Certain Crystalline Silicon Photovoltaic Products from China and Taiwan

Investigation Nos. 701-TA-511 & 731-TA-1246-1247 (Preliminary)

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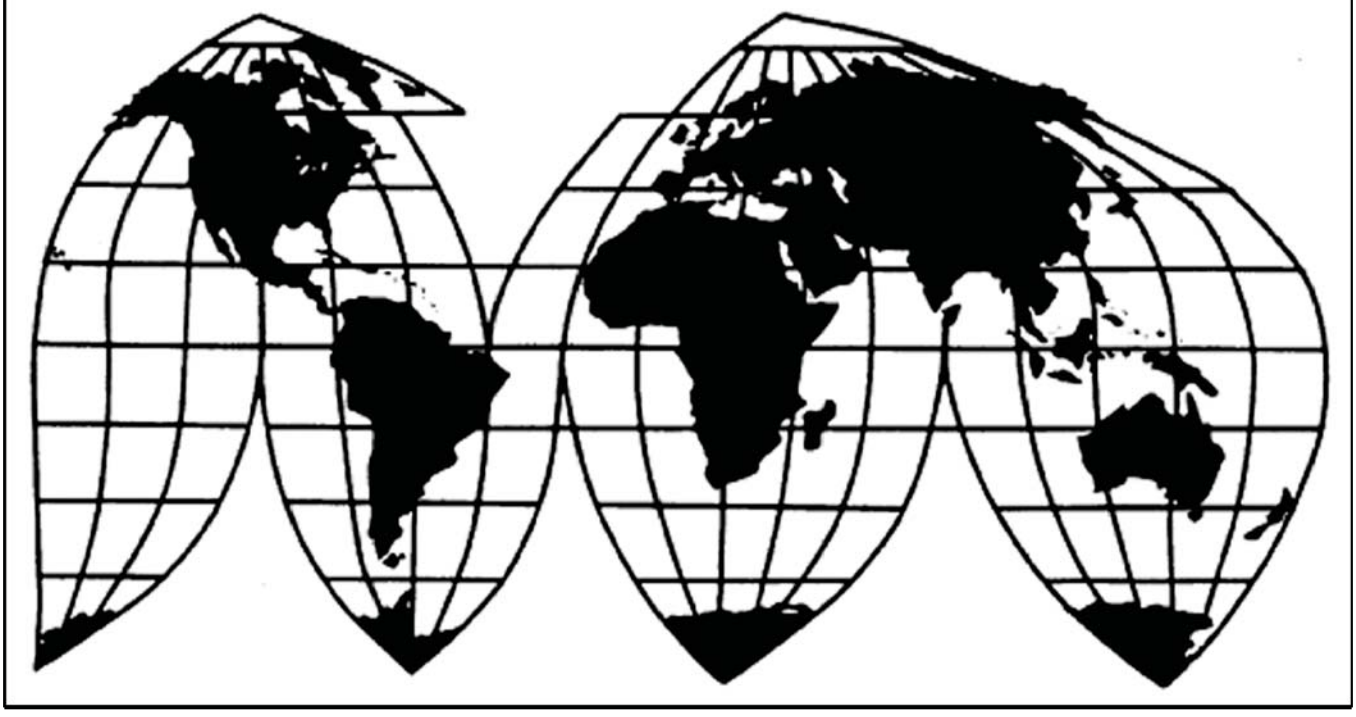
U.S. International Trade Commission



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U.S. International Trade Commission

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UNITED STATES INTERNATIONAL TRADE COMMISSION

Investigation Nos. 701-TA-511 and 731-TA-1246-1247 (Preliminary)

CERTAIN CRYSTALLINE SILICON PHOTOVOLTAIC PRODUCTS FROM CHINA AND TAIWAN

DETERMINATIONS

On the basis of the record[1] developed in the subject investigations, the United States International Trade Commission (Commission) determines,[2] pursuant to sections 703(a) and 733(a) of the Tariff Act of 1930 (19 U.S.C. §§ 1671b(a) and 1673b(a)) (the Act), that there is a reasonable indication that an industry in the United States is materially injured by reason of imports from China and Taiwan of certain crystalline silicon photovoltaic products, provided for in subheadings 8541.40.60 (statistical reporting numbers 8541.40.6020 and 8541.40.6030) of the Harmonized Tariff Schedule of the United States, that are alleged to be sold in the United States at less than fair value ("LTFV") and are allegedly subsidized by the Government of China.

COMMENCEMENT OF FINAL PHASE INVESTIGATIONS

Pursuant to section 207.18 of the Commission's rules, the Commission also gives notice of the commencement of the final phase of its investigations. The Commission will issue a final phase notice of scheduling, which will be published in the *Federal Register* as provided in section 207.21 of the Commission's rules, upon notice from the Department of Commerce (Commerce) of affirmative preliminary determinations in the investigations under sections 703(b) or 733(b) of the Act, or, if the preliminary determinations are negative, upon notice of affirmative final determinations in those investigations under sections 705(a) or 735(a) of the Act. Parties that filed entries of appearance in the preliminary phase of the investigations need not enter a separate appearance for the final phase of the investigations. Industrial users, and, if the merchandise under investigation is sold at the retail level, representative consumer organizations have the right to appear as parties in Commission antidumping and countervailing duty investigations. The Secretary will prepare a public service list containing the names and addresses of all persons, or their representatives, who are parties to the investigations.

BACKGROUND

On December 31, 2013, a petition was filed with the Commission and Commerce by SolarWorld Industries America, Hillsboro, Oregon, alleging that an industry in the United States is materially injured or threatened with material injury by reason of LTFV and subsidized imports of certain crystalline silicon photovoltaic products from China and LTFV imports of

[1] The record is defined in sec. 207.2(f) of the Commission's Rules of Practice and Procedure (19 CFR § 207.2(f)).

[2] Commissioners Shara L. Aranoff and F. Scott Kieff are recused from these investigations.

certain crystalline silicon photovoltaic products from China and Taiwan. Accordingly, effective December 31, 2013, the Commission instituted countervailing duty investigation No. 701-TA-511 and antidumping duty investigation Nos. 731-TA-1246-1247 (Preliminary).

Notice of the institution of the Commission's investigations and of a public conference to be held in connection therewith was given by posting copies of the notice in the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the *Federal Register* of January 8, 2014 (79 FR 1388). The conference was held in Washington, DC, on January 22, 2014, and all persons who requested the opportunity were permitted to appear in person or by counsel.

Views of the Commission[1]

Based on the record in the preliminary phase of these investigations, we find that there is a reasonable indication that an industry in the United States is materially injured by reason of imports of certain crystalline silicon photovoltaic ("CSPV") products from China and Taiwan that are allegedly sold in the United States at less than fair value and imports of the subject merchandise from China that are allegedly subsidized by the Government of China.

I. The Legal Standard for Preliminary Determinations

The legal standard for preliminary antidumping and countervailing duty determinations requires the Commission to determine, based upon the information available at the time of the preliminary determinations, whether there is a reasonable indication that a domestic industry is materially injured or threatened with material injury, or that the establishment of an industry is materially retarded, by reason of the allegedly unfairly traded imports.[2] In applying this standard, the Commission weighs the evidence before it and determines whether "(1) the record as a whole contains clear and convincing evidence that there is no material injury or threat of such injury; and (2) no likelihood exists that contrary evidence will arise in a final investigation."[3]

II. Background

The petitions in these investigations were filed on December 31, 2013 by SolarWorld Industries America, Inc., a producer of CSPV cells and modules.[4] Petitioner appeared at the staff conference and submitted a postconference brief.

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[1] Commissioners Aranoff and Kieff did not participate in the preliminary phase of these investigations.

[2] 19 U.S.C. §§ 1671b(a), 1673b(a) (2000); *see also American Lamb Co. v. United States*, 785 F.2d 994, 1001-04 (Fed. Cir. 1986); *Aristech Chem. Corp. v. United States, 2*0 CIT 353, 354-55 (1996). No party argues that the establishment of an industry in the United States is materially retarded by the allegedly unfairly traded imports.

[3] *American Lamb Co*., 785 F.2d at 1001; *see also Texas Crushed Stone Co. v. United States*, 35 F.3d 1535, 1543 (Fed. Cir. 1994).

[4] In November 2012, the Commission completed antidumping and countervailing duty investigations on CSPV cells and modules from China, pursuant to a petition filed by SolarWorld. The Commission determined that an industry in the United States was materially injured by reason of subject imports that Commerce had determined were subsidized and sold in the United States at less than fair value. *Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360 (Nov.2012) ("*CSPV I"*). Commerce also determined that the country of origin of CSPV modules was determined by the country of manufacture of the CSPV cells. Antidumping and countervailing duty orders were issued in December 2012 on subject merchandise. 77 Fed. Reg. 73017, 73018 (Dec. 7, 2012). Both the Commission's and Commerce's final determinations are subject to ongoing litigation.

(Continued…)

A number of respondent entities participated in these investigations. They include the China Chamber of Commerce for Import and Export of Machinery and Electronic Products ("CCCME"), an association of producers/exporters of the subject merchandise, which participated in the conference and submitted a postconference brief; and a trade association of Taiwanese respondent producers and exporters, as well as individual producers and exporters of subject merchandise from Taiwan, which also participated in the conference and submitted a postconference brief.[5] Three purchasers, SolarCity Corporation, Strata Solar, and Real Goods Solar, and one importer, SunEdison, Inc., also appeared at the conference on behalf of respondents, but did not submit postconference briefs.

III. Domestic Like Product

A. *In General*

In determining whether there is a reasonable indication that an industry in the United States is materially injured or threatened with material injury by reason of imports of the subject merchandise, the Commission first defines the "domestic like product" and the "industry."[6] Section 771(4)(A) of the Tariff Act of 1930, as amended ("the Tariff Act"), defines the relevant domestic industry as the "producers as a whole of a domestic like product, or those producers whose collective output of a domestic like product constitutes a major proportion of the total domestic production of the product."[7] In turn, the Tariff Act defines "domestic like product" as "a product which is like, or in the absence of like, most similar in characteristics and uses with, the article subject to an investigation."[8]

The decision regarding the appropriate domestic like product(s) in an investigation is a factual determination, and the Commission has applied the statutory standard of "like" or "most similar in characteristics and uses" on a case-by-case basis.[9] No single factor is

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Because of Commerce's country of origin ruling, U.S. imports of CSPV modules from China made from cells produced in another country were considered outside the scope of the prior investigations. Petitioner stated in those investigations that this result was contrary to its intended scope definition. As a result, petitioner claimed that Commerce's country of origin determination necessitated filing the current petition as CSPV module assemblers in China adjusted their global supply chains to obtain non-Chinese cells to evade the antidumping and countervailing duties put in place after the prior investigations. Confidential Report ("CR") at I-6 n.11, Public Report ("PR") at I-4 n.11.

[5] Seventeen Taiwanese respondents are listed in the entry of appearance. Letter from Peter Koenig to the Honorable Lisa R. Barton (Jan. 15, 2014).

[6] 19 U.S.C. § 1677(4)(A).

[7] 19 U.S.C. § 1677(4)(A).

[8] 19 U.S.C. § 1677(10).

[9] *See*, *e.g.*, *Cleo Inc. v. United States*, 501 F.3d 1291, 1299 (Fed. Cir. 2007); *NEC Corp. v. Department of Commerce*, 36 F. Supp. 2d 380, 383 (Ct. Int'l Trade 1998); *Nippon Steel Corp. v. United States*, 19 CIT 450, 455 (1995); *Torrington Co. v. United States*, 747 F. Supp. 744, 749 n.3 (Ct. Int'l Trade 1990), *aff'd*, 938 F.2d 1278 (Fed. Cir. 1991) ("every like product determination 'must be made on the particular record at issue' and the 'unique facts of each case'"). The Commission generally considers a (Continued…)

dispositive, and the Commission may consider other factors it deems relevant based on the facts of a particular investigation.[10] The Commission looks for clear dividing lines among possible like products and disregards minor variations.[11] Although the Commission must accept Commerce's determination as to the scope of the imported merchandise that is subsidized and/or sold at less than fair value,[12] the Commission determines what domestic product is like the imported articles Commerce has identified.[13] The Commission may, where appropriate, include domestic articles in the domestic like product in addition to those described in the scope.[14]

B. *Product Description*

In its notice of initiation, Commerce defined the imported merchandise within the scope of these investigations as follows:

> 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. For purposes of this investigation, subject merchandise also includes modules, laminates and/or panels assembled

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(…Continued)
number of factors including the following: (1) physical characteristics and uses; (2) interchangeability; (3) channels of distribution; (4) customer and producer perceptions of the products; (5) common manufacturing facilities, production processes, and production employees; and, where appropriate, (6) price. *See Nippon*, 19 CIT at 455 n.4; *Timken Co. v. United States*, 913 F. Supp. 580, 584 (Ct. Int'l Trade 1996).

[10] *See*, *e.g.*, S. Rep. No. 96-249 at 90-91 (1979).

[11] *See*, *e.g.*, *Nippon*, 19 CIT at 455; *Torrington*, 747 F. Supp. at 748-49*; see also* S. Rep. No. 96-249 at 90-91 (Congress has indicated that the like product standard should not be interpreted in "such a narrow fashion as to permit minor differences in physical characteristics or uses to lead to the conclusion that the product and article are not 'like' each other, nor should the definition of 'like product' be interpreted in such a fashion as to prevent consideration of an industry adversely affected by the imports under consideration.").

[12] *See*, *e.g.*, *USEC, Inc. v. United States*, 34 Fed. Appx. 725, 730 (Fed. Cir. 2002) ("The ITC may not modify the class or kind of imported merchandise examined by Commerce."); *Algoma Steel Corp. v. United States,* 688 F. Supp. 639, 644 (Ct. Int'l Trade 1988), *aff'd*, 865 F.3d 240 (Fed. Cir.), *cert. denied*, 492 U.S. 919 (1989).

[13] *Hosiden Corp. v. Advanced Display Mfrs.,* 85 F.3d 1561, 1568 (Fed. Cir. 1996) (the Commission may find a single like product corresponding to several different classes or kinds defined by Commerce); *Cleo*, 501 F.3d at 1298 n.1 ("Commerce's {scope} finding does not control the Commission's {like product} determination."); *Torrington*, 747 F. Supp. at 748-52 (affirming the Commission's determination defining six like products in investigations where Commerce found five classes or kinds).

[14] *See*, *e.g.*, *Pure Magnesium from China and Israel*, Inv. Nos. 701-TA-403 and 731-TA-895-96 (Final), USITC Pub. 3467 at 8 n.34 (Nov. 2001); *Torrington,* 747 F. Supp. at 748-49 (holding that the Commission is not legally required to limit the domestic like product to the product advocated by the petitioner, co-extensive with the scope).

in the subject country consisting of crystalline silicon photovoltaic cells that are completed or partially manufactured within a customs territory other than that subject country, using ingots that are manufactured in the subject country, wafers that are manufactured in the subject country, or cells where the manufacturing process begins in the subject country and is completed in a non-subject country.

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.

Excluded from the scope of this investigation 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 investigation are any products covered by the existing antidumping and countervailing duty orders on crystalline silicon photovoltaic cells, whether or not assembled into modules, from the People's Republic of China. *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); *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).

Also excluded from the scope of this investigation 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.

Merchandise covered by this investigation is currently classified in the Harmonized Tariff Schedule of the United States (HTSUS) under subheadings 8501.61.0000, 8507.20.8030, 8507.20.8040, 8507.20.8060, 8507.20.8090, 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 this investigation is dispositive.[15]

Solar CSPV systems convert sunlight into electricity for on-site use or for distribution through the electric grid. The main components of CSPV systems are modules (also commonly referred to as panels), which are comprised of cells that use crystalline silicon to convert sunlight into electricity. 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.[16]

CSPV cells use crystalline silicon to convert sunlight to electricity and are the basic elements of a PV module. They have a positive layer, a negative layer, and a positive-negative junction (p/n junction). Electricity is generated when sunlight strikes the cell, knocking electrons loose that flow onto thin metal "fingers" that run across the cell and conduct electricity to the busbars. Most cells are five inches by five inches or six inches by six inches and have an output of 3 to 4.5 watts.[17]

The two main types of CSPV cells and modules are monocrystalline silicon and multicrystalline (or polycrystalline) silicon. Monocrystalline cells are made from a single grown crystal and tend to have a higher conversion efficiency. Multicrystalline cells have a random crystal structure and tend to have a lower conversion efficiency.[18]

CSPV modules for grid-connected applications, whether residential, nonresidential or utility, are generally the same regardless of the application, although the sizes that are most commonly used in each type of application may differ. Off-grid CSPV modules are usually less than 200 watts and are often smaller than on-grid modules. Off-grid modules may have different output voltages in order to charge batteries and often use fewer cells, and sometimes divided cells, to achieve the desired output.[19]

C. *Parties' Arguments and Analysis*

Petitioner argues, using the Commission's traditional like product factors, that the Commission should find, as it did in the previous investigations, that there is one domestic like product, corresponding to the scope definition, which does not include thin-film products.[20]

[15] 79 Fed. Reg. 4661, 4667 (Jan. 29, 2014) (initiation of antidumping duty investigations); *id.* at 4671 (initiation of countervailing duty investigation).

[16] CR at I-16, PR at I-13.

[17] CR at I-17, PR at I-13.

[18] CR at I-19, PR at I-14.

[19] CR at I-20, PR at I-15.

[20] Petition at 24.

CCCME and the Taiwanese respondents argue that the Commission should include thin-film products in its definition of the domestic like product.[21]

Based on the record in the preliminary phase of these investigations, we define a single domestic like product consisting of CSPV products within the scope of the investigations, as the Commission did in *CSPV I.*[22] Respondents' arguments do not differ significantly from those proffered in *CSPV I,* and the evidence on the record of these investigations does not indicate that the technologies have changed enough to warrant a different determination, as explained below.

Physical Characteristics and Uses. In *CSPV I*, the Commission found that there are significant differences in physical characteristics and capabilities between CSPV products and thin-film products that are related to differences in their underlying raw materials and production processes.[23] According to respondents in the preliminary phase of these investigations, there are some thin-film products that report conversion efficiency rates of 13.3 percent for cadmium telluride modules (with a record of 16.1 percent), while CSPV products report conversion efficiencies of 14-15 percent for multicrystalline and 16-20 percent for monocrystalline products.[24] Nevertheless, there is no indication in the record that thin-film module efficiencies, in the aggregate, are now equivalent to CSPV module efficiencies.[25] In addition, there is no evidence in the record that other physical differences between thin-film and CSPV products have diminished since the time of the prior CSPV investigations. We observe that in *CSPV I*, the record indicated that thin-film modules could be and were used on rooftops that are not able to hold a significant amount of weight.[26]

Manufacturing Facilities, Production Processes and Employees. In the prior CSPV investigations, the Commission found, and the parties did not contest, that the record showed no overlap in the manufacturing facilities, production processes or employees used to produce CSPV and thin-film products.[27] In the preliminary phase of these investigations, as indicated above, CCCME stated that U.S. thin-film producer First Solar purchased a company that is developing a high-efficiency crystalline technology to complement its thin-film products. Production is expected to occur in late 2014 or early 2015. However, nothing in the record indicates that CSPV and thin-film products will be manufactured using the same equipment or workers.[28]

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[21] CCCME's Postconference Brief at 15-17 & Exh. 1 at 15-19; Taiwanese Respondents' Postconference Brief, App. A at 1-2.

[22] *CSPV I*, USITC Pub. 4360 at 12.

[23] *CSPV I*, USITC Pub. 4360 at 8.

[24] CCCME's Postconference Brief at 15-16 & Exh. 1 at 15-16; Taiwanese Respondents' Postconference Brief, Exh. A at 1-2.

[25] *Compare* CR/PR at Table I-1 *with* CR/PR at Table I-2.

[26] *CSPV-I*, USITC Pub. 4360 at I-22.

[27] *CSPV I*, USITC Pub. 4360 at 9.

[28] CR at I-48 – I-49 & n.84, PR at I-37 & n.84.

Channels of Distribution. In *CSPV I*, the Commission found that 12 of 19 U.S. producers of CSPV and/or thin-film products reported that the two products share the same channels of distribution, as did 34 of 49 responding importers. In the preliminary phase of these investigations, nothing in the record indicates that these channels have changed significantly since the time of the prior investigations, as CSPV modules are sold to distributors and installers in the residential market segment and thin-film products are typically sold directly to utilities.[29]

Interchangeability. The Commission found in *CSPV I* that while CSPV products may be interchangeable with thin-film products at the design phase (depending on the project), thin-film products have different balance of system requirements than CSPV products.[30] As indicated above, CCCME contends that purchasers consider both CSPV and thin-film technologies on an equal footing when undertaking a new project. Thus, nothing in the record of the preliminary phase of these investigations indicates that the degree of interchangeability has increased.[31]

Producer and Customer Perceptions. Respondents argue in the preliminary phase of these investigations that purchasers consider bids for both types of technology,[32] an argument also raised in *CSPV I*.[33] In *CSPV I,* the Commission found that 11 of 19 U.S. producers of CSPV and/or thin-film products and 23 of 49 responding importers reported that their customers perceive the products to have different physical characteristics, flexibility, efficiency, power outage, space requirements, bankability, environmental concerns, climate suitability, performance characteristics, reliability, durability, and established nature.[34]

Price. The Commission found in *CSPV I* that in their questionnaire responses, 12 of 19 U.S. producers of CSPV and/or thin-film products reported that CSPV products are generally priced higher than thin-film products, as did 35 of 49 responding importers.[35] While there are reports on the record in the preliminary phase of these investigations that the prices of CSPV products have since decreased and are more in line with the prices of thin-film products,[36] this also occurred during *CSPV I.*[37]

Conclusion. The differences between CSPV and thin-film products that the Commission identified in *CSPV I* continue to exist. In view of the foregoing discussion, particularly with respect to differences in physical characteristics, manufacturing

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[29] *See* CR at I-51 – I-52, PR at I-38 – I-39.

[30] *CSPV I*, USITC Pub. 4360 at 11. The "balance of system" includes components such as the inverter and the racking on which the system is installed. CR at I-20, PR at I-15.

[31] *See* CR at I-49 – I-50, PR at I-37.

[32] *See* CR at I-51, PR at I-38.

[33] *CSPV I*, USITC Pub. 4360 at 11 (finding that although a number of purchasers considered both products for their purchases, many reported that they considered either CSPV or thin-film products, but not both).

[34] *CSPV I*, USITC Pub. 4360 at 11.

[35] *CSPV I*, USITC Pub. 4360 at 11.

[36] CR at I-53, PR at I-40.

[37] *CSPV I*, USITC Pub. 4360 at 11.

processes, and production employees, as well as limited interchangeability and distribution channels, the fact that the two products are perceived somewhat differently by producers and customers, and the fact that prices of CSPV products are generally higher than thin-film products, we find, as the Commission did in the previous investigations, that there is a single domestic like product consisting of the CSPV products within the scope of the investigations.

IV. Domestic Industry

The domestic industry is defined as the domestic "producers as a whole of a domestic like product, or those producers whose collective output of a domestic like product constitutes a major proportion of the total domestic production of the product."[38] In defining the domestic industry, the Commission's general practice has been to include in the industry producers of all domestic production of the like product, whether toll-produced, captively consumed, or sold in the domestic merchant market.[39]

A. *Related Parties*

We must determine whether any producer of the domestic like product should be excluded from the domestic industry pursuant to Section 771(4)(B) of the Tariff Act. This provision allows the Commission, if appropriate circumstances exist, to exclude from the domestic industry producers that are related to an exporter or importer of subject merchandise or which are themselves importers.[40] Exclusion of such a producer is within the Commission's discretion based upon the facts presented in each investigation.[41]

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[38] 19 U.S.C. § 1677(4)(A).

[39] In *CSPV I*, the Commission considered, even though no party raised any argument to the contrary, whether firms that simply assembled modules in the United States engaged in sufficient production-related activities to be considered part of the domestic industry. The Commission determined that these firms did engage in sufficient production-related activities to include them in the domestic industry. *CSPV I*, USITC Pub. 4360 at 13. As the evidence in the record of the preliminary phase of these investigations contains no new evidence that indicates we should revisit the finding in the prior investigations and because no party has raised this issue in the preliminary phase of these investigations, we do not discuss it further. Accordingly, we continue to treat U.S. module assemblers as producers of the domestic like product.

[40] *See Torrington Co. v. United States*, 790 F. Supp. 1161, 1168 (Ct. Int'l Trade 1992), *aff'd without opinion*, 991 F.2d 809 (Fed. Cir. 1993); *Sandvik AB v. United States*, 721 F. Supp. 1322, 1331-32 (Ct. Int'l Trade 1989), *aff'd mem.,* 904 F.2d 46 (Fed. Cir. 1990); *Empire Plow Co. v. United States*, 675 F. Supp. 1348, 1352 (Ct. Int'l Trade 1987).

[41] The primary factors the Commission has examined in deciding whether appropriate circumstances exist to exclude a related party include the following:

(1) the percentage of domestic production attributable to the importing producer;

(2) the reason the U.S. producer has decided to import the product subject to investigation, *i.e.*, whether the firm benefits from the LTFV sales or subsidies or whether the firm must import in order to enable it to continue production and compete in the U.S. market; and

(Continued…)

In *CSPV I*, the Commission considered whether seven domestic producers, which were related parties either by virtue of their imports of subject merchandise or their affiliation with one or more importers, producers, or exporters of subject merchandise from China, should be excluded from the domestic industry. One producer, Suntech, was excluded from the domestic industry.[42]

In the preliminary phase of these investigations, one domestic producer, Motech Americas LLC ("Motech"), is a wholly owned subsidiary of Motech Industries Co., Ltd. of Taiwan, and is affiliated with Motech Suzhou New Energy of China, which is also a wholly owned subsidiary of Motech Industries Co., Ltd. of Taiwan.[43] Another domestic producer, Wanxiang New Energy LLC**,** is a wholly owned subsidiary of the Wanxiang Group of China.[44] Four domestic producers, ***, as well as ***, imported or arranged for the imports of subject merchandise from Taiwan.[45] We must determine whether appropriate circumstances exist to exclude any or all of these four firms from the domestic industry.

Petitioner argues in favor of excluding Motech and Suntech from the domestic industry. It contends that, because Motech is related to a subject producer with operations in both Taiwan and China, and has a direct interest in ensuring that subject imports continue to enter the United States in increasing quantities and at unfair prices, the Commission should exclude Motech.[46] With respect to Suntech, petitioner contends that although Suntech shut down its U.S. facility in March 2013, during the period of investigation the firm had a direct interest in ensuring an abundant supply of unfairly traded subject imports.[47]

Although CCCME does not address the issue of related parties, the Taiwanese respondents argue that there is no basis to exclude Motech from the domestic industry as all its

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(…Continued)

(3) the position of the related producer vis-a-vis the rest of the industry, *i.e*., whether inclusion or exclusion of the related party will skew the data for the rest of the industry. *See, e.g*., *Torrington Co. v. United States*, 790 F. Supp. at 1168.

[42] *CSPV I*, USITC Pub. 4360 at 16.

[43] CR/PR at Table III-1 n.2.

[44] CR/PR at Table III-1 n.3.

[45] CR at III-18, PR at III-7, CR/PR at Tables III-10 – III-12. A fifth firm, ***, but this importation of subject merchandise occurred outside of the period of investigation. CR at III-18 n.10, PR at III-7 n.10. Accordingly, *** is not a related party for the purpose of the preliminary phase of these investigations.

While *** also imported cells and modules from China, based upon the available data, a portion of these products constitute nonsubject merchandise because they are believed to be subject to the existing orders. In *CSPV I*, Commerce ruled that the module's country of origin is the country of origin of the solar cell. CR at I-11 – I-12 n.17, PR at I-9 n.17. The scope in the instant investigations excludes merchandise covered by the orders issued in *CSPV I*. Nevertheless, as explained in detail in our discussion of negligibility below, should Commerce accept petitioner's view as to country of origin, some CSPV modules from China, currently considered to be nonsubject merchandise, may be considered subject imports from China.

[46] Petition at 31; Petitioner's Postconference Brief, Exh. 1 at 74-75.

[47] Petition at 32-33.

transactions are at fair market value. They present no argument with regard to the other related parties.[48]

We discuss below whether appropriate circumstances exist to exclude the four related party producers.

Motech. The Commission considered whether to exclude module assembler Motech from the domestic industry in *CSPV I*, in which Taiwan was not a subject country. It found that Motech's primary interest was in domestic production. On the basis of this finding and its examination of Motech's financial performance, the Commission found that appropriate circumstances did not exist to warrant excluding Motech from the domestic industry.[49]

The record in these investigations indicates that Motech accounted for *** percent of U.S. production of CSPV modules in 2012. It ***.[50] Motech ***.[51] Motech's U.S. production of CSPV modules totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. It totaled *** kilowatts in January-September ("interim") 2012 and *** kilowatts in interim 2013.[52] Motech's *** totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. They totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. [53] Motech's *** totaled *** kilowatts in 2010 and 2011 and *** kilowatts in 2012. They totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013.

Motech's total kilowatts ***, relative to its domestic production, totaled *** percent in 2010, *** percent in 2011, and *** percent in 2012. The ratio was *** percent in interim 2012 and *** percent in interim 2013. Its ratio of operating income to net sales was *** percent in 2010, *** percent in 2011, and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013.[54] [55] Its operating performance was ***, although the ratio of its operating income to net sales was *** in 2011 while the industry average was ***.[56] In terms of capital expenditures, it invested $*** in 2010, $*** in 2011, and $*** in 2012. Motech's capital expenditures totaled $*** in interim 2012 and $*** in interim 2013.[57]

Motech's interest in domestic production has decreased over the period of investigation, as evidenced by the fact that its production of CSPV modules has steadily declined. The high ratio of its subject imports to domestic production at both the beginning and the end of the period highlights this fact as well. The firm ***. While its financial

[48] Taiwanese Respondents' Postconference Brief at 4.

[49] *CSPV I*, USITC Pub. 4360 at 16.

[50] CR/PR at Table III-1.

[51] CR/PR at Table III-5.

[52] CR/PR at Table III-11.

[53] CR/PR at Table III-11.

[54] Motech's Domestic Producer Questionnaire Response at III-11.

[55] For purposes of the preliminary phase of these investigations, Commissioner Pinkert does not rely upon a related producer's financial performance in determining whether to exclude it from the domestic industry.

[56] *Compare* Motech's Domestic Producer Questionnaire Response *with* CR at Table VI-3.

[57] Motech's Domestic Producer Questionnaire Response at III-15.

performance *** and it regularly invested in its operations by making capital expenditures and also incurred research and development ("R&D") expenses in every year of the period of investigation,[58] it appears these measures were taken pursuant to its interest in assembling modules from imported cells. In view of the foregoing factors, although the issue is a close call, we determine that appropriate circumstances exist to exclude Motech from the domestic industry.

Wanxiang. In 2012, Wanxiang accounted for *** percent of U.S. production of CSPV modules. It ***.[59] Module assembler Wanxiang sourced ***.[60] Wanxiang's U.S. production of CSPV modules totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. It totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. Wanxiang's *** totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. They totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013.[61]

Wanxiang's total subject kilowatts imported from Taiwan, relative to its domestic production, was *** percent in 2010 and 2011, and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013, ***.[62] Its ratio of operating income to net sales was *** percent in 2010, *** percent in 2011, and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013.[63] Its operating performance was ***.[64] In terms of capital expenditures, invested $*** in its U.S. operations in 2010, $*** in 2011, and $*** in 2012. It invested $*** in interim 2012 and $*** in interim 2013.

Wanxiang's U.S. production of modules ***. Its *** followed the same pattern, however. Unlike some other module assemblers, Wanxiang ***. As noted above, it *** the petition on Taiwan. Its investment in its U.S. operations has ***.[65] However, Wanxiang is a ***. On balance, because of its high ratio of subject imports to domestic production and the fact that it does appear to have benefitted from its subject imports, we find that circumstances are appropriate to exclude Wanxiang from the domestic industry.

*** accounted for *** percent of domestic production of CSPV modules in 2012. It ***.[66] ***.[67] Its U.S. production of CSPV modules totaled *** kilowatts in 2010, *** kilowatts

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[58] Motech's R&D expenditures totaled $*** in 2010, $*** in 2011 and $*** in 2012. They totaled $*** in interim 2012 and $*** in interim 2013. Motech's Domestic Producer Questionnaire at III-15.

[59] CR/PR at Table III-1.

[60] CR/PR at Table III-12.

[61] CR/PR at Table III-12.

[62] CR/PR at Table III-11.

[63] Wanxiang's Domestic Producer Questionnaire Response at III-11.

[64] *Compare* Wanxiang's Domestic Producer Questionnaire Response at III-11 *with* CR at Table VI-3.

[65] Wanxiang's R&D expenses totaled $*** in 2010, $*** in 2011, and $*** in 2012. They totaled $*** in interim 2012 and in interim 2013. Wanxiang's Domestic Producer Questionnaire Response at III-15.

[66] CR/PR at Table III-1.

in 2011, and *** kilowatts in 2012. It totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. *** totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. It totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013.[68]

Relative to domestic production, *** total subject kilowatts imported from Taiwan were *** percent in 2011 and *** percent in 2012. This ratio was *** percent in interim 2012 and *** percent in interim 2013.[69] Its ratio of operating income to net sales was *** percent in 2011 and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013.[70] Its operating performance was ***.[71] In terms of capital expenditures, it invested $*** in 2011 and $*** in 2012. It invested $*** in interim 2012 and $*** in interim 2013.[72]

While *** U.S. production of modules has ***. As noted above, *** reporting domestic producer and no party has argued for its exclusion from the domestic industry. Moreover, it has ***.[73] Nonetheless, because of its high ratio of subject imports to domestic production and because it appears to have benefitted from these subject imports, we find circumstances appropriate to exclude *** from the domestic industry.

Suntech. Suntech did not provide a questionnaire response in the preliminary phase of these investigations, but the data Suntech reported in the prior investigations are included in the Commission's report here. Suntech opened operations to produce solar modules in October 2010, then closed its assembly plant in March 2013.[74] In the previous investigations, the Commission found appropriate circumstances existed to exclude Suntech from the domestic industry in light of its position on the petitions, the size of its subject imports and its financial performance.[75]

As Suntech did not provide a questionnaire response in the preliminary phase of these investigations, its most recent financial data are unknown. However, it performed better than the industry average in 2011 while importing CSPV cells from China, and it appears to have benefitted from sourcing CSPV cells from Taiwan in 2012, once the imports from China became subject to investigation.[76] In view of these facts, we find that appropriate circumstances exist to exclude Suntech from the domestic industry in the preliminary phase of these investigations.

Conclusion. In view of the above discussion, we find that appropriate circumstances exist to exclude Motech, Wanxiang, ***, and Suntech from the domestic industry. In light of

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(…Continued)

[67] CR/PR at Table III-10.

[68] CR/PR at Table III-10.

[69] CR/PR at Table III-10.

[70] *** Domestic Producer Questionnaire Response at III-11.

[71] *Compare* *** Domestic Producer Questionnaire Response at III-11 *with* CR at Table VI-3.

[72] *** Domestic Producer Questionnaire Response at III-15.

[73] Its R&D expenses totaled $*** in 2010, $*** in 2011, and $*** in 2012. They totaled $*** in interim 2012 and $*** in interim 2013. *** Domestic Producer Questionnaire Response at III-15.

[74] CR/PR at Table III-2.

[75] *CSPV I*, USITC Pub. 4360 at 15.

[76] CR at VII-12 n.10, PR at VII-8 n.10.

our definition of the domestic like product, we define the domestic industry to include all U.S. producers of CSPV cells and CSPV modules, except for Motech, Wanxiang, ***, and Suntech.

V. Data Sources and Coverage

As in *CSPV I*, the Commission's report quantifies imports from subject and nonsubject countries using data from questionnaire responses rather than official import statistics on imports under the relevant U.S. tariff subheadings. The Commission explained in *CSPV I* that official import statistics may include some imports of out-of-scope thin-film products in addition to imports of subject CSPV cells and CSPV modules. In addition, official import statistics measure imports of modules in terms of units and define modules as "solar cells assembled into modules or panels."[77] As a consequence, the reported units for official statistics might refer to the number of modules and not the number of cells imported into the United States, such that summing imports of cells and imports of modules might not accurately yield the total volume of imported cells. To measure quantity more accurately, the Commission's questionnaires asked parties to report data in kilowatts. Lastly, the definitions in the questionnaires aimed to capture the language of Commerce's scope. However, as described below in our discussion of negligible imports, the scope language was revised subsequent to the mailing of the questionnaires. In any final phase investigations, we welcome parties' suggestions regarding the best language to use in the questionnaires in order to obtain data consistent with Commerce's scope.

The U.S. industry data used in the preliminary phase of these investigations are based on the questionnaire responses of five firms reporting domestic production activities during the period of investigation. These five producers accounted for *** percent of U.S. production of CSPV modules in 2012.[78] However, staff has consolidated the data submitted by firms in the prior investigations with the data submitted in the preliminary phase of these investigations. As such, staff compiled data representing *** percent of total 2012 U.S. production of CSPV modules.[79] Two of these firms reported producing CSPV cells, accounting for 100.0 percent of U.S. production of CSPV cells in 2012.[80]

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[77] *CSPV I*, USITC Pub. 4360 at 19-20.

[78] CR/PR at Tables III-1 & III-6.

[79] CR/PR at III-1 & n.1. When the data of the four domestic producers that are related parties are excluded, data pertaining to the firms that we have included in the domestic industry account for *** percent of total 2012 U.S. production of CSPV modules. The data in Table C-2 (revised) exclude data from the four firms that we have not included in the domestic industry.

With respect to financial results based on the Commission's previous investigations, the relevant overlapping period represents full year 2010 and 2011, and the first half of 2012. Accordingly, for items such as sales volume and value, as well as other corresponding financial information, period-to-period changes in absolute amounts between full year 2011 and 2012, and between interim 2012 and interim 2013, are likely overstated to some extent due to the absence of complete full year 2012, interim 2012 and interim 2013 financial information for U.S. producers who continued to have operations during those periods. CR/PR at VI-1 n.3.

[80] CR/PR at Table III-1.

U.S. import data are based on official Commerce import statistics and on questionnaire responses from 38 U.S. importers, accounting for *** percent of total U.S. imports of CSPV products from China in 2012, *** percent of such U.S. imports from Taiwan and *** percent of such U.S. imports from nonsubject countries.[81] However, as explained below in the discussion on the issue of negligibility, due to questions regarding the scope of the investigations and how to ascertain country of origin, coverage estimates may not be accurate with respect to import data.

The Commission received responses to its questionnaires from 28 producers of CSPV cells in China, which accounted for approximately *** percent of total 2012 production of CSPV cells in China. The Commission also received questionnaire responses from 51 producers of CSPV modules in China, which accounted for approximately *** percent of total 2012 production of CSPV modules in China.[82]

With respect to subject imports from Taiwan, the Commission received responses to its questionnaires from 13 firms accounting for approximately *** percent of 2012 production of CSPV cells in Taiwan. Thirteen responding Taiwanese producers reported that they produced CSPV modules in Taiwan as well, accounting for approximately *** percent of 2012 production of CSPV modules in Taiwan.[83]

VI. Negligible Imports

Pursuant to Section 771(24) of the Tariff Act, imports from a subject country of merchandise corresponding to a domestic like product that account for less than 3 percent of all such merchandise imported into the United States during the most recent 12 months for which data are available preceding the filing of the petition shall be deemed negligible.[84]

A key issue in the preliminary phase of these investigations is the nature of the data used to measure subject and nonsubject imports from both China and Taiwan. According to Commerce's scope determination in the prior investigations, the country of origin of a CSPV module is the country of origin of its component CSPV cells. Commerce found that the assembly of a CSPV module did not constitute "substantial transformation" of the CSPV cell and did not confer country of origin onto the assembled module.[85]

The scope in these investigations, as stated in Commerce's notices of initiation, differs from the scope of investigation for *CSPV I*. U.S. imports from China that are subject to the existing antidumping and countervailing duty orders on CSPV products are explicitly excluded from the scope of these investigations. In addition, the scope in these investigations specifically includes modules, laminates and/or panels assembled in the subject country consisting of CSPV

[81] CR/PR at IV-1.

[82] CR at VII-3, PR at VII-3.

[83] CR at VII-14, PR at VII-10.

[84] 19 U.S.C. §§ 1671b(a), 1673b(a), 1677(24)(A)(i), 1677(24)(B); *see also* 15 C.F.R. § 2013.1 (developing countries for purposes of 19 U.S.C. § 1677(36)).

[85] CR at IV-8 n.8, PR at IV-6 n.8.

cells that are partially manufactured in a country other than the subject country and use ingots or wafers that are manufactured in the subject country or cells where the manufacturing process begins in the subject country and is completed in a nonsubject country.[86] If Commerce's country of origin findings from *CSPV I* were applied to these investigations, then there would be no subject imports from China.[87] Although the petitions in these investigations were filed on December 31, 2013, petitioner filed a scope revision on January 13, 2014. Because the Commission's questionnaires were mailed on January 6, 2014, Commission staff had no opportunity to gather data pertinent to the CSPV products covered by the scope as revised on January 13.

Petitioner argues for an interpretation of the scope that would include two general categories of merchandise: (1) CSPV cells from Taiwan (whether imported directly as cells or whether imported as modules assembled in Taiwan or a nonsubject country) and (2) CSPV modules from China or Taiwan that are assembled from cells completely or partially manufactured in a third country from inputs manufactured in the subject country (*i.e.*, ingots or wafers that are manufactured in the subject country, or cells where the manufacturing process begins in the subject country and is completed in another country).[88] Petitioner states that the second category is described in the second sentence of the current scope definition and includes what petitioner calls the "two out of three" and "partially manufactured" rules. These rules would define country of origin for cells and modules in part according to the origin of upstream production, whether it be ingots and wafer production or partially manufactured cells. [89]

As explained above, the Commission drafted questionnaires and sent them to market participants before it was fully aware of petitioner's proposed rules. Therefore, neither the Commission's U.S. importer nor foreign producer questionnaire requested that market participants quantify the volume of Taiwanese or third-country CSPV cells that were made from Chinese ingots or wafers, or were partially manufactured in China, during the period of investigation. Accordingly, we cannot ascertain from the importer questionnaire responses the quantity of subject imports from China based on the scope interpretation that petitioner advocates.[90] Consequently, we cannot provide a specific negligibility calculation as to these imports.[91]

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[86] 79 Fed. Reg. at 4667, 4671.

[87] CR at IV-8 n.10, PR at IV-6 n.10.

[88] CR at I-12, PR at I-9 – I-10.

[89] *See* CR at I-13 – I-15, PR at I-10 – I-12. Both Chinese and Taiwanese respondents argue that these rules are contrary to the country of origin determination established by Commerce in the prior investigations. CCCME's Postconference Brief at 4-8; Taiwanese Respondents' Postconference Brief, Exh. A at 3-4.

[90] We have some limited data regarding the quantity of subject imports as advocated by the petitioner. Examining the January-September 2013 U.S. import data, which are the most recent data available preceding the filing of the petition, modules imported from China containing Taiwanese-origin (Continued…)

Commerce is responsible for defining the scope of the merchandise imported from China and Taiwan that is subject to investigation. In these preliminary phase determinations, we do not project how Commerce will resolve the parties' disputes concerning the scope. We expect that Commerce will rule on the scope of the investigations in the near future.

The United States Court of Appeals for the Federal Circuit has held that the Commission must make preliminary determinations based upon the information before it at the time, including findings concerning negligibility in preliminary determinations.[92] Thus, the Commission must apply the *American Lamb* standard and examine whether the record as a whole contains clear and convincing evidence that imports are negligible and whether no likelihood exists that contrary evidence will arise in a final investigation.[93] As the Statement of Administrative Action ("SAA") for the Uruguay Round Agreements Act notes:

> *** not intended to limit the Commission's ability to use reasonable estimates in calculating whether import volumes are negligible. The amendments are, however, intended to preclude termination based on negligibility in a preliminary investigation where, for example: (1) the Commission is uncertain regarding appropriate like product designations and corresponding import volumes are not negligible with respect to one of the arguably appropriate designations; or (2) imports are extremely close to the relevant quantitative thresholds and there is a reasonable indication that data obtained in a final investigation will establish that imports exceed the quantitative thresholds.[94]

By the same token, termination at the preliminary phase of these investigations based on a finding of negligible imports would not be appropriate when the parameters of the scope definition, including questions of country of origin, are not clear.

Accordingly, we determine for purposes of the preliminary phase of these investigations that subject imports from China are not negligible. Because it is not clear whether or how

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(…Continued)
cells accounted for *** percent of all U.S. imports. *See* CR/PR at Table IV-5. ***. CR at IV-20 – IV-21, PR at IV-10.

[91] In any final phase of these investigations, we shall seek separate data on the origin of the ingots and wafers used to make the CSPV cells manufactured in China, as well as all countries involved in the manufacture of the cells that originate in China. We welcome the parties' comments on how to collect these data.

[92] *Co-Steel Raritan, Inc. v. United States*, 357 F.3d 1294 (Fed. Cir. 2004).

[93] *American Lamb Co. v. United States*, 785 F.2d 994, 1001 (Fed. Cir. 1986); *see Co-Steel Raritan, Inc. v. U.S. Int'l Trade Comm'n*, 31 CIT 58 (2007). In *Co-Steel,* the Federal Circuit concluded that the CIT had improperly remanded the case and instructed the Commission on remand to reopen the record. Previously, the Commission had found imports from a certain country to be negligible based on the information then available, and the Commission had declined to speculate as to whether Commerce would revise the scope, as had been requested by petitioner late in the preliminary phase, in a way that would affect the negligible import analysis. *Co-Steel*, 357 F.3d at 1313-17.

