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AD/CVD Operations
A-SMACC's Business Proprietary Information
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The Honorable Gina M. Raimondo
Secretary of Commerce
International Trade Administration
Attn: Enforcement and Compliance
APO/Dockets Unit, Room 18022
U.S. Department of Commerce
14th Street and Constitution Avenue, NW
Washington, DC 20230

Re: ***Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China*:** Request for Circumvention Ruling Pursuant to Section 781(b) of the Tariff Act of 1930

Dear Secretary Raimondo:

On behalf of the American Solar Manufacturers Against Chinese Circumvention ("A-SMACC"), including domestic [ ], domestic [ ], and domestic [ ], we respectfully request that the U.S. Department of Commerce (the "Department") determine, pursuant to section 781(b) of the Tariff Act of 1930 (the "Act"), *codified as amended at* 19 U.S.C. § 1677j(b), that imports from certain producers of crystalline silicon photovoltaic ("CSPV") cells and modules from the People's Republic of China ("China") that are completed in Malaysia prior to exportation to the United States are circumventing the antidumping ("AD") and countervailing duty ("CVD") orders on imports of CSPV cells, whether or not assembled into modules, from China (collectively, the "Orders").[1] A-SMACC is a domestic interested party pursuant to 19 C.F.R. § 351.102(b)(17) and 19 U.S.C. § 1677(9)(F). [ ] are interested parties within the meaning of 19 U.S.C. § 1677(9)(C), [ ].

As discussed below, information reasonably available to A-SMACC demonstrates that certain Chinese producers are diverting Chinese-origin components through Malaysia to undergo minor processing to complete CSPV cells and modules subject to the Orders and subsequently to export the merchandise to the United States to avoid AD/CVD duties. Specifically, certain companies are completing the production of CSPV cells in Malaysia using wafers manufactured in China from Chinese polysilicon with additional Chinese-origin components and then exporting the cells to the United States or assembling such cells into modules with additional Chinese-origin components before exporting to the United States. These companies are Jinko Solar Technology Sdn. Bhd. ("Jinko Solar Malaysia"), a subsidiary of Chinese producer JinkoSolar Holding Co., Ltd. ("Jinko Solar Group" or "Jinko Solar");[2] LONGi (Kuching) Sdn. Bhd. ("LONGi Malaysia"), a subsidiary of Chinese producer LONGi Green Energy Technology Co., Ltd. ("LONGi Group" or "LONGi");[3] and JA Solar (Malaysia) Co., Ltd. or JA Solar Malaysia Sdn. Bhd. (collectively

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1 *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 77 Fed. Reg. 73,018 (Dep't Commerce Dec. 7, 2012) (amended final deter. of sales at less than fair value, and antidumping duty order) ("AD Order"); *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 77 Fed. Reg. 73,017 (Dep't Commerce Dec. 7, 2012) (countervailing duty order) ("CVD Order").

2 Jinko Solar Group Website Excerpts, attached at **Exhibit 9**; Jinko Solar Malaysia 2019 Financial Statements, attached at **Exhibit 2**.

3 LONGi Group 2020 Annual Report, excerpts attached at **Exhibit 3**; LONGi Malaysia 2019 Financial Statements, attached at **Exhibit 4**.

"JA Solar Malaysia"), the Malaysian base of Chinese producer JA Solar Technology Co., Ltd. ("JA Solar").[4] These companies are subject to high AD/CVD rates under the Orders.[5]

China's dominance in the global supply chain for CSPV products has grown significantly in recent years and is well documented in the industry. Following the imposition of AD/CVD duties on Chinese-origin solar cells, Chinese integrated producers started building cell and module assembly plants across Southeast Asia, while continuing to rely heavily on Chinese labor, raw materials, and inputs. Chinese producers have developed a circumvention scheme that involves moving the end of the production process for CSPV products, which entails only minor processing, to a third country for the express purpose of avoiding AD/CVD duties, while at the same time retaining as much of the subsidized supply chain and labor as possible in China.[6] As described below, an assessment of global capital expenditures for ingots, wafers, CSPV cells, and modules as a whole shows that China's share of global capital expenditures continues to grow and to dwarf

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4 JA Solar Website Excerpts, attached at **Exhibit 5**.

5 The current AD China-wide rate is 238.95 percent. *See Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 85 Fed. Reg. 79,165, 79,167 (Dep't Commerce Dec. 9, 2020) (notice of correction to the final results of the 2017-2018 antidumping duty admin. rev.). Certain Jinko Solar companies and certain JA Solar companies received 95.50 percent AD rates in the last completed AD review. *See id.* at 79,166-67. In the AD review for the period December 1, 2015 through November 30, 2016, LERRI Solar Technology Co., Ltd. (aka LONGi Solar Technology Co. Ltd.) received an AD rate of 15.85 percent. *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 83 Fed. Reg. 35,616, 35,618 (Dep't Commerce July 27, 2018) (final results of antidumping duty admin. rev. and final deter. of no shipments; 2015-2016). The CVD all others rate is 15.24 percent. *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 77 Fed. Reg. 63,788, 63,789 (Dep't Commerce Oct. 17, 2012) (final affirm. countervailing duty deter. and final affirm. critical circumstances deter.). In the last completed CVD review, certain JA Solar companies received a 14.43 percent CVD rate and certain Jinko Solar companies received the non-selected CVD rate of 11.97 percent. *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 86 Fed. Reg. 17,356, 17,357 (Dep't Commerce Apr. 2, 2021) (notice of amended final results of the 2017 countervailing duty admin. rev.).

6 For instance, in discussing the company's investment in a Malaysian facility, a representative of JA Solar asserted that while raw materials such as silicon wafers were being imported from China, the finished product from Penang comprising solar cells and modules would not be subject to duties. *See* Sangeetha Amarthalingam, *JA Solar to Begin Exporting Solar Cells from Malaysia Next Month*, The Edge Markets (Oct. 21, 2015), attached at **Exhibit 6**.

the rest of the world.[7] For example, in 2020, China accounted for [ ] of global polysilicon capacity,[8] and [ ] of global ingot and solar wafer capacity.[9] In terms of production, China accounted for approximately 80 percent of solar-related polysilicon production in 2020,[10] and 95 percent of global production of wafers in 2019.[11] Chinese companies have made the bare minimum investment outside of China in order to be able to avoid AD/CVD duties, while the vast majority of investments and expenditures remain in China. Industry experts also confirm that the majority of CSPV products imported into the United States arrive from Southeast Asia post-assembly (with most of the assembly plants being owned by Chinese firms), but "70% of the actual value of that equipment accrues to China where key, pre-assembly steps in the making of the equipment take place, including production of solar-grade silicon, ingots, wafers and cells."[12] For this reason, generally, production costs from "Southeast Asian nations account for just 27% of the value of a typical PV module exported to the U.S., despite those nations being most likely to be the last port of call before final, assembled equipment arrives in the U.S."[13] As discussed below, an assessment of the statutory factors demonstrates that the Department should determine that imports of CSPV cells and modules produced and/or exported by these companies

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7 *See Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled Into Other Products: Monitoring Developments in the Domestic Industry*, Inv. No. TA-201-075, USITC Pub. 5021 (Feb. 2020) (Monitoring) ("USITC Pub. 5021") at F-26 – F-27, excerpts attached at **Exhibit 7**.

8 [ ], excerpts attached at **Exhibit 8**; Expert Report at 4, attached at **Exhibit 1**.

9 [ ], excerpts attached at **Exhibit 8**. [ ].

10 Expert Report at 4, attached at **Exhibit 1**.

11 *Id.* at 7.

12 *Solar PV Trade and Manufacturing: A Deep Dive*, BloombergNEF (Feb. 2021) at 22, excerpts attached at **Exhibit 10**.

13 *Id.*

in Malaysia are circumventing the Orders and that such imports should be included within the scope of the Orders.

A-SMACC requests that the Department initiate an anti-circumvention inquiry on imports of CSPV cells and modules from Malaysia that are produced and/or exported by the companies subject to this request and simultaneously issue an affirmative preliminary circumvention determination as soon as possible to provide the domestic industry with the relief to which it is entitled to under these Orders.

I. BACKGROUND

The AD and CVD investigations on imports of CSPV cells, whether or not assembled into modules, from China, were initiated on November 8, 2011.[14] On October 17, 2012, the Department published its final determination that subject merchandise was being sold, or was likely to be sold, in the United States at less than fair value.[15] On the same day, the Department issued a final determination that countervailable subsidies were being provided to producers and exporters of subject merchandise.[16] Following the U.S. International Trade Commission's ("Commission") determination that the domestic industry was materially injured by reason of imports of subject

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14 *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 76 Fed. Reg. 70,960 (Dep't Commerce Nov. 16, 2011) (initiation of antidumping duty investigation); *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 76 Fed. Reg. 70,966 (Dep't Commerce Nov. 16, 2011) (initiation of countervailing duty investigation).

15 *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China*, 77 Fed. Reg. 63,791 (Dep't Commerce Oct. 17, 2012) (final deter. of sales at less than fair value, and affirm. final deter. of critical circumstances, in part).

16 *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 77 Fed. Reg. 63,788 (Dep't Commerce Oct. 17, 2012) (final affirm. countervailing duty deter. and final affirm. critical circumstances deter.).

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merchandise,[17] the Department imposed the AD and CVD orders on December 7, 2012.[18] On March 20, 2019, after the completion of the first sunset review of the Orders by the Department and the Commission, the Department published the continuation of both the AD and CVD orders.[19]

The scope of the Orders provides that:

> The merchandise covered by this order is crystalline silicon photovoltaic cells, and modules, laminates, and panels, consisting of crystalline silicon photovoltaic cells, whether or not partially or fully assembled into other products, including, but not limited to, modules, laminates, panels and building integrated materials.
>
> This order cover{s} crystalline silicon photovoltaic cells of thickness equal to or greater than 20 micrometers, having a p/n junction formed by any means, whether or not the cell has undergone other processing, including but not limited to, cleaning, etching, coating, and/or addition of materials (including, but not limited to, metallization and conductor patterns) to collect and forward the electricity that is generated by the cell.
>
> Merchandise under consideration may be described at the time of importation as parts for final finished products that are assembled after importation, including, but not limited to, modules, laminates, panels, building-integrated modules, building-integrated panels, or other finished goods kits. Such parts that otherwise meet the definition of merchandise under consideration are included in the scope of this order.
>
> Excluded from the scope of this order are thin film photovoltaic products produced from amorphous silicon (a-Si), cadmium telluride (CdTe), or copper indium gallium selenide (CIGS).
>
> Also excluded from the scope of this order are crystalline silicon photovoltaic cells, not exceeding 10,000 mm in surface area, that are permanently integrated into a consumer good whose function is other than power generation and that consumes the electricity generated by the integrated crystalline silicon photovoltaic cell. Where more than one cell is permanently integrated into a consumer good, the

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17 *Crystalline Silicon Photovoltaic Cells and Modules From China*, 77 Fed. Reg. 72,884 (Int'l Trade Comm'n Dec. 6, 2012).

18 AD Order, 77 Fed. Reg. at 73,018; CVD Order, 77 Fed. Reg. at 73,017.

19 *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 84 Fed. Reg. 10,300 (Dep't Commerce Mar. 20, 2019) (continuation of antidumping duty order); *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 84 Fed. Reg. 10,299 (Dep't Commerce Mar. 20, 2019) (continuation of countervailing duty order).

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surface area for purposes of this exclusion shall be the total combined surface area of all cells that are integrated into the consumer good.

Additionally, excluded from the scope of this order are panels with surface area from 3,450 mm to 33,782 mm with one black wire and one red wire (each of type 22 AWG or 24 AWG not more than 206 mm in length when measured from panel extrusion), and not exceeding 2.9 volts, 1.1 amps, and 3.19 watts. For the purposes of this exclusion, no panel shall contain an internal battery or external computer peripheral ports.

Also excluded from the scope of this order are:

1) Off grid CSPV panels in rigid form with a glass cover, with the following characteristics:
   (A) a total power output of 100 watts or less per panel;
   (B) a maximum surface area of 8,000 cm^2 per panel;
   (C) do not include a built-in inverter;
   (D) must include a permanently connected wire that terminates in either an 8mm male barrel connector, or a two-port rectangular connector with two pins in square housings of different colors;
   (E) must include visible parallel grid collector metallic wire lines every 1-4 millimeters across each solar cell; and
   (F) must be in individual retail packaging (for purposes of this provision, retail packaging typically includes graphics, the product name, its description and/or features, and foam for transport); and

2) Off grid CSPV panels without a glass cover, with the following characteristics:
   (A) a total power output of 100 watts or less per panel;
   (B) a maximum surface area of 8,000 cm per panel;
   (C) do not include a built-in inverter;
   (D) must include visible parallel grid collector metallic wire lines every 1-4 millimeters across each solar cell; and
   (E) each panel is
      1. permanently integrated into a consumer good;
      2. encased in a laminated material without stitching, or
      3. has all of the following characteristics: (i) the panel is encased in sewn fabric with visible stitching, (ii) includes a mesh zippered storage pocket, and (iii) includes a permanently attached wire that terminates in a female USB-A connector.

Modules, laminates, and panels produced in a third-country from cells produced in China are covered by this order; however, modules, laminates, and panels produced in China from cells produced in a third-country are not covered by this order.

> Merchandise covered by this order is currently classified in the Harmonized Tariff System (HTS) of the United States under subheadings 8501.61.0010, 8507.20.80, 8541.40.6015, 8541.40.6025, and 8501.31.8010. These HTSUS subheadings are provided for convenience and customs purposes; the written description of the scope of this order is dispositive.[20]

The Department has found that cells manufactured in China, modules manufactured in China with Chinese cells, and modules manufactured in third countries from Chinese cells are subject to the Orders.

Since the imposition of the Orders, U.S. imports of CSPV cells and modules from China have declined significantly. For instance, from 2011, the year the petitions were filed in the underlying investigations, to 2020, the value of Chinese imports decreased 86 percent, from $2.8 billion to $392 million.[21] The sharp decline has continued into 2021, with less than $7.5 million of imports from China from January through May of this year.[22] At the same time, U.S. imports of CSPV cells and modules from Malaysia have surged. In 2011, the United States imported a mere $576 million of CSPV cells and modules from Malaysia.[23] Since then, Malaysian imports

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[20] *See, e.g.*, Preliminary Decision Memorandum accompanying *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China*, 86 Fed. Reg. 21,277 (Dep't Commerce Apr. 22, 2021) (prelim. results of antidumping duty admin. rev., partial rescission of antidumping admin. rev., and prelim. deter. of no shipments; 2018-2019) at 3-5 (internal citations omitted).

[21] Official Import Statistics, attached at **Exhibit 11**. Merchandise subject to the Orders is provided for in HTS subheading 8541.40.60. "Within subheading 8541.40.60, subject merchandise was included in statistical reporting numbers 8541.40.6020 ('solar cells, assembled into modules or made up into panels') and 8541.40.6030 ('solar cells, other') through June 30, 2018. As of July 1, 2018, a superior text for crystalline silicon photovoltaic cells (described in statistical note 11 to chapter 85) applies to two subordinate reporting categories, 8541.40.6015 ('assembled into modules or made up into panels') and 8541.40.6025 ('other')." *See* USITC Pub. 5021 at I-15 – I-16, excerpts attached at **Exhibit 7**. A-SMACC provides official import data for HTS numbers 8541.40.6020 and 8541.40.6030 for the period from 2010 through June 30, 2018 and data for HTS numbers 8541.40.6015 and 8541.40.6025 for the period from July 1, 2018 to date. The HTS numbers through June 30, 2018, *i.e.*, 8541.40.6020 and 8541.40.6030 included thin film products.

[22] Official Import Statistics, attached at **Exhibit 11**.

[23] *Id.*

dramatically increased, to more than $2.3 billion in 2020.[24] This trend has continued into 2021, with more than $900 million of imports in just the first five months of the year.[25] Notably, in ten years, Malaysian import value share of CSPV cells and modules went from accounting for a 5.5 percent value share of total U.S. imports in 2010 to nearly 34.8 percent in the first five months of 2021.[26] As detailed below, the evidence indicates that these imports include CSPV cells and modules that are circumventing, and should be included within, the scope of the Orders.

II. DESCRIPTION OF THE PRODUCT AND MANUFACTURING PROCESS

CSPV cells use crystalline silicon to convert sunlight to electricity, and have a positive layer, a negative layer, and a positive-negative junction ("p/n junction").[27] Electricity is generated when sunlight strikes the CSPV cell, knocking electrons loose that flow onto thin metal "fingers" that run across the CSPV cell and conduct electricity to the busbars.[28] CSPV cells are a primary component of CSPV modules (also called panels), which in turn are the main components of CSPV systems.[29] CSPV laminates consist of CSPV cells that are connected, encapsulated in an ethyl vinyl acetate ("EVA") film, and covered with a glass front sheet and a back sheet.[30] The back sheet is most commonly a plastic film composite, but glass is also used on the back of the module in some applications, like bifacial modules, to improve efficiency.[31] CSPV modules typically are

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24 *Id.*

25 *Id.*

26 *Id.*

27 *Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190, USITC Pub. 4874 (Mar. 2019) (Review) ("USITC Pub. 4874") at I-30, excerpts attached at **Exhibit 12**.

28 *Id.*

29 *Id.*

30 *Id.* at I-31.

31 *Id.*

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comprised of the laminate that is framed in aluminum and attached to a junction box.[32] CSPV modules can be used in both ground-mounted and rooftop-mounted systems.[33] In addition, CSPV modules can be used in both the off-grid market segment and the three on-grid market segments – residential, nonresidential, and utility.[34] The junction box of CSPV modules can be connected to other modules, an inverter (which converts the direct current generated by the system to alternating current), or, in the case of off-grid modules, a battery and a charge controller (which controls battery charging).[35] In addition to standard size modules, CSPV cells can be used in building-integrated PV.[36] Solar CSPV systems convert sunlight into electricity for on-site use or for distribution through the electric grid.[37] The two main types of CSPV cells and modules are monocrystalline silicon and multicrystalline (or polycrystalline) silicon, with various products within these two categories.[38] Within these two categories, there are a number of cell and module technologies.[39]

There are five main stages in the manufacturing process for CSPV products.[40] Polysilicon is refined, then it is formed into ingots, which are sliced into wafers, doped and converted into CSPV cells, and then assembled into modules.[41] A large part of the process involves procurement

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32 *Id.* at I-32.

33 *Id.*

34 *Id.*

35 *Id.*

36 *Id.* at I-38.

37 *Id.* at I-30.

38 *Id.* at I-33.

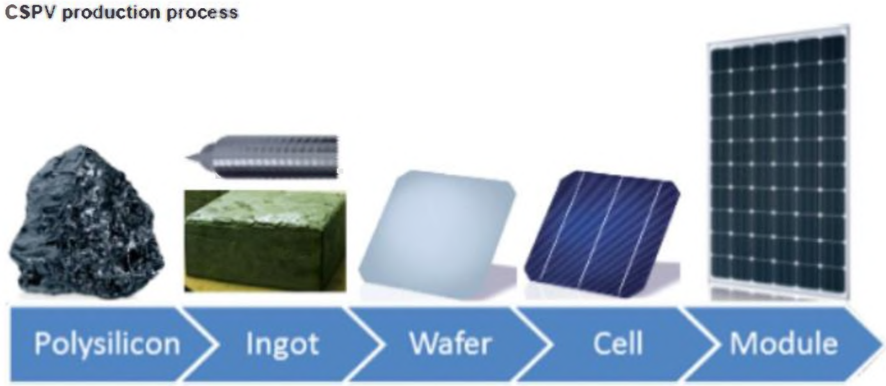
39 *Id.* at I-35 – I-38.

40 *Id.* at I-43.

41 *Id.*

of the polysilicon itself. These are discrete production steps that may occur in different plants or locations, and producers may source products at each stage of the value chain or produce the products in-house.[42] CSPV cells and modules are tested and inspected at various points during the production process.[43]

CSPV production process



Note.--For ingots, the top picture is a crystal used in monocrystalline wafers, while the bottom picture is an ingot used in making multicrystalline wafers.

Source: SolarWorld, "Energy for You and Me" brochure, pp. 6–7, 9; ingot photo courtesy of DOE/NREL, credit John Wohlgemuth, Solarex, https://www.nrel.gov/.

Source: USITC Pub. 4874 at I-44, excerpts attached **Exhibit 12**.

The first stage in the manufacturing process is refining polysilicon. This is an extremely important step, requiring very high levels of energy, labor, and capital investment (approximately $1.4 billion for a largescale polysilicon production factory).[44] Indeed, the capital cost requirements for polysilicon are the most significant in the PV module supply chain.[45] Polysilicon is the primary raw material in the production of CSPV cells.[46] Polysilicon and wafers have higher technical

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42 *Id.*

43 *Id.*

44 *See* Expert Report at 6, attached at **Exhibit 1**.

45 *Id.*

46 USITC Pub. 5021 at I-7, excerpts attached at **Exhibit 7**.

hurdles and factories are larger, more expensive and time-consuming to build compared to the downstream production stages,[47] and as discussed below, polysilicon facilities require very substantial investments. There are multiple approaches to polysilicon refining.[48] The Siemens method accounted for more than 85 percent of global production in 2017.[49] The fluidized bed reactor ("FBR") technology accounts for most of the remaining market.[50]

> In the first step in the Siemens process, quartz (silicon dioxide) and carbon are heated to around 1,800 degrees Celsius. The carbon reacts with the oxygen, resulting in carbon dioxide and silicon with a purity of around 98 to 99 percent. The silicon is then combined with hydrogen chloride gas at 300 to 350 degrees Celsius, with the reaction resulting in the liquid trichlorosilane. Next, heated silicon rods are inserted into a Siemens reactor, where they are further heated to 1,000 degrees Celsius or more. Hydrogen and trichlorosilane gas are fed into the reactor. The silicon from the trichlorosilane is deposited onto the rods, which steadily increase in size until they are removed from the reactor about a week later. The resulting products are high purity polysilicon chunks or rocks.
>
> Instead of inserting rods, "FBR uses seed granules of purified silicon. The seed granules are fed into a chamber that has heated silane gas entering from below and exiting above. The flow of gas 'fluidizes' the silicon granules, causing them to flow like a liquid, as the silane gas breaks down and deposits silicon layers on them. The granules grow larger and heavier and exit when they are sufficiently large. As they do so, new seed granules and gas are introduced into the chamber and the process continues." The FBR process, which is newer than the Siemens process, uses 80 to 90 percent less energy, requires a smaller footprint, is a continuous process, takes up less space in shipping, and can increase downstream production efficiency. However, the process is difficult to scale and achieve high purity production at low cost.[51]

In the Czochralski process for producing crystals used in monocrystalline wafers:

> {P}olysilicon rocks are first placed into a quartz crucible along with a small amount of boron, which is used to provide a positive electric orientation . . . . The crucible

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47 *Solar PV Trade and Manufacturing: A Deep Dive*, BloombergNEF (Feb. 2021) at 4, excerpts attached at **Exhibit 10**.

48 USITC Pub. 4874 at I-44, excerpts attached at **Exhibit 12**.

49 *Id.*

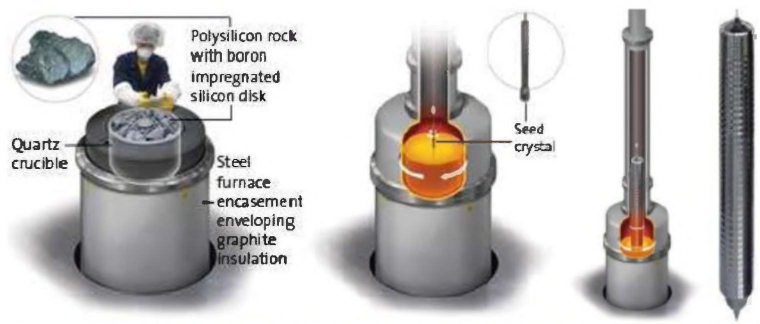
50 *Id.*

51 *Id.* at I-44 – I-45 (internal citations omitted).

is then loaded into a Czochralski furnace and heated to about 2,500 degrees Fahrenheit. Once the polysilicon is melted, a seed crystal is lowered into the material and rotated, with the crucible rotated in the opposite direction. The melt starts to solidify on the seed and the seed is slowly raised out of the melt – creating a single long crystal. The crystal is then cooled before it is moved onto the next step. The process of growing the crystal takes about 2.5 days.

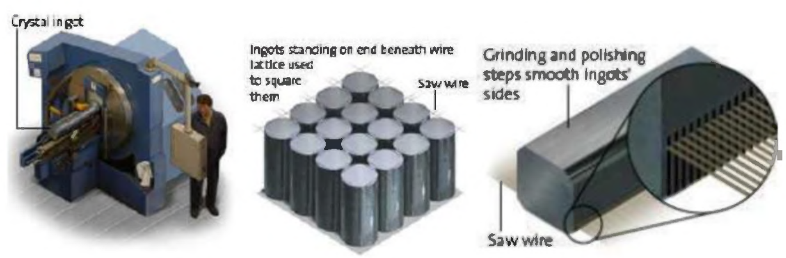
Once the crystal has cooled, it is processed into wafers. The top and tail (each end of the cylindrical crystal) are cut off . . . . The remaining portion of the crystal (or ingot) is cut into equal length pieces and then it is squared. In squaring, the rounded sides of the ingot are cut into four flat sides, leaving only rounded corners. A wire saw then slices the ingots into wafers. A majority of global manufacturers have switched to diamond wire saws for monocrystalline wafer slicing, which has several benefits including increasing the speed of the production process. The wafers are then cleaned, dried, and inspected.[52]

Czochralski process, crucible loading/charging (left), seed crystal (second from left), crystal growing (second from right), and finished crystal (right)



Source: SolarWorld Website, https://www.solarworld-usa.com/solar-101/making-solar-panels, retrieved July 15, 2017.

Figure I-15
Wafer production: Cutting off the top and tail (left), squaring (middle), and slicing into wafers (right)



Source: SolarWorld Website, https://www.solarworld-usa.com/solar-101/making-solar-panels, retrieved July 15, 2017.

Source: USITC Pub. 4874 at I-46, excerpts attached **Exhibit 12**.

[52] *Id.* at I-45 (internal citations omitted).

The second stage involves forming the refined polysilicon into ingots. The third stage involves slicing the ingots into wafers. These processes often result in high yield losses which add significantly to the overall costs. The ingot and wafer production processes are different for monocrystalline and multicrystalline cells.

For multicrystalline ingots:

> {T}he first step is also loading polysilicon into a crucible. This crucible is then loaded into a directional solidification systems ("DSS") furnace, where it is cast into ingots. The ingot is then cut into blocks. These blocks are tested and any parts of the block that do not pass these tests are cropped off. The blocks are sliced into wafers using a wire saw. Finally, the wafers are cleaned, dried, and inspected. This process results in square wafers, while the monocrystalline process results in wafers with rounded corners.[53]

According to an industry expert, "{t}he wafer is the most critical component with respect to PV module performance."[54]

The fourth stage involves processing the wafers into CSPV cells.[55] The cell manufacturing process varies by company and technology.[56] In addition, some firms use a highly automated

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53 *Id.* at I-46 – I-47. *See also* Expert Report at 7-9, attached at **Exhibit 1**.

54 Expert Report at 7, attached at **Exhibit 1**.

55 A-SMACC submits that wafers from China that have already been doped and contain a p/n junction, which are then shipped to Malaysia for finishing prior to export to the United States, are already in-scope merchandise and should be subject to duties, consistent with the Department's recent scope rulings. *See* Memorandum from Lauren Caserta, Int'l Trade Compliance Analyst, Off. VII, AD/CVD Operations, through Melissa G. Skinner, Senior Director, Off. VII, AD/CVD Operations, to James Maeder, Deputy Assistant Sec'y for AD/CVD Operations, re: *Final Scope Ruling on the Antidumping and Countervailing Duty Orders on Crystalline Silicon Photovoltaic Cells from the People's Republic of China: ET Solar Inc.* (June 15, 2021) (PUBLIC VERSION) ("ET Solar Scope Ruling"), attached at **Exhibit 13**; Memorandum from Peter Shaw, Int'l Trade Compliance Analyst, AD/CVD Operations, through Melissa G. Skinner, Senior Director, Off. VII, AD/CVD Operations, to James Maeder, Deputy Assistant Sec'y for AD/CVD Operations, re: A*ntidumping and Countervailing Duty Orders on Crystalline Silicon Photovoltaic Cells from the People's Republic of China, and Certain Crystalline Silicon Photovoltaic Products from Taiwan: The Solaria Corporation Scope Ruling* (Apr. 8, 2021) ("Solaria Scope Ruling"), attached at **Exhibit 14**. To the extent such merchandise is not already considered subject, and to the extent that Chinese wafers that do not yet contain a p/n junction and/or other Chinese inputs are being used in the production processes described herein, such merchandise is circumventing the Orders.

56 USITC Pub. 4874 at I-47, excerpts attached at **Exhibit 12**.

manufacturing process, while others mix automation and manual labor in their production processes.[57] The main steps in the process are as follows:

- **Cleaning and texturing:** First, the wafers are cleaned, then the surface of the wafer undergoes a chemical treatment that reduces the reflection of sunlight and increases light absorption . . . .
- **Diffusion:** In the next step, "phosphorus is diffused into a thin layer of the wafer surface. The molecular-level impregnation occurs as the wafer surface is exposed to phosphorus gas at a high heat, a step that gives the surface a negative potential electrical orientation. The combination of that layer and the boron-doped layer below creates a positive-negative, or p/n, junction – a critical partition in the functioning of a PV cell."[58]
- **Edge isolation:** A thin layer of silicon is then removed from the edge of the CSPV cell to separate the positive and negative layers.
- **Coating:** Next, a silicon nitride antireflective coating is added to the PV cells to increase the absorption of sunlight.
- **Printing:** Metals are then printed on the solar CSPV cell to collect the electricity. On the front of the CSPV, these metals are printed in thin metal strips called fingers, which are connected to the rest of the module via busbars. A metal layer, typically aluminum, is also printed on the back of the CSPV cell.
- **Co-firing:** The CSPV cells then enter a furnace, where the "high temperature causes the silver paste to become imbedded in the surface of the silicon layer, forming a reliable electrical contact."
- **Testing and sorting:** The final step in the process is the testing and sorting of the CSPV cells based on their characteristics and efficiency.[59]

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57 *Id.*

58 Based on the Department's scope rulings, by this point in the process (creation of the p/n junction), the wafer is now considered a solar cell and therefore merchandise subject to the scope of these investigations.

59 USITC Pub. 4874 at I-47, excerpts attached at **Exhibit 12** (internal citations omitted).

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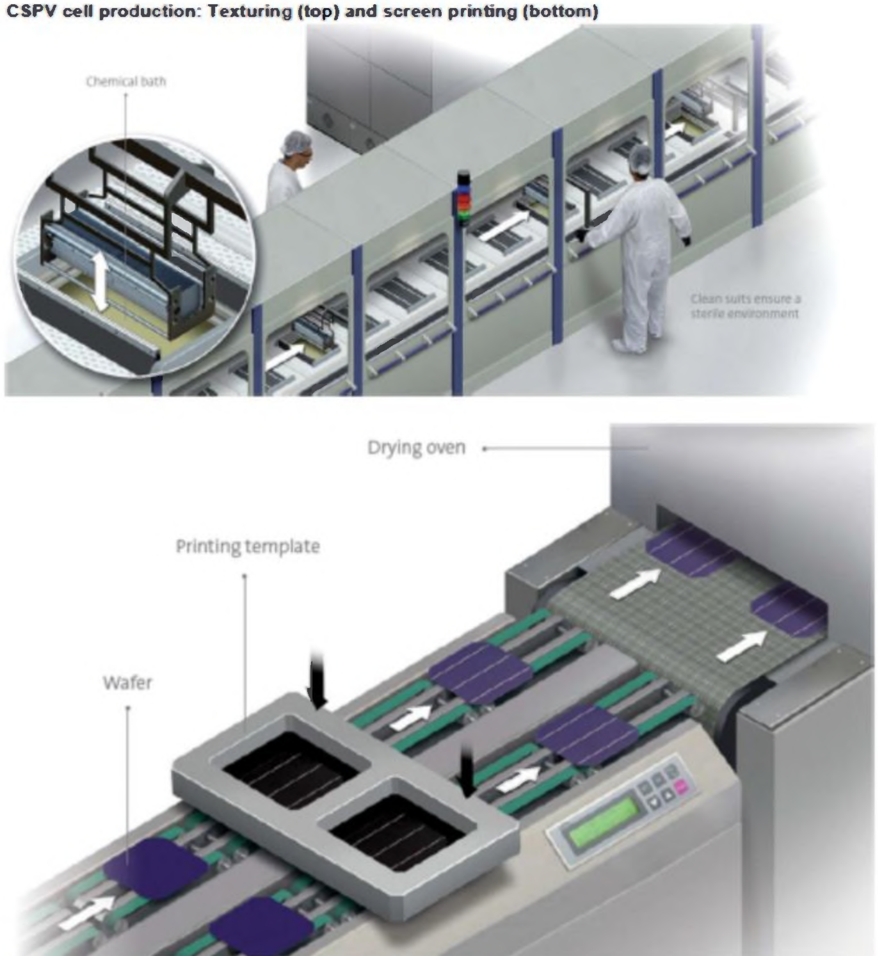
CSPV cell production: Texturing (top) and screen printing (bottom)



Source: SolarWorld, "Energy for You and Me" brochure, pp. 12–13.

Source: USITC Pub. 4874 at I-48, excerpts attached **Exhibit 12**.

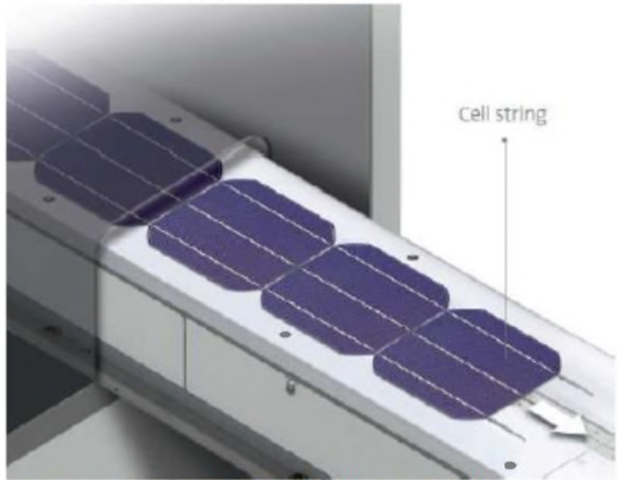
The fifth and last stage involves assembling the CSPV cells into modules. The extent of automation and manual labor involved in module assembly varies depending on the producer.[60] Generally during the assembly process:

> a string of CSPV cells is soldered together. . . . A piece of glass is placed on the production line, on top of which is added a piece of {EVA}. The CSPV cells are laid out in a rectangular matrix that will provide the appropriate wattage and power requirements. Typically, a sealant is added, often EVA, and a back sheet is added. The CSPV cells are then laminated in a vacuum and are cured. At this stage, the CSPV cells are referred to as a "laminate." Frames are then usually attached to the

60 *Id.* at I-49.

laminate, and a junction box is attached to the back. In the final step, modules are cleaned and inspected.[61]

Soldering CSPV cells together into strings



Source: SolarWorld, "Energy for You and Me" brochure, pp. 12–13.

Source: USITC Pub. 4874 at I-49, excerpts attached **Exhibit 12**.

III. <u>IMPORTS OF CSPV CELLS AND MODULES COMPLETED IN MALAYSIA ARE CIRCUMVENTING THE ORDERS</u>

Congress has provided the Department with the necessary tools to combat the circumvention of AD/CVD duties.[62] The statute expressly contemplates that it may be necessary to include within the scope of an AD/CVD order merchandise that has been completed or assembled in another foreign country before being imported into the United States. Specifically, section 781(b)(1) of the Act provides with respect to merchandise assembled or completed in a third country that if (A) the merchandise imported into the United States is of the same class or kind as merchandise produced in the foreign country that is subject to the existing order; (B) before importation into the United States, such merchandise is completed or assembled in another foreign country from merchandise which is (i) subject to such order, or (ii) produced in the foreign country

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61 *Id.* (internal citations omitted).

62 *See Deacero S.A. de C.V. v. United States*, 817 F.3d 1332, 1337 (Fed. Cir. 2016).

with respect to which such order applies; (C) the process of assembly or completion in the third country is minor or insignificant; (D) the value of the merchandise produced in the foreign country to which the order applies is a significant portion of the total value of the merchandise exported to the United States; and (E) the Department determines that action is appropriate to prevent evasion of such order, the agency may include such imported merchandise within the scope of the existing order, after taking into account any advice provided by the Commission pursuant to section 781(e) of the Act.[63] While A-SMACC recognizes that the Department has previously found that solar cells/modules produced in a third country (Vietnam) from raw wafers imported from China without a p/n junction are not subject to the scope of the Orders, as the Department has previously explained, the agency's practice for determining substantial transformation in country-of-origin determinations is distinct from its practice under section 781 of the Act of determining whether merchandise being completed or assembled into a product in a third country is circumventing an AD/CVD order.[64] For instance, in *Cold-Rolled Steel from Korea*, the Department found that because the analyses are distinct, a finding that the process of finishing hot-rolled steel or cold-rolled steel into corrosion-resistant steel products constitutes substantial transformation does not preclude finding that the process is minor or insignificant in an analysis under section 781(b) of

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63 *See* 19 U.S.C. §1677j(b)(1). The legislative history to section 781(b) of the Act indicates that Congress intended the Department to make circumvention determinations on a case-by-case basis, in recognition that the facts of individual cases and the nature of specific industries are widely variable. *See* Preliminary Decision Memorandum accompanying *Certain Cold-Rolled Steel Flat Products From the Republic of Korea*, 84 Fed. Reg. 32, 875 (Dep't Commerce July 10, 2019) (affirm. prelim. deter. of anti-circumvention inquiries on the antidumping duty and countervailing duty orders) ("CR from Korea PDM") at 11 n.49 (citing S. Rep. No. 103-412, at 81-82 (1994)).

64 Issues and Decision Memorandum accompanying *Certain Cold-Rolled Steel Flat Products From the Republic of Korea*, 84 Fed. Reg. 70,934 (Dep't Commerce Dec. 26, 2019) (affirm. final deter. of circumvention of the antidumping and countervailing duty orders) ("Cold-Rolled from Korea IDM") at cmt. 9; *see also* Issues and Decision Memorandum accompanying *Diamond Sawblades and Parts Thereof From the People's Republic of China*, 84 Fed. Reg. 33,920 (Dep't Commerce July 16, 2019) (final deter. of anti-circumvention inquiry) at cmt. 4.

the Act.[65] In fact, the Court of Appeals for the Federal Circuit has explained that if the Department "applies the substantial transformation test and concludes that the imported article has a country of origin different from the country identified in an AD or CVD order, then {the Department} can include such merchandise within the scope of an AD and CVD order only if it finds circumvention under {section 781(b) of the Act}."[66]

In determining whether the process of assembly or completion in the third country is minor or insignificant, the Department must take into account: (A) the level of investment in the foreign country; (B) the level of research and development in the foreign country; (C) the nature of the production process in the foreign country; (D) the extent of production facilities in the foreign country, and; (E) whether the value of the processing performed in the foreign country represents a small proportion of the value of the merchandise imported into the United States.[67]

The statute also directs the Department to consider additional factors in determining whether to include merchandise assembled or completed in a foreign country under the order at issue, such as the pattern of trade, including sourcing patterns; whether the manufacturer or exporter of the merchandise that is subject to the order at issue or produced in the country with respect to which such order applies is affiliated with the person who uses that merchandise to assemble or complete in the foreign country the merchandise that is subsequently imported into

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65 Cold-Rolled from Korea IDM at 43.

66 *Id.* at 47 (citing *Bell Supply Co. v. United States*, 888 F.3d 1222, 1230 (Fed. Cir. 2018)).

67 19 U.S.C. §1677j(b)(2). Although the Department must consider all five factors in its analysis, no single factor is dispositive, and the agency's practice is to evaluate each of these five factors as they exist in the third country, depending on the totality of the circumstances of the particular inquiry. *See* 19 C.F.R. § 351.225(h); *U.K. Carbon and Graphite Co. v. United States*, 931 F. Supp. 2d 1322, 1335 (Ct. Int'l Trade 2013) ("The Court notes that the five factors {in 19 U.S.C. § 1677j(b)(2)(A)-(E)} are to be separately taken into consideration, as appropriate, and their totality weighed."); CR from Korea PDM at 11.

the United States; and whether imports into the third country of the merchandise that is subject to the order at issue or produced in the country with respect to which such order applies have increased after initiation of the underlying investigation which resulted in the issuance of the order at issue.[68] An assessment of these statutory factors demonstrates that the CSPV cells and/or modules completed in Malaysia by Jinko Solar Malaysia, LONGi Malaysia, and JA Solar Malaysia using Chinese-origin components are circumventing, and thus should be included within the scope of, the Orders.

A. The Merchandise Imported into the United States is of the Same Class or Kind as Merchandise Produced in China that is Subject to the Orders

The merchandise imported into the United States completed by Jinko Solar Malaysia, LONGi Malaysia, and JA Solar Malaysia in the third country are CSPV cells and/or modules that are identical to the CSPV cells and modules from China that are subject to the Orders. Chinese-origin components are being shipped to Malaysia to be completed into CSPV cells and modules for the express purpose of avoiding AD/CVD duties. But for the desire to circumvent the Orders, the final production stages for the CSPV cells and modules would take place in China. Specifically, [ ] indicate that Jinko Solar Malaysia and LONGi Malaysia exported merchandise described as solar cells, solar modules and bifacial solar modules to the United States, which meet the description of merchandise subject to the Orders.[69] In 2020, LONGi acquired Vina Solar Technology Company Limited and Vina Cell Technology Company Limited

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68 *See* 19 U.S.C. §1677j(b)(3).

69 [ ] Data, attached at **Exhibit 15**. [ ].

(collectively, "Vina Solar"),[70] a Vietnam-based solar cell and module producer.[71] Given this affiliation, shipments from LONGi Malaysia may be identified as produced or exported by LONGi, Vina Solar, or Vina Cell. A-SMACC requests that the Department investigate imports of cells/modules from Malaysia that are completed by LONGi Malaysia, regardless of whether LONGi, Vina Solar, or Vina Cell is named as the producer or exporter. Similarly, sources indicate that JA Solar Malaysia exports multi-crystalline solar cells to the United States, which also meets the description of subject merchandise.[72]

B. <u>The CSPV Cells and Modules Imported into the United States are Completed in Malaysia Using Chinese-Origin Components Prior to Importation into the United States</u>

Evidence reasonably available to A-SMACC demonstrates that before importation into the United States, Chinese-origin components are being completed into CSPV cells and/or modules in Malaysia. As detailed above, the production process for CSPV products generally includes the following main five stages: (1) polysilicon is refined, (2) the polysilicon is formed into ingots, (3) the ingots are sliced into wafers, (4) the wafers are converted to CSPV cells, and (5) the CSPV cells are assembled into modules. A-SMACC understands that certain companies are completing

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70 LONGi Group 2020 Annual Report at 5, 33, excerpts attached at **Exhibit 3**. LONGi's annual reports list Vina Cell and Vina Solar separately, describing Vina Cell's principal business as the manufacturing and sales of PV cells and Vina Solar's principal business as the manufacturing and sales of PV modules. *Id.* However, industry articles widely reference "Vina Solar," presumably referring to the two companies collectively and/or one of them individually. In addition, industry publication [ ]. [ ], excerpts attached at **Exhibit 8**. As such, A-SMACC refers to both Vina Solar and Vina Cell collectively, as Vina Solar.

71 Mark Osborne, *LONGi Solar Strikes Deal to Buy Vietnam-Based OEM Vina Solar*, PV Tech (Feb. 24, 2020), attached at **Exhibit 16**.

72 Sangeetha Amarthalingam, *JA Solar to Begin Exporting Solar Cells from Malaysia Next Month*, The Edge Markets (Oct. 21, 2015), attached at **Exhibit 6**; *see also* JA Solar Malaysia Datamyne Website Excerpts, attached at **Exhibit 17**. While JA Solar Malaysia is [ ], the company may be [ ] *See* [ ] Data, attached at **Exhibit 15**.

the production of CSPV cells and/or modules in the third country using Chinese-origin components in multiple ways to avoid AD/CVD duties. These include completing the production process through polysilicon refinement, ingot formation and the production of the wafers in China, after which the wafers are converted to CSPV cells in Malaysia using additional and substantial Chinese-origin components. At this point, the companies may export the completed CSPV cells to the United States or assemble the cells into modules using additional and substantial Chinese-origin components. In addition, the companies may be taking some of the preliminary steps for converting wafers to cells within China, after which only the remaining cell production steps and module assembly take place in the third country, again using additional and substantial Chinese-origin components, before the companies export the completed CSPV cells and/or modules to the United States. A-SMACC believes that the vast majority of the materials and equipment for the process of converting the Chinese wafers to CSPV cells are being sourced from China, including but not limited to: silane, phosphorus oxychloride (POCI3), aluminum and/or silver paste. Similarly, the vast majority of the materials and equipment for the process of converting the CSPV cells to modules are also being sourced from China, including but not limited to: solar glass, EVA, backsheet, aluminum frames, and junction boxes.

First, A-SMACC provides evidence indicating that each of the companies that is subject to this request obtains Chinese-origin wafers and/or cells to complete into CSPV cells or modules in the third country.

- **Jinko Solar** built a solar cell and module processing facility in Penang, Malaysia in 2015.[73] Jinko Solar does not produce polysilicon, ingots, or wafers in Malaysia.[74] Thus, the Malaysian facility must source wafers (produced from polysilicon ingots) from elsewhere. Jinko Solar produces silicon ingots and wafers in a number of facilities in China.[75] And the company has publicly stated that it has built a "vertically integrated solar power product value chain, manufacturing from silicon wafers to solar modules."[76] Jinko Solar also has stated that it "leverage{s} {its} vertically integrated platform and cost-efficient manufacturing capabilities in China to produce high quality products at competitive costs," and that its "solar cell and silicon wafer operations support {its} solar module production."[77] This suggests that Jinko Solar Malaysia obtains the upstream components used to complete the production in Malaysia of at least some of its CSPV cells and modules from its Chinese affiliates, placing them within the purview of this request. While Jinko Solar does not appear to refine polysilicon itself,[78] some if not all of the virgin polysilicon that it obtains to produce silicon ingots comes from Chinese suppliers.[79] For instance, industry publication [ ] reports that [ ].[80]

- **LONGi's** Malaysia facility is engaged in the manufacture and sale of solar ingots, wafers, cells, and modules.[81] While LONGi appears to produce some ingots and wafers in addition to cells and modules in Malaysia, it does not appear to have sufficient wafer production capacity to support all of its cells and module production capacity in Malaysia, and thus the company's production of ingots and wafers appears to be predominantly based in China. Specifically, LONGi appears to manufacture ingots and/or wafers at eight different locations in China, compared to just the Kuching

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73 *Jinkosolar Plans to Build a Cell & Module Manufacturing Facility in Penang, Malaysia*, Jinko Solar Holding Co., Ltd. (Mar. 19, 2015), excerpts attached at **Exhibit 18**.

74 *See* JinkoSolar Holding Co., Ltd., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2020) at 67, excerpts attached at **Exhibit 19**.

75 *See id.*

76 *Id.* at 88.

77 *Id.* at 63.

78 Jinko Solar has stated that it produces monocrystalline silicon ingots using silicon materials, consisting of virgin polysilicon feedstock and recovered silicon materials of various grades. The company also has stated that it processes recoverable silicon materials into recovered silicon materials. The company indicates that it purchases solar grade virgin polysilicon and recoverable silicon materials for its production. *Id.* at 65, 67, 69.

79 Jinko Solar has stated that it purchases solar grade virgin polysilicon from both domestic suppliers and foreign suppliers. *Id.* at 69.

80 [ ], excerpts attached at **Exhibit 20**.

81 LONGi Malaysia 2019 Financial Statements at 1, attached at **Exhibit 4**.

facilities in Malaysia.[82] As such, the information reasonably available indicates that for some of the CSPV modules exported from Malaysia, LONGi obtains Chinese-origin wafers. Indeed, LONGi Malaysia's 2019 financial statements list under "holding company and related party transactions" purchases of solar wafers, cells, and modules, further indicating that the Malaysian facility likely obtains some of these components from its affiliated companies in China.[83] While LONGi does not appear to refine polysilicon itself,[84] LONGi's suppliers of silicon material include a large number of Chinese suppliers.[85] According to industry publication [ ], LONGi's [ ].[86]

- **JA Solar Malaysia** launched a solar cell processing facility in Penang, Malaysia in 2015. JA Solar does not produce polysilicon, ingots, or wafers in Malaysia.[87] Thus, the Malaysian facility must source wafers (produced from polysilicon ingots) from elsewhere. JA Solar produces ingots and wafers in its Chinese facilities.[88] While JA Solar also appears to produce wafers in Vietnam, as of the end of 2020, JA Solar's production capacity for wafers in Vietnam was [ ], compared to [ ] in China.[89] And when the company first started exporting solar cells from Malaysia, the company stated that "raw materials such as silicon wafers were being imported from China . . . ."[90] It is reasonable to assume that for a substantial portion of the cells completed in Malaysia, JA Solar continues to use wafers that it produces in China. Furthermore, the Chinese producer has touted its vertically integrated production.[91] This suggests that JA Solar Malaysia obtains the upstream components used to

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[82] LONGi Group 2020 Annual Report at 13, 32-33, excerpts attached at **Exhibit 3**.

[83] LONGi Malaysia 2019 Financial Statements at 34, attached at **Exhibit 4**.

[84] LONGi Group 2020 Annual Report at 13, excerpts attached at **Exhibit 3**.

[85] *Id.* at 49-50, 68-69. The LONGi companies also appear to purchase silicon material from non-Chinese suppliers to supplement its supply from Chinese suppliers. *See* Mark Osborne, *LONGi Secures Major Polysilicon Supply Deal from OCI Malaysia and 46GW of Solar Glass from Flat Glass*, PV Tech (Feb. 10, 2021), attached at **Exhibit 21**.

[86] [ ], excerpts attached at **Exhibit 20**.

[87] [ ], excerpts attached at **Exhibit 8**; Mark Osborne, *JA Solar Adding 10,000MT of Monocrystalline Silicon Ingot Capacity*, PV Tech (Feb. 24, 2020), attached at **Exhibit 22**.

[88] JA Solar also produces a limited volume of wafers in Vietnam. For instance, JA Solar's year end wafer production capacity was [ ] in 2020 in Vietnam, while it was [ ] in China. [ ], excerpts attached at **Exhibit 8**.

[89] *Id.*

[90] Sangeetha Amarthalingam, *JA Solar to Begin Exporting Solar Cells from Malaysia Next Month*, The Edge Markets (Oct. 21, 2015), attached at **Exhibit 6**.

[91] Anu Bhambhani, *JA Solar to Expand Vertical Integrated Production Capacity of Ingot, Wafer, Solar Cell & Modules for RMB 10.39 Billion Investment*, Taiyang News (Sept. 17, 2020), attached at **Exhibit 23**.

> complete the production of at least some of its CSPV cells from its Chinese affiliates, placing them within the purview of this request. JA Solar does not appear to refine polysilicon itself, and obtains high-purity polysilicon from Chinese suppliers.[92] According to industry publication [ ], JA Solar had [
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>].[93]

A-SMACC submits that the CSPV cells and modules completed in Malaysia by Jinko Solar, LONGi, and JA Solar using Chinese-origin wafers and/or cells are circumventing the Orders. As demonstrated above, reasonably available evidence indicates that each of the companies that is subject to this request likely obtains Chinese-origin CSPV wafers – "the most critical component with respect to PV module performance."[94]

Indeed, China's dominance in the CSPV supply chain generally and in the polysilicon and wafer markets in particular is well known. China's production of polysilicon increased more than 450 percent from 2010 to 2018 and accounted for 58 percent of global production in 2019.[95] By last year, China accounted for approximately 80 percent of solar-grade polysilicon production worldwide.[96] Similarly, China's production of wafers increased more than 850 percent from 2010 to 2018 and accounted for **93 percent of global production** in 2018.[97] China's production of CSPV cells and modules both increased almost 700 percent from 2010 to 2018 and accounted for 73 percent and 72 percent of global production in 2018, respectively.[98] China's dominance of the

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92 Liam Stoker, *Daqo New Energy and JA Solar Pen Long-Term High-Purity Polysilicon Supply Deal*, PV Tech (May 12, 2021), attached at **Exhibit 24**; Tang Shihua, *China's JA Solar Inks Third Major Polysilicon Purchase Deal in a Month*, Yicai Global (May 13, 2021), attached at **Exhibit 25**.

93 [ ], excerpts attached at **Exhibit 20**.

94 Expert Report at 7, attached at **Exhibit 1**.

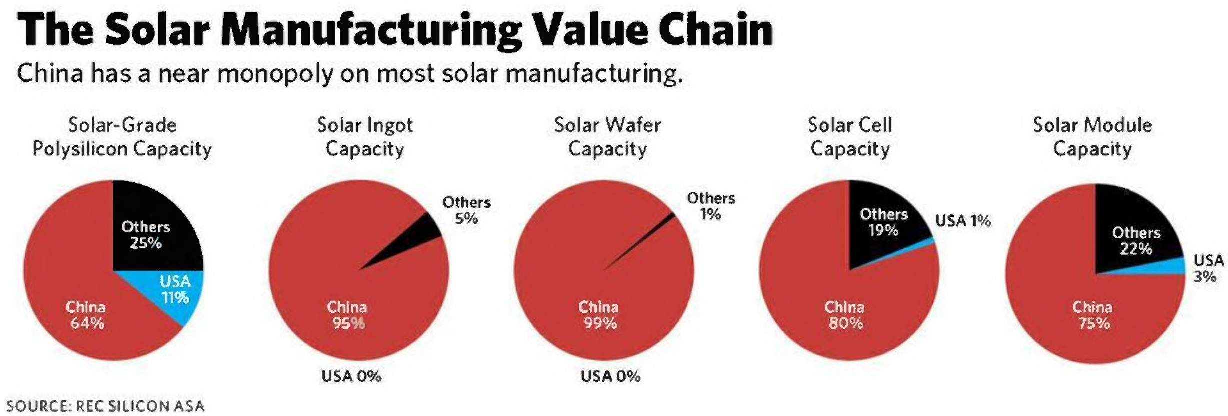
95 USITC Pub. 5021 at F-16, excerpts attached at **Exhibit 7**.

96 Expert Report at 4, attached at **Exhibit 1**.

97 USITC Pub. 5021 at F-20, excerpts attached at **Exhibit 7**.

98 *Id.* at F-22, F-24.

solar supply chain has only increased even further more recently. For instance, the following graphic demonstrates that China has a near monopoly on most solar manufacturing, with estimates based on capacity:[99]



In fact, according to [ ], an industry publication, in 2020, China's capacity for polysilicon generally was [ ], while the rest of the world's capacity, combined, was [ ], *i.e.*, **China's share was approximately [ ] percent of total global capacity**.[100] For ingots and wafers, China's capacity in 2020 was [ ], while the rest of the world's capacity was [ ], *i.e.*, **China's share was [ ] percent of total global capacity**.[101] According to another industry publication, BloombergNEF, the top ten

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99 Joan Fitzgerald, *The Case for Taking Back Solar*, The American Prospect (Mar. 24, 2021), attached at **Exhibit 26**.

100 [ ], excerpts attached at **Exhibit 8**; *see also* Expert Report at 4, attached at **Exhibit 1** (estimating that China accounted for 84 percent of global polysilicon capacity in 2020). As the Department is aware, U.S. companies are unable to ship polysilicon to China due to trade restrictions in China. [ ].

101 [ ], excerpts attached at **Exhibit 8**. [ ].

polysilicon producers supplied 83 percent of the market in 2019,[102] with seven of those producers being Chinese.[103] According to the CPIA, the top ten wafer manufacturers are all located in mainland China.[104] BloombergNEF also reports that the top ten wafer producers supplied 95 percent of the market in 2019, with <u>all</u> of the companies being based in China, except for Canadian Solar (which is a Chinese company headquartered in Canada but with the vast majority of its production facilities in China).[105]

In addition to CSPV wafers and/or cells, A-SMACC has reason to believe that all, or the majority, of the other materials used to convert the Chinese wafers to cells and then assemble the cells into modules in Malaysia are obtained from China. Again, based on information reasonably available to A-SMACC, these materials include, but are not limited to, silane, phosphorus oxychloride (POCI3), aluminum and/or silver paste for converting the wafers to cells, and solar glass, EVA, backsheet, aluminum frames, and junction boxes for assembling the cells into modules. China is also a major supplier of these other components for CSPV cells and modules. Indeed, industry publications confirm that the vast majority of the key components for solar panel assembly in Malaysia are now being produced in China.[106] According to BloombergNEF, "{b}esides ample supply of components along the PV value chain such as cells and wafers, China is also home to the largest manufacturers of key materials such as PV glass and aluminum

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102 *Solar PV Trade and Manufacturing: A Deep Dive*, BloombergNEF (Feb. 2021) at 1, excerpts attached at **Exhibit 10**.

103 *Id.* at 9.

104 Expert Report at 7, attached at **Exhibit 1**.

105 *Solar PV Trade and Manufacturing, A Deep Dive*, BloombergNEF (Feb. 2021) at 12, excerpts attached at **Exhibit 10**; Canadian Solar Inc., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2020) at F-73, excerpts attached at **Exhibit 27**.

106 *Solar PV Trade and Manufacturing, A Deep Dive*, BloombergNEF (Feb. 2021) at 16, excerpts attached at **Exhibit 10**.

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frames."[107] China's market share of solar glass has stayed above 90 percent in the global market for years.[108] Two Chinese producers alone, Xinyi Solar and Flat Glass, were projected to supply more than 50 percent of the market in 2020.[109] In addition, the world's largest solar silver paste suppliers have their factories in China.[110] Producers like Canadian Solar and Jinko Solar also own subsidiaries that produce the aluminum frames, junction boxes, and EVA in China.[111]

In addition, while the exact sourcing patterns for the companies that are subject to this request are not reasonably available to A-SMACC, publicly available evidence indicates that these companies are in fact sourcing many of the other materials for completing CSPV cells and assemble into modules from China. For instance, LONGi Malaysia's 2019 financial statements indicate that the Malaysian facility purchases consumable items from its immediate holding company (a Chinese company) and related parties.[112] While "consumable items" are not otherwise defined in the document, this likely is in reference to the other materials needed to complete production of CSPV cells and modules. LONGi Group's 2020 annual report also indicates that the group purchases glass and aluminum frames from Chinese suppliers, in addition to certain suppliers from other countries.[113] Industry publication [ ] also notes that LONGi had [

107 *Id.* at 20.

108 Hong Wang, *New Policies Set to Ease China Solar Glass Production Constraints Amidst Soaring Costs*, PV Tech (Nov. 19, 2020), attached at **Exhibit 28**.

109 *Solar PV Trade and Manufacturing: A Deep Dive*, BloombergNEF (Feb. 2021) at 18, excerpts attached at **Exhibit 10**.

110 *Id.* at 14.

111 *Id.* at 18.

112 LONGi Malaysia 2019 Financial Statements at 34-35, attached at **Exhibit 4**.

113 LONGi Group 2020 Annual Report at 69-70, excerpts attached at **Exhibit 3**.

].[114] Given the affiliation, it is likely LONGi Malaysia relied on such purchases of glass and aluminum frames. Industry articles also indicate that LONGi's Malaysian facilities sourced, in addition to glass and aluminum frames, EVA solar film, backsheets, packaging materials and chemicals from China, in addition to other countries.[115]

Like LONGi, industry articles indicate that Jinko Solar has purchased solar glass from Chinese manufacturer Flat Glass.[116] In December 2020, for instance, it was announced that Flat Glass will supply CNY14.2 billion ($2.2 billion) worth of products, or 338 million square meters of PV glass, to Shanghai-based Jinko Solar and five of its affiliates, <u>including one in Malaysia</u>, over the next three years.[117] It is estimated that this will be used to make 59 GW of PV modules.[118] Similarly, JA Solar Malaysia's 2019 financial statements indicate that the Malaysian facility purchases raw materials from related companies.[119] While "raw materials" are not otherwise defined in the document, this likely is in reference to the other materials needed to complete production of CSPV cells.[120]

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114 [ ], excerpts attached at **Exhibit 29**.

115 Jack Wong, *China-Based LONGi to Invest RM100mil More in Malaysia*, The Star (Nov. 20, 2017), attached at **Exhibit 30**.

116 Vincent Shaw & Max Hall, *Chinese PV Industry Brief: More Manufacturing Capacity from Trina, GCL Integration and Eging PV*, PV Magazine (Jan. 5, 2021), attached at **Exhibit 31**.

117 Tang Shihua, *China's Flat Glass Hits Limit Up on USD2.2 Billion PV Glass Deal With Jinko Solar*, Yicai Global (Dec. 31, 2020), attached at **Exhibit 32**.

118 *Id.*

119 JA Solar Malaysia 2019 Financial Statement at 36, excerpts attached at **Exhibit 34**.

120 *Id.*

A-SMACC obtained Malaysian import data from a subscription database made available by Global Trade Information Services ("GTIS") for the period from 2011 through 2020.[121] In the decade after the petitions for the underlying investigations were filed in 2011, the data from GTIS shows that Malaysian imports of Chinese wafers, cells, and many components and chemicals used in the manufacturing process for CSPV cells and modules have increased significantly. For instance, in 2020, the value of Malaysia's imports under HS code 3818.00, which includes wafers and chemical compounds that have been doped, from China amounted to over $546 million, in sharp contrast to $23.9 million in 2011. This trend continues in the cell production step: imports under HS code 7115.90, which includes silver and aluminum paste, a key component, increased over three hundred percent by volume over the course of the decade. Furthermore, Malaysian imports under HS Code 2804.69, which includes silane, a chemical used in solar cell assembly, increased over tenfold from 10,721 kilograms to 147,274 kilograms. Finally, the data show that the value of imports under HS Code 8544.42, which includes junction boxes used in solar modules tripled, and the value of imports under HS Code 7314.19, which includes screen frames used in solar module assembly nearly doubled. A summary of data for components and inputs appears at **Exhibit 33**.[122]

Given that LONGi Malaysia, Jinko Solar Malaysia, and JA Solar Malaysia are subsidiaries of large vertically integrated Chinese CSPV producers that tout their global dominance, it is even

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121 *See* Global Trade Information Services Malaysian Import Data, attached at **Exhibit 33**.

122 Some of the HS codes are basket categories and may include other goods. Nonetheless, that imports of merchandise under these HS codes from China increased substantially following the imposition of the Orders further corroborates other information discussed in this petition demonstrating that the subject companies are importing Chinese materials to complete the production of cells/modules in Malaysia. These HS codes are examples and may not be the best or only appropriate codes for these goods.

more likely that a substantial portion of the components for completing the production of CSPV cells and assembling into modules in the third country are obtained through the parent Chinese companies. In fact, industry publication [ ] reports that certain module manufacturers have in-house production facilities for certain components for module assembly.[123] [ ], for instance, has subsidiaries producing frames, EVA, and junction boxes.[124] [ ] announced in [ ] a factory for the production of frames for [ ].[125] As the Commission has previously noted, Chinese CSPV cell and module producers have benefited not only from policies through which they directly received support, but also through policies directed at the supply chain.[126] For instance, just recently, Chinese engineering company Triumph Group, a unit of state-owned conglomerate China National Building Materials Group Corporation, signed an agreement with the government of Suqian City, Jiangsu Province, to build a solar glass factory at the Grand Canal Suqian Port Industrial Park.[127] The Triumph Group is also the controlling shareholder of state-owned manufacturer Luoyang Glass, another producer of solar glass.[128] The European Commission previously identified subsidy rates of 3.2 percent to 16.7 percent for participating producers of solar glass in a CVD investigation.[129] Chinese producers of aluminum extrusions

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123 [ ], excerpts attached at **Exhibit 29**.

124 *Id.*

125 *Id.*

126 USITC Pub. 5021 at F-47, excerpts attached at **Exhibit 7**.

127 Vincent Shaw & Max Hall, *Chinese PV Industry Brief: New Solar Glass Factory in Jiangsu, Longi Maintains Wafer Prices Unchanged*, PV Magazine (June 25, 2021), attached at **Exhibit 35**.

128 *Id.*

129 USITC Pub. 5021 at F-47, excerpts attached at **Exhibit 7**.

(which include module frames) benefit from a range of government policies to support the aluminum industry.[130] The Chinese government has also supported energy intensive polysilicon production through reduced electricity rates and other policies.[131] For example, LDK received significant electricity fee subsidies from the Financial Bureau of Xin Yu Economic Zone for its polysilicon production operations.[132] Similarly, Daqo received reduced electricity rates from the government in Xinjiang as part of the approval for the expansion of its polysilicon manufacturing plant and in 2018, received "unrestricted cash government subsidies" totaling $13.1 million.[133] By obtaining the bulk of their raw materials (including the critical wafer input) from China, these companies with minor Malaysian finishing facilities are benefiting from the same Chinese government subsidies that subsidize Chinese producers directly. The evidence discussed above establishes that Chinese producers are completing CSPV cells and modules in Malaysia from merchandise manufactured in China before exporting them to the United States.

C. The Completion of the CSPV Cells and Modules in Malaysia is Minor and Insignificant

1. The Level of Investment in Malaysia is Minimal

In determining the relative level of total investment, as the Department has done in recent proceedings, the agency should compare the level of investment in Malaysia for a facility to complete the production of CSPV cells or complete the production of the cells and assemble them

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130 *Id.*

131 *Id.* at F-47 – F-48.

132 *Id.* at F-48.

133 *Id.*

into modules to the investment required to produce CSPV cells/modules using a fully integrated production process.[134]

The resources and investment needed to produce CSPV cells/modules using a fully integrated process are very significant. For an integrated supplier covering polysilicon to ingot/wafer, the required capital investment would likely exceed $1.7 billion for a 20 GW supply of polysilicon, ingot, and wafers.[135]

Industry publications confirm that the investment required for the upstream production processes through the wafer stage is much more significant than the investment required for the final cell and module finishing stages. For instance, according to BloombergNEF, "{t}echnical hurdles are highest for plants that make polysilicon and wafers. These plants are also costly to build and take longest to construct. Cell and module factories can be built faster . . . ."[136] In fact, "{v}ertical integration, high factory capex and technical hurdles have made the wafer market the most consolidated segment of the PV value chain."[137] Indeed, "{w}afer factories require high

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134 *See, e.g.*, Cold-Rolled from Korea IDM at 62-65. The statute does not instruct the Department to use a particular analysis when evaluating the level of investment in the foreign country for purposes of section 781(b)(2)(A) of the Act, and the Department may determine an appropriate analysis to apply. The Department has explained that its "past practice has been to compare the total investment required (as well as, separately, the research and development, production process, and facilities) from the beginning of the production process in the country subject to an {AD or CVD} order to the investment required (as well as, separately, the research and development, production process, and facilities) to finish the final product in a third country, rather than to compare the investments (as well as, separately, the research and development, production process, and facilities) required to perform the same finishing steps in each country." In doing so, the Department has emphasized that this reflects the agency's concerns with circumvention being achieved by shifting one or more of the last few minor or insignificant steps of the production process to a third country. *See id.* at 64.

135 Expert Report at 9, attached at **Exhibit 1**. This assumes 30,000 tons of polysilicon required for 10 GW of wafers using the assumptions as detailed in the NREL PV Manufacturing Report. This equates to a 60,000 ton polysilicon facility meeting the supply requirements 20 GW ingot/wafer facility.

136 [ ], excerpts attached at **Exhibit 29**.

137 *Id.* at 10.

upfront capital expenditure and bear many technical hurdles, which makes it difficult for new factories to be built outside of China."[138]

Building a new polysilicon production facility also requires substantial investment. Recent announcements place the cost for a new facility in the range of $1.4 billion per 100,000 tons.[139] For instance, in 2018, Daqo New Energy announced a new 35,000 ton polysilicon facility in Xinjiang, China, with the capital expenditure quoted as approximately $502M.[140] In 2020, Tongwei Group announced a new 40,000 ton facility in Yunnan Province, China covering approximately 800 acres, with the capital expenditure noted as $563M.[141] In March 2021, Xinte Energy Co Ltd announced a new project to build a 100,000-tonne per year high-purity polysilicon production plant in Inner Mongolia, northern China, with the total investment estimated to be around CNY 8.799 billion ($1.36 billion).[142] The expansions noted above are supported by long-term supply contracts with Chinese PV Suppliers.[143] For instance, JA Solar and LONGi Group have 5-year contracts with Xinte for 97,200 and 270,000 tons of polysilicon, respectively.[144]

In addition to being capital intensive, polysilicon manufacturing is also energy intensive.[145] The CPIA quoted the average power consumption for a polysilicon production facility at 70

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138 *Id.* at 11.

139 Expert Report at 6, attached at **Exhibit 1**.

140 *Id.*

141 *Id.*

142 Sladjana Djunisic, *Xinte Energy Prcposes to Build 100,000-Tonne-Per Year Polysilicon Production Plant*, Renewables Now (Mar. 2, 2021), attached at **Exhibit 36**.

143 Expert Report at 6, attached at **Exhibit 1**.

144 *Id.*

145 *Id.*

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kWh/kg, which equates to 7,000 GWh of power for a 100,000 ton factory.[146] Actual investments by producers confirm the large investment required for polysilicon production facilities. For instance, GCL-Poly invested $826 million in constructing a 60,000 tonne polysilicon plant in China in 2017.[147] In Tennessee, Dow/Hemlock invested $1.2 billion to build a polysilicon production facility, with a $3 billion expansion originally planned.[148] In contrast, "{b}uilding a new module factory has low technical hurdles compared with wafer and polysilicon."[149] In fact, BloombergNEF notes that "{g}iven low technical and financial barriers, it is also easier for module companies to open shop in other countries in response to tariffs or other policy developments. Once duties on Chinese solar cells were imposed by the {United States}, large integrated manufacturers built both cell and module assembly plants across Southeast Asia."[150] This is precisely what is happening here – moving the relatively low-investment portions of the process to third countries like Malaysia to evade the AD/CVD orders while maintaining the high-investment portions of the process in China, causing injury to the domestic industry.

The substantial level of investment required for the production of CSPV products through the completion of wafers is confirmed by the actual investment of Chinese producers. For instance, LONGi Group announced in 2019 plans for a new 15 GW ingot and wafer production facility,

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146 *Id.*

147 Ian Clover, *GCL-Poly Investing $826m in Construction of 60,000 MT Polysilicon Plant in China*, PV Magazine (Apr. 6, 2017), attached at **Exhibit 37**.

148 *Hemlock Semiconductor Corporation*, Wikipedia (last accessed July 6, 2021), attached at **Exhibit 38**.

149 *Solar PV Trade and Manufacturing: A Deep Dive*, BloombergNEF (Feb. 2021) at 19, excerpts attached at **Exhibit 10**.

150 *Id.*

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which is expected to cost around $643 million.[151] JA Solar announced in 2020 plans for a new 20 GW ingot/wafer expansion in China, with the capital expenditure expected to be around RMB5.8 billion ($857 million).[152] In 2018, another Chinese producer, GCL-Poly, announced plans to build a 20 GW mono-Si ingot facility in Yunnan Province at a capital cost of $1.43 billion.[153]

While Jinko Solar Group, JA Solar, and LONGi Group do not appear to refine polysilicon themselves and instead start with the production of ingots in their Chinese facilities, the Department should also take into account the level of investment required for the initial raw polysilicon stage of production. As discussed above, reasonably available evidence indicates that the Chinese companies source polysilicon from Chinese suppliers to produce the ingots used for the wafers exported to Malaysia to be completed into CSPV cells and modules, *i.e.*, the circumventing merchandise. However, even an assessment of the investment required in China for a facility starting from the ingot production stage is instructive and demonstrates that such investment is substantially greater than the investment in the third country starting from the cell finishing stage. As indicated above, the level of investment required to build a polysilicon production facility can range between $502 million and $3 billion. For instance, Chinese polysilicon supplier and solar cell producer Tongwei recently signed an agreement with the government of Leshan City and the Wuhua district for a new polysilicon manufacturing site with a capacity of 200,000 metric tons and the total investment around RMB14 billion ($2.1 billion).[154]

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151 Mark Osborne, *LONGi Investing US$875 Million in 2020 Production Capacity Expansion Plans*, PV Tech (Apr. 17, 2019), attached at **Exhibit 39**.

152 Mark Osborne, *JA Solar's Capacity Expansion Announcements in 2020 Top 104GW Across Wafer, Cell and Modules*, PV Tech (Sept. 24, 2020), attached at **Exhibit 40**.

153 Expert Report at 9, attached at **Exhibit 1**.

154 Vincent Shaw & Max Hall, *Chinese PV Industry Brief: Tongwei Plans 200,000 MT Polysilicon Factory*, PV Magazine (July 2, 2021), attached at **Exhibit 41**.

This is corroborated by industry publications. Specifically, according to BloombergNEF, the cost of building a new factory in China for polysilicon manufacturing is estimated to be about $15 million per thousand tons, or $39 million per gigawatt.[155] Even these levels of investment are likely highly subsidized by the Chinese government. For instance, GCL-Poly, a Chinese polysilicon producer, has close ties to the China People's Liberation Army and the Chinese government.[156] Similarly, TBEA Co., Ltd, the parent company of Xinte Energy,[157] another Chinese polysilicon supplier, states on its website that it "actively practices the national strategy of 'the Belt and Road initiative' and is devoted to sharing the advanced electricity construction experience of China with the world."[158]

By comparison, the level of investment required in Malaysia to simply finalize the CSPV cells and assemble the cells with other Chinese-origin components into modules is much lower. For instance, the capital costs are in the range of $40 million to $50 million per GW of production capacity for cell manufacturing facilities, and recent announcements of new module production facilities indicate capital costs in the range of $20 million to $30 million for module-only factories, making this the least capital-intensive step in the supply chain.[159]

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155 *Solar PV Trade and Manufacturing: A Deep Dive*, BloombergNEF (Feb. 2021) at 8, excerpts attached at **Exhibit 10**. While this provides an average cost per gigawatt and is informative, as discussed above, many polysilicon production facilities appear to be much larger, indicating that polysilicon facilities generally need to be built on a larger scale and thus would require much larger investments to initially build the facility. In addition, it is the level of investment required for polysilicon, ingot, and wafer production combined (*i.e.*, the production stages taking place in China) that should be compared with the investment required to complete CSPV cells and modules in the third country.

156 Steven Mufson, *China's Growing Share of Solar Market Comes at a Price*, Washington Post (Dec. 16, 2011), attached at **Exhibit 42**.

157 *TBEA Announces Plan of Domestic Listing of Its Subsidiary Xinte Energy*, PVTIME (Jan. 15, 2021), attached at **Exhibit 43**.

158 TBEA Website Excerpts, attached at **Exhibit 44**.

159 Expert Report at 10, 13, attached at **Exhibit 1**.

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The actual investments in Malaysia by the companies subject to this circumvention petition confirm the much smaller investment levels for cell and/or module production facilities compared to the investment required for integrated production facilities in China that engage in the upstream production processes. For instance, Jinko Solar invested approximately $100 million when it first built its cell and module manufacturing facility in Penang, Malaysia, including equipment and working capital, with production capacity of 500 MW for cells and 450 MW for modules.[160] Similarly, LONGi invested approximately RMB840 million ($125.5 million) when it built its new 1 GW monocrystalline solar cell manufacturing plant in Kuching, Malaysia in 2019, to add to its 500 MW mono solar cell and 500 MW module assembly production.[161] JA Solar invested RM300 million ($70 million) when it first launched its Malaysian manufacturing facility, initially a 400 MW solar cell factory.[162]

While not required, in addition to the fact that these companies' investments in Malaysia for cell and module production are much smaller scale than the companies' investments in China for the upstream production processes, the Chinese companies' investments in China for production facilities that solely produce cells and modules appear to be generally much more larger scale than the finishing facilities in Malaysia. For instance, in 2019, LONGi announced investment plans for two 5 GW mono module plants and one 5 GW mono solar cell plant in various cities in China, with the expected level of investment for each ranging between RMB1.839 billion ($269.2

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160 *Jinkosolar Plans to Build a Cell & Module Manufacturing Facility in Penang, Malaysia*, Jinko Solar Holding Co., Ltd. (Mar. 19, 2015), excerpts attached at **Exhibit 18**.

161 Mark Osborne, *LONGi to Build New 1GW Mono Solar Cell Plant in Malaysia*, PV Tech (Feb. 25, 2019), attached at **Exhibit 45**.

162 Ian Clover, *JA Solar Completes $70m Malaysian Fab*, PV Magazine (Oct. 21, 2015), attached at **Exhibit 46**.

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million) and RMB2.462 billion ($348.4 million).[163] LONGi Group's 2020 annual report also indicates that the company has a number of cell and/or module production facilities in China with capacities ranging between 3 GW and 7.5 GW.[164] Similarly, JA Solar announced in 2021 plans to invest around RMB6 billion ($926 million) in a new 6 GW solar cell plant and 6 GW module assembly plant in China.[165] Furthermore, Jinko Solar's cell and/or module production facilities in China have much larger plant sizes than Jinko Solar's Malaysian facility.[166] Clearly, the Chinese companies have made a minimal investment in the third country, demonstrating that the companies intended for the completion of the subject merchandise in the third country to be minor and insignificant, further showing that these companies are engaging in circumvention of the Orders as contemplated by section 781(b) of the Act. An assessment of global capital expenditures for ingots, wafers, CSPV cells, and modules as a whole is telling and shows that China's share of global capital expenditures dwarfs the rest of the world.

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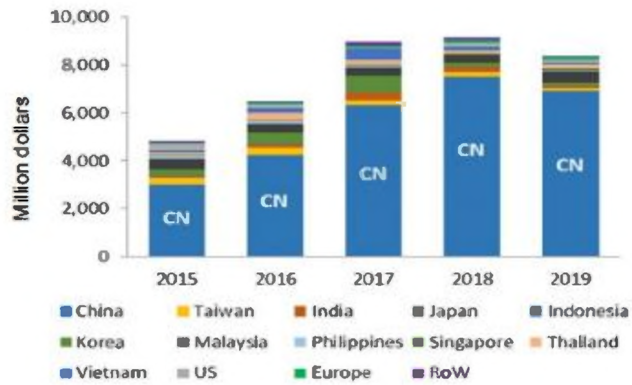
163 Mark Osborne, *LONGi Approves 10GW of Module and 5GW of New Solar Cell Capacity Expansion Plans*, PV Tech (Oct. 15, 2019), attached at **Exhibit 47**.

164 LONGi Group 2020 Annual Report at 31-32, excerpts attached at **Exhibit 3**.

165 Mark Osborne, *JA Solar Takes Solar Cell Capacity Plans at Yangzhou Plant to 10GW*, PV Tech (Jan. 26, 2021), attached at **Exhibit 48**.

166 JinkoSolar Holding Co., Ltd., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2020) at 67, excerpts attached at **Exhibit 19**.

CSPV products: Global capital expenditures for ingots, wafers, CSPV cells, and CSPV modules, 2015-19



Notes: 2019 data are projections. Given declining costs for building plants, decreases in spending do not necessarily translate to lower capacity additions in GW terms.

Source: Colville, Finlay, "Solar PV Capex Trending at US$9 billion Annually as New GW Fabs in China Slash Investments Required," *PV Tech*, December 10, 2019, https://www.pv-tech.org/editors-blog/solar-pv-capex-trending-at-us9-billion-annually-as-new-gw-fabs-in-china-sla, retrieved December 18, 2019.

Source: USITC Pub. 5021 at F-26 – F-27, excerpts attached at **Exhibit 7**.

2. The Level of Research and Development in Malaysia is Minimal

The level of research and development in Malaysia to complete the production of CSPV cells and assemble into modules with Chinese-origin components is minimal. Rather than researching and developing their own technology, these companies are predominantly importing technology from China. Indeed, the CPIA Report for 2019 states that "the key equipment of PERC cell production equipment has basically completed domestication," which indicates that most of the equipment is from Chinese suppliers.[167] This follows a trend from many other industries, where China-based companies take over not only the market for the end product (PV modules), but also the capital equipment used to manufacture the same.[168] From a manufacturing perspective, it is a best practice to use the same manufacturing equipment regardless of where the factory is located.

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167 Expert Report at 11, attached at **Exhibit 1**.

168 *Id.*

Thus, it is highly likely that most new cell processing facilities built outside of China also use production equipment sourced from China.[169] The CPIA also stated that "all domestic component production equipment has been localized," indicating that all of the module production equipment is available from local Chinese suppliers.[170] Given that the companies in the third country here are subsidiaries of large vertically integrated Chinese CSPV producers, the third country companies undoubtedly relied on the Chinese parent companies' R&D in building the production facilities in the third country and implementing production processes. For instance, JA Solar has previously indicated that it produces JA Solar's Percium solar cells at its Malaysian facility[171] – the company's "flagship product" that it launched in October 2013,[172] *i.e.*, prior to the establishment of the Malaysian facility.[173]

In contrast to the little to no research and development activities taking place in Malaysia, the research and development expenditures within China of Chinese integrated producers of CSPV cells/modules that engage in the upstream production processes generally are extensive. Jinko Solar has publicly stated that its "{r}esearch and development expenses consist primarily of silicon materials used in {its} research and development activities and salaries, bonuses and other benefits for research and development personnel, and depreciation of equipment for research and

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169 *Id.*

170 *Id.* at 13.

171 Sam Pothecary, *JA Solar Announces Facility Expansion in Malaysia*, PV Magazine (Oct. 6, 2016), attached at **Exhibit 49**.

172 *JA Solar Reaches Important Milestone: Monocrystalline PV Product Shipments Total 7GW Over Last Decade*, JA Solar (July 26, 2016), attached at **Exhibit 50**.

173 Ian Clover, *JA Solar Completes $70m Malaysian Fab*, PV Magazine (Oct. 21, 2015), attached at **Exhibit 46**.

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development."[174] In 2018, 2019, and 2020, Jinko Solar Group's R&D expenses were RMB366.6 million, RMB324.4 million, and RMB389.2 million ($59.6 million), respectively.[175] Jinko Solar Malaysia's 2019 financial statements do not separately list R&D expenses.[176] While Jinko Solar has an R&D center in Malaysia, it houses only about 100 researchers,[177] while Jinko Solar Group as a whole reportedly has 1,078 full-time employees in R&D.[178]

Similarly, LONGi Group by the end of the reporting period for its 2020 annual report had obtained a total of 1,001 issued patents and invested RMB2.592 billion (approximately $397.2 million)[179] in R&D, with RMB499,103,854.57 (approximately $76.5 million)[180] in R&D expenses in just the reporting period for its 2020 annual report.[181] The company did not separately list any R&D expenses in its Malaysian subsidiary's 2019 financial statements.[182] LONGi Group is known for investing heavily in R&D spending. For instance, LONGi Group set a solar industry R&D expenditure record in 2017, spending more in that year than any solar manufacturer to date.[183]

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174 JinkoSolar Holding Co., Ltd., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2020) at 94, excerpts attached at **Exhibit 19**.

175 *Id.* at 124.

176 *See generally* Jinko Solar Malaysia 2019 Financial Statements, attached at **Exhibit 2**.

177 *Jinkosolar's R&D Center in Penang, Malaysia Continues to Give Return on Investment*, PV Tech (Dec. 26, 2019), attached at **Exhibit 51**.

178 JinkoSolar Holding Co., Ltd., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2020) at 133, excerpts attached at **Exhibit 19**.

179 Using an exchange rate of 6.5250 RMB per U.S. dollar from December 31, 2020. *Foreign Exchange Rates - H.10: Historical Rates for the Chinese Yuan Renminbi*, Federal Reserve (July 6, 2021), attached at **Exhibit 52**.

180 Using an exchange rate of 6.5250 RMB per U.S. dollar from December 31, 2020. *Id.*

181 LONGi Group 2020 Annual Report at 17, 19, excerpts attached at **Exhibit 3**.

182 *See generally* LONGi Malaysia 2019 Financial Statements, attached at **Exhibit 4**.

183 Mark Osborne, *LONGi Sets Solar Industry Record for R&D Spending*, PV Tech (Apr. 9, 2018), attached at **Exhibit 53**.

Given that the vast majority of LONGi Group's manufacturing facilities are in China, it is likely that all or most of the company's R&D occurs in China.[184]

Likewise, JA Solar's consolidated R&D expenses were RMB175.5 million in 2016 and RMB160.1 million ($24.6 million) in 2017.[185] JA Solar Malaysia did not separately list any R&D expenses in its 2019 financial statements.[186] Again, given that the vast majority of JA Solar's manufacturing facilities are in China, all or most of the company's R&D likely occurs in China.[187] As of the end of 2017, JA Solar indicated that two of its facilities in China were factories and R&D centers, and did not indicate that it had an R&D center in Penang, Malaysia.[188]

3. <u>**The Production Process in Malaysia Involves Minimal Additional Processing**</u>

Again, in evaluating the production process in Malaysia, the Department should compare that process to the production operations of an integrated Chinese CSPV producer up through the stage at which the wafers or cells are sent to Malaysia for further minor processing. As detailed above, there are five main stages in the production process for CSPV products.[189] For inquiry merchandise, A-SMACC understands that all of the manufacturing process up through the production of the wafers is taking place in China. Again, to the extent that the wafers are also undergoing some of the cell conversion steps in China before being exported to the third country

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184 LONGi Website Excerpts, attached at **Exhibit 54**.

185 JA Solar Holdings Co., Ltd., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2017) at 71, excerpts attached at **Exhibit 55**.

186 JA Solar Malaysia 2019 Financial Statement, attached at **Exhibit 34**.

187 JA Solar Website Excerpts, attached at **Exhibit 5**.

188 JA Solar Holdings Co., Ltd., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2017) at 54, excerpts attached at **Exhibit 55**.

189 USITC Pub. 4874 at I-43, excerpts attached at **Exhibit 12**.

to be completed into cells and assembled into modules,[190] the production process in the third country would be even more minimal.

As can be seen in the description of the manufacturing process above, the production process up through the wafers, starting from the initial raw polysilicon stage, is much more substantial than the process of converting the wafers to cells and assembling modules. While the process of converting wafers to CSPV cells is not trivial – either in terms of capital or workforce – the production process up through the wafers is much more substantial in terms of production activities, investment, research, and expense, and is technologically complex.

Again, while Jinko Solar Group, JA Solar, and LONGi Group do not appear to refine polysilicon themselves and instead start with the production of ingots in their Chinese facilities, the Department should also take into account the initial raw polysilicon stage of production in comparing the production processes in China and in the third country. As discussed above, reasonably available evidence indicates that the Chinese companies source polysilicon from Chinese suppliers to use to produce the ingots used to produce the wafers that are exported to Malaysia to be completed into CSPV cells or modules. Regardless, even considering just the ingot and wafer production stages, the production process in Malaysia is minimal compared to the production of ingots and wafers in China, which requires more investment, research, expenses, production activities, and are technologically complex processes.

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190 Again, A-SMACC submits that wafers from China that have already been doped and contain a p/n junction, which are then shipped to Malaysia for finishing prior to export to the United States, are already in-scope merchandise and should be subject to duties, consistent with the Department's recent scope rulings. *See* ET Solar Scope Ruling, attached at **Exhibit 13**; Solaria Scope Ruling, attached at **Exhibit 14**. To the extent such merchandise is not already considered subject, and to the extent that Chinese wafers that do not yet contain a p/n junction are being used in the production processes described herein, such merchandise is circumventing the Orders.

Furthermore, as detailed below, the final steps of the production process that occur in Malaysia accounts for a relatively small proportion of the cost of production.

4. The Production Facilities in Malaysia are Limited

The facilities completing the CSPV cells and assembling the modules in Malaysia are limited compared to the integrated production facilities in China that also engage in the upstream production processes. Indeed, the companies subject to this request appear to have much more production space in their Chinese facilities than their facilities in the third country. Specifically, Jinko Solar Group's 2020 annual report indicates that the company's plant sizes in Penang, Malaysia for solar cells and modules are 8,191 square meters and 12,679 square meters, respectively.[191] In contrast, the company has one silicon ingot and wafer facility in China with a plant size of 68,397 square meters, and another silicon ingot facility in China with a plant size of 165,333 square meters, both substantially larger than the Malaysian facilities.[192] Even Jinko Solar's production facilities in China for cells and modules are larger than the equivalent type of facilities in Malaysia, indicating that the Malaysian facilities are intended for minor processing only. Specifically, Jinko Solar Group has identified facilities in China for cells and modules, respectively, ranging in plant size from 89,543 square meters to 289,091 square meters.[193]

Similarly, LONGi's production facilities in China are much larger than its facilities in Malaysia. For instance, in 2020, LONGi's total year end production capacity in Malaysia for cells

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191 JinkoSolar Holding Co., Ltd., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2020) at 67, excerpts attached at **Exhibit 19**.

192 *Id.*

193 *Id.* Jinko Solar Group also has a solar module facility in Florida with a plant size of 26,538 square meters. *See id.*

and modules were [ ] and [ ], respectively.[194] In contrast, the total year end production capacity for LONGi's Chinese facilities for cells and modules were [ ] and [ ], respectively.[195] Even for wafer production, LONGi's total year end capacity in Malaysia in 2020 was [ ], compared to [ ] in China.[196]

JA Solar's Malaysian facility is also smaller than the company's Chinese facilities. For instance, as of 2017, JA Solar reported that its Penang, Malaysia facility had a space of 19,357 square meters.[197] In contrast, the company's Chinese facilities ranged in size from 38,157 square meters to 559,973 square meters.[198] Furthermore, in 2020, JA Solar's Malaysian facility's year end cell production capacity was [ ], compared to the company's cell production capacity in China, [ ].[199] JA Solar also had capacity for production of wafers and modules in China of [ ] and [ ], respectively, as of the end of 2020.[200]

In addition, industry publications confirm that "{t}echnical hurdles are highest for plants that make polysilicon and wafers. These plants are also costly to build and take longest to construct. Cell and module factories can be built faster and can respond quicker to technological trends and policy developments like import tariffs,"[201] and that "{w}afer factories require high upfront capital expenditure and bear many technical hurdles, which makes it difficult for new

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194 [ ], excerpts attached at **Exhibit 8**.

195 *Id.*

196 *Id.*

197 JA Solar Holdings Co., Ltd., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2017) at 54, excerpts attached at **Exhibit 55**.

198 *Id.*

199 [ ], excerpts attached at **Exhibit 8**.

200 *Id.*

201 *Solar PV Trade and Manufacturing: A Deep Dive*, BloombergNEF (Feb. 2021) at 1, excerpts attached at **Exhibit 10**.

factories to be built outside of China."[202] In contrast, "{c}ell manufacturing is more versatile compared to wafers and polysilicon and has lower technical hurdles."[203] Similarly, "{b}uilding a new module factory has low technical hurdles compared to wafer and polysilicon."[204] In fact, due to the "low technical and financial barriers, it is also easier for module companies to open shop in other countries in response to tariffs or other policy developments."[205]

The production facilities needed for the initial raw polysilicon stage are also very sophisticated. Again, while Jinko Solar Group, JA Solar, and LONGi Group do not appear to refine polysilicon themselves and instead start with the production of ingots in their Chinese facilities, the Department should also take into account the initial raw polysilicon stage of production in comparing the extent of the production facilities in China and in the third country given that the Chinese companies finishing in Malaysia appear to source large amounts of polysilicon from Chinese suppliers. For instance, the modified Siemens method of production of polysilicon, which most of China-based polysilicon production is based on, is a mature, large-scale, chemical manufacturing process.[206] Most new production facilities have been constructed in China, with new factories on the scale of 100,000 tons per year planned for the near future.[207] This equates to 275 tons per day at full capacity – a very large-scale operation.[208]

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202 *Id.* at 11.

203 *Id.* at 13.

204 *Id.* at 19.

205 *Id.*

206 Expert Report at 4, attached at **Exhibit 1**.

207 *Id.*

208 *Id.*

5. The Value of the Processing Performed in Malaysia Represents a Small Proportion of the Value of the Merchandise Imported into the United States

For CSPV products, the production of the wafers, from the initial raw polysilicon stage, is the most critical component with respect to PV module performance and represents the highest percentage of the bill of materials ("BOMs").[209] Even for the cost of converting wafers to cells and the cost of assembling modules from CSPV cells, the cost of the materials is the most substantial proportion of the cost. Again, A-SMACC believes that all, or most, of those materials are also obtained from China.

This general cost breakdown is confirmed by industry publications. For instance, according to BloombergNEF, with the imposition of tariffs on Chinese equipment, the majority of CSPV products imported into the United States arrive from Southeast Asia (which should include Malaysia) post-assembly, but "70% of the actual value of that equipment accrues to China where key, pre-assembly steps in the making of the equipment take place, including production of solar-grade silicon, ingots, wafers and cells."[210] For this reason, generally, production costs in "Southeast Asian nations account for just 27% of the value of a typical PV module exported to the U.S., despite those nations being most likely to be the last port of call before final, assembled equipment arrives in the U.S.," reiterating that most of the plants assembling modules in Southeast Asia are owned by Chinese firms.[211] BloombergNEF further reports generally, as of year-end 2019, that "{o}ver half of the cost of making monocrystalline silicon wafers into cells comes from

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209 *Id.* at 7.

210 *Solar PV Trade and Manufacturing: A Deep Dive*, BloombergNEF (Feb. 2021) at 22, excerpts attached at **Exhibit 10**.

211 *Id.*

the purchase of materials such as silver (Ag) and aluminum (Al) pastes {}. Front silver paste alone is the single largest cost component and accounted for 33% of total cost."[212] Similarly, for the "{b}est-in-class cash cost for cell-to-module for mono c-Si modules made by large firms as of year-end 2019" the cost of the materials (aluminum frame, glass, EVA, backsheet, junction box, and other materials) constituted 83 percent of the total cost.[213] BloombergNEF also notes that "{w}hether a silicon-based module is assembled on U.S. soil or abroad, about half its total value is accounted for by non-silicon raw materials such as silver paste, glass and back sheets," with the "vast majority of suppliers of these materials {being} concentrated in China."[214] As a result, the publication notes that despite the U.S. tariffs on Chinese-made PV cells and modules, China continues to accrue the largest share of value from modules installed in the United States – regardless of where the equipment is assembled.[215] While A-SMACC does not have access to the specific production costs of the companies subject to this petition, A-SMACC believes that the general cost breakdowns discussed above are typical in the industry and would apply to the merchandise completed in Malaysia subject to this petition.

A-SMACC also provides a value-added analysis that demonstrates that the value of the processing in the third country represents a small proportion of the value of the CSPV modules imported into the United States. The Commission has previously found that for both CSPV cells and modules, the most substantial component of the total cost of goods sold is the total raw material

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212 *Id.* at 14.

213 *Id.* at 18.

214 *Id.* at 23.

215 *Id.*

cost.[216] For cells, while the total raw material cost reflects a combination of polysilicon, wafers, and all other raw material costs, the main underlying raw material input is wafers made from polysilicon.[217] A BOM cost breakdown for a [ ] cell manufactured in [ ] demonstrates that the [ ] wafer, sourced from China, represents the largest cost portion at [ ] percent.[218] A BOM cost breakdown for a [ ] module manufactured in [ ] shows that the BOM cost is dominated by the cell cost, which is primarily comprised of the wafer cost.[219] A BOM breakdown if the cells are excluded from the calculation shows that the glass, frame, EVA, and junction box account for [ ] percent of the module cost.[220] It is understood that due to the extensive supply chain in China, many Chinese module suppliers use materials sourced from China for module production, even if the factory is in a different country.[221] These calculations are discussed in further detail in the expert report attached to this submission. To the extent that some of the production steps to convert the wafers to CSPV cells occur in China, prior to being exported to the third country for finishing, the value of processing in the third country would constitute an even smaller proportion.

These calculations are corroborated by LONGi's overall module production costs in its annual reports.[222] LONGi is vertically integrated from ingot/wafer through module production,

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216 USITC Pub. 4874 at I-11 n.45, excerpts attached at **Exhibit 12**.

217 *Id.*

218 Expert Report at 11, attached at **Exhibit 1**.

219 *Id.* at 14.

220 *Id.*

221 *Id.*

222 *Id.* at 14-15.

such that these costs are representative of the overall industry.[223] LONGi breaks down its production costs across six categories: (1) raw materials; (2) manufacturing overhead; (3) direct labor; (4) energy or power; (5) depreciation; and (6) contract costs.[224] The last category, contract costs, was introduced in 2020 and represents contract performance costs and contract acquisition costs.[225] An analysis of the production cost breakdown over the past three years (2018 through 2020) for LONGi's PV products (encompassing all of the production steps from ingot/wafer production through modules) is provided in the expert report attached to this submission.[226] This breakdown shows that the most significant cost category is raw materials at an average of 73 percent of the overall production cost, which encompasses ingot, wafer, cell, and module production.[227] LONGi reported the production of 26,602 MW of modules in 2020, 8,365 MW in 2019, and 7,276 in 2018.[228] The percentages of the various cost categories are consistent despite the differences in production volume.[229] In particular, the raw material cost is very consistent at roughly 73 percent of overall production costs over this period.[230] Considering the BOM analysis for cells and modules, the material costs related to silicon wafers and cells dominate the overall module production costs.[231] Further, considering the significant capital investment required for polysilicon, ingot, and wafer production, it is clear that overall module production costs are

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223 *Id.*

224 *Id.*

225 *Id.*

226 *Id.*

227 *Id.* at 15.

228 *Id.* at 14-15.

229 *Id.*

230 *Id.*

231 *Id.*

strongly impacted by the dominance of raw materials produced in China, even if the cell and module factories are located in other Southeast Asia countries.[232]

In evaluating this factor, the Department has emphasized in recent circumvention proceedings that Congress has redirected the agency's focus away from a rigid numerical calculation towards a more qualitative focus on the nature of the production process.[233] For instance, in *Corrosion-Resistant Steel Products from China*, the Department noted that a qualitative analysis, which indicated that the primary direct material inputs (*i.e.*, hot-rolled steel or cold-rolled steel) used by producers in the third country to produce the merchandise subject to the anti-circumvention inquiry (*i.e.*, corrosion-resistant steel) was manufactured and supplied by producers in the country subject to an existing AD/CVD order on corrosion-resistant steel (China), and that significant costs in addition to the direct material inputs were not incurred, would be sufficient to determine that the value of processing in the third country constitutes a small portion of the value of the merchandise exported to the United States.[234] Similarly, in *Diamond Sawblades from China*, with respect to diamond sawblades that were being assembled or completed in a third country with Chinese cores and Chinese segments, *i.e.*, where all the direct material inputs were of Chinese origin, and the processing performed in the third country involved only laser-welding and finishing, which the Department found to be less complex, intensive, or multi-step processes

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232 *Id.*

233 *See* Preliminary Decision Memorandum accompanying *Certain Corrosion-Resistant Steel Products From the People's Republic of China*, 82 Fed. Reg. 58,170 (Dep't Commerce Dec. 11, 2017) (affirm. prelim. deter. of anti-circ. inquiries on the antidumping duty and countervailing duty orders) ("CORE Circumvention Prelim Decision Memo") at 21; *see also* Preliminary Decision Memorandum accompanying *Diamond Sawblades and Parts Thereof From the People's Republic of China*, 83 Fed. Reg. 57,425 (Dep't Commerce Nov. 15, 2018) (prelim. affirm. deter. of circ.) ("DSB Circumvention Prelim Decision Memo") at 11.

234 *See* CORE Circumvention Prelim Decision Memo at 22. The Department had also obtained the information necessary to evaluate the value added by the processing in the third country and concluded that the quantitative finding supported the Department's qualitative finding. *See id.*

than the production of the cores and segments, the Department found that a qualitative analysis supported its finding that the proportion of the processing value added in the third country is small.[235]

Like these prior proceedings, here, reasonably available evidence indicates that the primary direct material inputs used to complete CSPV cells in Malaysia, *i.e.*, wafers, silane, phosphorus oxychloride (POCI3), aluminum and/or silver paste , and the additional components used to assemble the CSPV cells into modules, *i.e.*, solar glass, EVA, backsheet, aluminum frames, and junction boxes, were sourced from China, the country subject to the Orders. Accordingly, a qualitative analysis itself would also be sufficient to conclude that the value of processing in Malaysia represents a small proportion of the value of the merchandise imported to the United States.

D. The Value of the Merchandise Produced in China is a Significant Portion of the Total Value of the Merchandise Exported to the United States

As discussed above, the value of the processing in Malaysia represents a minority of the value of the merchandise imported into the United States, for both cells and modules. In contrast, the overwhelming majority of the production and costs are accounted for by the Chinese components that are completed and assembled in Malaysia. Again, the Commission has also previously found that for both CSPV cells and modules, the most substantial component of the total cost of goods sold is the total raw material cost.[236] For cells, while the total raw material cost

[235] *See* DSB Circumvention Prelim Decision Memo at 11. There was also information on the record regarding the cost of production of diamond sawblades manufactured in the third country and the value of diamond sawblades sold to the United States and the Department also calculated the value of processing performed in the third country to preliminarily find that the value of processing performed in the third country as a proportion of the value of the merchandise imported into the United States is small for the products at issue in the inquiry. *See id.* at 13.

[236] USITC Pub. 4874 at I-11 n.45, excerpts attached at **Exhibit 12**.

reflects a combination of polysilicon, wafers, and all other raw material costs, the main underlying raw material input is wafers made from polysilicon.[237] This demonstrates that the value of the merchandise produced in China accounts for a significant portion of the total value of the merchandise ultimately exported to the United States.

E. The Department Should Include CSPV Cells and Modules from Malaysia in the Scope of the Orders to Prevent Evasion and Further Supply Chain Destruction

Given the facts and evidence presented above, there is a reasonable basis to conclude that CSPV cells and modules are being completed in Malaysia by Jinko Solar, JA Solar and LONGi within the meaning of 19 U.S.C. § 1677j(b) such that they should be included in the scope of the Orders to prevent evasion and further supply chain destruction. Chinese producers have developed a circumvention scheme that involves moving the very end of the production process for CSPV products, which entails minor processing, to a third country for the express purpose of avoiding AD/CVD duties while retaining as much of the subsidized supply chain and labor as possible in China. In fact, it is widely recognized in the industry that following the imposition of AD/CVD duties on Chinese-made solar cells, Chinese integrated producers started building cell and module assembly plants across Southeast Asia, while continuing to rely heavily on Chinese inputs.[238] Industry publications report that most U.S. solar installations today use modules from plants located in Vietnam, Malaysia, and Thailand, and most module-assembly plants that ship from Southeast Asia to the United States are Chinese-owned.[239]

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237 *Id.*

238 *Solar PV Trade and Manufacturing: A Deep Dive*, BloombergNEF (Feb. 2021) at 19, excerpts attached at **Exhibit 10**.

239 *Id.* at 21.

It is imperative that the Department confirm that the completion of CSPV cells and modules in a third country using components manufactured in China will not take the finished product outside the scope of the Orders. An affirmative determination here is critical to put an end to these blatant attempts to avoid paying the requisite AD/CVD duties on CSPV cells and modules from China and to provide the domestic industry with the full extent of trade relief that it deserves.

F. Additional Factors Considered by the Department

An assessment of the additional statutory factors that the Department considers in determining whether to include merchandise assembled or completed in a third country within the scope of an existing order further supports an affirmative determination of circumvention.

1. The Pattern of Trade Demonstrates Circumvention of the Orders

As discussed above, the import trends paint a clear picture of the circumvention taking place. Since the underlying investigations and imposition of the Orders, U.S. imports of CSPV cells and modules from China have decreased substantially.[240] At the same time, U.S. imports of CSPV cells and modules from Malaysia have skyrocketed, increasing from approximately $576 million in 2011 (the year of petition filing in the underlying investigations) to over $2.3 billion in 2020, an increase of nearly 300 percent.[241] These import trends are a strong indication that Chinese producers are circumventing the Orders by shipping Chinese-origin components to Malaysia for completion into CSPV cells or modules to be sold at dumped and subsidized prices in the United States.

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240 Official Import Statistics, attached at **Exhibit 11**.

241 *Id.*

2. <u>The Chinese Manufacturers/Exporters Subject to the Orders Are Affiliated with the Companies that Complete the CSPV Cells and Modules in Malaysia</u>

As discussed above, reasonably available evidence indicates that the companies in Malasyia are sourcing from their Chinese affiliates or parent companies, which are subject to the AD/CVD orders, at least some of the components used to complete the production of CSPV cells/modules in Malaysia, to circumvent the Orders. Specifically, Jinko Solar Malaysia is a subsidiary of Chinese company JinkoSolar Holding Co., Ltd.,[242] JA Solar Malaysia is the Malaysian base for JA Solar, and LONGi Malaysia is a subsidiary of Chinese company LONGi Green Energy Technology Co., Ltd.[243]

3. <u>Imports of Chinese-Origin Components for CSPV Cells and Modules into Malaysia from China Have Increased Significantly After the Initiation of the Underlying Investigations</u>

Imports of Chinese-origin components for CSPV cells and modules into Malaysia have increased significantly after the initiation of the underlying investigations. LONGi Group, JA Solar, and Jinko Solar all established cell and module facilities in Malaysia after the imposition of the Orders in 2012.[244] As discussed above, A-SMACC reasonably believes that these companies are importing most, if not all, of the components for converting wafers to CSPV cells and module assembly from China, in addition to obtaining Chinese-origin wafers or cells. Thus, by definition,

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242 Jinko Solar Group Website Excerpts, attached at **Exhibit 9**; Jinko Solar Malaysia 2019 Financial Statements, attached at **Exhibit 2**.

243 LONGi Group 2020 Annual Report at 4-8, excerpts attached at **Exhibit 3**; LONGi Malaysia 2019 Financial Statements, attached at **Exhibit 4**.

244 *Jinkosolar Plans to Build a Cell & Module Manufacturing Facility in Penang, Malaysia*, Jinko Solar Holding Co., Ltd. (Mar. 19, 2015), attached at **Exhibit 18**.

there has been an increase in imports of Chinese-origin components into Malaysia since the underlying investigations.

This is supported by official import statistics. Specifically, the data indicate that there has been an increase in imports of Malaysian imports of Chinese wafers, cells, and inputs including silver and aluminum paste, silane, junction boxes, and screen frames into Malaysia from China since 2011, the year of filing of the petitions in the underlying investigations.[245] This upward trend of imports of Chinese-origin components into Malaysia, which is consistent with the other evidence demonstrating that these companies are sourcing these components from China, is further evidence of circumvention of the Orders.

* * *

REQUEST FOR PROPRIETARY TREATMENT

Pursuant to 19 C.F.R. § 351.304(a)(1)(i) of the Department's regulations, we request business proprietary treatment for the bracketed information in the narrative of this submission and exhibits as detailed below. Disclosure of this information, which is not otherwise publicly available, would cause substantial harm to the competitive position of the submitter and would impair the ability of the Department to obtain information in the future necessary to fulfill its statutory functions. In particular, A-SMACC requests business proprietary treatment for the

[245] Global Trade Information Services Malaysian Import Data, attached at **Exhibit 33**. Some of the HS codes are basket categories and may include other goods. Nonetheless, that imports of merchandise under these HS codes from China increased substantially following the imposition of the Orders further corroborates other information discussed in this petition demonstrating that the subject companies are importing Chinese materials to complete the production of cells/modules in Thailand. These HS codes are examples and may not be the best or only appropriate codes for these goods.

 PUBLIC VERSION

identities of the companies that are part of A-SMACC, as disclosure of this information could lead to retribution against these companies and cause substantial harm.

Pursuant to section 351.304(b)(1) of the Department's regulations, A-SMACC agrees in principle to permit disclosure of business proprietary information contained in these petitions under an appropriately drawn administrative protective order ("APO"). A-SMACC respectfully reserves the right, however, to comment on all APO applications prior to disclosure. A public version of this submission has been prepared and is being filed pursuant to the Department's regulations at 19 C.F.R. § 351.304(c)(1).

(1) **Page 50 and Exhibit 1**: *Business or trade secrets concerning the nature of a product or production process* (19 C.F.R. § 351.105(c)(1)) and/or *Production costs (but not the identity of the production components unless a particular component is a trade secret*) (19 C.F.R. § 351.105(c)(2)).

(2) **Exhibit 1**: *The names of particular persons from whom business proprietary information was obtained* (19 C.F.R. § 351.105(c)(9)).

(3) **Pages 1, 2, 4, 20, 21, 23-26, 28, 29, 31, 33, 46, EL-1, EL-2, EL-3, Client Certifications, and Exhibits 8, 15, 20 and 29**: *Any other specific business information the release of which to the public would cause substantial harm to the competitive position of the submitter* (19 C.F.R. § 351.105(c)(11)).

If you have any questions regarding this submission, please do not hesitate to contact us.

Respectfully submitted,

/s/ Timothy C. Brightbill
Timothy C. Brightbill, Esq.
Laura El-Sabaawi, Esq.
Elizabeth S. Lee, Esq.

Counsel to American Solar Manufacturers Against Chinese Circumvention

COMPANY CERTIFICATION

I, [ ], representative of the American Solar Manufacturers Against Chinese Circumvention, certify that I prepared or otherwise supervised the preparation of the attached submission, *Request for Circumvention Ruling Pursuant to Section 781(b) of the Tariff Act of 1930*, filed on August 16, 2021, pursuant to the Antidumping and Countervailing Duty Orders on *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China* (Case Nos. A-570-979 and C-570-980). I certify that the public information and any business proprietary information of the American Solar Manufacturers Against Chinese Circumvention contained in this submission is accurate and complete to the best of my knowledge. I am aware that the information contained in this submission may be subject to verification or corroboration (as appropriate) by the U.S. Department of Commerce. I am also aware that U.S. law (including, but not limited to, 18 U.S.C. 1001) imposes criminal sanctions on individuals who knowingly and willfully make material false statements to the U.S. Government. In addition, I am aware that, even if this submission may be withdrawn from the record of the AD/CVD proceeding, the U.S. Department of Commerce may preserve this submission, including a business proprietary submission, for purposes of determining the accuracy of this certification. I certify that a copy of this signed certification will be filed with this submission to the U.S. Department of Commerce.

[ ]

Date: August 16, 2021

COMPANY CERTIFICATION

I, [ ], a member company of the American Solar Manufacturers Against Chinese Circumvention, certify that I prepared or otherwise supervised the preparation of the attached submission, *Request for Circumvention Ruling Pursuant to Section 781(b) of the Tariff Act of 1930*, filed on August 16, 2021, pursuant to the Antidumping and Countervailing Duty Orders on *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China* (Case Nos. A-570-979 and C-570-980). I certify that the public information and any business proprietary information of [ ] contained in this submission is accurate and complete to the best of my knowledge. I am aware that the information contained in this submission may be subject to verification or corroboration (as appropriate) by the U.S. Department of Commerce. I am also aware that U.S. law (including, but not limited to, 18 U.S.C. 1001) imposes criminal sanctions on individuals who knowingly and willfully make material false statements to the U.S. Government. In addition, I am aware that, even if this submission may be withdrawn from the record of the AD/CVD proceeding, the U.S. Department of Commerce may preserve this submission, including a business proprietary submission, for purposes of determining the accuracy of this certification. I certify that a copy of this signed certification will be filed with this submission to the U.S. Department of Commerce.

[ ]

Date: August 16, 2021

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I, [ ], a member company of the American Solar Manufacturers Against Chinese Circumvention, certify that I prepared or otherwise supervised the preparation of the attached submission, *Request for Circumvention Ruling Pursuant to Section 781(b) of the Tariff Act of 1930*, filed on August 16, 2021, pursuant to the Antidumping and Countervailing Duty Orders on *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China* (Case Nos. A-570-979 and C-570-980). I certify that the public information and any business proprietary information of [ ] contained in this submission is accurate and complete to the best of my knowledge. I am aware that the information contained in this submission may be subject to verification or corroboration (as appropriate) by the U.S. Department of Commerce. I am also aware that U.S. law (including, but not limited to, 18 U.S.C. 1001) imposes criminal sanctions on individuals who knowingly and willfully make material false statements to the U.S. Government. In addition, I am aware that, even if this submission may be withdrawn from the record of the AD/CVD proceeding, the U.S. Department of Commerce may preserve this submission, including a business proprietary submission, for purposes of determining the accuracy of this certification. I certify that a copy of this signed certification will be filed with this submission to the U.S. Department of Commerce.

[ ]

Date: August 16, 2021

COMPANY CERTIFICATION

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[ ]

Date: August 16, 2021

REPRESENTATIVE CERTIFICATION

I, Timothy C. Brightbill, with Wiley Rein LLP, counsel to the American Solar Manufacturers Against Chinese Circumvention, certify that I have read the attached submission, *Request for Circumvention Ruling Pursuant to Section 781(b) of the Tariff Act of 1930*, filed on August 16, 2021, pursuant to the Antidumping and Countervailing Duty Orders on *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China* (Case Nos. A-570-979 and C-570-980). In my capacity as counsel for this submission, I certify that the information contained in this submission is accurate and complete to the best of my knowledge. I am aware that U.S. law (including, but not limited to, 18 U.S.C. 1001) imposes criminal sanctions on individuals who knowingly and willfully make material false statements to the U.S. Government. In addition, I am aware that, even if this submission may be withdrawn from the record of the AD/CVD proceeding, the U.S. Department of Commerce may preserve this submission, including a business proprietary submission, for purposes of determining the accuracy of this certification. I certify that a copy of this signed certification will be filed with this submission to the U.S. Department of Commerce.

Signature: Timothy C. Brightbill
Timothy C. Brightbill

Date: August 16, 2021

<u>CERTIFICATE OF SERVICE</u>

PUBLIC SERVICE

Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China
A-570-979 & C-570-980
Anti-Circumvention Inquiry

I certify that a copy of this public submission was served on the following parties, via electronic service, on August 16, 2021.

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EXHIBIT LIST		
Exhibit No.	**Description**	**Security**
1	Expert Report	Public Version
2	Jinko Solar Malaysia 2019 Financial Statements	Public
3	LONGi Group 2020 Annual Report (excerpt)	Public
4	LONGi Malaysia 2019 Financial Statements	Public
5	JA Solar Website Excerpts	Public
6	Sangeetha Amarthalingam, *JA Solar to Begin Exporting Solar Cells from Malaysia Next Month*, The Edge Markets (Oct. 21, 2015)	Public
7	*Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled Into Other Products: Monitoring Developments in the Domestic Industry*, Inv. No. TA-201-075, USITC Pub. 5021 (Feb. 2020) (Monitoring) (excerpt)	Public
8	[ ] (excerpt)	Public Version
9	Jinko Solar Group Website Excerpts	Public
10	*Solar PV Trade and Manufacturing: A Deep Dive*, BloombergNEF (Feb. 2021) (excerpt)	Public
11	Official Import Statistics	Public
12	*Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190, USITC Pub. 4874 (Mar. 2019) (Review) (excerpt)	Public
13	Memorandum from Lauren Caserta, Int'l Trade Compliance Analyst, Off. VII, AD/CVD Operations, through Melissa G. Skinner, Senior Director, Off. VII, AD/CVD Operations, to James Maeder, Deputy Assistant Sec'y for AD/CVD Operations, re: *Final Scope Ruling on the Antidumping and Countervailing Duty Orders on Crystalline Silicon Photovoltaic Cells from the People's Republic of China: ET Solar Inc.* (June 15, 2021) (PUBLIC VERSION)	Public

EXHIBIT LIST		
Exhibit No.	**Description**	**Security**
14	Memorandum from Peter Shaw, Int'l Trade Compliance Analyst, AD/CVD Operations, through Melissa G. Skinner, Senior Director, Off. VII, AD/CVD Operations, to James Maeder, Deputy Assistant Sec'y for AD/CVD Operations, re: *Antidumping and Countervailing Duty Orders on Crystalline Silicon Photovoltaic Cells from the People's Republic of China, and Certain Crystalline Silicon Photovoltaic Products from Taiwan: The Solaria Corporation Scope Ruling* (Apr. 8, 2021)	Public
15	[ ] Data	Public Version
16	Mark Osborne, *LONGi Solar Strikes Deal to Buy Vietnam-Based OEM Vina Solar*, PV Tech (Feb. 24, 2020)	Public
17	JA Solar Malaysia Datamyne Website Excerpts	Public
18	*Jinkosolar Plans to Build a Cell & Module Manufacturing Facility in Penang, Malaysia*, Jinko Solar Holding Co., Ltd. (Mar. 19, 2015) (excerpt)	Public
19	JinkoSolar Holding Co., Ltd., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2020) (excerpt)	Public
20	[ ] (excerpt)	Public Version
21	Mark Osborne, *LONGi Secures Major Polysilicon Supply Deal from OCI Malaysia and 46GW of Solar Glass from Flat Glass*, PV Tech (Feb. 10, 2021)	Public
22	Mark Osborne, *JA Solar Adding 10,000MT of Monocrystalline Silicon Ingot Capacity*, PV Tech (Feb. 24, 2020)	Public
23	Anu Bhambhani, *JA Solar to Expand Vertical Integrated Production Capacity of Ingot, Wafer, Solar Cell & Modules for RMB 10.39 Billion Investment*, Taiyang News (Sept. 17, 2020)	Public
24	Liam Stoker, *Daqo New Energy and JA Solar Pen Long-Term High-Purity Polysilicon Supply Deal*, PV Tech (May 12, 2021)	Public

EXHIBIT LIST		
Exhibit No.	**Description**	**Security**
25	Tang Shihua, *China's JA Solar Inks Third Major Polysilicon Purchase Deal in a Month*, Yicai Global (May 13, 2021)	Public
26	Joan Fitzgerald, *The Case for Taking Back Solar*, The American Prospect (Mar. 24, 2021)	Public
27	Canadian Solar Inc., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2020) (excerpt)	Public
28	Hong Wang, *New Policies Set to Ease China Solar Glass Production Constraints Amidst Soaring Costs*, PV Tech (Nov. 19, 2020)	Public
29	[ ] (excerpt)	Public Version
30	Jack Wong, *China-Based LONGi to Invest RM100mil More in Malaysia*, The Star (Nov. 20, 2017)	Public
31	Vincent Shaw & Max Hall, *Chinese PV Industry Brief: More Manufacturing Capacity from Trina, GCL Integration and Eging PV*, PV Magazine (Jan. 5, 2021)	Public
32	Tang Shihua, *China's Flat Glass Hits Limit Up on USD2.2 Billion PV Glass Deal With Jinko Solar*, Yicai Global (Dec. 31, 2020)	Public
33	Global Trade Information Services Malaysian Import Data	Public
34	JA Solar Malaysia 2019 Financial Statement (excerpt)	Public
35	Vincent Shaw & Max Hall, *Chinese PV Industry Brief: New Solar Glass Factory in Jiangsu, Longi Maintains Wafer Prices Unchanged*, PV Magazine (June 25, 2021)	Public
36	Sladjana Djunisic, *Xinte Energy Proposes to Build 100,000-Tonne-Per Year Polysilicon Production Plant*, Renewables Now (Mar. 2, 2021)	Public
37	Ian Clover, *GCL-Poly Investing $826m in Construction of 60,000 MT Polysilicon Plant in China*, PV Magazine (Apr. 6, 2017)	Public

EXHIBIT LIST		
Exhibit No.	**Description**	**Security**
38	*Hemlock Semiconductor Corporation*, Wikipedia (last accessed July 6, 2021)	Public
39	Mark Osborne, *LONGi Investing US$875 Million in 2020 Production Capacity Expansion Plans*, PV Tech (Apr. 17, 2019)	Public
40	Mark Osborne, *JA Solar's Capacity Expansion Announcements in 2020 Top 104GW Across Wafter, Cell and Modules*, PV Tech (Sept. 24, 2020)	Public
41	Vincent Shaw & Max Hall, *Chinese PV Industry Brief: Tongwei Plans 200,000 MT Polysilicon Factory*, PV Magazine (July 2, 2021)	Public
42	Steven Mufson, *China's Growing Share of Solar Market Comes at a Price*, Washington Post (Dec. 16, 2011)	Public
43	*TBEA Announces Plan of Domestic Listing of Its Subsidiary Xinte Energy*, PVTIME (Jan. 15, 2021)	Public
44	TBEA Website Excerpts	Public
45	Mark Osborne, *LONGi to Build New 1GW Mono Solar Cell Plant in Malaysia*, PV Tech (Feb. 25, 2019)	Public
46	Ian Clover, *JA Solar Completes $70m Malaysian Fab*, PV Magazine (Oct. 21, 2015)	Public
47	Mark Osborne, *LONGi Approves 10GW of Module and 5GW of New Solar Cell Capacity Expansion Plans*, PV Tech (Oct. 15, 2019)	Public
48	Mark Osborne, *JA Solar Takes Solar Cell Capacity Plans at Yangzhou Plant to 10GW*, PV Tech (Jan. 26, 2021)	Public
49	Sam Pothecary, *JA Solar Announces Facility Expansion in Malaysia*, PV Magazine (Oct. 6, 2016)	Public
50	*JA Solar Reaches Important Milestone: Monocrystalline PV Product Shipments Total 7GW Over Last Decade*, JA Solar (July 26, 2016)	Public

EXHIBIT LIST		
Exhibit No.	**Description**	**Security**
51	*Jinkosolar's R&D Center in Penang, Malaysia Continues to Give Return on Investment*, PV Tech (Dec. 26, 2019)	Public
52	*Foreign Exchange Rates - H.10: Historical Rates for the Chinese Yuan Renminbi*, Federal Reserve (July 6, 2021)	Public
53	Mark Osborne, *LONGi Sets Solar Industry Record for R&D Spending*, PV Tech (Apr. 9, 2018)	Public
54	LONGi Website Excerpts	Public
55	JA Solar Holdings Co., Ltd., United States Securities and Exchange Commission, Form 20-F (for the fiscal year ended December 31, 2017) (excerpt)	Public

EXHIBIT 1

EXPERT REPORT FOR CRYSTALLINE SILICON PV MANUFACTURING

SECRETARY OF COMMERCE

Anti-Circumvention Inquiry
DOC Case Nos. A-570-979/C-570-980
Prepared for Wiley Rein LLP

[ ]
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[ ]

Expert Report
August 13, 2021

DECLARATION

I, [ ] declare that this Report was prepared on behalf of Wiley Rein LLP ("Wiley") in connection with its request for an anti-circumvention inquiry ("ACV Inquiry") concerning certain imports of crystalline silicon photovoltaic ("CSPV") cells and modules from the People's Republic of China ("China").

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Expert Report
August 13, 2021

Introduction

This report examines the crystalline silicon PV manufacturing supply chain in China from polysilicon to PV module production. The manufacturing supply chain includes five major steps, as shown in Figure 1.

- Polysilicon manufacturing
- Ingot manufacturing
- Wafer manufacturing
- Cell manufacturing
- PV module manufacturing

China's growth in the PV industry since 2010 is detailed in Table 1. While attention has been focused on the cell and module production steps, China also dominates polysilicon and wafer production, at 80 percent and 95 percent of the world's production in 2020, respectively.

Table 1
China Production Metrics Across the Crystalline Silicon PV Industry (1)

Year	Polysilicon (metric tons)	Wafers (MW)	Cells (MW)	Modules (MW)
2010	45,000	11,000	10,800	10,800
2011	84,000	20,000	21,000	21,000
2012	71,000	26,000	23,000	23,000
2013	84,600	29,500	25,100	27,400
2014	136,000	38,000	33,000	35,600
2015	165,000	48,000	41,000	45,800
2016	194,000	64,800	51,200	53,700
2017	242,000	91,700	72,000	75,000
2018	259,000	109,200	87,200	85,700
2019	342,000	134,600	108,600	98,600
2020	392,000	161,300	134,800	124,600

(1) Annual production metrics as detailed by the China Photovoltaic Industry Association ("CPIA") Development Road Map of China's Photovoltaic Industry for 2018, 2019 and 2020 (collectively, the "CPIA Development Reports"). Reports downloaded from http://www.chinapv.org.cn/road_map.html on 6/27/2021.

Figure 1
Supply Chain for the Crystalline Silicon PV Industry

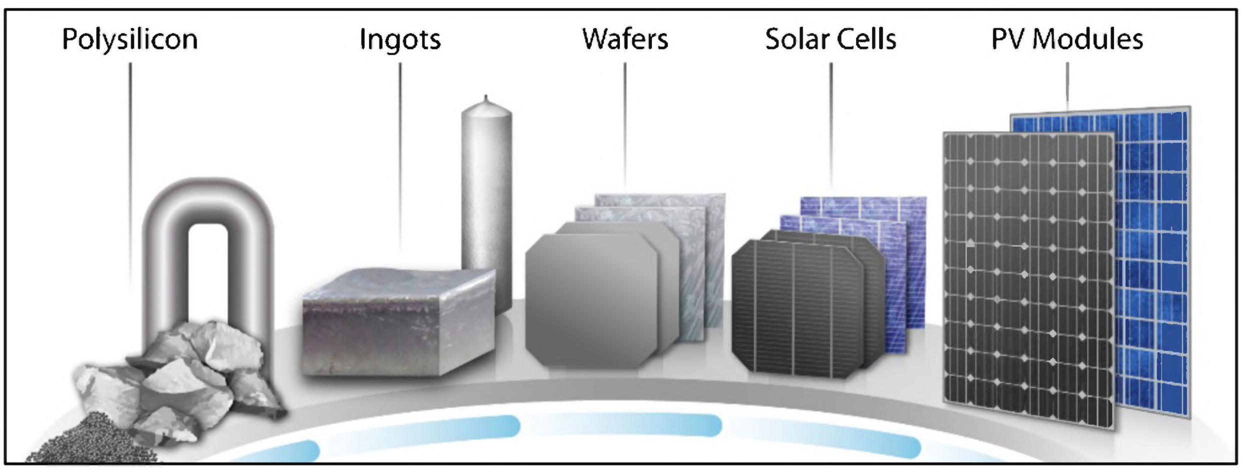


Image Credit: "Crystalline Silicon Photovoltaic Module Manufacturing Costs and Sustainable Pricing: 1H 2018 Benchmark and Cost Reduction Road Map" Source: NREL Technical Report TP-6A20-72134 Revised February 2020 (the "NREL PV Manufacturing Report")

Polysilicon Production

Market Overview

China was the leading global producer of polysilicon feedstock in 2020, accounting for roughly 80 percent of solar-related polysilicon production and 84 percent of production capacity. China-based polysilicon production was 392,000 metric tons ("MT") versus 525,000 MT worldwide. Seven of the top ten polysilicon manufacturers were located in China as shown in Table 2. This concentration of polysilicon manufacturing represents a large expansion in China over the last 10 years. In contrast, China had only one of the top ten polysilicon manufacturers in 2011, representing only 11 percent of worldwide production capacity.

