

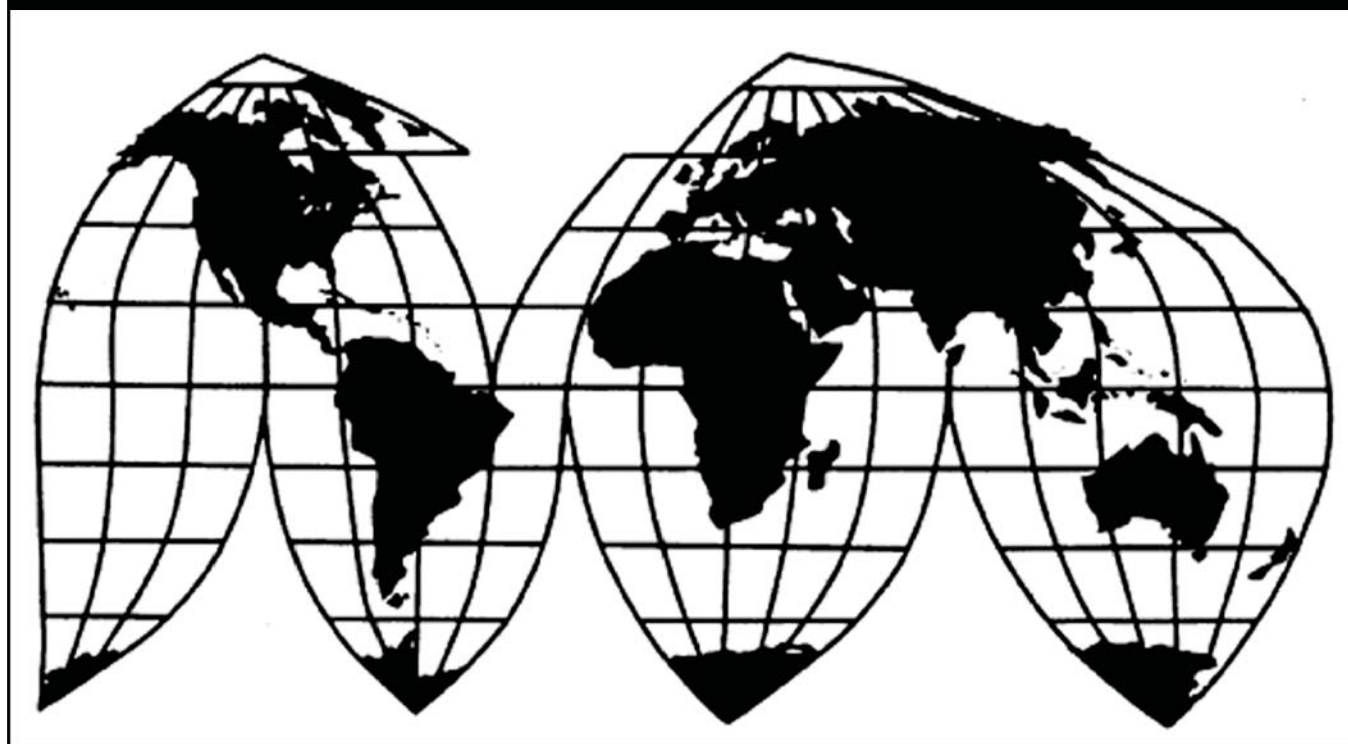
Certain Crystalline Silicon Photovoltaic Products from China and Taiwan

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

Publication 4519

February 2015

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

COMMISSIONERS

Meredith M. Broadbent, Chairman

Dean A. Pinkert, Vice Chairman

Irving A. Williamson

David S. Johanson

F. Scott Kieff

Rhonda K. Schmidlein

Karen Laney

Acting Director of Operations

Staff assigned

Christopher Cassise, Senior Investigator

Andrew David, Industry Analyst

Aimee Larsen, Economist

David Boyland, Accountant

Lee Navarro, Statistician

Carolyn Holmes, Statistical Assistant

Mary Jane Alves, Attorney

James McClure, Supervisory Investigator

Address all communications to
Secretary to the Commission
United States International Trade Commission
Washington, DC 20436

U.S. International Trade Commission

Washington, DC 20436
www.usitc.gov

Certain Crystalline Silicon Photovoltaic Products from China and Taiwan

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

Publication 4519



February 2015

CONTENTS

	Page
Determinations	1
Views of the Commission	3
Separate and Dissenting Views of Chairman Meredith M. Broadbent	51
Part I: Introduction	I-1
Background.....	I-1
Statutory criteria and organization of the report	I-1
Statutory criteria	I-1
Organization of report.....	I-2
Market summary	I-3
Summary data and data sources.....	I-4
Previous and related investigations	I-4
Nature and extent of subsidies and sales at LTFV	I-5
Countervailable subsidies.....	I-5
Sales at LTFV	I-5
The subject merchandise	I-6
Commerce’s scope	I-6
Scope issues in the prior CSPV solar investigation	I-7
Scope issues in the preliminary phase of these CSPV solar investigations.....	I-10
Scope issues in the final phase of these CSPV solar investigations	I-13
Commerce’s final scope definitions	I-14
Tariff treatment.....	I-17
The product	I-18
Description and applications	I-18
Manufacturing processes	I-25
Domestic like product issues.....	I-30
CSPV cells vs CSPV modules	I-30
CSPV products vs. thin film solar products.....	I-32
Part II: Conditions of competition in the U.S. market	II-1
U.S. market characteristics.....	II-1

CONTENTS

	Page
U.S. purchasers.....	II-2
Channels of distribution	II-3
Market Segments	II-5
Geographic distribution	II-9
Supply and demand considerations	II-10
U.S. supply	II-10
U.S. demand	II-19
Substitutability issues.....	II-32
Lead times	II-32
Knowledge of country sources	II-33
Factors affecting purchasing decisions.....	II-33
Comparisons of domestic products, subject imports, and nonsubject imports.....	II-42
Comparison of U.S.-produced and imported product	II-44
Elasticity estimates.....	II-47
U.S. supply elasticity.....	II-47
U.S. demand elasticity	II-47
Substitution elasticity	II-47
Part III: U.S. producers' production, shipments, and employment.....	III-1
U.S. producers	III-2
U.S. production, capacity, and capacity utilization	III-4
U.S. producers of CSPV cells.....	III-6
U.S. producers of CSPV modules.....	III-6
U.S. producers' U.S. shipments and exports.....	III-8
U.S. producers' inventories	III-10
U.S. producers' imports and purchases	III-10
U.S. employment, wages, and productivity	III-14
Part IV: U.S. imports, apparent U.S. consumption, and market shares	IV-1
U.S. importers.....	IV-1

CONTENTS

	Page
U.S. import data as requested in the Commission's U.S. importer questionnaire.....	IV-3
Preliminary phase.....	IV-3
Final phase.....	IV-5
U.S. imports.....	IV-6
Negligibility.....	IV-14
Negligibility analysis in the preliminary phase.....	IV-14
Negligibility analysis in the final phase.....	IV-15
Cumulation considerations.....	IV-16
Apparent U.S. consumption.....	IV-17
U.S. market shares.....	IV-19
Ratio of imports to U.S. production.....	IV-21
Part V: Pricing data.....	V-1
Factors affecting prices.....	V-1
Raw material costs.....	V-1
U.S. inland transportation costs.....	V-2
Pricing practices.....	V-3
Pricing methods.....	V-3
Sales terms and discounts.....	V-4
Price data.....	V-5
Price trends.....	V-9
Price comparisons.....	V-9
Lost sales and lost revenue.....	V-10
Part VI: Financial experience of U.S. producers.....	VI-1
Background.....	VI-1
Operations on CSPV cells and modules.....	VI-2
Revenue.....	VI-2
Cost of goods sold.....	VI-3
Gross profit or loss.....	VI-5

CONTENTS

	Page
SG&A expenses and operating income or loss.....	VI-5
Capital expenditures and research and development expenses	VI-6
Capital and investment	VI-6
Actual negative effects	VI-7
Anticipated negative effects.....	VI-7
Part VII: Threat considerations and information on nonsubject countries	VII-1
The industry in China.....	VII-3
Reporting producers of CSPV cells and modules in China	VII-6
Five largest reporting producers of CSPV modules in China.....	VII-10
The industry in Taiwan	VII-12
Reporting producers of CSPV cells and modules in Taiwan.....	VII-15
Five largest reporting producers of CSPV cells in Taiwan	VII-19
Foreign industry data for China and Taiwan combined.....	VII-21
U.S. inventories of imported merchandise	VII-24
Country of origin of ingots and wafers used in the production of CSPV cells	VII-24
CSPV cell producers in China	VII-24
CSPV cell producers in Taiwan.....	VII-26
U.S. importers' outstanding orders.....	VII-28
Antidumping or countervailing duty orders in third-country markets	VII-29
The European Union.....	VII-29
India	VII-30
Australia.....	VII-30
Canada.....	VII-30
China	VII-31
Information on nonsubject countries	VII-31
Global demand	VII-31
Global CSPV cell and module production.....	VII-32

CONTENTS

	Page
Appendixes	
A. <i>Federal Register</i> notices	A-1
B. Hearing witnesses.....	B-1
C. Summary data	C-1
D. Nonsubject country price data.....	D-1
E. Final Commerce scope definitions: Adjusted Trade and Pricing Data	E-1

Note.—Information that would reveal confidential operations of individual concerns may not be published and therefore has been deleted. Such deletions are indicated by asterisks.

UNITED STATES INTERNATIONAL TRADE COMMISSION

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

CERTAIN CRYSTALLINE SILICON PHOTOVOLTAIC PRODUCTS FROM CHINA AND TAIWAN

DETERMINATIONS

On the basis of the record¹ developed in the subject investigations, the United States International Trade Commission (“Commission”) determines, pursuant to sections 705(b) and 735(b) of the Tariff Act of 1930 (19 U.S.C. § 1671d(b) and 19 U.S.C. § 1673d(b)) (“the Act”), 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, 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 have been found by the Department of Commerce to be sold in the United States at less than fair value (“LTFV”), and subsidized by the government of China.²

BACKGROUND

The Commission instituted these investigations effective December 31, 2013, following receipt of petitions filed with the Commission and Commerce by SolarWorld America, Inc., Hillsboro, Oregon. The final phase of the investigations was scheduled by the Commission following notification of preliminary determinations by Commerce that imports of CSPV products from China and Taiwan were dumped within the meaning of 733(b) of the Act (19 U.S.C. § 1673b(b)) and were subsidized by the government of China within the meaning of section 703(b) of the Act (19 U.S.C. § 1671b(b)). Notice of the scheduling of the final phase of the Commission’s investigations and of a public hearing 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* on August 25, 2014 (79 FR 50696). The hearing was held in Washington, DC, on December 8, 2014, and all persons who requested the opportunity were permitted to appear in person or by counsel.

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 Vice Chairman Dean A. Pinkert and Commissioners Irving A. Williamson, David S. Johanson, and Rhonda K. Schmidlein voted in the affirmative. Chairman Meredith M. Broadbent voted in the affirmative with respect to CSPV modules from China and Taiwan and in the negative with respect to CSPV cells from Taiwan (CSPV cells from China were not included in the scope of these investigations). Commissioner F. Scott Kieff did not participate in these investigations.

Views of the Commission

Based on the record in the final phase of these investigations, we find 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 the U.S. Department of Commerce (“Commerce”) has found to be sold in the United States at less than fair value and subsidized by the government of China.¹

I. Background

A. Procedural Background

In response to antidumping and countervailing duty petitions filed by the firm now known as SolarWorld America, Inc. (“SolarWorld”) on October 19, 2011, the Commission determined in November 2012 that an industry in the United States was materially injured by reason of certain CSPV products imported from China that Commerce had determined were sold in the United States at less than fair value and subsidized by the government of China.² Effective December 7, 2012, Commerce issued antidumping and countervailing duty orders on those imports.³

In those investigations (*CSPV 1*), Commerce determined the country of origin of CSPV modules based on the country where the CSPV cells were manufactured. Pursuant to this country of origin ruling, Commerce determined that the scope of those investigations included CSPV cells produced in China; CSPV modules assembled in China from CSPV cells made in China; and CSPV modules assembled in a third country from CSPV cells made in China. Commerce also determined, over SolarWorld’s objection,⁴ that the scope of those investigations did not include

¹ Chairman Broadbent determines that an industry in the United States is not materially injured or threatened with material injury by reason of subject imports of CSPV cells from Taiwan. See Separate and Dissenting Views of Chairman Meredith M. Broadbent. She joins sections I-II.B, and III.A, and sections IV-VI as they pertain to subject imports of CSPV modules.

² *Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360 (Nov. 2012) (“*CSPV 1*”); Confidential Report in *CSPV 1*, Memorandum INV-KK-103 (Oct. 25, 2012), as supplemented by Memorandum INV-KK-107 (Nov. 6, 2012) (“*CSPV 1 CR*”).

³ 77 Fed. Reg. 73017 (Dec. 7, 2012); 77 Fed. Reg. 73018 (Dec. 7, 2012). The *CSPV 1* determinations by the Commission are subject to ongoing litigation involving an appeal by certain respondents, whereas the *CSPV 1* determinations by Commerce are subject to ongoing litigation involving appeals by certain respondents as well as SolarWorld.

⁴ According to SolarWorld, the scope of the *CSPV 1* orders was intended to include U.S. imports of modules assembled in China from non-Chinese cells, and their non-inclusion permitted module assemblers in China to benefit from what Commerce had deemed to be unfair subsidies. Petitioner’s Posthearing Brief at Exhibit 1 at 1-9; Revised and Corrected Transcript of Commission’s December 8, 2014 Hearing (“Hearing Tr.”) at 78-79 (Brightbill).

U.S. imports of CSPV modules assembled in China from CSPV cells made in a country other than China.⁵

Because it did not perceive that the *CSPV 1* orders provided sufficient relief from unfairly traded imports,⁶ on December 31, 2013, SolarWorld filed the instant antidumping and countervailing duty petitions regarding certain CSPV products imported from China and Taiwan.⁷ SolarWorld's representatives appeared at the hearing accompanied by counsel and filed prehearing and posthearing briefs, comments on the implications of Commerce's final scope determinations, and final comments.

A number of respondent entities also 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,⁸ and the Taiwan Photovoltaic Industry Association, a trade association of Taiwanese respondent producers and exporters, as well as individual producers and exporters of subject merchandise from Taiwan (collectively "TPIA").⁹ Representatives and counsel for CCCME and TPIA appeared at the hearing, submitted prehearing and posthearing briefs, comments on the implications of

⁵ Christian Marsh, Deputy Assistant Secretary for Antidumping and Countervailing Duty Operations, 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 (Oct. 9, 2012); 77 Fed. Reg. 63791, 63792-93 (Oct. 17, 2012) (antidumping duty determination); 77 Fed. Reg. 63788, 63790 (Oct. 17, 2012) (countervailing duty determination).

⁶ According to SolarWorld, even before the orders were imposed, producers in China and Taiwan made minor changes to their production methods, "exploited the loophole [in the scope], and continued to ship dumped and subsidized product to the United States." Petitioner's Postconference Brief at 1-3, Exhibit 1 at 8-16. For example, SolarWorld alleged that module assemblers in China either bought cells from producers in Taiwan or shipped wafers to Taiwan to be processed into cells and returned to China for assembly into modules. Petitioner's Prehearing Brief at 41-43; Hearing Tr. at 11-12 (Brightbill), 24-25 (Dulani), 71-75, 77-80, 94-97 (Brightbill, Dulani); *see also* Hearing Tr. at 20 (Brightbill) (pointing to CCCME's estimate that 70 percent of firms exporting to the United States used CSPV cells made in Taiwan by early 2014).