[94] SAA, H.R. Rep. 316, 103 Cong., 2d Sess., vol. 1 at 857 (1994) (emphasis added).

Commerce will apply petitioner's proposed rules concerning which products are subject imports from China or Taiwan, Commerce's decision may impact import levels with respect to subject imports from both subject countries. [95] [96]

For all of these reasons, we do not find that subject imports from China or Taiwan are negligible on the basis of the *American Lamb* standard.[97]

VII. Cumulation

For purposes of evaluating the volume and price effects for a determination of reasonable indication of material injury by reason of subject imports, section 771(7)(G)(i) of the Tariff Act requires the Commission to cumulate subject imports from all countries as to which petitions were filed and/or investigations self-initiated by Commerce on the same day, if such imports compete with each other and with the domestic like product in the U.S. market. In assessing whether subject imports compete with each other and with the domestic like product, the Commission generally has considered four factors:

(1) the degree of fungibility between subject imports from different countries and between subject imports and the domestic like product, including consideration of specific customer requirements and other quality related questions;

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[95] Petitioner contends that based upon unadjusted Commerce statistics, U.S. imports from China accounted for 10 percent of total U.S. imports of CSPV cells and 30 percent of CSPV modules based on value. Using an alternative methodology based on U.S. importer questionnaire data, petitioner computed that U.S. imports from China accounted for *** percent of total reported U.S. imports. Petitioner maintains that both methods establish that U.S. imports from China are not negligible. CR at IV-16 – IV-17, PR at IV-7- IV-8. Respondents contend that, according to the scope definition in these investigations, there are no subject U.S. imports from China and, therefore, U.S. imports from China are negligible. CCCME's Postconference Brief at 4-8.

[96] If unadjusted Commerce statistics are used, subject imports from Taiwan accounted for 37 percent of total imports of CSPV cells and 15 percent of CSPV modules, based on value, during the most recent 12-month period prior to the filing of the petitions for which data were collected (December 2012 through November 2013). CR at IV-16 – IV-17, PR at IV-7 – IV-8. Because these figures exceed the 3 percent statutory negligibility threshold, subject imports from Taiwan appear not negligible. Based on petitioner's alternative computation utilizing U.S. importer questionnaire data, as explained below, U.S. imports from Taiwan accounted for *** percent of total reported U.S. imports. CR at IV-17, PR at IV-8. As discussed above, due to questions regarding the scope of the investigations and how to ascertain country of origin, coverage estimates may not be accurate with respect to import data. However, Taiwanese respondents did not argue that subject imports from Taiwan were negligible.

[97] We note that petitioner argues that the Commission should apply the *American Lamb* standard to the preliminary phase of these investigations. Petitioner's Postconference Brief at 24 & Exh. 1 at 19. In addition, respondents stated at the conference that the questionnaire import data are not "cleanly nonsubject." Tr. at 165-66 (Ms. Jacobs). CCCME also acknowledged that ambiguities in the definitions of CSPV products led to inconsistent data across and within questionnaires. CCCME's Postconference Brief at 10-11.

(2) the presence of sales or offers to sell in the same geographic markets of subject imports from different countries and the domestic like product;

(3) the existence of common or similar channels of distribution for subject imports from different countries and the domestic like product; and

(4) whether the subject imports are simultaneously present in the market.[98]

While no single factor is necessarily determinative, and the list of factors is not exclusive, these factors are intended to provide the Commission with a framework for determining whether the subject imports compete with each other and with the domestic like product.[99] Only a "reasonable overlap" of competition is required.[100]

Petitioner contends that the Commission should consider subject imports from China and Taiwan cumulatively.[101] CCCME states that it takes no position on the issue of cumulation,[102] while Taiwanese respondents argue that subject imports from Taiwan do not compete with imports from China or with the domestic like product.[103]

Based on the discussion below, we determine to consider subject imports from China and Taiwan on a cumulated basis. The discussion below assumes some appreciable proportion of CSPV products would be classified as subject imports from China under petitioner's proposed method for ascertaining country of origin.[104]

As an initial matter, petitioner filed the antidumping/countervailing duty petitions with respect to both countries on the same day, December 31, 2013. In addition, there appears to be a reasonable overlap of competition between CSPV imports from both countries, and between CSPV imports from each source and the domestic like product.

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[98] *See Certain Cast-Iron Pipe Fittings from Brazil, the Republic of Korea, and Taiwan*, Inv. Nos. 731-TA-278-80 (Final), USITC Pub. 1845 (May 1986), *aff'*d, *Fundicao Tupy, S.A. v. United States*, 678 F. Supp. 898 (Ct. Int'l Trade), *aff'd*, 859 F.2d 915 (Fed. Cir. 1988).

[99] *See*, *e.g.*, *Wieland Werke, AG v. United States*, 718 F. Supp. 50 (Ct. Int'l Trade 1989).

[100] The Statement of Administrative Action (SAA) to the Uruguay Round Agreements Act (URAA), expressly states that "the new section will not affect current Commission practice under which the statutory requirement is satisfied if there is a reasonable overlap of competition." H.R. Rep. No. 103-316, Vol. I at 848 (1994) (*citing Fundicao Tupy*, 678 F. Supp. at 902); *see Goss Graphic Sys., Inc. v. United States*, 33 F. Supp. 2d 1082, 1087 (Ct. Int'l Trade 1998) ("cumulation does not require two products to be highly fungible"); *Wieland Werke, AG*, 718 F. Supp. at 52 ("Completely overlapping markets are not required.").

[101] Petitioner's Postconference Brief, Exh. 1 at 78-83.

[102] CCCME's Postconference Brief, Exh. 1 at 21.

[103] Taiwanese Respondents' Postconference Brief at 10-11.

[104] Because we have determined that subject imports from China are not negligible for purposes of these preliminary phase determinations, they are eligible for cumulation. *See* 19 U.S.C. § 1677(7)(G)(ii)(II). Our analysis of subject imports from China is based on data from the staff report on all imports of CSPV products from China, whether subject or nonsubject.

Fungibility. The record in the preliminary phase of these investigations indicates that CSPV cells and modules are at least moderately fungible, regardless of source. Most responding U.S. producers, as well as most responding U.S. importers, described CSPV products from the United States and China as being "always" or "frequently" interchangeable, and described CSPV products from the United States and Taiwan in the same manner. Most responding U.S. producers, along with most responding U.S. importers, also described CSPV products from China and Taiwan as being "always" or "frequently" interchangeable.[105]

Channels of Distribution. U.S. producers sold CSPV modules in all channels of distribution, *i.e.*, to distributors, residential and commercial installers, and utilities/developers, but sold their products primarily to distributors and commercial installers during the period of investigation. Imports of CSPV modules from China were also sold in all channels of distribution, but were sold primarily to commercial installers and utilities/developers. Similarly, imports of CSPV modules from Taiwan were sold primarily to commercial installers and utilities/developers in 2010, but then shifted to primarily residential installers and utilities/developers in 2012.[106]

Geographic Overlap. U.S. producers and importers reported selling CSPV products in all regions in the contiguous United States. The domestic like product and imports from both China and Taiwan were present in all continental regions during the period of investigation.[107]

Simultaneous Presence in Market. Monthly Commerce statistics show that imports from both China and Taiwan entered the United States in each month of the period of investigation and were therefore simultaneously present in the market.[108] Imports of CSPV cells and modules from both subject countries were present in the U.S. market in each month of the period.[109]

Conclusion. Based on the above discussion, we find that there is a reasonable overlap of competition between imports of CSPV cells and modules from China and Taiwan and the domestic like product, as well as between imports of CSPV cells and modules from China and such imports from Taiwan. Contrary to Taiwanese respondents' claims, the record in the preliminary phase of these investigations does not indicate a lack of fungibility between subject imports from Taiwan, any imports from China that may be subject to these investigations, and the domestic like product. The record indicates that there is substantial geographic overlap among CSPV cells and modules from the United States, China, and Taiwan, and that the requirement for their simultaneous presence in the market has been satisfied. Accordingly, because the antidumping and countervailing duty petitions were filed on the same day and the record indicates that there is a reasonable overlap of competition between and among imports from the subject countries and the domestic like product, we analyze imports of CSPV cells and

[105] CR/PR at Table II-7.
[106] CR at II-3, PR at II-2, CR/PR at Table II-1.
[107] CR/PR at Table II-2.
[108] CR at IV-23, PR at IV-10 – IV-11.
[109] Supplement II to Petition, Exh. 1-Supp-11 (Jan. 13, 2014).

modules from China and Taiwan on a cumulated basis in making our determination as to whether there is a reasonable indication of material injury by reason of subject imports.

VIII. Reasonable Indication of Material Injury by Reason of Subject Imports

A. *Legal Standard*

In the preliminary phase of antidumping and countervailing duty investigations, the Commission determines whether there is a reasonable indication that an industry in the United States is materially injured or threatened with material injury by reason of the imports under investigation.[110] In making this determination, the Commission must consider the volume of subject imports, their effect on prices for the domestic like product, and their impact on domestic producers of the domestic like product, but only in the context of U.S. production operations.[111] The statute defines "material injury" as "harm which is not inconsequential, immaterial, or unimportant."[112] In assessing whether there is a reasonable indication that the domestic industry is materially injured by reason of subject imports, we consider all relevant economic factors that bear on the state of the industry in the United States.[113] No single factor is dispositive, and all relevant factors are considered "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[114]

Although the statute requires the Commission to determine whether there is a reasonable indication that the domestic industry is "materially injured by reason of" unfairly traded imports,[115] it does not define the phrase "by reason of," indicating that this aspect of the injury analysis is left to the Commission's reasonable exercise of its discretion.[116] In identifying a causal link, if any, between subject imports and material injury to the domestic industry, the Commission examines the facts of record that relate to the significance of the volume and price effects of the subject imports and any impact of those imports on the condition of the domestic industry. This evaluation under the "by reason of" standard must ensure that subject imports are more than a minimal or tangential cause of injury and that there is a sufficient causal, not merely a temporal, nexus between subject imports and material injury.[117]

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[110] 19 U.S.C. §§ 1671b(a), 1673b(a).

[111] 19 U.S.C. § 1677(7)(B). The Commission "may consider such other economic factors as are relevant to the determination" but shall "identify each {such} factor ... {a}nd explain in full its relevance to the determination." 19 U.S.C. § 1677(7)(B).

[112] 19 U.S.C. § 1677(7)(A).

[113] 19 U.S.C. § 1677(7)(C)(iii).

[114] 19 U.S.C. § 1677(7)(C)(iii).

[115] 19 U.S.C. §§ 1671b(a), 1673b(a).

[116] *Angus Chemical Co. v. United States*, 140 F.3d 1478, 1484-85 (Fed. Cir. 1998) ("{T}he statute does not 'compel the commissioners' to employ {a particular methodology}."), *aff'g* 944 F. Supp. 943, 951 (Ct. Int'l Trade 1996).

[117] The Federal Circuit, in addressing the causation standard of the statute, has observed that "{a}s long as its effects are not merely incidental, tangential, or trivial, the foreign product sold at less than fair value meets the causation requirement." *Nippon Steel Corp. v. USITC*, 345 F.3d 1379, 1384 (Continued…)

In many investigations, there are other economic factors at work, some or all of which may also be having adverse effects on the domestic industry. Such economic factors might include nonsubject imports; changes in technology, demand, or consumer tastes; competition among domestic producers; or management decisions by domestic producers. The legislative history explains that the Commission must examine factors other than subject imports to ensure that it is not attributing injury from other factors to the subject imports, thereby inflating an otherwise tangential cause of injury into one that satisfies the statutory material injury threshold.[118] In performing its examination, however, the Commission need not isolate the injury caused by other factors from injury caused by unfairly traded imports.[119] Nor does the "by reason of" standard require that unfairly traded imports be the "principal" cause of injury or contemplate that injury from unfairly traded imports be weighed against other factors,

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(…Continued)
(Fed. Cir. 2003). This was re-affirmed in *Mittal Steel Point Lisas Ltd. v. United States*, 542 F.3d 867, 873 (Fed. Cir. 2008), in which the Federal Circuit, quoting *Gerald Metals, Inc. v. United States*, 132 F.3d 716, 722 (Fed. Cir. 1997), stated that "this court requires evidence in the record 'to show that the harm occurred "by reason of" the LTFV imports, not by reason of a minimal or tangential contribution to material harm caused by LTFV goods.'" *See also Nippon Steel Corp. v. United States*, 458 F.3d 1345, 1357 (Fed. Cir. 2006); *Taiwan Semiconductor Industry Ass'n v. USITC*, 266 F.3d 1339, 1345 (Fed. Cir. 2001).

[118] SAA, H.R. Rep. 103-316, Vol. I at 851-52 (1994) ("{T}he Commission must examine other factors to ensure that it is not attributing injury from other sources to the subject imports."); S. Rep. 96-249 at 75 (1979) (the Commission "will consider information which indicates that harm is caused by factors other than less-than-fair-value imports."); H.R. Rep. 96-317 at 47 (1979) ("in examining the overall injury being experienced by a domestic industry, the ITC will take into account evidence presented to it which demonstrates that the harm attributed by the petitioner to the subsidized or dumped imports is attributable to such other factors;" those factors include "the volume and prices of nonsubsidized imports or imports sold at fair value, contraction in demand or changes in patterns of consumption, trade restrictive practices of and competition between the foreign and domestic producers, developments in technology and the export performance and productivity of the domestic industry"); *accord Mittal Steel*, 542 F.3d at 877.

[119] SAA at 851-52 ("{T}he Commission need not isolate the injury caused by other factors from injury caused by unfair imports."); *Taiwan Semiconductor Industry Ass'n* , 266 F.3d at 1345. ("{T}he Commission need not isolate the injury caused by other factors from injury caused by unfair imports ... . Rather, the Commission must examine other factors to ensure that it is not attributing injury from other sources to the subject imports." (emphasis in original)); *Asociacion de Productores de Salmon y Trucha de Chile AG v. United States*, 180 F. Supp. 2d 1360, 1375 (Ct. Int'l Trade 2002) ("{t}he Commission is not required to isolate the effects of subject imports from other factors contributing to injury" or make "bright-line distinctions" between the effects of subject imports and other causes.); *see also Softwood Lumber from Canada*, Inv. Nos. 701-TA-414 and 731-TA-928 (Remand), USITC Pub. 3658 at 100-01 (Dec. 2003) (Commission recognized that "{i}f an alleged other factor is found not to have or threaten to have injurious effects to the domestic industry, *i.e.*, it is not an 'other causal factor,' then there is nothing to further examine regarding attribution to injury"), *citing Gerald Metals,* 132 F.3d at 722 (the statute "does not suggest that an importer of LTFV goods can escape countervailing duties by finding some tangential or minor cause unrelated to the LTFV goods that contributed to the harmful effects on domestic market prices.").

such as nonsubject imports, which may be contributing to overall injury to an industry.[120] It is clear that the existence of injury caused by other factors does not compel a negative determination.[121]

Assessment of whether material injury to the domestic industry is "by reason of" subject imports "does not require the Commission to address the causation issue in any particular way" as long as "the injury to the domestic industry can reasonably be attributed to the subject imports" and the Commission "ensure{s} that it is not attributing injury from other sources to the subject imports."[122] [123] Indeed, the Federal Circuit has examined and affirmed various Commission methodologies and has disavowed "rigid adherence to a specific formula."[124]

The Federal Circuit's decisions in *Gerald Metals*, *Bratsk,* and *Mittal Steel* all involved cases in which the relevant "other factor" was the presence in the market of significant volumes of price-competitive nonsubject imports. The Commission interpreted the Federal Circuit's guidance in *Bratsk* as requiring it to apply a particular additional methodology following its finding of material injury in cases involving commodity products and a significant

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[120] S. Rep. 96-249 at 74-75; H.R. Rep. 96-317 at 47.

[121] *See Nippon*, 345 F.3d at 1381 ("an affirmative material-injury determination under the statute requires no more than a substantial-factor showing. That is, the 'dumping' need not be the sole or principal cause of injury.").

[122] *Mittal Steel*, 542 F.3d at 877-78; *see also id.* at 873 ("While the Commission may not enter an affirmative determination unless it finds that a domestic industry is materially injured 'by reason of' subject imports, the Commission is not required to follow a single methodology for making that determination ... {and has} broad discretion with respect to its choice of methodology.") *citing United States Steel Group v. United States*, 96 F.3d 1352, 1362 (Fed. Cir. 1996) and S. Rep. 96-249 at 75.

[123] Commissioner Pinkert does not join this paragraph or the following three paragraphs. He points out that the Federal Circuit, in *Bratsk*, 444 F.3d 1369, and *Mittal Steel*, held that the Commission is *required*, in certain circumstances when considering present material injury, to undertake a particular kind of analysis of non-subject imports, albeit without reliance upon presumptions or rigid formulas. *Mittal Steel* explains as follows:

> What *Bratsk* held is that "where commodity products are at issue and fairly traded, price competitive, non-subject imports are in the market," the Commission would not fulfill its obligation to consider an important aspect of the problem if it failed to consider whether non-subject or non-LTFV imports would have replaced LTFV subject imports during the period of investigation without a continuing benefit to the domestic industry. 444 F.3d at 1369. Under those circumstances, *Bratsk* requires the Commission to consider whether replacement of the LTFV subject imports might have occurred during the period of investigation, and it requires the Commission to provide an explanation of its conclusion with respect to that factor.

542 F.3d at 878.

[124] *Nucor Corp. v. United States*, 414 F.3d 1331, 1336, 1341 (Fed. Cir. 2005); *see also Mittal Steel*, 542 F.3d at 879 ("*Bratsk* did not read into the antidumping statute a Procrustean formula for determining whether a domestic injury was 'by reason' of subject imports.").

market presence of price-competitive nonsubject imports.[125] The additional "replacement/benefit" test looked at whether nonsubject imports might have replaced subject imports without any benefit to the U.S. industry. The Commission applied that specific additional test in subsequent cases, including the *Carbon and Certain Alloy Steel Wire Rod from Trinidad and Tobago* determination that underlies the *Mittal Steel* litigation.

Mittal Steel clarifies that the Commission's interpretation of *Bratsk* was too rigid and makes clear that the Federal Circuit does not require the Commission to apply an additional test nor any one specific methodology; instead, the court requires the Commission to have "evidence in the record 'to show that the harm occurred 'by reason of' the LTFV imports,'" and requires that the Commission not attribute injury from nonsubject imports or other factors to subject imports.[126] Accordingly, we do not consider ourselves required to apply the replacement/benefit test that was included in Commission opinions subsequent to *Bratsk*.

The progression of *Gerald Metals*, *Bratsk*, and *Mittal Steel* clarifies that, in cases involving commodity products where price-competitive nonsubject imports are a significant factor in the U.S. market, the Court will require the Commission to give full consideration, with adequate explanation, to non-attribution issues when it performs its causation analysis.[127]

The question of whether the material injury threshold for subject imports is satisfied notwithstanding any injury from other factors is factual, subject to review under the substantial evidence standard.[128] Congress has delegated this factual finding to the Commission because of the agency's institutional expertise in resolving injury issues.[129]

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[125] *Mittal Steel*, 542 F.3d at 875-79.

[126] *Mittal Steel*, 542 F.3d at 873 (quoting from *Gerald Metals*, 132 F.3d at 722), 875-79 & n.2 (recognizing the Commission's alternative interpretation of *Bratsk* as a reminder to conduct a non-attribution analysis).

[127] To that end, after the Federal Circuit issued its decision in *Bratsk*, the Commission began to present published information or send out information requests in final phase investigations to producers in nonsubject countries that accounted for substantial shares of U.S. imports of subject merchandise (if, in fact, there were large nonsubject import suppliers). In order to provide a more complete record for the Commission's causation analysis, these requests typically seek information on capacity, production, and shipments of the product under investigation in the major source countries that export to the United States. The Commission plans to continue utilizing published or requested information in final phase investigations in which there are substantial levels of nonsubject imports.

[128] We provide in our respective discussions of volume, price effects, and impact a full analysis of other factors alleged to have caused any material injury experienced by the domestic industry.

[129] *Mittal Steel*, 542 F.3d at 873; *Nippon Steel Corp*., 458 F.3d at 1350, *citing U.S. Steel Group*, 96 F.3d at 1357; S. Rep. 96-249 at 75 ("The determination of the ITC with respect to causation is ... complex and difficult, and is a matter for the judgment of the ITC.").

B. *Conditions of Competition and the Business Cycle*

The following conditions of competition inform our analysis of whether there is a reasonable indication of material injury by reason of subject imports.

1. Demand Conditions

The demand for CSPV cells and modules is derived from the demand for solar electricity. The demand for solar electricity is affected by power rates and energy consumption, environmental concerns and the general movement toward "green energy" alternatives, cost competitiveness with traditional energy sources, a desire for national energy independence, and the availability of Federal, state and local incentives.[130]

Electricity demand in the United States is supplied primarily by conventional sources, such as coal and natural gas, as well as renewable energy source such as solar, wind, geothermal, and biomass. Approximately two-thirds of U.S. electricity was generated from either coal or natural gas during the period of investigation. However, the share of electricity generated from renewable energy sources, such as solar, has increased on an annual basis.[131]

The parties, as well as all U.S. producers and most importers, agree that there has been an increase in U.S. demand since 2010.[132] As measured by apparent U.S. consumption, demand for CSPV modules increased from *** kilowatts in 2010 to *** kilowatts in 2011, then increased further to *** kilowatts in 2012; it totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013.[133] U.S. producers and importers attributed the increased demand to lower module prices, Federal, state and local incentive programs, declining polysilicon prices, and a demand for "green" energy. Some commercial customers purchase solar energy to "lock in" their energy costs for 20 or more years and benefit from an energy hedging value, coupled with satisfying a "green" corporate social responsibility goal.[134]

There is a wide array of fiscal incentives that are designed to lower the cost of project development, including various tax credits, cash grants in lieu of credit and loan guarantees. Tax credits are the most common form of fiscal incentive; several types of tax credits have been modified and extended at various times, which has affected the timing of the development of various solar projects.[135]

Two of the most widespread regulatory policies are renewable portfolio standards ("RPSs") and feed-in-tariffs ("FITs"). RPSs primarily affect demand for renewable energy, including solar electricity, by mandating its use and thereby increasing the demand for CSPV products. In the United States, 29 states and the District of Columbia have RPS policies in place.

[130] CR at II-19, PR at II-12.

[131] CR at II-20, PR at II-12.

[132] Petitioner's Postconference Brief at 5-6, CCCME's Postconference Brief at 18-19, CR/PR at Table II-5.

[133] CR/PR at Table IV-7.

[134] CR at II-21, PR at II-13.

[135] CR at II-25, PR at II-16.

FITs mainly affect the supply of solar energy by paying a solar electricity generator a known rate of return. Five states have FITs in place in the United States.[136] [137]

Competition with traditional energy sources is driven by the levelized cost of electricity for solar electricity. The levelized cost of electricity varies state-by-state, by time of day and by the availability of other electricity sources. Electricity providers using renewable sources seek to achieve "grid parity" with other sources of electricity.[138]

There are three market segments comprising the solar energy market: commercial, utility, and residential. [139] Most producers and importers reported that prices of conventional energy, such as natural gas or coal, did not affect demand for CSPV products or cause demand of CSPV products to decrease in residential and commercial market segments during the period of investigation.[140] Some firms indicated that the utility market is more sensitive to price pressure from conventional energy sources.[141]

2. Supply Conditions

During the period of investigation, the U.S. market was supplied by the domestic industry, subject imports, and nonsubject imports. The domestic industry's market share declined substantially over the period.[142] Subject import market share, however, increased substantially.[143] Nonsubject import market share declined significantly,[144] as CSPV products

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[136] CR at II-25 – II-26, PR at II-17.

[137] Commissioner Broadbent notes that the existence of these incentive programs in the United States and other global markets, such as those in the European Community, has likely caused a growth in demand for solar energy products that is significantly in excess of the growth that would have occurred absent the incentive programs. By putting in place these incentive programs, the United States, the European Community, and other nations have altered structural demand conditions that would otherwise have been in place in these markets and encouraged solar energy producers in other markets, including China, to increase their capacity to produce CSPV products beyond the level these markets would typically be expected to support.

[138] CR at II-22, PR at II-14.

[139] CR at II-4, PR at II-3. In the residential market segment, panels are affixed to residential rooftops or installed in stand-alone systems. In the commercial (or nonresidential) segment, panels are affixed to large, flat non-residential rooftops or installed in stand-alone systems. In the utility-scale segment, large scale solar panel arrays are installed as stand-alone units. CR at II-4, PR at II-3.

[140] CR at II-23, PR at II-15.

[141] CR at II-24, PR at II-16.

[142] The domestic industry's market share was *** percent in 2010, *** percent in 2011, and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013. CR/PR at Table C-2 (revised).

[143] Subject import market share was *** percent in 2010, *** percent in 2011, and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013. CR/PR at Table C-2 (revised).

[144] Nonsubject import market share was *** percent in 2010, *** percent in 2011, and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013. CR/PR at Table C-2 (revised).

from China became subject to investigation in 2011 and subject to duties in 2012.[145] Consequently, in 2012 and thereafter most of the influx of CSPV imports into the U.S. market switched from Chinese to Taiwanese in origin.

The Commission obtained questionnaire responses from five domestic producers of CSPV cells and modules.[146] Petitioner, by far the largest U.S. producer of CSPV cells and modules,[147] reported that since 2010 ***.[148] Evidence in the record indicates that, based on U.S. Energy Information Administration data, U.S. module production has decreased *** percent from 2010 to 2012,[149] and at least eight U.S. producers have shuttered facilities and/or declared bankruptcy.[150]

The record indicates that, during the period of investigation, most nonsubject imports in the market were from China.[151] Other sources of nonsubject imports of CSPV cells were Malaysia, Singapore, Japan, Philippines, and Germany.[152] Other nonsubject sources of CSPV modules were Malaysia, Mexico, Philippines, Germany, and Japan.[153] These nonsubject imports were present in the U.S. market throughout the period of investigation.[154]

Seventeen of 35 responding importers reported that they were unable to supply CSPV products at some point during the period of investigation. Some reported that the supply of CSPV products has decreased since duties were placed on CSPV products from China in 2012.[155] Importers also reported that dependency on cells from Taiwan limited their ability to fulfill orders and led to some allocations.[156]

The domestic industry participated in all segments of the U.S. market, as did imports from both subject and nonsubject sources.[157]

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[145] CR at I-5, PR at I-4.

[146] CR at III-1 – III-2, PR at III-1. Two firms reported that they produced CSPV cells and modules in the United States and three firms reported that they produced only CSPV modules. *Id*.

[147] Petitioner's share of reported U.S. production of CSPV cells was *** percent in 2012 and its share of reported U.S. production of CSPV modules was *** percent in that year. CR/PR at Table III-1.

[148] CR/PR at Table III-2.

[149] Petitioner's Postconference Brief at 13 & Exh. 3. This figure includes producers we have excluded from the domestic industry.

[150] Petitioner's Postconference Brief at 12-13, 32-33; CR at III-4 n.5, PR at III-3 n.5.

[151] CR/PR at Table IV-4.

[152] CR at IV-9, PR at IV-6.

[153] CR at IV-9, PR at IV-7.

[154] Nonsubject imports from China totaled *** kilowatts in 2010, *** kilowatts in 2011 and *** kilowatts in 2012. They totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. Total nonsubject imports followed the same pattern. They totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. They totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. CR/PR at Table IV-4.

[155] CR at II-18, PR at II-11.

[156] CR at II-18 – II-19, PR at II-11.

[157] CR/PR at Table II-1.

3. Substitutability and Other Conditions

Both domestic producers and importers of subject merchandise reported nationwide sales of CSPV products.[158] The record shows that there is a high degree of substitutability between the domestic like product and subject imports.[159] As discussed above, most market participants reported that the domestic like product and the subject imports are "always" or "frequently" interchangeable.[160]

Several factors affect purchasing decisions. Evidence obtained in the prior investigations indicates that price and quality are the most important factors in purchasing decisions.[161] Nothing in the record of the preliminary phase of these investigations indicates otherwise. Conditions of sale, such as price discounts/rebates, lead times between order and delivery dates, payment terms, and services are also important.[162] According to respondents, non-price factors such as the ability to produce "Zep-compatible" modules that are used in the residential segment[163] and cell count (*i.e.* 60 versus 72-cell modules) and voltage of modules are also important.[164]

Taiwanese respondents argue that their products are quite different from other imports, as they are of the highest quality and sell at a price premium.[165] In any final phase investigations, we intend to seek more information on the substitutability of the subject imports from Taiwan with the domestic like product.

Raw material costs accounted for *** percent of U.S. producers' total costs of goods sold during 2012, up from *** percent in 2010. The principal raw material cost for the production of CSPV modules is the CSPV cell. Raw material costs for the production of CSPV cells accounted for *** percent of U.S. producers' total cost of goods sold ("COGS") during 2012, down from *** percent in 2010. The price of polysilicon, the primary raw material input for CSPV cells, fell 67.2 percent from the first quarter of 2010 to the third quarter of 2013.[166] According to petitioner, the costs of silver paste (used in cell production) and aluminum frames

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[158] CR/PR at Table II-2.

[159] CR at II-30 – II-31, PR at II-20.

[160] CR/PR at Table II-7.

[161] *CSPV I*, USITC Pub. 4360 at II-20. Half of responding producers (2 of 4) and approximately half of responding importers (16 of 35) reported that differences other than price were "sometimes" important in comparing the domestic and Chinese products. Two of four responding producers and 17 of 35 responding importers reported that differences other than price were "frequently" important. When comparing the domestic and Taiwanese products, half of responding producers (2 of 4) and half of responding importers (16 of 31) reported that differences other than price were "sometimes" important and the remaining half of responding U.S. producers and 8 of 31 responding importers reported that differences other than price were "frequently" important. CR at II-33, PR at II-22.

[162] CR at II-30, PR at II-20.

[163] CCCME's Postconference Brief at 43-44. In the Zep-compatible mounting system, the panel itself is part of the racking hardware by use of a specially grooved frame. CR at I-22, PR at I-11.

[164] CCCME's Postconference Brief at 28-29.

[165] Taiwanese Respondents' Postconference Brief at 7-8.

[166] CR/PR at V-1.

(used in module production) are dependent on the silver and aluminum commodity markets. It reported that each component comprises ***.[167]

C. *Volume of Subject Imports*

Section 771(7)(C)(i) of the Tariff Act provides that the "Commission shall consider whether the volume of imports of the merchandise, or any increase in that volume, either in absolute terms or relative to production or consumption in the United States, is significant."[168]

Although apparent U.S. consumption of CSPV products increased over *** percent between 2010 and 2012,[169] the quantity of subject imports, measured in kilowatts, rose much more rapidly. Between 2010 and 2012, subject imports grew over *** percent. Furthermore, the quantity of subject imports was *** percent higher in interim 2013 than it was in interim 2012.[170]

Subject import market share increased *** percentage points between 2010 and 2012, and was *** percentage points higher in interim 2013 than in interim 2012.[171] Subject imports took market share away from the domestic industry, whose U.S. shipments increased by only *** percent from 2010 to 2012, and were substantially less in interim 2013 when compared with interim 2012.[172] The market share of the domestic industry declined by *** percentage points from 2010 to 2012 and was *** percentage points lower in interim 2013 than in interim 2012.[173]

Subject import market share also increased at the expense of nonsubject imports. Nonsubject imports lost *** percentage points in terms of market share from 2010 to 2012 and experienced a substantial drop between the interim periods.[174] As previously discussed, China

[167] CR/PR at V-1.

[168] 19 U.S.C. § 1677(7)(C)(i).

[169] Apparent U.S. consumption was *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. It was *** kilowatts in interim 2012 and *** kilowatts in interim 2013. CR/PR at Table IV-7.

[170] Subject imports totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. They totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. CR/PR at Table IV-6.

[171] Subject import market share was *** percent in 2010, *** percent in 2011, and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013. CR/PR at Table IV-7.

[172] U.S. shipments totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. They totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. CR/PR at Table C-2 (revised).

[173] Domestic producers' market share was *** percent in 2010, *** percent in 2011, and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013. CR/PR at Table C-2 (revised).

[174] Nonsubject import market share was *** percent in 2010, *** percent in 2011, and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013. CR/PR at Table IV-7.

was the largest source of nonsubject imports and antidumping and countervailing duties were imposed on CSPV products from China in 2012.

In view of these data, we find that the volume of cumulated subject imports is significant in absolute terms and relative to consumption and production in the United States.[175]

D. *Price Effects of the Subject Imports*

Section 771(7)(C)(ii) of the Tariff Act provides that, in evaluating the price effects of subject imports, the Commission shall consider whether –

> (I) there has been significant price underselling by the imported merchandise as compared with the price of domestic like products of the United States, and
>
> (II) the effect of imports of such merchandise otherwise depresses prices to a significant degree or prevents price increases, which otherwise would have occurred, to a significant degree.[176]

We have previously found that the domestic like product and the subject imports are highly substitutable and that nothing in the record of these investigations calls into question the Commission's finding in *CSPV I* that price and quality are the two most important factors in purchasing decisions, but that several other factors are also important to purchasers. The latter point is corroborated by market participants' responses to the questionnaires in the preliminary phase of these investigations.[177]

The Commission collected pricing data on four CSPV module products.[178] Two U.S. producers reported data accounting for approximately *** percent of U.S. shipments during the period of investigation.[179] Because of the data collection issues explained above, the

[175] U.S. producers' production totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. It totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. CR/PR at Table C-2 (revised).

[176] 19 U.S.C. § 1677(7)(C)(ii).

[177] *See* CR/PR at Table II-8 (all U.S. producers and a majority of U.S. importers report that differences other than price are "sometimes" or "frequently" significant in purchasing decisions). Firms mentioned differences other than price in CSPV products form the United States, subject or nonsubject countries in cell type, product range (*e.g.*, smaller modules for off-grid), availability of product, transportation network, warranty provisions, and production guarantees. CR at II-36, PR at II-24.

[178] The products were distinguished by peak power wattage. Product 1 involved wattage from 220 to 239; Product 2, wattage from 240 to 259; Product 3, wattage from 260 to 279; and Product 4, wattage from 280 to 309. CR at V-6, PR at V-4.

[179] CR at V-7, PR at V-4; *see* *** Domestic Producer Questionnaire Responses. As explained above, we have found circumstances appropriate to exclude Motech, Wanxiang, ***, and Suntech from the domestic industry.

Commission was only able to obtain subject pricing data for CSPV products from Taiwan. These data accounted for 59.9 percent of imports from Taiwan during the period of investigation.[180]

The pricing data show that underselling occurred in *** instances in which price comparisons were possible and margins of underselling ranged from *** percent to *** percent. In the remaining *** instances, the margins of overselling ranged from *** percent to *** percent.[181] Based on the record in the preliminary phase of these investigations, we find there has been significant underselling of the domestic like product by the subject imports.[182] This significant underselling resulted in the domestic industry reducing prices, losing sales and ultimately losing significant market share over the period of investigation.[183]

Our analysis of the information on the record of the preliminary phase of these investigations leads us to find evidence of price depression. Prices for the domestic like product trended downward throughout the period of investigation for all four pricing products. These price declines persisted, even after imposition of the orders on CSPV products from China in December 2012, as the low-priced cumulated subject imports increased in quantity. Domestic price decreases ranged from *** percent to *** percent during the period, while subject import price decreases ranged from *** percent to *** percent.[184]

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[180] CR at V-7, PR at V-4.

[181] *Compare* *** Domestic Producer Questionnaire Responses *with* CR/PR at Tables V-3 - V -6.

[182] CCCME argues that the pricing product data are flawed because they do not distinguish CSPV products by relevant technical characteristics or by market segment. It claims the Commission cannot properly evaluate the pricing data and reach a conclusion as to whether under- or overselling has occurred, because the existing data do not permit the Commission to ensure product comparability in its price comparisons. CCCME's Postconference Brief at 12. According to CCCME, defining the pricing data by reference to wattage ranges alone cannot ensure that the pricing product data obtained from U.S. producers and importers are directly comparable. Other technical criteria, such as cell efficiency, cell count and voltage, as well as the market segment into which the module is sold, also affect the pricing of the product. *Id*. at 34-35. In view of these concerns, we intend to solicit more precise pricing data in any final phase investigations. We encourage the parties to include in their written comments on draft questionnaires any suggestions they have regarding improvements that can be made to better define pricing products.

[183] *** reported that they had to reduce prices or roll back announced price increases during the period of investigation. The domestic industry reported lost sales as well. The *** lost sales allegations involve *** purchasers, and totaled $10,389,500 regarding 15,007,760 watts of CSPV modules. Two purchasers commented that they disagreed with two allegations totaling $2,425,000, and no allegations have been confirmed. CR at V-19, PR at V-11, CR/PR at Table V-9 & n.1. As previously discussed between 2010 and 2012, subject import market share increased by *** percentage points and domestic industry market share declined by *** percentage points. CR/PR at Table C-2 (revised).

[184] CR at V-16, PR at V-9; *compare* *** Domestic Producer Questionnaire Responses *with* CR/PR at Tables V-3 – V-6.. Domestic price decreases ranged from *** percent to *** percent during fourth quarter 2012 through third quarter 2013, while subject import price decreases ranged from *** percent to *** percent. *Compare* *** Domestic Producer Questionnaire Responses *with* CR/PR at Tables V-3 – V-6.

The record reflects that the domestic industry's costs, in particular its raw material costs, decreased during the period of investigation.[185] Nevertheless, the industry's COGS to net sales ratio rose. It increased from *** percent in 2010 to *** percent in 2011, and then to *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013. This ratio increased even as unit COGS decreased due to falling unit and aggregate sales values.[186] Unit COGS increased slightly by *** percent from 2010 to 2011 before declining by *** percent from 2001 to 2012, an overall decrease of *** percent from 2010 to 2012; it was somewhat higher in interim 2012 than in interim 2013. At the same time, the unit net sales value declined steadily by *** percent from 2010 to 2011, and by *** percent from 2011 to 2012, an overall decrease of *** percent from 2010 to 2012; it was slightly lower in interim 2012 than in interim 2013.[187] Aggregate net sales values decreased at a faster rate than total COGS from 2010 to 2012.[188]

For the purposes of the preliminary phase of these investigations, in view of the above, we find that the large volume of subject imports had a significant adverse effect on prices in the United States for the domestic like product.

E. *Impact of the Subject Imports*[189]

Section 771(7)(C)(iii) of the Tariff Act provides that the Commission, in examining the impact of the subject imports on the domestic industry, "shall evaluate all relevant economic factors which have a bearing on the state of the industry." These factors include output, sales, inventories, capacity utilization, market share, employment, wages, productivity, profits, cash flow, return on investment, ability to raise capital, research and development, and factors affecting domestic prices. No single factor is dispositive and all relevant factors are considered "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."

Apparent U.S. consumption increased steadily over the period of investigation,[190] but from 2010 to 2012, U.S. producers' U.S. shipments increased only slightly overall in comparison

[185] CR/PR at V-1, Table C-2 (revised).

[186] CR/PR at Table C-2 (revised).

[187] CR/PR at Table C-2 (revised).

[188] Aggregate net sales values decreased by *** percent between 2010 and 2011 and by *** percent between 2011 and 2012; overall, they decreased by *** percent between 2010 and 2012. They were higher in interim 2012 than in interim 2013. Total COGS decreased by *** percent between 2010 and 2011, and by *** percent between 2011 and 2012. Overall, they decreased by *** percent between 2010 and 2012; they were higher in interim 2012 than in interim 2013. CR/PR at Table C-2 (revised).

[189] In its notice initiating the antidumping duty investigations on CSPV products from China and Taiwan, Commerce reported an estimated margin of 165.04 percent for imports from China and 75.68 percent for imports from Taiwan. 79 Fed. Reg. at 4665. Commerce also determined there was sufficient information in the petition to investigate 28 alleged countervailable Chinese subsidy programs. *Id*. at 4670.

and were substantially lower in interim 2013 than in interim 2012.[191] U.S. producers' market share declined substantially over the period.[192]

U.S. producers' production capacity increased between 2010 and 2012, but was lower in interim 2013 than in interim 2012,[193] due to a number of shuttered facilities and bankruptcies. Capacity utilization decreased steadily and significantly over the entire period.[194] Inventories increased substantially between 2010 and 2012, but were less in interim 2013 as compared to interim 2012.[195]

Employment levels declined between 2010 and 2012 by almost *** percent. They were *** percent lower in interim 2013 than in interim 2012.[196] Wages decreased as well.[197] Productivity increased between 2010 and 2012, but was less in interim 2013 than in interim 2012.[198]

The domestic industry suffered operating losses the entire period. These losses grew between 2010 and 2012, but were lower in interim 2013 than in interim 2012.[199] Net sales, as measured by quantity, declined over the entire period;[200] the value of net sales decreased by

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(…Continued)

[190] Apparent U.S. consumption totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. It totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. CR/PR at Table IV-7.

[191] U.S. producers' U.S. shipments totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. They totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. CR/PR at Table C-2 (revised).

[192] U.S. producers' market share was *** percent in 2010, *** percent in 2011, and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013. CR/PR at Table C-2 (revised).

[193] Capacity totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. It totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. CR/PR at Table C-2 (revised).

[194] Capacity utilization was *** percent in 2010, *** percent in 2011, and *** percent in 2012. It was *** percent in interim 2012 and *** percent in interim 2013. CR/PR at Table C-2 (revised).

[195] Inventories totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. They totaled *** kilowatts in interim 2013 and *** kilowatts in interim 2013. CR/PR at Table C-2 (revised).

[196] The number of production and related workers totaled *** in 2010, *** in 2011, and *** in 2012. It totaled *** in interim 2012 and *** in interim 2013. CR/PR at Table C-2 (revised).

[197] Wages paid totaled $*** in 2010, $*** in 2011, and $*** in 2012. They totaled $*** in interim 2012 and $*** in interim 2013. CR/PR at Table C-2 (revised).

[198] Productivity totaled *** watts per hour in 2010, *** watts per hour in 2011, and *** watts per hour in 2012. It totaled *** watts per hour in interim 2012 and *** watts per hour in interim 2013. CR/PR at Table C-2 (revised).

[199] Operating losses totaled $*** in 2010, $*** in 2011, and $*** in 2012. They totaled $*** in interim 2012 and $*** in interim 2013. CR/PR at Table C-2 (revised).

[200] Net sales totaled *** kilowatts in 2010, *** kilowatts in 2011, and *** kilowatts in 2012. They totaled *** kilowatts in interim 2012 and *** kilowatts in interim 2013. CR/PR at Table C-2 (revised).

more than half between 2010 and 2012, and continued to fall at the end of the period of investigation.[201]

Capital expenditures for CSPV modules declined substantially during the period of investigation.[202] R&D expenses for CSPV modules followed the same trend.[203]

For purposes of these preliminary phase determinations, we find that the subject imports had a significant impact on the domestic industry. The significant and increasing volume of low-priced subject imports took market share away from the domestic industry, the domestic industry's output did not increase commensurately with apparent U.S. consumption, and employment fell. Both the adverse price effects of the subject imports and the increased volume and market share led to decreased revenues for the domestic industry. This, in turn, contributed to the domestic industry's poor financial performance.

We have considered whether there are other factors, including the effect of nonsubject imports, that may have had an adverse impact on the domestic industry during the period of investigation to ensure we are not attributing any injury from other such factors to the subject imports. Nevertheless, as we have explained, it is unclear from the record in the preliminary phase of these investigations which Chinese imports are subject to the orders issued pursuant to the prior investigations, and therefore excluded from the scope of these investigations, and which are subject to these investigations.

As stated above, the record does indicate that, during the period of investigation, most nonsubject imports in the market were from China.[204] As previously discussed, nonsubject imports increased from 2010 to 2012, and then declined following the investigation and subsequent imposition of duties on CSPV products from China.[205] In pricing comparisons, nonsubject imports from China were priced lower than the domestic like product in 30 out of 37 pricing comparisons and were priced higher than subject imports from Taiwan in 17 out of 43 pricing comparisons.[206] Given that many indicators of the domestic industry's condition continued to decline in interim 2013, when the quantity of nonsubject imports declined severely, the record indicates that the subject imports, as currently defined, are having adverse

[201] The value of net sales totaled $*** in 2010, $*** in 2011, and $*** in 2012. It totaled $*** in interim 2012 and $*** in interim 2013. CR/PR at Table C-2 (revised).

[202] Capital expenditures totaled $*** in 2010, $*** in 2011, and $*** in 2012. They totaled $*** in interim 2012 and $*** in interim 2013. CR/PR at Table C-2 (revised).

[203] R&D expenses for modules totaled $*** in 2010, $*** in 2011, and $*** in 2012. They totaled $*** in interim 2012 and $*** in interim 2013. *Calculated from* Domestic Producers' Questionnaire Responses.

[204] CR/PR at Table IV-4. Other sources of nonsubject imports of CSPV cells were Malaysia, Singapore, Japan, Philippines, and Germany. CR at IV-9, PR at IV-6. Other nonsubject sources of CSPV modules were Malaysia, Mexico, Philippines, Germany, and Japan. CR at IV-9, PR at IV-7.

[205] CR/PR at Table IV-6.