Table 2
Global Top 10 Polysilicon Manufacturers by Actual Production in 2020 (1)

Rank	Company	Manufacturing Locations	Total Capacity (2) (metric tons)
1	Tongwei Co., Ltd.	China	96,000
2	Wacker Chemie AG	Germany/USA	85,000
3	Daqo New Energy Corp.	China	80,000
4	GCL-Poly Energy Holdings Ltd.	China	100,000
5	Xinte Energy Co., Ltd.	China	80,000
6	Xinjiang East Hope New Energy Co., Ltd.	China	60,000
7	OCI Company Ltd.	S. Korea/Malaysia	36,500
8	Asia Silicon (Qinghai) Co., Ltd.	China	22,000
9	Hemlock Semiconductor Operations LLC	USA	18,000
10	Inner Mongolia Dongli PV Electronics Co., Ltd.	China	12,000

(1) As reported on the Beunreuter Research website accessed from https://www.bernreuter.com on 8/10/2021.
(2) Reported annual capacity at the end of 2020. Table rankings are by actual polysilicon shipments, not production capacity.

Manufacturing Process

Most polysilicon production in China is based on a modified Siemens method, with less than three percent attributed to the fluidized bed reactor ("FBR") method. An overview of the modified Siemens method is provided here, with the understanding that some manufacturers may vary slightly from this process.

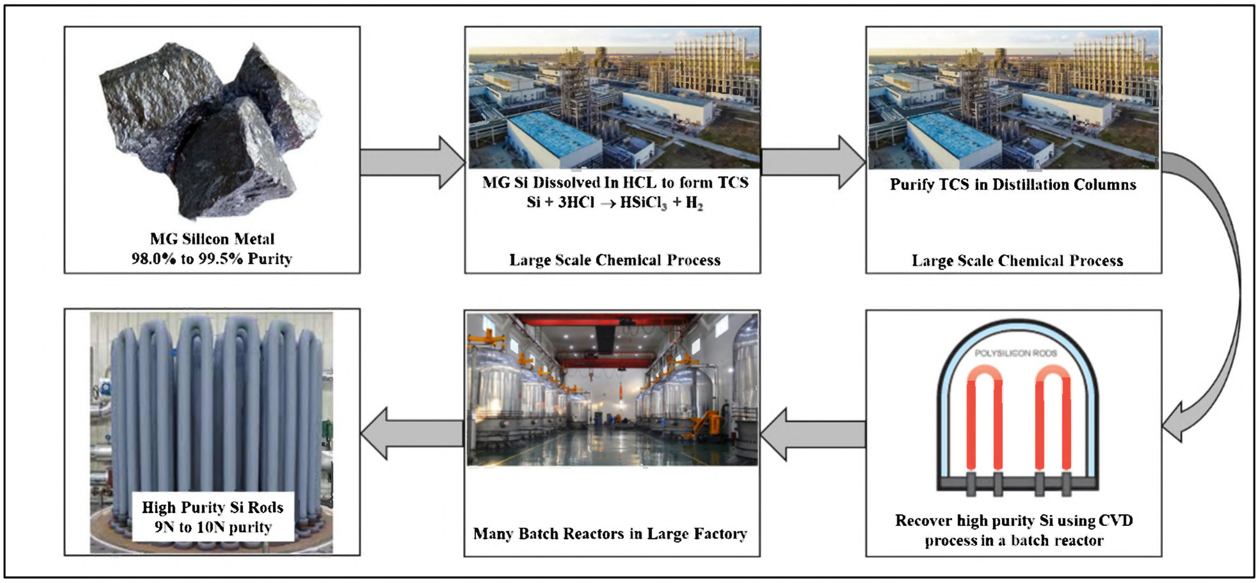
The modified Siemens method is a large-scale, mature chemical manufacturing process. Most new production facilities have been constructed in China, with new factories on the scale of 100,000 tons per year planned for the near future. This equates to 275 tons per day at full capacity, representing a very large-scale operation.

A schematic of the modified Siemens process is shown in Figure 2. The following description is a general overview of the process, as reported by China-based polysilicon manufacturers. In the modified Siemens process, metallurgical grade ("MG") silicon is converted to volatile chlorosilane and distilled before converting it to high-purity silicon via a chemical vapor deposition ("CVD") process.

The modified Siemens process is comprised of three distinct manufacturing steps:

- Trichlorosilane ("TCS") gas production
- TCS purification by distillation
- Deposition of high purity silicon by CVD

Figure 2
Modified Siemens Process for Polysilicon Manufacturing



TSC Production

TCS is formed from MG-Si and liquid chlorine though an in-house, integrated manufacturing process. In the first step, liquid chlorine is vaporized to chlorine gas. The chlorine gas is routed to a furnace where it is reacted with hydrogen to form hydrogen chloride ("HCl"). TCS is formed from the combination of MG-Si in powder form and HCl gas in a hydrochlorination process.

Distillation

In the distillation step, TCS is purified to form high-purity feedstock. In the distillation process, the TCS components are separated based on the differences in their respective boiling points. Impurities in the raw TCS gas from the MG-Si feedstock, such as boron, phosphorous and metal halides are separated out, resulting in a high-purity TCS.

Deposition

In the deposition step, the high-purity TCS is vaporized, mixed with hydrogen gas and fed into a batch CVD reactor. The mixed gas passes over thin silicon filament rods heated to 1,100°C. High-purity silicon is deposited on the surface of the rods via a CVD process. The TCS and hydrogen are continuously fed into the reactor until the desired diameter of polysilicon rod is achieved.

The resulting product is high-purity silicon rods which are broken into chunks and sealed in plastic bags with inert gas for shipment. Compared to the incoming MG-Si feedstock at roughly 99.0 percent purity, the purity of the resulting polysilicon rods is much higher. We note that when referring to purity, 99.99999 percent purity is referred to as "seven-nines" or 7N purity, 99.999999 percent as 8N purity and so on.

Generally, grades of polysilicon are as follows:

- Solar grade for multi-crystalline Si ("multi-Si") wafers: 7N to 8N purity
- Solar grade for monocrystalline silicon ("mono-Si) wafers: 9N to 10N purity
- Electronics grade for semiconductor wafers: 10N to 11N purity

Capital Cost, Energy Use and Productivity

The capital cost requirements for polysilicon are the most significant in the PV module supply chain, with recent announcements placing the cost for a new facility in the range of $1,400M USD per 100,000 tons.

- In 2018, Daqo New Energy ("Daqo") announced a new 35,000 ton polysilicon facility in Xinjiang, China. The capital expenditure was quoted as approximately $502M USD.
- In 2020, Tongwei Group ("Tongwei") announced a new 40,000 ton facility in Yunnan Province, China covering 800 approximately acres. The capital expenditure was noted as $563M USD.
- In 2021, Xinte Energy ("Xinte") announced plans to build a new 100,000 ton facility in Baotou, Inner Mongolia, China with an associated capital expenditure of $1,350M USD.

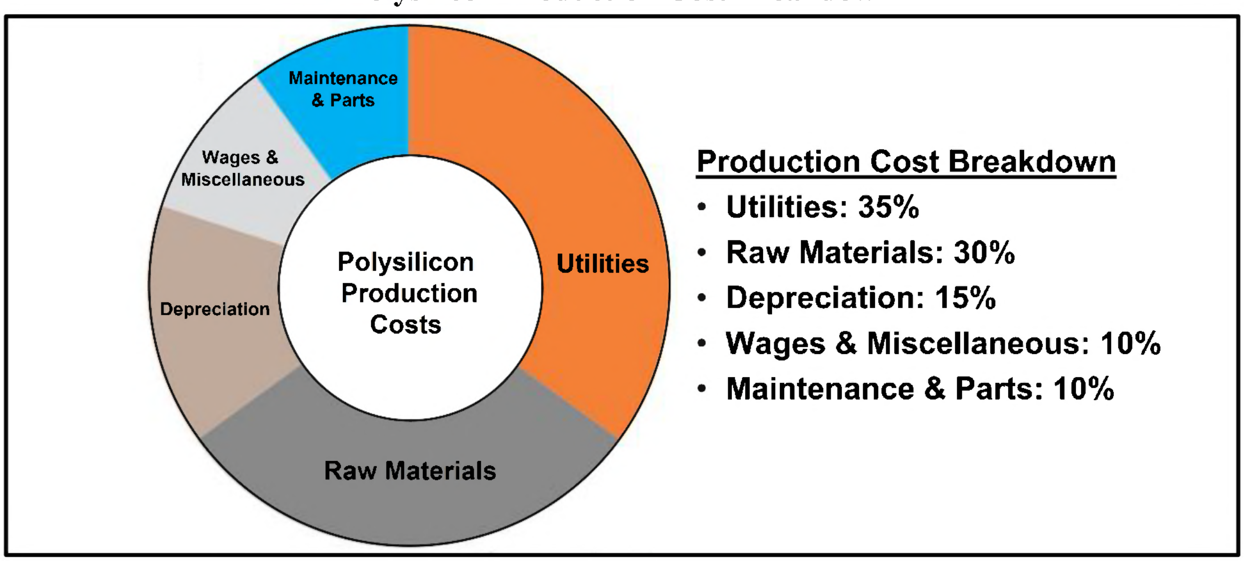
The expansions noted above are supported by long-term supply contracts with Chinese PV suppliers. For example, JA Solar and Longi Group have 5-year contracts with Xinte for 97,200 and 270,000 tons of polysilicon, respectively.

A cost breakdown for polysilicon production is shown in Figure 3, as reported by Daqo in its 2020 annual report. Daqo is a top ten supplier with most of its production dedicated to high-purity polysilicon, so it is a good representative for the Chinese polysilicon industry. Daqo reports spending roughly one percent of revenues on R&D, with all of its manufacturing and R&D facilities located in China.

Utilities are the largest portion of the production cost (35%), followed by raw materials (30%), equipment depreciation (15%), wages (10%) and maintenance/parts (10%). Polysilicon factories are located in regions with low and/or subsidized energy costs as indicated by the following quote: "Currently electricity is the largest component of our polysilicon production costs. In our polysilicon manufacturing facilities in Xinjiang, because of the abundant coal resources, the local electricity rate is much lower than in most areas in China" (Daqo New Energy, 2020 Annual Report). CPIA quoted the average power consumption at 70 kWh/kg-Si, which equates to 7,000 GWh of power for a 100,000 ton factory. This is roughly three times higher power consumption than the next greatest process step, ingot production.

The major raw materials are MG-Si, liquid chlorine, nitrogen, calcium oxide and hydrogen. Although not addressed in this Report, we note that MG-Si from China has been subject to anti-dumping actions.

Figure 3
Polysilicon Production Cost Breakdown



(1) As reported in Daqo's 2020 annual report (Form 20-F SEC filing)

Ingot and Wafer Manufacturing

Market Overview

China accounted for 95 percent of the worldwide production of wafers in 2019 according to CPIA, with all of the top ten wafer manufacturers in China. Similar statistics were reported by the International Energy Agency ("IEA") PV Power Systems Program ("PVPS") in its 2020 report on the PV market industry (the "IEA Report") available at https://iea-pvps.org/trends-reports/. The wafer is the most critical component with respect to PV module performance and represents the highest percentage of the bill of materials ("BOM") cost, as will be discussed in more detail later in the Report.

Mono-Si wafers manufactured via the Czochralski ("Cz") process accounted for over 90 percent of the PV market in 2020. Multi-Si wafers produced using the directional solidification ("DS") process had the majority market share prior to 2019. However, there has been a rapid adoption of mono-Si wafers over the last few years. The Cz process has been used for decades in the semiconductor industry to manufacture electronic grade wafers for integrated circuits.

Manufacturing Process

Multicrystalline Silicon Wafers

A schematic of the DS process is shown in Figure 4. Polysilicon feedstock is loaded into a rectangular quartz crucible and placed into a vacuum furnace. The feedstock is melted, annealed and cooled to form a large, rectangular multi-Si ingot. The multi-Si ingots formed by the DS process have lower purity and more grains compared to single crystal mono-Si ingots formed by the Cz process. After ingot formation, the crucible is removed, and the ingot edges are cropped. The ingot is sawed into bricks, which are ground, polished, glued to a glass substrate and sawed into individual wafers.

Figure 4

Direct Solidification Method for multi-Si Wafers for PV Manufacturing

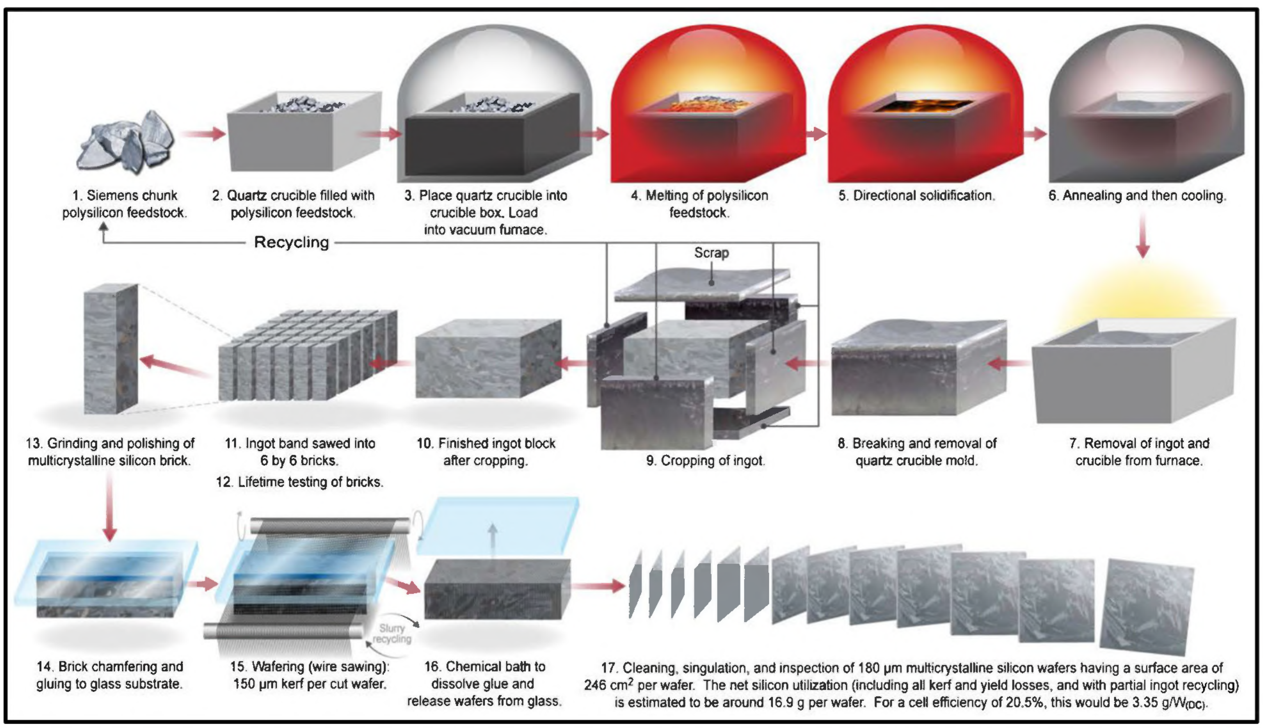


Image Credit: NREL PV Manufacturing Report

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Though not discussed in detail in this Report, there has been a trend towards larger wafer sizes over the last few years. The standard wafer size for multi-Si wafers was 156 mm on a side with rounded corners, referred to as the "M0" wafer size. Wafers denoted by "M" in the name refer to pseudo-square wafers with rounded corners. Wafers denoted by "G" in the name refer to fully-square wafers.

M3 wafers are pseudo square with a length of 158.75 mm, slightly larger than M0 wafers. A wafer with a larger area produces more power given the same material properties. Hence, bigger is better when it comes to wafer size. The "G1" wafer size is also 158.75 mm on a side but has an area that is 0.7 percent larger than the M3 wafer due to its fully square shape. The largest wafers under consideration are "G12" wafers, which are fully-square and 210 mm on a side. This wafer size is 80 percent larger than the M3 size, representing a simple and straightforward method to increase module power. The trend towards larger wafer sizes is expected to increase the shift away from multi-Si wafers, as additional capital investments will be required to adjust and optimize the DS process for larger wafers.

Monocrystalline Silicon Wafers

A schematic of the Cz process for mono-Si wafers is shown in Figure 5. Polysilicon chunks are loaded into a round crucible. The polysilicon is slowly melted and dopants are added. A seed crystal is introduced into the melt and pulled up while being rotated to form an ingot of high purity, single-crystal silicon. The process is referred to as "crystal pulling" and is slower compared to the DS process.

The crystal pulling process results in a long, cylindrical boule of single-crystal silicon. The ends are removed and the boule is formed into a brick, all by sawing. The resulting brick is ground, polished, glued to a glass substrate and sliced into wafers.

Figure 5
Czochralski Method in PV Manufacturing for mono-Si Wafers

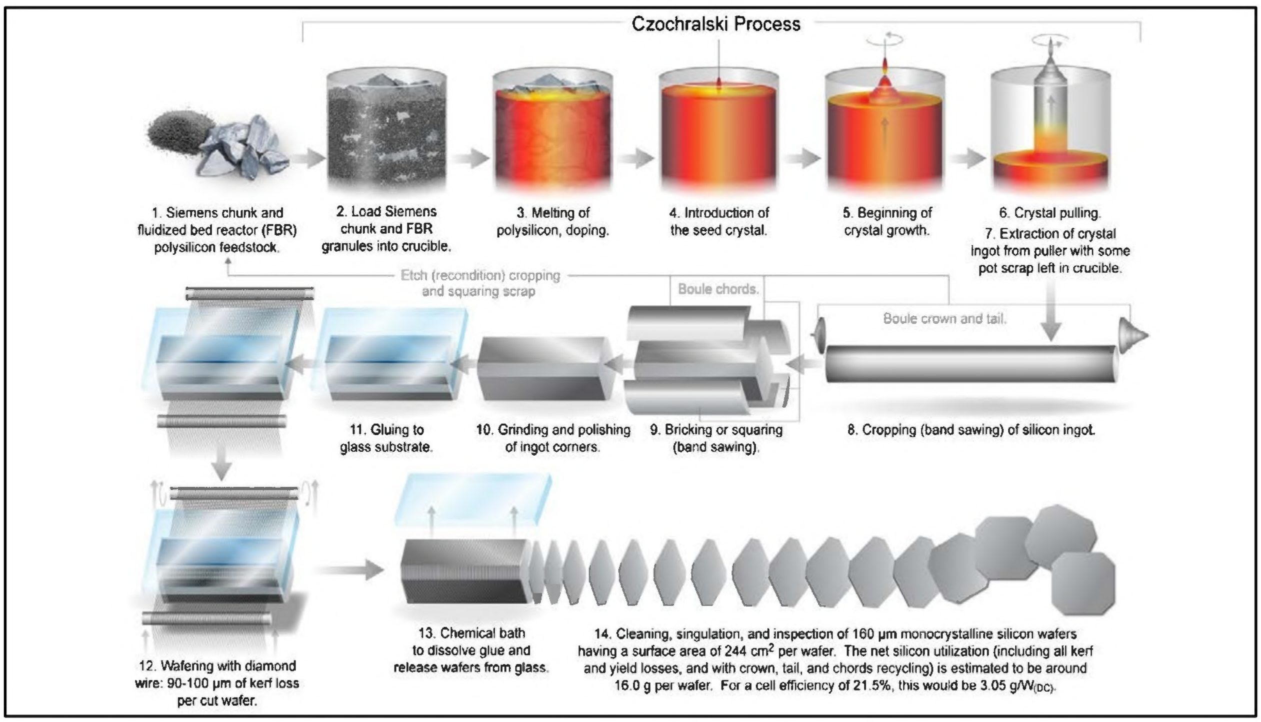

Image Credit: NREL PV Manufacturing Report

CPIA reported the charging rate for a single furnace as 1,900 kg in 2020. This is higher than the reported charging rate for the DS process at 1,100 kg. While the Cz process is slower and consumes more energy, the resulting mono-Si wafers are of higher quality and purity compared to multi-Si wafers.

Most silicon wafers are "p-type" material doped with gallium, representing a shift from the boron-doped wafers used previously. The next major transition in the wafer market is expected to be towards n-type wafers, which have even higher performance, but currently represent less than 5 percent of the market.

Capital Cost, Energy Use and Productivity

The capital cost requirements for ingot/wafer production are the second highest in the PV module supply chain. Recent announcements place the cost for a new ingot/wafer facility in the range of $45M to $70M USD per GW for Cz-based mono-Si production facilities in the 15 GW to 20 GW size range in China (*i.e.*, a range of $645M to $1,400M in total).

- In 2018, GCL-Poly announced plans to build a 20 GW mono-Si ingot facility in Yunnan Province at a capital cost of $1,430M USD.
- In 2019, LONGi announced plans to construct a new 15 GW ingot/wafer facility in the Yinchuan Economic and Technological Development Zone, Ningxia Province for a capital cost of $645M USD.

For an integrated supply covering polysilicon to ingot/wafer, the required capital investment would exceed $1,700M USD for a 20 GW supply of polysilicon, ingot and wafers. This assumes 30,000 tons of polysilicon required for 10 GW of wafers using the assumptions as detailed in the NREL PV Manufacturing Report. This equates to a 60,000 ton polysilicon facility meeting the supply requirements 20 GW ingot/wafer facility.

The power consumption of the Cz process is 26 kWh/kg-Si, roughly four times that of the DS process. Similar to polysilicon production facilities, ingot facilities also tend to be located in areas with cheap and/or subsidized electricity. Specific power consumption data is not readily available for cell conversion and module assembly. However, it is widely accepted that highly intense power requirements of polysilicon and ingot/wafer production steps substantially exceed that of cell conversion and module assembly.

Cell Manufacturing

Market Overview

China accounted for 78 percent of global cell production in 2019, as detailed in the CPIA and IEA Reports. CPIA reported twenty manufacturers in China with manufacturing capacities above 2 GW and four above 10 GW. The large number of cell manufacturers compared to polysilicon and ingot/wafer manufacturers is indicative of a lower entry barrier at this stage of the supply chain.

Over the last few years, the market has shifted towards passivated emitter and rear contact ("PERC") cells, which have higher efficiency compared to traditional aluminum back side field ("Al-BSF") cells. According to the CPIA, the market share of PERC cells reached 86 percent in 2020, with traditional Al-BSF cells falling to under 10 percent.

The trend towards PERC technology and larger wafers has driven the requirement for both new cell manufacturing facilities and upgrades to existing ones.

Cell Manufacturing Process

In the cell manufacturing process, incoming silicon wafers undergo a series of processing steps to create the current-generating PV device structure and metal interconnects to collect the current. The manufacturing process flow is shown in Figure 6.

The major steps in the PERC cell manufacturing process are as follows:

- Wet etch process to clean the wafer, remove saw damage and texture the surface
- Emitter formation by a batch phosphorous oxychloride ("$POCL_3$") diffusion process
- Phosphosilicate glass ("PSG") removal and edge isolation step by wet chemical process
- Silicon nitride ("SiN") anti-reflective coating and rear aluminum oxide ("Al_2O_3") passivation
- Laser contact opening on the back side of the wafer
- Metallization formation via screen printing and firing (rear-side pads and front grid lines)
- Electrical test and sort

Figure 6
PERC Cell Manufacturing Steps

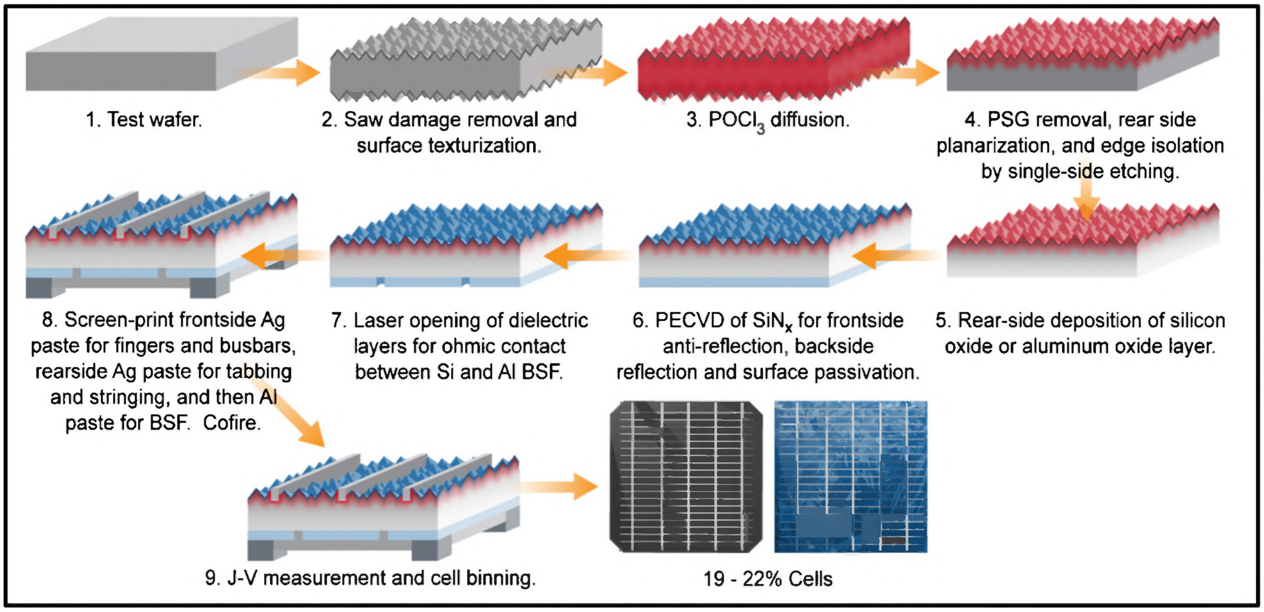

Image Credit: NREL PV Manufacturing Report

Capital Cost and Productivity

The large majority of global cell manufacturing capacity is in China, with recent manufacturing capacity additions in nearby Southeast Asian countries such as Malaysia, Vietnam and Thailand. Reported capital costs for cell factories are in the range of $40M USD to $50M USD per GW of capacity, with higher costs associated with new facilities for larger size (210 mm) mono-Si wafers.

Recent announcements of cell manufacturing facilities include the following:

- JA Solar's construction of a 3.6 GW cell facility in Hebei Province, China at a cost of $166M USD.
- JA Solar's plans to build a 6 GW cell facility in Jiangsu, China at capital cost of $254M USD.
- Trina Solar's announced plans for an investment of approximately 2.498 billion RMB ($383M USD) for a new cell facility with a design capacity of 7.5 GW.

The capital costs noted above are consistent with those reported by CPIA, which were roughly $43M USD per GW of cell production capacity. We note that some of the reported costs are for new facilities while others are associated with expansions and upgrades of existing facilities.

The CPIA Report for 2019 states that "the key equipment of PERC cell production equipment has basically completed domestication" which indicates that most of the equipment is from Chinese suppliers. This follows a trend from many other industries, where China-based companies take over not only the market for the end product (PV modules), but also the capital equipment used to manufacture the same.

From a manufacturing perspective, it is a best practice to use the same manufacturing equipment regardless of where the factory is located. Thus, it is highly likely that most new cell manufacturing facilities built outside of China also use production equipment sourced from China.

Bill of Material Cost Breakdown

In order to understand the cost breakdown for PV cells, we examined a detailed BOM for a [ ] cell manufactured in [ ] as shown in Table 3. We note that this information was provided confidentially. The [ ] wafer, sourced from China, represents the largest cost portion at [ ] percent. Considering that China's wafer capacity represented 95 percent of global production of wafers in 2020, it is highly likely that most cells processed in southeast Asia use wafers sourced from China. Even this [ ].

Table 3
[ ] Cell BOM Cost Breakdown

Item	Process Step	Cost Fraction (%)	Comment
Wafer	Incoming Material	[ ]	[ ]
Ag Paste	Metallization	[ ]	[ ]
Screens	Metallization	[ ]	[ ]
Chemicals	Texturing	[ ]	[ ]
Chemicals	Edge Isolation	[ ]	[ ]
Chemicals	Passivation/Diffusion	[ ]	[ ]
Gases	Facility Scrubber	[ ]	[ ]
Al Paste	Metallization	[ ]	[ ]
Packaging	Shipping	[ ]	[ ]

Module Manufacturing

Market Overview

According to the CPIA and IEA Reports, China accounted for over 70% of global module production in 2020, with three manufacturers exceeding 10 GW of production and the top suppliers accounting for 55 percent of module production. Chinese suppliers have followed the recent trend of opening module assembly facilities in nearby Southeast Asian countries such as Malaysia, Vietnam and Thailand.

The major technology trends in the module market have been towards the use of half-cells, mono-Si PERC cells, larger module sizes and bifacial module. The CPIA Reports state that half-cell modules represented over 70 percent of the market share in 2020.

Module Manufacturing Process

Figure 7 shows the basic elements of a crystalline silicon PV module and Figure 8 shows the basic manufacturing steps. The basic manufacturing process has not changed appreciably in recent years. The only major change with respect to module factories has been the scale, with many new factories well above 1 GW in production capacity.

Figure 7
Key Elements of a PV Module

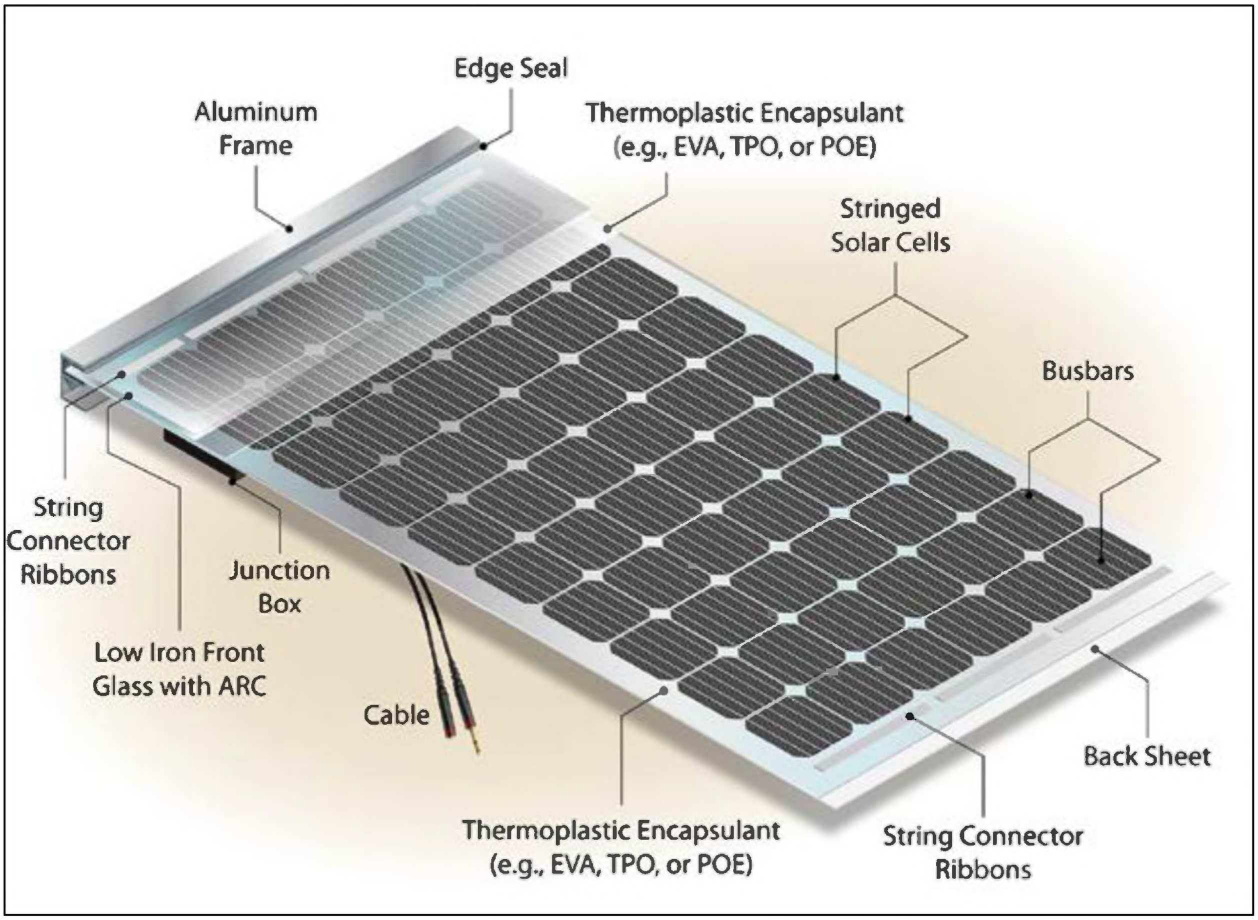

Image Credit: NREL PV Manufacturing Report

PV cells are soldered together to form cell strings. The cell strings are connected to bus bars and the resulting assembly is laminated between two layers of ethylene vinyl acetate ("EVA") encapsulant, a back sheet and a tempered glass plate. The EVA protects the cell matrix from the environment and bonds the laminate together. The frame and tempered glass provide mechanical strength. Silicone is placed within the frame to secure the laminate and provide additional strength. A junction box is mounted to the back of the module with silicone to allow for an electrical connection to the cell strings within the module.

The recent changes at the cell level (PERC cells, half-cells, larger cells, bifacial cells) have not had an appreciable change to the module structure or manufacturing process. In the case of bifacial cells, this has driven the use of either glass-glass packaging or transparent back sheets, but neither of these changes has required a significant change to manufacturing processes or costs.

Figure 8
PV Module Manufacturing Process

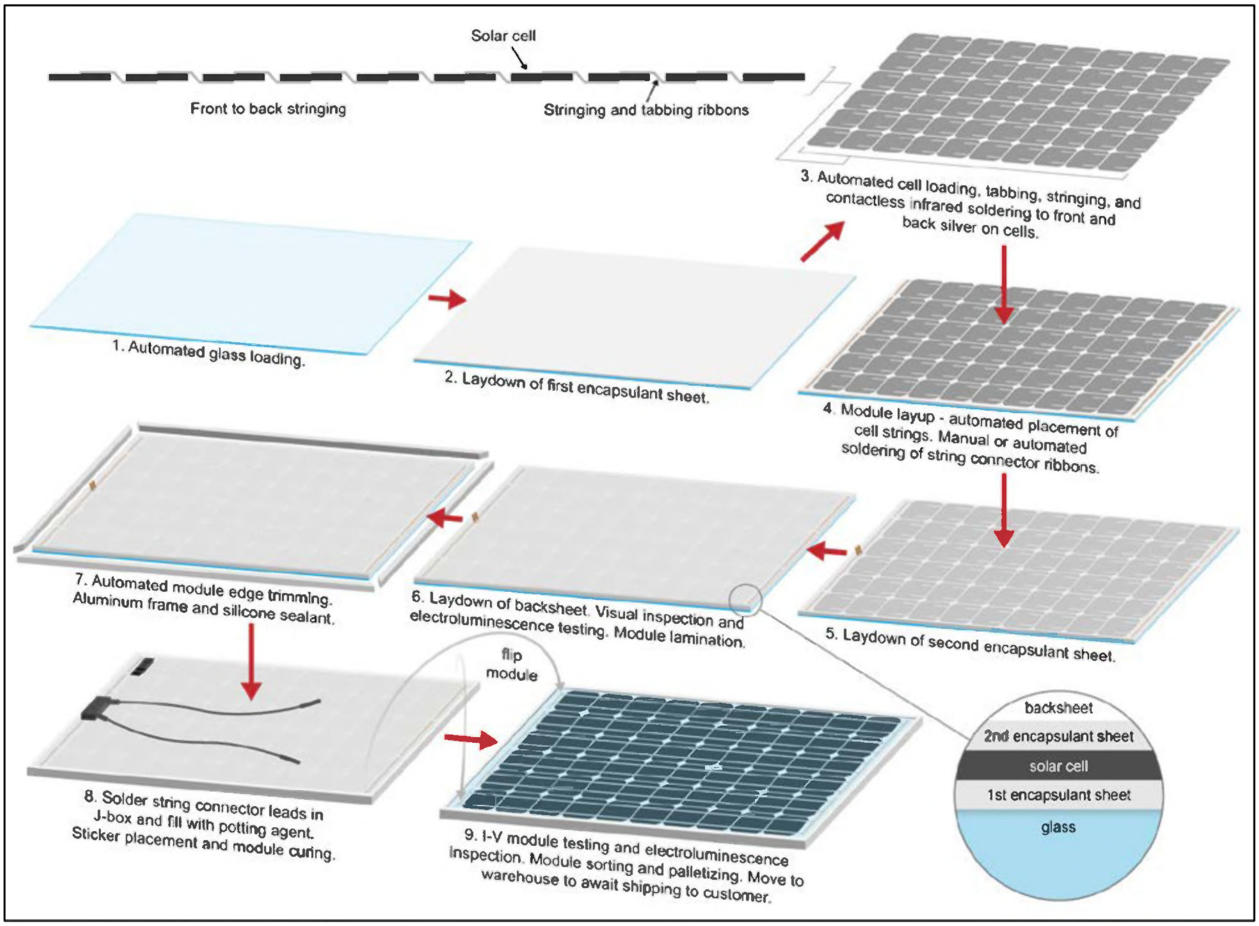

Image Credit: NREL PV Manufacturing Report

Capital Cost and Productivity

Recent announcements of new module production facilities indicate capital costs in the range of $20M USD to $30M USD per GW for module-only factories, which makes this the least capital-intensive step in the supply chain.

Recent announcements of module manufacturing facilities include the following:

- JA Solar plans to build a 6 GW module facility in Yangzhou, China at a cost of $122M USD.
- JA Solar plans to build a 3.5 GW module factory in Viet Yen, Vietnam at a cost of $103M USD.

We note that the CPIA reported lower capital costs at roughly 6.45 billion RMB ($10M USD) per GW of module production capacity. CPIA also stated that “all domestic component production equipment has been localized” indicating that all of the module production equipment is available from local Chinese suppliers. Some of the cost differences may be due to the factory size, location, level of automation and whether it is a new facility or an expansion of an existing one.

Bill of Material Cost Breakdown

In order to understand the cost breakdown of the materials that comprise the modules, we examined a detailed BOM for [ ] modules manufactured in [ ]. We note that this information was provided confidentially. In examining the module BOM cost breakdown, we looked at several different utility-scale modules, all using [ ] cells.

The breakdown in Table 4 shows that the BOM cost is dominated by the cell cost, which, as discussed earlier, is primarily comprised of the wafer cost. We note that this was calculated on a per piece cost basis, not a $/W_{DC}$ basis, which greatly simplifies the analysis. The BOM provided for our review included the high-volume pricing for each item, as well as the quantity of each item used in a module.

Table 4 includes the BOM breakdown if the cells are excluded from the calculation. In this case, the glass, frame and EVA and junction box account for over [ ]% of the module cost. It is our understanding that, due to the extensive supply chain in China, many Chinese module suppliers use materials sourced from China for module production, even if the factory is in a different country. It is notable that the cost attributed to the silicon wafer in this analysis represents the large majority of the module cost. [

].

Table 4
Module BOM Cost Breakdown

Material	Cost Fraction With Cells (%)	Cost Fraction without Cells (%)
Cell (Si Wafer) (2)	[ ]	-
Cell (Non-Wafer) (3)	[ ]	-
Glass	[ ]	[ ]
Frame	[ ]	[ ]
EVA	[ ]	[ ]
Junction Box	[ ]	[ ]
Back Sheet	[ ]	[ ]
Interconnects	[ ]	[ ]
Silicone Sealant	[ ]	[ ]
Shipping and Labeling	[ ]	[ ]

(1) Does not include certain variable costs (labor, electricity, maintenance), certain fixed costs (depreciation) or fixed operating expenses (R&D and SG&A).
(2) The portion of the cell cost attributable to the wafer cost only.
(3) Non-wafer cell costs include all materials and consumables used in the cell manufacturing process, except for the cost of the wafer itself. This includes all items detailed in Table 2, except for the wafer.

Overall Module Production Costs

LONGi reports overall module production costs in its annual reports. LONGi is vertically integrated from ingot/wafer through module production, so these costs are representative of the overall industry. LONGi breaks down its production costs across six categories as follows: (1) raw materials, (2) manufacturing overhead, (3) direct labor, (4) energy or power, (5) depreciation and (6) contract costs. The last category, contract costs, was introduced in 2020 and represents contract performance costs and contract acquisition costs.

Table 5 lists the production cost breakdown over the last three years (2018 through 2020) for LONGi's PV products. This encompasses all of the production steps from ingot/wafer production through modules.

The most significant cost category is raw materials at an average of 73 percent of the overall production cost, which encompasses ingot, wafer, cell and module production. LONGi reported the production of 26,602 MW of modules in 2020, 8,365 MW in 2019 and 7,276 MW in 2018. We note that the percentages of the various cost categories are consistent despite the differences in production volume. In particular, the raw material cost is very consistent at roughly 73 percent of overall production costs over this period.

Considering the BOM analyses for cells and modules, it is clear that the material costs related to silicon wafers and cells dominate the overall module production costs. Further, considering the significant capital investment required for polysilicon, ingot and wafer production, it is clear that overall module production costs are strongly impacted by the dominance of raw materials produced in China, even if the cell and module factories are located in other Southeast Asia countries.

LONGi reported research and development ("R&D") expenditures of approximately 5 percent of operating income over the same period. Consistent with most Chinese manufacturers, all of its R&D facilities are located in China.

Table 5
PV Production Cost Breakdown for Ingot/Wafer Through Module Production (1)

	2020 Production Costs		2019 Production Costs		2018 Production Costs	
Cost Category	x1,000 RMB	% of Total	x1,000 RMB	% of Total	x1,000 RMB	% of Total
Raw Materials	30,571,853	74.3	16,924,598	72.4	12,525,291	73.3
Mfg Overhead	3,576,563	8.7	2,595,724	11.1	1,621,781	9.5
Direct Labor	2,196,334	5.3	1,260,063	5.4	961,563	5.6
Energy (power)	1,799,552	4.4	1,318,800	5.6	930,440	5.4
Depreciation	1,597,218	3.9	1,290,179	5.5	1,056,620	6.2
Contract Costs	1,405,108	3.4	0	0.0	0	0.0
Total	41,145,629	100.0	23,389,364	100.0	17,095,694	100.0

(1) As publicly reported in LONGi Energy annual reports for 2018, 2019 and 2020.

Conclusions

Based on the information reviewed and as detailed herein, we are of the opinion that:

- Factories located in China account for a large majority of polysilicon production for the global solar industry with 80 percent of worldwide production in 2020.
- Factories located in China account for a large majority of the wafers produced for the global solar industry with 95 percent of worldwide production in 2020.
- The silicon wafer cost is the most significant portion of the cell BOM cost, indicating a significant impact from China-based polysilicon and wafer supply chains on cell production costs.
- The BOM cost attributable to wafers is the most significant portion of the module BOM cost, indicating a significant impact from the China-based polysilicon and wafer supply chains.
- A typical BOM for modules produced in [ ] included multiple significant cost items sourced from China, including the frame, EVA encapsulants, junction box, interconnects and silicone sealant.

- There is reason to believe that the target companies in Southeast Asia may source even more inputs from China, including, for example solar glass. This further increases the total module cost proportion attributable to Chinese raw materials, with such inputs likely constituting the vast majority of the value in modules produced by the target companies in Southeast Asia.
- Raw materials represent a significant majority (over 70 percent) of the overall module production costs, including manufacturing overhead (indirect costs), direct labor, energy and depreciation.
- The capital investment costs for a new polysilicon production facility in China have been reported in the range of $1,400M USD for a 100,000 ton facility. The polysilicon production facilities are larger, require more investment, are more energy intensive and are more complex to design and operate compared to cell and module manufacturing facilities.
- The capital investment costs for new mono-Si ingot/wafer factories in China have been reported in the range of $450M USD to $700M USD for 10 GW of capacity. Thus, the investment costs for the polysilicon and ingot/wafer portions of the solar production process substantially exceed the investment costs for the cell conversion and module assembly portions.
- Considering all of the above factors, along with the prevalence of the raw materials produced in China (polysilicon, wafers, glass, frame, EVA encapsulants, junction box, interconnects and silicone sealant), it is our belief that a significant majority of production costs for Southeast Asian third-county producers can be attributed to manufacturing stages that take place in China.

I declare under penalty of perjury under the laws of the United States of America that to the best of my knowledge, the foregoing is true and correct.

Executed in [ ] on August 13, 2021.

[ ]

[ ]

REMAINDER
OF EXHIBIT NOT CAPABLE OF PUBLIC SUMMARY

EXHIBIT 2

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These financial statements and reports of the company with * ~~Qualified~~ / Unqualified Auditors' Report for the financial year end 31 December 2019 were circulated on 29 May 2020

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Transaction Date/Time	: 02/06/2020 11:43:17			
Lodging Reference No	: ROC0206202001474			
Entity No	: 201501002886(1128218-T)			
Document(s) Lodged:	JINKO SOLAR TECHNOLOGY SDN. BHD.			
SNO	Form Type	Doc Date	Event Date	Received Date
1	667	31/12/2019	29/05/2020	02/06/2020

9/6/2020

....
Director
Lee Swee Lim

JINKO SOLAR TECHNOLOGY SDN BHD
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

FINANCIAL STATEMENTS
FOR THE YEAR ENDED 31 DECEMBER 2019

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JINKO SOLAR TECHNOLOGY SDN. BHD.
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

REPORTS AND FINANCIAL STATEMENTS
31 DECEMBER 2019

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JINKO SOLAR TECHNOLOGY SDN. BHD.
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

CORPORATE INFORMATION

Directors	Li, Xiande Chen Kangping Lee Swee Lim
Secretaries	Tan Siew Sim Leong Yit Kher
Registered Office	No. 116 2nd Floor (Room 1) Wisma Tan Ah Chye Jalan Sungai Pinang 10150 Georgetown Pulau Pinang
Business Address	2481 Tingkat Perusahaan 4A Kawasan Perusahaan Bebas Perai 13600 Perai Penang
Auditors	Grant Thornton Chartered Accountants
Bankers	Citibank Berhad Export-Import Bank of China Malayan Banking Berhad Ping An Bank Co., Ltd. United Overseas Bank (Malaysia) Berhad Bank Muamalat Malaysia Berhad

JINKO SOLAR TECHNOLOGY SDN. BHD.
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

DIRECTORS' REPORT
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

The directors have pleasure in submitting their report and the audited financial statements of the Company for the financial year ended **31 December 2019**.

PRINCIPAL ACTIVITIES

The principal activities of the Company in the course of the financial year remain unchanged and consist of research and development and manufacturing and sales of solar energy cells and modules and their related auxiliary products.

RESULTS

	RM
Profit after taxation for the financial year	**184,496,141**

In the opinion of the directors, the results of the operations of the Company for the financial year ended **31 December 2019** were not substantially affected by any item, transaction or event of a material and unusual nature.

DIVIDENDS

No dividends have been declared or paid by the Company since the end of the previous financial year.

RESERVES AND PROVISIONS

There were no material transfers to or from reserves or provisions during the financial year other than those disclosed in the financial statements.

SHARE CAPITAL AND DEBENTURE

During the financial year, the Company increased its paid up capital from RM67,914,000 to RM405,707,000 by way of issuance of 337,793,000 new ordinary shares at an issue price of RM1.00 per ordinary share for a total cash consideration of RM337,793,000 for working capital purposes.

The new ordinary shares issued during the financial year rank *pari passu* in all respects with the existing ordinary shares of the Company.

ULTIMATE HOLDING COMPANY

The immediate and penultimate holding company is Jinko Solar Co., Ltd. ("JSCL") and JinkoSolar Technology Limited ("JTL") respectively. Both JSCL and JTL are incorporated in the People's Republic of China and Hong Kong respectively. The ultimate holding company is JinkoSolar Holding Co., Ltd. a company incorporated in Cayman Islands and whose shares are quoted on the New York Stock Exchange.

DIRECTORS

The directors in office during the financial year and during the period from the end of the financial year to the date of the report are as follows:

Li, Xiande
Chen Kangping
Lee Swee Lim

DIRECTORS' INTERESTS IN SHARES

Pursuant to Section 59(3) of the Companies Act 2016, the beneficial interests of **Mr. Li, Xiande** and **Mr. Chen Kangping** are disclosed in the annual report of the ultimate holding company, JinkoSolar Holding Co., Ltd. None of the other directors in office at the end of the financial year had any interest in shares, options and debentures of the Company or its related corporations during the financial year.

DIRECTORS' REMUNERATION AND BENEFITS

During the financial year, the fees and other benefits received and receivable by the directors of the Company are as follows:

	RM
Salaries, allowances and bonus	**404,300**
Defined contribution plan	**52,169**
Benefits-in-kind	**42,500**
	498,969

During and at the end of the financial year, no arrangements subsisted to which the Company is a party, with the objects of enabling directors of the Company to acquire benefits by means of the acquisition of shares in or debentures of the Company or any other body corporate.

Since the end of the previous financial year, no director of the Company has received or become entitled to receive any benefit (other than as disclosed above) by reason of a contract made by the Company or a related corporation with a director or with a firm of which the director is a member, or with a company in which the director has a substantial financial interest, other than those related party transactions disclosed in the notes to the financial statements.

INDEMNIFYING DIRECTORS, OFFICERS AND AUDITORS

No indemnity has been given to or insurance effected for any director, officer or auditor of the Company during the financial year.

SIGNIFICANT EVENTS DURING REPORTING PERIOD

Significant events during the reporting period are disclosed in Note 25 to the financial statements.

OTHER STATUTORY INFORMATION

Before the financial statements of the Company were made out, the directors took reasonable steps:

(i) to ascertain that proper action had been taken in relation to the writing off of bad debts and the making of provision for doubtful debts and satisfied themselves that no bad debts had been written off and no provision for doubtful debts was necessary, and

(ii) to ensure that any current assets which were unlikely to realise their value as shown in the accounting records in the ordinary course of business had been written down to an amount which they might be expected so to realise.

At the date of this report, the directors are not aware of any circumstances:

(i) that would render the amount written off for bad debts or the amount of the provision for doubtful debts in the Company inadequate to any substantial extent, or

(ii) that would render the value attributed to the current assets in the financial statements of the Company misleading, or

(iii) that would render any amount stated in the financial statements of the Company misleading, or

(iv) which have arisen which render adherence to the existing methods of valuation of assets or liabilities of the Company misleading or inappropriate.

At the date of this report, there does not exist:

(i) any charge on the assets of the Company that has arisen since the end of the financial year which secures the liabilities of any other person, and

(ii) any contingent liability in respect of the Company that has arisen since the end of the financial year.

In the opinion of the directors:

(i) no contingent liability or other liability has become enforceable or is likely to become enforceable within the period of twelve months after the end of the financial year which will or may affect the ability of the Company to meet its obligations as and when they fall due, and

(ii) there has not arisen in the interval between the end of the financial year and the date of this report any item, transaction or event of a material and unusual nature likely to affect substantially the results of the operations of the Company for the current financial year in which this report is made.

AUDITORS

The total amount of fees paid to or receivable by the auditors, **Grant Thornton**, as remuneration for their services as auditors of the Company for the financial year ended 31 December 2019 is RM203,000.

The auditors, **Grant Thornton**, have expressed their willingness to continue in office.

Signed in accordance with a resolution of the directors:

....
Li, Xiande

....
Chen Kangping

Penang,

Date: 14 MAY 2020

JINKO SOLAR TECHNOLOGY SDN. BHD.
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

DIRECTORS' STATEMENT

In the opinion of the directors, the financial statements set out on pages 11 to 34 are properly drawn up in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia so as to give a true and fair view of the financial position of the Company as at **31 December 2019** and of its financial performance and cash flows for the financial year then ended.

Signed in accordance with a resolution of the directors:

Li, Xiande ....

Chen Kangping ....

Date: 14 MAY 2020

STATUTORY DECLARATION

I, **Koh Kean Ping**, the officer primarily responsible for the financial management of **Jinko Solar Technology Sdn. Bhd.** do solemnly and sincerely declare that the financial statements set out on pages 11 to 34 are to the best of my knowledge and belief, correct and I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the Statutory Declarations Act, 1960.

Subscribed and solemnly declared by)
the abovenamed at Penang, this)
day of 14 MAY 2020)
)

....
Koh Kean Ping
(I/C No. 780213-07-5699)

Before me,

PESURUHJAYA SUMPAH
No: P162
Nama: LIEW JUAN LENG
01-01-2019 - 31-12-2021
MALAYSIA

....
Commissioner for Oaths

115, JALAN HUTTON
10050 GEORGETOWN
PULAU PINANG

INDEPENDENT AUDITORS' REPORT TO THE MEMBER OF JINKO SOLAR TECHNOLOGY SDN. BHD.
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

Grant Thornton (AF:0042)
51-8-A, Menara BHL Bank
Jalan Sultan Ahmad Shah
10050 Penang
Malaysia

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Report on the Audit of the Financial Statements

Opinion

We have audited the financial statements of **Jinko Solar Technology Sdn. Bhd.**, which comprise the statement of financial position as at **31 December 2019**, and the statement of comprehensive income, statement of changes in equity and statement of cash flows for the financial year then ended, and notes to the financial statements, including significant accounting policies, as set out on pages 11 to 34.

In our opinion, the accompanying financial statements give a true and fair view of the financial position of the Company as at **31 December 2019** and of its financial performance and cash flows for the financial year then ended in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia.

Basis for Opinion

We conducted our audit in accordance with approved standards on auditing in Malaysia and International Standards on Auditing. Our responsibilities under those standards are further described in the *Auditors' Responsibilities for the Audit of the Financial Statements* section of our report. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Independence and Other Ethical Responsibilities

We are independent of the Company in accordance with the *By-Laws (on Professional Ethics, Conduct and Practice)* of the Malaysian Institute of Accountants ("By-Laws") and the International Ethics Standards Board for Accountants' *Code of Ethics for Professional Accountants* ("IESBA Code"), and we have fulfilled our other ethical responsibilities in accordance with the By-Laws and the IESBA Code.

Information Other than the Financial Statements and Auditors' Report Thereon

The directors of the Company are responsible for the other information. The other information comprises the Directors' Report but does not include the financial statements of the Company and our auditors' report thereon.

Our opinion on the financial statements of the Company does not cover the Directors' Report and we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements of the Company, our responsibility is to read the Directors' Report and, in doing so, consider whether the Directors' Report is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated.

If, based on the work we have performed, we conclude that there is a material misstatement of the Directors' Report, we are required to report that fact. We have nothing to report in this regard.

Independent Auditors' Report To The Member Of
Jinko Solar Technology Sdn. Bhd. (cont'd)
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

Responsibilities of the Directors for the Financial Statements

The directors of the Company are responsible for the preparation of financial statements of the Company that give a true and fair view in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia. The directors are also responsible for such internal control as the directors determine is necessary to enable the preparation of financial statements of the Company that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements of the Company, the directors are responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the Company or to cease operations, or have no realistic alternative but to do so.

Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements of the Company as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with approved standards on auditing in Malaysia and International Standards on Auditing will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements of the Company.

As part of an audit in accordance with approved standards on auditing in Malaysia and International Standards on Auditing, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements of the Company, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the directors.

- Conclude on the appropriateness of the directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the financial statements of the Company or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditors' report. However, future events or conditions may cause the Company to cease to continue as a going concern.

Independent Auditors' Report To The Member Of
Jinko Solar Technology Sdn. Bhd. (cont'd)
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

- Evaluate the overall presentation, structure and content of the financial statements of the Company, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Other Matter

This report is made solely to the member of the Company, as a body, in accordance with Section 266 of the Companies Act 2016 in Malaysia and for no other purpose. We do not assume responsibility to any other person for the content of this report.

Grant Thornton
No. AF: 0042
Chartered Accountants

Terence Lau Han Wen
No. 03298/04/2021 J
Chartered Accountant

Penang

Date: 14 May 2020

JINKO SOLAR TECHNOLOGY SDN. BHD.
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

STATEMENT OF FINANCIAL POSITION AS AT 31 DECEMBER 2019

	NOTE	2019 RM	2018 RM
ASSETS			
Non-current assets			
Property, plant and equipment	4	1,256,440,704	1,128,770,535
Intangible assets	5	185,384	272,790
		1,256,626,088	1,129,043,325
Current assets			
Inventories	6	296,047,162	365,812,542
Trade receivables	7	1,540,025,441	673,178,952
Other receivables, deposits and prepayments	8	343,104,663	272,939,433
Current tax assets		-	13,588
Restricted cash	9	5,027,802	84,377,404
Fixed deposit with a licensed bank	10	4,341,291	4,257,611
Cash and bank balances	11	104,165,046	74,921,358
		2,292,711,405	1,475,500,888
TOTAL ASSETS		3,549,337,493	2,604,544,213
EQUITY AND LIABILITIES			
Share capital	12	405,707,000	67,914,000
Retained profits/(Accumulated loss)	13	42,469,727	(142,026,414)
Exchange translation reserve	14	25,439,410	31,485,688
Total equity		473,616,137	(42,626,726)
Non-current liabilities			
Deferred tax liabilities	15	14,645,000	-
Current liabilities			
Trade payables	16	1,023,617,205	682,011,623
Other payables, accruals and provision	17	1,816,217,364	1,737,546,443
Borrowings	18	221,139,005	227,612,873
Current tax liabilities		102,782	-
		3,061,076,356	2,647,170,939
Total liabilities		3,075,721,356	2,647,170,939
TOTAL EQUITY AND LIABILITIES		3,549,337,493	2,604,544,213

The accompanying notes form an integral part of the financial statements.

JINKO SOLAR TECHNOLOGY SDN. BHD.
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

STATEMENT OF COMPREHENSIVE INCOME
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

	NOTE	2019 RM	2018 RM
Revenue	19	**3,379,007,577**	2,200,527,559
Cost of sales		**(2,828,465,217)**	(2,229,872,677)
Gross profit/(loss)		**550,542,360**	(29,345,118)
Other income		**13,089,872**	9,588,742
Administrative expenses		**(175,088,669)**	(124,553,207)
Selling and distribution expenses		**(181,485,733)**	(116,389,628)
Operating profit/(loss)		**207,057,830**	(260,699,211)
Finance costs		**(7,727,684)**	(18,689,043)
Profit/(Loss) before taxation	20	**199,330,146**	(279,388,254)
Taxation	21	**(14,834,005)**	49,235,975
Net profit/(loss) for the financial year		**184,496,141**	(230,152,279)
Other comprehensive (gain)/loss:			
Items that will not be reclassified subsequently to profit or loss:			
Foreign currency translation differences		**(6,046,278)**	313,198
Total comprehensive profit/(loss) for the financial year		**178,449,863**	(229,839,081)

The accompanying notes form an integral part of the financial statements.

JINKO SOLAR TECHNOLOGY SDN. BHD.
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

STATEMENT OF CHANGES IN EQUITY FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

	NOTE	Share Capital RM	Non-distributable Exchange Translation Reserve RM	Retained Profits/ (Accumulated Loss) RM	Total Equity RM
2019					
Balance at beginning		**67,914,000**	**31,485,688**	**(142,026,414)**	**(42,626,726)**
Allotment of shares	**12**	**337,793,000**	**-**	**-**	**337,793,000**
Foreign exchange differences on translation	**14**	**-**	**(6,046,278)**	**-**	**(6,046,278)**
Profit for the financial year		**-**	**-**	**184,496,141**	**184,496,141**
Total comprehensive profit for the financial year		**337,793,000**	**(6,046,278)**	**184,496,141**	**516,242,863**
Balance at end		**405,707,000**	**25,439,410**	**42,469,727**	**473,616,137**
2018					
Balance at beginning		67,914,000	31,172,490	88,125,865	187,212,355
Foreign exchange differences on translation	14	-	313,198	-	313,198
Loss for the financial year		-	-	(230,152,279)	(230,152,279)
Total comprehensive loss for the financial year		-	313,198	(230,152,279)	(229,839,081)
Balance at end		67,914,000	31,485,688	(142,026,414)	(42,626,726)

The accompanying notes form an integral part of the financial statements.

JINKO SOLAR TECHNOLOGY SDN. BHD.
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

STATEMENT OF CASH FLOWS
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

	2019 RM	2018 RM
CASH FLOWS FROM OPERATING ACTIVITIES		
Profit/(Loss) before taxation	**199,330,146**	(279,388,254)
Adjustments for:		
Amortisation of intangible assets	**85,549**	120,756
Depreciation	**101,113,604**	63,972,579
Loss/(Gain) on disposal of property, plant and equipment	**6,094,981**	(314,927)
Impairment loss on property, plant and equipment	**16,824,625**	-
Interest expense	**7,727,684**	18,689,043
Interest income	**(673,366)**	(501,651)
Inventories written-down to net realisable value	**217,032**	8,079,724
Property, plant and equipment written off	**-**	50,265
Provision for warranty	**27,354,706**	17,775,641
Unrealised loss/(gain) on foreign exchange	**7,306,925**	(7,252,619)
Operating profit/(loss) before working capital changes	**365,381,886**	(178,769,443)
Decrease/(Increase) in inventories	**66,507,575**	(44,209,191)
Increase in receivables	**(989,386,612)**	(19,216,925)
Increase in payables	**857,502,087**	709,258,633
Cash generated from operations	**300,004,936**	467,063,074
Interest paid	**(7,727,684)**	(18,689,043)
Income tax paid	**(72,689)**	(153,798)
Net cash from operating activities	**292,204,563**	448,220,233
CASH FLOWS FROM INVESTING ACTIVITIES		
Interest received	**673,366**	501,651
Proceeds from disposal of property, plant and equipment	**15,505,691**	1,533,262
Purchase of property, plant and equipment	**(280,491,899)**	(489,325,792)
Net cash used in investing activities	**(264,312,842)**	(487,290,879)
CASH FLOWS FROM FINANCING ACTIVITIES		
(Repayment)/Drawdown of borrowings	**(4,153,919)**	5,995,377
Decrease/(Increase) in restricted cash	**79,415,300**	(58,865,887)
Net changes in immediate holding company's balance	**(418,627,425)**	14,757,622
Net changes in penultimate holding company's balance	**9,566,901**	69,336,408
Net changes in related company's balance	**(969,420)**	-
Proceeds from issuance of shares	**337,793,000**	-
(Placement)/Withdrawal of fixed deposit	**(129,449)**	3,522
Net cash from financing activities	**2,894,988**	31,227,042
NET INCREASE/(DECREASE) IN CASH AND BANK BALANCES	**30,786,709**	(7,843,604)
Effects of changes in foreign exchange rates	**(1,543,021)**	1,593,332
CASH AND BANK BALANCES AT BEGINNING	**74,921,358**	81,171,630
CASH AND BANK BALANCES AT END	**104,165,046**	74,921,358

The accompanying notes form an integral part of the financial statements.

JINKO SOLAR TECHNOLOGY SDN. BHD.
Company No. 201501002886 (1128218-T)
(Incorporated in Malaysia)

NOTES TO THE FINANCIAL STATEMENTS - 31 DECEMBER 2019

1. GENERAL INFORMATION

The Company is a private limited liability company, incorporated and domiciled in Malaysia.

The principal activities of the Company in the course of the financial year remain unchanged and consist of research and development and manufacturing and sales of solar energy cells and modules and their related auxiliary products.

The immediate and penultimate holding company is Jinko Solar Co., Ltd. ("JSCL") and JinkoSolar Technology Limited ("JTL") respectively. Both JSCL and JTL were incorporated in the People's Republic of China and Hong Kong respectively. The ultimate holding company is JinkoSolar Holding Co., Ltd. a company incorporated in Cayman Islands and whose shares are quoted on the New York Stock Exchange.

The registered office of the Company is located at No.116, 2nd Floor (Room 1), Wisma Tan Ah Chye, Jalan Sungai Pinang, 10150 Georgetown, Pulau Pinang.

The principal place of business is located at 2481, Tingkat Perusahaan 4A, Kawasan Perusahaan Bebas Perai, 13600 Perai, Penang.

The financial statements were authorised for issue by the Board of Directors in accordance with a resolution of the directors on 14 May 2020.

2. BASIS OF PREPARATION

2.1 Statement of Compliance

The financial statements of the Company have been prepared in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia.

2.2 Basis of Measurement

The financial statements of the Company are prepared under the historical cost convention unless otherwise indicated in the summary of accounting policies as set out below and on the going concern basis as the directors of the Company are of the opinion that the Company will have adequate funds to meet its obligations as and when they fall due based on the following considerations:-

- the immediate holding company have confirmed that it would continue to provide financial assistance to the Company within the twelve months period from the end of the reporting period; and

- the Company expects to continue to generate positive operating cash inflows to meet payments arising from its financial obligations.

The financial statements are presented in Ringgit Malaysia ("RM"). All financial information is presented in RM, unless otherwise stated. The Company's functional currency is determined to be US Dollar ("USD").

2.3 Significant Accounting Estimates and Judgements

The preparation of financial statements requires management to make judgements, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised and in any future periods affected.

2.3.1 Judgements made in applying accounting policies

There are no significant areas of critical judgement in applying accounting policies that have any significant effect on the amount recognised in the financial statements.

2.3.2 Key sources of estimation uncertainty

The key assumptions concerning the future and other key sources of estimation uncertainty at the end of the reporting date that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below:

(i) **Useful lives of plant and machinery**

The depreciable costs of plant and equipment are allocated on the straight line basis over their estimated useful lives. Management estimates the useful lives of these assets to be within 10 years. Changes in the expected level of usage and technological developments could impact the economic useful lives and residual value of these assets.

(ii) **Impairment of property, plant and equipment**

The Company performs an impairment review as and when there are impairment indicators to ensure that the carrying value of the property, plant and equipment does not exceed its recoverable amount. The recoverable amount represents the present value of the estimated future cash flows expected to arise from continuing operations. Therefore, in arriving at the recoverable amount, management exercise judgement in estimating the future cash flows, growth rate and discount rate.

(iii) **Inventories**

The management reviews inventories to identify damaged, slow-moving and obsolete inventories. This review requires judgements and estimates. Possible changes in these estimates could result in revision to the valuation of inventories.

(iv) **Impairment of loans and receivables**

The Company assesses at the end of each reporting period whether there is any objective evidence that a financial asset is impaired. To determine whether there is objective evidence of impairment, the Company considers factors such as the probability of insolvency or significant financial difficulties of the debtor and default or significant delay in payments.

Where there is objective evidence of impairment, the amount and timing of future cash flows are estimated based on historical loss experience of assets with similar credit risk characteristics.

3. SIGNIFICANT ACCOUNTING POLICIES

3.1 Property, Plant and Equipment

Property, plant and equipment are stated at cost less accumulated depreciation and impairment losses. Cost includes the prices paid to acquire or construct the assets, interest capitalised during the construction period and any expenditure that substantially extends the useful life of an existing asset.

Property, plant and equipment are depreciated on a straight line basis to write off the cost of each asset to its residual value over its estimated useful life at the following annual rates:

Building improvements	5%
Plant and machinery	10%
Office equipment	20% - 33.33%
Motor vehicles	25%

Capital expenditure in progress primarily represents the construction of new production lines. Cost incurred in the construction are capitalised and transferred to property, plant and equipment upon completion, at which time depreciation commences.

Upon the disposal of an item of property, plant and equipment, the difference between the net disposal proceeds and its carrying amount is charged or credited to the profit or loss.

3.2 Intangible Assets

Intangible assets include purchased software and licenses and all directly attributable costs of preparing the assets for its intended use and are amortised on a straight line basis over their estimated useful lives of between 3 to 10 years. The amount amortised is charged to the profit or loss.

3.3 Leases

Lease

A lease is an agreement whereby the lessor conveys to the lessee in return for a payment or series of payments the right to use an asset for an agreed period of time.

Finance lease

A finance lease which includes hire purchase arrangement, is a lease that transfers substantially all the risks and rewards incidental to ownership of an asset to the lessee. Title may or may not eventually be transferred.

Plant and equipment acquired by way of finance leases are stated at amount equal to the lower of their fair values and the present value of minimum lease payments at the inception of the leases, less accumulated depreciation and any impairment losses.

In calculating the present value of the minimum lease payments, the discount rate is the interest rate implicit in the lease, if this is determinable; if not, the Company's incremental borrowing rate is used.

Operating lease

An operating lease is a lease other than finance lease.

Operating lease income or operating lease rental are recognised in profit or loss on a straight line basis over the period of the lease.

3.4 **Inventories**

Inventories are stated at the lower of cost and net realisable value.

Cost of raw materials is determined on weighted average basis. Cost of finished goods and work-in-progress includes direct materials, direct labour and attributable production overheads.

Goods-in-transit is recognised when the risk and reward of ownership are transferred to the Company and is recognised at cost.

Net realisable value represents the estimated selling price less the estimated costs of completion and estimated costs necessary to make the sale.

3.5 **Financial Instruments**

3.5.1 **Initial recognition and measurement**

A financial asset or a financial liability is recognised in the statement of financial position when, and only when, the Company becomes a party to the contractual provisions of the instrument.

A financial instrument is recognised initially, at its fair value plus, in the case of a financial instrument not at fair value through profit or loss, transactions costs that are directly attributable to the acquisition or issue of the financial instrument. For intra-group loans and advances, and other contractual arrangements, that constitute a financing transaction, the financial asset or financial liability is measured at the present value of the future payments discounted at a market rate of interest for a similar debt instruments.

3.5.2 **Financial instrument categories**

The Company categorises financial instruments as follows:

Financial assets

Loans and receivables

Loans and receivables category comprises debt instruments that are not quoted in an active market.

Financial assets categorised as loans and receivables are subsequently measured at amortised cost using the effective interest method.

Loans and receivables are classified as current assets, except for those having maturity dates later than 12 months after the end of the reporting period which are classified as non-current.

All financial assets are subject to review for impairment.

Financial liabilities

All financial liabilities are subsequently measured at amortised cost.

Financial liabilities are classified as current liabilities, except for those having maturity dates later than 12 months after the end of the reporting period which are classified as non-current.

3.5.3 **Subsequent measurement**

Debt instruments that meet the following conditions are measured at amortised cost using the effective interest method:

(i) returns to the holder are determinable, e.g. a fixed amount and/or variable rate of return benchmark against a quoted or observable interest rate;
(ii) there is no contractual provision that could result in the holder losing the principal amount of any interest attributable to the current or prior periods; and
(iii) prepayment option, if any, is not contingent on future events.

Debt instruments that are classified as current assets or current liabilities are measured at the undiscounted amount of the cash or other consideration expected to be paid or received unless the arrangement constitutes, in effect, a financing transaction.

All other financial assets or financial liabilities not measured at amortised cost or cost less impairment are measured at fair value with changes recognised in profit or loss.

All financial assets (except for financial assets measured at fair value through profit or loss) are assessed at each reporting date whether there is any objective evidence of impairment. An impairment loss is measured as follows:

(i) For an instrument measured at amortised cost, the impairment loss is the difference between the asset's carrying amount and the present value of estimated cash flows discounted at the asset's original effective interest rate.
(ii) For an instrument measured at cost less impairment, the impairment loss is the difference between the asset's carrying amount and the best estimate of the amount that would be received for the asset if it were to be sold at the reporting date.

3.5.4 **Derecognition**

A financial asset or part of it is derecognised, when and only when the contractual rights to the cash flows from the financial asset expire or the financial asset is transferred to another party without retaining control or substantially all risks and rewards of the asset. On derecognition of a financial asset, the difference between the carrying amount and the sum of the consideration received (including any new asset obtained less any new liability assumed) and any cumulative gain or loss that had been recognised in equity is recognised in the profit or loss.

A financial liability or a part of it is derecognised when, and only when, the obligation specified in the contract is discharged or cancelled or expired. On derecognition of a financial liability, the difference between the carrying amount of the financial liability extinguished or transferred to another party and the consideration paid, including any non-cash assets transferred or liabilities assumed, is recognised in profit or loss.

3.6 **Impairment of Non-Financial Assets**

The Company assesses at the end of each reporting period whether there is an indication that an asset other than inventories may be impaired.

For the purpose of impairment testing, recoverable amount (i.e. the higher of the fair value less cost to sell and value-in-use) is determined on an individual asset basis unless the asset does not generate cash flows that are largely independent of those from other assets. If this is the case, the recoverable amount is determined for the cash-generating units ("CGU") to which the asset belongs.

If the recoverable amount of the asset (or CGU) is estimated to be less than its carrying amount, the carrying amount of the asset (or CGU) is reduced to its recoverable amount.

The difference between the carrying amount and recoverable amount is recognised as an impairment loss in the profit or loss.

An impairment loss for an asset is reversed if, and only if, there has been a change in the estimates used to determine the asset's recoverable amount since the last impairment loss was recognised. The carrying amount of this asset is increased to its revised recoverable amount, provided that this amount does not exceed the carrying amount that would have been determined (net of any accumulated amortisation or depreciation) had no impairment loss been recognised for the asset in prior years. A reversal of impairment loss for an asset is recognised in profit or loss.

3.7 Impairment and Uncollectibility of Financial Assets

For short-term trade and other receivables where the effect of discounting is immaterial, impairment loss is tested for each individually significant receivable wherever there is any indication of impairment. Individually significant receivables for which no impairment loss is recognised are grouped together with all other receivables by classes based on credit risk characteristics and aged according to their past due period. A collective allowance is estimated for a class group based on the Company's experiences of loss ratio in each class, taking into consideration current market conditions.

3.8 Provision for Liabilities and Warranty Costs

Provisions are recognised when the Company has a present legal or constructive obligation as a result of past events, when it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation, and when a reliable estimate of the amount can be made.

Provisions are measured at the present value of the expenditures expected to be required to settle the obligation using a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the obligation. The increase in the provision due to passage of time is recognised as finance cost expense.

Provision for warranty costs is made in respect of goods sold and still under warranty at the end of the reporting period based on the terms of warranty and historical claim experience.

3.9 Revenue Recognition

Revenue from sale of goods is recognised in the profit or loss when the significant risks and rewards of ownership have been transferred to the buyer.

Interest income is recognised in the profit or loss on the accrual basis.

3.10 Borrowing Costs

Borrowing costs are recognised as expenses in profit or loss in the period in which they are incurred by using the effective interest method.

3.11 Employee Benefits

Short term benefits

Wages, salaries, bonuses and social security contributions are recognised as an expense in the year in which the associated services are rendered by employees of the Company. Short term accumulating compensated absences such as paid annual leave are recognised when services are rendered by employees that increase their entitlement to future compensated absences, and short term non-accumulating compensated absences such as sick leave are recognised when the absences occur.

Defined contribution plans

As required by law, companies in Malaysia make contributions to the national pension scheme, the Employees Provident Fund ("EPF"). Such contributions are recognised as an expense in the profit or loss as incurred.

3.12 Income Tax

Income tax expense comprises current and deferred tax. Current tax and deferred tax are recognised in profit or loss except to the extent that it relates to a business combination or items recognised directly in equity or other comprehensive income.

Current tax is the expected tax payable or receivable on the taxable income or loss for the year, using tax rates enacted or substantively enacted by the end of the reporting period, and any adjustment to tax payable in respect of previous years.

Deferred tax is recognised using the liability method, providing for temporary differences between the carrying amounts of assets and liabilities in the statement of financial position and their tax bases. Deferred tax is not recognised for temporary differences arising from the initial recognition of goodwill, the initial recognition of assets or liabilities in a transaction that is not a business combination and that affects neither accounting nor taxable profit or loss. Deferred tax is measured at the tax rates that are expected to be applied to the temporary differences when they reverse, based on the laws that have been enacted or substantively enacted by the end of the reporting period.

Deferred tax assets and liabilities are offset if there is a legally enforceable right to offset current tax liabilities and assets, and they relate to income taxes levied by the same tax authority on the same taxable entity, or on different tax entities, but they intend to settle current tax liabilities and assets on a net basis or their tax assets and liabilities will be realised simultaneously.

A deferred tax asset is recognised to the extent that it is probable that future taxable profits will be available against which the temporary difference can be utilised. Deferred tax assets are reviewed at the end of each reporting period and are reduced to the extent that it is no longer probable that the related tax benefit will be realised.

3.13 Goods and Services Tax ("GST") and Sales and Services Tax ("SST")

GST is a consumption tax based on the value-added concept. GST is imposed on goods and services at every production and distribution stage in the supply chain including importation of goods and services, at the applicable tax rate of 6%. Input tax that a company pays on business purchases is offset against output tax.

Revenue, expenses and assets are recognised net of GST except:

- where the GST incurred in a purchase of asset or service is not recoverable from the authority, in which case the GST is recognised as part of the cost of acquisition of the asset or as part of the expense item as applicable; and

- receivables and payables that are stated with GST inclusive.

The net GST recoverable from, or payable to, the taxation authority is included as part of receivables or payables in the statement of financial position.

The Finance Ministry of Malaysia has zero rated the GST effective from 1 June 2018. The government has replaced the GST with SST which came into effect on 1 September 2018.

The SST has two elements: a service tax that is charged and levied on taxable services provided by any taxable person in Malaysia in the course and furtherance of business, and a single stage sales tax levied on imported and locally manufactured goods, either at the time of importation or at the time the goods are sold or otherwise disposed of by the manufacturer.

The rate for sales tax is fixed at 5% or 10%, while the rate for service tax is fixed at 6%.

3.14 Cash and Cash Equivalents

Cash comprises cash in hand, cash at bank and demand deposits. Cash equivalents are short term and highly liquid investments that are readily convertible to known amount of cash and which are subject to an insignificant risk of changes in value, against which bank overdraft balances, if any, are deducted.

3.15 Restricted Cash

Restricted cash represents deposits legally held by banks which are not available for the Company's use. These deposits are held as collateral for issuance of letters of credit or guarantee to suppliers for purchase of machinery and inventories.

3.16 Foreign Currency Translations

3.16.1 Translation of foreign currency transactions

Transactions in foreign currencies are translated to the Company's functional currency at exchange rate at the dates of the transactions.

Monetary assets and liabilities denominated in foreign currencies at the end of the reporting period are translated to the functional currency at the exchange rate at that date.

Non-monetary assets and liabilities measured at historical cost in a foreign currency at the end of the reporting period are translated to the functional currency at the exchange rate at the date of the transaction except for those measured at fair value shall be translated at the exchange rate at the date when the fair value was determined.

Exchange differences arising from the settlement of foreign currency transactions and from the translation of foreign currency monetary assets and liabilities are recognised in profit or loss.

Exchange differences arising on the translation of non-monetary items carried at fair value are included in profit or loss for the period except for the differences arising on the translation of non-monetary items in respect of which gains or losses are recognised directly in other comprehensive income.

3.16.2 Translation to the presentation currency

The Company's functional currency is in USD while its presentation currency is in RM.

Assets and liabilities presented in the statement of financial position are translated from USD to RM at the closing rate at the end of the reporting period.

Income and expenses presented in the profit or loss are translated from USD to RM at exchange rates at the dates of the transactions.

All resulting exchange differences is recognised in other comprehensive income and reported as a component of equity.

3.17 Share Capital, Share Issuance Costs and Dividends

Classification

Ordinary shares are classified as equity. Other shares are classified as equity and/or liability according to the economic substance of the particular instrument.

Share issuance costs

Incremental external costs directly attributable to the issuance of new shares are deducted against equity.

Dividends

Dividends on ordinary shares are accounted for in shareholder's equity as an appropriation of retained profits and recognised as a liability in the period in which they are declared.

3.18 Related Parties

A related party is a person or entity that is related to the Company. A related party transaction is a transfer of resources, services or obligations between the Company and its related party, regardless of whether a price is charged.

(a) A person or a close member of that person's family is related to the Company if that person:

- (i) Has control or joint control over the Company;
- (ii) Has significant influence over the Company; or
- (iii) Is a member of the key management personnel of the Company.

(b) An entity is related to the Company if any of the following conditions applies:

- (i) The entity and the Company are members of the same group.
- (ii) The entity is an associate or joint venture of the other entity.
- (iii) Both entities are joint ventures of the same third party.
- (iv) The entity is a joint venture of a third entity and the other entity is an associate of the third entity.
- (v) The entity is a post-employment benefit plan for the benefits of employees of either the Company or an entity related to the Company.
- (vi) The entity is controlled or jointly-controlled by a person identified in (a) above.
- (vii) A person identified in (a)(i) above has significant influence over the Company or is a member of the key management personnel of the Company.
- (viii) The entity, or any member of a group when it is a part, provides key management personnel services to the Company or to the parent of the Company.

4. PROPERTY, PLANT AND EQUIPMENT

	Building improvements RM	Plant and machinery RM	Office equipment RM	Motor vehicles RM	Capital expenditure in progress RM	Total RM
2019						
At cost						
Balance at beginning	150,519,862	617,994,574	29,186,909	711,953	490,097,448	1,288,510,746
Additions	57,561,427	187,716,917	4,718,631	390,434	30,104,490	280,491,899
Disposals	-	(31,241,804)	-	-	-	(31,241,804)
Reclassification	159,481,927	326,022,723	20,868,201	256,447	(506,629,298)	-
Effects of movements in exchange rate	(4,051,588)	(11,604,648)	(596,651)	(14,813)	432,760	(15,834,940)
Balance at end	363,511,628	1,088,887,762	54,177,090	1,344,021	14,005,400	1,521,925,901
Accumulated Depreciation						
Balance at beginning	15,656,078	131,036,261	12,578,526	469,346	-	159,740,211
Current charge	11,837,136	80,657,755	8,404,172	214,541	-	101,113,604
Disposals	-	(9,641,132)	-	-	-	(9,641,132)
Effects of movements in exchange rate	(298,427)	(2,019,247)	(227,098)	(7,339)	-	(2,552,111)
Balance at end	27,194,787	200,033,637	20,755,600	676,548	-	248,660,572
Accumulated Impairment						
Current year	-	16,824,625	-	-	-	16,824,625
Carrying amount	336,316,841	872,029,500	33,421,490	667,473	14,005,400	1,256,440,704
2018						
At cost						
Balance at beginning	141,355,370	549,047,357	23,698,261	696,627	57,173,800	771,971,415
Additions	5,909,191	16,507,475	4,899,029	-	462,010,097	489,325,792
Disposals	-	(1,696,645)	-	-	-	(1,696,645)
Written off	-	-	(50,875)	-	-	(50,875)
Reclassification	-	40,692,278	-	-	(40,692,278)	-
Effects of movements in exchange rate	3,255,301	13,444,109	640,494	15,326	11,605,829	28,961,059
Balance at end	150,519,862	617,994,574	29,186,909	711,953	490,097,448	1,288,510,746
Accumulated Depreciation						
Balance at beginning	8,760,182	76,668,677	6,916,741	302,500	-	92,648,100
Current charge	6,542,463	51,895,632	5,378,134	156,350	-	63,972,579
Disposals	-	(478,310)	-	-	-	(478,310)
Written off	-	-	(610)	-	-	(610)
Effects of movements in exchange rate	353,433	2,950,262	284,261	10,496	-	3,598,452
Balance at end	15,656,078	131,036,261	12,578,526	469,346	-	159,740,211
Carrying amount	134,863,784	486,958,313	16,608,383	242,607	490,097,448	1,128,770,535

(i) The carrying amount of plant and machinery amounting to **RM83,427,550** (2018: RM127,125,678) charged to a licensed bank as security for banking facilities granted to the Company.

(ii) During the financial year, plant and machinery with cost of **RM28,263,305** (2018: RM Nil) was impaired to its scrap value due to technology obsolescence.

5. INTANGIBLE ASSETS

Computer software and licences

	2019 RM	2018 RM
At cost		
Balance at beginning	**812,835**	795,336
Effects of movements in exchange rate	**(8,004)**	17,499
Balance at end	**804,831**	812,835
Accumulated amortisation		
Balance at beginning	**540,045**	407,360
Current year	**85,549**	120,756
Effects of movements in exchange rate	**(6,147)**	11,929
Balance at end	**619,447**	540,045
Carrying amount	**185,384**	272,790

6. INVENTORIES

	2019 RM	2018 RM
Raw materials	**97,884,080**	71,429,562
Work-in-progress	**27,697,373**	140,796,825
Finished goods	**104,662,105**	98,706,181
Consumables	**27,185,264**	34,671,981
Goods in transit	**38,618,340**	20,207,993
	296,047,162	365,812,542
Recognised in profit or loss:		
Inventories recognised as cost of sales	**2,828,248,185**	2,221,792,953
Inventories written-down to net realisable value	**217,032**	8,079,724

7. TRADE RECEIVABLES

	2019 RM	2018 RM
Third parties	**2,627,625**	37,058,976
Due from immediate holding company	**-**	584,674,201
Due from related companies	**1,537,397,816**	51,445,775
	1,540,025,441	673,178,952

	2019	2018
	RM	RM
Analysis by currencies:		
Ringgit Malaysia	**1,329,857**	1,095,727
US Dollar	**1,538,649,764**	646,165,884
Australian Dollar	**-**	21,175,690
Euro	**-**	4,741,651
Chinese Renminbi	**45,820**	-
	1,540,025,441	673,178,952

The normal credit terms granted to trade receivables range from **30 to 90 days** (2018: 30 to 90 days). Other credit terms are assessed and approved on a case-by-case basis.

8. OTHER RECEIVABLES, DEPOSITS AND PREPAYMENTS

	2019	2018
	RM	RM
Third parties	**527,024**	1,220,440
Due from immediate holding company	**2,306**	10,455
Due from penultimate holding company	**-**	32,259,503
Due from related company	**958,317**	-
Refundable deposits	**18,430,130**	12,258,483
Prepayments	**321,411,974**	219,729,121
GST claimable	**1,774,912**	7,461,431
	343,104,663	272,939,433

	2019	2018
Analysis by currencies:		
Ringgit Malaysia	**21,407,578**	20,012,522
US Dollar	**321,694,779**	246,254,870
Euro	**-**	6,672,041
Chinese Renminbi	**2,306**	-
	343,104,663	272,939,433

Included in prepayments are the following:

(i) An amount of **RM205,454,298** (2018: RM59,375,323) paid to third parties, a related company and penultimate holding company for purchase of raw materials.

(ii) An amount of **RM92,581,971** (2018: RM138,531,406) paid to third parties for purchase of machinery and related accessories.

9. RESTRICTED CASH

	2019 **RM**	2018 RM
Held as collateral for issuance of letter of credit to supplier for purchase of machinery	**5,027,802**	63,707,404
Cash margin as security for short term borrowings granted to the Company	-	20,670,000
	5,027,802	84,377,404

Analysis by currencies:

	2019 **RM**	2018 RM
US Dollar	**3,511,304**	29,173,970
Euro	**1,516,498**	55,203,434
	5,027,802	84,377,404

10. FIXED DEPOSIT WITH A LICENSED BANK

The effective interest rate of the fixed deposit as at the end of the reporting period is **2.2%** (2018: 2.40%) per annum. The fixed deposit with a licensed bank is pledged for bank guarantee facility granted to the Company.

11. CASH AND BANK BALANCES

	2019 **RM**	2018 RM
Analysis by currencies:		
Ringgit Malaysia	**6,709,720**	3,655,860
US Dollar	**97,235,945**	33,719,482
Chinese Renminbi	**193,562**	35,741,539
Euro	**25,819**	1,801,189
Canadian Dollar	-	3,288
	104,165,046	74,921,358

12. SHARE CAPITAL

	Number of ordinary shares		**Amount**	
	2019	2018	**2019** **RM**	2018 RM
Issued and fully paid:				
Balance at beginning	**67,914,000**	67,914,000	**67,914,000**	67,914,000
Allotment of shares	**337,793,000**	-	**337,793,000**	-
	405,707,000	67,914,000	**405,707,000**	67,914,000

During the financial year, the Company increased its paid up capital from RM67,914,000 to RM405,707,000 by way of issuance of 337,793,000 new ordinary shares at an issue price of RM1.00 per ordinary share for a total cash consideration of RM337,793,000 for working capital purposes.

13. RETAINED PROFITS

The franking of dividends of the Company is under the single tier system and therefore there is no restriction on the Company to distribute dividends subject to the availability of retained profits.

14. EXCHANGE TRANSLATION RESERVE

The exchange translation reserve is in respect of foreign exchange differences arising from the translation of the financial statements of the Company from its functional currency to its presentation currency.

15. DEFERRED TAX LIABILITIES

	2019 RM	2018 RM
Balance at beginning	**-**	51,284,000
Recognised in profit or loss	**14,645,000**	(51,284,000)
Balance at end	**14,645,000**	-

The deferred tax liabilities is represented by :-

	2019 RM	2018 RM
Property, plant and equipment	**104,966,000**	-
Unabsorbed tax losses	**(40,535,000)**	-
Unabsorbed capital allowances	**(34,525,000)**	-
Others	**(15,261,000)**	-
Balance at end	**14,645,000**	-

16. TRADE PAYABLES

	2019 RM	2018 RM
Third parties	**320,799,329**	330,423,943
Due to immediate holding company	**292,476,509**	162,495,594
Due to related companies	**410,341,367**	189,092,086
	1,023,617,205	682,011,623

	2019 RM	2018 RM
Analysis by currencies:		
Ringgit Malaysia	**44,038,945**	49,954,133
US Dollar	**932,102,480**	584,485,697
Chinese Renminbi	**40,956,535**	37,090,266
Euro	**6,519,245**	10,481,527
	1,023,617,205	682,011,623

The normal credit terms granted by trade payables range from **30 to 90 days** (2018: 30 to 90 days).

17. OTHER PAYABLES, ACCRUALS AND PROVISION

	2019 RM	2018 RM
Third parties	**139,013,251**	112,132,487
Due to immediate holding company		
- interest bearing range from **2.00%** (2018: 2.00% to 4.35%) per annum	**43,955,034**	418,112,760
- non-interest bearing	**-**	33,613,566
Due to penultimate holding company	**10,312,785**	22,716,548
Due to related companies	**1,504,929,448**	1,031,685,816
Other payables	**1,698,210,518**	1,618,261,177
Accruals	**54,420,620**	82,109,952
Provision for warranty	**63,586,226**	37,175,314
	1,816,217,364	1,737,546,443

	2019 RM	2018 RM
Analysis by currencies:		
Ringgit Malaysia	**193,477,068**	201,954,398
US Dollar	**1,564,629,252**	1,255,544,945
Chinese Renminbi	**52,579,571**	178,288,474
Euro	**5,531,473**	101,758,626
	1,816,217,364	1,737,546,443

The interest bearing loan is unsecured and repayable on demand.

18. BORROWINGS

	2019 RM	2018 RM
Onshore foreign exchange currency loan	**65,415,090**	66,696,923
Revolving credit	**9,122,930**	10,335,000
Short term loans	**146,600,985**	150,580,950
	221,139,005	227,612,873

	2019 RM	2018 RM
Analysis by currencies:		
US Dollar	**74,538,020**	77,031,923
Chinese Renminbi	**146,600,985**	150,580,950
	221,139,005	227,612,873

	2019 %	2018 %
Effective interest rate per annum:		
Onshore foreign exchange currency loan	**2.45 to 2.80**	3.15 to 3.65
Revolving credit	**3.25 to 3.45**	3.95 to 4.35
Short term loans	**4.785**	4.83

The borrowings are repayable in full within one year.

The borrowings are secured by way of:

(i) Placement of fixed deposit;
(ii) Standby letter of credit issued by Maybank Shanghai Branch which in turn is guaranteed by the immediate holding company of the Company;
(iii) Fresh fixed charged over certain plant and machinery of the Company; and
(iv) Corporate guarantee of the immediate holding company.

19. REVENUE

Revenue represents the invoiced value of goods sold less returns.

20. PROFIT/(LOSS) BEFORE TAXATION

This is arrived at:

	2019 RM	2018 RM
After charging:		
Amortisation	**85,549**	120,756
Audit fee – current year	**203,000**	180,000
– underprovision in prior year	**10,800**	-
Depreciation	**101,113,604**	63,972,579
Impairment loss on property, plant and equipment	**16,824,625**	-
Interest expense:		
- Intercompany loan interest	**1,187,980**	10,750,071
- Short term loan interest	**6,539,704**	7,938,972
Inventories written-down to net realisable value	**217,032**	8,079,724
Loss on disposal of property, plant and equipment	**6,094,981**	-
Loss on foreign exchange:		
- Realised	**-**	11,275,950
- Unrealised	**7,306,925**	-
Provision for warranty	**27,354,706**	17,775,641
Property, plant and equipment written off	**-**	50,265
Rental of equipment	**171,614**	325,148
Rental of forklift and truck	**3,291,127**	2,408,360

	2019 RM	2018 RM
Rental of hostel	**2,111,900**	1,348,668
Rental of premises	**24,618,466**	20,040,988
* Staff costs	**235,615,954**	189,624,973
And crediting:		
Gain on disposal of property, plant and equipment	**-**	314,927
Gain on foreign exchange:		
- Realised	**7,883,302**	-
- Unrealised	**-**	7,252,619
Interest income	**673,366**	501,651

*** Staff costs**		
- Salaries, allowances and bonus	**217,744,813**	176,091,419
- EIS	**286,435**	218,662
- EPF	**14,832,090**	11,402,880
- SOCSO	**2,752,616**	1,912,012
	235,615,954	189,624,973

Included in the staff costs are directors' emoluments as shown below:

Directors' emoluments		
- Salaries, allowances and bonus	**404,300**	417,050
- EPF	**52,169**	53,832
	456,469	470,882
- Benefits-in-kind	**42,500**	26,000
	498,969	496,882

21. TAXATION

	2019 RM	2018 RM
Malaysian income tax:		
Based on results for the financial year		
- Current tax	**(161,608)**	(92,892)
- Deferred tax relating to the origination and reversal of temporary differences	**(14,645,000)**	-
	(14,806,608)	(92,892)
(Under)/Over provision in prior year		
- Current tax	**(27,397)**	(24,584)
- Deferred tax	**-**	49,353,451
	(27,397)	49,328,867
	(14,834,005)	49,235,975

The reconciliation of tax expense of the Company is as follows:

	2019 RM	2018 RM
Profit/(Loss) before taxation	**199,330,146**	(279,388,254)
Income tax at Malaysian statutory tax rate of 24%	**(47,839,235)**	67,053,181
Income not subject to tax	**5,529,599**	1,740,629
Expenses not deductible for tax purposes	**(28,660,972)**	(7,020,702)
Deferred tax movement	**56,164,000**	(61,866,000)
	(14,806,608)	(92,892)
(Under)/Over provision in prior year	**(27,397)**	49,328,867
	(14,834,005)	49,235,975

The deferred tax (assets)/liabilities movement as at the end of the reporting period prior to set-off is represented by:

	2019 RM	2018 RM
Property, plant and equipment	**104,966,000**	51,455,000
Unabsorbed capital allowances	**(34,525,000)**	(43,316,000)
Unabsorbed tax losses	**(40,535,000)**	(40,535,000)
Others	**(15,261,000)**	(9,123,000)
	14,645,000	(41,519,000)

The unabsorbed capital allowances and tax losses available to be carried forward for set-off against future income of a nature and amount sufficient for the tax credits to be utilised are **RM143,856,000** (2018: RM180,483,000) and **RM168,896,000** (2018: RM168,896,000) respectively.

The unabsorbed tax losses can be carried forward for seven consecutive years of assessment immediately following that year of assessment (unused tax losses accumulated up to year of assessment 2018 can be carried forward until year assessment of 2025) and the unabsorbed capital allowances can be carried forward indefinitely pursuant to the gazetted Finance Act 2018.

The Company has been granted pioneer status under the Promotion of Investments Act, 1986 by the Malaysian Industrial Development Authority which exempts 100% of the statutory income of the Company in relation to the production of solar energy cells and modules.

22. RELATED PARTY TRANSACTIONS

(i) Identity of related parties

The Company has related party relationship with companies related by virtue of having the same ultimate holding company.

(ii) Related company transactions

	2019 RM	2018 RM
Transactions with penultimate holding company		
- Sales to	**417,088,719**	146,186,249
- Purchases from	**(97,529,127)**	(160,810,455)

	2019 RM	2018 RM
Transactions with immediate holding company		
- Loan interest charged by	**(1,187,980)**	(10,750,071)
- Sales to	**99,560**	129,566,587
- Purchases from	**(622,892,874)**	(625,776,493)
Transactions with related companies		
- Sales to	**2,914,141,949**	1,552,943,522
- Purchases from	**(542,683,023)**	(237,546,668)
- Disposal of assets	**15,013,970**	-

(iii) **Compensation of key management personnel**

The Company has no other members of key management personnel apart from the Board of Directors which compensation has been shown in Note 20.

Key management personnel are those persons including directors having authority and responsibility for planning, directing and controlling the activities of the Company, directly or indirectly.

23. COMMITMENTS

	2019 RM	2018 RM
Contracted but not provided for:		
- Property, plant and equipment	**80,475,815**	246,518,379
Non-cancellable operating lease:		
- Rental of premises		
- Within one year	**24,514,347**	15,964,796
- More than one year and less than two years	**18,165,717**	11,628,096
- More than two years and less than five years	**54,497,152**	7,562,492
- More than five years	**38,883,439**	-
	136,060,655	35,155,384

The Company enters into non-cancellable operating lease agreements for rental of its factories and warehouse.

24. MATERIAL LITIGATION

Oceantrax Engineering Sdn. Bhd. ("Oceantrax") has through its solicitor issued two winding up notices dated 27 August 2018 and 30 August 2018 respectively pursuant to section 465(1)(e) and section 466(1)(a) of the Companies Act 2016 claiming for the sum of RM5,600,927 and RM688,846 respectively from the Company for the construction and installation works carried out in the prior years ("Collectively referred to as "the Winding Up Notices"). On 24 September 2018, the Company has via its solicitors, filed a fortuna injunction application to the Penang High Court to prevent Oceantrax for filing any Winding Up Notices against the Company ("Fortuna Injuction"). On 28 September 2018, upon an ex parte hearing of the injunction application, the Penang High Court granted an interim injunction restraining Oceantrax from taking any action towards the proceeding of the winding up petition against the Company, including advertising and gazetting the winding up petition ("Interim Injunction").

Despite the Interim Injunction, Oceantrax's solicitors have on 3 and 4 October 2018 served the Company a sealed copy of the Winding Up Petition and advertise the Winding Up Petition without the support of any judgment and mala fide can be reflected in the way the advertisement was deliberately effected. Following the mentioned event, the Company had filed an application to strike out the Winding Up Petition and filed committal proceedings against Oceantrax and certain parties representing Oceantrax for non-compliance of the Interim Injuction ("Committal Proceeding")..

An application was made by the Company in the Penang High Court for settlement of the above claims. The Company has put forth a settlement sum of RM5,213,121 subject to approval by Oceantrax and for the Penang High Court to decide whether the settlement sum (*once approved*) is to be paid to Oceantrax or its co-contractor Shanxi Weixin Construction Engineering Co. Ltd. The hearing date is fixed on 4 June 2020 for further direction from the Penang High Court.

25. SIGNIFICANT EVENTS DURING REPORTING PERIOD

Patent Infringement Lawsuit

In March 2019, certain parties have filed a patent infringement lawsuit against the ultimate holding company and certain subsidiaries which included the Company as the "Respondent" at the U.S. International Trade Commission ("ITC Proceeding") and the U.S Disctrict Court for the District of Delaware, USA ("Delaware case") for patent infringement purportedly owned by the Plaintiff. The Jinko Group ("Jinko Solar Holding Co., Ltd. and its subsidiaries") has obtained a stay of the Delaware case pending completion of the ITC Proceedings while the ITC Proceeding is currently awaiting Final Determintation schedule to be issued in August 2020.

26. EVENT AFTER THE REPORTING PERIOD

The World Health Organisation had on 11 March 2020 declared the 2019 Novel Coronavirus (COVID-19) outbreak as a pandemic. To contain the spread of infections of this virus in the country, the Malaysian government has issued a Gazetted Order known as the Movement Control Order (MCO) to restrict the movements of people for the period from 18 March 2020 to 31 March 2020. On 25 March 2020, the Malaysian government announced the extension of the MCO for another 2 weeks until 14 April 2020. On 10 April 2020, the Malaysian government had further extended the MCO for another 2 weeks until 28 April 2020. On 23 April 2019, the Malaysian government has announced a further extension of the MCO to 12 May 2020. On 1 May 2020, the Malaysian government had allowed most economic sectors and business activities to resume business, subject to conditions and standard operating procedure (SOP), starting on 4 May 2020.

Since these developments occurred subsequent to the end of the reporting period, the COVID-19 pandemic is treated as a non-adjusting event. Consequently, the financial statements for the financial year ended 31 December 2019 are not adjusted for any effects arising from this non-adjusting event which may impact on the carrying amounts of the Company's assets as at 31 December 2019.

However, the COVID-19 pandemic could have an impact to the Company's financial performance for the financial year ending 31 December 2020 (FYE 2020) due to the disruption of economic activity globally. The financial impact on the Company's performance, if any, will be reflected in the FYE 2020 financial statements. At this juncture, management is not in a position to quantify the potential damages to be suffered due to the uncertainties prevailing within and outside the country.

Lodger Information

Name	:	LEONG YIT KHER (MIA 31070)
NRIC No	:	811010-02-5471
Address	:	PAUL LEONG & PARTNERS No. 116, 2nd Floor, Wisma Tan Ah Chye, Jalan Sungai Pinang, 10150 Georgetown, Pulau Pinang.
Phone No.	:	04-283 5955
Email	:	paulleong.paulleong.pg@gmail.com

EXHIBIT 3

Ticker Symbol: 601012 Stock Name: LONGi

LONGi Green Energy Technology Co., Ltd.
Annual Report 2020

Kindly reminder: The annual report 2020 in English is for reference only. The Report in Chinese shall prevail in case of any discrepancy between the two versions.

Section I Definitions

I. Definitions

For the purpose of this Report, the following terms shall have the meanings given thereto below unless the context otherwise requires:

Definitions of frequently used terms		
LONGi or the Company	refers to	LONGi Green Energy Technology Co., Ltd., renamed from Xi'an LONGi Silicon Materials Corp. in February 2017
Wuxi LONGi	refers to	Wuxi LONGi Silicon Materials Co., Ltd., a wholly-owned subsidiary of the Company
Yinchuan LONGi	refers to	Yinchuan LONGi Silicon Materials Co., Ltd., a wholly-owned subsidiary of the Company
Ningxia LONGi	refers to	Ningxia LONGi Silicon Materials Co., Ltd., a wholly-owned subsidiary of the Company
LONGi (H.K.)	refers to	LONGi (H.K.) Trading Limited, a wholly-owned subsidiary of the Company
LONGi (Kuching)	refers to	LONGi (Kuching) Sdn. Bhd., a wholly-owned subsidiary of LONGi (H.K.)
Lijiang LONGi	refers to	Lijiang LONGi Silicon Materials Co., Ltd., a wholly-owned subsidiary of the Company
Baoshan LONGi	refers to	Baoshan LONGi Silicon Materials Co., Ltd., a wholly-owned subsidiary of the Company
Chuxiong LONGi	refers to	Chuxiong LONGi Silicon Materials Co., Ltd., a wholly-owned subsidiary of the Company
Huaping LONGi	refers to	Huaping LONGi Silicon Materials Co., Ltd., a wholly-owned subsidiary of the Company
Tengchong LONGi	refers to	Tengchong LONGi Silicon Materials Co., Ltd., a wholly-owned subsidiary of the Company
Qujing LONGi	refers to	Qujing LONGi Silicon Materials Co., Ltd., a wholly-owned subsidiary of the Company
LONGi Solar	refers to	LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of the Company
Taizhou LONGi Solar	refers to	Taizhou LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi Solar
Zhejiang LONGi Solar	refers to	Zhejiang LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi Solar
Chuzhou LONGi Solar	refers to	Chuzhou LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi Solar
Ningxia LONGi Solar	refers to	Ningxia LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi Solar
Yinchuan LONGi Solar	refers to	Yinchuan LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi Solar
LONGi Technology (Kuching)	refers to	LONGi Technology (Kuching) Sdn. Bhd., a wholly-owned subsidiary of LONGi Solar
Germany LONGi	refers to	LONGi Solar Technologie GmbH, a wholly-owned subsidiary of the Company
LONGi (U.S.)	refers to	LONGi Solar Technology (U.S.) Inc., a wholly-owned subsidiary of the Company

Jiangsu LONGi Solar	refers to	Jiangsu LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi Solar
Xianyang LONGi Solar	refers to	Xianyang LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi Solar
Shaanxi LONGi Solar	refers to	Shaanxi LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi Solar
Jiaxing LONGi Solar	refers to	Jiaxing LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi Solar
Xi'an LONGi Solar	refers to	Xi'an LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi Solar
Yinchuan LONGi PV	refers to	Yinchuan LONGi PV Technology Co., Ltd., a wholly-owned subsidiary of the Company
Ningbo EZ	refers to	Ningbo Jiangbei EZ New Energy Technology Co., Ltd., a wholly-owned subsidiary acquired by the Company in July 2020
Vina Cell	refers to	Vina Cell Technology Company Limited, a wholly-owned subsidiary acquired by the Company in July 2020
Vina Solar	refers to	Vina Solar Technology Company Limited, a wholly-owned subsidiary acquired by the Company in July 2020
Datong LONGi Solar	refers to	Datong LONGi Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi Solar
Clean Energy	refers to	Xi'an LONGi Clean Energy Co., Ltd., a wholly-owned subsidiary of the Company
LONGi New Energy	refers to	Xi'an LONGi New Energy Co., Ltd., a wholly-owned subsidiary of the Company
Longxing New Energy	refers to	Huludao Longxing New Energy Co., Ltd., a wholly-owned subsidiary of Clean Energy
Longle Solar	refers to	Guangzhou Longle Solar Technology Co., Ltd., a wholly-owned subsidiary of LONGi New Energy
Ningde LONGi Solar	refers to	Ningde LONGi Solar Energy Co., Ltd., a wholly-owned subsidiary of LONGi New Energy
Lechang Solar	refers to	Xiangcheng Lechang Solar Energy Co., Ltd., a wholly-owned subsidiary of LONGi New Energy
Jinli New Energy	refers to	Xinyang Jinli New Energy Equipment Co., Ltd., a wholly-owned subsidiary of LONGi New Energy
Xinwei New Energy	refers to	Xuzhou Xinwei New Energy Technology Co., Ltd., a wholly-owned subsidiary of LONGi New Energy
Datong Clean Energy	refers to	LONGi Green & Clean Energy Co., Ltd. in Yunzhou District, Datong City, a wholly-owned subsidiary of Clean Energy
Guangling Clean Energy	refers to	Guangling Longxing Green & Clean Energy Co., Ltd., a wholly-owned subsidiary of Clean Energy
Xuanli Solar	refers to	Hami Liushuquan Xuanli Solar Power Generation Co., Ltd., a wholly-owned subsidiary of Clean Energy
Tongxin LONGi	refers to	Tongxin LONGi New Energy Co., Ltd., a joint stock company of Wuxi LONGi and Ningxia LONGi
LONGi Tianhua	refers to	Zhongning LONGi Tianhua New Energy Co., Ltd., a joint stock company of Ningxia LONGi
Daqing New Energy	refers to	Daqing Huiqing New Energy Co., Ltd., a joint stock company of Clean Energy
Zhongning New	refers to	Zhongning LONGi Solar New Energy Co., Ltd., a joint stock company of

Energy		Clean Energy
Zhaozhou New Energy	refers to	Zhaozhou Longhui New Energy Co., Ltd., a joint stock company of Clean Energy
Pingmei LONGi	refers to	Pingmei LONGi New Energy Technology Co., Ltd., a joint stock company of the Company
Sichuan Yongxiang	refers to	Sichuan Yongxiang New Energy Co., Ltd., a joint stock company of the Company
Tongchuan Xiaguang	refers to	Tongchuan Xiaguang New Energy Power Generation Co., Ltd., a joint stock company of the Company
Yidao New Energy	refers to	Yidao New Energy Technology (Quzhou) Co., Ltd., formerly a joint stock company of the Company, and transferred its equity in September 2020
Yunnan Tongwei	refers to	Yunnan Tongwei High Purity Crystal Silicon Co., Ltd., a joint stock company of the Company
Zhejiang MTCN	refers to	Zhejiang MTCN Technology Co., Ltd., a joint stock company of the Company
LERRI Solar (India)	refers to	LERRI Solar Technology (India) Private Limited, a wholly-owned subsidiary of the Company
Japan LONGi	refers to	LONGi Solar Technology K.K., a wholly-owned subsidiary of the Company
LONGi Venture Capital	refers to	Xi’an LONGi Green Energy Venture Capital Management Co., Ltd., a wholly-owned subsidiary of the Company
LONGi Green Energy Architecture	refers to	Xi'an LONGi Green Energy Architecture Technology Co., Ltd., a wholly-owned subsidiary of LONGi Venture Capital
Ruicheng Lvlong	refers to	Ruicheng Lvlong Clean Energy Co., Ltd., a holding subsidiary of Clean Energy
LONGi Engineering	refers to	LONGi Green Energy Solar Engineering Co., Ltd., a wholly-owned subsidiary of LONGi New Energy
Intelligent Technology	refers to	Xi’an LONGi Intelligent Technology Co., Ltd., a wholly-owned subsidiary of the Company
LONGi (Netherlands)	refers to	LONGi (Netherlands) Trading B.V., a wholly-owned subsidiary of LONGi (H.K.)
Lufeng LONGi	refers to	Lufeng LONGi Silicon Materials Co., Ltd., a wholly-owned subsidiary of the Company
Mono silicon	refers to	A single crystal in which the silicon atoms in the whole silicon crystal are arranged periodically, made of high purity polysilicon and mainly obtained by czochralski technique and float zone process
Wafer	refers to	A square or octagonal slice cut from a mono ingot or poly ingot
Ingot	refers to	A rod-like mono silicon grown from poly silicon by czochralski (CZ) and float zone (FZ), with a morphology of single crystal
Cell	refers to	Solar cell, a device that converts the solar radiant energy into electric energy through semiconductor materials using the principle of photoelectric conversion, also known as a "PV cell"
Module	refers to	The solar module consisting of a plurality of solar power generation units by means of series and parallel connection. Its function is to amplify the solar power generation units with low power into a photoelectric device that can be used alone. With high power, it can be used alone to charge all kinds of batteries, or used in series or parallel as the power generation unit of off-grid or grid-connected solar power supply system
MW	refers to	Megawatt, a unit of power for solar cells, 1 megawatt = 1,000 kilowatts

GW	refers to	Gigawatt, a unit of power for solar cells, 1 gigawatt = 1,000 megawatts
Cell conversion efficiency	refers to	The ratio of the optimum output power of a solar cell to the solar radiant power projected onto its surface
SSE	refers to	Shanghai Stock Exchange
CSRC	refers to	China Securities Regulatory Commission
Company Law	refers to	The *Company Law of the People's Republic of China*
Articles of Association	refers to	The *Articles of Association of LONGi Green Energy Technology Co., Ltd.*
Reporting period	refers to	January 1, 2020 to December 31, 2020
RMB	refers to	RMB Yuan, unless otherwise specified herein

Note: In this Report, any discrepancy between the sum of sub-items and the mantissa of the total is caused by rounding.

Section II Company Profile and Key Financial Indicators

I. Company Information

Legal name in Chinese	隆基绿能科技股份有限公司
Abbreviated name in Chinese	隆基股份
Legal name in English	LONGi Green Energy Technology Co., Ltd.
Abbreviated name in English	LONGi
Legal Representative	Li Zhenguo

II. Contacts and Contact Details

	Board Secretary	Representative of Securities Affairs
Name	Liu Xiaodong	Wang Hao
Contact address	No. 8369 Shangyuan Road, Economic and Technological Development Zone, Xi'an	No. 8369 Shangyuan Road, Economic and Technological Development Zone, Xi'an
Tel	029-81566863, 029-86519912	029-81566863, 029-86519912
Fax	029-86689601	029-86689601
E-mail	longi-board@longigroup.com	longi-board@longigroup.com

III. Basic Information

Registered address	No. 388 Middle Aerospace Road, Chang'an District, Xi'an
Postal code	710100
Office address	No. 8369 Shangyuan Road, Economic and Technological Development Zone, Xi'an
Postal code	710018
Website	http://www.longigroup.com
E-mail	longi-board@longigroup.com

IV. Information Disclosure and Location for Annual Report Collection

Name of media selected by the Company for information disclosure	China Securities Journal, Shanghai Securities News, Securities Times, and Securities Daily
Website designated by CSRC for publishing the Annual Report	www.sse.com.cn
Location for Annual Report collection	Office of the Board of Directors

V. Company's Stock

The Company's stock				
Class of stock	Listing exchange	Stock name	Ticker symbol	Abbreviated name before change
A-share	Shanghai Stock Exchange	LONGi	601012	N/A

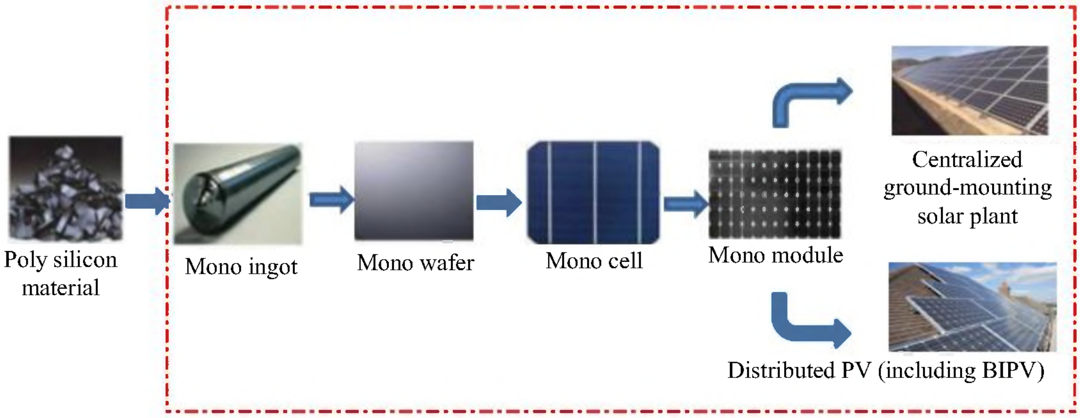
VI. Other Related Information

Accounting firm engaged by the Company (domestic)	Name	PwC Zhongtian Certified Public Accountants (Special General Partnership)
	Office address	11/F, PwC Center, Tower 2, Link Square, No. 202 Hubin Road, Huangpu District, Shanghai
	Name of signatory	Zhang Jiayan and Han Tao

Section III Overview of the Company's Business

I. Principal Business and Operation Mode of the Company and Industry Situation during the Reporting Period

The Company is committed to driving the transition of low-carbon energy, long focused on providing global customers with high-efficiency mono solar power generation solutions, and mainly specialized in the R&D, production and sales of mono ingots, wafers, cells and modules, in an effort to provide product and system solutions to development of centralized ground-mounting solar power systems and distributed roof-top solar power systems. At present, the Company's production bases of mono ingots and wafers are mainly concentrated in Shaanxi (Xi'an), Ningxia (Yinchuan, Zhongning), Yunnan (Lijiang, Baoshan, Qujing, Chuxiong), Jiangsu (Wuxi) and Malaysia (Kuching); mono cell production bases mainly in Shaanxi (Xi'an), Ningxia (Yinchuan), Jiangsu (Taizhou), Malaysia (Kuching) and Vietnam (Bac Giang); and module production bases mainly in Anhui (Chuzhou), Zhejiang (Quzhou and Jiaxing), Jiangsu (Taizhou), Shaanxi (Xi'an and Xianyang), Shanxi (Datong), Malaysia (Kuching) and Vietnam (Bac Giang). It offers PV solar plant development and system solutions in many places at home and abroad. During the reporting period, the principal business and operation model did not change significantly compared with a year earlier. The position of the principal business and products in the PV industry chain is as shown below:



Note: The red box in the figure above shows the Company's business scope in the industrial chain.

The PV industry during the reporting period has been elaborated in the "Discussion and Analysis of Business Situation", as detailed in Section IV of this Report.

II. Notes to Material Changes in the Company's Major Assets during the Reporting Period

√ Applicable □ Not Applicable

See "II (III) Analysis of assets and liabilities" in Section IV of this Report for details.

The foreign assets are RMB 15.920 billion, accounting for 18.17% of the total assets.

III. Analysis of Core Competitiveness during the Reporting Period

√ Applicable □ Not Applicable

(I) Forward-looking strategic planning and high-efficiency strategy implementation capabilities

LONGi's core management has long been engaged in and had an insight into the PV industry and mono field, in possession of forward-looking strategic planning capability. In 2006, LONGi has, after in-depth analysis on technical routes in the PV industry, chosen the most potential mono route for minimized LCOE as its specialization, and centralized the resources, long engaged in the R&D, production and sales of mono products, and made innovative breakthroughs in a number of mono PV technology nodes. Led by LONGi, the market share of mono products has increased rapidly in the and high-efficiency products and services to the market, LONGi has accelerated the pace of production capacity construction to ensure the market supply of mono products, pursued the increase of market share, and realized the rapid growth of business performance. During the reporting period, LONGi achieved an operating revenue of RMB 54.583 billion, up 65.92% year on year; the net profit attributable to the parent company reached RMB 8.552 billion, up 61.99% year on year; basic EPS was RMB 2.27, a year-on-year rise of 54.42%; the weighted average return on equity after deducting non-recurring profit or loss was 25.93%, an increase of 2.84 percentage points, and the net cash flow from operating activities was RMB 11.015 billion, up 35.02% year on year. In 2020, we have mainly done the following:

(I) Deepened the globalization strategy and implemented global operations effectively

During the reporting period, LONGi continued to advance the globalization strategy and facilitate the effective implementation of global operations. The annual overseas revenue was RMB 21.461 billion, up 70% year on year. In 2020, LONGi deepened the capacity building of global sales organization, further promoted the localization and echelon of talents, deepened the principle of localized management, empowered to stimulate the organizational vitality, further expanded the overseas sales areas, and significantly increased the market share in key countries and regions; in terms of overseas production capacity construction, LONGi acquired Ningbo EZ, enhanced the technical transformation and efficiency improvement of the bases in Malaysia and Vietnam, and effectively guaranteed the production capacity supply in the overseas market.

(II) Adhered to the customer value-oriented product strategy and solutions, and increased rapidly the market share of mono products

During the reporting period, with the core of enhancing customer values and relying on the quality, cost and brand advantages, LONGi effectively met customers' market demand for mono products. The sales of main products (i.e., mono wafers and modules) increased significantly over the same period last year, bringing steady growth of operating revenue and profit. In 2020, LONGi achieved the shipments of 58.15GW mono wafers, including the external sales of 31.84GW, a year-on-year increase of 25.65%, and 26.31GW for self-use; the shipments of mono modules were 24.53GW, including the external sales of 23.96GW, up 223.98% year on year, and 0.57GW for self-use. In addition, LONGi- continued to improve its EPC system development capability, completed the promotion and marketing of BIPV products, named "LONGi Roof". In 2020, LONGi reached a strategic cooperation agreement with-large energy groups, implemented differentiated marketing strategies for different markets, enhanced the customer communication with product and brand advantages, and rapidly increased the market share of module products; it strengthened the supply capacity of raw and auxiliary materials and the guarantee of production capacity, giving priority to ensuring the performance capacity of order delivery; besides, it kept expanding the advantages of product performance, quality consistency and stability, so that brand advantage and product premium ability were highlighted. In 2020, the global market share of LONGi's module products was about 19%, a significant increase of 11 percentage points from 2019. Led by LONGi, the global market share of mono products has increased rapidly, and mono products have replaced poly ones. The market share of mono products has risen to 90.2% in 2020, an increase of more than 20 percentage points from 2019, according to the *2020 China PV Industry Development Roadmap* released by the China Photovoltaic Industry Association (CPIA).

(III) Continuously implemented the product leadership strategy, and achieved remarkable results in the product and service upgrades

In 2020, LONGi continued to deepen the product leadership strategy, create value for customers, lead the technological innovation with high targets, constantly promote the reduction of product costs as well as the efficiency and quality improvement, maintain high R&D inputs, and introduce the high value results into mass production, with sufficient reserves of new products and technologies. By the end of the reporting period, LONGi had obtained a total of 1,001 issued patents and invested RMB 2.592 billion in R&D, accounting for 4.75% of its operating revenue. In terms of ingot pulling and

(V) Investment analysis

1. General analysis of equity investments in external entities

√ Applicable □ Not Applicable

With the advent of grid parity, plus the positive policy for carbon neutrality in various countries, the market demand of the PV industry will enter a new stage of rapid development. During the reporting period, LONGi promoted steadily the implementation of high-efficiency capacity expansion projects in each link, and increased the layout of high-efficiency mono cell capacity. In addition, to further improve the layout of overseas capacity, LONGi acquired Vina Cell and Vina Solar in July 2020 to consolidate its competitiveness in the global market.

(1) Significant equity investment

√ Applicable □ Not Applicable

On June 30, 2020, LONGi signed a *Share Purchase Agreement* with Wang Zhaofeng, Yang Yongzhi, Zhao Xuewen and Ningbo Chaofang Industrial Investment Partnership (Limited Partnership), under which LONGi purchased 100% of the equity of Ningbo EZ in cash, at the benchmark price of RMB 1.78 billion. Depending on their performance, the performance commitment companies (Target Company and its subsidiaries, sub-subsidiaries, joint stock companies) should pay the floating consideration or performance-based compensation to LONGi. The equity delivery of the underlying assets was completed on July 31, 2020 (please refer to LONGi's Announcement No. L2020-070 on July 1, 2020 for details). The target production base acquired is located in Vietnam, which further improved LONGi's global capacity layout.

(2) Significant non-equity investment

√ Applicable □ Not Applicable

S/N	Description	Sponsor	Estimated total investment approved by competent authorities (RMB Hundred Million)	Project progress	Source of funds
1	5GW High-efficiency Mono Module Project of Chuzhou LONGi Solar	Chuzhou LONGi Solar	22.62	Fully put into production	Raised funds + self-pooled funds
2	5GW High-efficiency Mono Cell Project of Ningxia LONGi Solar	Ningxia LONGi Solar	30.5	Fully put into production	Raised funds + self-pooled funds
3	6GW Mono Ingot Project (Phase II) of Baoshan	Baoshan LONGi	17.49	Fully put into production	Self-pooled funds
4	6GW Mono Ingot Project (Phase II) of Lijiang	Huaping LONGi	19.37	Fully put into production	Self-pooled funds
5	10GW Mono Wafer Project (Phase II) of Chuxiong	Chuxiong LONGi	14.86	Fully put into production	Self-pooled funds
6	1.25GW Mono Cell Project of Kuching	LONGi Technology (Kuching)	9.57	Fully put into production	Self-pooled funds

7	15GW Mono Ingot and Wafer Project of Yinchuan	Yinchuan LONGi PV	45.86	Fully put into production	Raised funds + self-pooled funds
8	5GW Mono Module Project of Taizhou	Jiangsu LONGi Solar	17.9	Fully put into production	Self-pooled funds
9	5GW Mono Module Project of Xianyang	Xianyang LONGi Solar	18.39	Fully put into production	Self-pooled funds
10	5GW Mono Module Project (Phase II) of Chuzhou	Chuzhou LONGi Solar	20.21	Fully put into production	Self-pooled funds
11	5GW Mono Cell Project of Xi'an Jingwei New Town	Shaanxi LONGi Solar	24.62	Fully put into production	Raised funds + self-pooled funds
12	5GW Mono Module Project of Jiaxing	Jiaxing LONGi Solar	19.48	Fully put into production	Self-pooled funds
13	10GW Mono Ingot Project of Tengchong	Tengchong LONGi	18.37	Partially put into operation	Self-pooled funds
14	7.5GW Mono Cell Project (Phase I) of Xi'an Aerospace Base	Xi’an LONGi Solar	32.26	Fully put into production in the Q1 2021	Self-pooled funds
15	10GW Mono Ingot and Wafer Project of Qujing	Qujing LONGi	23.27	Partially put into operation	Self-pooled funds
16	3GW Mono Cell Project of Ningxia LONGi Solar	Ningxia LONGi Solar	13.97	Under construction and expected to be put into production in Q4 2021	Raised funds (note) + self-pooled funds

Note: The *Proposal on the Closing of Investment Projects Raised by Rights Offering in 2018 and the Use of the Carryover and Surplus Funds for New Projects and Permanent Replenishment of Working Capital* were passed at the 20th Meeting of the Fourth Board of Directors in 2020 and the First Extraordinary General Meeting in 2021. It's hereby agreed to invest RMB 1.2 billion of surplus funds from 5GW High-efficiency Mono Cell Project of Ningxia LONGi Solar in the construction of 3GW Mono Cell Project of Ningxia LONGi Solar, and the remaining RMB 16.98882 million for the permanent replenishment of working capital.

(3) Financial assets measured at fair value

√ Applicable □ Not Applicable

See "XI. Disclosure of Fair Value" in Section XI of this Report for details.

(VI) Sales of material assets and equities

□ Applicable √ Not Applicable

(VII) Analysis of major holding and joint-stock companies

√ Applicable □ Not Applicable

1. Major holding subsidiaries

Unit: RMB Ten Thousand

Name	Principal business	Registered capital	Total assets	Net assets	Operating revenue	Operating profit	Net profit

Ningxia LONGi	Manufacturing and sales of ingots	25,000	273,134.82	162,893.32	185,455.55	49,579.34	43,742.21
Huaping LONGi	Manufacturing and sales of ingots	30,000	156,617.99	89,824.21	287,578.85	70,966.10	60,486.87
Yinchuan LONGi	Manufacturing and sales of ingots and wafers	100,000	774,700.65	661,170.46	794,724.08	193,270.75	170,664.31
Wuxi LONGi	Manufacturing and sales of wafers	20,000	114,700.04	99,558.74	45,560.20	3,153.27	1,491.41
Lijiang LONGi	Manufacturing and sales of ingots	80,000	200,213.43	138,963.45	307,392.75	60,878.24	51,840.17
Baoshan LONGi	Manufacturing and sales of ingots	100,000	414,346.59	281,332.68	597,271.34	146,429.55	124,765.13
Chuxiong LONGi	Manufacturing and sales of wafers	50,000	372,355.03	195,606.54	1,063,717.92	118,796.57	101,277.17
Yinchuan LONGi PV	Manufacturing and sales of ingots and wafers	5,000	609,055.25	377,659.49	271,966.79	38,471.63	34,965.34
LONGi Solar	Manufacturing and sales of PV cells and modules	200,000	3,686,980.35	996,583.94	3,334,038.32	-13,401.88	-2,345.15
LONGi New Energy	Development and operation of PV distributed solar plants	140,000	369,115.55	177,447.82	95,145.05	15,572.39	13,115.98
Clean Energy	Development and operation of PV centralized solar plants	50,000	434,326.25	202,584.83	120,098.59	66,729.08	57,021.61
LONGi (H.K.)	Import & export of mono silicon and polysilicon raw materials and products	HKD 779 million	485,538.66	221,802.69	678,209.17	20,771.59	20,743.52
LONGi (Kuching)	Manufacturing and sales of ingots, wafers, cells and modules	MYR 978.162 million	217,043.67	170,100.81	180,720.92	18,740.46	15,761.96
Vina Cell	Manufacturing and sales of PV cells	USD 68.4357 million	217,215.24	136,542.19	138,796.47	22,946.17	22,263.86
Vina Solar	Manufacturing and sales of PV modules	USD 91.0193 million	185,341.52	82,670.31	87,241.27	8,628.62	7,123.95

Notes: ① Allowing for many subsidiaries, the financial data of LONGi Solar, Clean Energy and New Energy shall be presented in the consolidated statements, and other companies in the individual statements.