⁷ The petitions are supported by the Coalition for American Solar Manufacturing, which consists of about 250 U.S. companies with about 25,000 employees, mostly small and medium-sized installers, including SolarWorld; ***. Confidential Report, Memorandum INV-MM-134 (Dec. 23, 2014) as supplemented by Memorandum INV-NN-005 (Jan. 28, 2015) ("CR") at I-1 n.1; Public Report, *Certain Crystalline Silicon Photovoltaic Products from China and Taiwan*, Inv. Nos. 701-TA-511 and 731-TA-1246 to 1247 (Final), USITC Pub. 4519 (Feb. 2015) ("PR") at I-1 n.1; Hearing Tr. at 23 (Dulani).

⁸ Representatives from Yingli Green Energy Americas, Inc., Canadian Solar (USA) Inc., and Trina Solar (U.S.) Inc., producers of subject merchandise in China, appeared at the hearing.

⁹ The entry of appearance identified 17 Taiwanese Respondents. Letter from Peter Koenig to the Honorable Lisa R. Barton (Jan. 15, 2014). Representatives from Neo Solar Power Corporation, Gintech Energy Corporation, Solartech Energy Corp., and Winaico USA, producers or importer of subject merchandise from Taiwan, appeared at the hearing. TPIA generally agreed with the arguments presented in CCCME's prehearing brief regarding any material injury or threat analysis of cumulated subject imports from China and Taiwan, but it presented separate arguments regarding domestic like product, related parties, and any material injury or threat analysis of subject CSPV cells and subject CSPV modules from Taiwan. TPIA's Prehearing Brief at 3.

Commerce's final scope determinations, and final comments. The Commission also received a prehearing brief from tenKsolar, Inc. ("tenKsolar"), a U.S. assembler of modules and importer of subject merchandise.¹⁰ Kyocera Solar, Inc., an importer of subject merchandise, and Kyocera Mexicana S.A. de C.V., an assembler of modules in Mexico, (collectively "Kyocera") filed a joint prehearing brief and comments on the implications of Commerce's final scope determinations.¹¹

B. Data Collection

In the final phase of these investigations, the two firms that submitted data on their U.S. production of CSPV cells accounted for all known U.S. production of CSPV cells in 2013.¹² With regard to U.S. module operations, the record includes questionnaire responses submitted by nine U.S. producers during the final phase of these investigations as well as usable questionnaire responses submitted by nine U.S. producers either in the preliminary phase of these investigations or during the Commission's 2011-2012 *CSPV 1* investigations.¹³ Collectively, responding U.S. module producers accounted for *** percent of total U.S. production of CSPV modules in 2012.¹⁴

The record also contains questionnaire data from 48 firms that are believed to account for all U.S. imports of CSPV products from China and Taiwan.¹⁵ Data on the subject industries are based on questionnaire responses from 26 foreign producers that accounted for approximately 69.5 percent of CSPV cell production in China in 2013; 46 foreign producers that accounted for approximately 73.1 percent of CSPV module production in China in 2013; 12 foreign producers that accounted for approximately 82.5 percent of CSPV cell production in Taiwan in 2013; and 15 foreign producers that accounted for approximately *** percent of total CSPV module production in Taiwan in 2013.¹⁶

¹⁰ tenKsolar supports CCCME and TPIA's prehearing briefs. tenKsolar's Prehearing Brief at 1-2.

¹¹ Representatives for U.S. module producer/importer Silicon Energy, the Solar Energy Industries Association, and U.S. purchasers PetersenDean, Mountain View Solar, SunEdison, and Strata Solar LLC appeared at the hearing.

¹² CR at I-5, III-1; PR at I-4, III-1.

¹³ CR at I-5, III-1; PR at I-4, III-1.

¹⁴ CR at I-5, III-1; PR at I-4, III-1.

¹⁵ CR at IV-1; PR at IV-1. Importer questionnaire data are used instead of official import statistics that may include imports that are outside the scope of these investigations, such as thin-film products. Additionally, official import statistics reportedly reflect the number of modules and not the number of cells imported into the United States. In contrast, the Commission tailored the importer questionnaire to ask recipients to report data in kilowatts, to differentiate between imports from China that are within the scope of existing orders and those that are subject to these investigations, and to subdivide their data into sixteen categories that would permit the Commission to conform its import data to various possible scope definitions. CR at IV-1 at n.2, IV-3 to IV-9; PR at IV-1 at n.2, IV-3 to IV-6.

¹⁶ CR at I-5, VII-3, VII-15 to VII-16; PR at I-4, VII-3, VII-12; CR/PR at Table VII-1 to VII-2, VII-5 to VII-6.

Commerce did not finalize the scope of these investigations until December 16, 2014.¹⁷ In the intervening time, the parties agreed about how the scope defined the country of origin for U.S. imports of CSPV cells, U.S. imports of CSPV modules assembled anywhere in the world from CSPV cells made in China, U.S. imports of CSPV modules assembled in Taiwan from CSPV cells made in Taiwan, and U.S. imports of modules assembled in third countries using cells made in third countries.¹⁸ During much of the pendency of these investigations, however, the parties argued about the possible use of three scope permutations affecting classification of all other U.S. imports of CSPV modules (and laminates): (1) the rule from the *CSPV 1* investigations whereby the cell's manufacturing location dictated the module's country of origin; (2) the scope language in the petitions, Commerce's notices of initiation, and Commerce's preliminary determinations, which applies the so-called "two out of three" and "partially manufactured" rules;¹⁹ and (3) the scope proposed in Commerce's October 3, 2014 scope clarification memorandum.²⁰ Ultimately, Commerce announced a different scope definition in its December 16, 2014 final determinations. Under this definition, subject merchandise from China includes U.S. imports of the following: (1) CSPV modules assembled in China from CSPV cells made in Taiwan and (2) CSPV modules assembled in China from CSPV cells made in third countries. Additionally, subject merchandise from Taiwan includes U.S. imports of: (1) CSPV cells made in Taiwan; (2) CSPV modules assembled in Taiwan from CSPV cells made in Taiwan; and (3) CSPV modules assembled in third countries other than China from CSPV cells made in Taiwan.²¹

¹⁷ 79 Fed. Reg. 76962, 76963 (Dec. 23, 2014) (countervailing duty China); 79 Fed. Reg. 76970, 76971 (Dec. 23, 2014) (antidumping duty China); 79 Fed. Reg. 76966, 968 (Dec. 23, 2014) (Taiwan).

¹⁸ The parties agreed that U.S. imports of CSPV cells manufactured in China are nonsubject merchandise from China because they are already covered by the existing *CSPV 1* orders; U.S. imports of CSPV cells manufactured in Taiwan are subject merchandise from Taiwan; and U.S. imports of CSPV cells made in nonsubject countries are nonsubject merchandise. The parties also agreed that U.S. imports of modules assembled anywhere in the world from cells made in China are nonsubject merchandise from China because they are already covered by the existing *CSPV 1* orders. They also agreed that U.S. imports of modules assembled in Taiwan using cells made in Taiwan are subject merchandise from Taiwan and that U.S. imports of modules assembled in third countries using cells made in third countries are nonsubject merchandise. *See, e.g.*, CR/PR at Table IV-2; CR at I-7 to I-21, E-4; PR at I-6 to I-17.

¹⁹ Under the "two out of three" rule, a CSPV module would be deemed to have a Chinese (Taiwanese) country of origin if the module was assembled in China (Taiwan) from CSPV cells that were manufactured in a country other than China (Taiwan) using either ingots or wafers from China (Taiwan). Likewise, under the "partially manufactured" rule, if CSPV cell manufacturing began in China (or Taiwan) but was completed elsewhere before the cells were assembled into modules in China (or Taiwan), then the CSPV module would be deemed to have a country of origin of China (or Taiwan). CR at I-14 to I-17, IV-6 to IV-7, E-4; PR at I-11 to I-12, IV-5 to IV-6.

²⁰ According to the October 3 scope clarification memorandum, the module assembly location would mostly determine the country of origin for U.S. imports of modules, except for modules covered by the prior orders (which are nonsubject merchandise from China) and modules assembled in third countries with cells made in Taiwan (which would be deemed subject merchandise from Taiwan). CR at I-17 to I-18, IV-6 to IV-7, E-4; PR at I-13 to I-14, IV-5 to IV-6.

²¹ Thus, under Commerce's December 16, 2014 final determinations, the module assembly location mostly determines the country of origin for U.S. imports of modules (and laminates), except for

CCCME argues that the Commission lacks substantial evidence to support affirmative determinations because Commerce did not finalize the scope of the investigations until a late stage in the investigations. CCCME is mistaken for several reasons. Specifically, the Commission makes its determinations pursuant to statutory deadlines, and any determination by the Commission, whether affirmative or negative, must be supported by substantial evidence.²² The Commission's reviewing courts do not require the Commission to obtain perfect information or 100 percent coverage.²³ The Commission recognized early in these investigations that changes in the scopes were likely and took steps to ensure that it collected the information that would allow it to fulfill its statutory obligations.²⁴ In the questionnaires issued in the final phase of these investigations, the Commission asked U.S. producers and importers to segregate their import data into sixteen categories, which were designed to provide the Commission with flexibility to adjust the data to conform to different possible scope definitions.²⁵

The manner in which the Commission collected the data in these investigations permitted the agency and the parties to consider and evaluate the implications of various possible scope definitions to the Commission's analysis. For example, CCCME relied on record evidence to present arguments in its prehearing brief predicated on the possible application of Commerce's rule of origin from the *CSPV 1* investigations or the scope language in the petitions and Commerce's preliminary determinations.²⁶ The body of the Commission's report includes tables compiled prior to Commerce's final determinations that present data according to the scope definition in the petitions and Commerce's preliminary antidumping and countervailing duty determinations.²⁷ In its prehearing brief, TPIA relied on record evidence to compile tables that are consistent with its own arguments about possible use of the scope definition in Commerce's October 3, 2014 scope clarification memorandum.²⁸ During the hearing and in their posthearing briefs, the parties also presented arguments reflecting their understanding of

modules covered by the prior orders (which are nonsubject merchandise from China), modules assembled in Taiwan with cells made in nonsubject countries (which are excluded from the scope of the Taiwan investigation and considered nonsubject merchandise from Taiwan), and modules assembled in third countries with cells made in Taiwan (which are considered subject merchandise from Taiwan). 79 Fed. Reg. 76962; 79 Fed. Reg. 76970; CR at I-18 to I-21, E-4; PR at I-14 to I-17.

²² See, e.g., 19 U.S.C. §§ 1516a(a)(2), 1516a(b), 1671d(b), 1673d(b).

²³ See, e.g., *LG Electronics, Inc. v. U.S. Int'l Trade Comm'n*, Ct. No. 1300100, Slip Op. 14-129 at 15 (Ct. Int'l Trade Nov. 6, 2014); *American Bearing Mfrs. Ass'n v. United States*, 28 CIT 1698, 1724-25 n.22, 350 F. Supp. 2d 1100, 1124 n.22 (2004); *U.S. Steel Group v. United States*, 18 CIT 1190, 1203, 873 F. Supp. 673, 688, *aff'd* 96 F.3d 1352 (Fed. Cir. 1996); *Torrington Co. v. United States*, 16 CIT 220, 222-24, 790 F. Supp. 1161, 1166 (1992), *aff'd*, 991 F.2d 809 (Fed. Cir. 1993).

²⁴ See, e.g., USITC Pub. 4454 at 15-19.

²⁵ See, e.g., CR/PR at E-4.

²⁶ See, e.g., CCCME's Prehearing Brief at 6-9, 41 at n.153.

²⁷ See, e.g., CR/PR at Tables II-1, III-10 to III-17, IV-6, IV-7, V-3 to V-10.

²⁸ See, e.g., TPIA's Prehearing Brief at Exhibit 7.

the ramifications of various possible scope permutations.²⁹ Indeed, even though the scope definitions in Commerce’s December 16, 2014 final determinations were very similar to scope language in Commerce’s October 3, 2014 scope clarification memorandum,³⁰ the Commission took the unusual step of giving the parties an additional opportunity, before the closure of the record to new factual information, to submit comments concerning the implications of Commerce’s final determinations in addition to their scheduled final comment submissions.³¹

Notwithstanding the prior uncertainties about the scope definition, Appendix E of the Commission’s report presents tables that reasonably reflect Commerce’s final scope determinations, as described in additional detail herein.³²

II. Domestic Like Product

A. In General

In determining whether an industry in the United States is materially injured or threatened with material injury by reason of imports of subject merchandise, the Commission first defines the “domestic like product” and the “industry.”³³ 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.”³⁴ 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.”³⁵

The decision regarding the appropriate domestic like product 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.³⁶ No single factor is

²⁹ See, e.g., Hearing Tr. at 70-75 (Brightbill), 94-95 (Brightbill), 185-87 (Paul), 192-93 (Lee); Petitioner’s Posthearing Brief at 1-3, Exhibit 1 at 5-9; CCCME’s Posthearing Brief at Exhibit 1 at 1-2; TPIA’s Posthearing Brief at 10-15, Answers to Commissioners’ Question 1.

³⁰ See, e.g., CR at E-4; PR at E-4 (indicating that the differences in the scope language between the October 3, 2014 scope clarification memorandum and the December 16, 2014 final scope determinations affected only two categories (11 and 12), involving modules assembled in Taiwan using cells made in third countries, which were deemed nonsubject merchandise from Taiwan instead of subject merchandise from Taiwan); CR/PR at Table E-11 (indicating that U.S. imports of categories 11 and 12 involved *** kW between January 2011 to June 2014 (the period of investigation or “POI”).

³¹ CCCME’s final comments exceeded the 15-page limit set forth in the Commission’s rules (19 C.F.R. § 207.39). Accordingly, we have disregarded the exhibits to CCCME’s final comments.

³² CR at I-7 to I-21, IV-1 to IV-8; PR at I-6 to I-17, IV-1 to IV-6; CR/PR at Appendix E.

³³ 19 U.S.C. § 1677(4)(A).

³⁴ 19 U.S.C. § 1677(4)(A).

³⁵ 19 U.S.C. § 1677(10).

³⁶ 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

dispositive, and the Commission may consider other factors it deems relevant based on the facts of a particular investigation.³⁷ The Commission looks for clear dividing lines among possible domestic like products and disregards minor variations.³⁸ Although the Commission must accept Commerce's determination as to the scope of the imported merchandise that is subsidized or sold at less than fair value,³⁹ the Commission determines what domestic product is like the imported articles Commerce has identified.⁴⁰

B. Product Description

In its final determinations, Commerce defined the imported goods within the scope of the investigations concerning subject imports from China as follows:

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 includes modules, laminates and/or panels assembled in the PRC

particular record at issue' and the 'unique facts of each case'"). The Commission generally considers a 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). To resolve questions of whether the domestic like product includes upstream and downstream products, the Commission applies its "semi-finished domestic like product" analysis. *See, e.g., Certain Lightweight Thermal Paper from China, Germany, and Korea*, Inv. Nos. 701-TA-451 and 731-TA-1126 to 1128 (Preliminary), USITC Pub. 3964 (Nov. 2007); *Glycine from India, Japan, and Korea*, Inv. Nos. 731-TA-1111 to 1113 (Preliminary), USITC Pub. 3921 at 7 (May 2007); *Artists' Canvas from China*, Inv. No. 731-TA-1091 (Final), USITC Pub. No. 3853 at 6 (May 2006).

³⁷ *See, e.g., S. Rep. No. 96-249 at 90-91 (1979).*

³⁸ *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.").

³⁹ *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).

⁴⁰ *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 in which Commerce found five classes or kinds).

country consisting of crystalline silicon photovoltaic cells produced in a customs territory other than the PRC.