[206] CR/PR at App. D.

effects on the domestic industry independent of any that have been caused by nonsubject imports.[207]

In addition, we do not find that the "bad business decisions" that CCCME claims have impeded petitioner's ability to compete at the forefront of technology demonstrate that the subject imports have not caused material injury to the domestic industry.[208] Although CCCME faults the domestic industry for not selling products that are Zep compatible, the record indicates that the Zep compatibility system was developed in 2009, and one of the largest residential installers did not begin testing it until 2012 and did not purchase it until 2013.[209] In addition, petitioner presented evidence that it can and does produce 1,000 volt modules in the United States.[210]

Given that the domestic industry supplied a range of products throughout the period of investigation[211] and operated substantially under capacity during most of the period, and there is no indication from the record that it placed its customers on allocations, CCCME's argument that the domestic industry does not have sufficient capacity to satisfy domestic demand is unsupported by the current record.[212]

We observe that CCCME made similar arguments in the prior investigations, which the Commission did not find sufficient to demonstrate that material injury was not by reason of subject imports.[213] There is no clear and convincing evidence in the preliminary phase of these investigations that the domestic industry's business decisions, as opposed to subject imports, have caused the difficulties experienced by the domestic industry.

Consequently, we conclude, for the purposes of the preliminary phase of these investigations, that subject imports had a significant adverse impact on the domestic industry. In light of this, we find a reasonable indication that the domestic industry is materially injured by reason of subject imports.

IX. Conclusion

For the reasons stated above, we determine that there is a reasonable indication that an industry in the United States is materially injured by reason of subject imports of CSPV products from China and Taiwan that are allegedly sold in the United States at less than fair value and imports of the subject merchandise from China that are allegedly subsidized by the Government of China.

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[207] Commissioner Pinkert encourages parties to comment on the application of the *Bratsk/Mittal Steel* analysis to any final phase of these investigations.

[208] *See* CCCME's Postconference Brief at 43-44.

[209] Petitioner's Postconference Brief at 45; CR at II-32 n.43, PR at II-21 n.43.

[210] Petitioner's Postconference Brief, Exh. 1 at 68, Exh. 41.

[211] *See* CR/PR at Tables V-3 – V-6.

[212] *See* CCCME's Postconference Brief at 45.

[213] *CSPV I*, USITC Pub. 4360 at 37.

PART I: INTRODUCTION

BACKGROUND

These investigations result from a petition filed on December 31, 2013, by SolarWorld Industries America, Inc. ("SolarWorld"),[1] alleging that an industry in the United States is materially injured or is threatened with material injury, by reason of imports from China and Taiwan of crystalline silicon photovoltaic products ("CSPV products")[2] that are allegedly sold in the United States at less-than-fair-value ("LTFV") and subsidized by the Government of China. The following tabulation provides information relating to the background of these investigations.[3] [4]

Effective date	Action
December 31, 2013	Petition filed with Commerce and the Commission; institution of Commission investigation (79 FR 1388, January 8, 2014)
January 22, 2014	Commission's conference
January 23	Commerce's notice of initiation of antidumping investigations (79 FR 4661, January 29, 2014)
January 23	Commerce's notice of initiation of a countervailing duty investigation (79 FR 4667, January 29, 2014)
February 14	Commission's vote
February 19	Commission's determinations
February 26	Commission's views

STATUTORY CRITERIA AND ORGANIZATION OF THE REPORT

Statutory criteria

Section 771(7)(B) of the Tariff Act of 1930 (the "Act") (19 U.S.C. § 1677(7)(B)) provides that in making its determinations of injury to an industry in the United States, the Commission--

[1] The petition states that it is also supported by the Coalition for American Solar Manufacturing, which includes U.S. producers SolarWorld, ***.

[2] See the section entitled "The Subject Merchandise" in *Part I* of this report for a complete description of the merchandise subject to these investigations.

[3] Pertinent *Federal Register* notices are referenced in app. A, and may be found at the Commission's website (www.usitc.gov).

[4] A list of witnesses that appeared at the conference is presented in app. B of this report.

shall consider (I) the volume of imports of the subject merchandise, (II) the effect of imports of that merchandise on prices in the United States for domestic like products, and (III) the impact of imports of such merchandise on domestic producers of domestic like products, but only in the context of production operations within the United States; and. . . may consider such other economic factors as are relevant to the determination regarding whether there is material injury by reason of imports.

Section 771(7)(C) of the Act (19 U.S.C. § 1677(7)(C)) further provides that--

In evaluating the volume of imports of merchandise, the Commission shall consider whether the volume of imports of the merchandise, or any increase in that volume, either in absolute terms or relative to production or consumption in the United States is significant.
. . .
In evaluating the effect of imports of such merchandise on prices, the Commission shall consider whether. . .(I) there has been significant price underselling by the imported merchandise as compared with the price of domestic like products of the United States, and (II) the effect of imports of such merchandise otherwise depresses prices to a significant degree or prevents price increases, which otherwise would have occurred, to a significant degree.
. . .
In examining the impact required to be considered under subparagraph (B)(i)(III), the Commission shall evaluate (within the context of the business cycle and conditions of competition that are distinctive to the affected industry) all relevant economic factors which have a bearing on the state of the industry in the United States, including, but not limited to . . . (I) actual and potential decline in output, sales, market share, profits, productivity, return on investments, and utilization of capacity, (II) factors affecting domestic prices, (III) actual and potential negative effects on cash flow, inventories, employment, wages, growth, ability to raise capital, and investment, (IV) actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the domestic like product, and (V) in {an antidumping investigation}, the magnitude of the margin of dumping.

Organization of report

Part I of this report presents information on the subject merchandise, alleged subsidy/dumping margins, and domestic like product. *Part II* of this report presents information

on conditions of competition and other relevant economic factors. *Part III* presents information on the condition of the U.S. industry, including data on capacity, production, shipments, inventories, and employment. *Parts IV* and *V* present the volume of subject imports and pricing of domestic and imported products, respectively. *Part VI* presents information on the financial experience of U.S. producers. *Part VII* presents the statutory requirements and information obtained for use in the Commission's consideration of the question of threat of material injury as well as information regarding nonsubject countries.

MARKET SUMMARY

The U.S. market for CSPV modules[5] totaled approximately $*** and *** kilowatts[6] in 2012. The Commission received questionnaire responses from 5 firms that produce CSPV products in the United States, which accounted for all U.S. CSPV cell production and *** percent of U.S. CSPV module production in 2012. The Commission received questionnaire responses from 40 U.S. firms that reported importing CSPV products from China, Taiwan, and nonsubject countries in 2012.

U.S. producers' U.S. shipments of CSPV modules totaled *** kilowatts valued at $*** in 2012, and accounted for *** percent of apparent U.S. consumption by quantity (*** percent by value). Subject U.S. imports of CSPV products from China totaled *** kilowatts in 2012.[7] U.S. imports of CSPV products from Taiwan totaled *** kilowatts in 2012, and accounted for *** percent of apparent U.S. consumption by quantity (*** percent by value). U.S. imports from all other sources combined totaled approximately *** kilowatts, and accounted for *** percent of apparent consumption by quantity (*** percent by value). CSPV cells and modules are generally used in integrated solar power generating systems for large utilities and commercial and residential roof-top applications.

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[5] In order to avoid issues of double counting, reported U.S. apparent consumption is measured using data compiled for the U.S. market for CSPV modules. The U.S. secondary market for CSPV cells is relatively small.

[6] Or *** megawatts or *** gigawatts. A megawatt is 1,000 kilowatts. A gigawatt is 1,000 megawatts or 1 million kilowatts.

[7] U.S. imports from China that are subject to the existing antidumping and countervailing duty orders pursuant to the Commission's prior investigation in C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012 are explicitly excluded from the scope of these investigations. After excluding these U.S. imports as nonsubject imports from China, in the present investigation, there are no subject imports from China. Thus, U.S. import data and apparent consumption data presented in Part IV of this report will show zero subject U.S. imports from China. Petitioner claimed that there may be subject imports from China using its "two out of three" and "partially manufactured" rules. A negligibility discussion granting petitioner's claim of existing subject U.S. imports from China is presented in *Part IV, Negligibility*.

SUMMARY DATA AND DATA SOURCES

A summary of data collected in these investigations is presented in appendix C. U.S. industry data are based on questionnaire responses of two U.S. producers of CSPV cells and five U.S. producers of CSPV modules that accounted for all of U.S. production of CSPV cells and *** percent of modules during the period of investigation. Data for U.S. imports from China, Taiwan, and nonsubject countries are based on responses to the Commission's U.S. importer questionnaire. Foreign industry data are based on responses to the Commission's U.S. foreign producer questionnaire. Appendix C, table C-2 presents domestic industry data without ***, which are related to Chinese and Taiwanese foreign producers.

PREVIOUS AND RELATED INVESTIGATIONS[8]

In November 2012, the Commission completed antidumping and countervailing duty investigations on crystalline silicon photovoltaic solar cells and modules from China.[9] On October 19, 2011, SolarWorld filed a petition with a scope definition that included CSPV cells and modules from China.[10] The Commission determined that the U.S. industry experienced material injury by reason of LTFV imports from China and countervailable subsidies granted by the Government of China, which Commerce found to have occurred. Commerce also determined that the country of origin of CSPV modules was determined by the country of manufacture of its CSPV cells. Antidumping and countervailing duty orders were put in place in December 2012 on CSPV cell and modules from China.[11]

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[8]On November 2, 2011, the Commission instituted a Section 337 investigation on certain integrated solar power systems. This investigation involves the alleged patent infringement of an Andalay Solar, Inc. patent on its solar panel mounting system technology. Canadian Solar is a respondent in the investigation. The specific solar mounting system is not at issue in these investigations. See *Certain Integrated Solar Power Systems and Components Thereof: Notice of Institution of Investigation Pursuant to 19 U.S.C. 1337*, 76 FR 69284, November 8, 2011.

[9]C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012.

[10] The scope of the present CSPV solar investigations explicitly excludes those solar products covered by the orders issued in these prior investigations.

[11] Because of Commerce's country of origin ruling, U.S. imports of CSPV modules from China using cells from another country were considered outside the scope of the prior investigations. Petitioner stated in the prior investigations that this result was contrary to its intended scope definition. As a result, petitioner claimed that Commerce's country of origin determination necessitated the current petition as CSPV module assemblers in China adjusted their global supply chains to obtain non-Chinese cells to evade the antidumping and countervailing duties put in place after the prior investigation. *See, infra, Scope Issues.*

NATURE AND EXTENT OF ALLEGED SUBSIDIES AND SALES AT LTFV

Alleged subsidies

On January 29, 2014, Commerce published a notice in the *Federal Register* of the initiation of its countervailing duty investigation on CSPV products from China. In its notice, Commerce determined that there was sufficient information in the petition to investigate 28 alleged countervailable subsidy programs.[12]

Alleged sales at LTFV

On January 29, 2014, Commerce published a notice in the *Federal Register* of the initiation of its antidumping investigations on CSPV products from China and Taiwan. The alleged estimated weighted-average dumping margins (in percent *ad valorem*), as reported by Commerce are 165.04 percent for China and 75.68 percent for Taiwan.[13]

THE SUBJECT MERCHANDISE

Commerce's scope

Commerce has defined the scope of this investigation as follows:

> The merchandise covered by this investigation 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. For purposes of this investigation, subject merchandise also includes modules, laminates and/or panels assembled in the subject country consisting of crystalline silicon photovoltaic cells that are completed or partially manufactured within a customs territory other than that subject country, using ingots that are manufactured in the subject country, wafers that are manufactured in the subject country, or cells where the manufacturing process begins in the subject country and is completed in a non-subject country.
>
> 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,

[12] *Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China: Initiation of Countervailing Duty Investigation*, 79 FR 4667, January 29, 2014. Commerce's notice did not list the programs under investigation.

[13] *Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China and Taiwan: Initiation of Antidumping Duty Investigations*, 79 FR 4661, January 29, 2014.

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.

Excluded from the scope of this investigation 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 investigation are any products covered by the existing antidumping and countervailing duty orders on crystalline silicon photovoltaic cells, whether or not assembled into modules, from the People's Republic of China. *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); *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).

Also excluded from the scope of this investigation 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.

Merchandise covered by this investigation is currently classified in the Harmonized Tariff Schedule of the United States (HTSUS) under subheadings 8501.61.0000, 8507.20.8030, 8507.20.8040, 8507.20.8060, 8507.20.8090, 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 this investigation is dispositive

Scope Issues in the Prior CSPV Solar Investigation

Petitioner contended that it became necessary to file the current antidumping and countervailing duty petition on CSPV solar products because of a "loophole" that developed in the scope of the prior investigation on CSPV cells and modules.[14] Petitioner intended the scope

[14] Chinese respondents submitted that they consider the petitioner's use of the phrase "loophole in the scope" to be pejorative and urge the Commission not to use this term. They argued that U.S. imports of CSPV modules from China that are manufactured with CSPV cells from another country (the "loophole") were legally imported into the United States and according to a determination by

(*continued*...)

of the prior CSPV solar investigations to include both CSPV cells manufactured in China and modules assembled in China. The scope of the prior investigations was as follows:

> *The merchandise covered by these investigations are 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 investigations 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.*
>
> *Subject merchandise 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 subject merchandise are included in the scope of this investigation.*
>
> *Excluded from the scope of this investigation 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 investigation 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.*
>
> *Merchandise covered by this investigation is currently classified in the Harmonized Tariff System of the United States (HTS) under subheadings 8501.61.0000, 8507.20.80, 8541.40.6020 and 8541.40.6030. These HTS subheadings are provided for convenience and customs purposes; the written description of the scope of this investigation is dispositive.*[15]

(…*continued*)
Commerce were not within the scope of the antidumping and countervailing duty orders on CSPV cells and modules. Chinese respondents' postconference brief, p. 4 fn. 13.

[15] C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012, p. 5.

During the preliminary phase of the prior investigations, on November 7, 2011 (one day prior to the Commission staff conference), petitioner submitted to Commerce a scope clarification, which attempted to add the following paragraph to the original scope definition:

> *These proceedings cover crystalline silicon PV cells, whether exported directly to the United States or via third countries; crystalline silicon PV modules/panels produced in the PRC, regardless of country of manufacture of the cells used to produce the modules or panels, and whether exported directly to the United States or via third countries, and crystalline silicon PV modules or panels produced in a third country from crystalline silicon PV cells manufactured in the PRC, whether exported directly to the United States or via third countries.*

Commerce did not adopt this specific revision in its notice of initiation and invited parties to comment on the revision during the 20 day scope comment period. Commerce stated in its notice of initiation:

> *Because Petitioner's November 7, 2011, scope submission was filed one day prior to the statutory deadline for initiation, the Department has had neither the time nor the administrative resources to evaluate Petitioner's proposed language regarding merchandise produced using inputs from third-country markets, or merchandise processed in third-country markets.*[16]

The original scope definition and the proposed revision essentially raised the issue of whether four separate product categories would be included in the final scope definition. These categories were: (1) CSPV cells produced in China; (2) CSPV modules produced in China using CSPV cells produced in China; (3) CSPV modules produced in China using CSPV cells produced in a third-country; and (4) CSPV modules produced in a third country using CSPV cells produced in China. The parties appeared to agree that the first two product categories were properly covered by the original scope definition. However, petitioner claimed that product categories 3 and 4 were always intended to be included in the original scope definition, but submitted the November 7, 2011 scope revision to Commerce to clarify its intention. Respondents claimed that according to their reading of the original scope definition, only the first two product categories were properly within the scope of those investigations and the inclusion of product categories 3 and 4 would widen the scope of the investigations.

After the consideration of scope comments, Commerce conducted a "substantial transformation" analysis to determine whether the process of module assembly conferred country of origin on CSPV cells. Commerce determined that the process of module assembly

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[16] *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules from the People's Republic of China: Initiation of Antidumping Duty Investigation,* 76 FR 70960, November 16, 2011.

did not "substantially transform" the cell and thus the country of origin of the CSPV cell conferred the country of origin of the CSPV module. In order to incorporate its decision, Commerce added the following language to the scope of the investigations:

> *Modules, laminates, and panels produced in a third-country from cells produced in the People's Republic of China are covered by this investigation; however, modules, laminates, and panels produced in China from cells produced in a third country are not covered by this investigation.*

Of the four product categories described above, this additional language added product category (4) to the scope of those investigations. Therefore, as defined by Commerce, the scope included the following categories: (1) CSPV cells produced in China; (2) CSPV modules produced in China using CSPV cells produced in China; and (4) CSPV modules produced in a third country using CSPV cells produced in China. Against the wishes of petitioner, Commerce did not include, but instead explicitly excluded product category (3), which is CSPV modules produced in China using CSPV cells produced in a third country.[17] In its final determination, Commerce did not modify the definition of the scope of the investigations from its preliminary phase investigation determination.[18] Petitioner stated that it is a large increase in U.S. imports of category (3) products, namely CSPV modules assembled in China using CSPV cells manufactured in Taiwan that necessitated the present investigations.

Scope Issues in these CSPV Solar Investigations

In the current investigations, petitioner stated that its intention was to draft a scope definition that would include two general categories of merchandise:[19]

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[17]*Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China: Preliminary Determination of Sales at Less Than Fair Value, Postponement of Final Determination and Affirmative Preliminary Determination of Critical Circumstances;* 77 FR 31309, May 25, 2012; *See also 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*, Memorandum to Gary Taverman, Acting Deputy Assistant Secretary for Antidumping and Countervailing Duty Operations, March 19, 2012 (Commerce found that module assembly did not substantially transform the solar cell and thereby, the module's country of origin is the country of origin of the solar cell.).

[18]*See Issues and Decision Memorandum for the Final Determination in the Antidumping Duty Investigation of Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules, from the People's Republic of China*, Christian Marsh, Deputy Assistant Secretary for Antidumping and Countervailing Duty Operations, October 9, 2012, pp. 4-9 (affirming its preliminary substantial transformation determination).

[19]Petitioner's postconference brief, exh. 1, p. 1.

(1) CSPV cells from Taiwan (whether they are imported directly as cells , or whether the cells are imported as modules assembled in Taiwan or a third country); and
(2) CSPV modules from China or Taiwan that are assembled from cells completely or partially manufactured in a third country from inputs manufactured in the subject country (i.e., ingots or wafers that are manufactured in the subject country, or cells where the manufacturing process begins in the subject country and is completed in another country).[20]

Category (1) covers CSPV cells and modules from Taiwan (which use Taiwanese cells) and is described in the first sentence of the current scope definition. Category (2) is described in the second sentence of the current scope definition and includes what petitioner calls the "two out of three" and "partially manufactured" rules.

"The Two out Three Rule"[21]

Petitioner's "two out of three" rule states that if two out of three production processes occur in the same country then the country of origin of that CSPV module is that country. The production processes in question are: (1) ingot manufacture, (2) wafer manufacture, and (3) module assembly. Therefore, CSPV modules assembled in China (or Taiwan) using cells that

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[20] Commerce, in the prior investigations, determined that module assembly did not constitute "substantial transformation" of the CSPV cell thus the cell determined the country of origin of the module. In its analysis, Commerce did not directly address the issue of whether an ingot or wafer conferred country of origin to a cell, or rather, whether a wafer is "substantially transformed" by the cell conversion processes. *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China: Preliminary Determination of Sales at Less Than Fair Value, Postponement of Final Determination and Affirmative Preliminary Determination of Critical Circumstances;* 77 FR 31309, May 25, 2012; *See also 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*, Memorandum to Gary Taverman, Acting Deputy Assistant Secretary for Antidumping and Countervailing Duty Operations, March 19, 2012

Chinese respondents argued that the country of origin of a cell is properly determined by the country where cell conversion takes place. They stated that Commerce observed the fact that the process of cell conversion gives the cell the ability to do what is intended to do, namely generate electricity. They also cited other semiconductor investigations where Commerce has determined that the country of origin is the country where the wafer is fabricated (a process analogous to the process of cell conversion in the present investigation). Chinese respondents' postconference brief, exh.1, pp. 5-8 citing *DRAMS of One Megabit and Above from Taiwan*, Inv. No. 731-TA-811 (Final), USITC Pub. No. 3256 (December 1999), p. 5.

[21] Staff notes that questionnaires were drafted and sent to market participants before the Commission was fully aware of the "two out of three" rule or an agreed upon definition of "partially manufactured" existed. These concepts originated in petitioner's January 13, 2014 submission to Commerce and were further discussed at the Commission's conference. Questionnaires to U.S. importers, however, did request import data divided into 12 subcategories based on the country of origin of the CSPV cell. *See Part IV*, p. 1.

have either ingots or wafers of Chinese (or Taiwanese) origin would be included within the scope of these investigations as U.S. imports from China (or Taiwan) even if the manufacture of the cells was completed in a third country.[22] Petitioner explained the "two out of three" rule to Commerce this way:

> *{P}anels and modules assembled in a subject country (e.g., China), even if the cells in those modules are produced in a different country (e.g., Taiwan or a nonsubject country), if those cells are made from ingots, wafers or partially manufactured cells that were manufactured in the subject country (e.g., China). This would cover situations where the panels or modules are assembled in a subject country from cells made in a different country but: 1) the ingots used for the wafers made into the cells were manufactured in the subject country; 2) the wafers made into the cells were manufactured in the subject country; or 3) the cell manufacturing process began in the subject country and then was completed in a non-subject country. With reference to the steps described in the petition, this means that the scope covers module assembly (step 4) in a subject country, even if cell conversion (step 3) does not occur in the subject country, if either ingot crystallization (step 1), wafer production (step 2) or the beginning of cell conversion (step 3) also occurs in the same subject country.*[23]

Both Chinese and Taiwanese respondents argued that the petitioner's "two out of three" rule is untenable because it is contrary to the country of origin determination already established by Commerce in the prior CSPV solar investigation.[24] They claimed that petitioner is attempting to create a country of origin rule that states that the country of origin is the country of ingot or wafer manufacture. They argue that this rule should be disregarded because ingot and wafer may not confer country of origin, and if it did, would conflict with Commerce's

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[22]Petitioner's postconference brief, exh. 1, p. 1. Petitioner stated that it does not know what share of third country cells are made with Chinese or Taiwanese ingots or wafers. Petitioner testified that some of these production processes are being shifted from country to country. Conference transcript, p. 104 (Brightbill). Petitioner conceded, however, that there exists no information that would suggest that such cell production is occurring in Taiwan on a large basis. Ibid. at pp. 6-7.

[23]*Supplement II to Petition for the Imposition of Antidumping and Countervailing Duties: Certain Crystalline Silicon Photovoltaic Products from China and Taiwan,* January. 13, 2014, p. 2.

[24]Chinese respondents' postconference brief, pp. 4-8; Taiwanese respondents' postconference brief, exh. A, p. 3. In its initiation notice, Commerce did state that "when considering product coverage with respect to these investigations, the Department will be informed by the product coverage decisions that it made in the investigations that resulted in the existing orders . . " *Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China and Taiwan: Initiation of Antidumping Duty Investigations*, 79 FR 4661, January 29, 2014.

country of origin rule.[25] Taiwanese respondents also opined that petitioner's "two out of three" rule would be impossible to implement by U.S. Customs.[26]

"Partially Manufactured" cells

Petitioner asserted that the second sentence of the current scope definition also includes CSPV modules assembled in China or Taiwan using "partially manufactured" cells from a subject country. "Partially manufactured" is defined in the scope as "cells where the manufacturing process begins in the subject country and is completed in another country." According to petitioner, there are a number of opportunities in the cell production process to stop production and ship to another country and includes many of the sub-processes described in the petition under "cell conversion."[27]

Tariff treatment

The subject merchandise is provided for in subheadings 8541.40.60 (statistical reporting numbers 8541.40.6020 ("solar cells, assembled into modules or made up into panels") and 8541.40.6030 ("solar cells, other")) of the Harmonized Tariff Schedule of the United States ("HTS"), and is free of duty under the general duty rate.[28] These products may also be imported as parts or subassemblies of goods provided for in subheadings 8501.31.8000, 8501.61.0000 and 8507.20.80.

[25]Chinese Respondents' postconference brief, pp. 4-8.

[26]Taiwanese Respondents' postconference brief, p. 4.

[27]Petitioner's postconference brief, exh. 1, p. 3-4. Petitioner concedes that although "partial cell manufacturing" is currently not common in the marketplace and makes little sense commercially, it could be used to circumvent trade remedies.

Chinese respondents argued that "partial cell manufacturing" does not occur in the marketplace and the very nature of cell production would prohibit it. They explained that cell production requires several successive steps, such as texturing, surface refinement, diffusion, etching, and vapor deposition, all of which require a "clean-room" environment. They claimed that removing a semifinished cell from these "clean-room" environments would be an expensive logistical challenge which would likely damage the cell. Chinese respondents' postconference brief, exh. 2, pp. 5-6; Conference transcript, p. 238 (Koerner)("It would be similar to when you're having a car race, stopping in the middle of the race, changing the engine, and then you go on. It doesn't really make sense from a production efficiency point of view.")

[28] Generally, CSPV cells enter under HTS 8541.40.6030 and CSPV modules under 8541.40.6020.

THE PRODUCT[29]

Description and applications

Solar CSPV systems convert sunlight into electricity for on-site use or for distribution through the electric grid. The main components of CSPV systems are modules (also commonly referred to as panels), which are comprised of cells that use crystalline silicon to convert sunlight into electricity. 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.[30]

Description

CSPV cells use crystalline silicon to convert sunlight to electricity and are the basic elements of a PV module (figure I-1). They have a positive layer, a negative layer and a positive-negative junction (p/n junction). Electricity is generated when sunlight strikes the cell, knocking electrons loose that flow onto thin metal "fingers" that run across the cell and conduct electricity to the busbars.[31] Most cells are five inches by five inches or six inches by six inches and have an output of 3 to 4.5 watts.[32]

Figure I-1
CSPV cell (left) and module (right)

Source: SolarWorld, "Energy for You and Me" brochure, p. 7.

[29] Unless otherwise noted, information in this section is from C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012.

[30] 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. Petition, pp. 29–30.

[31] From USITC Publication 4360; see also Petition, pp. 11–12; 29; Stephanie Chasteen and Rima Chaddha, "Inside a Solar Cell," http://www.pbs.org/wgbh/nova/solar/insi-nf.html.

[32] European Photovoltaic Industry Association (EPIA), *Solar Generation 6*, 2011, p. 20.

CSPV cells are interconnected and encapsulated between a backing material and a glass front. A frame is often added and a junction box is attached to form a complete module.[33] The junction box can be attached 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 charge controller (which controls battery charging) and battery.[34] Typical on-grid modules have 60 to 72 cells and a power output of between 120 watts and more than 400 watts. They are generally around 62 to 78 inches long, 32 to 39 inches wide, and 1.2 to 2 inches thick. Modules generally weigh between 34 and 62 pounds.[35] In addition to standard size modules, CSPV cells can be used in building integrated PV (BIPV), which are building materials that incorporate solar cells, such as solar shingles or solar windows (figure I-2).[36]

Figure I-2
Building integrated CSPV

Source: Photos courtesy of U.S. Department of Energy (DOE)/National Renewable Energy Lab (NREL), credit Spire Solar Chicago (left) and Atlantis Energy, Inc. (right).

The two main types of CSPV cells and modules are monocrystalline silicon and multicrystalline (or polycrystalline) silicon. Monocrystalline cells are made from a single grown crystal and tend to have a higher conversion efficiency. Multicrystalline cells have a random crystal structure and tend to have a lower conversion efficiency (table I-1).[37] The average conversion efficiency of new models of monocrystalline modules (based on the year first

[33] Petition, pp. 16, 29.
[34] From USITC Publication 4360; see also SolarWorld, "Energy for You and Me" brochure, p. 14.
[35] From USITC Publication 4360; see also EPIA, *Solar Generation 6*, 2011, p. 20; Petition, p. 25.
[36] Petition, p. 12.
[37] Conversion efficiency is the percent of sunlight that is converted to electricity. String-ribbon cells are a type of multicrystalline cell produced via a different production method, as discussed below. From USITC Publication 4360; see also EPIA, *Solar Generation 6*, 2011, p. 25.

introduced) *** from *** in 2010 to *** in 2012, and was *** for modules introduced in early 2013. The average conversion efficiencies of new models of multicrystalline modules *** from *** in 2010 to *** in 2012, and was *** for modules introduced in early 2013.[38]

Table I-1

Share of monocrystalline and multicrystalline modules available in the United States with efficiencies in each range, 2012

Module Efficiency	Multicrystalline (percent)	Monocrystalline (percent)
13% or less	***	***
13.1 to 14%	***	***
14.1 to 15%	***	***
15.1 to 16%	***	***
16.1 to 17%	***	***
17.1 to 18%	***	***
18.1% or higher	***	***
Total	100.0	100.0

Note: ***

Sources: ***

CSPV modules for grid-connected applications, whether residential, nonresidential, or utility, are generally the same regardless of the application, though the sizes that are most commonly used in each type of application may differ. Off-grid CSPV modules are usually less than 200 watts and are often smaller than on-grid modules. Off-grid modules may have different output voltages in order to charge batteries and often use fewer cells, and sometimes divided cells, to achieve the desired output. Modules typically used in on-grid applications, such as a standard 240 watt monocrystalline module, may also be used in off-grid applications if that wattage module is required. For example, a house that is not connected to the grid could use the same modules as a house that is connected to the grid.

Uses

There are four primary market segments for CSPV cells and modules. There are three grid-connected market segments–residential, nonresidential, and utility–and an off-grid market. In the grid-connected market, installations are usually either ground-mounted or roof-mounted. In addition to the module, there are a number of other components of the installation called the balance of system (BOS). The BOS includes components such as the inverter,[39] and the racking on which the system is installed.[40]

[38] Data are for modules available globally. Data from 2013 only includes the first part of the year, and may not be representative of all new modules introduced in that year. ***

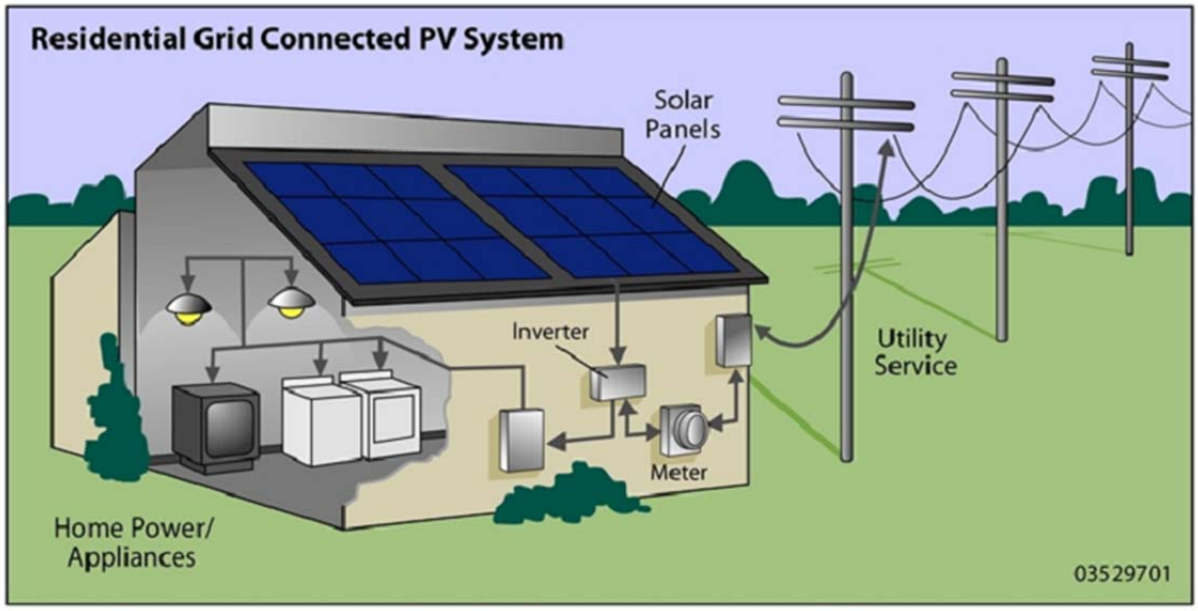
[39] USITC, *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, p. 3-1.

[40] In addition to equipment, there are a number of services associated with installing a PV system such as site assessment and design, permitting, financing, and the system installations, as well as

(*continued*...)

Residential grid-connected systems are installed at individual homes. CSPV modules are typically installed on the roof, though they can also be ground-mounted, and connected to an inverter. The system can use a central inverter, which converts the power from multiple modules, or each module can have its own microinverter attached. In residential installations, the electricity generated by the system is used for power in the individual home (figure I-3). Homeowners use grid energy when solar electricity generation is not sufficient to meet demand and often feed energy back into the grid when solar electricity generation exceeds home use. In the United States, the average size of a residential PV installation was 6.2 kilowatts (kW) in 2012.[41]

Figure I-3
Residential grid-connected CSPV system



Source: DOE, Office of Energy Efficiency and Renewable Energy (EERE) Website, http://www.energysavers.gov/your_home/electricity/index.cfm/mytopic=10720 (accessed November 9, 2011).

Rooftop residential systems can be installed using several types of mounting systems. One commonly used mounting system is the "top down rail system." In this system, "modules attach from their upper side to the rails with specified clamps" (figure I-4).[42] A second type of system uses rack mounts, which "allow for a variety of specific tilt angles. The PV array can be

(…*continued*)
operations and maintenance services after the installation is completed. USITC, *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, pp. 3-1–4.

[41] The average size was 5.7 kW in 2010 and 2011. From USITC Publication 4360; see also Larry Sherwood, *U.S. Solar Market Trends 2010*, June 2011, pp. 5–7; Larry Sherwood, *U.S. Solar Market Trends 2011*, August 2012, p. 7; Sherwood, Larry, *U.S. Solar Market Trends 2012*, July 2013, p. 10; EPIA, *Solar Generation 6*, 2011, p. 12.

[42] Mayfield, Ryan, "Rack & Stack—PV Array Mounting," January 31, 2012.

set at an optimal tilt angle based on the site's latitude or, if adjustable racks are chosen, repositioned seasonally to optimize energy output."[43] In recent years, firms have developed new types of mounting systems in order to reduce installation time and improve the appearance of installed systems. One example is the Zep Solar mounting system.[44] "Zep's innovation is the 'Zep Groove'—making the panel itself part of the racking hardware via a specially grooved frame, eliminating rails and using the module frame as the structural and mounting element."[45]

Figure I-4
Residential grid-connected CSPV system

* * * * * * *

Source: Mayfield, Ryan, "Rack & Stack—PV Array Mounting," *Home Power Magazine*, January 31, 2012; Zep Solar Website, http://www.zepsolar.com/index.php/products (accessed January 28, 2014).

Nonresidential systems are installed at commercial, industrial, government, and similar buildings and sites (figure I-5). Nonresidential installations are typically larger than residential installations, with an average size of 120 kW in 2012, though there can be significant variation in size—the largest installation in 2012 was 20 MW. However, they function similarly to residential installations, providing electricity to meet onsite needs, pulling additional electricity from the grid when needed, and feeding excess electricity back into the grid when it is not needed.[46]

[43] Mayfield, Ryan, "Rack & Stack—PV Array Mounting," *Home Power Magazine*, January 31, 2012.

[44] Hren, Rebekah, "Solar Equipment Innovations," *Home Power Magazine*, August 22, 2013; CCCME postconference brief, exh. 4; McCabe, Joseph, "A New Competitive Landscape for Solar PV Racking," *Renewable Energy World*, July 20, 2012.

[45] Wesoff, Eric, "Zep Finds Its Groove with an Innovative Mounting System for PV Modules," *Greentech Media*, October 5, 2011.

[46] The average size installation is up from 81 kW in 2010. Larry Sherwood, *U.S. Solar Market Trends 2010*, June 2011, pp. 5–7; Sherwood, Larry, U.S. Solar Market Trends 2012, July 2013, p. 10; EPIA, *Solar Generation 6*, 2011, p. 12.

Figure I-5
Installation of a nonresidential CSPV system

Source: Photos courtesy of DOE/NREL, credit Dennis Schroeder.

Utility systems are generally the largest systems, averaging more than 4.3 MW per installation in 2012 (excluding small systems installed through feed-in tariff programs), and provide electricity directly to the electric grid for sale to customers rather than for on-site use (figure I-6). These systems are generally ground-mounted and currently tend to use central inverters rather than microinverters.[47] The growth of the utility market in the United States has led to more demand for CSPV modules and equipment that can be used in 1,000 volt systems, as compared to the 600 volt systems generally installed in residential and nonresidential systems in the United States.[48]

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[47] The average system size in 2010 was over 1,450 kW. From USITC Publication 4360; see also Larry Sherwood, *U.S. Solar Market Trends 2010*, June 2011, pp. 5–7; Sherwood, Larry, U.S. Solar Market Trends 2012, July 2013, p. 9; Bayar, Tildy, "Microinverters Make a Move on Multi-MW Solar Power Installations," *Renewable Energy World*, August 16, 2013.

[48] CSPV systems installed in the United States have traditionally been 600 volt systems, whereas in Europe and other locations many of the installed systems have been 1,000 volt systems. The main reason for the use of 600 volt systems in the United States is that most of the market was historically rooftop installations, for which the National Electric Code (NEC) required the use of systems no larger than 600 volts unless additional conditions were met. With the growth of the utility-scale market, there has been increasing demand for equipment and components that are certified for use in 1,000 volt DC (Vdc) systems, as these systems require fewer balance of system components and can reduce the installation time and cost. Module and other equipment manufacturers have responded to this increase in demand by certifying modules to the relevant UL standard. However, since "module manufacturers did not have access to 1,000 Vdc–rated subcomponents, such as connectors and junction boxes, PV modules listed to UL 1703 at 1,000 Vdc were not available in the North American market until 2012." Utility systems are generally covered by the National Electrical Safety Code (NESC) rather than the NEC, which, unlike the NEC, allows the use of modules certified to safety standards other than UL. As a result, utility systems installed prior to 2012 typically used equipment certified to International Electrotechnical Commission (IEC) standards. One thousand volt systems are still primarily used in utility applications,

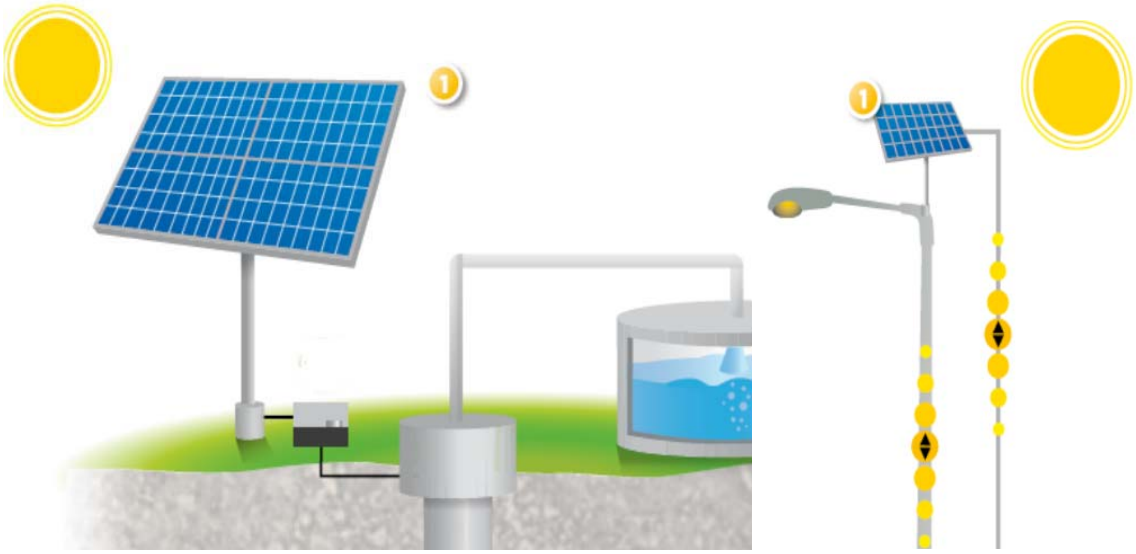
(*continued*...)

Figure I-6
LA Ola PV plant, a utility CSPV system on Lanai, Hawaii

Source: Photo courtesy of DOE/NREL, credit Jamie Keller.

The off-grid market includes a range of uses such as water pumping and purification systems, street lights, emergency phones, homes in remote locations, telecommunications systems, and military applications (figure I-7). These systems often have additional balance of system components, such as a battery and charge controller, though inverters are not needed for all off-grid applications.[49]

Figure I-7
Off-grid water pumping system (left) and light system (right)



1. Module

Source: SolarWorld, "Sunmodule for Off-grid Systems," 3.

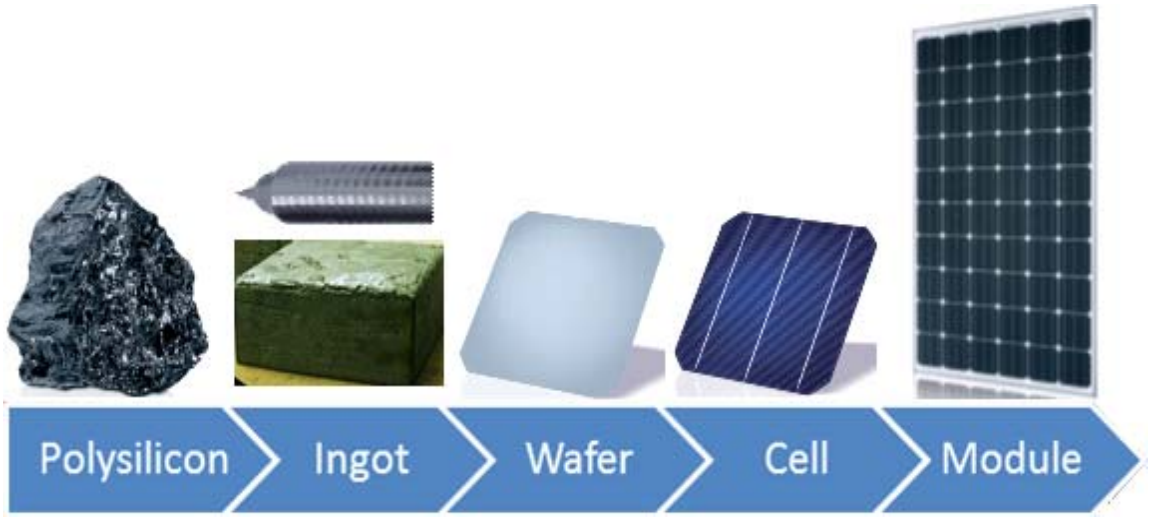
(…*continued*)
but are starting to be used in some nonresidential applications. However, they may not have the same cost reduction benefits in these systems due to factors such as increased permitting costs. Bally, Greg, David Brearley, and Marvin Harmon, "1,000 Vdc Utilization Voltages in Nonresidential PV Applications," *SolarPro,* April/May 2013; Seitzler, Matthew, "Designing and Installing a 1,000 Vdc Rooftop PV System," *SolarPro*, April/May 2013; Conference transcript, p. 177 (Morrison), pp. 178–179, 212 (Hershman), p. 219–220 (Koerner); CCCME postconference brief, exh. 1, p. 26.

[49] From USITC Publication 4360; see also SolarWorld, "Sunmodule for Off-grid Systems," pp. 3–6.

Manufacturing processes

There are five principal stages of the CSPV value chain. First, polysilicon is refined, then it is formed into ingots, which are sliced into wafers, which are converted to cells that are assembled into modules, the finished product (figure I-8). 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. ***.[50] The ingot and wafer production process differs for monocrystalline and polycrystalline cells, as discussed below.

Figure I-8
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: From USITC Publication 4360; see also SolarWorld, "Energy for You and Me" brochure, pp. 6–7, 9; ingot photo courtesy of DOE/NREL, credit John Wohlgemuth, Solarex.

Silicon refining

The first step in the CSPV value chain is refining polysilicon. There are multiple approaches to polysilicon refining, but this discussion will focus on the Siemens method, which was used for almost 80 percent of the polysilicon produced in 2009.

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

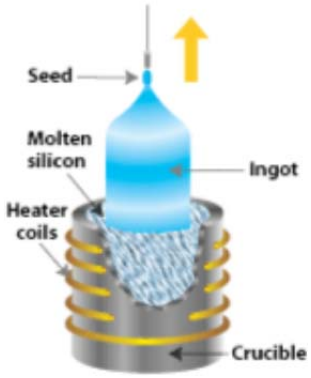
[50] ***.

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 polysilicon chunks or rocks with purity of 99.9999 percent to 99.999999 percent (or 6N to 8N).

Ingots and wafers for monocrystalline cells

In the Czochralski process[51] 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-9). The crucible is then loaded into a Czochralski furnace and heated to about 2,500 degree 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. ***.[52]

Figure I-9
Czochralski process



Source: DOE, EERE Website, http://www.eere.energy.gov/basics/renewable_energy/types_silicon.html (accessed November 5, 2011).

[51] The Czochralski process is discussed here as it is used by the petitioners and several of the respondents. Another process is the float-zone process which "produces purer crystals than the Czochralski method because the crystals are not contaminated by a crucible. In the float-zone process, a silicon rod is set atop a seed crystal and then lowered through an electromagnetic coil. The coil's magnetic field induces an electric field in the rod, which heats and melts the interface between the rod and the seed. Single-crystal silicon forms at the interface and grows upward as the coils are slowly raised." DOE, EERE Website, http://www.eere.energy.gov/basics/renewable_energy/types_silicon.html (accessed November 5, 2011); Trina Solar, "Form 20-F," April 18, 2011, p. 39; Suntech, "Form 20-F," May 9, 2011, p. 37; SolarWorld, "Energy for You and Me" brochure, p. 8.