② Vina Cell and _Vina Solar have been incorporated into the consolidated statements of the Company since August 2020, and their operating revenue, operating profit and net profit are the totals from August to December 2020.

2. Major joint stock companies

Unit: RMB Ten Thousand

Name	Principal business	Shareholding	Registered capital	Total assets	Net assets	Net profit
Zhongning	Solar energy development and	30%	30,000	148,349.84	38,955.73	19.32

New Energy	investment					
Tongxin LONGi	Investment & development of energy projects, and operation management of power projects	49%	15,952	74,412.67	34,524.89	2,297.82
Sichuan Yongxiang	Manufacturing and sales of non-metallic mineral products and PV equipment components	15%	280,000	486,615.74	191,618.14	52,239.95
Pingmei LONGi	Production and sales of cells and modules	19.8%	90,000	259,485.21	122,772.33	12,694.90
Tongchuan Xiaguang	Development and operation of PV power - projects	51%	43,000	176,193.71	54,060.14	8,842.92
Daqing New Energy	Development, investment, construction and operation of PV power -projects	30%	13,246	76,705.28	24,840.68	3,158.38
Zhaozhou New Energy	Development, investment and construction of PV power - projects	30%	11,841	64,048.04	17,229.59	2,396.88

Note: The Company holds 51% of shares in Tongchuan Xiaguang, but has no control over Tongchuan Xiaguang according to the Articles of Association, and thus not included in the consolidated range.

(VIII) Structured entities controlled by the Company

□ Applicable √ Not Applicable

III. Discussion and Analysis on the Company's Future Development

(I) Industry structure and trend

√ Applicable □ Not Applicable

1. Competitive landscape

In 2020, the market competition among PV enterprises was increasingly fierce, subject to the pandemic and the prominent contradiction between supply and demand in the industrial chain. Major vendors have basically listed, with market share concentrated quickly to leading quality enterprises. PV enterprises have presented complementary coexistence of vertical integration and specialization in local fields, evidenced by constantly emerging new techniques and accelerated product upgrading. In the context of the certainty of PV industry demand and energy transition, a number of enterprises have successively launched huge capacity expansion plans, and more and more enterprises outside the industry have poured into the PV industry, thus keeping the future market competition increasingly fierce. The major competitive landscape is as follows:

(1) With the rapid improvement of industry concentration and the obvious differentiation of market profitability, the comprehensive competitiveness of enterprises will become the focus of attention

With the rapid technological progress and intensified market competition in the industry, the "Matthew Effect" is obvious in the PV industry, giving rise to the market polarization. Relying on talents, capital, technology, scale, brand, supply chain management and other advantages, leading enterprises are always able to maintain a high rate of capacity utilization and profitability, so that they may have the capability of continuous R&D investment and equipment upgrading, improve constantly their competitive edges and market shares, and present a significant siphonic effect of talents, thus forming a virtuous cycle. In contrast, enterprises with weak competitiveness cannot keep up with the pace of technological progress in the industry, and meantime are lack of funds for technological upgrading or equipment renewal, thus gradually losing competitiveness and falling into business difficulties, and finally phasing out of the market. In this way, the concentration ratio has been constantly increased. In recent years, the improved concentration of industrial chains has proved the formation of the above competitive pattern, as shown in the figure below:

3. Matters not disclosed in the interim announcement

√ Applicable □ Not Applicable

Unit: Yuan Currency: RMB

Counterparty	Affiliated relation	Type	Contents of related party transaction	Pricing principle	Price	Amount	Proportion in the similar transaction amount (%)	Settlement way	Market price	Reasons for great differences between transaction price and market reference price
Dalian Linton NC Machine Co., Ltd.	Others	Purchasing of goods	Production equipment	Reference market price	/	1,368,036,459.23	13.51	Cash transaction	/	Not applicable
Sichuan Yongxiang New Energy Co., Ltd.	Others	Purchasing of goods	Poly silicon material	Reference market price	/	1,307,765,734.50	11.35	Cash transaction	/	Not applicable
Pingmei LONGi New Energy Technology Co., Ltd.	Others	Purchasing of goods	Outsourced processing of cells	Reference market price	/	1,106,844,550.38	35.50	Cash transaction	/	Not applicable
Linton Kayex Technology Co., Ltd.	Others	Purchasing of goods	Production equipment	Reference market price	/	766,584,070.18	7.57	Cash transaction	/	Not applicable
Yingkou Jinchen Machinery Co., Ltd.	Others	Purchasing of goods	Production equipment	Reference market price	/	104,561,940.24	1.03	Cash transaction	/	Not applicable
Shenyang LONGi Electromagnetic Technology Co., Ltd.	Others	Purchasing of goods	Production equipment	Reference market price	/	44,402,592.80	0.44	Cash transaction	/	Not applicable
Shanghai Fuchuan Intelligent Technology Co., Ltd.	Others	Purchasing of goods	Production equipment	Reference market price	/	41,301,942.83	0.41	Cash transaction	/	Not applicable
Dalian Weikaite Technology Co., Ltd.	Others	Purchasing of goods	Production equipment	Reference market price	/	30,361,238.95	0.30	Cash transaction	/	Not applicable
Sichuan Yongxiang New Energy Co., Ltd.	Others	Purchasing of goods	Spare parts	Reference market	/	30,203,469.02	3.44	Cash transaction	/	Not applicable

				price						
Yidao New Energy Technology (Quzhou) Co., Ltd.	Others	Purchasing of goods	Cell	Reference market price	/	14,539,470.18	0.47	Cash transaction	/	Not applicable
Dalian Linton NC Machine Co., Ltd.	Others	Purchasing of goods	Spare parts	Reference market price	/	2,638,520.27	0.30	Cash transaction	/	Not applicable
Ningxia Zhongjing Semiconductor Materials Co., Ltd.	Others	Purchasing of goods	Poly silicon material	Reference market price	/	2,547,590.45	0.02	Cash transaction	/	Not applicable
Shenyang LONGi Electromagnetic Technology Co., Ltd.	Others	Purchasing of goods	Spare parts	Reference market price	/	2,075,740.46	0.24	Cash transaction	/	Not applicable
Bao Grid Shanghai Energy Technology Co., Ltd.	Others	Purchasing of goods	Others	Reference market price	/	918,875.13	0.18	Cash transaction	/	Not applicable
Ningxia Zhongjing Semiconductor Materials Co., Ltd.	Others	Purchasing of goods	Spare parts	Reference market price	/	736,968.68	0.08	Cash transaction	/	Not applicable
United Nations Quality Detection Group Co., Ltd.	Others	Receiving of labor services	Testing services	Reference market price	/	343,962.26	0.07	Cash transaction	/	Not applicable
Shanghai Fuchuan Intelligent Technology Co., Ltd.	Others	Purchasing of goods	Spare parts	Reference market price	/	146,643.54	0.02	Cash transaction	/	Not applicable
Suzhou Yingzhen Intelligent Technology Co., Ltd.	Others	Purchasing of goods	Spare parts	Reference market price	/	31,465.49	0.00	Cash transaction	/	Not applicable
Yingkou Jinchen Machinery Co., Ltd.	Others	Purchasing of goods	Spare parts	Reference market price	/	13,800.39	0.00	Cash transaction	/	Not applicable
Tongchuan Xiaguang New Energy Power Generation Co., Ltd.	Others	Sales of goods	Solar plant construction and services	Reference market price	/	152,440,125.26	11.50	Cash transaction	/	Not applicable
Datong Xinrong Oulong Clean Energy Co., Ltd.	Others	Sales of goods	Solar plant construction and services	Reference market price	/	135,383,317.76	10.22	Cash transaction	/	Not applicable
Hunyuan Chenglong Clean Energy Co., Ltd.	Others	Sales of goods	Solar plant construction and	Reference market	/	121,215,174.60	9.15	Cash transaction	/	Not applicable

			services	price						
Pingmei LONGi New Energy Technology Co., Ltd.	Others	Sales of goods	Wafer	Reference market price	/	107,709,341.06	0.76	Cash transaction	/	Not applicable
Yidao New Energy Technology (Quzhou) Co., Ltd.	Others	Sales of goods	Wafer	Reference market price	/	59,069,925.77	0.42	Cash transaction	/	Not applicable
Pingmei LONGi New Energy Technology Co., Ltd.	Others	Sales of goods	Module	Reference market price	/	38,041,096.53	0.11	Cash transaction	/	Not applicable
Ningxia Zhongjing Semiconductor Materials Co., Ltd.	Others	Sales of goods	Utilities	Reference market price	/	11,625,763.72	1.43	Cash transaction	/	Not applicable
Trina Solar (Vietnam) Science&Technology Co., Ltd.	Others	Sales of goods	Others	Reference market price	/	4,708,934.91	0.58	Cash transaction	/	Not applicable
Linton Kayex Technology Co., Ltd.	Others	Sales of goods	Module	Reference market price	/	2,509,503.12	0.01	Cash transaction	/	Not applicable
Linton Kayex Technology Co., Ltd.	Others	Sales of goods	Solar plant construction and services	Reference market price	/	1,817,592.30	0.14	Cash transaction	/	Not applicable
Xi'an Zhongjing Semiconductor Materials Co., Ltd.	Others	Sales of goods	Utilities	Reference market price	/	1,284,878.95	0.16	Cash transaction	/	Not applicable
Pingmei LONGi New Energy Technology Co., Ltd.	Others	Sales of goods	Technical services	Reference market price	/	1,082,379.51	0.13	Cash transaction	/	Not applicable
Sichuan Yongxiang New Energy Co., Ltd.	Others	Sales of goods	Square silicon core	Reference market price	/	619,469.03	0.08	Cash transaction	/	Not applicable
Ningxia Zhongjing Semiconductor Materials Co., Ltd.	Others	Sales of goods	Others	Reference market price	/	473,373.26	0.06	Cash transaction	/	Not applicable
Sichuan Yongxiang New Energy Co., Ltd.	Others	Sales of goods	Others	Reference market price	/	249,666.62	0.03	Cash transaction	/	Not applicable
Xi'an Zhongjing Semiconductor Materials Co., Ltd.	Others	Sales of goods	Others	Reference market	/	198,514.22	0.02	Cash transaction	/	Not applicable

				price						
Zhaozhou Longhui New Energy Co., Ltd.	Others	Sales of goods	Module	Reference market price	/	126,159.29	0.00	Cash transaction	/	Not applicable
Dalian Linton NC Machine Co., Ltd.	Others	Sales of goods	Auxiliary materials	Reference market price	/	88,495.58	0.01	Cash transaction	/	Not applicable
Dalian Linton NC Machine Co., Ltd.	Others	Sales of goods	Others	Reference market price	/	67,141.94	0.01	Cash transaction	/	Not applicable
Xinyi Zhongda Energy Saving Technology Co., Ltd.	Others	Sales of goods	Solar plant construction and services	Reference market price	/	20,047.17	0.00	Cash transaction	/	Not applicable
Shenyang LONGi Electromagnetic Technology Co., Ltd.	Others	Sales of goods	Others	Reference market price	/	1,800.00	0.00	Cash transaction	/	Not applicable
Linton Kayex Technology Co., Ltd.	Others	Sales of goods	Others	Reference market price	/	1,760.00	0.00	Cash transaction	/	Not applicable
Shanghai Fuchuan Intelligent Technology Co., Ltd.	Others	Sales of goods	Others	Reference market price	/	1,480.00	0.00	Cash transaction	/	Not applicable
Ningxia Zhongjing Semiconductor Materials Co., Ltd.	Others	Rendering of services	Housing	Reference market price	/	1,768,217.36	0.22	Cash transaction	/	Not applicable
Ningxia Zhongjing Semiconductor Materials Co., Ltd.	Others	Rendering of services	Equipment	Reference market price	/	56,952.00	0.01	Cash transaction	/	Not applicable
Total				/	/	5,464,616,144.94	/	/	/	/
Details of large sales returns					N/A					
Description of related party transactions					The aforesaid related party transactions facilitate the development and execution of the Company's daily business and meet the objective needs of normal production & operation and capacity expansion, without any damage to the interests of the Company and other shareholders, especially minority stockholders, nor impacts on the independence of the Company and dependence on related parties.					

(3) Provision for impairment of entrusted asset management

□ Applicable √ Not Applicable

2. Entrusted loans

(1) Overall situation

□ Applicable √ Not Applicable

Others

□ Applicable √ Not Applicable

(2) Individual situation

□ Applicable √ Not Applicable

Others

□ Applicable √ Not Applicable

(3) Provision for impairment

□ Applicable √ Not Applicable

3. Others

□ Applicable √ Not Applicable

(IV) Other material contracts

√ Applicable □ Not Applicable

(1) Progress of material contracts for daily operations disclosed by the Company as of the end of the reporting period

S/N	Contract type	Contents	Name of contracting parties	Contract performance period	Number of contracts	Date of signing	Progress
1	Long-term purchase contract	Silicon material procurement	The Company, Yinchuan LONGi, Lijiang LONGi, and Ningxia LONGi etc.; OCI Company Ltd. and its subsidiary OCIM Sdn. Bhd.	March 2018 to February 2021	64,638t	2018-2-5	Executed as of the disclosure date of this Report
2	Long-term purchase contract	Silicon material procurement	Yinchuan LONGi, Ningxia LONGi, Lijiang LONGi, and Huaping LONGi etc.; Xinjiang Daqo New Energy Co., Ltd.	January 1, 2020 to December 31, 2022	112,800t	2019-8-6	In progress
3	Long-term purchase contract	Silicon material procurement	Yinchuan LONGi, Ningxia LONGi, and Lijiang LONGi etc.; Sichuan Yongxiang Co., Ltd., Sichuan Yongxiang Poly-Silicon Co., Ltd. and Inner Mongolia Tongwei Silicon Co., Ltd.	May 2018 to December 2020	55,000t	2018-5-22	Executed
4	Long-term purchase contract	Silicon material procurement	Yinchuan LONGi, Ningxia LONGi, and Lijiang LONGi etc.; Xinte Energy Co., Ltd., Xinjiang Xinte Crystal Silicon Technology Co., Ltd.	January 2019 to December 2021	91,080t	2018-7-27	The procurement amount for 2019-2020 has been completed, and the procurement amount for

							2021 shall be implemented in accordance with the long-term order framework contract in Item 5 of this table
5	Long-term purchase contract	Silicon material procurement	Yinchuan LONGi, Ningxia LONGi, Lijiang LONGi, Huaping LONGi, Yinchuan LONGi, Qujing LONGi, and Tengchong LONGi etc.; Xinte Energy Co., Ltd.	January 2021 to December 2025	Not less than 270,000t	2020-12-14	Executed in 2021
6	Long-term purchase contract	Glass procurement	LONGi Solar, Zhejiang LONGi Solar, Taizhou LONGi Solar, Yinchuan LONGi Solar, Chuzhou LONGi Solar, Datong LONGi Solar, LONGi (H.K.), and LONGi (Kuching); Flat Glass Group Co., Ltd., Anhui Flat Solar Glass Co., Ltd., Zhejiang Jiafu Glass Co., Ltd., and Flat Glass (Vietnam) Co., Ltd.	July 1, 2019 to December 31, 2021	161,600,000m^2	2019-5-15	The procurement amount for 2019-2020 has been completed, and the procurement amount for 2021 shall be implemented in accordance with Item 7 of this table
7	Long-term purchase contract	Glass procurement	LONGi Solar, Zhejiang LONGi Solar, Taizhou LONGi Solar, Jiangsu LONGi Solar, Chuzhou LONGi Solar, Xianyang LONGi Solar, Jiaxing LONGi Solar, Yinchuan LONGi Solar, Datong LONGi Solar, LONGi Green Energy Architecture, LONGi (H.K.), LONGi (Kuching), and Vina Solar; Flat Glass Group Co., Ltd., Anhui Flat Solar Glass Co., Ltd., Zhejiang Jiafu Glass Co., Ltd., Flat Glass (Vietnam) Co., Ltd. and Flat Glass (Hong Kong) Co., Ltd.	February 8, 2021	123,780,000m^2 to be purchased in 2021, and 46GW modules to be purchased from 2022 to 2023	February 8, 2021	Executed in 2021
8	Long-term purchase contract	Glass procurement	LONGi Solar, Zhejiang LONGi Solar, Taizhou LONGi Solar, Yinchuan LONGi Solar, Chuzhou LONGi Solar, Datong LONGi Solar, LONGi (H.K.), and LONGi (Kuching); IRICO Group New Energy Company Limited and IRICO (Hefei) Photovoltaic Co., Ltd.	July 3, 2019 to December 31, 2021	68,500,000m^2	2019-7-3	In progress
9	Long-term	PV	LONGi Solar, Zhejiang	Q3 2019 to	47.1 million	2019-7-22	Due to

	purchase contract	aluminum frame	LONGi Solar, Taizhou LONGi Solar, Yinchuan LONGi Solar, Chuzhou LONGi Solar, Datong LONGi Solar, LONGi (H.K.), and LONGi (Kuching); Jiangsu Akcome Science & Technology Co., Ltd.	Q4 2021	sets		business changes of the other party, the two parties negotiated to terminate this contract in April 2020. The actual quantity was 8.33 million sets
10	Long-term purchase contract	PV aluminum frame	LONGi Solar, Zhejiang LONGi Solar, Taizhou LONGi Solar, Yinchuan LONGi Solar, Chuzhou LONGi Solar, Datong LONGi Solar, LONGi (H.K.), and LONGi (Kuching); Yingkou Changtai Aluminum Co., Ltd.	Q3 2019 to Q4 2021	49,700,000 sets	2019-7-22	In progress
11	Long-term purchase contract	Glass procurement	LONGi Solar, Zhejiang LONGi Solar, Taizhou LONGi Solar, Yinchuan LONGi Solar, Chuzhou LONGi Solar, Datong LONGi Solar, LONGi (H.K.), LONGi (Kuching), Xianyang LONGi Solar, Jiangsu LONGi Solar, Jiaxing LONGi Solar, and LONGi Green Energy Architecture; Wujiang CSG Glass Co., Ltd. and Dongguan CSG Solar Glass Co., Ltd.	July 31, 2020 to July 31, 2025	Estimated to be about RMB 5.7 billion at the market price when the contract is signed	2020-7-31	In progress
12	Long-term purchase contract	Silicon material procurement	Yinchuan LONGi, Ningxia LONGi, and Yinchuan LONGi PV etc.; Asia Silicon (Qinghai) Co., Ltd.	September 1, 2020 to August 31, 2025	124,800t	2020-8-18	In progress
13	Long-term sales contract	Wafer sales	LONGi; Vina Cell Technology Company Limited, Shanghai EZ New Energy Technology Co., Ltd.	January 2019 to December 2021	1.31 billion	2019-7-15	In July 2020, the Company acquired 100% of the equity of the counterparty, and the related transactions were transformed into those between subsidiaries
14	Long-term sales contract	Wafer sales	LONGi and Shanxi Lu'an Solar Technology Co., Ltd.	January 2020 to December 2022	2.1 billion	2019-8-9	In progress
15	Long-term sales contract	Wafer sales	LONGi; Chint New Energy Technology (Haining) Co., Ltd.,	January 2020 to December	660 million	2019-9-9	In progress

			Zhejiang CHINT Solar Technology Co., Ltd. and Hangzhou Mintai Import and Export Trading Co., Ltd.	2022			
16	Long-term sales contract	Wafer sales	LONGi and Jolywood (Taizhou) Solar Technology Co., Ltd.	January 2020 to December 2022	800 million	2019-9-16	In progress
17	Long-term sales contract	Wafer sales	LONGi and Jiangsu Runergy New Energy Technology Co., Ltd.	January 1, 2020 to December 31, 2022	3.82 billion	2020-1-10	In progress
18	Long-term sales contract and supplementary contract	Wafer sales	LONGi and Tongwei Solar (Chengdu) Co., Ltd.	January 1, 2020 to December 31, 2022	5.8 billion	2020-1-22 2020-9-10	In progress
19	Long-term sales contract	Sales of modules	LONGi Solar and a U.S. ground-mounting solar power system developer	2019-2022	Estimated to be about RMB 600 million at the market price when the contract is signed	2018-7-17	In progress

(2) Progress of investment agreements disclosed by the Company as of the end of the reporting period

S/N	Investment target	Parties	Date of signing	Investment scale	Project progress
1	5GW Mono Module Project of Chuzhou	LONGi Solar and Management Committee of Chuzhou Economic and Technological Development Zone	2018-1-4	5GW mono modules	Fully put into production
2	6GW Mono Ingot Project (Phase II) of Baoshan	LONGi, Baoshan Municipal People's Government and People's Government of Longling County	2018-3-28	6GW mono ingots	Fully put into production
3	6GW Mono Ingot Construction Project (Phase II) of Lijiang	LONGi and Lijiang Municipal People's Government	2018-4-3	6GW mono ingots	Fully put into production
4	10GW Mono Wafer Project (Phase II) of Chuxiong	LONGi, People's Government of Chuxiong Yi Autonomous	2018-4-15	10GW mono wafers	Fully put into production

EXHIBIT 4

16/6/2020

Prelodgement Collection Slip

UserID	: dsuhana(SW)
Transaction Date/Time	: 12/06/2020 15:20:06
Lodging Reference No	: ROC12062020002555
Entity No	: 201601000013(1170938-X)
Document(s) Lodged:	LONGI (KUCHING) SDN. BHD.

SNO	Form Type	Doc Date	Event Date	Received Date
1	557	31/12/2019	10/06/2020	12/06/2020

19 JUN 2020

LONGI (KUCHING) SDN. BHD.

Registration No. 201601000013 (1170938-X)

(Incorporated In Malaysia)

REPORTS OF THE DIRECTORS AND FINANCIAL STATEMENTS FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

KSK CORPORATE SERVICES S/B, KUCHING

SW12062020001017

12/6/2020 3:29:36 PM

001 dsuhana

201601000013(1170938-X), APP-CIU-FINANCIAL STATEMENT CA 2016 (PRIVATE LIMITED)	50.00
201801031220(1293246-M), APP-CIU-FINANCIAL STATEMENT CA 2016 (PRIVATE LIMITED)	50.00
199901023375(498275-D), APP-CIU-FINANCIAL STATEMENT CA 2016 (PRIVATE LIMITED)	50.00

These financial statements and reports of the Company with ~~Qualified~~ / Unqualified Auditor's Report for the financial year ended 31 December 2019 were circulated on 10 June 2020

TEN CHAI CHAO
DIRECTOR

SM121006057085

LONGI (KUCHING) SDN. BHD.
(Incorporated in Malaysia)

FINANCIAL STATEMENTS

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LONGI (KUCHING) SDN. BHD.
(Incorporated in Malaysia)

DIRECTORS' REPORT

The directors of **LONGI (KUCHING) SDN. BHD.** have pleasure in submitting their report and the audited financial statements of the Company for the financial year ended December 31, 2019.

PRINCIPAL ACTIVITY

The principal activities of the Company are manufacture and sale of solar ingots, solar wafers, solar cells and solar modules.

RESULTS OF OPERATIONS

The results of the Company for the financial year are as follows:

	RM
Profit net of tax	107,914,733

In the opinion of the directors, the results of the operations of the Company during the financial year were not substantially affected by any item, transaction or event of a material and unusual nature.

DIVIDEND

No dividend has been paid or declared by the Company since the end of the previous financial period. The directors also do not recommend any dividend payment in respect of the current financial year.

RESERVES AND PROVISIONS

There were no material transfers to or from reserves or provisions during the financial year other than those disclosed in the financial statements.

ISSUE OF SHARES AND DEBENTURES

The Company has not issued any shares or debentures during the financial year.

SHARE OPTIONS

No options have been granted by the Company to any parties during the financial year to take up unissued shares of the Company.

No shares have been issued during the financial year by virtue of the exercise of any option to take up unissued shares of the Company. As at the end of the financial year, there were no unissued shares of the Company under options.

OTHER STATUTORY INFORMATION

Before the statement of comprehensive income and the statement of financial position of the Company were made out, the directors took reasonable steps:

(a) to ascertain that proper action had been taken in relation to the writing off of bad debts and the making of an allowance for doubtful debts and satisfied themselves that there were no bad debts and that adequate provision has been made for doubtful debts; and

(b) to ensure that any current assets which were unlikely to realise their value in the ordinary course of business had been written down to their estimated realised value.

At the date of this report, the directors are not aware of any circumstances:

(a) which would require the writing off of bad debts or render the amount of allowance for doubtful debts in the financial statements of the Company inadequate to any substantial extent; or

(b) which would render the values attributed to current assets in the financial statements of the Company misleading; or

(c) which have arisen which render adherence to the existing method of valuation of assets or liabilities of the Company misleading or inappropriate; or

(d) not otherwise dealt with in this report or financial statements which would render any amount stated in the financial statements of the Company misleading.

At the date of this report, there does not exist:

(a) any charge on the assets of the Company which has arisen since the end of the financial year which secures the liabilities of any other person; or

(b) any contingent liability of the Company which has arisen since the end of the financial year.

No contingent or other liability has become enforceable, or is likely to become enforceable within the period of twelve months after the end of the financial year which, in the opinion of the directors, will or may substantially affect the ability of the Company to meet its obligations as and when they fall due.

In the opinion of the directors, no item, transaction or event of a material and unusual nature has arisen in the internal between the end of the financial year and the date of this report which is likely to affect substantially the results of operations of the Company in the financial year in which this report is made.

DIRECTORS

The directors of the Company in office during the financial year and during the period from the end of the financial year to the date of this report are:

Zhong BaoShen
Chen Hong
Ten Chai Chao (appointed on October 10, 2019)
Li DingWu (resigned on October 10, 2019)
Wang JuBin (resigned on October 10, 2019)

DIRECTORS' INTERESTS

None of the directors in office at the end of the financial period held shares or had any beneficial interest in the shares of the Company or its related corporations during or at the end of the financial period, except as disclosed below:

	No. of ordinary share of CNY 1			
Shares in the ultimate holding company Longi Green Energy Technology Co., Ltd.	**Balance as of 1.1.2019**	**Bought**	**Sold**	**Balance as of 31.12.2019**
Registered in the name of directors				
Zhong BaoShen	49,371,423	14,811,427	-	64,182,850
Chen Hong	231,000	79,300	-	310,300
Li DingWu	15,000	64,500	(79,500)	-

Other than as disclosed above, none of the other directors in office at the end of financial year had any interest in the shares of the company or its holding companies or its related corporations during the financial year.

DIRECTORS' BENEFITS

Since the end of the previous financial period, none of the directors of the Company has received or become entitled to receive any benefit (other than the benefit included in the aggregate amount of emoluments received or due and receivable by directors as disclosed in the financial statements or the fixed salary of a full-time employee of the Company in Note 6) by reason of a contract made by the Company or a related corporation with the director or with a firm of which he is a member, or with a company in which he has a substantial financial interest, except as disclosed in Note 25 to the financial statement.

During and at the end of the financial year, no arrangement subsisted to which the Company was a party whereby directors of the Company might acquire benefits by means of the acquisition of shares in, or debentures of, the Company or any other body corporate.

HOLDING COMPANIES

The immediate holding company is Longi (H.K) Trading Limited, a company incorporated in Hong Kong and the ultimate holding company is Longi Green Energy Technology Co., Ltd., a company incorporated in China, and listed on Shanghai Stock Exchange in China.

INDEMNITY AND INSURANCE FOR DIRECTORS AND OFFICERS

There was no indemnity given to or insurance effected for any directors, officers and auditors of the Company in accordance with Section 289 of the Companies Act 2016.

AUDITORS

The auditors, Deloitte PLT, have indicated their willingness to continue in office.

AUDITORS' REMUNERATION

The amount paid as remuneration of the auditors for the financial year ended December 31, 2019 is as disclosed in Note 6 to the financial statements.

Signed on behalf of the Board
in accordance with a resolution of the Directors,

CHEN HONG

ZHONG BAOSHEN

Kuching,
March 13, 2020

Deloitte.

Deloitte PLT (LLP0010145-LCA)
Chartered Accountants (AF0080)
3rd Floor, Sublot 6
Block E, Queen's Court
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INDEPENDENT AUDITORS' REPORT
TO THE MEMBER OF LONGI (KUCHING) SDN. BHD.
(Incorporated in Malaysia)

Report on the Audit of the Financial Statements

Opinion

We have audited the financial statements of **LONGI (KUCHING) SDN. BHD.**, which comprise the statement of financial position as of December 31, 2019, and the statement of profit or loss and other comprehensive income, statement of changes in equity and statement of cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies, as set out on pages 9 to 36.

In our opinion, the accompanying financial statements give a true and fair view of the financial position of the Company as of December 31, 2019, and of its financial performance and its cash flows for the year then ended in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia.

Basis for Opinion

We conducted our audit in accordance with approved standards on auditing in Malaysia and International Standards on Auditing. Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Financial Statements section of our report. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Independence and Other Ethical Responsibilities

We are independent of the Company in accordance with the By-Laws (on Professional Ethics, Conduct and Practice) of the Malaysian Institute of Accountants ("By-Laws") and the International Ethics Standards Board for Accountants' Code of Ethics for Professional Accountants ("IESBA Code"), and we have fulfilled our other ethical responsibilities in accordance with the By-Laws and the IESBA Code.

Information Other than the Financial Statements and Auditors' Report Thereon

The directors of the Company are responsible for the other information. The other information comprises the Directors' Report, but does not include the financial statements of the Company and our auditors' report thereon.

Our opinion on the financial statements of the Company does not cover the Directors' Report and we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements of the Company, our responsibility is to read the Directors' Report and, in doing so, consider whether the Directors' Report is materially inconsistent with the financial statements of the Company or our knowledge obtained in the audit or otherwise appears to be materially misstated.

If, based on the work we have performed, we conclude that there is a material misstatement of the Directors' Report, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of the Directors for the Financial Statements

The directors of the Company are responsible for the preparation of financial statements of the Company that give a true and fair view in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia. The directors are also responsible for such internal control as the directors determine is necessary to enable the preparation of financial statements of the Company that are free from materials misstatement, whether due to fraud or error.

In preparing the financial statements of the Company, the directors are responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the Company or to cease operations, or have no realistic alternatives but to do so.

Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements of the Company as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with approved standards on auditing in Malaysia and International Standards on Auditing will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with approved standards on auditing in Malaysia and International Standards on Auditing, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements of the Company, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedure that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the directors.

- Conclude on the appropriateness of the directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the financial statements of the Company or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditors' report. However, future events or conditions may cause the Company to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements of the Company, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

(Forward)

Other Matter

This report is made solely to the member of the Company, as a body, in accordance with Section 266 of the Companies Act 2016 in Malaysia and for no other purpose. We do not assume responsibility to any other person for the contents of this report.

DELOITTE PLT (LLP0010145-LCA)
Chartered Accountants (AF0080)

WONG KING YU
Partner - 03194/06/2021 J
Chartered Accountant

Kuching,
March 13, 2020

LONGI (KUCHING) SDN. BHD.
(Incorporated in Malaysia)

STATEMENT OF COMPREHENSIVE INCOME
FOR THE FINANCIAL YEAR ENDED DECEMBER 31, 2019

	Note	2019 RM	2018 RM
Revenue	5	1,150,437,847	613,448,175
Cost of sales		(984,333,441)	(681,613,722)
Gross profit/(loss)		166,104,406	(68,165,547)
Distribution expenses		(8,562,924)	(8,837,982)
Administrative expenses		(27,703,534)	(23,122,734)
Profit/(Loss) from operations	6	129,837,948	(100,126,263)
Other income	7	16,183,496	1,724,761
Other operating expenses	7	(26,068,332)	(23,470,901)
Finance costs	8	(652,042)	(577,301)
Profit/(Loss) before tax		119,301,070	(122,449,704)
Income tax expense	9	(11,386,337)	(54,604)
Profit/(Loss) net of tax, representing total comprehensive income/(loss) for the year		107,914,733	(122,504,308)

The accompanying notes form an integral part of the financial statements.

LONGI (KUCHING) SDN. BHD.
(Incorporated in Malaysia)

STATEMENT OF FINANCIAL POSITION
AS OF DECEMBER 31, 2019

	Note	2019 RM	2018 RM
Non-current Assets			
Property, plant and equipment	10	868,290,110	962,209,566
Intangible assets	11	1,279,788	2,017,381
Total Non-current Assets		869,569,898	964,226,947
Current Assets			
Inventories	12	303,615,375	340,520,902
Trade and other receivables	13	95,354,662	219,743,246
Prepayments	14	2,517,253	17,498,242
Tax refundables		-	23,596
Cash and bank balances	15	26,679,957	74,050,420
Total Current Assets		428,167,247	651,836,406
Total Assets		1,297,737,145	1,616,063,353
Equity			
Share capital	16	353,337,000	353,337,000
Retained earnings/(Accumulated losses)	17	9,352,040	(98,562,693)
Total Equity/Net Equity		362,689,040	254,774,307
Current liabilities			
Trade payables	18	302,704,272	353,290,878
Other liabilities	19	53,922,869	325,989,690
Amount owing to holding companies	20	555,431,673	671,519,415
Amount owing to related party	21	15,911	-
Bank borrowing	22	-	5,667,454
Provisions for warranty	23	11,616,793	4,821,609
Deferred tax liability	24	11,333,637	-
Tax payables		22,950	-
Total Current Liabilities		935,048,105	1,361,289,046
Total Equity and Liabilities		1,297,737,145	1,616,063,353

The accompanying notes form an integral part of the financial statements.

LONGI (KUCHING) SDN. BHD.
(Incorporated in Malaysia)

STATEMENT OF CHANGES IN EQUITY
FOR THE FINANCIAL YEAR ENDED DECEMBER 31, 2019

	Note	Share capital RM	(Accumulated Loss)/Retained Earnings RM	Net Equity/Total Equity RM
Balance at January 1, 2018		250,000,000	23,941,615	273,941,615
Issuance of shares	16	103,337,000	-	103,337,000
Total comprehensive loss for the year		-	(122,504,308)	(122,504,308)
Balance as of December 31, 2018/ January 1,2019		353,337,000	(98,562,693)	254,774,307
Total comprehensive income for the year		-	107,914,733	107,914,733
Balance as of December 31, 2019		353,337,000	9,352,040	362,689,040

The accompanying notes form an integral part of the financial statements.

LONGI (KUCHING) SDN. BHD.
(Incorporated in Malaysia)

STATEMENT OF CASH FLOWS
FOR THE FINANCIAL YEAR ENDED DECEMBER 31, 2019

	Note	2019 RM	2018 RM
CASH FLOWS FROM/(USED IN) OPERATING ACTIVITIES			
Profit/(Loss) before tax		119,301,070	(122,449,704)
Adjustments for:			
Allowance for doubtful debts	13	152,912	564
Depreciation of property, plant and equipment	10	68,334,497	58,651,221
Amortisation of intangible assets	11	506,361	461,758
Intangible assets written off	11	299,715	-
Devaluation of inventories		-	6,125,351
Devaluation of inventories no longer required		(6,265,244)	-
Inventories written off		3,469,278	159,932
Property, plant and equipment written off	10	671,623	301,886
Impairment of property, plant and equipment	10	14,821,216	-
Loss/(Gain) on disposal of property, plant and equipment	7	1,703,042	(125,737)
Interest expense	8	652,042	577,301
Interest income	7	(861,482)	(847,686)
Unrealised foreign exchange (gains)/losses	7	(13,554,705)	6,621,571
Operating Profit/(Loss) Before Working Capital Changes		189,230,325	(50,523,543)
Movements in Working Capital:			
Decrease/(Increase) in:			
Inventories		39,701,493	(171,579,889)
Trade and other receivables		122,995,193	(111,479,200)
Prepayments		14,987,793	(2,011,024)
(Decrease)/Increase in:			
Trade payables		(41,597,978)	235,228,207
Other liabilities		(279,600,543)	132,296,619
Amount owing to related party		15,911	-
Cash Generated From Operations Activities		45,732,194	31,931,170
Tax refunded		140,896	-
Tax paid		(147,050)	(112,700)
Net Cash From Operating Activities		45,726,040	31,818,470

(Forward)

LONGI (KUCHING) SDN. BHD.
(Incorporated in Malaysia)

STATEMENT OF CASH FLOWS
FOR THE FINANCIAL YEAR ENDED DECEMBER 31, 2019 (CONTINUED)

	Note	2019 RM	2018 RM
CASH FLOWS (USED IN)/FROM INVESTING ACTIVITIES			
Additions of property, plant and equipment		(12,056,623)	(123,671,483)
Additions of intangible assets	11	(68,483)	(1,213,737)
Proceeds from disposal of property, plant and equipment		34,475,274	12,468,432
Interest income received		861,482	847,686
Net Cash From/(Used In) Investing Activities		23,211,650	(111,569,102)
CASH FLOWS (USED IN)/FROM FINANCING ACTIVITIES			
Cash received from bank borrowing		-	6,087,901
Cash paid to bank borrowing		(5,667,454)	-
Advance from holding companies		-	262,571,072
Repayment to holding company		(108,716,932)	(256,224,009)
Proceeds from issuance of shares	16	-	103,337,000
Movement of placement of short-term monetary deposits pledged to a bank		-	(2,900,000)
Interest paid		(652,042)	(577,301)
Net Cash (Used In)/From Financing Activities		(115,036,428)	112,294,663
NET (DECREASE)/INCREASE IN CASH AND CASH EQUIVALENTS		(46,098,738)	32,544,031
CASH AND CASH EQUIVALENTS AT BEGINNING OF YEAR		74,050,420	41,318,179
Effect of foreign exchange rate changes		(1,271,725)	188,210
CASH AND CASH EQUIVALENTS AT END OF YEAR	15	26,679,957	74,050,420

Property, plant and equipment was acquired by the following means:

	2019 RM	2018 RM
Cash	12,056,623	123,671,483
Accrued expenses and other payables	14,029,573	36,428,784
	26,086,196	160,100,267

The accompanying notes form an integral part of the financial statements.

LONGI (KUCHING) SDN. BHD.
(Incorporated in Malaysia)

NOTES TO THE FINANCIAL STATEMENTS
FOR THE YEAR ENDED DECEMBER 31, 2019

1 GENERAL INFORMATION

The Company is a private limited liability company and domiciled in Malaysia.

The immediate holding company is Longi (H.K) Trading Limited, a company incorporated in Hong Kong and the ultimate holding company is Longi Green Energy Technology Co., Ltd., a company incorporated in China and listed on Shanghai Stock Exchange in China.

The principal activities of the Company are manufacture and sale of solar ingots, solar wafers, solar cells and solar modules.

The registered office and principal place of business of the Company is located at Lot 2118, Jalan Usaha Jaya, Sama Jaya Free Industrial Zone, 93450 Kuching, Sarawak.

The financial statements of the Company were authorised for issue by the Board of Directors in accordance with a resolution of the directors on March 13, 2020.

2 BASIS OF PREPARATION OF FINANCIAL STATEMENTS

The financial statements of the Company have been prepared in accordance with Malaysian Private Entities Reporting Standard ("MPERS") issued by the Malaysian Accounting Standards Board ("MASB") and the provisions of the Companies Act 2016 in Malaysia.

3 SIGNIFICANT ACCOUNTING POLICIES

Basis of Accounting

The financial statements of the Company have been prepared using cost bases (which include historical cost, amortised cost, and lower of cost and net realisable value) and fair value bases (which include fair value basis and fair value less costs to sell basis).

Management has used estimates and assumptions in measuring the reported amounts of assets and liabilities at the end of the reporting period and the reported amounts of revenues and expenses during the reporting period. Judgements and assumptions are applied in the measurement, and hence, the actual results may not coincide with the reported amounts. The areas involving significant judgements and estimation uncertainties are disclosed in Note 4.

3 SIGNIFICANT ACCOUNTING POLICIES (CONT'D)

Revenue Recognition

The Company measures revenue from sale of goods or service transaction at the fair value of the consideration received or receivable, which is usually the invoice price, net of any trade discounts and volume rebates given to a customer in a sale or service transaction.

Revenue from a sale of goods is recognised when:

(a) the Company has transferred to the buyer the significant risks and rewards of ownership of the goods;
(b) the Company retains neither continuing managerial involvement to the degree usually associated with ownership nor effective control over the goods sold;
(c) the amount of the revenue can be measured reliably;
(d) it is probable that the economic benefits associated with the transaction will flow to the Company; and
(e) the costs incurred or to be incurred in respect of the transaction can be measured reliably.

Rental income is accrued on time basis, by reference to the agreement entered.

Interest income is recognised on a time proportion basis, by reference to the agreements entered into.

Functional and Presentation Currency

The financial statements of the Company are presented in the currency of the primary economic environment in which the Company operates (its functional currency). For the purpose of presenting the financial statements, the results and financial position of the Company are expressed in Ringgit Malaysia, which is the functional currency of the Company, and also the presentation currency for the financial statements.

In preparing the financial statements of the Company, transactions in currencies other than the Company's functional currency (foreign currencies) are recorded at the rates of exchange prevailing on the date of the transactions. At the end of each reporting period, monetary items denominated in foreign currencies are retranslated at the rates prevailing at the end of the period (i. e. the closing rate). Non-monetary items carried at the revalued amounts or fair value that are denominated in foreign currencies are retranslated at the rates prevailing at the date when the fair value was determined. Non-monetary items that are measured in terms of historical cost in a foreign currency are not retranslated.

Exchange differences are recognised in profit or loss in the period in which they arise except for exchange differences arising on the retranslation of non-monetary items carried at fair value in respect of which gains and losses are recognised in other comprehensive income. For such non-monetary items, the exchange component of that gain or loss is also recognised in other comprehensive income.

3 SIGNIFICANT ACCOUNTING POLICIES (CONT'D)

Employee Benefits

(i) Short-term Benefits

Wages, salaries, bonuses and social security contributions are recognised as an expense in the period in which the associated services are rendered by employees of the Company. Short-term accumulating compensated absences such as paid annual leave are recognised when services are rendered by employees that increase their entitlement to future compensated absences. Short-term non-accumulating compensated absences such as sick leave are recognised when the absences occur.

(ii) Defined Contribution Plan

The Company is required by law to make monthly contributions to the Employees' Provident Fund ("EPF"), a statutory defined contribution plan for all its eligible employees based on certain prescribed rates of the employees' salaries. The Company's contributions to the EPF is disclosed separately. The employees' contributions to the EPF are included in contract costs recognised and staff costs. Once the contributions have been paid, there are no further payment obligations

Leases

As Lessor

Leases where the Company retains substantially all the risks and rewards of ownership of the asset are classified as operating leases. Initial direct costs incurred in negotiating an operating lease are added to the carrying amount of the leased asset and recognised over the lease term on the same basses as rental income.

As Lesses

The Company does not capitalise the underlying leased asset or recognise a lease liability in an operating lease. Instead, lease payments under an operating lease are recognised as an expense on the straight-line basis over the lease term unless another systematic basis is more representative of the time pattern of the user's benefit.

Borrowing Costs

All borrowing costs are recognised as an expense in the year in which they are incurred by using effective interest method.

Taxation

Income tax expense represents the sum of the tax currently payable and deferred tax.

(a) Current tax

The tax currently payable is based on taxable profit for the period. Taxable profit differs from profit as reported in the statement of comprehensive income because it excludes items of income or expense that are taxable or deductible in other years and it further excludes items that are never taxable or deductible. The Company's liability for current tax is calculated using tax rates that have been enacted or substantively enacted by the end of the reporting period.

3 **SIGNIFICANT ACCOUNTING POLICIES (CONT'D)**

Taxation (Cont'd)

(b) **Deferred tax**

Deferred tax is recognised on differences between the carrying amounts of assets and liabilities in the financial statements and the corresponding tax bases used in the computation of taxable profit. Deferred tax liabilities are generally recognised for all taxable temporary differences, and deferred tax assets are generally recognised for all deductible temporary differences, unused tax losses and unused tax credits to the extent that it is probable that taxable profits will be available against which those deductible temporary differences, unused tax losses and unused tax credits can be utilised. Such assets and liabilities are not recognised if the temporary difference arises from the initial recognition of other assets and liabilities in a transaction that affects neither the taxable profit nor the accounting profit.

The carrying amount of deferred tax assets is reviewed at the end of each reporting period and reduced to the extent that it is no longer probable that sufficient taxable profits will be available to allow all or part of the asset to be recovered.

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply in the period in which the liability is settled or the asset realised, based on tax rates (and tax laws) that have been enacted or substantively enacted by the end of the reporting period. The measurement of deferred tax liabilities and assets reflects the tax consequences that would follow from the manner in which the Company expects, at the reporting date, to recover or settle the carrying amount of its assets and liabilities.

Deferred tax assets and liabilities are offset when there is a legally enforceable right to set off current tax assets against current tax liabilities and when they relate to income taxes levied by the same taxation authority and the Company intends to settle its current tax assets and liabilities on a net basis.

(c) **Current and deferred tax for the period**

Current and deferred tax are recognised as an expense or income in profit or loss, except when they relate to items credited or debited outside profit or loss (either in other comprehensive income or directly to equity), in which case the current tax and deferred tax is also recognised outside profit or loss (either in other comprehensive income or directly to equity).

Property, Plant and Equipment

All property, plant and equipment are initially measured at cost. For a purchased asset, cost comprises purchase price plus all directly attributable costs incurred in bringing the asset to its present location and condition for management's intended use. For a self-constructed asset, cost comprises all direct and indirect costs of construction (including provision for restoration and cost of major inspection) but excludes internal profits.

3 SIGNIFICANT ACCOUNTING POLICIES (CONT'D)

Property, Plant and Equipment (cont'd)

All property, plant and equipment are subsequently measured at cost less accumulated depreciation and accumulated impairment losses.

All other property, plant and equipment are depreciated on a straight-line method to their residual values at rates based on the estimated useful lives of various assets.

The annual depreciation rates are as follows:

Lands	2%
Buildings	3%
Machineries	10%
Electronic equipment	20%
Transportation facility	20%

Construction-in-progress are not depreciated but are subject to impairment test if there is any indication of impairment.

At the end of each reporting period, the residual values, useful lives and depreciation methods for the property, plant and equipment are reviewed for reasonableness. Any change in estimate of an item is adjusted prospectively over its remaining useful life, commencing in the current period.

The gain or loss arising on disposal or retirement of an item of property, plant and equipment is determined as the difference between the disposal proceeds and the carrying amount of the asset and is recognised in statement of comprehensive income.

Intangible assets

Intangible assets are measured at cost less accumulated amortisation and any accumulated impairment losses.

Amortisation is recognised in profit or loss on a straight-line basis over the estimated useful live of intangible assets from the date that they are available for use.

The annual amortisation rate of the software is 20%.

Impairment of Non-Financial Assets

At each reporting date, the Company reviews the carrying amounts of assets (other than financial assets which are dealt with in its respective policies) to determine if there is any indication that those assets may be impaired. If any such indication exists, the asset's recoverable amount, which is the higher of net selling price and value in use, is estimated.

Whenever the carrying amount of an asset exceeds its recoverable amount, an impairment loss is recognised in the statement of comprehensive income.

3 SIGNIFICANT ACCOUNTING POLICIES (CONT'D)

Impairment of Non-Financial Assets (cont'd)

An impairment loss is reversed if there has been a change in the estimate used to determine the recoverable amount and is only reversed to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortisation, if no impairment loss had been recognised. A reversal is recognised in the statement of comprehensive income.

Inventories

Inventories are stated at the lower of cost and net realisable value. Cost is determined on the weighted average method. Cost of semi-finished goods and finished goods consists of raw materials, direct labour and an appropriate proportion of manufacturing overheads while the cost of raw materials and trading goods consists of the purchase price plus the cost of bringing the inventories to their present location. Net realisable value represents the estimated selling price in the ordinary course of business less selling and distribution costs and all other estimated costs to completion.

Financial Instruments

(a) **Initial Recognition and Measurement**

The Company recognises a financial asset or a financial liability (including derivative instruments) in the statement of financial position when, and only when, it becomes a party to the contractual provisions of the instrument.

On initial recognition, all financial assets and financial liabilities are measured at fair value, which is generally the transaction price, plus transaction costs if the financial asset or financial liability is not measured at fair value through profit or loss.

For instruments measured at fair value through profit or loss, transaction costs are expensed to profit or loss when incurred.

(b) **Derecognition of Financial Instruments**

For derecognition purposes, the Company first determines whether a financial asset or a financial liability should be derecognised in its entirety as a single item or derecognised part-by-part of a single item or of a group of similar items.

A financial asset, whether as a single item or as a part, is derecognised when, and only when, the contractual rights to receive the cash flows from the financial asset expire, or when the Company transfers the contractual rights to receive cash flows of the financial asset, including circumstances when the Company acts only as a collecting agent of the transferee, and retains no significant risks and rewards of ownership of the financial asset or no continuing involvement in the control of the financial asset transferred.

3 **SIGNIFICANT ACCOUNTING POLICIES (CONT'D)**

(b) **Derecognition of Financial Instruments (cont'd)**

A financial liability is derecognised when, and only when, it is legally extinguished, which is either when the obligation specified in the contract is discharged or cancelled or expires. A substantial modification of the terms of an existing financial liability is accounted for as an extinguishment of the original financial liability and the recognition of a new financial liability. For this purpose, the Company considers a modification as substantial if the present value of the revised cash flows of the modified terms discounted at the original effective interest rate differs by 10% or more when compared with the carrying amount of the original liability.

(c) **Subsequent Measurement of Financial Assets**

For the purpose of subsequent measurement, the Company classifies financial assets into financial assets at amortised cost and are subject to review for impairment.

All other financial assets are subject to review for impairment.

(d) **Subsequent Measurement of Financial Liabilities**

After initial recognition, the Company measures all financial liabilities at amortised cost using the effective interest method.

(e) **Fair Value Measurement of Financial Instruments**

The fair value of a financial asset or a financial liability is determined by reference to the quoted market price in an active market, and in the absence of an observable market price, by a valuation technique using reasonable and supportable assumptions.

(f) **Recognition of Gains and Losses**

For financial assets and financial liabilities carried at amortised cost, a gain or loss is recognised in profit or loss only when the financial asset or financial liability is derecognised or impaired, and through the amortisation process of the instrument.

(g) **Impairment and Uncollectibility of Financial Assets**

At the end of each reporting period, the Company examines whether there is any objective evidence that a financial asset or a group of financial assets is impaired. Evidences of trigger loss events include:

(i) significant difficulty of the issuer or obligor;
(ii) a breach of contract, such as a default or delinquency in interest or principal payment;
(iii) granting exceptional concession to a customer;
(iv) it is probable that a customer will enter bankruptcy or other financial reorganisation;
(v) the disappearance of an active market for that financial asset because of financial difficulties; or

3 **SIGNIFICANT ACCOUNTING POLICIES (CONT'D)**

(g) **Impairment and Uncollectibility of Financial Assets (cont'd)**

(vi) any observable market data indicating that there may be a measurable decrease in the estimated future cash flows from a group of financial assets.

For short-term trade and other receivables, where the effect of discounting is immaterial, impairment loss is tested for each individually significant receivable wherever there is any indication of impairment.

(h) **Share Capital and Distributions**

The Company classifies and presents an issued financial instrument (or its component parts), on initial recognition as a financial liability or an equity instrument in accordance with the substance of the contractual arrangement and the definitions of a financial liability and an equity instrument.

(i) Share Capital

Ordinary shares are classified as equity instruments.

When ordinary shares are issued in a private placement or in a rights issue to existing shareholders, they are recorded at the issue price. For ordinary shares issued in exchange for non-monetary assets, they are measured by reference to the fair values of the assets received.

Transaction costs of an equity transaction are accounted for as a deduction from equity, net of any related income tax effect.

(ii) Distributions

The Company establishes a distribution policy whereby cash dividends can only be paid out of retained profits. Other distributions, such as stock dividends and distributions in specie, may be paid out of any reserve to the extent that the utilisation is permitted by company laws and regulations.

Distributions to holders of an equity instrument are debited directly in equity, net of any related income tax effect.

A dividend declared is recognised as a liability only after it has been appropriately authorised, which is the date when the Board of Directors declares an interim dividend, or in the case of a proposed final dividend, the date the shareholders of the Company approve the proposed final dividend in an annual general meeting of shareholders.

3 SIGNIFICANT ACCOUNTING POLICIES (CONT'D)

Provisions

Provisions are recognised when the Company has a present obligation (legal or constructive) as a result of past events and when it is probable that the Company will be required to settle the obligation, and when a reliable estimate of the amount of the obligation can be made. Provisions are reviewed by the directors at each reporting date and adjusted to reflect the current best estimate. Provision is reversed if it is no longer probable that the Company will be required to settle the obligation.

Statement of Cash Flows

The Company adopts the indirect method in the preparation of the statement of cash flows.

Cash equivalents are short-term, highly liquid investments that are readily convertible to cash with insignificant risk of changes in value.

4 CRITICAL ACCOUNTING JUDGEMENTS AND KEY RESOURCES OF ESTIMATION UNCERTAINTY

In the application of the Company's accounting policies, the directors are required to make judgements, estimates and assumptions about the carrying amounts of assets and liabilities that are not readily apparent from other sources. The estimates and associated assumptions are based on historical experience and other factors that are considered to be relevant. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period which the estimate is revised if the revision affects only that period, or in the period of the revision and future periods if the revision affects both current and future periods.

(a) **Critical judgements in applying the Company's accounting policies**

In the process of applying the Company's accounting policies, the directors are of the opinion that there are no instances of application of judgement which are expected to have a significant effect on the amounts recognised in the financial statements.

(b) **Key sources of estimation uncertainty**

The key assumptions concerning the future and other key sources of estimation uncertainty at the reporting date that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below:

4 CRITICAL ACCOUNTING JUDGEMENTS AND KEY RESOURCES OF ESTIMATION UNCERTAINTY (CONT'D)

(b) **Key sources of estimation uncertainty (Cont'd)**

(i) Depreciation of Property, Plant and Equipment

The cost of an item of property, plant and equipment is depreciated on the straight-line method or another systematic method that reflects the consumption of the economic benefits of the asset over its useful life. Estimates are applied in the selection of the depreciation method, the useful lives and the residual values. The actual consumption of the economic benefits of the property, plant and equipment may differ from the estimates applied and this may lead to a gain or loss on an eventual disposal of an item of property, plant and equipment.

(ii) Inventories

The inventories are stated at lower of cost and net realisable value. The Company assesses the net realisable value of the inventories at each reporting date. When estimating the net realisable value of the inventories, management consider all of the facts relating to the inventories and the operating environment at the time the estimates are made.

Where the expectation is different from the original estimate, such difference will impact the carrying value of the inventories in the period in which such estimate has been changed.

5 REVENUE

	2019 **RM**	**2018** **RM**
Sales of solar modules	677,963,468	485,454,617
Sales of solar wafers	196,795,456	87,412,879
Sales of solar cells	263,832,558	39,771,246
Sales of ancillary materials	10,874,013	626,047
Sales of scrap material	972,352	178,903
Sales of solar ingot	-	4,483
	1,150,437,847	613,448,175

6 PROFIT/(LOSS) FROM OPERATIONS

The following amounts have been included in arriving at the profit/(loss) from operations:

	2019 RM	2018 RM
Depreciation of property, plant and equipment (Note 10)	68,334,497	58,651,221
Employee benefit expenses	11,948,359	11,384,176
Provision for warranty (Note 23)	6,795,184	4,821,609
Amortisation of intangible asset (Note 11)	506,361	461,758
Rental expense	149,023	107,063
Auditor's remuneration	120,000	120,000
Directors' remuneration	64,600	-
Directors' fee	6,500	3,600
Devaluation of inventories	-	6,125,351
Devaluation of inventories no longer required	(6,265,244)	-

Included in employee benefit expenses is contribution to Employee Provident Fund of RM1,103,227 (2018: RM1,044,690).

Included in Directors' remuneration is contribution to Employee Provident Fund of RM7,794 (2018: Nil).

7 OTHER INCOME/(OPERATING EXPENSES)

	2019 RM	2018 RM
Unrealised foreign exchange gains	13,554,705	-
Sales of spare parts	1,092,270	22,580
Interest income	861,482	847,686
Other income	198,432	315,233
Rental income	164,741	59,857
Scrap sales	311,866	353,668
Gain on disposal of property, plant and equipment (Note 10)	-	125,737
Total other income	16,183,496	1,724,761
Realised foreign exchange losses	4,007,702	16,386,948
Unrealised foreign exchange losses	-	6,621,571
Net foreign exchange losses	4,007,702	23,008,519
Impairment of property, plant and equipment (Note 10)	14,821,216	-
Inventories written off	3,469,278	159,932
Loss on disposal of property, plant and equipment (Note 10)	1,703,042	-
Other operating expenses	1,242,559	-
Property, plant and equipment written off (Note 10)	671,623	301,886
Allowance of doubtful debts (Note 13)	152,912	564
Total other operating expenses	26,068,332	23,470,901

8 FINANCE COSTS

	2019 RM	2018 RM
Bank charges	532,898	406,935
Interest expenses on bank borrowing	119,144	170,366
	652,042	577,301

9 INCOME TAX EXPENSE

	2019 RM	2018 RM
Current year's income tax	52,700	54,604
Deferred tax expense (Note 24)	11,333,637	-
	11,386,337	54,604

A numerical reconciliation of income tax expense/(credit) to loss before tax at the applicable statutory income tax rate to income tax expense at the effective income tax rate is as follows:

	2019 RM	2018 RM
Profit/(Loss) before tax	119,301,070	(122,449,704)
Tax expense/(credit) at applicable statutory tax rate of 24% (2018: 24%)	28,632,257	(29,387,929)
Expenses that are not deductible for tax purposes	15,667,008	11,619,814
Income not subject to tax	(5,880,373)	(229,234)
Utilisation of deferred tax asset previously not recognised	(22,288,378)	-
Deferred tax liability not recognised due to MIDA exemption	(4,744,177)	-
Deferred tax asset not recognised during the year	-	18,051,953
Tax expense for the year	11,386,337	54,604

As of December 31, 2019, the Company has unabsorbed capital allowances and unutilised tax losses of approximately RM187,767,973 (2018: RM302,063,786) which subject to agreement by the tax authorities, are available to offset against future taxable profits.

The Company is awaiting the approval from the government on the incentive granted by the Malaysian Industrial Development Authority ("MIDA") in the form of income tax exemption of 100% on statutory income for a period of 10 years under P.U.(A) 112 of The Income Tax (Exemption) order (No.11) 2006 Income Tax Act 1967 for carrying out activities such as design, development, manufacture of solar, ingot, wafer, cells and modules starts from the date set by the Minister of International Trade and Industry.

Registration Number: 201601000013 (1170938-X)

10 PROPERTY, PLANT AND EQUIPMENT

	Lands RM	Buildings RM	Machineries RM	Electronic Equipment RM	Transportation Facility RM
Cost:					
Balance as of January 1, 2018	11,570,458	452,538,979	344,708,799	6,841,646	1,860,569
Additions	-	-	-	-	-
Disposal	-	-	(6,229,549)	-	-
Written off	-	-	-	-	-
Reclassification	-	63,391,035	137,134,057	3,022,922	1,026,812
Balance as of December 31, 2018/January 1, 2019	11,570,458	515,930,014	475,613,307	9,864,568	2,887,381
Additions	-	-	-	-	-
Disposal	-	-	(39,614,404)	(199,301)	(6,809)
Written off	-	-	(853,593)	(30,589)	-
Reclassification	-	2,349,793	48,662,570	887,786	127,520
Balance as of December 31, 2019	11,570,458	518,279,807	483,807,880	10,522,464	3,008,092

Registration Number: 201601000013 (1170938-X)

10 **PROPERTY, PLANT AND EQUIPMENT (CONT'D)**

	Lands RM	Buildings RM	Machineries RM	Electronic Equipment RM	Transportation Facility RM
Accumulated depreciation					
Balance as of January 1, 2018	239,331	13,909,950	15,614,524	624,248	242,306
Depreciation for the period	225,647	17,797,798	38,129,053	2,030,674	468,049
Disposal	-	-	(827,776)	-	-
Written off	-	-	-	-	-
Balance as of December 31, 2018/January 1, 2019	464,978	31,707,748	52,915,801	2,654,922	710,355
Depreciation for the year	225,647	19,064,971	46,343,739	2,139,716	560,424
Disposals	-	-	(4,076,161)	(6,709)	(1,833)
Written off	-	-	(199,987)	(12,572)	-
Balance as of December 31, 2019	690,625	50,772,719	94,983,392	4,775,357	1,268,946

Registration Number: 201601000013 (1170938-X)

10 **PROPERTY, PLANT AND EQUIPMENT (CONT'D)**

	Lands RM	Buildings RM	Machineries RM	Electronic Equipment RM	Transportation Facility RM
Accumulated impairment losses					
Balance as of January 1, 2018	-	-	1,097,924	-	-
Impairment loss for the year	-	-	-	-	-
Balance as of December 31, 2018 /January 1, 2019	-	-	1,097,924	-	-
Impairment loss for the year	-	-	14,821,216	-	-
Balance as of December 31, 2019	-	-	15,919,140	-	-
Carrying amount					
Balance as of December 31, 2018	11,105,480	484,222,266	421,599,582	7,209,646	2,177,026
Balance as of December 31, 2019	10,879,833	467,507,088	372,905,348	5,747,107	1,739,146

10 PROPERTY, PLANT AND EQUIPMENT (CONT'D)

In 2019, the Company has recognised impairment loss of RM14,821,216 (2018: Nil) in respect of their machineries following their assessment of the recoverable amounts of these obsolete machineries.

Property, plant and equipment with carrying amount of RM868,290,110 (2018: RM962,209,566) have been pledged to a licensed bank for credit facilities granted to its ultimate holding company.

11 INTANGIBLE ASSETS

	Software RM
Cost	
Balance as of January 1, 2018	1,428,258
Additions	1,213,737
Balance as of December 31, 2018/ January 1, 2019	2,641,995
Additions	68,483
Written Off	(299,715)
Balance as of December 31, 2019	2,410,763
Accumulated amortisation	
Balance as of January 1, 2018	162,856
Charge for the year	461,758
Balance as of December 31, 2018/ January 1, 2019	624,614
Charge for the year	506,361
Balance as of December 31, 2019	1,130,975
Carrying amount	
Balance as of December 31, 2018	2,017,381
Balance as of December 31, 2019	1,279,788

12 INVENTORIES

	2019 RM	2018 RM
At cost		
Materials	91,130,949	97,833,417
Goods in transit	46,299,166	26,975,551
Semi-Finished Goods	2,035,449	2,361,984
Finished Goods	159,274,583	81,245,438
	298,740,147	208,416,390
At net realisable value		
Finished Goods	4,875,228	132,104,512
Total inventories	303,615,375	340,520,902
Inventories recognised as an expense	984,333,441	681,613,722

In current year, there are devaluation of inventories no longer required amounting RM6,265,244 (2018: devaluation of inventories of RM6,125,351) and inventories written off amounting to RM3,469,278 (2018: RM159,932).

13 TRADE AND OTHER RECEIVABLES

	2019 RM	2018 RM
Trade receivables:		
- Third parties	10,157,115	19,634,411
- Ultimate holding company	-	5,641,761
- Immediate holding company	77,316,656	3,483,358
- Related parties	551,673	186,031,560
	88,025,444	214,791,090
Other receivables:		
- Third parties	2,380,808	4,568,107
- Deposit	143,416	182,330
- Ultimate holding company	-	164,296
- Related party	4,804,994	37,423
	7,329,218	4,952,156
	95,354,662	219,743,246

	2019 RM	2018 RM
Trade receivables:		
- Third parties	10,259,712	-
Allowance for doubtful debts	(102,597)	-
	10,157,115	-

Trade receivables are non-interest bearing and on 30 - 90 days (2018: 30 - 90 days) term.

Movement in allowance for doubtful debts

Trade receivables:		
At beginning of the year	-	-
Change for the year (Note 7)	(102,597)	-
At the end of the year	(102,597)	-

13 TRADE AND OTHER RECEIVABLES (CONT'D)

	2019 RM	2018 RM
Other receivables:		
- Third parties	2,393,951	4,569,849
Allowance for doubtful debts	(13,143)	(1,742)
	2,380,808	4,568,107
Other receivables:		
- Deposit	202,160	202,160
Allowance for doubtful debts	(58,744)	(19,830)
	143,416	182,330

Other receivables consist of GST refundable amounting RM2,106,091 (2018: RM4,535,014).

Movement in allowance for doubtful debts

	2019 RM	2018 RM
Other receivables:		
At beginning of the year	(21,572)	(21,008)
Change for the year (Note 7)	(50,315)	(564)
At end of the year	(71,887)	(21,572)

Allowance for doubtful debts is recognised based on the evaluation of collectability and on management's estimate.

14 PREPAYMENTS

	2019 RM	2018 RM
Purchase of property, plant and equipment	1,797,078	5,660,583
Other prepayments	629,643	361,274
Purchase of consumable items	50,269	6,370
Purchase of spare parts	40,263	277,344
Purchase of materials	-	11,192,671
	2,517,253	17,498,242

15 CASH AND BANK BALANCES

	2019 RM	2018 RM
Cash and bank balances	26,679,957	74,050,420

Cash and cash equivalents of the Company comprised cash and bank balances of RM26,679,957 (2018: RM74,050,420).

16 SHARE CAPITAL

	2019 Number of ordinary shares	2018 Number of ordinary shares	2019 RM	2018 RM
Issue and fully paid				
At the beginning of year	353,337,000	250,000,000	353,337,000	250,000,000
Issued during the year	-	103,337,000	-	103,337,000
At the end of year	353,337,000	353,337,000	353,337,000	353,337,000

The holders of ordinary shares are entitled to receive dividends as and when declared by the Company. All ordinary shares carry one vote per share without restrictions and rank equally with regard to the Company residual assets.

17 RETAINED EARNINGS

The Company is under the single tier income tax system and accordingly, the entire unappropriated profits of the Company are available for distribution as single tier dividends.

18 TRADE PAYABLES

	2019 RM	2018 RM
Trade payables:		
Ultimate holding company	147,007,306	196,311,508
Immediate holding company	-	14,177,927
Related parties	50,504,334	28,028,118
Third parties	105,192,632	114,773,325
	302,704,272	353,290,878

Trade payables comprise amounts for trade purchases and ongoing costs respectively. The credit period granted for trade purchases ranged from 30 to 120 days (2018: 30 to 120 days).

19 OTHER LIABILITIES

	2019 RM	2018 RM
Advances from customers	11,042,136	257,851,081
Accrued expenses	8,151,964	20,521,239
Other payables	34,728,769	47,617,370
Total other liabilities	53,922,869	325,989,690

Advances from customer are for sale of solar wafers, solar modules and machineries. Included in advances from customers are advances from related parties amounted RM9,856,868 (2018: RM256,759,652)

Included in accrued expenses and other payables are payables for purchase of machineries amounting to RM14,029,573 (2018: RM36,428,784).

20 AMOUNT OWING TO HOLDING COMPANIES

	2019 RM	2018 RM
Amount owing to immediate holding company	555,431,673	667,203,272
Amount owing to ultimate holding company	-	4,316,143
	555,431,673	671,519,415

The amount owing to immediate holding company, which arose mainly from advances given to the Company which were non-trade nature, unsecured, interest-free and repayable on demand.

The amount owing to ultimate holding company, which arose mainly from advances given to the Company which were non-trade nature, unsecured, interest-free and repayable on demand.

21 AMOUNT OWING TO RELATED PARTY

The amount owing to related party, which were non-trade nature, unsecured, interest-free and repayable on demand.

22 BANK BORROWING

	2019 RM	2018 RM
Trade bill financing facility (unsecured)	-	5,667,454

The bank borrowing is unsecured and with interest rate of 3.07% (2018: 3.52%).

23 PROVISIONS FOR WARRANTY

	2019 RM	2018 RM
At beginning of the year	4,821,609	-
Addition provision in the year (Note 6)	6,795,184	4,821,609
At ending of the year	11,616,793	4,821,609

The provisions for warranty of the Company represent management's best estimates of the Company's liability to cover claims arising from sales of solar module and the warranties cover a 25 years' period.

24 DEFERRED TAX LIABILITIES

Deferred income tax as at December 31 relates to the following:

	Property, Plant and Equipment	
	2019 RM	2018 RM
At beginning of the year	-	-
Transfer from profit or loss (Note 9)	11,333,637	-
At the end of the year	11,333,637	-

As the company is awaiting the approval from MIDA for tax exemption for 10 years. There are no deferred tax impact for the next 10 year. Hence, the deferred tax liabilities recognised during the financial year are the tax effect after taking into consideration the 10 years tax exemption period.

25 HOLDING COMPANY AND RELATED PARTY TRANSACTION

	2019 RM	2018 RM
Immediate holding company		
Sales of solar cells	230,016,440	3,493,185
Sales of ancillary materials	4,237,817	176,464
Sales of solar wafers	13,828	-
Purchase of polysilicon	(1,297,833)	-
Intercompany advances received	-	258,263,599
Purchase of consumable items	-	(2,325,259)
Purchase of solar cell	-	(11,732,096)
Ultimate holding company		
Sales of property, plant and equipment	24,477,520	161,184
Sales of solar wafers	20,975,591	6,428,459
Sales of ancillary materials	1,706,704	-
Sales of consumable items	181,278	-
Purchase of solar modules, solar cells and solar wafers	(275,316,881)	(182,741,565)
Purchase of property, plant and equipment	-	(4,316,268)

25 HOLDING COMPANY AND RELATED PARTY TRANSACTION (CONT'D)

	2019 RM	2018 RM
Related parties		
Sales of solar modules, solar cells and solar wafers	714,858,553	487,714,943
Sales of ancillary materials	4,840,735	428,126
Sales of property, plant and equipment	3,796,338	12,428,085
Sales of consumable items	1,137,005	-
Purchase of solar module, solar cell and solar wafers	(109,848,037)	(26,495,006)
Purchase of property, plant and equipment	(1,444,961)	(11,147,795)
Purchase of ancillary materials	(1,394,662)	-
Purchase of consumable items	(991,353)	(1,152,249)

Related parties are entities with common direct or indirect shareholders and/or directors. Related parties also include entities in which certain directors and/or substantial shareholders of the Company or persons connected to such directors and/or substantial shareholders have interest. Parties are considered to be related if the party has the ability to control the other party or exercise significant influence over the other party in making financial and operating decisions.

The above related party transactions are negotiated based on terms and conditions agreed between the related parties and the Company.

26 KEY MANAGEMENT PERSONNEL COMPENSATION

The Company's directors and other key management personnel compensation for the year ended December 31, 2019 are RM3,293,425 (2018: RM2,730,373).

27 FINANCIAL INSTRUMENTS

Categories of financial instruments

	2019 RM	2018 RM
Financial assets at amortised cost		
Trade and other receivables	95,354,662	219,743,246
Cash and cash balances	26,679,957	74,050,420
Financial liabilities at amortised cost		
Trade payables	302,704,272	353,290,878
Accrued expenses and other payables	42,880,733	68,138,609
Amount owing to holding companies	555,431,673	671,519,415
Amount owing to related party	15,911	-
Bank borrowing	-	5,667,454

28 BANKING FACILITIES

The Company has bank guarantee facilities of RM21,200,000 (2018: RM21,200,000) that are unsecured. As at December 31, 2019, the Company has utilised RM18,003,400 (2018: RM9,280,400) of its bank guarantee facilities obtained from local licensed bank as collateral deposit to utility service provider. As at the reporting date, no values are placed on the bank guarantee facility as the Directors regard the value are minimal and the likelihood of default to be low.

The Company has letter of credit facilities of RM37,080,600 (RM37,080,600) that are unsecured. As at December 31, 2019, the Company has utilised letter of credit facilities amounting to RM23,368,000 (2018: RM11,309,689).

29 CAPITAL COMMITMENTS

As at December 31, 2019, the Company has a capital commitment to acquire property, plant and equipment:

	2019 **RM**	**2018** **RM**
Approved and contracted for	4,726,999	6,649,970

Registration Number: 201601000013 (1170938-X)

LONGI (KUCHING) SDN. BHD.
(Incorporated in Malaysia)

STATEMENT BY DIRECTORS

The directors of **LONGI (KUCHING) SDN. BHD.** state that, in their opinion, the accompanying financial statements are drawn up in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia so as to give a true and fair view of the financial position of the Company as of December 31, 2019 and of the financial performance and the cash flows of the Company for the year ended on that date.

Signed in accordance with a resolution of the Directors,

CHEN HONG

ZHONG BAOSHEN

Kuching,

March 13, 2020

DECLARATION BY THE DIRECTOR PRIMARILY RESPONSIBLE FOR THE FINANCIAL MANAGEMENT OF THE COMPANY

I, **TEN CHAI CHAO**, the director primarily responsible for the financial management of **LONGI (KUCHING) SDN. BHD.**, do solemnly and sincerely declare that the accompanying financial statements are, in my opinion, correct and I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the Statutory Declarations Act, 1960.

TEN CHAI CHAO

Subscribed and solemnly declared by the abovenamed **TEN CHAI CHAO** at **KUCHING** in the State of **SARAWAK** this March 13, 2020.

Before me,

COMMISSIONER FOR OATHS
NO. Q 119
PHANG DAH NAN
01 Jul 2018-31 Dec 2020
MALAYSIA

COMMISSIONER FOR OATHS

PHANG DAH NAN
Commissioner For Oaths
No. 55, 1st Floor,
Jalan Chan Bee Kiew
Off Jalan Padungan,
93100 Kuching, Sarawak.

Lodged by:
KSK CORPORATE SERVICES SDN BHD
(Company No. 584358-U)
2nd Floor, Lot 144,
Jalan Petanak. 93100 Kuching. Sarawak
Tel: 082-243491
Fax: 082-253857

EXHIBIT 5

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JA SOLAR

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Products & Solutions News & Events

Home 》 Global Branches

Headquarter

Add: Building 8, Noble Center, East Auto Museum Road, Fengtai District, Beijing 100160, China
Tel: +86 10 6361 1888
Fax: +86 10 6361 1999
E-mail: sales@jasolar.com
marketing@jasolar.com

Global Branches

Sales Offices | Manufacturing Bases

JA Solar (Xingtai) PV Technology Co., Ltd

No. 1688, Chang' an Road, Development Zone, Xingtai City, Hebei Province, China

JA Solar (Yanjiao) PV Technology Co., Ltd

Yanjiao Economic and Technological Development Zone, Sanhe City, Hebei Province, China

JA Solar Co., Ltd

5th Jinglong Industrial Park, No.123 Xinxing Road Ningjin, Xingtai City, Hebei Province, China

JA Solar (Zhangjiakou) PV Technology Co., Ltd

Room 6001, KWAH International Wei' er Road, Gaoxin District, Zhangjiakou City, Hebei Province, China

JA Solar (Hefei) PV Technology Co., Ltd

No. 999, Changning Avenue, Gaoxin District, Hefei City, Anhui Province, China

JA Solar (Shanghai) PV Technology Co., Ltd

No. 168, Lane 3111, Huancheng West Road, Fengxian District, Shanghai, China

JA Solar (Yangzhou) PV Technology Co., Ltd

No.1, Jianhua Road, Bali Town, Development Zone, Yangzhou City, Jiangsu Province, China

JA Solar (Donghai) PV Technology Co., Ltd

No. 1, Guangming Road, West District, Donghai Country Development Zone, Lianyungang City, Jiangsu Province, China

JA Solar (Baotou) PV Technology Co., Ltd

JA Solar (Malaysia) Co., Ltd

Bayan Lepas Industrial Area, Penang, Malaysia

No. 21, New Equipment Manufacturing Area, Equipment Manufacturing Industrial Park, Baotou City, Inner Mongolia, China

JA Solar (Vietnam) Co., Ltd

Quang Chau Industrial Park, Quang Chau Town, Viet Yen County, Bac Giang Province, Vietnam

About Us

- Overview
- Culture
- Chairman Address
- Social Responsibility
- Global Branches

PV Modules

- 60-cell MBB Half-cell Module
- 72-cell MBB Half-cell Module
- 60-cell MBB Bifacial PERC Half-Cell Double Glass Module
- 72-cell MBB Bifacial PERC Half-Cell Double Glass Module
- 60-cell MBB Bifacial PERC Half-Cell Double Glass Module
- 72-cell MBB Bifacial PERC Half-Cell Double Glass Module

Global Project References

- 100MW Three Gorges Ground-Mounted...
- 49MW Ground Power Station in Southwark, UK
- 80MW Ground-Mounted Power Plant in Utah, USA
- 255MW Ground-Mounted Power Plant in Bahia, Brazil
- 5.44MW Rooftop Distributed Power Plant of UFES, Brazil
- 10.1MW Ground-Mounted Power Plant in Toshka, Egypt

Legal Statement Privacy Policy

EXHIBIT 6

Vaccination Tracker

4.49M

Doses administered

MORE DETAILS →

WORLD CORPORATE MALAYSIA

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JA Solar to begin exporting solar cells from Malaysia next month

Sangeetha Amar

October 21, 2015 1

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GEORGE TOWN (Oct 21): Chinese Nasdaq-listed JA Solar Holdings Co Ltd, which invested RM300 million in its Malaysian facility here, is expected to begin the first shipment of its 400MW multi-crystalline solar cells for its export markets, primarily in the US and Europe, by next month.

The production of the 400MW solar cells constitute about 10% of the group’s total capacity of 4GW, said its strategic planning and business developmet head, Dr Christoph Flink.

He also said the overall contribution to the group’s revenue from Penang would be 'substantial' and 'important', hence the high value of its investment here.

"One reason why we are in Malaysia is because it is part of our long-term strategy of moving some of our manufacturing sites to outside China. This is to reduce geograhical risk and adjust to politics and policies around the world.

"[In] Asia, the first to lead our manufacturing site is Malaysia, but we have also signed a memorandum of understanding in India, which might be on a joint-venture basis," he said.

Flink told reporters at a media launch that JA Solar was looking for other regions, where it could source for local content and adjust them to the group's strategic commitments.

"Each of these investments is too big to accommodate short-term solutions," he said, adding that any kind of policies, including anti-dumping, tend to be temporary in nature.

He was asked to comment on the anti-dumping policies introduced by US and Europe, against Chinese solar products.

"It changes every year, but our investment in Malaysia is definitely for the long run. We will deliver to US and other regions," he said, adding while the raw materials such as silicon wafers were being imported from China, the finished product from Penang comprising solar cells and modules would not be subject to the anti-dumping duties.

He expects the solar panel industry to grow exponentially despite the slowdown in the global economy, due to government policies that have been put in place to aid the renewable energy revolution.

In its second quarter ended June 30, 2015, net income of JA Solar, which is the world's second largest solar cell manufacturer, rose 240% to RMB136 million (RM92.2 million); while revenue was 11.8% higher at RMB2.7 billion (RM1.83 billion), as compared to the corresponding quarter last year. It has a market capitalisation of US$438.6 million (RM1.8 billion)

In recent months, Malaysia has turned into a major destination for Chinese solar companies seeking to circumvent the high taxes imposed by US and Europe since 2012, with increasing quantum.

In May, China-based Jinko Solar Holdings Co opened its 500MW solar cells and 450MW solar panels facility in Bayan Lepas, Penang.

Meanwhile, JA Solar Malaysia Sdn Bhd's deputy Ken Y Ong said the RM300 million investment was mostly spent on machinery and upgrading of rented facility in Bayan Lepas.

The group would be employing 700 employees, including 100 managers, technical engineers and supervisors, he added.

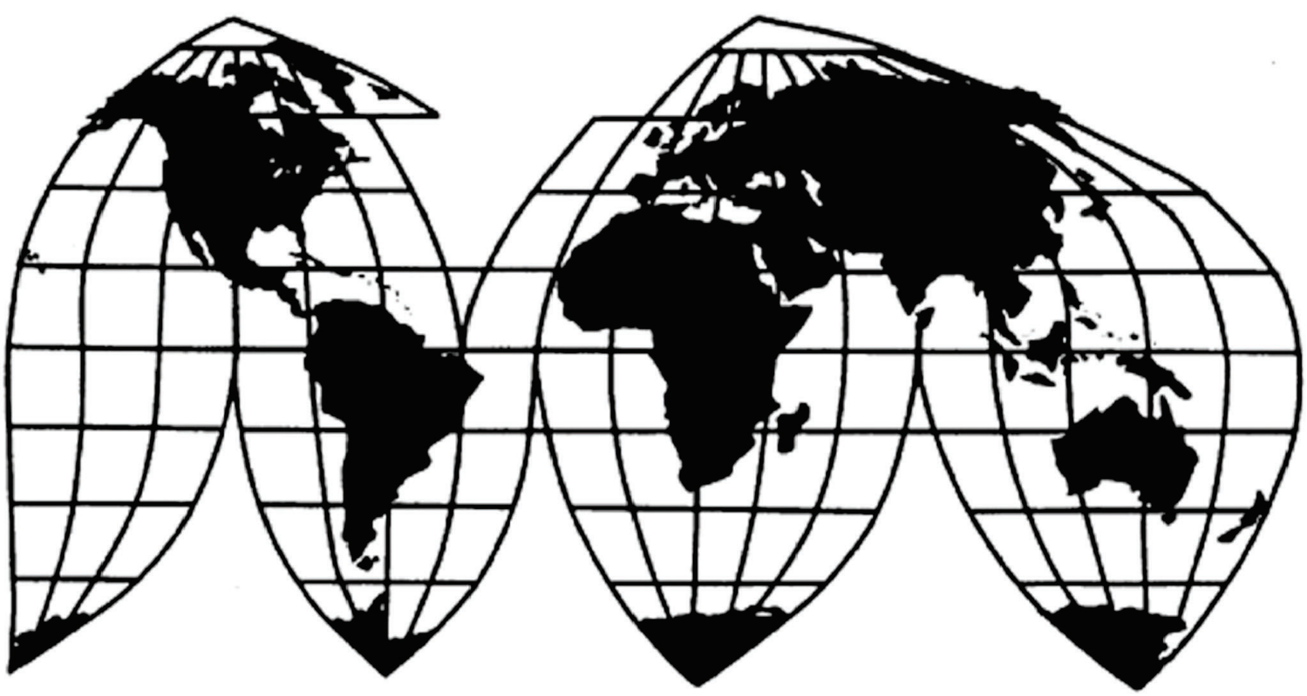
EXHIBIT 7

Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled Into Other Products: Monitoring Developments in the Domestic Industry

Investigation No. TA-201-075 (Monitoring)

Publication 5021 **February 2020**

U.S. International Trade Commission



Washington, DC 20436

Antidumping and countervailing duty investigations on primary raw materials

There are no antidumping or countervailing duty orders currently in effect on U.S. imports of polysilicon, the primary raw material in the production of CSPV cells.

Section 232 investigations (Commerce)[34]

Steel

The relevant HTS subheadings within the scope of this safeguard remedy, 8541.40.60, 8501.31.80, 8501.32.60, 8501.61.00, and 8507.20.80, were not included in the enumeration of certain steel products subject to the additional 25-percent *ad valorem* duties under Section 232 of the Trade Expansion Act of 1962, as amended.[35] However, steel is used in balance of systems components (such as tracking systems on which modules are mounted) for solar installations.[36] [37] Table I-1 presents a summary of current Section 232 tariffs on U.S. imports of steel, by country.

Table I-1
Steel mill articles: Section 232 tariffs summary

Country	Effective date	Ad valorem duty rate	Absolute quotas
Argentina	May 31, 2018	Exempt	180,000 metric tons
Australia	May 31, 2018	Exempt	Exempt
Brazil	May 31, 2018	Exempt	4,193,157 metric tons
Canada	May 20, 2019	Exempt	Exempt
European Union	May 31, 2018	25%	N/A
Korea	April 30, 2018	Exempt	2,631,012 metric tons
Mexico	May 20, 2019	Exempt	Exempt
Turkey	May 21, 2019	25%	N/A
All other countries	March 8, 2018	25%	N/A

Source: U.S. Customs and Border Patrol website: https://www.cbp.gov/trade/programs-administration/entry-summary/232-tariffs-aluminum-and-steel, updated on May 29, 2019.

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[34] See appendix E for additional details.
[35] 83 FR 11625, March 15, 2018.
[36] NEXTracker Webpage, https://www.nextracker.com/product-services/solar-storage/nx-horizon/, retrieved October 22, 2019.
[37] See U.S. notes 16(a) and 16(b), subchapter III of chapter 99.

Table I-3
CSPV cells: Safeguard TRQ measure on cells

Item	Safeguard duty on first 2.5 GW of imported cells	Safeguard duty on imported cells exceeding 2.5 GW (percent)
February 7, 2018 - February 6, 2019	--	30
February 7, 2019 - February 6, 2020	--	25
February 7, 2020 - February 6, 2021	--	20
February 7, 2021 - February 6, 2022	--	15

Source: 83 FR 3541, January 25, 2018.

Import duties under the safeguard measure

The safeguard measure imposed an increase in duties on imports of CSPV modules for a period of four years, with annual reductions in the rates of duty in the second, third, and fourth years. The additional duty is imposed on the declared value of CSPV modules, including the cost or value of the non-cell portions of the modules (such as aluminum frames). Table I-4 presents the import duties under the safeguard measure on CSPV modules.

Table I-4
CSPV modules: Safeguard measure on modules

Item	Safeguard duty on imported modules (percent)
February 7, 2018 - February 6, 2019	30
February 7, 2019 - February 6, 2020	25
February 7, 2020 - February 6, 2021	20
February 7, 2021 - February 6, 2022	15

Source: 83 FR 3541, January 25, 2018.

Tariff treatment

The subject merchandise is provided for in subheading 8541.40.60 of the Harmonized Tariff Schedule of the United States ("HTS"), and has been free of duty under the general duty column since at least 1987. Within subheading 8541.40.60, the subject merchandise was included in statistical reporting numbers 8541.40.6020 ("solar cells, assembled into modules or made up into panels") and 8541.40.6030 ("solar cells, other") through June 30, 2018. As of July 1, 2018, a superior text for crystalline silicon photovoltaic cells (described in statistical note 11 to chapter 85) applies to two subordinate reporting categories, 8541.40.6015 ("assembled into modules or made up into panels") and 8541.40.6025 ("other").[53]

Under subheading 9903.45.22, imports of cells in excess of the prescribed TRQ quantity subject to the safeguard measure are currently subject to a general duty rate of 25 percent ad valorem (unless the product of an exempt country); under subheading 9903.45.25 all covered modules from nonexempt countries are currently subject to the safeguard duty rate of 25 percent ad valorem.

These articles may also be imported as parts or subassemblies of goods provided for in subheadings 8501.31.80, 8501.61.00, and 8507.20.80.[54] Inverters or batteries with CSPV cells attached are provided for under HTSUS subheadings 8501.61.00 and 8507.20.80, respectively. In addition, CSPV cells covered by the reviews may also be classifiable as DC generators of subheading 8501.31.80, when such generators are imported with CSPV cells attached. Goods classified in subheadings 8501.31.80 and 8501.61.00 have general duty rates of 2.5 percent ad valorem, and goods classified in subheading 8507.20.80 have a general duty rate of 3.5 percent ad valorem. The following statistical reporting numbers were added on March 1, 2018: 8501.31.8010 (covering DC generators of an output not exceeding 750 W: photovoltaic generators of a kind described in statistical note 9 to subchapter 85),[55] 8501.32.6010 (DC generators of an output exceeding 750 W but not exceeding 75 kW: photovoltaic generators of a kind described in statistical note 9), 8501.61.0010 (AC generators (alternators): photovoltaic

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[53] Statistical Note 11: For the purposes of statistical reporting numbers 8541.40.6015 and 8541.40.6025, the term "crystalline silicon photovoltaic cells" means crystalline silicon photovoltaic cells of a thickness equal to or greater than 20 micrometers, having a p/n junction (or variant thereof) formed by any means, whether or not the cell imported under statistical reporting number 8541.40.6025 (or subassemblies thereof imported under statistical reporting number 8541.40.6015) has undergone other processing, including, but not limited to, cleaning, etching, coating, and/or addition of materials (including, but not limited to, metallization and conductor patterns) to collect and forward the electricity that is generated by the cell. Such cells include photovoltaic cells that contain crystalline silicon in addition to other photovoltaic materials. This includes, but is not limited to, passivated emitter rear contact cells, heterojunction with intrinsic thin-layer cells, and other so-called hybrid cells.

[54] The subject cells may be presented as integral elements of subassemblies of components or of goods of these three subheadings, even if not treated as "parts" for tariff purposes.

[55] Statistical Note 9 to chapter 85 provides as follows: For the purposes of heading 8501, photovoltaic generators consist of panels of photocells combined with other apparatus, e.g., storage batteries and electronic controls (voltage regulator, inverter, etc.) and panels or modules equipped with elements, however simple (for example, diodes to control the direction of the current), which supply the power directly to, for example, a motor, an electrolyser. In these devices, electricity is produced by means of solar cells which convert solar energy directly into electricity (photovoltaic conversion).

The industry in China

This section compiles data and information on the historical development of the Chinese industry. The data used here are primarily compiled from databases and data sets that offer long-term historical data on the industry in China. As most sources report data from 2010, the text will focus on 2010 to 2018 or 2019. Longer term data, as available, are in tables and charts. *** data for 2019 are as of ***.

Supply chain

Polysilicon

China's production of polysilicon increased more than 450 percent during 2010–18, rising from 45,000 metric tons in 2010 to 259,000 metric tons in 2018 (figure F-1).[16] China accounted for 58 percent of global production in 2019.[17]

[16] CPIA, "China Photovoltaic Industry Development Roadmap," 2019, p. 2, http://www.chinapv.org.cn/road_map.html, retrieved November 4, 2019; Fang, Lv, Xu Honghua, Wang Sicheng, Li Hailing, Ma Liyun, and Li Ping "National Survey Report of PV Power Applications in China 2018," IEA PVPS, 2019, p. 18, http://www.iea-pvps.org/?id=93, retrieved December 19, 2019.

[17] IEA PVPS, *Trends in Photovoltaic Applications 2019*, Report IEA PVPS T1-36:2019, p. 59, http://www.iea-pvps.org/?id=256, retrieved December 19, 2019.

Figure F-3
Polysilicon: Chinese polysilicon production capacity and share of global capacity, 2010–19

*　　*　　*　　*　　*　　*　　*

Source: ***.

Wafers

The production of wafers in China increased more than 850 percent during 2010–18, rising from 11 GW in 2010 to 107 GW in 2018 (figure F-4).[21] Capacity utilization in China in 2018 was 73 percent.[22] China accounted for 93 percent of global wafer production in 2018.[23]

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[21] CPIA, "China Photovoltaic Industry Development Roadmap," 2019, p. 2, http://www.chinapv.org.cn/road_map.html, retrieved November 4, 2019; Fang, Lv, Xu Honghua, Wang Sicheng, Li Hailing, Ma Liyun, and Li Ping "National Survey Report of PV Power Applications in China 2018," IEA PVPS, 2019, p. 19, http://www.iea-pvps.org/?id=93, retrieved December 19, 2019.

[22] Capacity utilization for 2018 is calculated based on capacity reported to the IEA to ensure comparability with production data, while *** capacity data are presented below for time series and comparison to global capacity purposes. Fang, Lv, Xu Honghua, Wang Sicheng, Li Hailing, Ma Liyun, and Li Ping "National Survey Report of PV Power Applications in China 2018," IEA PVPS, 2019, p. 19, http://www.iea-pvps.org/?id=93, retrieved December 19, 2019.

[23] IEA PVPS, *Trends in Photovoltaic Applications 2019*, Report IEA PVPS T1-36:2019, p. 59, http://www.iea-pvps.org/?id=256, retrieved December 19, 2019.

Figure F-5
Wafers: Wafer production capacity in China and share of global capacity held by China, 2010–19

*   *   *   *   *   *   *

Source: ***.

CSPV cells and modules

Cells

Production of cells in China increased almost 700 percent during 2010–18, rising from 11 GW in 2010 to 85 GW in 2018 (figure F-6). The share of global production held by China increased from 9 percent in 2005 to 43 percent in 2010, then reached 73 percent in 2018.[25] The capacity utilization rate in 2018 was 66 percent.[26]

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[25] Data for China and the world include thin film products. CPIA, "China Photovoltaic Industry Development Roadmap," 2019, p. 3, http://www.chinapv.org.cn/road_map.html, retrieved November 4, 2019; China data prior to 2010 and data for the rest of the world for all years is from IEA PVPS, *Trends in Photovoltaic Applications*, 2006–2019 editions, http://www.iea-pvps.org/?id=256, retrieved December 19, 2019; Fang, Lv, Xu Honghua, Wang Sicheng, Li Hailing, Ma Liyun, and Li Ping "National Survey Report of PV Power Applications in China 2018," IEA PVPS, 2019, p. 19, http://www.iea-pvps.org/?id=93, retrieved December 19, 2019.

[26] Capacity utilization for 2018 is calculated based on capacity reported to the IEA to ensure comparability with production data, while *** capacity data are presented below for time series and comparison to global capacity purposes. Fang, Lv, Xu Honghua, Wang Sicheng, Li Hailing, Ma Liyun, and Li Ping "National Survey Report of PV Power Applications in China 2018," IEA PVPS, 2019, p. 19, http://www.iea-pvps.org/?id=93, retrieved December 19, 2019.

Figure F-7
CSPV cells: CSPV cell production capacity in China and share of global capacity held by China, 2010–19

* * * * * * *

Source: ***.

Modules

PV module production in China increased almost 700 percent during 2010–18, rising from 11 GW in 2010 to 83 GW in 2018 (figure F-8). The share of global module production held by China increased from 14 percent in 2005 to 50 percent in 2010, then rose to 72 percent in 2018.[28] The capacity utilization rate for module production in China was 64 percent.[29]

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[28] Data include thin film products. CPIA, "China Photovoltaic Industry Development Roadmap," 2019, p. 3, http://www.chinapv.org.cn/road_map.html, retrieved November 4, 2019; China data prior to 2010 and data for the rest of the world for all years is from IEA PVPS, *Trends in Photovoltaic Applications*, 2006–19 editions, http://www.iea-pvps.org/?id=256, retrieved December 19, 2019; Fang, Lv, Xu Honghua, Wang Sicheng, Li Hailing, Ma Liyun, and Li Ping "National Survey Report of PV Power Applications in China 2018," IEA PVPS, 2019, p. 20, http://www.iea-pvps.org/?id=93, retrieved December 19, 2019.

[29] Capacity utilization for 2018 is calculated based on capacity reported to the IEA to ensure comparability with production data, while *** capacity data are presented below for time series and comparison to global capacity purposes. Fang, Lv, Xu Honghua, Wang Sicheng, Li Hailing, Ma Liyun, and Li Ping "National Survey Report of PV Power Applications in China 2018," IEA PVPS, 2019, p. 20, http://www.iea-pvps.org/?id=93, retrieved December 19, 2019.

Figure F-9
CSPV modules: CSPV module production capacity in China and share of global capacity held by China, 2010–19

*   *   *   *   *   *   *

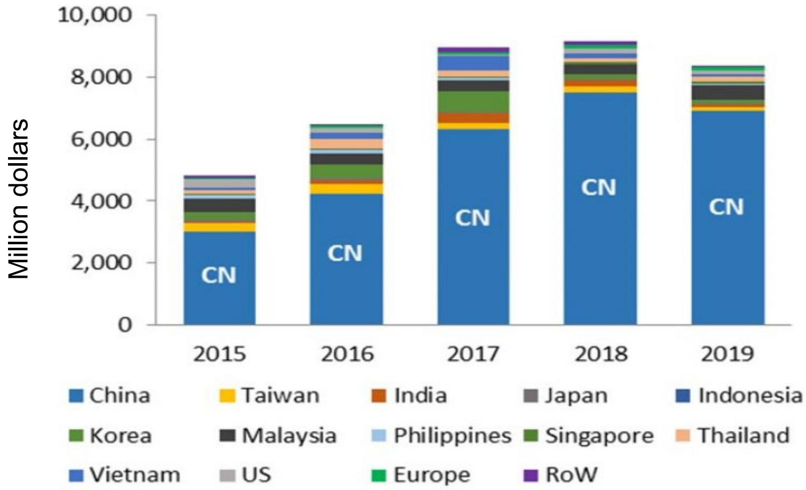
Source: ***.

Capital expenditures

Reflecting the large increase in capacity shown above, China accounted for most of the approximately $9 billion in global CSPV capital expenditures (including ingots, wafers, cells, and modules) in 2018, and China's share increased during 2015–18 (figure F-10). Examining cells specifically, China's share of global capital expenditures increased from less than 60 percent in 2015 to more than 80 percent in 2018 (figure F-11).[31]

[31] Colville, Finlay, "Solar PV Capex Trending at US$9 billion Annually as New GW Fabs in China Slash Investments Required," *PV Tech*, December 10, 2019, https://www.pv-tech.org/editors-blog/solar-pv-capex-trending-at-us9-billion-annually-as-new-gw-fabs-in-china-sla, retrieved December 18, 2019.

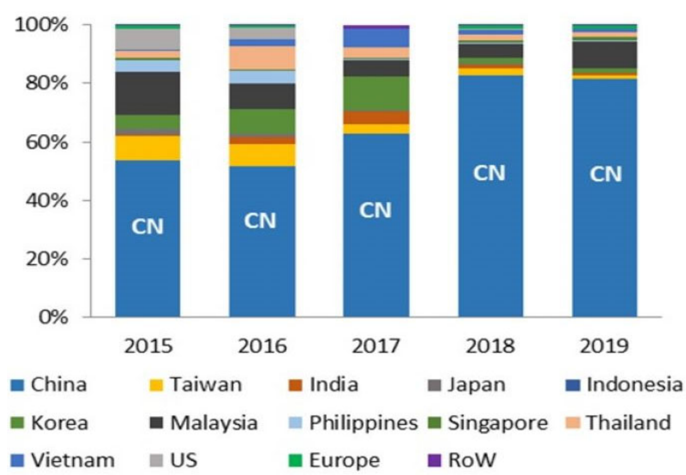
Figure F-10
CSPV products: Global capital expenditures for ingots, wafers, CSPV cells, and CSPV modules, 2015-19



Notes: 2019 data are projections. Given declining costs for building plants, decreases in spending do not necessarily translate to lower capacity additions in GW terms.

Source: Colville, Finlay, "Solar PV Capex Trending at US$9 billion Annually as New GW Fabs in China Slash Investments Required," *PV Tech*, December 10, 2019, https://www.pv-tech.org/editors-blog/solar-pv-capex-trending-at-us9-billion-annually-as-new-gw-fabs-in-china-sla, retrieved December 18, 2019.

Figure F-11
CSPV cells: Share of global capital expenditures for CSPV cells



Notes: 2019 data are projections.

Source: Colville, Finlay, "Solar PV Capex Trending at US$9 billion Annually as New GW Fabs in China Slash Investments Required," *PV Tech*, December 10, 2019, https://www.pv-tech.org/editors-blog/solar-pv-capex-trending-at-us9-billion-annually-as-new-gw-fabs-in-china-sla, retrieved December 18, 2019.

Other grants

CSPV manufacturers in China receive a range of other grants and funding from government sources. For example, Trina reported receiving "unrestricted cash government subsidies" during 2009-15 of $25 million.[77] Longi listed more than 130 projects under the category of "government subsidy" for which the company had a balance at the start of the year or received money in 2018.[78]

Supply chain

CSPV cell and module producers benefited not only from the policies through which they directly received support, but also through policies directed at the supply chain. For example, the European Commission identified subsidy rates of 3.2 percent to 16.7 percent for participating producers of solar glass in its countervailing duty investigation.[79] Chinese producers of aluminum extrusions (which include module frames) benefit from a range of government policies to support the aluminum industry.[80] The Chinese government has

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[77] Trina, "Form 20-F," Annual filing to the Securities and Exchange Commission for the fiscal year ended December 31, 2011, p. F-19. https://www.sec.gov/Archives/edgar/data/1382158/000110465912022420/a12-6567_120f.htm, retrieved December 28, 2019; Trina, "Form 20-F," Annual filing to the Securities and Exchange Commission for the fiscal year ended December 31, 2012, April 2, 2013, p. F-21, https://www.sec.gov/Archives/edgar/data/1382158/000110465913026502/a12-29784_120f.htm, retrieved December 28, 2019; Trina, "Form 20-F," Annual filing to the Securities and Exchange Commission for the fiscal year ended December 31, 2015, April 19, 2016, p. F-18, https://www.sec.gov/Archives/edgar/data/1382158/000110465916112305/a16-1508_120f.htm, retrieved December 28, 2019.

[78] LONGi Green Energy Technology Co., Ltd., *Annual Report 2018*, April 30, 2019, pp. 249–262, https://en.longigroup.com/uploadfile/network/2019/07/20190702100700106.pdf, retrieved December 24, 2019.

[79] European Commission, Commission Implementing Regulation (EU) No 471/2014 of 13 May 2014 imposing definitive countervailing duties on imports of solar glass originating in the People's Republic of China, *Official Journal of the European Union*, May 14, 2014, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R0471, retrieved December 30, 2019.

[80] USITC, *Aluminum: Competitive Conditions Affecting the U.S. Industry*, Publication No. 4703, Investigation No. 332-557, June 2017, pp. 253–267, https://www.usitc.gov/publications/332/pub4703.pdf, retrieved December 30, 2019.

supported energy intensive polysilicon production[81] through reduced electricity rates, and other policies. For example, LDK "received regularly significant electricity fee subsidies from the Financial Bureau of Xin Yu Economic Zone" for its polysilicon production operations.[82] Daqo received reduced electricity rates from the government in Xinjiang as part of the approval for the expansion of its polysilicon manufacturing plant.[83] In 2018, Daqo also received "unrestricted cash government subsidies" totaling $13.1 million.[84]

CSPV demand policies

Early off-grid policies

Initial solar policies in China focused on increasing deployment in rural, off-grid areas. ***.[85] In addition, ***

[81] For a discussion of antidumping and countervailing duties on imports of polysilicon from the EU, Korea, and the United States, see the supply chain section above.

[82] European Union, Council Implementing Regulation No 1239/2013 of 2 December 2013, *Official Journal of the European Union*, December 5, 2013, L 325/120, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1239&from=EN, received December 24, 2019.

[83] Bellini, Emiliano, "Daqo Gets Government Approval and Cheaper Power for Poly Production Expansion," *PV Magazine*, May 25, 2018, https://www.pv-magazine.com/2018/05/25/daqo-gets-government-approval-and-cheaper-power-for-poly-production-expansion/, retrieved December 30, 2019.

[84] Daqo, "Form 20-F," Annual report to the Securities and Exchange Commission for the fiscal year ended December 31, 2018, April 17, 2019, p. F-14, https://www.sec.gov/Archives/edgar/data/1477641/000114420419020070/tv517398_20f.htm, retrieved December 30, 2019.

[85] ***.

EXHIBIT 8

ENTIRE EXHIBIT NOT CAPABLE OF PUBLIC SUMMARY

EXHIBIT 9

JinKO Solar

English

Global Presence

9+

Global Factories

Jinko Solar

English

Services Centers

100+

Covered Countries

Jinkosolar Worldwide Offices

Worldwide Region

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Xinyuan County Industrial Park A

Jinkosolar Yuhuan Industries Inc

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JinKO Solar

English

Jinkosolar Sichuan Industries Inc

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Post code: 614800

Tel:+0833-3251666

Jinko Solar US Industries Inc

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EXHIBIT 10

Solar PV Trade and Manufacturing

A Deep Dive

February 2021

BloombergNEF

Contents

Table of tables

Section 1. Executive Summary

172GW

Crystalline silicon PV module manufacturing capacity build since 2017

83%

Polysilicon supplied by top 10 firms in 2019

$0.20/Watt

Monocrystalline silicon module price in 3Q 2020

The following is an in-depth examination of current solar photovoltaic (PV) manufacturing and trade trends produced under an ongoing partnership between BloombergNEF and the Energy Security & Climate Change Program at the Center for Strategic and International Studies in Washington. This report focuses exclusively on the PV industry and offers a deeper-dive look at current global competitive dynamics. Similar reports covering the wind and battery storage sectors have been published separately and are available for download at both CSIS.org and BNEF.com.

1. The PV manufacturing value chain consists of five main components: polysilicon, ingots, wafers, cells and modules.
2. The quality of Chinese products across all value chain segments is improving. The trade dispute between the U.S. and China that began in 2012 prompted Chinese companies to up their game and Chinese companies are now leading innovators in the space.
3. The greatest level of market consolidation exists farthest up the PV production chain. The top 10 polysilicon and wafer firms supplied 83% and 95% of the market in 2019, respectively.
4. Technical hurdles are highest for plants that make polysilicon and wafers. These plants are also costly to build and take longest to construct. Cell and module factories can be built faster and can respond quicker to technological trends and policy developments like import tariffs.
5. Major polysilicon makers in South Korea have recently ceased domestic production because they can no longer compete against new, more efficient factories in China. Since 2017, 91% of new polysilicon processing capacity (on a nameplate basis) has been built in China. In the U.S., the newest factory was built in 2016 by Wacker-Chemie in Tennessee.
6. Since 2010, over 220GW of new wafer manufacturing capacity has been brought online. Almost all of this was built in China where there is over 227GW of commissioned nameplate capacity, compared with just 18GW in all other countries combined.
7. The market for solar cells is much less consolidated. In 2019, the top 10 cell producers supplied 59% of the market. Leading cell makers are vertically-integrated companies that own wafer and/or module manufacturing as well. This allows them to exert better cost control and manage output certainty.
8. Module assemblers rely heavily on supply of external components such as PV-quality glass and aluminum frames. A local module assembly industry in a country can benefit from these adjacent industries being located nearby.
9. Given low technical and financial barriers, companies have historically proven relatively agile at responding to tariffs or other policy developments. After the U.S. imposed duties on Chinese-made solar cells, for instance, large integrated manufacturers built both cell and module assembly plants across Southeast Asia. The tariffs had limited success in boosting domestic manufacturing in the U.S.

10. The U.S. surge in demand for PV equipment over the past decade has not been accompanied by a similar rise in domestic PV manufacturing across the value chain. Instead, the U.S. has relied on imports, first from China then from Southeast Asia.
11. The U.S. has relied heavily on other countries to fulfil its demand for solar cells and modules. Countries of origin for imported cells and modules fluctuate with different U.S. government trade actions.
12. Most U.S. solar installations today use modules manufactured at plants located in Vietnam, Malaysia and Thailand that are owned by Chinese firms.
13. Whether a silicon-based module is assembled on U.S. soil or abroad, about half its total value is accounted for by non-silicon raw materials mainly produced in China. As a result, despite U.S.-imposed tariffs on Chinese-made PV cells and modules, China continues to accrue the largest share of value from modules installed in the U.S. – regardless of where the equipment gets assembled.

The manufacturing process at a glance

Polysilicon is the key feedstock for the production of solar cells. Its raw material, silicon dioxide (SiO_2), is high purity quartz sand and one of the most common minerals on Earth. The purification process that transforms raw silicon into hyper pure polysilicon, or "solar-grade" silicon that is suitable for PV, occurs in two stages.

The first involves taking the sand and heating with a clean type of charcoal or coke. This results in 98% pure silicon, also known as "metallurgical grade silicon". The next step is to heat the metallurgical grade silicon with acid to convert it to a gas called silane. The gas is then put into a hot reactor vessel, with some cooler 'seeds' of silicon crystal, and condenses to form pure rods of silicon, which are broken into chunks.

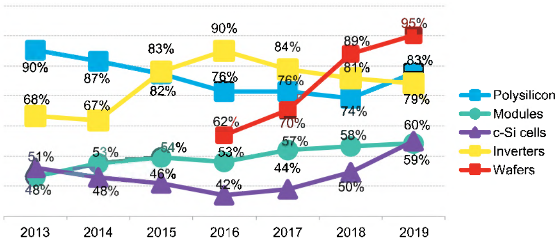
After the polysilicon arrives at the ingot factory as a sack of chunks, it is shaped into either multicrystalline or monocrystalline ingots by melting it and allowing it to cool slowly into solids. To create higher-value monocrystalline (mono) ingots, the crystal must grow very slowly into a single perfect block. Multicrystalline is made much faster by allowing interlocking crystals to form multiple nodes. Ingots are then sliced into wafers and doped with either phosphorus (p-type) or boron (n-type), which change their electrical properties by making either free electrons or electron holes that respond when excited by light.

Mono is a more efficient, yet costly product. However, as outlined later in this report, the costs for mono have fallen at a faster pace. Most ingot factories also contain wafer-manufacturing capabilities. This report has assumed wafer manufacturing data to include ingot capacity as well. The doped wafers are electrically connected and sealed into cells, then finally strung and finally assembled into the modules that go onto roofs or into open spaces.

Market overview

Generally speaking, the further up the PV production chain, the more consolidated the market is (Figure 2). The top ten polysilicon and wafer firms supplied 83% and 95% of the market in 2019, respectively. Polysilicon and wafers have higher technical hurdles and factories are more expensive and time-consuming to build. Cell and module factories can be built relatively quickly and can respond faster to market trends and policy moves such as the imposition of import tariffs.

Figure 2: Share of market supplied by the top ten firms across the PV value chain



Source: BloombergNEF

Inner Mongolia supplied 65% of the market in 2020 at costs significantly below the annual marginal cost of $6.6/kg.

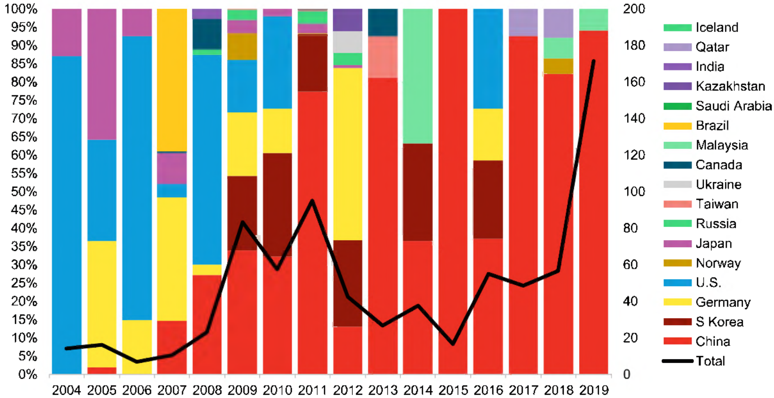
Global polysilicon manufacturing capacity

Chinese polysilicon firms added 74,000 tons of new nameplate capacity in 2011. Up to around 2012 however, Chinese products did not satisfy quality requirements from many wafer makers and could not compete against U.S. and German equipment. The story changed after China retaliated against U.S. import tariffs on Chinese cells and modules in 2012, by levying duties on U.S. polysilicon. Chinese polysilicon makers used the trade dispute to scale up and gain the experience to produce higher quality polysilicon.

Since 2017, 91% of new global polysilicon nameplate production capacity has been built in China (Figure 6). The current cost of building a new factory in China runs at about $15 million per thousand tons, or $39 million per gigawatt. Factory capex has come down over time, but high technical hurdles remain.

Tongwei, Daqo, Xinte, GCL and East Hope alone added over 80% of new capacity in China since 2017 (261,000 tons). In the U.S., the newest factory was built back in 2016 by Wacker-Chemie in Tennessee with a capacity of 20,000 tons. OCI, headquartered in South Korea, has faced stiff competition from China for its domestic-made polysilicon. The firm built its newest plant in Malaysia in 2014 and has recently closed all of its South Korean manufacturing.

Figure 6: Annual polysilicon factory additions per country of factory location and capacity in tons (right)



Source: BloombergNEF

Annual polysilicon production

Chinese polysilicon output

Chinese ingot and wafer makers at one time relied on international polysilicon companies in Germany and the U.S. for high-quality polysilicon. However, this foreign dependence has shrunk over time and China imported only 20% of the polysilicon it used in PV production in 1H 2020. Meanwhile, German and South Korean polysilicon producers rely heavily on exporting to China.

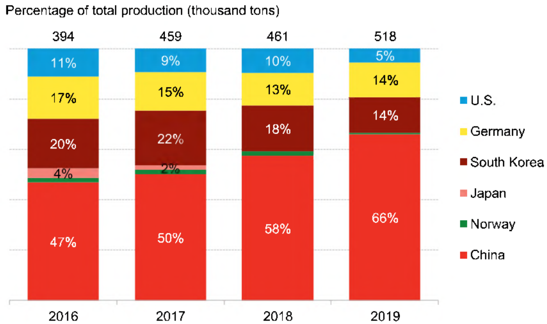
Seven of the world's top 10 polysilicon producers in 2019 were Chinese (Figure 7). After adding 60,000 tons of new capacity in 2019 under a partnership with Longi Green Energy Technology, Tongwei became the largest Chinese polysilicon maker in 2019 with 64,464 tons. This represented a 234% increase in output compared with 2018 and can be attributed to having the lowest production costs. Tongwei's ambitions go even further; the firm is building two new factories totalling 75,000 tons along with Longi Green Energy Technology.

International players – Germany, South Korea, the U.S. and Norway

International players, especially Wacker-Chemie in Germany, still do a better job than Chinese companies at avoiding undesired contamination during both the breaking up of rods into smaller pieces and the packaging process. As the market moves toward mono wafers, polysilicon of higher purity is required. Chinese firms have raised their quality standards since 2017, but are still not at the same level of Wacker's product.

Wacker was the biggest producer of polysilicon in 2019 and increased its output by 20% to 72,000 tons. As well as supplying the solar industry, the firm also sells to the electronics semiconductor industry. The company owns three factories, two in Germany and one in Tennessee. The U.S. plant, affected by Chinese import tariffs on U.S. polysilicon, made 12,000 tons with a total capacity of 20,000 tons in 2019.

Figure 7: Annual polysilicon production by country of company headquarters



Source: BloombergNEF

South Korean firm OCI was the second-largest producer of polysilicon in 2019 thanks to a capacity expansion of its Malaysian plant. However, like other Korean manufacturers such as Hankook Silicon (bankrupt in 2018) and Hanwha Chemical, OCI had to shutter its 52,000-ton factory in South Korea in early 2020. OCI and Hanwha's plant closures in 2020 will leave South Korea with no active polysilicon capacity due to high electricity prices and Chinese import tariffs on South Korean polysilicon.

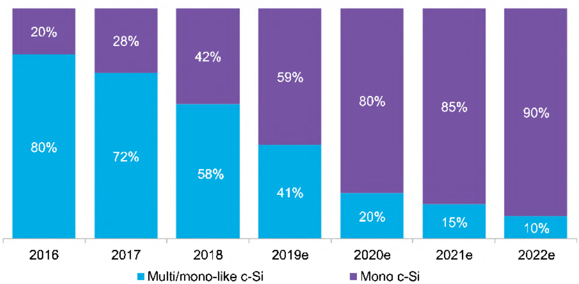
Hemlock Semiconductor's plant in Michigan produced 25,000 tons of polysilicon in 2019 vs. a total nameplate capacity of 35,000 tons. Cheap electricity in China, tariffs on U.S. polysilicon imports and improved quality across Chinese product have make it increasingly hard for Hemlock to find buyers in China, where almost all PV wafer makers are based. However, the U.S. firm still has some long-term supply contracts outstanding and owns ingot production in Taiwan. Product from that plant is shipped to some Chinese wafer makers.

3.2. Wafers

The share of monocrystalline wafers used in PV cells has surged since 2017 at the expense of multicrystalline. The market share for mono was expected to exceed multi in 2019, with almost 60% of the total. From 2020 on, the overwhelming majority of silicon wafer production is expected to be monocrystalline (Figure 8).

The surge in mono products can be explained by a combination of both supply and demand forces. On the supply side, new Chinese polysilicon factories built after 2017 have finally met the necessary product quality required for monocrystalline silicon wafers. On the demand side, cell manufacturers have switched to monocrystalline because it yields higher cell efficiencies.

Figure 8: Market split between mono and multi silicon wafer products



Source: BloombergNEF

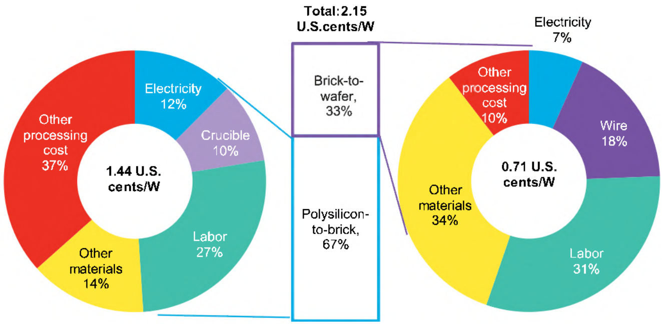
High barriers to entry caused market consolidation

Vertical integration, high factory capex and technical hurdles have made the wafer market the most consolidated segment of the PV value chain. While some wafer makers also make cells, most cell makers have limited or no wafer capacity, preferring to outsource this step of the value chain.

Best-in-class cost structure

Best-in-class cash costs for processing silicon into mono and multi wafers were 2.15 cents Watt in 2019 (Figure 9). The corresponding cost for producing multi wafers was 1.73 cents per Watt. Polysilicon ingots are cut into bricks before being further sliced into wafers. Major costs are labor, electricity and crucibles. The lowest cost mono and multi producers typically enjoy lower crucible costs thanks to in-house crucible production. Monocrystalline silicon is more expensive to make due to the use of premium polysilicon, as well as higher processing and labor costs in the polysilicon-to-brick conversion.

Figure 9: Best-in-class cash costs of making polysilicon into mono wafers by the end of 2019



Source: BloombergNEF

Wafer manufacturing capacity

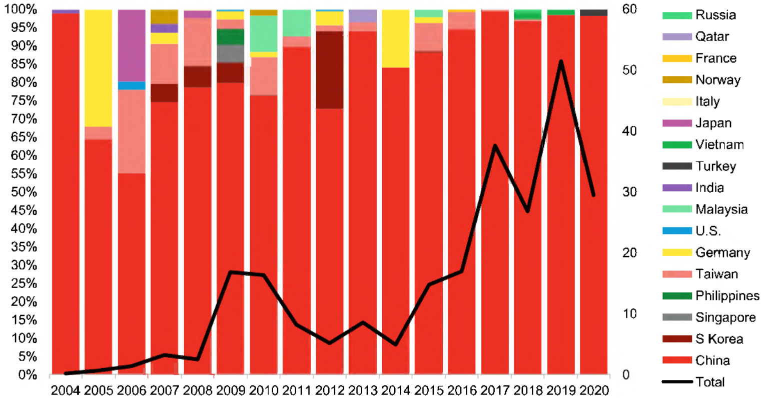
Since 2010, over 220GW of new wafer manufacturing capacity has been brought online. Almost three quarters of this was built after 2016. With minor exceptions, all of these new factories are located in China. China has over 227GW/year of commissioned wafer nameplate capacity as of 2020, compared with just 18GW/year across the rest of the world.

Nearly all the PV industry's demand for polysilicon comes from China. For the country, having control over wafer manufacturing has been critical on its path to global dominance of the PV supply chain. Wafer factories require high upfront capital expenditure and bear many technical hurdles, which makes it difficult for new factories to be built outside of China.

Wafers are an essential piece of the final cell and module composition. Given the current state of global polysilicon oversupply, wafer makers enjoy strong market and purchasing power. International polysilicon makers have struggled since China managed to supply most of its domestic wafer needs with locally manufactured polysilicon (Figure 10).

At the same time, wafers are a large part of the cost breakdown for solar cells and modules. Many large cell and module companies such as Trina Solar, Jinko Solar or Canadian Solar own wafer factories as well. Meanshile, Longi Green Energy Technology is a wafer maker that has entered cell and module production. Cell and module producers compete fiercely to supply high-efficiency solar panels at competitive costs. Therefore, securing reliable supply of mono wafers is crucial for large incumbents.

Figure 10: Annual wafer factory additions per country of factory location and yearly GW



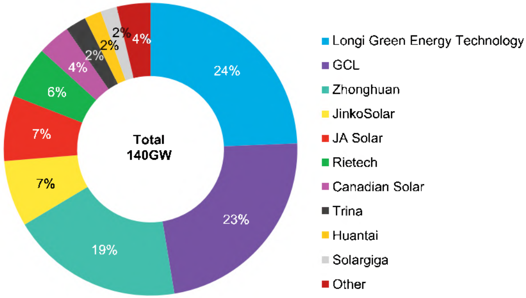
Source: BloombergNEF

Annual wafer production

In 2019, the top ten wafer makers supplied 95% of the market, up from 62% in 2016 (Figure 11). With the exception of Canadian Solar, which is headquartered in Canada but has factories in China, all of the companies were based in China. A total 140GW worth of wafers were made in 2019. The three biggest players alone (Longi, GCL and Zhonghuan) supplied 66% of the market.

In 2018, almost the entire wafer market flipped to using diamond wire saws to cut the wafers. The change meant thinner wafers and less losses of valuable silicon ingot. It also gave monocrystalline cells a decisive advantage over multicrystalline. Mono wafer specialist Longi Green Energy Technology, which had expanded into cell and module production to prove the viability of mono, became the biggest wafer producer in 2019 and increased its output by 68% from 20GW in 2018 to 34GW in 2019. This growth followed the latest expansions of its Chinese factories in Ningxia, Shaanxi and Yunnan, which has brought Longi's total nameplate capacity to 55GW in 2020. The integrated solar company has already announced plans for an additional 40GW of capacity and is currently building another 12GW.

Figure 11: Top ten solar wafer manufacturers by annual production, 2019



Source: BloombergNEF. Note: All 10 firms are headquartered in China, with the exception of Canadian Solar though the company has extensive manufacturing plants in China.

3.3. Cells

Compared with polysilicon and wafers, the solar cells segment of the value chain is far less consolidated. In 2019, the top ten cell producers supplied 59% of the market. Leading cell makers are often vertically integrated companies that own wafer and/or module manufacturing as well, but may buy outsourced wafers if the spot price is lower than their cost of production.

Cell manufacturing is more versatile compared to wafers and polysilicon and has lower technical hurdles. A multicrystalline cell factory can be upgraded to monocrystalline passivated emitter rear contact (PERC) production, for example, while a multi wafer factory would need significant investment to make mono wafers.

In addition, compared with wafers and polysilicon, it is easier to temporarily halt production lines across cell factories and quickly ramp them back up again. Over the last decade, there has been overcapacity global cell manufacturing, particularly as older capacity has been slow to retire.

Different cell types, efficiencies and costs

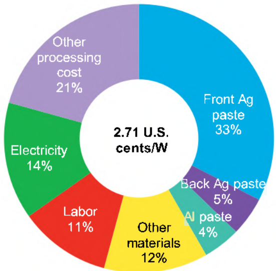
Mono PERC cells have become the market standard over the last two years at the expense of multi Al-BSF cells. Wide market adoption of different cell products is a factor of both efficiency and cost, where higher cell efficiencies command higher prices.

Historically, multicrystalline dominated the market because its lower efficiency was offset by lower costs. However, the additional cost of making mono PERC cells has decreased over time, to the point where better efficiencies of mono cells outweigh their higher expenses. The introduction of diamond wire saws in 2018, and the move to PERC designs, brought the production cost of mono below the cost of multi for the top players.

Cell cost breakdown

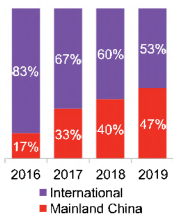
Over half of the cost of making monocrystalline silicon wafers into cells comes from the purchase of materials such as silver (Ag) and aluminum (Al) pastes (Figure 12). Front silver paste alone is the single largest cost component and accounted for 33% of total cost. It is used to form the electrical contacts on the front side of the cell.

Figure 12: Best-in-class cash costs of making silicon wafers into mono PERC cells as of year-end 2019



Source: BloombergNEF, company filings, industry sources.

Figure 13: Front Ag paste supply by company origin



Source: BloombergNEF

The largest silver paste suppliers have their factories in China. In addition to lower labor costs, there is an advantage of being located close to cell manufacturers. However, the majority of silver paste is still produced by non-Chinese companies. DuPont (U.S.), Heraeus (Germany), Samsung SDI (South Korea) and Gigasolar (Taiwan) supplied over 50% of the market in 2019 (Figure 13).

Global crystalline silicon solar cell manufacturing

Era of tariffs

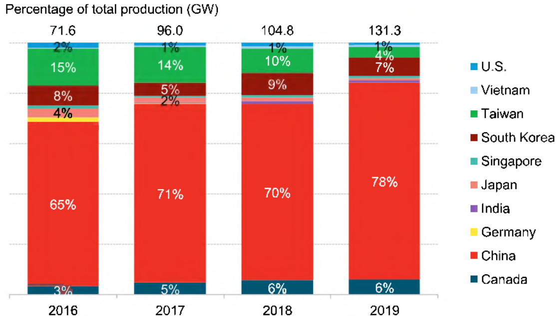
In 2011, there was about 49GW/year of cumulative solar cell manufacturing capacity worldwide, of which 71% was located in China. A year later, U.S. imposed antidumping (AD) and countervailing duty (CVD) tariffs on Chinese cells. Manufacturers then turned to Taiwanese cell makers to avoid the duties. However, the U.S. government responded in early 2015 by imposing tariffs on Taiwanese cells too.

U.S. trade restrictions on China and Taiwan triggered a rapid expansion of cell production across Southeast Asian countries in 2015 and 2016. Hanwha made the most aggressive move and built a 1.6GW plant in Malaysia in 2015, followed by other early movers such as JA Solar and JinkoSolar. Since 2015, cell makers have added almost 24GW of nameplate capacity across Southeast Asia.