Subject merchandise includes modules, laminates and/or panels assembled in the PRC consisting of 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.⁴¹

CSPV cells use mono- or multicrystalline silicon cells to convert sunlight into electricity.⁴² These cells are strung together, sealed, laminated, and framed to make CSPV modules (also known as solar panels).⁴³ They are the main component of solar CSPV systems that generate electricity for off-grid uses and for on-grid applications for residences, non-residences, and utilities.⁴⁴

Commerce excluded from the scope of the investigations concerning subject imports from China any products already covered by the existing *CSPV 1* antidumping and countervailing duty orders.⁴⁵ Commerce also excluded from the scope of these investigations certain CSPV cells that are permanently integrated into certain consumer goods.⁴⁶ Furthermore, Commerce excluded from the scope of these investigations thin-film photovoltaic products produced from amorphous silicon (“a-Si”), cadmium telluride (“CdTe”), or copper indium gallium selenide (“CIGS”).⁴⁷ “Thin film” is typically a lower-wattage photovoltaic product that converts sunlight into electricity less efficiently than CSPV products.⁴⁸ It is

⁴¹ Commerce explained that merchandise covered by these investigations 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, but that the written description of the scope of these investigations is dispositive. 79 Fed. Reg. at 76971; 79 Fed. Reg. at 76963-64.

⁴² CR at I-18 to I-21; PR at I-14 to I-17. Monocrystalline cells are made from a single grown crystal and tend to convert sunlight into electricity more efficiently than multicrystalline cells that have a random crystal structure. CR at I-24 to I-25; PR at I-19 to I-20.

⁴³ CR at I-39; PR at I-29.

⁴⁴ CR at I-22; PR at I-18.

⁴⁵ 79 Fed. Reg. at 76971; 79 Fed. Reg. at 76963.

⁴⁶ 79 Fed. Reg. at 76971; 79 Fed. Reg. at 76963 (excluding from the scope “crystalline silicon photovoltaic cells, not exceeding 10,000mm² 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”).

⁴⁷ 79 Fed. Reg. at 76971; 79 Fed. Reg. at 76963.

⁴⁸ *CSPV 1*, USITC Pub. 4360 at 8.

manufactured by layering a compound such as a-Si, CdTe, and/or CIGS onto glass or a flexible substrate such as stainless steel or plastic.⁴⁹

Commerce defined the scope of the investigation concerning subject imports from Taiwan 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. Subject merchandise includes crystalline silicon photovoltaic cells of thickness equal to or greater than 20 micrometers, having a p/n junction formed by any means, whether or not the cell has undergone other processing, including, but not limited to, cleaning, etching, coating, and/or addition of materials (including, but not limited to, metallization and conductor patterns) to collect and forward the electricity that is generated by the cell.

Modules, laminates, and panels produced in a third country from cells produced in Taiwan are covered by this investigation. However, modules, laminates, and panels produced in Taiwan from cells produced in a third country are not covered by this investigation.⁵⁰

Commerce excluded from the scope of the investigation concerning subject imports from Taiwan any products already covered by the existing *CSPV 1* antidumping and countervailing duty orders, certain CSPV cells that are permanently integrated into certain consumer goods, and a-Si, CdTe, or CIGS thin-film products.⁵¹

C. Analysis⁵²

In the *CSPV 1* investigations, the Commission defined the domestic like product as CSPV products and rejected respondents' request for a broader definition that included thin film products.⁵³ The Commission also determined not to define CSPV cells and CSPV modules as separate domestic like products, and no party argued otherwise.⁵⁴

In the final phase of these investigations, no party disputed the Commission's decision in the preliminary determinations that the domestic like product does not include thin film

⁴⁹ *CSPV 1*, USITC Pub. 4360 at 8.

⁵⁰ Commerce explained that merchandise covered by this investigation is currently classified in the HTSUS under subheadings 8501.61.0000, 8507.20.8030, 8507.20.8040, 8507.20.8060, 8507.20.8090, 8541.40.6020, 8541.40.6030 and 8501.31.8000, but that the written description of the scope of this investigation is dispositive. 79 Fed. Reg. at 76968.

⁵¹ 79 Fed. Reg. at 76968.

⁵² Chairman Broadbent does not join this discussion because she finds that CSPV cells and modules are separate domestic like products. See Separate and Dissenting Views of Chairman Broadbent.

⁵³ *CSPV 1*, USITC Pub. 4360 at 4-12.

⁵⁴ *CSPV 1*, USITC Pub. 4360 at 6; *CSPV 1* (Preliminary), USITC Pub. 4295 at 10-11.

products.⁵⁵ In their comments on the draft questionnaires for the final phase of these investigations, no party asked the Commission to collect data concerning any possible alternative domestic like product definition. TPIA requested that the Commission define CSPV cells and CSPV modules as separate domestic like products based on a semi-finished domestic like product analysis, but it did not make this request until its prehearing brief in the final phase of these investigations.⁵⁶ It asserts that, because no party argued in favor of two like products in any of the prior CSPV proceedings, the Commission “was not presented with both sides of the issue.”⁵⁷ CCCME takes “no position” on TPIA’s request for two domestic like products.⁵⁸

⁵⁵ In its preliminary determinations, the Commission concluded that the record did not indicate that CSPV products and thin-film technologies had changed enough to warrant departing from the Commission’s determinations in the *CSPV 1* investigations not to include thin film in the domestic like product definition. Due to differences in their underlying raw materials, manufacturing facilities, manufacturing processes, and production employees, CSPV and thin-film products differ significantly in physical characteristics, conversion efficiency, output, and other capabilities. These physical limitations affect their relative prices, limit their interchangeability, and limit any overlap in channels of distribution, particularly for non-utility sales. *CSPV 1*, USITC Pub. 4360 at 8-11; *CSPV 1* CR at I-22 to I-23, App. E.f; *CSPV 2* (Preliminary), USITC Pub. 4454 at 8-10. For example, less efficient and generally lower output thin film may be more suited than CSPV products for installation in larger quantities on flat roofs, on less-expensive land (deserts), and as part of projects without space restrictions that limit the number of modules to achieve a particular wattage. Twelve of 19 domestic producers of CSPV or thin film and 34 of 49 responding U.S. importers had identified some overlap in the channels of distribution for thin film and CSPV products. At the same time, evidence supported the reporting by *** that “CSPV modules are used more commonly in space- and weight-constrained commercial and residential market segments than thin-film modules (thus requiring different distribution channels), while thin-film modules are used more commonly in the utility-scale market (and are thus dependent on the distribution channels serving that market).” *CSPV 1* CR at I-22 to I-23 (overall smaller thin-film shipments predominantly to utilities), Table II-1 (CSPV shipped mostly to commercial installers and distributors), Figure II-1, App. E.b, E.d; *CSPV 1* Views, EDIS Doc. No. 548905 at 8-10; *CSPV 2* (Preliminary), USITC Pub. 4454 at 9. Eleven of 19 U.S. producers of CSPV and/or thin film and 23 of 49 responding U.S. importers reported that their customers perceive the products have different physical characteristics, flexibility, efficiency, power outage, space requirements, bankability, environmental concerns, climate suitability, performance characteristics, reliability, durability, and established nature. *CSPV 1*, USITC Pub. 4360 at 11. In light of the lack of any contrary argument, for the reasons stated in the preliminary determinations, we do not define the domestic like product broader than the scope to include thin film products.

⁵⁶ The lateness of TPIA’s request for two domestic like products precluded the Commission from surveying market participants on this issue through its regular questionnaire process.

⁵⁷ Specifically, TPIA argues that CSPV cells have different physical characteristics and functions than CSPV modules, because lamination prevents thin CSPV cells from cracking and breaking or oxidizing and degrading due to air exposure. Additionally, it claims, single CSPV cells lack sufficient power and components to generate and transmit the amount of electricity required for residential, commercial, utility, and off-grid applications. It asserts that module assembly involves a large number of workers, significant technical expertise, and highly automated and sophisticated operations. It contends that module assembly, which accounts for the majority of labor costs and involves substantial capital investments and processing time, adds significant value to the finished module. TPIA argues that CSPV cells serve different markets (module assemblers or integrated firms’ internal captive consumption)

SolarWorld asks the Commission to define a single domestic like product that includes CSPV cells and modules for the reasons articulated in the Commission's prior determinations.⁵⁹

To resolve domestic like product questions involving upstream articles (CSPV cells) and downstream articles (CSPV modules), the Commission uses a "semi-finished products" domestic like product analysis.⁶⁰ The principal facts on which the Commission determined to include CSPV cells and modules in the same domestic like product in the *CSPV 1* proceedings have not changed.⁶¹ The record in these investigations does not support defining CSPV cells and CSPV modules as separate domestic like products.

Dedication to production of downstream article: CSPV cells are dedicated for use in the production of CSPV modules,⁶² either directly by the CSPV cell manufacturer in the production of its own CSPV modules or by a separate entity that is a CSPV module assembler.⁶³ No party has argued that there are independent uses for the CSPV cells, much less significant commercial uses outside assembly into modules.

Lack of separate markets for upstream and downstream articles: The record does not demonstrate separate markets for CSPV cells and CSPV modules. There is no separate market for CSPV cells based on any independent use, as noted above. Moreover, the two remaining U.S. producers of CSPV cells, SolarWorld and Suniva, internally consume the majority of the CSPV cells they manufacture in the United States in their U.S. production of CSPV modules.⁶⁴

than modules (distributors, residential/commercial installers, and utility developers). It asserts that competition between U.S. and subject producers occurs primarily in the module channel of distribution, given that merchant market sales of CSPV cells account for such a small share of total CSPV product purchases. TPIA's Posthearing Brief at 2-3; TPIA's Prehearing Brief at 6-13.

⁵⁸ CCCME's Posthearing Brief at Exhibit 1 at 1.

⁵⁹ Petitioner's Posthearing Brief at 3, Exhibit 1 at 63-68; Petitioner's Prehearing Brief at 6-7.

⁶⁰ In applying the semi-finished analysis, the Commission examines the following: (1) the significance and extent of the processes used to transform the upstream into the downstream articles; (2) whether the upstream article is dedicated to the production of the downstream article or has independent uses; (3) differences in the physical characteristics and functions of the upstream and downstream articles; (4) whether there are perceived to be separate markets for the upstream and downstream articles; and (5) differences in the costs or value of the vertically differentiated articles. *See, e.g., Certain Frozen Fish Fillets from Vietnam*, Inv. No. 731-TA-1012 (Preliminary), USITC Pub. 3533 at 7 (Aug. 2002); *Live Swine from Canada*, Inv. No. 731-TA-1076 (Final), USITC Pub. 3766 at 8 n.40 (Apr. 2005); *Live Cattle from Canada and Mexico*, Inv. Nos. 701-TA-386 and 731-TA-812 to 813 (Preliminary), USITC Pub. 3155 at 6 (Feb. 1999).

⁶¹ *CSPV 1*, USITC Pub. 4360 at 6; *CSPV 1* (Preliminary), USITC Pub. 4295 at 10-11.

⁶² CSPV cells are sometimes used to make non-standard size modules for the very small building integrated photovoltaic market. Building integrated photovoltaic products, such as solar shingles or solar windows, are materials that incorporate solar cells (often thin film and sometimes CSPV cells). CR at I-23 to I-24, II-1; PR at I-19.

⁶³ CR at III-9 & n.7; PR at III-6 & n.7; Petitioner's Prehearing Brief at 6-7. In any event, complete dedication of the upstream article to production of the downstream article is not a prerequisite to finding a single domestic like product. *See, e.g., Outboard Engines from Japan*, Inv. No. 731-TA-1069 (Final), USITC Pub. 3752 at 7 (Feb. 2005).

⁶⁴ CR at III-9 & n.7; PR at III-6 & n.7; Petitioner's Prehearing Brief at 6-7. The Commission has previously included both upstream and downstream articles in the domestic like product definition,

U.S. CSPV cell producers sell CSPV cells in the commercial market to a very limited degree (***) percent of SolarWorld's total CSPV cell shipments and *** percent of Suniva's total CSPV cell shipments in 2013), and these CSPV cells are also intended for assembly into CSPV modules.⁶⁵ Both CSPV cells and CSPV modules are integrated into photovoltaic solar systems that convert sunlight into electricity for use in residential, commercial, and utility applications.⁶⁶

Similarities in physical characteristics and functions: Because CSPV cells are the basic element of a CSPV module, both cells and modules share the same primary physical characteristics. The characteristics of CSPV cells that enable them to convert sunlight into electricity are not affected by the module assembly process but are an essential function of the module in CSPV solar systems. Likewise, CSPV modules cannot serve their intended function of converting sunlight into electricity without the inclusion of CSPV cells.⁶⁷

Processes used to manufacture the downstream article from the upstream article: CSPV cells undergo only one major manufacturing step (assembly) to become CSPV modules.⁶⁸ The essential characteristic of CSPV cells to convert sunlight into electricity is enhanced when multiple CSPV cells are strung together, laminated, framed, and connected to an inverter as CSPV modules.⁶⁹ The assembly process does not change the essential characteristics of the CSPV cells.⁷⁰

where not all upstream articles were directly consumed by manufacturers of downstream articles but were sometimes sold by the manufacturer of the upstream article and purchased for manufacture into the downstream article. *See, e.g., Hand Trucks and Certain Parts Thereof from China*, Inv. No. 731-TA-1059 (Preliminary), USITC Pub. 3660 at 7 (Jan. 2004); *Diamond Sawblades and Parts Thereof from China and Korea*, Inv. Nos. 731-TA-1092 and 1093 (Preliminary), USITC Pub. 3791 at 6-7 (Aug. 2005); *Outboard Engines from Japan*, USITC Pub. 3752 at 7.

⁶⁵ U.S. CSPV cell producers also export CSPV cells, but those CSPV cells are used to manufacture CSPV laminates and CSPV modules. Moreover, ***. CR at III-9 & n.7; PR at III-6 & n.7; CR/PR at Table III-7; CR/PR at Table *** at note.

⁶⁶ Petitioner's Prehearing Brief at 7; CR at I-22, I-27, I-42; PR at I-18, I-21, I-31.

⁶⁷ Petitioner's Prehearing Brief at 7; CR at I-22, I-27, I-42; PR at I-18, I-21, I-31.

⁶⁸ To assemble CSPV cells into modules, manufacturers use highly automated and sophisticated yet relatively more labor-intensive processes in which they assemble into a laminate soldered strings of CSPV cells on a rectangular matrix sealed with ethyl vinyl acetate and a back sheet and then attach a frame and junction box. Some firms import laminates and then otherwise finish them in the United States, such as by installing proprietary, U.S.-origin electronics. CR at I-23 to I-24, I-32 to I-40, I-43; PR at I-19, I-25 to I-29, I-31; CR/PR at note to Tables ***; tenKsolar's Prehearing Brief at 1-2.

⁶⁹ CSPV modules generate higher wattages than the individual CSPV cells used to make them, their junction box permits modules to be connected to an inverter that converts the systems direct current into alternating current for additional transmission, and lamination permits the CSPV cells to withstand the elements in order to convert sunlight into electricity over a longer useful life. CR at I-23 to I-24, I-32 to I-40, I-43; PR at I-19, I-25 to I-29, I-31. Semi-finished products dedicated for use in downstream products do not necessarily encompass all attributes or functions of the finished products. *See, e.g., Live Swine*, USITC Pub. 3693 at 7; *Carbazole Violet Pigment 23 from China and India*, Inv. Nos. 701-TA-437 and 731-TA-1060 and 1061 (Final), USITC Pub. 3744 at 5-7 (Dec. 2004).