[52] ***.

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 squared. In squaring, the rounded sides of the ingot are cut into four flat sides, leaving only rounded corners. A wire saw then cuts the ingots into wafers. ***.[53]

Ingots and wafers for multicrystalline cells

For multicrystalline ingots,[54] the first step is also loading polysilicon into a crucible. This crucible is then loaded into a directional solidification systems (DSS) furnace. In this furnace, the polysilicon is "cast into multicrystalline ingots under precise heating and cooling conditions."[55]

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. Finally, the blocks are sliced into wafers using a wire saw. This process results in square wafers, while the multicrystalline process results in wafers with rounded corners.

Cells

The monocrystalline and polycrystalline wafers, which are 180 to 200 micrometers thick, are next processed into cells. This step of the process is the "most capital intensive part of the manufacturing process." It is "a highly automated, capital intensive, and technologically sophisticated process, requiring skilled technicians and employees with advanced degrees" (figure I-10). ***.[56] The main phases of cell production are as follows[57]:

- **Cleaning and texturing:** First, the wafers are cleaned, then the surface of the wafer undergoes a chemical treatment which 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

[53] ***.

[54] Multicrystalline wafers can be produced using string-ribbon wafers, though this only accounts for a small share of global production. These were the types of products produced by Evergreen Solar.

[55] There is also increasing production of quasi-mono (also called mono-like or monocast) ingots and wafers. *** GT Advanced Technologies Inc., "Form 10-K," May 25, 2011, p. 9; ***.

[56] ***.

[57] Discussion of cell production process is from USITC Publication 4360; see also SolarWorld, "Energy for You and Me" brochure, pp. 12–13; Yingli, "Form 20-F," April 23, 2013, p. 41; Trina Solar, "Form 20-F," April 2, 2013; JA Solar, "Form 20-F," April 16, 2013, pp. 40–41; Hanwha SolarOne, "Form 20-F," April 29, 2013, p. 36; ***.

creates a positive-negative, or P/N, junction–a critical partition in the functioning of a PV cell."[58]

Figure I-10
CSPV cells: Texturing (left) and diffusion furnace (right)

* * * * * * *

Source: SolarWorld, "Energy for You and Me" brochure, p. 12; ***.

- **Edge isolation:** A thin layer of silicon is then removed from the edge of the 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 (figure I-11).
- **Printing:** Metals are then printed on the solar cell to collect the electricity. On the front of the cell these metals are printed in thin metal strips called fingers, which are connected to the rest of the module via busbars. ***.

Figure I-11
CSPV cells: Silicon nitride deposition (left) and printing (right)

* * * * * * *

Source: SolarWorld, "Energy for You and Me" brochure, p. 13; ***.

- **Co-firing:** The 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."[59]
- **Testing and sorting:** The final step in the process is the testing and sorting of the cells based on their characteristics and efficiency (figure I-12).

Figure I-12
CSPV cells: Testing (left) and sorting (right)

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[58] SolarWorld, "Energy for You and Me" brochure, p. 12.
[59] JA Solar, "Form 20-F," April 16, 2013, p. 41.

Modules

The cells are next assembled into modules. Module assembly accounts for the majority of labor costs in the production process. Petitioners note that module assembly "is more labor intensive than cell production, but nonetheless is still a highly automated and sophisticated process." There is a trend in the industry toward more automation in module assembly, but some companies employ highly automated processes while others balance automation and manual labor. Respondents note that module assembly in China and the United States use similar levels of automation.

First, a string of cells is soldered together. A piece of glass is placed on the production line, on top of which is added a piece of ethyl vinyl acetate (EVA). The cells are laid out in a rectangular matrix that will provide the appropriate wattage and power requirements (figure I-13).[60] Typically a sealant is added, often EVA, and a back sheet is added. The cells are then laminated in a vacuum and are cured. At this stage the 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-13
CSPV modules: Example automated assembly process between stringing and lamination

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[60] From USITC Publication 4360; see also Spire Website, http://www.spirecorp.com/spire-solar/turnkey-solar-manufacturing-lines/ (accessed January 31, 2014).

DOMESTIC LIKE PRODUCT ISSUES[61]

CSPV products vs. Thin Film solar products[62]

The petitioner contended that the Commission should find one domestic like product coextensive with the scope of the investigations as identified by Commerce.[63] Both Chinese and Taiwanese respondents argued that the Commission should expand the definition of the domestic like product to include thin film solar products and include in the domestic industry those firms that produce those products.[64]

In the Commission's prior investigations into CSPV cells and modules, respondents advanced the argument to expand the definition of the domestic like product to include thin film solar products. In its views, the Commission determined not to expand the domestic like product to include thin film solar products. Specifically, the Commission stated:

> *As noted above, in the preliminary determinations, the Commission did not define the domestic like product to include thin-film products. In these final investigations, we have had the opportunity to survey domestic producers, importers, and purchasers on this issue. Based on the current record, we again conclude that thin-film products should not*

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[61] In the Commission's prior CSPV solar investigations, the Commission addressed three domestic like product issues: (1) whether cells and modules should be separate domestic like products, (2) whether "off-grid" CSPV solar panels should be a separate domestic like product, and (3) whether thin film solar products should be added to the definition of the domestic like product. Issues (1) and (2) have not been raised in the present investigations. Respondents, however, raised issue (3) at the staff conference and in its postconference brief. This section of the report therefore addresses that issue.

[62] In these preliminary phase investigations, the Commission's questionnaires that were issued to market participants did not request information or data regarding thin film solar products.

[63] Petitioner's postconference brief, p. 4 and exh. 1 pp. 22-32. Petitioner also observed that the European Commission excluded thin film solar products from its trade remedy investigation on CSPV products. The EU Commission opined:

> *Thin film PV products are clearly excluded from the product definition ... Indeed, thin film PV products have different physical, chemical and technical characteristics compared to the product concerned. They are produced via a different production process and not from crystalline silicon which is the main raw material to produce modules, cells and wafers. They have lower conversion efficiency and a lower wattage output and therefore they are not suitable for the same types of applications than those of the product concerned. On these grounds, the arguments {in favor of including thin film products within the product definition} had to be rejected.* Ibid. at exh.1 p. 23 fn. 61.

[64] Chinese Respondents' postconference brief, exh. 1, pp. 15-19; Taiwanese Respondents' postconference brief, exh. A, pp. 1-2.

be included in the same domestic like product as CSPV cells and CSPV modules. The record demonstrates a number of differences between CSPV and thin-film products. Specifically, the two products are manufactured using different raw materials, manufacturing facilities, manufacturing processes, and production employees. Differences between the two products in terms of chemical composition, weight, size, conversion efficiency, output, inherent properties, and other factors limit their interchangeability after the design phase and in specific projects, and they also limit overlap in distribution channels, particularly for non-utility sales. A number of market participants reported viewing CSPV and thin-film products as sometimes competitive, but generally different products; they reported CSPV products to be generally higher-priced than thin-film products. On balance, we find that the differences between CSPV and thin-film products are more significant than their similarities in today's evolving marketplace and weigh in favor of a finding of a single domestic like product consisting of the CSPV products within the scope of the investigations.[65]

Thin Film Photovoltaic (PV) Cells and Modules–Definition and Background[66]

Thin film cells and modules use a several micron thick layer of either amorphous silicon (a-Si), cadmium telluride (CdTe), copper indium (gallium) selenium (CIS or CIGS), or a combination of a-Si and micro-crystalline silicon (μc-Si) to convert sunlight to electricity.[67] CdTe modules are typically on glass while a-Si and CIGS can be on glass or a flexible substrate such as stainless steel or plastic (figure I-14). The characteristics of modules for several large scale producers are indicated in table I-2, but thin film modules, particularly a-Si and CIGS modules, have a broad range of possible sizes given the different substrates that can be used and the flexibility those substrates allow in module size selection. For example, one of SoloPower's flexible CIGS modules is 86 inches long, more than 30 inches longer than the on-glass modules produced by companies like First Solar, Solar Frontier, and Sharp (see table I-2).[68] Thin film module outputs generally range from 60 watts to 350 watts. Thin film products can also be used in building integrated products such as solar shingles.

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[65] C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012, pp. 11-12.

[66] Unless otherwise noted, information in this section is from C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012.

[67] Other PV technologies "include fully organic PV (OPV) and hybrid dye-sensitized solar cells (DSSC)." These technologies currently have low efficiencies and have not been produced on a large scale. EPIA, *Solar Generation 6*, 2011, 25.

[68] From USITC Publication 4360; see also SoloPower, SoloPanel Model SP3L, specifications (accessed January 27, 2014).

Figure I-14

Ground-mounted thin film installation (left), flexible a-Si module (center), and thin film solar shingles (right)

Source: Photos courtesy of DOE NREL, credit Peter McNutt (left) and United Solar Ovonic (center and right).

Table I-2

Thin film modules: Module characteristics, select companies, January 2014

Module type	Firm	Module output (watts)	Module efficiency *(percent)*	Dimensions (length x width x depth)	Weight
Mult-ijunction amorphous silicon (a-Si) and microcrystalline silicon (µc-Si)	Sharp	135	9.6	55.2 x 39.4 x 0.3 inches (1,402 x 1,001 x 7.4 mm)	57.3 lbs (26 kg)
Cadmium telluride (CdTe)	First Solar	85 to 95	13.3 (average)	47.2 x 23.6 x 0.3 inches (1,200 x 600 x 6.8 mm)	26.5 lbs (12 kg)
Copper indium selenium (CIS)	Solar Frontier	145 to 165	11.8 to 13.4	49.5 x 38.5 x 1.4 inches (1,257 x 977 x 35 mm)	44.1 lbs (20 kg)

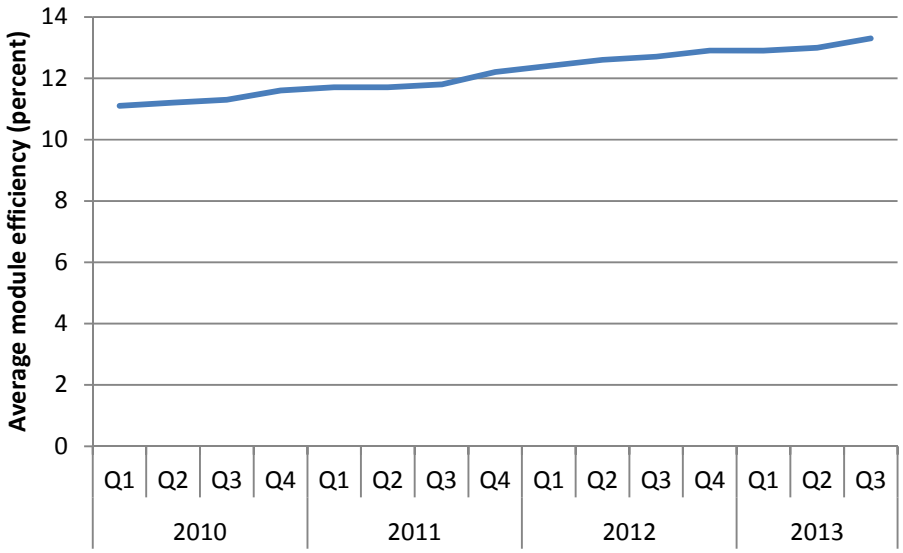
Note: lbs= pounds. There are a number of companies making thin film modules, and the characteristics of the modules vary by company. However, First Solar accounted for *** of global CdTe module production in 2012, and Solar Frontier accounted for *** of CIGS/CIS module production in 2012. Sharp, including its production in Japan and its 3Sun joint venture in Italy, accounted for *** of thin film silicon production. Therefore, these data indicate the products *** available in the market. The information for Sharp is based on a November 2011 U.S. data sheet; however the same information is currently listed on the 3Sun Website. Efficiency for First Solar is the average efficiency in 3rd quarter of 2013.

Source: Solar Frontier Website, http://www.solar-frontier.com/eng/products/modules/S002210.html (accessed January 27, 2014); Sharp, 135 WATT frameless, glass-on-glass thin film module, datasheet (accessed January 27, 2014); 3Sun Website, http://www.3sun.com/?q=it/node/39 (accessed January 27, 2014); First Solar, First Solar FS Series 3 Black PV Module, product datasheet (accessed January 27, 2014); First Solar, "First Solar Q3 '13 Earning Call, October 31, 2013, p. 19; Yamada, Hiroyuki and Osamu Ikki, "National Survey Report of PV Power Applications in Japan 2012," May 31, 2013, p. 22; Castello, Salvatore, Anna De Lillo, Salvatore Guastella, Fabrizio Paletta, "National Survey Report of PV Power Applications in Italy 2012," May 2013, p. 14; ***.

Domestic thin film module shipments in 2012 had an average conversion efficiency of 13 percent.[69] Conversion efficiencies vary by technology type and there is some overlap in the efficiencies of the various technologies (see table I-2).[70] Thin film module efficiencies have increased over time. For example, First Solar's thin film module efficiency increased from 11.1 percent in the first quarter of 2010 to 13.3 percent in the third quarter of 2013 (figure I-15).[71] Thin film modules are also capable of generating power in low light conditions, such as early in the morning or late in the day.

Figure I-15

Thin film modules: Average conversion efficiency for First Solar CdTe modules, 2010–3rd quarter 2013



Note: Q: Quarter.

Source: First Solar, "Q1 2011 Earnings Call," May 3, 2011, p. 27; First Solar, "Q2 2012 Earnings Call," August 1, 2012; p. 20; First Solar, "First Solar Q3 '13 Earning Call, October 31, 2013, p. 19.

Thin film PV systems convert sunlight into electricity for use on-site or for distribution through the electric grid. Thin film systems can be ground-mounted or roof-mounted and also generally require an inverter and other balance of system components, though flexible thin films may not require the same racking as modules on glass.[72]

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[69] U.S. Energy Information Administration (EIA), *Solar Photovoltaic Cell/Module Shipments Report 2012*, December 2013, p. 8.

[70] EPIA, *Solar Generation 6*, 2011, p. 25.

[71] First Solar, "Q1 2011 Earnings Call," May 3, 2011, p. 27; First Solar, "Q2 2012 Earnings Call," August 1, 2012, p. 20; First Solar, "First Solar Q3 '13 Earning Call, October 31, 2013, p. 19.

[72] A diagram of a residential installation would be the same as in figure I-3.

Thin film modules can be used in all three of the major grid-connected market segments—residential, nonresidential, and utility—and in the off-grid market. Shipments of thin film modules to the residential sector declined from 35 MW in 2011 to 12 MW in 2012, shipments to the nonresidential (commercial and industrial) sector decreased from 50 MW in 2011 to 11 MW in 2012, and shipments to the utility sector increased from 86 MW to 274 MW.[73] However, depending on the technology and substrate, the number of market segments in which thin film modules produced by particular companies are used may vary. For example, the primary applications of flexible a-Si and CIGS modules are generally the residential and nonresidential markets, particularly the building integrated market and on rooftops that are not able to hold a significant amount of weight (due to the modules' flexibility and light weight). In contrast, CdTe modules on glass are primarily sold in the nonresidential and utility market segments. CIGS modules on glass are used in all three of the major grid-connected market segments and in the off-grid market.

Production Process

The thin film production process varies by company and technology, with companies often employing proprietary production processes.[74] In general, a thin layer of the photosensitive material (e.g., a-Si, CdTe, CIGS) is deposited directly onto a glass, stainless steel, or plastic substrate via physical vapor deposition, chemical vapor deposition, electrochemical deposition, or a combination of methods. For CdTe modules on glass, the process is continuous and automated, with a piece of glass entering the production line every ten seconds and emerging on the other end as a complete module in about two hours, according to Abound Solar's former production rate. First Solar notes that there are three main stages in the CdTe production process: (1) in the deposition stage, a layer of cadmium sulfide is applied and then a layer of cadmium telluride; (2) in the cell definition stage, lasers are used to create interconnected cells; and (3) in the third stage, busbars, an inter-laminate material, and a rear piece of glass are added, the module is laminated, and a junction box and wires are added. For modules on a flexible substrate, a roll to roll manufacturing process is used, whereby a long roll of the plastic or stainless steel substrate is unrolled as it moves through production equipment that deposits the photosensitive material, such as through vacuum deposition (figure I-16). In some cases this results in a more manual module assembly process as the roll is cut into individual cells that are interconnected and then laminated to form the module.

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[73] Thin film accounted for 1.8 percent of total shipments to the residential sector in 2012, 0.7 percent of shipments to the nonresidential (commercial and industrial) sector, and 18.7 percent of shipments to the utility sector. Total shipments in EIA data include thin film, CSPV, and non-subject concentrating photovoltaic modules, and include off-grid applications. The market share of thin film products declined in the residential and commercial sectors from 2011 to 2012, but increased in the utility sector. EIA, *Solar Photovoltaic Cell/Module Shipments Report 2011*, September 2012, p. 16; EIA, *Solar Photovoltaic Cell/Module Shipments Report 2012*, December 2013, p. 17.

[74] This section provides a general overview of thin film production techniques and includes some specific examples, but does not cover all possible production methods.

Figure I-16
Roll to roll CIGS production equipment (left) and CIGS on a flexible substrate (right)

Source: Photos courtesy of DOE/NREL, credit Global Solar Energy.

U.S. Producers of Thin Film Solar Products

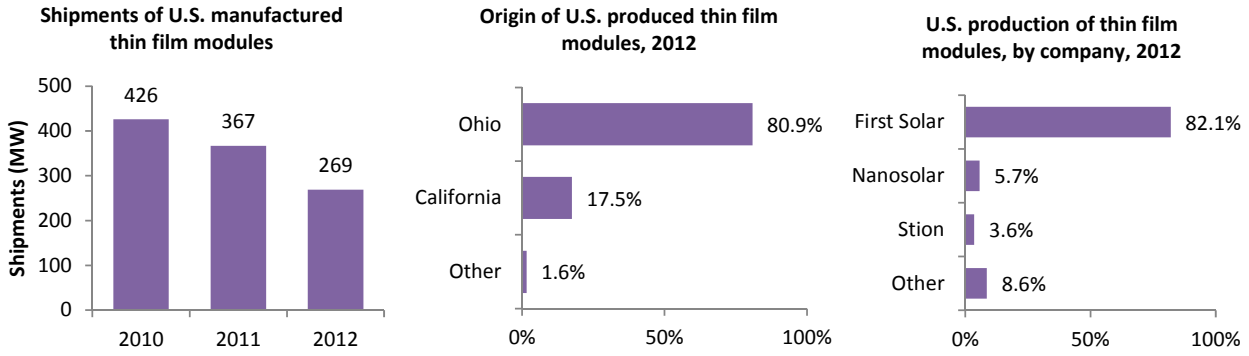
Shipments of U.S.-manufactured thin film modules (including exports) decreased from 426 MW in 2010 to 367 MW in 2011, and 269 MW in 2012, according to the Energy Information Administration. Most thin film module shipments originated in Ohio (80.9 percent) and California (17.5 percent) (figure I-17).[75] According to estimates by GTM Research, First Solar—whose production is in Ohio—accounted for 82.1 percent of U.S. production in 2012, followed by Nanosolar (which closed in 2013) and Stion.[76]

[75] EIA, *Solar Photovoltaic Cell/Module Shipments Report 2011*, September 2012, p. 9; EIA, *Solar Photovoltaic Cell/Module Shipments Report 2010*, January 2012, p. 9; EIA, *Solar Photovoltaic Cell/Module Shipments Report 2012*, December 2013, p. 10.

[76] Feldman and Margolis, "National Survey Report of PV Power Applications in the United States," November 2013, p. 15; Wesoff, Eric, "Nanosolar, Thin-Film Solar Hype Firm, Officially Dead," *Greentech Media*, July 12, 2013.

Figure I-17

Thin film modules: U.S. manufactured module shipments, 2010–12, state of origin in 2012, and leading producers, 2012



Note: Includes exports. The share of production by First Solar differs from the share of shipments originating in Ohio since the two figures are from different data sources.

Source: *EIA, Solar Photovoltaic Cell/Module Shipments Report 2011*, September 2012, p. 9; EIA, *Solar Photovoltaic Cell/Module Shipments Report 2010*, January 2012, p. 9; EIA, *Solar Photovoltaic Cell/Module Shipments Report 2012*, December 2013, p. 10; Feldman and Margolis, "National Survey Report of PV Power Applications in the United States, November 2013, p. 15.

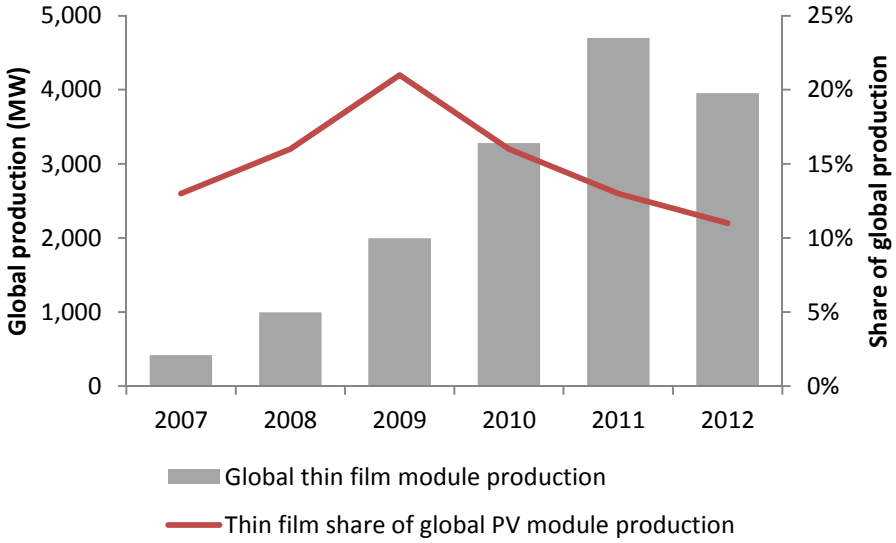
U.S. production of thin film products, based on data from ***, accounted for about *** percent of global thin film module production.[77] In terms of global production, the share of global production accounted for by thin film has been declining since 2009, while production of thin film modules peaked in 2011 (figure I-18).[78]

[77] Feldman and Margolis, "National Survey Report of PV Power Applications in the United States, November 2013, p. 15; ***.

[78] Mehta, Shyam, "GTM Research: Yingli Gains Crown as Top Producer in a 36 GW Global PV Market," GTM Research, May 1, 2013.

Figure I-18

Thin film modules: Volume and share of global PV production, 2007–12



Source: Mehta, Shyam, "GTM Research: Yingli Gains Crown as Top Producer in a 36 GW Global PV Market," GTM Research, May 1, 2013.

Note: Thin film module production in MW is approximate since it is calculated based on the share of production multiplied by the production for all types of PV modules.

During the period of investigation, a number of U.S. producers of thin film solar products have either entered or exited the market. Figure I-19 shows a time line of when U.S. producers of thin film solar products either entered or exited the U.S. market during the period of investigation.

Figure I-19

Thin film cells and modules: Listing of firms with thin film production facilities opening and/or closing in the United States, 2010–January 2014

	2010		2011		2012		2013		Jan.
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	2014
Abound							◆ Ceased production in CO; filed for bankruptcy		
AQT Solar		● Opened plant in CO				◆ Reportedly seeking to sell IP and assets			
Ascent	● Started production at larger plant in CO								
EPV Solar	◆ Filed for bankruptcy								
First Solar								◆ Sold second plant (in AZ) that built but did not open	
GE						◆ Suspended larger CO plant construction; later sold IP to First Solar			
Global Solar						◆ Reduced workforce by 70%; subsequently acquired by Hanergy			
Heliovolt	No known changes in production capacity								
ISET/Pioneer PV	No known changes in production capacity								
Konarka					◆ Filed for bankruptcy				
MiaSole					◆ Announced reduction in production capacity; subsequently acquired by Hanergy				
Nanosolar		● Started mass cell production in CA						◆ Assets auctioned	
SoloPower			● Started test runs in OR				◆ Suspended manufacturing in OR		
Powerfilm	No known changes in production capacity								
Sencera					◆ Plant closed				
Solyndra		●	◆ 2010: Opened new plant in CA; 2011: ended manufacturing, bankruptcy filing						
Stion			● Opened plant in MS						
United Solar		◆	◆		◆ 2010: ended module assembly; 2011: ended cell production; 2012: bankruptcy				
WK Solar								◆ Expected to close; most operations idled in 2011	
Xunlight	No known changes in production capacity								

● Production capacity increase
◆ Production capacity decrease

Note: This figure includes plants that opened or closed during 2010–2013, based on publicly available data, and does not include all changes in production capacity or information on the extent to which production capacity was utilized.

Source: From USITC Publication 4360 and public research material.

Commission's Six-factor Domestic Like Product Analysis

The Commission's decision regarding the appropriate domestic products that are "like" the subject imported products is based on a number of factors including: (1) physical characteristics and uses; (2) common manufacturing facilities, production processes, and production employees; (3) interchangeability; (4) customer and producer perceptions; (5) channels of distribution; and (6) price. The following sections provide information regarding these factors provided by the parties and state what the Commission determined in its prior investigation on CSPV cells and modules.

Physical Characteristics and Uses

Petitioner argued that CSPV products and thin film solar products use completely different raw material inputs and production technologies. Petitioner stated that CSPV products consist of 60 or 72 silicon cells strung together, whereas thin film solar products are comprised of a thin layer of cadmium telluride, copper indium gallium selenide, or amorphous silicon. It also observed that thin film solar products generally have smaller dimensions, are thinner, and weigh less than CSPV products. Petitioner stated that the CSPV products have different efficiency and energy output rates with thin film solar products being less efficient and producing a lower wattage rate than CSPV products. Petitioner contended that nothing has occurred in the marketplace or with the technology since the prior CSPV cells and modules investigation that would warrant a change in the Commission's analysis that it conducted in the prior investigation.[79]

In the prior CSPV cells and modules investigation, the Commission determined that there were significant differences in the physical characteristics between CSPV solar products and thin film solar products. Specifically, the Commission stated:

> *There are significant differences in physical characteristics and capabilities between CSPV and thin-film products that are related to differences in their underlying raw materials and production processes. Typical on-grid CSPV modules consist of a 34- to 62-pound framed glass laminate that measures 62 to 78 inches long, 32 to 39 inches wide, and 1.2 to 2 inches thick and that is comprised of 60 to 72 cells. . . . Thin-film modules consist of a glass or flexible substrate such as stainless steel or plastic with a surface layer of amorphous silicon ("a-Si"), cadmium telluride ("CdTe"), and/or copper indium (gallium) (di)selenide ("CIGS"). Thin-film modules generally have smaller dimensions and in particular are thinner. They tend to weigh less, and the variety of substrates used to make thin-film modules provides more flexibility and a broader range of possible sizes, including some that are considerably longer than on-grid CSPV modules.*

[79] Petitioner's postconference brief, p. 4 and exh. 1 pp. 25-28.

Typical on-grid CSPV modules have a power output of 120 to more than 400 watts. . . . Thin-film products generally range from 60 to 350 watts, although their output varies depending on the substrate used and the module's size. For CSPV modules, conversion efficiencies vary somewhat depending on the type of module. Overall, thin-film products tend to have a considerably lower conversion rate, despite the fact that thin-film products are able to generate power in low-light conditions.
In terms of end uses, CSPV products convert sunlight into electricity for use on-site or for distribution through the grid; CSPV modules route electricity generated by the interconnected cells to the junction box, which can be attached to other modules, an inverter, or, in the case of off-grid modules, a charge controller and battery. Thin-film products also convert sunlight into electricity for use on-site or for distribution through the electric grid. Some CSPV cells are used for building-integrated photovoltaics such as solar shingles or solar windows, and thin-film products are also sometimes used in solar shingles. Although Respondents argue that both CSPV and thin-film products convert sunlight into energy, this characteristic is also shared by other products. . . Aesthetically, U.S. producers reported that CSPV modules have a more-defined cell pattern than thin-film products, which appear to be one large semiconductor. Moreover, thin-film products are more suited to installation in larger quantities on flat roofs, on less-expensive land (deserts), or in projects without space restrictions that limit the number of modules to achieve a particular wattage.[80]

In the present investigations, respondents argued that the differences between CSPV products and thin film solar products have lessened since the Commission looked at this issue in its prior investigations. Respondents stated that with advances in technology, thin film solar products are no longer less efficient per square meter than CSPV products. They stated that a number of thin film products now report conversion efficiency rates of 13.3 percent for cadmium telluride modules (with a record of 16.1 percent). CSPV products report conversion efficiencies of 14-15 percent for multicrystalline and 16-20 percent for monocrystalline products.[81]

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[80] C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012, pp. 8-9.

[81] Chinese Respondents' postconference brief, pp. 15-16 and exh. 1, pp. 15-16 (citing to reports by First Solar, the largest U.S. producer of thin film solar products); Taiwanese Respondents' postconference brief, exh. A, pp. 1-2.

Common Manufacturing Facilities, Production Processes, and Production Employees

Petitioner stated that the production processes and manufacturing facilities for CSPV cells and thin film products are completely different. It stated that the thin film production process uses entirely different inputs and bypasses an essential step in CSPV cell production process, namely the production of the silicon crystal and wafer. Thin film solar products, by contrast, are produced by directly placing thin layers of photovoltaic material onto a substrate. These photovoltaic materials most commonly consist of amorphous silicon, cadmium telleride, and copper indium gallium selenide, materials not used in the production of CSPV cells. Petitioner observed that not a single U.S. or foreign producer reported production of both CSPV solar products and thin film solar products using the same manufacturing equipment and workers.[82]

In the prior CSPV cells and modules investigation, the Commission determined that there were significant differences in the manufacturing processes between CSPV solar products and thin film solar products. Specifically, the Commission stated:

> *The record showed no overlap in the manufacturing facilities, production processes, or employees used to produce CSPV and thin-film products. . . . Other record data confirm differences in the manufacturing facilities, production processes, and employees. As indicated earlier, CSPV products are made from refined polysilicon that is formed into ingots, sliced into wafers, converted into cells, and then assembled into modules. The cells in CSPV modules use either mono- or multi-crystalline silicon; when sunlight hits the modules, it knocks loose electrons that flow into the cells' thin metal "fingers" and conduct electricity to the busbars. The CSPV cells are soldered together in strings and arranged in a rectangular matrix, sealed with an EVA sheet, joined to a back sheet, laminated, framed, and then mounted to a junction box. In contrast, manufacturers generally make thin-film products by applying a layer of photosensitive material such as a-Si, CdTe, and/or CIGS to glass or to a flexible substrate such as stainless steel or plastic.*[83]

Chinese respondents stated that there is a U.S. producer, First Solar, that produces both CSPV products and thin film solar products. In 2013, First Solar acquired TetraSun, a company developing a high-efficiency, low-cost, crystalline technology. First Solar stated that it plans to

[82]Petitioner's postconference brief, exh. 1, p. 24.

[83]C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012, pp. 9-10.

have CSPV modules under the First Solar brand name complement its thin film solar products. Production of these CSPV modules is projected to occur in in late 2014 or early 2015.[84]

Interchangeability

Petitioner stated that because of the different physical characteristics of the two products, especially efficiency and output rates, the interchangeability of CSPV products and thin film solar products is limited. It contended that thin film solar products need more surface area to generate the same amount of electricity that can be generated by CSPV products, and thus, are less suitable for roof-top residential and commercial applications. Because of the larger geographic areas needed for thin film solar products, petitioner alleged that they are typically used in the utility market segment.[85]

In the prior CSPV cells and modules investigation, the Commission determined that in a majority of cases, CSPV solar products and thin film solar products are not interchangeable. Specifically, the Commission stated:

> *At the design phase, CSPV products may be interchangeable with thin-film products, depending on the project. Nonetheless, thin-film products have different balance of system requirements than CSPV products. Moreover, due to their lower conversion efficiencies and lower wattage output, thin-film products need more surface area to generate the same energy as CSPV modules, making thin-film products somewhat more attractive for projects in environments with high temperatures and significant amounts of sunlight. Thin-film products also may be more suitable for utility as opposed to residential and smaller non-residential applications, except for those projects needing a lighter product for mounting on a lower-strength roof or a more flexible product.*[86]

Respondents, citing U.S. importer questionnaire responses and purchaser testimony at the conference, claimed that the two product types are interchangeable in the marketplace and compete in the utility sector as well as the residential and commercial roof-top sectors.[87]

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[84]Chinese Respondents' postconference brief, p. 17, exh.1, pp. 18-19, and exh. 11 (citing to First Solar's 3Q2013 10-Q). Nowhere in First Solar's 10-Q does it state that CSPV and thin film will be manufactured using the same manufacturing equipment or workers.

[85]Petitioner's postconference brief, exh. 1, p. 28 (Citing First Solar's 2012 Annual Report which indicates that even the most advanced 2 foot by 4 foot thin film modules have an average rated power of only 92.5 watts which is well below the average rated power of 225 watts to 300 watts for CSPV products).

[86]C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012, pp. 10-11.

[87] Chinese Respondents' postconference brief, p. 16 and exh. 1, pp. 16-17; "We have installed monocrystalline, polycrystalline, and thin film solar panels and consider all three technologies to be part

(*continued*...)

Customer and Producer Perceptions

Petitioner stated that customers and producers generally perceive CSPV products to be the established PV technology with higher efficiency and thin film solar products to be a newer, less established and less efficient technology.[88]

In the prior CSPV cells and modules investigation, the Commission determined that in a majority of cases, CSPV solar products and thin film solar products were perceived differently. Specifically, the Commission stated:

> *In their questionnaire responses, 11 of 19 U.S. producers of CSPV and/or thin-film products and 23 of 49 responding importers reported that their customers perceive the products to have different physical characteristics, flexibility, efficiency, power outage, space requirements, bankability, environmental concerns, climate suitability, performance characteristics, reliability, durability, and established nature. . . . Although a number of purchasers considered both products for their purchases, many reported that they considered either CSPV or thin-film products but not both.*[89]

Respondents claimed that customers and producers perceive both products to be similar and in direct competition with one another. Respondents cited First Solar's 2013 annual report in which it states that manufacturers of CSPV cells are among its main competitors. Respondents also claimed that customers, especially large solar project developers, will consider bids for both types of technology.[90]

Channels of Distribution

Petitioner observed that there are three primary market segments for solar products: (1) utilities; (2) commercial; and (3) residential. According to petitioner, CSPV products compete in all markets whereas thin film solar products are highly concentrated in the utility sector. Even in the utility sector, petitioner claimed that there is limited overlap of competition between CSPV and thin film solar products because of the difference in the customary negotiation process for each technology. Petitioner argued that the utility sector generally purchases its thin film solar products in direct negotiations between the producer and the

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(…*continued*)
of the same market," Conference transcript, p. 133 (Stanton)(discussing residential solar market); Taiwanese Respondents' postconference brief, exh. A, pp. 1-2.

[88]Petitioner's postconference brief, exh. 1, pp. 31-32.

[89]C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012, p. 11.

[90] Chinese Respondents' postconference brief, p. 17 and exh. 1, p. 18; Taiwanese Respondents' postconference brief, exh. A, pp. 1-2.

utility or developer whereas residential and commercial applications are generally sold from solar producer to distributor or installer and then to end user.

In the prior CSPV cells and modules investigation, the Commission determined that CSPV solar products and thin film solar products share similar channels of distribution. Specifically, the Commission stated:

> *In their questionnaire responses, 12 of 19 U.S. producers of CSPV and/or thin-film products reported that the two products share the same channels of distribution, as did 34 of 49 responding importers. CSPV modules used in residential grid-connected systems are typically installed on the roof and connected to an inverter (either central inverter or individual module micro-inverters) to provide electricity for the individual home or feed energy back into the grid when solar generation exceeds home use; typical residential installations were 5.7 kilowatts ("KW") in 2011. CSPV modules are also used in non-residential systems installed on commercial, industrial, government, or similar buildings; these installations are typically larger and have been increasing in size (about 81 KW in 2010 and about 43 percent higher a year later), but they function similarly to residential installations. . . . Thin-film modules also may be used in residential, non-residential, and utility on-grid as well as off-grid applications. According to questionnaire data, between 2009 and 2011, the majority of U.S.-manufactured CSPV modules were sold to commercial installers; in the first half of 2012, a majority of shipments were to distributors. A smaller but growing share of CSPV products were sold to residential installers and to utility co/developers throughout the POI. . .*[91]

Chinese respondents claimed that the channels of distribution for both products are identical whereby both products are sold directly to utilities and sold to wholesalers and distributors to be sold in the residential and commercial roof-top sector.[92]

[91] *Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012, p. 10.

[92] Chinese Respondents' postconference brief, p. 16 and exh. 1, p. 17.

Price

Petitioner stated that CSPV and thin film solar products have always had differing price points. Because of the difference in the technological efficiency, CSPV products are generally more expensive than thin film products.[93]

In the prior CSPV cells and modules investigation, the Commission determined that the price of CSPV solar products was generally higher than those of thin film solar products. Specifically, the Commission stated:

> *In their questionnaire responses, 12 of 19 U.S. producers of CSPV and/or thin-film products reported that CSPV products are generally priced higher than thin-film products, as did 35 of 49 responding importers. Several reported that the price differential between CSPV products and thin-film products narrowed during the POI, with the decline in polysilicon prices as well as the influx of lower-priced imports of CSPV products from China.*[94]

Respondents argued that because thin film solar products compete with CSPV products, since the Commission's prior investigations, the prices of CSPV products have significantly decreased and are now more in line with the prices of thin film products.[95]

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[93]Petitioner's postconference brief, exh. 1, p. 25.

[94]C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012, p. 11.

[95] Chinese Respondents' postconference brief, p. 17 and exh. 1, p. 19; Taiwanese Respondents' postconference brief, exh. A, pp. 1-2.

PART II: CONDITIONS OF COMPETITION IN THE U.S. MARKET

U.S. MARKET CHARACTERISTICS

CSPV modules are made of CSPV cells that convert sunlight into electricity. These modules are installed on or above roofs of residential and non-residential buildings or as stand-alone units, as well as for other products such as building integrated photovoltaics ("BIPV").[1] Modules vary in sizes, nominal power output, and efficiencies. Typical on-grid modules have 60 to 72 cells and a power output of between 200 watts and 310 watts.[2] As discussed in Part I, the three on-grid market segments are residential, commercial, and utility.

The demand for CSPV cells and modules is derived from the demand for solar electricity. In 2012, the United States accounted for 11 percent of all global PV installations, its highest market share in 15 years.[3] Demand for CSPV products has increased and is expected to continue to grow in the United States. PV installations increased 241.4 percent from 2010 to 2012 (figure II-1). This growth continued in 2013, with PV installations forecasted to have increased 27 percent between 2012 and 2013, with a 52 percent growth rate in the residential sector alone.[4] According to industry experts, it is anticipated that the United States will install ***.[5] While there has been growth in the overall market for CSPV products, the market is complex and demand trends vary across geographic markets, market segments, and customer types.

[1] Petition, p. 25.

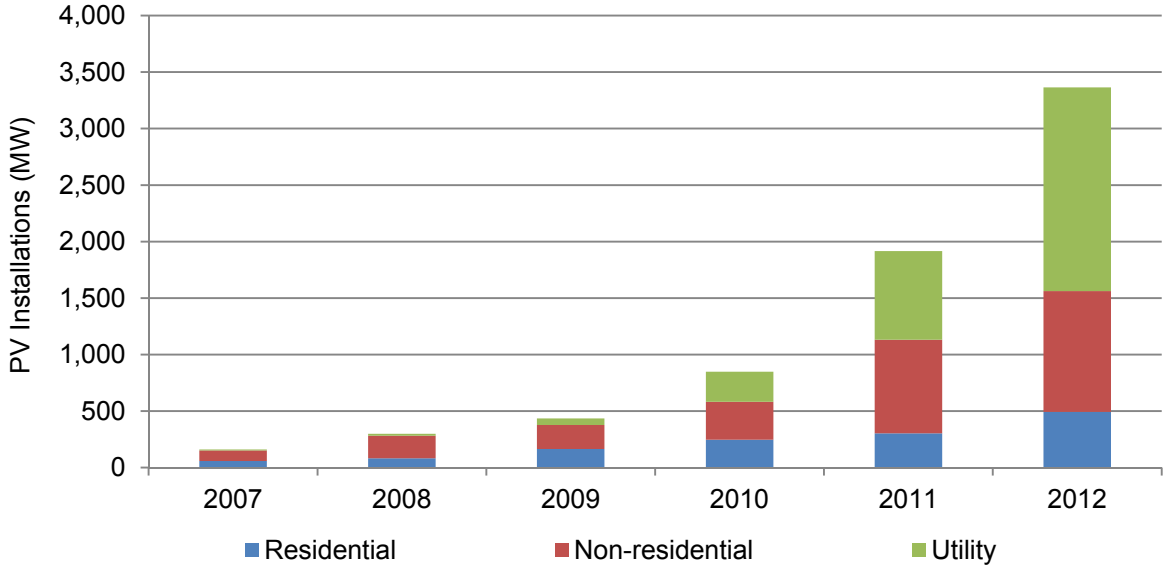
[2] "2012 Crystalline Silicon Module Guide", *SolarPro*, Issue 5.6, October/November 2012. SolarPro listed modules that met the UL1703 standard and were also eligible for the California Solar Initiative (CSI) program which it considers a good indication of a manufacturer's commitment to maintaining or establishing a presence in the North American market.

[3] SEIA, "2012 Year in Review-Executive Summary," U.S. Solar Market Insight, 2013, p. 3.

[4] SEIA, "Executive Summary," U.S. Solar Market Insight, Q3 2013, p.4.

[5] Petitioner's postconference brief, exhibit 4; ***.

Figure II-1
U.S. PV Installations by market segment, 2007-2012



Source: SEIA, "2012 Year in Review-Executive Summary," U.S. Solar Market Insight, 2013, p. 5.

Government policy and incentives have played a key role in the development of solar electricity. Federal, state, and local incentives for renewable energy have bolstered demand for CSPV cells and modules.[6] [7] Because solar energy has historically cost more than energy from conventional sources like fossil fuels, policy mechanisms have helped to lower its generating costs and encourage its use. These mechanisms include fiscal incentives, such as tax credits to offset the cost of generating solar energy, and regulatory policies that mandate its use and set its price.

CHANNELS OF DISTRIBUTION

According to petitioner, CSPV cells are typically internally consumed to produce solar modules or sold to companies that fabricate modules or panels. CSPV modules are generally sold to distributors, installers, and utility/developers.[8] [9] U.S. producers sold to all four channels

[6] Barbose, Galen et al., "Tracking the Sun IV," September 2011, p. 5.

[7] These policies and incentives can vary significantly from one state to another. Conference transcript, pp. 59-60, p. 86 (Brinser) and pp. 154-155 (Morrison).

[8] Petition, p. 27.

[9] Installers are firms that are responsible for the CSPV system installation; however, they may subcontract some parts of the installation to other firms such as electrical contractors. Installers may sell the system themselves or be contracted by other system sellers, such as third-party owners, to install the system. *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, p. 3-11.

of distribution, but sold primarily to distributors and commercial installers during the period of investigation. Imports from China were sold primarily to commercial installers and utilities/developers. Imports from Taiwan were sold primarily to commercial installers and utilities/developers in 2010 but then shifted to primarily residential installers and utilities/developers in 2012 (table II-1).[10] [11]

Table II-1
CSPV modules: U.S. producers' and importers' U.S. shipments, by sources and channels of distribution, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

Market Segments

Petitioner notes that within the channels of distribution (distributors, installers, and utilities/developers), there are three main market segments:[12]

(1) Residential, where panels are affixed to residential rooftops or installed in stand-alone systems;
(2) Commercial {also referred to as nonresidential}, where panels are affixed to large, flat non-residential rooftops or installed in stand-alone systems; and
(3) Utility-scale, where large scale solar panel arrays are installed as stand-alone units.

The residential market segment consists primarily of installations by home or building owners in order to generate electricity for use on site. The U.S. residential installer industry is highly fragmented with more than 2,000 active solar installers in the market, with the top five firms combined accounting for less than one-third of the U.S. market in 2012.[13] Some residential installations may be owned by a third-party lessor who sells the electricity to a residential client.[14]

The commercial market segment consists primarily of building owners seeking to generate electricity for use on site, and may also be provided by third-party lessors. This market

[10] Data were collected based on the country of exportation of the module and not on the country of origin of the cell.

[11] According to Taiwan respondents, Taiwan producers typically focus more on the residential and commercial segments of the market. Conference transcript, p. 226 (Kobes).

[12] Petition, p. 27.

[13] Overall, the leading residential installers in the United States in 2012 appear to be SolarCity, Verengo Solar, Trinity Solar, RevoluSun, REC Solar, and Sungevity. *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, p. 3-11.

[14] According to Solar Energy Industries Association (SEIA), third-party ownership in the residential solar sector has increased. In 2012, third-party owned systems accounted for over 50 percent of all new residential installations in most major residential markets. SEIA, "2012 Year in Review-Executive Summary," U.S. Solar Market Insight, 2013, p. 2.

is also highly fragmented, with more than 1,000 nonresidential installers active in 2012 and the top five firms accounting for less than 25 percent of installations by watt.[15] According to industry representatives, larger installation firms may have several advantages that include the ability to provide financing, leverage lower system prices, expand into new states and acquire local firms; this has led industry representatives to predict significant consolidation among residential and commercial installers.[16]

The utility market segment consists primarily of installations owned by utility companies or third parties where the electricity is generated for a power grid.[17] Utility project development is more concentrated among a smaller number of firms, with the top five utility project developers accounting for 59 percent of U.S. project completed in 2012.[18]

All three market segments (residential, commercial, and utility) have experienced considerable growth during the period of investigation. However, the relative share of installed capacity has been shifting from the commercial segment to the utility segment, driven in large part by state renewable portfolio standard requirements (figure II-2).