Tariffs on China and Taiwan also benefited Hanwha's South Korean manufacturing, which grew from 600MW in 2015 to 3.7GW just three years later. However, in 2018, the U.S. imposed its Section 201 and 301 tariffs on crystalline silicon cells from outside China, which included Southeast Asia and South Korea. The first 2.5GW batch of cell imports is however tariff-free.

Taiwanese cell makers also lost market share in the Indian market as a result of 2018 safeguard duties against PV cell and module imports, set in an attempt to boost local PV manufacturing in India.

Figure 15: Annual cell production by country of headquarters (not factory location)



Source: BloombergNEF

Large cell makers own other parts of the value chain as well

Seven of 2019's top 10 cell manufacturers owned wafer manufacturing capacity as well. Vertical integration and industry partnerships across the PV supply chain are common among big players to have some control over production costs.

Tongwei, which was the largest Chinese polysilicon maker in 2019, topped the list of cell makers in the same year with 13.4GW of output, 105% more than in the previous year. The firm just closed a supply contract with Longi's wafer factories for about 13.5GW, which gives it supply certainty. In exchange, Tongwei will supply a fixed amount of polysilicon to Longi's wafer plants.

Other top producers such as JA Solar, Longi, Canadian Solar and Hanwha also achieved record cell outputs in 2019 as they expanded factories and moved new manufacturing to Southeast Asia.

3.4. Modules

Module makers are heavily reliant on the supply of external components such as PV glass and aluminum frames. Recent glass supply shortages have increased production costs for module makers and caused disruptions across module production lines.

Despite U.S. tariffs on Chinese-made cells and modules, China continues to expand its global dominance. Big, Chinese integrated solar firms participate in multiple segments of the PV value chain, which allows them to have better cost control and supply certainty. In addition, most of the key components for panel assembly are now being produced in China.

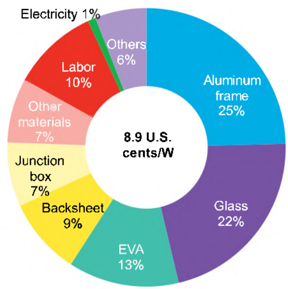
Compared with more upstream manufacturing components, module assembly quality and costs are influenced by the supply of this equipment. As a result, securing reliable supply of high-quality product is essential for module manufacturers. Large players, such as Longi, secure stable supplies by signing volume contracts that span two to three years. These agreements offer some discount but are still exposed to spot price fluctuations of raw materials like glass and aluminum. Longi has closed contracts for 47GW worth of PV glass and 44GW of aluminum frames. The company plans to spend over $2.6 billion on these agreements between 2019 and 2025. Other module makers, such as Canadian Solar and Jinko Solar, have gone further and own subsidiaries that produce frames, junction boxes and EVA. In April 2020, Longi also announced the creation of a joint venture for the production of 10GW worth of frames.

The price of external materials is determined by production costs and suppliers' gross margins. Both variables are exposed to spot prices of commodities and supply-demand market dynamics. In 2020, glass supply was pinched by a sharp rise in demand for bifacial modules, which use 25-56% more glass than traditional monofacial modules. Bifacial demand has spiked since 2018 when such modules accounted for just 3% of the installed market. By 2019, that had grown to 18% and was expected to reach 35% in 2020, and 60% in 2021.

Glass manufacturers have not invested in factories to keep up with the changes in product required by module makers, who are switching to bifacial dual-glass modules that require thinner glass, and are making larger product. Glass prices have risen by 71% since July 2020 as glass manufacturers struggle to meet demand. (The Chinese government has also tried to control overcapacity in glass production through quotas, but this is really a minor contributor to the glass shortage).

As a response to shortages, PV glass giants Xinyi Solar and Flat Glass are expected to add a total of 2.1 million tons of capacity in 2020 and an additional 1.4 million tons in 2021. These two Chinese producers alone will supply over 50% of the market in 2020.

Figure 18: Best-in-class cash cost for cell-to-module for mono c-Si modules made by large firms as of year-end 2019



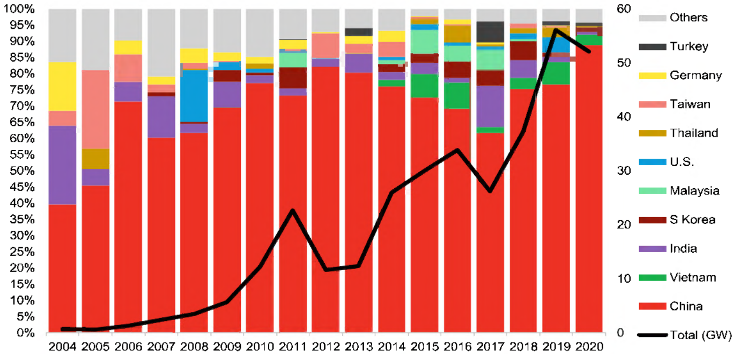
Source: BloombergNEF. Note: Most costly components in "other materials" are ribbons and adhesives. Packaging cost is categorized into "others".

Global c-Si module manufacturing capacity

Module factories have low technical hurdles

Since 2017, almost 172GW/year of c-Si module manufacturing capacity has been built globally, 134GW of it in China (Figure 19). Building a new module factory has low technical hurdles compared with wafer and polysilicon.

Figure 19: Crystalline-silicon module factory additions per country of factory location and yearly GW



Source: BloombergNEF

Large module makers have been regularly upgrading their production lines to adjust for new cell structures and other technological needs. Factories that lack the most modern equipment can become obsolete quickly in the current competitive market environment.

Factory locations track policy developments

Given low technical and financial barriers, it is also easier for module companies to open shop in other countries in response to tariffs or other policy developments. Once duties on Chinese solar cells were imposed by the U.S., large integrated manufacturers built both cell and module assembly plants across Southeast Asia. Since 2015, Longi has added over 7.4GW/year of module factories in Malaysia and Vietnam, followed by Hanwha (6.3GW/year) and Canadian Solar (2.7GW/year).

India's local content rules for its national solar auctions require cells and modules to be produced domestically. This condition spurred local manufacturing in the country. Over 11GW/year of crystalline silicon module capacity has been added since 2009 in India, of which 6.8GW/year were built after 2016. Indian module makers have also benefitted from U.S. tariffs on Chinese product, as well as their own government's duties on imports from China and Malaysia in 2018.

In the U.S., about 3.6GW/year of module assembly capacity has come online since 2017. Hanwha built a 1.7GW/year module assembly factory in Georgia in 2019, where it uses its own cells imported under the 2.5GW tariff-free cap. JinkoSolar and LG built 0.5GW and 0.4GW of annual module capacity in 2019, respectively. The two firms import their own cells for assembly in the U.S. under the 2.5GW tariff-free cap, from their facilities in Malaysia and South Korea. In 2018, over 1.3GW/year of new module factories were announced in the U.S. by firms including Sunpreme, Solaria or Mission Solar. However, no significant construction milestones have been achieved to date.

More module assembly capacity is expected online over the next couple of years, with the vast majority of it planned for China.

Annual module production

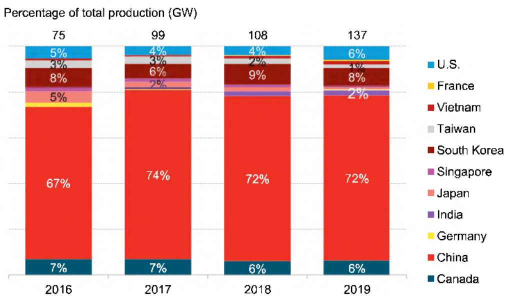
Compared with the 313GW/year of commissioned crystalline silicon module assembly capacity, around 137GW worth of modules (44%) were actually made in 2019. Many of the factories built several years ago have halted production or are waiting to be upgraded because their product is no longer competitive. Other have stopped production altogether.

About 118GW of solar modules were installed in projects across the world in 2019. The majority of the remaining 19GW of modules produced were "safe-harbored" in the U.S. (purchased on paper) for tax credit purposes.

China's global dominance in module production has not diminished over time (Figure 20). Besides ample supply of components along the PV value chain such as cells and wafers, China is also home to the largest manufacturers of key materials such as PV glass and aluminum frames. Overall, integrated Chinese solar manufacturers have been able to expand their production lines across the entire PV value chain due to the proliferation of other adjacent industries in China. For another country to keep up with Chinese PV output, a network of industries would need to be significantly expanded or built from scratch. Even still, it is unclear whether these new factories could be cost-competitive against China.

In 2019, India- and Vietnam-based module makers benefited from U.S. import tariffs on China and were able to grow their U.S. sales. First Solar and SunPower, the largest U.S. manufacturers, also profited from the tariffs and sold 5.7GW and 2.55GW worth of modules in 2019, respectively.

Figure 20: Annual module production by country of headquarters (not factory location)



Source: BloombergNEF

Section 4. U.S. PV cell and module trade trends

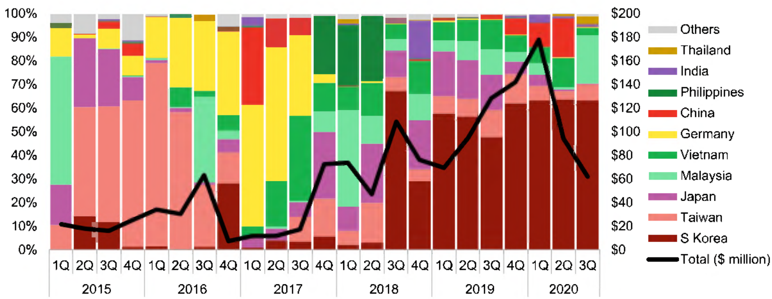
Given its limited PV manufacturing capabilities, the U.S. has heavily relied on other countries to fulfil its demand for solar cells and modules. The countries of origin of U.S. imported cells and modules have varied over the years in the wake of various U.S. government trade actions.

PV cell imports

After imposing anti-dumping and countervailing duties against Chinese-made cells in 2012, U.S. module makers began to predominantly import cells from Taiwan (Figure 21). Cell imports plummeted in 4Q 2016 after tariffs were imposed on Taiwan in 2015. Module makers continued to import Taiwanese cells despite the tariffs through 4Q 2016, because tax credits for solar projects in the U.S. were expected to step down after 2016. To circumvent the tariffs, Chinese and Taiwanese cell makers started building factories across Southeast Asia around 2015, which started exporting to the U.S. in 2017.

Starting in 3Q 2018, South Korea became the single biggest exporter of solar cells to the U.S. Hanwha's 1.7GW/year and LG's 0.5GW/year module factories in the U.S. were two of the main destinations. Despite the set of new tariffs that were lifted in 2018, U.S. module factories have continued to import South Korean and Southeast Asian cells under the 2.5GW tariff-free cap. A total of 1.7GW was imported in 2020 through September.

Figure 21: U.S. PV quarterly cell imports by country and value ($ million)



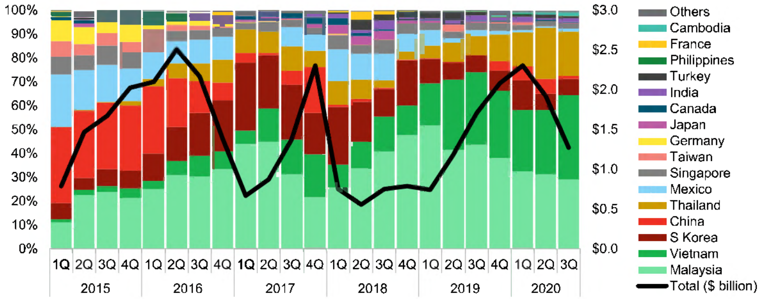
Source: BloombergNEF

PV module imports

Most U.S. solar installations today use imported modules from Vietnam, Malaysia and Thailand. Most module-assembly plants that ship from Southeast Asia to the U.S. are Chinese-owned. The U.S. imported about 20GW of modules between January-September 2020.

Module assembly in Southeast Asian countries and South Korea remains still considerably cheaper than in the U.S. Despite the 2012 AD and CVD duties imposed on Chinese cells, plenty of solar modules continued to arrive from China until 2016. As outlined earlier, Chinese module makers found a loophole under which they imported Taiwanese-made cells to China and assembled them into modules to sell the final product tariff-free into the U.S.

Figure 22: U.S. PV quarterly module imports by country and value ($ billion)



Source: BloombergNEF

Value break-out of projects built in the U.S.

The U.S. imported 21GW of PV modules and cells in 2019. That far exceeded the 11.5GW of projects actually built that year as installers sought to "safe harbor" (stockpile) equipment ahead of a looming step-down in the value of the U.S. Investment Tax Credit (ITC) subsidy. The U.S. imported a further 20GW of PV modules through the first three quarters of 2020, well above the 16GW of solar BloombergNEF that ultimately got built. This continuing stockpiling of PV equipment suggests that most, if not nearly all, projects commissioned in the U.S. in 2020 and 2021 will be outfitted with equipment assembled abroad.

In the wake of tariffs the U.S. imposed on equipment made in China, the majority of goods the U.S. imports arrive from Southeast Asia post-assembly. However, 70% of the actual value of that equipment accrues to China where key, pre-assembly steps in the making of the equipment take place, including production of solar-grade silicon, ingots, wafers and cells. For this reason, Southeast Asian nations account for just 27% of the value of a typical PV module exported to the U.S., despite those nations being most likely to be the last port of call before final, assembled equipment arrives in the U.S. (Figure 24). One other important fact: most of the plants assembling modules in Southeast Asia are actually owned by Chinese firms.

For the minority of modules installed in U.S. projects after having been assembled on U.S. soil, 26% of the value is accrued locally, mainly in the form of the labor and electricity used to put together the PV panels (Figure 23). Even for this equipment, however, the majority of the value creation (60%) still accrues to China. China-based firms produce 80% of the world's refined polysilicon, as well as virtually all wafers and non-silicon materials that go into the final cells that U.S. module-makers import. In the rare cases where cells are also manufactured in the U.S., the share of value creation only marginally increases, to 29% and does so at the expense of countries other than China.

BloombergNEF assumes just 2.5GW of the approximately 16GW installed in the U.S. in 2020 was assembled on U.S. soil. Module makers in the U.S. mainly imported cells from South Korea and Southeast Asia up to 2.5GW but no higher because that is the quota the U.S. government has set for tariff-free imports from those nations. Were the current U.S. tariffs on imported PV cells to be lifted, most modules installed in the U.S. would come directly from China or Southeast Asia, given the significantly lower all-in production costs those nations offer.

Figure 23: Value break-out of a typical crystalline silicon PV module assembled on U.S. soil (based on cash costs)

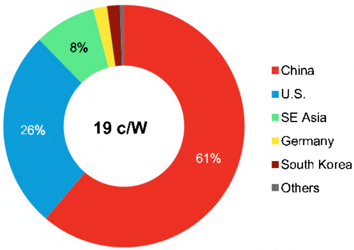
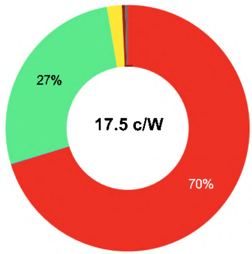


Figure 24: Value break-out of a typical crystalline silicon PV module imported from Southeast Asia (based on cash costs)



Source: BloombergNEF Note: Value creation distributed by country for modules assembled in the U.S. based on cash costs. Cash costs exclude tariffs, depreciation and transport fees, as well as profit margins. Cash costs components include: polysilicon, silicon-to-wafer production, non-silicon raw materials, wafer-to-cell production, non-cell raw materials and cell-to-module assembly.

Whether a silicon-based module is assembled on U.S. soil or abroad, about half its total value is accounted for by non-silicon raw materials such as silver paste, glass and back sheets. The vast majority of suppliers of these materials are concentrated in China. As a result, despite U.S.-imposed tariffs on Chinese-made PV cells and modules, China continues to accrue the largest share of value from modules installed in the U.S. – regardless of where the equipment gets assembled.

EXHIBIT 11

U.S. Imports of Solar Cells and Modules

	Calendar Year											YTD (Jan. - May.)	
Value in USD	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2020 YTD	2021 YTD
China	$1,206,523,519	$2,839,189,943	$1,717,275,514	$1,171,671,947	$1,634,023,148	$1,733,411,447	$1,531,623,484	$555,986,638	$24,226,640	$101,328,641	$392,701,212	$281,159,627	$7,364,374
Malaysia	$148,104,636	$576,448,485	$1,512,044,764	$1,251,732,146	$896,650,224	$1,315,646,602	$2,530,530,775	$1,617,247,949	$871,258,814	$1,747,571,029	$2,301,534,368	$920,337,268	$958,773,408
Vietnam	$666,295	$1,289,311	$939,641	$157,663	$7,407,974	$176,289,341	$529,802,567	$799,546,882	$430,446,324	$1,112,823,566	$1,644,893,917	$592,905,296	$681,078,299
Thailand	$2,706	$336,806	$12,447	$374,043	$750,568	$40,858,231	$531,950,499	$444,186,822	$198,237,338	$581,498,157	$1,464,662,606	$630,965,033	$532,622,709
Total Imports	$2,691,842,297	$5,051,086,913	$5,213,699,297	$3,721,106,255	$4,286,778,297	$6,083,041,778	$8,487,012,753	$5,336,523,598	$2,971,618,569	$5,064,313,077	$7,575,398,069	$3,256,288,125	$2,752,966,064
Chinese % of total imports	44.8%	56.2%	32.9%	31.5%	38.1%	28.5%	18.0%	10.4%	0.8%	2.0%	5.2%	8.6%	0.3%
Malaysian % of total imports	5.5%	11.4%	29.0%	33.6%	20.9%	21.6%	29.8%	30.3%	29.3%	34.5%	30.4%	28.3%	34.8%
Vietnamese % of total imports	0.0%	0.0%	0.0%	0.0%	0.2%	2.9%	6.2%	15.0%	14.5%	22.0%	21.7%	18.2%	24.7%
Thai % of total imports	0.00%	0.01%	0.0%	0.0%	0.0%	0.7%	6.3%	8.3%	6.7%	11.5%	19.3%	19.4%	19.3%

Source: USITC (DataWeb), HTSUS subheadings 8541.40.6020 and 8541.40.6030 through June 30, 2018 and 8541.40.6015 and 8541.40.6025 as of July 1, 2018 per USITC pub. 5021 at I-15, I-16.

Chinese Import Share Decrease 2011-2020	-86.17%
Malaysia Import Share Increase 2011-2020	299.26%
Vietnam Import Share Increase 2011-2020	127479.30%
Thailand Import Share Increase 2011-2020	434768.32%

Imports For Consumption | Monthly data for 2010

Data Row Count	42													
Data Type	**Country**	**Quantity Description**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
First Unit of Quantity	Argentina	number	0	200	410	250	200	0	350	0	243	820	0	447
First Unit of Quantity	Australia	number	50	187	14	248	48	2,573	22	11	500	3	0	0
First Unit of Quantity	Austria	number	0	0	0	24	0	0	0	0	0	0	0	4,419
First Unit of Quantity	Belgium	number	32	0	0	7,213	0	7	63	0	0	33,620	0	177
First Unit of Quantity	Brazil	number	0	0	0	0	0	0	0	500	0	0	0	0
First Unit of Quantity	Canada	number	2,738	3,913	14,645	11,916	2,504	1,326	142	291	104	1,497	836	10,056
First Unit of Quantity	China	number	866,958	1,106,474	721,191	524,109	1,296,376	1,016,663	4,109,179	725,677	1,284,490	1,631,210	1,836,306	2,252,969
First Unit of Quantity	Croatia	number	0	0	0	0	0	5,000	166	0	0	0	0	0
First Unit of Quantity	Czech Republic	number	153,000	145,000	201,550	0	0	0	0	0	0	0	856	778
First Unit of Quantity	Denmark	number	0	0	0	44	0	0	0	0	0	89	25	44
First Unit of Quantity	France	number	36	5	0	0	0	0	0	17,676	0	0	4	0
First Unit of Quantity	Gabon	number	0	0	0	0	0	0	0	0	0	0	0	2,500
First Unit of Quantity	Germany	number	1,089,177	1,008,022	653,258	1,235,957	995,217	1,297,286	906,000	718,782	1,068,429	1,920,157	1,068,408	1,845,839
First Unit of Quantity	Hong Kong	number	1,704	500	1,677	401	2,803	1,040	55,279	1,394	0	10	7,786	400
First Unit of Quantity	Hungary	number	0	0	0	0	0	9,300	0	0	0	0	0	0
First Unit of Quantity	India	number	3,272	293	681	746	853	3,283	4,251	8,656	22,237	19,987	29,655	28,656
First Unit of Quantity	Indonesia	number	0	0	0	0	0	0	0	0	0	0	1	0
First Unit of Quantity	Ireland	number	0	0	0	0	0	0	4	0	0	0	0	0
First Unit of Quantity	Israel	number	13	0	0	0	25	540	0	33	0	0	0	0
First Unit of Quantity	Italy	number	720	0	71	506	0	7	2,776	0	26	1,098	5,370	8,668
First Unit of Quantity	Japan	number	62,102	59,422	487,343	334,750	519,242	600,419	452,671	159,825	249,066	189,252	571,249	1,004,578
First Unit of Quantity	Luxembourg	number	0	0	0	0	0	0	0	0	0	0	0	2
First Unit of Quantity	Malaysia	number	33,600	2,363,270	3,209,406	2,124,935	31,023	35,104	27,248	11,262,684	2,365,280	47,095	287,533	140,292
First Unit of Quantity	Mexico	number	103,995	72,773	78,043	81,627	62,461	149,008	176,108	90,459	139,065	121,685	161,624	179,534
First Unit of Quantity	Netherlands	number	0	4,545	0	20	0	0	0	0	0	0	1,004	1,915
First Unit of Quantity	New Zealand	number	200	0	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Norway	number	8,700	13,000	18,500	23,100	0	0	0	0	0	0	0	0
First Unit of Quantity	Philippines	number	7,406	6,041	179	3,964	87,980	7,460	25,566	11,724	7,409	17,197	5,185	4,816
First Unit of Quantity	Poland	number	0	15	29	0	69	6	0	0	19	0	0	0
First Unit of Quantity	Portugal	number	1	0	0	0	0	18	0	0	14,000	0	0	0
First Unit of Quantity	Russia	number	0	2,200	1,950	0	0	0	0	0	0	0	0	2,000
First Unit of Quantity	Singapore	number	142	56	0	2,247	14,880	6,964	13,613	28,045	26,320	38,640	18,920	38,153
First Unit of Quantity	South Africa	number	0	0	0	0	0	0	0	0	0	0	2,222	0
First Unit of Quantity	South Korea	number	0	31,066	61,654	35,943	78,029	118,657	113,522	118,915	71,134	123,919	158,817	27,145
First Unit of Quantity	Spain	number	260	1,826	0	3,333	2,177	13,214	72	59,492	39,851	11,350	11,339	201
First Unit of Quantity	Sweden	number	1,920	15,600	0	8,580	4,680	7,800	3,900	0	1	0	22,010	0
First Unit of Quantity	Switzerland	number	57	0	1,010	47	35,652	0	100,000	81,420	39	1	0	10
First Unit of Quantity	Taiwan	number	731,479	1,830,952	1,639,803	1,282,661	2,938,422	1,375,714	1,954,915	3,834,910	2,503,231	2,359,377	1,333,209	2,166,166
First Unit of Quantity	Thailand	number	0	0	0	0	0	50	0	0	0	0	0	0
First Unit of Quantity	Turkey	number	0	0	157	0	156	0	0	542	312	0	0	156
First Unit of Quantity	United Kingdom	number	662	4	29,927	1,232	10,308	2,102	2,002	5,223	66,423	1,476	39,580	2,005
First Unit of Quantity	Vietnam	number	0	0	0	0	0	0	0	2,438	0	0	988	0
Total:			3,068,224	6,665,364	7,121,498	5,683,853	6,083,105	4,653,541	7,947,849	17,128,697	7,858,179	6,518,483	5,562,927	7,721,926

Imports For Consumption | Monthly data for 2011

Data Row Count 38

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
First Unit of Quantity	Argentina	number	0	440	100	0	0	290	0	0	0	200	0	0
First Unit of Quantity	Australia	number	73	240	80	0	18	252	142	30	100	10	86	9,982
First Unit of Quantity	Austria	number	0	0	0	0	35	0	0	0	6,920	0	1	0
First Unit of Quantity	Belgium	number	0	0	1	0	0	0	3,010	0	0	0	180	31,725
First Unit of Quantity	Brazil	number	0	0	5,158	0	0	0	0	153,600	0	0	0	0
First Unit of Quantity	Canada	number	1,015	5,801	972	1,362	1,365	779	15,786	4,754	5,470	16,398	245	28,336
First Unit of Quantity	China	number	3,010,475	1,654,556	3,938,754	2,719,413	3,088,745	9,437,628	13,543,321	7,199,507	6,506,662	6,561,864	9,883,708	3,094,684
First Unit of Quantity	Croatia	number	0	0	0	0	0	601	0	0	370	0	0	0
First Unit of Quantity	Czech Republic	number	597	555	0	0	1,054	0	0	20	0	0	8	0
First Unit of Quantity	Denmark	number	82	0	16	0	0	0	0	0	0	0	0	18
First Unit of Quantity	France	number	0	20	0	2,691	64	0	2,000	4	5	4	13	0
First Unit of Quantity	Germany	number	1,582,320	1,666,507	2,646,079	4,255,295	3,899,109	829,756	1,819,515	675,248	967,251	388,883	119,692	98,750
First Unit of Quantity	Hong Kong	number	0	0	1,500	1,232	3,300	510	660	10,279	0	2,004	6,441	3,676
First Unit of Quantity	Hungary	number	0	0	38	0	0	0	0	0	0	0	0	0
First Unit of Quantity	India	number	25,864	36,719	38,070	111,188	25,355	10,251	12,795	2,359	70	31,689	58,256	46
First Unit of Quantity	Israel	number	0	0	1	1	4	7	0	240	6	0	700	3
First Unit of Quantity	Italy	number	0	5,011	90	0	0	76	1,225	0	20,950	4	334	0
First Unit of Quantity	Japan	number	857,242	930,626	286,947	1,095,882	1,946,223	1,534,057	1,229,808	1,430,350	879,740	1,105,988	578,388	267,948
First Unit of Quantity	Malaysia	number	144,096	200,758	8,461	133,418	101,702	482,088	473,240	875,577	556,340	5,050,669	5,695,506	914,613
First Unit of Quantity	Mexico	number	164,009	134,646	104,098	76,606	111,747	121,219	68,831	112,142	108,313	84,676	141,181	161,515
First Unit of Quantity	Netherlands	number	1	125	7	0	50,503	0	1,165	0	901	2,392	1,883	0
First Unit of Quantity	New Zealand	number	0	0	0	0	0	0	0	0	0	0	0	1,158
First Unit of Quantity	Norway	number	0	0	0	0	0	0	0	11	40	0	0	0
First Unit of Quantity	Philippines	number	184,442	475,510	1,065,697	1,124,201	1,601,652	1,225,445	1,107,931	1,818,438	1,804,671	2,176,434	2,118,531	1,768,624
First Unit of Quantity	Poland	number	3	58	17	49	9	0	40	0	24	40	0	0
First Unit of Quantity	Portugal	number	0	0	0	0	0	0	0	0	1,056	0	356	0
First Unit of Quantity	Russia	number	0	1,500	0	5	18	0	0	0	0	0	0	0
First Unit of Quantity	Singapore	number	22,960	21,160	0	41,916	19,624	11,190	4,480	33,360	11,200	24,080	1,015,074	23,520
First Unit of Quantity	Slovakia	number	1	0	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	South Korea	number	175,954	258,974	92,955	295,037	11,841	225,629	68,233	450,117	22,948	26,741	143,185	72,434
First Unit of Quantity	Spain	number	125,067	3	4,182	290	166	490	31	75	3,272	3,093	0	0
First Unit of Quantity	Sweden	number	50	0	15	0	2,001	0	0	0	0	1	0	0
First Unit of Quantity	Switzerland	number	9	0	0	0	0	16	0	0	39	4,302	0	0
First Unit of Quantity	Taiwan	number	1,698,348	1,603,162	1,534,133	837,579	1,255,099	1,633,032	1,749,361	931,103	680,266	323,147	533,254	2,687,389
First Unit of Quantity	Thailand	number	0	84,660	0	0	768,480	0	0	0	0	0	0	33
First Unit of Quantity	Turkey	number	50	0	0	0	0	0	100	0	0	0	0	176
First Unit of Quantity	United Kingdom	number	1,720	12	8,302	5,899	2,334	8,891	3,554	2,421	1,536	2,924	3,172	1,325
First Unit of Quantity	Vietnam	number	988	988	494	650	494	0	468	468	0	0	972	459
Total:			7,995,366	7,082,031	9,736,167	10,702,714	12,890,942	15,522,207	20,105,696	13,700,103	11,578,150	15,805,543	20,301,166	9,166,414

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Data Row Count 40

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
First Unit of Quantity	Argentina	number	80	0	0	368	0	100	100	0	0	0	0	0
First Unit of Quantity	Australia	number	3,871	0	0	175	47	40	60	0	149	40	116	204
First Unit of Quantity	Austria	number	0	0	0	55	0	159	150	57	52	0	20,913	72
First Unit of Quantity	Belgium	number	15	2,845	5,634	2,750	2	0	1,501	2,406	0	0	0	0
First Unit of Quantity	Canada	number	63,743	17,057	89,161	39,917	1,158	42	4,315	40,728	3,926	164,768	254	581
First Unit of Quantity	China	number	6,190,281	2,052,059	3,661,624	755,617	1,578,632	1,505,343	533,524	394,133	730,818	956,497	462,122	225,543
First Unit of Quantity	Czech Republic	number	252	14,165	4,224	22,115	3,391	0	0	663	0	0	0	963
First Unit of Quantity	Finland	number	0	0	0	0	0	0	0	0	0	1	0	0
First Unit of Quantity	France	number	2	0	111	0	0	0	3,788	0	0	0	0	0
First Unit of Quantity	Germany	number	156,038	1,350,632	56,368	67,460	14,634	53,899	36,623	327,087	144,460	159,746	404,397	204,003
First Unit of Quantity	Hong Kong	number	8,051	20	3,260	774	1,672	4,170	1,649	2,240	600	1,072	745	2,000
First Unit of Quantity	Hungary	number	0	0	0	0	0	0	0	20,000	0	0	0	0
First Unit of Quantity	India	number	2,086	16,995	32	42	63	0	6,111	6,452	9,221	824	553	7,414
First Unit of Quantity	Israel	number	10	16	0	3	3	12	34	26	1	0	0	0
First Unit of Quantity	Italy	number	0	12	6	178	24	12	150	45	12	22	40	0
First Unit of Quantity	Jamaica	number	0	0	0	0	0	0	0	0	0	2	0	0
First Unit of Quantity	Japan	number	1,027,141	2,059,518	1,053,378	1,262,881	298,395	388,094	437,573	454,680	378,939	909,061	700,798	928,133
First Unit of Quantity	Lithuania	number	0	0	0	0	0	0	0	16,464	6,272	6,272	12,544	12,544
First Unit of Quantity	Macau	number	0	150	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Malaysia	number	1,010,823	1,300,705	1,476,798	849,894	1,306,125	1,288,147	3,088,020	3,053,080	2,042,899	2,625,740	3,200,524	2,779,976
First Unit of Quantity	Mexico	number	119,906	172,558	106,706	46,270	146,727	113,160	160,051	160,770	127,269	83,736	85,427	36,676
First Unit of Quantity	Netherlands	number	65	0	0	0	643	401	1	1	0	6	0	2
First Unit of Quantity	New Zealand	number	0	139	200	0	1,776	500	500	0	0	0	0	0
First Unit of Quantity	Norway	number	0	0	0	0	0	0	0	0	0	0	6	0
First Unit of Quantity	Philippines	number	1,561,201	2,003,146	1,464,669	1,586,212	2,022,239	1,470,408	2,126,087	81,780	56,660	356,072	32,122	55,680
First Unit of Quantity	Poland	number	0	38	27	0	30	0	0	0	0	0	0	0
First Unit of Quantity	Portugal	number	5	0	0	0	228	0	0	0	0	0	0	0
First Unit of Quantity	Saudi Arabia	number	0	0	0	0	0	2	0	0	0	0	0	0
First Unit of Quantity	Singapore	number	26,880	20,160	36,100	19,600	31,927	21,840	43,120	30,800	29,680	52,640	21,280	872,231
First Unit of Quantity	Slovakia	number	0	0	0	0	0	0	58	0	0	0	0	0
First Unit of Quantity	South Korea	number	455,616	766,713	552,572	317,574	216,129	308,613	325,802	138,243	115,086	155,135	150,746	199,610
First Unit of Quantity	Spain	number	10,058	23,266	20,153	38,297	8,803	3,111	450	960	960	31,366	13	979,928
First Unit of Quantity	Sweden	number	0	3,512	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Switzerland	number	6,000	0	0	0	2	0	0	0	1	4	0	0
First Unit of Quantity	Taiwan	number	1,940,728	5,550,809	2,874,698	4,538,443	3,694,694	2,629,866	3,236,389	3,026,364	2,237,586	1,925,602	1,834,258	682,510
First Unit of Quantity	Thailand	number	0	0	12,200	0	0	0	0	0	5	0	0	0
First Unit of Quantity	Turkey	number	0	0	0	14	0	0	0	0	0	0	190	0
First Unit of Quantity	United Arab Em	number	6,000	0	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	United Kingdom	number	2,105	6,362	2,176	2,094	2,117	2,496	1,506	1,345	1,124	1,347	0	576
First Unit of Quantity	Vietnam	number	1,296	0	1,728	864	0	432	0	864	2,984	5,354	0	0
Total:			12,592,253	15,360,877	11,421,825	9,551,597	9,329,461	7,790,847	10,007,562	7,759,188	5,888,704	7,435,307	6,927,048	6,988,646

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Data Row Count 37

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
First Unit of Quantity	Argentina	number	0	0	0	100	250	0	0	0	0	0	0	0
First Unit of Quantity	Australia	number	162	0	0	99	0	127	159	0	54	640	88	127
First Unit of Quantity	Austria	number	527	80	55	0	20	0	0	100	0	0	0	0
First Unit of Quantity	Belgium	number	0	0	0	0	3	0	254	0	0	0	0	107
First Unit of Quantity	Canada	number	34,500	684	7,165	435	167	168	18,639	614	12,852	23,876	8,818	596
First Unit of Quantity	Chile	number	0	0	0	0	0	0	0	0	0	50	0	0
First Unit of Quantity	China	number	333,033	353,647	362,701	483,344	2,678,170	721,550	1,155,081	947,163	922,346	733,547	822,813	1,057,937
First Unit of Quantity	Costa Rica	number	0	0	0	0	0	0	0	0	0	30,938	0	0
First Unit of Quantity	Czech Republic	number	0	0	2,990	6,110	2,184	2,912	0	0	0	0	0	0
First Unit of Quantity	Denmark	number	0	0	0	0	2,400	1,920	240	480	25	0	0	0
First Unit of Quantity	Finland	number	0	0	20	0	0	2	0	0	0	0	0	0
First Unit of Quantity	France	number	0	0	0	1	0	0	39,377	0	88	0	117	28
First Unit of Quantity	Germany	number	145,179	36,797	482,506	28,138	16,786	299,179	869,183	584,317	840,956	282,085	1,984	921,072
First Unit of Quantity	Greece	number	0	0	0	0	0	0	0	0	208	0	0	0
First Unit of Quantity	Hong Kong	number	600	11,200	0	1,810	12	1,654	6,482	0	25,000	1,170	17,360	21,408
First Unit of Quantity	India	number	413	560	16	0	858	1,275	699	333	1,180	20	577	0
First Unit of Quantity	Israel	number	0	10	0	0	0	0	0	0	118	1	13	0
First Unit of Quantity	Italy	number	33	0	8	24	462	31	3,066	26	65	41	123	4
First Unit of Quantity	Japan	number	306,638	121,701	331,918	58,794	63,677	230,652	29,655	24,334	14,758	27,679	23,852	31,829
First Unit of Quantity	Jordan	number	0	0	0	0	50	0	0	0	0	0	0	0
First Unit of Quantity	Lithuania	number	18,816	12,544	0	6,272	12,544	12,544	12,544	12,544	0	12,544	6,272	9,408
First Unit of Quantity	Malaysia	number	5,731,456	3,651,388	5,138,186	16,969,056	3,914,486	2,409,746	3,306,848	3,341,884	3,993,632	3,857,587	2,522,292	3,456,206
First Unit of Quantity	Mexico	number	68,361	72,053	86,282	88,354	91,401	115,810	120,584	102,431	110,041	116,759	119,702	98,682
First Unit of Quantity	Netherlands	number	0	50	0	0	16	0	0	0	0	0	0	0
First Unit of Quantity	Norway	number	0	0	0	0	0	0	9,222	0	0	0	0	0
First Unit of Quantity	Philippines	number	16,450	30,918	83,395	310,180	21,612	710,776	45,551	32,452	51,478	48,727	18,890	36,860
First Unit of Quantity	Poland	number	0	0	38	0	0	12	0	0	0	0	0	0
First Unit of Quantity	Singapore	number	1,120	13,440	78,860	41,852	8,980	16,240	43,480	26,546	39,775	11,440	21,020	11,760
First Unit of Quantity	South Korea	number	272,995	467,767	143,381	320,369	14,581	9,629	12,222	13,837	20,668	11,296	31,072	111,709
First Unit of Quantity	Spain	number	94,994	319,713	188,798	14,209	0	1,295	0	0	0	44	0	28
First Unit of Quantity	Sweden	number	0	0	0	448	0	0	0	0	0	0	0	0
First Unit of Quantity	Switzerland	number	0	0	0	0	0	1	0	0	1	0	0	0
First Unit of Quantity	Taiwan	number	1,245,456	703,615	732,894	951,539	496,976	707,579	576,253	659,469	764,689	1,100,128	719,557	735,649
First Unit of Quantity	Thailand	number	0	0	2	0	0	0	600	9,384	4,992	4,992	4,992	4,992
First Unit of Quantity	Turkey	number	0	3	0	60	0	0	0	168	0	0	0	0
First Unit of Quantity	United Kingdom	number	13	857	21	5,332	10,688	4,979	5,072	1,226	1,990	23,960	41	0
First Unit of Quantity	Vietnam	number	0	0	0	0	0	0	7,051	0	0	0	0	0
Total:			8,270,746	5,797,027	7,639,236	19,286,526	7,336,323	5,248,081	6,262,262	5,757,308	6,804,916	6,287,524	4,319,583	6,498,402

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Data Row Count 37

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
First Unit of Quantity	Australia	number	330	126	69	166	170	1	182	131	24	224	153	0
First Unit of Quantity	Belgium	number	0	0	0	0	79	0	10	0	0	0	0	0
First Unit of Quantity	Cambodia	number	0	0	0	0	0	0	0	308	1,736	200	3,731	0
First Unit of Quantity	Canada	number	6,707	4,499	46	224	15,342	165,166	29,890	3,311	3,973	7,659	10,013	40,699
First Unit of Quantity	China	number	541,533	659,970	967,645	822,822	1,358,386	1,127,380	4,430,252	595,341	1,084,473	454,122	937,756	787,788
First Unit of Quantity	Czech Republic	number	0	0	0	0	0	1,456	728	0	0	0	0	26
First Unit of Quantity	Denmark	number	0	960	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	France	number	0	0	0	7	0	0	6	4	0	53	0	414
First Unit of Quantity	Germany	number	1,631,660	2,124,587	555,527	428,678	592,160	482,131	1,116,743	1,149,609	792,022	1,037,651	1,555,170	1,125,059
First Unit of Quantity	Hong Kong	number	4,708	6,374	5	335	1,200	465	0	2,690	1,000	250	2,700	0
First Unit of Quantity	India	number	80	1,014	1,400	1,150	831	1,210	38,846	21,282	53,751	49,051	42,324	8,674
First Unit of Quantity	Ireland	number	0	0	0	0	0	0	0	0	0	0	0	5
First Unit of Quantity	Israel	number	0	0	0	0	0	0	0	29	52	177	16	0
First Unit of Quantity	Italy	number	54	53	0	322	1,000	38	904	0	0	5,138	169	1,046
First Unit of Quantity	Japan	number	35,901	62,243	53,384	34,330	14,440	276,079	296,720	1,122,745	1,052,344	814,012	825,100	354,231
First Unit of Quantity	Lithuania	number	0	0	6,272	6,272	6,272	12,544	6,272	6,272	12,544	6,272	0	0
First Unit of Quantity	Malaysia	number	3,838,402	2,576,721	3,539,151	3,490,395	2,220,072	3,489,323	2,812,020	3,574,218	2,533,105	2,754,371	2,973,824	2,835,435
First Unit of Quantity	Mexico	number	96,611	113,360	106,589	103,866	63,926	89,211	144,118	138,419	182,609	207,882	211,224	215,566
First Unit of Quantity	New Zealand	number	0	0	0	0	0	0	0	84	0	0	0	0
First Unit of Quantity	Norway	number	0	0	0	0	0	0	0	0	0	0	17,718	0
First Unit of Quantity	Philippines	number	339,836	35,352	88,989	20,557	493,753	6,253	8,243	80	359,819	1,634	77,863	531,458
First Unit of Quantity	Poland	number	0	0	0	0	0	0	0	0	3,687	0	0	24
First Unit of Quantity	Portugal	number	0	0	0	0	0	0	0	0	0	0	1,400	0
First Unit of Quantity	Qatar	number	0	0	0	6	0	0	0	0	0	0	0	0
First Unit of Quantity	Romania	number	170	0	0	0	0	0	0	0	0	0	0	151
First Unit of Quantity	Serbia	number	0	0	43	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Singapore	number	8,960	11,200	18,955	7,280	3,360	6,160	36,321	27,440	43,992	33,125	65,268	73,108
First Unit of Quantity	South Korea	number	14,544	107,165	78,482	197,237	47,076	153,397	73,642	50,481	66,572	95,295	106,074	313,906
First Unit of Quantity	Spain	number	265	0	0	79	0	126	13,519	0	0	0	0	0
First Unit of Quantity	Sweden	number	0	0	0	0	0	0	0	0	0	0	1,120	0
First Unit of Quantity	Switzerland	number	0	0	0	3	0	0	27	0	0	2,500	0	0
First Unit of Quantity	Taiwan	number	755,329	911,808	951,746	747,398	1,483,162	4,219,523	2,242,329	914,556	831,822	3,747,538	3,657,679	4,232,047
First Unit of Quantity	Thailand	number	4,992	0	4,992	0	3,840	6,144	2,208	3,840	1,608	15,972	4,992	8,998
First Unit of Quantity	Turkey	number	0	0	1	0	0	0	7,700	2,100	3,380	17,015	4,578	2,548
First Unit of Quantity	United Arab Em	number	0	0	0	17	0	0	0	0	0	0	0	0
First Unit of Quantity	United Kingdom	number	0	0	7,525	71	568	15,973	1,408	12,678	832	21,243	0	8,202
First Unit of Quantity	Vietnam	number	0	0	0	0	0	0	0	1,400	3,350	11,906	2,672	20,746
Total:			7,280,082	6,615,432	6,380,821	5,861,215	6,305,637	10,052,580	11,262,088	7,627,018	7,032,695	9,283,290	10,501,544	10,560,131

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Data Row Count 41

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
First Unit of Quantity	Australia	number	277	20	0	157	144	0	150	0	0	230	30	0
First Unit of Quantity	Belgium	number	4	117	0	0	0	395	450	0	0	0	0	0
First Unit of Quantity	Belize	number	0	2,959	3,016	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Canada	number	26,202	16,582	7,915	46,806	60,992	60,568	42,662	40,158	90,049	52,175	72,792	64,841
First Unit of Quantity	China	number	383,342	491,541	892,770	965,370	958,562	1,166,039	1,028,381	1,427,184	8,870,134	1,523,475	1,840,463	2,755,929
First Unit of Quantity	Cyprus	number	0	57,064	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Denmark	number	0	0	0	0	0	0	0	1	0	0	0	0
First Unit of Quantity	Dominican Rep	number	0	0	0	0	0	0	0	0	0	0	0	1
First Unit of Quantity	Estonia	number	0	0	5	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Finland	number	0	0	0	0	0	0	0	0	0	0	33,231	0
First Unit of Quantity	France	number	0	0	0	32	0	64	624	171	698	17,754	28	164
First Unit of Quantity	Germany	number	147,166	90,699	1,476,709	273,202	180,118	304,927	199,895	279,233	633,899	685,739	664,986	899,247
First Unit of Quantity	Hong Kong	number	140	0	0	5,514	0	1,338	420	5,200	400	2,500	2,900	11,300
First Unit of Quantity	Hungary	number	0	32,358	0	0	0	60,000	160,000	0	0	0	0	0
First Unit of Quantity	India	number	32,635	41,010	36,037	9,671	113,432	138,522	97,447	7,055	10,268	5,635	72,227	7,800
First Unit of Quantity	Indonesia	number	0	600	0	0	95	0	0	1,948	1,432	2,279	1,126	4,259
First Unit of Quantity	Ireland	number	0	0	0	0	0	0	0	1,000	0	0	0	0
First Unit of Quantity	Israel	number	31	0	14	8	0	43	0	0	0	33	0	0
First Unit of Quantity	Italy	number	78	51	27	1,769	1,916	449	505	1,616	45	710	207	142
First Unit of Quantity	Japan	number	1,026,487	1,443,101	422,478	1,398,385	555,836	1,343,235	599,511	444,379	684,049	579,051	264,767	987,836
First Unit of Quantity	Lithuania	number	0	6,272	6,272	6,272	0	0	0	0	0	0	0	0
First Unit of Quantity	Malaysia	number	2,036,669	2,304,542	2,260,568	2,115,331	1,447,519	3,299,978	1,582,254	2,180,966	4,554,331	1,420,347	2,699,887	2,047,187
First Unit of Quantity	Mexico	number	119,227	232,388	234,518	273,486	224,233	324,975	273,821	325,008	369,275	341,298	357,018	321,984
First Unit of Quantity	Netherlands	number	0	0	0	0	744	0	0	21	5	638	616	940
First Unit of Quantity	New Zealand	number	0	110	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Norway	number	17,235	3,452	4,581	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Pakistan	number	0	0	0	0	0	0	250	0	0	0	0	0
First Unit of Quantity	Philippines	number	21,293	208,236	101,490	1,208	2,349	6,841	47,118	12,471	106,553	130,209	276,310	172,085
First Unit of Quantity	Poland	number	0	0	0	32	0	0	0	0	0	22	0	0
First Unit of Quantity	Portugal	number	0	0	0	0	0	0	43,050	0	1,904	0	0	0
First Unit of Quantity	Singapore	number	96,124	63,963	180,406	202,997	138,468	158,357	199,824	238,488	261,329	231,784	241,718	258,303
First Unit of Quantity	Slovakia	number	0	0	0	0	0	0	12	0	0	0	0	0
First Unit of Quantity	South Korea	number	42,750	207,262	178,134	258,859	305,694	277,464	185,475	278,812	433,272	456,388	503,713	443,502
First Unit of Quantity	Spain	number	0	0	0	225	343	0	344	320	18	0	1,838	0
First Unit of Quantity	Switzerland	number	0	0	0	0	0	0	8,118	0	0	0	0	5,601
First Unit of Quantity	Taiwan	number	826,577	494,776	940,464	1,147,355	775,388	1,174,212	796,911	1,151,674	1,638,269	3,074,043	4,352,910	3,019,155
First Unit of Quantity	Thailand	number	14,128	1,236	7,256	16,940	18,120	27,902	13,546	22,336	8,708	46,864	86,849	97,221
First Unit of Quantity	Turkey	number	649	0	4,728	25,386	15,165	254,944	7,191	1,680	24,176	13,054	14,321	2,760
First Unit of Quantity	United Arab Em	number	0	0	10	25	210	39	15	36	58	115	0	48
First Unit of Quantity	United Kingdom	number	10,064	4,083	2,754	3,471	1	0	10,970	32	0	0	640	1,690
First Unit of Quantity	Vietnam	number	5,775	22,020	25,643	61,123	85,339	269,708	108,823	82,413	172,058	156,336	207,595	884,900
Total:			4,806,853	5,724,442	6,785,795	6,813,624	4,884,668	8,870,000	5,407,767	6,502,202	17,860,930	8,740,679	11,696,172	11,986,895

Imports For Consumption | Monthly data for 2016

Data Row Count 43

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
First Unit of Quantity	Australia	number	240	0	30	0	0	0	0	0	0	0	0	146
First Unit of Quantity	Austria	number	0	0	0	0	30	0	0	0	0	0	0	0
First Unit of Quantity	Bangladesh	number	0	0	400	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Belgium	number	0	0	0	0	0	0	0	10	16	0	0	0
First Unit of Quantity	Br Virgin Is	number	0	0	0	0	0	135	0	0	0	0	0	0
First Unit of Quantity	Canada	number	68,430	72,374	71,144	80,442	36,774	47,987	63,400	46,464	53,660	56,285	54,019	52,307
First Unit of Quantity	China	number	1,411,657	1,636,512	1,933,846	1,928,817	1,414,583	1,615,853	857,140	804,708	1,857,411	650,980	369,250	232,070
First Unit of Quantity	Colombia	number	0	0	0	1,000	0	0	0	0	0	0	0	0
First Unit of Quantity	Denmark	number	0	0	0	0	0	960	0	0	0	0	0	0
First Unit of Quantity	France	number	0	0	0	14,240	9,248	8,412	26,409	1,007	0	2,830	600	144
First Unit of Quantity	Germany	number	1,510,631	1,751,243	635,067	2,527,393	743,357	1,753,230	4,506,946	3,013,446	2,863,659	200,589	906,009	272,078
First Unit of Quantity	Honduras	number	0	0	0	0	0	0	0	0	300	0	0	0
First Unit of Quantity	Hong Kong	number	6,000	1,500	200	0	0	15,702	1,421	3,424	3,000	0	16,500	2,000
First Unit of Quantity	Hungary	number	0	0	0	0	0	0	37,589	0	58,000	0	0	0
First Unit of Quantity	India	number	12,244	4,301	3,139	3,489	57,693	8,227	5,342	10,247	20,006	2,935	4,459	3,535
First Unit of Quantity	Indonesia	number	1,240	1,360	2,339	390	1,116	2,136	1,088	1,786	1,945	1,205	28,315	1,300
First Unit of Quantity	Israel	number	13	22	0	0	0	0	0	0	0	0	20	0
First Unit of Quantity	Italy	number	52	2,312	21	398	685	6,459	11,210	2,710	6,824	6,048	2,778	189
First Unit of Quantity	Japan	number	108,572	221,607	329,033	152,069	163,724	220,190	169,837	338,344	349,736	324,402	155,202	78,718
First Unit of Quantity	Latvia	number	0	0	30	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Lithuania	number	14,000	24,600	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Malaysia	number	2,335,770	1,118,720	3,246,897	3,060,045	2,229,568	2,352,364	6,492,976	15,039,513	10,085,942	7,720,115	6,645,917	3,580,121
First Unit of Quantity	Mauritius	number	0	0	0	0	0	0	10,868	0	0	0	0	0
First Unit of Quantity	Mexico	number	442,320	274,183	207,302	266,626	284,103	251,109	232,565	271,915	304,459	289,127	209,764	180,124
First Unit of Quantity	Netherlands	number	2,420	1,879	0	2,520	1,680	2,520	0	0	0	0	0	0
First Unit of Quantity	Peru	number	0	0	0	0	0	0	0	0	0	3,400	0	0
First Unit of Quantity	Philippines	number	228,636	97,624	125,531	55,444	289,518	46,444	31,995	24,290	150	22,301	3,637	34,640
First Unit of Quantity	Poland	number	0	0	23,400	928	0	3,542	30	146	23,030	700	4,980	700
First Unit of Quantity	Portugal	number	0	0	0	0	0	0	0	0	0	6,450	4,800	11,400
First Unit of Quantity	Romania	number	0	0	0	0	0	0	0	0	0	0	0	102
First Unit of Quantity	Singapore	number	249,350	235,118	213,590	235,464	366,864	749,587	336,224	492,592	146,671	430,379	156,526	113,830
First Unit of Quantity	Slovakia	number	0	0	0	0	0	0	0	0	0	0	0	86
First Unit of Quantity	South Africa	number	7,700	26,950	35,200	8,250	22,000	13,750	0	0	0	26,950	0	6,700
First Unit of Quantity	South Korea	number	519,696	512,919	847,205	566,474	609,059	774,360	904,657	1,197,793	934,422	1,122,423	1,491,134	752,584
First Unit of Quantity	Spain	number	7,362	69,473	600	1,389	2,970	0	2,960	1,455	2	4	0	0
First Unit of Quantity	Sweden	number	0	0	0	0	0	0	0	4	0	0	0	0
First Unit of Quantity	Taiwan	number	3,400,925	4,415,257	3,940,059	3,720,018	2,653,790	3,924,122	5,170,966	3,073,351	1,245,020	486,304	294,579	222,098
First Unit of Quantity	Thailand	number	203,601	132,859	168,194	316,688	319,875	381,702	582,577	292,287	431,421	326,175	361,770	244,115
First Unit of Quantity	Togo	number	0	0	0	0	0	0	0	0	26	0	0	0
First Unit of Quantity	Turkey	number	552	100	6,624	8,180	0	1,543	0	192	0	5,303	8,440	0
First Unit of Quantity	United Arab Em	number	0	0	43	0	0	0	0	140	61	25	0	0
First Unit of Quantity	United Kingdom	number	0	11	44	24	19,634	0	41,027	50	9,648	0	0	16,161
First Unit of Quantity	Vietnam	number	375,181	136,330	255,075	689,672	1,264,977	1,504,325	1,558,908	1,350,156	774,565	539,823	557,302	249,178
Total:			10,906,592	10,737,254	12,045,013	13,639,960	10,491,248	13,684,659	21,046,135	25,966,030	19,169,974	12,224,753	11,276,001	6,054,326

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Data Row Count 38

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
First Unit of Quantity	Australia	number	0	0	0	162	0	0	0	40	130	0	0	100
First Unit of Quantity	Austria	number	42	14	0	300	0	0	0	2,000	0	0	0	0
First Unit of Quantity	Belgium	number	0	0	0	0	100	0	0	0	0	0	1	0
First Unit of Quantity	Brazil	number	22	0	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Bulgaria	number	0	0	0	0	0	0	0	0	0	0	3,333	0
First Unit of Quantity	Canada	number	33,509	34,739	35,421	58,709	41,223	59,156	57,705	50,899	72,677	109,502	212,436	201,405
First Unit of Quantity	China	number	155,702	181,092	81,699	71,949	59,748	151,737	142,416	310,354	635,976	2,400,056	1,949,130	512,053
First Unit of Quantity	Denmark	number	0	0	0	0	5,436	24	0	1	960	956	0	0
First Unit of Quantity	France	number	1,212	160	0	144	452	2,806	664	5,974	4,077	464	1,102	1,864
First Unit of Quantity	Germany	number	1,528,081	594,056	2,735,637	2,288,963	1,035,939	983,795	1,195,603	1,085,406	992,358	942,962	361,898	383,360
First Unit of Quantity	Hong Kong	number	17,000	10,200	300	32	758	0	0	6,890	0	0	0	0
First Unit of Quantity	Hungary	number	20	102,500	0	0	100,000	34,850	0	15,000	0	0	0	0
First Unit of Quantity	India	number	12,270	29,921	11,460	3,626	4,150	6,420	27,854	27,661	14,517	26,389	57,679	104,102
First Unit of Quantity	Indonesia	number	4,344	1,916	2,186	6,308	21,333	3,910	4,156	18,721	10,259	11,080	11,572	14,231
First Unit of Quantity	Ireland	number	0	0	0	0	110	16	0	0	0	101	0	0
First Unit of Quantity	Israel	number	12	0	200	0	0	0	0	0	0	0	11	0
First Unit of Quantity	Italy	number	130	232	73	2,741	143	169	57	466	147,369	9,593	5,109	6,970
First Unit of Quantity	Japan	number	205,306	134,599	139,887	174,959	59,262	157,155	188,076	158,581	472,850	1,591,373	9,277,530	7,292,695
First Unit of Quantity	Lithuania	number	0	0	0	3,027	0	6	0	0	0	15,300	148,500	45
First Unit of Quantity	Malaysia	number	1,124,234	1,130,041	1,691,304	1,032,541	1,656,323	1,030,113	1,237,337	2,096,230	1,747,247	1,864,933	2,557,558	6,484,692
First Unit of Quantity	Maldives	number	0	560	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Mexico	number	12,211	16,353	33,433	6,101	1,262	3,321	30,328	216,180	231,755	212,436	274,650	178,112
First Unit of Quantity	Netherlands	number	840	15,000	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Philippines	number	0	300	23,400	1,050	7,782	450	1,965	3,168	38,400	7,500	1,296,617	8,262,420
First Unit of Quantity	Poland	number	12	700	0	0	0	0	50	80	840	410,070	33,576	13,728
First Unit of Quantity	Portugal	number	0	3,273	0	0	2	0	0	0	0	0	0	0
First Unit of Quantity	Singapore	number	58,665	55,384	56,838	34,052	57,326	192,300	95,630	164,170	132,771	480,671	178,902	122,212
First Unit of Quantity	Slovakia	number	0	0	0	0	0	0	861	0	0	0	0	0
First Unit of Quantity	South Africa	number	0	0	0	0	0	0	20	0	2	0	0	0
First Unit of Quantity	South Korea	number	616,356	430,616	555,168	1,001,581	445,109	645,958	840,663	619,936	920,166	982,439	2,436,900	870,039
First Unit of Quantity	Spain	number	50	0	131	0	35	0	235	0	1	0	0	0
First Unit of Quantity	Switzerland	number	0	0	0	0	29	1	0	4,751	122	130	8,299	0
First Unit of Quantity	Taiwan	number	2,331,288	664,004	882,957	590,541	57,899	107,435	25,995	413,265	3,114,892	7,354,434	2,403,637	1,657,016
First Unit of Quantity	Thailand	number	105,821	174,103	514,589	209,086	287,841	257,264	410,482	409,617	394,233	565,673	355,640	396,839
First Unit of Quantity	Turkey	number	0	0	0	0	0	0	0	0	3,077	0	21,875	0
First Unit of Quantity	United Arab Em	number	0	24,640	45,268	1	23	0	0	0	0	0	0	0
First Unit of Quantity	United Kingdom	number	35	80,648	1	21,853	0	16,162	18,547	31	3,196	3,929	20,990	425
First Unit of Quantity	Vietnam	number	162,815	103,094	469,611	430,912	1,284,906	1,268,632	3,269,530	2,133,491	2,088,099	6,991,256	4,630,087	1,745,567
Total:			6,369,977	3,788,145	7,279,563	5,938,638	5,127,191	4,921,680	7,548,174	7,742,912	11,025,974	23,981,247	26,247,032	28,247,875

Imports For Consumption | Monthly data for 2018

Data Row Count 32

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
First Unit of Quantity	Australia	number	120	0	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Austria	number	7	0	0	4	20	0	0	0	0	0	0	0
First Unit of Quantity	Belgium	number	0	0	0	0	0	100	0	0	0	0	0	0
First Unit of Quantity	Brazil	number	12	0	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Canada	number	110,799	47,494	750	14,080	33,777	12,402	0	0	0	0	0	0
First Unit of Quantity	China	number	234,408	59,859	143,886	159,687	245,211	179,148	0	0	0	0	0	0
First Unit of Quantity	Denmark	number	1	0	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Dominican Rep	number	0	0	0	0	250	0	0	0	0	0	0	0
First Unit of Quantity	Egypt	number	0	0	0	0	1	0	0	0	0	0	0	0
First Unit of Quantity	France	number	2,288	76	750	2,054	14,241	11	0	0	0	0	0	0
First Unit of Quantity	Germany	number	31,430	101	2,180	115	293,614	0	0	0	0	0	0	0
First Unit of Quantity	Hong Kong	number	0	6	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Hungary	number	101	0	0	0	4	0	0	0	0	0	0	0
First Unit of Quantity	India	number	107,335	111,712	30,917	15,332	26,703	27,200	0	0	0	0	0	0
First Unit of Quantity	Indonesia	number	12,256	13,172	12,392	2,070	24,402	10,654	0	0	0	0	0	0
First Unit of Quantity	Ireland	number	1	0	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Italy	number	876	103	5,733	2,647	1,414	5,342	0	0	0	0	0	0
First Unit of Quantity	Japan	number	6,333,820	667,382	230,022	207,338	2,188,798	597,565	0	0	0	0	0	0
First Unit of Quantity	Lithuania	number	145,000	150,000	0	0	26,000	0	0	0	0	0	0	0
First Unit of Quantity	Malaysia	number	15,663,620	4,396,340	933,946	2,783,667	1,639,617	1,792,944	0	0	0	0	0	0
First Unit of Quantity	Mexico	number	269,076	124,285	32,992	130,351	96,502	69,607	0	0	0	0	0	0
First Unit of Quantity	Netherlands	number	2,953	0	0	0	0	0	0	0	0	0	0	0
First Unit of Quantity	Philippines	number	8,589,807	2,692,017	6,756	1,364,549	1,597,049	892,305	0	0	0	0	0	0
First Unit of Quantity	Poland	number	0	0	0	2,151	0	0	0	0	0	0	0	0
First Unit of Quantity	Singapore	number	95,231	163,266	155,258	62,220	24,268	112,170	0	0	0	0	0	0
First Unit of Quantity	South Korea	number	1,833,883	400,643	366,067	325,515	230,500	1,300,335	0	0	0	0	0	0
First Unit of Quantity	Spain	number	0	0	0	16	0	25	0	0	0	0	0	0
First Unit of Quantity	Taiwan	number	1,567,712	1,158,141	572,260	1,529,982	2,453,127	1,937,084	0	0	0	0	0	0
First Unit of Quantity	Thailand	number	929,705	1,748,068	141,048	85,025	167,375	191,074	0	0	0	0	0	0
First Unit of Quantity	Turkey	number	0	299,718	11,646	221,397	42,980	70,586	0	0	0	0	0	0
First Unit of Quantity	United Kingdom	number	12,851	30	0	0	3,158	380	0	0	0	0	0	0
First Unit of Quantity	Vietnam	number	5,561,524	2,623,399	780,335	1,009,824	3,724,320	1,748,052	0	0	0	0	0	0
Total:			41,504,816	14,655,812	3,426,938	7,918,024	12,833,331	8,946,984	0	0	0	0	0	0

Imports For Consumption | Monthly data for 2019

Data Row Count 0

	Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Total:		0		0	0	0	0	0	0	0	0	0	0	0	

Imports For Consumption | Monthly data for 2020

Data Row Count 0

	Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Total:		0		0	0	0	0	0	0	0	0	0	0	0	

Imports For Consumption | Monthly data for 2021

Data Row Count 0

	Data Type	Country	Quantity Description	JAN	FEB	MAR	APR
Total:		0		0	0	0	

Imports For Consumption | Monthly data for 2010

Data Row Count 42

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Landed Duty-Paid Value	Argentina	number	0	16,120	41,653	19,008	18,056	0	28,016	0	45,986	73,360	0	40,365
Landed Duty-Paid Value	Australia	number	14,449	43,003	2,097	95,839	13,843	19,697	11,443	10,598	7,752	2,781	0	0
Landed Duty-Paid Value	Austria	number	0	0	0	5,753	0	0	0	0	0	0	0	80,617
Landed Duty-Paid Value	Belgium	number	23,136	0	0	522,346	0	8,165	16,218	0	0	274,909	0	9,994
Landed Duty-Paid Value	Brazil	number	0	0	0	0	0	0	0	21,199	0	0	0	0
Landed Duty-Paid Value	Canada	number	68,169	45,302	127,294	153,834	279,270	111,619	30,225	45,102	34,338	148,586	212,940	81,657
Landed Duty-Paid Value	China	number	49,142,851	46,506,895	66,948,898	45,501,928	59,716,403	95,200,812	83,200,334	120,513,209	146,276,989	115,603,047	189,691,527	188,220,626
Landed Duty-Paid Value	Croatia	number	0	0	0	0	0	3,090	17,357	0	0	0	0	0
Landed Duty-Paid Value	Czech Republic	number	986,650	718,492	988,516	0	0	0	0	0	0	0	41,100	23,340
Landed Duty-Paid Value	Denmark	number	0	0	0	27,956	0	0	0	0	0	66,279	11,620	27,277
Landed Duty-Paid Value	France	number	25,879	2,478	0	0	0	0	0	70,125	0	0	2,147	0
Landed Duty-Paid Value	Gabon	number	0	0	0	0	0	0	0	0	0	0	0	23,273
Landed Duty-Paid Value	Germany	number	6,509,729	3,907,147	4,387,498	7,357,606	4,960,449	7,528,365	6,391,167	5,538,864	8,756,763	12,705,761	7,588,494	10,359,527
Landed Duty-Paid Value	Hong Kong	number	24,378	33,255	84,277	21,787	171,205	80,368	95,274	57,209	0	6,061	138,853	47,196
Landed Duty-Paid Value	Hungary	number	0	0	0	0	0	9,332	0	0	0	0	0	0
Landed Duty-Paid Value	India	number	500,026	117,331	167,134	357,091	365,780	548,521	619,845	2,313,675	6,257,576	3,417,162	7,603,880	8,606,047
Landed Duty-Paid Value	Indonesia	number	0	0	0	0	0	0	0	0	0	0	2,559	0
Landed Duty-Paid Value	Ireland	number	0	0	0	0	0	0	9,273	0	0	0	0	0
Landed Duty-Paid Value	Israel	number	2,612	0	0	0	5,274	235,380	0	8,037	0	0	0	0
Landed Duty-Paid Value	Italy	number	402,281	0	7,865	7,236	0	8,000	38,685	0	6,940	36,015	49,913	44,065
Landed Duty-Paid Value	Japan	number	15,751,462	17,558,832	21,729,804	19,926,736	21,147,004	21,989,101	22,854,941	23,520,394	26,461,938	27,944,638	43,262,884	46,650,203
Landed Duty-Paid Value	Luxembourg	number	0	0	0	0	0	0	0	0	0	0	0	4,399
Landed Duty-Paid Value	Malaysia	number	4,252,955	12,960,652	27,957,306	9,835,199	4,200,116	4,299,842	2,981,134	27,690,569	45,662,287	5,819,883	1,708,873	735,820
Landed Duty-Paid Value	Mexico	number	42,964,575	30,016,946	35,021,578	30,136,389	24,172,821	42,530,161	38,956,182	36,267,486	50,396,160	44,181,801	53,199,668	53,481,590
Landed Duty-Paid Value	Netherlands	number	0	3,727,380	0	3,855	0	0	0	0	0	0	22,047	19,874
Landed Duty-Paid Value	New Zealand	number	3,440	0	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Norway	number	20,083	29,976	41,702	103,876	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Philippines	number	2,316,261	611,014	54,261	3,433,078	2,123,898	107,091	2,837,762	5,271,642	4,850,768	3,747,030	2,859,434	41,351
Landed Duty-Paid Value	Poland	number	0	16,857	4,611	0	23,594	3,068	0	0	16,538	0	0	0
Landed Duty-Paid Value	Portugal	number	4,680	0	0	0	0	11,162	0	0	3,822	0	0	0
Landed Duty-Paid Value	Russia	number	0	3,229	6,176	0	0	0	0	0	0	0	0	2,464
Landed Duty-Paid Value	Singapore	number	17,282	5,675	0	852,611	5,221,679	2,652,255	4,175,596	8,244,467	10,075,031	15,237,185	7,425,023	15,346,112
Landed Duty-Paid Value	South Africa	number	0	0	0	0	0	0	0	0	0	0	22,230	0
Landed Duty-Paid Value	South Korea	number	0	377,057	603,282	916,336	798,569	1,486,311	1,119,924	1,754,887	3,639,081	5,177,391	5,039,703	1,569,895
Landed Duty-Paid Value	Spain	number	152,235	284,323	0	575,889	350,500	26,320	34,672	315,574	472,255	70,750	340,483	125,716
Landed Duty-Paid Value	Sweden	number	807,933	6,252,371	0	3,131,313	1,713,422	2,824,072	1,424,724	0	2,063	0	88,405	0
Landed Duty-Paid Value	Switzerland	number	11,373	0	25,048	26,281	141,351	0	335,218	578,636	17,456	7,409	0	16,051
Landed Duty-Paid Value	Taiwan	number	22,025,527	23,092,583	18,444,799	18,684,250	29,616,691	17,618,071	24,628,541	28,816,650	29,719,532	26,595,447	17,559,209	19,962,204
Landed Duty-Paid Value	Thailand	number	0	0	0	0	0	2,706	0	0	0	0	0	0
Landed Duty-Paid Value	Turkey	number	0	0	51,423	0	39,240	0	0	62,703	47,250	0	0	19,707
Landed Duty-Paid Value	United Kingdom	number	43,333	24,245	73,414	40,308	49,939	120,146	54,738	61,300	224,329	37,123	63,791	70,420
Landed Duty-Paid Value	Vietnam	number	0	0	0	0	0	0	0	520,806	0	0	145,489	0
Total:			146,071,299	146,351,163	176,768,636	141,736,505	155,129,104	197,423,655	189,861,269	261,683,132	332,974,854	261,152,618	337,080,272	345,609,790

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Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Landed Duty-Paid Value	Argentina	number	0	41,080	9,200	0	0	24,528	0	0	0	14,000	0	0
Landed Duty-Paid Value	Australia	number	6,964	73,940	17,093	0	4,302	63,576	30,820	11,020	34,551	3,820	31,133	3,659,456
Landed Duty-Paid Value	Austria	number	0	0	0	0	46,645	0	0	0	27,581	0	3,353	0
Landed Duty-Paid Value	Belgium	number	0	0	8,370	0	0	0	26,484	0	0	0	104,547	4,026,070
Landed Duty-Paid Value	Brazil	number	0	0	54,081	0	0	0	0	500,820	0	0	0	0
Landed Duty-Paid Value	Canada	number	84,201	189,988	337,699	459,709	111,792	152,194	132,209	82,088	112,798	158,390	98,296	7,118,728
Landed Duty-Paid Value	China	number	167,550,195	196,726,190	206,732,894	196,462,034	225,816,024	241,808,804	217,422,166	232,805,560	249,605,952	212,905,632	277,903,194	413,451,298
Landed Duty-Paid Value	Croatia	number	0	0	0	0	0	23,048	0	0	16,496	0	0	0
Landed Duty-Paid Value	Czech Republic	number	22,656	16,635	0	0	31,590	0	0	3,093	0	0	3,361	0
Landed Duty-Paid Value	Denmark	number	14,639	0	26,640	0	0	0	0	0	0	0	0	5,776
Landed Duty-Paid Value	France	number	0	22,654	0	376,568	19,644	0	22,011	2,057	4,629	2,433	12,799	0
Landed Duty-Paid Value	Germany	number	10,389,549	8,099,363	13,911,733	23,479,386	20,107,433	8,084,352	13,549,268	6,652,955	5,270,779	3,218,718	4,033,555	1,621,027
Landed Duty-Paid Value	Hong Kong	number	0	0	29,453	110,155	298,243	15,525	6,364	167,801	0	171,954	1,884,960	741,438
Landed Duty-Paid Value	Hungary	number	0	0	10,496	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	India	number	2,627,426	7,830,307	11,796,240	5,551,178	7,066,403	1,562,544	4,958,576	612,615	121,976	125,668	607,091	20,528
Landed Duty-Paid Value	Israel	number	0	0	9,863	9,945	12,534	4,738	0	16,519	5,134	0	3,110	8,250
Landed Duty-Paid Value	Italy	number	0	60,988	24,202	0	0	98,696	37,621	0	81,398	2,731	11,747	0
Landed Duty-Paid Value	Japan	number	45,190,294	46,178,944	44,124,497	41,222,926	41,304,186	42,503,837	28,095,016	15,004,141	10,236,681	48,230,656	20,761,940	21,751,815
Landed Duty-Paid Value	Malaysia	number	790,468	1,150,574	796,988	19,336,144	12,873,983	57,814,407	56,572,883	99,664,596	60,778,656	128,570,103	92,199,384	45,900,299
Landed Duty-Paid Value	Mexico	number	36,708,330	42,025,909	35,237,338	32,459,542	46,179,817	41,924,582	30,999,293	40,309,349	49,587,277	44,104,026	53,116,961	62,052,836
Landed Duty-Paid Value	Netherlands	number	3,780	22,051	10,592	0	232,050	0	520,192	0	53,109	892,528	705,469	0
Landed Duty-Paid Value	New Zealand	number	0	0	0	0	0	0	0	0	0	0	0	13,957
Landed Duty-Paid Value	Norway	number	0	0	0	0	0	0	0	18,390	19,041	0	0	0
Landed Duty-Paid Value	Philippines	number	1,514,772	5,831,336	19,480,283	7,415,367	28,179,194	33,005,806	27,232,558	22,804,139	20,305,402	27,935,041	31,420,738	18,861,583
Landed Duty-Paid Value	Poland	number	2,758	23,032	4,023	21,485	6,573	0	15,961	0	9,422	41,604	0	0
Landed Duty-Paid Value	Portugal	number	0	0	0	0	0	0	0	0	155,831	0	54,995	0
Landed Duty-Paid Value	Russia	number	0	4,942	0	5,473	3,074	0	0	0	0	0	0	0
Landed Duty-Paid Value	Singapore	number	9,009,526	7,407,336	0	2,776,775	7,145,566	3,721,908	1,576,920	9,916,224	3,530,507	6,739,214	7,422,886	5,505,334
Landed Duty-Paid Value	Slovakia	number	3,186	0	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	South Korea	number	6,089,025	7,134,662	7,422,104	9,090,085	1,554,655	4,531,287	863,357	3,301,528	758,478	1,785,880	6,799,774	5,277,455
Landed Duty-Paid Value	Spain	number	133,489	4,991	332,364	33,119	88,193	16,960	18,915	36,706	116,393	23,009	0	0
Landed Duty-Paid Value	Sweden	number	3,365	0	27,218	0	20,913	0	0	0	0	5,697	0	0
Landed Duty-Paid Value	Switzerland	number	6,855	0	0	0	0	23,780	0	0	25,717	1,605,664	0	0
Landed Duty-Paid Value	Taiwan	number	23,887,362	18,952,529	12,169,019	8,465,629	6,643,713	7,600,631	11,890,903	6,776,024	11,776,289	14,892,505	12,955,595	25,116,294
Landed Duty-Paid Value	Thailand	number	0	93,082	0	0	199,632	0	0	0	0	0	0	44,092
Landed Duty-Paid Value	Turkey	number	15,675	0	0	0	0	0	36,950	0	0	0	0	100,119
Landed Duty-Paid Value	United Kingdom	number	37,792	25,232	49,836	265,257	49,040	57,301	48,019	42,327	58,373	130,881	121,421	23,098
Landed Duty-Paid Value	Vietnam	number	157,636	153,081	149,285	151,464	147,285	0	142,764	138,435	0	0	126,090	123,271
Total:			304,249,943	342,068,846	352,771,511	347,692,241	398,142,484	443,038,504	394,199,250	438,866,387	412,692,470	491,560,154	510,382,399	615,422,724

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Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Landed Duty-Paid Value	Argentina	number	8,956	0	0	31,282	0	8,853	5,100	0	0	0	0	0
Landed Duty-Paid Value	Australia	number	1,425,224	0	0	47,802	18,393	29,321	23,480	0	48,630	9,370	40,884	28,021
Landed Duty-Paid Value	Austria	number	0	0	0	8,783	0	19,030	14,236	153,783	143,001	0	204,031	201,487
Landed Duty-Paid Value	Belgium	number	24,642	193,626	360,081	184,270	3,004	0	109,649	163,872	0	0	0	0
Landed Duty-Paid Value	Canada	number	8,473,341	4,790,614	22,402,195	10,014,442	129,614	11,560	33,347	48,160	932,949	637,969	41,156	164,410
Landed Duty-Paid Value	China	number	425,622,383	403,107,292	210,454,738	62,325,589	123,071,519	100,035,420	69,959,787	65,007,292	112,776,280	73,768,165	50,472,707	20,674,342
Landed Duty-Paid Value	Czech Republic	number	8,495	3,077,640	941,719	4,950,187	1,058,072	0	0	20,655	0	0	0	177,350
Landed Duty-Paid Value	Finland	number	0	0	0	0	0	0	0	0	0	9,541	0	0
Landed Duty-Paid Value	France	number	2,112	0	69,803	0	0	0	15,700	0	0	0	0	0
Landed Duty-Paid Value	Germany	number	17,496,232	37,449,121	7,630,139	6,172,378	3,682,484	7,677,551	3,083,612	10,107,568	36,525,279	20,230,045	33,680,813	17,310,417
Landed Duty-Paid Value	Hong Kong	number	1,880,759	2,855	128,791	91,010	156,828	344,831	99,554	16,358	6,982	119,588	17,961	76,950
Landed Duty-Paid Value	Hungary	number	0	0	0	0	0	0	0	2,403	0	0	0	0
Landed Duty-Paid Value	India	number	156,862	6,841,157	20,834	19,087	21,627	0	883,409	1,418,051	1,785,799	215,954	84,060	160,848
Landed Duty-Paid Value	Israel	number	2,662	4,780	0	8,550	9,250	15,380	39,900	10,528	9,140	0	0	0
Landed Duty-Paid Value	Italy	number	0	12,312	2,620	27,729	5,553	4,598	3,163	11,819	16,621	7,769	18,211	0
Landed Duty-Paid Value	Jamaica	number	0	0	0	0	0	0	0	0	0	3,676	0	0
Landed Duty-Paid Value	Japan	number	41,329,436	20,200,993	7,997,899	8,342,728	5,611,914	18,492,575	24,710,787	19,943,044	5,461,998	7,753,057	6,749,685	6,105,923
Landed Duty-Paid Value	Lithuania	number	0	0	0	0	0	0	0	33,101	13,208	13,208	26,416	26,416
Landed Duty-Paid Value	Macau	number	0	6,093	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Malaysia	number	107,581,929	122,411,791	127,401,954	85,413,701	135,377,695	113,245,018	165,482,884	147,629,304	154,969,027	154,125,474	124,803,990	73,601,997
Landed Duty-Paid Value	Mexico	number	40,568,986	65,503,463	51,201,224	22,469,529	48,462,513	48,223,765	42,634,681	48,148,619	47,483,153	29,039,691	24,075,874	14,628,535
Landed Duty-Paid Value	Netherlands	number	9,740	0	0	0	148,536	109,066	4,594	3,646	0	8,608	0	9,901
Landed Duty-Paid Value	New Zealand	number	0	2,385	3,413	0	30,068	8,510	8,504	0	0	0	0	0
Landed Duty-Paid Value	Norway	number	0	0	0	0	0	0	0	0	0	0	4,657	0
Landed Duty-Paid Value	Philippines	number	18,641,832	38,749,787	67,650,151	42,339,708	41,458,406	39,235,519	45,814,718	25,099,000	25,054,503	31,080,945	11,636,254	7,660,564
Landed Duty-Paid Value	Poland	number	0	22,973	8,124	0	9,071	0	0	0	0	0	0	0
Landed Duty-Paid Value	Portugal	number	3,380	0	0	0	61,845	0	0	0	0	0	0	0
Landed Duty-Paid Value	Saudi Arabia	number	0	0	0	0	0	5,615	0	0	0	0	0	0
Landed Duty-Paid Value	Singapore	number	6,445,460	4,757,007	4,608,062	4,384,321	6,484,208	4,446,283	8,339,144	6,122,651	5,690,678	9,186,998	3,655,830	6,014,143
Landed Duty-Paid Value	Slovakia	number	0	0	0	0	0	0	2,538	0	0	0	0	0
Landed Duty-Paid Value	South Korea	number	18,862,412	15,467,762	12,481,520	11,069,452	13,715,338	12,874,568	12,693,670	23,940,398	7,127,876	8,260,228	2,950,800	2,104,929
Landed Duty-Paid Value	Spain	number	39,958	974,644	5,214,048	5,593,157	2,381,360	619,971	121,163	238,038	239,400	47,939	6,293	3,993,606
Landed Duty-Paid Value	Sweden	number	0	14,407	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Switzerland	number	90,075	0	0	0	5,871	0	0	0	3,209	4,627	0	0
Landed Duty-Paid Value	Taiwan	number	19,524,024	38,600,839	46,848,479	43,793,119	47,239,183	32,375,039	20,836,670	50,967,968	27,936,168	33,950,521	45,599,877	16,403,555
Landed Duty-Paid Value	Thailand	number	0	0	4,971	0	0	0	0	0	7,476	0	0	0
Landed Duty-Paid Value	Turkey	number	0	0	0	8,339	0	0	0	0	0	0	86,984	0
Landed Duty-Paid Value	United Arab Em	number	11,878	0	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	United Kingdom	number	40,761	81,244	66,478	49,233	72,263	47,815	44,838	28,863	34,434	12,573	0	16,907
Landed Duty-Paid Value	Vietnam	number	116,473	0	210,452	99,025	0	91,141	0	96,876	145,948	179,726	0	0
Total:			708,368,012	762,272,785	565,707,695	307,443,421	429,214,615	377,921,429	394,965,128	399,211,997	426,411,759	368,665,672	304,156,483	169,360,301

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Data Type	**Country**	**Quantity Description**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
Landed Duty-Paid Value	Argentina	number	0	0	0	8,500	18,000	0	0	0	0	0	0	0
Landed Duty-Paid Value	Australia	number	55,089	0	0	22,319	0	40,223	50,963	0	18,475	169,643	34,434	34,547
Landed Duty-Paid Value	Austria	number	376,607	8,848	5,096	0	2,301	0	0	9,301	0	0	0	0
Landed Duty-Paid Value	Belgium	number	0	0	0	0	9,388	0	33,118	0	0	0	0	41,492
Landed Duty-Paid Value	Canada	number	3,037,375	75,032	144,883	74,004	123,133	119,871	444,319	146,541	818,204	231,538	103,714	137,225
Landed Duty-Paid Value	Chile	number	0	0	0	0	0	0	0	0	0	4,850	0	0
Landed Duty-Paid Value	China	number	35,477,765	46,304,004	52,777,557	61,606,768	82,290,203	112,004,788	127,724,540	147,776,446	139,939,201	118,110,205	122,934,497	124,725,973
Landed Duty-Paid Value	Costa Rica	number	0	0	0	0	0	0	0	0	0	122,521	0	0
Landed Duty-Paid Value	Czech Republic	number	0	0	582,632	1,210,573	486,474	621,120	0	0	0	0	0	0
Landed Duty-Paid Value	Denmark	number	0	0	0	0	62,504	50,003	6,251	12,500	2,217	0	0	0
Landed Duty-Paid Value	Finland	number	0	0	8,267	0	0	2,297	0	0	0	0	0	0
Landed Duty-Paid Value	France	number	0	0	0	6,296	0	0	156,038	0	14,178	0	31,671	41,064
Landed Duty-Paid Value	Germany	number	11,761,047	1,043,086	1,727,125	1,286,765	2,577,344	3,001,490	4,077,356	2,099,508	3,290,112	3,817,074	160,779	3,999,988
Landed Duty-Paid Value	Greece	number	0	0	0	0	0	0	0	0	52,047	0	0	0
Landed Duty-Paid Value	Hong Kong	number	30,255	153,150	0	86,811	3,906	70,223	128,740	0	78,976	8,914	2,941,154	3,784,549
Landed Duty-Paid Value	India	number	69,826	89,434	9,729	0	165,128	65,186	99,244	26,424	177,476	24,816	104,637	0
Landed Duty-Paid Value	Israel	number	0	6,361	0	0	0	0	0	0	7,026	3,409	4,006	0
Landed Duty-Paid Value	Italy	number	18,523	0	3,325	8,884	20,394	32,060	31,773	9,105	36,681	15,261	47,593	7,367
Landed Duty-Paid Value	Japan	number	2,971,317	2,308,598	2,469,798	1,457,301	1,822,421	2,732,598	796,260	1,197,659	1,932,957	2,606,631	634,093	1,638,936
Landed Duty-Paid Value	Jordan	number	0	0	0	0	6,820	0	0	0	0	0	0	0
Landed Duty-Paid Value	Lithuania	number	38,685	25,790	0	12,895	25,790	25,790	25,790	25,790	0	25,790	12,895	19,392
Landed Duty-Paid Value	Malaysia	number	107,132,008	74,967,182	152,310,485	152,310,125	113,694,776	92,447,932	125,558,096	108,070,917	92,606,536	95,563,339	41,967,750	95,103,000
Landed Duty-Paid Value	Mexico	number	26,079,011	26,969,756	35,124,737	33,077,824	35,087,980	43,209,713	47,047,560	37,678,475	38,084,870	41,169,579	44,129,275	31,781,599
Landed Duty-Paid Value	Netherlands	number	0	7,596	0	0	14,500	0	0	0	0	0	0	0
Landed Duty-Paid Value	Norway	number	0	0	0	0	0	0	38,743	0	0	0	0	0
Landed Duty-Paid Value	Philippines	number	1,906,968	8,236,897	4,750,221	6,632,157	6,559,875	10,367,284	14,145,272	7,534,557	5,092,415	15,694,553	5,825,733	11,572,822
Landed Duty-Paid Value	Poland	number	0	0	10,397	0	0	6,525	0	0	0	0	0	0
Landed Duty-Paid Value	Singapore	number	168,967	2,025,362	11,638,262	5,896,852	1,386,776	2,547,712	6,907,297	4,308,254	6,679,267	1,954,344	3,420,064	2,049,432
Landed Duty-Paid Value	South Korea	number	8,328,623	5,049,686	2,381,830	1,743,876	1,562,310	1,552,278	1,820,926	2,427,135	3,701,874	2,028,983	3,546,470	2,343,021
Landed Duty-Paid Value	Spain	number	4,980,863	4,820,473	6,614,156	3,433,900	0	356,864	0	0	0	15,195	0	4,271
Landed Duty-Paid Value	Sweden	number	0	0	0	109,535	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Switzerland	number	0	0	0	0	0	6,536	0	0	4,777	0	0	0
Landed Duty-Paid Value	Taiwan	number	15,085,294	24,822,879	42,546,556	32,912,473	41,290,694	57,575,569	31,779,875	54,448,570	71,235,340	75,522,907	72,913,557	53,012,467
Landed Duty-Paid Value	Thailand	number	0	0	7,463	0	0	0	7,957	112,883	60,637	60,529	60,529	64,045
Landed Duty-Paid Value	Turkey	number	0	2,572	0	17,160	0	0	0	88,487	0	0	0	0
Landed Duty-Paid Value	United Kingdom	number	2,707	33,402	16,204	22,464	12,685	46,076	71,840	24,150	35,644	95,016	9,101	0
Landed Duty-Paid Value	Vietnam	number	0	0	0	0	0	0	157,663	0	0	0	0	0
Total:			217,520,930	196,950,108	313,128,723	301,937,482	287,223,402	326,882,138	361,109,621	365,996,702	363,868,910	357,245,097	298,881,952	330,361,190

Imports For Consumption | Monthly data for 2014

Data Row Count 37

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Landed Duty-Paid Value	Australia	number	111,857	53,672	56,818	76,217	97,539	5,545	63,503	40,665	29,148	31,708	46,547	0
Landed Duty-Paid Value	Belgium	number	0	0	0	0	42,593	0	5,362	0	0	0	0	0
Landed Duty-Paid Value	Cambodia	number	0	0	0	0	0	0	0	46,091	142,868	13,817	455,390	0
Landed Duty-Paid Value	Canada	number	227,266	147,092	29,069	66,712	2,802,631	2,159,135	6,186,841	358,664	597,724	1,735,315	2,113,239	2,460,931
Landed Duty-Paid Value	China	number	79,692,724	109,094,937	174,681,880	148,398,861	241,759,521	190,699,353	165,571,641	85,952,365	165,747,073	65,430,146	98,866,717	108,127,930
Landed Duty-Paid Value	Czech Republic	number	0	0	0	0	0	268,484	134,542	0	0	0	0	5,340
Landed Duty-Paid Value	Denmark	number	0	23,594	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	France	number	0	0	0	2,280	0	0	4,625	2,712	0	12,200	0	138,343
Landed Duty-Paid Value	Germany	number	3,969,610	5,350,376	1,687,138	4,058,318	1,575,813	8,954,880	6,558,720	16,355,179	17,008,238	22,311,740	21,853,269	13,763,391
Landed Duty-Paid Value	Hong Kong	number	832,191	1,096,291	9,025	26,450	58,589	72,876	0	204,299	48,411	10,696	5,880	0
Landed Duty-Paid Value	India	number	19,326	164,464	212,632	171,248	135,059	218,130	6,347,565	3,806,335	4,257,310	9,508,031	8,567,503	1,671,016
Landed Duty-Paid Value	Ireland	number	0	0	0	0	0	0	0	0	0	0	0	10,327
Landed Duty-Paid Value	Israel	number	0	0	0	0	0	0	0	8,366	2,470	18,667	5,089	0
Landed Duty-Paid Value	Italy	number	22,855	20,886	0	74,524	71,508	8,254	66,029	0	0	281,687	35,179	149,706
Landed Duty-Paid Value	Japan	number	970,635	1,157,045	694,945	394,911	879,704	4,032,385	3,584,318	8,801,834	4,810,370	7,906,525	8,690,654	10,413,834
Landed Duty-Paid Value	Lithuania	number	0	0	12,895	12,707	12,707	25,414	12,707	12,707	25,414	12,707	0	0
Landed Duty-Paid Value	Malaysia	number	91,588,402	84,234,478	108,684,566	82,454,587	78,407,309	75,656,617	95,494,687	85,077,365	54,392,497	23,847,427	55,865,911	60,946,378
Landed Duty-Paid Value	Mexico	number	35,660,250	39,436,675	39,532,744	38,515,188	23,076,880	32,092,038	42,926,079	42,326,013	55,837,168	53,909,751	50,303,352	52,595,603
Landed Duty-Paid Value	New Zealand	number	0	0	0	0	0	0	0	4,524	0	0	0	0
Landed Duty-Paid Value	Norway	number	0	0	0	0	0	0	0	0	0	0	70,515	0
Landed Duty-Paid Value	Philippines	number	17,244,377	11,733,804	10,907,924	6,891,929	8,330,762	1,092,526	1,442,074	36,187	2,400,949	487,160	1,032,130	6,169,830
Landed Duty-Paid Value	Poland	number	0	0	0	0	0	0	0	0	15,050	0	0	7,266
Landed Duty-Paid Value	Portugal	number	0	0	0	0	0	0	0	0	0	0	232,250	0
Landed Duty-Paid Value	Qatar	number	0	0	0	3,044	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Romania	number	4,445	0	0	0	0	0	0	0	0	0	0	3,970
Landed Duty-Paid Value	Serbia	number	0	0	9,600	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Singapore	number	1,465,861	1,841,139	3,276,525	1,214,378	562,808	1,054,659	6,426,838	5,019,526	7,901,017	4,842,628	11,844,773	12,141,866
Landed Duty-Paid Value	South Korea	number	2,478,370	2,689,740	4,685,523	3,116,733	8,934,308	13,288,869	12,607,269	9,001,012	8,805,319	18,296,935	16,843,638	10,068,989
Landed Duty-Paid Value	Spain	number	8,381	0	0	2,735	0	26,648	57,075	0	0	0	0	0
Landed Duty-Paid Value	Sweden	number	0	0	0	0	0	0	0	0	0	0	195,807	0
Landed Duty-Paid Value	Switzerland	number	0	0	0	4,543	0	0	6,110	0	0	4,950	0	0
Landed Duty-Paid Value	Taiwan	number	49,859,377	56,726,672	102,749,644	88,558,086	170,028,137	39,857,920	107,998,184	6,625,967	27,893,869	51,082,464	35,198,549	25,276,591
Landed Duty-Paid Value	Thailand	number	60,637	0	60,637	0	46,644	74,630	31,360	46,644	19,532	198,591	61,027	150,866
Landed Duty-Paid Value	Turkey	number	0	0	6,075	0	0	0	1,372,802	380,058	684,503	3,342,060	804,749	521,104
Landed Duty-Paid Value	United Arab Em	number	0	0	0	4,820	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	United Kingdom	number	0	0	30,250	14,985	8,007	650,645	44,078	54,753	26,372	138,232	0	34,358
Landed Duty-Paid Value	Vietnam	number	0	0	0	0	0	0	0	246,500	584,250	2,056,633	452,500	4,068,091
Total:			284,216,564	313,770,865	447,327,890	374,063,256	536,830,519	370,239,008	456,942,409	264,407,766	351,229,552	265,480,070	313,544,668	308,725,730

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Data Row Count 41

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Landed Duty-Paid Value	Australia	number	73,752	25,465	0	57,520	39,984	0	118,849	0	0	79,429	11,578	0
Landed Duty-Paid Value	Belgium	number	2,233	40,706	0	0	0	8,323	6,124	0	0	0	0	0
Landed Duty-Paid Value	Belize	number	0	12,686	12,505	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Canada	number	2,341,755	3,601,912	1,602,341	7,326,179	7,819,152	10,460,841	5,244,863	5,868,005	6,540,463	9,466,942	7,489,170	9,389,103
Landed Duty-Paid Value	China	number	49,817,386	74,766,606	131,278,968	138,088,062	112,883,555	173,120,060	141,246,118	182,692,257	158,850,939	183,400,710	194,469,423	192,797,363
Landed Duty-Paid Value	Cyprus	number	0	238,984	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Denmark	number	0	0	0	0	0	0	0	2,558	0	0	0	0
Landed Duty-Paid Value	Dominican Rep	number	0	0	0	0	0	0	0	0	0	0	0	9,516
Landed Duty-Paid Value	Estonia	number	0	0	6,500	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Finland	number	0	0	0	0	0	0	0	0	0	0	131,675	0
Landed Duty-Paid Value	France	number	0	0	0	10,141	0	23,456	244,892	60,641	250,778	222,245	20,190	22,505
Landed Duty-Paid Value	Germany	number	13,984,217	14,413,781	42,550,217	30,390,320	28,845,669	46,382,839	26,384,715	21,476,988	33,147,743	50,879,743	46,383,797	54,431,619
Landed Duty-Paid Value	Hong Kong	number	5,344	0	0	36,058	0	48,393	5,663	21,575	5,604	13,571	28,081	20,861
Landed Duty-Paid Value	Hungary	number	0	5,966	0	0	0	10,862	28,880	0	0	0	0	0
Landed Duty-Paid Value	India	number	2,737,073	1,614,969	1,120,461	1,952,467	1,243,696	750,788	1,408,568	360,241	461,030	521,290	863,872	314,855
Landed Duty-Paid Value	Indonesia	number	0	53,340	0	0	6,185	0	0	126,093	99,557	185,906	84,003	290,744
Landed Duty-Paid Value	Ireland	number	0	0	0	0	0	0	0	20,517	0	0	0	0
Landed Duty-Paid Value	Israel	number	10,021	0	4,656	6,568	0	13,138	0	0	0	14,565	0	0
Landed Duty-Paid Value	Italy	number	23,625	8,463	5,827	330,830	124,025	77,258	99,042	101,120	17,619	137,500	40,357	16,206
Landed Duty-Paid Value	Japan	number	3,772,269	3,813,032	2,899,016	12,139,270	4,167,530	13,869,672	12,698,801	4,310,855	11,757,311	32,214,896	4,802,875	9,038,667
Landed Duty-Paid Value	Lithuania	number	0	12,707	12,707	12,707	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Malaysia	number	27,323,575	26,882,554	48,127,053	140,284,554	98,849,442	114,126,400	105,797,527	159,083,458	148,681,005	121,753,131	143,577,043	181,160,860
Landed Duty-Paid Value	Mexico	number	40,639,507	56,500,906	65,445,048	74,840,044	66,615,058	80,936,756	74,600,643	87,448,499	92,175,186	92,528,629	97,337,260	82,916,456
Landed Duty-Paid Value	Netherlands	number	0	0	0	0	10,172	0	0	3,472	6,845	111,609	221,298	159,047
Landed Duty-Paid Value	New Zealand	number	0	9,488	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Norway	number	68,603	3,797	5,039	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Pakistan	number	0	0	0	0	0	0	55,396	0	0	0	0	0
Landed Duty-Paid Value	Philippines	number	1,920,489	4,339,162	4,184,937	5,792	630,047	2,043,090	14,170,773	3,706,697	11,100,738	10,294,340	12,670,666	20,351,158
Landed Duty-Paid Value	Poland	number	0	0	0	6,801	0	0	0	0	0	5,518	0	0
Landed Duty-Paid Value	Portugal	number	0	0	0	0	0	0	73,587	0	377,185	0	0	0
Landed Duty-Paid Value	Singapore	number	14,323,097	12,168,346	34,189,019	37,533,152	24,201,589	30,586,619	39,255,240	43,870,782	51,469,651	44,610,320	45,310,725	49,013,434
Landed Duty-Paid Value	Slovakia	number	0	0	0	0	0	0	4,907	0	0	0	0	0
Landed Duty-Paid Value	South Korea	number	8,116,923	15,544,477	33,165,340	20,465,573	25,695,926	25,455,886	30,812,922	51,924,320	40,158,213	54,421,441	52,813,763	45,697,012
Landed Duty-Paid Value	Spain	number	0	0	0	45,424	12,317	0	72,078	3,519	3,508	0	407,479	0
Landed Duty-Paid Value	Switzerland	number	0	0	0	0	0	0	32,224	0	0	0	0	19,135
Landed Duty-Paid Value	Taiwan	number	10,755,623	24,152,750	20,873,952	22,774,464	18,495,122	37,119,678	29,096,080	27,803,997	41,954,111	37,354,874	39,787,823	32,318,514
Landed Duty-Paid Value	Thailand	number	384,218	15,013	311,858	843,091	1,585,069	1,587,483	626,477	679,132	516,882	5,114,199	11,714,773	17,480,036
Landed Duty-Paid Value	Turkey	number	109,995	0	955,126	5,012,815	3,129,504	2,647,789	1,461,468	263,010	4,889,682	2,573,971	2,848,002	516,248
Landed Duty-Paid Value	United Arab Em	number	0	0	3,250	8,274	69,542	13,772	5,587	8,303	13,629	35,508	0	14,564
Landed Duty-Paid Value	United Kingdom	number	78,832	31,440	17,793	24,768	2,967	0	43,445	48,012	0	0	127,345	315,172
Landed Duty-Paid Value	Vietnam	number	1,020,055	3,952,864	4,661,923	9,058,655	13,039,301	13,593,786	16,917,993	10,361,506	18,684,897	24,322,589	29,695,555	30,980,217
Total:			177,508,592	242,209,414	391,433,536	501,253,529	407,465,852	552,876,889	500,512,862	600,245,557	621,162,576	670,262,926	690,836,753	727,273,292

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Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Landed Duty-Paid Value	Australia	number	85,004	0	10,066	0	0	0	0	0	0	0	0	55,214
Landed Duty-Paid Value	Austria	number	0	0	0	0	44,032	0	0	0	0	0	0	0
Landed Duty-Paid Value	Bangladesh	number	0	0	39,360	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Belgium	number	0	0	0	0	0	0	0	5,481	11,156	0	0	0
Landed Duty-Paid Value	Br Virgin Is	number	0	0	0	0	0	31,575	0	0	0	0	0	0
Landed Duty-Paid Value	Canada	number	11,503,826	9,353,158	8,314,964	10,551,577	4,528,779	5,848,067	8,384,219	5,757,272	7,621,152	8,132,554	5,044,893	3,695,954
Landed Duty-Paid Value	China	number	173,514,584	210,495,292	216,773,926	174,330,621	180,334,617	174,634,939	107,670,171	105,912,305	79,274,844	48,951,540	32,007,989	27,722,656
Landed Duty-Paid Value	Colombia	number	0	0	0	3,310	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Denmark	number	0	0	0	0	0	20,613	0	0	0	0	0	0
Landed Duty-Paid Value	France	number	0	0	0	5,240,245	3,414,534	3,182,434	3,284,830	382,251	0	11,658	49,052	13,357
Landed Duty-Paid Value	Germany	number	22,949,248	12,602,996	9,330,406	14,567,670	13,797,497	15,546,655	19,931,806	20,721,119	19,420,252	10,775,387	3,553,634	630,041
Landed Duty-Paid Value	Honduras	number	0	0	0	0	0	0	0	0	21,039	0	0	0
Landed Duty-Paid Value	Hong Kong	number	19,137	2,625	8,089	0	0	1,755,114	12,007	46,034	20,121	0	37,984	29,117
Landed Duty-Paid Value	Hungary	number	0	0	0	0	0	0	6,953	0	20,359	0	0	0
Landed Duty-Paid Value	India	number	1,061,133	413,905	198,421	498,866	444,712	471,238	370,778	1,103,826	1,283,886	317,463	136,564	440,683
Landed Duty-Paid Value	Indonesia	number	45,611	137,012	329,097	40,521	138,555	129,969	77,603	76,244	333,340	134,471	242,770	124,328
Landed Duty-Paid Value	Israel	number	4,794	6,768	0	0	0	0	0	0	0	0	5,671	0
Landed Duty-Paid Value	Italy	number	12,557	95,481	10,445	65,477	144,568	469,574	392,370	116,628	210,952	65,258	127,268	85,981
Landed Duty-Paid Value	Japan	number	2,698,591	9,246,620	12,216,608	1,440,742	9,429,193	8,684,352	3,744,039	16,556,680	19,582,036	17,637,404	5,126,704	7,368,889
Landed Duty-Paid Value	Latvia	number	0	0	4,825	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Lithuania	number	26,734	42,147	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Malaysia	number	204,653,973	136,202,160	201,258,186	252,995,352	275,980,554	280,206,599	226,346,240	254,546,483	217,995,670	220,465,640	158,172,299	101,707,619
Landed Duty-Paid Value	Mauritius	number	0	0	0	0	0	0	2,086,656	0	0	0	0	0
Landed Duty-Paid Value	Mexico	number	101,980,769	78,734,698	68,645,948	80,375,287	80,989,396	76,765,107	71,016,169	84,146,435	74,348,513	43,129,764	49,751,724	44,754,498
Landed Duty-Paid Value	Netherlands	number	492,440	362,040	0	443,453	284,207	451,000	0	0	0	0	0	0
Landed Duty-Paid Value	Peru	number	0	0	0	0	0	0	0	0	0	35,784	0	0
Landed Duty-Paid Value	Philippines	number	20,690,333	10,782,749	33,451,774	15,203,376	22,117,086	11,399,239	10,048,662	558,877	12,601	997,185	19,034	25,893
Landed Duty-Paid Value	Poland	number	0	0	4,095,617	241,380	0	708,616	5,997	22,957	4,367,554	70,109	726,071	70,109
Landed Duty-Paid Value	Portugal	number	0	0	0	0	0	0	0	0	0	1,132,880	846,720	2,017,680
Landed Duty-Paid Value	Romania	number	0	0	0	0	0	0	0	0	0	0	0	13,955
Landed Duty-Paid Value	Singapore	number	46,698,322	32,341,051	33,213,402	23,058,114	37,334,150	44,561,513	43,065,985	26,822,549	21,632,028	19,830,003	19,850,459	11,772,049
Landed Duty-Paid Value	Slovakia	number	0	0	0	0	0	0	0	0	0	0	0	5,747
Landed Duty-Paid Value	South Africa	number	1,390,656	4,842,276	6,126,328	1,447,271	3,835,538	2,378,711	0	0	0	4,040,355	0	1,014,378
Landed Duty-Paid Value	South Korea	number	62,040,705	76,298,737	111,202,794	105,111,507	114,333,898	147,984,860	132,151,224	138,843,683	134,710,363	121,115,033	101,686,312	85,829,610
Landed Duty-Paid Value	Spain	number	37,536	354,687	7,135	844,721	586,152	0	574,830	268,399	6,715	2,498	0	0
Landed Duty-Paid Value	Sweden	number	0	0	0	0	0	0	0	3,185	0	0	0	0
Landed Duty-Paid Value	Taiwan	number	30,396,747	31,986,228	36,520,736	23,473,751	29,796,670	24,382,932	24,391,531	20,280,776	12,571,563	2,903,309	4,437,511	4,639,387
Landed Duty-Paid Value	Thailand	number	15,107,732	24,943,274	28,540,482	54,401,212	44,471,435	59,865,002	54,971,259	46,844,570	66,781,906	51,940,229	50,508,417	33,574,981
Landed Duty-Paid Value	Togo	number	0	0	0	0	0	0	0	0	4,506	0	0	0
Landed Duty-Paid Value	Turkey	number	53,560	43,934	1,238,996	1,550,801	0	342,974	0	48,416	0	21,075	1,322,460	0
Landed Duty-Paid Value	United Arab Em	number	0	0	6,626	0	0	0	0	8,226	17,107	6,732	0	0
Landed Duty-Paid Value	United Kingdom	number	0	11,075	6,204	11,727	81,573	0	163,825	4,228	44,077	0	0	64,125
Landed Duty-Paid Value	Vietnam	number	20,260,915	22,804,212	32,101,217	38,091,509	54,273,159	60,886,709	63,799,418	83,475,881	48,590,458	43,460,685	39,274,358	22,784,046
Total:			715,724,907	662,103,125	803,651,652	803,988,490	876,360,305	920,707,792	772,496,572	806,552,505	708,882,198	595,177,016	472,927,894	348,440,297

Imports For Consumption | Monthly data for 2017

Data Row Count 38

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Landed Duty-Paid Value	Australia	number	0	0	0	52,143	0	0	0	3,490	42,613	0	0	34,544
Landed Duty-Paid Value	Austria	number	2,543	19,081	0	3,572	0	0	0	7,009	0	0	0	0
Landed Duty-Paid Value	Belgium	number	0	0	0	0	10,321	0	0	0	0	0	3,059	0
Landed Duty-Paid Value	Brazil	number	11,537	0	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Bulgaria	number	0	0	0	0	0	0	0	0	0	0	13,650	0
Landed Duty-Paid Value	Canada	number	3,507,317	4,328,510	3,456,408	6,976,408	5,335,649	8,200,054	8,427,555	7,160,066	11,238,147	16,555,895	28,804,242	30,094,344
Landed Duty-Paid Value	China	number	11,907,668	8,716,640	4,498,709	2,455,851	2,582,672	2,611,763	2,502,498	20,752,936	58,485,528	215,246,170	178,319,515	47,906,688
Landed Duty-Paid Value	Denmark	number	0	0	0	0	21,979	23,650	0	2,500	19,564	20,208	0	0
Landed Duty-Paid Value	France	number	190,858	30,300	0	15,910	63,302	146,753	180,061	896,071	37,825	115,230	181,352	558,256
Landed Duty-Paid Value	Germany	number	2,896,430	978,663	3,172,579	3,933,158	2,327,194	1,593,009	2,323,360	2,178,360	1,914,102	1,846,012	539,476	709,173
Landed Duty-Paid Value	Hong Kong	number	33,326	145,145	7,542	35,842	2,343	0	0	902,139	0	0	0	0
Landed Duty-Paid Value	Hungary	number	6,344	36,466	0	0	29,549	6,415	0	2,895	0	0	0	0
Landed Duty-Paid Value	India	number	363,316	225,336	133,443	155,131	374,980	162,303	180,956	310,541	495,715	3,263,324	10,857,007	14,351,900
Landed Duty-Paid Value	Indonesia	number	244,281	176,334	185,909	461,884	477,826	301,670	329,771	783,256	471,682	285,242	615,719	833,682
Landed Duty-Paid Value	Ireland	number	0	0	0	0	11,297	16,535	0	0	0	7,755	0	0
Landed Duty-Paid Value	Israel	number	3,551	0	24,069	0	0	0	0	0	0	0	10,200	0
Landed Duty-Paid Value	Italy	number	12,576	43,952	11,439	100,842	27,226	32,209	7,947	24,684	10,363,494	5,176,212	663,296	882,986
Landed Duty-Paid Value	Japan	number	4,363,733	1,095,013	1,524,630	5,023,612	2,960,306	9,131,126	585,910	3,387,655	4,348,451	5,880,422	19,288,892	27,157,587
Landed Duty-Paid Value	Lithuania	number	0	0	0	21,833	0	10,267	0	0	0	14,305	321,301	2,749
Landed Duty-Paid Value	Malaysia	number	61,094,939	61,798,480	172,741,121	106,474,574	171,689,686	111,896,828	128,190,795	148,992,596	150,253,973	161,777,932	178,583,906	163,753,119
Landed Duty-Paid Value	Maldives	number	0	129,552	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Mexico	number	50,558	33,339	44,866	282,624	150,509	188,983	6,898,520	51,707,642	53,832,855	49,471,790	65,855,170	41,422,421
Landed Duty-Paid Value	Netherlands	number	133,626	133,517	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Philippines	number	0	3,419	95,193	4,076	87,866	2,921	248,464	21,744	111,904	30,995	2,507,192	17,762,995
Landed Duty-Paid Value	Poland	number	12,887	70,109	0	0	0	0	10,442	11,940	118,740	7,489,745	6,074,132	2,195,900
Landed Duty-Paid Value	Portugal	number	0	582,111	0	0	7,650	0	0	0	0	0	0	0
Landed Duty-Paid Value	Singapore	number	6,350,685	6,328,222	6,623,307	4,034,543	6,931,639	23,533,217	11,420,824	18,908,800	14,531,245	22,324,825	21,016,322	16,542,085
Landed Duty-Paid Value	Slovakia	number	0	0	0	0	0	0	3,960	0	0	0	0	0
Landed Duty-Paid Value	South Africa	number	0	0	0	0	0	0	3,292	0	9,690	0	0	0
Landed Duty-Paid Value	South Korea	number	60,484,592	58,596,067	72,768,821	45,894,452	66,666,490	84,306,987	106,347,776	87,236,248	121,634,369	123,619,887	146,825,597	135,022,647
Landed Duty-Paid Value	Spain	number	10,111	0	3,272	0	5,200	0	42,163	0	6,057	0	0	0
Landed Duty-Paid Value	Switzerland	number	0	0	0	0	5,875	6,367	0	109,568	122,495	128,706	36,864	0
Landed Duty-Paid Value	Taiwan	number	1,769,446	2,485,857	1,916,168	1,074,820	770,990	376,061	484,732	955,706	2,478,156	8,511,057	4,122,608	1,412,824
Landed Duty-Paid Value	Thailand	number	13,103,049	20,136,469	33,303,631	22,760,475	28,650,812	25,634,266	43,668,472	43,770,192	50,300,047	67,393,761	42,235,869	53,229,779
Landed Duty-Paid Value	Turkey	number	0	0	0	0	0	0	0	0	424,511	0	3,157,500	0
Landed Duty-Paid Value	United Arab Em	number	0	4,102,400	7,526,880	7,450	2,278	0	0	0	0	0	0	0
Landed Duty-Paid Value	United Kingdom	number	30,931	319,880	5,485	93,630	0	66,734	73,900	7,464	16,042	30,601	95,681	15,083
Landed Duty-Paid Value	Vietnam	number	7,450,655	4,130,480	27,188,516	38,791,440	42,650,417	43,484,727	55,688,540	76,304,284	77,051,607	132,769,567	159,124,905	134,911,744
Total:			174,034,959	174,645,342	335,231,988	238,654,270	331,844,056	311,732,845	367,619,938	464,437,786	558,308,812	821,959,641	869,253,455	688,800,506

Imports For Consumption | Monthly data for 2018

Data Row Count 32

Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Landed Duty-Paid Value	Australia	number	42,070	0	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Austria	number	8,910	0	0	5,559	2,780	0	0	0	0	0	0	0
Landed Duty-Paid Value	Belgium	number	0	0	0	0	0	4,220	0	0	0	0	0	0
Landed Duty-Paid Value	Brazil	number	4,470	0	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Canada	number	15,146,578	6,727,033	124,875	1,487,217	4,501,505	1,476,658	0	0	0	0	0	0
Landed Duty-Paid Value	China	number	6,001,519	1,017,211	1,455,628	1,575,214	2,452,389	3,875,356	0	0	0	0	0	0
Landed Duty-Paid Value	Denmark	number	2,200	0	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Dominican Rep	number	0	0	0	0	54,890	0	0	0	0	0	0	0
Landed Duty-Paid Value	Egypt	number	0	0	0	0	2,400	0	0	0	0	0	0	0
Landed Duty-Paid Value	France	number	413,029	13,388	110,888	179,320	1,859,374	2,943	0	0	0	0	0	0
Landed Duty-Paid Value	Germany	number	3,448,137	72,676	18,405	54,041	380,383	0	0	0	0	0	0	0
Landed Duty-Paid Value	Hong Kong	number	0	3,468	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Hungary	number	3,069	0	0	0	3,938	0	0	0	0	0	0	0
Landed Duty-Paid Value	India	number	14,080,864	1,790,450	521,424	1,351,126	2,920,319	2,715,861	0	0	0	0	0	0
Landed Duty-Paid Value	Indonesia	number	193,399	351,719	531,442	358,429	638,064	438,033	0	0	0	0	0	0
Landed Duty-Paid Value	Ireland	number	8,997	0	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Italy	number	139,150	20,504	753,300	339,558	221,979	739,152	0	0	0	0	0	0
Landed Duty-Paid Value	Japan	number	27,996,212	4,495,770	3,449,033	8,955,903	7,538,740	16,380,215	0	0	0	0	0	0
Landed Duty-Paid Value	Lithuania	number	327,355	337,407	0	0	57,024	0	0	0	0	0	0	0
Landed Duty-Paid Value	Malaysia	number	121,112,001	51,981,584	58,881,850	59,736,151	65,917,143	91,155,891	0	0	0	0	0	0
Landed Duty-Paid Value	Mexico	number	61,486,816	29,048,496	9,686,160	26,907,718	25,682,946	18,261,921	0	0	0	0	0	0
Landed Duty-Paid Value	Netherlands	number	12,280	0	0	0	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Philippines	number	15,407,988	4,780,816	116,655	3,003,645	7,751,125	1,887,654	0	0	0	0	0	0
Landed Duty-Paid Value	Poland	number	0	0	0	24,007	0	0	0	0	0	0	0	0
Landed Duty-Paid Value	Singapore	number	12,448,663	18,096,599	16,443,912	6,019,503	2,625,230	14,640,812	0	0	0	0	0	0
Landed Duty-Paid Value	South Korea	number	108,531,332	35,731,132	46,190,910	47,867,075	31,724,411	22,653,347	0	0	0	0	0	0
Landed Duty-Paid Value	Spain	number	0	0	0	4,002	0	32,247	0	0	0	0	0	0
Landed Duty-Paid Value	Taiwan	number	2,283,407	1,788,075	826,013	3,301,665	3,489,319	2,623,752	0	0	0	0	0	0
Landed Duty-Paid Value	Thailand	number	48,335,315	12,778,712	14,905,449	9,129,672	21,542,994	24,835,824	0	0	0	0	0	0
Landed Duty-Paid Value	Turkey	number	0	1,485,765	1,727,512	3,969,939	12,586,356	9,055,635	0	0	0	0	0	0
Landed Duty-Paid Value	United Kingdom	number	63,820	7,083	0	0	16,527	105,187	0	0	0	0	0	0
Landed Duty-Paid Value	Vietnam	number	59,637,770	18,357,456	4,072,301	17,064,526	20,524,711	44,737,483	0	0	0	0	0	0
Total:			497,135,351	188,885,344	159,815,757	191,334,270	212,494,547	255,622,191	0	0	0	0	0	0

Imports For Consumption | Monthly data for 2019

	Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Data Row Count		0													
Total:			0	0	0	0	0	0	0	0	0	0	0	0	

Imports For Consumption | Monthly data for 2020

	Data Type	Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Data Row Count		0													
Total:			0	0	0	0	0	0	0	0	0	0	0	0	

Imports For Consumption | Monthly data for 2021

	Data Type	Country	Quantity Description	JAN	FEB	MAR	APR
Data Row Count		0					
Total:			0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

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Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Belgium	number	0	0	0	0	0	0	0	29	0	0	0	0
Canada	number	0	0	0	0	0	0	32,278	29,196	9,761	37,155	12,369	5,552
China	number	0	0	0	0	0	0	124,713	73,809	69,369	57,014	195,447	52,814
Croatia	number	0	0	0	0	0	0	0	0	0	40	0	0
Denmark	number	0	0	0	0	0	0	0	0	720	0	0	0
France	number	0	0	0	0	0	0	6,144	3,072	415	52	488	1,142
Germany	number	0	0	0	0	0	0	428	6,466	15	25	0	0
Hong Kong	number	0	0	0	0	0	0	17	0	0	0	0	0
India	number	0	0	0	0	0	0	27,626	6,973	23,178	75,134	38,176	7,274
Indonesia	number	0	0	0	0	0	0	5,527	2,050	1,224	3,216	4,940	1,523
Italy	number	0	0	0	0	0	0	5,252	2,386	11,717	5,914	9,857	5,626
Japan	number	0	0	0	0	0	0	143,790	99,047	169,323	279,544	43,838	83,572
Malaysia	number	0	0	0	0	0	0	372,203	448,728	533,935	795,881	831,542	968,479
Mexico	number	0	0	0	0	0	0	180,436	131,878	109,639	119,921	103,327	65,655
Philippines	number	0	0	0	0	0	0	7,592	1,219	6,000	0	3,822	3,072
Russia	number	0	0	0	0	0	0	0	0	0	0	25	0
Singapore	number	0	0	0	0	0	0	163,523	112,465	157,887	179,700	106,682	62,021
South Korea	number	0	0	0	0	0	0	595,284	1,166,442	848,748	1,121,616	683,906	318,436
Spain	number	0	0	0	0	0	0	0	156	0	1	10	24
Switzerland	number	0	0	0	0	0	0	0	0	0	0	0	72
Taiwan	number	0	0	0	0	0	0	96,832	313,262	370,974	272,620	139,093	126,392
Thailand	number	0	0	0	0	0	0	66,890	64,014	105,438	133,135	78,240	64,481
Turkey	number	0	0	0	0	0	0	28,465	28,008	30,402	26,364	24,620	34,854
United Kingdom	number	0	0	0	0	0	0	0	1,195	0	483	10	0
Vietnam	number	0	0	0	0	0	0	473,747	483,824	399,615	450,515	529,747	367,449
		0	0	0	0	0	0	2,330,747	2,974,219	2,848,360	3,558,330	2,806,139	2,168,438

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Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Australia	number	0	0	0	8	0	0	0	0	1	0	0	0
Austria	number	668	0	0	0	0	0	0	0	0	0	10	0
Belgium	number	0	0	0	38	0	0	0	0	0	0	182	0
Bulgaria	number	0	0	1	0	0	0	7	0	0	0	0	8
Burma	number	0	0	0	0	0	0	0	120	0	405,244	3,025	0
Cambodia	number	0	0	0	0	1,544	0	0	12,000	7,905	36,330	44,613	40,533
Canada	number	24,887	7,324	12,263	15,758	29,426	25,539	19,805	55,100	51,046	65,068	53,938	79,258
China	number	89,027	30,024	145,379	49,150	67,080	72,284	53,704	240,789	3,519,405	3,699,311	5,778,975	5,277,496
Croatia	number	0	0	0	0	0	0	0	0	12,000	0	0	0
France	number	0	6,544	631	0	39	0	12	0	4	52	0	0
Germany	number	10	0	0	2,000	18	187	0	89	202	10,075	1,199	25
India	number	5,395	4,747	10,736	7,192	166,472	10,739	41,114	62,090	120,498	180,182	198,841	161,939
Indonesia	number	12,600	5,016	6,038	2,395	19,358	8,184	672	12,840	1,028	4,460	5,321	3,076
Italy	number	4,320	3,170	10,250	5,132	4,590	9,872	8,837	5,624	14,024	5,968	9,517	6,048
Japan	number	125,358	208,930	83,572	125,358	200,681	1,535,092	149,063	10,137,600	3,688,897	3,495,924	1,175,040	2,992,057
Jordan	number	0	26	0	0	0	0	0	27	1,188	4,158	12,475	122
Malaysia	number	1,560,719	625,691	600,769	1,619,674	1,873,877	1,424,334	1,502,289	5,119,154	4,582,787	2,307,953	3,066,786	5,268,975
Mexico	number	79,343	66,294	69,071	44,430	50,897	33,220	56,516	94,734	144,632	128,402	51,554	70,198
Netherlands	number	0	1	0	0	0	16	0	0	0	0	0	0
Nicaragua	number	0	0	0	0	0	0	0	0	0	12,000	0	0
Philippines	number	23,020	21,616	17,391	9,800	110,486	5,798	31,760	1,072	1,376	197,619	7,529	19,943
Poland	number	0	0	0	0	0	700	0	0	0	0	0	323
Russia	number	0	0	0	0	0	0	0	629	0	0	0	0
Singapore	number	56,909	121,600	132,813	57,095	122,057	193,262	229,313	155,756	226,042	222,768	231,390	284,782
Slovenia	number	0	0	0	0	0	0	0	500	0	0	0	0
South Korea	number	1,358,869	2,706,681	2,013,770	1,520,287	3,146,180	3,341,332	1,160,896	10,968,212	27,147,064	19,446,678	43,320,345	28,387,469
Spain	number	0	0	486	15	0	0	0	0	0	0	0	192
Sweden	number	0	0	0	0	0	0	140	0	0	0	0	0
Switzerland	number	0	0	0	0	0	0	0	0	320	0	0	0
Taiwan	number	135,250	298,336	223,391	619,968	1,128,196	473,293	2,595,253	4,720,288	4,786,571	6,710,000	5,765,906	6,689,826
Thailand	number	33,611	169,318	189,703	243,378	375,652	316,102	319,159	617,312	406,330	474,205	555,641	625,512
Turkey	number	40,782	57,174	42,193	113,392	170,264	127,302	80,066	127,424	42,498	21,504	10,340	10,509
United Kingdom	number	10	0	7	0	0	0	2	1	2	0	1	0
Vietnam	number	417,293	247,405	583,175	588,944	804,684	1,255,603	2,131,580	6,321,926	5,066,033	4,562,374	4,437,284	3,903,758
		3,968,071	4,579,897	4,141,639	5,024,014	8,271,501	8,832,859	8,380,188	38,653,287	49,819,853	41,990,275	64,729,912	53,822,049

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Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Australia	number	0	0	0	0	0	0	0	0	0	2	0	0
Austria	number	18	16	220	0	0	0	0	0	24	0	0	0
Bangladesh	number	0	0	0	60	0	0	0	0	0	0	0	0
Belgium	number	0	0	0	0	0	0	0	0	0	450	0	0
Brazil	number	0	0	856	0	0	0	0	0	0	1,995	0	0
Burma	number	4,564	1,544	9,883	3,752	5,440	300	686,716	6,743	4,368	2,600	1,630	5,098
Cambodia	number	25,229	47,608	90,549	43,790	60,725	88,552	153,765	94,739	268,226	148,556	219,167	304,520
Canada	number	47,781	42,696	59,171	49,220	57,884	49,279	44,387	68,153	46,982	103,990	38,010	26,718
China	number	1,584,333	13,592,747	8,707,287	1,989,742	18,423,125	1,118,737	146,270	178,620	80,726	2,538,631	152,378	50,375
France	number	0	0	0	0	0	0	0	131	64	410	420	8
Georgia	number	0	0	0	0	0	0	0	0	260	0	0	0
Germany	number	511	310	2	0	0	99	839	1,077	0	291	0	158
Haiti	number	0	0	0	0	0	0	0	0	0	4,050	0	0
Hungary	number	3,000	0	0	0	0	0	0	0	0	0	0	0
India	number	354,321	16,930	22,956	30,688	3,120	6,062	18,940	14,922	17,778	54,207	6,756	26,905
Indonesia	number	4,514	5,800	2,243	5,439	240	8,884	12,734	6,464	7,682	13,912	0	8,542
Italy	number	9,460	15,502	37,906	28,382	18,408	1,666	1,371	62,266	2,913	20,972	30,614	4,656
Japan	number	805,535	5,389,416	2,509,781	603,625	0	4,200	0	12,600	0	0	0	17
Jordan	number	4,158	122	122	122	0	0	0	594	0	594	2,376	0
Lithuania	number	0	0	0	0	0	0	0	0	0	0	1,097	0
Malaysia	number	6,632,556	4,669,502	2,069,295	1,607,567	2,445,028	8,955,469	1,636,559	14,517,433	8,592,941	7,181,988	5,619,314	5,491,764
Mexico	number	108,557	33,132	28,565	12,676	5,966	32,961	50,205	46,705	35,885	52,025	68,110	60,865
Netherlands	number	1	0	0	35	0	4	0	15	1	0	0	2
Philippines	number	26,754	30,026	60,719	15,467	38,980	73,264	8,657	100	3,200	0	42,175	32,620
Poland	number	68	0	840	0	1,676	110	68	1,680	0	0	0	1,680
Singapore	number	181,483	237,368	190,333	191,198	143,321	142,986	126,553	165,006	102,525	145,596	172,445	108,157
South Korea	number	41,093,959	25,538,684	25,398,850	32,835,796	12,020,192	11,783,496	18,424,475	16,465,008	13,343,445	29,012,089	21,755,921	17,796,467
Spain	number	0	0	0	0	50	0	0	0	0	0	0	0
Sweden	number	9	0	0	0	0	0	0	0	0	0	0	0
Switzerland	number	0	0	0	0	8	0	0	0	0	0	0	0
Taiwan	number	5,337,778	2,958,791	3,726,232	680,828	1,550,289	1,229,644	2,015,269	2,593,957	1,825,455	2,617,376	2,868,692	2,540,329
Thailand	number	794,785	709,187	1,212,184	1,102,777	2,184,733	1,438,761	3,405,969	1,733,171	1,674,042	831,259	567,218	2,108,700
Turkey	number	36,060	105,293	84,240	72,180	163,288	56,712	55,795	61,100	30,065	43,615	0	0
Ukraine	number	0	0	0	0	0	0	9,912	1,416	708	0	5,664	0
United Arab Em	number	0	0	0	0	0	0	0	0	0	0	0	3
United Kingdom	number	0	0	0	0	0	0	0	4	1	0	0	98
Vietnam	number	4,595,829	2,459,997	8,697,412	8,853,574	4,579,470	1,714,790	1,800,057	2,666,725	2,460,773	2,888,038	5,485,226	3,124,952
		61,651,263	55,854,671	52,909,646	48,126,918	41,701,943	26,705,976	28,598,541	38,698,629	28,498,064	45,662,646	37,037,213	31,692,634

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Country	Quantity Description	JAN	FEB	MAR	APR	MAY
Armenia	number	0	520	520	1,040	0
Australia	number	0	0	1,634	0	0
Burma	number	400	161,950	450	3,850	0
Cambodia	number	334,421	192,125	176,275	277,922	234076
Canada	number	28,378	37,151	319,390	27,872	36203
China	number	63,997	65,895	69,607	38,922	90635
France	number	384	0	320	0	0
Germany	number	0	0	1,530	3,535	0
Hungary	number	0	613	0	0	0
India	number	12,022	6,184	29,986	3,980	5801
Indonesia	number	4,518	8,268	2,772	3,988	4364
Italy	number	6,008	2,187	5,144	3,020	3416
Japan	number	0	2,940	31,396	17,453	20277
Malaysia	number	10,968,475	4,999,451	23,078,042	5,262,029	14786765
Mexico	number	0	100	44,933	896	9962
Netherlands	number	0	0	1	0	0
Philippines	number	48,600	13,623	11,716	7,154	45790
Poland	number	0	32	855	1,790	895
Singapore	number	127,573	110,033	551,004	117,534	232193
South Korea	number	16,406,122	12,812,265	17,757,434	28,255,123	18054355
Spain	number	0	550	0	64	127
Taiwan	number	2,545,966	2,028,310	2,223,552	1,483,090	2006831
Thailand	number	805,741	19,182,751	2,765,496	1,946,252	3259544
Turkey	number	9,295	22,360	16,558	44,120	25502
Ukraine	number	0	3,186	5,664	0	0
United Kingdom	number	0	0	3	0	0
Vietnam	number	5,701,716	3,977,228	6,183,748	8,761,091	6066769
		37,063,616	43,627,722	53,278,030	46,260,725	44883505

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

0

Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
0		0	0	0	0	0	0	0	0	0	0	0	

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Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Belgium	number	0	0	0	0	0	0	0	11,260	0	0	0	0
Canada	number	0	0	0	0	0	0	3,215,262	2,896,158	896,439	3,182,724	1,041,689	432,108
China	number	0	0	0	0	0	0	807,295	2,786,308	1,163,235	1,062,312	1,063,365	966,808
Croatia	number	0	0	0	0	0	0	0	0	0	8,554	0	0
Denmark	number	0	0	0	0	0	0	0	0	12,363	0	0	0
France	number	0	0	0	0	0	0	756,900	379,750	88,675	22,568	79,084	89,935
Germany	number	0	0	0	0	0	0	109,292	108,376	5,251	12,178	0	0
Hong Kong	number	0	0	0	0	0	0	2,427	0	0	0	0	0
India	number	0	0	0	0	0	0	3,370,178	285,620	2,153,524	8,737,372	4,339,999	658,198
Indonesia	number	0	0	0	0	0	0	292,309	197,108	66,722	91,117	210,671	62,604
Italy	number	0	0	0	0	0	0	764,673	288,818	1,552,163	626,853	1,836,992	678,112
Japan	number	0	0	0	0	0	0	4,586,861	4,683,239	5,561,775	9,980,712	1,678,248	2,894,924
Malaysia	number	0	0	0	0	0	0	52,110,179	49,654,452	69,863,087	56,343,183	94,600,206	99,903,087
Mexico	number	0	0	0	0	0	0	47,856,551	30,196,267	21,590,976	21,639,447	20,684,384	15,543,690
Philippines	number	0	0	0	0	0	0	27,267	51,026	9,799	0	336,052	380,460
Russia	number	0	0	0	0	0	0	0	0	0	0	3,200	0
Singapore	number	0	0	0	0	0	0	24,034,156	14,730,286	21,072,436	23,421,318	13,835,190	7,939,737
South Korea	number	0	0	0	0	0	0	34,585,792	63,805,378	65,901,551	73,002,342	70,255,786	36,456,532
Spain	number	0	0	0	0	0	0	0	37,945	0	30,433	14,996	8,103
Switzerland	number	0	0	0	0	0	0	0	0	0	0	0	12,843
Taiwan	number	0	0	0	0	0	0	2,633,939	2,411,430	1,603,815	1,394,007	3,539,413	1,226,010
Thailand	number	0	0	0	0	0	0	9,324,949	8,660,621	13,444,507	17,623,714	10,158,423	7,497,158
Turkey	number	0	0	0	0	0	0	2,347,062	2,391,154	2,736,368	2,053,547	1,674,266	2,401,394
United Kingdom	number	0	0	0	0	0	0	0	296,403	0	119,282	4,325	0
Vietnam	number	0	0	0	0	0	0	50,315,409	55,586,184	49,160,246	52,110,761	36,279,314	22,600,163
		0	0	0	0	0	0	237,140,501	239,457,783	256,882,932	271,462,424	261,635,603	199,751,866

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Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Australia	number	0	0	0	5,950	0	0	0	0	4,622	0	0	0
Austria	number	9,442	0	0	0	0	0	0	0	0	0	2,984	0
Belgium	number	0	0	0	11,234	0	0	0	0	0	0	18,897	0
Bulgaria	number	0	0	2,375	0	0	0	30,055	0	0	0	0	36,075
Burma	number	0	0	0	0	0	0	0	6,900	0	364,132	364,246	0
Cambodia	number	0	0	0	0	158,609	0	0	809,678	528,085	2,394,012	3,105,518	3,642,663
Canada	number	2,025,392	538,135	685,057	976,775	1,964,094	1,447,394	1,168,996	3,507,230	3,284,590	3,645,157	3,594,925	4,836,939
China	number	1,114,956	500,473	644,505	426,438	1,488,841	534,193	414,540	518,239	4,715,994	36,788,024	6,697,366	47,485,072
Croatia	number	0	0	0	0	0	0	0	0	6,710	0	0	0
France	number	0	771,913	112,923	0	9,157	0	7,068	0	3,933	16,401	0	0
Germany	number	5,087	0	0	135,566	17,163	37,600	0	32,721	17,088	897,026	52,048	8,558
India	number	635,737	401,381	665,519	748,621	1,248,979	393,461	3,976,333	7,359,156	14,420,604	18,815,289	22,479,690	17,595,864
Indonesia	number	6,565	64,199	701,231	87,456	895,267	947,222	80,178	375,214	17,901	242,308	117,884	353,568
Italy	number	576,701	398,038	942,280	238,339	458,052	870,871	269,036	524,377	630,954	566,621	877,588	527,624
Japan	number	4,367,434	7,424,736	2,903,142	4,408,459	7,088,151	4,360,367	4,441,363	10,766,857	3,972,676	3,781,598	1,075,722	2,808,307
Jordan	number	0	3,719	0	0	0	0	0	4,263	105,495	555,441	1,692,118	52,748
Malaysia	number	59,670,779	68,996,871	74,433,458	95,389,019	135,656,847	138,928,869	152,603,296	193,538,704	197,109,570	201,662,140	255,346,936	174,234,540
Mexico	number	17,893,547	15,421,550	16,065,206	7,472,977	8,615,814	6,406,374	11,982,611	17,563,357	11,689,310	17,824,923	8,635,350	11,530,066
Netherlands	number	0	2,392	0	0	0	3,395	0	0	0	0	0	0
Nicaragua	number	0	0	0	0	0	0	0	0	0	1,425,750	0	0
Philippines	number	183,526	184,082	228,983	143,531	763,318	452,643	1,892,678	16,172	31,293	1,236,213	756,576	2,166,117
Poland	number	0	0	0	0	0	66,746	0	0	0	0	0	52,400
Russia	number	0	0	0	0	0	0	0	5,422	0	0	0	0
Singapore	number	6,205,508	11,190,172	11,631,754	5,194,468	12,071,239	20,937,242	24,676,621	16,359,669	23,830,664	22,359,213	23,293,143	29,923,108
Slovenia	number	0	0	0	0	0	0	0	70,000	0	0	0	0
South Korea	number	31,466,038	48,305,068	44,925,473	41,673,263	61,566,619	44,892,368	49,031,878	70,839,250	69,845,019	91,483,893	94,207,691	92,530,542
Spain	number	0	0	155,826	5,534	0	0	0	0	0	0	0	76,172
Sweden	number	0	0	0	0	0	0	16,946	0	0	0	0	0
Switzerland	number	0	0	0	0	0	0	0	0	63,447	0	0	0
Taiwan	number	926,286	2,537,821	4,586,579	20,547,946	28,214,534	4,445,665	5,911,823	6,273,541	5,586,403	7,435,342	10,013,896	18,771,661
Thailand	number	3,320,313	17,638,262	21,335,262	28,088,891	44,477,383	44,573,653	46,599,744	57,337,929	54,094,797	77,483,968	88,377,523	98,170,432
Turkey	number	2,798,104	5,114,937	2,993,145	11,758,590	19,988,175	16,096,332	10,304,302	16,091,736	5,147,167	2,810,557	1,248,621	1,189,808
United Kingdom	number	3,960	0	72,500	0	0	0	15,861	12,043	22,950	0	7,422	0
Vietnam	number	9,401,578	19,586,814	39,254,230	38,324,499	77,890,482	129,348,848	114,688,538	129,903,678	140,420,158	136,141,457	128,693,485	149,169,799
		140,610,953	199,080,563	222,339,448	255,637,556	402,572,724	414,743,243	428,111,867	531,916,136	535,549,430	627,929,465	650,659,629	655,162,063

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Country	Quantity Description	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Australia	number	0	0	0	0	0	0	0	0	0	6,850	0	0
Austria	number	2,181	22,359	16,720	0	0	0	0	0	3,481	0	0	0
Bangladesh	number	0	0	0	80,500	0	0	0	0	0	0	0	0
Belgium	number	0	0	0	0	0	0	0	0	0	76,872	0	0
Brazil	number	0	0	51,099	0	0	0	0	0	0	163,125	0	0
Burma	number	496,139	66,806	423,889	329,523	293,471	19,761	1,116,908	433,311	309,245	152,893	132,053	307,344
Cambodia	number	2,521,923	4,810,587	9,281,435	4,018,336	5,467,757	7,708,314	13,959,467	8,305,396	21,884,962	13,682,761	16,168,010	22,367,331
Canada	number	2,763,346	1,706,134	2,866,745	2,845,090	6,115,153	3,661,947	1,719,180	6,313,012	2,580,065	8,376,789	979,005	1,053,758
China	number	19,108,123	69,641,176	98,258,782	47,959,671	86,358,648	33,667,335	8,539,980	13,868,575	4,599,090	6,554,777	3,065,221	1,079,834
France	number	0	0	0	0	0	0	0	14,800	7,200	50,182	51,182	5,679
Georgia	number	0	0	0	0	0	0	0	0	38,655	0	0	0
Germany	number	30,743	54,389	2,006	0	0	4,410	40,330	43,530	0	15,755	0	44,909
Haiti	number	0	0	0	0	0	0	0	0	0	4,712	0	0
Hungary	number	4,450	0	0	0	0	0	0	0	0	0	0	0
India	number	11,011,033	1,884,744	2,720,830	3,200,167	464,918	802,481	2,457,097	1,103,569	1,495,336	5,882,983	755,049	3,444,382
Indonesia	number	254,073	135,132	72,290	130,126	27,771	472,247	832,211	465,906	330,034	974,360	0	602,398
Italy	number	1,124,750	1,223,448	9,419,709	6,958,705	4,538,273	131,940	145,117	4,461,215	224,516	4,025,799	6,766,559	486,388
Japan	number	822,601	5,235,831	2,398,681	651,534	0	78,371	0	232,171	0	0	0	12,863
Jordan	number	505,300	52,748	52,748	52,748	0	0	0	47,179	0	49,719	233,410	0
Lithuania	number	0	0	0	0	0	0	0	0	0	0	75,194	0
Malaysia	number	211,840,355	199,719,092	225,832,162	210,670,842	193,866,820	111,794,243	185,477,692	201,662,224	192,582,422	171,666,170	202,683,177	193,739,169
Mexico	number	8,834,186	5,309,398	4,792,322	2,053,746	892,345	5,257,271	8,373,176	8,309,669	7,209,356	10,488,822	13,614,718	13,501,179
Netherlands	number	2,070	0	0	29,355	0	20,308	0	2,845	2,707	0	0	5,593
Philippines	number	2,639,246	2,642,827	6,148,260	2,691,231	384,427	104,548	501,872	11,112	7,601	0	84,005	255,610
Poland	number	45,268	0	109,621	0	234,810	67,050	41,390	263,326	0	0	0	226,240
Singapore	number	19,379,626	24,662,993	19,419,760	20,207,984	16,027,206	15,928,342	14,084,890	18,448,006	11,898,912	16,958,757	20,624,230	13,418,907
South Korea	number	134,313,077	122,804,293	161,847,207	83,303,910	46,417,524	68,284,446	63,908,809	65,641,771	56,705,423	101,532,963	64,697,525	72,144,998
Spain	number	0	0	0	0	14,950	0	0	0	0	0	0	0
Sweden	number	3,311	0	0	0	0	0	0	0	0	0	0	0
Switzerland	number	0	0	0	0	6,178	0	0	0	0	0	0	0
Taiwan	number	10,470,385	7,635,625	21,458,394	2,464,813	1,750,215	1,676,406	2,896,961	4,058,342	2,839,872	2,484,302	2,297,404	3,476,929
Thailand	number	112,195,056	93,729,210	158,974,708	153,463,220	153,281,677	137,614,642	109,873,611	142,216,144	117,510,540	84,589,408	70,536,326	130,678,064
Turkey	number	4,386,643	12,181,072	9,748,136	8,394,052	19,018,105	6,694,076	6,497,780	7,023,971	3,476,106	5,027,250	0	0
Ukraine	number	0	0	0	0	0	0	1,166,249	166,607	84,891	0	657,124	0
United Arab Em	number	0	0	0	0	0	0	0	0	0	0	0	90,838
United Kingdom	number	0	0	0	0	0	0	0	17,950	8,164	0	0	13,177
Vietnam	number	126,316,578	123,700,738	153,030,092	120,921,814	133,905,525	129,696,111	184,178,403	145,280,203	113,144,417	148,498,829	142,186,039	124,035,168
		669,070,463	677,218,602	886,925,596	670,427,367	669,065,773	523,684,249	605,811,123	628,390,834	536,942,995	581,264,078	545,606,231	580,990,758

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Country	Quantity Description	JAN	FEB	MAR	APR	MAY
Armenia	number	0	116,170	84,242	168,480	0
Australia	number	0	0	61,690	0	0
Burma	number	25,320	198,508	50,463	129,536	0
Cambodia	number	5,355,740	12,573,160	13,062,484	24,376,160	23496322
Canada	number	943,694	1,024,923	1,778,525	1,672,089	1631540
China	number	1,302,452	2,296,055	1,343,494	1,442,573	1591107
France	number	38,401	0	49,281	0	0
Germany	number	0	0	93,315	142,050	0
Hungary	number	0	9,331	0	0	0
India	number	1,377,156	402,591	3,581,078	164,007	317249
Indonesia	number	227,800	677,824	238,541	373,454	141656
Italy	number	603,807	279,287	518,667	351,985	302757
Japan	number	0	53,350	68,327	134,133	468062
Malaysia	number	203,276,012	215,060,282	220,333,634	224,718,812	227909660
Mexico	number	0	6,592	118,654	30,465	166104
Netherlands	number	0	0	2,720	0	0
Philippines	number	191,337	3,245,572	2,391,137	1,524,026	1417296
Poland	number	0	19,860	125,512	299,124	104949
Singapore	number	16,074,197	12,997,741	25,847,745	15,269,104	29969649
South Korea	number	78,226,153	69,893,446	83,870,087	70,032,688	52397948
Spain	number	0	110,025	0	17,175	22007
Taiwan	number	3,323,701	2,585,255	4,157,990	2,745,826	7258390
Thailand	number	94,515,452	79,026,197	156,972,984	134,149,889	158320362
Turkey	number	1,039,004	2,489,756	1,777,252	4,711,400	2692980
Ukraine	number	0	311,612	556,660	0	0
United Kingdom	number	0	0	2,961	0	0
Vietnam	number	105,492,518	119,161,399	205,317,913	191,321,138	166701952
		512,012,744	522,538,936	722,405,356	673,774,114	674909990

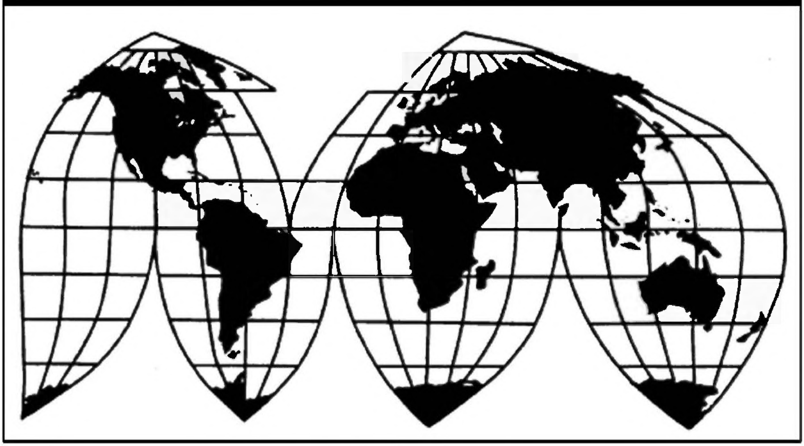
EXHIBIT 12

Crystalline Silicon Photovoltaic Cells and Modules from China

Investigation Nos. 701-TA-481 and 731-TA-1190 (Review)

Publication 4874 **March 2019**

U.S. International Trade Commission



Washington, DC 20436

9777 on Adjusting Imports of Steel and Aluminum into the United States.[43] Under these Presidential Proclamations, in addition to reporting the regular Chapters 72 and 73 of the Harmonized Tariff Schedule ("HTS") classification for the imported steel merchandise and the regular Chapter 76 of the HTS classification for the imported aluminum merchandise, importers shall report the following HTS classification for imported merchandise subject to the additional duty: 9903.80.01 (25 percent ad valorem additional duty for steel mill products) and 9903.85.01 (10 percent ad valorem additional duty for aluminum products). These duty requirements are effective with respect to goods entered, or withdrawn from warehouse for consumption, on or after March 23, 2018.[44]

As explained in the section entitled "The product" of this report, both steel and aluminum are raw material inputs in the production of CSPV cells and modules.[45]

SUMMARY DATA

Table I-1 presents a summary of data from the terminal years of the original investigations and the current full five-year reviews. Figure I-1 presents apparent U.S. consumption data for 2009-17.[46] Data from the original investigations and these current five-year reviews are not comparable in the following respects. First, the import component of apparent U.S. consumption in 2017 is derived from adjusted official U.S. import statistics and may include items that are not in scope.[47] In these reviews, 47 importers that accounted for approximately 26.2 percent of U.S. imports of CSPV cells and modules from China and 56.4 percent of U.S. imports from nonsubject countries in 2017 submitted usable questionnaire

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[43] 83 FR 13355 and 83 FR 13361, March 28, 2018; 83 FR 20683 and 83 FR 20677, May 7, 2018; 83 FR 25849 and 25857, June 5, 2018; 83 FR 40429, August 15, 2018; and 83 FR 45019 and 45025, September 4, 2018.