⁷⁰ *Cf. DRAMs of One Megabit and Above from Taiwan*, Inv. No. 731-TA-811 (Preliminary), USITC Pub. 3149 at 6, n.15 (Dec. 1998) (defining a single domestic like product that includes DRAM chips and

The relative cost or value of the vertically differentiated articles: Market participants also reported that CSPV cells represent a substantial portion of the total cost of finished CSPV modules.⁷¹

In sum, CSPV cells are dedicated for use in CSPV modules, and the vast majority of the CSPV cells manufactured in the United States are consumed by the CSPV cell manufacturer in its own production of CSPV modules. Only a fraction of CSPV cells manufactured in the United States are sold in the commercial market, and even then, CSPV cells are used to manufacture CSPV modules, further indicating a lack of separate markets for the upstream and downstream products. The processes used to manufacture CSPV modules from CSPV cells are technologically sophisticated, more labor intensive than manufacturing CSPV cells, and add value to the product, but they enhance rather than change the basic function of the CSPV cells, which is to convert sunlight into electricity. For these reasons, we determine that CSPV cells and CSPV modules should be included in the same domestic like product.

Consequently, based on the record, we define a single domestic like product corresponding to the scope of these investigations that includes CSPV cells and CSPV modules, consistent with the Commission's determinations in *CSPV 1* and in the preliminary phase of these investigations.

III. Domestic Industry

A. In General

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."⁷² 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.⁷³ These investigations raise two domestic industry issues: (1) whether firms that assemble CSPV cells into CSPV modules engage in sufficient production-related activities to be included in the domestic industry as U.S. producers, and (2) whether it is

modules after finding that the essential physical and functional characteristics of DRAM module are imparted to it by the DRAM chip).

⁷¹ CR/PR at Table VI-1, VI-2, II-14 (on average, importers reported that CSPV cells account for *** percent of the cost of CSPV modules, and the averages reported by U.S. producers and purchasers were *** percent and *** percent, respectively). See generally *Carbazole Violet*, USITC Pub. 3744 at 6-7 (finding one domestic like product where conversion into downstream product added substantial value, but the upstream product was the most costly input used to make the downstream product).

⁷² 19 U.S.C. § 1677(4)(A).

⁷³ *Polyvinyl Alcohol from China, Germany, Japan, Korea & Singapore*, Inv. Nos. 731-TA-1014 to 1018 (Preliminary), USITC Pub. 3553 at 10 (Oct. 2002); *Ferrovandium from China and South Africa*, Inv. Nos. 731-TA-986 to 987 (Preliminary), USITC Pub. 3484 at 7 & n.35 (Jan. 2002); *Certain Welded Large Diameter Line Pipe from Japan*, Inv. No. 731-TA-919 (Final), USITC Pub. 3464 at 10 n.53 (Nov. 2001); *Certain Carbon Steel Plate from China, Russia, South Africa, and Ukraine*, Inv. Nos. 731-TA-753 to 756 (Final), USITC Pub. 3076 at 9 (Dec. 1997).

appropriate to exclude any producer of the domestic like product from the domestic industry as a related party pursuant to 19 U.S.C. § 1677(4)(B).

B. Sufficient Production-Related Activities⁷⁴

In these investigations, we consider whether firms that manufacture CSPV modules in the United States engage in sufficient production-related activities to be considered part of the domestic industry.⁷⁵ Consistent with our findings in *CSPV 1* and in the preliminary phase of these investigations,⁷⁶ and based on the record,⁷⁷ we determine that U.S. module assemblers engage in sufficient production-related activities to include them in the domestic industry as domestic producers of the domestic like product. Consequently, we treat their resulting products as shipments by the domestic industry, even if those modules are assembled in the United States from inputs that are imported. No party has argued that module assemblers should not be included in the domestic industry in the final phase of these investigations.

C. Related Parties

We also must determine whether any producer of the domestic like product should be excluded from the domestic industry pursuant to 19 U.S.C. § 1677(4)(B). Section 1677(4)(B) of the Tariff Act 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

⁷⁴ Chairman Broadbent does not join this discussion because she finds that CSPV cells and CSPV modules are separate domestic like products, and thus defines two separate domestic industries producing cells and modules. See Separate and Dissenting Views of Chairman Broadbent.

⁷⁵ In deciding whether a firm qualifies as a domestic producer of the domestic like product, the Commission generally analyzes the overall nature of a firm's U.S. production-related activities, although production-related activity at minimum levels could be insufficient to constitute domestic production. The Commission generally considers six factors: (1) source and extent of the firm's capital investment; (2) technical expertise involved in U.S. production activities; (3) value added to the product in the United States; (4) employment levels; (5) quantity and type of parts sourced in the United States; and (6) any other costs and activities in the United States directly leading to production of the like product. No single factor is determinative and the Commission may consider any other factors it deems relevant in light of the specific facts of any investigation. *Diamond Sawblades and Parts Thereof from China and Korea*, Inv. Nos. 731-TA-1092 to 1093 (Final), USITC Pub. 3862 at 8-11 (Jul. 2006).

⁷⁶ *CSPV 1*, USITC Pub. 4360 at 13; USITC Pub. 4454 at 10 n.39.

⁷⁷ 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. CR/PR at Table VI-4 (showing capital expenditures and R&D expenses for CSPV cell operations *** for CSPV module operations); CR at I-36 to I-40; PR at I-28 to I-29. CSPV module operations provide lower value-added than CSPV cell manufacturing but still add meaningful value to the product. CR at VI-11; PR at VI-4; CR/PR at Table II-14. Although a sizeable portion of U.S.-made CSPV modules used inputs imported from nonsubject or subject sources, domestically produced CSPV cells constituted the largest single source of CSPV cells used to manufacture CSPV modules in the United States throughout the POI. CR/PR at Table III-6.

or which are themselves importers.⁷⁸ Exclusion of such a producer is within the Commission's discretion based upon the facts presented in each investigation.⁷⁹ In *CSPV 1*, of the seven domestic producers that were related parties either by virtue of their imports of subject merchandise or their corporate affiliations, the Commission determined that appropriate circumstances existed to exclude only Suntech from the domestic industry.⁸⁰ In the preliminary phase of these investigations,⁸¹ the Commission determined that appropriate circumstances existed to exclude Suntech, Motech, Wanxing, and *** as related parties.⁸²

In the final phase of these investigations, SolarWorld asks the Commission to exclude Suntech, Motech, and Wanxiang from the domestic industry, based on its contention that these firms benefit from their related party status and principally act as importers instead of CSPV manufacturers.⁸³ CCCME "does not take a position" on whether to exclude any firm from the domestic industry.⁸⁴ TPIA argues that it is not appropriate to exclude Motech, Suntech, and Wanxiang from the domestic industry because importation of CSPV cells from Taiwan is necessary due to inadequate commercial availability of CSPV cells from the domestic industry and these firms are too small to skew the domestic industry's data.⁸⁵

In the final phase of these investigations, we conclude that numerous U.S. module assemblers qualify as related parties by virtue of their imports of subject merchandise and/or corporate relationships.⁸⁶ At the same time, we do not find that importation of subject merchandise by itself, even in appreciable quantities, necessarily warrants excluding a firm as a related party. This is particularly true when U.S. module assemblers primarily or exclusively rely

⁷⁸ 19 U.S.C. § 1677(4)(B).

⁷⁹ See *Torrington Co. v. United States*, 790 F. Supp. at 1168; *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).

⁸⁰ In *CSPV 1*, the Commission excluded Suntech as a related party because of the ***, its ***, its ***, its ***, and its *** between January 2009 and June 2012. *CSPV 1 Views* at 14-15. In *CSPV 1*, the Commission found that Motech's primary interest was in domestic production. On this basis and its examination of Motech's financial performance, the Commission found that appropriate circumstances did not exist to exclude Motech from the domestic industry as a related party. *Id.* at 15-16.

⁸¹ In the preliminary phase of these investigations, SolarWorld argued that it was appropriate to exclude Suntech and Motech from the domestic industry, arguing that each was primarily an importer rather than a domestic producer. Petitioner's Postconference Brief at Exhibit 1 at 73-75. TPIA argued against excluding Motech based on its assertion that all of Motech's transactions were at fair market value. TPIA's Postconference Brief at 4. CCCME took no position on this issue. CCCME's Postconference Brief at Exhibit 1 at 21.

⁸² *CSPV 1*, USITC Pub. 4360 at 10-15.

⁸³ Petitioner's Prehearing Brief at 8-12 (noting that Motech is related to subject producers in China and Taiwan and has a direct interest in ensuring the continuation of increasing volumes of unfairly traded subject imports; arguing that while operational Suntech was the world's largest producer of solar cells, controlled several subsidiaries in China in addition to its U.S. facility, and had a direct interest in and benefitted from its importing activities; and contending that Wanxiang clearly benefitted from the availability of unfairly priced ***); Hearing Tr. at 97 (Kaplan).

⁸⁴ CCCME's Posthearing Brief at Exhibit 3 at 12.

⁸⁵ TPIA's Posthearing Brief at Exhibit 1 at 11.

⁸⁶ CR/PR at Table III-5, Table E-2 to Table E-10.

on imported subject CSPV cells. As discussed above, even if module assemblers rely on imported inputs for their manufacturing process, CSPV module assembly adds value to the product and generally requires capital investment, R&D expenses, some automation and technical expertise, and some skilled labor.⁸⁷ We do not find appropriate circumstances exist to exclude most of these U.S. module assemblers from the domestic industry (including ***) because they appear to be acting as U.S. producers of CSPV modules more than as U.S. importers of subject merchandise.⁸⁸

We reach different conclusions, however, with respect to *** and Suntech, firms that accounted for ***. In addition to importing CSPV cells from subject sources for their U.S. module assembly operations, these firms imported sizeable and growing volumes of finished CSPV modules, at levels that exceeded their U.S. production of CSPV modules, providing further support that their interests lie in importing rather than production in the United States, as discussed below.

***, a U.S. module assembler that accounted for *** percent of U.S. production of CSPV modules by kilowatts during the POI, is a related party based on its imports of subject ***.⁸⁹ ***.⁹⁰

On balance, we determine to exclude *** from the domestic industry. *** stated that its ***⁹¹ ***, *** U.S. module producer, *** U.S. production of modules ***.⁹² The firm imported ***,⁹³ and *** its operating performance was ***.⁹⁴ ⁹⁵ The firm *** capital expenditures *** R&D expenses during the POI.⁹⁶ ***.⁹⁷

⁸⁷ See, e.g., CR/PR at Table II-14, Table VI-4; CR at I-36 to I-40, VI-11; PR at I-28 to I-29, VI-4.

⁸⁸ See, e.g., CR/PR at Table III-5, Table ***. We recognize that U.S. module assembler *** also imported sizeable volumes of CSPV modules relative to its U.S. production of CSPV modules. At the same time, however, ***. No party argued in favor of excluding *** from the domestic industry as a related party. Moreover, ***. Unlike *** and Suntech, which ***, *** maintained its interest in domestic production, as evidenced by the fact that the firm *** during the POI. The firm undertook ***. Additionally, the firm *** the petitions, and it does not appear to have benefitted from its importing activities. CR/PR at Table VI-3, Table E-*** and note.

⁸⁹ CR/PR at Table III-1.

⁹⁰ CR/PR at Table E-3. It ***. CR/PR at Table E-3.

⁹¹ U.S. Producer Questionnaire.

⁹² CR/PR at Table III-2. *** U.S. production of CSPV modules totaled *** kW in 2011, *** kW in 2012, *** kW in 2013, *** kW in the first six months of 2013 (“interim 2013”), and *** kW in the first six months of 2014 (“interim 2014”). As a share of its U.S. production, CSPV modules made using Taiwanese-origin cells were *** percent in 2011, *** percent in 2012, *** percent in 2013 and interim 2013, and *** percent in interim 2013. CR/PR at Table E-3.

⁹³ *** reported importing ***. The firm’s total imports of finished modules exceeded its U.S. module production operations throughout the POI, further suggesting the firm’s primary interest as an importer of CSPV modules rather than a U.S. producer of CSPV modules. The firm’s imports of subject CSPV modules from *** were *** kW in 2011, *** kW in 2012, *** kW in 2013, *** kW in interim 2013, and *** kW in interim 2014, meaning that ***, alone, exceeded its U.S. production of CSPV modules in 2013, and it ***. CR/PR at Table E-3.

⁹⁴ Its ratio of operating income to net sales was *** percent in 2011, *** percent in 2012, *** percent in 2013, and *** percent in interim 2013, whereas the domestic industry’s average was ***

Suntech. Suntech is a related party because it imported ***.⁹⁸ Additionally, Suntech is a wholly owned subsidiary of Suntech Power Holdings Co. of California, which in turn is a wholly owned subsidiary of Suntech Power Holdings Co., Ltd. of China. Suntech Power Holdings Co., Ltd. has four wholly owned subsidiaries in China that produce/export CSPV cells and CSPV modules: Wuxi Suntech Power Co., Ltd.; Wuxi Sun-Shine Power Co., Ltd.; Luoyang Suntech Power Co., Ltd.; and Suntech Power Co., Ltd.⁹⁹

We determine to exclude Suntech from the domestic industry as a related party. Suntech, a U.S. CSPV module assembler, accounted for *** percent of U.S. production of CSPV modules by kilowatts in 2011.¹⁰⁰ Suntech ***.¹⁰¹ Suntech did not provide a questionnaire response in these investigations. In the prior investigations, however, its imports of merchandise within the scope of the *CSPV 1* investigations were ***.¹⁰² The firm ***.¹⁰³

There is no information regarding Suntech's more recent financial performance, but its financial performance in the prior investigations ***.¹⁰⁴ Although the firm reported investing ***.¹⁰⁵

percent in 2011, *** percent in 2012, *** percent in 2013, and *** percent in interim 2013. U.S. Producer Questionnaire; CR/PR at Table VI-3.

⁹⁵ Vice Chairman Pinkert does not rely upon a firm's financial performance in these investigations as a factor in determining whether there are appropriate circumstances to exclude the firm from the domestic industry, as it is unclear the extent to which the firm has derived a specific financial benefit from its status as a related party. *See Allied Mineral Products v. United States*, 28 CIT 1861, 1865-67 (2004).

⁹⁶ In terms of capital expenditures, it invested \$*** in 2011 and \$*** in 2012. Its R&D expenditures totaled ***. U.S. Producer Questionnaire.

⁹⁷ CR/PR at Table III-1.

⁹⁸ CR/PR at Table III-17 n.11.

⁹⁹ *CSPV 1* Views at 20.

¹⁰⁰ *CSPV 1* Views at 21.

¹⁰¹ CR/PR at Table III-5; *CSPV 1* Views at 21.

¹⁰² The ratio of Suntech's total imports from China of products within the scope of the *CSPV 1* investigations to its domestic production (based on kilowatts) was *** percent in 2010, *** percent in 2011, *** percent in the first six months of 2011, and *** percent in the first six months of 2012. *CSPV 1* Views at 21; *CSPV 1* CR at Table III-8.

¹⁰³ Suntech's CSPV module production was *** kW in 2010, *** kW in 2011, *** kW in the first six months of 2011, and *** kW in the first six months of interim 2012. Suntech's imports from China of CSPV modules within the scope of the *CSPV 1* investigations were *** kW in 2010, *** kW in 2011, *** kW in the first six months of 2011, and *** kW in the first six months of 2012; it imported *** kW of finished modules made from Taiwanese cells in the first six months of 2012. Suntech's imports from China of CSPV cells within the scope of the *CSPV 1* investigations were *** kW in 2010, *** kW in 2011, *** kW in interim 2011, and *** kW in interim 2012; it imported *** kW of CSPV cells from Taiwan in the first six months of 2012. *CSPV 1* Views at 21; *CSPV 1* CR at Table III-8.