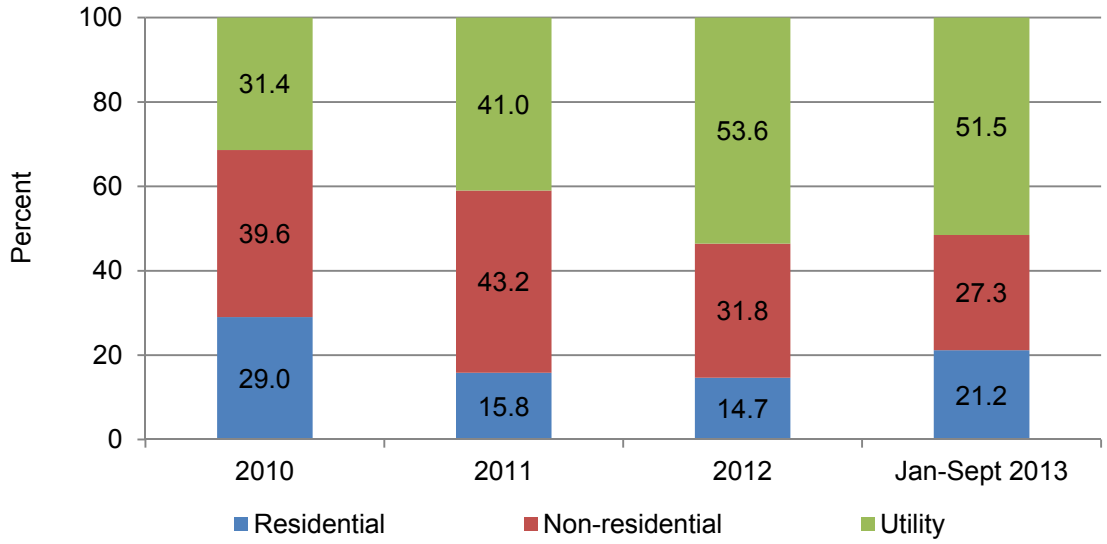
[15] In 2012, the top commercial installers appear to be SunPower, SolarCity, SunEdison, Borrego Solar Systems, and Chevron Energy Solutions. *Renewable Energy and Related Services: Recent Developments,* USITC Publication 4421, August 2013, pp. 3-11-12.

[16] *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, p. 3-12-13.

[17] Utility scale projects often involve a bidding process. Respondents assert that, with utility projects, there are two contracts being negotiated at the same time: "one for the Engineering, Procurement, and Construction ("EPC") firm for the construction of the project and one for the Power Purchase Agreement ("PPA") for the sale of electricity to the utility company." Respondent's postconference brief, exhibit 2, p. 15.

[18] In 2012, the top utility project developers were First Solar, Sempra, SunPower, EDF, GCL Solar Energy, and SunEdison. *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, p. 3-15.

Figure II-2
Annual share of U.S. solar installations by market segment, 2010-12, and January-September 2013



Source: SEIA, "2012 Year in Review-Executive Summary," U.S. Solar Market Insight, 2013, p. 5; SEIA, "Q1 2013- Executive Summary," U.S. Solar Market Insight, 2013, p. 6; and SEIA, "Q3 2013- Executive Summary," U.S. Solar Market Insight, 2013, p. 6.

GEOGRAPHIC DISTRIBUTION

U.S. producers and importers reported selling CSPV products to all regions in the contiguous United States (table II-2). U.S. producers reported that *** percent of sales were within 100 miles of their production facility, *** percent between 101 and 1,000 miles, and *** percent of sales were over 1,000 miles. Importers of CSPV products from China reported that *** percent of sales were within 100 miles of their U.S. point of shipment, *** percent between 101 and 1,000 miles, and *** percent over 1,000 miles. Importers of CSPV products from Taiwan reported that *** percent of sales were within 100 miles of their U.S. point of shipment, *** percent between 101 and 1,000 miles, and *** percent over 1,000 miles. The top states with the highest PV installation rates during the period were California, Arizona, North Carolina, Massachusetts, Nevada, New Jersey, and Hawaii.[19]

[19] SEIA, "2012 Year in Review-Executive Summary," U.S. Solar Market Insight, 2013, p. 6; SEIA, "Q3 2013-Executive Summary," U.S. Solar Market Insight, 2013, p.7.

Table II-2

CSPV products: Geographic market areas in the United States served by U.S. producers and importers, by number of responding firms

Region	U.S. producers	Importers from China	Importers from Taiwan
Northeast	3	26	10
Midwest	4	22	9
Southeast	4	25	9
Central Southwest	3	22	8
Mountain	3	26	11
Pacific Coast	5	30	14
Other[1]	3	23	11
Present in all continental regions	3	19	7

[1] All other U.S. markets, including AK, HI, PR, and VI, among others.

Source: Compiled from data submitted in response to Commission questionnaires.

SUPPLY AND DEMAND CONSIDERATIONS

U.S. supply

Domestic production

Based on available information, U.S. producers of CSPV products have the ability to respond to changes in demand with large changes in the quantity of shipments of U.S.-produced CSPV products to the U.S. market. The main contributing factors to this degree of responsiveness of supply are the availability of unused capacity, existence of alternate markets, and some inventories; supply responsiveness is somewhat constrained due to an inability to switch from production of alternative products to CSPV products.

Industry capacity

Domestic capacity utilization for both CSPV cells and CSPV modules fell during the period of investigation. Capacity utilization, by kilowatt, for CSPV cells decreased from *** percent in 2010 to *** percent in 2012 and was *** percent and *** percent in interim 2012 and interim 2013, respectively. For U.S.-produced CSPV modules, capacity utilization fell from *** percent in 2010 to *** percent in 2012; capacity utilization was lower in interim 2013 (*** percent) than in interim 2012 (*** percent). As shown in figure II-3, while U.S. producers' overall capacity for both CSPV cells and modules increased from 2010 to 2012, production generally fell throughout the period. This relatively moderately-low level of capacity utilization suggests that U.S. producers may have substantial capacity to increase production of product in response to an increase in prices.

Figure II-3
CSPV products: U.S. production, capacity, and capacity utilization of CSPV cells and modules, 2010-2012, January-September 2012 and January-September 2013

* * * * * * *

Alternative markets

U.S. producers have a moderate-to-large ability to shift shipments between the U,S, market and other markets in response to price changes for CSPV cells but a limited ability to do so for CSPV modules. U.S. producers' exports of CSPV cells, as a percentage of total shipments, increased irregularly from *** percent in 2010 to *** percent in 2012; U.S. producers' exports of CSPV cells were higher in interim 2012 (*** percent) compared to interim 2013 (*** percent). U.S. producers' exports of CSPV modules, as a percentage of total shipments, steadily decreased from *** percent in 2010 to *** percent in 2012 and were lower in interim 2013 (*** percent) compared to interim 2012 (*** percent).

Inventory levels

U.S. producers' inventories of CSPV products, as a ratio to total shipments, increased irregularly from *** percent in 2010 to *** percent in 2012; the ratio of inventories to total shipments were lower in interim 2013 (*** percent) compared to interim 2012 (*** percent). These inventory levels suggest that U.S. producers may have some ability to respond to changes in demand with changes in the quantity shipped from inventories.

Production alternatives

*** responding U.S. producers stated that they could not switch production from CSPV products to other products.

Supply constraints

Two of five responding producers reported that their firms were unable to supply CSPV products since 2010. *** reported that demand for CSPV products has outpaced its manufacturing capacity. *** reported that it experienced supply constraints in the fourth quarter of 2010 due to the high demand caused by the expected expiration of the Treasury 1603 cash grant.[20]

[20] The SEIA reports that as a result of the expected expiration of the Section 1603 Treasury Cash Grant program in December 31, 2010, many project developers initiated projects during the summer of 2010 to meet the start-construction deadline at the end of 2010. The program was ultimately extended through December 31, 2011. As a result, SEIA identified an "application boom" in Q2-2010, and an "installation boom" in Q1-2011 in the nonresidential market segment. Petition, SEIA, "U.S. Solar Market
(*continued*...)

Subject imports from China

The Commission received 53 questionnaire responses from Chinese producers.[21] Based on available information, producers of CSPV products from China have the ability to respond to changes in demand with large changes in the quantity of shipments of CSPV products to the U.S. market. The main contributing factors to this degree of responsiveness of supply are the increasing capacity and the existence of large export markets; supply responsiveness is somewhat constrained due to limited inventories and an inability to shift from production of alternative products.

Industry capacity

Chinese producers' capacity utilization for both CSPV cells and CSPV modules decreased during the period of investigation. Chinese production and capacity levels for both CSPV cells and modules are shown in figure II-4. Capacity utilization for CSPV cells decreased from *** percent in 2010 to *** percent in 2012 and was *** percent and *** percent in interim 2012 and interim 2013, respectively. The decrease in capacity utilization was driven by increases in total capacity that exceeded annual production increases.

For CSPV modules, Chinese producers' capacity decreased from *** percent in 2010 to *** percent in 2012; capacity utilization was *** percent and *** percent in interim 2012 and interim 2013, respectively. Similar to China's CSPV cell production, the decrease in capacity utilization for CSPV modules was driven by increases in total capacity that outpaced China's production levels.[22] Based on questionnaire response, both Chinese capacity and production levels of CSPV products are estimated to increase in 2014.

Figure II-4
CSPV products: Chinese production and capacity for CSPV cells and modules, 2010-2012, and projected 2013-2014

* * * * * * *

Alternative markets

Responding Chinese producers have the ability to divert shipments of CSPV products to or from alternative markets in response to changes in price of CSPV products. Responding Chinese producers primarily export CSPV modules while using their production of CSPV cells internally for CSPV modules. Approximately *** of Chinese producers' CSPV cells were

(…*continued*)
Insight: 1st Quarter 2011—Executive Summary," Exhibit I-23, pp. 6-10 and Figure 2-2. SEIA also adds that as a result of the "2010 Overhang," 2010 module shipments greatly exceeded 2010 module installations.

[21] The 53 responding producers account for an estimated *** percent of total CSPV cell production and *** percent of total CSPV module production in China.

[22] Chinese capacity to produce CSPV modules was *** times greater than U.S. total apparent consumption of CSPV modules in 2012.

internally consumed during the period of investigation. Exports of CSPV cells, as a percentage of total shipments, decreased from *** percent in 2010 to *** percent in 2012. Home market shipments of CSPV cells (as a percentage of total shipments) fluctuated between *** percent to *** percent during 2010-12.

However, the vast majority of Chinese-produced CSPV modules were exported during the period (figure II-5). Shipments of CSPV modules to the United States increased from *** percent in 2010 to *** percent in 2011 and then decreased to *** percent in 2012. Shipments of CSPV modules to all other markets decreased from *** percent in 2010 to *** percent in 2012. Shipments of CSPV modules to the United States are projected to increase in 2013 and 2014; however, exports to all other markets are projected to decline.

Figure II-5
CSPV products: Shares of total shipments of CSPV modules by Chinese producers, 2010-2012, and projected 2013-2014

* * * * * * *

Inventory levels

Responding Chinese producers have a limited ability to use inventories as a means of increasing shipments of CSPV products. For CSPV cells, the ratio of inventories as a share of total shipments increased from *** percent in 2010 to *** percent in 2012. For CSPV modules, the ratio of inventories as a share of total shipments increased from *** percent in 2010 to *** percent in 2012.

Production alternatives

*** responding Chinese producers reported that no other products could be produced using the same machinery and equipment used in the production of CSPV products.

Subject imports from Taiwan

The Commission received 19 questionnaire responses from Taiwan producers.[23] Based on available information, producers of CSPV products from Taiwan have the ability to respond to changes in demand with large changes in the quantity of shipments of CSPV products to the U.S. market. The main contributing factors to this degree of responsiveness of supply are the availability of unused capacity and existence of alternate market; supply responsiveness is somewhat constrained due to limited inventories and an inability to shift from production of alternative products.

[23] The 19 responding producers account for approximately *** percent of total CSPV cell production and *** percent CSPV module production in Taiwan.

Industry capacity

Taiwan producers' capacity utilization for both CSPV cells and CSPV modules decreased during the period of investigation but are projected to increase in 2013 and 2014. The Taiwan industry focuses primarily on the production of CSPV cells.[24] Capacity utilization for CSPV cells decreased from *** percent in 2010 to *** percent in 2012; capacity utilization was higher in interim 2013 (*** percent) compared to interim 2012 (*** percent). Estimates indicate that capacity utilization will be *** percent in 2014. The decrease in capacity utilization was driven by increases in total capacity that exceeded its annual production increases (figure II-6).

For CSPV modules, Taiwan producers' capacity utilization decreased from *** percent in 2010 to *** percent in 2012; capacity utilization was higher in interim 2013 (*** percent) compared to interim 2012 (*** percent) and is estimated to be *** percent in 2014. Similar to Taiwan's CSPV cell production, the decrease in capacity utilization for CSPV modules was driven by increases in total capacity that outpaced Taiwan's production levels (figure II-6).[25]

Figure II-6
CSPV products: Taiwan production and capacity for CSPV cells and modules, 2010-2012, and projected 2013-2014

* * * * * * *

Alternative markets

Responding Taiwan producers have the ability to divert shipments of CSPV products to or from alternative markets in response to changes in price of CSPV products. Taiwan's industry is export-oriented with only a small share of CSPV products shipped to its home market.[26] The overwhelming majority of Taiwan producers' shipments of CSPV cells were exported (figure II-7). Total exports of Taiwan-produced CSPV cells, as a share of total shipments, decreased from *** percent in 2010 to *** percent in 2012. China was Taiwan's largest export market; exports of Taiwan-produced CSPV cells to China, as a share of total shipments, increased irregularly from *** percent in 2010 to *** percent in 2012 and is projected to continue to increase. Shipments of Taiwan-produced CSPV cells to the United States, as a share of total shipments, decreased irregularly from *** percent in 2010 to *** percent in 2012.

[24] Conference transcript, pp. 142-143 (Kobes).

[25] Taiwan capacity to produce CSPV modules was 50 times greater than U.S. total apparent consumption of CSPV modules in 2012.

[26] According to Robert Kobes of AUO, a Taiwanese producer, the history of Taiwan has been primarily as an exporter. The majority of shipments from Taiwan are exported to Japan which currently has a rapidly growing market, as well as China and the United States. Conference transcript, p. 183 (Kobes).

Figure II-7
CSPV products: Shares of total shipments of CSPV cells by Taiwan producers, 2010-2012, and projected 2013-2014

* * * * * * *

Similarly for CSPV modules, Taiwan producers reported that the majority of their total shipments were exported to other markets (figure II-8). Total exports, as a share of total shipments, decreased from *** percent in 2010 to *** percent in 2012. Shipments of CSPV modules to the United States increased from *** percent in 2010 to *** percent in 2012.

Figure II-8
CSPV products: Shares of total shipments of CSPV modules by Taiwan producers, 2010-2012, and projected 2013-2014

* * * * * * *

Inventory levels

Responding Taiwan producers have a limited ability to use inventories as a means of increasing shipments of CSPV products. For CSPV cells, the ratio of inventories as a share of total shipments increased from *** percent in 2010 to *** percent in 2012 and was *** percent in interim 2013 compared to *** percent in interim 2012. For CSPV modules, the ratio of inventories as a share of total shipments increased from *** percent in 2010 to *** percent in 2012 and was *** percent in interim 2013 compared to *** percent in interim 2012.

Production alternatives

*** responding Taiwan producers responded that no other products could be produced using the same machinery and equipment used in the production of CSPV products.

Supply constraints

Seventeen of 35 responding importers reported that their firms were unable to supply CSPV products at some point during the period of investigation. Several firms reported that the supply of CSPV products has decreased since the duties were placed on Chinese cells and modules in 2012. *** reported that it invested heavily to increase its wafer and cell capacity in China which was then negatively impacted with the imposed duties in 2012; the duties have significantly increased cells costs and eliminated its ability to utilize its increased cell capacity in China. Two importers reported that their dependency on cells from Taiwan has limited their ability to fulfill orders. *** reported that it lost a customer because it was no longer able to supply the customer with custom-made solar panels. It also reported that it consistently is unable to supply customers with CSPV products or deliver on time because of the unreliability of new suppliers. *** reported that it has declined sales due to supply constraints in times of spiked demand, such as the period before the expiration of the Treasury 1603 cash grant. It also reported that its supply allocation has been cut by *** headquarters due to its ability to sell at

higher prices in other markets or its inability to procure key raw materials for production. *** reported that it declines sales or will refrain from bidding on a project if it is unable to realize its "pricing guidance and contribution margin." *** reported that it also is selective in the projects it selects in order to maintain profitability. *** reported that it also refuses to accept projects if the buyer's requested price term is too low and/or the buyer's credit level is not high enough. *** reported that the spiked demand in Europe during the third quarter of 2010 as well as in China and Japan during the fourth quarter of 2013 has affected its U.S. supply. *** reported that demand has been higher than its manufacturing capacity; it noted that in 2013, there was strong demand for its products in the EU, Japan, as well as from its U.S. customers like SolarCity. In 2013, it allocated its products to Japan instead of the United States because Japan's market prices were higher due to its generous feed in tariff rates.

Nonsubject imports

Based on importer questionnaire data (presented in *Part IV*), CSPV products are imported from a few nonsubject countries and in very limited quantities. The largest sources of U.S. imports of CSPV products from nonsubject countries were Malaysia, Mexico, Philippines, Germany, and Japan. Excluding imports from China that are already subject to duties, nonsubject imports accounted for *** percent of apparent consumption during 2010-12.

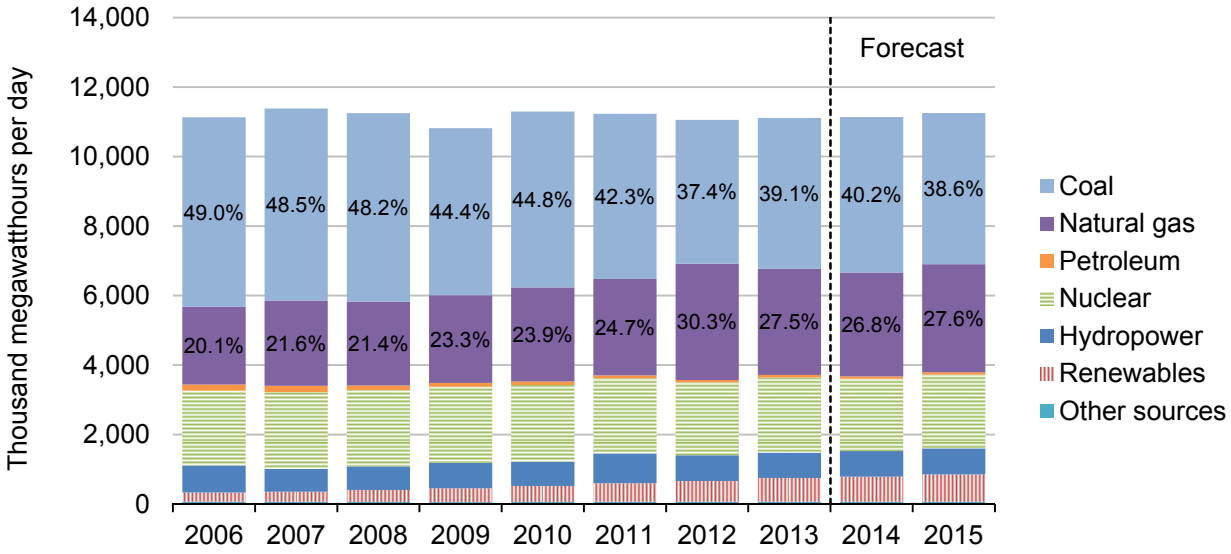
U.S. demand

Based on available information, the overall demand for CSPV products is likely to experience moderately-large to large changes in response to changes in price. The main contributing factors are the ability of substitute products and the large cost share of CSPV products in most of its end-use products.

The demand for CSPV cells and modules is derived from the demand for solar electricity. The demand for solar electricity is attributed to increasing power rates and energy consumption, environmental concerns and the general movement toward "green energy" alternatives, cost competitiveness with traditional energy sources, a desire for national energy independence, and the availability of Federal, state, and local incentives.

Electricity demand in the United States is supplied primarily by conventional sources, such as coal and natural gas, as well as renewable energy sources such as solar, wind, geothermal, and biomass. Approximately two-thirds of U.S. electricity was generated from either coal or natural gas (figure II-9). However, the share of electricity generated from renewable energy sources, such as solar, has increased on an annual basis.

Figure II-9
U.S. Electricity generation by fuel, by sector, 2006-2013 and forecasted 2014-15



Note: Labels show percentage share of total generation provided by coal and natural gas.

Source: Short-Term Energy Outlook, January 2014.

Apparent consumption

Apparent U.S. consumption of CSPV modules increased substantially during the period, increasing from *** kilowatts in 2010 to *** kilowatts in 2012, and showed continued growth during the 2013 interim period. Overall, apparent U.S. consumption increased *** percent from 2010 to 2012.

Demand trends

The majority of firms reported an increase in U.S. demand for CSPV products since 2010 (table II-5). U.S. producers and importers attributed the increased demand to lower module prices, Federal, state, and local incentive programs, declining polysilicon prices, and a demand for “green” energy. Importer *** stated that “Demand for rooftop and wholesale solar has grown due to state solar or renewable energy mandates that are designed to increase the utility's obligated purchase per year over a decade or more. Some utilities that have no state solar mandate buy solar energy to serve their peak energy demand needs, which is when solar production is highest. Finally, some commercial customers purchase solar to "lock in" their energy costs for 20 or more years and benefit from an energy hedging value, coupled with satisfying a "green" corporate social responsibility goal.

Table II-5

CSPV products: Firms' responses regarding U.S. demand, by number of responding firms

Item	Increase	Decrease	Fluctuate	No change
Demand in the United States				
U.S. producers	5	0	0	0
Importers	29	3	2	4
Demand outside the United States				
U.S. producers	2	0	2	0
Importers	23	2	2	2

Source: Compiled from data submitted in response to Commission questionnaires.

Two of four responding U.S. producers and the majority of importers indicated that demand outside the United States has increased since 2010. The increase in demand outside of the United States was attributed to similar reasons as the growth in the United States: reduced module prices, the existence of government incentives and mandatory renewable energy goals, and a growing trend towards green energy.[27] Two producers and three importers reported that the economic recession in Europe and the fluctuating incentives has resulted in fluctuating or falling demand in the EU.[28]

Other factors affecting demand

The demand for CSPV products is derived from the demand for solar electricity. However, purchasers can demand energy and electricity from a wide variety of sources, ranging from traditional fossil fuels to various forms of renewable energy (including wind, solar, geothermal, and biomass). Competition with traditional energy sources are driven by its levelized cost of electricity for solar electricity. Electricity providers using renewable energy sources seek to achieve "grid parity" with other sources of electricity.[29] The levelized cost of electricity varies state-by-state, by time of day, and by the availability of other electricity sources.[30] [31]As shown in figure II-9, the general trend of the price of electricity generated by

[27] According to Neo Solar Power, due to Japan's shift away from nuclear energy after the 2011 tsunami, Japan's solar energy market is rapidly growing. It stated that approximately 30 percent of Taiwan's exports are sent to Japan. Conference transcript, p. 140 (Lu).

[28] According to petitioner, solar demand in Germany and Italy, two of the largest European solar markets, decreased by about 55 percent between 2012 and 2013 and demand in these countries is expected to continue to fall. Petitioner's postconference brief, p. 7.

[29] Grid parity is the price at which the levelized cost of electricity generated from renewable sources is competitive with the cost of conventional energy from the grid.

[30] Conference transcript, pp. 150-153 (Button and Morrison).

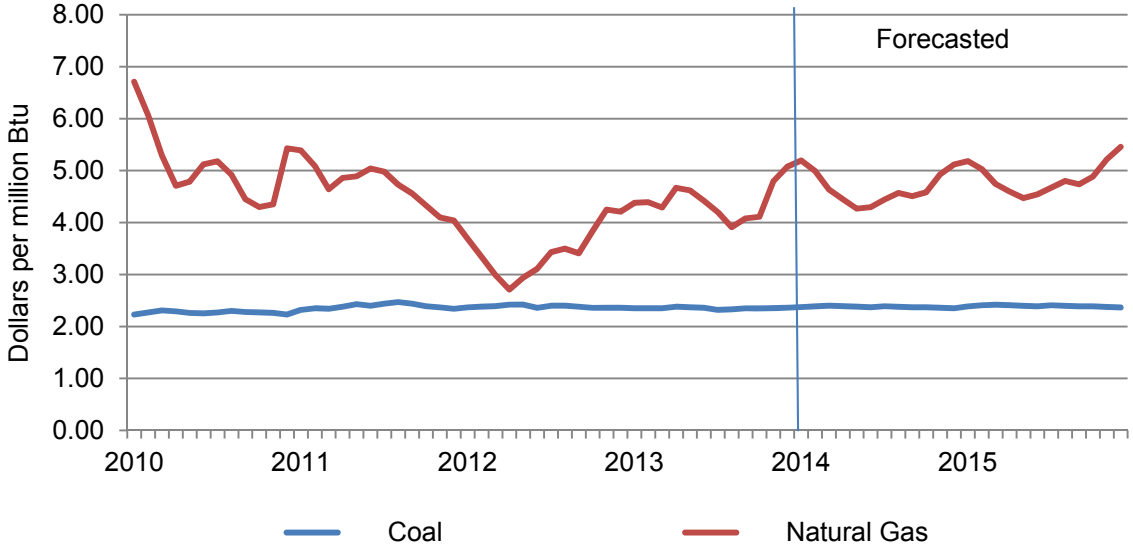
[31] The electricity market varies state-by-state; the type of grid access and the price for electricity depends on the particularities of each state. Strata Solar, a commercial and utilities project developer, reported that it focuses on two principal markets, North Carolina and California. In North Carolina, the price that it receives for its solar electricity is established by the utilities commission. However, in

(*continued*...)

coal has remained unchanged since 2010 and its price is forecasted to stay stable through 2015. The general trend of the price of electricity generated by natural gas declined substantially from 2010 to 2012, but has increased in 2013 and is projected to remain higher than its 2012 levels.

Figure II-9

U.S. natural gas and coal electric power price, monthly, January 2010-December 2013 and projected January 2014-December 2015



Source: "Short-Term Energy Outlook, January 2014- U.S. Energy Prices Table 2," *U.S. Energy Information Administration*, retrieved January 29, 2014.

As shown in table II-6, the majority of producers (4 of 5) and the majority of importers (17 of 23) reported that prices of conventional energy, such as natural gas or coal, did not affect demand for CSPV products or cause the demand of CSPV products to decrease in the residential and commercial markets since 2010. In fact, a plurality of importers indicated that conventional energy prices have caused the demand for CSPV products in the residential and commercial market segments to increase since 2010. Several importers reported that prices of traditional sources of electricity, like natural gas and coal, have been rising, which have made alternative energy sources, such as solar, more attractive. *** stated that "Although the cost of certain conventional energy sources such as natural gas has decreased recently, the average electricity price for homeowners has continued to increase. At the same time, the price for residential solar systems has dropped dramatically. This is in part due to state and federal tax credits and rebates, but increasingly due to the high prices of retail electricity."

(…*continued*)
California, it negotiates a price with the end user in a power purchase agreement. So the price depends on the state in which the firm is operating. Conference transcript, pp. 152-153 (Morrison).

Table II-6

CSPV products: Firms' responses regarding the effect of conventional energy prices on U.S. demand for CSPV products since 2010, by market segment

Item	Increase	Decrease	Fluctuate	No change
Effect on residential demand				
U.S. producers	0	0	1	4
Importers	10	4	5	11
Effect on commercial demand				
U.S. producers	0	0	2	2
Importers	11	4	7	6
Effect on Utilities				
U.S. producers	0	1	2	1
Importers	8	7	7	6

Source: Compiled from data submitted in response to Commission questionnaires

Regarding the utility market, firms' responses were varied. Several firms indicated that the utility market is more sensitive to price pressure from other conventional energy sources. A plurality of importers reported that the falling prices of natural gas have placed downward pressure on module and system prices. One importer (***) stated that the price of natural gas is often used to calculate the replacement cost for solar energy; therefore, the falling prices of natural gas have placed pressure on the cost of solar projects to become more competitive. But it also noted that environmental benefits can offer a premium price; it noted that despite the price difference between coal and solar, consumers generally prefer solar.

Government policies

Various policy mechanisms were created to help solar electricity reach price parity with traditional energy sources. These mechanisms include fiscal incentives and regulatory policies. There are a wide array of fiscal incentives which are designed to lower the cost of project development, including various tax credits, cash grants in lieu of credit, and loan guarantees (table II-3). Tax credits are the most common form of fiscal incentive; several types of tax credits have been modified and extended at various times which have affected the timing of the development of solar projects.

Table II-3

CSPV products: Selected U.S. fiscal incentives to promote solar energy

Type of incentive	Description	Expiration Date
Production tax credit (PTC)	Encourages solar energy production by providing a 10-year production-based tax credit equal to 2.3¢/kWh	Project must be under construction by end of 2013.
Investment tax credit (ITC)	Encourages investment in solar energy projects by reducing tax liabilities by up to 30 percent of eligible capital expenditures.	Project must be commissioned by end of 2016 for 30 percent ITC; 10 percent ITC after 2016, without expiration.
Cash grant program (Treasury 1603 program)	Cash grant equal to up to 30 percent of eligible capital expenditures in lieu of the ITC	Project must be under construction by the end of 2011 and completed by the end of 2016.
Loan guarantee program (DOE 1706 loan program)	Authorized $16 billion in loan guarantees, mostly for wind and solar generation projects	Must have begun construction before September 30, 2011.
Manufacturing tax credit (MTC)	Allocated $2.3 billion in investment tax credits up to 30 percent of investment in manufacturing facilities of clean energy products.	Project must have been commissioned before February 17, 2013.

Source: *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, pp. 2-11-12.

Two of the most widespread regulatory policies are renewable portfolio standards ("RPSs")[32] and feed-in-tariffs ("FITs").[33] RPSs primarily affect demand for renewable energy, including solar electricity, by mandating its use and thereby increasing the demand for CSPV products. In the United States, 29 states and the District of Columbia have RPS policies in place.[34] FITs primarily affect the supply of solar energy by paying a solar electricity generator a known rate of return. In the United States, five states have FITs in place (California, Hawaii, Oregon, Rhode Island, and Vermont). According to the petitioner, these incentives are provided to the purchaser and installer and are available regardless of the country of origin of the modules.[35]

Firms were asked how Federal, state, and local government incentives have affected the demand for CSPV products since 2010 (table II-4). One producer, *** reported that state and local government incentives have fluctuated. It stated that "Since 2010, more and more states have offered incentives for renewable energy, including PV incentives. Several states have also issued favorable net metering decisions and/or have implemented new or expanded solar

[32] An RPS is a regulatory mandate that requires entities that supply electricity, such as utility companies, to generate or buy a portion of their retail electricity sales from renewable energy sources, including solar.

[33] A FIT offers a guarantee of payments to solar electricity developers for the electricity they produce. Payments are based on a certain price per kilowatt-hour (kWh) at which electricity is purchased, typically as part of a long-term agreement set over a period of 15-20 years.

[34] In 2011, California increased its RPS goals by 20 percent by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020. SolarWorld's postconference brief, p. 47.

[35] Petitioner's postconference brief, p. 46.

deployment programs. Other states and utilities have decreased the amount in cash incentives offered during the period." All five U.S. producers reported that the 1603 Federal Treasury cash grant increased the demand for CSPV products during the period. Despite changes in federal and state incentive programs, demand for CSPV products continues to increase. According to petitioner, ***.[36]

Importers' responses were varied with a plurality indicating that federal, state, and local incentives have increased the demand for CSPV product since 2010. Several importers noted that FITs and RPSs vary from state-to-state. *** noted stated that in some states such as California, numerous incentives have expired which have decreased demand for CSPV products; but in other states such as in New York, new incentives are being put in place which has put an upward pressure on demand. *** reported that state rebate program budgets, and incentive levels, have mostly decreased across the United States; it noted that these decreases in incentives place a cost pressure on installation systems. *** reported that the federal ITC and Section 1603 have helped to reduce the cost of an installed solar system, thereby increasing the demand for CSPV modules.

Table II-4
CSPV products: Firms' responses regarding the effect of Federal, state, and local government incentives on demand for CSPV products since 2010

Item	Increase	Decrease	No change
Federal government incentives			
U.S. producers	4	0	1
Importers	20	7	7
State and local government incentives			
U.S. producers	5	0	0
Importers	20	6	11

Source: Compiled from data submitted in response to Commission questionnaires

Business cycles

Three of four U.S. producers and 23 of 36 importers indicated that the market was subject to business cycles. The majority of firms reported seasonal fluctuations due to weather conditions as well as incentive program deadlines. Several firms indicated that demand is typically heavier in the latter half of the year during the warmer summer months up until the end of the calendar year in order to finish projects for tax accounting purposes to qualify for various incentive programs.

Two of three U.S. producers and 11 of 24 importers indicated that the market was subject to distinct condition of competition. Most firms identified government incentive programs and renewable energy portfolio mandates. Other factors identified included the availability of financing for the solar industry, the oversupply of product in the market, and

[36]Petitioner's postconference brief, p. 50.

falling prices of alternative power products which include conventional energy such as natural gas as well as other renewable energy sources such as wind power.

Three of four U.S. producers and 18 of 29 importers indicated that there have been changes to the business cycle and conditions of competition since 2010. Specifically, firms identified the expiration of the Treasury 1603 cash grant program, the newly imposed duties on CSPV cells from China, and declined demand in Europe, which has shifted sales competition to the U.S. market.

End uses, cost shares, and installed costs

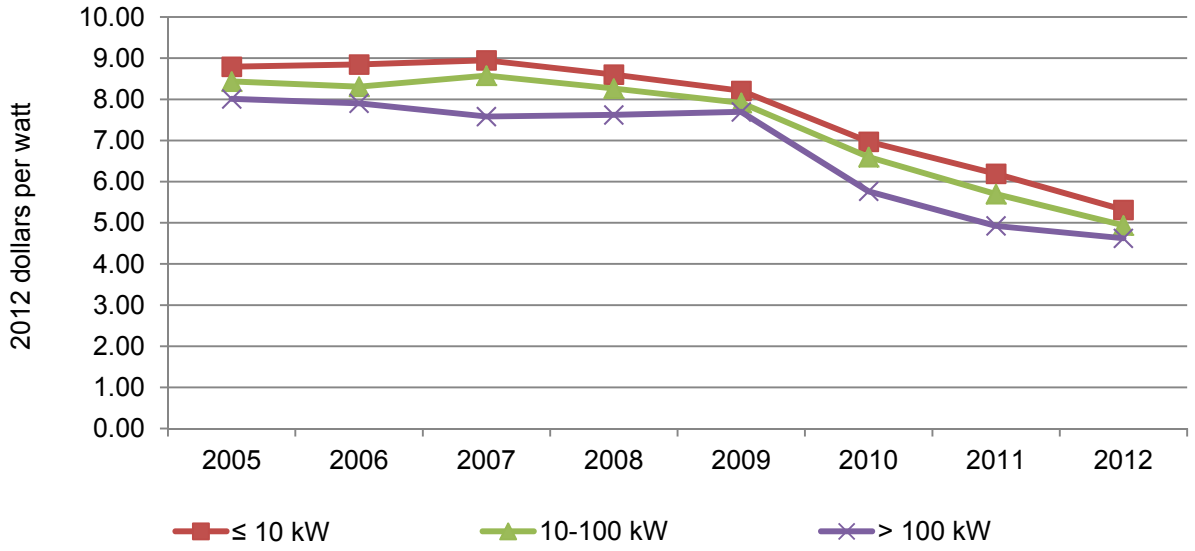
CSPV products account for a moderate share of the cost of the end-use products in which it is used. The primary end use for CSPV cells are modules, and for modules, some form of solar power generation installation or system (see *Part I* for more information). Generally, the cost share of CSPV products increases as the size of the installation project increases. Five U.S. producers and 14 importers provided cost-share information for modules.[37] For residential systems, two responding producers and four of ten responding importers reported cost shares ranging from 15-25 percent; five importers reported cost shares ranging between 30-50 percent, and the remaining importer reported 80 percent. For commercial systems, the majority of firms (both U.S. producers and 5 of 7 importers) reported cost shares ranging between 30-50 percent. For utility systems, the majority of firms (sole responding U.S. producer and 4 of 5 responding importers) reported cost shares ranging between 30-45 percent.

According to several industry sources, average installed prices for PV modules in solar installations have declined steadily in all three market segments throughout the period. According to Solar Energy Industries Association, national average residential system prices fell 32.4 percent, commercial system prices declined 37.7 percent, and utility systems fell 57.5 percent between the first quarter of 2010 and the third quarter of 2013.[38] Another industry report shows similar downward price trends in residential and commercial PV installations, with installation prices falling 20 to 25 percent in all three project sizes (figure II-10). Both reports noted that installed PV prices vary greatly from state-to-state and project-to-project, with a considerable spread among the data in each market segment.

[37] Of these firms, three U.S. producers and 12 importers indicated that CSPV products accounted for 100 percent of the total cost of the module.

[38] *Crystalline Silicon Photovoltaic Cells and Modules from China, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final),* Publication 4360, 2012, p. 107, SEIA, "U.S. Solar Market Insight, Q2 2010, p. 11; and SEIA, "Executive Summary," U.S. Solar Market Insight, Q3 2013, p.14.

Figure II-10
Average installed price of residential and commercial PV systems, by system size, 2005-2012



Source: Barbose, Galen L., Naïm Darghouth, Samantha Weaver, and Ryan H. Wiser, "Tracking the Sun VI, An Historical Summary of the Installed Price of Photovoltaics in the United States from 1998-2012," Lawrence Berkeley National Laboratory, 2013, p. 13.

Substitute products

Three of five responding U.S. producers and 11 of 19 responding importers indicated that there were substitute products for CSPV products. Thin film was the most often identified substitute for CSPV products by responding firms. Most responding U.S. producers and importers indicated that thin film did not affect the price of CSPV products. Other substitutes identified by firms include concentrated solar products and traditional power sources.

SUBSTITUTABILITY ISSUES

The degree of substitution between domestic and imported CSPV products depends upon such factors as relative prices, quality (e.g., grade standards, reliability of supply, defect rates, etc.), and conditions of sale (e.g., price discounts/rebates, lead times between order and delivery dates, payment terms, CSPV products services, etc.). Based on available data, staff believes that there is high degree of substitutability between domestically produced CSPV products and CSPV products imported from subject sources.

Lead times

CSPV products are primarily sold from inventory. U.S. producers reported that *** percent of their commercial shipments came from inventories, with lead times averaging 3-30 days. The remaining *** percent of their commercial shipments was produced-to-order, with

lead times averaging 75-120 days. Importers of CSPV products from China reported that *** percent of their sales came from U.S. inventories and *** percent of their sales came from foreign inventories. The remaining *** percent of their sales of Chinese product was produced-to-order. Importers of CSPV products from Taiwan reported that *** percent of their sales came from U.S. inventories and *** percent of their sales came from foreign inventories. The remaining *** percent of sales of Taiwan product was produced-to-order. Importers reported that lead times for sales of imports from U.S. inventories averaged 5-14 days; lead times of sales of CSPV products held in foreign inventories averaged 25-50 days. Importers reported that lead times of sales of CSPV products that were produced-to-order averaged 60-90 days.

Factors Affecting Purchasing Decisions

According to petitioner, "Regardless of the channel of sale, the main driver in the decision making process for U.S. customers is the price of a solar cell or panel per watt."[39] Petitioner added that despite the large increases in U.S. demand for CSPV products, U.S. producers continue to lose market share because of the low-priced imports from China and Taiwan.[40] "Thus, with the drastic collapse in market pricing caused by unfairly traded subject imports, price is effectively the only factor that matters."[41]

According to respondents, there are a variety of non-price factors that affect purchasing decisions. Respondents argue that it is due to these non-price factors that have caused SolarWorld to limit or inhibit its participation in each of the market segments.[42] During the conference, respondents reported that SolarWorld's inability to produce "Zep-compatible" modules that are used in the residential segment are inhibiting SolarWorld from competing for sales in this segment of the market.[43] Respondents also stated that, in addition to module racking systems, purchasing decisions are also based on cell count (60 versus 72-cell modules) and voltage of modules. It argues that SolarWorld is unable to compete in the utility sector because it does not offer 72-cell or 1,000 volt modules.[44] Respondents also noted warranty

[39] Petition, p. 39.

[40] Petitioner's postconference brioef, pp. 12 and 22.

[41] Petitioner's postconference brief, p. 29. Petitioner's cite to the conference transcript where SolarCity, one of the largest residential intallers, stated that "as long as the quality is consistent throughout the bidders, the lowest bidder wins." Conference transcript, p. 239 (Stanton).

[42] Conference transcript, p. 180 (Button).

[43] The Zep mounting system is a proprietary solar panel mounting system used primarily in the residential segment. One of the largest residential installers, SolarCity, began testing the Zep system in 2012 and then purchased Zep Solar in 2013. It reported that 50 percent of the residential market now uses the Zep mounting system. Conference transcript, pp. 137, 177 (Stanton).

[44] Conference transcript, p. 211 (Morrison); Chinese respondents' postconference brief, pp. 44-45.

insurance,[45] "third-party pan verified pan files", payment terms, and credit assurance as other non-price factors that affect purchasing decisions.[46]

In the previous CSPV solar investigation, purchasers were asked a variety of questions to determine what factors influence their decisions when buying CSPV cells and modules. Price and quality were cited most as being important factors in their purchase decision.[47] At least two-thirds of the responding 53 purchasers identified the following as "very important" factors: price (51 firms); quality meets industry standards (48); availability (45); reliability of supply (42); product consistency (41); warranty (38); bankability (35), and delivery time (34).[48]

Comparison of U.S.-produced and imported CSPV products

In order to determine whether U.S.-produced CSPV products can generally be used in the same applications as imports from China and Taiwan, U.S. producers and importers were asked whether the products can "always," "frequently," "sometimes," or "never" be used interchangeably. As shown in table II-7, the majority of producers and most importers reported that domestic CSPV products and CSPV products imported from China and Taiwan are "always" or "frequently" interchangeable.

[45] Conference transcript, pp. 180-181 (Stanton).

[46] Conference transcript, pp. 214-215 (Mendenhall). A pan file informs the purchaser how the module will perform over temperature and how many watts the module will produce at different temperatures and different conditions.

[47] Crystalline Silicon Photovoltaic Cells and Modules from China, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), Publication 4360, 2012, p. II-20.

[48] Crystalline Silicon Photovoltaic Cells and Modules from China, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), Publication 4360, 2012, p. II-21.

Table II-7
CSPV products: Interchangeability between CSPV products produced in the United States and in other countries, by country pairs

Country pair	Number of U.S. producers reporting				Number of U.S. importers reporting			
	A	F	S	N	A	F	S	N
U.S. vs. subject countries:								
U.S. vs. China	1	2	1	0	7	19	6	4
U.S. vs. Taiwan	1	2	1	0	5	15	8	4
Subject countries comparisons:								
China vs. Taiwan	1	2	1	0	5	16	7	4
Nonsubject countries comparisons:								
U.S. vs. nonsubject	1	1	1	0	4	14	8	2
China vs. nonsubject	1	1	1	0	5	15	9	1
Taiwan vs. nonsubject	1	1	1	0	4	13	10	1

Note.—A=Always, F=Frequently, S=Sometimes, N=Never.

Source: Compiled from data submitted in response to Commission questionnaires.

Several responding producers and importers noted the interchangeability assessment assumed compliance with UL and EST safety standards. Other factors included panel voltage, temperature co-efficient of cells, and efficiency levels. Two importers reported that there are no small panel manufacturers in the United States for stand-alone products. *** reported that U.S. producers cannot match the high power output, wattage specifications, and quality of those modules that it imports from China and Malaysia. *** reported that the U.S. producers' focus on mono-crystalline CSPV technology is not as cost or performance effective for commercial and utility projects as the polycrystalline modules that it imports from China. *** noted that U.S. producers tend to produce a product is more appropriate for residential rooftops using 60-cell mono-crystalline modules, while foreign producers tend to produce 72-cell polysilicon modules that are ideal for commercial and utility-scale applications.[49]

In addition, producers and importers were asked to assess how often differences other than price were significant in sales of CSPV products from the United States, subject, or nonsubject countries. As seen in table II-8, half of responding producers (2 of 4) and 16 of 35 importers reported that differences other than price were "sometimes" important in comparing U.S. and Chinese product and 2 producers and 17 of 35 importers reported that differences other price were "frequently" important. When comparing U.S. and Taiwan product, half of responding producers (2 of 4) and half of responding importers (16 of 31) reported that differences other than price were "sometimes" important and the remaining half of U.S. producers and 8 of 31 importers reported that differences other than price were "frequently" important.

[49] SolarWorld stated that it can produce both 60-cell and 72-cell modules; it also reported that it produces both mono-crystaline and polysilicon products. Conference transcript, pp. 62 (Brinser) and postconference brief, p. 68.