[44] *Section 232 Tariffs on Aluminum and Steel Duty on Imports of Steel and Aluminum Articles under Section 232 of the Trade Expansion Act of 1962*, https://www.cbp.gov/trade/programs-administration/entry-summary/232-tariffs-aluminum-and-steel, retrieved December 12, 2018.

[45] For both CSPV cells and modules, total raw material cost is the most substantial component of total COGS. For cells, total raw material cost reflects a combination of polysilicon, wafers, and all other raw material costs; however, the main underlying raw material input for CSPV cells is wafers made from polysilicon.

[46] Complete summaries of these data from the final *CSPV 1* investigations for 2009-11, January-June 2011, and January-June 2012 appear in appendix C. Select data from *CSPV 3* are also presented in appendix C.

[47] Import statistics for 2017 were adjusted to remove the following: (1) known imports of modules that contained U.S.-produced cells and (2) an estimated amount of thin film products (based on the ratio of total imports held by thin film products in July and August 2018 under HTS statistical reporting numbers 8541.40.6035 and 8541.40.6045). However, the adjusted import statistics presented may include additional items that are specifically excluded from the scope of these orders.

THE PRODUCT

Description and applications

Description[64]

CSPV cells (figure I-2) use crystalline silicon to convert sunlight to electricity and are the basic elements of a module. They have a positive layer, a negative layer and a positive-negative junction (p/n junction). Electricity is generated when sunlight strikes the CSPV cell, knocking electrons loose that flow onto thin metal "fingers" that run across the CSPV cell and conduct electricity to the busbars.[65] Most CSPV cells, as of 2017, were 156.0 mm by 156.0 mm (6.14 inches by 6.14 inches) or 156.75 mm by 156.75 mm (6.17 inches by 6.17 inches).[66] As of 2017, CSPV cells typically have wattages[67] ranging from 4 watts to more than 5 watts per cell. Cells are the essential element in CSPV modules (also commonly referred to as panels), which in turn are the main components of CSPV systems. Solar CSPV systems[68] convert sunlight into electricity for on-site use or for distribution through the electric grid.

(*...continued*)
Assembled Into Modules, From the People's Republic of China: Countervailing Duty Order, 77 FR 73017, December 7, 2012.

[64] This section is primarily from *Crystalline Silicon Photovoltaic Cells (Whether or not Partially or Fully Assembled into Other Products), Inv. No. TA-201-75*, USITC Publication 4739, November 2017, pp. I-11–17 and I-31–I-38. Citations to direct quotes, pictures, and data were retained.

[65] Electricity is carried from the thin metal strips on solar cells to wider metal strips known as busbars. These busbars are interconnected during the manufacturing process so that electricity is carried from the cell to the junction box.

[66] International Technology Roadmap for Photovoltaic ("ITRPV"), Results 2017 Including Maturity Report, Ninth Edition, September 2018, pp. 40–41, http://www.itrpv.net/.cm4all/uproc.php/0/ITRPV%20Ninth%20Edition%202018%20including%20maturity%20report%2020180904.pdf?cdp=a&_=165a39bbf90, retrieved December 18, 2018.

[67] This report discusses data in terms of watts ("W"), kilowatts ("kW" (equal to 1,000 watts)), megawatts ("MW" (1,000 kW)), and gigawatts ("GW" (1,000 MW)).

[68] In addition to CSPV products, there is commercial production of thin film photovoltaic products (which are not included in the scope of the investigation). Thin film cells and modules use a several micron thick layer of a photosensitive semiconductor material such as amorphous silicon ("a-Si"), cadmium telluride ("CdTe"), copper indium (gallium) (di)selenide ("CIS" or "CIGS") to convert sunlight to electricity.

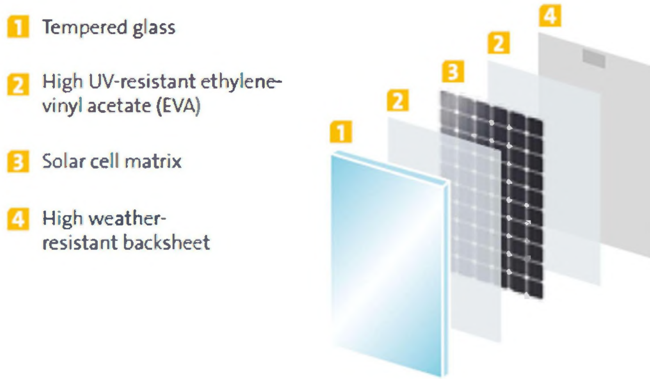
Figure I-2
CSPV cells

Source: SolarWorld Website, http://www.solarworld.de/en/group/from-sand-to-module/solar-cells/, retrieved July 6, 2017.

CSPV laminates consist of the CSPV cells that are connected, encapsulated in an ethyl vinyl acetate ("EVA") film,[69] and covered with a glass front sheet and a back sheet (figure I-3). The back sheet is most commonly a plastic film composite, though glass is also used in some applications such as bifacial modules.

[69] There are other encapsulation materials that are used, but EVA accounted for more than 90 percent of the market in 2017. ITRPV, Results 2017 Including Maturity Report, Ninth Edition, September 2018, p. 19.

Figure I-3
Layers of a typical CSPV laminate



Source: SolarWorld, "SolarWorld Quality," brochure, May 2014, p. 10, https://www.solarworld-usa.com/~/media/www/files/brochures/sw-01-7182us-flyer-solarworldquality.pdf.

CSPV modules typically consist of the laminate that is "framed" in aluminum, and then attached to a junction box. CSPV modules can be used in both ground-mounted and rooftop-mounted systems and in both the off-grid market segment and the three on-grid market segments—residential, nonresidential, and utility.[70] The junction box can be connected to other modules, an inverter (which converts the direct current generated by the system to alternating current), or, in the case of off-grid modules, a battery and a charge controller (which controls battery charging). Typical on-grid modules have 60, 72, or 96 CSPV cells, though in some instances CSPV cells are cut in half resulting in 120 or 144 half-cut CSPV cells (figure I-4).[71] CSPV 60-cell modules are, on average 65 inches long and 39 inches wide, and are typically 1.5 to 2 inches in depth. CSPV 60-cell modules commonly weigh between 33 to 51 pounds. CSPV 72-cell

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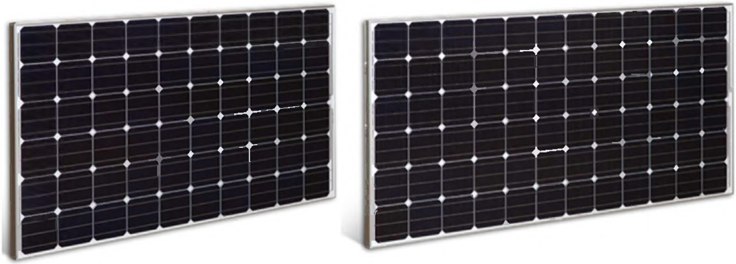
[70] Photovoltaics ("PV") do not include solar water heat and concentrated solar power ("CSP"). While PV uses a photosensitive semiconductor material to convert sunlight directly to electricity, solar water heat uses sunlight to heat water and CSP uses reflected sunlight to generate steam or a vapor that turns a turbine to generate electricity.

[71] Schwartz, Joe, "High-Power c-Si PV Module Specifications," *SolarPro*, Issue 10.3, May/June 2017, pp. 48–59, https://solarprofessional.com/articles/products-equipment/modules/high-power-c-si-pv-module-specifications-2017#.WV-8AP6Wx-A, retrieved December 18, 2018.

Figure I-4
CSPV 60-cell module (left) and 72-cell module (right)



Source: Suniva, Suniva Optimus Series Monocrystalline Solar Modules, OPT Series: OPT 72 cell modules (silver frame), brochure, January 18, 2017, http://suniva.com/documents/[SAMD_0060]%20Suniva%20Optimus%2060%20Silver%20OCOF%20Rev%205%202017%2001%2018.pdf, retrieved December 18, 2018; Suniva, Suniva Optimus Series Monocrystalline Solar Modules, OPT Series: OPT 60 cell modules (silver frame), brochure, January 18, 2017, http://suniva.com/documents/[SAMD_0051]%20Suniva%20Optimus%2072%20cell%2038mmOCOF%20-%20Rev%209%20-%202017%2001%2018.pdf, retrieved December 18, 2018.

modules are generally around 78 inches long, 39 inches wide, and 1.5 to 2 inches thick.[72] CSPV 72-cell modules generally weigh from 45 to 61 pounds.[73]

The two main types of CSPV cells and modules are monocrystalline silicon and multicrystalline (or polycrystalline) silicon, though there are various products within these two categories. Monocrystalline cells are made from a single grown crystal and tend to convert sunlight into electricity more efficiently. Multicrystalline cells have a random crystal structure and tend to have a lower conversion efficiency, though there are a range of conversion efficiencies for monocrystalline and multicrystalline modules.[74] For example, efficiencies for 72-cell or more multicrystalline modules listed in SolarPro's 2017 module specifications range

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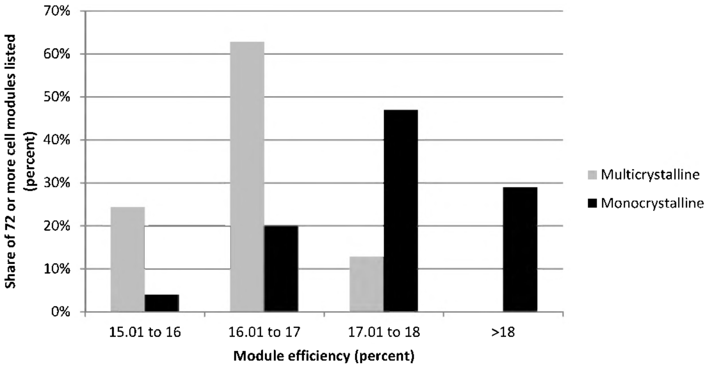
[72] EnergySage, "What is the Average Solar Panel Size and Weight?" n.d., http://news.energysage.com/average-solar-panel-size-weight/, retrieved July 7, 2017.

[73] Schwartz, Joe, "High-Power c-Si PV Module Specifications," *SolarPro*, Issue 10.3, May/June 2017, 48–59, https://solarprofessional.com/articles/products-equipment/modules/high-power-c-si-pv-module-specifications-2017#.WV-8AP6Wx-A, retrieved December 18, 2018.

[74] Conversion efficiency is the percent of sunlight that is converted to electricity.

from 15.2 to 17.8 percent, while efficiencies for monocrystalline modules range from 15.5 to 21.5 percent (figure I-5).[75]

Figure I-5
CSPV: Efficiencies of modules (72 or more cells, 300 or more watts) listed in SolarPro's 2017 module specifications



Note.--According to *SolarPro*, its 2017 list of CSPV module specifications includes "232 models with rated outputs of 300 W STC and greater from 29 manufacturers. The included models are listed and available for deployment in US-based projects. This c-Si specifications table is not intended to be exhaustive or all-inclusive; rather, our goal is to present comparative information on a wide cross-section of high-power PV solutions for utility, commercial and select residential projects." For comparison purposes, the data presented here include the models with 72 or more CSPV cells and for which a module efficiency was included.

Source: Schwartz, Joe, "High-Power c-Si PV Module Specifications," SolarPro, Issue 10.3, May/June 2017, pp. 48–59, https://solarprofessional.com/articles/products-equipment/modules/high-power-c-si-pv-module-specifications-2017#.WV-8AP6Wx-A, retrieved December 18, 2018.

[75] Schwartz, Joe, "High-Power c-Si PV Module Specifications," *SolarPro*, Issue 10.3, May/June 2017, pp. 48–59, https://solarprofessional.com/articles/products-equipment/modules/high-power-c-si-pv-module-specifications-2017#.WV-8AP6Wx-A, retrieved December 18, 2018.

The average output of 60-cell multicrystalline modules listed in SolarPro's 2017 module specifications was 268 watts and the average output of monocrystalline modules was 293 watts.[76] The average output of 72-cell multicrystalline modules listed in SolarPro's 2017 module specifications was 319 watts, while the average power output of 72-cell monocrystalline modules was 340 watts.[77]

The conversion efficiency of CSPV modules has increased over time, with the median efficiency of modules installed in U.S.-distributed systems, for example, increasing from 15.4 percent in 2012 to 17.3 percent in 2016 (figure I-6). The median efficiency of multicrystalline[78] modules (the only type for which separate data were available) installed in U.S. distributed systems increased from 14.7 percent to 16.8 percent during 2012–16.[79] Larger sized CSPV modules have also become more common, with 72-cell modules accounting for around 30 percent of global production in 2017.[80]

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[76] Schwartz, Joe, "60-Cell PV Modules Specifications (2017)," *SolarPro*, Issue 10.6, November/December 2017, pp. 42–53, http://solarprofessional.com/articles/products-equipment/modules/60-cell-pv-modules-specifications-2017#.W4_wns5JGUk, retrieved December 18, 2018.

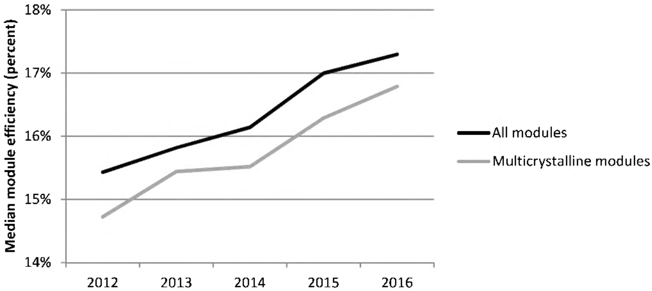
[77] *SolarPro's* module specifications only include modules of 300 watts or more. Data presented here for 72 cell modules include those with 144 half-cut cells. Schwartz, Joe, "High-Power c-Si PV Module Specifications," *SolarPro*, Issue 10.3, May/June 2017, pp. 48–59, https://solarprofessional.com/articles/products-equipment/modules/high-power-c-si-pv-module-specifications-2017#.WV-8AP6Wx-A, retrieved December 18, 2018.

[78] See "Description and uses" section of this report for further information on multicrystalline (or polycrystalline) silicon and monocrystalline silicon cells and modules.

[79] Data for all products may include some thin-film modules. Barbose, Galen and Naïm Darghouth, *Tracking the Sun X: The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States*, Data file, Lawrence Berkeley National Laboratory, September 2017, https://emp.lbl.gov/publications/tracking-sun-10-installed-price, retrieved December 18, 2018.

[80] ITRPV, Results 2017 Including Maturity Report, Ninth Edition, September 2018, p. 48.

Figure I-6
CSPV: Median efficiency of modules installed in U.S.-distributed systems, by year of installation



Note.--The "all modules" category may include some thin film products. This figure does not include 2017 data since data in the 2018 *Tracking the Sun* report are not comparable to earlier years.

Source: Barbose, Galen and Naïm Darghouth, *Tracking the Sun X: The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States*, Data file, Lawrence Berkeley National Laboratory, September 2017, https://emp.lbl.gov/publications/tracking-sun-10-installed-price, retrieved December 18, 2018; Barbose, Galen and Naïm Darghouth, *Tracking the Sun XI: Installed Price Trends for Distributed Photovoltaic Systems in the United States*, Lawrence Berkeley National Laboratory, September 2018, pp. 14–15, https://emp.lbl.gov/tracking-the-sun, retrieved December 18, 2018.

Within the broad areas of monocrystalline and multicrystalline products, there are a number of cell and module technologies. The production of passive emitter rear contact ("PERC") and related technologies is rapidly increasing, and these technologies accounted for more than 20 percent of cell production in 2017.[81] Manufacturers have also increased the number of busbars used in cells, with cells containing five or more busbars accounting for about 30 percent of global production in 2017.[82] Select cell and module technologies are described below:

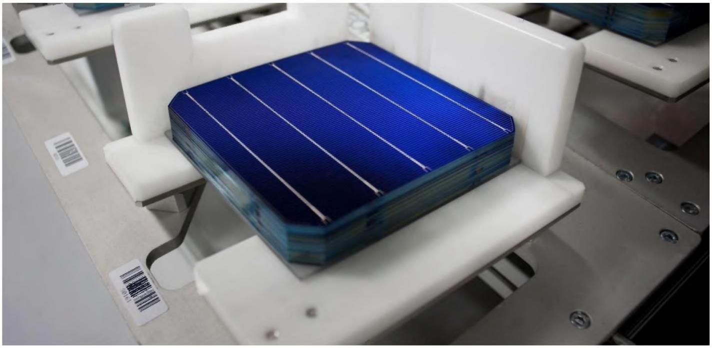
- **Back contact cells:** Some manufacturers place metal contacts onto the rear side of the cell, creating back (or rear contact) cells. This provides several advantages such as reduced shading, improved cell interconnection, and better aesthetics.
- **Bifacial:** Bifacial cells convert light that hits both the front and back of the CSPV cell into electricity. Whereas most CSPV cells have a metalized back layer, bifacial cells allow light through to the back side of the CSPV cell. They often incorporate either the PERC or heterojunction technologies discussed below. When incorporated into

[81] ITRPV, Results 2017 Including Maturity Report, Ninth Edition, September 2018, p. 42.
[82] Ibid., p. 35.

modules, they use a transparent back sheet or rear glass layer to allow reflected sunlight on the rear of the CSPV cell. Bifacial cells increase energy production, but are also more expensive to produce.

- **Busbars:** Manufacturers are increasing the number of busbars in PV cells, which results in higher efficiency and greater power output (figure I-7). Some manufacturers have eliminated busbars, which can provide benefits such as reducing electrical losses and increasing the surface area of the cell that can absorb sunlight.

Figure I-7
CSPV cell containing five busbars



Source: SolarWorld Website, https://www.solarworld-usa.com/newsroom/media-downloads, retrieved September 4, 2017.

- **Frameless modules:** Some PV modules do not use a frame, which reduces costs. These modules typically use glass as the rear layer to ensure mechanical stability.
- **Half-cut cells:** Some manufacturers have switched to modules with half-cut cells. These are standard cells that are cut in half, such that a standard 60-cell module would instead have 120 half cells. Half-cut cells result in lower cell currents and, therefore, reduce power losses and increase cell efficiency and overall module output.
- **Heterojunction:** Heterojunction cells, which include heterojunction with intrinsic thin layer (HIT), add thin layers of photosensitive semiconductor materials (typically amorphous silicon) on top of a monocrystalline wafer. These additional layers increase the absorption of sunlight, and the overall efficiencies of the CSPV cells. They also perform better in hot climates than typical monocrystalline cells. They are more expensive to produce and are difficult to scale up to commercial production, however, so only a few companies currently produce this technology.

- **n-type mono:** In the production of most types of monocrystalline CSPV wafers, the silicon is doped with boron to create a positive electrical orientation. In the production of n-type mono wafers, the silicon is doped with phosphorous to create a negative electrical orientation. In the cell production process, a positive layer is added to create the p/n junction. n-type cells can be more expensive to produce, but have a number of benefits, such as higher conversion efficiencies, no light-induced degradation, and the potential use of less pure wafers.
- **Passive Emitter Rear Contact (PERC):** PERC cells incorporate an additional rear dielectric layer that reflects light that did not generate electricity as it initially passed through the CSPV cell back into the CSPV cell. There is, therefore, another opportunity for the CSPV cell to absorb this light. PERC cells have a higher efficiency, and improved performance in certain conditions, such as low light and high heat conditions. Existing CSPV cell production lines can be reconfigured to produce PERC cells with the addition of two steps. Therefore, the changeover to PERC technology is relatively straightforward, though there are some challenges with PERC technology such as the potential for more rapid cell degradation. Related technologies include Passivated Emitter Rear Totally Diffused (PERT) and Passivated Emitter Rear Locally Diffused (PERL).

In addition to standard size modules, CSPV cells can be used in building-integrated PV ("BIPV modules" or "BIPV products"). BIPV products are materials integrated into the building envelope, such as the façade or roof, containing CSPV cells. These building integrated materials replace conventional construction materials, such as glass or roof shingles, taking over the function that conventional materials would otherwise perform while also producing electricity (figure I-8).

CSPV modules are also used in off-grid applications. In many instances, modules typically used in on-grid applications may also be used in off-grid applications. For example, a house that is not connected to the electrical grid could use the same modules as a house that is grid-connected. However, there are a broad range of off-grid applications, such as power generation in remote locations, mobile power solutions, telecommunications power and lighting systems, and portable consumer goods (such as systems for recharging consumer electronics like tablets and phones) (figure I-9). The CSPV modules used in some of these applications may be different from those typically used in on-grid applications. For example, these products are often designed for specific power and portability requirements, and some modules have different wattages than modules used in grid-connected applications.

Figure I-12
La Ola PV plant, a utility CSPV system on Lanai, Hawaii

Source: Photo courtesy of DOE/NREL, credit Jamie Keller, https://www.nrel.gov/.

As noted above, there are a broad range of off-grid applications, such as power generation in remote locations, mobile power solutions, telecommunications power and lighting systems, and portable consumer goods (such as systems for recharging consumer electronics like tablets and phones). These systems often have additional BOS components, such as a battery and charge controller, though inverters are not needed for all off-grid applications.

Manufacturing processes[90]

There are five principal stages involved in the manufacture of CSPV products. First, polysilicon is refined, then it is formed into ingots, which are sliced into wafers, converted to CSPV cells, and assembled into the finished product, modules (figure I-13). These are discrete production steps that may be done in different plants or locations. Companies may source products at each stage of the value chain or produce the products in-house. CSPV cells and modules are tested and inspected during the production process.[91] The ingot and wafer production process differs for monocrystalline and multicrystalline cells, as discussed below.

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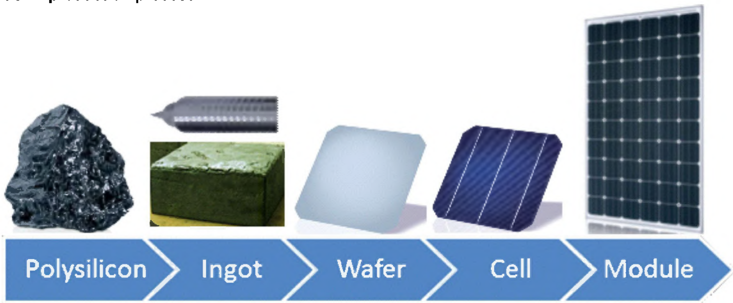
[90] This section is derived from *Crystalline Silicon Photovoltaic Cells (Whether or not Partially or Fully Assembled into Other Products), Inv. No. TA-201-75,* USITC Publication 4739, November 2017, pp. I-18–24. Citations to direct quotes, pictures, and data were retained.

[91] SolarWorld, "Real Value," 2016, https://www.solarworld-usa.com/why-choose-solarworld/the-solarworld-standard#Product_certifications, retrieved December 18, 2018.

Figure I-13
CSPV production process



Note.--For ingots, the top picture is a crystal used in monocrystalline wafers, while the bottom picture is an ingot used in making multicrystalline wafers.

Source: SolarWorld, "Energy for You and Me" brochure, pp. 6–7, 9; ingot photo courtesy of DOE/NREL, credit John Wohlgemuth, Solarex, https://www.nrel.gov/.

Silicon refining

The first step in the CSPV value chain is refining polysilicon. There are multiple approaches to polysilicon refining. This discussion will focus on the Siemens method, which accounted for more than 85 percent of global production in 2017, and fluidized bed reactor ("FBR") technology, which accounts for most of the remaining market.[92]

In the first step in the Siemens process, quartz (silicon dioxide) and carbon are heated to around 1,800 degrees Celsius. The carbon reacts with the oxygen, resulting in carbon dioxide and silicon with a purity of around 98 to 99 percent. The silicon is then combined with hydrogen chloride gas at 300 to 350 degrees Celsius, with the reaction resulting in the liquid trichlorosilane. Next, heated silicon rods are inserted into a Siemens reactor, where they are further heated to 1,000 degrees Celsius or more. Hydrogen and trichlorosilane gas are fed into the reactor. The silicon from the trichlorosilane is deposited onto the rods, which steadily increase in size until they are removed from the reactor about a week later. The resulting products are high purity polysilicon chunks or rocks.

Instead of inserting rods, "FBR uses seed granules of purified silicon. The seed granules are fed into a chamber that has heated silane gas entering from below and exiting above. The flow of gas 'fluidizes' the silicon granules, causing them to flow like a liquid, as the silane gas breaks down and deposits silicon layers on them. The granules grow larger and heavier and exit

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[92] ITRPV, Results 2017 Including Maturity Report, Ninth Edition, September 2018, p. 8.

when they are sufficiently large. As they do so, new seed granules and gas are introduced into the chamber and the process continues."[93] The FBR process, which is newer than the Siemens process, uses 80 to 90 percent less energy, requires a smaller footprint, is a continuous process, takes up less space in shipping, and can increase downstream production efficiency. However, the process is difficult to scale and achieve high purity production at low cost.

Ingots and wafers for monocrystalline cells

In the Czochralski process[94] for producing crystals used in monocrystalline wafers, polysilicon rocks are first placed into a quartz crucible along with a small amount of boron, which is used to provide a positive electric orientation (figure I-14). The crucible is then loaded into a Czochralski furnace and heated to about 2,500 degrees Fahrenheit. Once the polysilicon is melted, a seed crystal is lowered into the material and rotated, with the crucible rotated in the opposite direction. The melt starts to solidify on the seed and the seed is slowly raised out of the melt—creating a single long crystal. The crystal is then cooled before it is moved onto the next step. The process of growing the crystal takes about 2.5 days.

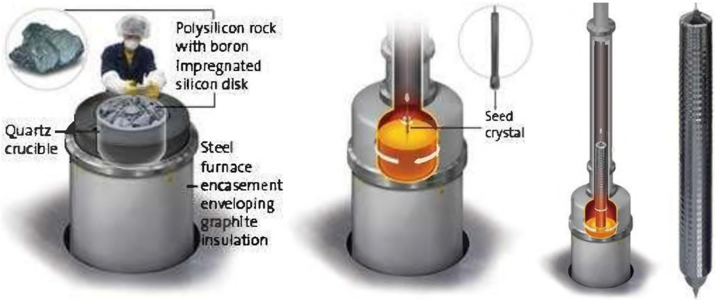
Once the crystal has cooled, it is processed into wafers. The top and tail (each end of the cylindrical crystal) are cut off (figure I-15). The remaining portion of the crystal (or ingot) is cut into equal length pieces and then it is squared. In squaring, the rounded sides of the ingot are cut into four flat sides, leaving only rounded corners. A wire saw then slices the ingots into wafers. A majority of global manufacturers have switched to diamond wire saws for monocrystalline wafer slicing, which has several benefits including increasing the speed of the production process. The wafers are then cleaned, dried, and inspected.

[93] REC Silicon website, http://www.recsilicon.com/technology/rec-silicons-fluidized-bed-reactor-process, retrieved June 12, 2017.

[94] This discussion will focus on the Czochralski process, which accounted for more than 95 percent of production in 2016. ITRPV, 2016 Results, March 2017, p. 19, http://www.itrpv.net/.cm4all/iproc.php/ITRPV%20Eighth%20Edition%202017.pdf?cdp=a, retrieved December 18, 2018.

Figure I-14

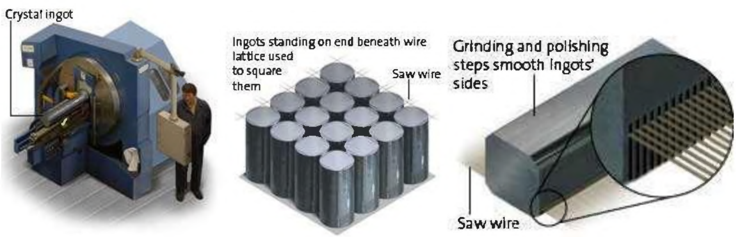
Czochralski process, crucible loading/charging (left), seed crystal (second from left), crystal growing (second from right), and finished crystal (right)



Source: SolarWorld Website, https://www.solarworld-usa.com/solar-101/making-solar-panels, retrieved July 15, 2017.

Figure I-15

Wafer production: Cutting off the top and tail (left), squaring (middle), and slicing into wafers (right)



Source: SolarWorld Website, https://www.solarworld-usa.com/solar-101/making-solar-panels, retrieved July 15, 2017.

Ingots and wafers for multicrystalline cells

For multicrystalline ingots, the first step is also loading polysilicon into a crucible. This crucible is then loaded into a directional solidification systems ("DSS") furnace, where it is cast into ingots. The ingot is then cut into blocks. These blocks are tested and any parts of the block that do not pass these tests are cropped off. The blocks are sliced into wafers using a wire saw.

Finally, the wafers are cleaned, dried, and inspected. This process results in square wafers, while the monocrystalline process results in wafers with rounded corners.

CSPV cells[95]

The monocrystalline and multicrystalline wafers, which are 180 to 200 micrometers thick, are next processed into CSPV cells. CSPV cell production is capital intensive and requires a skilled workforce. Some firms use a highly automated manufacturing process, while others mix automation and manual labor in their production processes. The main steps in CSPV cell production are as follows: [96]

- **Cleaning and texturing:** First, the wafers are cleaned, then the surface of the wafer undergoes a chemical treatment that reduces the reflection of sunlight and increases light absorption (figure I-16).
- **Diffusion:** In the next step, "phosphorus is diffused into a thin layer of the wafer surface. The molecular-level impregnation occurs as the wafer surface is exposed to phosphorus gas at a high heat, a step that gives the surface a negative potential electrical orientation. The combination of that layer and the boron-doped layer below creates a positive-negative, or p/n, junction–a critical partition in the functioning of a PV cell."[97]
- **Edge isolation:** A thin layer of silicon is then removed from the edge of the CSPV cell to separate the positive and negative layers.
- **Coating:** Next, a silicon nitride antireflective coating is added to the PV cells to increase the absorption of sunlight.
- **Printing:** Metals are then printed on the solar CSPV cell to collect the electricity. On the front of the CSPV cell, these metals are printed in thin metal strips called fingers, which are connected to the rest of the module via busbars. A metal layer, typically aluminum, is also printed on the back of the CSPV cell.
- **Co-firing:** The CSPV cells then enter a furnace, where the "high temperature causes the silver paste to become imbedded in the surface of the silicon layer, forming a reliable electrical contact."[98]
- **Testing and sorting:** The final step in the process is the testing and sorting of the CSPV cells based on their characteristics and efficiency.

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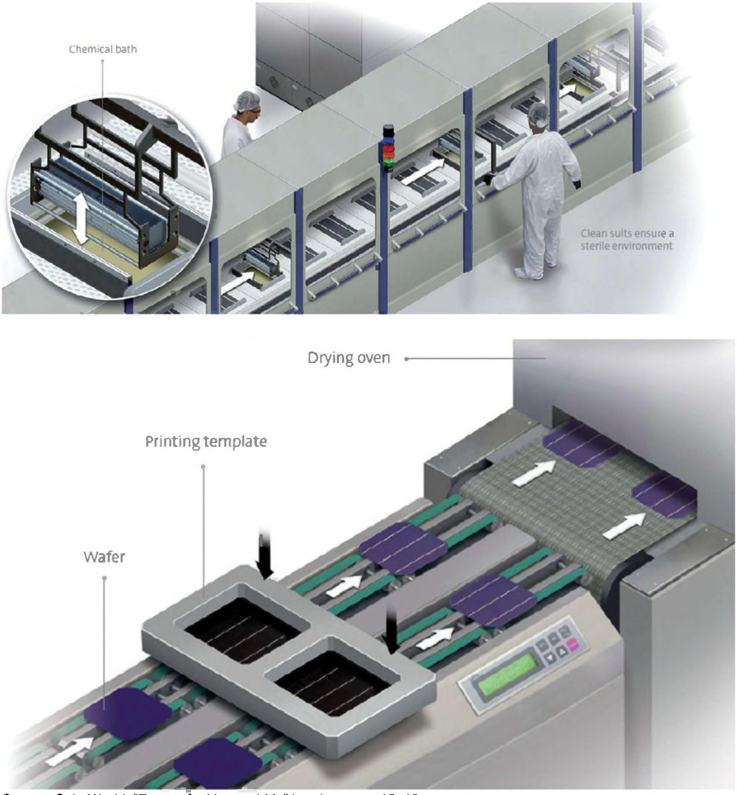
[95] The cell manufacturing process varies by company and technology.

[96] This section will discuss the general manufacturing process. There may be additional steps for certain technologies.

[97] SolarWorld, "Energy for You and Me" brochure, p. 12.

[98] JA Solar, "Form 20-F," April 16, 2013, p. 41.

Figure I-16
CSPV cell production: Texturing (top) and screen printing (bottom)

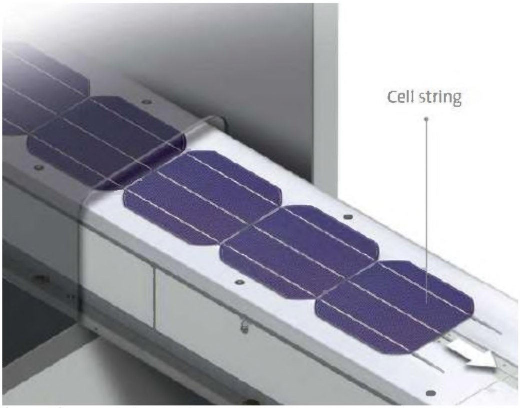


Source: SolarWorld, “Energy for You and Me” brochure, pp. 12–13.

Modules

The CSPV cells are next assembled into modules. The extent of automation and manual labor involved in module assembly varies depending on the company, though it is generally the most labor-intensive part of the manufacturing process. First, a string of CSPV cells is soldered together (figure I-17). A piece of glass is placed on the production line, on top of which is added a piece of ethyl vinyl acetate ("EVA"). The CSPV cells are laid out in a rectangular matrix that will provide the appropriate wattage and power requirements. Typically, a sealant is added, often EVA, and a back sheet is added. The CSPV cells are then laminated in a vacuum and are cured. At this stage, the CSPV cells are referred to as a "laminate." Frames are then usually attached to the laminate, and a junction box is attached to the back. In the final step, modules are cleaned and inspected.

Figure I-17
Soldering CSPV cells together into strings



Source: SolarWorld, "Energy for You and Me" brochure, pp. 12–13.

DOMESTIC LIKE PRODUCT ISSUES

The domestic like product is defined as the domestically produced product or products which are like, or in the absence of like, most similar in characteristics and uses with, the subject merchandise. In the previous *CSPV 1* and *CSPV 2* antidumping and countervailing duty determinations, the Commission found one domestic like product consisting of CSPV cells and

EXHIBIT 13

UNITED STATES DEPARTMENT OF COMMERCE
International Trade Administration
Washington, D.C. 20230

A-570-979
C-570-980
Scope Inquiry: ET Solar
~~Business Proprietary Information~~ **Public Version**
E&C/OVII: LC

June 15, 2021

MEMORANDUM TO: James Maeder
Deputy Assistant Secretary
for Antidumping and Countervailing Duty Operations

THROUGH: Melissa G. Skinner
Senior Director, Office VII
Antidumping and Countervailing Duty Operations

FROM: Lauren Caserta LNC
International Trade Compliance Analyst, Office VII
Antidumping and Countervailing Duty Operations

RE: Final Scope Ruling on the Antidumping and Countervailing Duty Orders on Crystalline Silicon Photovoltaic Cells from the People's Republic of China: ET Solar Inc.

I. SUMMARY

On March 30, 2021, the Department of Commerce (Commerce) issued a preliminary scope ruling regarding solar modules imported by ET Solar Inc. (ET Solar) that are manufactured in Vietnam using certain components fabricated in the People's Republic of China (China).[1] At ET Solar's request,[2] the relevant scope inquiry was initiated to determine whether the solar modules at issue are covered by the antidumping duty (AD) and countervailing duty (CVD) orders on crystalline silicon photovoltaic cells (solar cells) from China.[3] Commerce examined the plain

[1] *See* Memorandum, "Preliminary Scope Ruling on the Antidumping and Countervailing Duty Orders on Crystalline Silicon Photovoltaic Cells from the People's Republic of China: ET Solar Inc.," dated March 30, 2021 (Preliminary Scope Ruling).
[2] *See* ET Solar's Letter, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China: Request for Scope Ruling on Certain Solar Modules Manufactured in Vietnam," dated June 4, 2020 (Incomplete Scope Request); *see also* ET Solar's Letter, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China: Supplemental Questionnaire," dated July 14, 2020 (Supplemental Scope Response).
[3] *See Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China: Amended Final Determination of Sales at Less Than Fair Value, and Antidumping Duty Order*, 77 FR 73018 (December 7, 2012) and *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China: Countervailing Duty Order*, 77 FR 73017 (December 7, 2012) (collectively, *Orders*).

language of the orders and performed a substantial transformation analysis to determine the country-of-origin of the merchandise at issue. Based on these analyses, Commerce preliminarily found that ET Solar's imported solar modules were within the scope of the *Orders*.[4]

II. BACKGROUND

On June 4, 2020, Commerce received an incomplete request from importer ET Solar to determine whether certain solar modules imported from Vietnam to the United States that contain unfinished solar cells from China are outside the scope of the *Orders*.[5] Commerce reviewed the information contained in this initial submission and determined it to be insufficient to make a scope determination with respect to the merchandise imported by ET Solar. On June 30, 2020, Commerce issued a supplemental questionnaire to ET Solar requesting further information and documentation regarding the complete production process for the merchandise at issue, which takes place partially in China and partially in Vietnam.[6] ET Solar submitted its supplemental response and additional documentation between July 2, 2020, and July 14, 2020.[7] Pursuant to 19 CFR 351.225(e), on August 27, 2020, Commerce initiated a formal scope inquiry and provided parties with 20 days to submit comments and factual information relating to this scope inquiry and 10 days to submit rebuttal comments.[8] Commerce received no comments in response to this initiation.

On January 21, 2021, Commerce issued a request for additional information pertaining to the five factors normally considered when using a substantial transformation analysis to determine a product's country of origin.[9] Commerce received responses from ET Solar and the American Alliance for Solar Manufacturing (the Alliance).[10]

Based on the information provided by ET Solar and the Alliance, Commerce issued its Preliminary Scope Ruling, as well as the source documentation (*e.g.*, prior scope rulings, excerpts from the petition, and a prior ruling issued by U.S. Customs and Border Protection) relied on in its preliminary analysis, on March 30, 2021.[11] Interested parties were invited to

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[4] *See* Preliminary Scope Ruling.
[5] *See* Incomplete Scope Request.
[6] *See* Commerce's Letter, "ET Solar Scope Ruling Request: Supplemental Questionnaire," dated June 30, 2020.
[7] *See* Supplemental Scope Response; *see also* ET Solar's Letter, "Scope Ruling Request in Crystalline Silicon Photovoltaic Cells from China: Submission of Form 7501 for APO Application," dated July 2, 2020.
[8] *See* Commerce's Letter, "Crystalline Silicon Photovoltaic Cells from the People's Republic of China: Initiation of Scope Inquiry on Certain Solar Modules Imported from Vietnam Containing Components Manufactured in the People's Republic of China," dated August 27, 2020.
[9] *See* Memorandum, "Crystalline Silicon Photovoltaic Cells from the People's Republic of China: Request for Additional Information," dated January 21, 2021; *see also* Memorandum, "Crystalline Silicon Photovoltaic Cells from the People's Republic of China: Deadline Correction for Additional Information Request," dated January 22, 2021.
[10] *See* ET Solar's Letter, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China: Response to Request for Information," dated February 12, 2021; and the Alliance's Letter, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China: Response to Request for Information," dated February 12, 2021.
[11] *See* Preliminary Scope Ruling and associated attachments.

comment on the Preliminary Scope Ruling.[12] On May 12, 2021, Commerce received a case brief from ET Solar.[13] On May 19, 2021, Commerce received a rebuttal brief from the Alliance.[14]

Commerce has reviewed and analyzed all evidence and arguments on the administrative record and continues to find that the solar modules imported by ET Solar are subject to the scope of the *Orders*. Commerce's analysis for the final scope ruling is unchanged from the analysis contained in the Preliminary Scope Ruling. We have provided our responses to the interested parties' comments on the Preliminary Scope Ruling in the "Discussion of the Issues" section of this memorandum.

III. SCOPE OF THE *ORDERS*

The merchandise covered by these *Orders* is crystalline silicon photovoltaic cells, and modules, laminates, and panels, consisting of crystalline silicon photovoltaic cells, whether or not partially or fully assembled into other products, including, but not limited to, modules, laminates, panels and building integrated materials.

These *Orders* cover crystalline silicon photovoltaic cells of thickness equal to or greater than 20 micrometers, having a p/n junction formed by any means, whether or not the cell has undergone other processing, including, but not limited to, cleaning, *etc*hing, coating, and/or addition of materials (including, but not limited to, metallization and conductor patterns) to collect and forward the electricity that is generated by the cell.

Merchandise under consideration may be described at the time of importation as parts for final finished products that are assembled after importation, including, but not limited to, modules, laminates, panels, building-integrated modules, building-integrated panels, or other finished goods kits. Such parts that otherwise meet the definition of merchandise under consideration are included in the scope of these *Orders*.

Excluded from the scope of these *Orders* are thin film photovoltaic products produced from amorphous silicon (a-Si), cadmium telluride (CdTe), or copper indium gallium selenide (CIGS). Also excluded from the scope of these *Orders* are crystalline silicon photovoltaic cells, not exceeding 10,000mm^2 in surface area, that are permanently integrated into a consumer good whose function is other than power generation and that consumes the electricity generated by the integrated crystalline silicon photovoltaic cell. Where more than one cell is permanently integrated into a consumer good, the surface area for purposes of this exclusion shall be the total combined surface area of all cells that are integrated into the consumer good.

Modules, laminates, and panels produced in a third-country from cells produced in China are covered by these *Orders*; however, modules, laminates, and panels produced in China from cells

[12] *See* Memorandum, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China: Scope Ruling Request from ET Solar: Briefing Schedule," dated May 5, 2021.
[13] *See* ET Solar's Letter, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China: Final Scope Case Brief," dated May 12, 2021 (ET Solar's Case Brief).
[14] *See* the Alliance's Letter, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China: Scope Rebuttal Brief," dated May 19, 2021 (Alliance's Rebuttal Brief).

produced in a third-country are not covered by these *Orders*.

Merchandise covered by these *Orders* is currently classified in the Harmonized Tariff Schedule of the United States (HTSUS) under subheadings 8501.61.0000, 8507.20.80, 8541.40.6015, 8541.40.6020, 8541.40.6025, 8541.40.6030, 8541.40.6035, 8541.40.6045, and 8501.31.8000. These HTSUS subheadings are provided for convenience and customs purposes; the written description of the scope of these *Orders* is dispositive.

IV. DESCRIPTION OF MERCHANDISE SUBJECT TO THIS REQUEST

The merchandise at issue is solar modules that are assembled in Vietnam and imported into the United States by ET Solar, located in Pleasanton, CA.[15] Multiple companies located in China, Hong Kong, and Vietnam are involved in the supply and production chains for the finished modules, which consist of individual solar cells fabricated from silicon wafers.[16]

According to ET Solar, the production process for the modules at issue begins in China, where silicon wafers are manufactured and processed by [ ].[17] First, silicon wafers are cleaned and textured before a phosphorous dopant is diffused into the boron-doped wafer to form a p/n junction.[18] [ ] then removes a thin layer of silicon from the edge of the unfinished cell to separate the positive and negative layers created during the diffusion process, and applies an anti-reflective coating to the front of the cell that optimizes its ability to absorb sunlight.[19] These cells are then purchased by a Vietnamese company, Ha Noi Solar Technology Company Limited (Ha Noi Solar), through a Hong Kong supplier, [ ].[20] The unfinished cells undergo further processing at Ha Noi Solar, where aluminum and silver pastes are printed onto the surface of the cell to create an electrical grid capable of collecting the energy generated by the cell.[21] Ha Noi Solar then dries, sinters, tests, and sorts the cells, which are subsequently sold to companies that produce solar modules made up of multiple cells.[22]

To fabricate the modules at issue, finished solar cells are purchased from Ha Noi Solar by KRSolar Technology Co., Ltd. (KRSolar), an intermediary company [ ], and sold to Green Wing Solar Technology Co., Ltd. (GW Solar), a module production company located in Vietnam.[23] KR Solar also provides GW Solar with all other raw materials necessary to produce finished solar modules.[24] GW Solar then solders cells together, adds glass and an ethyl vinyl acetate (EVA) coating, and arranges cells into a matrix before sealing and laminating

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[15] *See* Incomplete Scope Request at 2-3.
[16] *Id*.
[17] *Id*. at 2.
[18] *See* Supplemental Scope Response at 2-3 and Exhibit 14.
[19] *Id*.
[20] *See* Incomplete Scope Request at 2; *see also* Supplemental Scope Response at 2 and Exhibit 14.
[21] *See* Incomplete Scope Request at 2 and 9; *see also* Supplemental Scope Response at 2 and Exhibit 14.
[22] *See* Incomplete Scope Request at 3 and 9; *see also* Supplemental Scope Response at 2 and Exhibit 14.
[23] *See* Incomplete Scope Request at 2-3; *see also* Supplemental Scope Response at 2 and Exhibit 14.
[24] *See* Incomplete Scope Request at 3; *see also* Supplemental Scope Response at 2, 4, and Exhibits 6 and 14.

them.[25] Frames and junctions boxes are then affixed to the joined cells, and the finished modules are cleaned and inspected before being sold back to KR Solar.[26] ET Solar then purchases the finished solar modules from KR Solar for importation to the United States.[27]

V. LEGAL FRAMEWORK

When a request for a scope ruling is filed, Commerce examines the scope language of the order(s) at issue and the description of the product contained in the scope ruling request.[28] Pursuant to Commerce's regulations, Commerce may also examine other information, including the description of the merchandise contained in the petition, the records from the investigations, and relevant prior scope determinations made for similar products.[29] If Commerce determines that these sources are sufficient to decide the matter, it will issue a final scope ruling stating whether the merchandise is covered by the order(s).[30]

Where the descriptions of the merchandise in the sources described in 19 CFR 351.225(k)(1) are not dispositive, Commerce will consider the five additional factors set forth at 19 CFR 351.225(k)(2). These factors are: (i) the physical characteristics of the merchandise; (ii) the expectations of the ultimate purchasers; (iii) the ultimate use of the product; (iv) the channels of trade in which the product is sold; and (v) the manner in which the product is advertised and displayed. The determination as to which analytical framework is most appropriate in any given scope proceeding is made on a case-by-case basis after consideration of all evidence before Commerce.

Because AD and CVD orders apply to merchandise from particular countries, determining the country where the merchandise is produced is fundamental to proper administration and enforcement of the AD and CVD statute. The scope of an AD or CVD order is limited to merchandise that originates in the country covered by the order.[31] Commerce has explicitly stated that the scope of an AD order is "defined by the type of merchandise and the country-of-origin."[32]

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[25] *See* Incomplete Scope Request at 3; *see also* Supplemental Scope Response at 2 and Exhibit 14.
[26] *Id*.
[27] *Id.*
[28] *See Walgreen Co. v. United States*, 620 F.3d 1350, 1357 (Fed. Cir. 2010).
[29] *See* 19 CFR 351.225(k)(1).
[30] *See* 19 CFR 351.225(d).
[31] *See Stainless Steel Plate in Coils from Belgium: Final Results of Antidumping Duty Administrative Review*, 69 FR 74495 (December 14, 2004) (*SSPC from Belgium*) and the accompanying Issues and Decision Memorandum at Comment 4.
[32] *See Notice of Final Determination of Sales at Less Than Fair Value: Certain Cold-Rolled Carbon Steel Flat Products from Argentina*, 58 FR 37062 (July 9, 1993), where Commerce stated that "{the} scope of an antidumping or countervailing duty order is defined by the type of merchandise and by the country of origin (*e.g.*, widgets from Ruritania). For merchandise to be subject to an order it must meet both parameters, *i.e.*, product type and country of origin. In determining country of origin for scope purposes, Commerce applies a 'substantial transformation rule.'" This language was quoted by the Court of International Trade in *Advanced Tech & Materials Co., Ltd. v. United States*, 35 C.I.T. 1380, 1384 (CIT 2011) and *Ugine and ALZ Belgium*, *N.V. v. United States*, 517 F. Supp 2d 1333, 1345 (CIT 2007).

In determining the country-of-origin of a product, Commerce's practice has been to conduct a substantial transformation analysis.[33] The Court of International Trade (CIT) has upheld Commerce's "substantial transformation" analysis as a means to carry out its country-of-origin analysis.[34] The CIT states that "{the} 'substantial transformation' rule provides a yardstick for determining whether the processes performed on merchandise in a country are of such significance as to require that the resulting merchandise be considered the product of the country in which the transformation occurred."[35] Because the scope request addressed modules assembled in a third country that contain unfinished solar cells manufactured in China, we have used a substantial transformation analysis to determine whether the merchandise imported by ET Solar should be covered by the scope of the *Orders*.

VI. DISCUSSION OF THE ISSUES

Comment 1: Whether the Chinese-Origin Components Imported to Vietnam for Use in the Manufacture of the Modules at Issue are Solar Cells under the Scope of the *Orders*

ET Solar's Arguments:

- The scope of the *Orders* references "crystalline silicon photovoltaic *cells*" and "modules, laminates, and panels produced in a third-country from *cells* produced in China."[36] However, the plain language of the *Orders* does not specifically reference silicon wafers imported from China. Thus, the *Orders* would not apply to the merchandise at issue, which contains silicon wafers imported from China.[37]
- The scope of the *Orders* includes "crystalline silicon photovoltaic cells, and modules, laminates, and panels," which accordingly fall within the same class or kind of merchandise.[38] However, the term "silicon wafers" is presumed to have been deliberately excluded from this description by Commerce because the scope was not intended to cover silicon wafers.[39]
- Because of the presumably deliberate exclusion of the term "solar wafer" from the description of the scope of the *Orders*, Commerce cannot now determine that silicon wafers fall within the same class or kind of merchandise as solar cells, modules, laminates, and panels within the context of the substantial transformation analysis.[40]

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[33] *See*, *e.g.*, *Notice of Final Determination of Sales at Less Than Fair Value: Glycine from India*, 73 FR 16640 (March 28, 2008), and accompanying Issues and Decision Memorandum at Comment 5; *see also SSPC from Belgium* and accompanying Issues and Decision Memorandum at Comment 4.

[34] *See E.I. DuPont De Nemours & Company v. United States*, 8 F. Supp. 692, 695 (CIT 1993) as "noting that in determining if merchandise exported from an intermediate country is covered by an antidumping order, Commerce identified the country of origin by considering whether the essential component is substantially transformed in the country of exportation."

[35] *Id*.

[36] *See* ET Solar's Case Brief at 3 (emphasis in the original).

[37] *Id*. at 3-4.

[38] *Id*. at 4.

[39] *Id*. at 4-5.

[40] *Id*.

The Alliance's Arguments:

- The scope of the *Orders* clearly defines solar cells as having "a p/n junction formed by any means, *whether or not* the cell has undergone other processing" that includes, but is not limited to, the addition of metallization materials and conductor patterns.[41]
- Commerce previously noted in the Preliminary Scope Ruling that "it is the addition of a p/n junction that transforms a silicon wafer into a solar cell, even if the cell itself lacks certain additional processing that must be performed before cells can be used to transmit or channel electricity once they are assembled into solar modules or panels."[42]
- Despite ET Solar's attempt to reclassify the product produced in China and exported to Vietnam as a "solar wafer," this product is already a Chinese solar cell because it contains a p/n junction formed when phosphorous is diffused into the boron-infused silicon wafers in China.[43]
- Commerce should reject ET Solar's attempt to classify the product imported from China for further processing in Vietnam as a "wafer" simply because this word is not referenced in the language of the scope. Commerce should instead continue to find that the scope description of the *Orders* is dispositive and clearly contemplates the coverage of solar cells with p/n junctions formed in China prior to third-country processing.[44]
- In the Preliminary Scope Ruling, Commerce correctly determined that both the upstream product produced in China and the downstream product finished in Vietnam were of the same class or kind of product.[45] Regardless of whether the word "wafer" appears in the scope language of the *Orders*, the merchandise imported into Vietnam from China is considered to be a solar cell because it contains a p/n junction.[46]
- The merchandise imported into Vietnam from China is necessarily of the same class or kind of merchandise as fully finished solar cells and solar modules produced in Vietnam because they all contain a p/n junction.[47] Both the unfinished solar cells produced in China and the finished solar cells produced in Vietnam would also fall under the same HTSUS subheading as a result.[48]

Analysis:

Commerce agrees with the Alliance that the products exported from China and imported by Ha Noi Solar to be used in the construction of ET Solar's imported modules are solar cells, rather than solar wafers, in the context of the *Orders*. Consistent with the Preliminary Scope Ruling, Commerce finds that the process of imbuing silicon wafers with a p/n junction results in the creation of solar cells – albeit unfished solar cells – capable of converting sunlight into electricity via the photovoltaic effect.[49]

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[41] *See* the Alliance's Rebuttal Brief at 3.
[42] *Id*.
[43] *Id*.
[44] *Id*. at 3-4.
[45] *Id*. at 4.
[46] *Id*.
[47] *Id*.
[48] *Id*. at 5.
[49] *See* Preliminary Scope Ruling at 8-9, 11.

ET Solar's arguments regarding the plain language of the *Orders* as well as the class or kind component of the substantial transformation analysis are contingent upon its classification of the merchandise exported from China as "solar wafers" rather than "solar cells." However, the scope of the *Orders* clearly defines solar cells as "having a p/n junction formed by any means, whether or not the cell has undergone other processing, including, but not limited to, cleaning, *etc*hing, coating, and/or the addition of materials (including, but not limited to, metallization and conductor patterns) to collect and forward the electricity that is generated by the cell." The information placed on the record by ET Solar clearly indicates that a p/n junction is present in both the unfinished merchandise exported from China and the finished merchandise exported from Vietnam.[50] Thus, both types of merchandise are classified as solar cells under the plain language of the scope of the *Orders*, and would fall within the same class or kind of merchandise in the context of a substantial transformation analysis.

Comment 2: Whether Third Country Manufacturing Changes the Important Qualities or Use of the Merchandise at Issue

ET Solar's Arguments:
- As part of its substantial transformation analysis, Commerce must consider whether processing in the country of export changes the important qualities or use of the component at issue.[51] Commerce claims that a cell's p/n junction imparts the essential quality of a solar cell, which is its ability to convert sunlight into electricity via the photovoltaic effect.[52] However, ET Solar has already demonstrated in its previous responses that the wafers exported from China cannot yet generate electricity and are, therefore, useless from a commercial and consumer standpoint.[53]
- The ability to generate power is the most important quality and use of a finished solar cell, and the record demonstrates that this quality is fully imparted during the manufacturing process in Vietnam. Commerce should, thus, find that the silicon wafers subject to this inquiry are outside the scope of the *Orders*.[54]

The Alliance's Arguments:
- Commerce has previously concluded that the essential component of the solar cell is the p/n junction, which was formed in China prior to further processing in Vietnam.[55] ET Solar argues that the merchandise was substantially transformed in a third country because the process enabling electricity to be forwarded from the cell occurred in Vietnam. However, this ignores the plain language of the *Orders*, which clearly identifies a solar cell as containing a p/n junction "whether or not the cell has undergone other processing, including but not limited to … addition of other materials … to collect and forward the electricity that is generate by the cell."[56]

[50] *See* Preliminary Scope Ruling at 8-9.
[51] *See* ET Solar's Case Brief at 5.
[52] *Id*.
[53] *Id*. at 5-6.
[54] *Id*. at 6.
[55] *See* the Alliance's Case Brief at 5.
[56] *Id*. at 5-6.

- ET Solar has acknowledged that the p/n junction of the solar cell is formed in China. Because the essential component of the solar cell is the ability to generate power and this ability is conferred by the p/n junction formed in China, Commerce should continue to find that the merchandise imported from China was not substantially transformed in Vietnam.[57]

Analysis:

Commerce agrees with the Alliance that the essential component of the solar cell is the p/n junction that was formed in China, and that this component is present in both the unfinished merchandise exported from China and the finished merchandise exported from Vietnam. Consistent with the Preliminary Scope Ruling, Commerce finds that the final processing of these solar cells in a third country does not change the important qualities or use of the essential components contained in the merchandise at issue.[58]

ET Solar argues that the essential component of a solar cell is the cell's ability to "generate power," which happens once metallic grids and ohmic contacts are added to a silicon wafer containing a p/n junction (*i.e.*, an unfinished solar cell) that allow electricity to be channeled out of a cell. However, Commerce has previously determined that the p/n junction is responsible for creating the conditions that induce the photovoltaic effect that ultimately generates electricity, and that the metallic grids and contacts are only responsible for channeling this electricity out of the cell. As determined during the investigation, the addition of a dopant, "which is a trace impurity element diffused into a thin layer of the wafers' surface to impart an opposite electrical orientation to the cell surface, creates the positive/negative junction that is needed for the conversion of sunlight into electricity, which is the purpose of solar cells."[59] Furthermore, Commerce has determined in a previous scope ruling that the presence of a p/n junction is the factor which ultimately separates a non-subject solar wafer from a subject solar cell:

> In sum, the raw material purchased from China by Irex, partially processed solar wafers, does not fall within this scope because there is not yet a p/n junction. Since there is not yet a p/n junction, the raw material is not a photovoltaic cell from China within the meaning of the scope of the Orders. Therefore, based on the record evidence and descriptions submitted by SunSpark and the language of the scope of the Orders, the merchandise at issue in this scope inquiry is not within the scope of the Orders.[60]

The essential component of the merchandise at issue is not defined solely by reference to end-use or commercial utility, and the plain language of the *Orders* clearly covers certain unfinished solar cells that may require additional processing steps before they are assembled into working

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[57] *Id*. at 6.
[58] *See* Preliminary Scope Ruling at 11.
[59] *See* Memorandum, "Scope Clarification: Antidumping and Countervailing Duty Investigation of Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China," dated March 19, 2012.
[60] *See* Memorandum, "Antidumping and Countervailing Duty Orders on Crystalline Silicon Photovoltaic Cells from the People's Republic of China: SunSpark Technology Inc. Scope Ruling," dated October 23, 2020.

modules, implying that the essential component of a solar cell, module, or panel is completed before the final steps of processing necessary for consumer use. By analogy, a car is useless to a consumer without tires or a steering wheel, but it is doubtful that the addition of tires or a steering wheel to an otherwise complete car could reasonably be considered "substantial transformation." Moreover, the scope's explicit reference to both finished and unfinished products contradicts the notion that the essential component must be determined by reference to consumer utility, rather than to a solar cell's role as an intermediate product. Accepting ET Solar's rationale would result in a policy whereby substantial transformation would occur whenever final steps are taken in a third country that, however minor, are necessary for the consumer's use of the product. Thus, Commerce finds that further processing in Vietnam does not change the essential component of the solar cells at issue.

Comment 3: Whether the Nature of the Third-Country Processing in Vietnam is Substantial and Sophisticated

ET Solar's Arguments:

- As part of its substantial transformation analysis, Commerce must consider whether processing in the exporting country was substantial or sophisticated.[61] The record demonstrates that a number of companies are involved in the production of the merchandise at issue. Ha Noi Solar purchases unfinished silicon wafers from a Hong Kong supplier that are sourced from a manufacturer in China. Ha Noi Solar then transforms the wafers into fully functional solar cells in Vietnam.[62]
- The third-country manufacturing process requires four pieces of machinery: a serigraphy machine, a drying machine, a sintering machine, and a testing machine.[63] Wafers undergo a metallization process to form metallic grids and ohmic contacts on their surface. These contacts are critical points at which electricity generated and channeled across the wafer's surface is collected. Without the metallic grid created by the metallization process, the merchandise remains a non-functional silicon wafer.[64]
- Both sides of a wafer must be metallized and dried, then sintered to solidify the dry metal pastes onto the wafers. Once the wafers have been sintered, they have officially transitioned from solar wafers to unfinished solar cells.[65] In order to finish the solar cells and ready them for assembly into modules, they must be tested, classified, and sorted according to their efficiency ratings. Once this process is complete, the solar cell is deemed "finished."[66]
- The third-party information submitted to the record by the petitioners attempts to compare the manufacturing processes undertaken in China and Vietnam, but it does not contravene the fact that both processes are substantial and sophisticated.[67] The record clearly demonstrates that third-country processing in Vietnam is substantial and

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[61] *See* ET Solar's Case Brief at 6.
[62] *Id*.
[63] *Id*.
[64] *Id*. at 6-7.
[65] *Id*. at 7.
[66] *Id*.
[67] *Id*. at 7-8.

sophisticated, which counsels in favor of finding the merchandise at issue to be outside the scope of the *Orders*.[68]

The Alliance's Arguments:

- In the Preliminary Scope Ruling, Commerce correctly determined that the extent of manufacturing that takes place in China is "more capital intensive and critical to the functioning of a finished solar cell" than the third-country manufacturing in Vietnam. ET Solar does not dispute this finding in its case brief and, instead, argues that this does not necessarily mean that the processes occurring in Vietnam were not significant in their own right.[69]
- The most effective way for Commerce to consider meaningfully the sophistication of the processing steps completed in two countries is to compare them, and this methodology is typical of the considerations made by Commerce in a substantial transformation analysis. Commerce should continue to find that the "more capital-intensive and critical" processing steps that take place in China should weigh in favor of finding that the solar cells were not substantially transformed in Vietnam.[70]
- Commerce should also consider the fact that ET Solar does not dispute the disparity between Chinese and Vietnamese processing when determining which is more capital-intensive and critical to the formation of the solar cell.[71]

Analysis:

Consistent with the Preliminary Scope Ruling, Commerce continues to find that while the processes performed in Vietnam help enable the solar cell to harness the electricity it produces, the steps performed in China to create the conditions necessary to induce the photovoltaic effect are more complex and extensive by comparison. This indicates that the merchandise exported from China and imported into Vietnam by Ha Noi Solar was not substantially transformed by third-country processing.

ET Solar does not dispute the finding that the manufacturing processes undertaken in China are more substantial and sophisticated than those taking place in Vietnam. Rather, ET Solar argues that the manufacturing processes of both countries may be categorized as substantial and sophisticated, and that this conclusion should preclude a comparison of their relative intensities for the purposes of Commerce's substantial transformation analysis. However, ET Solar does not offer a convincing explanation as to why these processes should not be compared as part of Commerce's substantial transformation analysis.

In the Preliminary Scope Ruling, Commerce determined that the steps necessary to impart the essential character of a solar cell take place in China.[72] These steps include the diffusion of phosphorous into the boron-doped wafer to form the cell's p/n junction, the edging process which fully separates the positive and negative layers created during the diffusion process, and

[68] *Id*. at 8.
[69] *See* the Alliance's Rebuttal Brief at 6.
[70] *Id*. at 6-7.
[71] *Id*. at 7.
[72] *See* Preliminary Scope Ruling at 12.

the application of an anti-reflective coating to increase its ability to absorb sunlight.[73] The capital-intensive and critical steps performed in China, therefore, include the formation of the p/n junction which induces the photovoltaic effect, as well as the physical changes that support light absorption and the viability of the electrical paths inside the cell. As demonstrated by the information on the record, these steps take place before the cells are exported to Ha Noi Solar in Vietnam. By contrast, the steps performed in Vietnam (including metallization, sintering, testing, and sorting) only transform an unfinished solar cell into a finished solar cell by enabling the cell to channel the energy it creates. Ultimately, the steps performed in Vietnam do not encompass the formation of the essential component that defines both finished and unfinished solar cells. The scope language itself makes the p/n junction the defining characteristic of a "solar cell" within the meaning of the *Orders*, regardless of whether the cell has undergone further processing and, therefore, we cannot agree with ET Solar's arguments about substantial and sophisticated processing in Vietnam.

Comment 4: Whether the Cost of Production and Value Added to the Merchandise at Issue in the Third Country is Significant

ET Solar's Arguments:

- Commerce does not have an established threshold for determining whether the cost of processing in a third country by itself represents a substantial transformation. However, Commerce has previously found in *Peer Bearing Co. – Changshan* that a 38 percent increase to the cost of production counsels in favor of finding that substantial transformation has occurred, even when this added cost is less than the cost incurred in the subject country.[74]
- ET Solar has already submitted evidence to the record demonstrating that the total additional cost of production in Vietnam is near the level found determinative in *Peer Bearing Co. – Changshan*, while the total added value imparted in Vietnam is significantly higher. Both the cost of production and added value attributed to processing in Vietnam are significant, and the latter is substantial in both absolute and relative terms.[75]
- A complete analysis of this factor points to the conclusion that the wafers imported into Vietnam and incorporated into ET Solar's modules are substantially transformed in Vietnam.[76]

The Alliance's Arguments:

- Commerce should consider the limited cost of production and value added during processing in Vietnam as weighing in favor of finding that no substantial transformation has occurred. Alternatively, Commerce should continue to find that the portion of production costs attributed to Vietnamese processing does not outweigh the four other components of the substantial transformation analysis.[77]

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[73] *Id*.
[74] *See* the Alliance's Rebuttal Brief (citing *Peer Bearing Co. – Changshan v. United States*, 128 F. Supp.3d 1286, 1296 (CIT 2015) (*Peer Bearing Co. – Changshan*)).
[75] *Id*.
[76] *Id*.
[77] *See* the Alliance's Rebuttal Brief at 7.

- In [ ], Commerce previously found that third-country processing that accounts for [ ] percent of the cost of production did not indicate that substantial transformation occurred when considered with other factors.[78] ET Solar claims that the total added cost of production in Vietnam is "roughly [ ] percent." In this determination, Commerce states that it is "[ ]."[79]
- ET Solar cites *Peer Bearing Co. – Changshan* to support its claims regarding the cost of production and value added in Vietnam. While the CIT ultimately affirmed Commerce's revised determination that substantial transformation occurred in Thailand, Commerce noted in its determination that a third-country cost of manufacturing of 38 percent "was not so significant as to outweigh the other factors which the Department must take into account."[80] The CIT also noted that "even if this 38 percent value-added calculation were *disregarded*, the record still would contain substantial evidence to support the ultimate determination that the {product at issue was substantially transformed}."[81]
- In *Peer Bearing Co. – Changshan*, the evidence supporting the other four factors of the substantial transformation analysis included the fact that none of the parts made in China and exported to a third country for further processing "possessed the physical properties, mechanical properties, or essential character" of the completed product. As such, the facts of *Peer Bearing Co. – Changshan* differ significantly from ET Solar's inquiry, in which the essential characteristic of the merchandise – the p/n junction – is imparted in China.[82]
- Evidence on the record exists that undermines ET Solar's cost of production estimate. The expert witness cited by the Alliance estimated that the cost of production attributable to production occurring in Vietnam [ ] of the total cost of production, with [ ] attributable to production occurring in China.[83]
- The circumstances of ET Solar's inquiry are more analogous to *Bell Supply Co. v. United States*, in which the CIT found that the proprietary cost of manufacturing at issue was outweighed by the fact that the "essential component" of the unfinished and finished products was conferred in China prior to further processing in a third country.[84] Thus, Commerce should continue to find that the cost of production and value added during further processing should not overcome other record evidence that substantial transformation has not occurred.

Analysis:

Consistent with the Preliminary Scope Ruling and the arguments put forth by the Alliance, Commerce continues to find that the cost of production and value added in Vietnam do not

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[78] *Id.* (citing [ ]).
[79] *Id*. at 7.
[80] *Id*. at 8 (citing *Peer Bearing Co. – Changshan* at 1291).
[81] *Id*.
[82] *Id*. at 1293.
[83] *See* the Alliance's Rebuttal Brief at 8-9.
[84] *Id*. at 9 (citing *Bell Supply Co. v. United States*, 393 F. Supp. 3d 1229 (Ct. Int'l Trade 2019) (*Bell Supply Co. v. United States*) at 1243).

account for a portion of the overall solar cell production costs and price that is sufficient to outweigh the conclusions drawn from the other four factors of the substantial transformation analysis.[85] As noted by ET Solar in its case brief, Commerce does not have an established threshold for determining whether a certain cost in a third country, by itself, represents substantial transformation. Thus, Commerce has the discretion to weigh the non-insignificant portion of production costs and final prices that can be attributed to further processing in Vietnam against the other components of the overall analysis. ET Solar does not put forth any arguments in its case brief that lead Commerce to reconsider the importance of the cost of production and value-added factor when compared with the totality of factors under consideration for the merchandise at issue.

Comment 5: Whether the Level of Investment Imparted to the Merchandise at Issue in Vietnam is Significant

ET Solar's Arguments:

- Commerce affirmed in the Preliminary Scope Ruling that it has set no quantitative threshold for what qualifies as a significant level of investment for its substantial transformation analysis framework.[86] In *Peer Bearing Co. – Changshan*, the CIT held that a scenario in which processing in a subject country requires relatively more types of production equipment than processing in a third country does not necessarily support a finding that a third-country level of investment is not significant.[87]
- ET Solar has already demonstrated on the record that the baseline capital required to purchase the equipment and machinery necessary for the manufacturing process amounts to [ ].[88] This number represents a massive level of investment, and does not account for factory overhead, maintenance, labor, and raw material costs associated with processing in Vietnam.[89]
- Commerce must give greater weight to the specific investment data provided by ET Solar than the "general third-party musings regarding processes occurring in the subject country" provided by the Alliance. The record demonstrates that the level of investment attributed to processing in Vietnam is significant.[90]

The Alliance's Arguments:

- ET Solar cites *Peer Bearing Co. – Changshan* to support its claim that initial processing in a country that requires a greater amount of production equipment than further processing in a third country does not necessarily mean that a third-country level of investment is not significant.[91] However, that case can be distinguished from the facts of ET Solar's scope inquiry because the former involved Commerce's total reliance on qualitative data to support its initial determination that the relative levels of investment did not justify a finding of substantial transformation, as noted by the CIT.[92] ET Solar

[85] Preliminary Scope Ruling at 12-13.
[86] *See* ET Solar's Case Brief at 9.
[87] *Id*.
[88] *Id*.
[89] *Id*.
[90] *Id*.
[91] *Id*.
[92] *Id*. at 9-10.

did not provide a baseline for the cost of processing equipment in China, but the Alliance provided quantitative data regarding relative rates of capital depreciation that allow for a comparative calculation of relative investment levels.[93]

- The information provided by the Alliance demonstrates that the capital investment required for Chinese-based processing is substantially higher than that required for the processing that occurs in Vietnam.[94] Commerce should continue to find that the solar cell production processes that take place in China "are more technologically complex and capital-intensive than in Vietnam" and "require higher levels of capital investment."[95]

Analysis:

Consistent with the Preliminary Scope Ruling and the arguments put forth by the Alliance, Commerce continues to find that the information on the record demonstrates that the solar cell production processes occurring in China are more technologically complex and capital-intensive than in Vietnam, and thus require higher levels of capital investment.[96] In *Bell Supply Co. v. United States*, the CIT affirmed Commerce's comparison of the capital investment required for downstream processing as a proxy for the degree of transformation in a third country.[97] As noted in the CIT's determination:

> The greater the investment, the analysis goes, the greater the transformation of the product. This approach is reasonable, so as not to evaluate the level of investment in a vacuum. Different industries have different barriers to entry – a small capital investment in one industry might be significant in another. Therefore, in order to contextualize the investment in further processing, it is reasonable to compare the level of investment required at different processing stages within the same industry.[98]

ET Solar failed to provide a discussion of levels of investment in China that might serve as a basis for comparing initial China-based production stages with the further processing stages undertaken in Vietnam, and did not make any arguments in its case brief that lead Commerce to reconsider its determination regarding level of investment in the context of the substantial transformation analysis. Thus, Commerce continues to find that the level of investment associated with third-country processing in Vietnam is not indicative of a substantial transformation of the merchandise at issue.

VII. CONCLUSION

Based on the totality of the evidence and the comments made by both parties on the plain language of the orders and the five criteria of the substantial transformation analysis, Commerce

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[93] *Id*. at 10.
[94] *Id*.
[95] *Id*. at 9.
[96] Preliminary Scope Ruling at 13-14.
[97] *See Bell Supply Co. v. United States* at 23.
[98] *Id*.

continues to find that the unfinished Chinese solar cells used to produce the imported modules described by ET Solar in its scope inquiry are not substantially transformed as a result of the production processes undertaken in Vietnam. Accordingly, we continue to find that the modules at issue, as described in ET Solar's scope request, are within the scope of the *Orders*.

VIII. RECOMMENDATION

We recommend determining that the merchandise produced in Vietnam using certain Chinese-manufactured solar cells and imported by ET Solar is covered by the scope of the *Orders*. If you accept this recommendation, we will issue this final scope ruling.

☒ Agree　　　　☐ Disagree

6/15/2021

X James Maeder

Signed by: JAMES MAEDER

James Maeder
Deputy Assistant Secretary
for Antidumping and Countervailing Duty Operations

EXHIBIT 14

UNITED STATES DEPARTMENT OF COMMERCE
International Trade Administration
Washington, D.C. 20230

A-570-979, C-570-980, A-583-853
Scope Inquiry
Solar Cells and Products
Public Document
E&C/OVII: PS

April 8, 2021

MEMORANDUM TO: James Maeder
Deputy Assistant Secretary
for Antidumping and Countervailing Duty Operations

THROUGH: Melissa G. Skinner
Senior Director, Office VII
Antidumping and Countervailing Duty Operations

FROM: Peter Shaw
International Trade Compliance Analyst
Antidumping and Countervailing Duty Operations

SUBJECT: Antidumping and Countervailing Duty Orders on Crystalline Silicon Photovoltaic Cells from the People's Republic of China, and Certain Crystalline Silicon Photovoltaic Products from Taiwan: The Solaria Corporation Scope Ruling

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I. Summary

On January 19, 2021, the Department of Commerce (Commerce) received a scope ruling request from The Solaria Corporation (Solaria),[1] requesting that Commerce find Solaria's PowerXT photovoltaic (PV) cells and modules, manufactured in the Republic of Korea (Korea), are not included in the scope of the antidumping duty (AD) and countervailing duty (CVD) orders on crystalline silicon photovoltaic (CSPV) cells, whether or not assembled into modules from the People's Republic of China (China), and the AD order on certain crystalline silicon photovoltaic products from Taiwan (collectively, the *Orders*).[2] On the basis of our analysis of Solaria's

[1] *See* Solaria's Letter, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, from the People's Republic of China (A-570-979 and C-570-980); and Certain Crystalline Silicon Photovoltaic Products from Taiwan (A-583-853): Scope Ruling Request for Modules and Cells Manufactured In and Imported From Korea," dated January 15, 2021 (Solaria's Scope Request). We note that these requests were filed after 5pm on Friday, January 15, 2021. Because of that and the fact that Monday, January 18, 2021 was a Federal holiday and Commerce was closed, the filed date of these letters for purposes of calculating Commerce's deadlines is Tuesday, January 19, 2021.

[2] *See Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, from the People's Republic of China: Amended Final Determination of Sales at Less Than Fair Value, and Antidumping Duty Order*, 77 FR 73018 (December 7, 2012); and *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, from the People's Republic of China: Countervailing Duty Order,* 77 FR 73017 (December 7, 2012) (collectively, *China Solar I Orders*); *see also Certain Crystalline Silicon Photovoltaic Products from Taiwan: Antidumping Duty Order,* 80 FR 8596 (February 18, 2015) (*Taiwan Order*) (collectively, *Orders*).

request and the sources described in 19 CFR 351.225(k)(1), we determine that Solaria's PowerXT PV cells and modules are included in the scope of the *Orders*.

II. Background

On December 7, 2012, Commerce published the China Solar I Orders and on February 18, 2015, Commerce published the Taiwan Order.[3] On October 7, 2020, Solaria submitted a request for Commerce to issue a scope ruling that its PowerXT PV cells and modules are not included in the scope of the *Orders*.[4] On November 13, 2020, Commerce determined that the request was missing certain information that was necessary for Commerce to make a scope ruling and, accordingly, we rejected Solaria's scope request and issued a supplemental questionnaire to Solaria requesting additional information.[5] On January 19, 2021, Solaria submitted its responses to Commerce's supplemental questionnaire and refiled its original scope ruling request.[6]

On February 24, 2021, we extended the deadline for issuing a final scope ruling until April 19, 2021.[7] On April 1, 2021, we received comments from the American Alliance for Solar Manufacturing (the petitioner).[8]

III. Scope of the *Orders*

<u>*China Solar I Orders*</u>

The merchandise covered by the orders is crystalline silicon photovoltaic cells, and modules, laminates, and panels, consisting of crystalline silicon photovoltaic cells, whether or not partially or fully assembled into other products, including, but not limited to, modules, laminates, panels and building integrated materials.

The orders cover crystalline silicon photovoltaic cells of thickness equal to or greater than 20 micrometers, having a p/n junction formed by any means, whether or not the cell has undergone other processing, including, but not limited to, cleaning, etching, coating, and/or addition of materials (including, but not limited to, metallization and conductor patterns) to collect and forward the electricity that is generated by the cell.

Merchandise under consideration may be described at the time of importation as parts for final finished products that are assembled after importation, including, but not limited to, modules,

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[3] *See China Solar I Orders*; *see also Taiwan Order*.
[4] *See* Solaria's Letter, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China (A-570-979 and C-570-980); and Certain Crystalline Silicon Photovoltaic Products from Taiwan (A-583-853): Scope Ruling Request for Modules and Cells Manufactured In and Imported from Korea," dated October 7, 2020.
[5] *See* Commerce's Letter, "Scope Ruling Request on Solaria's Modules and Cells Manufactured in Korea, Supplemental Questionnaire," dated November 13, 2020.
[6] *See* Solaria's Scope Request.
[7] *See* Memorandum, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, from the People's Republic of China and Certain Crystalline Silicon Photovoltaic Products from Taiwan – Solaria's Scope Ruling Request: Extension," dated February 24, 2021.
[8] *See* Petitioner's Letter, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China, and Certain Crystalline Silicon Photovoltaic Products from Taiwan: Response to Solaria's Scope Ruling Request," dated April 1, 2021.

laminates, panels, building-integrated modules, building-integrated panels, or other finished goods kits. Such parts that otherwise meet the definition of merchandise under consideration are included in the scope of the orders.

Excluded from the scope of the orders are thin film photovoltaic products produced from amorphous silicon (a-Si), cadmium telluride (CdTe), or copper indium gallium selenide (CIGS). Also excluded from the scope of the orders are crystalline silicon photovoltaic cells, not exceeding 10,000 mm^2 in surface area, that are permanently integrated into a consumer good whose function is other than power generation and that consumes the electricity generated by the integrated crystalline silicon photovoltaic cell. Where more than one cell is permanently integrated into a consumer good, the surface area for purposes of this exclusion shall be the total combined surface area of all cells that are integrated into the consumer good.

Additionally, excluded from the scope of the orders are panels with surface area from 3,450 mm^2 to 33,782 mm^2 with one black wire and one red wire (each of type 22 AWG or 24 AWG not more than 206 mm in length when measured from panel extrusion), and not exceeding 2.9 volts, 1.1 amps, and 3.19 watts. For the purposes of this exclusion, no panel shall contain an internal battery or external computer peripheral ports.

Also excluded from the scope of the orders are:
(1) Off grid CSPV panels in rigid form with a glass cover, with the following characteristics:
(A) A total power output of 100 watts or less per panel;
(B) a maximum surface area of 8,000 cm2 per panel;
(C) do not include a built-in inverter;
(D) must include a permanently connected wire that terminates in either an 8mm male barrel connector, or a two-port rectangular connector with two pins in square housings of different colors;
(E) must include visible parallel grid collector metallic wire lines every 1–4 millimeters across each solar cell; and
(F) must be in individual retail packaging (for purposes of this provision, retail packaging typically includes graphics, the product name, its description and/or features, and foam for transport); and
(2) Off grid CSPV panels without a glass cover, with the following characteristics:
(A) A total power output of 100 watts or less per panel;
(B) a maximum surface area of 8,000 cm2 per panel;
(C) do not include a built-in inverter;
(D) must include visible parallel grid collector metallic wire lines every 1–4 millimeters across each solar cell; and
(E) each panel is
1. permanently integrated into a consumer good;
2. encased in a laminated material without stitching, or
3. has all of the following characteristics:
(i) the panel is encased in sewn fabric with visible stitching, (ii) includes a mesh zippered storage
pocket, and (iii) includes a permanently attached wire that terminates in a female USB–A connector.

Modules, laminates, and panels produced in a third country from cells produced in China are covered by the orders; however, modules, laminates, and panels produced in China from cells produced in a third country are not covered by the orders.

Merchandise covered by the orders is currently classified in the HTSUS under subheadings 8501.61.0000, 8507.20.80, 8541.40.6020, 8541.40.6030, and 8501.31.8000. These HTSUS subheadings are provided for convenience and customs purposes; the written description of the scope of the orders is dispositive.

Taiwan Order

The merchandise covered by this order is crystalline silicon photovoltaic cells, and modules, laminates and/or panels consisting of crystalline silicon photovoltaic cells, whether or not partially or fully assembled into other products, including building integrated materials.

Subject merchandise includes crystalline silicon photovoltaic cells of thickness equal to or greater than 20 micrometers, having a p/n junction formed by any means, whether or not the cell has undergone other processing, including, but not limited to, cleaning, etching, coating, and/or addition of materials (including, but not limited to, metallization and conductor patterns) to collect and forward the electricity that is generated by the cell.

Modules, laminates, and panels produced in a third-country from cells produced in Taiwan are covered by this order. However, modules, laminates, and panels produced in Taiwan from cells produced in a third country are not covered by this order.

Excluded from the scope of this order are thin film photovoltaic products produced from amorphous silicon (a-Si), cadmium telluride (CdTe), or copper indium gallium selenide (CIGS). Also excluded from the scope of this order are crystalline silicon photovoltaic cells, not exceeding 10,000mm^2 in surface area, that are permanently integrated into a consumer good whose function is other than power generation and that consumes the electricity generated by the integrated crystalline silicon photovoltaic cells. Where more than one cell is permanently integrated into a consumer good, the surface area for purposes of this exclusion shall be the total combined surface area of all cells that are integrated into the consumer good.

Further, also excluded from the scope of this order are any products covered by the existing antidumping and countervailing duty orders on crystalline silicon photovoltaic cells, whether or not assembled into modules, from China.[9]

Also excluded from the scope of this order are modules, laminates, and panels produced in China from crystalline silicon photovoltaic cells produced in Taiwan that are covered by an existing proceeding on such modules, laminates, and panels from China.

Additionally, excluded from the scope of this order are solar panels that are: (1) less than 300,000 mm^2 in surface area; (2) less than 27.1 watts in power; (3) coated across their entire surface with a polyurethane doming resin; and (4) joined to a battery charging and maintaining unit (which is an acrylonitrile butadiene styrene (ABS) box that incorporates a light emitting

[9] *See China Solar I Orders*.

diode (LED)) by coated wires that include a connector to permit the incorporation of an extension cable. The battery charging and maintaining unit utilizes high-frequency triangular pulse waveforms designed to maintain and extend the life of batteries through the reduction of lead sulfate crystals. The above-described battery charging and maintaining unit is currently available under the registered trademark "SolarPulse."

Merchandise covered by the order is currently classified in the HTSUS under subheadings 8501.61.0000, 8507.20.8030, 8507.20.8040, 8507.20.8060, 8507.20.8090, 8541.40.6015, 8541.40.6020, 8541.40.6030, 8541.40.6035, and 8501.31.8000. These HTSUS subheadings are provided for convenience and customs purposes; the written description of the scope of the order is dispositive.

IV. Legal Framework

When a request for a scope ruling is filed, Commerce examines the scope language of the order(s) at issue and the description of the product contained in the scope ruling request.[10] Pursuant to Commerce's regulations, Commerce may also examine other information, including the description of the merchandise contained in the petition, the record from the investigation, and prior scope determinations made for the same product.[11] If Commerce determines that these sources are sufficient to decide the matter, we will issue a final scope ruling as to whether the merchandise in question is covered by an order.[12]

Conversely, where the descriptions of the merchandise in the sources described in 19 CFR 351.225(k)(1) are not dispositive, Commerce will consider the five additional factors set forth at 19 CFR 351.225(k)(2). These factors are: (i) the physical characteristics of the merchandise; (ii) the expectations of the ultimate purchasers; (iii) the ultimate use of the product; (iv) the channels of trade in which the product is sold; and (v) the manner in which the product is advertised and displayed. The determination as to which analytical framework is most appropriate in any given scope proceeding is made on a case-by-case basis after consideration of all evidence before Commerce.

V. Description of Merchandise Subject to this Scope Request

The products subject to this scope ruling request are Solaria's Power XT PV cells and modules. Solaria imports fully assembled solar modules from Korea, manufactured from Solaria's proprietary PowerXT PV cells. The PowerXT PV cells are, according to Solaria, solar cells manufactured in Korea using partially processed solar wafers, or feedstock, produced in China and Taiwan.[13] The feedstock is a crystalline silicon wafer measuring approximately 0.025 square meters, and possesses certain attributes such as material dopants, chemical etching, and anti-reflective coatings. The feedstock possesses a p/n junction as well as an asymmetric metallization pattern that renders the feedstock useless when used in conventional solar panels. According to Solaria, the feedstock is transformed into PowerXT PV cells and incorporated into modules through Solaria's proprietary PowerXT manufacturing process in Korea, resulting in a

[10] *See Walgreen Co. v. United States*, 620 F.3d 1350, 1357 (Fed. Cir. 2010).
[11] *See* 19 CFR 351.225(k)(1).
[12] *See* 19 CFR 351.225(d).
[13] *See* Solaria's Scope Request at Attachment A, 3-4.

solar module that has superior performance and aesthetics.[14] The solar modules Solaria imports from Korea are classifiable under HTS subheading 8541.40.6015.

VI. Arguments from Solaria

Solaria's Scope Request[15]

- The language of the scope covers, and is limited to, crystalline silicon photovoltaic cells manufactured in China or Taiwan and modules manufactured outside of China or Taiwan, from CSPV cells manufactured in China or Taiwan.[16]
- Solaria's PowerXT cells are manufactured in Korea using proprietary manufacturing technology and dedicated equipment, which utilizes unique crystalline solar cell wafer feedstock from China or Taiwan.[17]
- The feedstock does not and cannot function as a conventional solar cell. The feedstock does not have a functional p/n junction and cannot be interconnected into a useful solar panel in its original state.[18]
- The language of the scope states that the products covered by the *Orders* are solar cells "having a p/n junction … to collect and forward the electricity that is generated by the cell."[19] The feedstock lacks a functional p/n junction and is, therefore, physically incapable of converting sunlight into electricity. It is only the end result of the PowerXT manufacturing process that allows the cell to be capable of generating electricity.[20]
- Solaria's feedstock material is not a functional solar cell that can be interconnected into a useful solar panel, in contrast with solar PV cells contemplated by and covered by the scope of the *Orders*.[21] The feedstock cannot be used to manufacture solar panels without the substantial transformation that occurs in Korea.[22]
- Solaria's PowerXT cells are formed by cutting the feedstock into five distinct and separate strips of wafer cell material, and making a direct large-area electrical p/n junction within the PowerXT cell, between the top of one wafer cell strip with the bottom of another wafer cell strip by slightly overlapping them.[23]
- Solaria's feedstock is unique because Solaria's goal is not to maximize the efficiency of the feedstock, but rather to optimize the efficiency of the PowerXT PV cell. Furthermore, Solaria's feedstock is unique in its color uniformity requirements.[24]
- There is no commercial market for Solaria's feedstock material because it cannot be used by any other customer due to Solaria's patented design. Solaria must purchase the entire production distribution from its suppliers.[25]
- Solaria's solar modules are produced from PV cells manufactured in Korea.[26]

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[14] *Id.* at Attachment A, 5-7.
[15] *Id.* at Attachment A, 4-25.
[16] *Id.* at Attachment A, 6.
[17] *Id.*
[18] *Id.*
[19] *Id.*
[20] *Id.*
[21] *Id.* at Attachment A, 8.
[22] *Id.*
[23] *Id.* at Attachment A, 10.
[24] *Id.* at Attachment A, 12-13.
[25] *Id.* at Attachment A, 14.
[26] *Id.* at Attachment A, 15.

- Manufacturing PowerXT cells requires an integrated shingling and bussing manufacturing line that consists of three pieces of equipment that perform five processes.[27] The processes include: laser scribing, singulation, adhesive dispense, curing, and ribbon wire bonding, after which, the feedstock is physically and electrically transformed into a functioning solar cell.[28]
- Solaria addresses the criteria of 19 CFR 351.225(k)(2), as follows:
  - **Physical Characteristics:** The feedstock has different physical characteristics from conventional solar cells. The feedstock possesses asymmetric metallization patterns and does not have a functional p/n junction. Solaria transforms the feedstock through a five-step process requiring three sets of equipment in order for the feedstock to go through substantial physical and electrical transformation.[29]
  - **The Expectations of the Ultimate Purchasers:** The ultimate consumer for the feedstock is Solaria itself, as the feedstock is highly customized and specialized, it cannot be converted into functional PV cells outside of Solaria's manufacturing process.[30]
  - **The Ultimate Use of the Product:** The feedstock cannot be used to manufacture conventional solar panels without Solaria's manufacturing process. In particular, Solaria's manufacturing goal is not to maximize efficiency of the feedstock, but rather to optimize the efficiency of Solaria's PowerXT PV cell. This runs counter to traditional solar cell manufacturing goals.[31]
  - **The Channels of Trade in Which the Product are Sold:** There is no commercial market for Solaria's feedstock because there is no practical use of the feedstock outside of Solaria's manufacturing process. There are no channels of trade for the feedstock.[32]
  - **The Manner in Which the Product is Advertised and Displayed:** The feedstock is a patented, highly customized, and specialized material with no commercial market, therefore there is no advertising or display of the feedstock.[33]

Solaria's Supplemental Response[34]

- Solaria substantially transforms the non-functional feedstock it purchases from China and Taiwan into functioning PV cells through a unique, multi-step manufacturing process using specially designed custom equipment in Korea.[35]
- Given the amount of processing, capital investment, costs incurred, and value-addition created by Solaria's manufacturing locations in Korea, Solaria believes Korea is the correct country of origin for the products Solaria imports into the United States.[36]
- The downstream product, Solaria's PowerXT solar cell, is capable of converting sunlight into electricity, whereas the upstream product, the feedstock, cannot. Because the physical characteristics and functions of the PowerXT solar cell and feedstock are not the same, they are not the same class or kind of merchandise.[37]

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[27] *Id.* at Attachment A, 16.
[28] *Id.* at Attachment A, 20.
[29] *Id.* at Attachment A, 22.
[30] *Id.* at Attachment A, 23.
[31] *Id.*
[32] *Id.* at Attachment A, 24.
[33] *Id.*
[34] *Id.* at Attachment B, 1-22.
[35] *Id.* at Attachment B, 1.
[36] *Id.* at Attachment B, 2.
[37] *Id.* at Attachment B, 2-3.

- Solaria's processing in Korea changes the important physical qualities of the feedstock, and results in a functioning solar cell capable of converting sunlight into electricity and, therefore, capable of module assembly.[38]
- During the manufacturing process in Korea, the feedstock loses its identity as a square wafer material with visible metallization patterns. The new monolithic, rectangular, and functional solar cells are ready for module assembly.[39]
- The nature and sophistication of the PowerXT cell production is significant. The process is covered by over 250 patents and is a unique process not used by other solar companies. This process is more expensive and capital-intensive than conventional solar cell manufacturing and module assembly.[40]
- The cost of production and value added to make Solaria's PowerXT cell in Korea is six cents per watt. This is 67 percent more than the cost of conventional solar cells. The feedstock is only 40 percent of the total cost of the PowerXT cell.[41]
- The advanced manufacturing process employs proprietary and specialized materials, including metal interconnects and electrically-conductive adhesives, a custom production line, specialized facilities, and skilled assembly labor.[42]
- The level of additional capital investment to produce PowerXT cell is significant. The capital investment required for converting feedstock to functional cells is almost identical to that for manufacturing conventional solar cells.[43]
- Solaria defines a p/n junction to be functional if it is capable of transmitting power that can be collected and utilized in a product. Given that the feedstock does not have a functional p/n junction, it is not physically capable of generating electricity unless the feedstock undergoes PowerXT manufacturing.[44]
- Solaria states that the feedstock cannot generate "energy" when struck by sunlight, and defines energy as power over time, *i.e.*, kWh.[45]
- The feedstock material has traditional solar cell dopants of boron and phosphorus, which are deposited in the feedstock in China or Taiwan. A non-functional p/n junction is formed in China or Taiwan, and a functional p/n junction is formed in Korea.[46]
- The functional p/n junction is formed only when the feedstock is cut into 5 separate strips and the strips are overlapped slightly one over the other. This overlapping process creates a large-format solar PV cell and the functional p/n junction is formed between the strips. This process occurs in Korea.[47]
- Solaria's two-step manufacturing process was not contemplated at the time of the *China Solar I Orders*. The manufacturing process began development and commercialization in 2014.[48]
- Commerce noted Solaria excluded a portion of the scope definition, which references "whether or not the cell has undergone other processing to collect and forward the electricity

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[38] *Id.* at Attachment B, 3.
[39] *Id.* at Attachment B, 4-6.
[40] *Id.* at Attachment B, 7.
[41] *Id.* at Attachment B, 8.
[42] *Id.* at Attachment B, 9.
[43] *Id.* at Attachment B, 10.
[44] *Id.* at Attachment B, 13-14.
[45] *Id.* at Attachment B, 14-15.
[46] *Id.* at Attachment B, 15-16.
[47] *Id.* at Attachment B, 16.
[48] *Id.* at Attachment B, 17.

that is generated by the cell."[49] Solaria states that regardless of whether or not a portion of the scope language has been excluded, the issue is the same. The scope covers solar "cells" whose "essential" function is to convert sunlight into electricity. Without a functional p/n junction, the feedstock cannot do that, and is not a "cell" as described in the scope of the *Orders*.[50]

- The p/n junction in the feedstock is non-functional because no viable end product can be manufactured from it. The p/n junction in the feedstock has no capability to produce electricity, as any standard interconnect process would create an electrical short. This is because the metallic busbars that carry the electrical current created from the p/n junction are formed on the top and bottom, but are specifically offset from each other to facilitate cutting and overlapping of the strips from the feedstock. This offset prevents any practical method to carry the current effectively, thus rendering the p/n junction non-functional.[51]
- The p/n junction can only be activated by forming a new p/n junction from the top of one PV strip to the bottom of another PV strip after the feedstock is cut and further processed in Korea.[52]

VII. Analysis

In a scope inquiry, Commerce first examines the scope language of the order, the description of the merchandise contained in the Petition, records of the underlying investigations, the International Trade Commission (ITC) Report, and the description of the merchandise in the scope ruling request. We find that the description of the products, the scope language, and the Petitions[53] are, together, dispositive as to whether the products at issue are subject merchandise, in accordance with 19 CFR 351.225(k)(1). Accordingly, for this determination, we find it unnecessary to consider the additional factors specified in 19 CFR 351.225(k)(2). We find that Solaria's PowerXT PV cells and modules meet the criteria for "modules, laminates, and panels produced in a third-country from cells produced in China{/Taiwan}," and therefore determine Solaria's PowerXT cells and modules to be covered by the scope of the *Orders*.

The *Orders* define the subject merchandise as "crystalline silicon photovoltaic cells, and modules, laminates, and panels, consisting of crystalline silicon photovoltaic cells, whether or not partially or fully assembled into other products, including but not limited to, modules, laminates, panels and building integrated materials."[54] The scope language further specifies that the *Orders* cover:

> crystalline silicon photovoltaic cells of thickness equal to or greater than 20 micrometers, having a p/n junction formed by any means, whether or not the cell has undergone other processing, including, but not limited to, cleaning, etching, coating, and/or addition of materials (including, but not limited to, metallization

[49] *Id.* at Attachment B, 18.
[50] *Id.*
[51] *Id.* at Attachment B, 20.
[52] *Id.*
[53] *See* Petitioner's Letter, "Petition for the Imposition of Antidumping and Countervailing Duties: Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, from the People's Republic of China", dated October 19, 2011 at Exhibit II-19, 3 (China Solar I Petition); *see also* Petitioner's Letter, "Petition for the Imposition of Antidumping and Countervailing Duties: Certain Crystalline Silicon Photovoltaic Products from the People's Republic of China and Taiwan," dated December 31, 2013 at 15 (Taiwan Petition) (collectively, Petitions).
[54] *See Orders.*

and conductor patterns) to collect and forward the electricity that is generated by the cell.[55]

The *Orders* also stipulate that "{m}odules, laminates, and panels produced in a third-country from cells produced in China{/Taiwan} are covered by this investigation; however, modules, laminates, and panels produced in China{/Taiwan} from cells produced in a third-country are not covered by this investigation."[56]

Accordingly, the plain language of the scope presents two key factors for analysis in regard to Solaria's feedstock, PowerXT cells and modules, and whether or not they are covered by the *Orders*. Specifically, Commerce will consider whether or not: (1) the feedstock has a p/n junction; and (2) if the modules are produced in a third country from cells that were produced in China or Taiwan. In accordance with 19 CFR 351.225(k)(1), in considering these factors, Commerce will evaluate the descriptions of the merchandise contained in the Petitions, the initial investigations, and any prior scope determinations by Commerce or the ITC.

Positive/Negative Junction

In considering whether Solaria's feedstock imported from China or Taiwan satisfies the criteria of having a p/n junction, we analyzed whether the feedstock meets the definition of a solar cell as defined by the scope language, the Petitions, and the scope clarification memo (SCM)[57] accompanying the final determination in the investigation of solar cells from China. The SCM provided a narrative description of the cell conversion process, where silicon wafers are processed into solar cells capable of generating electricity.[58]

> Solar cells are made from crystalline silicon wafers. A dopant, which is a trace impurity element diffused into a thin layer of the wafers' surface to impart an opposite electrical orientation to the cell surface, **creates the positive/negative junction that is needed for the conversion of sunlight into electricity**, which is the purpose of solar cells.[59] (emphasis added)

As the SCM states, once a wafer is doped and an opposite electrical orientation is imparted on the surface, it results in the creation of a p/n junction. When sunlight strikes the cell, the positive and negative charge carriers are released, causing electrical current to flow.[60] It is at this point

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[55] *Id*.
[56] *Id*.
[57] *See* Memorandum, "Scope Clarification: Antidumping and Countervailing Duty Investigations of Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, from the People's Republic of China," dated March 19, 2012 (SCM). We note that in *Certain Crystalline Silicon Photovoltaic Products from Taiwan: Final Determination of Sales at Less Than Fair Value,* 79 FR 76966 (December 23, 2014) (*Taiwan Solar Products*), and accompanying Issues and Decision Memorandum (IDM) Commerce determined that its analysis in the China Solar I Orders, regarding the processing of solar cells into solar modules, was equally applicable for the purpose of solar cells produced in Taiwan and used in the manufacturing of solar modules in Taiwan or third countries other than China. *Id.* at 20-21.
[58] *See* SCM at 6.
[59] *Id.*; *see also Taiwan Solar Products* IDM at 18-19.
[60] *See Crystalline Silicon Photovoltaic Cells and Modules from China: Investigation Nos. 701-TA-481 and 731-TA-1190 (Prelim),* USITC Publication 4295, dated December 2011 (ITC Solar Cells and Modules Prelim) at 6.

that the cell is capable of generating electricity from sunlight.[61] In Exhibit 2 of Attachment B of its scope request, Solaria submitted production flowcharts, narrative descriptions, and image representations of the silicon wafer, feedstock, and PowerXT cell and module manufacturing processes.[62] According to the silicon wafer manufacturing process provided by Solaria, at step three of this process, the silicon wafer is doped with boron.[63] Additionally, at step three of the feedstock manufacturing process flowchart, phosphorus, a dopant of opposite electrical orientation of the wafer, is diffused into the wafer.[64] Thus, it is at this step in the feedstock manufacturing process, after the wafer has been fully doped, that a p/n junction is created. As specified in the SCM, a solar cell is capable of converting sunlight into electricity once the p/n junction at this step is created.[65] As noted in the exhibit, the steps involved to form the p/n junction take place in the suppliers' manufacturing facilities in China or Taiwan, and not in Korea.[66]

Solaria's interpretation of the scope language refers to cells "having a p/n junction … to collect and forward the electricity that is generated by the cell." Solaria claims that the feedstock it purchases from China or Taiwan is not capable of transmitting power that can be collected and utilized due to its non-functioning p/n junction and, therefore the feedstock is excluded by the language of the scope.[67] We disagree with this interpretation. Solaria omitted, from that quote by the use of ellipses, language that states the *Orders* cover cells whether or not the cell has undergone other processing to collect and forward the electricity that is generated by the cell. Thus the full quote is: "This order covers crystalline silicon photovoltaic cells of thickness equal to or greater than 20 micrometers, having a p/n junction formed by any means, whether or not the cell has undergone other processing, including, but not limited to, cleaning, etching, coating, and/or addition of materials (including, but not limited to, metallization and conductor patterns) to collect and forward the electricity that is generated by the cell."[68] As previously stated, Solaria's feedstock has a p/n junction formed in China or Taiwan, and is capable of converting sunlight into electricity. The feedstock undergoes further processing in Korea in order for it to be capable of collecting and forwarding the electricity that is generated by the cell. By the language of the scope, this further processing is irrelevant in determining whether or not the cell is included in the scope. Per the language of the *Orders*, the SCM, and the Petitions, Solaria's feedstock possesses a p/n junction capable of converting sunlight into electricity prior to import into Korea.

Solaria states that the feedstock it purchases from China or Taiwan does not and cannot function as a CSPV cell due to its lack of a "functional" p/n junction and inability to generate electricity.

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[61] *See Crystalline Silicon Photovoltaic Cells and Modules from China: Investigation Nos. 701-TA-481 and 731-TA-1190 (Final),* USITC Publication 4360, dated November 2012 (ITC Solar Cells and Modules Final) at I-9.
[62] *See* Solaria Scope Request at Attachment B, Exhibit 2, 4-9. We note that in Exhibit 2, at page 5 "Feedstock processing" Solaria made three previously undisclosed alterations to the provided figure sourced from the National Renewable Energy Lab. *See* Solaria's Letter, "Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China (A-570-979 and C-570-980); and Certain Crystalline Silicon Photovoltaic Products From Taiwan (A–583–853): Comments to Clarify and Correct Factual Information on the Record," dated March 26, 2021.
[63] *Id*. at 4
[64] *Id.* at 6.
[65] *See* SCM at 6.
[66] *See* Solaria Scope Request at Attachment B, Exhibit 2, 6; and Attachment B, 15.
[67] *Id.* at Attachment B, 18.
[68] *See* SCM at 3.

As described above, Solaria's feedstock possesses a p/n junction formed in China or Taiwan, and is capable of converting sunlight into electricity. The fact that the cell may not collect or forward electricity prior to processing in Korea does not render the p/n junction useless or immaterial. In addition, the Petitions detail the complete solar cell manufacturing process, including the final steps of the cell conversion process following the creation of the p/n junction.[69] The process includes coating the solar cells with silicon nitride, and the addition of conductive metals such as silver to form electrically conducive channels that channel electricity generated by the cell into electricity collection points.[70] Solaria's feedstock processing flowchart describes the feedstock undergoing these steps in China or Taiwan.[71] Specifically, step six of the feedstock processing flowchart describes the deposition of silicon nitride on both sides, and step eight of the flowchart describes the "front and rear screen-printing of metal pastes for electrode formation, and firing." Furthermore, silver is included in the added materials section at this step. As noted in Solaria's feedstock processing exhibit, these steps take place in China or Taiwan, and not in Korea.[72] The Petitions explicitly state that following these steps, the individual cell is completed and that "the next production step involves the assembly of cells into modules or panels."[73] Based on the language of the Petitions, the silicon wafer has completed its conversion into a solar cell, and therefore, despite Solaria's reference to its feedstock, Solaria's feedstock is indeed a finished solar cell once it has completed these production steps.

Solaria argues that the feedstock cannot function as a CSPV cell due to its patented asymmetric metallization patterns that render the feedstock material useless in conventional solar PV panels.[74] This is because the busbars that are processed onto the feedstock are purposefully misaligned on the top from the bottom, in order to facilitate cutting and overlapping of the strips from the feedstock.[75] According to Solaria, the offset renders the p/n junction non-functional, and only by cutting and overlapping the strips to create a large-area electrical p/n junction can the solar cell generate electricity from sunlight.[76] This process occurs in Korea and creates a shingled solar module. We have concluded above that the feedstock already has a functional p/n junction prior to further manufacturing in Korea and, therefore, is capable of converting sunlight into electricity. Furthermore, the language of the scope specifically states that the addition of materials, including metallization and conductor patterns, to collect and forward the electricity that is generated by the cell, is not relevant in determining whether the cell is within the scope of the *Orders*.[77] Accordingly, the addition of Solaria's patented asymmetric metallization patterns is not relevant in determining whether the cell is within scope. Therefore, we find that the feedstock can function as a CSPV cell due to its p/n junction.

Country-of-Origin

The *Orders* specify that solar modules produced in a third country from cells produced in China or Taiwan are covered by the scope.[78] As explained in the previous section, we find that the

[69] *See* Petitions.
[70] *See* China Solar I Petition at Exhibit II-19, 3.
[71] *See* Solaria Scope Request at Attachment B, Exhibit 2, 6.
[72] *See* China Solar I Petition at Exhibit II-19, 3.
[73] *Id*.
[74] *See* Solaria Scope Request at Attachment A, 6.
[75] *Id*. at Attachment B, 20.
[76] *Id*. at Attachment B, 20; Attachment A, 10.
[77] *See Orders*.
[78] *Id*.

feedstock imported into Korea are solar cells produced in China or Taiwan. Therefore, the solar modules Solaria produces in Korea using these cells are within the scope of the *Orders*.

We disagree with Solaria that the production process taking place in Korea constitutes substantial transformation. We determine that the product leaving China or Taiwan is a solar cell and that the PowerXT cell and assembly process performed in Korea constitutes module assembly and does not substantially transform the solar cell such that it changes the country of origin of the cell. We addressed the scenario of module assembly taking place in a third country in the investigations.[79]

Solaria describes its PowerXT cell and module assembly as an eight-step process, where steps one through four are described as cell assembly and steps five through eight are module assembly.[80] The four steps of the PowerXT cell assembly include: (1) starting feedstock; (2) singulation; (3) strip formulation; and (4) module layup. Step three, strip formulation, is described by Solaria as applying electrically-conductive adhesives onto the strips and curing the strips to solidify the adhesives and create a monolithic cell structure.[81] Step four, module layup, is described as the placing and attaching of an end-ribbon wire to connect individual PowerXT cells together.[82] We find these two steps to be part of module assembly and, thus; according to the SCM, do not rise to the level of what is needed to substantially transform a solar cell. Thus, the only remaining steps of the PowerXT cell assembly are: (1) the starting feedstock; and (2) singulation. The first is, on its face, not transformative, as it is the start of the process, and the second step, singulation, is described as laser scribing to create a partial incision and then cutting the feedstock into five rectangular strips.[83] We find that the singulation, or the cutting of the feedstock, in and of itself, does not substantially transform Solaria's "feedstock" or solar cells and, thus, does not change their country of origin. Solaria itself noted in its scope request that Commerce has concluded the essential component of solar modules/panels is the solar cell, because the purpose of solar modules is to convert sunlight into electricity and that process occurs in the solar cell.[84] This essential component was formed in the solar cell during the cell conversion process in China or Taiwan. The process of cutting and overlapping the strips does not change the basic nature of the solar cell and does not transform its essential components. Furthermore, we note the ITC has stated that modules are made from "cells that are conductively connected to one another in the form of a string or matrix."[85] Solaria's process of applying electrically-conductive adhesives onto the strips (strip formation), and attaching a ribbon wire to place the strips into strings, is the process of conductively connecting cells into a string or matrix

[79] *See* SCM at 7-8.
[80] *See* Solaria Scope Request at Attachment B, Exhibit 2, 9. We note that in the Scope Request at Attachment A, 17-20, Solaria describes the PowerXT cell manufacturing process in five steps. At Attachment B, 12-13, Solaria describes the PowerXT cell manufacturing process in eight steps. According to Attachment B, Exhibit 2, Step 4, Module Layup, the feedstock undergoes the placement and tabbing of strings into a complete circuit, which requires the added material of copper ribbons. This corresponds to the last step of the PowerXT cell manufacturing process as described in Attachment A, 17-20, and Attachment B, 12-13.
[81] *See* Solaria Scope Request at Attachment A, 18-19.
[82] *Id*. at Attachment A, 19; Attachment B, 12.
[83] *Id*. at Attachment A, 17-18.
[84] *See* Solaria Scope Request at Attachment B, 17 (citing *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China: Final Determination of Sales at Less Than Fair Value, and Affirmative Final Determination of Critical Circumstances, in Part,* 77 FR 63791 (October 17, 2012) and accompanying IDM at Comment 1); *see also* Taiwan Solar Products and accompanying IDM at 19.
[85] *See* ITC Solar Cells and Modules Prelim at 6.