¹⁰⁴ Suntech's ratio of operating income to net sales was ***. *CSPV 1* at 21; *CSPV1* CR at Table VI-4.

¹⁰⁵ Suntech invested \$***. *CSPV 1* Views at 21; CR/PR at Table III-2.

Based on our definition of the domestic like product and our findings above, we define the domestic industry as all U.S. producers of CSPV cells and CSPV modules except for Suntech and ***.¹⁰⁶

IV. Negligible Imports

Section 771(24) of the Tariff Act, which defines “negligibility,” provides that imports from a subject country that are 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 petitions or self-initiation, as the case may be, shall be deemed negligible.¹⁰⁷

No party argues that imports from Taiwan or China are negligible based on Commerce’s final scope determinations.¹⁰⁸ According to available data for the most recent twelve month period prior to the filing of the petitions (full-year 2013), subject imports of CSPV products from Taiwan are *** percent of total CSPV imports and subject imports from China are *** percent of total CSPV imports.¹⁰⁹ Both of these figures exceed the applicable three percent negligible imports threshold. Consequently, imports from Taiwan and China are not negligible.^{110 111}

¹⁰⁶ The decision to exclude Suntech and *** from the domestic industry did not have a significant impact on our analysis of material injury and causation, because these exclusions did not significantly change the trends in the domestic industry’s overall performance during the POI due to the relatively small size of their production operations. *Compare, e.g.*, CR/PR at Table C-2 and Table C-4.

¹⁰⁷ In the case of countervailing duty investigations involving developing countries (as designated by the United States Trade Representative), the statute indicates that the negligibility limits are 4 percent and 9 percent, rather than 3 percent and 7 percent. 19 U.S.C. § 1677(24).

¹⁰⁸ CCCME’s original argument that imports from China are negligible was predicated on the assumption that Commerce would apply the same approach to define the scope in these investigations as in the *CSPV 1* investigations. *See, e.g.*, CCCME’s Prehearing Brief at 8-9. As discussed above, the Commission must accept Commerce’s definition of the scope of these investigations, and Commerce did not apply the same approach to define the scope in these investigations as in the *CSPV 1* investigations.

TPIA reserved the right to comment on negligibility at a later point in these investigations, TPIA’s Prehearing Brief at 13, although it did not subsequently do so. Any argument that imports from Taiwan are negligible would have been based both on a decision by Commerce to exclude from the scope of these investigations those CSPV modules assembled in third countries from CSPV cells made in Taiwan and a decision by the Commission to define CSPV cells and modules as separate domestic like products. Neither predicate occurred.

¹⁰⁹ CR/PR at Table E-13.

¹¹⁰ Pointing to classification decisions from Customs, Kyocera argues that its imports of CSPV modules that are assembled in Mexico from CSPV cells made in Taiwan should be considered imports from Mexico, and not imports of subject merchandise from Taiwan. Because these investigations involve imports from Taiwan and China (and not Mexico), Kyocera asserts that Commerce has not made any finding that imports from Mexico are dumped or subsidized, so it argues that its imports from Mexico cannot be included in any injury analysis. Even if these imports were included in any injury analysis, Kyocera argues that the Commission must determine that imports from Mexico are negligible, based on Kyocera’s assertion that the statute requires an analysis of “imports from a country of merchandise corresponding to a domestic like product identified by the Commission ...”, which in this

V. Cumulation¹¹²

For purposes of evaluating the volume and price effects for a determination of material injury by reason of subject imports, the Commission cumulatively assesses “the volume and effect of imports of the subject merchandise from all countries with respect to which” petitions were filed on the same day “if such imports compete with each other and with domestic like products in the United States market.”¹¹³

A threshold question we must address in these investigations is whether subject imports from China and Taiwan are eligible for cumulation. TPIA argues they are not, because the scope of the investigation on subject imports from Taiwan is different than the scope of the investigations on subject imports from China.¹¹⁴ Absent common scope definitions, it argues

case means an analysis of whether imports from Mexico are negligible. Kyocera’s Prehearing Brief; Kyocera’s Comments on Implications of Commerce’s Final Scope Determinations.

Kyocera’s arguments are based on two flawed premises. First, Kyocera overlooks that the Commission must defer to Commerce’s definition of the scope of the merchandise subject to these investigations, and Commerce has determined that U.S. imports of CSPV modules assembled in third countries such as Mexico from CSPV cells made in Taiwan are U.S. imports of subject merchandise from Taiwan, as discussed earlier. Moreover, Kyocera does not read the negligible imports language in tandem with 19 U.S.C. §§ 1671(d)(b), 1673(d)(b), which direct the Commission to determine whether a domestic industry is materially injured “by reason of imports, or sales (or the likelihood of sales) for importation, of the merchandise *with respect to which the administering authority has made an affirmative determination under subsection (a)(1) of this section*. If the Commission determines that *imports of the subject merchandise are negligible*, the investigation shall be terminated.” (emphasis added). It is not reasonable to read “any country” into the definition of negligible imports without taking into account that the statute centers the negligibility analysis on the imports of the subject merchandise with respect to which Commerce has made an affirmative determination.

¹¹¹ Chairman Broadbent finds that, for the same twelve-month time period, subject imports of CSPV modules from China and Taiwan were 82.9 percent and 10.6 percent, respectively, of total CSPV module imports. The scope of the instant investigations regarding imports from China does not include CSPV cells. With respect to CSPV cells from Taiwan, she finds that subject imports from Taiwan were *** percent of total CSPV cell imports. CR/PR at E-12. Consequently, subject imports of CSPV cells from Taiwan, and subject imports of CSPV modules from China and Taiwan, are not negligible.

¹¹² Chairman Broadbent joins these views concerning cumulation as they apply to whether the threshold provisions for cumulation have been met and whether subject imports of CSPV modules from China and Taiwan compete with each other and with domestically produced CSPV modules. She finds that the analysis of the four factors indicates even greater overlap of competition if only CSPV modules are considered.

¹¹³ 19 U.S.C. § 1677(7)(G)(i)(I). None of the statutory exceptions in 19 U.S.C. § 1677(7)(G)(i)(II) applies in these investigations.

¹¹⁴ TPIA argues that the scope of the investigation on subject imports from Taiwan includes cells and modules assembled in the subject country with cells made in the subject country, whereas such products are excluded from the investigations on subject imports from China. Likewise, it argues, the scope of the investigations on subject imports from China includes modules assembled in the subject country with cells made in a nonsubject country as well as modules assembled in China with cells made in Taiwan, whereas those products are excluded from the scope of the investigation on subject imports

that the Commission is precluded from cumulating subject imports from Taiwan and China for any analysis of material injury or threat of material injury.^{115 116} In the alternative, TPIA argues that the Commission has discretion whether to cumulate,¹¹⁷ and asks the Commission not to exercise its discretion for its material injury or threat analysis.¹¹⁸ By contrast, SolarWorld contends that the scope definitions for the investigations on subject imports from China and Taiwan are common in that both involve solar cells and modules, with the difference being that

from Taiwan. TPIA's Comments on Implications of Commerce's Final Scope Determinations at 3 (characterizing the scopes as "mutually exclusive").

¹¹⁵ As support for a common scope definition requirement, it points to the statute's use of the singular terms "the subject merchandise," "the class or kind of merchandise," and "the scope of an investigation." It argues that if different scopes were permitted, the statute would authorize the Commission to "cumulatively assess the volume and effect of imports of the subject merchandise from each country ..." rather than "all countries." Because the SAA expresses the intent to comply with U.S. international obligations, TPIA argues that the U.S. statute must be read consistently with the WTO Antidumping Agreement's provision permitting cumulation where "imports of a product from more than one country are simultaneously subject to antidumping investigations." TPIA also refers to what it acknowledges is a dissenting opinion in the preliminary determinations in *Paintbrushes from China and Indonesia*, in which one Commissioner declined to cumulate synthetic filament paintbrushes from China with natural bristle and synthetic filament paintbrushes from Indonesia. TPIA's Posthearing Brief at 3-6, Exhibit 1 at 17-18; TPIA's Prehearing Brief at 14-16. The Commission majority, by contrast, found that cumulation was consistent with the statute because the scopes of the investigations overlapped. *Certain Paintbrushes from China and Indonesia*, Inv. Nos. 731-TA-857-858 (Preliminary), USITC Pub. 3237 at 10 n.67 (Sept. 1999).

¹¹⁶ After initially reporting that it "does not take a position on whether a common scope definition is a prerequisite for cumulation," CCCME's Posthearing Brief at Exhibit 3 at 1, CCCME now clarifies that it takes no position on whether U.S. law requires a common scope for cumulation, although it argues that the WTO Antidumping and Subsidies and Countervailing Measures Agreements permit cumulation only where "imports of a product from more than one country are simultaneously subject" to investigations. Because the scope of the investigations on subject imports from China covers modules and the scope of the investigations on subject imports from Taiwan covers cells, it argues that the singular "product" requirement of the WTO agreements would preclude cumulation of imports from China and Taiwan in these investigations. CCCME's Comments on Implications of Commerce's Final Scope Determinations at 9.

¹¹⁷ TPIA does not attempt to explain what language in the statute gives the Commission discretion to cumulate for purposes of any material injury analysis.

¹¹⁸ TPIA asserts that the industry in Taiwan is foremost a CSPV cell industry, whereas China and the United States have vertically integrated CSPV module manufacturing industries that depend on producers in Taiwan for additional CSPV cells. Claiming that any competition in the U.S. market is for sales of CSPV modules made in the United States, China, and third countries, it argues that subject imports from Taiwan that predominantly consist of CSPV cells do not compete in the U.S. market with CSPV modules from China or the United States. Indeed, it claims, subject imports from Taiwan were included in these investigations "only so that SolarWorld could ensure the scope of the investigations would include Chinese modules made with Taiwanese cells." TPIA's Posthearing Brief at 6-8; TPIA's Prehearing Brief at 16-23; TPIA's Comments on the Implications of Commerce's Final Scope Determinations at 4-5 (also arguing sharply divergent volume and price trends for subject imports from China and Taiwan based on the revised data).

products already subject to the prior orders are excluded from the scopes of both.¹¹⁹ In any event, SolarWorld argues that even if the scope definitions are not common, the Commission must cumulate where, as here, there is a reasonable overlap of competition among subject imports and the domestic like product.¹²⁰

We disagree with TPIA that the statute requires a common scope definition as a prerequisite to cumulation. The plain language of the statute does not preclude cumulation of imports corresponding to differing scopes when the statutory requirements of competition and simultaneous initiation are otherwise satisfied.¹²¹ In the few instances in which the Commission has encountered this issue, resolution has turned on whether imports competed with one another and the domestic like product. For example, when the investigations had been initiated at the same time, the Commission majority in its negative preliminary determinations in *Paintbrushes* found it appropriate to cumulate synthetic filament paintbrushes from China with natural bristle and synthetic filament paintbrushes from Indonesia after finding the statutory requirements for cumulation (that subject imports compete with one another and the domestic like product) had been met.¹²² By contrast, in *Pure Magnesium from China, Israel, and Russia*, the Commission did not cumulate subject

¹¹⁹ Hearing Tr. at 94 (Brightbill); Petitioner’s Comments on Implications of Commerce’s Final Scope Determinations at 3-4, 10.

¹²⁰ Hearing Tr. at 93-94 (Brightbill); Petitioner’s Prehearing Brief at 12-17; Petitioner’s Comments on Implications of Commerce’s Final Scope Determinations at 3-4, 10.

¹²¹ The statute provides in relevant part that the Commission “shall cumulatively assess the volume and effect of imports of the subject merchandise from all countries with respect to which” petitions were filed on the same day “if such imports compete with each other and with domestic like products in the United States market.” 19 U.S.C. § 1677(7)(G)(i)(I). In turn, the statute defines “subject merchandise” as “the class or kind of merchandise that is within the scope of an investigation” 19 U.S.C. § 1677(25). The WTO Agreements also do not appear to preclude an investigating authority from cumulating imports absent common scope definitions, inasmuch as they do not reference scope definitions. We also observe that the Commission is bound to follow U.S. law. 19 U.S.C. §§ 3512, 3533.

¹²² *Certain Paintbrushes from China and Indonesia*, Inv. Nos. 731-TA-857 to 858 (Preliminary), USITC Pub. 3237 at 10-11 (Sept. 1999); *see generally Sugar from the European Union; Sugar from Belgium, France, and Germany; and Sugar and Syrups from Canada*, Inv. Nos. 104-TAA-7, AA1921-198 to 200 and 731-TA-3 (Review), USITC Pub. 3238 (Jul. 1999) (determining that the Commission could cumulate imports with overlapping scopes for these five-year reviews if there was a likely reasonable overlap of competition among subject imports and the domestic like product in the event of revocation and the no discernible adverse impact exception was not met); *see also generally Circular Welded Carbon-Quality Steel Pipe from India, Oman, the United Arab Emirates, and Vietnam*, Inv. Nos. 701-TA-482 to 784 and 731-TA-1191 to 1194 (Preliminary), USITC Pub. 4298 at 5, 12-14 (Dec. 2011) (after finding a reasonable overlap of competition among all subject imports and the domestic like product, cumulating imports from India with other imports even though the scope of the antidumping duty investigation on imports from India only included imports from Zenith whereas the scope of the countervailing duty investigation on imports from India included all imports from India); *cf. Certain Pipe and Tube from Argentina, Brazil, Canada, India, Korea, Mexico, Singapore, Taiwan, Thailand, Turkey, and Venezuela*, Invs. 701-TA-253 and 731-TA-132, 252, 271, 273, 276-277, 296, 409-410, 532-534 and 536-537 (Review), USITC Pub. 3316 at 30-31 (Jul. 2000) (exercising discretion to cumulate imports from all subject sources notwithstanding variances in the scope definitions of the orders under review).

imports of granular magnesium from China with subject magnesium ingot imports from Russia and Israel after finding limited direct competition between them and differences in the channels of distribution.¹²³

Accordingly, we reject TPIA's contention that different scopes preclude cumulation of subject imports from China and Taiwan. Because SolarWorld filed the antidumping and countervailing duty petitions with respect to both countries on the same day, December 31, 2013, and the record supports finding a reasonable overlap of competition between imports of CSPV products from China and Taiwan and between imports of CSPV products from each subject country and the domestic like product, we consider subject imports from China and Taiwan on a cumulated basis.¹²⁴

In assessing whether subject imports compete with each other and with the domestic like product, the Commission generally has considered four factors:

¹²³ Customers reported that imports of granular magnesium from China were "unique in the marketplace," and virtually all granular magnesium imported from China was sold to grinders whereas only a very small portion of imports from Russia and Israel was sold to grinders. *Pure Magnesium from China, Israel, and Russia*, Inv. Nos. 701-TA-403 and 731-TA-895 to 897 (Preliminary), USITC Pub. 3376 at 16-17 (Dec. 2000).

Similarly, in an investigation involving the pre-URAA version of the statute (under which the Commission cumulated imports "subject to investigation" even when the investigations were not initiated simultaneously), the Commission determined not to cumulate the imports within the scope of the *SQ Carbon and Alloy Bars* investigation with the imports within the scope of the separate pending investigation of *Hot-Rolled Lead and Bismuth Carbon Steel Products*. Because the scopes of the two cases had no overlap, the Commission was persuaded that there was not a sufficiently reasonable overlap of competition to justify cumulation. *Certain Special Quality Hot-Rolled and Semifinished Carbon and Alloy Steel Products from Brazil*, Inv. Nos. 701-TA-314 to 317 and 731-TA-552 to 555 (Preliminary), USITC Pub. 2512 (June 1992).