Table II-8

CSPV products: Significance of differences other than price between CSPV products produced in the United States and in other countries, by country pair

Country pair	Number of U.S. producers reporting				Number of U.S. importers reporting			
	A	F	S	N	A	F	S	N
U.S. vs. subject countries:								
U.S. vs China	0	2	2	0	4	13	16	2
U.S. vs. Taiwan	0	2	2	0	5	8	16	2
Subject countries comparisons:								
China vs. Taiwan	0	2	2	0	3	10	15	1
Nonsubject countries comparisons:								
U.S. vs. nonsubject	0	2	1	0	4	8	12	3
China vs. nonsubject	0	2	1	0	3	9	13	2
Taiwan vs. nonsubject	0	2	1	0	3	8	9	2

Note.--A = Always, F = Frequently, S = Sometimes, N = Never.

Source: Compiled from data submitted in response to Commission questionnaires.

Firms reported differences in cell type, product range (e.g. smaller modules for off-grid), availability of product, transportation network, warranty provisions, and production guarantees. One importer reported that low voltage modules (18V) for charging RV batteries are not readily available in the U.S. market. One importer reported that mono-crystalline technology is its primary focus in the U.S. market; it stated that its cell production process and module lamination process increases its overall performance, which is better than the Chinese products. It also noted that it has better esthetics than China and other manufacturers due to its full black modules.[50] Taiwan respondents contend that Taiwan's CSPV products are "advanced, high-efficiency products" which have higher conversion efficiencies and power outputs, superior design, long-term stability, and reliability. It reported that Taiwan can sell these products at a price premium and that Taiwanese products do not compete with the lower quality of products produced in China.[51]

[50] According one Taiwan producer and importer, AUO, it produces primarily mono-crystalline cells and it focuses on high efficiency products that are used in residential and commercial segments. It reported that it does not focus on polycrystalline cells because it does not want to compete with China. Conference transcript, p. 226 (Kobes). However, Taiwan producer NSP reported that most of Taiwan's production is in polycrystalline products. Conference transcript, p. 226 (Lu).

[51] Taiwan respondents' postconference brief, pp. 10 and 19.

PART III: U.S. PRODUCERS' PRODUCTION, SHIPMENTS, AND EMPLOYMENT

The Commission analyzes a number of factors in making injury determinations (see 19 U.S.C. §§ 1677(7)(B) and 1677(7)(C)). Information on the subsidies was presented in *Part I* of this report and information on the volume and pricing of imports of the subject merchandise is presented in *Part IV* and *Part V*. Information on the other factors specified is presented in this section and/or *Part VI* and (except as noted) is based on the questionnaire responses of two U.S. producers of CSPV cells, which accounted for approximately *** percent of total 2012 U.S. CSPV cell production, and 16 U.S. producers that produce CSPV modules[1], which accounted for approximately *** percent of total 2012 U.S. production of CSPV modules.[2]

U.S. PRODUCERS

The Commission sent producers' questionnaires to 134 firms identified by the Commission as possible U.S. producers or U.S. importers of CSPV cells and/or modules. The Commission received responses from five firms reporting domestic production activities during the period of investigation.[3] Of the reporting firms, two U.S. producers, petitioner SolarWorld and Suniva, reported that they produced CSPV cells in the United States and three firms, Itek, Motech, and Wanxiang, reported that they produced only CSPV modules in the United States. Both U.S. CSPV cell producers, SolarWorld and Suniva, also reported manufacturing CSPV modules.[4] Table III-1 lists U.S. producers of CSPV products, their production location(s), positions on the petition, total production, and shares of total production.

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[1]In the present CSPV solar investigation, the Commission received questionnaire submissions from five U.S. producers, which accounted for all U.S. CSPV cell production, but a minority share of U.S. CSPV module production during the period of investigation (see table III-1). Many of the U.S. producers that provided trade and financial data to the Commission in its prior CSPV solar investigation have declared bankruptcy during the period of investigation and are no longer going concerns. As trade and financial data were compiled similarly in the prior investigation, staff has consolidated the data submitted by these firms in the prior investigation into the current trade and financial databases presented in this report. The firms whose prior data are being used are: ***.

[2]Based on a comparison of U.S. producers' reported production of CSPV cells and modules in 2012 with total 2012 U.S. production of cells of 294.76 megawatts and of modules of 437.71 megawatts as reported in Energy Information Administration (EIA), Solar Photovoltaic Cell/Module Shipments Report 2012, December 2013, p. 10.

[3]The following companies reported that they did not produce CSPV products in the United States during the period of investigation: ***.

[4]In the prior CSPV solar investigations, the petitioner maintained that the domestic industry properly included both U.S. producers of CSPV cells and CSPV modules because sufficient production related activity is done in the United States for the U.S. producers of CSPV modules to be properly included into the domestic industry. It cited extensive capital investment, research, and development necessary to

(*continued*...)

Table III-1
CSPV products: U.S. producers of CSPV cells and CSPV modules, their positions on the petition, production locations, production, and shares of reported production, 2012

Firm	Production location(s)	Share of reported 2012 U.S. production	Position on petition
U.S. producers of CSPV cells			
SolarWorld[1]	Camarillo, CA Hillsboro, OR	***	Petitioner
Suniva	Norcross, GA	***	***
		100.0	
U.S. producers of CSPV modules			
Itek	Bellingham, WA	***	*** ***
Motech[2]	Newark, DE	***	***
SolarWorld[1]	Camarillo, CA Hillsboro, OR	***	Petitioner
Suniva	Norcross, GA	***	***
Wanxiang[3]	Rockford, IL	***	*** ***
U.S. producer data from prior investigation		***	
		100.0	

(…*continued*)
engage in module production. Respondents did not raise any issues with regard to this issue. The Commission determined that CSPV module assemblers did engage in sufficient production related activities to be considered members of the U.S. industry. Specifically, the Commission stated:

> *In these final investigations, no party objects to including module assemblers in the domestic industry. Based on the final record, module operations involve not-insubstantial capital expenditures, ongoing research and development ("R&D") expenses, some automation and technical expertise, and higher employment levels, albeit generally less technically skilled workers than for CSPV cell production. CSPV module operations provide lower value-added than CSPV cell manufacturing but still provide meaningful value-added; although a relatively large portion of U.S.-made CSPV modules used CSPV cells imported from non-subject or subject sources, the majority were made from domestically produced CSPV cells by the end of the POI. On balance, absent contrary argument, we again find that U.S. firms assembling CSPV cells into modules engage in sufficient production-related activities to include these firms in the domestic industry (and thus to treat their finished products as shipments of the domestic like product).*

Crystalline Silicon Photovoltaic Cells and Modules from China, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub.4360, November 2012, pp. 12-13. This issue has not been raised by any party in the current investigations.

However, in the prior investigations and in the current investigations, the petitioner argued that Motech and Suntech should be excluded from the domestic industry as related parties. *See, infra.*

[1]SolarWorld is a wholly owned subsidiary of SolarWorld AG of Bonn, Germany, a producer of CSPV cells and modules in Germany through its wholly owned subsidiaries Deutsche Cell GmbH and Solar Factory GmbH of Freiberg, Germany.
[2]Motech Americas LLC ("Motech") is a wholly owned subsidiary of Motech Industries Co., Ltd. of Tainan City, Taiwan and affiliated with Itogumi Motech of Hokkaido, Japan and Motech Suzhou New Energy of Kunshan City, China, which are also wholly owned subsidiaries of Motech Industries Co., Ltd.
[3]Wanxiang is a wholly owned subsidiary of the Wanxiang Group of Hangzhou, China.

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. PRODUCTION, CAPACITY, AND CAPACITY UTILIZATION

Numerous U.S. producers of CSPV products in these investigations and the Commission's prior CSPV solar investigations reported events that affected total U.S. capacity and production. Table III-2 lists the events that occurred during the period of investigation. Table III-3 shows a time line of when U.S. producers of CSPV cell or modules either entered or exited the U.S. market during the period of investigation.[5]

Table III-2
CSPV products: U.S. producers of CSPV cells and modules, activities affecting U.S. capacity, by date

* * * * * * *

[5]Petitioner observed that based on U.S. Energy Information Administration data, U.S. module production has decreased *** percent from 2010 to 2012 and lists of a number of U.S. firms either reducing production or declaring bankruptcy, such as (1) BP Solar (shuttered manufacturing facility and exited solar industry in 2012), (2) Solar Power Industries (sold off solar assets and exited solar industry in September 2012), (3) Siliken Manufacturing (filed for bankruptcy in January 2013), (4) Helios Solar Works suspended operations in September 2013, (5) Sharp Corp. (shuttering its U.S. production facility in 2014), (6) Schott (shuttered its U.S. manufacturing facility in 2012), (7) MX Solar (shuttered its U.S. manufacturing facility in 2012), and (8) SolarWorld (shuttered its U.S. ingot and wafer production activities in August 2013). Petitioner's postconference brief, pp. 12-13 and 32-33.

Table III-3

CSPV products: Listing of U.S. firms with CSPV production facilities opening and/or closing, 2010-January 2014

	2010		2011		2012		2013		Jan.
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	2014
1Soltech					Moved to larger module plant in TX				
Advanced Solar Photonics								Filed for bankruptcy	
Alternative Energies Kentucky			Started module production in KY						KY plant closed (not known if 1st or 2nd half 2013)
BP Solar	Announced plan to close module plant in MD								
Evergreen Solar				Closed cell and module plant in MA					
Helios				Opened module plant in WI					Halted module production
Isofoton							Module plant opened in OH		
Itek Energy					Approximate date module plant opened in WA (added equipment in 2012, 2013)				
Jetion Solar				Announced plan to open module plant in NC (as of December 2013 not yet opened)					
Kyocera	Opened module plant in CA							Layoffs at module plant in CA	
Mage Solar				Opened module plant in GA					
Mission Solar (Nexolon)								Announced plans to open module plant in TX	
Motech	Bought GE module plant in DE								
MX Solar			Opened NJ plant			Closed module plant in NJ			
NuSun		Approximate start IN module production							Intended to vacate IN plant by end of January
Schott Solar						Closed module plant in NM			
Sharp									Plan to end U.S. production by end of March
Silevo									Announed plan to open cell and module plant in NY
Solartech Renewables	Opened module plant in NY								
Silicor Materials (Calisolar)	CA cell plant open					2011: Announced downsizing cell production; 2012: Sold cell equipment			
Silicon Energy					2010: moved to larger WA manufacturing plant; 2011: Opened module plant in MN				
Siliken				Closed module plant in CA					
Solar Power Industries									Auctioned cells and module equipment from plant in PA
Solaria Corp.	Started module shipments from plant in CA								
SolarWorld							Closed module plant in CA		
Solon Corp.					2010: Opened module plant in AZ; 2011: Closed module plant in AZ				
Spectrawatt		2010: Opened cell plant in NY in the first half of the year, and closed plant in the second half							
Suniva					Added module assembly at GA plant (expanded cell production, 2010, module production, 2013)				
SunPower				Opened module plant in CA (with Flextronics)					
Suntech			Opened module plant in AZ					Closed module plant in AZ	
Taggart Solar						Announced planned KY module plant (as of Nov. 2013 not opened)			
tenKsolar			Opened module plant in MN						
Transform Solar						Announced will close ID cell plant (date of plant opening not available)			
Twin Creeks Technologies				MS cell plant open			Company liquidated		
Wanxiang	Module plant opened								
	Production capacity increase								
	Production capacity decrease								

Note: This table includes plants that opened or closed during 2010–2013, based on publicly available data, and does not include all changes in production capacity or information on the extent to which production capacity was utilized.

Source: From USITC Publication 4360 and public research material.

U.S. Producers of CSPV Cells

Of the five responding U.S. producers, two firms, the petitioner SolarWorld and Suniva, reported that they manufactured CSPV cells in the United States during the period of investigation. SolarWorld[6] and Suniva reported that they internally consume the majority of their CSPV cells in their U.S. production of CSPV modules.[7]

Data on U.S. producers of CSPV cells capacity, production, and capacity utilization are presented in table III-4. Total U.S. capacity of CSPV cells increased from 2010 to 2012 by *** percent and was higher in January-September 2013 than in January-September 2012 by *** percent. Total U.S. production of CSPV cells decreased from 2010 to 2012 by *** percent, and was lower in January-September 2013 than in January-September 2012 by *** percent. Annual capacity utilization rates for CSPV cell production ranged from *** percent in 2010 to *** percent in 2012.

Table III-4
CSPV cells: U.S. producers' production, capacity, and capacity utilization, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

U.S. Producers of CSPV Modules

Of the five responding U.S. producers, three firms, Itek, Motech, and Wanxiang, reported that they did not produce CSPV cells in the United States, but rather assembled CSPV modules using CSPV cells either transferred, purchased, or imported from another related or unrelated firm. Table III-5 lists the responding U.S. producers of CSPV modules as well as U.S. module producers that submitted data in the Commission's prior CSPV solar investigation, affiliated CSPV cell producers, and the source of their CSPV cells, by firm and country of origin.

[6]SolarWorld announced that it shuttered its U.S. ingot and wafer production activities in August 2013. Therefore, it has ceased production of ingots and wafers in the United States. Petitioner's postconference brief, p. 33 and exh. 1, p. 52.

[7]In 2012, SolarWorld reported that *** percent of its total shipments of CSPV cells were commercial sales of CSPV cells with *** percent being internally consumed to produce modules, and *** percent exported to ***. In 2012, Suniva reported that *** percent of its total shipments of CSPV cells were commercial sales, with *** percent being internally consumed to produce modules, and approximately *** percent being ***. In 2012, Suniva reported ***.

Table III-5
CSPV modules: U.S. producers of modules, affiliated firms, sources of CSPV cells, by firm and country of origin

* * * * * * *

Data on U.S. producers of CSPV modules capacity, production, and capacity utilization are presented in table III-6. Total U.S. capacity of CSPV modules increased from 2010 to 2012 by *** percent, but was lower in January-September 2013 than in January-September 2012 by *** percent. Total U.S. production of CSPV modules decreased from 2010 to 2012 by *** percent, and was lower in January-September 2013 than in January-September 2012 by *** percent. Annual capacity utilization rates for CSPV module production ranged from *** percent in 2010 to *** percent in 2012.

Table III-6
CSPV modules: U.S. producers' production, capacity, and capacity utilization, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

U.S. PRODUCERS' U.S. SHIPMENTS AND EXPORTS

As detailed in table III-7, the volume of U.S. shipments of CSPV cells increased by *** percent from 2010 to 2012, but was lower in January-September 2013 than in January-September 2012 by *** percent. The value of U.S. shipments decreased by *** percent from 2010 to 2012, and was lower in January-September 2013 than in January-September 2012 by *** percent. During the period of investigation, the vast majority of U.S. produced CSPV cells were internally consumed by their producers to manufacture CSPV modules. In 2012, U.S. producers of CSPV cells, SolarWorld and Suniva, reported that *** percent and *** percent, respectively, of their total U.S. shipments were internally consumed to produce CSPV modules.[8]

As shown in table III-8, the volume of U.S. shipments of CSPV modules increased by *** percent from 2010 to 2012, but was lower in January-September 2013 than in January-September 2012 by *** percent. The value of U.S. shipments decreased by *** percent from 2010 to 2012 and was lower in January-September 2013 than in January-September 2012 by *** percent.

[8]Suniva reported that ***.

Table III-7
CSPV cells: U.S. producers' U.S. shipments, exports shipments, and total shipments OF CELLS, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

Table III-8
CSPV modules: U.S. producers' U.S. shipments, exports shipments, and total shipments OF MODULES, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

U.S. PRODUCERS' INVENTORIES

Data on end-of-period inventories of CSPV products for the period of investigation are presented in table III-9.

Table III-9
CSPV products: U.S. producers' inventories, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

U.S. PRODUCERS' IMPORTS AND PURCHASES

*** reporting U.S. producers reported U.S. imports or purchases of imports from China or Taiwan.[9] These firms include: ***.[10] Tables III-10-12 present those firms who purchased and/or imported CSPV products from China or Taiwan during the period of investigation, the quantity of purchases and/or imports and their U.S. production.

Table III-10
CSPV products: * U.S. production, subject imports, ratio to U.S. production, 2010-2012, January-September 2012, and January-September 2013**

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[9] Petitioners claimed that two firms should be excluded from the domestic industry as related parties. These firms include: (1) Suntech and (2) Motech. Petitioner argued that these firms import CSPV cells or modules from China and/or Taiwan and have a direct interest in continuing to import unfairly traded U.S. imports. Petition, pp. 30-32; Petitioner's postconference brief, exh. 1, pp. 73-75.

Chinese respondents took no position on the issue of related parties. Chinese respondents' postconference brief, exh. 1, p. 21.

Appendix C, table C-2 presents the U.S. industry summary data excluding the trade and financial data of ***.

[10] ***.

* * * * * *

Table III-11
CSPV products: * U.S. production, subject imports, ratio to U.S. production, 2010-2012, January-September 2012, and January-September 2013**

* * * * * * *

Table III-12
CSPV products: * U.S. production, subject imports, ratio to U.S. production, 2010-2012, January-September 2012, and January-September 2013**

* * * * * * *

U.S. EMPLOYMENT, WAGES, AND PRODUCTIVITY

Data provided by U.S. producers on the number of production and related workers ("PRWs") engaged in the production of CSPV products, the total hours worked by such workers, wages paid to such PRWs, productivity, and unit labor costs during the period of investigation are presented in table III-13.

Table III-13
CSPV products: Average number of production and related workers, hours worked, wages paid to such employees, hourly wages, productivity, and unit labor costs, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

PART IV: U.S. IMPORTS, APPARENT U.S. CONSUMPTION, AND MARKET SHARES

U.S. IMPORTERS

The Commission sent U.S. importers' questionnaires to 134 firms identified by the Commission as possible U.S. producers or U.S. importers of CSPV cells and/or modules.[1] Questionnaire responses containing usable data were received from 38 firms and accounted for approximately *** percent of U.S. imports of CSPV products from China in 2012, *** percent of U.S. imports from Taiwan, and *** percent of U.S. imports from nonsubject countries.[2]

Table IV-1 lists all responding U.S. importers of CSPV products, their U.S. locations, and their quantities of imports, by source, for 2012.

[1] The following firms reported that they did not import CSPV products during the period of investigation: ***.

[2] Based on a comparison of the value of 2012 U.S. imports of CSPV cells and modules from China reported in the responses to the Commission's U.S. importer questionnaire with total landed-duty paid value of 2012 U.S. imports from China of cells and modules as reported by official Commerce import statistics (HTS 8541.40.6030 and 8541.40.6020). The percentage of U.S. imports from nonsubject countries were computed in the same manner. U.S. importers reported ***. Questionnaire data coverage percentages may be understated because the official Commerce statistics may include other products not within the scope of these investigations such as thin film solar products.

Table IV-1
CSPV products: U.S. importers by source, 2012

Importer	U.S. headquarters	Share of reported 2012 U.S. imports (percent)					
		China		Taiwan		All other sources	
		Cells	Modules[1]	Cells	Modules[1]	Cells	Modules[1]
Ameresco, Inc.	Framingham, MA	***	***	***	***	***	***
AUO Green Energy America Corp.	Milpitas, CA	***	***	***	***	***	***
BP Solar International, Inc.	Warrenville, IL	***	***	***	***	***	***
Canadian Solar USA, Inc.	San Ramon, CA	***	***	***	***	***	***
Carmanah Technologies	Victoria, BC	***	***	***	***	***	***
DMEGC Solar USA, LLC	Torrance, CA	***	***	***	***	***	***
Essco Wholesale Electric, Inc.	Chandler, AZ	***	***	***	***	***	***
ET Solar, Inc.	Pleasanton,	***	***	***	***	***	***
General Electric Company	Schenectady, NY	***	***	***	***	***	***
Grape Solar, Inc.	Eugene, OR	***	***	***	***	***	***
Hanwha SolarOne USA, Inc.	Santa Clara, CA	***	***	***	***	***	***
Hareon Solar USA, Corp.	San Jose, CA	***	***	***	***	***	***
IES Residential, Inc.	Stafford, TX	***	***	***	***	***	***
Itek Energy	Bellingham, WA	***	***	***	***	***	***
JA Solar USA, Inc.	San Jose, CA	***	***	***	***	***	***
Jiawei Technology USA, Ltd.	Hayward, CA	***	***	***	***	***	***
JinkoSolar USA, Inc.	San Francisco, CA	***	***	***	***	***	***
Lightway Solar America, Inc.	Iselin, NJ	***	***	***	***	***	***
Morgan Stanley Capital Group, Inc.	Purchase, NY	***	***	***	***	***	***
Motech Americas, LLC	Newark, DE	***	***	***	***	***	***
NextEra Energy Resources, LLC	Juno Beach, FL	***	***	***	***	***	***
Renesola America, Inc.	San Francisco, CA	***	***	***	***	***	***
RNG Group, Inc.	Chino, CA	***	***	***	***	***	***
Schuco USA, LLP	Newington, CT	***	***	***	***	***	***
Silver Ridge Power, LLC	Arlington, VA	***	***	***	***	***	***
SNJ Enterprises, LLC	Bend, OR	***	***	***	***	***	***
Solarland USA Corp.	Grayslake, IL	***	***	***	***	***	***
SolarWorld Industries America, Inc.	Hillsboro, OR	***	***	***	***	***	***
Solatube International, Inc.	Vista, CA	***	***	***	***	***	***
SUMEC North America, Inc.	The Woodlands, TX	***	***	***	***	***	***
SunEdison, LLC	Belmont, CA	***	***	***	***	***	***
Sunforce Products, Inc.	Montreal, Canada, QC	***	***	***	***	***	***
Suniva, Inc.	Norcross, GA	***	***	***	***	***	***
Sunperfect Solar, Inc.	San Jose, CA	***	***	***	***	***	***
Tri Valley Wholesale	Newark, CA	***	***	***	***	***	***
Trina Solar USA, Inc.	San Jose, CA	***	***	***	***	***	***
Wanxiang New Energy, LLC	Rockford, IL	***	***	***	***	***	***
Yingli Green Energy Americas, Inc.	New York City, NY	***	***	***	***	***	***
Total		***	***	***	***	***	***

(1) Imports of modules are presented based on the country of origin of the contained cells.
(2) Less than 0.05 percent.

U.S. IMPORT DATA AS REQUESTED IN THE COMMISSION'S U.S. IMPORTER QUESTIONNAIRE

In order to properly calculate subject U.S. imports in the present investigations, Commission staff requested that U.S. importers provide their U.S. import data subdivided into 12 categories. These categories are intended to capture both subject merchandise as defined using Commerce's country of origin rule and nonsubject imports such as CSPV cells and modules covered by the prior CSPV investigations, which are explicitly excluded from the current investigations.[3] The 12 categories were defined in the following manner:

(1) U.S. imports of cells from China
(2) U.S. imports of modules from China containing Chinese-origin cells
(3) U.S. imports of modules from China containing Taiwanese-origin cells
(4) U.S. imports of modules from China containing third-country origin cells

(5) U.S. imports of cells from Taiwan
(6) U.S. imports of modules from Taiwan containing Chinese-origin cells
(7) U.S. imports of modules from Taiwan containing Taiwanese-origin cells
(8) U.S. imports of modules from Taiwan containing third-country origin cells

(9) U.S. imports of cells from all other sources
(10) U.S. imports of modules from all other sources containing Chinese-origin cells
(11) U.S. imports of modules from all other sources containing Taiwanese-origin cells
(12) U.S. imports of modules from all other sources containing third-country origin cells

At the Commission's staff conference both petitioner and respondents were asked which categories they believed should be included in subject imports and which should be considered as U.S. imports outside the scope of these investigations. As sheen in table IV-2, although petitioner designated a number of categories that it's "two out of three" and "partially manufactured" rules would apply, both petitioner and respondents generally agreed as to the following designation of the U.S. import categories:

[3] Chinese respondents argued that the Commission's U.S. import data is flawed because of certain ambiguities in the U.S. importer questionnaire. Chinese respondents' postconference brief, pp. 9-14. Staff notes that questionnaires were drafted and sent to market participants before the Commission was fully aware of the petitioner's "two out of three" rule or an agreed upon definition of "partially manufactured" existed. These concepts originated in petitioner's January 13, 2014 submission to Commerce and were further discussed at the Commission's conference. *See Scope Issues, Part I.* Petitioner argued that the U.S. import data collected by the Commission does sufficiently divide up the data in order for the Commission to determine what is subject merchandise and what is not. Petitioner's postconference brief, exh. 1, pp. 17-20.

Table IV-2
CSPV products: Petitioner's and Chinese respondents' positions on whether categories of U.S. importers are within scope of these investigation and country of origin thereof

Category of U.S. imports	Petitioner & Respondents Agree to the Designation and Country of Origin of these U.S. Imports	Except Petitioner Would Apply its "Two out of Three" and "Partially Manufactured" Rules to These Categories
(1) U.S. imports of cells from China	Nonsubject-China (covered by prior orders)	
(2) U.S. imports of modules from China containing Chinese-origin cells	Nonsubject-China (covered by prior orders)	
(3) U.S. imports of modules from China containing Taiwanese-origin cells	Subject-Taiwan	✓ Subject-China
(4) U.S. imports of modules from China containing third-country origin cells	Nonsubject	✓ Subject-China
(5) U.S. imports of cells from Taiwan	Subject-Taiwan	
(6) U.S. imports of modules from Taiwan containing Chinese-origin cells	Nonsubject-China (covered by prior orders)	✓ Subject-Taiwan
(7) U.S. imports of modules from Taiwan containing Taiwanese-origin cells	Subject-Taiwan	
(8) U.S. imports of modules from Taiwan containing third-country origin cells	Nonsubject	✓ Subject-Taiwan
(9) U.S. imports of cells from all other sources	Nonsubject	✓ Subject-China or Taiwan
(10) U.S. imports of modules from all other sources containing Chinese-origin cells	Nonsubject-China (covered by prior orders)	
(11) U.S. imports of modules from all other sources containing Taiwanese-origin cells	Subject-Taiwan	
(12) U.S. imports of modules from all other sources containing third-country origin cells	Nonsubject	

Source: U.S. Importer Questionnaire, question II-5; Petitioner's postconference brief, exh. 1, pp. 1-7; Chinese respondents' postconference brief, pp. 4-8.

As shown in table IV-2, the parties generally agreed that as the scope is defined, there are no subject U.S. imports from China unless they are able to meet petitioner's "two out of three" and "partially manufactured" rules. With regard to the "two out of three" rule, petitioner stated that it does not know what share of third country cells are made with Chinese or Taiwanese ingots or wafers. Although unable to quantify the share, ***.[4] With regard to the "partially manufactured" rule, petitioner testified that it has observed some of these production processes being shifted from country to country.[5] Petitioner conceded, however, that there exists no information publically available that would suggest that such cell production is occurring in Taiwan on a large scale basis.[6] Respondents argued that these rules are untenable and should be ignored because they attempt to redefine the country of origin of CSPV products contrary to the country of origin rule promulgated by Commerce in its prior CSPV solar investigation.[7] Table IV-3 presents U.S. import data as collected by the Commission in the 12 categories discussed above.

Table IV-3
CSPV products: U.S. imports by categories requested in the U.S. importer questionnaire, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

[4] Foreign producer questionnaire responses of ***. According to petitioner, the "two out of three" and "partially manufactured" rules confer country of origin directly upon the module and not upon the cell. *Supplement II to Petition for the Imposition of Antidumping and Countervailing Duties: Certain Crystalline Silicon Photovoltaic Products from China and Taiwan*, January. 13, 2014, p. 2.

[5] Conference transcript, p. 104 (Brightbill).

[6] Petitioner's postconference brief, exh. 1, pp. 6-7.

[7] Petitioner does not address the potential conflict of its rules and the country of origin rule promulgated by Commerce in its prior CSPV solar investigation. For example, modules that are assembled in China using cells produced completely in Taiwan, but using ingots or wafers from China would be Chinese modules under petitioner's rules. Under Commerce's country of origin rule, the CSPV cell confers the country of origin and the country of origin of the cell in the example is Taiwan. Thus, unless the ingot or the wafer conferred country of origin to the cell (an issue which Commerce has not directly addressed in this or the prior CSPV solar investigation case, but has declined to confer country of origin to "wafers" in other semiconductor investigations), the two country of origin determinations could conflict. See Chinese respondents' postconference, exh. 10.

U.S. IMPORTS

Table IV-4 presents data for U.S. imports of CSPV products from China,[8] Taiwan, and nonsubject countries. The U.S. import data are compiled using responses to the Commission's U.S. importer questionnaire.[9] As shown, subject U.S. imports of CSPV products from China totaled *** throughout the period of investigation.[10] U.S. imports of CSPV cells from Taiwan decreased by *** percent from 2010 to 2012 and were lower by *** percent in January-September 2013 than in January-September 2012. The volume of U.S. imports from nonsubject countries of CSPV cells decreased to *** from 2010 to 2012 (after an ***), but ***. The largest sources of U.S. imports of CSPV cells from nonsubject countries in 2012 were: (1) Malaysia, (2) Singapore, (3) Japan, (4) Philippines, and (5) Germany.[11]

U.S. imports of CSPV modules from Taiwan increased by *** percent from 2010 to 2012 and were higher by *** percent in January-September 2012 than in January-September 2013. The volume of U.S. imports from nonsubject countries of CSPV modules was relatively small, but increased by *** percent from 2010 to 2012, and was higher by *** percent in January-September 2013 than in January-September 2012. The largest sources of U.S. imports of CSPV

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[8]According to Commerce's scope determination, the country of origin of a CSPV module is the country of origin of its component CSPV cells. Commerce found that the assembly of a CSPV panel did not constitute "substantial transformation" of the CSPV cell and thereby, confer country of origin onto the assembled CSPV module. *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China: Preliminary Determination of Sales at Less Than Fair Value, Postponement of Final Determination and Affirmative Preliminary Determination of Critical Circumstances*; 77 FR 31309, May 25, 2012; *See also 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, Memorandum to Gary Taverman, Acting Deputy Assistant Secretary for Antidumping and Countervailing Duty Operations*, March 19, 2012.

[9]In the preliminary phase of these investigations and the Commission's prior CSPV solar investigations, petitioner observed that the volumes reported in the official Commerce statistics under HTS 8541.40.6020 (modules) most likely report the number of modules and not the number of cells imported into the United States. This may result in quantities that when summed do not accurately reflect the total volume of imported cells. Therefore, throughout this report, U.S. import volume data are compiled using "kilowatts" compiled from U.S. importer questionnaire responses.

[10] U.S. imports from China that are subject to the existing antidumping and countervailing duty orders pursuant to the Commission's prior investigations in C*rystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012 are explicitly excluded from the scope of these investigations. After excluding these U.S. imports as nonsubject imports from China, in the present investigations, there are no subject imports from China. Thus, U.S. import data and apparent consumption data presented in Part IV of this report will show *** subject U.S. imports from China. Petitioner claimed that there may be subject imports from China using its "two out of three" or "partially manufactured" country of origin rules, but concedes that the quantity of these imports is unknown. A negligibility discussion granting petitioner's claim of existing subject U.S. imports from China is presented in *Part IV, Negligibility*.

[11] Based on data of the 2012 landed duty paid value of U.S. imports provided by Commerce.

modules from nonsubject countries in 2012 were: (1) Malaysia, (2) Mexico, (3) Philippines, (4) Germany, and (5) Japan.[12]

Table IV-4
CSPV products: U.S. imports, by origin and type, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

NEGLIGIBILITY

The statute requires that an investigation be terminated without an injury determination if imports of the subject merchandise are found to be negligible.[13] Negligible imports are generally defined in the Tariff Act of 1930, as amended, as imports from a country of merchandise corresponding to a domestic like product where such imports account for less than 3 percent of the volume of all such merchandise imported into the United States in the most recent 12-month period for which data are available that precedes the filing of the petition or the initiation of the investigation. However, if there are imports of such merchandise from a number of countries subject to investigations initiated on the same day that individually account for less than 3 percent of the total volume of the subject merchandise, and if the imports from those countries collectively account for more than 7 percent of the volume of all such merchandise imported into the United States during the applicable 12-month period, then imports from such countries are deemed not to be negligible.[14]

Citing U.S. import statistics from Commerce[15] as well as questionnaire data,[16] petitioner argued that U.S. imports from China and Taiwan are not negligible.[17] Petitioner claimed that

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[12] Based on data of the 2012 landed duty paid value of U.S. imports provided by Commerce.

[13] Sections 703(a)(1), 705(b)(1), 733(a)(1), and 735(b)(1) of the Act (19 U.S.C. §§ 1671b(a)(1), 1671d(b)(1), 1673b(a)(1), and 1673d(b)(1)).

[14] Section 771 (24) of the Act (19 U.S.C § 1677(24)).

[15] Petitioner cited unadjusted Commerce statistics to show the values of U.S. imports from China, Taiwan, and nonsubject countries without considering that a portion of U.S. imports from China are covered by the prior CSPV solar investigation and are explicitly excluded from the scope of this investigation and that rules such as petitioner's "two out of three" and "partially manufactured" rules in addition to Commerce's country of origin rule may affect the country of origin of a portion of U.S. imports. Petitioner's postconference brief, exh. 1., p. 76-77.

[16] Petitioner cited in an alternative negligibility calculation, U.S. importer questionnaire data, again, without considering that a portion of U.S. imports from China are covered by the prior CSPV solar investigation and are explicitly excluded from the scope of this investigation and that rules such as petitioner's "two out of three" and "partially manufactured" rules in addition to Commerce's country of origin rule may affect the country of origin of a portion of U.S. imports. Petitioner's postconference brief, exh. 44.

[17] By way of comparison, Chinese foreign producers reported *** kilowatts of total production of CSPV modules using CSPV cells originating in Taiwan in January-September 2013. This amounted to ***

(*continued*...)

according to unadjusted Commerce statistics, U.S. imports from Taiwan from December 2012 to November 2013 accounted for 37 percent of total U.S. imports of CSPV cells and 15 percent of CSPV modules based on value. It stated that U.S. imports from China accounted for 10 percent of total U.S. imports of CSPV cells and 30 percent of CSPV modules based on value. Using its alternative computation based on U.S. importer questionnaire data, petitioner computed that U.S. imports from Taiwan accounted for *** percent of total reported U.S. imports and U.S. imports from China accounted for *** percent. Petitioner maintained that both computation methods establish that neither U.S. imports from Taiwan nor from China are negligible.[18]

Respondents argued that according to the scope definition in these investigations, there are no subject U.S. imports from China; and therefore, U.S. imports from China are negligible.[19] As discussed above, petitioner and Chinese respondents generally agree as to which U.S. import categories are subject and which are nonsubject.[20] The parties, however, disagreed as to the application of petitioner's "two out of three" and "partially manufactured" rules. Petitioner claimed that the application of these rules would show that subject U.S. imports from China are entering the United States at levels that are not negligible.[21] Chinese respondents argued that the petitioner's rules are untenable and conflict with Commerce's country of origin rule and should therefore be discarded. Chinese respondents claimed that after the ambiguities of petitioner's rules are removed, it is clear that there are no subject U.S. imports from China; and therefore, U.S. imports from China are negligible.[22]

Table IV-5 presents total U.S. imports, by share of their U.S. import category as collected by the Commission in its U.S. importer questionnaire. As shown in table IV-2, petitioner argued that in the application of its "two out of three" and "partially manufactured" rule, potential subject U.S. imports from China may only exist in a number of U.S. import categories, namely, category (3) U.S. imports of modules from China containing Taiwanese cells, (4) U.S. imports of modules from China containing third country cells, and (9) U.S. imports of cells from third countries. Upon examination of January-September 2013 U.S. import data (the most recent period, albeit 9 months instead of 12 months, for which data are available that precedes the filing of the petition), categories (4) and (9) contain relatively small volumes, which

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(…*continued*)
percent of total Chinese production of CSPV modules during that nine-month period. Total reported U.S. imports of Chinese CSPV modules containing Taiwanese cells for the period totaled *** kilowatts.

[18] In petitioner's negligibility computations, it is assuming that all or a vast majority of U.S. imports of modules from China after 2011 were manufactured with CSPV cells originating from Taiwan given the economic incentive by Chinese module producers to evade antidumping and countervailing duties imposed by the Commission's prior CSPV solar investigation on its modules with CSPV cells of Chinese origin.

[19] Chinese postconference brief, pp. 4-8.

[20] See table IV-2.

[21] Petitioner's postconference brief, exh. 1, pp. 1-7. The petitioner conceded that it is unable to quantify what share of Taiwanese or third country cells are made with Chinese ingots or wafers. The record does show that ***. See Foreign producer questionnaire responses of ***.

[22] Chinese postconference brief, pp. 4-8.

cumulatively amount to *** percent of total U.S. imports, and thus, below the negligibility threshold. Category (3), however, contains relatively large and growing volumes, which in January-September 2013 accounted for *** percent of all U.S. imports. This amount is clearly above the negligibility threshold of 3 percent. The issue then becomes how to determine the country of origin of the category (3) imports. The application of the country of origin rule promulgated by Commerce would result in the country of origin of these modules to be Taiwan because they are manufactured with CSPV cells of Taiwanese origin. The application of the petitioner's "two out of three" rule would necessitate the examination the manufacturing process of the CSPV cell in Taiwan and ask whether the ingot or wafer was of Chinese origin. If the ingot or wafer is of Chinese origin then the country of origin of the module would be China. The application of petitioner's "partially manufactured" rule also necessitates the examination of the manufacturing process of the Taiwanese CSPV cells and if cell production commenced in China and these semifinished cells were completed in Taiwan then shipped back to China upon completion then the country of origin of the module would be China. Thus, the country of origin determination of these CSPV modules assembled in China using petitioner's rules would conflict with the country of origin determination using Commerce's rule.

If the Commission determines to apply petitioner's "two out of three"[23] rule, regardless of any potential conflict with Commerce's country of origin rule then it would become necessary to divide the data compiled for U.S. import categories (3), (4), and (9) (the shaded categories on table IV-5) based on: (1) those data that met the petitioner's rules and were therefore subject U.S. imports from China and (2) those imports that did not meet the rule requirements and would be either U.S. imports from Taiwan or nonsubject imports from a third country. Neither the Commission's U.S. importer nor foreign producer questionnaire requested that market participants quantify the volume of Taiwanese CSPV cells that were using Chinese

[23]The petitioner's "partially manufactured" rule would be impossible for the Commission to apply with data currently on the record. The Commission's questionnaires contained no inquiries to market participants that asked about the partial manufacture of CSPV cells in one country and the shipment of semifinished CSPV cells to another country. When discussed at the Commission's staff conference, petitioner conceded that "partial cell manufacturing" is currently not common in the marketplace and makes little sense commercially, but could be used to circumvent trade remedies. Petitioner's postconference brief, exh. 1, p. 3-4.

Chinese respondents argued that "partial cell manufacturing" does not occur in the marketplace and the very nature of cell production would prohibit it. They explained that cell production requires several successive steps, such as texturing, surface refinement, diffusion, etching, and vapor deposition, all of which require a "clean-room" environment. They claimed that removing a semifinished cell from these "clean-room" environments would be an expensive logistical challenge which would likely damage the cell. Chinese respondents' postconference brief, exh. 2, pp. 5-6; Conference transcript, p. 238 (Koerner)("It would be similar to when you're having a car race, stopping in the middle of the race, changing the engine, and then you go on. It doesn't really make sense from a production efficiency point of view.")

ingots or wafers during the period of investigation.[24] Therefore, Commission staff is unable to divide U.S. imports of CSPV modules from China using Taiwanese CSPV cells without speculating as to the share of those U.S. imports that actually contained Chinese ingots or wafers. If these U.S. imports cannot be divided then staff is unable to provide a specific negligibility calculation as to these imports.[25] The Commission's foreign producer questionnaire, however, did ask CSPV cell producers in Taiwan whether they used ingots or wafers from China in their manufacture of CSPV cells from Taiwan. Of the 13 responding CSPV cell producers in Taiwan ***.[26]

Table IV-5
CSPV products: U.S. imports, by share, by import category, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

CUMULATION CONSIDERATIONS

In assessing whether imports compete with each other and with the domestic like product, the Commission has generally considered four factors: (1) fungibility, (2) presence of sales or offers to sell in the same geographical market, (3) common or similar channels of distribution, and (4) simultaneous presence in the market. Issues concerning fungibility and channels of distribution are addressed in Part II of this report. With regard to geographical markets and presence in the market, the petitioner argued that imported CSPV products from China and Taiwan compete without regard to geographical location in the United States and that these imports have been simultaneously present in the U.S. market during the period of investigation. Petitioner cited to U.S. import statistics from Commerce showing that CSPV products from China and Taiwan entered through the same ports of entry with Taiwan's imports sharing 7 of the largest 10 ports of entry for Chinese imports. Monthly Commerce statistics also showed that Chinese and Taiwanese imports entered the United States monthly and were therefore simultaneous present in the U.S. market.[27]

Taiwanese respondents argued that U.S. imports of Taiwan and China should not be cumulated for three reasons. First, they argued that producers in Taiwan and China participate in different markets and service different customers. Taiwanese producers, manufacturing

[24] Staff notes that questionnaires were drafted and sent to market participants before the Commission was fully aware of the "two out of three" rule or an agreed upon definition of "partially manufactured" existed. These concepts originated in petitioner's January 13, 2014 submission to Commerce and were further discussed at the Commission's conference.

[25] The petitioner conceded that it is unable to quantify what share of Taiwanese or third country cells are made with Chinese ingots or wafers. Petitioner's postconference brief, exh. 1, pp. 1-7.

[26] See Foreign producer questionnaire responses of ***.

[27] Petitioner's postconference brief, exh. 1, pp. 78-83; Monthly U.S. import statistics and U.S. imports statistics by port of entry provided by Commerce.

primarily CSPV cells,[28] participate in the solar cell industry which services CSPV module assemblers as their customers. Chinese module assemblers, however, participate in the alternative energy market and service installers (residential and commercial), distributors, and utilities as their primary customers.[29] Second, Taiwanese respondents argued that Taiwanese CSPV cells are of such superior quality than anything produced in China because of their high conversion efficiency and advanced cell technology that they command a price premium in the global market.[30] Finally, Taiwanese respondents claimed that U.S. imports from Taiwan are not present in all geographical markets as are Chinese CSPV modules. They argued that Taiwan's sale of CSPV cells are concentrated on certain modular producers which have projects in the Northeast, Southwest, Mountain, and Pacific regions of the United States.[31]

Chinese respondents have not raised any issues with regard to cumulation of subject imports.[32]

APPARENT U.S. CONSUMPTION

Data on apparent U.S. consumption of CSPV modules[33] are presented in table IV-6. From 2010 to 2012, the quantity of apparent U.S. consumption of CSPV modules increased by *** percent and was higher by *** percent in January-September 2013 than in January-September 2012. From 2010 to 2012, the value of apparent U.S. consumption increased by *** percent, but was lower by 1.3 percent in January-September 2013 than in January-September 2012.

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[28] Taiwanese respondents claimed that 80 to 90 percent of total Taiwanese solar exports are of CSPV cells and 80 percent of Taiwanese exports to the United States are CSPV cells. Taiwanese respondents' brief, p. 4.

[29] Taiwanese respondents' postconference brief, pp. 9-12.

[30] Taiwanese respondents cited a 8-10 percent price premium on their CSPV cells over global average prices for cells. Taiwanese respondents' brief, p. 11.

[31] Ibid.

[32] Chinese respondents' postconference brief, exh. 1, p. 20-21.

[33] Throughout the main body of this report, the apparent consumption of the U.S. market and U.S. market shares are measured using the data compiled for CSPV modules. The use of solely CSPV module data addresses two potential issues of double counting. First, the vast majority of U.S. shipments of CSPV cells manufactured in the United States are internally consumed to produce CSPV modules. For example, in 2011, SolarWorld reported that *** percent of its total shipments were commercial sales of CSPV cells with *** percent being internally consumed to produce modules, and *** percent exported. Second, because U.S. shipments of imports of CSPV cells are used to produce CSPV modules in the United States, there may be double counting as the cell is counted and the module to which it is assembled. Additionally, in its determinations in the prior CSPV solar investigations, the Commission found that U.S. module assemblers engaged in sufficient production related activities to include them as part of the domestic industry and their finished products as shipments of the domestic like product even though the assemblers sometimes used imported CSPV cells to manufacture the CSPV modules.

Table IV-6
CSPV modules: U.S. shipments of domestic product, U.S. shipments of imports, and apparent U.S. consumption, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

U.S. MARKET SHARES

Data on U.S. market shares for CSPV modules are presented in table IV-7. From 2010 to 2012, U.S. producers' market share based on volume decreased by *** percentage points and by *** percentage points based on value. U.S. producers' market share based on volume was lower by *** percentage points in January-September 2013 than in January-September 2012 and lower by *** percentage points based on value. Subject U.S. imports from China were nonexistent throughout the period of investigation. U.S. imports from Taiwan increased their U.S. market share by *** percentage points from 2010 to 2012 based on volume and *** percentage points based on value. U.S. market share of U.S. imports from Taiwan based on volume was higher by *** percentage points in January-September 2013 than in January-September 2012 and higher by *** percentage points based on value. The U.S. market share of U.S. imports from nonsubject countries remained steady and small from 2010 to 2012 based on volume and value. U.S. market share of U.S. imports from nonsubject countries based on volume was higher by *** percentage points in January-September 2013 than in January-September 2012 and higher by *** percentage points based on value.

Table IV-7
CSPV modules: U.S. consumption and market shares, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

RATIO OF IMPORTS TO U.S. PRODUCTION

Table IV-8 presents data on the ratio of U.S. imports to U.S. production.