(module layup) and, therefore, consists of module assembly and not a process by which the solar cell is substantially transformed.

According to the ITC, following the connection of cells together to form a string or matrix, a sealant such as ethyl vinyl acetate (EVA) is added to strengthen and weatherproof the cells before laminating the cells in a vacuum. The laminate is then "attached to a frame, and a junction box is mounted on the back."[86] Solaria's module assembly process, as listed in steps five through eight of the PowerXT cell and module assembly flowchart, are described here.[87] Step five consists of the lamination of the circuit including, the addition of EVA; step six is the aluminum framing of the laminate; and step seven is the attachment of the junction box. Step eight is immaterial, as it consists of testing, inspection, and sticker placement.[88] Additionally, according to the Petitions, the "petitioner, Trina Solar, a mandatory respondent, and the ITC all describe module assembly as stringing together 60 or 72 solar cells, laminating them, and fitting them in a glass-covered aluminum frame."[89] Again we find these steps are encompassed in steps one through eight of Solaria's self-described "PowerXT Cell and Module Assembly."[90] Accordingly, these steps would better be described as module assembly.

As stated in the SCM, module assembly "does not substantially alter the essential nature of solar cells, nor does it constitute significant processing such that it changes the country of origin of the cell, as it is an assembly process that only strings cells together, adding a protective covering and aluminum base."[91] Therefore, we disagree that Solaria's PowerXT cell and module assembly process substantially transforms the solar cell such that it changes the country of origin of the cell. We find that Solaria's PowerXT modules are produced in Korea from cells produced in China or Taiwan, and are covered by the *Orders*.

VIII. Recommendation

For the reasons discussed above, and in accordance with 19 CFR 351.225(d) and 19 CFR 351.225(k)(1), we recommend finding that Solaria's PowerXT cells and modules meet the criteria for "modules, laminates, and panels produced in a third-country from cells produced in China{/Taiwan}" and, therefore, are covered by the scope of the *Orders.* Because we reached this final scope ruling on the basis of the sources described in 19 CFR 351.225(k)(1), including the plain language of the scope, as explained above, we have not examined the criteria under 19 CFR 351.225(k)(2).

If the recommendation in this memorandum is accepted, we will serve a copy of this memorandum on all interested parties on the scope service list via FEDEX in lieu of first-class mail, as directed in 19 CFR 351.225. We will also issue the appropriate instructions to U.S.

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[86] *See* ITC Solar Cells and Modules Final at 6.
[87] *See* Solaria Scope Request at Attachment B, Exhibit 2, 9.
[88] *Id*.
[89] *See* SCM at 8.
[90] *See* Solaria Scope Request at Attachment B, Exhibit 2, 9.
[91] *See* SCM at 8; *see also* Taiwan Final IDM at 21 ("we believe that {Commerce's} analysis in *Solar I* {regarding the fact that module assembly does not constitute substantial transformation} is equally applicable to this investigation.")

Customs and Border Protection stating that we found Solaria's PowerXT cells and modules to be within the scope of the *Orders*.

☒ Agree ☐ Disagree

4/8/2021

X James Maeder

Signed by: JAMES MAEDER

James Maeder
Deputy Assistant Secretary
for Antidumping and Countervailing Duty Operations

EXHIBIT 15

ENTIRE EXHIBIT NOT CAPABLE OF PUBLIC SUMMARY

EXHIBIT 16

NEWS (HTTPS://WWW.PV-TECH.ORG/CATEGORY/NEWS/)

LONGi Solar strikes deal to buy Vietnam-based OEM Vina Solar

By Mark Osborne (https://www.pv-tech.org/author/markosborne/)

February 24, 2020

Cell Processing (https://www.pv-tech.org/industry-segments/cell-processing/), Companies (https://www.pv-tech.org/industry-segments/companies/), Fab & Facilities (https://www.pv-tech.org/industry-segments/fab-facilities/), Financial & Legal (https://www.pv-tech.org/industry-segments/financial-legal/), Manufacturing (https://www.pv-tech.org/industry-segments/manufacturing/), Markets & Finance (https://www.pv-tech.org/industry-segments/markets-finance/), Materials (https://www.pv-tech.org/industry-segments/materials/), Modules (https://www.pv-tech.org/industry-segments/modules/)

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'Solar Module Super League' (SMSL) member, LONGi Solar has signed a framework agreement to buy Vietnam-based solar cell and module OEM (Original Equipment Manufacturer), Vina Solar for RMB 1.78 billion (US$253 million).

Vina Solar is a subsidiary of Chinese industrial company East Group. The deal to purchase Vina Solar comes straight after China-based PV manufacturer, Jiangsu Akcome Science & Technology Co would have seemed to have pulled out of deal to purchase Vina Solar and its subsidiaries for the same amount as LONGi Solar has agreed.

After further detailed due diligence, LONGi Solar hopes to complete the purchase before the end of June 2020.

However, in a financial filing the company gave no reasons for the planned purchase of Vina Solar, or its future plans for the company, which has had number of rival PV manufacturers from China as customers.

c-si manufacturing (https://www.pv-tech.org/tag/csi-manufacturing/), china (https://www.pv-tech.org/tag/china/), east group (https://www.pv-tech.org/tag/east-group/), longi green energy technology (https://www.pv-tech.org/tag/longi-green-energy-technology/), longi solar (https://www.pv-tech.org/tag/longi-solar/), pv modules (https://www.pv-tech.org/tag/pv-modules/), solar cell (https://www.pv-tech.org/tag/solar-cell/), vietnam (https://www.pv-tech.org/tag/vietnam/), vina solar (https://www.pv-tech.org/tag/vina-solar/)

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PV Tech Premium

ANALYSIS: Could a US budget bill amendment end up stymying utility-scale solar growth? (https://www.pv-tech.org/analysis-could-a-us-budget-bill-amendment-end-up-stymying-utility-scale-solar-growth/)

August 13, 2021

An amendment added to the US budget resolution bill this week seeks to prevent renewables projects using technology built in China from claiming federal funds and subsidies. Liam Stoker explores the amendment's potential to disrupt solar deployment.

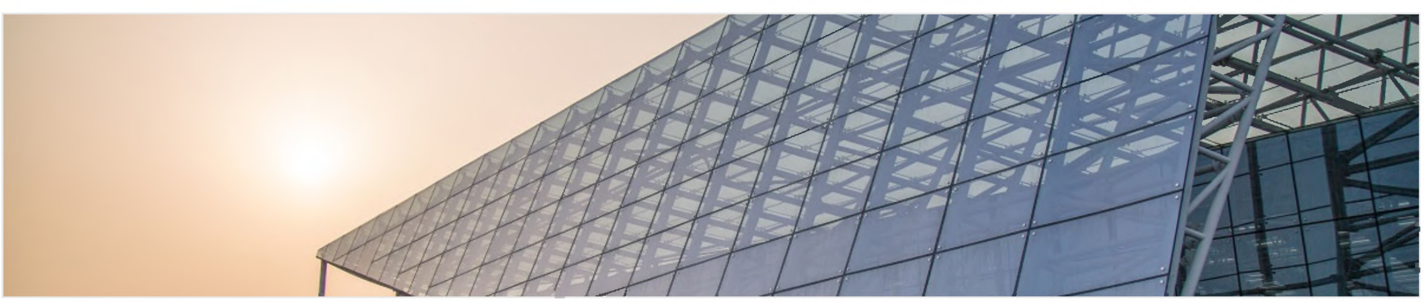
(https://www.pv-tech.org/canadian-solar-recalibrates-2021-expansion-plans-amidst-supply-chain-uncertainty/)

PV Tech Premium

Canadian Solar recalibrates 2021 expansion plans amidst supply chain uncertainty (https://www.pv-tech.org/canadian-solar-recalibrates-2021-expansion-plans-amidst-supply-chain-uncertainty/)

August 12, 2021

Canadian Solar has tweaked its planned capacity expansions for this year, stripping back module assembly capacity expansion to instead produce more solar wafers and cells as the industry continues to recalibrate following months of supply chain volatility.



(https://www.pv-tech.org/xinyi-solar-boasts-doubling-of-h1-profits-but-warns-over-solar-glass-headwinds/)

Xinyi Solar boasts doubling of H1 profits but warns over solar glass headwinds (https://www.pv-tech.org/xinyi-solar-

boasts-doubling-of-h1-profits-but-warns-over-solar-glass-headwinds/)

August 9, 2021

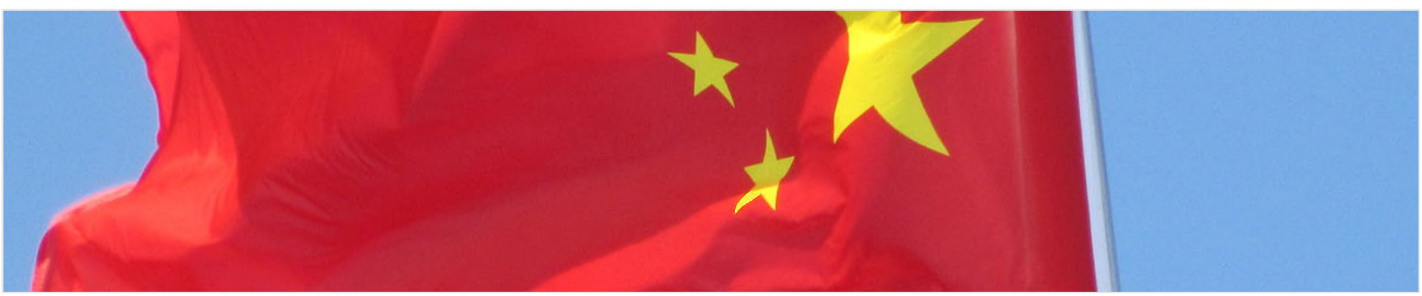
Solar glass provider Xinyi Solar has reported a more-than-doubling of profits in H1 2021, but warned that weaker demand and lower prices for solar glass will dampen its results in the second half of the year.

(https://www.pv-tech.org/xinte-sells-shares-to-tbea-to-fund-100000mt-polysilicon-expansion/)

Xinte sells shares to TBEA to fund 100,000MT polysilicon expansion (https://www.pv-tech.org/xinte-sells-shares-to-tbea-to-fund-100000mt-polysilicon-expansion/)

August 9, 2021

Polysilicon manufacturer Xinte Energy has raised RMB2.3 billion (US$355.9 million) from its owner TBEA in order to fund its target polysilicon capacity of 100,000 metric tonnes (MT)

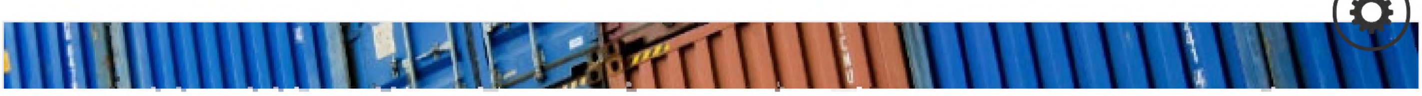


(https://www.pv-tech.org/chinas-nea-demands-monthly-updates-on-renewable-projects-from-its-utilities/)

China's NEA demands monthly updates on renewable projects from its utilities (https://www.pv-tech.org/chinas-nea-demands-monthly-updates-on-renewable-projects-from-its-utilities/)

August 9, 2021

China's power planning agency the National Energy Administration (NEA) has demanded regularly monthly updates on new renewable energy projects from utility companies in the country



(https://www.pv-tech.org/contractual-mitigation-strategies-for-the-solar-sector-as-governments-target-alleged-forced-labour/)

Contractual mitigation strategies for the solar sector as governments target alleged forced labour (https://www.pv-tech.org/contractual-mitigation-strategies-for-the-solar-sector-as-governments-target-alleged-forced-labour/)

August 9, 2021

In the wake of the US Withhold and Release Order and other sanctions targeting alleged forced labour in solar supply chains, Graham Vinter, Ursula Owczarkowski and Sarah Bishop of law firm Covington & Burling LLP explore the legal status quo and the options at hand for solar companies to mitigate contractual risk.

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EXHIBIT 17

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Supplier: JA SOLAR MALAYSIA SDN BHD

Malaysia

Below is a sample of the information available on JA SOLAR MALAYSIA SDN BHD in Descartes Datamyne's extensive global trade database. For more details, as well as for information on other suppliers, click here (https://www.datamyne.com/request-an-online-demo/) to contact us, or fill out the form on the right hand side of the screen.

12 Month Supply Chain Summary (September 01, 2019 — August 31, 2020)

JA SOLAR MALAYSIA SDN BHD supplied **8** shipments to the US since Sep 1, 2019.

Top Importer

GE Power Cpv Towantic Geen 13 (ny) (/importer/32884603/ge-power-cpv-towantic-geen-13--ny-)

2

Importers for this supplier for the last 12 months

Top HS Code Products

1. **841869 - Refrigerating or Freezing Equipment, Nesoi (/hts/84/841869)**
2. **841899 - Refrigerator Freezer And Heat Pump Parts Nesoi (/hts/84/841899)**

Top Carriers

1. Oia Global Logistics

2. Cma-cgm

Top Ports of Departure

1. Houston, TX

2. Los Angeles, CA

Top Countries of Origin

1. Malaysia

See all shipments for JA Solar Malaysia Sdn Bhd when you subscribe to Datamyne.

How Datamyne Benefits You

Datamyne covers the trade of some 50 countries across 5 continents, as well as the details of US import and export commerce with over 230 trading partners. Original US import bills are available online one day after we receive them from Customs, making our US import data the earliest available anywhere.

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JA SOLAR MALAYSIA SDN BHD

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EXHIBIT 18

JinkoSolar Plans to Build a Cell & Module Manufacturing Facility in Penang, Malaysia

03/19/2015

PDF Version

SHANGHAI, March 19, 2015 /PRNewswire-FirstCall/ -- JinkoSolar Holding Co., Ltd. ("JinkoSolar" or the "Company") (NYSE: JKS), a global leader in the PV industry, today announced that it plans to build a solar cell and module manufacturing facility in Penang, Malaysia.

Located in Penang, Malaysia, the manufacturing facility will utilize the latest high - efficiency multi-crystalline technology, and once completed, will provide JinkoSolar with additional production capacity of 500MW for solar PV cells and 450MW for modules. The Company has signed a tenancy agreement with Nationgate Technology (M) Sdn. Bhd. for the workshops in which the production line is going to be built. JinkoSolar will invest approximately US$100 million to build the plant including equipment and working capital which is expected to begin operations in May 2015.

"We are excited to be among the first Chinese solar manufacturers to invest in Malaysia. The Malaysian plant will be our first overseas cell production facility and its module capacity will add to our overseas module capacity, currently located in South Africa and Portugal. By expanding our production capacity geographically, we are further diversifying our global manufacturing layout and enhancing our competitiveness in overseas markets." commented Mr. Kangping Chen, JinkoSolar's Chief Executive Officer. "Malaysia continues to support the growth of the renewable energy industry by leveraging its competitive cost environment, relatively advanced industrial capabilities, talent pool of well educated engineers, and preferential tax policies. Our project is strongly supported by MIDA (Malaysian Industrial Development Authority) and the local government. We are looking forward to working closely with them to create local jobs and help further promote the development of solar industry in Malaysia."

About JinkoSolar Holding Co., Ltd.

JinkoSolar (NYSE: JKS) is a global leader in the solar industry. JinkoSolar distributes its solar products and sells its solutions and services to a diversified international utility, commercial and residential customer base in China, the United States, Japan, Germany, the United Kingdom, Chile, South Africa, India, Mexico, Brazil, the United Arab Emirates, Italy, Spain, France, Belgium, and other countries and regions. JinkoSolar has built a vertically integrated solar product value chain, with an integrated annual capacity of 2.5 GW for silicon ingots and wafers, 2.0 GW for solar cells, and 3.2 GW for solar modules, as of December 31, 2014. JinkoSolar also sells electricity in China, and has connected approximately 500 MW of solar power projects to the grid, as of December 31, 2014.

JinkoSolar has over 13,000 employees spread across its 11 subsidiaries in Germany, Italy, Switzerland, the United States, Canada, Australia, Singapore, Japan, India, South Africa and Chile; 12 global sales offices in China, Spain, the United Kingdom, the United Arab Emirates, Jordan, Saudi Arabia, Egypt, Morocco, Ghana, Brazil, Costa Rica and Mexico; and four productions facilities in Jiangxi and Zhejiang Provinces, China, Portugal and South Africa.

To find out more, please see: www.jinkosolar.com

Safe Harbor Statement

This press release contains forward-looking statements. These statements constitute "forward-looking" statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, and as defined in the U.S. Private Securities Litigation Reform Act of 1995. These forward-looking statements can be identified by terminology such as "will," "expects," "anticipates," "future," "intends, "plans," "believes," "estimates" and similar statements. Among other things, the quotations from management in this press release and the Company's operations and business outlook, contain forward-looking statements. Such statements involve certain risks and uncertainties that could cause actual results to differ materially from those in the forward-looking statements. Further information regarding these and other risks is included in JinkoSolar's filings with the U.S. Securities and Exchange Commission, including its annual report on Form 20-F. Except as required by law, the Company does not undertake any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise.

For investor and media inquiries, please contact:

Mr. Sebastian Liu
JinkoSolar Holding Co., Ltd.
Tel: +86 21 6061 1792
Email: ir@jinkosolar.com

To view the original version on PR Newswire, visit:http://www.prnewswire.com/news-releases/jinkosolar-plans-to-build-a-cell--module-manufacturing-facility-in-penang-malaysia-300053017.html

SOURCE Jinko Solar Holding Co., Ltd.

EXHIBIT 19

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 20-F

(Mark One)

☐ **REGISTRATION STATEMENT PURSUANT TO SECTION 12(b) OR 12(g) OF THE SECURITIES EXCHANGE ACT OF 1934**

OR

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2020.

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

OR

☐ **SHELL COMPANY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

Date of event requiring this shell company report

For the transition period from to

Commission file number: 001-34615

JinkoSolar Holding Co., Ltd.

(Exact name of Registrant as specified in its charter)

N/A
(Translation of Registrant's name into English)

Cayman Islands
(Jurisdiction of incorporation or organization)

1 Jingke Road
Shangrao Economic Development Zone
Jiangxi Province, 334100
People's Republic of China
(86-793) 846-9699
(Address of principal executive offices)

Haiyun (Charlie) Cao, Chief Financial Officer
1 Jingke Road
Shangrao Economic Development Zone
Jiangxi Province, 334100
People's Republic of China
Tel: (86-793) 846-9699
Fax: (86-793) 846-1152
E-mail: charlie.cao@jinkosolar.com
(Name, Telephone, E-mail and/or Facsimile number and Address of Company Contact Person)

Securities registered or to be registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
American Depositary Shares, each representing four ordinary shares, par value US$0.00002 per share Ordinary shares, par value US$0.00002 per share*	JKS	New York Stock Exchange

* Not for trading, but only in connection with the listing of the American depositary shares on New York Stock Exchange.

Securities registered or to be registered pursuant to Section 12(g) of the Act:

None
(Title of Class)

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act:

None
(Title of Class)

Indicate the number of outstanding shares of each of the issuer's classes of capital or common stock as of the close of the period covered by the annual report.

187,434,469 ordinary shares, excluding 455,217 ADSs representing 1,820,868 ordinary shares reserved for future grants under our share incentive plans and conversion of our convertible notes and 2,945,840 ordinary shares as treasury stock, as of December 31, 2020.

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes ☒ No ☐

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934.

Yes ☐ No ☒

Note – Checking the box above will not relieve any registrant required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 from their obligations under those Sections.

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer or an emerging growth company. See definition of "large accelerated filer," "accelerated filer" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐

Emerging growth company ☐

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards† provided pursuant to Section 13(a) of the Exchange Act. ☐

† The term "new or revised financial accounting standard" refers to any update issued by the Financial Accounting Standards Board to its Accounting Standards Codification after April 5, 2012.

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

U.S. GAAP ☒	International Financial Reporting Standards as issued by the International Accounting Standards Board ☐	Other ☐

If "Other" has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow.

Item 17 ☐ Item 18 ☐

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes ☐ No ☒

(APPLICABLE ONLY TO ISSUERS INVOLVED IN BANKRUPTCY PROCEEDINGS DURING THE PAST FIVE YEARS)

Indicate by check mark whether the registrant has filed all documents and reports required to be filed by Sections 12, 13 or 15(d) of the Securities Exchange Act of 1934 subsequent to the distribution of securities under a plan confirmed by a court. Yes ☐ No ☐

TABLE OF CONTENTS

We sell our products in major export markets and China. As of December 31, 2020, we had nine production facilities globally and 23 oversea subsidiaries in Japan, South Korea, Vietnam, India, Turkey, Germany, Italy, Switzerland, the United States, Mexico, Brazil, Chile, Australia, Portugal, Canada, Malaysia, the United Arab Emirates, Kenya and Denmark. As of the same date, we also had global sales teams in China, the United Kingdom, France, Spain, Bulgaria, Greece, Ukraine, Jordan, Saudi Arabia, Tunisia, Morocco, Kenya, South Africa, Costa Rica, Colombia, Panama, Kazakhstan, Malaysia, Myanmar, Sri Lanka, Thailand, Vietnam, Poland and Argentina to conduct sales, marketing and brand development for our products around the world. In addition, as of December 31, 2020, we had an aggregate of over 2,000 customers in over 100 countries and regions for our solar modules, including distributors, project developers and system integrators.

Our solar cells and modules utilize advanced solar technologies, such as the passivated emitter rear cell ("PERC") technology and half cell technology, and have achieved industry-leading conversion efficiency. In 2018, 2019 and 2020, the average conversion efficiency rate of our solar cells using our P-type monocrystalline silicon wafers was 21.9%, 22.3% and 22.9%, respectively. In 2018, 2019 and 2020, the average conversion efficiency rate of our N-type monocrystalline solar cells was 22.8%, 23.3% and 23.5%, respectively. We believe that both of these average conversion efficiency rates were consistently higher than industry average. In May 2018, our P-type monocrystalline solar cells broke the world record by hitting conversion efficiency rate of 23.95%. In December 2018, our N-type monocrystalline solar cells reached the conversion efficiency rate of 24.2%. In June 2019, our P-type monocrystalline solar cells and N-type monocrystalline solar cells reached the maximum conversion efficiency rate of 24.38% and 24.58%, respectively. In July 2020, the maximum conversion efficiency rate of our N-Type monocrystalline solar cells reached 24.79%.

Our high-quality manufacturing capabilities have enabled us to produce solar cells and modules meeting the industry's highest performance standards. All of our solar modules sold in Europe are CE, IEC, TÜV, and MCS certified, all of our solar module sold in India are BIS certified, all of our solar modules sold in North America are UL certified and our monocrystalline solar modules sold in China are CQC certified. In 2013, our solar modules passed TÜV Nord's Dust & Sand Certification Test, demonstrating their suitability for installation in desert regions, and we also unveiled our "Eagle II" solar modules, which represent a new standard for performance and reliability. In May 2017, we became one of the first Chinese PV manufacturers to pass the intensive UV test according to IEC 61345 from TÜV Rheinland. In July 2017, we guaranteed that all our standard PV modules meet IEC 62804 double anti-PID standards. In May 2018, our entire portfolio of PV modules passed the Potential Induced Degradation resistance test as required by TÜV Nord's IEC TS 62804-1 standards. In March 2019, we received the 5th "All Quality Matters Award" from TÜV Rheinland.

We leverage our vertically integrated platform and cost-efficient manufacturing capabilities in China to produce high quality products at competitive costs. Our solar cell and silicon wafer operations support our solar module production. As of December 31, 2020, we had an integrated annual capacity of 22 GW for mono wafers, 11 GW for solar cells and 31 GW for solar modules. Our manufacturing facilities are primarily located in five provinces across China, Florida of the United States and Penang of Malaysia, providing convenient and timely access to key resources and suppliers.

We no longer have any downstream solar power projects in China after we disposed of our downstream solar power projects business in China in the fourth quarter of 2016, but still have two overseas solar power projects which are located in Mexico and Argentina.

Our Products and Services

Our product mix has evolved rapidly since our inception, as we have incorporated more of the solar power value chain through the expansion of our production capabilities and acquisitions. We currently manufacture a series of products from silicon wafers to solar modules. Our principal product is solar modules, but we also sell silicon wafers and solar cells from time to time to meet our customers' demand. In 2020, sales of solar modules, silicon wafers and solar cells represented 92.7%, 1.3% and 1.0%, respectively, of our total revenues. In addition, we also sell small volumes of recovered silicon materials to optimize the utilization of our production capacity.

The following table sets forth details of our sales volume by product for the periods indicated:

Products	2018 (MW)	2019 (MW)	2020 (MW)
Silicon wafers	1,168.6	2,383.3	1,583.7
Solar cells	364.9	478.1	670.6
Solar modules	11,170.5	14,207.5	18,770.6

In August 2020, we launched our new generation of 610W Tiger Pro High-efficiency monocrystalline TR solar module and our BIPV solutions, Building Integrated Photovoltaics product series, which were unveiled at SNEC 2020 in Shanghai.

On August 21, 2020, we were ranked as a top solar brand in debt financed projects and named a most "bankable" PV manufacturer by Bloomberg New Energy Finance. Forty-nine global solar module manufacturers were ranked based on Bloomberg New Energy Finance's global survey of key PV stakeholders assessing which module brands used in projects are most likely to obtain non-recourse debt financing from commercial banks.

In September 2020, we supplied Trung Nam Group with 611MW of Tiger bifacial transparent backsheet modules, which were installed at the Thuan Nam solar power plant project in Vietnam. Located in Thuan Nam, the Thuan Nam solar power plant project was one of the largest solar power projects by capacity that were using bifacial modules in both Vietnam and Southeast Asia.

In November 2020, we supplied 541 MW Tiger Series modules for the first phase of the Xuan Thien project in Vietnam. This project was considered as one of the largest solar power projects in Southeast Asia. This project demonstrates the latest PV development and energy transformation in Southeast Asia.

Solar Cells

We commenced production of solar cells in July 2009 following our acquisition of Zhejiang Jinko. The efficiency of a solar cell converting sunlight into electricity is represented by the ratio of electrical energy produced by the solar cell to the energy from sunlight that reaches the solar cell. The conversion efficiency of solar cells is determined to a large extent by the quality of silicon wafers used to produce the solar cells. In 2018, we led the industry in the resizing of the 158 mm x 158 mm solar cell. In 2019, we released solar cells of larger size and incorporating the tilling ribbon technology, which greatly increased the power of the components and brought more benefits to customers. In 2020, we developed and mass produced highly efficient P-type monocrystalline solar cells of 163 mm x 163 mm and 182 mm x 182 mm, and constructed an industry-leading production line for N-type monocrystalline solar cells. In December 2020, our maximum mass production efficiency of P-type monocrystalline solar cells and N-type monocrystalline solar cells reached 23.2% and 24.2%, respectively.

In May 2018, our P-type monocrystalline solar cells broke the world record by hitting conversion efficiency of 23.95%.

In December 2018, our N-type multicrystalline solar cells broke the world record by hitting conversion efficiency of 22.12%.

In December 2018, our N-type monocrystalline solar cells reached the conversion efficiency of 24.2%.

In June 2019, our P-type monocrystalline solar cells and N-type monocrystalline solar cells reached the maximum conversion efficiency of 24.38% and 24.58%, respectively.

In September 2020, the maximum solar conversion efficiency of our large-area N-type monocrystalline silicon solar cells reached 24.9%, which was confirmed by the Institute for Solar Energy Research in Hamelin (ISFH) in Germany and set a world record for large-size contact-passivated solar cells.

Silicon Wafers

We commenced production of monocrystalline silicon wafers and multicrystalline silicon wafers in March 2008 and July 2008, respectively.

In 2018, we developed P-type and N-type monocrystalline silicon wafers with high quality and low oxygen content of 158 mm x 158 mm. In 2019, we developed technologies for silicon wafers of larger size, which resolved technical difficulties such as non-destructive cutting and concentric circle defects, and combined with N4/N5 technology, greatly improved the quality and efficiency of N-type monocrystalline silicon wafers while reducing its cost. In 2020, we developed and mass produced high quality silicon wafers of 182 mm x 182 mm, and conducted research on silicon wafers of 210 mm x 210 mm or larger size. We optimized Outer-furnace Czochralski technology and charging technology and developed and verified N7/N8 technology, which greatly improved the quality and efficiency of silicon wafers while increasing manufacturing capacity and reducing costs.

Recovered Silicon Materials

We commenced processing of recoverable silicon materials into recovered silicon materials in June 2006. We are able to process and recover a broad range of recoverable silicon materials, which enables us to reduce our overall silicon material costs and improve product quality and yield.

Except as indicated otherwise, we own the facilities completed and under construction and own the right to use the relevant land for the durations described below (including capacities and major equipment):

Products	Location	Facility No.	Plant Size (square meters)	Duration of Land Use Right	Major equipment
Silicon Ingots and Wafers	Shangrao Economic Development Zone, Jiangxi	1	68,397	(i) March 16, 2010 to February 3, 2057; (ii) December 9, 2009 to September 23, 2058; (iii) July 6, 2009 to August 10, 2059; (iv) July 10, 2009 to February 7, 2057; (v)January 6, 2009 to August 10, 2059	Monocrystalline furnaces, multicrystalline furnaces, wire saws, wire squarers
Silicon Ingots	Yili,Xinjiang	2	165,333	(i) May 28,2016 to May 27, 2026;(ii) January 1,2017 to December 31, 2029	Monocrystalline furnaces
	Leshan, Sichuan	12	279,469	May 31, 2019 to May 30, 2069	
Solar Cells	Yuanhua Town, Haining, Zhejiang	3	107,865	(i) November 23, 2009 to June 6, 2057; (ii) October 29, 2009 to May 26, 2058; (iii) August 17, 2010 to July 25, 2060	Diffusion furnaces, sintering furnaces, PECVD antireflection coatings manufacturing equipment, automatic printers
	Penang, Malaysia	4	8,191	January 1, 2015 to December 31, 2022	
Solar Modules	Shangrao Economic Development Zone, Jiangxi	5	134,950	July 6, 2009 to August 10, 2059	Laminating machine, solar cell module production line before and after component lamination, automatic glue spreads' working station, solar cell module testing devices
	Yuanhua Town, Haining, Zhejiang	6	98,497	September 9, 2016 to September 8, 2066	
	Yuanhua Town, Haining, Zhejiang	7	89,543	(i) October 29, 2009 to May 26, 2058; (ii) August 17, 2010 to July 25, 2060; (iii) September 15, 2010 to August 29, 2060	
	Penang, Malaysia	8	12,679	January 1, 2015 to December 31, 2022	
	Yuhuan, Zhejiang	9	92,540	September 9, 2016 to September 8, 2066	
	Yuanhua Town, Haining	10	140,647	March 22,2018 to March 15, 2068	
	Jacksonville, Florida	11	26,538	May 1, 2018 to April 30, 2028	
	Chuzhou, Anhui	13	289,091	April 13, 2020 to April 12, 2070	
	Yiwu, Zhejiang	14	281,089	March 12, 2020 to March 12, 2020	

As of December 31, 2020, short-term borrowings of RMB926.4 million (US$142.0 million) and long-term borrowings of RMB908.7 million (US$139.3 million) were secured by land use rights, plant and equipment. We believe our current land use rights, existing facilities and equipment are adequate for our current requirements.

Major Plans to Construct, Expand or Improve Facilities

We have entered into purchase and other agreements for purchase of additional manufacturing equipment and expansion of our production capacities. Our capital commitments under these contracts amounted to RMB3.63 billion (US$555.6 million) as of December 31, 2020, of which RMB3.24 billion (US$496.4 million) will be due in 2021 and RMB386.2 million (US$59.2 million) will be due after one year but within five years. We may terminate these agreements or revise their terms in line with our new plan and as a result, may be subject to cancellation, late charges and forfeiture of prepayments. See "Item 3. Key Information—D. Risk Factors—Risks Related to Our Business and Industry—We may continue to undertake acquisitions, investments, joint ventures or other strategic alliances, and such undertakings may be unsuccessful." and "Item 3. Key Information—D. Risk Factors—Risks Related to Our Business and Industry—We may face termination and late charges and risks relating to the termination and amendment of certain equipment purchases contracts."

Manufacturing Process

Silicon Ingot Manufacturing

We produce monocrystalline silicon ingots in electric furnaces. We place silicon materials, consisting of virgin polysilicon feedstock and recovered silicon materials of various grades according to formulas developed in-house into a quartz crucible in the furnace, where the silicon materials are melted. While heating the silicon materials, we pump a stream of argon, a chemically inert gas, into the furnace to remove the impurities vaporized during the heating process and to inhibit oxidation, thus enhancing the purity of the silicon ingots. A thin crystal "seed" is dipped into the molten silicon to determine the crystal orientation and structure. The seed is rotated and then slowly extracted from the molten silicon, which adheres to the seed and is pulled vertically upward to form a cylindrical silicon ingots consisting of a single large silicon crystal as the molten silicon and crucible cool. We have modified some of our monocrystalline furnaces to allow us to apply our furnace reloading production process, which enables us to increase the size of our silicon ingots while lowering our unit production costs by enhancing the utilization rate of our furnaces and reducing unit costs of consumables and utilities. After the silicon ingot is pulled and cooled, we square the silicon ingots in our squaring machines into blocks.

Raw Materials

The principal raw material used in our manufacturing process is virgin polysilicon. We also use recoverable silicon materials in our production. In 2018, 2019 and 2020, virgin polysilicon accounted for over 90%, and recoverable silicon materials accounted for 3.5%, 5.7% and 5.0%, respectively, of our total silicon raw material purchases by value. We procure our raw materials from diversified sources. In 2020, purchases from foreign suppliers and domestic suppliers accounted for 75.2% and 24.8% of our total silicon raw material purchases, respectively.

In 2018, 2019 and 2020, our five largest suppliers provided 56.4%, 55.9% and 66.5%, respectively, of our total silicon purchases by value. In 2018, three of our suppliers individually accounted for more than 10%, and our largest supplier accounted for 15.5% of our total silicon purchases by value. In 2019, one of our suppliers individually accounted for more than 10%, and our largest supplier accounted for 23.3% of our total silicon purchases by value. In 2020, three of our suppliers individually accounted for more than 10%, and our largest supplier accounted for 19.6% of our total silicon purchases by value. In 2018, 2019 and 2020, our five largest group suppliers accounted for 62.9%, 68.6% and 70.0%, respectively, of our total silicon purchases by value. In 2018, three of our group suppliers individually accounted for more than 10%, and our largest group supplier accounted for 22.0% of our total silicon purchases by value. In 2019, four of our group suppliers individually accounted for more than 10%, and our largest group supplier accounted for 25.2% of our total silicon purchases by value. In 2020, four of our group suppliers individually accounted for more than 10%, and our largest group supplier accounted for 19.6% of our total silicon purchases by value. A “group supplier” refers to an aggregation of our suppliers that are within the same corporate group.

Our supply contracts generally include prepayment obligations for the procurement of silicon raw materials. As of December 31, 2020, we had RMB1.0 billion (US$153.7 million) of advances to suppliers.

In November 2020, we and our subsidiary Sichuan Jinko signed a long-term purchase agreement with certain subsidiaries of Tongwei Co., Ltd. The raw materials procurement would ensure a stable supply of polycrystalline silicon in line with our strategic and operational plans. Under the agreement, we locked in nearly 100,000 metric tons of polycrystalline silicon, and both parties could negotiate additional purchases. The price for any additional order would be negotiated and determined based on market conditions.

Virgin Polysilicon

We purchase solar grade virgin polysilicon from both domestic and foreign suppliers. We purchase our virgin polysilicon through spot market purchases to take advantage of decreasing virgin polysilicon prices.

Recoverable Silicon Materials

We purchase pre-screened recoverable silicon materials from our suppliers which are delivered to our facilities for chemical treatment, cleaning and sorting into recovered silicon materials. Currently, we purchase most of our recoverable silicon materials on the spot market.

Ancillary Materials

We use metallic pastes as raw materials in our solar cell production process. Metallic pastes are used to form the grids of metal contacts that are printed on the front and back surfaces of the solar cells through screen-printing to create negative and positive electrodes. We procure metallic pastes from third parties under monthly contracts. In addition, we use EVA, tempered glass, aluminum frames and other raw materials in our solar module production process. We procure these materials from third parties on a monthly basis.

ITEM 4A. UNRESOLVED STAFF COMMENTS

None.

ITEM 5. OPERATING AND FINANCIAL REVIEW AND PROSPECTS

A. Operating Results

We are a global leader in the PV industry based in China. We have built a vertically integrated solar power product value chain, manufacturing from silicon wafers to solar modules. We sell most of our solar modules under our own “JinkoSolar” brand, with a small portion of solar modules on an OEM basis. We also sell silicon wafers and solar cells not used in our solar module production. As of December 31, 2020, we had an integrated annual capacity of 22.0 GW for mono wafers, 11.0 GW for solar cells and 31.0 GW for solar modules.

Our revenues were RMB25.04 billion, RMB29.75 billion and RMB35.13 billion (US$5.38 billion) in 2018, 2019 and 2020, respectively. We had net income of RMB405.6 million, RMB924.4 million and RMB335.3 million (US$51.4 million) in 2018, 2019 and 2020 respectively.

Principal Factors Affecting Our Results of Operations

We believe that the following factors have had, and we expect that they will continue to have, a significant effect on the development of our business, financial condition and results of operations.

Industry Demand

Our business and revenue growth depends on the industry demand for solar power and solar power products. Demand for solar power and products depends on various factors including the global macroeconomic environment, pricing, cost-effectiveness, performance and reliability in comparison to alternative forms of energy, and the impact of government regulations and policies. Solar power is one of the fastest-growing sources of energy and is driven by factors such as cost-competitiveness, reliability as a predictable energy source, and growing commitments by various governments to combat climate change.

Operating Expenses

Our operating expenses include selling and marketing expenses, general and administrative expenses, research and development expenses and impairment of long-lived assets.

Selling and Marketing Expenses. Our selling and marketing expenses consist primarily of shipping and handling expenses, warranty cost, exhibition costs, salaries, bonuses and other benefits for our sales personnel as well as sales-related travel and entertainment expenses. In 2018, 2019 and 2020, our selling and marketing expenses were RMB1.71 billion, RMB2.25 billion and RMB2.47 billion (US$379.2 million), respectively.

General and Administrative Expenses. General and administrative expenses consist primarily of salaries and benefits for our administrative, finance and human resources personnel, amortization of land use rights, office expenses, entertainment expenses, business travel expenses, professional service fees, disposal and impairment of long-lived assets as well as provision for bad debts. In 2018, 2019 and 2020, our general and administrative expenses were RMB779.4 million, RMB1.06 billion and RMB1.41 billion (US$216.0 million), respectively.

Research and Development Expenses. Research and development expenses consist primarily of silicon materials used in our research and development activities and salaries, bonuses and other benefits for research and development personnel, and depreciation of equipment for research and development. In 2018, 2019 and 2020, our research and development expenses were RMB366.6 million, RMB324.4 million and RMB389.2 billion (US$59.6 million), respectively.

Impairment of long-lived assets. Impairment of long-lived assets consist primarily as a result of the obsolescence of certain equipment for upgrade in our wafer and cell production line and impairment for one of our overseas solar power projects. In 2018, 2019 and 2020, we recognized impairment of long-lived assets of RMB14.5 million, RMB68.3 million and RMB114.2 million (US$17.5 million), respectively.

Interest Expenses, Net

Our interest expenses consist primarily of interest expenses with respect to the issuance of convertible senior notes, long-term bonds, short-term and long-term borrowings from banks and other lenders. In 2018, 2019 and 2020, we incurred interest expenses of RMB429.3 million, RMB605.9 million and RMB705.2 million (US$108.1 million), net of interest income of RMB83.5 million, RMB171.0 million and RMB216.6 million (US$33.2 million), respectively. Interest expense capitalized during the construction period of property, plant and equipment, and project assets in 2018, 2019 and 2020 were RMB51.2 million, RMB43.8 million and RMB29.3 million (US$4.5 million), respectively.

Government Grants

From time to time we apply for and receive government incentives in the form of subsidies from local and provincial governments. Government grants which are not subject to any condition and are not related to assets are recognized as subsidy income when received. The governments grant subsidies to encourage and support large-scale enterprises and high technology enterprises based in the relevant locations to upgrade their technology and develop the overseas market. We record such subsidies as subsidy income as there are no further obligations on us. The amount of government subsidies we receive may vary from period to period and there is no assurance that we will continue to receive government subsidy in the future. In 2018, 2019 and 2020, our government subsidy income, which was not assets-related, was RMB52.2 million, RMB63.0 million and RMB192.0 million (US$29.4 million), respectively.

Government grants related to assets are initially recorded as other payables and accruals. These grants will be deducted from the carrying amount when the assets are ready for use and approved by related government. We received government grants related to assets of RMB8.1 million, RMB24.9 million and RMB20.0 million (US$3.1 million) in 2018, 2019 and 2020, respectively.

Exchange (Loss)/Gain, Net

In 2018, we incurred foreign exchange gain of RMB33.7 million, primarily due to appreciation of the U.S. dollars against Renminbi. In 2019, we incurred foreign exchange gain of RMB8.8 million, primarily due to the appreciation of the U.S. dollars against the Renminbi. In 2020, we incurred foreign exchange loss of RMB336.5 million (US$51.6 million), primarily due to deprecation of the U.S. dollars against the Renminbi.

We believe that the continual improvement of our research and development capability is vital to maintaining our long-term competitiveness. In 2018, 2019 and 2020, our research and development expenses were RMB366.6 million, RMB324.4 million and RMB389.2 million (US$59.6 million), respectively. We intend to continue to devote management and financial resources to research and development as well as to seek cooperative relationships with other academic institutions to further lower our overall production costs, increase the conversion efficiency rate of our solar power products and improve our product quality.

Intellectual Property

As of the date of this annual report, we have been granted 1,012 patents by the State Intellectual Property Office of the PRC, including 873 utility model patents, 129 invention patent and 10 design patents. We also have 428 pending patent applications. These patents and patent applications relate to the technologies utilized in our manufacturing processes. We intend to continue to assess appropriate opportunities for patent protection of critical aspects of our technologies. We also rely on a combination of trade secrets and employee and third-party confidentiality agreements to safeguard our intellectual property. Our research and development employees are required to enter into agreements that require them to assign to us all inventions, designs and technologies that they develop during the terms of their employment with us. For information related to intellectual property claims that we have involved, see “Item 8. Financial Information—A. Consolidated Statements and Other Financial Information—Legal and Administrative Proceedings.”

We filed trademark registration applications with the PRC Trademark Office, World Intellectual Property Organization, or WIPO and trademark authorities in other countries and regions. As of the date of this annual report, we have been granted 332 trademarks in the PRC, such as “”, “” and “”, and 27 trademarks in Hong Kong and Taiwan, including “”, and “”.We also have 102 trademarks registered in WIPO. We have pending trademark applications of 90 trademarks in 48 countries and regions, including Brazil, Qatar, Saudi Arabia, Thailand, Indonesia, the United Arab Emirates, Australia, Singapore, Panama, Kazakhstan, Kenya, South Africa, Nicaraguan, El Salvador, Sri Lanka, India, Chile, the United States, European Union, Israel. In addition, we have registered 22 trademarks in the United States, 16 trademarks in Canada and 16 trademarks in Europe.

D. Trend Information

Other than as disclosed elsewhere in this annual report, we are not aware of any trends, uncertainties, demands, commitments or events for 2019 that are reasonably likely to have a material effect on our net revenues, income, profitability, liquidity or capital resources, or that would cause reported consolidated financial information not necessarily to be indicative of future operating results or financial conditions.

E. Off-balance Sheet Arrangements

Other than disclosed in this annual report, we have no other outstanding financial guarantees or other commitments to guarantee the payment obligations of our related parties. We have not entered into any derivative contracts that are indexed to our shares and classified as shareholder’s equity or that are not reflected in our consolidated financial statements. Furthermore, we do not have any retained or contingent interest in assets transferred to an unconsolidated entity that serves as credit, liquidity or market risk support to such entity. We do not have any variable interest in any unconsolidated entity that provides financing, liquidity, market risk or credit support to us or that engages in leasing, hedging or research and development services with us. We have not entered into nor do we expect to enter into any off-balance sheet arrangements .

Employment Agreements

We have entered into employment agreements with each of our executive officers. These employment agreements became effective on the signing date and will remain effective through 2020. We may terminate an executive officer's employment for cause, at any time, without prior notice or remuneration, for certain acts of the officer, including, but not limited to, failure to satisfy our job requirements during the probation period, a material violation of our regulations, failure to perform agreed duties, embezzlement that causes material damage to us, or conviction of a crime. An executive officer may terminate his or her employment for cause at any time, including, but not limited to, our failure to pay remuneration and benefits or to provide a safe working environment pursuant to the employment agreement, or our engagement in deceptive or coercive conduct that causes him or her to sign the agreement. If an executive officer breaches any terms of the agreement, which leads to, including, but not limited to, termination of the agreement, resignation without notice, or failure to complete resignation procedures within the stipulated period, he or she shall be responsible for our economic losses and shall compensate us for such losses. We may renew the employment agreements with our executive officers.

D. Employees

As of December 31, 2018, 2019 and 2020, we had a total of 12,565, 15,195 and 24,361employees, respectively. The increase in our number of employees in 2020 was mainly attributable to the expansion of our manufacturing facilities in China. As of December 31, 2020, we had 24,361 full-time employees, including 21,661 in manufacturing, 1,078 in research and development, 394 in sales and marketing and 1,228 in administration. Substantially all of these employees are located in China with a small portion of employees based in the United States, Europe and other countries and regions.

We believe we maintain a good working relationship with our employees, and we have not experienced any labor disputes or any difficulty in recruiting staff for our operations. In October 2013 and 2014, we were named one of the Top 100 Best Employers in China in 2013 by the World Executive Journal in conjunction with the World HR Laboratory, Bossline and CEO-ZINE. JinkoSolar was awarded HR Asia Best Companies to Work for in Asia Awards – China Edition, in 2018, 2019 and 2020. With the corporate culture of equality, accountability, commitment, and driving excellence, we were acknowledged for the best practices in human resource management.

Our employees are not covered by any collective bargaining agreement. In line with the expansion of our operations, we plan to hire additional employees, including additional accounting, finance and sales, marketing personnel as well as manufacturing and engineering employees.

In line with local customary practices, we have made contributions to the social insurance funds which met the requirement of the local minimum wage standard, instead of the employees' actual salaries as required, and have not made full contribution to the housing funds. We estimate the aggregate amount of unpaid social security benefits and housing funds to be RMB560.2 million, RMB595.3 million and RMB605.8 million (US$92.8 million), respectively, as of December 31, 2018, 2019 and 2020. See "Item 3. Key Information—D. Risk Factors—Risks Related to Doing Business in China—Our failure to make payments of statutory social welfare and housing funds to our employees could adversely and materially affect our financial condition and results of operations."

E. Share Ownership

The following table sets forth information with respect to the beneficial ownership of our shares as of the date of this annual report by:

- each of our directors and executive officers; and

EXHIBIT 20

ENTIRE EXHIBIT NOT CAPABLE OF PUBLIC SUMMARY

EXHIBIT 21

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NEWS (HTTPS://WWW.PV-TECH.ORG/CATEGORY/NEWS/)

LONGi secures major polysilicon supply deal from OCI Malaysia and 46GW of solar glass from Flat Glass

By Mark Osborne (https://www.pv-tech.org/author/markosborne/)

February 10, 2021

Companies (https://www.pv-tech.org/industry-segments/companies/), Fab & Facilities (https://www.pv-tech.org/industry-segments/fab-facilities/), Financial & Legal (https://www.pv-tech.org/industry-segments/financial-legal/), Manufacturing (https://www.pv-tech.org/industry-segments/manufacturing/), Markets & Finance (https://www.pv-tech.org/industry-segments/markets-finance/), Materials (https://www.pv-tech.org/industry-segments/materials/), Modules (https://www.pv-tech.org/industry-segments/modules/)

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Leading monocrystalline wafer producer LONGi Green Energy has signed a three-year high-purity polysilicon supply deal from OCI Malaysia, while securing 46GW of PV glass from China's Flat Glass Co.

The deal with FLat will lock in glass availability for LONGi Solar's module assembly plants.

According to the agreement, the material procurement starts from March 2021, will run through to the end of 2024 and is worth approximately RMB6.36 billion (US$ 988.2 million), based on current ASPs of RMB92,500/MT (US$14,373.84).

LONGi has been securing a number of key polysilicon supply contracts due to polysilicon capacity constraints in China and the expanding customer demand for p-type mono wafers.

LONGi subsidiary and major 'Solar Module Super League' (SMSL) member LONGi Solar has targets of shipping around 45GW of PV modules in 2021.

46GW solar flat glass contract

LONGi Solar has also announced a new solar flat glass procurement contract with Flat Glass Group, securing front glass (3.2mm thickness) and rear glass (2.0mm thickness) capable of supporting 46GW of PV module production between 2022 to the end of 2023, worth approximately RMB10.4 billion (US$1.62 billion).

The glass supply is for LONGi Solar's 13 module assembly subsidiaries, including operations in Vietnam.

Solar glass has been in short supply since the second-half of 2020, due to Chinese government restrictions on new capacity expansions, due to general building glass overcapacity of around 30%, compared to demand.

However, restrictions were lifted specifically for solar specific glass sizes and thicknesses, due to the chronic shortages that limited PV module shipments since. New capacity is expected to come on-stream later in 2021 and beyond to meet growing demand and reduce ASPs which have led to profit margin decline for a number of PV module manufacturers.

flat glass co (https://www.pv-tech.org/tag/flat-glass-co/), longi solar (https://www.pv-tech.org/tag/longi-solar/), longii green energy technology (https://www.pv-tech.org/tag/longii-green-energy-technology/), oci company (https://www.pv-tech.org/tag/oci-company/), polysilicon (https://www.pv-tech.org/tag/polysilicon/), polysilicon pricing (https://www.pv-tech.org/tag/polysilicon-pricing/), polysilicon production (https://www.pv-tech.org/tag/polysilicon-production/), solar flat glass (https://www.pv-tech.org/tag/solar-flat-glass/)

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(https://www.pv-tech.org/tackling-solars-polysilicon-crisis-part-two-no-blind-price-cuts-technology-is-king-and-collaborate-to-reduce-waste/)

PV Tech Premium

Tackling solar's polysilicon crisis, part two: No blind price cuts, technology is king and collaborate to reduce waste (https://www.pv-tech.org/tackling-solars-polysilicon-crisis-part-two-no-blind-price-cuts-technology-is-king-and-collaborate-to-reduce-waste/)

June 10, 2021

In the second part of a two-part feature on the solar industry's response to polysilicon price increases, Carrie Xiao hears from industry leaders about the importance of technology innovation, efforts to reduce waste and the need to avoid cutting prices blindly just to appease customers.

EXHIBIT 22

NEWS (HTTPS://WWW.PV-TECH.ORG/CATEGORY/NEWS/)

JA Solar adding 10,000MT of monocrystalline silicon ingot capacity

By Mark Osborne (https://www.pv-tech.org/author/markosborne/)

February 24, 2020

Companies (https://www.pv-tech.org/industry-segments/companies/), Fab & Facilities (https://www.pv-tech.org/industry-segments/fab-facilities/), Financial & Legal (https://www.pv-tech.org/industry-segments/financial-legal/), Manufacturing (https://www.pv-tech.org/industry-segments/manufacturing/), Markets & Finance (https://www.pv-tech.org/industry-segments/markets-finance/), Materials (https://www.pv-tech.org/industry-segments/materials/)

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'Solar Module Super League' (SMSL) member JA Solar is to expand its monocrystalline silicon ingot capacity by 10,000MT at its subsidiary in Xingtai Economic Development Zone, Hebei province, China.

The capacity expansion will enable JA Solar to produce 18,000MT at the Xingtai facility. The company did not say what the ingot size would be as the industry is rapidly shifting to a number of larger wafer sizes, from 210mm x 210mm to the 300mm alternative that went into volume production in late 2019 at Tianjin Zhonghuan Semiconductor.

JA Solar did not disclose the amount of capital expenditure required for the project.

The company has made several major capacity expansion announcements so far in 2020, shortly after a stock relisting in China at the end of 2019.

JA Solar said in January 2020 (https://www.pv-tech.org/news/ja-solar-starts-ramping-1.6gw-monocrystalline-ingot-capacity-expansion-proj) that it had started ramping a 1.6GW monocrystalline ingot production expansion project at its main dedicated plant in Baotou, Inner Mongolia.

In mid-February, *PV Tech* highlighted (https://www.pv-tech.org/news/ja-solar-adding-8.6gw-of-new-and-upgraded-high-efficiency-solar-cell-capaci) that JA Solar was planning to expand high-efficiency solar cell capacity from 5GW to 10GW at a recently announced factory in China.

At the time, the firm added it would also spend RMB 1.3 billion (US$161.3 million) on upgrading 3.6GW of solar cell capacity at its existing facility in Jinglong Third Industrial Park, Ningjin County, Xingtai City, Hebei Province.

At the start of the year (https://www.pv-tech.org/news/ja-solar-unveils-plans-for-new-5gw-cell-10gw-module-production-facilities), JA Solar also announced plans to expand PV module capacity by 10GW at two facilities, costing 6.6 billion Yuan (US$948 million), while expanding solar production by a further 5GW.

c-si manufacturing (https://www.pv-tech.org/tag/csi-manufacturing/), china (https://www.pv-tech.org/tag/china/), ja solar (https://www.pv-tech.org/tag/ja-solar/), monocrystalline wafer (https://www.pv-tech.org/tag/monocrystalline-wafer/)

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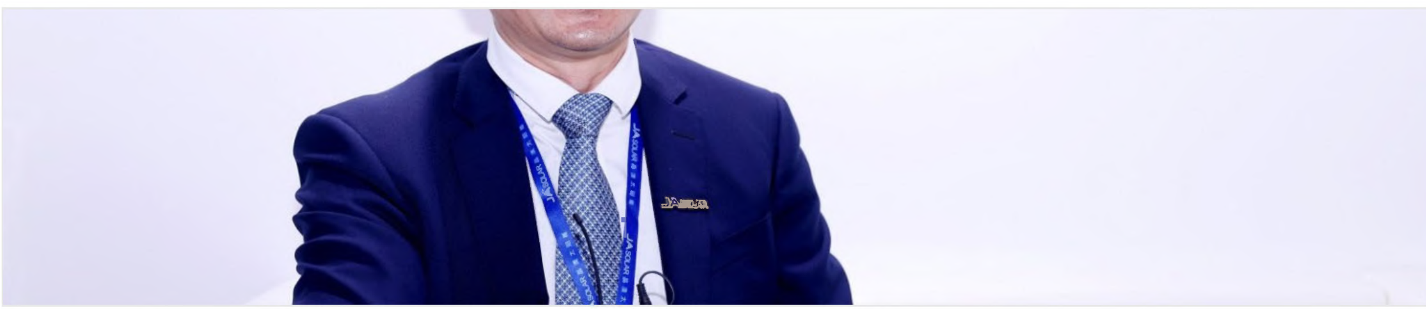

(https://www.pv-tech.org/how-ja-solar-is-responding-to-materials-price-increases/)

PV Tech Premium

How JA Solar is responding to materials price increases (https://www.pv-tech.org/how-ja-solar-is-responding-to-materials-price-increases/)

June 9, 2021

Price increases in polysilicon and other auxiliary solar module materials have exerted much pressure on manufacturers, JA Solar has said, impacting on profitability in the first half of 2021. Xinming Huang, senior vice president at JA Solar, tells PV Tech how the company is responding.

EXHIBIT 23

TAIYANGNEWS
ALL ABOUT SOLAR POWER

Business

JA Solar To Expand Capacity For RMB 10.39 Billion

JA Solar To Expand Vertical Integrated Production Capacity Of Ingot, Wafer, Solar Cell & Modules For RMB 10.39 Billion Investment

07:48 PM (Beijing Time) - 17. September 2020

KEY TAKEAWAYS

- JA Solar will expand its integrated solar PV manufacturing capacity in China and Vietnam
- RMB 10.39 billion investment will expand the company's annual capacity of ingot, wafer, solar cell and module
- Capacity expansion will prep the company for its future capacity planning and meet market demand

JA Solar Technology Co., Ltd. has revealed plans to expand its integrated production capacity of silicon wafers, cells and modules with a combined investment of RMB 10.391 billion ($1.53 billion), the management announced in a stock exchange filing. This includes the expansion of its capacity of silicon wafers, cells and modules.

The management explained that this investment is in line with the company's strategic needs for future capacity planning and conducive to its vertical integrated industrial chain layout. "After the project is put into production, it can effectively increase the production capacity of high efficiency products and meet the market demand," it stated.

Ingots and wafers

It plans to add 1 GW annual capacity for ingots and 5 GW annual wafer capacity for RMB 670 million ($99 million) in Ningjin county of China.

Another 20 GW of annual ingot production capacity is planned for Yunnan Hydropower and Silicon Processing Integrated Industry Demonstration base in Nanhaizi Industrial Park, also in China for an investment of RMB 5.83 billion ($861 million). This capacity will be implemented in 2 phases.

Solar cells

For high efficiency crystalline solar cells, the company wants to expand its manufacturing capacity by another 3.5 GW through a new project company in Vietnam's Gwangju Industrial Zone, Bac Giang province. Project construction period is likely to last 15 months and will cost RMB 1.47 billion ($217 million).

Through its wholly owned subsidiary JA Solar (Yangzhou) Solar Technology Co., Ltd., the company will set up 6 GW of high efficiency solar cell project in Yangzhou Economic and Technological Development Zone for RMB 1.72 billion ($254 million). Its construction period should last 12 months.

Recently, JA Solar announced the completion and commercial operations of its 3.6 GW solar cell production capacity with a total investment of RMB 1.13 billion using 182 mm wafer size in Ningjin county of Hebei province in China (**see** China PV News Snippets: Risen Energy, JA Solar, ZNShine).

Module

For solar modules, the aim for JA Solar is to set up 3.5 GW capacity of new high power modules in Vietnam through JA Solar Viet Nam Company Limited. It will be set up in Gwangju Industrial Zone of Bac Giang province by using existing land to build this new production line and supporting facilities. It estimates an investment of RMB 700 million ($103 million) on this project and the new line to come up within 11 months.

While JA did not say when all these new capacities are planned to be online, as per the company's 2019 annual report, its annual wafer production capacity was 11.5 GW with 11 GW of solar cell and 11 GW of module capacity. During TaiyangNews' 1st Virtual Conference on 500W+ modules, JA Solar's Tao Wang said his company is looking at reaching 20 GW of cumulative module capacity by the end of 2020 and by the end of 2021, it should scale up to 23 GW (see **TaiyangNews 500W+ Conference: JA Solar**).

Anu Bhambhani

Anu Bhambhani is the Senior News Editor of TaiyangNews

Write, follow the author.

EXHIBIT 24

NEWS (HTTPS://WWW.PV-TECH.ORG/CATEGORY/NEWS/)

Daqo New Energy and JA Solar pen long-term high-purity polysilicon supply deal

By Liam Stoker (https://www.pv-tech.org/author/liamstoker/)

May 12, 2021

Fab & Facilities (https://www.pv-tech.org/industry-segments/fab-facilities/), Manufacturing (https://www.pv-tech.org/industry-segments/manufacturing/), Materials (https://www.pv-tech.org/industry-segments/materials/)

Asia & Oceania (https://www.pv-tech.org/regions/asia-oceania/), Central & East Asia (https://www.pv-tech.org/regions/central-east-asia/)

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Daqo New Energy's Phase 4B project is to come onstream in Q1 2022, adding 35,000MT of capacity. Image: Daqo New Energy.

Daqo New Energy and JA Solar have signed a long-term supply deal for high-purity polysilicon, the latest in a growing line of deals as manufacturers look to lock in polysilicon supply.

Under the terms of the agreement, Daqo will supply JA Solar with around 78,200 MT of high-purity mono-grade polysilicon for three-and-a-half years between July 2021 and December 2025.

Actual volumes and prices are to be negotiated on a monthly basis according to market conditions, with JA making an advance payment to Daqo.

Polysilicon supply and pricing has proven particularly volatile in recent months as demand far outstrips supply of the material. Poly spot prices have escalated to in excess of RMB150/kg (US$23.28/kg) in some instances, leading module prices to creep up as a result.

In Q4 2020, Daqo reported polysilicon ASPs of US$10.79/kg (https://www.pv-tech.org/daqo-has-best-year-as-polysilicon-prices-continued-to-rise/), indicating the extent to which prices have risen in just a few months. Daqo is to report its Q1 2021 figures next week.

Volatility is now expected to continue into 2022, when new capacity is to come onstream. Daqo is one such polysilicon supplier bringing new capacity online next year with its Phase 4B project, which is to add 35,000 MT to the supplier's total capacity, slated to come online in Q1 2022.

Longgen Zhang, chief executive at Daqo New Energy, added: "With our Phase 4B project expected to come online in Q1 2022, we will enter another growth phase and be able to provide more ultra-high purity polysilicon to the market. We look forward to continuing to work together with our customers to provide more first-class products and solutions to the fast-growing global solar PV market."

EXHIBIT 25

China's JA Solar Inks Third Major Polysilicon Purchase Deal in a Month

TANG SHIHUA

DATE: MAY 13 2021 / SOURCE: YICAI

China's JA Solar Inks Third Major Polysilicon Purchase Deal in a Month

(Yicai Global) May 13 -- JA Solar Technology has

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Prices of Polysilicon

signed its third major procurement contract in the last 30 days, to ensure the supply of raw materials for its expanded production of solar cell parts.

A subsidiary of JA Solar inked a deal with Xinjiang Daqo New Energy on May 12 to buy about 78,200 tons of polysilicon between from this July through December 2025, Beijing-based JA Solar said in a statement yesterday. Xinjiang Daqo is almost 95 percent owned by New York-listed Daqo New Energy.

The new contract could be worth more than CNY10 billion (USD1.6 billion) based on the estimated unit price of a CNY24.8 billion deal JA Solar signed with another supplier, Xinte Energy, at the end of last month. That was for 181,000 tons of polysilicon. Under the latest contract, JA Solar said the parties will negotiate the purchase price on a monthly basis.

On April 21, JA Solar also announced a deal to buy 75,000 tons of polysilicon from Asia Silicon Qinghai.

Last September, the company unveiled plans to spend CNY10.39 billion on capacity expansion. By the end of 2021, its annual solar cell parts capacity is expected to top 40 gigawatts, and the capacity for silicon wafers and batteries will be about 80 percent of that, it said last month.

A boom in solar power plant construction has driven raw material demand across the industrial chain, encouraging firms to actively expand production capacity and sign long-term supply contracts with their upstream suppliers.

Shares in JA Solar [SHE:002459] closed up 2.2 percent today at CNY25.89 (USD4) each.

Expected to Rise as China Raises Anti-Dumping Duties on Polysilicon Imports From South Korea

LIAO SHUMIN / NOV 22 2017

Xinte Energy Will Double Solar-Grade Polysilicon Output With USD645 Million Xinjiang Plant

TANG SHIHUA / FEB 28 2018

China's Xinte, TBEA Surge After Ja Solar Orders USD3.9 Billion of Solar Cell Materials

TANG SHIHUA / APR 29 2021

Editor: Tom Litting

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Keywords: JA Solar

EXHIBIT 26

THE AMERICAN PROSPECT IDEAS, POLITICS & POWER

The Case for Taking Back Solar

Installing a lot more solar is part of the path to clean, renewable energy. But we also need to be producing the entire supply chain.

BY JOAN FITZGERALD MARCH 24, 2021

FEATURECHINA

A Chinese worker assembles solar panels in Jiangxi province. The U.S. cannot preference its domestic solar manufacturers without rebuffing the World Trade Organization.

Solar has been the fastest-growing source of electric power in the United States for several years. The cost of energy produced by solar photovoltaic panels declined by 82 percent between 2010 and 2019 and became cheaper than coal and natural gas in 2018. Solar now comprises 3 percent of total electricity generation, totaling 43 percent of new generating capacity in 2020. But almost all of the panels and their component parts are made in China. That has to change.

We need to re-create a solar panel manufacturing industry for national-security, economic, environmental, and ethical reasons. Building a solar manufacturing industry will require changes in our current trade policy, as well as coordinated procurement to require a domestic solar supply chain, and R&D support for accelerating the development of more efficient panels. These interconnected elements also need to be linked to job training and placement for people with employment barriers and those losing their jobs in the transition from renewable to fossil fuel industry jobs.

More from Joan Fitzgerald

The United States employs about 250,000 workers in the solar industry—about 162,000 in installation and 34,423 in manufacturing. The remainder are in operations and maintenance and other supportive jobs. If we combine a strategy to transition to renewables with one to build a domestic solar industry and supply chain, employment could increase dramatically. A ten-gigawatt increase in production would add 62,500 direct and 75,000 total manufacturing jobs and would increase installation employment as well.

But China currently dominates in manufacturing all components of solar modules. A solar module begins with refined and melted polysilicon. A hair-thin wafer of the polysilicon forms the basis of a solar cell, which converts light energy to electricity. There are several types of cell structures, the most common being single cell (monocrystalline) and polycrystalline, which is used in what are called thin-film solar panels because they are built from flexible materials. China dominates in the production of each element—the refined silicon, the wafers, the cells, and the completed module enclosed in glass and metal or all glass (bifacial panels).

China's Shady Solar Strategy

China has a long-term strategic vision for dominating essential industries—and solar is one of them. In 2016, I wrote in the *Prospect* about how China used a combination of subsidies and free land to attract U.S. solar companies. They stipulated, however, that they couldn't sell their products in China, which violated free-trade principles and the promises China made to other WTO countries in its WTO accession protocols, but the U.S. government did not make an issue of it and many U.S. companies found it to be an offer they couldn't refuse.

China started developing its own solar industry and dumped products on the world market at below-cost prices—something that also violates trade law. By 2011, prices began falling dramatically and many U.S. and German producers couldn't compete. Now, China produces 75 percent of solar modules globally.

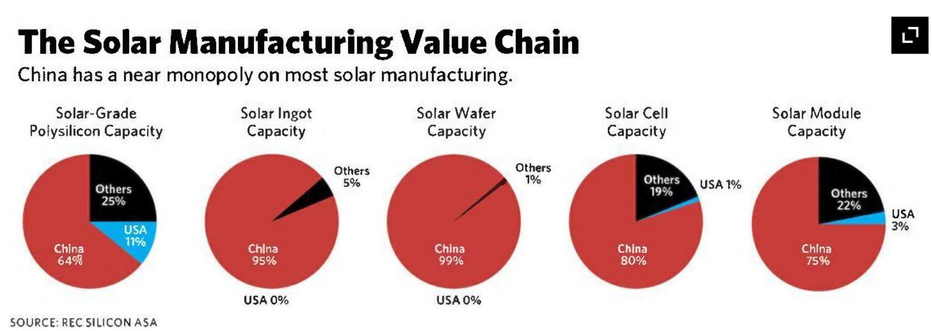
It's a similar story with polysilicon. The U.S. was the world's leader in polysilicon production until China used similar policies to gain dominance. A polysilicon plant uses an energy-intensive process that refines metallurgical-grade silicon to the high purity levels needed for solar cells and semiconductors. Although it took China a while to develop the manufacturing knowledge to be competitive, once it did the industry took off. In 2017, China imposed stiff tariffs on American and South Korean polysilicon, which meant the growing Chinese solar panel production sector had to use domestic polysilicon.

Investment and tariffs have been effective—China's polysilicon industry, all of it in western China, has grown 27-fold in the past ten years. Since 2017, 91 percent of new capacity worldwide has been in China. Two-thirds of the world's polysilicon market will be controlled by five companies in China and Hong Kong by 2021.

And it's the same story with wafers and cells. The U.S. currently has almost no production capacity for cells, while China produces 80 percent of the world's output. In 2020, China accounted for 99 percent of global wafer production, 80 percent of global cell production, and 75 percent of global module production—all substantial increases over its market share in 2010.

A March 2020 U.S. International Trade Commission report estimates that U.S. cell production dropped 75 percent between 2016 and 2018. U.S. cell imports jumped from 308 megawatts from January–June 2018 to 951 megawatts during that same period in 2019, an increase that coincided with the ramping up of new domestic module manufacturing.

Many U.S. states, cities, companies, and individuals are installing solar to avoid carbon emissions. They would be surprised to know that the majority of the solar panels installed in the United States come from dirty coal–fired factories and that some components of their panels are made with forced labor.



SOURCE: REC SILICON ASA

About 45 percent of the world's solar-quality polysilicon is produced in the Xinjiang region of China. Transforming silica into silicon for solar panels is an energy-intensive process that relies on electricity produced from dirty coal. Further, some manufacturers in western China have been accused of dumping toxic wastewater produced in the process into rivers. These practices produce significant air and water pollution that affects agricultural production and human health in the central and western regions of China where it is commonly produced.

The Australian Strategic Policy Institute has documented detention, re-education, and forced labor of Muslims in the Xinjiang region, where many inputs to solar panels are produced. A 2021 Horizon Advisory report names Chinese solar giants Daqo New Energy, East Hope Group, GCL-Poly, and Jinko Solar among the companies in the Xinjiang region using forced labor.

These companies are still exporting to the United States. American law bans importation of goods produced with forced labor, and there is considerable evidence that many of these goods make their way into the solar supply chain. The U.S. has banned cotton and tomato imports from the region and placed restrictions on hair products and computer inputs from Xinjiang, but to date, not polysilicon or other components of solar panels produced in the region.

The China Photovoltaic Industry Association not only denies the use of forced labor in the industry but uses threatening language to warn against restricting imports: "We also solemnly tell some American association and companies that if they intend to use this as an excuse to restrict and suppress relevant parties and companies in China, interfere with normal business cooperation and competition, and seek personal gain from it, they will not only violate international trade rules and market economic principles, but also destroy them."

U.S. Solar Policy: Fits and Starts

In dramatic contrast with China's policy for supporting every element of the solar production industry, U.S. policy has been scattershot. Rather than engage in long-term industrial planning, the main federal approach to support the solar industry has been tax credits, offered intermittently, while the Department of Energy has funded research and the government intermittently has subsidized some production and installation.

At the state and municipal level, we have a hodgepodge of renewable mandates and subsidies focused on installation. The main policy instrument is the renewable portfolio standard (RPS), which requires utilities to purchase a set percentage of their power from renewable sources by a set date. Currently, 38 states plus Washington, D.C., have an RPS (or similar program). While state subsidies have supported the record-breaking growth of solar energy deployment, they have done nothing to support manufacturing of solar components.

The American Recovery and Reinvestment Act (ARRA) of 2009 demonstrates the effectiveness of a direct federal subsidy of the clean-energy sector. Of its total investment of $840 billion, ARRA spent $92 billion on clean-energy technologies, including clean-energy generation, grid modernization, electric vehicles, transit, energy efficiency, and workforce training to support these industries.

To jump-start projects, the $25.7 billion invested for clean-energy generation paid developers 30 percent of their project costs in cash rather than as a tax credit between 2009 and 2015. Another $4.6 billion was provided for guaranteed loans to companies investing in renewable energy. Although Solyndra became the poster child for those arguing that the government can't pick winners, total interest payments to the government from the loans exceeded losses from loans by $30 million. The program invested in 183 projects, which leveraged private investment of nearly $5.4 billion. Of the 183 clean-energy projects, 58 went to solar equipment manufacturers, totaling $1.1 billion. Before the stimulus, solar provided less than 1 percent of the nation's electricity. As a result of the stimulus, solar more than doubled to 2.3 percent.

We need that scale of investment, and more, to expand domestic solar capacity. Currently, there are 21 solar panel manufacturers in the United States, 15 of which are American-based.

> China has a long-term vision for dominating strategic industries—and solar is one of them.

Some existing U.S. companies demonstrate how to reclaim domestic supply chains by building on established regional competence. When Tempe, Arizona–based First Solar opened its first factory in Perrysburg Township, Ohio, in 2001, it was the country's largest solar panel manufacturer. It was part of a solar boom in the Toledo area, building off research at the University of Toledo and historical strength in glass technology and manufacturing. Eighteen years later, the company opened a second factory nearby to produce its new Series 6 line. Representing a cumulative investment of over $1 billion, the new factory expanded First Solar's domestic capacity to 1.9 gigawatts. This larger line of panels is designed for commercial, industrial, and utility-scale uses.

The new plant added about 500 jobs, with the company now employing approximately 1,450 employees at both Ohio factories. The factory was in production 18 months after breaking ground, illustrating how quickly the country could ramp up domestic production. The company has said that it will exit 2021 with 2.6 gigawatts of capacity in Ohio as a result of process improvements.

First Solar sources all of its inputs for its production in Ohio from a diverse range of suppliers that, notably, does not include companies in China. "We operate a diversified supply chain and, wherever possible, source domestically produced content," said Mike Koralewski, First Solar's chief manufacturing officer. "Solar manufacturing at scale is a significant job creator, but its real impact often gets lost in the narrow focus on jobs directly created on the factory floor. Our manufacturing operations in Ohio indirectly support as many as 7,000 supply-chain jobs across America."

First Solar's expansion motivated the NSG Group to build a $265 million specialty coated-glass plant nearby with about 70 percent of its production going to First Solar. The 511,000-square-foot facility employs 110 hourly workers and 40 in salaried positions. It's the first glass furnace to be built in the United States in four decades. NSG, in turn, sources materials such as soda ash from Wyoming and sand from Michigan.

The cadmium telluride (CdTe) based thin-film panels First Solar makes are the second-most prevalent type of solar panel after crystalline. They are comparable or better than crystalline panels, and because they don't use silicon they are easier and cheaper to produce and have a lower carbon footprint. The company also leads the industry internationally in providing recycling of its modules, which it has been doing for the past decade. Recycling recovers more than 90 percent of the CdTe from every module, which can be used repeatedly. First Solar is the only solar manufacturer to achieve the coveted EPEAT ecolabel of the Green Electronics Council for energy and water efficiency of the production process and use of recycled material.

First Solar is a member of the Ultra Low-Carbon Solar Alliance, launched in October 2020 with the goal of increasing market demand for solar panels manufactured with low embedded carbon. Its members include ten solar companies representing the full spectrum of the solar value chain.

The Alliance hopes to have a third-party-verified embodied-carbon-specific ecolabel intended to complement existing sustainable-product labels. To be certified, a solar module company and its suppliers have to submit to lifecycle analysis to disclose their embedded carbon emissions.

France already has a version of this certification in place, and the European Commission is considering a requirement that all PV modules include carbon footprint information.

DAVID DAYEN

A solar array in Palm Springs, California. China produces around three-quarters of solar modules globally.

Alliance Executive Director Michael Parr is talking to federal and state agencies and other large purchasers of solar to encourage a preference for modules with the ecolabel. The strategy does not violate trade agreement rules against preferencing domestic suppliers because any company is eligible to seek certification. An ecolabel will initially privilege U.S. and European producers since there's roughly twice as much embodied energy in Chinese modules, according to Parr. And it wouldn't raise the price of solar projects—more than 60 percent of the embodied carbon in a given project is in the polysilicon and wafer, which is only about 6 to 8 percent of its cost.

While preferencing certified ecolabel producers is one approach to building a clean domestic solar supply chain, we also need a combination of trade policy, procurement policy under Buy American, manufacturing tax credits, and continued research and development.

The Trade Policy Conundrum

Members of the World Trade Organization (WTO) agree not to discriminate among trading partners and to treat imported and locally produced goods equally. That means the U.S. can't give preference to domestically made renewable-energy products and also follow WTO rules. One or the other has to give.

Other nations have used targeted industrial policies, and have been the subject of complaints by—of all nations—China. (Do as I say, not as I do.) China actually won a major case in which the WTO ruled in its favor. In 2013, Japan and the European Union mostly won a case against Ontario for paying higher prices for solar energy from locally produced equipment. In 2016, the U.S. brought a case against India before the WTO for its buy-local provisions for cells and modules. India retaliated by bringing a case against eight U.S. states with solar subsidies and buy-local policies. The WTO ruled against the U.S. and required changes in the policies. But with Trump having refused to appoint WTO appellate judges, enforcement of rulings is effectively impossible.

Several manufacturing advocates told me that the U.S. should give preference to domestic solar despite the fact that it violates the WTO. It took two years after Japan and the EU brought the case against Ontario for the WTO disputes settlement mechanism to issue its first ruling. The party can then appeal the decision, and if still found in violation, the party can protest the sanctions. If sanctions are applied, they don't start retroactively from when the rule was broken, but only after the final decision has been rendered. All this assumes that the WTO has appellate-system judges to hear appeals. Last week, the Biden administration indicated that it would not appoint a judge, putting all trade cases on hold. At some point, the president will need to decide whether domestic industrial goals take priority over a badly flawed trading system that his predecessors of both parties have long promoted, at the expense of U.S. manufacturing.

> Our dependence on China for solar deployment is no less dire than our dependence on its semiconductors.

While deliberately violating WTO rules may seem extreme, our dependence on China for solar deployment is no less dire than our dependence on semiconductors, on which the Biden administration is beginning to act. Due to increased demand for computers and other tech products during the pandemic, along with Trump's banning imports from Chinese companies suspected of using semiconductor technology for spying, the nation is experiencing a shortage of semiconductors that are in many consumer goods. Because the industry is so vital to the U.S. economy, Biden is expected to sign an executive order soon to offer financial support to the industry. This same sense of urgency should apply to the solar supply chain.

The tariffs that the Trump administration placed on foreign solar modules, under Sec. 201 of the Trade Act, which allows retaliation against dumped imports, motivated three foreign producers (Hanwha Q Cells, Jinko, and LG) to open U.S. module plants in response to the tariffs. While the Solar Energy Industries Association (SEIA) claims the U.S. lost 62,000 jobs and $19 billion in investment due to the higher prices of solar modules resulting from these tariffs, these figures are misleading. In fact, Wood McKenzie counted 19 gigawatts of new solar capacity in 2020, a 43 percent increase from 2019.

The SEIA posture reflects the fact that it is more a creature of companies that install solar (which want low prices) than those committed to domestic manufacturing (which resist unfair Chinese-subsidized competition). Short term, there is a tension between the goal of installing more solar at the lowest possible price and the goal of expanding domestic production. But long term, if the U.S. can rebuild supply chains and domestic technological leadership, prices will keep falling.

Putting It All Together

One tool a president can use is the Buy American Act of 1933, which imposes domestic-production rules on federal procurement and federal grants to states and counties for procurement. Another is the Buy America Act (the two are often confused). The latter is a set of rules that apply to purchases of iron, steel, and manufactured goods used in Department of Transportation–funded infrastructure projects.

The Buy America rules for DOT spending haven't been committed under our free-trade agreements and don't allow waivers for trading partners that are signatories of free-trade agreements with the U.S., while the Buy American Act does. Currently, the WTO Agreement on Government Procurement (GPA) gives the other 47 countries in the agreement the same Buy America status as domestic producers. President Biden's Buy America executive order calls for renegotiating those rules, as did Katherine Tai in her confirmation hearing to become the United States trade representative.

In practice, the U.S. can unilaterally exclude certain goods from GPA in trade agreements with a simple declaration that we are taking this category of goods out of commitments. We should do that with the solar supply chain. As one trade restriction supporter noted, "We can't let trade policy be set in Geneva."

Infrastructure build-out can promote domestic solar production. The Coalition for a Prosperous America proposes public investment in electric charging infrastructure for the national highway system using domestic solar and battery storage equipment. The proposal points out that the Federal-Aid Highway Program, with average annual spending of $40 billion between 2016 and 2020, is exempt from the WTO government procurement agreement. The U.S. also needs a major public investment in battery storage.

Congress should also reinstate the Department of Energy 48C Advanced Manufacturing Tax Credits offered under the American Recovery and Reinvestment Act to offset subsidized producers in China. This credit provided a 30 percent investment tax credit to clean-energy manufacturers and required that they pay prevailing wages. The value of the credits could be adjusted to target producers that locate in places that will be hard-hit as the fossil fuel industry declines and in environmental-justice communities. These credits should be extended over decades to create a sustained investment environment that produces innovation.

These disparate initiatives on research, installation, domestic production, trade, and incentives for utilities to shift to solar cry out for a coherent and coordinated national strategy. President Biden's commitment to a green transition, a large-scale infrastructure investment, and a turning away from past, America-last trade policies, creates the opportunity. Now we need to put it all together.

JOAN FITZGERALD

Joan Fitzgerald is a professor in the School of Public Policy and Urban Affairs at Northeastern University. Her latest book is 'Greenovation: Urban Leadership on Climate Change.'

EXHIBIT 27

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 20-F

(Mark One)

☐ **REGISTRATION STATEMENT PURSUANT TO SECTION 12(b) OR 12(g) OF THE SECURITIES EXCHANGE ACT OF 1934**

OR

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended December 31, 2020

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the transition period from to

OR

☐ **SHELL COMPANY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
Date of event requiring this shell company report

Commission file number: 001-33107

CANADIAN SOLAR INC.
(Exact name of Registrant as specified in its charter)

N/A
(Translation of Registrant's name into English)

British Columbia
(Jurisdiction of incorporation or organization)

545 Speedvale Avenue West
Guelph, Ontario, Canada N1K 1E6
(Address of principal executive offices)

Huifeng Chang, Chief Financial Officer
545 Speedvale Avenue West
Guelph, Ontario, Canada N1K 1E6
Tel: (1-519) 837-1881
Fax: (1-519) 837-2550
(Name, Telephone, E-mail and/or Facsimile number and Address of Company Contact Person)

Securities registered or to be registered pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol	Name of Each Exchange on Which Registered
Common shares with no par value	CSIQ	The NASDAQ Stock Market LLC (The NASDAQ Global Select Market)

Securities registered or to be registered pursuant to Section 12(g) of the Act:
None
(Title of Class)

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act:
None
(Title of Class)

Indicate the number of outstanding shares of each of the issuer's classes of capital or common stock as of the close of the period covered by the annual report.

59,820,384 common shares issued and outstanding which were not subject to restrictions on voting, dividend rights and transferability, as of December 31, 2020.

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer or an emerging growth company. See definition of "accelerated filer," "large accelerated filer" and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐
Emerging growth company ☐

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards† provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing: U.S. GAAP ☒

International Financial Reporting Standards as issued by the International Accounting Standards Board ☐ Other ☐

If "Other" has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow. Item 17 ☐ Item 18 ☐

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

(APPLICABLE ONLY TO ISSUERS INVOLVED IN BANKRUPTCY PROCEEDINGS DURING THE PAST FIVE YEARS)

Indicate by check mark whether the registrant has filed all documents and reports required to be filed by Sections 12, 13 or 15(d) of the Securities Exchange Act of 1934 subsequent to the distribution of securities under a plan confirmed by a court. Yes ☐ No ☐

† The term "new or revised financial accounting standard" refers to any update issued by the Financial Accounting Standards Board to its Accounting Standards Codification after April 5, 2012.

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒ Yes ☐ No

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Our dependence on a limited number of suppliers of silicon wafers, cells and silicon, and the limited number of suppliers for certain other components, such as silver metallization paste, solar module back-sheet, and ethylene vinyl acetate encapsulant, could prevent us from delivering our products to our customers in the required quantities or in a timely manner, which could result in order cancellations and decreased revenues.

We purchase silicon raw materials, silicon wafers and solar cells, from a limited number of third-party material suppliers. In 2020, we purchased a significant portion of the silicon wafers and solar cells used in our solar modules from third parties. Our major silicon wafer suppliers in 2020 included Longi and Zhenjiang Rende New Energy Science Technology Co., Ltd. Our major suppliers of solar cells in 2020 included Aiko Solar Energy Co., Ltd (“Aiko Solar”) and Tongwei Solar Co., Ltd. These suppliers may not always be able to meet our quantity requirements, or keep pace with the price reductions or quality improvements, necessary for us to price our products competitively. Supply may also be interrupted by accidents, disasters or other unforeseen events beyond our control. The failure of a supplier, for whatever reason, to supply silicon wafers, solar cells, silicon raw materials or other essential components that meet our quality, quantity and cost requirements in a timely manner could impair our ability to manufacture our products or increase our costs. The impact could be more severe if we are unable to access alternative sources on a timely basis or on commercially reasonable terms, and could prevent us from delivering our products to our customers in the required quantities and at prices that are profitable. Problems of this kind could cause order cancellations, reduce our market share, harm our reputation and cause legal disputes with our customers.

We are developing and commercializing higher conversion efficiency cells, but we may not be able to mass-produce these cells in a cost-effective way, if at all.

Higher efficiency cell structures are becoming an increasingly important factor in cost competitiveness and brand recognition in the solar power industry. Such cells may yield higher power outputs at the same cost to produce as lower efficiency cells, thereby lowering the manufactured cost per watt. The ability to manufacture and sell solar modules made from such cells may be an important competitive advantage because solar system owners can obtain a higher yield of electricity from the modules that have a similar infrastructure, footprint and system cost compared to systems with modules using lower efficiency cells. Higher conversion efficiency solar cells and the resulting higher output solar modules are one of the considerations in maintaining a price premium over thin-film products. However, while we are making the necessary investments to develop higher conversion efficiency solar power products, there is no assurance that we will be able to commercialize some or any of these products in a cost-effective way, or at all. In the near term, such products may command a modest premium. In the longer term, if our competitors are able to manufacture such products and we cannot do the same at all or in a cost-effective way, we will be at a competitive disadvantage, which will likely influence our product pricing and our financial performance.

We may be subject to unexpected warranty expense that may not be adequately covered by our insurance policies.

We warrant, for a period up to twelve years, that our solar products will be free from defects in materials and workmanship.

We also warrant that, for a period of 25 years, our standard polycrystalline modules will maintain the following performance levels:

- during the first year, the actual power output of the module will be no less than 97.5% of the labeled power output;
- from the second year to the 24th year, the actual annual power output decline of the module will be no more than 0.7%; and
- by the end of the 25th year, the actual power output of the module will be no less than 80.7% of the labeled power output.

We have lengthened this warranty against decline in performance to 30 years for our bifacial module and double glass module products.

We believe that our warranty periods are consistent with industry practice. Due to the long warranty period, however, we bear the risk of extensive warranty claims long after we have shipped our products and recognized revenue. We began selling specialty solar products in 2002 and began selling standard solar modules in 2004. Any increase in the defect rate of our products would require us to increase our warranty reserves and would have a corresponding negative impact on our results of operations. Although we conduct quality testing and inspection of our solar module products, these have not been and cannot be tested in an environment simulating the up-to-30-year warranty periods. In particular, unknown issues may surface after extended use. These issues could potentially affect our market reputation and adversely affect our revenues, giving rise to potential warranty claims by our customers. As a result, we may be subject to unexpected warranty costs and associated harm to our financial results as long as 30 years after the sale of our products.

Our principal executive office and principal place of business is located at 545 Speedvale Avenue West, Guelph, Ontario, Canada N1K 1E6. Our telephone number at this address is (1-519) 837-1881 and our fax number is (1-519) 837-2550. Our agent for service of process in the United States is CT Corporation System, located at 111 Eighth Avenue, New York, New York 10011.

All inquiries to us should be directed at the address and telephone number of our principal executive office set forth above. Our website is www.canadiansolar.com. The information contained on or accessible through our website does not form part of this annual report.

B Business Overview

Overview

We are one of the world’s largest solar power companies and a leading vertically-integrated provider of solar power products, services and system solutions with operations in North America, South America, Europe, South Africa, the Middle East, Australia and Asia.

We design, develop and manufacture solar ingots, wafers, cells, modules and other solar power products. Our solar power products include standard solar modules and specialty solar products. We are incorporated in Canada and conduct most of our manufacturing operations in China and Southeast Asia. Our products include a range of solar modules built to general specifications for use in a wide range of residential, commercial and industrial solar power generation systems. Specialty solar products consist of customized solar modules that our customers incorporate into their own products and complete specialty products, such as portable solar home systems. We sell our products primarily under our “Canadian Solar” brand name.

In recent years, we have increased our investment in, and management attention on our energy business. Our Global Energy segment primarily comprises solar power project development and sale, solar power projects operation and sales of electricity globally outside of China, and our CSI Solar segment comprises solar power project development and sale, solar power projects operation, and sale of electricity in China. While we plan to continue to monetize our current portfolio of solar power projects in operation, we also intend to grow our energy business by building up our project pipeline. In March 2015, we acquired Recurrent Energy, LLC, or Recurrent, a leading solar energy developer with solar power projects located principally in California and Texas, and thereby significantly increased our solar project pipeline. As of January 31, 2021, our project backlog (formerly called late-stage, utility-scale, solar project pipeline), which refers to projects that have passed their Cliff Risk Date and are expected to be built in the next one to four years, totaled approximately 3.8 gigawatt peak, or GWp, with 728 megawatt peak, or MWp, in North America, 2,229 MWp in Latin America, 312 MWp in Asia Pacific excluding China, 429 MWp in EMEA, and 125 MWp in China. The Cliff Risk Date depends on the country where a project is located and is defined as the date on which the project passes the last of the high-risk development stages (usually receipt of all required environmental approvals, interconnection agreements, FITs and PPAs. As of January 31, 2021, our project pipeline (formerly called our early-to-mid-stage, utility-scale, solar project pipeline) totaled 14.8 GW. In addition to our project backlog and project pipeline, as of January 31, 2021, we had 1,563 MWp of solar projects in construction; and a portfolio of solar power projects in operation totaling 493 MWp with an estimated resale value of approximately $620 million. As of January 31, 2021, our battery storage project pipeline totaled 6.5 GWh, 1,388 MWh of backlog, 913 MWh in construction, and 3 MWh in operation. As of January 31, 2021, our battery storage solutions pipeline totaled 3.6 GWh, 1,400 MWh in high probability forecast, and 861 MWh contracted or in construction. Contracted/in construction projects are expected to be delivered within the next 12 to 18 months. Forecast projects include those that have more than 75% probability of being contracted within the next 12 months, and the remaining pipeline includes projects that have been identified but have a below 75% probability of being contracted. See “—Sales, Marketing and Customers-Global Energy Segment-Solar Project Development and Sale” and “-Sales, Marketing and Customers-Global Energy Segment-Operating Solar Power Projects and Sales of Electricity” for a description of the status of our solar power projects in operation.

We believe that we offer one of the broadest crystalline silicon solar power product lines in the industry. Our product lines range from modules of medium power output to high efficiency, high-power output multi-crystalline and mono-crystalline modules, as well as a range of specialty products. We currently sell our products to a diverse customer base in various markets worldwide, including the U.S., Japan, China, Vietnam, Brazil, Spain, Australia, Germany, Mexico, Canada and the Netherlands. Our customers are primarily distributors, system integrators, project developers and installers/EPC companies.

We employ a flexible vertically integrated business model that combines internal manufacturing capacity with direct material purchases of both cells and wafers. We believe this approach has benefited us by lowering the cost of materials of our solar module products. We also believe that this approach provides us with greater flexibility to respond to short-term demand increases.

As of December 31, 2020, we had:

- 16.1 GW of total annual solar module manufacturing capacity, approximately 12.5 GW of which is located in China, 3.6 GW in Southeast Asia and the rest in other regions;

- 9.6 GW of total annual solar cell manufacturing capacity, approximately 3.2 GW of which is located in Southeast Asia and the rest in China;
- 6.3 GW of total annual wafer manufacturing capacity located in China; and
- 2.1 GW of total annual ingot manufacturing capacity located in China.

We intend to use substantially all of the silicon wafers that we manufacture to supply our own solar cell plants and to use substantially all of the solar cells that we manufacture to produce our own solar module products. We also intend to use some of the solar modules we produce in our energy projects. Our solar module manufacturing costs in China, including purchased polysilicon, wafers and cells, decreased from 20.4 cents per watt in December 2018 to 18.8 cents per watt in December 2019, and increased to 21.9 cents per watt in December 2020. Despite the recent increase, we expect to continue to decrease the manufacturing costs for our production of wafers, cells and modules in the long run.

We intend to continue to focus on reducing our manufacturing costs by improving solar cell conversion efficiency, enhancing manufacturing yields and reducing raw material costs.

Our Products and Services

Our business consists of the following two business segments: CSI Solar segment and Global Energy segment. Our CSI Solar Segment involves the design, development, manufacturing and sale of a wide range of solar power products, including solar modules, solar system kits, battery energy storage solutions, China energy (including solar projects, EPC services and electricity revenue in China), and other materials, components and services (including EPC). Our Global Energy Segment primarily consists of global solar and energy storage power projects (excluding China), O&M and asset management services, global electricity revenue (excluding China), as well as other development services.

Products Offered in Our CSI Solar Segment

Standard Solar Modules

Our standard solar modules are arrays of interconnected solar cells in weatherproof encapsulation. We produce a wide variety of standard solar modules, ranging from 3W to over 665W in power and using mono-crystalline or multi-crystalline cells in several different design patterns, including shingled cells. We introduced the industry's first module product using 166mm wafers, in comparison with the conventional 156.75mm wafers. We also first introduced the highest power 665W module using 210mm wafers in mass production. Our mainstream solar modules include CS7N (132 half-cells, 210mm wafer), CS7L (120 half-cells, 210mm wafer), CS6W (144 half-cells, 182mm wafer), CS3Y (156 half-cells, 166mm wafer), CS3W (144 half-cells, 166mm wafer), CS3N (132 half-cells, 166mm wafer), CS3L (120 half-cells, 166mm wafer), BiHiKu7 (bifacial module, 210mm wafer), BiHiKu6 (bifacial module, 182mm wafer), BiHiKu5 (bifacial module, 166mm wafer), BiHiKu (bifacial module, 166mm wafer), and HiDM CS1Y all-black modules. The mainstream modules are designed for residential, commercial and utility applications. The small modules are for specialty applications.

We launched our Quartech modules in March 2013. Quartech modules use 4-busbar solar cell technology which improves module reliability and efficiency. CS6P (6 × 10 cell layout) Quartech modules have power output between 255 W and 270 W, which enables us to offer customers modules with high power. We launched and started shipping Dymond modules in October 2014. Dymond modules are designed with double-glass encapsulation, which is more reliable for harsh environments and ready for 1500V solar systems.

We launched and started shipping SmartDC modules in September 2015. SmartDC modules feature an innovative integration of our module technology and power optimization for grid-tied PV applications. By replacing the traditional junction-box, SmartDC modules eliminate module power mismatch, mitigate shading losses and optimize power output at module-level. SmartDC modules also provide module-level data to minimize operational costs and to permit effective system management.

In March 2016, we launched our new Quintech SuperPower mono-crystalline modules. Quintech SuperPower mono-crystalline modules are made of cells with PERC technology and significantly improve module efficiency and reliability. CS6K (6 × 10 cell layout aligned with mainstream dimensions) Quintech SuperPower mono modules have a power output between 285 W and 300 W with high efficiency and high reliability. We started commercial production of Quintech CS6K and CS6U modules in 2016. These modules have features such as 5 busbar cells, standardized module dimensions and cell and module improvements, resulting in higher wattage production and better performance. These modules are intended for broad base introduction, which covers mono-crystalline cells, multi-crystalline cells and mono-crystalline PERC cells.

- In Ontario, we lease approximately 14,851 square meters of operation facilities in Guelph, Ontario, Canada for a term of ten years commencing September 1, 2010. We also lease a warehouse of 7,912 square meters and an office building of 1,146 square meters on the same premises as the Guelph, Ontario, Canada operation facilities for the same term. In December 2019, we have renewed the leases for three years from 2020 to 2023.
- In Vietnam, we lease approximately 15,784 square meters of manufacturing facilities in Haiphong City, Vietnam since 2015 and have renewed for another three years commencing August 7, 2018. The production has begun since 2016.
- In Thailand, Canadian Solar Manufacturing (Thailand) Co., Ltd. has a land of 179.2 Rai (286,732 square meters) with the ownership certificate obtained. A module manufacturing facility of 29,723 square meters and a cell manufacturing facility of 19,139 square meters were built and the production commenced in the third quarter of 2016 and in April 2017, respectively. The construction of another cell manufacturing facility with a floor area of 18,100 square meters and a module manufacturing facility with a floor area of 15,460 square meters were completed and the production commenced in the third quarter of 2019.

Except as disclosed in the “Item 3. Key Information—D. Risk Factors-Risks Related to Doing Business in China,” we believe we have obtained the environmental permits necessary to conduct the business currently carried on by us at our existing manufacturing facilities. For more details, see “B. Business Overview—Environmental Matters.”

ITEM 4A UNRESOLVED STAFF COMMENTS

None.

ITEM 5 *OPERATING AND FINANCIAL REVIEW AND PROSPECTS*

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our consolidated financial statements and the related notes thereto included elsewhere in this annual report on Form 20-F. This discussion may contain forward-looking statements based upon current expectations that involve risks and uncertainties. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of various factors, including those set forth under “Item 3. Key Information—D. Risk Factors” or in other parts of this annual report on Form 20-F. For discussion of 2018 items and year-over-year comparisons between 2019 and 2018 that are not included in this annual report on Form 20-F, refer to “Item 5. - Operating and Financial Review and Prospects” found in our Form 20-F for the year ended December 31, 2019, that was filed with the Securities and Exchange Commission on April 28, 2020.

In 2020, the Company reached a strategic decision to pursue a listing of its module and systems business in China, and resulted in a change of reportable business segments to CSI Solar segment and Global Energy segment. The prior period segment information has been recast to conform to the current period’s presentation. Refer to “Item 5. Operating and Financial Review and Prospects—A. Operating Results—Segment Reporting” for further details.

A Operating Results

Factors Affecting Our Results of Operations

The most significant factors that affect our financial performance and results of operations are:

- solar power products pricing;
- costs of silicon raw materials and solar ingots, wafers and cells relative to the selling prices of modules;
- government subsidies and the availability of financing for solar projects;
- industry and seasonal demand;
- impact of assets impairment;
- solar power project development and sale and EPC and development services;
- antidumping, countervailing and other duty costs and true-up charges; and
- foreign exchange.

Solar Power Products Pricing

Before 2004, all of our net revenues were generated from sales of specialty solar modules and products. In 2004, we began selling standard solar modules. In 2019, we generated 77.5% of our net revenues from our CSI Solar segment, which includes solar modules, solar system kits, battery energy storage solutions, China energy (including solar projects, EPC services and electricity revenue in China), and other materials, components and services (including EPC), and 22.5% from our Global Energy segment, which includes global solar and energy storage power projects (excludes China), O&M and asset management services, global electricity revenue (excludes China), as well as other development services . In 2020, we generated 79.1% of our net revenues from our CSI Solar segment and 20.9% from our Global Energy segment.

Our standard solar modules are priced based on the actual flash test result or the nameplate capacity of our modules, expressed in watts-peak. The actual price per watt is affected by overall demand for modules in the solar power market and increasingly by the total power of the module. Higher-powered modules usually command slightly higher prices per watt.

We price our standard solar modules based on the prevailing market price at the time we enter into sales contracts with our customers, taking into account the size of the contract, the strength and history of our relationship with the customer and the costs of silicon raw materials and solar ingots, wafers and cells. During the first few years of our operations, the average selling price for standard solar modules rose year-over-year across the industry, primarily because of high demand. During the period from 2004 to 2008, the average selling price of our standard solar modules ranged from $3.62 to $4.23. Following a price peak in the third quarter of 2008, the industry-wide average selling price of standard solar modules has declined sharply as competition increased. In 2017 and 2018, the average selling price of our standard solar modules was approximately $0.40 per watt and $0.34 per watt, respectively; and, in 2019 and 2020, it was approximately $0.29 per watt and $0.25 per watt, respectively. We expect the averaging selling price of our standard solar modules to continue to decline, albeit at a more moderate rate.

Costs of Silicon Raw Materials and Solar Ingots, Wafers and Cells Relative to the Selling Prices of Modules

We produce solar modules, which are an array of interconnected solar cells encased in a weatherproof frame, and products that use solar modules. Solar cells are the most important component of solar modules. Our solar cells are currently made from mono-crystalline and multi-crystalline solar wafers through multiple manufacturing steps. Solar wafers are the most important material for making solar cells. Solar ingots are the most important material for making solar wafers. If we are unable to procure silicon raw materials and solar ingots, wafers and cells at reduced prices in line with the decreasing selling prices of our solar modules, our revenues and margins could be adversely impacted, either due to higher manufacturing costs than our competitors or write-downs of inventory, or both. Our market share could decline if our competitors are able to offer better pricing than we are.

Government Subsidies and the Availability of Financing for Solar Projects

Over the past few years, the cost of solar energy has declined and the industry has become less dependent on government subsidies and economic incentives. However, governments in some of our largest markets have expressed their intention to continue supporting various forms of “green” energies, including solar power, as part of broader policies towards the reduction of carbon emissions. The governments in many of our largest markets, including the United States, Japan and the European Union, continue to provide incentives for investments in solar power that will directly benefit the solar industry. We believe that the near-term growth of the market still depends in large part on the availability and size of such government subsidies and economic incentives.

For a detailed discussion of the impact of government subsidies and incentives, possible changes in government policy and associated risks to our business, see “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—Governments may revise, reduce or eliminate subsidies and economic incentives for solar energy, which could cause demand for our products to decline.” and “Item 4. Information on the Company—B. Business Overview—Sales, Marketing and Customers.”

For a detailed discussion of the impact of the availability and cost of debt or equity for solar power projects and our customers’ ability to finance the purchase of our products or to construct solar power projects, see “Item 3. Key Information—D. Risk Factors—Risks Related to Our Company and Our Industry—The execution of our growth strategy depends upon the continued availability of third-party financing arrangements for our customers, which is affected by general economic conditions. Tight credit markets could depress demand or prices for solar power products and services, hamper our expansion and materially affect our results of operations.”

Income tax expense includes (a) deferred tax expense, which generally represents the net change in the deferred tax asset or liability balance during the year plus any change in valuation allowances; (b) current tax expense, which represents the amount of tax currently payable to or receivable from a taxing authority; and (c) non-current tax expense, which represents the increases and decreases in amounts related to uncertain tax positions from prior periods and not settled with cash or other tax attributes. We only recognize tax benefits related to uncertain tax positions when such positions are more likely than not of being sustained upon examination. For such positions, the amount of tax benefit that we recognize is the largest amount of tax benefit that is more than fifty percent likely of being sustained upon the ultimate settlement of such uncertain tax position. We record penalties and interests associated with the uncertain tax positions as a component of income tax expense.

We use the flow-through method to account for investment tax credits earned on qualifying projects placed into service. Under this method the investment tax credits are recognized as a reduction to income tax expense in the year the credit arises. The use of the flow-through method also results in a basis difference from the recognition of a deferred tax liability and an immediate income tax expense for reduced future tax depreciation of the related assets. Such basis differences are accounted for pursuant to the income statement method.

Recently Issued Accounting Pronouncements

See note 2(ak) Recently issued accounting pronouncements in the notes to our consolidated financial statements, included herein.

Results of Operations

The following table sets forth a summary, for the periods indicated, of our consolidated results of operations and each item expressed as a percentage of our total net revenues. Our historical results presented below are not necessarily indicative of the results that may be expected for any future period.

	For the years ended December 31,			
	2019		2020	
	(in thousands of $, except percentages)			
Net revenues	$ 3,200,583	100.0 %	3,476,495	100.0 %
CSI Solar segment	2,591,154	80.9 %	3,105,044	89.3 %
Global Energy segment	718,735	22.5 %	726,167	20.9 %
Elimination	(109,306)	(3.4)%	(354,716)	(10.2)%
Cost of revenues	2,482,086	77.6 %	2,786,581	80.2 %
CSI Solar segment	1,977,502	61.8 %	2,496,153	71.8 %
Global Energy segment	604,856	18.9 %	577,052	16.6 %
Elimination	(100,272)	(3.1)%	(286,624)	(8.2)%
Gross profit	718,497	22.4 %	689,914	19.8 %
CSI Solar segment	613,652	19.1 %	608,891	17.5 %
Global Energy segment	113,879	3.6 %	149,115	4.3 %
Elimination	(9,034)	(0.3)%	(68,092)	(2.0)%
Operating expenses:				
Selling and distribution expenses	180,326	5.6 %	224,243	6.5 %
General and administrative expenses	242,783	7.6 %	225,597	6.5 %
Research and development expenses	47,045	1.5 %	45,167	1.3 %
Other operating income, net	(10,536)	(0.3)%	(25,523)	(0.7)%
Total operating expenses	459,618	14.4 %	469,484	13.5 %
Income from operations	258,879	8.1 %	220,430	6.3 %
Other income (expenses)				
Interest expense	(81,326)	(2.5)%	(71,874)	(2.1)%
Interest income	12,039	0.4 %	9,306	0.3 %
Gain (loss) on change in fair value of derivatives, net	(22,218)	(0.7)%	50,001	1.4 %
Foreign exchange gain (loss)	10,370	0.3 %	(64,820)	(1.9)%
Investment income (loss)	1,929	0.1 %	(8,559)	(0.2)%
Other expenses, net	(79,206)	(2.5)%	(85,946)	(2.5)%
Income before income taxes and equity in earnings of unconsolidated investees	179,673	5.6 %	134,484	3.9 %
Income tax benefit (expense)	(42,066)	(1.3)%	1,983	0.1 %
Equity in earnings of unconsolidated investees	28,948	0.9 %	10,779	0.3 %
Net income	166,555	5.2 %	147,246	4.2 %
Less: Net income (loss) attributable to non-controlling interests	(5,030)	(0.2)%	543	0.0 %
Net income attributable to Canadian Solar Inc.	171,585	5.4 %	146,703	4.2 %

The short-term borrowings will mature during the period from the first quarter of 2021 to the fourth quarter of 2021 and bear interest ranging from 0.08% to 5.66% per annum. The credit facilities contain no specific extension terms but, historically, we have been able to obtain new short-term borrowings with similar terms shortly before they mature.

In January 2016, we signed a $60.0 million loan facility agreement with International Finance Corporation, or IFC, a member of World Bank Group to fund the construction of our solar cell and module production facilities in Vietnam and other countries approved by IFC. The loan was fully repaid in December 2020.

In 2016, we entered into a financing agreement with the Export Development Canada, or EDC, pursuant to which EDC agreed to provide bank guarantees or letters of credit of up to $100 million to support our global project development. Royal Bank of Canada and Toronto Branch of China Construction Bank Corporation serve as fronting banks for the facility. In September 2018, we renewed the agreement with EDC and increased the facility amount to $125 million with a more focused support for project development activities in North America, Latin America, Europe, Asia and Australia. Since September 2019, Credit Agricole Corporate and Investment Bank (Canada Branch) has joined as one of the fronting banks. In July 2020, the guarantee was renewed with an extended facility amount totaling $150 million.

In 2016, we obtained a syndicated three-year loan facility of JPY9.6 billion ($85.2 million) with Sumitomo Mitsui Banking Corporation, or SMBC, acting as the lead arranger and 13 other participating financial institutions. The facility is unsecured and loan proceeds may be used to develop our solar project pipeline in Japan and for general corporate working capital purposes. In October 2020, the facility agreement was renewed with 11 participating financial institutions led by SMBC at a term of two years and a facility amount of JPY9.1 billion ($88.2 million).

In January 2017, we obtained a five-year syndicated credit facility of $210 million with the Siam Commercial Bank Public Company Limited, or SCB, acting as the lead arranger and China Minsheng Banking Corporation Ltd, as one of the lenders. As of February 28, 2021, $96.4 million of the facility has been used to finance the construction of our solar cell and module manufacturing facilities in Thailand. Under the same facility agreement, we obtained a working capital facility of THB3.54 billion ($119.0 million) from SCB to support the operations of our manufacturing company in Thailand and $96.8 million was drawn as of February 28, 2021.

In March 2017, we entered into a three-year credit agreement of JPY4.0 billion ($35.5 million) with Sumitomo Mitsui Finance and Leasing Company, Limited, or SMFL, a member of Sumitomo Mitsui Financial Group. The facility received commitments from five finance leasing institutions. In April 2019, we renewed the agreement with a syndicate of four finance leasing institutions led by SMFL and expanded the facility to JPY5.35 billion ($48.0 million). In September 2019, we further expanded the facility to JPY6.85 billion ($63.0 million) and the facility will mature in March 2022. As of February 28, 2021, JPY3.3 billion ($31.4 million) was utilized in the development of our solar power projects in Japan.

In April 2017, we completed our second non-recourse project bond placement of JPY5.4 billion ($47.9 million) with Goldman Sachs Japan Co., Ltd. to finance the construction of the 19.05 MWp Gunma Aramaki solar power project in Japan. The project bond has a dual-tenor maturity of 1.5 years and 20.3 years, representing the initial and extended tenor respectively, within a single-tranche of bond. The bond pays a fixed coupon of 1.2875% per annum during the initial tenor and, if extended at our option, 1.3588% per annum thereafter. The project reached COD in December 2017 and the bond was assumed by the buyer upon the completion of project sale in December 2020.

In May 2017, we secured a five-year non-recourse project financing of AUD65 million ($50.8 million) with Bank of Tokyo-Mitsubishi UFJ, Ltd. and Clean Energy Finance Corporation for two solar farm power projects, the 17 MW Longreach project and the 30 MW Oakey 1 project, both in Queensland, Australia. In October 2017, we entered into a binding contract with Foresight Solar Fund Limited, or Foresight, pursuant to which Foresight agreed to acquire 49% interests in Longreach and Oakey. The sale of 49% interests was completed in the first quarter of 2018 and we have an option and intend to sell the remaining 51% interests to Foresight within three years after project COD. The Longreach project and the Oakey 1 project reached COD in November 2019 and February 2020, respectively.

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Appendix 1

Major Subsidiaries of CSI

The following table sets forth information concerning CSI's major subsidiaries:

Subsidiary	Place and Date of Incorporation	Attributable Equity Interest Held	Principal Activity
Canadian Solar Solutions Inc.	Canada June 22, 2009	100 %	Developing solar power project and manufacture of solar modules
Canadian Solar (Australia) Pty Limited	Australia February 3, 2011	100 %	Developing solar power projects
Canadian Solar O and M (Ontario) Inc.	Canada May 10, 2011	100 %	Solar farm operating and maintenance services
Canadian Solar Projects K.K.	Japan May 20, 2014	100 %	Developing solar power projects
Canadian Solar UK Projects Ltd.	United Kingdom August 29, 2014	100 %	Developing solar power projects
Recurrent Energy, LLC	USA March 31, 2015	100 %	Developing solar power projects
Canadian Solar Energy Singapore Pte. Ltd.	Singapore October 29, 2015	100 %	Development & ownership of solar PV projects
Canadian Solar Netherlands Cooperative U.A.	Netherlands November 8, 2016	100 %	Project holding and financing
Canadian Solar Construction (Australia) Pty Ltd	Australia July 04, 2017	100 %	Providing engineering, procurement and construction services
CSUK Energy Systems Construction and Generation JSC	Turkey October 30, 2017	100 %	Project development and management services
Canadian Solar Argentina Investment Holding Ltd.	United Kingdom January 23, 2018	100 %	Developing solar power projects
Canadian Solar New Energy Holding Company Limited	Hong Kong March 20, 2019	100 %	Project investment, financing, trading of solar modules
Canadian Solar Energy Holding Singapore Pte. Ltd.	Singapore April 22, 2019	100 %	Development & ownership of solar PV projects
CSI Solar Co., Ltd. (formerly known as "CSI Solar Power Group Co., Ltd.")	PRC July 7, 2009	79.59 %	Investment holding and trading
Canadian Solar Manufacturing (Luoyang) Inc.	PRC February 24, 2006	100 %*	Manufacture of solar modules, ingots and wafers
Canadian Solar Manufacturing (Changshu) Inc.	PRC August 1, 2006	100 %*	Production of solar modules
CSI Cells Co., Ltd.	PRC August 23, 2006	100 %*	Manufacture of solar cells
Canadian Solar (USA) Inc.	USA June 8, 2007	100 %*	Sales and marketing of modules
Canadian Solar Japan K.K.	Japan June 21, 2009	100 %*	Sales and marketing of modules
Canadian Solar EMEA GmbH	Germany August 21, 2009	100 %*	Sales and marketing of modules
Canadian Solar International Limited	Hong Kong March 25, 2011	100 %*	Sales and marketing of modules
Suzhou Sanysolar Materials Technology Co., Ltd.	PRC August 17, 2011	100 %*	Production of solar module materials
Canadian Solar South East Asia Pte. Ltd.	Singapore September 19, 2011	100 %*	Sales and marketing of modules
Canadian Solar Brazil Commerce, Import and Export of Solar Panels Ltd.	Brazil November 14, 2012	100 %*	Sales and marketing of solar modules, and providing solar energy solution
Canadian Solar Construction (USA) LLC	USA May 20, 2014	100 %*	Solar farm operating and maintenance services
CSI Solar Manufacturing (Funing) Co., Ltd. (formerly known as "CSI&GCL Solar Manufacturing (Yancheng) Inc.")	PRC May 29, 2014	100 %*	Research and development, manufacture and sales of solar cells, and solar power project development
Changshu Tegu New Material Technology Co., Ltd.	PRC September 2, 2014	100 %*	EVA solar packaging film research and development, production and sales
Changshu Tlian Co., Ltd.	PRC December 26, 2014	100 %*	Junction box and connector research, development, production and sales
Canadian Solar Manufacturing Vietnam Co., Ltd.	Vietnam June 25, 2015	100 %*	Production of solar modules
Canadian Solar Energy Private Limited	India May 06, 2015	100 %*	Sales and marketing of modules
Canadian Solar MSS (Australia) Pty Ltd.	Australia August 03, 2015	100 %*	Sales and marketing of modules
Canadian Solar Manufacturing (Thailand) Co., Ltd.	Thailand November 20, 2015	99.99992 %*	Cells and module production
Canadian Solar Sunenergy (Baotou) Co., Ltd.	PRC August 18, 2016	100 %*	Production of solar modules, ingots and wafers
Canadian Solar Middle East DMCC	United Arab Emirates March 28, 2017	100 %*	Sales and marketing of modules
CSI Investment Management (Suzhou) Co., Ltd.	PRC May 5, 2017	100 %*	Investment management & asset management
CSI New Energy Development (Suzhou) Co., Ltd. (formerly known as "Suzhou Gaochuangte New Energy Development Co., Ltd.")	PRC June 12, 2017	90 %*	Design, engineering construction and management of solar power projects
CSI Cells (Yancheng) Co., Ltd.	PRC May 18, 2017	70 %*	Production of solar cells
CSI Modules (Jiaxing) Co., Ltd.	PRC November 3, 2017	100 %*	Production of solar modules
CSI Wafer (Luoyang) Co., Ltd.	PRC November 27, 2017	100 %*	Production of solar cells and wafers
Canadian Solar SSES (Canada) Inc.	Canada Nov 27, 2019	100 %*	System solution and energy storage
Canadian Solar SSES (UK) Ltd	United Kingdom December 18, 2019	100 %*	Intellectual property holding

* Major subsidiaries within the scope of CSI Solar are held through CSI Solar Co., Ltd. of which CSI holds 79.59% equity rights of CSI Solar Co., Ltd.

EXHIBIT 28

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New policies set to ease China solar glass production constraints amidst soaring costs

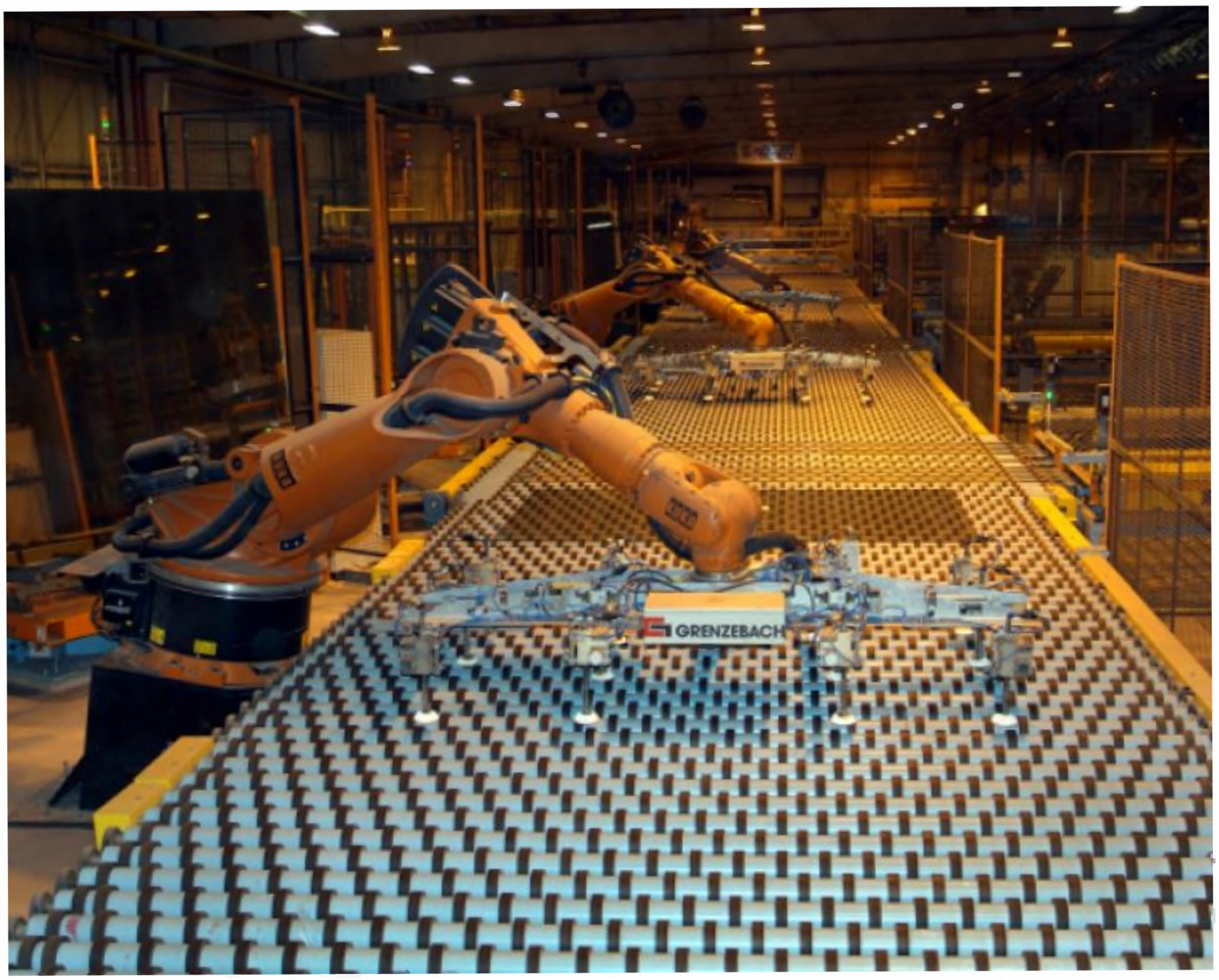
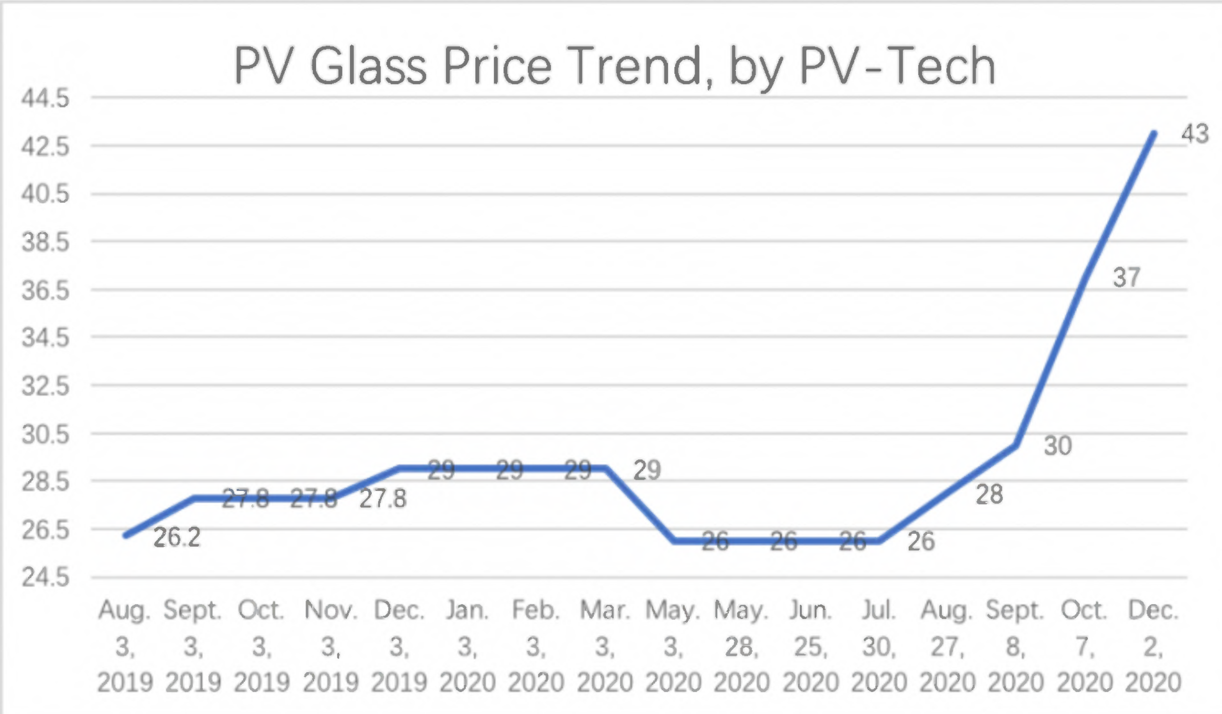


Image: AGC.

Quotes for PV glass have soared this month, reaching a price of RMB43/m² according to prices compiled by PV InfoLink, with some small-scale suppliers even quoted prices of RMB50/m².

The table below shows the price movement of mainstream PV glass since last August.



Graph 1: PV Glass Price Trend, PV Tech

Historic data indicates that while PV glass prices in China remained within the range of RMB20-3/㎡ between 2013 and 2019, it has soared in the second half of this year saw a total of 80% price rise, compared to that of July. Some small manufacturers even quote a price as high as RMB50/㎡, as supply cannot meet demand.

According to institutions like the China Photovoltaic Industry Association (CPIA), packaging accounts for nearly 50% of the total cost of modules, among which glass accounts for 19% of that packaging cost. A module manufacturer in China has done a calculation: a 166 uni-facial module requires 2.2 ㎡ of glass on average which, based on the current price, costs almost RMB100, equivalent to a cost of RMB0.2/W, effectively double the RMB0.1/W it cost in July.

In the long term, with solar installations increasing around the globe and the rising demand for thinner glass due to the permeability of double-glass modules, along with the development of thin-film solar glass industry driven by the popularisation of green buildings, the market demand for glass is likely to stay high.

Leading glass enterprises expand capacity to seize the momentum

China’s market share of solar glass has stayed above 90% for years on the global market. The top 5 glass producers - namely Xinyi Solar, Flat Group, Caihong Group, CNBM and CSG Holdings - shared 68.5% of the market in 2019.

Against the supply-demand tension, leading glass enterprises vied for earlier improvements in technology and capacity to further boost their respective market shares. CSG, for example, intends to invest RMB494 million (US$75 million) in a low-E glass production line that can manufacture 2.1

million square meters of insulating glass and 3.5 million square meters of coated glass per year. Flat plans to invest a total of RMB2.17 billion (US$330 million) in projects like its module cover glass phase 2 project with an annual capacity of 750,000 tons and a backsheet glass project with an annual capacity of 42 million square meters.

Capacity expansion plans

Company	**Current Capacity**	**Investment (billion RMB)**	**Capacity Planned**
Xinyi Solar	Unknown	Unknown	One additional thousand-ton level production line planned for each season in 2021-2022
CSG A	Five electronic glass production lines	0.494	2.1 million square meters of insulating glass, 3.5 million square meters of coated glass per year
		3.15	Four 1,200-ton solar glass production lines in light-weight, high transparency panel manufacturing base at its Anhui Solar Facillity, construction to be finished in 24 months
Flat	Solar glass 5,290 tons/day	2.17	Module cover glass phase 2 project with an annual capacity of 750,000 tons
Caihong New Energy	Unknown	0.5	5 deep processing lines for ultra-thin, dual-film, big-size photoelectric glass
		Unknown	Plans to build a solar glass kiln and supporting facility with pull volume 750 tons/day
Luoyang Glass	Unknown	0.186	Add a 32.4-million-square-meter backsheet glass deep processing production line
Almaden	Unknown	0.877	Construction of a smart deep processing line for big-size, high-power, ultra-thin solar glass, technological improvement， construction of a smart deep-processing line for BIPV anti-glare coated glass
		Unknown	An annual capacity of 100 million square meters of special photoelectric glass to be achieved upon the completion of Fengyang Base Project

Company	Current Capacity	Investment (billion RMB)	Capacity Planned
Kibing Glass	Unknown	1.373	1,200t/d high-transparency backsheet material and deep processing in Shaoxing
		1.027	1,200t/d high-transparency module substrate material production line in Zixing
Topray Solar	Four glass lines, daily melt volume 900T/D	Unknown	Technological improvement for 2 240-ton solar glass production lines in Chencheng, which produce 18 million square meters of 1.8-2.5 mm glass annually

Leading module companies “lock” orders in advance

Statistics show China now has over 11,000 solar glass-related enterprises registered, and the number is still growing. As of December 2019, China’s solar glass capacity stood at 25,360 t/d, with 6,900 t/d to be added in 2020.

However, as some overseas projects failed to meet capacity expectations due to the impact of COVID-19, and with China’s solar industry working flat out in Q4 2020, downstream enterprises are overwhelmed, especially by the spiralling glass price.

Flat recently revealed that it expects solar glass shortages of around 15% next year. ”With a completely open policy, the supply-demand balance will not be achieved earlier than 2022,” it said.