¹²⁴ CCCME argues that the WTO Dispute Settlement Body (DSB) action in *United States – Countervailing Duty Investigation on Hot-Rolled Steel Products from India* precludes the Commission from cumulating non-subsidized dumped subject imports from Taiwan with subject imports from China for purposes of the countervailing duty determination on subject imports from China. CCCME's Comments on Implications of Commerce's Final Scope Determinations at 9 n.29. We observe that, even after adoption, Dispute Settlement Body reports only bind Members with respect to particular cases or matters subject to the dispute and Members are provided a reasonable period of time to implement the findings and recommendations of the panel or Appellate Body in that dispute. WTO Agreement on Dispute Settlement Understanding, Articles 3, 17, 19, 21, 22. Given that the United States is currently in the process of addressing implementation of the findings regarding cumulation in the *Hot-Rolled Steel* dispute, we do not believe that it is appropriate for the Commission to take action based on the Appellate Body report in that dispute. Under the circumstances, we follow the Commission's practice of "cross-cumulating" imports subject to Commerce's affirmative countervailing duty determination with imports subject to Commerce's affirmative antidumping duty determinations. See *Bingham & Taylor v. United States*, 815 F.2d 982 (Fed. Cir. 1987); see also, e.g., *Circular Welded Carbon-Quality Steel Pipe from India, Oman, the United Arab Emirates, and Vietnam*, Inv. Nos. 701-TA-482 to 484 (Final), USITC Pub. 4362 at 12 n.59 (Dec. 2012); *Softwood Lumber from Canada*, Inv. Nos. 701-TA-414 and 731-TA-928 (Final), USITC Pub. 3509 at 29-31 (May 2009).

- (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;
- (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.¹²⁵

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.¹²⁶ Only a “reasonable overlap” of competition is required.¹²⁷

Fungibility. Even though there are no subject CSPV cells from China,¹²⁸ there is overlap with respect to CSPV modules because there were subject imports of CSPV modules from both China and Taiwan during the POI along with CSPV module shipments by the domestic industry during this period.¹²⁹ The quantity of CSPV module imports from Taiwan was smaller than that of imports of CSPV modules from China, but imports of modules from both sources were increasing over the POI.¹³⁰

The majority of responding U.S. producers, importers, and purchasers reported that subject CSPV products from China and Taiwan are “always” or “frequently” interchangeable with one another and with the domestic like product.¹³¹ Most responding purchasers reported that subject CSPV products from China were comparable to U.S. CSPV products for all non-price

¹²⁵ See *Certain Cast-Iron Pipe Fittings from Brazil, the Republic of Korea, and Taiwan*, Inv. Nos. 731-TA-278-280 (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).

¹²⁶ See, e.g., *Wieland Werke, AG v. United States*, 718 F. Supp. 50 (Ct. Int’l Trade 1989).

¹²⁷ 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, S.A. v. United States*, 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.”)).

¹²⁸ Any U.S. imports of CSPV cells from China are considered imports of nonsubject merchandise that are subject to the existing orders, whereas there are imports of CSPV cells from Taiwan and shipments by the domestic industry of CSPV cells. CR/PR at Table E-12, E-15.

¹²⁹ CR/PR at Table E-12.

¹³⁰ CR/PR at Table E-12. Notwithstanding respondents’ attempt to minimize the volume of CSPV modules imported into the United States from Taiwan, we note that U.S. imports of CSPV modules from Taiwan in kW exceeded the volume in kW of CSPV cells imported from Taiwan throughout most of the POI. CR/PR at Table E-12.

¹³¹ CR/PR at Table II-24.

characteristics except for availability and reliability of supply;¹³² most responding purchasers reported that subject CSPV products from Taiwan were comparable for all non-price characteristics except for availability;¹³³ and the majority of responding purchasers reported that subject CSPV products from China and Taiwan were comparable with respect to all non-price factors.¹³⁴ It is not unexpected that purchasers reported comparability among CSPV products from the United States, China, Taiwan, and even nonsubject countries, given that various module assemblers in China, Taiwan, the United States, and nonsubject countries manufactured CSPV modules from CSPV cells made in Taiwan and the domestic industry exported CSPV cells for assembly into CSPV modules that were subsequently sold in the U.S. market.¹³⁵ Thus, although there is not perfect symmetry between the products imported from China and the products imported from Taiwan and those made in the United States, the record supports finding products from all three sources to be fungible.

Channels of Distribution. During the POI, U.S. producers and importers of subject CSPV products from China and Taiwan each sold at least nominal quantities of CSPV products to all four channels of distribution: distributor; residential installer; commercial installer; and utilities/developers.¹³⁶ U.S. producers sold their products primarily to distributors and commercial installers during the POI.¹³⁷ Responding U.S. importers of subject CSPV products from China reported selling their products to all four channels of distribution.¹³⁸ U.S. importers

¹³² Seventeen purchasers reported subject CSPV products from China and the United States were “comparable” in terms of availability, while five reported U.S. products as “superior,” and 17 reported U.S. products as “inferior.” CR/PR at Table II-23. In terms of reliability of supply, 18 purchasers reported subject CSPV products from China and the United States were “comparable,” while seven reported U.S. products as “superior,” and 12 reported U.S. products as “inferior.” CR/PR at Table II-23.

¹³³ Twelve purchasers reported subject CSPV products from Taiwan and the United States were “comparable” in terms of availability, while five reported U.S. products as “superior,” and nine reported U.S. products as “inferior.” CR/PR at Table II-23.

¹³⁴ CR/PR at Table II-23.

¹³⁵ CR/PR at Table E-2 to E-9, E-12. We recognize that comparisons of products from China, Taiwan, and the United States were influenced by the fact that U.S. producers and importers based their reporting on scope definitions for imports of U.S. modules that Commerce ultimately changed with respect to some categories of module imports. CR at E-4; PR at E-4. Purchasers, however, were instructed to base their responses on the country from which the modules were exported, which turned out to be closely aligned with Commerce’s final scope determinations. CR at II-3 at n.8; PR at II-2 at n.8. The different formulations of Commerce’s scope definition with respect to certain categories of U.S. module imports might have affected whether certain categories of modules are considered U.S. imports of subject merchandise from Taiwan instead of subject merchandise from China, or U.S. imports of subject merchandise from nonsubject countries instead of subject merchandise from Taiwan. Notwithstanding, purchasers reported that all CSPV products are interchangeable with one another, irrespective of whether they were manufactured in China, Taiwan, the United States, or nonsubject countries. *See, e.g.*, CR/PR at Table II-23, II-26.

¹³⁶ CR/PR at Table E-1.

¹³⁷ CR/PR at Table E-1.

¹³⁸ CR/PR at Table E-1.

of subject CSPV products from Taiwan sold most of their products to residential installers during the POI.¹³⁹

Geographic Overlap. According to information reported by the domestic industry and U.S. importers of subject merchandise, the domestic like product and subject imports from both China and Taiwan were present in all regions of the United States during the POI.¹⁴⁰

Simultaneous Presence in Market. Subject imports from China and Taiwan were simultaneously present in the U.S. market with one another and the domestic like product during the POI. Monthly Commerce statistics show that subject imports from China and Taiwan entered the United States during each month of the POI, and pricing data indicate sales by the domestic industry throughout the POI.¹⁴¹

Conclusion. The record supports finding that subject imports from China and Taiwan are fungible with one another and with the domestic like product and that all were sold simultaneously in overlapping geographic markets and through similar channels of distribution. Because the record supports finding a reasonable overlap of competition among subject imports from China and Taiwan and the domestic like product, we cumulate subject imports from China and Taiwan for purposes of our analysis of material injury by reason of subject imports.

VI. Material Injury By Reason of Subject Imports¹⁴²

Based on the record in the final phase of these investigations, we find that an industry in the United States is materially injured by reason of imports of CSPV products from China and Taiwan that Commerce has found to be sold in the United States at less than fair value and subsidized by the government of China.

A. Legal Standards

In the final phase of antidumping and countervailing duty investigations, the Commission determines whether an industry in the United States is materially injured or threatened with material injury by reason of the imports under investigation.¹⁴³ 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

¹³⁹ CR/PR at Table E-1.

¹⁴⁰ CR/PR at Table II-5.

¹⁴¹ CR at IV-22; PR at IV-16; CR/PR at Tables E-26 to E-34.

¹⁴² Chairman Broadbent joins the remainder of these views as they concern the legal standards for material injury, the conditions of competition and the business cycle as they apply to the market for CSPV modules, and why the domestic CSPV module industry is materially injured by reason of subject imports of CSPV modules from China and Taiwan. She writes separately to explain why she finds that the domestic CSPV cell industry is not materially injured or threatened with material injury by reason of subject imports of CSPV cells from Taiwan. See Separate and Dissenting Views of Chairman Meredith M. Broadbent.

¹⁴³ 19 U.S.C. §§ 1671d(b), 1673d(b).

like product, but only in the context of U.S. production operations.¹⁴⁴ The statute defines “material injury” as “harm which is not inconsequential, immaterial, or unimportant.”¹⁴⁵ In assessing whether 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.¹⁴⁶ 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.”¹⁴⁷

Although the statute requires the Commission to determine whether the domestic industry is “materially injured or threatened with material injury by reason of” unfairly traded imports,¹⁴⁸ 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.¹⁴⁹ 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.¹⁵⁰

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

¹⁴⁴ 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 ... and explain in full its relevance to the determination.” 19 U.S.C. § 1677(7)(B).

¹⁴⁵ 19 U.S.C. § 1677(7)(A).

¹⁴⁶ 19 U.S.C. § 1677(7)(C)(iii).

¹⁴⁷ 19 U.S.C. § 1677(7)(C)(iii).

¹⁴⁸ 19 U.S.C. §§ 1671d(a), 1673d(a).

¹⁴⁹ *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).

¹⁵⁰ The Federal Circuit, in addressing the causation standard of the statute, 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 (Fed. Cir. 2003). This was further ratified in *Mittal Steel Point Lisas Ltd. v. United States*, 542 F.3d 867, 873 (Fed. Cir. 2008), where 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).

injury threshold.¹⁵¹ In performing its examination, however, the Commission need not isolate the injury caused by other factors from injury caused by unfairly traded imports.¹⁵² 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, such as nonsubject imports, which may be contributing to overall injury to an industry.¹⁵³ It is clear that the existence of injury caused by other factors does not compel a negative determination.¹⁵⁴

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.”¹⁵⁵ ¹⁵⁶ Indeed, the Federal Circuit has examined and affirmed various Commission methodologies and has disavowed “rigid adherence to a specific formula.”¹⁵⁷

¹⁵¹ SAA at 851-52 (“{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*, 542 F.3d at 877.

¹⁵² SAA at 851-52 (“{T}he Commission need not isolate the injury caused by other factors from injury caused by unfair imports.”); *Taiwan Semiconductor*, 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.”).

¹⁵³ S. Rep. 96-249 at 74-75; H.R. Rep. 96-317 at 47.

¹⁵⁴ *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.”).

¹⁵⁵ *Mittal*, 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’

The Federal Circuit's decisions in *Gerald Metals*, *Bratsk*, and *Mittal* all involved cases where 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 market presence of price-competitive nonsubject imports.¹⁵⁸ 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* litigation.

Mittal 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.¹⁵⁹ Accordingly, we do not consider ourselves required to apply the replacement/benefit test that was included in Commission opinions subsequent to *Bratsk*.

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.

¹⁵⁶ Vice Chairman 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*, held that the Commission is *required*, in certain circumstances when considering present material injury, to undertake a particular kind of analysis of nonsubject imports, albeit without reliance upon presumptions or rigid formulas. *Mittal* explains as follows:

What *Bratsk* held is that "where commodity products are at issue and fairly traded, price competitive, nonsubject 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 nonsubject 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.

¹⁵⁷ *Nucor Corp. v. United States*, 414 F.3d 1331, 1336, 1341 (Fed. Cir. 2005); see also *Mittal*, 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.>").

¹⁵⁸ *Mittal*, 542 F.3d at 875-79.

¹⁵⁹ *Mittal*, 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).

The progression of *Gerald Metals*, *Bratsk*, and *Mittal* 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.¹⁶⁰

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.¹⁶¹ Congress has delegated this factual finding to the Commission because of the agency's institutional expertise in resolving injury issues.¹⁶²

B. Conditions of Competition and the Business Cycle

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

1. Demand Conditions

CSPV cells are used to make CSPV modules, and CSPV modules are used in solar power systems that generate electricity from sunlight.¹⁶³ CSPV products account for a meaningful share of the total cost of the end-use products in which they are used.¹⁶⁴ Demand for CSPV products is derived from the demand for solar electricity, which is affected by factors such as total energy consumption, environmental concerns, cost competitiveness with traditional energy sources, and the availability of Federal, state, and local incentives.¹⁶⁵

¹⁶⁰ 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.

¹⁶¹ 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.

¹⁶² *Mittal*, 542 F.3d at 873; *Nippon*, 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.").

¹⁶³ CR at I-22; PR at I-18.

¹⁶⁴ Seven U.S. producers, 23 importers, and two purchasers reported that the cost share of CSPV cells in CSPV modules averaged 50 to 92.0 percent. CR/PR at Table II-14 (on average, importers reported that CSPV cells account for 92.0 percent of the cost of CSPV modules, and the averages reported by U.S. producers and purchasers was 78.6 percent and 50 percent, respectively). Generally, the cost share of CSPV products in a solar installation project increases as the size of the project increases. CR/PR at Table II-14 (estimating a cost share of 26.6 to 35.0 percent for residential installations, 35.8 to 38.5 percent for commercial installations, and 39.8 to 49.4 percent for utility installations); CR at II-40 to II-42; PR at II-30 to II-31.

¹⁶⁵ CR at II-1 to II-2, II-25, II-27; PR at II-1, II-19, II-20; USITC Pub. 4360 at 21.

a) Conventional and Renewable Sources of Energy

Electricity providers using renewable energy sources¹⁶⁶ seek to achieve “grid parity” (the point at which the levelized cost of electricity¹⁶⁷ generated from renewable sources equals the cost from the grid of electricity generated by conventional sources).¹⁶⁸ The levelized cost of electricity varies by region, time of the day, and availability of other electricity sources. During periods of non-peak electricity demand in the United States, only lowest-cost “baseload” generators (traditionally coal and nuclear plants) would be able to sell electricity to the grid, whereas during periods of peak electricity demand, even generators with somewhat higher costs may be able to sell electricity into the transmission or distribution grid.¹⁶⁹ For peak periods, natural-gas generated electricity generally sets the levelized cost of electricity that CSPV and other renewable systems must seek to meet, especially for sales to the utility segment.¹⁷⁰

b) Federal, State, and Local Incentives

Changes in the availability and scope of Federal, state, and local government incentives and regulations continue to play a role in demand for CSPV products.¹⁷¹ These incentives offset the cost of generating solar energy, mandate its use, or otherwise influence its price, thereby stimulating demand for renewable energy-generated electricity and assisting developers of solar power and other renewable energy sources to achieve sufficient economies of scale to become more competitive with conventional sources of electricity.¹⁷² These incentives and their benefits were designed to decline over time, as the cost to generate solar-powered electricity declined.¹⁷³ Most questionnaire respondents reported that the level or availability of Federal incentives either has not changed or has declined since 2011, and most also reported that the level or availability of state and local incentives has declined since 2011.¹⁷⁴ Questionnaire responses were mixed regarding how changes in the availability of Federal, state,

¹⁶⁶ Renewable sources of solar energy include CSPV modules, thin-film, and concentrated solar power systems; other renewable energy sources include wind, geothermal, and biomass. CR at II-29, II-43 to II-44; PR at II-21, II-31 to II-32.

¹⁶⁷ Levelized cost of electricity is the sum of all costs over the life of an energy system divided by the quantity of electricity that system would be expected to generate during the period the system is financed. CR at II-29; PR at II-21 to II-22; USITC Pub. 4360 at 21-22.