Table IV-8
CSPV products: Ratio of U.S. imports to U.S. production, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

PART V: PRICING DATA

FACTORS AFFECTING PRICES

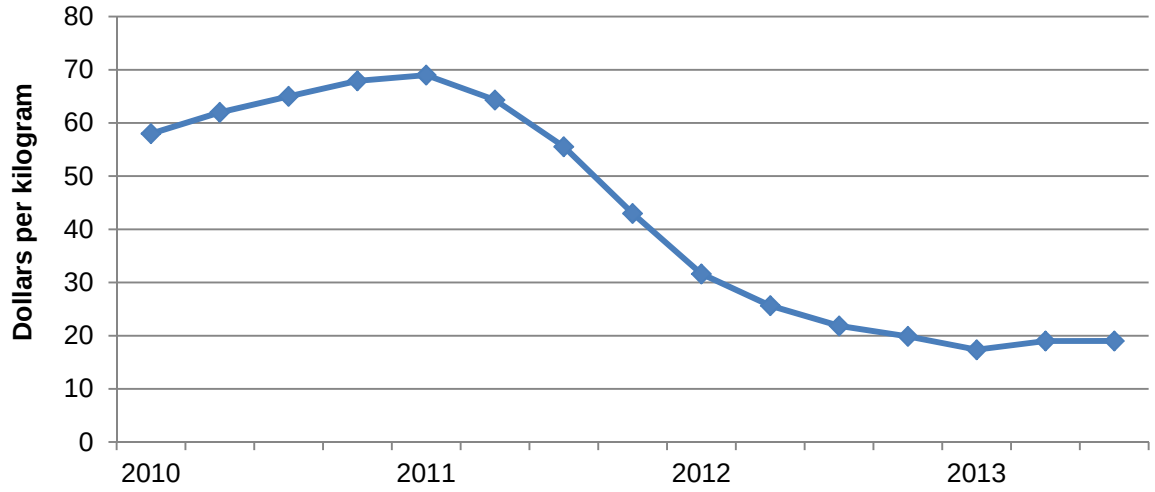
Raw material costs

Raw material costs for the production of CSPV modules (much of which are the cost of the cells) accounted for *** percent of U.S. producers' total costs of goods sold during 2012, up from *** percent in 2010. Raw material costs for the production of CSPV cells accounted for *** percent of U.S. producers' total cost of goods sold during 2012, down from *** percent in 2010. The main raw material input for CSPV cells is polysilicon (see *Part I* for additional information on the production process). The cost of polysilicon ingots and wafers substantially declined during the period; the cost of polysilicon, ingots, and wafers accounted for *** percent of U.S. producers' total cost of goods sold in 2012, down from *** percent in 2010 (see Part VI for additional information on raw material costs). According to petitioner, the costs of silver paste (used in cell production) and aluminum frames (used in module production) are dependent on the silver and aluminum commodity markets. It reported that each component comprises ***.

Polysilicon is a globally-traded commodity that serves both the solar industry and the semiconductor industry as their base material.[1] According to industry reports, the price of polysilicon fell 67.2 percent from the first quarter of 2010 to the third quarter of 2013 (figure V-1).

[1] Conference transcript, p. 63 (Brisner).

Table V-1
Quarterly price trends for polysilicon, January 2010-September 2013



Source: GTM Research Study for SEIA, "U.S. Solar Market Insight Report," 2010-2013.

Producers and importers reported varying perspectives on raw material price trends. Producer *** reported that prices have declined and that it expects prices to decrease slowly and then level off. *** reported that prices have increased due to the U.S. duties on polysilicon from China and the increased demand for the input. *** reported that price trends of raw material inputs have varied, with prices of polysilicon decreasing due to the large global supply but that it cannot price its cells and modules at levels that reflect raw material prices and other costs due to the low-priced imports of subject products. Importer *** reported that "Pricing for most raw materials used in the production of CSPV modules has generally decreased slightly over time, as raw material vendors and CSPV module manufacturers continue to look for ways to reduce the cost of installed solar power generation. For instance, suppliers of substrate (a.k.a. "backsheet") films, such as Dupont (E.I. duPont de Nemours & Co.), have reduced the thickness of their products to reduce cost, and have passed on a portion of these savings to CSPV module manufacturers. Another example is that CSPV module manufacturers have also been able to reduce the mass and dimensions of the aluminum frame used to mount CSPV modules to racking hardware without compromising on product certification and/or customer requirements, reducing cost in the process. As the pricing of rare earth elements has increased, suppliers of conductive pastes (such as German company Haraeus Materials Technology GmbH & Co. KG) and conductive ribbon (such as U.S. company Torpedo Specialty Wire Co.) have engineered their materials with less silver, without compromising the electrical characteristics of their products, further reducing the cost of these materials over time." Importer *** reported that raw material costs for polysilicon, ingots, and wafers have increased by at least 15 percent over the last two quarters. Importer *** reported that raw material costs have begun to increase and that it anticipates a gradual price increase.

U.S. inland transportation costs

Three of 5 responding U.S. producers and 26 of 35 importers reported that they typically arrange transportation to their customers. Most importers (23 of 35) reported that they shipped from their own storage facility. U.S. producers reported that their U.S. inland transportation costs ranged between 2 to 5 percent while importers reported U.S. inland transportation costs averaging between 2 to 7 percent.

PRICING PRACTICES

Pricing methods

U.S. producers and importers reported using transaction-by-transaction negotiations, contracts, price lists, and other methods such as vendor agreements and credit rebates. As presented in table V-1, U.S. producers and importers sell primarily on a transaction-by-transaction basis.

Table V-1
CSPV products: U.S. producers and importers reported price setting methods, by number of responding firms[1]

Method	U.S. producers	Importers
Transaction-by-transaction	4	25
Contract	1	17
Set price list	2	13
Other	1	4

[1] The sum of responses down may not add up to the total number of responding firms as each firm was instructed to check all applicable price setting methods employed.

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. producers reported selling most of their CSPV products through spot sales, whereas responding importers reported that their sales were split between short-term contracts and spot sales. As shown in table V-2, U.S. producers and importers reported their 2012 U.S. commercial shipments and U.S. imports of CSPV products by type of sale.

Table V-2
CSPV products: U.S. producers' and importers' shares of U.S. commercial shipments by type of sale, 2012

* * * * * * *

Sales terms and discounts

The majority of U.S. producers (4 of 5) typically quote prices on an f.o.b. basis, whereas responding importers were closely split with 16 importers selling on an f.o.b. basis and 18

selling on a delivered basis. Most U.S. producers (3 of 5) and half of responding importers (18 of 35) do not offer any type of discount. However, 2 U.S. producers and 17 importers reported offering favorable pricing for higher volume distributors and integrators and annual volume discounts. Two of 5 responding U.S. producers and 15 of 35 importers reported offering quantity-based discounts,[2] 1 producer and 9 importers reported offering volume discounts, and two importers reported offering discounts for early payments. The typical sale terms for most responding producers and importers is net 30 days; however, many firms noted that payment terms varied depending on customer's credit history and purchase volume.[3]

PRICE DATA

The Commission requested U.S. producers and importers to provide quarterly data for the total quantity and f.o.b. value of the following CSPV products shipped to unrelated U.S. customers during January 2010-September 2013.

Product 1.-- Crystalline silicon module, with a peak power wattage between 220 to 239, inclusive, P-max or Wp

Product 2.-- Crystalline silicon module, with a peak power wattage between 240 to 259, inclusive, P-max or Wp

Product 3.-- Crystalline silicon module, with a peak power wattage between 260 to 279, inclusive, P-max or Wp

Product 4.-- Crystalline silicon module, with a peak power wattage 280 to 309, inclusive P-max or Wp

Five U.S. producers and 16 importers provided usable pricing data for sales of the requested products, although not all firms reported pricing for all products for all quarters.[4] Pricing data reported by these firms accounted for approximately 54.7 percent of U.S. producers' shipments of product and 59.9 percent of imports from Taiwan during the period of investigation.

The price data were collected based on the origin of the cell. For example, product exported from China that included cells from Taiwan are classified as product of Taiwan origin; product exported from China that included cells from China are classified as product of Chinese origin. U.S. imports of CSPV products from China were assumed to be already subject to

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[2] *** reported that it offered discounts to its wholesale list price to residential and commercial installers and distributors. ***. It noted that customers are rewarded with higher discounts as their volumes increase. *** reported that it provided project-specific pricing for individual and specific projects that are below its wholesale list price. "***." ***.

[3] *** reported that its standard terms are net 30 days; however, it noted that it accepts 60 days occasionally in order to remain competitive with Chinese and Taiwanese importers.

[4] *** provided price data for product 2 from China and Taiwan; however, its data were not included due to very high unit values that would have substantially affected price trends.

AD/CVD duties; therefore, price data of imports from China are not subject to these investigations and, therefore, presented in Appendix D.[5]

Price data for products 1-4 are presented in tables V-3 to V-6 and figures V-2 to V-5. Price trend summary data are presented in table V-7.

Table V-3

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 1[1] and margins of underselling/(overselling), by quarters, January 2010-September 2013

Period	United States		Taiwan		
	Price *(per kilowatt)*	Quantity *(kilowatts)*	Price *(per kilowatt)*	Quantity *(kilowatts)*	Margin *(percent)*
2010: Jan.-Mar.	$2,088.26	9,279	$1,932.00	16	7.5
Apr.-June	1,995.46	22,975	1,862.14	92	6.7
July-Sept.	***	***	1,910.40	338	***
Oct.-Dec.	***	***	1,999.99	101	***
2011: Jan.-Mar.	***	***	1,349.60	171	***
Apr.-June	***	***	1,751.86	155	***
July-Sept.	***	***	1,375.36	175	***
Oct.-Dec.	***	***	1,015.65	798	***
2012: Jan.-Mar.	***	***	***	***	***
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***
2013: Jan.-Mar.	***	***	***	***	***
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***

[1] Product 1: Crystalline silicon module, with a peak power wattage between 220 to 239, inclusive, P-max or Wp.

Source: Compiled from data submitted in response to Commission questionnaires.

[5] See *Part IV* for further discussion of the defined scope and data compiled in response to the Commission's U.S. importer questionnaire.

Table V-4

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 2[1] and margins of underselling/(overselling), by quarters, January 2010-September 2013

Period	United States		Taiwan		
	Price *(per kilowatt)*	Quantity *(kilowatts)*	Price *(per kilowatt)*	Quantity *(kilowatts)*	Margin *(percent)*
2010:					
Jan.-Mar.	--	0	--	0	--
Apr.-June	--	0	--	0	--
July-Sept.	***	***	--	0	--
Oct.-Dec.	***	***	--	0	--
2011:					
Jan.-Mar.	***	***	--	0	--
Apr.-June	***	***	--	0	--
July-Sept.	***	***	--	0	--
Oct.-Dec.	***	***	$1,083.64	2,246	***
2012:					
Jan.-Mar.	***	***	1,021.27	5,525	***
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***
Oct.-Dec.	$837.29	65,216	***	***	***
2013:					
Jan.-Mar.	***	***	***	***	***
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***

[1] Product 2: Crystalline silicon module, with a peak power wattage between 240 to 259, inclusive, P-max or Wp.

Source: Compiled from data submitted in response to Commission questionnaires.

Table V-5

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 3[1] and margins of underselling/(overselling), by quarters, January 2010-September 2013

Period	United States		Taiwan		
	Price *(per kilowatt)*	Quantity *(kilowatts)*	Price *(per kilowatt)*	Quantity *(kilowatts)*	Margin *(percent)*
2010:					
Jan.-Mar.	--	0	***	***	--
Apr.-June	--	0	***	***	--
July-Sept.	--	0	***	***	--
Oct.-Dec.	--	0	***	***	--
2011:					
Jan.-Mar.	--	0	***	***	--
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***
2012:					
Jan.-Mar.	***	***	***	***	***
Apr.-June	$1,072.26	3,403	***	***	***
July-Sept.	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***
2013:					
Jan.-Mar.	***	***	***	***	***
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***

[1] Product 3: Crystalline silicon module, with a peak power wattage between 260 to 279, inclusive, P-max or Wp.

Source: Compiled from data submitted in response to Commission questionnaires.

Table V-6

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 4[1] and margins of underselling/(overselling), by quarters, January 2010-September 2013

Period	United States		Taiwan		
	Price *(per kilowatt)*	Quantity *(kilowatts)*	Price *(per kilowatt)*	Quantity *(kilowatts)*	Margin *(percent)*
2010:					
Jan.-Mar.	--	0	--	0	--
Apr.-June	***	***	--	0	--
July-Sept.	***	***	--	0	--
Oct.-Dec.	***	***	--	0	--
2011:					
Jan.-Mar.	***	***	--	0	--
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***
2012:					
Jan.-Mar.	***	***	***	***	***
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***
2013:					
Jan.-Mar.	***	***	***	***	***
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***

[1] Product 4: Crystalline silicon module, with a peak power wattage 280 to 309, inclusive P-max or Wp.

Source: Compiled from data submitted in response to Commission questionnaires.

Figure V-2

CSPV products: Weighted-average prices and quantities of domestic and imported product 1, by quarters, January 2010-September 2013

* * * * * * *

Figure V-3

CSPV products: Weighted-average prices and quantities of domestic and imported product 2, by quarters, January 2010-September 2013

* * * * * * *

Figure V-4

CSPV products: Weighted-average prices and quantities of domestic and imported product 3, by quarters, January 2010-September 2013

* * * * * * *

Figure V-5

CSPV products: Weighted-average prices and quantities of domestic and imported product 4, by quarters, January 2010-September 2013

* * * * * * *

Price trends

Prices steadily decreased during January 2010-September 2013.[6] These large price decreases occurred in all four price products. Table V-7 summarizes the price trends, by country and by product. As shown in the table, domestic price decreases ranged from *** percent to *** percent during January 2010-September 2013 while import price decreases ranged from *** percent to *** percent.

Table V-7

CSPV products: Summary of weighted-average f.o.b. prices for products 1-4 from the United States and Taiwan

* * * * * * *

Price comparisons

As shown in table V-8, prices for CSPV products imported from Taiwan were below those for U.S.-produced product in *** instances; margins of underselling ranged from *** percent. In the remaining *** instances, prices for CSPV products from Taiwan were between *** percent above prices for the domestic product.

[6] Respondents argue that the declining prices of CSPV modules are caused by four factors: falling polysilicon prices; low natural gas prices; competition with thin-film technology; and reduced government subsidies and incentives. Conference transcript, pp. 118-122 (Button). Chinese respondents' postconference brief, pp. 35-36.

Table V-8

CSPV products: Instances of underselling/overselling and the range and average of margins, by product, January 2010-September 2013

* * * * * * *

Respondents question the representativeness of the selected pricing products and data. They argue that technical characteristics (cell efficiency, cell count, and voltage), as well as the market segment into which the module is sold (residential, commercial, or utility), also affect the price of the product. Respondents contend that mono-crystalline modules are higher priced than polycrystalline modules due to their higher efficiencies as well as their higher production costs. Respondents argue that mono-crystalline products command a price premium over multi-crystalline products, and therefore, the price gap cannot be interpreted as underselling. Chinese respondents argue that modules sold into the utilities sector tend to be lower-priced than modules sold into the residential and commercial sectors, primarily because prices are determined by and sensitive to sales volumes.[7]

However, the petitioner argues that CSPV products are sold on the basis of wattage, and domestic and foreign producers compete on the basis of per-watt price. It stated that, while there should be a modest price premium for mono-crystalline modules, selling at that premium is not possible due to the set pricing of subject imports. It contends that currently there is no cost advantage to using either mono-crystalline or multi-crystalline cells due to the imports of Chinese and Taiwanese CSPV products and it argues that they should not be differentiated as separate pricing products.[8] The petitioner argues that CSPV producers do not track prices based on efficiency, particularly in light of constantly changing efficiencies due to technology advances. It also argues that there is no difference between module pricing in the three market segments, rather, it's the total system costs that may vary across market segments. It notes that while larger projects may receive quantity discounts due to the substantial volumes required for such projects, there are no significant differences in module pricing across market segments.[9]

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[7] Conference transcript, pp. 123-124 (Button); and Chinese respondents' postconference brief, pp. 12 and 34.

[8] SolarWorld reported that it produces both mono- and multi-crystalline cells. It reported that ***. In addition, SolarWorld stated that there is a small production cost difference between mono- and multi-crystalline modules; however, this cost difference is offset on a per watt-peak basis because mono-crystalline modules are higher in power than multi-crystalline modules. It reported that ***. Petitioner's postconference brief, pp. 34-35.

[9] Petitioner's postconference brief, pp. 18-19.

LOST SALES AND LOST REVENUE

The Commission requested U.S. producers of CSPV products to report any instances of lost sales or revenue they experienced due to competition from imports of CSPV products from China since January 1, 2010. Of the five responding U.S. producers, three reported that they had to either reduce prices or roll back announced price increases. The *** lost sales allegations, involving *** purchasers, totaled $10,389,500 and involved 15,007,760 watts of CSPV modules. [10] Staff contacted seven purchasers, and a summary of the information obtained follows (table V-9).[11]

Purchasers responding to the lost sales allegations also were asked whether they shifted their purchases of CSPV products from U.S. producers to suppliers of CSPV products from China since 2011. In addition, they were asked whether U.S. producers reduced their prices in order to compete with suppliers of CSPV products from China. *** responding purchasers reported that they had shifted purchases of CSPV products from U.S. producers to subject imports since 2011. *** purchasers reported that the U.S. producers had reduced their prices in order to compete with the prices of subject imports since 2011.

Table V-9
CSPV products: U.S. producers' lost sales allegations

* * * * * * *

[10] *** did not provide lost revenue allegations. However, it did report that it has had to reduce its prices because of lower-priced imports from China and Taiwan. ***.

[11] Lost sales included *** allegations for firms without fax numbers. Staff contacted these firms by email and requested responses to the general questions only. Information about the specific lost sales allegations were not included because email communication would not provide adequate protection for the BPI data associated with sales-specific details.

PART VI: FINANCIAL EXPERIENCE OF U.S. PRODUCERS

BACKGROUND

CSPV cell and module financial results, as presented in this section of the report, are divided into the following categories: cell operations (commercial sales and transfers) and module operations.[1]

The financial results on U.S. cell operations represent two companies: Suniva and SolarWorld.[2] With regard to U.S. module operations, the financial results presented in this section include five U.S. producers that submitted U.S. producer questionnaire responses in the current CSPV products investigation, as well as the financial results of ten U.S. producers that submitted usable U.S. producer questionnaire responses in the Commission's previous CSPV solar products investigation.[3]

As described in Part III of this report, a number of U.S. producers effectively began their operations during the period examined. Entry into the market, in general, involved initial investments in capacity and in some cases subsequent expansion, as well as closure and/or restructuring of existing capacity. As also described previously, a number of U.S. producers effectively exited the market with Evergreen being the *** in terms of company-specific module sales reported to the Commission. While not directly impacting Solar World's U.S. cell and module operations, the majority of the company's shareholders formally approved a financial restructuring plan in August 2013 which was subsequently court approved in mid-January 2014.[4] As noted below, SolarWorld's U.S. cell and module operations have undergone various operational restructurings which were not directly related to the above-referenced financial restructuring of the parent company.

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[1] The majority of U.S. producers reported their annual financial results based on calendar-year periods. Kyocera and Sharp (reporting on the basis of March-ending fiscal years) were the exceptions. Similarly, the majority of U.S. producers reported their financial results on the basis of U.S. generally accepted accounting principles (GAAP). SolarWorld and Solon were the exceptions and reported their financial results on the basis of International Financial Reporting Standards (IFRS).

[2] ***. USITC auditor preliminary-phase notes.

[3] *** submitted usable U.S. producer questionnaire responses in the current CSPV solar products investigation. The financial results of ***, which submitted usable financial results in the previous CSPV solar products investigation, are also included in the financial results presented in this section of the report. See Part III of this report regarding the current status of these producers.

With respect to financial results based on the Commission's previous CSPV solar products investigation specifically, the relevant overlapping period represents full year 2010 and 2011 and first half 2012. Accordingly, for items in table VI-3 such as sales volume and value, as well as other corresponding financial information, period-to-period changes in absolute amounts between full-year 2011 and 2012, and between interim 2012 and interim 2013, are likely overstated to some extent due to the absence of complete full-year 2012, interim 2012, and interim 2013 financial information for U.S. producers who continued to have operations during those periods.

[4] Conference transcript, pp.89-90 (Brinser). Petitioner's postconference brief, Exhibit 1, p. 62. ***. Ibid.

OPERATIONS ON CSPV CELLS AND MODULES

Table VI-1 and table VI-2, respectively, present income-and-loss data for operations on cells (commercial sales and transfers) and a corresponding variance analysis.[5] Income-and-loss data for operations on modules are presented in table VI-3. For reasons specified in footnote 6, a variance analysis of module financial results is not presented in this section of the report.[6]

Revenue

As described in Part III of this report, the majority of cell production is consumed by SolarWorld and Suniva in their own downstream module operations.[7] With regard to commercial sales and transfers of cells, i.e., the level of activity presented in table VI-1, total sales volume fluctuated during the full-year period and then was higher in interim 2013 compared to interim 2012. For both SolarWorld and Suniva cell *** generally represented the majority of commercial sales and transfers. SolarWorld's ***.

For the reasons described in footnote 3, the pattern of module sales volume is somewhat more difficult to interpret. With respect to the five U.S. producers that submitted U.S. producer questionnaires in the current investigation, overall module sales volume reached

[5] The Commission's variance analysis is calculated in three parts: sales variance, cost of goods sold (COGS) variance, and selling, general and administrative (SG&A) expenses variance. Each part consists of a price variance (in the case of the sales variance) or a cost variance (in the case of the COGS and SG&A expenses variances) and a volume (quantity) variance. The sales or cost variance is calculated as the change in unit price/cost times the new volume, while the volume variance is calculated as the change in volume times the old unit price/cost. Summarized at the bottom of table VI-2, the price variance is from sales, the cost/expense variance is the sum of those items from COGS and SG&A, respectively, and the net volume variance is the sum of the price, COGS, and SG&A volume variances.

A stable overall product mix generally enhances the utility of the Commission's variance analysis. In addition to underlying changes due to cell innovation and normal gains in efficiency, some period-to-period variations in product mix would generally be expected. With regard to cell operations (commercial sales and transfers) and the table VI-2 variance analysis, information submitted to the Commission does not indicate that there were any substantial changes in product mix during the period examined. USITC auditor preliminary-phase notes.

[6] While financial ratios and average unit values can provide a useful indication of the industry's financial condition with respect to module operations, a variance analysis would not be meaningful because changes in absolute amounts (e.g., total sales volume and value, COGS, and SG&A expenses) are to some extent overstated between full-year 2011 and 2012 and between interim 2012 and interim 2013 (see footnote 3). Staff therefore believes that a variance analysis of module financial results should not be presented.

[7] However, this was not the case for *** when the company's export sales volume exceeded its internal consumption.

Table VI-1
CSPV Cells (commercial sales and transfers): Results of operations of U.S. firms, 2010-12, January-September 2012, and January-September 2013

* * * * * * *

Table VI-2
CSPV Cells (commercial sales and transfers): Variance analysis of U.S. firms' operations, 2010-12, January-September 2012, and January-September 2013

* * * * * * *

Table VI-3
CSPV Modules: Results of operations of U.S. firms, 2010-12, January-September 2012, and January-September 2013

* * * * * * *

its highest level in 2011 and then declined somewhat in 2012. As shown in table VI-3, overall module sales volume was at its highest level in 2010 and subsequently declined.

For cell and module operations, average sales value declined throughout the period (see table VI-1 and table VI-3) with each reporting notably large declines between 2011 and 2012: (*** percent lower for cells and *** percent lower for modules). This similarity diverged somewhat during the interim period with average module sales value *** percent lower in interim 2013 compared to interim 2012, while average cell sales value was *** percent lower. The lower percentage decline in average module sales value at the end of the period, as compared to the previous percentage declines, is generally consistent with a SolarWorld company official's statement that, after duties were imposed pursuant to the previous CSPV solar products investigation, the "pricing collapse" slowed somewhat.[8]

At least directionally, declines in average cell and module sales values correspond with period-to-period declines in average raw material costs (see *Cost of goods sold and gross profit (loss) section of this report*). Nonetheless, for both cells and modules the share of raw material costs to sales remained at what can be characterized as high levels throughout the period: for cell operations total raw material cost as a share of total sales reached *** percent in 2011 and for module operations was *** percent in 2012 (see table VI-1 and table VI-3).

Cost of goods sold and gross profit or (loss)

For both cell and module operations, raw material cost was the single largest component of COGS throughout the period and was at its highest level for cell operations in 2010 (*** percent of COGS) and for module operations in 2011 (*** percent of COGS). While the share of COGS accounted for by total raw material cost did not change substantially for

[8] Conference transcript, pp. 73-74 (Brinser).

either cell or module operations, underlying raw material components were not static. For cell operations specifically, the polysilicon, ingot, and wafer component declined notably as a share of total COGS, while all other raw material costs increased.[9] With regard to module operations, supplemental information for interim 2013 indicates that internally produced cells, at *** percent, were the largest single component of total module raw material costs. In general, this appears to be consistent with the large share of U.S. module activity accounted for by integrated producers SolarWorld and Suniva at the end of the period.[10] In contrast, supplemental information submitted in the previous CSPV solar products investigation indicated that in 2010 purchased cells accounted for a somewhat larger share of total module raw material costs (*** percent) compared to internally produced cells (*** percent).[11] As the above indicates, module raw material costs presented in table VI-3 were not homogenous from period-to-period, but instead were a changing composite of internally-produced cells (in which the underlying raw material cost itself reflects various combinations of polysilicon, ingot, wafers, and other cell-related raw material costs), cells purchased from related and unrelated parties, other relevant module-related raw material costs, and partially manufactured modules.[12]

Other factory costs and direct labor were the second and third largest components of COGS for both cell and module operations. While the share of cell other factory costs to total COGS increased somewhat during the full-year period and then was lower in interim 2013 compared to interim 2012 (see table VI-1), the share of module other factory costs to total COGS declined throughout the period (see table VI-3). While a number of factors can be presumed to impact the relative level of cell other factory costs (e.g., on-going expansion activity and subsequent operational restructuring), it can be noted that cell sales volume was higher in interim 2013 compared to interim 2012. This in turn would generally result in increased fixed cost absorption and thus, to some extent, a decline in relative other factory costs. Also and as indicated in footnote 15, SolarWorld suspended its ingot and wafer production during interim 2013. Prospectively, this closure could be expected to eliminate (or substantially reduce) the other factory costs associated with this part of the company's operations.

With regard to module operations, the higher level of other factory costs in 2010 and subsequent decline in 2011, in large part, reflects Evergreen. In 2010, Evergreen was in the process of attempting to shift its cell and module operations from the United States to China

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[9] ***. USITC auditor preliminary-phase notes.

[10] Ibid.

[11] USITC auditor final-phase notes for Inv. Nos. 701-TA-481 and 731-TA-1190. Both sets of supplemental information should be considered estimates of the relative shares of internally produced cells and purchased cells to total module raw material costs; e.g., 2010 supplemental information did not include companies such as *** that did not respond to the Commission's final-phase U.S. producer questionnaire in the previous CSPV solar products investigation. As such, the relative importance of internally produced cells was likely somewhat greater in 2010 than the above-referenced percentage indicates.

[12] SolarWorld suspended its own ingot and wafer production in interim 2013 which further illustrates the changing nature of underlying raw material costs (see footnote 15).

and then subsequently ceased all U.S. operations in the first quarter of 2011. As noted below, SolarWorld restructured various parts of its U.S. operations in an effort to reduce costs. At least to some extent, these restructuring efforts likely impacted (directly or indirectly) the relative level of other factory costs of both cell and module operations.

As shown in table VI-1 and table VI-3, cell average COGS declined throughout most of the period and module average COGS declined throughout the entire period. In addition to primary manufacturing costs (i.e., raw material costs, direct labor, and other factory costs), COGS also includes the recognition of items such as lower of cost or market raw material and product inventory valuation adjustments, severance and shut-down costs, and to a lesser extent asset impairments.[13] With respect to SolarWorld and its efforts to reduce costs, the company noted that cost reductions included the direct elimination of facility and personnel expenses, as well as changes related to input usage and manufacturing; e.g., ***.[14] With regard to the elimination of facilities, shutdown costs specific to SolarWorld's cell operations would include the closure of its high volume ingot and wafer production facility during interim 2013.[15]

Cell and module operations generated marginal gross profit ratios (the ratio of total gross profit to total revenue) in 2010, essentially just above breakeven, followed by gross loss ratios of varying magnitudes for the rest of the period (see table VI-1 and table VI-3). In general, the subsequent expansion and contraction of gross loss ratios for both cell and module operations reflects the extent to which declines in average sales value did or did not exceed corresponding declines in average COGS.

SG&A expenses and operating income or (loss)

Given that cell and module operations generated only marginal gross profit in 2010 and then gross losses of varying magnitudes throughout the rest of the period, the presence of SG&A expenses by default resulted in operating losses for both sets if activity.

With respect to cell operations, the increase in SG&A expenses in 2011 is largely due to ***.[16] With respect to module operations, the higher level of SG&A expenses in 2011, in part, reflects ***.

Large non-recurring items not already reflected in COGS and/or SG&A expenses were included in cell and module "other expenses" and therefore did not directly impact the

---

[13] As reported to the Commission, notably large asset impairments were classified by U.S. producers as either SG&A expenses or "other expenses" (see note 1 to table VI-1 and note 2 to table VI-3). The most substantial inventory valuation adjustments were reportedly recognized in 2011 and included in COGS. Pursuant to GAAP and IFRS, U.S. producers are required to recognize losses immediately when balance sheet costs assigned to inventory exceed market or net realizable values, respectively.

[14] Petitioner's postconference brief, Exhibit 1, p. 53.

[15] Ibid. A SolarWorld company official indicated at the staff conference that the company's U.S. ingot and wafer operations could be restarted and that in essence current pricing and volumes were such that it was more cost effective to source these inputs from a related firm. Conference transcript, p. 91 (Dulani) and pp. 93-94. ***. SolarWorld U.S. producer questionnaire response to question III-7.

[16] ***. USITC auditor preliminary-phase notes.

industry's operating results (see note 2 to table VI-1 and table VI-3). In general, the most significant non-recurring items included in "other expenses" were fixed asset impairments.[17]

CAPITAL EXPENDITURES AND RESEARCH AND DEVELOPMENT EXPENSES

Data on capital expenditures and research and development (R&D) expenses related to cells and modules, respectively, are presented in table VI-4.

Table VI-4
CSPV Cells and Modules: Capital expenditures and research and development expenses, by firm, 2010-12, January-September 2012, January-September 2013

* * * * * * *

For both cell and module operations, total capital expenditures were at their highest levels in 2010. With regard to cell operations, the decline in 2011 (in large part reflecting the completion of ***) was followed by an increase in 2012 which was ***. In contrast, *** were at their highest level in 2010 and subsequently remained at relatively low levels throughout the rest of the period.

With respect to the five producers that submitted a U.S. producer questionnaire response in the current CSPV solar products investigation, declines in module-specific capital expenditures were reported throughout the full-year period (***) and were somewhat higher in interim 2013 (***) compared to interim 2012 (***). As shown in table VI-4, the decline in overall module capital expenditures was relatively large between 2010 and 2011 followed by continued declines throughout the period. (Note: As indicated previously and with respect to overall module operations, the absolute declines between 2011 and 2012, and between interim 2012 and interim 2013, are likely overstated to some extent (see footnote 3)).

The R&D expenses for cell operations, ***. Similarly and when considering the five producers that submitted U.S. producer questionnaires in the current CSPV solar products investigation, R&D expenses for module operations increased somewhat during the full-year

[17] To the extent that SolarWorld reported its financial results on the basis of IFRS, as opposed to GAAP, it should be noted that IFRS and GAAP differ on some points regarding how impairments are recognized; e.g., under IFRS, impairment charges for assets not held for sale can be reversed while reversal is not allowed under GAAP. Nonetheless, the underlying concept of impairment is basically the same under both accounting systems: "{t}he condition that exists when a long-lived asset's carrying amount is not expected to be recoverable over the remainder of its expected life." Wiley GAAP 2012, p. 434.

period (from ***) compared to interim 2012 (***).[18] When considering the overall R&D expenses shown in table VI-4, the ***.[19]

CAPITAL AND INVESTMENT

The Commission requested that U.S. producers describe any actual or potential negative effects of imports of CSPV cells and/or modules from China and/or Taiwan on their firms' growth, investment, ability to raise capital, development and production efforts, or the scale of capital investments. The responses of the U.S. producers that submitted U.S. producer questionnaire responses in the current CSPV solar product investigation are presented below.

Actual negative effects

Itek Energy	***.
Motech	***.
SolarWorld	***.
Suniva	***.
Wanxiang	***.

Anticipated negative effects

Itek Energy	***.
Motech	***.
SolarWorld	***.
Suniva	***.
Wanxiang	***.

[18] ***. As described by the company, "{o}ver the POI {period of investigation}, SolarWorld has ***, and, in the *** . . . {r}eductions in R&D included the ***, as well as the ***. Petitioner's postconference brief, Exhibit 1, pp. 53-54.

[19] *** were generally consistent with the R&D expenses reported in the company's public financial statements. Evergreen 2010 10-K, p. 34. As described by Evergreen, "{r}esearch and development expenses consist primarily of salaries and related personnel costs, including stock based compensation costs, consulting expenses and prototype costs related to the design, engineering, development, testing and enhancement of our products, manufacturing equipment and manufacturing technology." Evergreen 2010 10-K, p. 41. To the extent that the company also referenced its expansion of R&D initiatives in China (Evergreen 2010 10-K, p. 10), it appears reasonable to conclude that the R&D expenses reported to the Commission by Evergreen were not limited to just those directly supporting its U.S. operations.

PART VII: THREAT CONSIDERATIONS AND INFORMATION ON NONSUBJECT COUNTRIES

Section 771(7)(F)(i) of the Act (19 U.S.C. § 1677(7)(F)(i)) provides that—

> *In determining whether an industry in the United States is threatened with material injury by reason of imports (or sales for importation) of the subject merchandise, the Commission shall consider, among other relevant economic factors*[1]*--*
>
> *(I) if a countervailable subsidy is involved, such information as may be presented to it by the administering authority as to the nature of the subsidy (particularly as to whether the countervailable subsidy is a subsidy described in Article 3 or 6.1 of the Subsidies Agreement), and whether imports of the subject merchandise are likely to increase,*
>
> *(II) any existing unused production capacity or imminent, substantial increase in production capacity in the exporting country indicating the likelihood of substantially increased imports of the subject merchandise into the United States, taking into account the availability of other export markets to absorb any additional exports,*
>
> *(III) a significant rate of increase of the volume or market penetration of imports of the subject merchandise indicating the likelihood of substantially increased imports,*
>
> *(IV) whether imports of the subject merchandise are entering at prices that are likely to have a significant depressing or suppressing effect on domestic prices, and are likely to increase demand for further imports,*
>
> *(V) inventories of the subject merchandise,*

---

[1]Section 771(7)(F)(ii) of the Act (19 U.S.C. § 1677(7)(F)(ii)) provides that "The Commission shall consider {these factors} . . . as a whole in making a determination of whether further dumped or subsidized imports are imminent and whether material injury by reason of imports would occur unless an order is issued or a suspension agreement is accepted under this title. The presence or absence of any factor which the Commission is required to consider . . . shall not necessarily give decisive guidance with respect to the determination. Such a determination may not be made on the basis of mere conjecture or supposition."

(VI) the potential for product-shifting if production facilities in the foreign country, which can be used to produce the subject merchandise, are currently being used to produce other products,

(VII) in any investigation under this title which involves imports of both a raw agricultural product (within the meaning of paragraph (4)(E)(iv)) and any product processed from such raw agricultural product, the likelihood that there will be increased imports, by reason of product shifting, if there is an affirmative determination by the Commission under section 705(b)(1) or 735(b)(1) with respect to either the raw agricultural product or the processed agricultural product (but not both),

(VIII) the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the domestic like product, and

(IX) any other demonstrable adverse trends that indicate the probability that there is likely to be material injury by reason of imports (or sale for importation) of the subject merchandise (whether or not it is actually being imported at the time).[2]

Information on the nature of the alleged subsidies was presented earlier in this report; information on the volume and pricing of imports of the subject merchandise is presented in *Parts IV* and *V*; and information on the effects of imports of the subject merchandise on U.S. producers' existing development and production efforts is presented in *Part VI*. Information on inventories of the subject merchandise; foreign producers' operations, including the potential for "product-shifting;" any other threat indicators, if applicable; and any dumping in third-country markets, follows. Also presented in this section of the report is information obtained for consideration by the Commission on nonsubject countries.

[2]Section 771(7)(F)(iii) of the Act (19 U.S.C. § 1677(7)(F)(iii)) further provides that, in antidumping investigations, ". . . the Commission shall consider whether dumping in the markets of foreign countries (as evidenced by dumping findings or antidumping remedies in other WTO member markets against the same class or kind of merchandise manufactured or exported by the same party as under investigation) suggests a threat of material injury to the domestic industry."

THE INDUSTRY IN CHINA

The Commission received questionnaire responses from 28 producers of CSPV cells in China, which accounted for approximately *** percent[3] of total 2012 production of CSPV cells in China.[4] These firms are identified in table VII-1 along with each firms' cell capacity, production, and export shipment data. The Commission also received questionnaire responses from 51 producers of CSPV modules in China, which accounted for approximately *** percent[5] of total 2012 production of CSPV modules in China. These firms are identified in table VII-2 along with each firms' module capacity, production, and export shipment data.

[3] Based on total Chinese CSPV cell production in 2012 of *** megawatts reported in ***.

[4] China is estimated to have approximately 500 solar manufacturers. Conference transcript, p. 189 (Weiner); Petitioner claimed that Chinese respondents account for approximately *** percent of total Chinese capacity. Petitioner's postconference brief, pp. 18 and 24.

[5] Based on total Chinese CSPV module production in 2012 of *** megawatts reported in ***. The coverage percentage may be understated because *** reported total production data includes Chinese thin film production. Thin film production in China, however, is a relatively small percentage of its total production.

Table VII-1
CSPV cells: Reporting producers of CSPV CELLS in China, capacity, production, share of reported production, capacity utilization, exports to the United States, and share of exports to the United States, by firm, 2012

Firm	Share of reported production (percent)	Capacity (kilowatts)	Production (kilowatts)	Capacity utilization (percent)	Exports to the United States (kilowatts)	Total shipments (kilowatts)	Share of firm's total shipments exported the United States (percent)
Canadian Solar, Inc.	***	***	***	***	***	***	***
Changzhou Trina Solar Energy Co., Ltd.	***	***	***	***	***	***	***
CNBM International Corp.	***	***	***	***	***	***	***
CSGPVTech Co., Ltd.	***	***	***	***	***	***	***
Econess Energy Co., Ltd.	***	***	***	***	***	***	***
Eoplly New Energy Technology Co., Ltd.	***	***	***	***	***	***	***
ET Soalr Industry, Ltd.	***	***	***	***	***	***	***
Hangzhou Zhejiang University Sunny Energy Science and Technology Co., Ltd.	***	***	***	***	***	***	***
Hanwha SolarOne (Qidong) Co., Ltd.	***	***	***	***	***	***	***
Hareon Solar Technology Co., Ltd.	***	***	***	***	***	***	***
Hengdian Group DMEGCMagnetics Co., Ltd.	***	***	***	***	***	***	***
Jiangsu Aide Solar Energy Technology Co., Ltd.	***	***	***	***	***	***	***
JiangziRisun Solar Energy Co., Ltd.	***	***	***	***	***	***	***
Jinko Solar Co., Ltd.	***	***	***	***	***	***	***
LDK Solar Hi-Tech (Nanchang) Co., Ltd.	***	***	***	***	***	***	***
Lightway Green New Energy Co., Ltd.	***	***	***	***	***	***	***
Ningbo MaxsolarCo.,Ltd.	***	***	***	***	***	***	***
Realforce Power Co., Ltd.	***	***	***	***	***	***	***
ReneSola Jiangsu, Ltd.	***	***	***	***	***	***	***
Shanghai JA Solar Technology Co., Ltd.	***	***	***	***	***	***	***
Solargiga Energy Holdings, Ltd.	***	***	***	***	***	***	***
Sun Earth Solar Power Co., Ltd.	***	***	***	***	***	***	***
Suzhou Suncome Solar Science & Technology Co., Ltd.	***	***	***	***	***	***	***
Tainergy Tech (Kunshan) Co., Ltd.	***	***	***	***	***	***	***
Wuxi Suntech Power Co., Ltd.	***	***	***	***	***	***	***
Years Solar Co., Ltd.	***	***	***	***	***	***	***
Yingli Green Energy Holding Co., Ltd.	***	***	***	***	***	***	***
ZhongliTalesun Solar Co., Ltd.	***	***	***	***	***	***	***
Total	***	***	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Table VII-2
CSPV modules: Reporting producers of CSPV MODULES in China, capacity, production, share of reported production, capacity utilization, exports to the United States, and share of exports to the United States, by firm, 2012

Firm	Share of reported production (percent)	Capacity (kilowatts)	Production (kilowatts)	Capacity utilization (percent)	Exports to the United States (kilowatts)	Total shipments (kilowatts)	Share of firm's total shipments exported the United States (percent)
Canadian Solar, Inc.	***	***	***	***	***	***	***
Changzhou Almaden Co., Ltd.	***	***	***	***	***	***	***
Changzhou Trina Solar Energy Co., Ltd.	***	***	***	***	***	***	***
Cixi City Rixing Electronics Co., Ltd.	***	***	***	***	***	***	***
CNBM International Corp.	***	***	***	***	***	***	***
CSGPVTech Co., Ltd.	***	***	***	***	***	***	***
Dongguan Sunworth Solar Energy Co., Ltd.	***	***	***	***	***	***	***
Econess Energy Co., Ltd.	***	***	***	***	***	***	***
Eoplly New Energy Technology Co., Ltd.	***	***	***	***	***	***	***
ET Soalr Industry, Ltd.	***	***	***	***	***	***	***
German Solar Asia Co., Ltd.	***	***	***	***	***	***	***
Guangzhou Sumyok Solar Power Technology Co., Ltd.	***	***	***	***	***	***	***
Hangzhou Zhejiang University Sunny Energy Science and Technology Co., Ltd.	***	***	***	***	***	***	***
Hanwha SolarOne (Qidong) Co., Ltd.	***	***	***	***	***	***	***
Hareon Solar Technology Co., Ltd.	***	***	***	***	***	***	***
Hengdian Group DMEGC Magnetics Co., Ltd.	***	***	***	***	***	***	***
Jiangsu Aide Solar Energy Technology Co., Ltd.	***	***	***	***	***	***	***
Jiangsu Seraphim Solar System Co., Ltd.	***	***	***	***	***	***	***
JiangziRisun Solar Energy Co., Ltd.	***	***	***	***	***	***	***
JiansuSainty PV System Co., Ltd.	***	***	***	***	***	***	***
Jinko Solar Co., Ltd.	***	***	***	***	***	***	***
LDK Solar Hi-Tech (Nanchang) Co., Ltd.	***	***	***	***	***	***	***
Lightway Green New Energy Co., Ltd.	***	***	***	***	***	***	***
Realforce Power Co., Ltd.	***	***	***	***	***	***	***
ReneSola Jiangsu, Ltd.	***	***	***	***	***	***	***
Shanghai JA Solar Technology Co., Ltd.	***	***	***	***	***	***	***
Shenzhen Jiawei Photovoltaic Lighting Co., Ltd.	***	***	***	***	***	***	***
Shenzhen Sacred Industry Co., Ltd.	***	***	***	***	***	***	***
Shenzhen Sanyifeida Technology Co., Ltd.	***	***	***	***	***	***	***
Shenzhen Sungold Solar Co., Ltd.	***	***	***	***	***	***	***
Singfo Solar Energy Science &	***	***	***	***	***	***	***

Technology Co., Ltd.							
Solargiga Energy Holdings, Ltd.	***	***	***	***	***	***	***
Star Power International, Ltd.	***	***	***	***	***	***	***
Sumec Hardware & Tools Co., Ltd.	***	***	***	***	***	***	***
Sun Earth Solar Power Co., Ltd.	***	***	***	***	***	***	***
Sunny Apex Development, Ltd.	***	***	***	***	***	***	***
Suzhou Suncome Solar Science & Technology Co., Ltd.	***	***	***	***	***	***	***
Tianwei New Energy (Yangzhou) Co., Ltd.	***	***	***	***	***	***	***
Wanxiang Solar	***	***	***	***	***	***	***
Wenzhou Jingri Electric and Mechanial Co., Ltd.	***	***	***	***	***	***	***
Wuhan FYY Technology Co., Ltd.	***	***	***	***	***	***	***
Wuhu Zhongfu PV Co., Ltd.	***	***	***	***	***	***	***
Wuxi Suntech Power Co., Ltd.	***	***	***	***	***	***	***
Years Solar Co., Ltd.	***	***	***	***	***	***	***
Yingli Green Energy Holding Co., Ltd.	***	***	***	***	***	***	***
ZhangjiagangSEG PV Co., Ltd.	***	***	***	***	***	***	***
Zhejiang Global Photovoltaic Technology Co., Ltd.	***	***	***	***	***	***	***
Zhejiang Heda Solar Technology Co., Ltd.	***	***	***	***	***	***	***
Zhejiang ShinewPhotoelectronic Technology Co., Ltd.	***	***	***	***	***	***	***
ZhongliTalesun Solar Co., Ltd.	***	***	***	***	***	***	***
ZnshinePy-Tech Co., Ltd.	***	***	***	***	***	***	***
Total	***	***	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Reporting Producers of CSPV Cells and Modules in China

CSPV Cells

Table VII-3 presents data for reported capacity, production, and shipments of CSPV cells for all reporting producers in China. Collectively, Chinese foreign producers reported that CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to increase by an additional *** percent from 2012 to 2014. They reported CSPV cell production increased by *** percent from 2010 to 2012, and is projected to increase an additional *** percent from 2012 to 2014. In 2012, reporting foreign producers in China reported that *** percent of their total shipments of CSPV cells were internally consumed to produce CSPV modules in China, *** percent of CSPV cell shipments were to their home market, *** percent of their CSPV cell shipments were exported to the United States, *** percent were exported to Taiwan, and *** percent were exported to other markets.