Against such uncertainties in the glass market, some leading module enterprises that have close collaboration with the glass sector advanced orders for what they look set to need in the future. This August, LONGi announced a long-term purchase agreement for RMB 6.5 billion of solar glass signed between a subsidiary of CSG and 12 subsidiaries of LONGi.

As early as March this year, Caihong New Energy signed a Strategic Cooperation Agreement with JA Solar, supplying JA with about RMB2.1 billion of products including glass.

And yesterday (18 November), Trina Solar confirmed a major purchase order with Almaden (https://www.pv-tech.org/news/trina-solar-signs-major-wafer-and-glass-supply-deals-as-vertex-production-ramps), procuring 85 million m2 of solar glass at a purchase price of RMB2.1 billion (US$320 million).

Larger entites are therefore signing alliances in order to cement their lead, while other module manufacturers are said to be “sighing with expectation” over the ongoing supply and pricing constraints.

At the beginning of November, six leading solar enterprises in China appealed to the state with a joint statement (http://www.pv-tech.org/news/major-chinese-module-manufacturers-call-for-government-intervention-over-out-of-control-glass-prices) for fewer restraints on glass production expansion. In fact, China's Ministry of Industry and Information Technology (MIIT) approved the displacement of existing capacity by new solar glass projects at the end of October. Conducive to the advancement and restructure of the industry, it helps the glass industry use excess capacity as well as avoiding disorganized expansion.

The industry has also welcomed some good news earlier this month. An MIIT official responded to the statement on 7 November, confirming that the Ministry is working on a revision of policies to properly ease the limit on capacity displacement conditions. *PV Tech* understands the authority is drafting a document on promoting a healthy and sustainable development of the solar glass industry. A policy different from that of traditional float glass is expected to release new capacity soon, ease the supply-demand tension, and thus prevent the price from increasing further.

Tags: china (https://www.pv-tech.org/tags/china), pv glass (https://www.pv-tech.org/tags/pv+glass), trina solar (https://www.pv-tech.org/tags/trina+solar), tongwei (https://www.pv-tech.org/tags/tongwei), almaden (https://www.pv-tech.org/tags/almaden), ja solar (https://www.pv-tech.org/tags/ja+solar), longi (https://www.pv-tech.org/tags/longi), cng (https://www.pv-tech.org/tags/cng), flat (https://www.pv-tech.org/tags/flat), upstream (https://www.pv-tech.org/tags/upstream), manufacturing (https://www.pv-tech.org/tags/manufacturing), materials (https://www.pv-tech.org/tags/materials)

EXHIBIT 29

ENTIRE EXHIBIT NOT CAPABLE OF PUBLIC SUMMARY

EXHIBIT 30

China-based LONGi to invest RM100mil more in Malaysia

By **JACK WONG**

BUSINESS

Monday, 20 Nov 2017 12:00 AM MYT

KUCHING: China-based Xi'an LONGi Silicon Materials Corp (LONGi) will invest about RM100mil next year in expanding the company's various manufacturing facilities in Samajaya Free Industrial Zone (SFIZ), Kuching, to boost the production capacity of solar panels.

LONGi – the world's largest manufacturer of solar-grade mono-crystalline silicon products – has invested some RM1.3bil in SFIZ since spreading its wing to Sarawak with the acquisition of US-based SunEdison's silicon wafer production facility in SFIZ for US$63mil in March last year.

The facility has a capacity of 600MW.

According to LONGi (Kuching) Sdn Bhd chief executive officer Ngieng Sii Jing, the company's major investments last year were in the construction of new m
solar wafer plant, a passivated emitter rear cell solar c
plant.

"The first solar ingot was produced in December last y
by May, this year, making the company an integrated s

“We are ramping up in stages the production of the various plants,” he told StarBiz.

LONGi Kuching is the first in the world to have a full supply chain for mono-crystalline silicon products in one single location. Kuching is also LONGi’s first overseas operation.

Ngieng said the ingots were supplied to the wafer plant while the produced wafers supplied to the cells plant.

The solar cells will then be sold to the module plant, which produces the solar panels.

LONGi Kuching made another major acquisition in June, taking over the solar manufacturing plant owned by Comtec Solar International (M) Sdn Bhd for 200 million yuan (RM130mil).

China-based Comtec Solar is a pure-play mono-crystalline solar ingot and wafer manufacturer.

“With the acquisition,Comtec Solar gives us an additio
and upgraded its cooler system. The plant re-started o

LONGi also acquired the former factory of Sanmina-S
the production of printed circuit boards (PCB) in SFIZ.
it shifted operation to its new facility in Wuxi, China

The old factory has been converted for solar productic
some 42 ha.

Ngieng said next year’s proposed investment in the ex
new equipment, and in new warehouse facilities and o
production capacity.

“The proposed expansion will increase the ingot plant’

"With full operation of the various manufacturing facilities,we expect to achieve annual sales of RM2bil by next year," added Ngieng

He said the company would sell solar wafers and cells if there is any surplus after meeting its own requirements.

LONGi Kuching currently exports only solar panels to the United States, Canada and Europe.

The company ships out between 300 and 360 containers per month and ships in a similar number of containers per month of raw materials.

The raw materials, like glass panels, aluminium frames, EVA solar film (a key material for solar panel lamination), backsheets, packaging materials and chemicals, were sourced from China and other countries.

Ngieng said LONGi Kuching had qualified a Chinese firm, which owns a glass factory in Melaka, for the supply of raw materials. The company expects to source polysilicon – an essential raw material for solar cells – from South Korea's OCI Co Ltd-owned plant in Samalaju Industrial Park, Bintulu once the latter has met with the quality standard set by LONGi. OCI acquired the polycrystalline silicon plant from Japan's Tokuyama about six months ago.

"We are trying to bring our China suppliers to set up manufacturing plants in SFIZ. We are also helping to develop local suppliers."

Acording to Ngieng, LONGi, listed on the Shanghai Stock Exchange, commanded 42% share in the global market in mono-crystalline silicon as at the end of 2016.

He said the global demand for solar panels has seen exponential growth in the past several years, reaching 100 GW last year from 90 GW in 2015.

LONGi Kuching, which currently has a workforce of ab
by next year.

TAGS / KEYWORDS:

Business , Xi'an Longi , Samajaya , Solar , Ngieng Sii Jing , Invest

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Business

Did you find this article insightful?

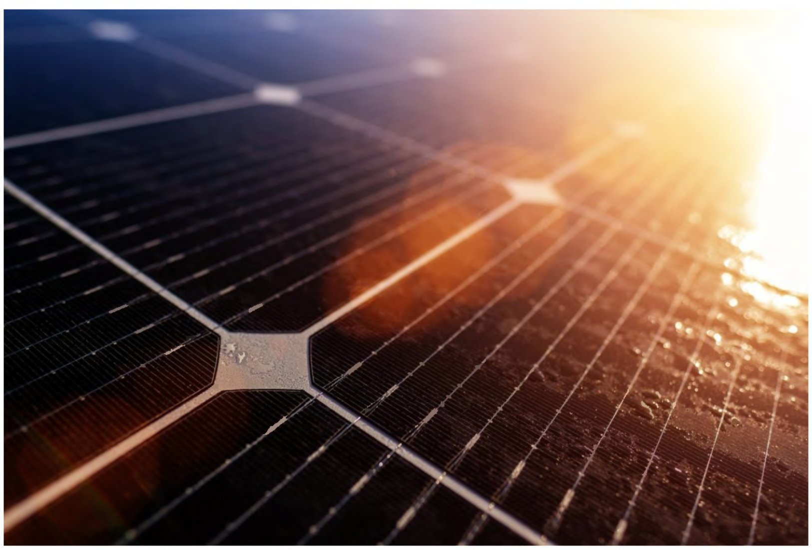
EXHIBIT 31

Chinese PV Industry Brief: more manufacturing capacity from Trina, GCL Integration and Eging PV

Plans to set up new cell and module capacities have been announced by the three manufacturers. Trina intends to add 10 GW of cell capacity to its manufacturing site in the Sichuan province, while GCL Integration wants to build an 8.5 GW monocrystalline solar cell factory in the Jiangsu province.

JANUARY 5, 2021 **VINCENT SHAW AND MAX HALL**

INVERTERS MARKETS MODULES & UPSTREAM MANUFACTURING CHINA



Trina Solar is planning to build a $652 million cell factory in the Sichuan province.

Image: Bru-nO/Pixabay

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Shenzhen-listed module manufacturer GCL Integration (GCL) announced last week it has signed an agreement with the government of Leshan City, in Sichuan province, for the construction of a 10 GW solar cell factory. The facility is expected to be built in two 5 GW phases with a total investment of RMB4.3 billion ($652 million). The first phase is expected to be completed by the end of 2021 while the second phase is scheduled for completion in June 2022. On Monday, the company also announced a capital increase of RMB790 million. These funds will be used to accelerate the construction of a 60 GW module factory that GCL is planning to build in Hefei city, Anhui province. Construction of the first, 15 GW phase was launched in December, with completion scheduled by June.

Shanghai-listed PV module maker and EPC contractor Eging PV announced last week a plan to increase its cell and module capacity. The company's existing factory in Jintan, Jiangsu province, will be upgraded and its module capacity will reach 3 GW while the cell capacity will be raised to 2 GW. The manufacturer will invest RMB1.5 billion in this new plan.

Panel provider Trina Solar had decided to build a new 8.5 GW monocrystalline solar cell factory in Yancheng City, Jiangsu province. The planned investment in the factory, which is expected to begin manufacturing activity within 24 months, amounts to around RMB3 billion. The new manufacturing facility will increase the company's planned annual production capacity in Yancheng City to 18.5 GW by 2023.

Module manufacturer JinkoSolar has agreed to buy up to 338 million square meters of solar glass from Chinese manufacturer Flat Glass. This amount would be enough to produce around 59 GW of modules up to 2023. The purchase price will be negotiated on a monthly basis.

Panel producer JA Solar has agreed to buy 32,400-43,200 metric tons of polysilicon from Xinjiang-based manufacturer Daqo. Shipments will be made up to December 2023. Also, in this case, the purchase price will be negotiated on a monthly basis.

Project developer and module provider Canadian Solar announced last week the sale of its 30% stake in Big Fish SPV S.r.l. and Iron SPV S.r.l. to Italian renewable energy company Falck Renewables. The two companies own solar plants with a combined capacity of 290 MW located in Italy. The financial terms of the transaction were not revealed.

Galloping sales of gas-guzzling SUVs in China ensured conventional vehicle sales by **manufacturer BYD** continued to outpace "new energy vehicles", according to the company's full-year sales figures. A near 44% year-on-year rise in SUV sales, to 174,298 units, added up to a 2% annual rise in oil-fueled vehicle sales as other conventional models suffered during the Covid-19 pandemic. Battery electric vehicle sales for BYD fell 11% year-on-year, to 130,970 units, and the plug-in hybrid figures fell 33% but the company saw a 44% uptick in e-bus sales, to 9,125 units.

The government of Huazhou City, in Guangdong province, announced, last week, a plan to invest RMB650 million in a 150 MW solar project across several locations. The plant will combine power generation with farming, fishery and agriculture. It is estimated the whole project will provide 160 GWh per year.

Hong Kong-listed BEWG Clean Energy Group announced an agreement with the government of Wannian county, Jiangxi province, to develop a 500 MW agrivoltaic project in the region.

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AUTHORS

More articles from Vincent Shaw

Max worked for **pv magazine** between 2012 and 2015 on a part-time basis and returned to the fold full-time in July 2018. An old-school print journalist, he has also worked in environmental consultancy, education, local government, infrastructure, aerospace, forensic science and sport.
More articles from Max Hall

Greece plans 350 MW solar-wind tender in May and a further 2.1 GW to 2024

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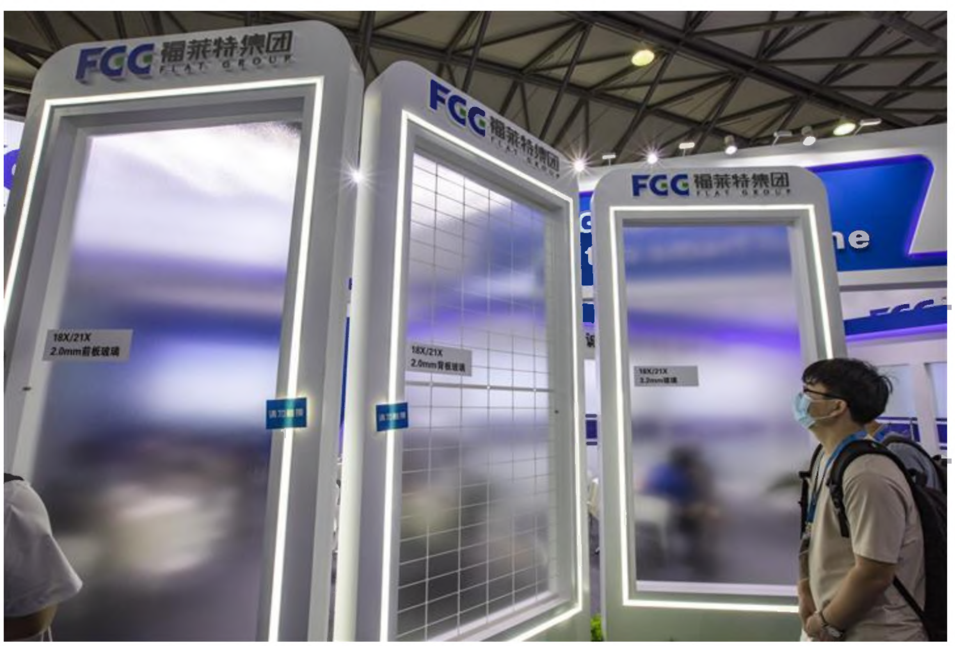
EXHIBIT 32

China's Flat Glass Hits Limit Up on USD2.2 Billion PV Glass Deal With Jinko Solar

TANG SHIHUA

DATE: DEC 31 2020 / SOURCE: YICAI



China's Flat Glass Hits Limit Up on USD2.2 Billion PV Glass Deal With Jinko Solar

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(Yicai Global) Dec. 31 -- Shares in Flat Glass Group hit the exchange-imposed daily limit today on the news that China's second biggest maker of photo-voltaic glass will supply CNY14.2 billion (USD2.2 billion) worth of products to Jinko Solar Holdings, the world's largest solar panel manufacturer.

Jiaxing, Zhejiang province-based Flat Glass [SHA:601865] shot up 10 percent to close at CNY39.90 (USD6.10).

Flat Glass and four of its units will supply 338 million square meters of PV glass to Shanghai-based Jinko Solar and five affiliates, including one in Malaysia, over the next three years at an average price of CNY42 (USD6.40) per square meter, Flat Glass said yesterday. It is estimated this will be used to make 59 gigawatts of photovoltaic cell modules.

Flat Glass will also invest CNY4.35 billion (USD664.3 million) to build five industrial furnaces with a melting capacity of 1,200 tons in Chuzhou, eastern Anhui province to expand its production capacity and better meet growing demand for larger photovoltaic components, it added yesterday. Furnaces have cost advantages and can produce customized products more easily, it added.

Flat Glass is predicting net profit of between CNY1.48 billion (USD226 million) and CNY1.64 billion this year, more than double that of last year as the price of PV glass surges, the firm said on Dec. 29.

The average cost of a 3.2-millimeter-thick pane of PV glass has jumped 48 percent since the start of the year to CNY43 (USD6.60) per square meter as of Dec. 23, according to market research firm PV InfoLink.

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Keywords: Supply Deal,Capacity Expansion,Solar Glass,Solar Power,Jink Solar,Flat Glass

EXHIBIT 33

Malaysian imports of CSPV cell and module components from China

QUANTITY			CALENDAR YEAR										
Name	**HS Code**	**Unit**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**% Change 2011-2020**
Argon	280421	M3	20	14,620	248	375	119,477	292,192	57,828	88,708	636	105	425.0%
Silicon	280469	KG	4,750,720	6,948,070	12,160,640	4,599,586	15,213,907	35,358,031	20,082,899	28,184,159	37,151,512	34,087,205	617.5%
Hydrochloric acid	280610	KG	915	134,774	18,888	2,800	27,000	117,004	278,494	774,486	2,511,635	786,331	85850.1%
Hydrofluoric acid	281111	KG	1,360,560	1,160,514	952,255	1,020,095	2,449,817	7,366,547	8,939,905	12,508,340	14,693,622	15,798,400	1061.2%
Phosphorus oxychloride	281212	KG							5,588	6,128	16,328	10,869	--
Silane	285000	KG	10,721	31,400	537,389	283,727	150	262,260	12,213	60,867	131,435	147,274	1273.7%
Silicone sealant and potting	321410	KG	605,146	135,018	281,912	353,684	689,158	1,218,040	1,728,219	2,281,593	2,253,635	2,343,755	287.3%
Wafers	381800	KG	218,425	698,690	2,609,162	1,216,811	2,965,424	3,638,545	15,350,791	12,005,169	27,647,000	15,955,540	7204.8%
Mono and DWS additives	391000	KG	5,302,902	12,488,386	6,868,574	6,150,566	4,386,616	5,114,156	7,262,596	9,361,300	6,463,405	5,761,829	8.7%
Solar glass	700719	KG	1,472,669	8,086,106	4,382,403	8,698,170	17,321,699	25,448,422	19,806,881	16,650,693	22,286,306	21,824,619	1382.0%
Silver paste, aluminum paste	711590	KG	297	1,019	597	276	229	195	125	10,160	3,077	1,288	333.6%
Screen frame	731419	M2	638,676	68,387	61,530	73,605	2,218,076	950,934	1,215,242	1,449,689	1,807,509	946,200	48.2%
Copper wire	740819	KG	290,602	306,951	338,326	394,887	1,247,527	1,530,244	1,027,833	1,436,071	1,179,518	1,530,065	426.5%
Module wires and cross connectors	740931	KG	27,603	17,713	65,583	69,485	539,042	1,354,290	1,817,570	2,271,978	2,654,368	2,105,086	7526.2%
PV Cells, Modules, and LEDs	854140	NO	64,537,349	34,284,755	176,318,862	256,407,910	424,286,815	407,419,714	573,913,237	392,063,273	518,163,539	798,677,415	1137.5%
Junction boxes	854442	KG	4,347,194	3,063,717	4,679,365	10,011,769	27,723,924	31,019,897	54,313,604	237,891,186	153,285,289	22,568,581	419.2%
Module frames	854190	KG	2,258,819	3,938,708	5,171,642	3,851,129	3,914,662	6,451,493	6,565,373	6,042,384	6,483,176	9,329,589	313.0%
VALUE			**CALENDAR YEAR**										
Name	**HS Code**	**Unit**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**% Change 2011-2020**
Argon	280421	USD	10,545	50,076	33,143	40,873	94,777	300,888	692,157	802,908	61,080	48,509	360.0%
Silicon	280469	USD	12,211,902	15,416,300	31,347,323	18,372,535	31,060,810	62,811,506	38,112,756	58,976,144	68,938,318	57,645,791	372.0%
Hydrochloric acid	280610	USD	118,737	160,675	76,475	6,273	45,990	145,033	131,281	348,615	701,722	393,788	231.6%
Hydrofluoric acid	281111	USD	2,064,062	1,535,239	1,048,745	1,104,213	2,441,664	6,533,282	9,688,623	15,891,940	16,235,248	13,530,548	555.5%
Phosphorus oxychloride	281212	USD							824,461	709,758	819,264	818,064	--
Silane	285000	USD	39,172	60,000	1,089,681	555,896	7,167	326,203	443,009	1,812,183	2,269,146	2,079,467	5208.5%
Silicone sealant and potting	321410	USD	5,583,731	2,009,192	2,763,343	2,272,925	2,627,862	3,415,114	4,200,695	7,047,669	5,459,705	5,939,231	6.4%
Wafers	381800	USD	23,911,742	16,201,194	15,822,869	12,009,183	34,496,020	257,307,279	397,262,150	454,330,443	421,730,525	546,080,914	2183.7%
Mono and DWS additives	391000	USD	18,195,497	24,428,843	21,917,986	24,137,874	14,251,325	12,835,980	29,049,951	43,783,727	26,034,739	22,431,639	23.3%
Solar glass	700719	USD	12,790,975	34,917,765	25,893,410	33,743,482	76,359,431	146,286,619	100,714,398	100,819,762	98,943,030	79,862,707	524.4%
Silver paste, aluminum paste	711590	USD	2,508,361	1,996,064	1,558,281	1,145,762	715,750	629,487	578,150	1,366,590	1,545,028	5,784,852	130.6%
Screen frame	731419	USD	1,381,556	567,834	407,189	555,599	2,386,956	1,582,866	2,011,001	2,836,585	3,600,034	2,741,800	98.5%
Copper wire	740819	USD	1,953,135	1,753,426	2,173,337	2,087,905	6,538,961	7,821,582	6,071,765	9,449,769	7,195,483	10,325,760	428.7%
Module wires and cross connectors	740931	USD	203,334	163,656	566,855	636,181	5,878,417	12,276,079	16,882,867	23,570,961	25,463,863	20,323,868	9895.3%
PV Cells, Modules, and LEDs	854140	USD	70,662,005	76,370,957	154,705,939	308,190,461	289,912,298	174,466,220	215,746,536	352,104,270	228,112,887	299,104,047	323.3%
Junction boxes	854442	USD	150,025,392	136,489,115	125,865,479	248,241,893	323,746,569	381,488,255	576,739,297	425,126,481	353,904,156	395,081,555	163.3%
Module frames	854190	USD	32,553,273	46,597,289	64,060,138	57,915,581	43,071,538	69,317,113	77,340,727	103,500,921	121,977,550	143,224,633	340.0%

Source: Global Trade Information Services (GTIS), accessed Jun. 14, 2021.

EXHIBIT 34

Exhibit SV-11

JA Solar Malaysia 2019 Financial Statement

SM121107682119

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UserID	: cheembun(PG)
Transaction Date/Time	: 06/07/2020 10:27:51
Lodgement Reference No	: [illegible]
Entity No	: 201401045979(1122165-U)
Document(s) Lodged:	JA SOLAR MALAYSIA SDN. BHD.

SNO	Form Type	Doc Date	Event Date	Received Date
1	SS7	31/12/2019	30/06/2020	06/07/2020

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201401045979(1122165-U), APP-CIU-FINANCIAL STATEMENT CA 2016 (PRIVATE LIMITED)	50.00
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JA SOLAR MALAYSIA SDN. BHD.
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REPORTS AND FINANCIAL STATEMENTS
FOR THE FINANCIAL YEAR ENDED
31 DECEMBER 2019

These Financial Statements and reports of the Company with ~~Qualified~~/Unqualified Auditors' Report for the financial year/~~period~~ ended 31 December 2019 were ~~tabled at the Annual General Meeting held~~/circulated on 30 June 2020

~~Director~~/Secretary
ONG TZE-EN
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LT Lim & Associates PLT

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(Incorporated in Malaysia)

CORPORATE INFORMATION

DIRECTORS	Huang, Xinming Tao, Ran Yan, Jingcun Ong Ken Yong Ong Tze En (f)
COMPANY SECRETARY	Ong Tze En (f) (MAICSA 7026537)
AUDITORS	LT Lim & Associates PLT *(formerly known as LT Lim Associates PLT)* (202006000005 (LLP0022786-LCA) & AF1466) Suite 2, DirectBiz Avenue No. 38B-2, Jalan Radin Anum Bandar Baru Seri Petaling 57000 Kuala Lumpur
REGISTERED OFFICE	170-09-01, Livingston Tower Jalan Argyll 10050 George Town Pulau Pinang
PRINCIPAL PLACE OF BUSINESS	Lot 17001, Medan Bayan Lepas Bayan Lepas Industrial Park (Phase 4) Mukim 12 D.B.D. 11900 Penang
IMMEDIATE HOLDING COMPANY	JA Solar Investment (Hong Kong) Limited
ULTIMATE HOLDING COMPANY	Ningjin County Jing Tai Fu Technology Co., Ltd.
PRINCIPAL BANKERS	Bank of China (Malaysia) Berhad Malayan Banking Berhad

DIRECTORS' REPORT
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

The directors hereby submit their report and the audited financial statements of the Company for the financial year ended 31 December 2019.

PRINCIPAL ACTIVITY

The principal activity of the Company is manufacture of photovoltaic solar cells.

RESULTS

	RM
Net profit for the financial year	38,042,811

DIVIDEND

No dividends have been paid or declared since the end of the previous financial year. The directors do not recommend that a dividend to be paid in respect of the current financial year.

RESERVES AND PROVISIONS

There were no material transfers to or from reserves or provisions except as disclosed in the financial statements.

DIRECTORS

The names of the directors of the Company in office since the beginning of the financial year to the date of this report are:

Ong Ken Yong	
Ong Tze En (f)	
Huang, Xinming	
Tao, Ran	(Appointed on 1 April 2019)
Yan, Jingcun	(Appointed on 17 September 2019)
Zhou Yong	(Resigned on 17 September 2019)
Cao, Bo	(Resigned on 31 March 2019)

DIRECTORS' BENEFITS

During and at the end of the financial year, no arrangements subsisted to which the Company is a party, with the object or objects of enabling directors of the Company to acquire benefits by means of the acquisition of shares in, or debentures of, the Company or any other body corporate.

Since the end of the previous financial year, no director has received or become entitled to receive a benefit (other than a benefit included in the aggregate amount of remunerations received or due and receivable by the directors as shown in the financial statements) by reason of a contract made by the Company or a related corporation with the director or with a firm of which the director is a member, or with a company in which the director has a substantial financial interest, other than a professional fee paid to a firm in which a director is a partner and a consultancy fee paid to a director as disclosed in Note 21 to the financial statements.

DIRECTORS' INTEREST

According to the Register of Directors' Shareholdings under Section 59 of the Companies Act 2016, none of the directors in office at the end of the financial year had any interest in shares in the Company or its related corporations during or at the end of the financial year.

DIRECTORS' REMUNERATION

Details of directors' remuneration are set out in Note 21 to the financial statements.

INDEMNIFYING DIRECTORS, OFFICERS OR AUDITORS

No indemnities have been given or insurance premiums paid, during or since the end of the financial year, for any person who is or has been the director, officer or auditor of the Company.

ISSUE OF SHARES AND DEBENTURES

There were neither changes in the issued and paid-up capital of the Company, nor issuances of debentures by the Company, during the financial year.

SHARE OPTIONS

No options have been granted by the Company to any parties during the financial year to take up unissued shares of the Company.

No shares have been issued during the financial year by virtue of the exercise of any option to take up unissued shares of the Company. As of the end of the financial year, there were no unissued shares of the Company under options.

OTHER STATUTORY INFORMATION

Before the financial statements of the Company were prepared, the directors took reasonable steps:

(a) to ascertain that proper action has been taken in relation to the writing-off of bad debts and the making of allowance for doubtful debts, and have satisfied themselves that all known bad debts had been written-off and that adequate allowance had been made for doubtful debts; and

(b) to ensure that any current assets which were unlikely to be realised at their book values in the ordinary course of business have been written down to their estimated realisable values.

As of the date of this report, the directors are not aware of any circumstances:

(a) which would render the amount written off for bad debts or the amount of the allowance for doubtful debts inadequate to any substantial extent in the financial statements of the Company; or

(b) which would render the value attributed to current assets in the financial statements of the Company misleading; or

(c) which have arisen which render adherence to the existing method of valuation of assets or liabilities of the Company misleading or inappropriate; or

(d) not otherwise dealt with in this report or financial statements which would render any amount stated in the financial statements of the Company misleading.

As of the date of this report, there does not exist:

(a) any charge on the assets of the Company which has arisen since the end of the financial year and secures the liability of any other person; or

(b) any contingent liability of the Company which has arisen since the end of the financial year.

No contingent or other liability has become enforceable, or is likely to become enforceable, within the period of twelve months after the end of the financial year which, in the opinion of the directors, will or may substantially affect the ability of the Company to meet its obligations as and when they fall due.

OTHER STATUTORY INFORMATION – continued

In the opinion of the directors:

(a) the results of the operations of the Company during the financial year were not substantially affected by any item, transaction or event of a material and unusual nature.

(b) no item, transaction or event of a material and unusual nature has arisen in the interval between the end of the financial year and the date of this report which is likely to affect substantially the results of operations of the Company for the financial year in which this report is made.

IMMEDIATE AND ULTIMATE HOLDING COMPANIES

The directors regard JA Solar Investment (Hong Kong) Limited and Ningjin County Jing Tai Fu Technology Co., Ltd., incorporated in Hong Kong and the People's Republic of China, as the immediate and ultimate holding companies respectively.

AUDITORS AND AUDITORS' REMUNERATION

The auditors, LT Lim & Associates PLT have expressed their willingness to continue in office.

LT Lim & Associates PLT was registered on 2 January 2020 and with effect from that date, LT Lim & Associates, a conventional partnership was converted to a limited liability partnership.

Details of auditors' remuneration are set out in Note 18 to the financial statements.

Signed on behalf of the Board of Directors in accordance with a resolution of the directors.

YAN, JINGCUN	HUANG, XINMING
Director	Director

Kuala Lumpur
3 March 2020

JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

STATEMENT BY DIRECTORS PURSUANT TO SECTION 251(2) OF THE COMPANIES ACT 2016

In the opinion of the directors, the financial statements set out on pages 12 to 38, are drawn up in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia so as to give a true and fair view of the financial position of the Company as of 31 December 2019 and of its financial performance and cash flows for the financial year then ended.

Signed on behalf of the Board of Directors in accordance with a resolution of the directors.

....
YAN, JINGCUN
Director

....
HUANG, XINMING
Director

Kuala Lumpur
3 March 2020

JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122163-U)
(Incorporated in Malaysia)

STATUTORY DECLARATION PURSUANT TO
SECTION 251(1)(b) OF THE COMPANIES ACT 2016

I, YAN, JINGCUN, being the director primarily responsible for the financial management of JA SOLAR MALAYSIA SDN. BHD., do solemnly and sincerely declare that the financial statements set out on pages 12 to 38 are, to the best of my knowledge and belief, correct and I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the Statutory Declarations Act, 1960.

Subscribed and solemnly declared by the
abovenamed YAN, JINGCUN at
KUALA LUMPUR in FEDERAL TERRITORY
on 3 March 2020

BEFORE ME:

PESURUHJAYA SUMPAH
W748
SABRINA BINTI
SYD MOHAMMED
SEBIR
1/1/2018-31/12/2020
MALAYSIA
No. 25-1, Tingkat 1,
Jalan Radin Bagus, Sri Petaling
57000 Kuala Lumpur

LT Lim & Associates PLT
(formerly known as LT Lim Associates PLT)
(202006000005 (LLP0022786-LCA) & AF 1460)
Chartered Accountants
Suite 2, DirectBiz Avenue
Tel : (603) 9057 2811
No. 38B-2, Jalan Radin Anum, Bandar Baru Seri Petaling, 57000 Kuala Lumpur
Fax : (603) 9057 3811
LT Lim & Associates PLT (formerly known as LT Lim Associates PLT) was registered on 2 January 2020 and with effect from that date, LT Lim & Associates, a conventional partnership was converted to a limited liability partnership.

INDEPENDENT AUDITORS' REPORT
TO THE MEMBERS OF JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

Report on the Audit of the Financial Statements

Opinion

We have audited the financial statements of JA SOLAR MALAYSIA SDN. BHD., which comprise the statement of financial position as at 31 December 2019, and the statement of comprehensive income, statement of changes in equity and statement of cash flows for the financial year then ended, and notes to the financial statements, including a summary of significant accounting policies, as set out on pages 12 to 38.

In our opinion, the accompanying financial statements give a true and fair view of the financial position of the Company as at 31 December 2019, and of its financial performance and its cash flows for the financial year then ended in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia.

Basis for Opinion

We conducted our audit in accordance with approved standards on auditing in Malaysia and International Standards on Auditing. Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Financial Statements section of our report. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Independence and Other Ethical Responsibilities

We are independent of the Company in accordance with the By-Laws (on Professional Ethics, Conduct and Practice) of the Malaysian Institute of Accountants ("By-Laws") and the International Ethics Standards Board for Accountants' Code of Ethics for Professional Accountants ("IESBA Code"), and we have fulfilled our other ethical responsibilities in accordance with the By-Laws and the IESBA Code.

Information Other than the Financial Statements and Auditors' Report Thereon

The directors of the Company are responsible for the other information. The other information comprises the Directors' Report but does not include the financial statements of the Company and our auditors' report thereon.

Our opinion on the financial statements of the Company does not cover the Directors' Report and we do not express any form of assurance conclusion thereon.

Company No. 1122165-U

Information Other than the Financial Statements and Auditors' Report Thereon – continued

In connection with our audit of the financial statements of the Company, our responsibility is to read the Directors' Report and, in doing so, consider whether the Directors' Report is materially inconsistent with the financial statements of the Company or our knowledge obtained in the audit or otherwise appears to be materially misstated.

If, based on the work we have performed, we conclude that there is a material misstatement of the Directors' Report, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of the Directors for the Financial Statements

The directors of the Company are responsible for the preparation of financial statements of the Company that give a true and fair view in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia. The directors are also responsible for such internal control as the directors determine is necessary to enable the preparation of financial statements of the Company that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements of the Company, the directors are responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the Company or to cease operations, or have no realistic alternative but to do so.

Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements of the Company as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with approved standards on auditing in Malaysia and International Standards on Auditing will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

Company No. 1122165-U

Auditors' Responsibilities for the Audit of the Financial Statements – continued

As part of an audit in accordance with approved standards on auditing in Malaysia and International Standards on Auditing, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements of the Company, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the directors.

- Conclude on the appropriateness of the directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the financial statements of the Company or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditors' report. However, future events or conditions may cause the Company to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements of the Company, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

LT Lim & Associates PLT
(formerly known as LT Lim Associates PLT)
(202006000005 (LLP0022786-LCA) & AF 1466)
Suite 2, DirectBiz Avenue
No. 38B-2, Jalan Radin Anum, Bandar Baru Seri Petaling, 57000 Kuala Lumpur
Chartered Accountants
Tel : (603) 9057 2811
Fax : (603) 9057 3811
LT Lim & Associates PLT (formerly known as LT Lim Associates PLT) was registered on 2 January 2020 and with effect from that date, LT Lim & Associates, a conventional partnership was converted to a limited liability partnership.

Company No. 1122165-U

Other Matters

This report is made solely to the members of the Company, as a body, in accordance with Section 266 of the Companies Act 2016 in Malaysia and for no other purpose. We do not assume responsibility to any other person for the content of this report.

LT LIM & ASSOCIATES PLT
202006000005 (LLP0022786-LCA) & AF1466
Chartered Accountants

HAN MENG CHEW
03426/03/2021 J
Chartered Accountant

Kuala Lumpur
Date: 3 March 2020

STATEMENT OF FINANCIAL POSITION
AS AT 31 DECEMBER 2019

	Note	2019 RM	2018 RM
NON-CURRENT ASSETS			
Property, plant and equipment	5	394,680,908	439,606,159
Intangible assets	6	299,512	-
Deferred tax assets	7	-	2,708,850
		394,980,420	442,315,009
CURRENT ASSETS			
Inventories	8	83,067,037	58,477,358
Trade and other receivables	9	91,143,589	34,052,635
Cash and cash equivalents	10	29,616,430	44,722,014
		203,827,056	137,252,007
TOTAL ASSETS		598,807,476	579,567,016
EQUITY			
Share capital	11	100,000,000	100,000,000
Accumulated losses		(6,317,377)	(44,360,188)
		93,682,623	55,639,812
NON-CURRENT LIABILITIES			
Deferred tax liabilities	7	6,450,405	-
		6,450,405	-
CURRENT LIABILITIES			
Short term borrowings	12	44,833,729	45,826,894
Trade and other payables	13	453,838,387	478,086,329
Current tax liabilities		2,332	13,981
		498,674,448	523,927,204
TOTAL LIABILITIES		505,124,853	523,927,204
TOTAL EQUITY AND LIABILITIES		598,807,476	579,567,016

The notes on pages 18 to 38 are an integral part of these financial statements.

JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

STATEMENT OF COMPREHENSIVE INCOME FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

	Note	2019 RM	2018 RM
Revenue	14	727,341,094	829,248,025
Cost of sales	15	(665,236,868)	(879,934,943)
Gross profit/(loss)		62,104,226	(50,686,918)
Other operating income	16	16,059,046	11,372,698
Selling and distribution expenses		(4,455,461)	(8,641,144)
Administrative expenses		(24,873,683)	(31,876,047)
Operating profit/(loss)		48,834,128	(79,831,411)
Finance costs	17	(1,579,730)	(2,573,884)
Profit/(Loss) before tax	18	47,254,398	(82,405,295)
Tax (expense)/credit	19	(9,211,587)	22,164,547
Net profit/(loss), representing total comprehensive income/(loss) for the financial year		38,042,811	(60,240,748)

The notes on pages 18 to 38 are an integral part of these financial statements.

STATEMENT OF CHANGES IN EQUITY
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

	Share capital RM	Accumulated losses RM	Total equity RM
At 1 January 2019	100,000,000	(44,360,188)	55,639,812
Total comprehensive income for the financial year	-	38,042,811	38,042,811
At 31 December 2019	100,000,000	(6,317,377)	93,682,623
At 1 January 2018	50,000,000	15,880,560	65,880,560
Issuance of ordinary shares	50,000,000	-	50,000,000
Total comprehensive loss for the financial year	-	(60,240,748)	(60,240,748)
At 31 December 2018	100,000,000	(44,360,188)	55,639,812

The notes on pages 18 to 38 are an integral part of these financial statements.

STATEMENT OF CASH FLOWS
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

	Note	2019 RM	2018 RM
OPERATING ACTIVITIES			
Profit/(Loss) before tax		47,254,398	(82,405,295)
Adjustment for:			
Allowance for write down of inventories to net realisable value		-	3,099,635
Amortisation and depreciation:			
- property, plant and equipment		90,030,938	89,799,950
- intangible assets		107,994	-
(Gain)/Loss on foreign exchange - unrealised		(14,837,731)	20,533,527
Intangible assets written off		667	-
Interest income		(218,052)	(208,678)
Interest expense		1,579,730	2,573,884
Inventories written off		1,149,374	-
Property, plant and equipment written off		4,006,135	70,347
Operating profit before working capital changes		129,073,453	33,463,370
Changes in working capital:			
Inventories		(25,739,053)	39,730,020
Receivables		5,092,790	1,002,029
Payables		(32,996,222)	(57,383,267)
Intercompany balances		(235,215,373)	68,466,381
Cash (used in)/generated from operations		(159,784,405)	85,278,533
Income tax paid		(68,083)	(32,000)
Income tax refunded		4,102	-
Interest received		218,052	208,678
Interest paid		(1,579,730)	(2,573,884)
Net cash (used in)/generated from operating activities		(161,210,064)	82,881,327
INVESTING ACTIVITIES			
Placement of short-term deposit more than three months		(12,516,402)	-
Purchase of property, plant and equipment		(50,300,566)	(7,298,011)
Increase in restricted cash		-	(5,206,020)
Withdrawal of fixed deposit previously pledged with a licensed bank		-	3,870,488
Net cash used in investing activities		(62,816,968)	(8,633,543)

The notes on pages 18 to 38 are an integral part of these financial statements.

STATEMENT OF CASH FLOWS
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019
(continued)

	Note	2019 RM	2018 RM
FINANCING ACTIVITIES			
Repayment of revolving credit		-	(2,333,599)
Repayment of onshore foreign currency loan		(232,266)	(52,434,776)
Proceeds from issuance of ordinary shares		-	50,000,000
Loan given to a related company		(100,578)	-
Loan obtained from immediate holding company		196,942,665	-
Repayment to immediate holding company		-	(45,123,828)
Net cash generated from/(used in) financing activities		196,609,821	(49,892,203)
NET (DECREASE)/INCREASE IN CASH AND CASH EQUIVALENTS		(27,417,211)	24,355,581
EXCHANGE DIFFERENCE IN TRANSLATION		62,774	(177,753)
CASH AND CASH EQUIVALENTS AT BEGINNING OF THE YEAR	(i)	39,515,994	15,338,166
CASH AND CASH EQUIVALENTS AT END OF THE YEAR	(i)	12,161,557	39,515,994

The notes on pages 18 to 38 are an integral part of these financial statements.

STATEMENT OF CASH FLOWS
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019
(continued)

(i) *Cash and Cash Equivalents*

Cash and cash equivalents included in the statement of cash flows comprise the following statement of financial position amounts:

	2019 RM	2018 RM
Cash and bank balances	17,295,343	44,722,014
Fixed deposits with a licensed bank	12,321,087	-
	29,616,430	44,722,014
Less: Bank balance restricted for usage	(5,133,786)	(5,206,020)
Short-term deposit more than three month	(12,321,087)	-
	12,161,557	39,515,994

The notes on pages 18 to 38 are an integral part of these financial statements.

NOTES TO THE FINANCIAL STATEMENTS – 31 DECEMBER 2019

1. GENERAL INFORMATION

JA Solar Malaysia Sdn. Bhd. is a private limited liability company, incorporated and domiciled in Malaysia. The addresses of the Company's registered office and principal place of business are set out in page 1.

The Company is principally engaged in manufacture of photovoltaic solar cells. There has been no significant change in the principal activity during the financial year under review.

The immediate and ultimate holding companies are JA Solar Investment (Hong Kong) Limited and Ningjin County Jing Tai Fu Technology Co., Ltd. incorporated in Hong Kong and the People's Republic of China respectively.

The financial statements are presented in Ringgit Malaysia ("RM"), which is also the functional currency of the Company.

These financial statements were authorised for issue by the Board of Directors on 3 March 2020.

2. BASIS OF PREPARATION

The financial statements have been prepared in accordance with Malaysian Private Entities Reporting Standard ("MPERS") issued by the Malaysian Accounting Standards Board ("MASB") and the requirements of the Companies Act 2016 in Malaysia.

The financial statements have been prepared using historical cost basis, unless otherwise stated in the significant accounting policies set out in Note 3 to the financial statements.

3. SIGNIFICANT ACCOUNTING POLICIES

The accounting policies set out below have been applied consistently to the periods presented in these financial statements, unless otherwise stated.

3.1 Property, Plant and Equipment

Property, plant and equipment are stated at cost, less accumulated depreciation and accumulated impairment losses.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.1 Property, Plant and Equipment – continued

The cost of an item of property, plant and equipment comprises (i) purchase price; (ii) any costs directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended by management; and (iii) the initial estimate of the costs of dismantling and removing the item and restoring the site on which the asset is located.

Construction work in progress is not depreciated until the asset is fully completed and ready for its intended use.

All other items of property, plant and equipment are depreciated by allocating the depreciable amounts of assets less their residual values over their estimated useful lives, using straight-line method. The annual depreciation rates used for the depreciation are as follows:

Leasehold improvements	6 to 9 years
Plant, machinery and factory equipment	5 to 7 years
Furniture, fittings and office equipment	5 to 10 years
Motor vehicles	5 to 7 years

The assets' residual values, useful lives and depreciation methods are reviewed, and adjusted prospectively if appropriate, if there is an indication of a significant change since the last reporting date.

Gains and losses on disposals are determined by comparing proceeds with carrying amount of the assets, and are recognised in the profit or loss.

Where an indication of impairment exists, the carrying value of the asset is assessed and written down immediately to its recoverable amount.

Expenditure on property, plant and equipment is included in the carrying amount of the asset when it is probable that future economic benefits in excess of the originally assessed standard of performance of the existing asset will flow to the Company. Repairs and maintenance are charged to the profit or loss during the financial year in which they are incurred.

3.2 Intangible Assets

Acquired intangible assets are recognised initially at cost. Subsequently, intangible assets are measured at cost less accumulated amortisation and any accumulated impairment losses.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.2 Intangible Assets – continued

Intangible assets are amortised by allocating the depreciable amounts of assets over their estimated useful lives, using straight-line method. The annual amortisation rate used for the amortisation is as follows:

Computer software	5 to 10 years

3.3 Impairment of Non-Financial Assets

The carrying amounts of non-financial assets (i.e. property, plant and equipment and intangible asset) are reviewed at the end of each reporting period to determine whether there is any indication of impairment. If any such indication exists, then the asset's recoverable amount is estimated.

For the purpose of impairment testing, assets are grouped together into the smallest group of assets that generates cash inflows from continuing use that are largely independent of cash inflows of other assets or cash-generating units ("CGU").

The recoverable amount of an asset of CGU is the greater of its value in use and its fair value less costs of disposal. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset or CGU.

An impairment loss id recognised in profit or loss if the carrying amount of an asset or its related CGU exceeds its estimated recoverable amount.

Impairment losses recognised in prior periods are assessed at the end of each reporting period for any indications that the loss has decreased or no longer exists. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortisation, if no impairment loss had been recognised. Reversals of impairment losses are credited to profit or loss in the financial year in which the reversals are recognised.

3.4 Inventories

Inventories are measured at the lower of cost and net realisable value (which is the estimated selling price less costs to complete and sell). Cost is determined using the weighted average cost method and comprises purchase price and directly attributable costs of bringing the inventories to their present location and condition. For manufactured goods, cost includes conversion costs of labour and variable and fixed production overheads. Net realisable value is determined on an item-by-item basis or on group of similar item basis.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.5 Financial Instruments

A financial instrument is a contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity.

(a) Initial recognition and measurement

A financial asset or a financial liability (including derivative instruments) is recognised only when the entity becomes a party to the contractual provisions of the instrument.

On initial recognition, a financial asset or a financial liability is measured at the transaction price, including transaction costs. For a financial asset or a financial liability that is subsequently measured at fair value through profit or loss, transaction costs are expensed to profit or loss when incurred.

An arrangement constitutes a financing transaction, if payment is deferred beyond normal business terms. Under a financing transaction, a financial asset or a financial liability is measured at the present value of the future payments discounted at a market rate of interest for a similar debt instrument as determined at initial recognition.

(b) Subsequent measurement

Debt instruments are measured at amortised cost using the effective interest method. Debt instruments that are classified as current assets or current liabilities are measured at the undiscounted amount of the cash or other consideration expected to be paid or received, unless the arrangement constitutes, in effect, a financing transaction.

Investments in non-convertible preference shares and non-puttable ordinary or preference shares, that are publicly traded or their fair value can otherwise be measured reliably without undue cost or effort, are measured at fair value with changes in fair value recognised in profit or loss. All other such investments are measured at cost less impairment.

Derivative financial instruments (other than derivatives designated as a hedging instrument) are measured at fair value and changes in fair value recognised in profit or loss.

All financial assets are subject to review for impairment, except for financial assets measured at fair value through profit or loss.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.5 Financial Instruments – continued

(c) Impairment

At the end of each reporting period, financial assets that are measured at cost or amortised cost are assessed as to whether there is objective evidence of impairment. If there is objective evidence of impairment, an impairment loss is recognised in profit or loss immediately.

For a financial asset measured at amortised cost, the impairment loss is the difference between the asset's carrying amount and the present value of estimated cash flows discounted at the asset's original effective interest rate. If such a financial asset has a variable interest rate, the discount rate for measuring any impairment loss is the current effective interest rate determined under the contract.

For a financial asset measured at cost less impairment, the impairment loss is the difference between the asset's carrying amount and the best estimate of the amount that would be receive for the asset if it were to be sold at the reporting date.

If, in a subsequent period, the amount of an impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, the previously recognised impairment loss is reversed in profit or loss.

(d) Derecognition

A financial asset is derecognised only when (i) the contractual rights to receive the cash flows from the financial asset expire or are settled; or (ii) the entity transfers to another party substantially all of the risks and rewards of ownership of the financial asset, including circumstances when the entity acts only as a collecting agent of the transferee, and retains no significant risks and rewards of ownership of the financial asset or no continuing involvement in the control of the financial asset transferred.

A financial liability is derecognised only when it is extinguished, i.e. when the obligation specified in the contract is discharged, is cancelled or expired. A substantial modification of the terms of an existing financial liability is accounted for as an extinguishment of the original financial liability and the recognition of a new financial liability.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.6 Cash and Cash Equivalents

Cash and cash equivalents consist of cash on hand, balances and deposits with banks and highly liquid investments which have an insignificant risk of changes in fair value with original maturities of three months or less, and are used by the Company in the management of their short-term commitments. For the purpose of the statement of cash flows, cash and cash equivalents are presented net of pledged deposits.

3.7 Share Capital

An equity instrument is any contract that evidences a residual interest in the assets of the Company after deducting all of its liabilities. Ordinary shares are equity instruments.

Ordinary shares are recorded at the proceeds received, net of directly attributable incremental transaction costs. Ordinary shares are classified as equity. Dividends on ordinary shares are recognised in equity in the period in which they are declared.

3.8 Leases

A lease is classified as a finance lease, if it transfers substantially all the risks and rewards incidental to ownership. All other leases that do not meet this criterion are classified as operating leases.

Finance lease – Lessee

At the commencement of the lease term, the rights of use and obligations under finance leases are recognised as assets and liabilities at amounts equal to the fair value of the leased asset or, if lower, the present value of the minimum lease payments, determined at the inception of the lease. Subsequently, the minimum lease payments are apportioned between the finance charge and the reduction of the outstanding liability using the effective interest method. Contingent rents are charged as expenses in the periods in which they are incurred.

Operating lease – Lessee

Lease payments under operating leases are recognised as an expense over the lease term on a straight-line basis, unless another systematic basis is more representative of the time pattern of the user's benefit.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.9 Revenue and Other Income

Revenue is measured at the fair value of the consideration received or receivable, net of any discounts, rebates, returns and taxes collected on behalf of government.

Revenue from the sale of goods is recognised when (i) significant risks and rewards of ownership of the goods are transferred to the buyer; (ii) the seller retains neither continuing managerial involvement to the degree usually associated with ownership nor effective control over the goods sold; (iii) the amount of revenue can be measured reliably; (iv) it is probable on the inflow of economic benefits that are associated with the transaction; and (v) the costs incurred or to be incurred in respect of the transaction can be measured reliably.

Interest income is recognised in the statement of comprehensive income as it accrues, taking into account the effective yield on the asset.

3.10 Employee Benefits

The cost of all employee benefits to which the employees have become entitled as a result of service rendered to the entity during the reporting period is recognised as an expense in profit or loss, other than the cost to be recognised as part of the cost of an asset.

Short-term employee benefits (including wages, salaries, social security contributions, short-term compensated absences, bonuses, non-monetary benefits, etc.) are measured at the undiscounted amount of benefits expected to be paid in exchange for the services rendered by employees.

The contribution payable to an approved fund for a period in accordance with the terms of the plan (i.e. a defined contribution plan) is recognised as an expense in profit or loss, other than the cost to be recognised as part of the cost of an asset. When the fixed contributions have been paid, the entity has no further contribution obligations.

Termination benefits are recognised as a liability and an expense only when the entity is demonstrably committed either: (i) to terminate the employment of an employee or group of employees before the normal retirement date; or (ii) to provide termination benefits as a result of an offer made in order to encourage voluntary redundancy. Termination benefits are measured at the best estimate of the expenditure that would be required to settle the obligation at the reporting date. When termination benefits are due more than twelve months after the end of the reporting period, they are measured at their discounted present value.

3.11 Borrowing Costs

All borrowing costs are recognised as an expense in profit or loss in the period in which they are incurred by using the effective interest method.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.12 Income Taxes

Current tax liability is recognised for tax payable on taxable profit for the current and past periods. If the amount paid for the current and past periods exceeds the amount payable for those periods, the excess is recognised as a current tax asset. Current tax liability or asset is measured at the amount it expects to pay or recover using the tax rates and laws that have been enacted or substantively enacted by the reporting date.

Deferred tax liability is recognised for all taxable temporary differences, except to the extent that the deferred tax liability arises from: (i) the initial recognition of goodwill; or (ii) the initial recognition of an asset or a liability in a transaction that is not a business combination, and at the time of the transaction, affects neither accounting profit nor taxable profit or tax loss.

Deferred tax asset is recognised for all deductible temporary differences to the extent that it is probable that taxable profit will be available against which the deductible temporary difference can be utilised, unless the deferred tax asset arises from the initial recognition of an asset or a liability in a transaction that is not a business combination, and at the time of the transaction, affects neither accounting profit nor taxable profit or tax loss.

A deferred tax liability or asset is measured using the tax rates and tax laws that have been enacted or substantively enacted by the reporting date. The measurement of deferred tax liabilities and deferred tax assets reflects the tax consequences that would follow from the manner in which, at the reporting date, the carrying amount of the related assets and liabilities is expected to be recovered or settled.

Current or deferred tax assets and liabilities are not discounted.

3.13 Foreign Currency

Functional currency is the currency of the primary economic environment in which the entity operates.

A foreign currency transaction is recorded, on initial recognition in the functional currency, by applying to the foreign currency amount the spot exchange rate between the functional currency and the foreign currency at the date of the transaction.

At the end of each reporting period: (i) foreign currency monetary items are translated using the closing rate; (ii) non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rate at the date of the transaction; and (iii) non-monetary items that are measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was determined.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.13 Foreign Currency – continued

Exchange differences arising on the settlement of monetary items or on translating monetary items are recognised in profit or loss in the period in which they arise.

4. KEY SOURCES OF ESTIMATION UNCERTAINTY AND JUDGEMENTS

The preparation of the financial statements in conformity with MPERS requires management to make judgements, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimates are revised and in any future periods affected.

There are no significant areas of estimation uncertainty and critical judgements in applying accounting policies that have significant effect on the amounts recognised in the financial statements other than as follows:

i) Useful lives of property, plant and equipment and intangible assets

The Company determines the estimated useful lives of its property, plant and equipment and intangible assets for calculation depreciation. This estimate is determined after considering the expected usage of the asset or physical wear and tear. Management reviews the residual value and useful lives annually and the future depreciation or amortisation charge would be adjusted where management believes that the useful lives differ from current estimates.

ii) Impairment of non-financial assets

When the recoverable amount of an asset is determined based on the estimate of the value-in-use of the cash-generating unit to which the asset is allocated, the management is required to make an estimate of the expected future cash flows from the cash-generating unit and also to apply a suitable discount rate in order to determine the present value of those cash flows.

iii) Write-down of inventories

Reviews are made periodically by management on damaged, obsolete and slow-moving inventories. These reviews require judgement and estimates. Possible changes in these estimates could result in revisions to the valuation of inventories.

4. KEY SOURCES OF ESTIMATION UNCERTAINTY AND JUDGEMENTS – continued

iv) Impairment of trade and other receivables

An impairment is recognised when there is objective evidence that a financial asset is impaired. Management specially reviews its loans and receivables financial assets and analyses historical bad debts, customer concentrations, customer creditworthiness, current economic trends and changes in the customer payment terms when making a judgement to evaluate the adequacy of the allowance for impairment losses. Where there is objective evidence of impairment, the amount and timing of future cash flows are estimated based on historical loss experience for assets with similar credit risk characteristics. If the expectation is different from the estimation, such difference will impact the carrying value of receivables.

v) Provision for income taxes

Judgement is involved in determining the provision for income taxes. There are certain transactions and computations for which the ultimate tax impact is uncertain during the ordinary course of business. The Company recognises liabilities for expected tax issues based on estimates of whether additional taxes will be due. Where the final tax outcome of such matters is different from the amounts that were initially recognised, the difference will be taken into profit or loss in the period in which such determination is made.

Company No. 1122165-U

5. PROPERTY, PLANT AND EQUIPMENT

	Short-term leasehold improvement RM	Plant, machinery and factory equipment RM	Furniture fittings and office equipment RM	Motor vehicles RM	Capital work-in-progress RM	Total RM
Cost						
At 1 January 2019	162,226,571	465,940,418	5,726,850	1,045,703	3,980,598	638,920,140
Additions	-	67,220	184,680	-	50,074,791	50,326,691
Adjustments	(429,175)	(351,396)	-	-	-	(780,571)
Transferred to intangible assets (Note 6)	-	-	(679,014)	-	-	(679,014)
Transferred to statement of comprehensive income	-	-	-	-	(26,125)	(26,125)
Reclassification	-	2,677,117	-	-	(2,677,117)	-
Written off	-	(8,900,344)	(75,002)	-	-	(8,975,346)
At 31 December 2019	161,797,396	459,433,015	5,157,514	1,045,703	51,352,147	678,785,775
Accumulated amortisation and depreciation						
At 1 January 2019	46,672,560	149,292,718	2,822,732	525,971	-	199,313,981
Charge for the financial year	21,857,212	66,971,793	1,018,074	183,859	-	90,030,938
Transferred to intangible assets (Note 6)	-	-	(270,841)	-	-	(270,841)
Written off	-	(4,916,930)	(52,281)	-	-	(4,969,211)
At 31 December 2019	68,529,772	211,347,581	3,517,684	709,830	-	284,104,867
Carrying amount						
At 31 December 2019	93,267,624	248,085,434	1,639,830	335,873	51,352,147	394,680,908
At 31 December 2018	115,554,011	316,647,700	2,904,118	519,732	3,980,598	439,606,159

5. PROPERTY, PLANT AND EQUIPMENT – continued

The Company has pledged certain plant and machineries with a carrying amount of RM128,988,739 (2018 – RM137,561,414) to secure banking facilities granted to the Company as disclosed in Note 12.

6. INTANGIBLE ASSETS

	Computer software RM
Cost	
At 1 January 2019	-
Transferred from property, plant and equipment (Note 5)	679,014
Written off	(2,500)
At 31 December 2019	676,514
Accumulated amortisation	
At 1 January 2019	-
Charge for the financial year	107,994
Transferred from property, plant and equipment (Note 5)	270,841
Written off	(1,833)
At 31 December 2019	377,002
Carrying amount	
At 31 December 2019	299,512
At 31 December 2018	-

7. DEFERRED TAX ASSETS/(LIABILITIES)

	2019 RM	2018 RM
Deferred tax assets	-	2,708,850
Deferred tax liabilities	(6,450,405)	-
	(6,450,405)	2,708,850

7. DEFERRED TAX (LIABILITIES)/ASSETS – continued

The details of deferred taxes:

	Property, plant and equipment RM	Unabsorbed capital allowances RM	Unutilised tax losses RM	Net unrealised foreign exchange loss/(gain) RM	Total RM
At 1 January 2019	(36,357,849)	36,320,551	36,549	2,709,599	2,708,850
Recognised in profit or loss	2,431,070	(10,355,737)	2,326,468	(3,561,056)	(9,159,255)
At 31 December 2019	(33,926,779)	25,964,814	2,363,017	(851,457)	(6,450,405)

Deductible temporary differences not recognised (stated at gross):

	2019 RM	2018 RM
Unutilised tax losses	-	9,693,617

8. INVENTORIES

	2019 RM	2018 RM
At cost:		
Raw materials	35,830,562	36,407,339
Work in progress	3,819,071	3,228,368
Finished goods	43,417,404	14,854,581
	83,067,037	54,490,288
At net realisable value:		
Finished goods	-	3,987,070
Total inventories	83,067,037	58,477,358
Recognised in profit or loss:		
Inventories recognised as cost of sales	665,236,868	879,934,943
Impairment loss	-	3,099,635

Included in raw materials and finished goods are goods in transit amounting to RM9,503,916 (2018 – RM8,940,335) and RM12,948,551 (2018 – RMNil) respectively.

9. TRADE AND OTHER RECEIVABLES

	2019 RM	2018 RM
Other receivables, deposits and prepayments	8,554,409	11,277,549
Amount due from related companies	82,589,180	22,775,086
	91,143,589	34,052,635

Included in other receivables, deposits and prepayments is an amount of RM778,206 (2018 – RM647,122) being advance payments to suppliers for purchase of raw materials.

Amount due from related companies

	2019 RM	2018 RM
Trade	82,488,602	22,775,086
Non-trade	100,578	-
	82,589,180	22,775,086

The non-trade amount is unsecured, interest-free and repayable upon demand.

10. CASH AND CASH EQUIVALENTS

	2019 RM	2018 RM
Cash and bank balances	17,295,343	44,722,014
Fixed deposit with a licensed bank	12,321,087	-
	29,616,430	44,722,014

Included in cash and bank balances is an amount of RM5,133,786 (2018 – RM5,206,020) which has been earmarked as security for a trade facility granted by a licensed bank to the Company as disclosed in Note 12.

The fixed deposit is pledged to a licensed bank for a banking facility granted to the Company.

11. SHARE CAPITAL

	2019 Number of ordinary shares	2018 Number of ordinary shares	2019 Amount RM	2018 Amount RM
Issued and fully paid shares classified as equity instruments:				
At 1 January 2019/2018	100,000,000	50,000,000	100,000,000	50,000,000
Issuance of shares	-	50,000,000	-	50,000,000
At 31 December 2019/2018	100,000,000	100,000,000	100,000,000	100,000,000

The holder of ordinary shares is entitled to receive dividends as declared from time to time and are entitled to one (1) vote per share without restrictions at the general meetings of the Company. All ordinary shares rank equally with regard to the Company's residual assets.

12. SHORT TERM BORROWINGS

	2019 RM	2018 RM
Revolving credit	4,107,029	4,164,816
Onshore Foreign Currency Loan	40,726,700	41,662,078
	44,833,729	45,826,894

The above bank facilities bear interest at the following rates:

	2019 %	2018 %
Revolving credit	3.15 - 4.15	2.75 - 4.00
Onshore Foreign Currency Loan	2.75 - 4.01	2.45 - 3.90

The revolving credit facility is denominated in USD and secured by way of an irrevocable standby letter of credit from a financial institution amounting to USD10,000,000. The standby letter of credit is in turn secured by way of a cash deposit pledged by Hefei JA Solar Technology Co. Ltd, a related company of the Company.

12. SHORT TERM BORROWINGS – continued

The onshore foreign currency loan is denominated in USD and secured by the following:

i) an irrevocable standby letter of credit from a financial institution amounting to USD25,000,000. The standby letter of credit is in turn secured by way of a cash deposit pledged by Hefei JA Solar Technology Co. Ltd, a related company of the Company;

ii) restricting the usage of bank balance amounting to USD1,250,000 as disclosed in Note 10; and

iii) a first ranking fixed charge over certain plant and machineries of the Company of not less than USD50,000,000 as disclosed in Note 5.

13. TRADE AND OTHER PAYABLES

	2019 RM	2018 RM
Trade payables	32,851,544	64,323,005
Other payables and accruals	18,096,983	33,657,827
Amount due to related companies	402,889,860	380,105,497
	453,838,387	478,086,329

Included in other payables and accruals in the previous financial year was an amount of RM331,112 being advance payments from customers.

Amount due to related companies

	2019 RM	2018 RM
Trade	43,912,329	218,070,631
Non-trade	358,977,531	162,034,866
	402,889,860	380,105,497

The non-trade amount is unsecured, interest-free and repayable upon demand.

14. REVENUE

Revenue represents the invoiced value of goods sold after allowance for goods returns and trade discounts.

15. COST OF SALES

Cost of sales represents cost of inventories sold.

16. OTHER OPERATING INCOME

	2019 RM	2018 RM
Compensation sum received from a supplier	172,424	-
Gain on foreign exchange - realised	-	9,387,270
- unrealised	14,837,731	-
Income from sales of scrap materials	755,644	863,282
Insurance claim amount received	24,348	543,337
Interest income	218,052	208,678
Others	50,847	370,131
	16,059,046	11,372,698

17. FINANCE COSTS

	2019 RM	2018 RM
Interest on revolving credit	153,409	176,745
Interest on onshore foreign currency loan	1,426,321	2,397,139
	1,579,730	2,573,884

18. PROFIT/(LOSS) BEFORE TAX

Profit/(Loss) before tax is determined after recognising the following expenses:

	2019 RM	2018 RM
Allowance for write down of inventories to net realisable value	-	3,099,635
Audit fee	78,000	78,000
Amortisation and depreciation:		
- property, plant and equipment	90,030,938	89,799,950
- intangible assets	107,994	-
Employee benefits:		
- defined contribution plan expenses	3,235,870	2,530,723
Intangible assets written off	667	-
Inventories written off	1,149,374	-
Loss on foreign exchange - realised	8,814,958	-
- unrealised	-	20,533,527
Property, plant and equipment written off	4,006,135	70,347
Rental of premises	7,895,176	7,888,287

19. TAX EXPENSE/(CREDIT)

	2019 RM	2018 RM
Current tax expense:		
- current year	52,332	50,083
- over provision in prior year	-	(4,048)
	52,332	46,035
Deferred tax expense:		
- relating to origination and reversal of temporary differences	11,481,081	(17,541,054)
- over provision in prior year	(2,321,826)	(4,669,528)
	9,159,255	(22,210,582)
Tax expense/(credit)	9,211,587	(22,164,547)

The significant difference between the income tax expense and accounting profit /(loss) multiplied by the applicable tax rate is analysed as follows:

	2019 RM	2018 RM
Profit/(Loss) before tax	47,254,398	(82,405,295)
Taxation at Malaysian statutory tax rate of 24% (2018 – 24%)	11,341,056	(19,777,271)
Effect of expenses not deductible for tax purposes	192,357	(40,168)
Effect of utilisation of previously unrecognised tax losses	-	2,326,468
Over provision of deferred tax expense in prior year	(2,321,826)	(4,669,528)
Over provision of income tax expense in prior year	-	(4,048)
Tax expense/(credit) for the financial year	9,211,587	(22,164,547)

20. CAPITAL COMMITMENT

	2019 RM	2018 RM
Property, plant and equipment:		
- contracted but not provided for in the financial statements	39,156,997	4,529,001

21. RELATED PARTY TRANSACTIONS

Other than those disclosed elsewhere in the financial statements, the significant related party transactions are disclosed below:

	2019 RM	2018 RM
Sales of goods to related companies	693,047,833	828,370,709
Purchases of raw materials from related companies	224,361,854	447,861,430
Loan given to related companies	100,578	-
Loan obtained from immediate holding company	196,942,665	-
Repayment to immediate holding company	-	45,123,828
Key management personnel compensation:		
Directors		
Consultancy fee	6,000	-
Professional fee	7,000	7,000
Short-term employee benefits	546,902	687,429
Defined contribution plan expenses	20,220	47,184
Estimated monetary value of benefit-in-kind	14,300	13,200
	594,422	754,813

The Company has no other members of key management personnel apart from the Board of Directors.

22. FINANCIAL INSTRUMENTS

22.1 Categories of financial instruments

	2019 RM	2018 RM
Financial assets at amortised cost		
Trade and other receivables	87,614,366	27,876,747
Cash and cash equivalents	29,616,430	44,722,014
	117,230,796	72,598,761
Financial liabilities at amortised cost		
Short term borrowings	44,833,729	45,826,894
Trade and other payables	452,861,581	477,257,468
	497,695,310	523,084,362

22.2 Net gains and losses arising from financial instruments

	2019 RM	2018 RM
Net gains/(losses) on:		
Financial assets at amortised cost		
Trade and other receivables	1,025,874	(2,132,427)
Cash and cash equivalents	13,277	30,925
Financial liabilities at amortised cost		
Short term borrowings	(818,832)	(5,749,896)
Trade and other payables	13,255,733	(15,047,335)
	13,476,052	(22,898,733)

23. COMPARATIVE FIGURES

The following comparatives have been reclassified to conform with the current financial year's presentation:

	As restated RM	As previously stated RM
Cash flow statement		
INVESTING ACTIVITIES		
Increase in restricted cash	(5,206,020)	-
Net cash used in investing activities	(8,633,543)	(3,427,523)
NET INCREASE IN CASH AND CASH EQUIVALENTS	24,355,581	29,561,601
CASH AND CASH EQUIVALENTS AT END OF THE YEAR	39,515,994	44,722,014

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UserID	: cheembun(PG)
Transaction Date/Time	: 06/07/2020 10:27:51
Lodging Reference No	: RO2S0072020087A4
Entity No	: 201401045979(1122165-U)
Document(s) Lodged:	JA SOLAR MALAYSIA SDN. BHD.

SNO	Form Type	Doc Date	Event Date	Received Date
1	557	31/12/2019	30/06/2020	06/07/2020

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201401045979(1122165-U), APP-CIU-FINANCIAL STATEMENT CA 2016 (PRIVATE LIMITED)	50.00
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JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

REPORTS AND FINANCIAL STATEMENTS
FOR THE FINANCIAL YEAR ENDED
31 DECEMBER 2019

These Financial Statements and reports of the Company with ~~Qualified~~/Unqualified Auditors' Report for the financial year/~~period~~ ended 31 December 2019 were ~~tabled at the Annual General Meeting held~~/circulated on 30 June 2020

~~Director~~/Secretary
ONG TZE-EN
(MAICSA 7026537)
SSM PC No. 202008003397

LT Lim & Associates PLT

JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

CORPORATE INFORMATION

DIRECTORS	Huang, Xinming Tao, Ran Yan, Jingcun Ong Ken Yong Ong Tze En (f)
COMPANY SECRETARY	Ong Tze En (f) (MAICSA 7026537)
AUDITORS	LT Lim & Associates PLT *(formerly known as LT Lim Associates PLT)* (202006000005 (LLP0022786-LCA) & AF1466) Suite 2, DirectBiz Avenue No. 38B-2, Jalan Radin Anum Bandar Baru Seri Petaling 57000 Kuala Lumpur
REGISTERED OFFICE	170-09-01, Livingston Tower Jalan Argyll 10050 George Town Pulau Pinang
PRINCIPAL PLACE OF BUSINESS	Lot 17001, Medan Bayan Lepas Bayan Lepas Industrial Park (Phase 4) Mukim 12 D.B.D. 11900 Penang
IMMEDIATE HOLDING COMPANY	JA Solar Investment (Hong Kong) Limited
ULTIMATE HOLDING COMPANY	Ningjin County Jing Tai Fu Technology Co., Ltd.
PRINCIPAL BANKERS	Bank of China (Malaysia) Berhad Malayan Banking Berhad

JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

DIRECTORS' REPORT
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

The directors hereby submit their report and the audited financial statements of the Company for the financial year ended 31 December 2019.

PRINCIPAL ACTIVITY

The principal activity of the Company is manufacture of photovoltaic solar cells.

RESULTS

	RM
Net profit for the financial year	38,042,811

DIVIDEND

No dividends have been paid or declared since the end of the previous financial year. The directors do not recommend that a dividend to be paid in respect of the current financial year.

RESERVES AND PROVISIONS

There were no material transfers to or from reserves or provisions except as disclosed in the financial statements.

DIRECTORS

The names of the directors of the Company in office since the beginning of the financial year to the date of this report are:

Ong Ken Yong	
Ong Tze En (f)	
Huang, Xinming	
Tao, Ran	(Appointed on 1 April 2019)
Yan, Jingcun	(Appointed on 17 September 2019)
Zhou Yong	(Resigned on 17 September 2019)
Cao, Bo	(Resigned on 31 March 2019)

DIRECTORS' BENEFITS

During and at the end of the financial year, no arrangements subsisted to which the Company is a party, with the object or objects of enabling directors of the Company to acquire benefits by means of the acquisition of shares in, or debentures of, the Company or any other body corporate.

Since the end of the previous financial year, no director has received or become entitled to receive a benefit (other than a benefit included in the aggregate amount of remunerations received or due and receivable by the directors as shown in the financial statements) by reason of a contract made by the Company or a related corporation with the director or with a firm of which the director is a member, or with a company in which the director has a substantial financial interest, other than a professional fee paid to a firm in which a director is a partner and a consultancy fee paid to a director as disclosed in Note 21 to the financial statements.

DIRECTORS' INTEREST

According to the Register of Directors' Shareholdings under Section 59 of the Companies Act 2016, none of the directors in office at the end of the financial year had any interest in shares in the Company or its related corporations during or at the end of the financial year.

DIRECTORS' REMUNERATION

Details of directors' remuneration are set out in Note 21 to the financial statements.

INDEMNIFYING DIRECTORS, OFFICERS OR AUDITORS

No indemnities have been given or insurance premiums paid, during or since the end of the financial year, for any person who is or has been the director, officer or auditor of the Company.

ISSUE OF SHARES AND DEBENTURES

There were neither changes in the issued and paid-up capital of the Company, nor issuances of debentures by the Company, during the financial year.

SHARE OPTIONS

No options have been granted by the Company to any parties during the financial year to take up unissued shares of the Company.

No shares have been issued during the financial year by virtue of the exercise of any option to take up unissued shares of the Company. As of the end of the financial year, there were no unissued shares of the Company under options.

OTHER STATUTORY INFORMATION

Before the financial statements of the Company were prepared, the directors took reasonable steps:

(a) to ascertain that proper action has been taken in relation to the writing-off of bad debts and the making of allowance for doubtful debts, and have satisfied themselves that all known bad debts had been written-off and that adequate allowance had been made for doubtful debts; and

(b) to ensure that any current assets which were unlikely to be realised at their book values in the ordinary course of business have been written down to their estimated realisable values.

As of the date of this report, the directors are not aware of any circumstances:

(a) which would render the amount written off for bad debts or the amount of the allowance for doubtful debts inadequate to any substantial extent in the financial statements of the Company; or

(b) which would render the value attributed to current assets in the financial statements of the Company misleading; or

(c) which have arisen which render adherence to the existing method of valuation of assets or liabilities of the Company misleading or inappropriate; or

(d) not otherwise dealt with in this report or financial statements which would render any amount stated in the financial statements of the Company misleading.

As of the date of this report, there does not exist:

(a) any charge on the assets of the Company which has arisen since the end of the financial year and secures the liability of any other person; or

(b) any contingent liability of the Company which has arisen since the end of the financial year.

No contingent or other liability has become enforceable, or is likely to become enforceable, within the period of twelve months after the end of the financial year which, in the opinion of the directors, will or may substantially affect the ability of the Company to meet its obligations as and when they fall due.

OTHER STATUTORY INFORMATION – continued

In the opinion of the directors:

(a) the results of the operations of the Company during the financial year were not substantially affected by any item, transaction or event of a material and unusual nature.

(b) no item, transaction or event of a material and unusual nature has arisen in the interval between the end of the financial year and the date of this report which is likely to affect substantially the results of operations of the Company for the financial year in which this report is made.

IMMEDIATE AND ULTIMATE HOLDING COMPANIES

The directors regard JA Solar Investment (Hong Kong) Limited and Ningjin County Jing Tai Fu Technology Co., Ltd., incorporated in Hong Kong and the People's Republic of China, as the immediate and ultimate holding companies respectively.

AUDITORS AND AUDITORS' REMUNERATION

The auditors, LT Lim & Associates PLT have expressed their willingness to continue in office.

LT Lim & Associates PLT was registered on 2 January 2020 and with effect from that date, LT Lim & Associates, a conventional partnership was converted to a limited liability partnership.

Details of auditors' remuneration are set out in Note 18 to the financial statements.

Signed on behalf of the Board of Directors in accordance with a resolution of the directors.

YAN, JINGCUN	HUANG, XINMING
Director	Director

Kuala Lumpur
3 March 2020

JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

STATEMENT BY DIRECTORS PURSUANT TO SECTION 251(2) OF THE COMPANIES ACT 2016

In the opinion of the directors, the financial statements set out on pages 12 to 38, are drawn up in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia so as to give a true and fair view of the financial position of the Company as of 31 December 2019 and of its financial performance and cash flows for the financial year then ended.

Signed on behalf of the Board of Directors in accordance with a resolution of the directors.

....
YAN, JINGCUN
Director

....
HUANG, XINMING
Director

Kuala Lumpur
3 March 2020

JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

STATUTORY DECLARATION PURSUANT TO SECTION 251(1)(b) OF THE COMPANIES ACT 2016

I, YAN, JINGCUN, being the director primarily responsible for the financial management of JA SOLAR MALAYSIA SDN. BHD., do solemnly and sincerely declare that the financial statements set out on pages 12 to 38 are, to the best of my knowledge and belief, correct and I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the Statutory Declarations Act, 1960.

Subscribed and solemnly declared by the
abovenamed YAN, JINGCUN at
KUALA LUMPUR in FEDERAL TERRITORY
on 3 March 2020

BEFORE ME:

PESURUHJAYA SUMPAH
W748
SABRINA BINTI
SYD MOHAMMED
SEBIR
[illegible]2018-31/12/2020
MALAYSIA
No. 25-1, Tingkat 1,
Jalan Radin Bagus, Sri Petaling
57000 Kuala Lumpur

INDEPENDENT AUDITORS' REPORT
TO THE MEMBERS OF JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

Report on the Audit of the Financial Statements

Opinion

We have audited the financial statements of JA SOLAR MALAYSIA SDN. BHD., which comprise the statement of financial position as at 31 December 2019, and the statement of comprehensive income, statement of changes in equity and statement of cash flows for the financial year then ended, and notes to the financial statements, including a summary of significant accounting policies, as set out on pages 12 to 38.

In our opinion, the accompanying financial statements give a true and fair view of the financial position of the Company as at 31 December 2019, and of its financial performance and its cash flows for the financial year then ended in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia.

Basis for Opinion

We conducted our audit in accordance with approved standards on auditing in Malaysia and International Standards on Auditing. Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Financial Statements section of our report. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Independence and Other Ethical Responsibilities

We are independent of the Company in accordance with the By-Laws (on Professional Ethics, Conduct and Practice) of the Malaysian Institute of Accountants ("By-Laws") and the International Ethics Standards Board for Accountants' Code of Ethics for Professional Accountants ("IESBA Code"), and we have fulfilled our other ethical responsibilities in accordance with the By-Laws and the IESBA Code.

Information Other than the Financial Statements and Auditors' Report Thereon

The directors of the Company are responsible for the other information. The other information comprises the Directors' Report but does not include the financial statements of the Company and our auditors' report thereon.

Our opinion on the financial statements of the Company does not cover the Directors' Report and we do not express any form of assurance conclusion thereon.

Company No. 1122165-U

Information Other than the Financial Statements and Auditors' Report Thereon – continued

In connection with our audit of the financial statements of the Company, our responsibility is to read the Directors' Report and, in doing so, consider whether the Directors' Report is materially inconsistent with the financial statements of the Company or our knowledge obtained in the audit or otherwise appears to be materially misstated.

If, based on the work we have performed, we conclude that there is a material misstatement of the Directors' Report, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of the Directors for the Financial Statements

The directors of the Company are responsible for the preparation of financial statements of the Company that give a true and fair view in accordance with Malaysian Private Entities Reporting Standard and the requirements of the Companies Act 2016 in Malaysia. The directors are also responsible for such internal control as the directors determine is necessary to enable the preparation of financial statements of the Company that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements of the Company, the directors are responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the Company or to cease operations, or have no realistic alternative but to do so.

Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements of the Company as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with approved standards on auditing in Malaysia and International Standards on Auditing will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

Company No. 1122165-U

Auditors' Responsibilities for the Audit of the Financial Statements – continued

As part of an audit in accordance with approved standards on auditing in Malaysia and International Standards on Auditing, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements of the Company, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the directors.

- Conclude on the appropriateness of the directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the financial statements of the Company or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditors' report. However, future events or conditions may cause the Company to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements of the Company, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Suite 2, DirectBiz Avenue Tel : (603) 9057 2811
No. 38B-2, Jalan Radin Anum, Bandar Baru Seri Petaling, 57000 Kuala Lumpur Fax : (603) 9057 3811

Company No. 1122165-U

Other Matters

This report is made solely to the members of the Company, as a body, in accordance with Section 266 of the Companies Act 2016 in Malaysia and for no other purpose. We do not assume responsibility to any other person for the content of this report.

LT LIM & ASSOCIATES PLT
202006000005 (LLP0022786-LCA) & AF1466
Chartered Accountants

HAN MENG CHEW
03426/03/2021 J
Chartered Accountant

Kuala Lumpur
Date: 3 March 2020

JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

STATEMENT OF FINANCIAL POSITION
AS AT 31 DECEMBER 2019

	Note	2019 RM	2018 RM
NON-CURRENT ASSETS			
Property, plant and equipment	5	394,680,908	439,606,159
Intangible assets	6	299,512	-
Deferred tax assets	7	-	2,708,850
		394,980,420	442,315,009
CURRENT ASSETS			
Inventories	8	83,067,037	58,477,358
Trade and other receivables	9	91,143,589	34,052,635
Cash and cash equivalents	10	29,616,430	44,722,014
		203,827,056	137,252,007
TOTAL ASSETS		598,807,476	579,567,016
EQUITY			
Share capital	11	100,000,000	100,000,000
Accumulated losses		(6,317,377)	(44,360,188)
		93,682,623	55,639,812
NON-CURRENT LIABILITIES			
Deferred tax liabilities	7	6,450,405	-
		6,450,405	-
CURRENT LIABILITIES			
Short term borrowings	12	44,833,729	45,826,894
Trade and other payables	13	453,838,387	478,086,329
Current tax liabilities		2,332	13,981
		498,674,448	523,927,204
TOTAL LIABILITIES		505,124,853	523,927,204
TOTAL EQUITY AND LIABILITIES		598,807,476	579,567,016

The notes on pages 18 to 38 are an integral part of these financial statements.

JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

STATEMENT OF COMPREHENSIVE INCOME FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

	Note	2019 RM	2018 RM
Revenue	14	727,341,094	829,248,025
Cost of sales	15	(665,236,868)	(879,934,943)
Gross profit/(loss)		62,104,226	(50,686,918)
Other operating income	16	16,059,046	11,372,698
Selling and distribution expenses		(4,455,461)	(8,641,144)
Administrative expenses		(24,873,683)	(31,876,047)
Operating profit/(loss)		48,834,128	(79,831,411)
Finance costs	17	(1,579,730)	(2,573,884)
Profit/(Loss) before tax	18	47,254,398	(82,405,295)
Tax (expense)/credit	19	(9,211,587)	22,164,547
Net profit/(loss), representing total comprehensive income/(loss) for the financial year		38,042,811	(60,240,748)

The notes on pages 18 to 38 are an integral part of these financial statements.

JA SOLAR MALAYSIA SDN. BHD.
(Company No. 1122165-U)
(Incorporated in Malaysia)

STATEMENT OF CHANGES IN EQUITY
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

	Share capital RM	Accumulated losses RM	Total equity RM
At 1 January 2019	100,000,000	(44,360,188)	55,639,812
Total comprehensive income for the financial year	-	38,042,811	38,042,811
At 31 December 2019	100,000,000	(6,317,377)	93,682,623
At 1 January 2018	50,000,000	15,880,560	65,880,560
Issuance of ordinary shares	50,000,000	-	50,000,000
Total comprehensive loss for the financial year	-	(60,240,748)	(60,240,748)
At 31 December 2018	100,000,000	(44,360,188)	55,639,812

The notes on pages 18 to 38 are an integral part of these financial statements.

STATEMENT OF CASH FLOWS
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019

	Note	2019 RM	2018 RM
OPERATING ACTIVITIES			
Profit/(Loss) before tax		47,254,398	(82,405,295)
Adjustment for:			
Allowance for write down of inventories to net realisable value		-	3,099,635
Amortisation and depreciation:			
- property, plant and equipment		90,030,938	89,799,950
- intangible assets		107,994	-
(Gain)/Loss on foreign exchange - unrealised		(14,837,731)	20,533,527
Intangible assets written off		667	-
Interest income		(218,052)	(208,678)
Interest expense		1,579,730	2,573,884
Inventories written off		1,149,374	-
Property, plant and equipment written off		4,006,135	70,347
Operating profit before working capital changes		129,073,453	33,463,370
Changes in working capital:			
Inventories		(25,739,053)	39,730,020
Receivables		5,092,790	1,002,029
Payables		(32,996,222)	(57,383,267)
Intercompany balances		(235,215,373)	68,466,381
Cash (used in)/generated from operations		(159,784,405)	85,278,533
Income tax paid		(68,083)	(32,000)
Income tax refunded		4,102	-
Interest received		218,052	208,678
Interest paid		(1,579,730)	(2,573,884)
Net cash (used in)/generated from operating activities		(161,210,064)	82,881,327
INVESTING ACTIVITIES			
Placement of short-term deposit more than three months		(12,516,402)	-
Purchase of property, plant and equipment		(50,300,566)	(7,298,011)
Increase in restricted cash		-	(5,206,020)
Withdrawal of fixed deposit previously pledged with a licensed bank		-	3,870,488
Net cash used in investing activities		(62,816,968)	(8,633,543)

The notes on pages 18 to 38 are an integral part of these financial statements.

STATEMENT OF CASH FLOWS
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019
(continued)

	Note	2019 RM	2018 RM
FINANCING ACTIVITIES			
Repayment of revolving credit		-	(2,333,599)
Repayment of onshore foreign currency loan		(232,266)	(52,434,776)
Proceeds from issuance of ordinary shares		-	50,000,000
Loan given to a related company		(100,578)	-
Loan obtained from immediate holding company		196,942,665	-
Repayment to immediate holding company		-	(45,123,828)
Net cash generated from/(used in) financing activities		196,609,821	(49,892,203)
NET (DECREASE)/INCREASE IN CASH AND CASH EQUIVALENTS		(27,417,211)	24,355,581
EXCHANGE DIFFERENCE IN TRANSLATION		62,774	(177,753)
CASH AND CASH EQUIVALENTS AT BEGINNING OF THE YEAR	(i)	39,515,994	15,338,166
CASH AND CASH EQUIVALENTS AT END OF THE YEAR	(i)	12,161,557	39,515,994

The notes on pages 18 to 38 are an integral part of these financial statements.

STATEMENT OF CASH FLOWS
FOR THE FINANCIAL YEAR ENDED 31 DECEMBER 2019
(continued)

(i) *Cash and Cash Equivalents*

Cash and cash equivalents included in the statement of cash flows comprise the following statement of financial position amounts:

	2019 RM	2018 RM
Cash and bank balances	17,295,343	44,722,014
Fixed deposits with a licensed bank	12,321,087	-
	29,616,430	44,722,014
Less: Bank balance restricted for usage	(5,133,786)	(5,206,020)
Short-term deposit more than three month	(12,321,087)	-
	12,161,557	39,515,994

The notes on pages 18 to 38 are an integral part of these financial statements.

NOTES TO THE FINANCIAL STATEMENTS – 31 DECEMBER 2019

1. GENERAL INFORMATION

JA Solar Malaysia Sdn. Bhd. is a private limited liability company, incorporated and domiciled in Malaysia. The addresses of the Company's registered office and principal place of business are set out in page 1.

The Company is principally engaged in manufacture of photovoltaic solar cells. There has been no significant change in the principal activity during the financial year under review.

The immediate and ultimate holding companies are JA Solar Investment (Hong Kong) Limited and Ningjin County Jing Tai Fu Technology Co., Ltd. incorporated in Hong Kong and the People's Republic of China respectively.

The financial statements are presented in Ringgit Malaysia ("RM"), which is also the functional currency of the Company.

These financial statements were authorised for issue by the Board of Directors on 3 March 2020.

2. BASIS OF PREPARATION

The financial statements have been prepared in accordance with Malaysian Private Entities Reporting Standard ("MPERS") issued by the Malaysian Accounting Standards Board ("MASB") and the requirements of the Companies Act 2016 in Malaysia.

The financial statements have been prepared using historical cost basis, unless otherwise stated in the significant accounting policies set out in Note 3 to the financial statements.

3. SIGNIFICANT ACCOUNTING POLICIES

The accounting policies set out below have been applied consistently to the periods presented in these financial statements, unless otherwise stated.

3.1 Property, Plant and Equipment

Property, plant and equipment are stated at cost, less accumulated depreciation and accumulated impairment losses.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.1 Property, Plant and Equipment – continued

The cost of an item of property, plant and equipment comprises (i) purchase price; (ii) any costs directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended by management; and (iii) the initial estimate of the costs of dismantling and removing the item and restoring the site on which the asset is located.

Construction work in progress is not depreciated until the asset is fully completed and ready for its intended use.

All other items of property, plant and equipment are depreciated by allocating the depreciable amounts of assets less their residual values over their estimated useful lives, using straight-line method. The annual depreciation rates used for the depreciation are as follows:

Leasehold improvements	6 to 9 years
Plant, machinery and factory equipment	5 to 7 years
Furniture, fittings and office equipment	5 to 10 years
Motor vehicles	5 to 7 years

The assets' residual values, useful lives and depreciation methods are reviewed, and adjusted prospectively if appropriate, if there is an indication of a significant change since the last reporting date.

Gains and losses on disposals are determined by comparing proceeds with carrying amount of the assets, and are recognised in the profit or loss.

Where an indication of impairment exists, the carrying value of the asset is assessed and written down immediately to its recoverable amount.

Expenditure on property, plant and equipment is included in the carrying amount of the asset when it is probable that future economic benefits in excess of the originally assessed standard of performance of the existing asset will flow to the Company. Repairs and maintenance are charged to the profit or loss during the financial year in which they are incurred.

3.2 Intangible Assets

Acquired intangible assets are recognised initially at cost. Subsequently, intangible assets are measured at cost less accumulated amortisation and any accumulated impairment losses.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.2 Intangible Assets – continued

Intangible assets are amortised by allocating the depreciable amounts of assets over their estimated useful lives, using straight-line method. The annual amortisation rate used for the amortisation is as follows:

Computer software	5 to 10 years

3.3 Impairment of Non-Financial Assets

The carrying amounts of non-financial assets (i.e. property, plant and equipment and intangible asset) are reviewed at the end of each reporting period to determine whether there is any indication of impairment. If any such indication exists, then the asset's recoverable amount is estimated.

For the purpose of impairment testing, assets are grouped together into the smallest group of assets that generates cash inflows from continuing use that are largely independent of cash inflows of other assets or cash-generating units ("CGU").

The recoverable amount of an asset of CGU is the greater of its value in use and its fair value less costs of disposal. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset or CGU.

An impairment loss id recognised in profit or loss if the carrying amount of an asset or its related CGU exceeds its estimated recoverable amount.

Impairment losses recognised in prior periods are assessed at the end of each reporting period for any indications that the loss has decreased or no longer exists. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortisation, if no impairment loss had been recognised. Reversals of impairment losses are credited to profit or loss in the financial year in which the reversals are recognised.

3.4 Inventories

Inventories are measured at the lower of cost and net realisable value (which is the estimated selling price less costs to complete and sell). Cost is determined using the weighted average cost method and comprises purchase price and directly attributable costs of bringing the inventories to their present location and condition. For manufactured goods, cost includes conversion costs of labour and variable and fixed production overheads. Net realisable value is determined on an item-by-item basis or on group of similar item basis.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.5 Financial Instruments

A financial instrument is a contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity.

(a) Initial recognition and measurement

A financial asset or a financial liability (including derivative instruments) is recognised only when the entity becomes a party to the contractual provisions of the instrument.

On initial recognition, a financial asset or a financial liability is measured at the transaction price, including transaction costs. For a financial asset or a financial liability that is subsequently measured at fair value through profit or loss, transaction costs are expensed to profit or loss when incurred.

An arrangement constitutes a financing transaction, if payment is deferred beyond normal business terms. Under a financing transaction, a financial asset or a financial liability is measured at the present value of the future payments discounted at a market rate of interest for a similar debt instrument as determined at initial recognition.

(b) Subsequent measurement

Debt instruments are measured at amortised cost using the effective interest method. Debt instruments that are classified as current assets or current liabilities are measured at the undiscounted amount of the cash or other consideration expected to be paid or received, unless the arrangement constitutes, in effect, a financing transaction.

Investments in non-convertible preference shares and non-puttable ordinary or preference shares, that are publicly traded or their fair value can otherwise be measured reliably without undue cost or effort, are measured at fair value with changes in fair value recognised in profit or loss. All other such investments are measured at cost less impairment.

Derivative financial instruments (other than derivatives designated as a hedging instrument) are measured at fair value and changes in fair value recognised in profit or loss.

All financial assets are subject to review for impairment, except for financial assets measured at fair value through profit or loss.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.5 Financial Instruments – continued

(c) Impairment

At the end of each reporting period, financial assets that are measured at cost or amortised cost are assessed as to whether there is objective evidence of impairment. If there is objective evidence of impairment, an impairment loss is recognised in profit or loss immediately.

For a financial asset measured at amortised cost, the impairment loss is the difference between the asset's carrying amount and the present value of estimated cash flows discounted at the asset's original effective interest rate. If such a financial asset has a variable interest rate, the discount rate for measuring any impairment loss is the current effective interest rate determined under the contract.

For a financial asset measured at cost less impairment, the impairment loss is the difference between the asset's carrying amount and the best estimate of the amount that would be receive for the asset if it were to be sold at the reporting date.

If, in a subsequent period, the amount of an impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, the previously recognised impairment loss is reversed in profit or loss.

(d) Derecognition

A financial asset is derecognised only when (i) the contractual rights to receive the cash flows from the financial asset expire or are settled; or (ii) the entity transfers to another party substantially all of the risks and rewards of ownership of the financial asset, including circumstances when the entity acts only as a collecting agent of the transferee, and retains no significant risks and rewards of ownership of the financial asset or no continuing involvement in the control of the financial asset transferred.

A financial liability is derecognised only when it is extinguished, i.e. when the obligation specified in the contract is discharged, is cancelled or expired. A substantial modification of the terms of an existing financial liability is accounted for as an extinguishment of the original financial liability and the recognition of a new financial liability.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.6 Cash and Cash Equivalents

Cash and cash equivalents consist of cash on hand, balances and deposits with banks and highly liquid investments which have an insignificant risk of changes in fair value with original maturities of three months or less, and are used by the Company in the management of their short-term commitments. For the purpose of the statement of cash flows, cash and cash equivalents are presented net of pledged deposits.

3.7 Share Capital

An equity instrument is any contract that evidences a residual interest in the assets of the Company after deducting all of its liabilities. Ordinary shares are equity instruments.

Ordinary shares are recorded at the proceeds received, net of directly attributable incremental transaction costs. Ordinary shares are classified as equity. Dividends on ordinary shares are recognised in equity in the period in which they are declared.

3.8 Leases

A lease is classified as a finance lease, if it transfers substantially all the risks and rewards incidental to ownership. All other leases that do not meet this criterion are classified as operating leases.

Finance lease – Lessee

At the commencement of the lease term, the rights of use and obligations under finance leases are recognised as assets and liabilities at amounts equal to the fair value of the leased asset or, if lower, the present value of the minimum lease payments, determined at the inception of the lease. Subsequently, the minimum lease payments are apportioned between the finance charge and the reduction of the outstanding liability using the effective interest method. Contingent rents are charged as expenses in the periods in which they are incurred.

Operating lease – Lessee

Lease payments under operating leases are recognised as an expense over the lease term on a straight-line basis, unless another systematic basis is more representative of the time pattern of the user's benefit.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.9 Revenue and Other Income

Revenue is measured at the fair value of the consideration received or receivable, net of any discounts, rebates, returns and taxes collected on behalf of government.

Revenue from the sale of goods is recognised when (i) significant risks and rewards of ownership of the goods are transferred to the buyer; (ii) the seller retains neither continuing managerial involvement to the degree usually associated with ownership nor effective control over the goods sold; (iii) the amount of revenue can be measured reliably; (iv) it is probable on the inflow of economic benefits that are associated with the transaction; and (v) the costs incurred or to be incurred in respect of the transaction can be measured reliably.

Interest income is recognised in the statement of comprehensive income as it accrues, taking into account the effective yield on the asset.

3.10 Employee Benefits

The cost of all employee benefits to which the employees have become entitled as a result of service rendered to the entity during the reporting period is recognised as an expense in profit or loss, other than the cost to be recognised as part of the cost of an asset.

Short-term employee benefits (including wages, salaries, social security contributions, short-term compensated absences, bonuses, non-monetary benefits, etc.) are measured at the undiscounted amount of benefits expected to be paid in exchange for the services rendered by employees.

The contribution payable to an approved fund for a period in accordance with the terms of the plan (i.e. a defined contribution plan) is recognised as an expense in profit or loss, other than the cost to be recognised as part of the cost of an asset. When the fixed contributions have been paid, the entity has no further contribution obligations.

Termination benefits are recognised as a liability and an expense only when the entity is demonstrably committed either: (i) to terminate the employment of an employee or group of employees before the normal retirement date; or (ii) to provide termination benefits as a result of an offer made in order to encourage voluntary redundancy. Termination benefits are measured at the best estimate of the expenditure that would be required to settle the obligation at the reporting date. When termination benefits are due more than twelve months after the end of the reporting period, they are measured at their discounted present value.

3.11 Borrowing Costs

All borrowing costs are recognised as an expense in profit or loss in the period in which they are incurred by using the effective interest method.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.12 Income Taxes

Current tax liability is recognised for tax payable on taxable profit for the current and past periods. If the amount paid for the current and past periods exceeds the amount payable for those periods, the excess is recognised as a current tax asset. Current tax liability or asset is measured at the amount it expects to pay or recover using the tax rates and laws that have been enacted or substantively enacted by the reporting date.

Deferred tax liability is recognised for all taxable temporary differences, except to the extent that the deferred tax liability arises from: (i) the initial recognition of goodwill; or (ii) the initial recognition of an asset or a liability in a transaction that is not a business combination, and at the time of the transaction, affects neither accounting profit nor taxable profit or tax loss.

Deferred tax asset is recognised for all deductible temporary differences to the extent that it is probable that taxable profit will be available against which the deductible temporary difference can be utilised, unless the deferred tax asset arises from the initial recognition of an asset or a liability in a transaction that is not a business combination, and at the time of the transaction, affects neither accounting profit nor taxable profit or tax loss.

A deferred tax liability or asset is measured using the tax rates and tax laws that have been enacted or substantively enacted by the reporting date. The measurement of deferred tax liabilities and deferred tax assets reflects the tax consequences that would follow from the manner in which, at the reporting date, the carrying amount of the related assets and liabilities is expected to be recovered or settled.

Current or deferred tax assets and liabilities are not discounted.

3.13 Foreign Currency

Functional currency is the currency of the primary economic environment in which the entity operates.

A foreign currency transaction is recorded, on initial recognition in the functional currency, by applying to the foreign currency amount the spot exchange rate between the functional currency and the foreign currency at the date of the transaction.

At the end of each reporting period: (i) foreign currency monetary items are translated using the closing rate; (ii) non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rate at the date of the transaction; and (iii) non-monetary items that are measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was determined.

3. SIGNIFICANT ACCOUNTING POLICIES – continued

3.13 Foreign Currency – continued

Exchange differences arising on the settlement of monetary items or on translating monetary items are recognised in profit or loss in the period in which they arise.

4. KEY SOURCES OF ESTIMATION UNCERTAINTY AND JUDGEMENTS

The preparation of the financial statements in conformity with MPERS requires management to make judgements, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimates are revised and in any future periods affected.

There are no significant areas of estimation uncertainty and critical judgements in applying accounting policies that have significant effect on the amounts recognised in the financial statements other than as follows:

i) Useful lives of property, plant and equipment and intangible assets

The Company determines the estimated useful lives of its property, plant and equipment and intangible assets for calculation depreciation. This estimate is determined after considering the expected usage of the asset or physical wear and tear. Management reviews the residual value and useful lives annually and the future depreciation or amortisation charge would be adjusted where management believes that the useful lives differ from current estimates.

ii) Impairment of non-financial assets

When the recoverable amount of an asset is determined based on the estimate of the value-in-use of the cash-generating unit to which the asset is allocated, the management is required to make an estimate of the expected future cash flows from the cash-generating unit and also to apply a suitable discount rate in order to determine the present value of those cash flows.

iii) Write-down of inventories

Reviews are made periodically by management on damaged, obsolete and slow-moving inventories. These reviews require judgement and estimates. Possible changes in these estimates could result in revisions to the valuation of inventories.

4. KEY SOURCES OF ESTIMATION UNCERTAINTY AND JUDGEMENTS – continued

iv) Impairment of trade and other receivables

An impairment is recognised when there is objective evidence that a financial asset is impaired. Management specially reviews its loans and receivables financial assets and analyses historical bad debts, customer concentrations, customer creditworthiness, current economic trends and changes in the customer payment terms when making a judgement to evaluate the adequacy of the allowance for impairment losses. Where there is objective evidence of impairment, the amount and timing of future cash flows are estimated based on historical loss experience for assets with similar credit risk characteristics. If the expectation is different from the estimation, such difference will impact the carrying value of receivables.

v) Provision for income taxes

Judgement is involved in determining the provision for income taxes. There are certain transactions and computations for which the ultimate tax impact is uncertain during the ordinary course of business. The Company recognises liabilities for expected tax issues based on estimates of whether additional taxes will be due. Where the final tax outcome of such matters is different from the amounts that were initially recognised, the difference will be taken into profit or loss in the period in which such determination is made.

5. PROPERTY, PLANT AND EQUIPMENT

	Short-term leasehold improvement RM	Plant, machinery and factory equipment RM	Furniture fittings and office equipment RM	Motor vehicles RM	Capital work-in-progress RM	Total RM
Cost						
At 1 January 2019	162,226,571	465,940,418	5,726,850	1,045,703	3,980,598	638,920,140
Additions	-	67,220	184,680	-	50,074,791	50,326,691
Adjustments	(429,175)	(351,396)	-	-	-	(780,571)
Transferred to intangible assets (Note 6)	-	-	(679,014)	-	-	(679,014)
Transferred to statement of comprehensive income	-	-	-	-	(26,125)	(26,125)
Reclassification	-	2,677,117	-	-	(2,677,117)	-
Written off	-	(8,900,344)	(75,002)	-	-	(8,975,346)
At 31 December 2019	161,797,396	459,433,015	5,157,514	1,045,703	51,352,147	678,785,775
Accumulated amortisation and depreciation						
At 1 January 2019	46,672,560	149,292,718	2,822,732	525,971	-	199,313,981
Charge for the financial year	21,857,212	66,971,793	1,018,074	183,859	-	90,030,938
Transferred to intangible assets (Note 6)	-	-	(270,841)	-	-	(270,841)
Written off	-	(4,916,930)	(52,281)	-	-	(4,969,211)
At 31 December 2019	68,529,772	211,347,581	3,517,684	709,830	-	284,104,867
Carrying amount						
At 31 December 2019	93,267,624	248,085,434	1,639,830	335,873	51,352,147	394,680,908
At 31 December 2018	115,554,011	316,647,700	2,904,118	519,732	3,980,598	439,606,159

5. PROPERTY, PLANT AND EQUIPMENT – continued

The Company has pledged certain plant and machineries with a carrying amount of RM128,988,739 (2018 – RM137,561,414) to secure banking facilities granted to the Company as disclosed in Note 12.

6. INTANGIBLE ASSETS

	Computer software RM
Cost	
At 1 January 2019	-
Transferred from property, plant and equipment (Note 5)	679,014
Written off	(2,500)
At 31 December 2019	676,514
Accumulated amortisation	
At 1 January 2019	-
Charge for the financial year	107,994
Transferred from property, plant and equipment (Note 5)	270,841
Written off	(1,833)
At 31 December 2019	377,002
Carrying amount	
At 31 December 2019	299,512
At 31 December 2018	-

7. DEFERRED TAX ASSETS/(LIABILITIES)

	2019 RM	2018 RM
Deferred tax assets	-	2,708,850
Deferred tax liabilities	(6,450,405)	-
	(6,450,405)	2,708,850

7. DEFERRED TAX (LIABILITIES)/ASSETS – continued

The details of deferred taxes:

	Property, plant and equipment RM	Unabsorbed capital allowances RM	Unutilised tax losses RM	Net unrealised foreign exchange loss/(gain) RM	Total RM
At 1 January 2019	(36,357,849)	36,320,551	36,549	2,709,599	2,708,850
Recognised in profit or loss	2,431,070	(10,355,737)	2,326,468	(3,561,056)	(9,159,255)
At 31 December 2019	(33,926,779)	25,964,814	2,363,017	(851,457)	(6,450,405)

Deductible temporary differences not recognised (stated at gross):

	2019 RM	2018 RM
Unutilised tax losses	-	9,693,617

8. INVENTORIES

	2019 RM	2018 RM
At cost:		
Raw materials	35,830,562	36,407,339
Work in progress	3,819,071	3,228,368
Finished goods	43,417,404	14,854,581
	83,067,037	54,490,288
At net realisable value:		
Finished goods	-	3,987,070
Total inventories	83,067,037	58,477,358
Recognised in profit or loss:		
Inventories recognised as cost of sales	665,236,868	879,934,943
Impairment loss	-	3,099,635

Included in raw materials and finished goods are goods in transit amounting to RM9,503,916 (2018 – RM8,940,335) and RM12,948,551 (2018 – RMNil) respectively.

9. TRADE AND OTHER RECEIVABLES

	2019 RM	2018 RM
Other receivables, deposits and prepayments	8,554,409	11,277,549
Amount due from related companies	82,589,180	22,775,086
	91,143,589	34,052,635

Included in other receivables, deposits and prepayments is an amount of RM778,206 (2018 – RM647,122) being advance payments to suppliers for purchase of raw materials.

Amount due from related companies

	2019 RM	2018 RM
Trade	82,488,602	22,775,086
Non-trade	100,578	-
	82,589,180	22,775,086

The non-trade amount is unsecured, interest-free and repayable upon demand.

10. CASH AND CASH EQUIVALENTS

	2019 RM	2018 RM
Cash and bank balances	17,295,343	44,722,014
Fixed deposit with a licensed bank	12,321,087	-
	29,616,430	44,722,014

Included in cash and bank balances is an amount of RM5,133,786 (2018 – RM5,206,020) which has been earmarked as security for a trade facility granted by a licensed bank to the Company as disclosed in Note 12.

The fixed deposit is pledged to a licensed bank for a banking facility granted to the Company.

11. SHARE CAPITAL

	2019 Number of ordinary shares	2018 Number of ordinary shares	2019 Amount RM	2018 Amount RM
Issued and fully paid shares classified as equity instruments:				
At 1 January 2019/2018	100,000,000	50,000,000	100,000,000	50,000,000
Issuance of shares	-	50,000,000	-	50,000,000
At 31 December 2019/2018	100,000,000	100,000,000	100,000,000	100,000,000

The holder of ordinary shares is entitled to receive dividends as declared from time to time and are entitled to one (1) vote per share without restrictions at the general meetings of the Company. All ordinary shares rank equally with regard to the Company's residual assets.

12. SHORT TERM BORROWINGS

	2019 RM	2018 RM
Revolving credit	4,107,029	4,164,816
Onshore Foreign Currency Loan	40,726,700	41,662,078
	44,833,729	45,826,894

The above bank facilities bear interest at the following rates:

	2019 %	2018 %
Revolving credit	3.15 - 4.15	2.75 - 4.00
Onshore Foreign Currency Loan	2.75 - 4.01	2.45 - 3.90

The revolving credit facility is denominated in USD and secured by way of an irrevocable standby letter of credit from a financial institution amounting to USD10,000,000. The standby letter of credit is in turn secured by way of a cash deposit pledged by Hefei JA Solar Technology Co. Ltd, a related company of the Company.

12. SHORT TERM BORROWINGS – continued

The onshore foreign currency loan is denominated in USD and secured by the following:

i) an irrevocable standby letter of credit from a financial institution amounting to USD25,000,000. The standby letter of credit is in turn secured by way of a cash deposit pledged by Hefei JA Solar Technology Co. Ltd, a related company of the Company;

ii) restricting the usage of bank balance amounting to USD1,250,000 as disclosed in Note 10; and

iii) a first ranking fixed charge over certain plant and machineries of the Company of not less than USD50,000,000 as disclosed in Note 5.

13. TRADE AND OTHER PAYABLES

	2019 RM	2018 RM
Trade payables	32,851,544	64,323,005
Other payables and accruals	18,096,983	33,657,827
Amount due to related companies	402,889,860	380,105,497
	453,838,387	478,086,329

Included in other payables and accruals in the previous financial year was an amount of RM331,112 being advance payments from customers.

Amount due to related companies

	2019 RM	2018 RM
Trade	43,912,329	218,070,631
Non-trade	358,977,531	162,034,866
	402,889,860	380,105,497

The non-trade amount is unsecured, interest-free and repayable upon demand.

14. REVENUE

Revenue represents the invoiced value of goods sold after allowance for goods returns and trade discounts.

15. COST OF SALES

Cost of sales represents cost of inventories sold.

16. OTHER OPERATING INCOME

	2019 RM	2018 RM
Compensation sum received from a supplier	172,424	-
Gain on foreign exchange - realised	-	9,387,270
- unrealised	14,837,731	-
Income from sales of scrap materials	755,644	863,282
Insurance claim amount received	24,348	543,337
Interest income	218,052	208,678
Others	50,847	370,131
	16,059,046	11,372,698

17. FINANCE COSTS

	2019 RM	2018 RM
Interest on revolving credit	153,409	176,745
Interest on onshore foreign currency loan	1,426,321	2,397,139
	1,579,730	2,573,884

18. PROFIT/(LOSS) BEFORE TAX

Profit/(Loss) before tax is determined after recognising the following expenses:

	2019 RM	2018 RM
Allowance for write down of inventories to net realisable value	-	3,099,635
Audit fee	78,000	78,000
Amortisation and depreciation:		
- property, plant and equipment	90,030,938	89,799,950
- intangible assets	107,994	-
Employee benefits:		
- defined contribution plan expenses	3,235,870	2,530,723
Intangible assets written off	667	-
Inventories written off	1,149,374	-
Loss on foreign exchange - realised	8,814,958	-
- unrealised	-	20,533,527
Property, plant and equipment written off	4,006,135	70,347
Rental of premises	7,895,176	7,888,287

19. TAX EXPENSE/(CREDIT)

	2019 RM	2018 RM
Current tax expense:		
- current year	52,332	50,083
- over provision in prior year	-	(4,048)
	52,332	46,035
Deferred tax expense:		
- relating to origination and reversal of temporary differences	11,481,081	(17,541,054)
- over provision in prior year	(2,321,826)	(4,669,528)
	9,159,255	(22,210,582)
Tax expense/(credit)	9,211,587	(22,164,547)

The significant difference between the income tax expense and accounting profit /(loss) multiplied by the applicable tax rate is analysed as follows:

	2019 RM	2018 RM
Profit/(Loss) before tax	47,254,398	(82,405,295)
Taxation at Malaysian statutory tax rate of 24% (2018 – 24%)	11,341,056	(19,777,271)
Effect of expenses not deductible for tax purposes	192,357	(40,168)
Effect of utilisation of previously unrecognised tax losses	-	2,326,468
Over provision of deferred tax expense in prior year	(2,321,826)	(4,669,528)
Over provision of income tax expense in prior year	-	(4,048)
Tax expense/(credit) for the financial year	9,211,587	(22,164,547)

20. CAPITAL COMMITMENT

	2019 RM	2018 RM
Property, plant and equipment:		
- contracted but not provided for in the financial statements	39,156,997	4,529,001

21. RELATED PARTY TRANSACTIONS

Other than those disclosed elsewhere in the financial statements, the significant related party transactions are disclosed below:

	2019 RM	2018 RM
Sales of goods to related companies	693,047,833	828,370,709
Purchases of raw materials from related companies	224,361,854	447,861,430
Loan given to related companies	100,578	-
Loan obtained from immediate holding company	196,942,665	-
Repayment to immediate holding company	-	45,123,828
Key management personnel compensation:		
Directors		
Consultancy fee	6,000	-
Professional fee	7,000	7,000
Short-term employee benefits	546,902	687,429
Defined contribution plan expenses	20,220	47,184
Estimated monetary value of benefit-in-kind	14,300	13,200
	594,422	754,813

The Company has no other members of key management personnel apart from the Board of Directors.

22. FINANCIAL INSTRUMENTS

22.1 Categories of financial instruments

	2019 RM	2018 RM
Financial assets at amortised cost		
Trade and other receivables	87,614,366	27,876,747
Cash and cash equivalents	29,616,430	44,722,014
	117,230,796	72,598,761
Financial liabilities at amortised cost		
Short term borrowings	44,833,729	45,826,894
Trade and other payables	452,861,581	477,257,468
	497,695,310	523,084,362

22.2 Net gains and losses arising from financial instruments

	2019 RM	2018 RM
Net gains/(losses) on:		
Financial assets at amortised cost		
Trade and other receivables	1,025,874	(2,132,427)
Cash and cash equivalents	13,277	30,925
Financial liabilities at amortised cost		
Short term borrowings	(818,832)	(5,749,896)
Trade and other payables	13,255,733	(15,047,335)
	13,476,052	(22,898,733)

23. COMPARATIVE FIGURES

The following comparatives have been reclassified to conform with the current financial year's presentation:

	As restated RM	As previously stated RM
Cash flow statement		
INVESTING ACTIVITIES		
Increase in restricted cash	(5,206,020)	-
Net cash used in investing activities	(8,633,543)	(3,427,523)
NET INCREASE IN CASH AND CASH EQUIVALENTS	24,355,581	29,561,601
CASH AND CASH EQUIVALENTS AT END OF THE YEAR	39,515,994	44,722,014

EXHIBIT 35

Chinese PV Industry Brief: New solar glass factory in Jiangsu, Longi maintains wafer prices unchanged

Triumph Group is planning to build a $1.71 billion PV glass factory in Suqian City, Jiangsu Province. Longi has maintained unchanged the prices of its wafers for July.

JUNE 25, 2021 VINCENT SHAW AND MAX HALL

HIGHLIGHTS MARKETS MARKETS & POLICY CHINA

Cell production at a Longi Solar facility.

Image: Longi Solar

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Chinese engineering company Triumph Group, a unit of state-owned conglomerate China National Building Materials Group Corporation, has signed an agreement with the government of Suqian City, Jiangsu Province, to build a solar glass factory at the Grand Canal Suqian Port Industrial Park. The company said in a statement it wants to invest RMB 11 million (around $1.71 billion) in the new manufacturing facility and that it expects to begin construction "soon." The Triumph Group is also the controlling shareholder of state-owned manufacturer Luoyang Glass.

The National Development and Reform Commission (NDRC) of China's Shaanxi Province released a new draft regulation for the deployment of PV in 2021. According to the new provisions, all future systems will have to integrate some battery storage to stabilize power injection. The storage system will have to be able to store and provide electricity for at least two hours and will have to feature a 10-year lifecycle with 5,000 charge and discharge cycles.

Monocrystalline module producer Longi has held its wafer prices for July. The price for p-type M6 products, measuring 166/223mm and with a thickness of 175um, is RMB4.89 (US$0.75) per piece and the price for p-type G1 (158.75/223mm and 175um) is RMB4.79 per piece. P-type M10 products, measuring 182/247mm and with a thickness of 175um will cost RMB5.87. All prices remained unchanged from the previous release.

A light-on-detail statement published on the website of the **Africa Solar Industry Association** on Tuesday claimed JinkoSolar will supply 2.6 MW of its panels to SGCC – which **pv magazine** second stage bid to install seven mini grids in towns and villages in Ethiopia under the World Bank-funded Lighting Africa program. The statement said Jinko had supplied 1 MW of products to SGCC for the first stage of the program, with the sites owned by the Ethiopian Power Distribution Company. The statement claimed the first round of sites, which were installed by April, were the “first off-grid PV project in East Africa” and the “first demonstration project of the World Bank’s Lighting Africa program.” However, the Lighting Africa website states the initiative was launched in Kenya in 2009.

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AUTHORS

More articles from Vincent Shaw

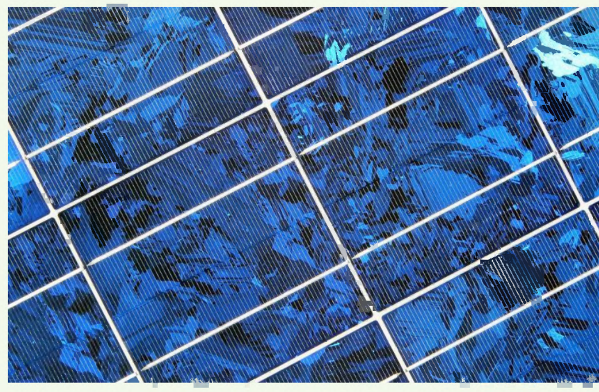
Max worked for **pv magazine** between 2012 and 2015 on a part-time basis and returned to the fold full-time in July 2018. An old-school print journalist, he has also worked in environmental consultancy, education, local government, infrastructure, aerospace, forensic science and sport.

EXHIBIT 36

Solar

Xinte Energy proposes to build 100,000-tonne-per year polysilicon production plant

March 2 (Renewables Now) - Chinese solar products maker Xinte Energy Co Ltd (HKG:1799) said that its board of directors unanimously approved the project to build a 100,000-tonne-per year high-purity polysilicon production plant in Inner Mongolia, northern China.



Solar modules. Author: Marco Bellucci. License: Creative Commons, Attribution 2.0 Generic

Given the amount of money needed for the undertaking -- the total investment is estimated at around CNY 8.799 billion (USD 1.36bn/EUR 1.13bn), tax inclusive, and the capital at CNY 5 billion -- the decision to proceed will be left to the shareholders, Xinte Energy explained.

The polysilicon producer plans to source the money from own funds, external funding, introduction of independent strategic investors, banks loans or finance leases.

With the PV power generation becoming cheaper by the year, the company expects the demand for polysilicon to increase significantly, but adds that the production of this material is highly energy intensive. According to Xinte Energy, electricity expenses currently account for more than 30% of the costs to produce polysilicon.

Estimating that the proposed plant would need over 6 billion kWh per year, the company said that it has opted to build the facility in Tumed Right Banner industrial park in Baotou City of the Inner Mongolia region. This location would allow the plant

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Sladjana has significant experience as a Spain-focused business news reporter and is now diving deeper into the global renewable energy industry. She is the person to seek if you need information about Latin American renewables and the Spanish market.

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EXHIBIT 37

GCL-Poly investing $826m in construction of 60,000 MT polysilicon plant in China

The clean energy company is spending RMB 5.68 billion on the creation of the poly plant, which will comprise 40,000 tonnes of new production capacity and 20,000 tonnes of relocated capacity from the firm's existing facility in Xuzhou.

APRIL 6, 2017 **IAN CLOVER**

MANUFACTURING MODULES & UPSTREAM MANUFACTURING CHINA

The new GCL-Poly 20 GW ingot facility will dramatically boost the company's mono ingot production capacity.

Image: Dave Tacon/Polaris

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China's GCL-Poly is to invest RMB 5.68 billion (US$826 million) in the construction of a 60,000 tonne polysilicon production facility in Xinjiang, China.

The project will comprise 40,000 tonnes of new capacity and 20,000 tonnes of 'relocated' capacity from GCL-Poly's existing production facility in Xuzhou, which will duly be closed once the new Xinjiang facility is up and running.

GCL-Poly will finance one third of the investment with capital from internal resources, with the remainder of the funds coming via debt finance. The company said in a press statement that it is in active discussions with potential investors regarding the project, although thus far no cooperation agreements have been signed.

The first phase of construction – comprising 20,000 tonnes of capacity, is expected to be completed by the second quarter of 2018, with phase two (an additional 20,000 tonnes) penciled for completion by the end of next year.

The final phase, which would include the transfer of 20,000 tonnes production capacity from Xuzhou to Xinjiang, is scheduled to be completed by the end of 2020. Once fully completed, GCL-Poly says that its annual polysilicon production capacity will rise to 115,000 tonnes by 2020.

Lower expected energy and tariff costs in China will also enable GCL-Poly to contribute to the reduction of polysilicon production costs, the company added.

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IAN CLOVER

Ian joined the pv magazine team in 2013 and specializes in power electronics (inverters) and battery storage. Ian also reports on the UK solar market, having worked as a print and web journalist in Britain for various multimedia companies, covering topics ranging from renewable energy and sustainability to real estate, sport and film.

More articles from Ian Clover

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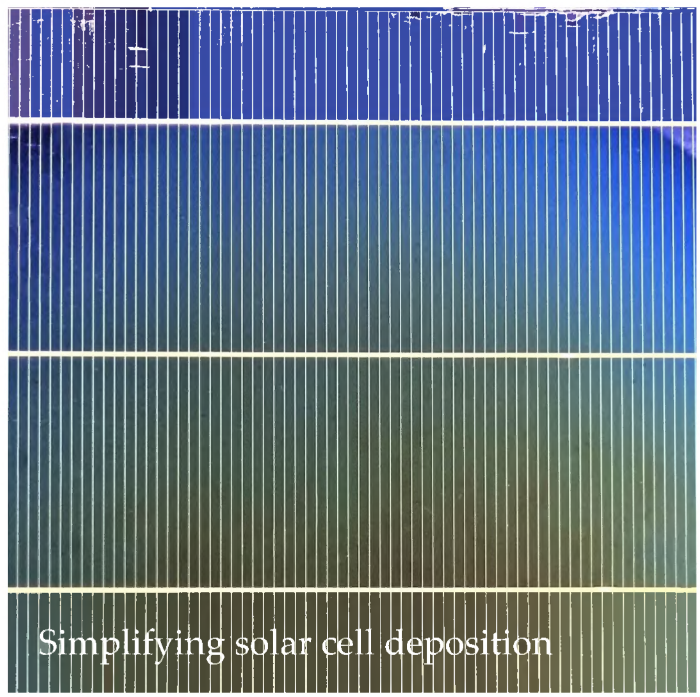

Simplifying solar cell deposition

EXHIBIT 38

WIKIPEDIA

Hemlock Semiconductor Corporation

Hemlock Semiconductor Corporation is the largest producer of polysilicon in the United States. It is owned by Corning Inc. and Shin-Etsu Handotai, founded in 1961, and named after Hemlock, Michigan, the location of its factory. Its current facilities produce some 36,000 tons of polycrystalline silicon, ranking it among the top five producers worldwide.[1]

Polycrystalline silicon, also called polysilicon, is a high purity, polycrystalline form of silicon, used as a raw material by the solar photovoltaic and electronics industry.

Contents

Former Tennessee facility

The company expanded with the Japanese joint venture partners Shin-Etsu Chemical and Mitsubishi Materials, for a new $1.2 billion plant opening near Clarksville, Tennessee. Though it officially opened in 2012, chemicals were never inventoried and no product was made. The plant was under negotiations in 2011 for a further $3 billion expansion, to keep pace with manufacturing competition from China.[2]

In December 2014, Hemlock Semiconductor Corporation announced the permanent closure of the $1.2 billion Tennessee plant, due to adverse conditions from industry oversupply and ongoing challenges from global trade disputes. Many of the approximately fifty employees in Tennessee were offered employment positions in Michigan at the Hemlock Semiconductor or Dow Corning facilities, and the rest received severance packages.[3]

In December 2015, Google announced that they will buy the facility, and invest more than $600 million to turn it into their 15th datacenter.[4]

End Of Dow Corning Joint Venture

Dow Corning announced that June 1, 2016 would be "day one" such that [5] Dow Chemical Company will assume 100% ownership of the Dow Corning Corporation, concluding the 73-year joint venture between Dow Chemical and Corning Inc..

Hemlock Semiconductor continues as an independently run entity with two shareholders: Corning Inc. owns 80.5%, and Shin-Etsu Chemical owns 19.5%.[6]

See also

- Dow Corning Corporation — *joint venture*.
- Corning Inc.
- Dow Chemical Company
- Shin-Etsu Chemical

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EXHIBIT 39

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LONGi investing US$875 million in 2020 production capacity expansion plans

By Mark Osborne (https://www.pv-tech.org/author/markosborne/)

April 17, 2019

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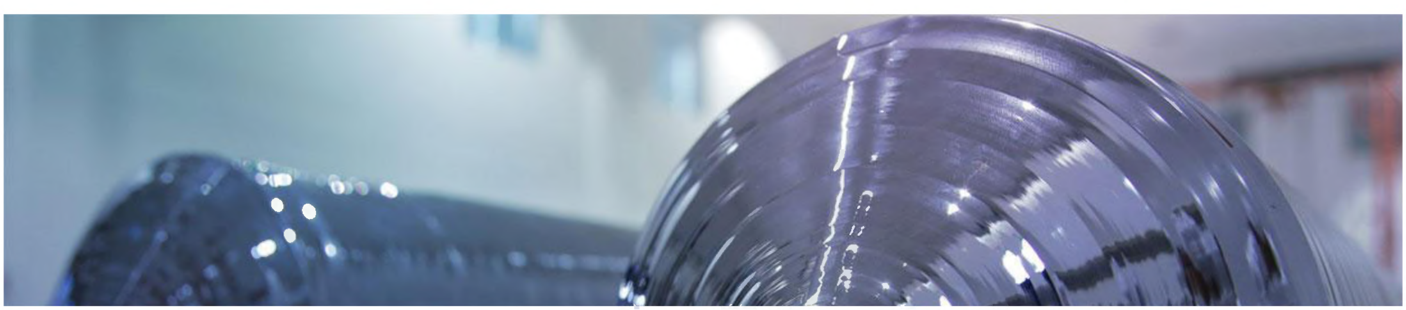
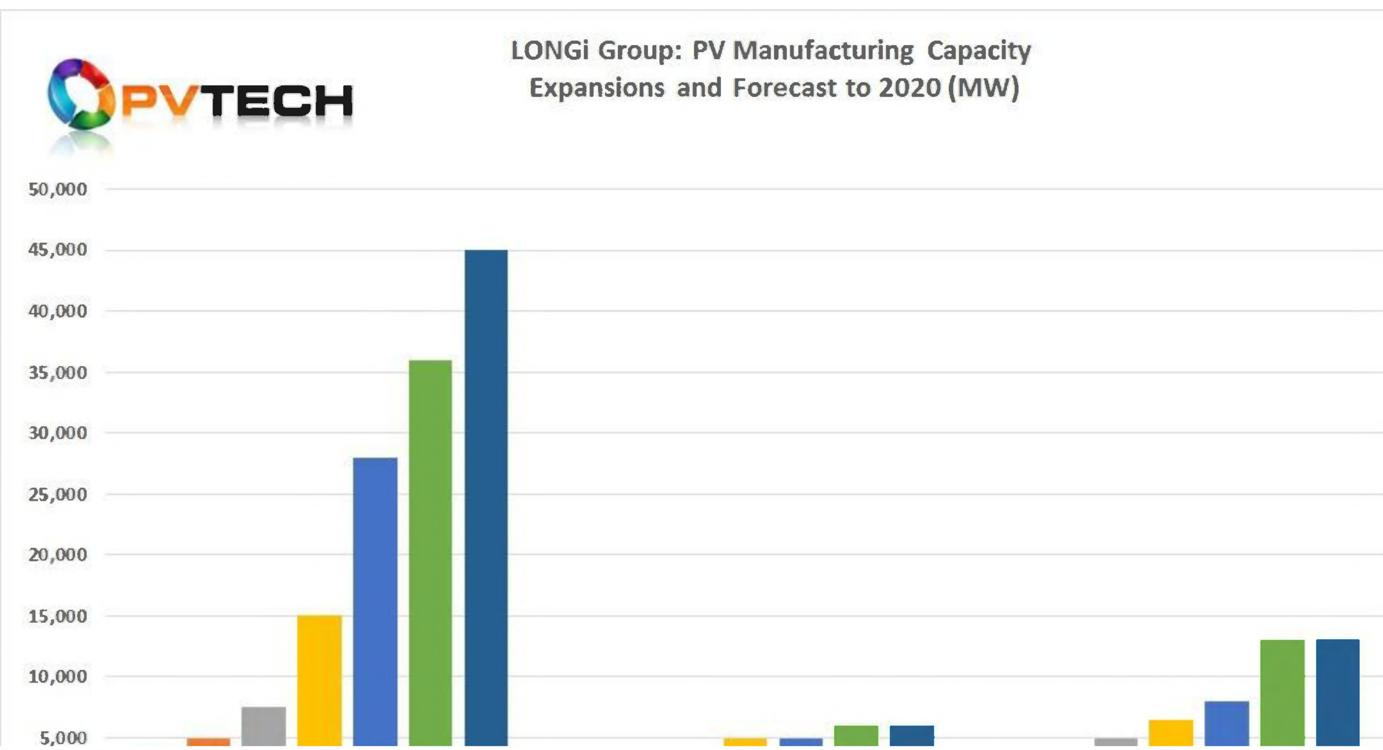


Leading monocrystalline wafer producer and 'Solar Module Super League' (SMSL) member LONGi Green Energy Technology is planning to invest around US$875.7 million in expanding its Czochralski-based monocrystalline silicon (mono-Si) ingot and wafer capacity by 15GW, while expanding mono-Si solar cell capacity by an initial 3GW in 2020.