¹⁶⁸ Conventional sources of electricity include coal, natural gas, nuclear, and oil. CR at II-25, II-29; PR at II-19, II-21 to II-22.

¹⁶⁹ CR at II-29; PR at II-21 to II-22; USITC Pub. 4360 at 21-22. Coal and natural gas accounted for approximately two-thirds of all electricity generated in the United States in 2013, with solar energy accounting for only a small fraction of that total share (0.2 percent). At the same time, the share of total electricity generated from renewable energy sources has been rapidly increasing, with 409 percent growth between 2011 and 2013. CR at II-26 to II-27; PR at II-19; CR/PR at Figure II-8 to II-9.

¹⁷⁰ USITC Pub. 4360 at 21-22.

¹⁷¹ CR at II-2, II-32 to II-38; PR at II-1, II-24 to II-29; USITC Pub. 4360 at 22-24.

¹⁷² CR at II-2; PR at II-1.

¹⁷³ USITC Pub. 4360 at 22-24.

¹⁷⁴ CR at II-34 to II-36; PR at II-26 to II-27; CR/PR at II-11.

and local incentives since 2011 have affected demand for CSPV products.¹⁷⁵ A plurality of questionnaire respondents reported that the availability of these incentives has decreased the price of solar-generated electricity.¹⁷⁶

c) Apparent U.S. Consumption Trends

Apparent U.S. consumption grew substantially during the POI.¹⁷⁷ We focus primarily on apparent U.S. consumption, market share, and U.S. shipments of CSPV modules to avoid double-counting CSPV cells that are consumed to manufacture CSPV modules.¹⁷⁸ The majority of questionnaire respondents reported an increase in U.S. demand for CSPV products since 2011.¹⁷⁹

d) Market Segments

CSPV products continue to be sold in three grid-connected market segments (residential, non-residential/commercial, and utility/co-developers) and for off-grid applications.¹⁸⁰ Installation size varies by segment, but the size of installations generally has grown over time in each segment.¹⁸¹ The residential and commercial segments are highly fragmented, whereas the utility segment is more concentrated, with the top five utility project developers accounting for 59 percent of U.S. projects completed in 2012.¹⁸² All three segments experienced considerable growth in the number of installations and the total wattage of installation projects during the POI.¹⁸³ Utilities were the largest segment of the U.S. market, but the residential segment experienced the largest increase in the number of installations.¹⁸⁴

2. Supply Conditions

In the *CSPV 1* investigations, the Commission observed that the domestic industry had the largest share of the U.S. market in 2009, but that the volume of imports from China that

¹⁷⁵ CR at II-36 to II-38; PR at II-27 to II-28; CR/PR at Table II-12.

¹⁷⁶ CR at II-37 to II-38; PR at II-27 to II-28; CR/PR at Table II-13.

¹⁷⁷ Apparent U.S. consumption, by quantity, increased from *** in 2011 to *** in 2012, and *** in 2013, and was *** in interim 2013 and *** in interim 2014. Apparent U.S. consumption increased *** percent between 2011 and 2012, *** percent between 2012 and 2013, and was *** percent higher in interim 2014 than in interim 2013. CR/PR at Table C-4.

¹⁷⁸ See, e.g., CR at I-3 at n.5; PR at I-3 at n.5. Commercial sales of CSPV modules were considerably larger than commercial sales of CSPV cells. CR/PR at Table E-13; CR at I-3 at n.5; PR at I-3 at n.5.

¹⁷⁹ CR at II-27 to II-29; PR at II-20 to II-21; CR/PR at Table II-6.

¹⁸⁰ CR at I-27 to I-31, II-4, II-6 to II-10; PR at I-21 to I-24, II-4 to II-9; CR/PR at Table II-1. Off-grid uses include water-pumping and purification systems, street lights, emergency phones, remotely located homes, telecommunication systems, and military applications. CR at I-31; PR at I-24.

¹⁸¹ CR at I-27, I-29, I-30; PR at I-21, I-23.

¹⁸² CR at II-6 to II-7; PR at II-5 to II-6.

¹⁸³ CR at II-7 to II-8; PR at II-6; CR/PR at Table II-2, Figure II-1.

¹⁸⁴ CR at II-7 to II-8; PR at II-6; CR/PR at Table II-2, Figure II-1.

were within the scope of those investigations nearly doubled by the end of 2011.¹⁸⁵ During the POI in the instant investigations, the U.S. market was supplied by the domestic industry, subject imports from China and Taiwan, and imports from nonsubject countries.

Domestic industry: Two firms (SolarWorld and Suniva) accounted for all known U.S. production of CSPV cells in 2013,¹⁸⁶ and over one dozen firms manufactured CSPV modules in the United States.¹⁸⁷ A number of firms exited the domestic industry during the POI.¹⁸⁸ SolarWorld accounted for *** percent of U.S. CSPV cell production and *** percent of U.S. CSPV module production in the United States during the POI.¹⁸⁹ As part of a series of cost-cutting measures, SolarWorld shuttered its U.S. ingot and wafer production operations in August 2013 and thus stopped its U.S. production of the wafers that it uses to manufacture CSPV cells.¹⁹⁰ The domestic industry's share of the U.S. market fell from a peak of *** of the market in 2011 to *** percent by the end of the POI.¹⁹¹ The domestic industry's capacity to produce CSPV cells and CSPV modules was lower than apparent U.S. consumption throughout the POI.¹⁹²

Subject imports: As a result of the *CSPV 1* investigations, U.S. imports of CSPV cells produced in China, CSPV modules assembled in China from CSPV cells made in China, and CSPV modules assembled in a third country from CSPV cells made in China became subject to antidumping and countervailing duty orders effective December 7, 2012.¹⁹³ Before those imports began to recede from the U.S. market, imports from Taiwan and China that are within the scope of the current investigations increased their presence in the U.S. market.¹⁹⁴ Subject imports accounted for *** percent of the U.S. market at the beginning of the POI but held more than *** percent of apparent U.S. consumption by the end of the POI.¹⁹⁵

¹⁸⁵ The domestic industry's share of the U.S. market was *** percent in 2009 compared to *** percent for subject imports from China and *** percent for imports from all other sources. *CSPV 1* Views at 37.

¹⁸⁶ CR at I-5, III-1; PR at I-4, III-1.

¹⁸⁷ CR at I-5, III-1; PR at I-4, III-1.

¹⁸⁸ For example, ***, ***, BP Solar shuttered its manufacturing facility and exited the solar industry in 2012; Helios Solar Works suspended operations in September 2013; ***, MX Solar shuttered its U.S. manufacturing facility in 2012; ***, Schott shuttered its U.S. manufacturing facility in 2012; Sharp shuttered its U.S. production facility in 2014; Siliken Manufacturing filed for bankruptcy in January 2013; Solar Power Industries sold off its solar assets and exited the solar industry in September 2012; ***, and ***. CR at III-4 at n.5; PR at III-4 at n.5; CR/PR at Table III-2.

¹⁸⁹ CR/PR at Table III-1.

¹⁹⁰ CR at III-9, VI-14 VI-10 to VI-17; PR at VI-5.

¹⁹¹ CR/PR at Table C-4.

¹⁹² CR/PR at Table III-4, Table C-4, Table E-12.

¹⁹³ 77 Fed. Reg. 73017, 73018 (Dec. 7, 2012).

¹⁹⁴ CR/PR at Table C-4. The volume of U.S. imports of CSPV modules assembled in China from cells made in Taiwan increased from *** MW in 2011 to *** MW in 2012 and *** MW in 2013, and was *** MW in interim 2013 and *** MW in interim 2014. CR/PR at Table C-4. Additionally, of the 26 CSPV cell producers in China and 12 CSPV cell producers in Taiwan, *** reported that its cell conversion process occurred in both the subject country and a third country. ***. Foreign producer questionnaire, responses to questions II-11(b) and II-18(b); CR at I-17 at n.34; PR at I-13 at n.34.

¹⁹⁵ CR/PR at Table C-4.

Nonsubject imports: Nonsubject imports accounted for a generally declining share of the U.S. market during the POI. Most of these imports involved CSPV products from China that became subject to antidumping and countervailing duty orders in late 2012. U.S. imports from nonsubject countries other than China (including Malaysia, Mexico, Philippines, Singapore, and Korea) never accounted for more than *** percent of apparent U.S. consumption during the POI.¹⁹⁶

3. Substitutability and Other Conditions

In the CSPV market, purchasers consider a variety of factors, but price continues to be an important consideration in purchasing decisions.¹⁹⁷ Purchasers reported that CSPV products made in China, Taiwan, the United States, and nonsubject countries are comparable with respect to nearly all factors surveyed, although they reported that CSPV products made in China and Taiwan are “superior” to CSPV products made in the United States in terms of price (that is, subject imports are lower priced than CSPV products made in the United States).¹⁹⁸ The majority of firms reported that CSPV products made in the United States, China, Taiwan, and nonsubject countries are “always” or “frequently” used interchangeably in the same applications.¹⁹⁹ These responses are consistent with other record evidence indicating that CSPV

¹⁹⁶ CR/PR at Table C-4; CR at IV-10; PR at IV-7 to IV-8. Available importer questionnaire data appear to provide lower coverage of imports from nonsubject sources than official import statistics. As CCCME pointed out, however, official import statistics overstate imports because, for example, they include out-of-scope products such as thin film imports from the Malaysian facility of the world’s largest thin film manufacturer (FirstSolar) in addition to nonsubject imports of CSPV modules assembled in Malaysia from CSPV cells made in third countries that are imported by SunEdison. As CCCME noted, it would be difficult to segregate out-of-scope merchandise from official import statistics. CCCME’s Posthearing Brief at Exhibit 1 at 2-3; CR at IV-1 at n.2. Furthermore, the parties agree that importer questionnaires provide very high if not complete coverage of CSPV imports from China and Taiwan, and as noted above, China was the largest source of nonsubject imports during the POI.

¹⁹⁷ CR/PR at Table II-16 (price was most frequently cited as the first-most important factor (23 purchasers) and the second-most important factor (13 purchasers) and availability was most frequently cited as the third-most important factor (17 purchasers)), Table II-17 (the factors rated as “very important” by more than half of responding purchasers were price (51 firms), availability (50), reliability of supply (50), product consistency (45), warranty (45), quality meets industry standards (40), delivery time (38), wattage efficiency (31), delivery terms (31), and extension of credit (28)); USITC Pub. 4360 at 23.

¹⁹⁸ CR/PR at Table II-23. Respondents argued that compatibility with proprietary Zep mounting frames was an important difference between subject imports and the domestic like product. *See, e.g.*, CCCME’s Posthearing Brief at Exhibit 4 at 3-4. Purchasers, however, did not rank the module racking system as an important factor in the hierarchy of the factors that influenced their purchasing decisions. CR/PR at Table II-21, Table II-23 (indicating that purchasers generally found all sources to be “comparable” in terms of mounting systems); CR at II-53 to II-54; PR at II-38 to II-39. Moreover, SolarWorld has a license agreement in place with Zep and has the capability to produce Zep-compatible modules, but has not seen demand in the market that would justify production of these modules. Petitioner’s Posthearing Brief at 13-14.

¹⁹⁹ CR/PR at Table II-24.

products made in the United States, China, Taiwan, and in nonsubject countries “usually” if not “always” meet minimum quality specifications,²⁰⁰ and that differences other than price are almost “never” significant.²⁰¹

CSPV modules made in the United States, China, Taiwan, and in nonsubject countries were sold in all U.S. market segments: distributors, residential installers, commercial installers, and utilities.²⁰² Monocrystalline CSPV modules, which are made with cells from a single grown crystal, tend to be more efficient at converting sunlight into electricity than multicrystalline CSPV modules, which are made with cells that have a random crystal structure.²⁰³ Typically, monocrystalline modules are black, whereas multicrystalline modules are blue. Architects apparently once preferred monocrystalline over multicrystalline modules for aesthetic reasons, but that reportedly has changed over time; thus, representatives of domestic producers testified that they produce both mono- and multi-crystalline modules and will provide black or white back sheets on the multicrystalline modules, to meet customer preferences.²⁰⁴

The record confirms that both the domestic industry and importers of CSPV products from China, Taiwan, and nonsubject countries supplied both monocrystalline and multicrystalline CSPV products to the U.S. market during the POI.²⁰⁵ At the same time, purchasers often do not specify a particular technology (monocrystalline versus multicrystalline CSPV products) in their requests for proposals (“RFPs”).²⁰⁶ Indeed, monocrystalline and multicrystalline products compete for sales to and were sold to purchasers in all segments of the U.S. market.²⁰⁷ Based on the record, we do not agree with respondents’ arguments that that there is attenuated competition between subject imports and the domestic like product, which are based primarily on their assertion that subject imports are concentrated in multicrystalline CSPV products whereas the domestic industry focuses on monocrystalline products.

The record shows that the domestic industry and importers of CSPV products supplied CSPV products in a range of wattages during the POI.²⁰⁸ Purchasers in all U.S. market segments also purchased a variety of wattages of CSPV products during the POI.²⁰⁹ Despite respondents’ suggestion that the products offered by the domestic industry “lagged” subject imports, almost all purchasers reported U.S. CSPV modules as being superior or comparable in terms of conversion efficiency and quality.²¹⁰

²⁰⁰ CR/PR at Table II-25.

²⁰¹ CR/PR at Table II-26.

²⁰² CR/PR at Table E-1.

²⁰³ CR at I-24 to I-25; PR at I-19 to I-20; CR/PR at Figure I-3.

²⁰⁴ CR at II-50; PR at II-36; Hearing Tr. at 91-92 (Shaver, Dulani).

²⁰⁵ CR/PR at Tables E-26 to E-33.

²⁰⁶ Petitioner’s Posthearing Brief at 10; Hearing Tr. at 62 (Kaplan), 80-84 (Dulani, Brightbill, Shaver, Clark, McKechnie), 109-113 (Johnson, Dulani, Shaver, McKechnie).

²⁰⁷ CR/PR at Tables II-3 to II-4, Tables E-26 to E-33; *see also, e.g.*, CCCME Posthearing Brief at Answers to Commissioner Pinkert’s Question 7, Exhibit 7 (showing consideration of monocrystalline and multicrystalline products for the same sale in the utility segment).

²⁰⁸ CR/PR at Tables E-26 to E-34.

²⁰⁹ CR/PR at Table II-3.

²¹⁰ CR/PR at Table II-23.

A plurality of purchasers reported that a module's "cell count" is also an important factor in their purchasing decisions.²¹¹ For residential projects, purchasers primarily used 60-cell modules, whereas 72-cell modules tended to be used in commercial and utility applications.²¹² At the same time, the majority of purchases during the POI involved 60-cell CSPV modules, and the domestic industry and importers of subject merchandise from China and Taiwan supplied both 60-cell and 72-cell modules to the U.S. market during the POI.²¹³ Consequently, the record does not support respondents' arguments that the domestic industry did not offer products of comparable cell counts to subject imports' CSPV modules.

Based on this record evidence, we do not find attenuated competition between subject imports and the domestic like product. Instead, we find that subject imports from China and Taiwan are highly substitutable with domestically produced CSPV products and that competition between subject imports and the domestic like product depends primarily on price.