Table VII-3
CSPV cells: China's reported production capacity, production, shipments, and inventories OF CELLS, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

CSPV Modules

Table VII-4 presents data for reported capacity, production, and shipments of CSPV modules for all reporting producers in China. They reported CSPV module capacity increased by *** percent from 2010 to 2012, and is projected to increase an additional *** percent from 2012 to 2014. They reported CSPV module production increased by *** percent from 2010 to 2012, and is projected to increase an additional *** percent from 2012 to 2014. In 2010, Chinese module producers reported that *** percent of total production used CSPV cells of Taiwanese origin, in 2012 the share of modules with CSPV cells from Taiwan had risen to *** percent, and in January-September 2013 the share had risen to *** percent.[6] In 2012, *** percent of total shipments of modules by Chinese producers were exported to the United States, *** percent to their home market, *** percent were internally consumed, and *** percent of their shipments were to other export markets.

Table VII-4
CSPV modules: China's reported production capacity, production, shipments, and inventories OF MODULES, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

Five Largest Reporting Producers of CSPV Modules in China[7]

Yingli China

Yingli China reported that *** percent of its total sales in the most recent fiscal year were sales of CSPV products. Its reported CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2013. Yingli China's reported CSPV cell production increased by *** percent from 2010 to 2012, and is projected to *** percent from 2012 to 2013. In 2012, *** percent of Yingli China's total shipments of CSPV cells were internally consumed to produce CSPV modules and *** percent of its shipments were to its home market.

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[6] Petitioner claimed that this ***. Petitioner's postconference brief, exh. 1, pp. 11-16.

Chinese respondents argued that the solar industry is a globalized industry that has always had global supply chains and that an increase in the use of Taiwanese CSPV cells, which was common in the industry before the Commission's prior CSPV solar investigation, is an effect of the increase in global demand of CSPV modules. Chinese respondents' postconference brief, exh. 1, pp. 31-32.

[7] Based on reported 2012 production of CSPV modules.

Yingli China reported CSPV module capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2013. Its reported CSPV module production increased by *** percent from 2010 to 2012, and is projected to *** percent from 2012 to 2013. In 2012, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells and ***.[8] Yingli China reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

Trina China

Trina China reported that *** percent of its total sales in the most recent fiscal year were sales of CSPV products. Its reported CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Trina China's reported CSPV cell production increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. In 2012, *** percent of Trina China's total shipments of CSPV cells were internally consumed to produce CSPV modules, *** percent of its shipments were to its home market, and *** percent were exported to the United States.

Trina China's reported CSPV module capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Its reported CSPV module production increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. In 2012, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells, ***.[9] Trina China reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

Suntech

Suntech reported that *** percent of its total sales in the most recent fiscal year were sales of CSPV products. Its reported CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Suntech's reported CSPV cell production decreased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. In 2012, *** percent of Suntech's total shipments of CSPV cells were internally consumed to produce CSPV modules, *** percent of its shipments were to its home market, *** percent were exported to the United States, and *** percent were exported to other markets.

Suntech's reported CSPV module capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Its reported CSPV module production decreased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. In 2012, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells, ***.[10] Suntech reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

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[8] ***. Foreign producer questionnaire response of Yingli, question II-16.

[9] ***. Foreign producer questionnaire response of Trina China, question II-16.

[10] ***. Foreign producer questionnaire response of Suntech, question II-16.

Canadian Solar China

Canadian Solar China reported that *** percent of its total sales in the most recent fiscal year were sales of CSPV products. Its reported CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Canadian Solar China's reported CSPV cell production increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. In 2012, *** percent of Canadian Solar China's total shipments of CSPV cells were internally consumed to produce CSPV modules.

Canadian Solar China's reported CSPV module capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Its reported CSPV module production increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. In 2012, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells, ***.[11] Canadian Solar China reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

Jinko Solar

Jinko Solar reported that *** percent of its total sales in the most recent fiscal year were sales of CSPV products. Its reported CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Jinko Solar's reported CSPV cell production increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. In 2012, *** percent of Jinko Solar's total shipments of CSPV cells were internally consumed to produce CSPV modules, *** percent of its shipments were to its home market, *** percent were exported to the United States, and *** percent were exported to other markets.

Jinko Solar's reported CSPV module capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Its reported CSPV module production increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. In 2012, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells, ***.[12] Jinko Solar reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

[11] ***. Foreign producer questionnaire response of Canadian Solar China, question II-16.

[12] ***. Foreign producer questionnaire response of Jinko Solar, question II-16.

THE INDUSTRY IN TAIWAN

The Commission received responses from 19 firms accounting for approximately *** percent[13] of 2012 production of CSPV cells in Taiwan and accounting for approximately *** percent[14] of 2012 capacity of CSPV modules in Taiwan. Thirteen of the 19 responding Taiwanese producers reported that they produced CSPV cells in Taiwan. These firms are identified in table VII-5 along with each firms' cell capacity, production, and export shipment data. Thirteen of the 19 responding Taiwanese producers reported that they produced CSPV modules in Taiwan. These firms are identified in table VII-6 along with each firms' module capacity, production, and export shipment data.

Table VII-5
CSPV cells: Reporting producers of CSPV CELLS in Taiwan, capacity, production, share of reported production, capacity utilization, exports to the United States, and share of exports to the United States, by firm, 2012

Firm	Share of reported production (percent)	Capacity (kilowatts)	Production (kilowatts)	Capacity utilization (percent)	Exports to the United States (kilowatts)	Total shipments (kilowatts)	Share of firm's total shipments exported the United States (percent)
AU Optronics Corp.	***	***	***	***	***	***	***
Big Sun Energy Technology, Inc.	***	***	***	***	***	***	***
E-Ton Solar Tech Co., Ltd.	***	***	***	***	***	***	***
Ever Energy Co., Ltd.	***	***	***	***	***	***	***
Gintech Energy Corp.	***	***	***	***	***	***	***
IST Energy Co., Ltd.	***	***	***	***	***	***	***
Motech Industries, Inc.	***	***	***	***	***	***	***
Neo Solar Power Corp.	***	***	***	***	***	***	***
Solartech Energy Corp.	***	***	***	***	***	***	***
Sunengine Corp., Ltd.	***	***	***	***	***	***	***
Tainergy Tech Co., Ltd.	***	***	***	***	***	***	***
Topcell Solar International Co., Ltd.	***	***	***	***	***	***	***
TSEC Corp.	***	***	***	***	***	***	***
Total	***	***	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

[13] Based on total Taiwanese CSPV cell production in 2012 of *** megawatts reported in Lin, Fu-Ming, *"Status of PV in Taiwan,"* Industrial Technology Research Institute, October 31, 2013, p. 17.

[14] Based on total Taiwanese CSPV module capacity in 2012 of *** megawatts reported in Lin, Fu-Ming, *"Status of PV in Taiwan,"* Industrial Technology Research Institute, October 31, 2013, p. 17.

Table VII-6
CSPV modules: Reporting producers of CSPV MODULES in Taiwan, capacity, production, share of reported production, capacity utilization, exports to the United States, and share of exports to the United States, by firm, 2012

Firm	Share of reported production (percent)	Capacity (kilowatts)	Production (kilowatts)	Capacity utilization (percent)	Exports to the United States (kilowatts)	Total shipments (kilowatts)	Share of firm's total shipments exported the United States (percent)
Anji Technology Co., Ltd.	***	***	***	***	***	***	***
Apollo Solar Energy Co., Ltd.	***	***	***	***	***	***	***
AU Optronics Corp.	***	***	***	***	***	***	***
Big Sun Energy Technology, Inc.	***	***	***	***	***	***	***
Gintech Energy Corp.	***	***	***	***	***	***	***
Inventec Energy Corp.	***	***	***	***	***	***	***
Motech Industries, Inc.	***	***	***	***	***	***	***
Neo Solar Power Corp.	***	***	***	***	***	***	***
Powercom Co., Ltd.	***	***	***	***	***	***	***
Solartech Energy Corp.	***	***	***	***	***	***	***
Tainergy Tech Co., Ltd.	***	***	***	***	***	***	***
Tynsolar Corp.	***	***	***	***	***	***	***
Win Win Precision Technology Co., Ltd.	***	***	***	***	***	***	***
Total	***	***	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Reporting Producers of CSPV Cells and Modules in Taiwan

CSPV Cells

Table VII-7 presents data for reported capacity, production, and shipments of CSPV cells for all reporting producers in Taiwan. Collectively, Taiwanese foreign producers reported that CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to increase by an additional *** percent from 2012 to 2014. They reported CSPV cell production increased by *** percent from 2010 to 2012, and is projected to increase an additional *** percent from 2012 to 2014. In 2012, reporting foreign producers in Taiwan reported that *** percent of their total shipments of CSPV cells were internally consumed to produce CSPV modules in Taiwan, *** percent of CSPV cell shipments were to their home market, *** percent of their CSPV cell shipments were exported to the United States, *** percent were exported to China,[15] and ***

[15] From 2010 to 2012, exports of CSPV cells from Taiwan to China increased *** percent. In January-September 2014, exports of CSPV cells from Taiwan to China were higher by *** percent than in January-September 2013. Exports of CSPV cells from Taiwan to China are project to ***.

(*continued*...)

percent were exported to other markets. Of the 13 responding CSPV cell producers in Taiwan ***.[16]

Table VII-7
CSPV cells: Taiwan's reported production capacity, production, shipments, and inventories OF CELLS, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

CSPV Modules

Table VII-8 presents data for reported capacity, production, and shipments of CSPV modules for all reporting producers in Taiwan. They reported CSPV module capacity increased by *** percent from 2010 to 2012, and is projected to *** percent from 2012 to 2014. They reported CSPV module production increased by *** percent from 2010 to 2012, and is projected to *** percent from 2012 to 2014. During the period of investigation, Taiwanese module producers reported that a vast majority of their CSPV modules are produced with CSPV cells from Taiwan. In 2012, *** percent of all CSPV modules manufactured in Taiwan contained cells produced in Taiwan. In 2012, *** percent of total shipments of modules by Taiwanese producers were exported to the United States, *** percent to their home market, *** percent were internally consumed, and *** percent of their shipments were to other export markets.

Table VII-8
CSPV modules: Taiwan's reported production capacity, production, shipments, and inventories OF MODULES, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

Five Largest Reporting Producers of CSPV Cells in Taiwan[17]

Gintech

Gintech reported that *** percent of its total sales in the most recent fiscal year were sales of CSPV products. Its reported CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Gintech's reported CSPV cell production

(…*continued*)

Petitioner claimed that this increase of exports of CSPV cells from Taiwan to China constituted a shift in the global supply chain intended to evade antidumping and countervailing duties on CSPV modules from China using Chinese CSPV cells. Petitioner's postconference brief, exh. 1, pp. 11-16.

Chinese respondents argued that the solar industry is a globalized industry that has always had global supply chains and that an increase in the exports of Taiwanese CSPV cells to China, which was common in the industry before the Commission's prior CSPV solar investigation, is an effect of the increase in global demand of CSPV modules. Chinese respondents' postconference brief, exh. 1, pp. 31-32.

[16] See Foreign producer questionnaire responses of ***.

[17] Based on reported 2012 production of CSPV cells.

increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014.[18] In 2012, *** percent of Gintech's total shipments of CSPV cells were internally consumed to produce CSPV modules, *** percent of its shipments were to its home market, *** percent were exported to the United States, *** percent were exported to China, and *** percent were exported to other markets such as ***.

Gintech's reported CSPV module capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Its reported CSPV module production decreased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. In 2012, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells. In 2012, *** percent of its total shipments of CSPV modules were home market sales and *** percent were exports to the United States. Gintech reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

Motech

Motech reported that *** percent of its total sales in the most recent fiscal year were sales of CSPV products. Its reported CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Motech's reported CSPV cell production increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014.[19] In 2012, *** percent of Motech's total shipments of CSPV cells were internally consumed to produce CSPV modules, *** percent of its shipments were to its home market, *** percent were exported to the United States, *** percent were exported to China, and *** percent were exported to other markets such as ***.

Motech's reported CSPV module capacity increased from *** kilowatts in 2010 to *** kilowatts in 2012, and is projected to *** in 2014. Its reported CSPV module production increased from *** kilowatts in 2010 to *** kilowatts in 2012, and is projected to *** in 2014. In 2012, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells. In 2012, *** percent of its total shipments of CSPV modules were home market sales, *** percent were internal consumption, *** percent were exported to other markets, and *** percent were exports to the United States. Motech reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

Neo Solar

Neo Solar reported that *** percent of its total sales in the most recent fiscal year were sales of CSPV products. Its reported CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Neo Solar's reported CSPV cell production increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014.[20] In 2012, *** percent of Neo Solar's total shipments of CSPV cells were internally consumed to

[18] Gintech reported ***. Foreign producer questionnaire response of Gintech, question II-17(b).
[19] Motech reported ***. Foreign producer questionnaire response of Motech, question II-17(b).
[20] Neo Solar reported ***. Foreign producer questionnaire response of Neo Solar, question II-17(b).

produce CSPV modules, *** percent of its shipments were to its home market, *** percent were exported to the United States, *** percent were exported to China, and *** percent were exported to other markets such as ***.

Neo Solar reported that it commenced CSPV module production in 2013 with a capacity of *** kilowatts and production of *** kilowatts. Neo Solar reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

Solartech

Solartech reported that *** percent of its total sales in the most recent fiscal year were sales of CSPV products. Its reported CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Solartech's reported CSPV cell production increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014.[21] In 2012, *** percent of Solartech's total shipments of CSPV cells were internally consumed to produce CSPV modules, *** percent of its shipments were to its home market, *** percent were exported to the United States, *** percent were exported to China, and *** percent were exported to other markets such as ***.

Solartech's reported CSPV module capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Its reported CSPV module production increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. In 2012, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells. In 2012, *** percent of its total shipments of CSPV modules were home market sales, *** percent were internally consumed, *** percent were exports to the United States, and *** percent were exported to other markets such as ***. Solartech reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

Topcell

Topcell reported that *** percent of its total sales in the most recent fiscal year were sales of CSPV products. Its reported CSPV cell capacity increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. Topcell's reported CSPV cell production increased by *** percent from 2010 to 2012, and is projected to *** from 2012 to 2014. In 2012, *** percent of Topcell's total shipments of CSPV cells were internally consumed, *** percent of its shipments were to its home market, *** percent were exported to China, and *** percent were exported to other markets such as ***. Solartech reported no capacity to produce CSPV modules during the period of investigation. It reported that its largest U.S. importer of CSPV cells during the period of investigation was ***.

[21] Solartech reported ***. Foreign producer questionnaire response of Solartech, question II-17(b).

FOREIGN INDUSTRY DATA FOR CHINA AND TAIWAN COMBINED

Table VII-9 presents information on the CSPV cell operations of the responding producers and exporters in China and Taiwan combined. Table VII-10 presents information on the CSPV module operations of the responding producers and exporters in China and Taiwan combined.

Table VII-9
CSPV cells: China and Taiwan's reported production capacity, production, shipments, and inventories OF CELLS, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

Table VII-10
CSPV modules: China and Taiwan's reported production capacity, production, shipments, and inventories OF MODULES, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

U.S. INVENTORIES OF IMPORTED MERCHANDISE

Table VII-11 presents data on U.S. importers' reported inventories of CSPV products.

Table VII-11
CSPV products: U.S. importers' inventories, 2010-2012, January-September 2012, and January-September 2013

* * * * * * *

U.S. IMPORTERS' OUTSTANDING ORDERS

The Commission requested U.S. importers to indicate whether they imported or arranged for the importation of CSPV cells or modules after June 30, 2012. *** of the 39 reporting U.S. importers stated that they had imported or arranged for importation since June 30, 2012. Table VII-12 presents the U.S. importers that had imported or arranged for the importation of the subject product from China and the quantity of those U.S. imports.[22]

[22] Data for arranged orders of U.S. imports do not take into account Commerce's country of origin rule that states that the country of origin of the CSPV cell determines the country of origin of the module.

Table VII-12
CSPV products: U.S. importers' orders of subject imports from China and Taiwan subsequent to September 30, 2013, by source

* * * * * * *

ANTIDUMPING OR COUNTERVAILING DUTY ORDERS IN THIRD-COUNTRY MARKETS

In July 2012, SolarWorld filed an antidumping petition with the European Commission alleging that producers of CSPV solar cells and modules[23] in China were selling CSPV cells and modules at less than fair value.[24] On September 6, 2012, the European Commission announced its initiation of an antidumping duty investigation on CSPV cells and modules from China.[25] On September 25, 2012, SolarWorld filed a countervailing duty complaint with the European Commission. In June of 2013, the EU Commission announced provisional duties in its antidumping investigation ranging from 37.3 percent to 67.9 percent.[26] After the imposition of the provisional duties, the EU Commission and a group of Chinese solar manufacturers, which represented approximately 70 percent of total Chinese exports to the EU, entered into a "price undertaking" agreement, which went into effect in August 2013, and stated that certain named Chinese solar producers would agree to volume quotas and minimum prices for two years.[27] All imports above the quota as well as those imports from unnamed Chinese producers are still subject to the antidumping and countervailing duty rates of 47.7 percent to 64.9 percent. Petitioner stated that subsequent to August 2013, the date the price undertaking went into

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[23] The scope of the EU investigation is CSPV cells and CSPV modules (regardless of the country of origin of the CSPV cell contained therein).

[24] Petitioner's postconference brief, exh. 1, pp. 58-61.

[25] Notice of initiation of an antidumping proceeding concerning imports of crystalline silicon photovoltaic modules and key components (i.e. cells and wafers) originating in the People's Republic of China, Official Journal of the European Union, C/269/5, September 6, 2012.

[26] *Imposing a provisional anti-dumping duty on imports of crystalline silicon photovoltaic modules and key components (i.e. cells and wafers) originating in or consigned from the People's Republic of China and amending Regulation (EU) No 18212013 making these imports originating in or consigned from the People's Republic of China subject to registration*, Commission Regulation (EU) No 513/2013, (June 4, 2013); Petitioner's postconference brief, Exh. 28.

[27] Although many terms are confidential, public reports stated that Chinese companies would have a combined quota of 7 gigawatts and a price floor of $0.7661 per watt. European Commission Directorate-General for Trade, *EU imposes definitive measures on Chinese solar panels, confirms undertaking with Chinese solar panel exporters*, Press Release (Dec. 2, 2013); Petitioner's postconference brief, exh. 2RR; Chinese respondents' brief, exh. 1, pp. 9-11 and exh. 32.

SolarWorld and other European solar manufacturers appealed the EU Commission set price floor as too low to adequately protect the market. The appeal is ongoing. Petitioner's postconference brief, exh. 1, p. 59.

effect, Chinese exports to the EU, which had previously accounted for 70 percent of total Chinese exports, accounted for only 30 percent of total Chinese exports of solar products.[28]

In October 2012, solar manufacturers in India filed an antidumping and countervailing duty complaint alleging that solar cells and modules from China, Taiwan, Malaysia, and the United States are being sold at LTFV and unfairly subsidized by the respective governments. On November 23, 2012, India initiated its investigation, but extended its duration until May 2014.[29]

On July 20, 2012, the Government of China announced the commencement of an antidumping and countervailing duty investigation into "solar-grade polysilicon" from the United States and Korea.[30] In January 2014, China upheld provisional duties on U.S. and South Korean polysilicon imposing antidumping duties as high as 57 percent and countervailing duties of 2.1 percent.[31]

INFORMATION ON NONSUBJECT COUNTRIES

In assessing whether the domestic industry is materially injured or threatened with material injury "by reason of subject imports," the legislative history states "that the Commission must examine all relevant evidence, including any known factors, other than the dumped or subsidized imports, that may be injuring the domestic industry, and that the Commission must examine those other factors (including non-subject imports) 'to ensure that it is not attributing injury from other sources to the subject imports.'"[32]

Global Demand

Global PV[33] installations (including nonsubject thin film products) increased from 21.7 GW in 2010 to 29.1 GW in 2012 (figure VII-1). The largest markets in 2012 were Germany (7.6 GW, 26 percent of installations), China (3.5 GW, 12 percent), Italy (3.4 GW, 12 percent), and the

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[28] Petitioner's postconference brief, exh. 1, p. 60.

[29] See Ministry of Commerce & Industry, Government of India, http://commerce.nic.in/writereaddata/traderemedies/adint_Solar_Cells_Malaysia_ChinaPR_Chinese_Taipei_USA%20Taipei%20and%20USA.pdf

[30] See Ministry of Commerce, People's Republic of China website: http://english.mofcom.gov.cn/aarticle/newsrelease/significantnews/201207/20120708245225.html accessed August 30, 2012.

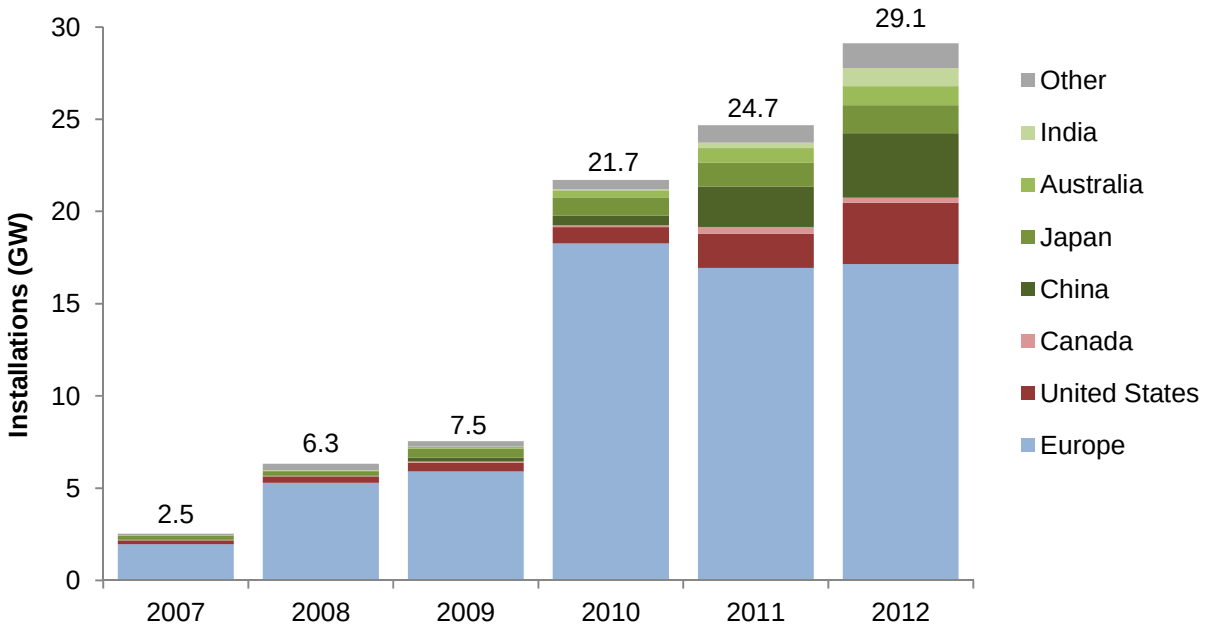
[31] The Government of China recently determined that it will not impose antidumping and countervailing duties on "solar-grade" polysilicon from the EU. *"China Won't Levy Duties on Polysilicon From European Suppliers,"* Bloomberg, January 24, 2014.

[32] *Mittal Steel Point Lisas Ltd. v. United States*, Slip Op. 2007-1552 at 17 (Fed. Cir. Sept. 18, 2008), quoting from Statement of Administrative Action on Uruguay Round Agreements Act, H.R. Rep. 103-316, Vol. I at 851-52; *see also Bratsk Aluminum Smelter v. United States*, 444 F.3d 1369 (Fed.Cir. 2006).

[33] In this section, references to CSPV are to subject products, while references to PV include both subject and nonsubject products (e.g., thin film products).

United States (3.3 GW, 11 percent).[34] Global demand in 2013 totaled 39 GW, according to an early estimate from Bloomberg New Energy Finance (BNEF), with installations in China estimated to total about 12 GW (31 percent of installations).[35] NPDSolarbuzz estimated that U.S. installations totaled 4.2 GW in 2013, which would represent about 11 percent of global installations.[36] The value of global installations—including modules, balance of system equipment, and installation costs—increased from $71.2 billion in 2010 to $91.6 billion in 2011, then declined to $79.7 billion in 2012.[37]

Figure VII-1
Global PV installations, 2007–12



Source: USITC, *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, p. 3-18.

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[34] USITC, *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, p. 3-17.

[35] These are preliminary market size estimates for 2013. BNEF indicates that China installed at least 12 GW, and possibly as much as 14 GW. However, the China Renewable Energy Industries Association estimates 2013 installations in China at 9.5 to 10.7 GW. Taiwan respondents' postconference brief, exh. 11.A, Bloomberg New Energy Finance, "China's 12 GW Solar Market Outstripped All Expectations in 2013," News release, January 23, 2014; Taiwan respondents' postconference brief, exh. 11.B, Lacey, Stephen, "China May Have Deployed More Solar in 2013 Alone Than America Has Installed Altogether," *Greentech Media*, January 24, 2014.

[36] NPDSolarbuzz, "Record 2013 Solar PV Installations Promotes U.S. to Strongest Market Outside Asia-Pacific, According to NPDSolarbuzz," News release, January 8, 2014.

[37] Pernick, Ron, Clint Wilder, and Trevor Winnie, *Clean Energy Trends 2013*, Clean Edge, March 2013, http://awsassets.wwf.org.za/downloads/clean_energy_trends_2013.pdf.

Note: For 2007–11, data for Europe are estimated PV installations. For 2012, data are grid connected capacity. Reproduced from source above, which listed the following data sources: EPIA, *Global Outlook for Photovoltaics until 2016*, May 2012, 19, 66–67; EPIA, *Global Market Outlook for Photovoltaics 2013–2017*, 2013, 16, 18, 31; GTM Research and SEIA, *U.S. Solar Market Insight Report: 2012 Year-in-Review*, 2013, 5; JPEA, Statistics on Shipments, February 26, 2013, 5; METI, "Announcement Regarding the Present Status," March 13, 2012; Watt and Passey, "PV in Australia 2012," May 2013, viii; Bloomberg New Energy Finance database (accessed May 30, 2013); Energy Foundation and CREIA, China Solar, April 2013, 5–6.

Global CSPV Cell and Module Production

Global CSPV cell production *** from *** in 2010 to *** in 2011, before *** to *** in 2012 (figure VII-2). Asia accounted for the *** of CSPV cell production in 2012, with China accounting for ***, Japan ***, and the rest of Asia *** (figure VII-3).[38] Full production data for 2013 are not yet available, but Solarbuzz indicates that the top CSPV cell producers in 2013, in descending order, were Yingli, JA Solar, Trina Solar, Neo Solar Power (including DelSolar), Motech, Jinko Solar, Gintech, Canadian Solar, and Hareon Solar.[39]

Figure VII-2
CSPV cells and modules: Global production, 2010–12

* * * * * * *

Figure VII-3
CSPV cells: Global production by country/region, 2011–12

* * * * * * *

Global CSPV module production *** from *** GW in 2010 to *** in 2012. China accounted for *** of module production in 2012 (including nonsubject thin film modules) while Japan accounted for ***, the rest of Asia ***, Europe ***, the United States ***, and the rest of the world *** (figure VII-4).[40] Full production data for 2013 are not yet available, but Solarbuzz indicates that the top CSPV module suppliers in 2013, in descending order, were Yingli, Trina Solar, Sharp, Canadian Solar, Jinko Solar, ReneSola, Hanwha SolarOne, Kyocera, and JA Solar.[41]

[38] A breakout of production in Asian countries other than China and Japan is not available from this source. ***

[39] First Solar was the fifth largest producer in the Solarbuzzlist, but produces thin film products. Solarbuzz, "Yingli Adds Cell Production Leadership to Module Shipment Supremacy in 2013," News release, January 31, 2014.

[40] A breakout of production in Asian countries other than China and Japan is not available from this source. ***

[41] First Solar was the seventh largest producer in the Solarbuzz list, but produces thin film modules. Lian, Ray, "Top 10 PV Module Suppliers in 2013," *PV Tech*, January 8, 2014.

Figure VII-4
Global PV module production (including nonsubject thin film) by country/region, 2012

* * * * * * *

Malaysia

Malaysia was the largest source of nonsubject PV imports during 2010–September 2013, though most imports in 2012 were thin film modules according Energy Information Administration (EIA) data.[42] Firms in Malaysia have approximately 2.1 GW of cell production capacity and 1.6 GW of module production capacity (table VII-1).[43] Production capacity in Malaysia has *** since 2009, when CSPV cell capacity totaled ***.[44] Most PV production is exported since the market in Malaysia totaled only 35 MW in 2012.[45]

Table VII-13
CSPV cells and modules: Producers in Malaysia, 2014

Company	Cell production capacity	Module production capacity
	(megawatts)	
AUOSunPower	>800	0
Flextronics	0	1,000
Hanwha Q-Cells	900	0
Panasonic	300	300
Sunrise	0	100
TSSolartech	80	0
Other Malaysian firms	0	177
Total	>2,080	1,577

[42] First Solar produces thin film modules in Malaysia. USITC DataWeb/USDOC (accessed January 28, 2014); Energy Information Administration (EIA), *Solar Photovoltaic Cell/Module Shipments Report 2012*, December 2013, p. 12; Dato' Hj. Badaruddin bin Mahyudin and Madam BadriyahAbdMalek, "National Survey Report of PV Power Applications in Malaysia 2012," May 2013, p. 12.

[43] Dato' Hj. Badaruddin bin Mahyudin and Madam BadriyahAbdMalek, "National Survey Report of PV Power Applications in Malaysia 2012," May 2013, p. 12; Flextronics, "Flextronics and MEMC Expand Partnership to Produce Solar Panels for SunEdison," News release, May 11, 2011; Malaysia, "Panasonic Begins Full-scale Production at 300 MW HIT Solar Module Factory in Malaysia," News release, August 30, 2013; SunPower, "Form 10-K," February 25, 2013, p. 10; Meza, Edgar, "Hanwha Q Cells Increases Production Capacity to 1.3 GWp," PV Magazine, January 9, 2014.

[44] ***

[45] Dato' Hj. Badaruddin bin Mahyudin and Madam BadriyahAbdMalek, "National Survey Report of PV Power Applications in Malaysia 2012," May 2013, p. 9.

Notes: Hanwha Q-Cells announced plans in January 2014 to expand production to 1.1 GW in Malaysia. TSSolartech's capacity is calculated based on their completion of 1 solar line for a plant in which they intend to have 8 solar lines with a capacity of 640 MW.

Source: Dato' Hj. Badaruddin bin Mahyudin and Madam BadriyahAbdMalek, "National Survey Report of PV Power Applications in Malaysia 2012," May 2013, p. 12; Flextronics, "Flextronics and MEMC Expand Partnership to Produce Solar Panels for SunEdison," News release, May 11, 2011; Panasonic, "Panasonic Begins Full-scale Production at 300 MW HIT Solar Module Factory in Malaysia," News release, August 30, 2013; SunPower, "Form 10-K," February 25, 2013, p. 10; Sunrise Solartech Website, http://www.srsolartech.cn/html/Latest_news/143.html (accessed January 29, 2014); TSSolartech Website, http://www.ts-solartech.com/company-news/ (accessed January 29, 2014); Meza, Edgar, "Hanwha Q Cells Increases Production Capacity to 1.3 GWp," *PV Magazine*, January 9, 2014.

Mexico

Mexico was the second largest source of nonsubject PV imports during 2010–September 2013.[46] The CSPV industry in Mexico is comprised of companies that assemble modules, primarily for export to the United States.[47] In 2013, CSPV module production capacity in Mexico, based on available data, was greater than ***. The *** firm, in terms of production capacity, was SunPower, which had more than 400 MW of capacity in 2013 (table VII-2).[48]

Table VII-14
CSPV cells and modules: Companies assembling modules in Mexico, 2013

Company	Module production capacity	Headquarters
	(megawatts)	
ERDM	>30	Mexico
Jabil Circuit	***	United States
Kyocera	150	Japan
Solartec	***	Mexico
SunPower	417	United States
Total	***	

Notes: As of February 2013, ten of twelve production lines at SunPower's planned 500 MW plant were operational. Production capacity is estimated based on the share of production lines that are operational.

Sources: SunPower, "Form 10-K," February 25, 2013, p. 10; Kyocera, "Mexican President Felipe Calderón Inaugurates KYOCERA's New Solar Module Manufacturing Facility in Tijuana," News release, March 6, 2009; staff report for Crystalline Silicon Photovoltaic Cells and Modules from China, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final); ***.

[46] USITC DataWeb/USDOC (accessed January 28, 2014).

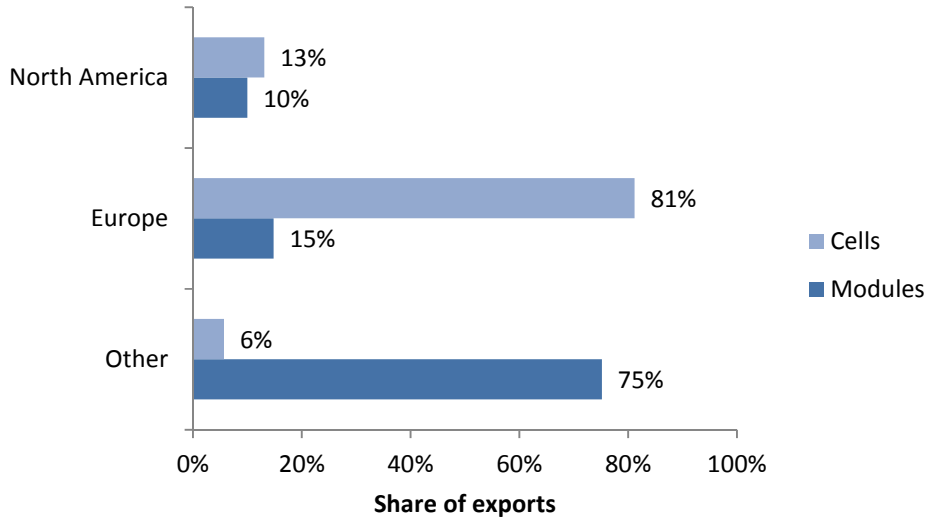
[47] The PV market in Mexico totaled only 10 MW in 2011. Mexico does not have a specific subheading for PV products, but exports in the broader HS 6-digit subheading, HS 8541.40, totaled $751 million in 2012, of which 98 percent were exported to the United States. Global Trade Information Service, Inc. (GTIS), Global Trade Atlas database (accessed January 28, 2014); EPIA, *Global Market Outlook for Photovoltaics until 2016*, May 2012, p. 67.

[48] SunPower, "Form 10-K," February 25, 2013, p. 10; Kyocera, "Mexican President Felipe Calderón Inaugurates Kyocera's New Solar Module Manufacturing Facility in Tijuana," News release, March 6, 2009; staff report for Crystalline Silicon Photovoltaic Cells and Modules from China, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final); ***.

Japan

Japanese production of CSPV cells totaled *** MW in 2012, and accounted for *** percent of global production. Japanese module production, including non-subject thin film products, totaled *** MW, and accounted for *** percent of global production.[49] Through the first nine months of 2013, Japanese shipments of domestically produced CSPV cells totaled 1.6 GW (of which 90 MW—6 percent—was exported), and shipments of domestically produced CSPV modules totaled 2.0 GW (of which 87 MW—4 percent—was exported). Japanese exports of CSPV cells are primarily to Europe, while exports of modules, including nonsubject thin film modules, were primarily to locations outside Europe and North America (figure VII-4).[50] The high production and relatively low level of exports through the first nine months of 2013 likely reflects the growth in the Japanese domestic market. Cumulative PV installations in Japan, before the introduction of a feed-in tariff on July 1, 2012, totaled 5.6 GW. In the 16 months following the introduction of the feed-in tariff, from July 1, 2012 to October 31, 2013, PV installations in Japan totaled 5.7 GW.[51]

Figure VII-4
Japanese exports of CSPV cells and CSPV and thin film modules, January–September 2013



[49] ***

[50] Japan Photovoltaic Energy Association, Japan Solar Cell and Module Shipment Statistics (in Japanese), News release, May 31, 2013, pp. 3–4; Japan Photovoltaic Energy Association, Solar Cell and Module Shipment Statistics (in Japanese), News release, September 12, 2013, pp. 4–5; Japan Photovoltaic Energy Association, Solar Cell and Module Shipment Statistics (in Japanese), News release, December 2, 2013, pp. 4–5.

[51] Japan Ministry of Economy, Trade, and Industry, "Announcement Regarding the Present Status of Introduction of Facilities Generating Renewable Energy as of October 31, 2013," News release, January 10, 2014.

Source: Japan Photovoltaic Energy Association, Japan Solar Cell and Module Shipment Statistics (in Japanese), News release, May 31, 2013, pp. 3–4; Japan Photovoltaic Energy Association, Solar Cell and Module Shipment Statistics (in Japanese), News release, September 12, 2013, pp. 4–5; Japan Photovoltaic Energy Association, Solar Cell and Module Shipment Statistics (in Japanese), News release, December 2, 2013, pp. 4–5.

Note: Japanese CSPV cell exports totaled 90 MW. Module exports totaled 151 MW, of which 87 MW were CSPV modules.

Philippines

The Philippines was the fourth largest source of nonsubject PV imports during 2010–September 2013.[52] SunPower has 700 MW of CSPV cell production capacity in the Philippines, and 600 MW of module production capacity.[53]

[52] USITC DataWeb/USDOC (accessed January 28, 2014).
[53] SunPower, "Form 10-K," February 25, 2013, p. 10.

APPENDIX A

FEDERAL REGISTER NOTICES

The Commission makes available notices relevant to its investigations and reviews on its website, www.usitc.gov. In addition, the following tabulation presents, in chronological order, *Federal Register* notices issued by the Commission and Commerce during the current proceeding.

Citation	Title	Link
79 FR 4661 January 29, 2014	*Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China and Taiwan: Initiation of Antidumping Duty Investigations*	http://www.gpo.gov/fdsys/pkg/FR-2014-01-29/pdf/2014-01738.pdf
79 FR 4667 January 29, 2014	*Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China: Initiation of Countervailing Duty Investigation*	http://www.gpo.gov/fdsys/pkg/FR-2014-01-29/pdf/2014-01743.pdf
79 FR 1388 January 8, 2014	*Certain Crystalline Silicon Photovoltaic Products From China and Taiwan; Institution of Antidumping and Countervailing Duty Investigations and Scheduling of Preliminary Phase Investigations*	http://www.gpo.gov/fdsys/pkg/FR-2014-01-08/pdf/2014-00130.pdf

APPENDIX B

LIST OF CONFERENCE WITNESSES

CALENDAR OF PUBLIC PRELIMINARY CONFERENCE

Those listed below appeared as witnesses at the United States International Trade Commission's preliminary conference:

Subject: Certain Crystalline Silicon Photovoltaic Products from China and Taiwan

Inv. Nos.: 701-TA-511 and 731-TA-1246-1247 (Preliminary)

Date and Time: January 21, 2014 - 9:30 a.m.

Sessions were held in connection with these preliminary investigations in the Main Hearing Room (room 101), 500 E Street, S.W., Washington, DC.

OPENING REMARKS:

Petitioner (**Timothy C. Brightbill**, Wiley Rein LLP)
Respondents (**Richard L.A. Weiner**, Sidley Austin LLP)

In Support of the Imposition of Antidumping and Countervailing Duty Orders:

Wiley Rein LLP
Washington, DC
on behalf of

SolarWorld Industires America, Inc. ("SolarWorld")

Mukesh Dulani, President, SolarWorld

Gordon Brinser, Special Counsel to the Chairman, SolarWorld

Ben Sanatarris, Strategic Affairs Division, SolarWorld

Timothy C. Brightbill)
) – OF COUNSEL
Laura El-Sabaawi)

In Opposition to the Imposition of
Antidumping and Countervailing Duty Orders:

Sidley Austin LLP
Washington, DC
on behalf of

China Chamber of Commerce for Import and Export
of Machinery and Electronic Products

Robert Petrina, Managing Director, Yingli Green Energy Americas, Inc.

Thomas Koerner, General Manager, Canadian Solar (USA) Inc.

John Morrison, Chief Operating Officer, Strata Solar

Kenneth R. Button, Senior Vice President, Economic Consulting Services, LLC

Jennifer Lutz, Senior Economist, Economic Consulting Services, LLC

Neil R. Ellis)
Richard L.A. Weiner)
Brenda A. Jacobs) – OF COUNSEL
Rajib Pal)
Raphaelle E. Monty)

Squire Sanders (US) LLP
Washington, DC
on behalf of

and

Wu Partners
Taipei, Taiwan
on behalf of

Taiwan Respondents

Robert JH Kobes, Sales & Marketing Vice President, Channel Business Division, Solar Business Unit, AU Optronics Corporation

Denny Lu, Vice President of Sales, Neo Solar Power

Chiu Shih Chien, Chief Legal Counsel, Neo Solar Power Corp.

Brandon Deno, Sales Director, Au Optronics Corp.

Naiwen Wong, Director of Business Development, Americas, Solartech Energy Corp.

Yen Hung Yu, Chief Financial Officer, Topcell Solar International Co., Ltd

Pan Lay-lay, Chief Financial Officer, Gintech Energy Corporation

Peter Koenig)
David Spooner) – OF COUNSEL
Sui-Yu Wu)

Perkins Coie LLP
Washington, DC
on behalf of

SunEdison, Inc.

Polly Shaw, Vice President, NAMR Government Affairs, SunEdison, Inc.

David S. Christy, Jr.)
) – OF COUNSEL
David J. Townsend)

Akin Gump Strauss Hauer & Feld LLP
Washington, DC
on behalf of

Evan Dube, Director of Public Policy, SunRun Inc.

Bernd Janzen) – OF COUNSEL

Covington & Burling LLP
Washington, DC
on behalf of

SolarCity Corporation

John M. Stanton, Vice President of Policy and Electricity Markets, SolarCity Corporation

Scott Hennessey, Director, Policy and Electricity Markets, SolarCity Corporation

David R. Grace) – OF COUNSEL

REBUTTAL/CLOSING REMARKS:

Petitioner (**Timothy C. Brightbill**, Wiley Rein LLP)
Respondents (**David R. Grace**, Covington & Burling LLP
and **Peter Koenig,** Squire Sanders (US) LLP)

APPENDIX C

SUMMARY DATA

Table C-1
CSPV modules: Summary data concerning the U.S. market, 2010-12, January-September 2012, and January-September 2013

* * * * * * *

Table C-2
CSPV modules: Summary data concerning the U.S. market excluding *, 2010-12, January-September 2012, and January-September 2013**

* * * * * * *

Table C-2 (revised)
CSPV modules: Summary data concerning the U.S. market excluding *, 2010-12, January-September 2012, and January-September 2013**

* * * * * * *

APPENDIX D
NONSUBJECT PRICE DATA

Fifteen importers reported price data for nonsubject product from China for products 1, 2, 3, and 4. Price data reported by these firms accounted for 72.0 percent of U.S. imports from China during the period of investigation. These price items and accompanying data are comparable to those presented in tables V-3 to V- 6. Price and quantity data for nonsubject China are shown in tables D-1 to D-4 and in figures D-1 to D-4 (with domestic and subject product).

In comparing nonsubject product pricing data with U.S. producer pricing data, prices for nonsubject product imported from China were lower than prices for U.S.-produced product in 42 instances and higher in 5 instances. In comparing nonsubject product pricing data with subject product pricing data, prices for nonsubject product imported from China were lower than prices product imported from Taiwan in 17 instances and higher in 26 instances. A summary of margins of underselling and overselling is presented in table D-5.

Table D-1

CSPV product: Weighted-average f.o.b. prices and quantities of imported product 1[1] and margins of underselling/(overselling), by quarters, January 2010-September 2013

* * * * * * *

Table D-2

CSPV product: Weighted-average f.o.b. prices and quantities of imported product 2[1] and margins of underselling/(overselling), by quarters, January 2010-September 2013

* * * * * * *

Table D-3

CSPV product: Weighted-average f.o.b. prices and quantities of imported product 3[1] and margins of underselling/(overselling), by quarters, January 2010-September 2013

* * * * * * *

Table D-4

CSPV product: Weighted-average f.o.b. prices and quantities of imported product 4[1] and margins of underselling/(overselling), by quarters, January 2010-September 2013

* * * * * * *

Figure D-1

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 1, by quarters, January 2010-September 2013

* * * * * * *

Figure D-2

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 2, by quarters, January 2010-September 2013

* * * * * * *

Figure D-3
CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 3, by quarters, January 2010-September 2013

* * * * * * *

Figure D-4
CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 4, by quarters, January 2010-September 2013

* * * * * * *

Table D-5
CSPV products: Summary of underselling/(overselling), by products, January 2010-September 2013

* * * * * * *