LONGi said it had signed a strategic agreement with the Yinchuan Economic and Technological Development Zone for the new 15GW ingot and wafer production facility, which is expected to cost around US$643 million. The facility is expected to gradually start ramping production in the second half of 2020.

The company had recently announced plans to invest approximately US$773 million (https://www.pv-tech.org/news/longi-investing-us773-million-in-significantly-expanding-mono-ingot-and-waf) in expanding mono-Si ingot capacity at two production sites in China, which included 6GW in Baoshan and 6GW in Lijiang. LONGi also announced at the same time a 10GW expansion of mono-Si wafer production as part of a Phase 2 expansion at facilities in Chuxiong.

These previously announced expansions would take mono-Si ingot cumulative nameplate capacity to 38GW in 2019. LONGi had previously announced plans to take ingot capacity to 45GW by the end of 2020.

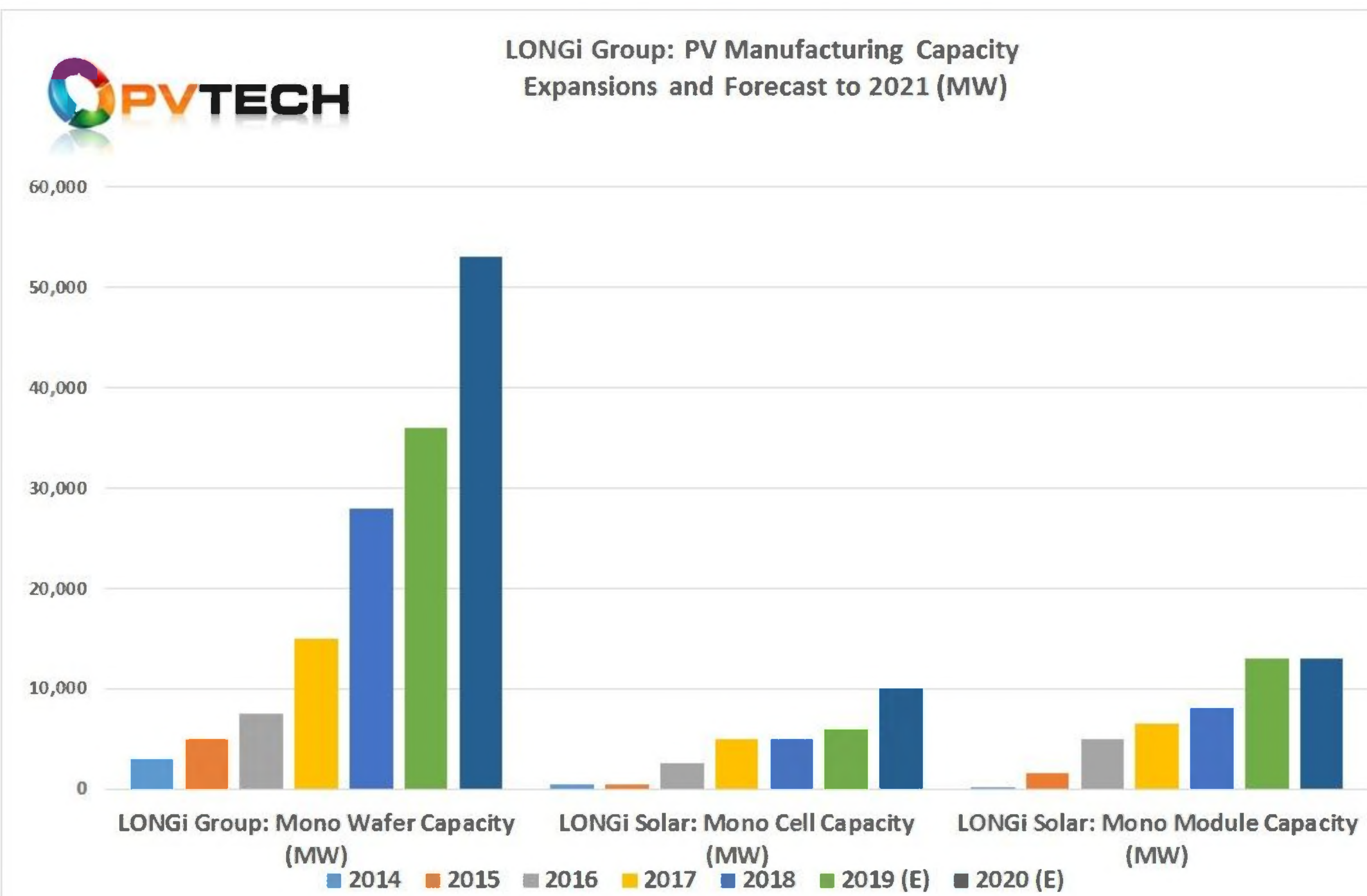


The new 15GW plans would take mono-Si ingot and wafer nameplate capacity to 53GW after 2020.

LONGi also announced that its subsidiary, SMSL member LONGi Solar would establish a mono-Si solar cell plant in Yinchuan. Initial capacity would be 3GW at a cost of around US$233 million. The facility would have a nameplate capacity of 5GW. The initial production ramp would be in the first half of 2020.

The company had recently announced a new 1GW mono-Si cell plant (https://www.pv-tech.org/news/longi-investing-us773-million-in-significantly-expanding-mono-ingot-and-waf) would be built in Malaysia at the Shama Jaya Free Industrial Park, Kuching City, Sarawak, Malaysia at a cost of approximately (US$125.5 million).

Combined with the latest expansions planned in China, LONGi Solar's mono-Si cell nameplate capacity would reach 10GW by the end of 2020.



LONGi’s Hi-MO N: N-type TopCon breakthroughs boost efficiency and energy yield for large scale PV (https://app.livestorm.co/solar-media/longis-hi-mo-n-n-type-topcon-breakthroughs-boost-efficiency-and-energy-yield-for-large-scale-pv?utm_source=pvtech&utm_medium=event-listings)

28 July 2021

LONGi has launched its Hi-MO N module, the company's first bifacial module with N-type TOPCon cells, designed to deliver ultra- high value and lower LCOE to utility-scale PV power plants. This PV TechTalk Product Series webinar will provide an overview of the module’s technology and how the introduction of n-type technologies will provide efficiency and performance gains for solar project developers.

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Risen Energy to set up US$10.2bn solar manufacturing plant in Malaysia (https://www.pv-tech.org/risen-energy-to-set-up-us10-2bn-solar-manufacturing-plant-in-malaysia/)

June 28, 2021

Risen Energy will spend MYR42.2bn (US$10.2 billion) over 15 years on a new solar manufacturing plant in Malaysia, representing

EXHIBIT 40

EDITORS' BLOG (HTTPS://WWW.PV-TECH.ORG/CATEGORY/FEATURES/EDITORS-BLOG/), FEATURES (HTTPS://WWW.PV-TECH.ORG/CATEGORY/FEATURES/)

JA Solar's capacity expansion announcements in 2020 top 104GW across wafer, cell and modules

By Mark Osborne (https://www.pv-tech.org/author/markosborne/)

September 24, 2020

Cell Processing (https://www.pv-tech.org/industry-segments/cell-processing/), Companies (https://www.pv-tech.org/industry-segments/companies/), Fab & Facilities (https://www.pv-tech.org/industry-segments/fab-facilities/), Financial & Legal (https://www.pv-tech.org/industry-segments/financial-legal/), Manufacturing (https://www.pv-tech.org/industry-segments/manufacturing/), Markets & Finance (https://www.pv-tech.org/industry-segments/markets-finance/), Materials (https://www.pv-tech.org/industry-segments/materials/), Modules (https://www.pv-tech.org/industry-segments/modules/)

The combined total capital expenditure (where noted) is guided at over US$4.1 billion through to the end of 2023. Image: JA Solar

PV Tech's analysis of 'Solar Module Super League' (SMSL) member JA Solar's capacity expansion announcements in the first nine months of 2020 have revealed the company has already announced a total of over 104GW of combined plans, including ingot/wafer, solar cell and module assembly.

Just before completing this analysis, leading SMSL member JinkoSolar stunned the industry by confirming it had completed a 9GW expansion of module assembly capacity in the first half of 2020. This was intended to be completed by year-end and would extend assembly capacity to 30GW, a 90% year-on-year increase by the end of 2020. Full analysis of JinkoSolar's news can be read here. (https://www.pv-tech.org/news/jinkosolar-almost-doubling-module-assembly-capacity-year-on-year-to-30gw)

Trina Solar has since updated its capacity expansion plans (https://www.pv-tech.org/news/trina-solar-adding-a-further-10gw-of-new-module-assembly-capacity-as-target-of-50gw-approaches) from targeting module assembly capacity reaching at least 39.5GW in 2022 to 50GW by the end of 2021.

Not to be left out, JA Solar had a number of capacity expansion projects 'under construction' by the end of 2019, which the company reported in its first annual report after re-listing in China. *PV Tech* estimated that these plans would all be completed and operational in 2020.

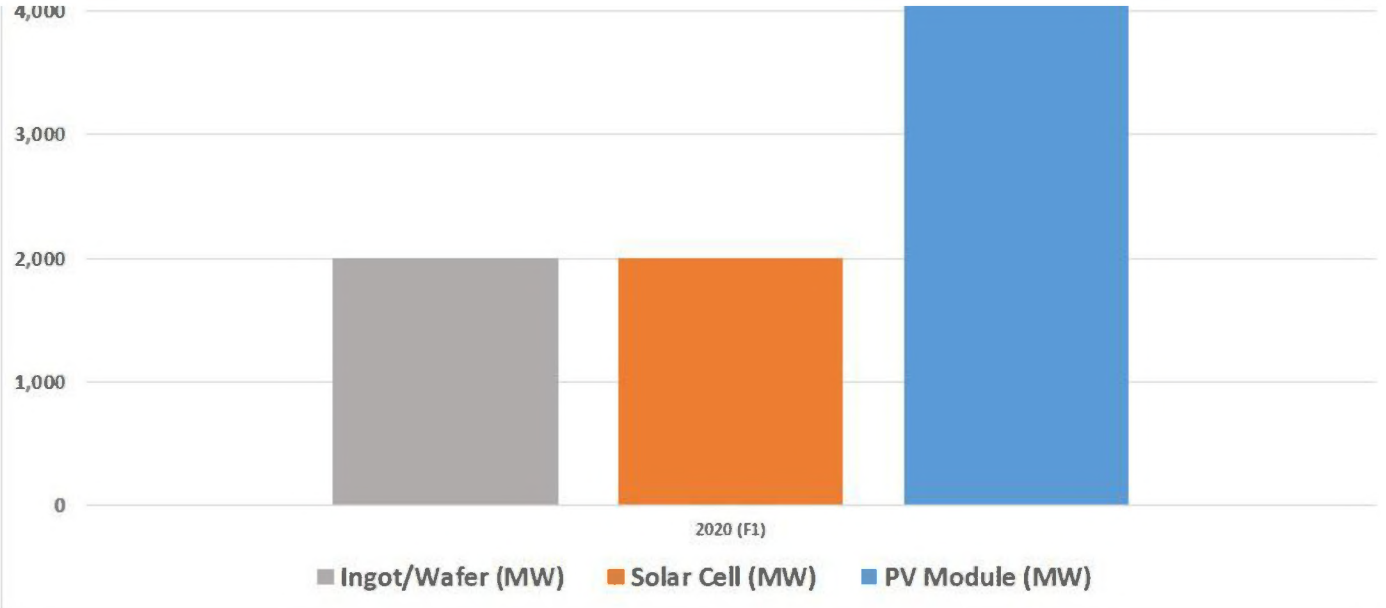
The manufacturer is believed to have exited 2019 with in-house nameplate capacity of 11.5GW of ingot/wafer production, followed by matching capacity for solar cells and module assembly of around 11GW. Putting this in perspective, JA Solar's PV module shipments in 2019 were reported to be 10.26GW, a record annual shipment figure and the first time the company had surpassed the 10GW milestone for annual module shipments.

First wave of expansion plans

The first capacity expansion plans to ramp in 2020 included around 2GW of ingot/wafer, 2GW of solar cell expansions and over 5GW of module assembly expansion plans. These were mainly in China but also cell and module expansions at its Malaysian facilities.

As a result, JA Solar was expected to end this year with in-house ingot/wafer nameplate capacity of approximately 13.5GW, solar cell capacity of around 13GW and module assembly exceeding 16GW.

This first set of 2020 plans totalled approximately 9GW of announced capacity expansions.



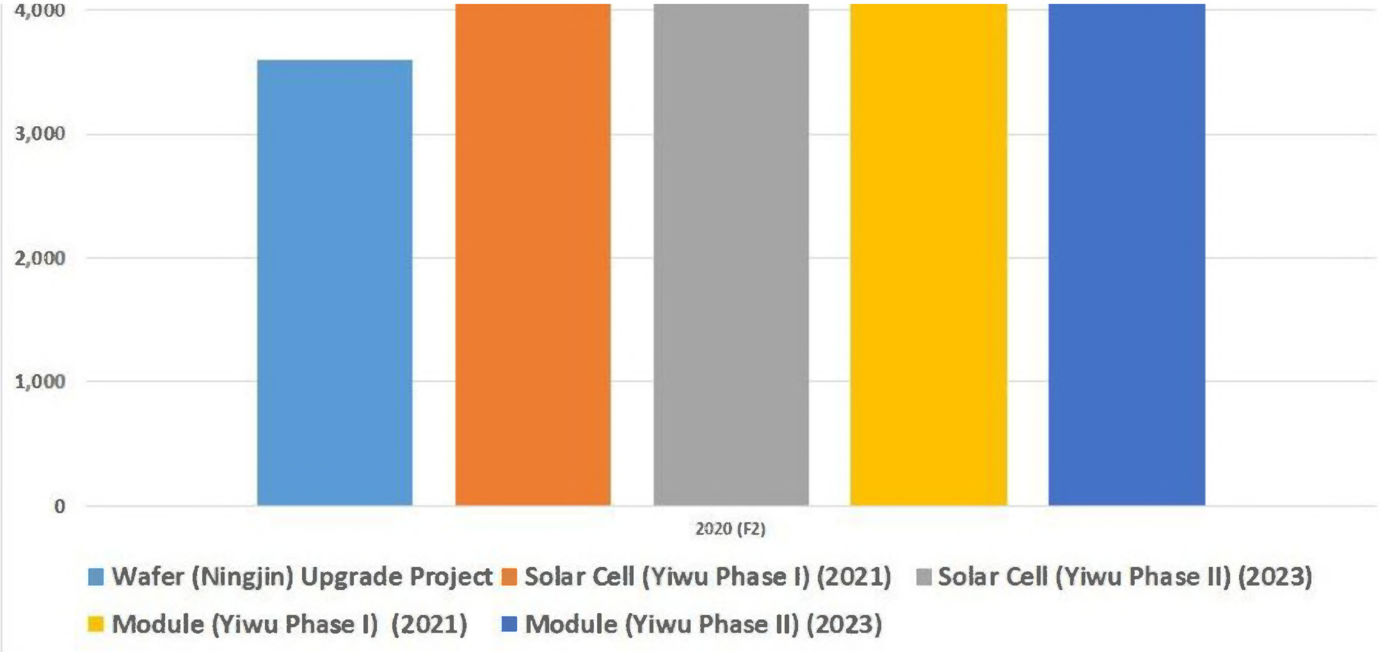
Second wave of expansion plans

However, in the first two months of 2020, JA Solar announced a second wave of capacity expansion announcements. These included plans for a 5GW cell production facility (soon after doubled to 10GW in March) as well as a 10GW module assembly plant.

The newbuild projects were said to require capital expenditure of around RMB10.2 billion (US$1.5 billion). Importantly, these expansions were said to be planned over a four-year period with the initial phase comprising a 5GW expansion of solar cell capacity and 5GW of module assembly expansions. Phase I is expected to be in production by the end of 2021. Phase II will be completed and start ramping sometime in 2023.

JA Solar also announced a complete re-tooling of idled workshops for 2GW of wafering equipment (Diamond Wire) at a plant in Ningjin, China costing around US$ 9.8 million and only taking around three months to complete and start ramping production.

This second wave of capacity expansion announcements totalled 23.6GW.



Third wave of expansion plans

On 13 August 2020 JA Solar started announcing a third wave of planned capacity expansions. This started with a new 20GW ingot/wafer expansion in Nanhaizi Industry, Qujing Economic and Technological Development Zone, Qujing City, Yunnan Province, China. The capital expenditure was expected to be around RMB5.8 billion (US$857 million). The planned expansions are to be carried out in two phases, taking 36 months for full completion.

This was followed four days later with another round of announcements, totalling 11.2GW. Included in this single announcement was 4GW of further wafer slicing capacity, split between two subsidiaries (Ningjin Songgong Electronic Materials Co and Crystal Ocean Semiconductor Materials (Donghai) Co) each of 2GW.

JA Solar also announced a major 20GW expansion of ingot/wafer production, located in the Nanhaizi Industrial Park, Qujing Economic and Technical Development Zone, Yunnan province by subsidiary, Qujing Jinglong Electronic Materials Co. The total Capex for this project was to be around RMB5.8 billion (US$853.6 million) with the project split into two phases and completion due in 36 months.

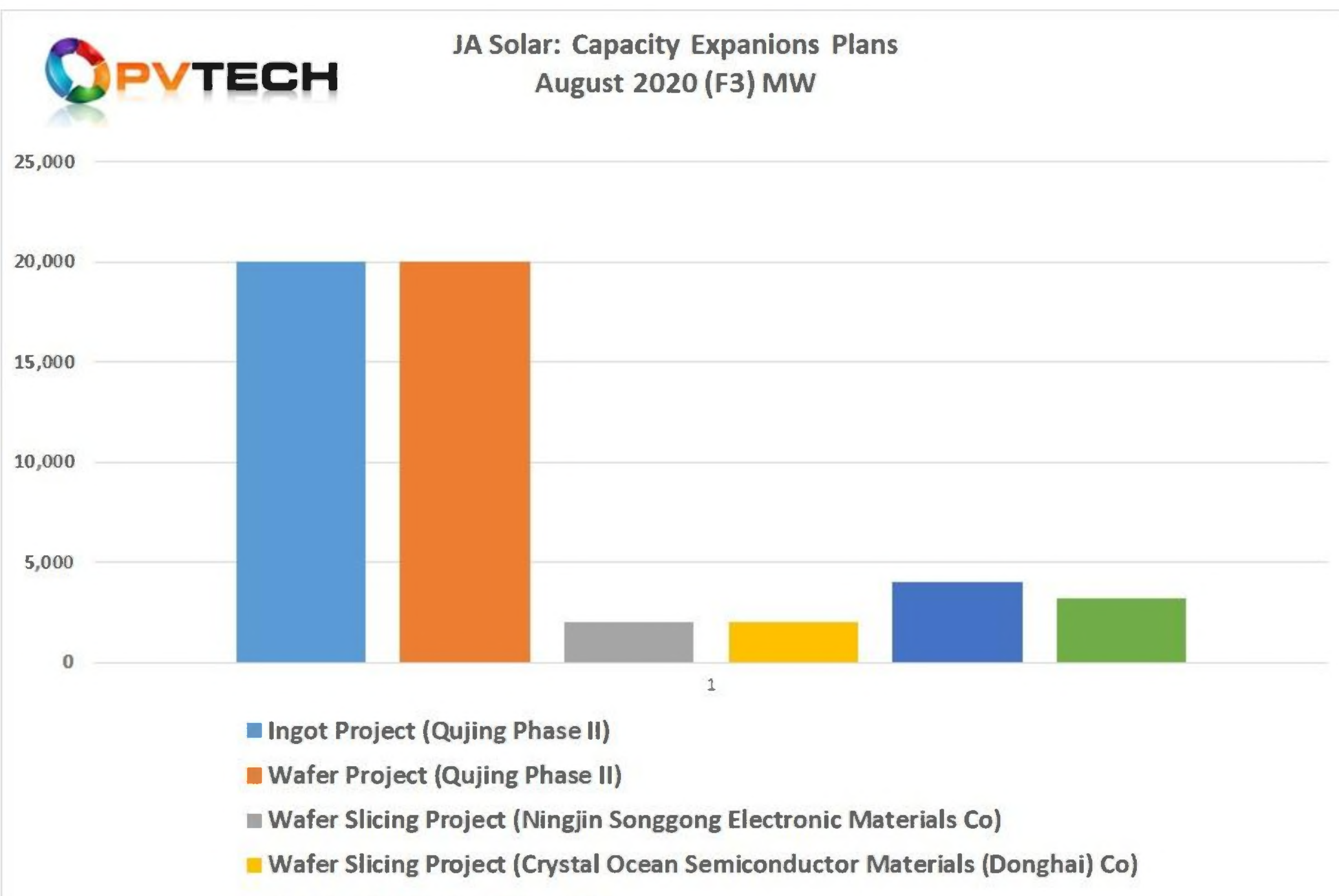
JA Solar also announced in this round of expansion plans a solar cell plant conversion to large-area high-efficiency cells, totalling 4GW at an existing solar cell plant in Xingtai City, Hebei Province. The total investment for the project was said to around RMB1.18 billion (US$174 million).

The SMSL member also announced it would utilise and existing facility in the Fengxian Comprehensive Bonded Zone, Shanghai to upgrade to large-area module assembly production, totalling 3.2GW of nameplate capacity at a capital cost of around RMB332.48 million (US$50 million). The conversion was said to take around six months to complete.

It should be noted that very few major manufacturers have specifically detailed manufacturing facilities that are being upgraded to high-efficiency large-area wafer/cell production plants, although many long-standing players have legacy facilities that have equipment that is approaching end-of-life and needs to be retooled or shuttered. Because of retrofitting facilities, it can become difficult to establish if new nameplate capacity is being added or whether such plans simply replace existing nameplate capacity.

However, on the basis of the information available it would seem that re-tooling existing facilities can add over 1GW of extra capacity, or more than a 50% capacity increase, due to new tooling density, productivity and higher overall cell/module conversion efficiencies.

This third wave of capacity expansion announcements, totalled 31.2GW.



Fourth wave of expansion plans

The fourth wave of capacity expansion announcements was announced in mid-September. Although JA Solar updated on some of the previously announced plans, several new expansions were also announced at that time.

The first was a 3.5GW high-efficiency large-area solar cell plant in Gwangju Industrial Zone, Gwangju Town, Viet An County, Bac Giang Province, Vietnam at a capital cost of around RMB1.47 billion (US$217.2 million). The project construction period was said to take around 15 months. JA Solar has operated a wafering plant in Bac Giang, Vietnam since 2015.

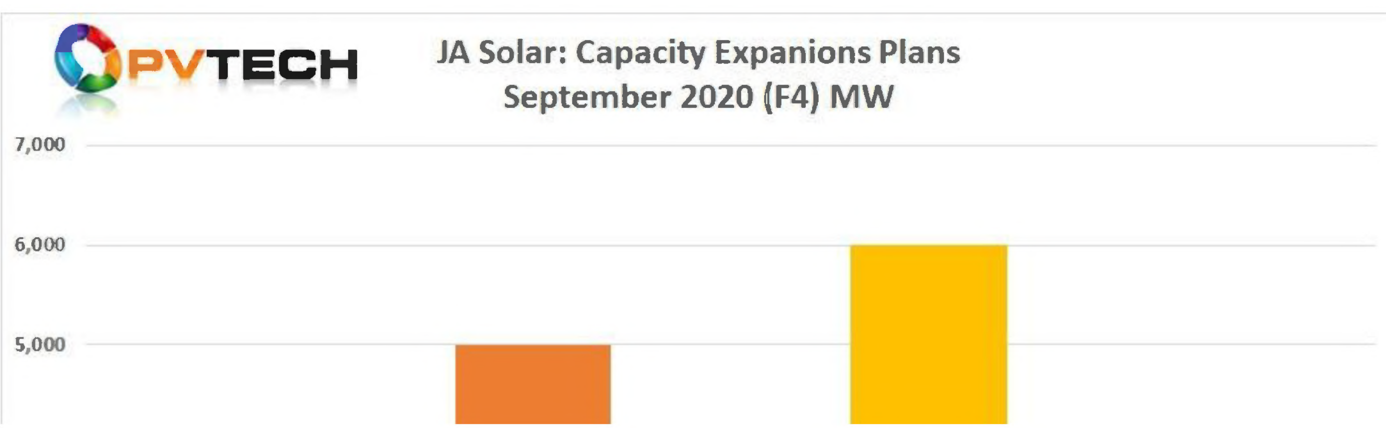
Also included were plans for JA Solar Vietnam to expand module assembly production at the same location by a further 3.5GW to support the solar cell expansion. The company said that the project would cost around RMB700 million (US$102.5 million) and be completed in 11 months.

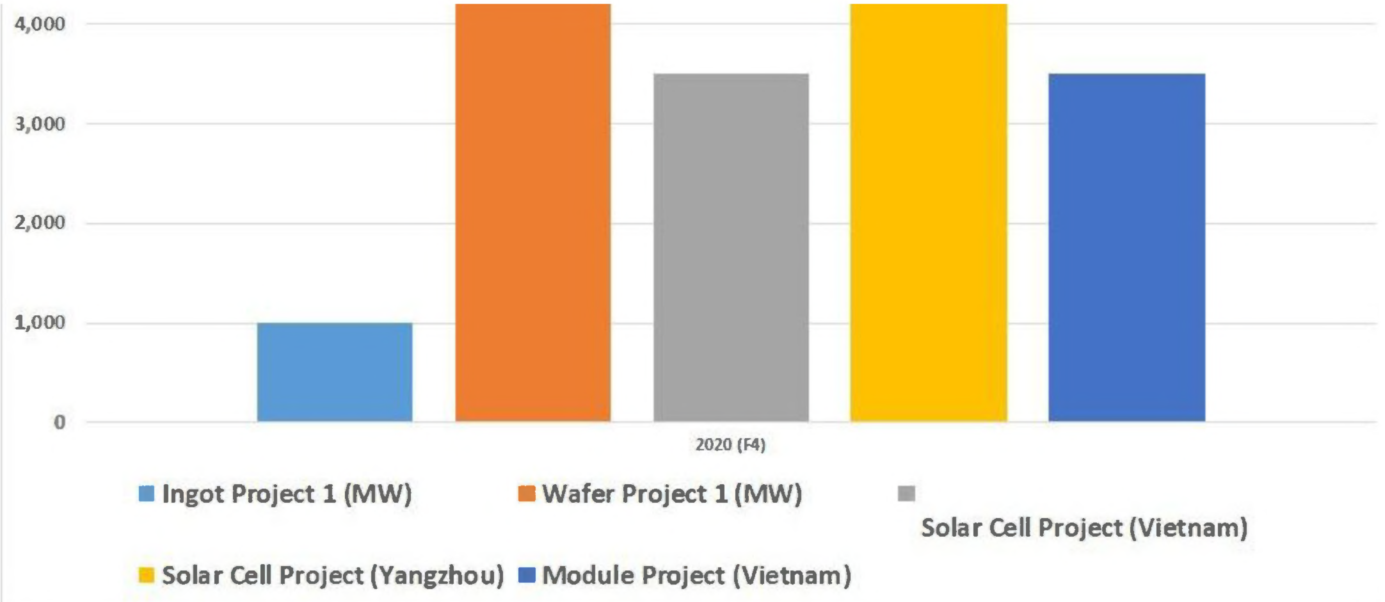
With inclusion of a 1.5GW ingot-wafer expansion announced in 2019 for the Vietnam manufacturing hub, JA Solar is significantly expanding its manufacturing footprint in the country, specifically for sales in overseas markets, not least expanding sales in the US.

Another major new project announcement was a 6GW high-efficiency large-area solar cell project, via its subsidiary, JA Solar (Yangzhou) Solar Technology Co. Located in the Yangzhou Economic and Technological Development Zone (ETDZ), Jiangsu province, JA Solar said the project would take around 12 months to complete at a total investment of around RMB1.72 billion (US$252 million).

The smallest project announced was a 1GW ingot expansion in Ningjin County, Hebei province, accompanied by a 5GW expansion of wafering operations. This project is expected to be complete in 12 months at a cost of around RMB 670.6 million (US$98 million).

This fourth wave of capacity expansion announcements, totalled 19GW.

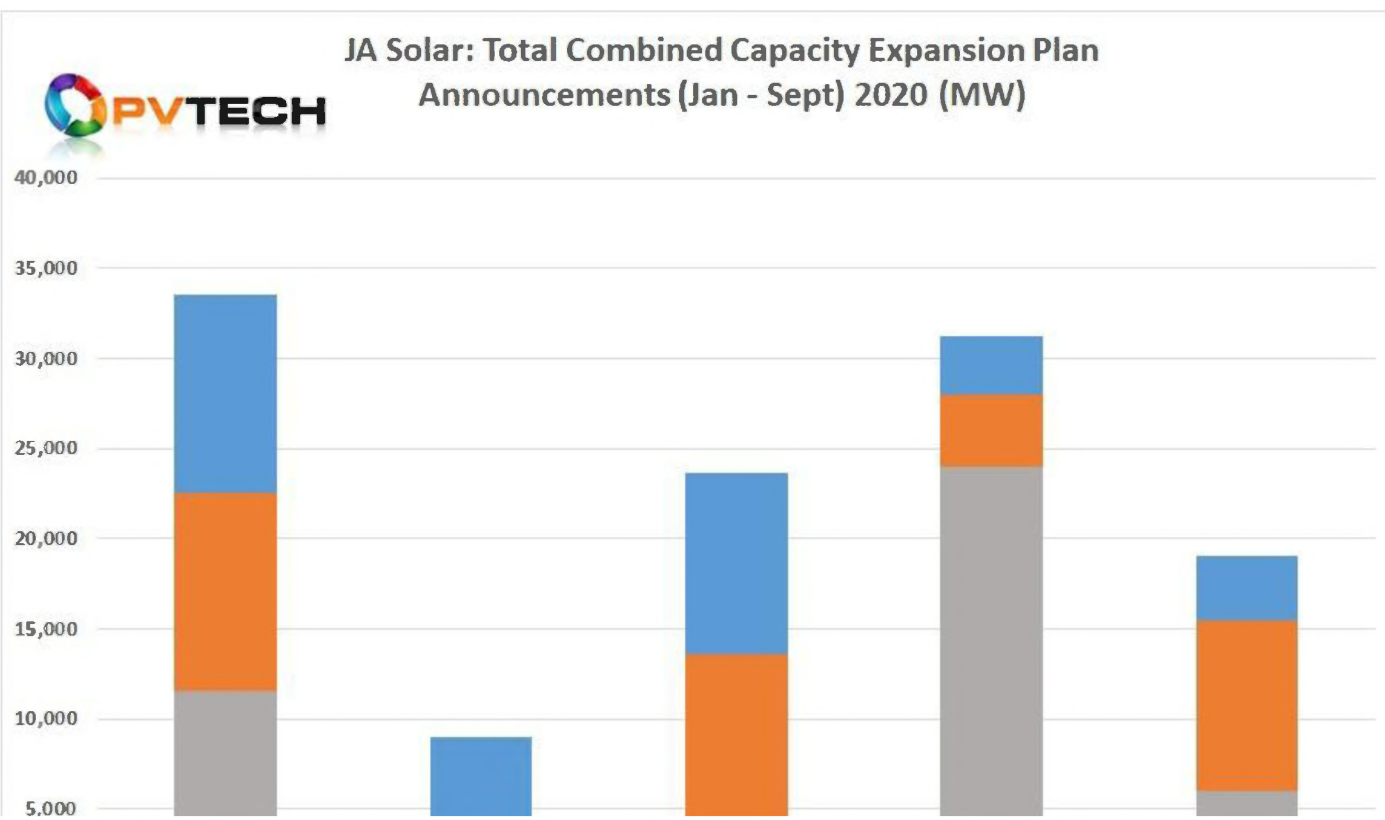


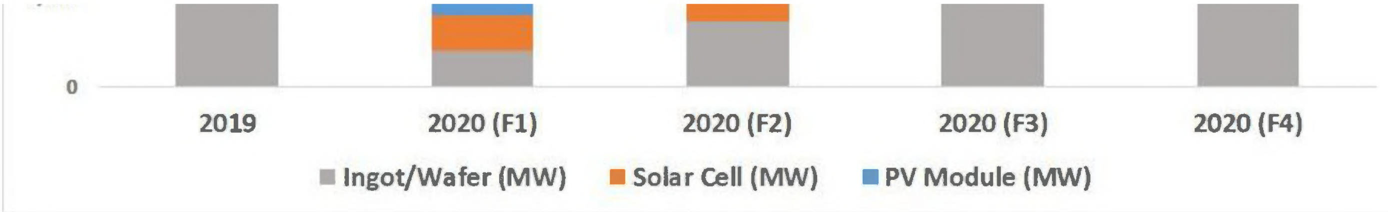


Summary

In the first nine-months of 2020, JA Solar has announced a combined total of 35.8GW of ingot/wafer capacity expansions, topped slightly by advanced solar cell expansion plans of 36.5GW and module assembly expansion plans reaching 32GW by the end of 2023. Combined, JA Solar has announced at least 104.8GW of combined capacity expansion plans in 2020.

The combined total capital expenditure (where noted) is guided at over US$4.1 billion through to the end of 2023.





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PV Tech Premium

How JA Solar is responding to materials price increases (https://www.pv-tech.org/how-ja-solar-is-responding-to-materials-price-increases/)

June 9, 2021

Price increases in polysilicon and other auxiliary solar module materials have exerted much pressure on manufacturers, JA Solar has said, impacting on profitability in the first half of 2021. Xinming Huang, senior vice president at JA Solar, tells PV Tech how the company is responding.

(https://www.pv-tech.org/project-round-up-mytilineos-lands-total-eren-epc-contract-clenergy-pens-deal-for-150mw-in-china/)

EXHIBIT 41

Chinese PV Industry Brief: Tongwei plans 200,000 MT polysilicon factory

The new polysilicon factory will be located in Leshan City and will be built thanks to an investment of $2.1 billion.

JULY 2, 2021 **VINCENT SHAW AND MAX HALL**

HIGHLIGHTS INVERTERS MARKETS MARKETS & POLICY MODULES & UPSTREAM MANUFACTURING CHINA

One of Tongwei's factories in China.

Image: Tongwei

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Polysilicon supplier and solar cell maker Tongwei announced on Thursday it signed an agreement with the government of Leshan City and the Wuhua district for a new polysilicon manufacturing site with a capacity of 200,000 metric tons. According to the statement, the total investment for this polysilicon capacity is RMB 14 billion, around $2.1 billion. Construction of the facility will take place in two phases of 100,000 MT each, with phase I estimated to be completed and commissioned by the end of 2022, followed by phase II. Tongwei has a total 80,000 MT polysilicon capacity and 150,000 MT under construction. By the end of 2022, the company will have a total polysilicon capacity of 330,000 MT, including the new expansion plan, and the figure will grow to 430,000 when phase II of the project is finished.

Chinese glass group G-Crystal announced on Thursday that its Malaysian unit completed construction and commissioned its glass production lines for thin-film PV panel products. Work on the facility started in 2018 with a planned capacity of 500 metric tons of PV glass per day. The company has signed a supplement agreement with First Solar for the next 10 years, G-Crystal added.

In its latest market observation, released Wednesday, **Taiwan-based market research company** PV InfoLink reports that the price of polysilicon remained stable from last week. The main deal price is around RMB 200 ($30.90) per kilo, with no change from last week. Due to lower capacity utilization on the wafer side, the high quote of poly was rejected by downstream users. Cost pressure eventually spread from downstream modules and cells to wafers. Due to high inventory and lower capacity utilization, wafer orders dried and wafer makers had to cut prices, especially on large-sized wafers like 182 mm and 210 mm, both of which suffered around 10% reductions. Cell prices also dropped slightly due in part to higher pressure from high inventory and the likelihood of a potential deal with module makers. Module prices also dropped because of upstream cost cutting. However, generally the market is still cool with high prices and low consumption.

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Australia's 'unsafe' solar installation standards under fire

2 JULY 2021

Australia is a world leader in rooftop solar deployment, but the head of Queensland-based renewables company REA Global has criticized the nation's s...

Independent shareholders at **state-controlled manufacturer** Luoyang Glass will vote on the proposed RMB 182 million ($28.2 million) acquisition of glassmaker Qinhuangdao North Glass Co Ltd at an extraordinary general meeting on July 21. Luoyang wants to acquire a 60% stake in the target company from the China Yaohua Glass Group Co Ltd warehousing and sales entity which is itself controlled by Luoyang's ultimate owner, China National Building Material Group. The deal would remove duplication and competition for Luoyang, which said the investment would also enable it to "optimize the layout of its photovoltaic glass business segment" and "expand production."

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AUTHORS

More articles from Vincent Shaw

EXHIBIT 42

Business

China’s growing share of solar market comes at a price

By Steven Mufson
December 16, 2011

China was mentioned 59 times when Energy Secretary Steven Chu testified last month before a House subcommittee on the U.S. loan guarantee program for renewable-energy projects.

“Countries like China are playing to win in the solar industry,” Chu said.

“My big thing is that I worry about China,” said Rep. Brian P. Bilbray (R-Calif.).

“The Chinese are eating our lunch,” said Rep. John D. Dingell (D-Mich.).

Yet if Chinese solar companies are eating our lunch, they’re also choking on it. Growth in global solar manufacturing capacity is outpacing global demand, and prices of solar energy products are plunging. And while U.S. politicians portray Chinese firms as heavily subsidized rivals gobbling up global market share, Chinese solar companies are suffering from some of the same ills afflicting their U.S. competitors.

Some of China’s biggest companies are losing money, shelving capital expenditure plans and looking to conserve dwindling reserves of cash. To avoid going deeper into debt, they have borrowed only a tiny fraction of $34 billion in loans available to them from the China Development Bank.

For consumers, the cutthroat competition is a good thing. Wholesale solar panel prices have dropped as much as 50 percent this year, and retail prices are less than half what they were five years ago. Industry experts say that the day is near when solar can compete against other energy sources without subsidies. In certain places and at certain times of day, it’s already viable. Meanwhile, analysts say, if China wants to subsidize solar products, Americans can buy more of them.

For some U.S. companies, China’s expanding industry has meant more jobs. Cheap panels fuel greater sales — and installation accounts for more than half of U.S. solar industry jobs.

Moreover, the United States has a trade surplus with China in solar goods, led by exports of polysilicon, the raw material needed to make photovoltaic cells, which in turn are the building blocks for solar panels.

The United States also exports the solar manufacturing machinery. Applied Materials, which made its name in the semiconductor business, beat analysts’ expectations earlier this year thanks to sales of equipment for making solar cells. To promote sales, the Santa Clara, Calif., company has set up a research center in the

Chinese city of Xian and moved its chief technology officer there. "Now we are doing for the green economy what we did for the Information Age," the company says on its Web site.

GT Advanced Technologies, which sells furnaces and other equipment for making the polysilicon and ingots used in making solar cells, does 98 percent of its business in Asia, much of it in China. "We compete very effectively as a U.S.-based corporation in spite of the fact that my Chinese competitors sell at half my price," said Tom Gutierrez, chief executive of the New Hampshire-based firm. "We beat them through technology and innovation."

But U.S. solar panel manufacturers and people who believe that solar manufacturing can become part of a new "clean technology" economy are unhappy. They believe that the flood of Chinese solar cells is a textbook case of dumping — an economic term to describe when foreign companies overwhelm a market with cheap goods to drive competitors out of business. Later, after gaining control of that market, the foreign companies can jack up prices.

Chinese panels are selling for less than $1 a watt, while those made elsewhere sell for about 20 percent more, according to Bloomberg New Energy Finance.

China supplies nearly half of U.S. solar panel imports — 44.6 million units in the first eight months of the year, up from 3.8 million in 2008, according to an anti-dumping petition filed by a group of U.S. firms. Those sales rocketed to $1.69 billion through August of this year from $233.3 million in 2008.

The biggest of those panel makers, Suntech, promotes its products in ads that show two panels hooked up to an electric American flag. "Now Power America, from America," the ad says, even though only 2 percent of Suntech's manufacturing capacity is in the United States.

But volume doesn't guarantee profits and for Chinese solar companies, it has been a painful rise to the top ranks of the global market. Suntech, JA Solar and LDK Solar, the top Chinese solar panel makers, reported losses for the third quarter and warned investors the outlook was grim. JA Solar reported operating losses and a writedown on the value of its inventory. Suntech, which lost $116.4 million in the third quarter, said it expected shipments to drop 10 percent in the fourth quarter.

"This will be challenging for all solar companies," Suntech chief executive Shi Zhengrong said during a conference call with investors in November. Many of China's more than 100 solar cell firms and 300 solar module companies with lower-quality products could close down.

In addition, Chinese solar panel makers are facing possible tariffs as the U.S. International Trade Commission weighs charges in the dumping case. In a 6 to 0 vote Dec. 5, the ITC found a "reasonable indication" that Chinese imports are "materially injuring" the U.S. industry. It is considering whether to impose duties, and at what level.

In a Nov. 22 conference call about its quarterly earnings, JA Solar chief executive Fang Peng said the company might move some of its finishing operations to other countries, such as South Korea or Taiwan, so that its panels would not be considered imports from China. "To be prudent we need to have a work-around solution," chief financial officer Min Cao said.

"China is not pricing its products to make money," said Timothy Brightbill, a lawyer at Wiley Rein who is representing U.S. solar panel makers in the dumping case. "It's pricing its products to try to dominate this market."

A new type of Chinese industry?

There is a measure of irony in the growth of the Chinese solar industry. In its new five-year economic plan, unveiled in March, China's government has singled out 35 sectors, including solar and other types of renewable energy, as priorities for creating a cleaner, technology-based economy, one with a healthier balance between domestic demand and exports.

"We have to develop our green economy," Cheng Siwei, former vice chairman of the standing committee of the National People's Congress, said at a Brookings Institution event Nov. 1.

Yet Barry Naughton, an economics professor at the University of California at San Diego, noted that China is, in fact, re-creating "the old pattern of economic development." Like many Chinese industries from the past, the solar industry is supported by subsidies and loans from state-owned banks; it imports equipment, thrives on low-margin, high-volume exports and often violates basic environmental standards in disposing of waste. In September, riot police clashed with about 500 people who damaged vehicles and stormed a Jinko Solar plant, which they said had dumped toxic waste in a local river.

The U.S. economy, by contrast, focuses on jobs that add more value — research, design and equipment manufacture — and it captures profits at the retail level.

"I'm worried that what we see in China is . . . a pattern where existing technologies — sometimes mature, sometimes not — are ramped up rapidly, expanded quickly, because they have access to government support," Naughton said. "That kind of support has a danger because it distorts the overall global environment for these newly emerging technologies — technologies that are important for all of us."

Joanna Lewis, a professor of science, technology and international affairs at Georgetown University, adds that "the part of the process that China excels in is energy-intensive and not environmentally friendly." She adds that solar is "clean, green technology, but only after you manufacture it" — and not if it's all exported.

While China talks about boosting its domestic market, its solar panel manufacturing capacity is 32 times greater than domestic consumption. Solar last year accounted for just 0.006 percent of China's electrical power, Naughton said.

"Solar panel manufacturers in China are not so much in a technology business as a commodity one," Massachusetts Institute of Technology professor Edward Steinfeld and MIT researcher Jason Lee wrote in an unpublished paper. "They get into the game by buying expensive assembly line equipment (mostly from American suppliers). They produce a product identical to that of their many other Chinese competitors, and then they try to hang on by producing at massive scale and tiny profit margins."

Solar subsidies

Yet this is a business that few political leaders in America are ready to concede.

"I'm not going to surrender to other countries technological leads that could end up determining whether or not we're building a strong middle class in this country," President Obama said Oct. 6 in discussing the bankruptcy of Solyndra, a solar panel maker that received $535 million of federal loan guarantees.

He added, "There are going to be times where it doesn't work out, but I'm not going to cave to the competition when they are heavily subsidizing all these industries."

Seven U.S. solar cell and module makers have banded together to form the Coalition for American Solar Manufacturing, a new group, to file the dumping case. Many of them thought the existing trade group, the Solar Energy Industries Association, would not back the petition because its chairman is an executive at Suntech, the Wuxi, China-based company that also has a small facility in Goodyear, Ariz. On Dec. 12, the German-based company SolarWorld quit the SEIA board, saying in a letter that it "no longer serves the interest of our company."

Over time, academic exchanges and trade have kept the Chinese and U.S. solar industries entwined. For example, Fang Peng, the chief executive of JA Solar, earned his doctorate at the University of Minnesota, then held technology and management posts at Applied Materials, working on semiconductors. Suntech's chief financial officer earlier worked at Disney, Bechtel and Price Waterhouse, and its supply chain head got his MBA at Michigan State.

But the dumping plaintiffs say it isn't just experience that has given Chinese firms a leg up. "We're really quite efficient," said Ben Santarris, a spokesman for the U.S. unit of SolarWorld. "However, it is very difficult for us to compete with the Communist Party of China."

SolarWorld's petition cites likely sources of government aid to Chinese solar panel makers, such as grants given to exporters by China's Export Product Research and Development Fund and cut-rate insurance from a state-owned firm. It alleges that firms such as Suntech and LDK Solar might get help under programs designed to foster "famous brand names," from the central government and the province of Jiangxi, where both firms are based.

Many subsidies are given out at the local or provincial level. The dumping petition points to Shandong's $340 million energy fund for solar water heaters, Hunan's call for a 150 percent tax deduction for solar research and development, and Yunnan's grants and low-interest loans.

Georgetown's Lewis notes that a Hunan company called Sunzone bought industrial land from the Chinese government at one-third the official rate, then listed the land on its books at full value.

A Suntech filing with the Securities and Exchange Commission in May says most of its subsidiaries qualify as "high and new technology enterprises" and therefore pay a 15 percent corporate income tax rate instead of 33 percent.

U.S. solar companies and lawmakers also point to the $34 billion in credit that the China Development Bank has offered to the big five panel makers. But JA Solar, which in September 2010 announced that the bank would provide $4.7 billion in financing, told Bloomberg News last month that it has not drawn down any of that amount. Suntech has used less than 10 percent of its $7 billion facility, said Andrew Beebe, the company's chief commercial officer. Other firms have also balked at the bank's offer for the time being.

The China Development Bank's interest rates have been "market rates," according to Beebe and SEC filings by Chinese solar firms listed on the New York Stock Exchange. Beebe says Suntech paid as little as 4.5 percent over the past couple of years and more than 6 percent this year. That is about three times as high as the rates Solyndra was paying for five-year loans from the Federal Financing Bank.

SEC filings reveal other advantages for Chinese firms. Suntech describes a guarantee it gave for a loan of 554 million euros provided by China Development Bank to a project developer called Solar Puglia, which Suntech had acquired. When Solar Puglia's power projects were not connected to the grid by Jan. 30, 2011, China Development Bank was entitled to demand immediate payment; it did not.

Another key trade dispute: The price and availability of polysilicon. China has imposed a quota on exports of polysilicon, the key ingredient of most solar panels. That has kept the price of silicon in China artificially low. In 2008, the price of polysilicon spiked as high as $450 a kilogram (2.2 pounds). Solyndra's panels did not use silicon, an appealing feature at that time, and Energy Department officials said they could not foresee a plunge in polysilicon prices.

But GCL Poly, a company with ties to the People's Liberation **Army** and the Chinese government, was already revving up production, providing half of the needs of Chinese exporters by late 2010, according to a report by the research group Fathom China. Today the price of polysilicon has crashed to less than $30 a kilogram. It's off 30 percent in the past month alone, the lowest level since around 2003, according to Bloomberg New Energy Finance group. GT's Gutierrez says companies can make polysilicon today at less than $25 a kilogram, after depreciation expenses.

Most of China's policies until now have been export-oriented, and Chinese companies' fortunes have risen and fallen with the size of subsidies in Germany, Italy and Spain.

Beijing's National Development and Reform Commission for years showed little interest in subsidizing domestic solar use, and a "Golden Sun" project subsidized by the ministries of finance and construction was plagued by corruption, poor planning and inferior products, Fathom China said. Ningxia province, beset by dust and pollution, found that every one of its 160,000 panels needed to be wiped clean four times a year. And the coal-dominated electricity grid is not suited to accommodate large amounts of fluctuating solar power.

But in the new five-year plan, the Chinese government has set a goal of generating 20 gigawatts of electricity with solar by 2020. That would represent just 1 percent of China's expected power generation, but it would be roughly equal to the world's total installed capacity. That could mean subsidies similar to Europe's "feed-in tariffs," which guarantee artificially high prices to solar energy producers. Such subsidies could tilt Chinese solar panel production toward the Chinese domestic market, potentially a positive development for U.S. manufacturers.

Will the best win?

China isn't the only one handing out subsidies.

Indeed, Chinese authorities have said they would investigate U.S. subsidies to solar manufacturers. Those include a 30 percent production tax credit, investment tax credits, research and development grants, and the Energy Department's recent loan guarantees. In addition, renewable energy standards in about 30 states are requiring electric utilities to boost the share of renewables in their power-generation portfolios, essentially forcing them to buy solar even if at higher prices, a subsidy hidden in utility rates paid by consumers.

"The support we have received in China is no different and perhaps significantly less than what we've seen many companies in the United States and Europe, and Germany in particular, receive," said Suntech's Beebe.

Meanwhile the U.S. solar industry is divided over the dumping case.

Some U.S. companies opposed to the dumping case note that SolarWorld received aid from Oregon to set up a solar cell factory there and that it will receive assistance from the government of Qatar for a joint venture producing polysilicon there. SolarWorld said that it has taken $11 million of Oregon tax credits, but added that those credits are "available to companies of all nationalities" and offset "less than 2 percent" of its more than $500 million investment in Oregon.

A SolarWorld spokesman said that the company does not "argue that subsidies are inherently improper," but rather "that it is illegal for one country's subsidies to fund its producers in mounting a predatory export drive that hobbles domestic producers of a foreign market — exactly what China has done."

The Coalition for Affordable Solar Energy, by contrast, includes firms involved in installation, which accounts for 52 percent of the solar industry jobs, the group says. For them, cheap panels mean more demand, regardless of where the panels come from. (SolarWorld says that installers, not consumers, have profited from falling panel prices.)

Then there are solar manufacturers that use thin-film technology, which is cheaper, though less efficient, than photovoltaic panels using crystalline polysilicon. First Solar, an Arizona company with plants in Germany, Malaysia and Ohio, is the industry leader and building a plant in Arizona. General Electric is spending $600 million to open a thin-film plant in Colorado.

GE's Victor Abate, vice president of renewables, said in an interview: "The price of solar had to come down for it to become mainstream. . . . The question is, can you compete? And that depends on technology. The best technology is going to win here."

"It's a race," DeLine said of solar panel manufacturing, "and it's not just the Chinese."

Steven Mufson

Steven Mufson covers the business of climate change for The Washington Post. Since joining The Post in 1989, he has covered economic policy, China, diplomacy, energy and the White House. Earlier, he worked for The Wall Street Journal. In 2020, he shared the Pulitzer Prize for a climate change series "2C: Beyond the Limit." Follow

EXHIBIT 43

PVTIME

TBEA Announces Plan of Domestic Listing of Its Subsidiary Xinte Energy

JANUARY 15, 2021 BY BENJAMIN IN FINANCE

PVTIME - TBEA Co., Ltd. (hereinafter referred to as the "Company") reviewed and approved the previously discussed "Proposal for Planning of Domestic Listing of the Company's Holding Subsidiary " during its second interim board meeting of 2021 earlier this week.

In order to seize the opportunity for the continuous improvement of the global new energy industry, optimize the company's capital structure, further expand and strengthen the company's presence in the new energy industry, the company plans to proceed with the preparatory work needed for the domestic listing of its subsidiary Xinte Energy Co., Ltd. (hereinafter referred to as "Xinte Energy").

UPCOMING SOLAR EVENTS

No event found!

XINTE 新特能源

1. Basic information of the entity to be listed in China

Xinte Energy is a solar-grade polysilicon producer and PV project contractor. Xinte Energy provides polysilicon production, sales of electricity, engineering and construction contracting, inverter manufacturing, and PV wafer and module manufacturing. Its financial data (consolidated) for the past two years are as follows:

	2019	2018
Total Assets	4,170,511.60	3,569,970.30
Net Assets	1,384,867.70	1,129,005.60
Operating Income	872,211.30	1,205,374.20
Operating Profit	90,311.50	154,631.60
Net Profit	51,679.30	111,064.20
Net Profit Attributable to the Parent Company	40,264.20	110,779.70

(Unit: 10,000 Yuan)

Note: the above data are prepared in accordance with international financial reporting standards and have been audited.

Xinte Energy was listed on the Main Board of the Hong Kong Stock Exchange on December 30, 2015, under the stock code 1799.HK. Presently, Xinte Energy has a total share capital of 1.2 billion shares, including 313,475,630 H shares, accounting for 26.12% of the total share capital; and 886,524,370 domestic shares, accounting for 73.88% of the total share capital. The company directly holds 783,921,287 domestic shares of Xinte Energy, accounting for 65.33% of the total share capital, and is the controlling shareholder of Xinte Energy. The company's wholly-owned subsidiary TBEA (Hong Kong) Co., Ltd. holds 1,223,200 H shares of Xinte Energy, accounting for 0.10% of the total share capital.

2. Authorization for domestic listing

The company is planning for the domestic listing of Xinte Energy and have started the preparatory work. The company's board of directors authorizes the company and Xinte Energy's management to initiate the preparatory work for Xinte Energy's domestic listing, including but not limited to the feasibility plan demonstration, the organization of the preparation of the listing plan, and the signing of relevant agreements involved in the planning process and other listing-related matters. After formulating the domestic listing plan, the relevant listing plan and other matters related to the listing will be submitted to the company and Xinte Energy's board of directors as well as the general meeting of shareholders for review.

3. Opinions of independent directors

The independent directors have expressed their opinions on the matter and believe that the company's domestic listing of Xinte Energy is in line with the company's strategic planning and long-term development, and there is no situation that harms the interests of the company and shareholders, especially small and medium shareholders. After the listing plan is determined, the company will perform the corresponding decision-making procedures in accordance with relevant laws and regulations, and review the relevant proposals for the domestic listing. It has been agreed that the company will start the preparatory work for the domestic listing of its holding subsidiary Xinte Energy Co., Ltd.

4. Opinions of the board of supervisors

The company's board of supervisors believes that the company's domestic listing of Xinte Energy is in line with the company's strategic planning and long-term development, and does not harm the interests of the company and shareholders, especially small and medium shareholders; and have agreed to start the preparatory work for the domestic listing of the company's controlling subsidiary Xinte Energy Co., Ltd.

5. Impact on the company

The company is a service provider that provides system solutions for the global energy industry. It is a national-level high-tech enterprise and large-scale energy equipment manufacturing enterprise. Its main business includes power transmission and transformation, new energy, and energy. Xinte Energy is the holding subsidiary of the company's new energy business segment and involved in the production of polysilicon, and engineering and construction contracting services for photovoltaic and wind power projects. Xinte Energy maintains a high degree of independence between its business areas and operating methods from other businesses of the company. The specific effects of Xinte Energy's domestic listing are as follows:

a) Proportion of net profit

According to the "Audit Report" (XYZH/2020URA30048) issued by ShineWing Certified Public Accountants (Special General Partnership), the company's net profit attributable to shareholders of the parent company in 2019 was 2.018 billion yuan, of which Xinte Energy's attributable to Shareholders of the parent company accounted for 13.05% of the net profit.

b) Proportion of net assets

According to the "Audit Report" (XYZH/2020URA30048) issued by ShineWing Certified Public Accountants (Special General Partnership), as of December 31, 2019, the company’s net assets attributable to shareholders of the parent company were 34.884 billion yuan, of which the new Xinte Energy's net assets attributable to shareholders of the parent company accounted for 21.43%.

c) Impact on the company's business

The company’s main business includes power transmission and transformation, new energy, and energy. Xinte Energy is the holding subsidiary of the company's new energy business segment and is involved in the production of polysilicon, and engineering and construction contracting service for photovoltaic and wind power projects. Xinte Energy maintains a high degree of independence between its business areas and operating methods from other businesses of the company. The domestic listing of Xinte Energy will not have a substantial impact on the continued operation of the company's other businesses.

d) Impact on the company's profitability

The domestic listing of Xinte Energy and the creation of a new financing platform are in line with the company's strategic planning and long-term development. The listing will enhance Xinte Energy’s financial strength, optimize its industrial layout, enhance the competitiveness and profitability of the new energy industry, and achieve better development of the new energy industry.

6.Rick warning

Xinte Energy's domestic listing plan is still in the preliminary planning stage. After the company's management has completed the preliminary preparations, the company's board of directors will need to determine whether Xinte Energy's domestic listing complies with the "Regulations on Pilot Domestic Listing of Subsidiaries of Listed Companies", etc. Laws, regulations, and regulatory documents require resolutions need to be submitted to the company's shareholders' meeting for approval. There will still be various uncertain factors in the implementation of this domestic listing, which may affect the listing planning and decision-making of Xinte Energy. There is a certain degree of uncertainty in this domestic listing.

In response to the above risks, the company will perform its information disclosure obligations in a timely manner based on the progress of the project. Investors are kindly requested to pay attention to the relevant risks.

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Breaking Featured

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JA Solar Supplies Largest Single Photovoltaic Project in Guam with All Modules Needed for Completion ›

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Number of Cancelled and Postponed Conferences Continue to Rise Amid Coronavirus Epidemic

Chinese Photovoltaic Enterprises Combine for More Than 80 Million Yuan in Donations Towards Coronavirus Relief Efforts

Risen Energy at Bloomberg Summit London: Asset Securitization Can Reduce the Leverage Cost of Energy Finance

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EXHIBIT 44

TBEA: a service provider of systematic solutions for global energy industry

TBEA is an active participant in the three national strategy new industries of "high-end power transmision and transformation equipment manufacturing, renewable energy and new materials" and has successfully established three listed companies: TBEA (stock code 600089), Xinjiang Joinworld Company Limited (stock code 600888) and Xinte Energy (stock code HK1799).

The Company actively practices the national strategy of "the Belt and Road initiative" and is devoted to sharing the advanced electricity construction experience of China with the world. The Company has provided green technology and smart environment-friendly, stable and efficient energy equipment to more than 70 countries, including the United States, Russia, Brazil, Mongolia, Tajikistan, Kyrgyzstan, Pakistan, etc. and supplied the turnkey project and systematic solutions from survey to design, construction, installation and debugging and to training, operation and maintenance to promote the construction of green and efficient power supply and grid, benefit the people of various countries and promote the economic development of local areas.

1000kV Shanxi Southeast – Nanyang –Jingmen extra-high voltage model project

Pakistan 100 MW photovoltaic power station constructed by TBEA

New materials such as electronic aluminum foil and electrode aluminum foil are used in the field of rail transit, electronic information technology and automotive lightweight fields etc.

2×660MW Zhundong Power Plant to transmit Xinjiang electricity outside

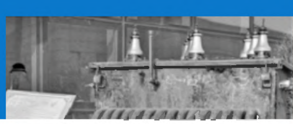
Distribution of TBEA industry parks

The Company has 14 manufacturing industry parks in China and 3 bases abroad.

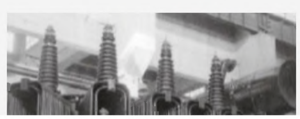
Xinjiang Headquarters Science and Technology R&D Base (Changji, Xinjiang)

years; as a participant, TBEA runs all the way up to now from the first equipment in China to the first one in the world.

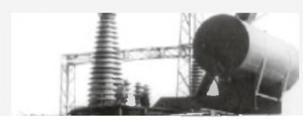
1938



1955



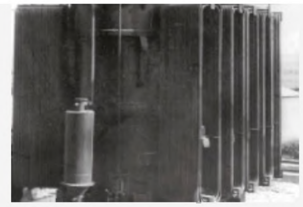
1959



1973

In 1938, TBEA developed the first power transformer in China

In 1955, TBEA developed the first 110kV transformer in China

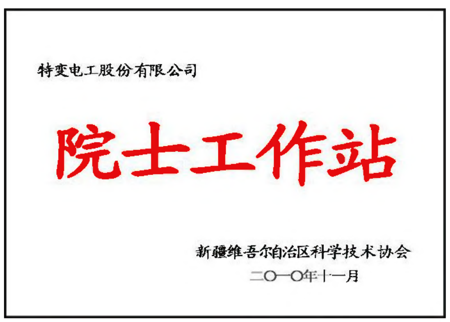


In 1959, TBEA developed the first 220kV transformer in China

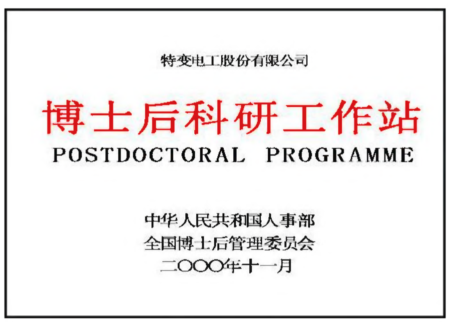
In 1973, TBEA developed the 330kV transfo China

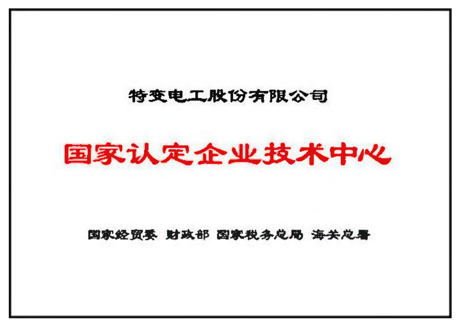
1938 1955 1959 197

Honors and qualifications

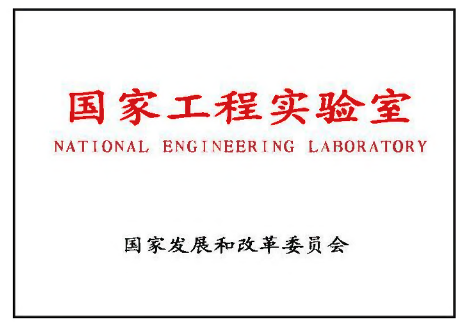


Academician Workstation





Enterprise Technology Center



Engineering Laboratory

Postdoctoral Science Research
Workstation

China National Science and Technology Progress Award


Ranking No. 228 in the World's top 500 mechanical companies


Ranking No.327 in China's top 500 enterprises


Ranking No.7 in top 100 of Chinese industrial machinery companies


Ranking No.133 in China's top 500 private enterprises

Ranking No.80 in Top 250 International Contractors listed by ENR

The business scope of TBEA covers over 70 countries and regions and over 20,000 employees are working for the Company.

In 2015, the total capital of the whole company reached 88.7 billion RMB and the sales revenue was more than 50 billion RMB. The Company has built the only national level UHV transformer engineering technology research center, four national level engineering labs, five national level enterprise technology centers, post doctor research work stations and academician work stations, which have formed a science and technology innovation platform where production, academy and research are integrated. The Company has won the honors of 1 special award, 4 class I awards and 1 class II award of national scientific and technological progress prize, China Industry Awards, National High-tech Enterprise, National Technology Innovation Model Enterprise, etc.

The development of TBEA has won high praises along the Belt and Road.

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EXHIBIT 45

NEWS (HTTPS://WWW.PV-TECH.ORG/CATEGORY/NEWS/)

LONGi to build new 1GW mono solar cell plant in Malaysia

By Mark Osborne (https://www.pv-tech.org/author/markosborne/)

February 25, 2019

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Southeast Asia & Oceania (https://www.pv-tech.org/regions/southeast-asia-oceania/)

Leading monocrystalline wafer producer and 'Solar Module Super League' (SMSL) member LONGi Green Energy Technology has announced plans to build a new 1GW monocrystalline solar cell manufacturing plant in Kuching, Malaysia.

LONGi Group said that the plant would be built in the Shama Jaya Free Industrial Park, Kuching City, Sarawak, Malaysia at a cost of approximately RMB 840 million (US$125.5 million) and operated by its SMSL subsidiary, LONGi Solar.

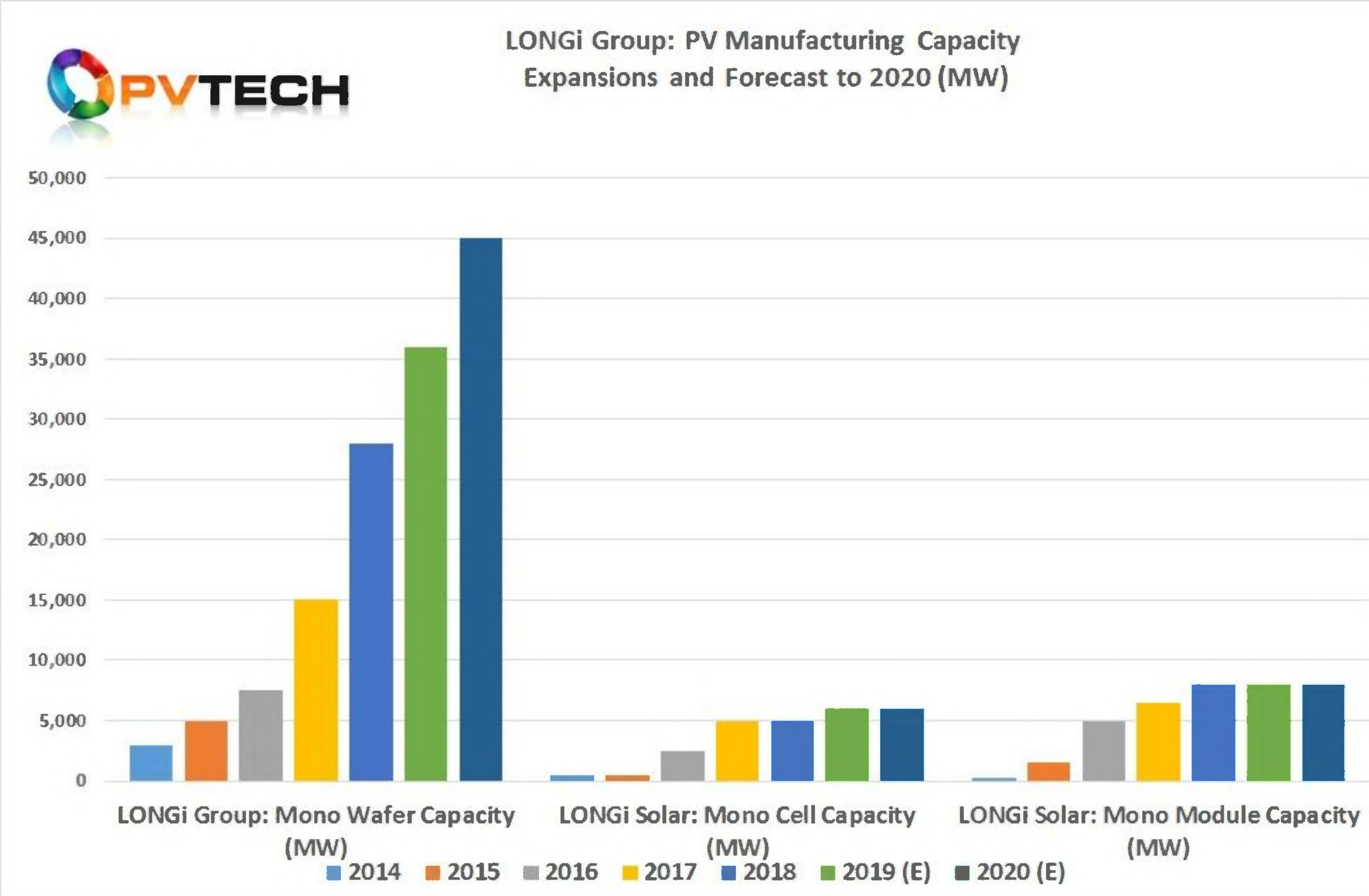
LONGi already owns and operates 500MW mono solar cell and 500MW of module assembly production at the industrial park in Kuching.

The company said that the capacity expansion was intended to meet demand in overseas markets and further expand its manufacturing footprint outside China.

The new capacity is expected to come online later in 2019, providing the company with a total of 6GW of in-house mono cell capacity.

According to PV Tech's capacity expansion announcement reports, no new production capacity was announced in Malaysia in 2018. New capacity expansion plans in Malaysia topped 4GW in 2017 and was the second largest home to manufacturing in South East Asia.

Only approximately 700MW of new solar cell capacity plans were announced in the second half of 2018, primarily due to changes to solar support in China under the 531 New Deal.



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(https://www.pv-tech.org/maxwell-technologies-breaks-own-hj-solar-cell-efficiency-record/)

EXHIBIT 46

JA Solar completes $70m Malaysian fab

The Chinese solar company has confirmed that production at the facility in Bayan Lepas will begin in the next couple of weeks. Fab is JA Solar's first outside of China.

OCTOBER 21, 2015 **IAN CLOVER**

MANUFACTURING MARKETS MARKETS & POLICY

Share

Chinese vertically integrated solar company JA Solar has completed construction of its first manufacturing facility outside of China □ a RM300 million ($70 million) facility in the city of Bayan Lepas, Malaysia.

Production at the plant will begin in a couple of weeks, with the first shipments to overseas markets expected before the end of the year, confirmed JA Solar□s Malaysia deputy general manager Ong Ken Yong.

The 400 MW factory will produce JA Solar□s high-efficiency multicrystalline silicon solar cells, and will account for around 10% of the company□s overall production. JA Solar□s shipments for Q3 2015 are forecast to be somewhere between 900 MW to 950 MW.

"One reason why we are in Malaysia is because it is part of our long-term strategy of moving some of our manufacturing sites to outside China. This is to reduce geograhical risk and adjust to developmet head, Dr Christoph Flink.

"[In] Asia, the first to lead our manufacturing site is Malaysia, but we have also signed a memorandum of understanding in India, which might be on a joint-venture basis," he added.

The facility will sustain employment for around 700 people, and JA Solar was keen to stress that the fab is also fully compliant with local regulations. □We have secured the necessary business, manufacturing and environmental licences and approvals from government authorities such as the Malaysian Investment Development Authority and the Department of Environment,□ Ong added.

According to recent analysis from Bloomberg New Energy Finance (BNEF), more than one-tenth of all production capacity of China□s leading solar firms will be located overseas by 2016, reaching more than 5.3 GW of solar cell capacity in foreign lands by the end of the year.

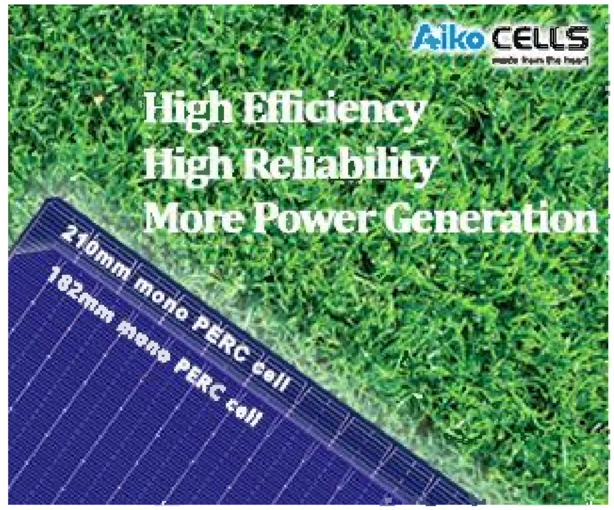
In addition to JA Solar□s Malaysian venture, Trina Solar is building a production facility in Thailand and JinkoSolar is nearing the completion of a 950 MW cell and module fab in Malaysia. BNEF believes that more than 50% of future solar panel production from leading Chinese companies will be located in Southeast Asian nations due to attractive economics and logistics, and despite the threat of widened antidumping investigations spreading to many of these nations.

** This article was updated on October 22 to correct the erroneous investment figure ($70 million, not $47 million) and comments pertaining to the markets the new fab is intended to serve. The article headline was also changed to reflect this.*

IAN CLOVER

Ian joined the pv magazine team in 2013 and specializes in power electronics (inverters) and battery storage. Ian also reports on the UK solar market, having worked as a print and web journalist in Britain for various multimedia companies, covering topics ranging from renewable energy and sustainability to real estate, sport and film.
More articles from Ian Clover

clover@pv-magazine.com



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Mobil REPLY

December 27, 2016 at 9:27 pm

Solar energy is our future, it is the only way mankind have if we want to live on this planet.

EXHIBIT 47

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LONGi approves 10GW of module and 5GW of new solar cell capacity expansion plans

By Mark Osborne (https://www.pv-tech.org/author/markosborne/)

October 15, 2019

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LONGi Green Energy Technology Co, the largest monocrystalline wafer producer, has approved future PV module and solar cell manufacturing plans of 10GW and 5GW, respectively.

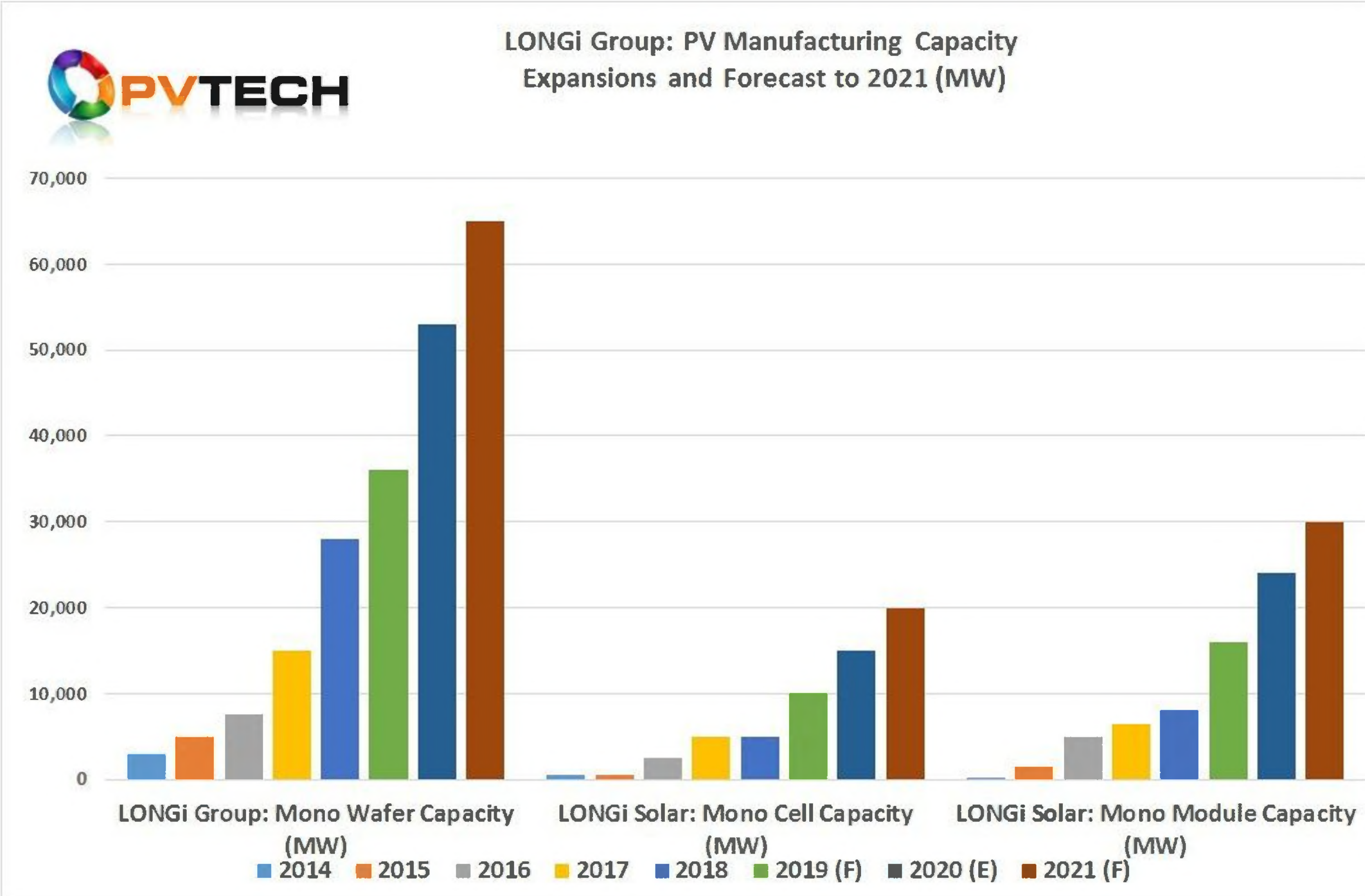
LONGi's Board of Director have approved the investment of approximately RMB 2.021 billion (US$ 286 million) in the construction of a 5GW mono module plant in Zhangzhou, China, dubbed Luzhou Phase II. The project is expected to take around 15 months to complete.

The company also approved another 5GW mono module plant in Xianyang, China in the Xianyang High-tech Industrial Development Zone. The capital expenditure and working capital for the project is expected to be in the region of RMB 1.839 billion (US$ 269.2 million) and take around 15 months to complete.

The third planned investment relates to a new 5GW mono solar cell plant to be located in Xi'an Xincheng City, China at a cost of approximately RMB 2.462 billion (US$ 348.4 million). The project is expected to take around 24 months, according to LONGi.

LONGi did not disclose in documents when the projects were expected to start construction and be completed.

The company has already announced separate plans to take cumulative PV module nameplate capacity to 23GW in 2020.



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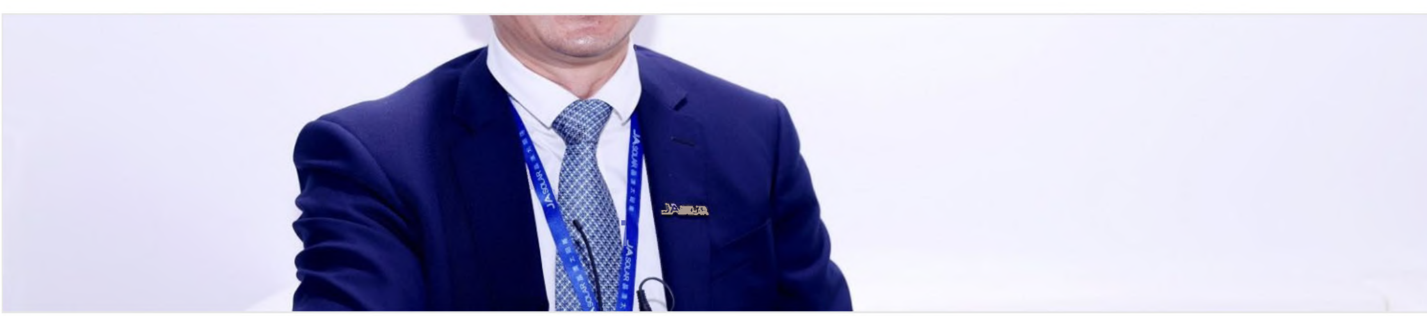

(https://www.pv-tech.org/how-ja-solar-is-responding-to-materials-price-increases/)

PV Tech Premium

How JA Solar is responding to materials price increases

EXHIBIT 48

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JA Solar takes solar cell capacity plans at Yangzhou plant to 10GW

By Mark Osborne (https://www.pv-tech.org/author/markosborne/)

January 26, 2021

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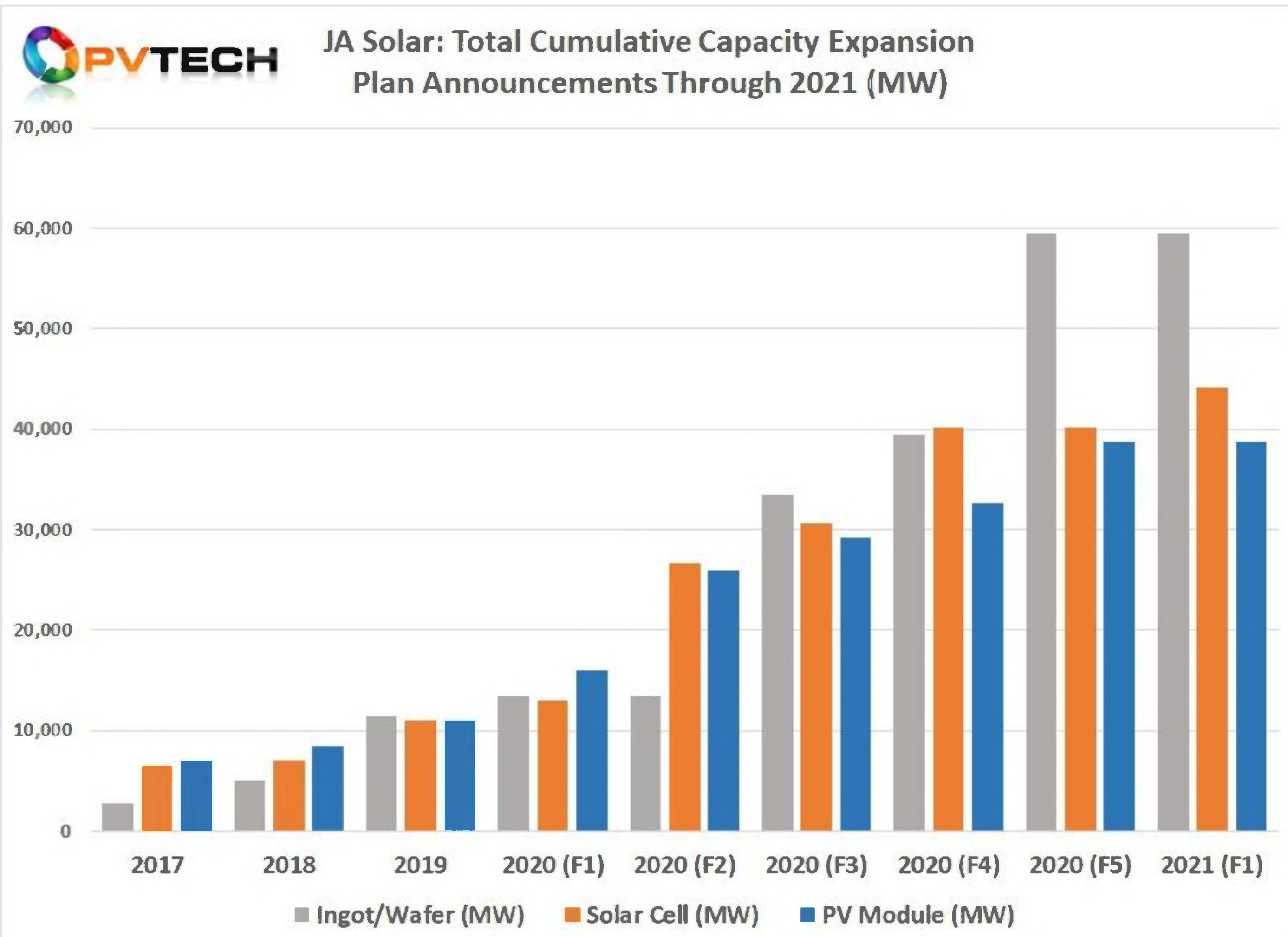
'Solar Module Super League' (SMSL) member JA Solar has updated its capacity expansion plans for its solar cell and module assembly plant in the Yangzhou Economic and Technological Development Zone (ETDZ).

The manufacturer has approved plans to invest in taking solar cell capacity to 10GW, up from previous plans to build a 6GW solar cell facility alongside a 6GW module assembly plant.

JA Solar said that the plans included a two-phase approach. The first phase would be a 6GW solar cell and a 6GW module assembly plant, with a total planned investment of around RMB6 billion (US$926 million).

The second phase would include a 4GW solar cell expansion with an investment of around RMB4 billion (US$617 million).



The first phase of the project would be completed within three years from the beginning of 2021, which included the module assembly plant being operational at the end of 2021.

The 4GW second phase would be subject market demand and negotiated separately with the ETDZ, according to the company.

Combined with a series of previous expansion plan announcements, JA Solar could achieve a total of around 35GW of module assembly capacity in 2021.

However, this is subject to change as projects previously announced begin construction through to production ramps of monocrystalline wafers, cell and modules at multiple sites, mainly in China.

c-si manufacturing (https://www.pv-tech.org/tag/csi-manufacturing/), china (https://www.pv-tech.org/tag/china/), investment (https://www.pv-tech.org/tag/investment/), ja solar (https://www.pv-tech.org/tag/ja-solar/), monocrystalline wafer (https://www.pv-tech.org/tag/monocrystalline-wafer/), perc (https://www.pv-tech.org/tag/perc/), pv modules (https://www.pv-tech.org/tag/pv-modules/), smsl (https://www.pv-tech.org/tag/smsl/)

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(https://www.pv-tech.org/african-coal-plant-operator-turns-to-solar-for-new-power-jv/)

African coal plant operator turns to solar for new power JV (https://www.pv-tech.org/african-coal-plant-operator-turns-to-solar-for-new-power-jv/)

June 14, 2021

Mozambique-based coal operator Ncondezi Energy has announced a joint venture (JV) with South African-based NESA to target South Africa's C&I solar and storage markets.

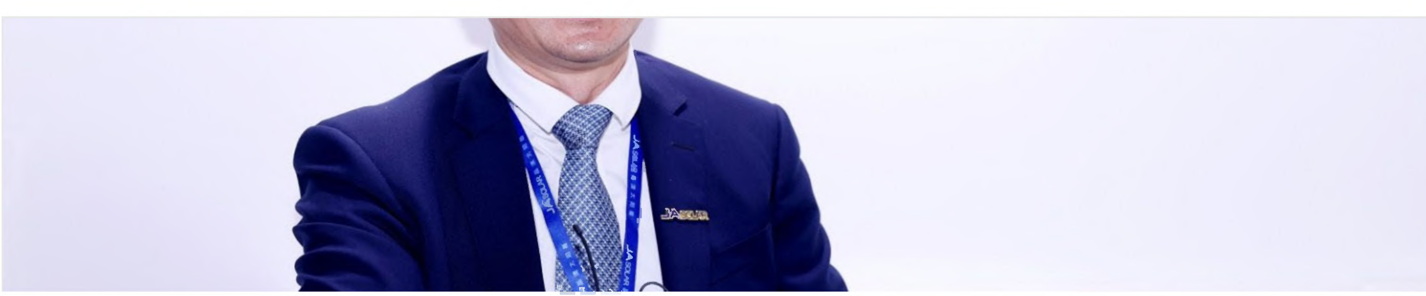

EXHIBIT 49

JA Solar announces facility expansion in Malaysia

The Chinese PV manufacturer initiated its Phase Two expansion at its 400 MW production facility on the Malaysian island of Penang, which should increase the production capacity to 1 GW per year, as it continues its global expansion in various PV markets.

OCTOBER 6, 2016 **SAM POTHECARY**

MARKETS MARKETS & POLICY

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Tier one solar player JA Solar is cranking up its production capacity outside of China, with news of a further expansion at its Bayan Lepas production facility. The expansion comes in the face of falling module prices around the work, as an oversupply seems to be taking hold of the industry.

It is just one year since the facility opened in Bayan Lepas on the island of Penang, Malaysia, and already JA Solar has launched its second phase expansion. The company will invest RM 400 million (USD 48 million) in the expansion, which will see the creation of 200 jobs at the plant.

Most notably, the investment will be used to significantly increase the manufacturing output capacity from 400 MW per annum to 1,000 MW per annum. Additionally, it will enable the facility to start producing JA Solar□s new line of Percium solar cells.

This further investment by them here reflects Penangs position as a key center for JA Solar and by making its latest products here, JA Solar can ensure that Penang and Malaysia remains at the forefront of the solar industry, said JA Solar Holdings Co Ltd President Jian Xie during a speech, while also the move was part of the companys global strategy.

One related development, which may have partially inspired the new investment in the Malaysia facility, is JA Solars decision to withdraw from the European Union (EU) pricing undertaking. The company voluntarily withdrew from the minimum import price undertaking, which it had agreed with the EU, as part of the EUs anti-dumping measures against Chinese PV manufacturers. The withdrawal means that large duties will be charged on JA Solars exports to Europe.

However, the measures are not applied to the companys manufacturing facilities located outside of its domestic location of China. Therefore, its Malaysian facility will be able to supply the European market without the duties being applied.

SAM POTHECARY

Sam joined pv magazine in 2016, primarily to manage the magazine's online presence. As well as writing and editing articles for the daily news section, he reports on the global solar industry and climate policies for the magazine.

More articles from Sam Pothecary

sam.pothecary@pv-magazine.com

Interview: Corporates' climate commitments open doors for massive renewable energy deployment

Chinese PV Industry Brief: Solar glass companies see profits soar in first half of 2021

In Conversation: Dust matters

Elsewhere on pv magazine...

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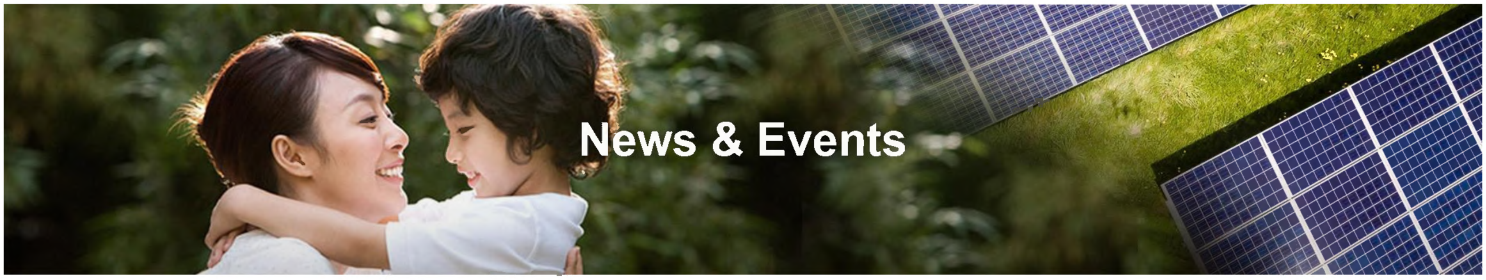

JA Solar Reaches Important Milestone: Monocrystalline PV Product Shipments Total 7GW Over Last Decade

Release time: 2016-07-26

JA Solar Holdings Co., Ltd. (Nasdaq: JASO) ("JA Solar"), one of the world's largest manufacturers of high-performance solar power products, today announced that as of middle of July this year, the company's shipments of monocrystalline PV products over the last ten years had totaled 7GW.

The strong shipment performance is the result of JA Solar's unremitting commitment to the development of higher-efficiency solar products. JA Solar was founded in 2005, and started production in March 2006. The company focuses on the research and development of monocrystalline cell products, and has accumulated rich experience in the area. Since 2010, JA Solar has been one of the world's leading solar cell producers and the largest P-type monocrystalline cell manufacturer. The world-class cell technologies enable JA Solar to manufacture PV modules with high conversion efficiency, high power output and high reliability. After transforming its main business from cells to modules, JA Solar's shipments of monocrystalline modules reached 500MW in 2013, making the company the world's largest P-type monocrystalline module provider. In 2014, the company shipped more than 1GW of monocrystalline modules, and the figure for 2016 is expected to near 2GW.

Percium, launched in October 2013 as a flagship product, is a high-efficiency monocrystalline module developed by JA Solar. Percium modules incorporate cells using Passivated Emitter and Rear Cell ("PERC") technology and JA's PERC cells have delivered continuous improvement in conversion efficiency over the past three years. In June 2014, volume production began for Percium high-efficiency cells, making JA Solar the industry leader in furnishing an average conversion efficiency of over 20% for a mass-produced P-type cell. Percium family products now have average conversion efficiencies of up to 21%; the average power output of 60-cell modules exceeds 295W, and that of 72-cell modules exceeds 345W. Percium modules feature better low-light performance, a lower temperature coefficient, lower light attenuation, and better PID resistance. For comparison, they generate 2% more electricity per rated "watt" than conventional monocrystalline modules.

In 2015, China launched an initiative, the "Front Runner" project, with the aim of bringing about a transformation of the PV industry and driving the industry to develop higher efficiency and lower cost per watt products. This undoubtedly provides a significant growth opportunity for JA Solar. As one of the few manufacturers in China that have the capacity to mass-produce high-efficiency monocrystalline PV modules, JA Solar provided 422MV modules for the national advanced PV technology demonstration project in Datong, Shanxi province, including 303MW monocrystalline modules. The first phase of the project has a total installed capacity of 1GW, for which JA Solar is providing 42% of modules needed, with monocrystalline modules accounting for more than 30% of the project's total. In addition, JA Solar produces five types of PV modules that meet or exceed China's "Front Runner" standards.

"JA Solar is one of the monocrystalline PV products manufacturers with the longest history, and is also the largest P-type monocrystalline modules provider in the world," said Mr. Jian Xie, President of JA Solar. "Reaching the shipments of 7GW monocrystalline modules demonstrates consumers' confidence in the quality of such products and the popularity of our high-efficiency products on the market. As the trend of monocrystalline module recovers in China, we intend to further bolster our track record of innovations in technology, with the goals of better conversion efficiency and improved manufacturing processes. JA Solar is proud to play a key role in the transformation and improvement of China's PV and manufacturing sectors."

The last one： JA Solar Establishes New Subsidiary in Brazil

Next： JA Solar Supplied All Modules for the First Large-scale Solar Power Plant in Bangladesh

...

21MW Ground-Moun...

38.7MW Ground-Mo...

5MW Rooftop Dis..

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PV Modules

60-cell MBB Half-cell Module

72-cell MBB Half-cell Module

72-cell MBB Bifacial PERC Half-Cell Double Glass Module

72-cell MBB Half-cell Module

60-cell MBB Bifacial PERC Half-Cell Double Glass Module

72-cell MBB Bifacial PERC Half-Cell Double Glass Module

Global Project References

100MW Three Gorges Ground-Mounted...

49MW Ground Power Station in Southwark, UK

80MW Ground-Mounted Power Plant in Utah, USA

255MW Ground-Mounted Power Plant in Bahia, Brazil

5.44MW Rooftop Distributed Power Plant of UFES, Brazil

10.1MW Ground-Mounted Power Plant in Toshka, Egypt

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EXHIBIT 51

INDUSTRY UPDATES (/INDUSTRY-UPDATES/)

Jinkosolar's R&D center in Penang, Malaysia continues to give Return on Investment

By Jinko Solar

December 26, 2019

Source: Jinko Solar

JinkoSolar, the world's largest solar module producer, initially broke ground on the first phase of a new research and development center in Penang, Malaysia in July 2016, with a total investment of US$50 million. The R&D center, which operates according to IEC/ISO requirements, was originally built over 700 square meters, before relocating to occupy an expanded area of 2,100 square meters in November 2018. It now has the capacity to house more than 100 researchers, who will continue to spearhead the company's research over the coming years. The R&D center will be geared towards continued research and development for the Tiger 460 watt panel and, furthermore, will ensure a secure supply of new materials and related tools all the way from the lab to the fab. This internationally significant initiative underlines the company's continued commitment to expanding and investing in R&D overseas and moving ahead quickly with its global technical leader ambitions.

Penang serves as one of the company's major production facilities and its research and development center focuses on future cell and module technology. Late last month, Jinkosolar unveiled its R&D roadmap at its Investor Conference in China, and announced its full-year sales target at the high end of its forecast, due to strong demand for the Tiger series and industry confidence in the premium mono market for 450watt and beyond.

The company's strength in research and development will help support and advance this critical industry trend on multiple levels and help secure the progress of ever-advancing solar PV technology. The center also allows Jinkosolar to facilitate access to multi-project runs to test the effectiveness of proposed research.

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Top-Performing PV Modules: 2021 PVEL Scorecard (https://app.livestorm.co/solar-media/top-performing-pv-modules-2021-pvel-scorecard?utm_source=pvtech&utm_medium=event-listings)
UPCOMING WEBINARS
May 26, 2021
Session 1 - 7:00 AM (BST) | Session 2 - 5:00 PM (BST)

Global PV Module Supply: Materials Sourcing, Traceability & Company Rankings (https://app.livestorm.co/solar-media/global-pv-module-supply-materials-sourcing-traceability-and-company-rankings?type=detailed)
UPCOMING WEBINARS
June 3, 2021

Utility Solar Summit UK (https://uss.solarenergyevents.com/)
SOLAR MEDIA EVENTS
June 15, 2021

Solar & Storage Finance Asia (https://financeasia.solarenergyevents.com/)
SOLAR MEDIA EVENTS
July 6, 2021

PV CellTech (http://celltech.solarenergyevents.com/?utm_source=pv-tech&utm_medium=website&utm_campaign=continual)
SOLAR MEDIA EVENTS
August 24, 2021

EXHIBIT 52

Foreign Exchange Rates - H.10

RSS Data Download

Effective June 24, 2019, the Federal Reserve Board staff will make a change to the indexation of the daily Broad, AFE, and EME dollar indexes. For more information, see the "Technical Q&As".

Release Date: Tuesday, July 06, 2021

Historical Rates for the Chinese Yuan Renminbi

(Rates in currency units per U.S. dollar except as noted by an asterisk)

3-JAN-00	8.2798
4-JAN-00	8.2799
5-JAN-00	8.2798
6-JAN-00	8.2797
7-JAN-00	8.2794
10-JAN-00	8.2794
11-JAN-00	8.2795
12-JAN-00	8.2796
13-JAN-00	8.2798
14-JAN-00	8.2797
17-JAN-00	ND
18-JAN-00	8.2793
19-JAN-00	8.2797
20-JAN-00	8.2794
21-JAN-00	8.2795
24-JAN-00	8.2789
25-JAN-00	8.2786
26-JAN-00	8.2782
27-JAN-00	8.2783
28-JAN-00	8.2781
31-JAN-00	8.2777
1-FEB-00	8.2774
2-FEB-00	8.2773
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4-FEB-00	8.2788
7-FEB-00	8.2788
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16-FEB-00	8.2777

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8-DEC-20	6.5307
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10-DEC-20	6.5419
11-DEC-20	6.5445
14-DEC-20	6.5480
15-DEC-20	6.5388
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30-DEC-20	6.5208
31-DEC-20	6.5250
1-JAN-21	ND
4-JAN-21	6.4601
5-JAN-21	6.4550
6-JAN-21	6.4617

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LONGi sets solar industry record for R&D spending

By Mark Osborne (https://www.pv-tech.org/author/markosborne/)

April 9, 2018

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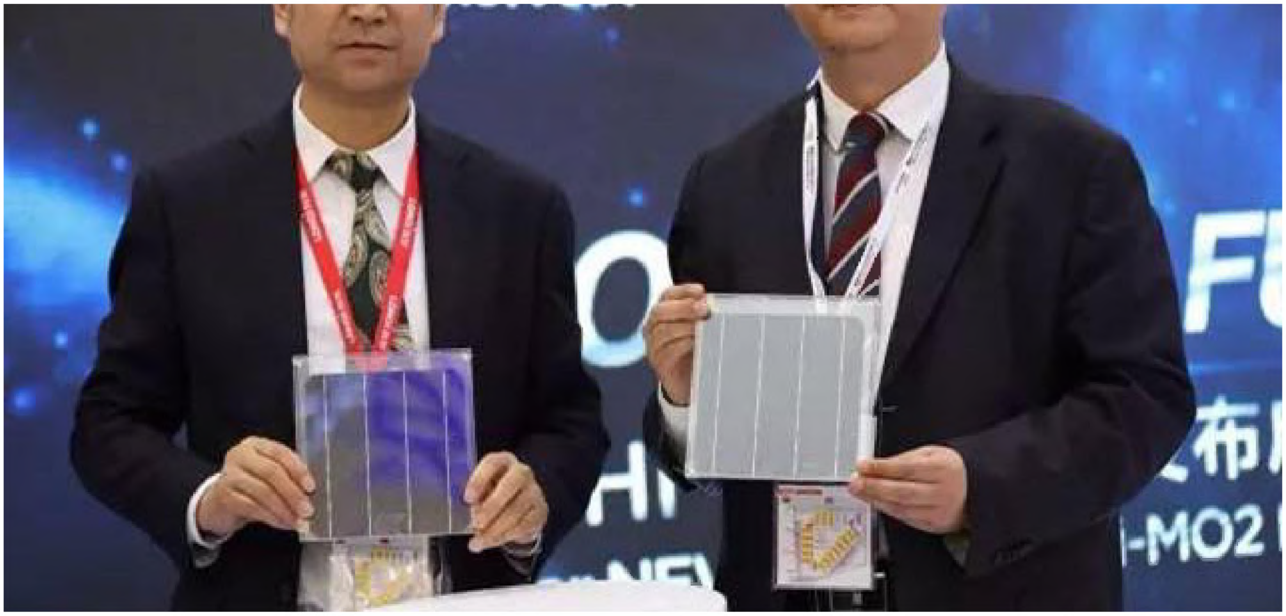
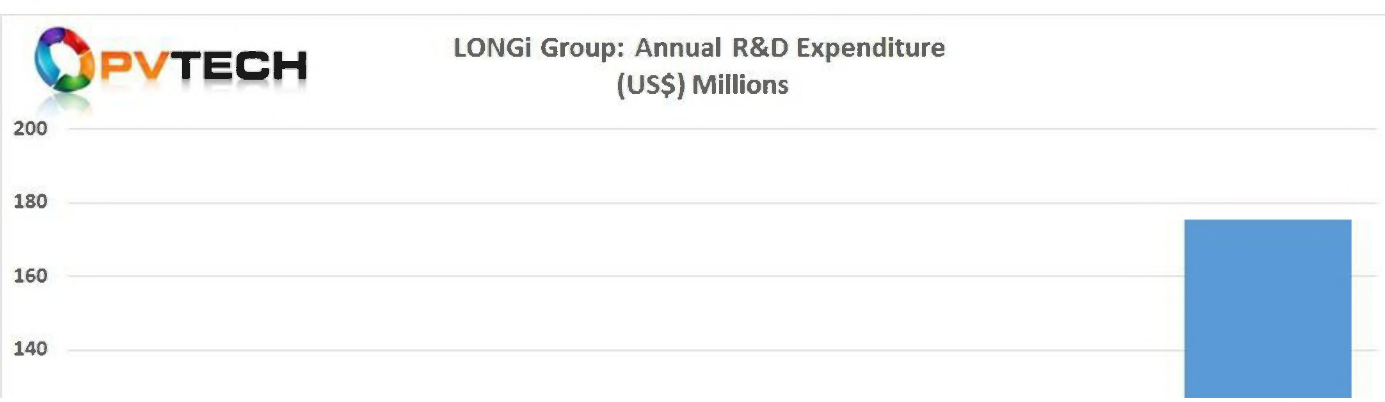


Leading integrated high-efficiency monocrystalline module manufacturer and 'Silicon Module Super League' (SMSL) member (https://www.pv-tech.org/editors-blog/top-10-module-suppliers-in-2017) LONGi Green Energy Technology set a new solar industry R&D expenditure record in 2017, not only surpassing the two historical leaders, First Solar and SunPower, but also spending more in one year than any PV manufacturer to date.

According to LONGi's recently released 2017 annual financial report, total R&D expenditure in 2017 almost doubled to RMB 1.1 billion (US$175.7 million), up 96.67% from US$89.2 million in 2016. LONGi reported total revenue of RMB 16.362 billion (US$2.59 billion) in 2017, up almost 42% from the previous year. Therefore, R&D spending accounted for 6.77% of revenue in 2017.

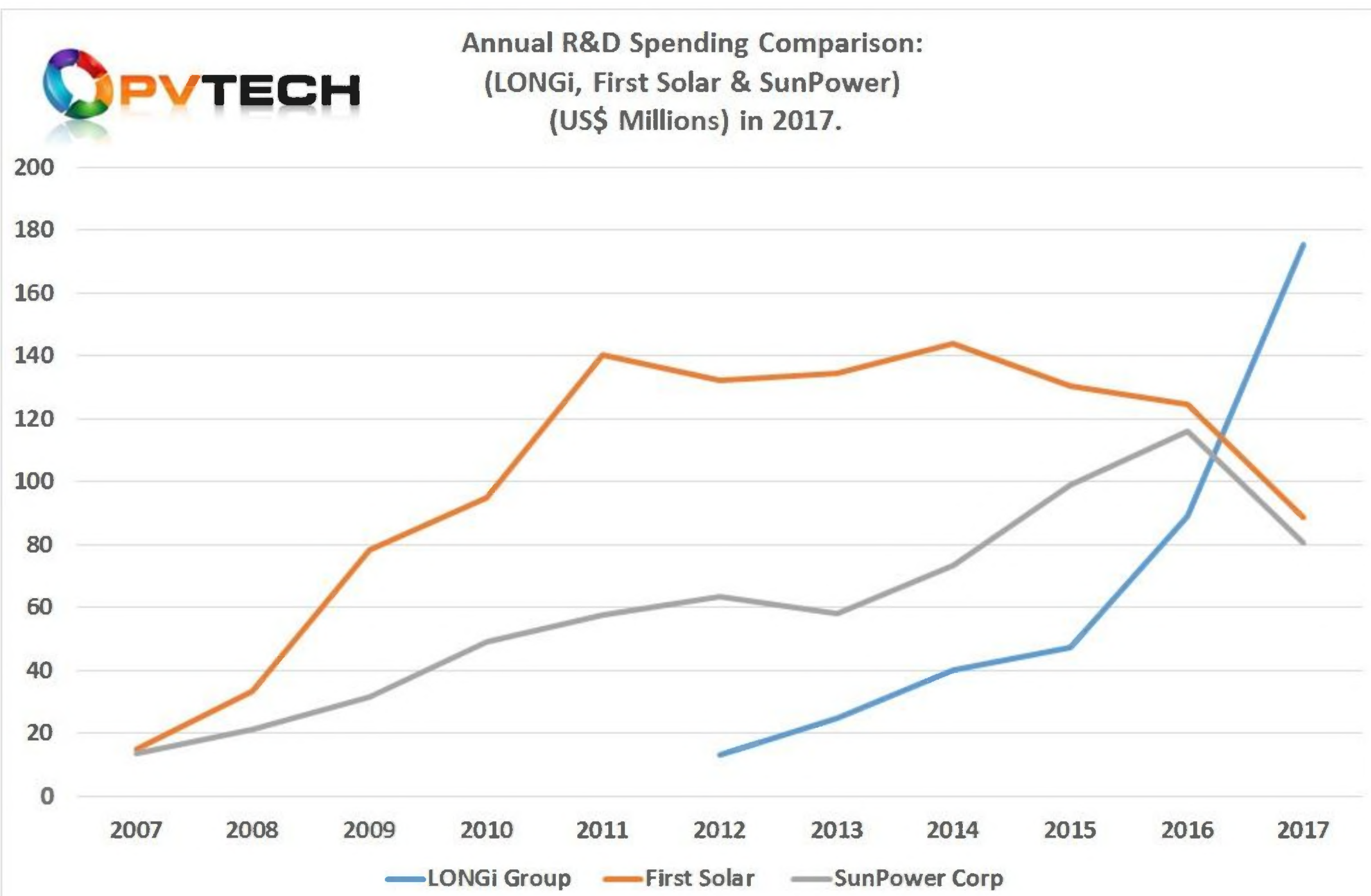
According to PV Tech's long-standing analysis of R&D spending (http://https://www.pv-tech.org/editors-blog/10-years-of-rd-spending-analysis-of-12-key-pv-module-manufacturers) of leading PV module manufacturers, only SunPower has come close when in 2015, R&D spending accounted for 6% of revenue and First Solar topped 5.1% in 2011.

However, one of the key metrics is that LONGi surpassed perennial top ranked R&D spenders, First Solar and SunPower, respectively, by a significant margin. Both US headquartered companies cut R&D spending in 2017, the first time for SunPower in four years, while First Solar trimmed R&D spending for the third consecutive year.



In contrast, LONGi has increased R&D spending for six years in row and has maintained a high-level of R&D investment over the last four years.

Initially, LONGi was a dedicated monocrystalline ingot and wafer producer but notably since 2015, the company started production of monocrystalline solar cells and modules. Focused on high-efficiency PERC (Passivated Emitter Rear Cell) technology, R&D spending almost doubled each year since 2016.



However, in reporting R&D expenditure of US$175.7 million, LONGi also set a new annual solar industry spending record, according to PV Tech's analysis.

First Solar had previously held the record at US$143.9 million, set in 2014. First Solar remains the leader in R&D spending on a cumulative basis, reaching over US$1.11 billion between 2007 and 2017.

SunPower remains second ranked at over US$663 million in the same time period. However, LONGi has jumped ahead of several other PV manufacturers to take the third ranked position with over US$390 million in cumulative R&D spending since 2012.

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LONGi Global Network

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OR

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended December 31, 2017

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

OR

☐ **SHELL COMPANY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

Date of event requiring this shell company report . . . .

For the transition period from **to**

Commission file number 001-33290

JA Solar Holdings Co., Ltd.

(Exact name of Registrant as specified in its charter)

The Cayman Islands
(Jurisdiction of incorporation or organization)

Building No.8, Noble Center, Automobile Museum East Road
Fengtai, Beijing 100070
The People's Republic of China
(Address of principal executive offices)

Ms. Ying Li
JA Solar Holdings Co., Ltd.
Building No.8, Noble Center, Automobile Museum East Road
Fengtai, Beijing 100070
The People's Republic of China
Tel: +86-10-63611888
Fax: +86-10-63611999
(Name, Telephone, E-mail and/or Facsimile and Address of Company Contact Person)

Securities registered or to be registered pursuant to Section 12(b) of the Act.

Title of each class	Name of each exchange on which registered

American depositary shares, each representing five ordinary share, par value US$0.0001 per share Ordinary shares, par value US$0.0001 per share*	The NASDAQ Stock Market LLC

* Not for trading but only in connection with the registration of American depositary shares

Securities registered or to be registered pursuant to Section 12(g) of the Act:

None
(Title of Class)

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Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act:

None
(Title of Class)

Indicate the number of outstanding shares of each of the issuer's classes of capital or common stock as of the close of the period covered by the annual report:

237,926,352 ordinary shares, par value US$0.0001 per share, as of December 31, 2017.

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

☐ Yes ☒ No

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934.

☐ Yes ☒ No

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

☒ Yes ☐ No

Indicate by check mark whether the registrant has submitted electronically and posted on its Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or such shorter period that the registrant was required to submit and post such files).

☒ Yes ☐ No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☐ Accelerated filer ☒ Non-accelerated filer ☐ Emerging growth company ☐

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards† provided pursuant to Section 13(a) of the Exchange Act. ☐

†The term "new or revised financial accounting standard" refers to any update issued by the Financial Accounting Standards Board to its Accounting Standards Codification after April 5, 2012.

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

US GAAP ☒ International Financial Reporting Standards as issued by the International Accounting Standards Board ☐ Other ☐

If "Other" has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow.

☐ Item 17 ☐ Item 18

If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

☐ Yes ☒ No

(APPLICABLE ONLY TO ISSUERS INVOLVED IN BANKRUPTCY PROCEEDINGS DURING THE PAST FIVE YEARS)

Indicate by check mark whether the registrant has filed all documents and reports required to be filed by Sections 12, 13 or 15(d) of the Securities Exchange Act of 1934 subsequent to the distribution of securities under a plan confirmed by a court.

☐ Yes ☐ No

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CERTAIN TERMS AND CONVENTIONS

Unless otherwise indicated, in this annual report:

- "ADS" refers to American depositary shares, each representing five ordinary shares of JA Solar, par value US$0.0001 per share;
- "Buyer Group" refers to Holdco, Parent, Merger Sub, Mr. Baofang Jin, JASO Top and the Rollover Shareholders collectively;
- "China" and the "PRC" refer to the People's Republic of China, excluding, for the purposes of this annual report only, Taiwan and the special administrative regions of Hong Kong and Macau;

SAFE, subject to certain regulations. Foreign exchange income under capital account can be retained or sold to financial institutions that have foreign exchange settlement and sales business, with prior approval from SAFE, unless otherwise provided.

On March 30, 2015, SAFE promulgated Circular 19, which expands a pilot reform of the administration of the settlement of the foreign exchange capitals of foreign-invested enterprises nationwide. Circular 19 came into force on June 1, 2015, replacing SAFE Circular 142, SAFE Circular 88 and SAFE Circular 36. Circular 19 removed certain restrictions previously provided under Circular 142 for foreign-invested enterprises. Circular 19 provides that, among other things, an FIE may convert foreign currency capital in its capital account into RMB on an "at will" basis. On June 9, 2016, SAFE promulgated Circular 16 to further expand and strengthen such "at will" conversion reform under Circular 19. Circular 16 provides an integrated standard for conversion of foreign exchange under capital account items on an "at will" basis which applies to all enterprises registered in the PRC. Pursuant to Circular 16, in addition to foreign currency capital, enterprises registered in the PRC may also convert their foreign debts, as well as repatriated funds raised through overseas listing, from foreign currency to RMB on an "at will" basis. Circular 16 reiterates that the RMB funds so converted shall not be used for the purpose of, whether directly or indirectly, (i) paying expenditures out of the ordinary course of business or prohibited by laws or regulations; (ii) making securities investment or other investments (except for banks' principal-secured products); (iii) extending loans to non-affiliated enterprises (except as expressly permitted in the business license); and (iv) purchasing non-self-used real properties (except for real estate enterprises). Any violation of Circular 19 or Circular 16 may result in severe penalties, including substantial fines.

If we require financial support from our PRC subsidiaries or we plan to provide funds to our PRC subsidiaries through loans or capital contributions in the future, we will be subject to statutory limits and restrictions, including those described above.

C. ORGANIZATIONAL STRUCTURE

For a description of our organizational structure, See "Item 4. Information on the Company—A. History and Development of the Company."

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D. PROPERTY, PLANTS AND EQUIPMENT IN OPERATION

We rent our principal executive office building (approximately 6,577 square meters) located in Fengtai, Beijing and also own an office building (approximately 12,695 square meters) located in Zhabei, Shanghai. In addition, we own and lease factory and office space in various locations around the world in connection with our operations. We believe that our existing facilities, together with the facilities under construction and to be constructed under our current plans, are adequate for our current requirements. The following table sets forth a summary of our material properties relating to our production and research and development as of December 31, 2017:

Location	Space (in square meters)	Usage of Property	Owned or Leased	Encumbrance
Ningjin, Hebei	427,552	Factory	Owned and Leased*	Yes*
Yangzhou, Jiangsu	527,200	Factory and R&D center	Owned	Yes**
Fengxian, Shanghai	204,262	Factory	Owned	Yes
Lianyungang, Jiangsu	309,890	Factory and R&D center	Owned	Yes
Hefei, Anhui	559,973	Factory	Owned	Yes
Sanhe, Hebei	38,157	Factory	Leased	None
Penang, Malaysia	19,357	Factory	Leased	None
Xingtai, Hebei	77,952	Factory	Owned	Yes
Viet Yen, Vietnam	188,594	Factory	Owned	None
Baotou, Inner Mongolia	151,333	Factory	Owned	None

* 383,969 square meters of land and facilities are leased, and 43,583 square meters of land are owned, and 29,921 square meters of our owned land are mortgaged.

**229,799 square meters of land are mortgaged.

See also "Item 4. Information on the Company—B. Business Overview—Manufacturing Capacity and Facilities."

Environmental Matters

As we use, generate and discharge toxic, volatile and otherwise hazardous chemicals and wastes in our research and development and manufacturing activities, we are required by PRC law to obtain pollutant discharging permits and undergo government-administered safety examinations with respect to our production facilities. So far, we have not been assessed any penalties for any non-compliance with PRC environmental law and regulations. However, if we fail to comply with such laws and regulations in the future, we may be required to pay fines, suspend production or cease operation. Any failure by us to control the use of or to adequately restrict the discharge of hazardous substances could restrict our utilization of our properties and facilities, subject us to potentially significant monetary damages and fines or suspensions in our business operations.

ITEM 4A. UNRESOLVED STAFF COMMENTS

None.

ITEM 5. OPERATING AND FINANCIAL REVIEW AND PROSPECTS

The following discussion and analysis of our financial condition and results of operations are based upon and should be read in conjunction with our consolidated financial statements and the related notes included in this annual report. This discussion contains forward-looking statements that involve risks, uncertainties and assumptions. We caution you that our business and financial performance are subject to substantial risks and uncertainties. Our actual results could differ materially from those projected in the forward-looking statements as a result of various factors, including those set forth in "Item 3. Key Information—D. Risk Factors" and elsewhere in this annual report.

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A. OPERATING RESULTS

Overview

We are a leading manufacturer of high-performance solar power products based in China. We conduct our business primarily through our wholly-owned subsidiaries in China, and operate and manage our business as two segments, namely, solar product manufacturing and solar power projects development. We commenced our business through JA Hebei in May 2005. Pursuant to a recapitalization plan, all of the former shareholders of JA Hebei transferred their equity interests in JA Hebei to JA BVI, our wholly-owned subsidiary incorporated under the laws of the British Virgin Islands. This recapitalization is accounted for as a legal reorganization of entities under common control, in a manner similar to a pooling-of-interest. Accordingly, our consolidated financial statements have been prepared as if the current corporate structure had been in existence throughout the periods presented.

We derive revenues primarily from sales of solar module and cell products to system integrator, project developers, distributors and module manufacturers. For the year ended December 31, 2017, our total revenues and net income were RMB19.7 billion (US$3.0 billion) and RMB300.1 million (US$46.1 million), respectively.

Factors Affecting Our Results of Operations

We believe that the following factors have had, and we expect that they will continue to have, a significant effect on the development of our business, financial condition and results of operations.

- ***Industry Demand.*** Demand for solar power products is critical to our business and revenue growth. Our business and revenue growth were closely related to industry demand as well as our ability to retain existing customers and attract new customers. From the second half of 2008 to the third quarter of 2009, demand for solar power and solar power products was significantly affected by the global financial crisis. After a sharp increase in global industry demand in 2010 and 2011, the growth of market demand slowed down in 2012, which resulted in a severe downturn for the whole industry through 2012 and 2013. The industry demand revived in 2015 and 2016 due to the development of emerging markets, such as China and the U.S. We expect industry demand significant growth in 2017 and 2018, because of the development of China, India and emerging markets. The growth prospects still have a great level of uncertainty and trade policy change can occur unexpectedly, which could temporarily lead to fluctuations in industry demand for solar power products including ours.

increased from 4.9 GW in 2016 to 7.5 GW in 2017. Our total revenues from sales in China increased from RMB8.1 billion in 2016 to RMB9.5 billion (US$1.5 billion) in 2017, which was primarily due to strong industry demand in China for solar power products. Our total revenues from sales outside China increased from RMB7,656.0 million to RMB10,126.5 million (US$1,556.4 million) in 2017, primarily due to a rapid increase of industry demand for solar power products. Our revenues from sales in China, as a percentage of our total revenues, decreased from 51.4% in 2016 to 48.5% in 2017, and our revenues from sales outside China, as a percentage of our total revenues, increased from 48.6% in 2016 to 51.5% in 2017. This reflected our efforts in developing overseas markets.

Cost of revenues. Our cost of revenues increased from RMB13.4 billion in 2016 to RMB17.3 billion (US$2.7 billion) in 2017. The increase in our cost of revenues was primarily due to the increase of total shipments.

Gross profit. We recorded a gross profit of RMB2.3 billion in 2016 to RMB2.4 billion (US$0.4 billion) in 2017. Our gross profit as a percentage of our total revenues decreased from 14.6% in 2016 to 12.3% in 2017, primarily due to the decrease of the average sales price in the whole PV modules industry.

Total operating expenses. Our total operating expenses were RMB1.7 billion (US$0.3 billion) in 2017 as compared to the total operation expenses of RMB1.4 billion in 2016.

- *Selling, general and administrative expenses.* Our selling, general and administrative expenses increased from RMB1,058 million in 2016 to RMB1,514 million (US$232.7 million) in 2017, and as the percentage of our total revenues increased from 6.8% in 2016 to 7.7% in 2017. The increase in our selling, general and administrative expenses in absolute amounts was primarily due to increase in shipping costs due to increase in sales volume in 2017, a one-time reversal of RMB303.4 million (US$46.6 million) of previously recorded expenses due to the resolution of our dispute with Hemlock in 2016, and bad debt provision increased by RMB60 million, from a reversal of RMB20 million in 2016 to a provision of RMB40 million in 2017, resulting from less recoveries, offsetting by a loss from disposal of fixed assets decreased by RMB87 million.

- *Loss from purchase commitments and contract termination costs.* We incurred loss from purchase commitments and contract termination costs of RMB16 million (US$2.5 million) in 2017 as a percentage of our total revenues at 0.1%. We evaluate firm purchase commitments and record a loss, if any, on firm purchase commitments using the same lower of cost or market approach as that used to value inventory. The total loss from purchase commitments is due to our commitments to purchase polysilicon prior to commencement of operation of our new facility. Loss from purchase commitments and contract termination costs decreased from RMB148.5 million in 2016 to RMB16.4 million (US$2.5 million), primarily due to a termination of business relationship with one of our business partners in 2016, which result in a loss of RMB99.6 million in 2016.

- *Research and development expenses.* Our research and development expenses decreased from RMB175.5 million in 2016 to RMB160.1 million (US$24.6 million) in 2017 and as a percentage of our total revenues at 1.1% in 2016 and 0.8% in 2017. The decrease in the absolute amount of our research and development expenses was due primarily to the decrease of the numbers of research and development projects in 2017.

- *Impairment loss on project assets.* In 2017, we incurred impairment loss of RMB3 million (US$0.5 million), as compared to impairment loss of RMB8 million in 2016, on project assets related to our decision to suspend the construction of certain projects.

Interest expenses. We incurred an interest expenses of RMB284.3 million and RMB324.4 million (US$49.9 million) in 2016 and 2017, respectively. The increase in our interest expense was primarily due to the increase in our borrowings and capital lease. The weighted average borrowings for 2016 and 2017 are RMB6.0 billion and RMB6.1 billion, and the weighted average interest rates for 2016 and 2017 are 4.64% and 4.50%, respectively. In 2017, we continued to sell certain modules and equipment to a third party for cash consideration and simultaneously entered into a three-year or ten-year contract to lease back the leased assets from the purchase-lessor, which result in an increase of payables related to capital lease from RMB487.5 million in 2016 to RMB1,150.6 million (US$176.8 million) in 2017.

Interest income. Our interest income was RMB17.3 million (US$2.7 million) in 2017 and RMB18.9 million in 2016, respectively.

Foreign exchange gain. We recorded a foreign exchange loss of RMB70.1 million (US$10.8 million) in 2017 as compared to a foreign exchange gain of RMB80.8 million in 2016, primarily due to the depreciation of U.S. dollar against RMB in 2017 and the appreciation of U.S. dollar against RMB in 2016.

Confirmation of Electronic Submission

Case & Segment Info:

Bar Code: **4152547**

Case Number: A-570-979

Case Title: Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules From People Republic of China

Case Segment: CIRC - Anti Circumvention Inquiry

Segment Begin Date:

Segment End Date:

Segment Specific Information: Request New Segment

Document Info:

Security Classification: Public Version

BPI Document Submission Barcode: 4152530

Document Type: Letter

Filed On Behalf Of (collective entity): American Solar Manufacturers Against Chinese Circumvention

Manual Submission: No

Comments:

Barcode:	Document Title - Document (Page Count):
4152547-01	Malaysia CIRC Petition, Part 1 - PV Malaysia Solar I Circumvention Petition, Part 1.pdf (225)
4152547-02	Malaysia CIRC Petition, Part 2 - PV Malaysia Solar I Circumvention Petition, Part 2.pdf (145)
4152547-03	Malaysia CIRC Petition, Part 3 - PV Malaysia Solar I Circumvention Petition, Part 3.pdf (130)
4152547-04	Malaysia CIRC Petition, Part 4 - PV Malaysia Solar I Circumvention Petition, Part 4.pdf (67)
4152547-05	Malaysia CIRC Petition, Part 5 - PV Malaysia Solar I Circumvention Petition, Part 5.pdf (42)

Submitter Info:

Filed By: tbrightbill@wiley.law

Firm/Organization Name: Wiley Rein LLP

Filed Date-Time Stamp: 8/16/2021 1:02:53 PM

INTERNATIONAL
TRADE
ADMINISTRATION

Confirmation of Electronic Submission

Case & Segment Info:

Bar Code: **4152573**

Case Number: C-570-980

Case Title: Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules From People Republic of China

Case Segment: CIRC - Anti Circumvention Inquiry

Segment Begin Date:

Segment End Date:

Segment Specific Information: Request New Segment

Document Info:

Security Classification: Public Version

BPI Document Submission Barcode: 4152559

Document Type: Letter

Filed On Behalf Of (collective entity): American Solar Manufacturers Against Chinese Circumvention

Manual Submission: No

Comments:

Barcode:	Document Title - Document (Page Count):
4152573-01	Malaysia CIRC Petition, Part 1 - PV Malaysia Solar I Circumvention
4152573-02	Petition, Part 1.pdf (225)
4152573-03	Malaysia CIRC Petition, Part 2 - PV Malaysia Solar I Circumvention
4152573-04	Petition, Part 2.pdf (145)
4152573-05	Malaysia CIRC Petition, Part 3 - PV Malaysia Solar I Circumvention
	Petition, Part 3.pdf (130)
	Malaysia CIRC Petition, Part 4 - PV Malaysia Solar I Circumvention
	Petition, Part 4.pdf (67)
	Malaysia CIRC Petition, Part 5 - PV Malaysia Solar I Circumvention
	Petition, Part 5.pdf (42)

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