4. Raw Materials

Raw material costs for CSPV modules, much of which is the cost of the CSPV cell, accounted for *** percent of U.S. CSPV module assemblers' total cost of goods sold in 2013, down from *** percent in 2011. Raw material costs for CSPV cells accounted for *** percent of U.S. CSPV cell producers' total cost of goods sold in 2013, down from *** percent in 2011.²¹⁴ Polysilicon is a key raw material used in the production of the wafers that are used to manufacture CSPV cells and other high-tech products.²¹⁵ In 2003, the global supply of polysilicon was inadequate to meet global demand by the semiconductor industry and particularly the CSPV industry, so spot prices of polysilicon rose from \$35/kg in 2003 to a high of \$500/kg in 2008 (and contract prices rose from \$25/kg to \$85/kg in this period). By 2008, global supply exceeded global demand, and polysilicon spot and contract prices then fell substantially to an estimated \$35/kg by 2012.²¹⁶ After falling approximately 75 percent from the first quarter of 2011 to the first quarter of 2013, the price of polysilicon ingots and wafers began to rebound and increased 26.7 percent and 9.5 percent, respectively, from the first quarter of 2013 to the second quarter of 2014.²¹⁷

²¹¹ CR/PR at Table II-17.

²¹² CR/PR at Table II-18.

²¹³ CR/PR at Table II-18, E-26 to E-33; Hearing Tr. at 30 (Johnson); Petitioner's Posthearing Brief at 11-12; USITC Pub. 4360 at 26-27.

²¹⁴ CR/PR at Table VI-1, Table VI-3.

²¹⁵ CR at V-1, VI-10 to VI-14; PR at V-1, VI-3 to VI-5; USITC Pub. 4360 at 28.

²¹⁶ USITC Pub. 4360 at 28.

²¹⁷ CR at V-1 to V-2; PR at V-1; CR/PR at Figure V-1.

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.”²¹⁸

As discussed above, apparent U.S. consumption of CSPV products grew substantially during the POI with the highest rate of growth occurring from 2012 to 2013 and between the interim periods.²¹⁹ U.S. shipments of subject imports also progressively increased throughout the POI, overtaking the domestic industry’s U.S. shipments in 2012.²²⁰ Indeed, the absolute volume of U.S. shipments of subject imports increased substantially faster than the growth in apparent U.S. consumption throughout the POI, with subject imports’ growth of 1,611.9 percent between 2011 and 2013 being almost *** the already *** percent growth of apparent U.S. consumption during this period.²²¹

Corresponding to this increase in absolute volume, cumulated subject imports rapidly increased their market share by *** percentage points between 2011 and 2013 before stabilizing between interim 2013 and interim 2014.²²² Thus, not only did subject imports from China and Taiwan almost completely replace the substantial market share held at the beginning of the POI by imports from China that became subject to antidumping and countervailing duty orders,²²³ but they also further reduced the domestic industry’s market share, with the domestic industry losing another *** percentage points of market share between 2011 and

²¹⁸ 19 U.S.C. § 1677(7)(C)(i).

²¹⁹ Apparent U.S. consumption, by quantity, increased from *** in 2011 to *** in 2012, and *** in 2013, and was *** in interim 2013 and *** in interim 2014. Apparent U.S. consumption increased *** percent between 2011 and 2012, *** percent between 2012 and 2013, and was *** percent higher in interim 2014 than in interim 2013. CR/PR at Table C-4.

²²⁰ Subject imports increased from 146.0 MW in 2011 to 877.3 MW in 2012, and 2,499.7 MW in 2013, and were 957.1 MW in interim 2013 and 2,080.3 MW in interim 2014. In contrast, the domestic industry’s U.S. shipments progressively declined from *** MW in 2011 to *** MW in 2012, and *** MW in 2013, although they were lower (*** MW) in interim 2013 than in interim 2014 (*** MW). CR/PR at Table C-4.

²²¹ CR/PR at Table C-4 (also showing that the volume of subject imports on an absolute basis was 117.3 percent higher in interim 2014 than in interim 2013 and that apparent U.S. consumption was *** percent higher in interim 2014 than in interim 2013).

²²² Subject CSPV products increased their share of apparent U.S. consumption from *** percent in 2011 to *** percent in 2012 and then to *** percent in 2013. Their market share showed little change between the interim periods. It was *** percent in interim 2013 and *** percent in interim 2014. CR/PR at Table C-4.

²²³ Nonsubject imports, which primarily consisted of CSPV products from China that became subject to antidumping and countervailing duty orders in December 2012, lost *** percentage points of market share between 2011 and 2013, although their market share was *** percentage points higher in interim 2014 compared to interim 2013. CR/PR at Table C-4 (indicating that nonsubject imports’ market share fell from *** percent in 2011 to *** percent in 2012 and *** percent in 2013, and was *** percent in interim 2013 and *** percent in interim 2014).

2013.²²⁴ This increase in market penetration at the expense of the domestic industry is particularly noteworthy in light of our prior findings that the subject imports were highly substitutable for the domestic like product and competed in the same geographic markets and same U.S. market segments as the domestic industry (residential, non-residential, and utility).

The substantial and increasing presence of subject imports in the U.S. market during the POI is also apparent when the volume of subject imports from China and Taiwan is considered relative to U.S. production.²²⁵ Due to a series of closures of U.S. manufacturing facilities,²²⁶ the domestic industry reduced its overall production capacity between 2011 and 2013.²²⁷ Nonetheless, the domestic industry had considerable excess production capacity throughout the POI, indicating that it was capable of supplying additional demand.²²⁸

Based on these considerations, we conclude that the volume of subject CSPV products imported into the United States from China and Taiwan is significant, absolutely and relative to consumption and production in the United States, and that the increase in subject import volume absolutely and relative to domestic production and apparent U.S. consumption is also significant.

D. Price Effects

Section 771(7)(C)(ii) of the Tariff Act provides that evaluating the price effects of the 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

²²⁴ The domestic industry's market share fell from *** percent in 2011 to *** percent in 2012 and *** percent in 2013, and was *** percent in interim 2013 and *** percent in interim 2014. CR/PR at Table C-4. We focus primarily on apparent U.S. consumption, market share, and U.S. shipments of CSPV modules to avoid double-counting CSPV cells that are consumed to manufacture CSPV modules. *See, e.g.*, CR at I-3 at n.5; PR at I-3 at n.5 (also noting that the U.S. commercial market for CSPV cells is relatively small).

²²⁵ The ratio of subject imports to domestic production was 21.6 percent in 2011, 221.3 percent in 2012, 1,142.2 percent in 2013, 1,202.4 percent in interim 2013 and 1,391.5 percent in interim 2014. CR/PR at Table E-16.

²²⁶ *See, e.g.*, CR at III-4 at n.5; PR at III-4 at n.5; CR/PR at Table III-2.

²²⁷ The domestic industry's average production capacity was *** MW in 2013 compared to *** MW in 2011, and was *** MW in interim 2013 and *** MW in interim 2014. CR/PR at Table C-4.

²²⁸ The domestic industry's production capacity was lower than apparent U.S. consumption throughout the POI, but it had excess capacity throughout this period. Its capacity utilization was *** percent in 2011, *** percent in 2012, *** percent in 2013, *** percent in interim 2013, and *** percent in interim 2014. CR/PR at Table C-4.

(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.²²⁹

As discussed above, purchasers reported considering a variety of factors when purchasing CSPV cells and modules, but they identified price most frequently as the first and second most important factors in purchasing decisions. CSPV products made in the United States, China, and Taiwan are products of comparable quality that are highly interchangeable with one another, as discussed above. Given the high substitutability between the domestic like product and subject imports, competition in the U.S. CSPV market primarily depends on price.

In these investigations, four U.S. producers and 28 importers of subject merchandise from China and Taiwan provided usable quarterly net U.S. f.o.b. selling price data for eight CSPV module products for the period January 2011 through June 2014.²³⁰ These pricing data cover a majority of reported U.S. shipments by the domestic industry and of subject merchandise imported from China and Taiwan.²³¹

We acknowledge that the pricing data were collected based on a different scope definition than was ultimately announced by Commerce on December 16, 2014. We find that the data accurately depict the prices of subject imports notwithstanding respondents' contrary assertions. The Commission was able to reclassify the pricing data according to the U.S. importers' responses to question II-5 of the U.S. importer questionnaire. For thirteen of the sixteen categories of U.S. imports, the scope definitions did not change, so there was no need to reclassify the pricing data. Two of the three categories that did change accounted for a small share of U.S. imports.²³² For the final category (category 4), modules assembled in China using cells made in Taiwan from non-Chinese inputs, Commerce's final scope determinations treated

²²⁹ 19 U.S.C. § 1677(7)(C)(ii).

²³⁰ The pricing products included the following: (1) 60-cell multicrystalline silicon module, with a peak power wattage of 240 to 250, inclusive, P-max or Wp; (2) 60-cell monocrystalline silicon module, with a peak power wattage of 240 to 250, inclusive, P-max or Wp; (3) 60-cell multicrystalline silicon module, with a peak power wattage of 255 to 265, inclusive, P-max or Wp; (4) 60-cell monocrystalline silicon module, with a peak power wattage of 255 to 265, inclusive, P-max or Wp; (5) 60-cell multicrystalline silicon module, with a peak power wattage of 270 to 280, inclusive, P-max or Wp; (6) 60-cell monocrystalline silicon module, with a peak power wattage of 270 to 280, inclusive, P-max or Wp; (7) 72-cell multicrystalline silicon module, with a peak power wattage of 300 to 315, inclusive, P-max or Wp; and (8) 72-cell monocrystalline silicon module, with a peak power wattage of 300 to 315, inclusive, P-max or Wp. CR at V-7 to V-8; PR at V-5.

²³¹ CR at V-7 n.10, V-8 to V-9; PR at V-5 n.10, V-5 to V-6; CR/PR at Tables E-26 to E-34.

²³² CR/PR at E-4. The Commission's questionnaires did not collect pricing data on modules assembled in China using cells made in third countries from non-Chinese inputs because this category of U.S. imports fell outside the original scope language, so there were no corresponding pricing data to modify. This category corresponded to a small share of U.S. imports, *** percent of total U.S. imports of modules in 2011 and *** percent of total U.S. imports of modules in 2013. CR/PR at Table E-11 (category 6). With respect to the category corresponding to modules assembled in Taiwan using cells made in third countries from Taiwanese inputs, there were *** U.S. imports during the POI, so ***. CR/PR at Table E-11 (category 11).

these imports as originating from China instead of Taiwan, and the Commission reclassified the pricing data accordingly, where possible,²³³ or in one case, contacted the U.S. importer (***) and asked the firm to resubmit its pricing data to reflect Commerce’s final scope determinations, due to the nature of this firm’s U.S. imports.²³⁴ After making these adjustments to the pricing data to account for Commerce’s final scope determinations, the Commission made further adjustments to the pricing data, making sure not to include in the pricing data for the domestic industry the data reported by *** as U.S. shipments of the domestic like product, to reflect the exclusion of *** from the domestic industry as a related party, consistent with the Commission’s usual approach.²³⁵ On this basis, we conclude that the pricing data accurately reflect the prices of imports from each subject country.

As discussed above, purchasers do not generally specify whether they want monocrystalline or multicrystalline CSPV products. Both technologies were sold in all segments of the U.S. market and competed for the same sales, meaning that prices of multicrystalline CSPV products affect prices of monocrystalline products and *vice versa*.²³⁶ Likewise, products of particular wattages or cell counts were not limited to a single segment of the U.S. market. Nevertheless, at respondents’ request, the Commission modified the pricing products from those used in the *CSPV 1* investigations to seek data on CSPV modules with higher wattages, and it asked questionnaire respondents to report separate pricing data for monocrystalline and multicrystalline products and to report pricing data on 60-cell modules as well as 72-cell modules.²³⁷

²³³ CR/PR at Table E-11 (category 4) (Of the firms with category 4 imports, three (***) accounted for the vast majority (93.5 percent) of imports that were deemed subject merchandise from Taiwan based on Commerce’s final determinations. Although these three firms imported some subject CSPV products from China (about 4.5 percent of their imports), most of their U.S. imports consisted of CSPV products that Commerce’s final scope determinations deemed to be subject merchandise from Taiwan. *** did not submit any pricing data, so no adjustments were needed for this firm. All pricing data for *** were considered subject merchandise from Taiwan because imports that would be considered U.S. imports of subject merchandise from China accounted for a small share of their imports. Of the remaining firms with category 4 imports, the pricing data for those that reported such data were treated as pricing data for U.S. imports of subject merchandise from China, because these firms reported only small volumes of products that would be considered U.S. imports of subject merchandise from Taiwan under Commerce’s final scope determinations).

²³⁴ ***.

²³⁵ Respondents argue that pricing data for CSPV modules assembled in the United States from inputs imported from subject countries should be reclassified as pricing data for subject imports instead of pricing data for the domestic industry. As discussed above, however, we have found that U.S. assemblers of modules engage in sufficient production-related activities to treat them as U.S. producers of the domestic like product and their shipments as U.S. shipments of the domestic industry, consistent with our approach in the *CSPV 1* investigations and in other cases involving similar questions. See, e.g., *Chlorinated Isocyanurates from China and Japan*, Inv. Nos. 701-TA-501 and 731-TA-1226 (Final), USITC Pub. 4494 at n.161 (Oct. 2014).

²³⁶ CR/PR at Tables II-3 and II-4; see also, e.g., CCCME Posthearing Brief at Answers to Commissioner Pinkert’s Question 7, Exhibit 7 (showing consideration of monocrystalline and multicrystalline products for the same sale in the utility segment).

²³⁷ CR/PR at Tables E-26 to E-34.

Notwithstanding these additional breakouts of the pricing data, as a majority of the price comparisons show, subject imports pervasively undersold the domestic like product at sizeable margins throughout the POI, regardless of whether the sales involved monocrystalline or multicrystalline products, and regardless of considerations such as wattage or cell count.²³⁸ Specifically, subject imports undersold the domestic like product in 60 of 99 possible quarterly comparisons, or 60.6 percent of the time, at margins reaching as high as 39.6 percent.²³⁹ On a volume basis, of the *** MW of U.S. shipments of CSPV products by the domestic industry reflected in the pricing data, *** MW (or *** percent) were undersold by subject imports; similarly, of the *** MW of U.S. shipments of CSPV products by importers of subject merchandise reflected in the pricing data, *** MW (or *** percent) undersold the domestic like product.²⁴⁰

Other record data corroborate that subject imports undersold the domestic like product. For example, purchasers generally ranked subject imports as superior in terms of price compared to the domestic like product (*i.e.*, they are lower priced).²⁴¹

Based on this evidence, we conclude that there has been significant underselling of the domestic like product by cumulated subject imports, allowing the significant volume of cumulated subject imports to gain significant market share at the expense of the domestic industry.²⁴²

We also considered movements in the prices of products 1 to 8 during the POI. The quarterly pricing data show an overall decline in prices of the domestic like product and subject imports during the period of investigation.²⁴³ Various industry sources also reported declining CSPV module prices as well as declining CSPV system prices.²⁴⁴ Nevertheless, we cannot conclude that the cumulated subject imports have depressed prices of the domestic like product in the U.S. market to a significant degree. Even though apparent U.S. consumption increased progressively, there are several factors other than subject imports that also explain price declines between January 2011 and June 2014, including declines in raw material costs

²³⁸ CR/PR at Tables E-26 to E-34.

²³⁹ CR/PR at Tables E-26 to E-34.

²⁴⁰ CR/PR at Tables E-26 to E-34.

²⁴¹ CR/PR at Table II-23.

²⁴² CR/PR at Table C-4.

²⁴³ During the POI, the domestic industry's prices for pricing product 1 declined *** percent. During the same period, there were declines of *** percent for pricing product 2, *** percent for pricing product 3, *** percent for pricing product 4, *** percent for pricing product 6, *** percent for pricing product 7, and *** percent for pricing product 8. For subject imports from China, prices for pricing product 1 declined *** percent during the POI. During the same period, there were declines of *** percent for pricing product 2, *** percent for pricing product 3, *** percent for pricing product 4, *** percent for pricing product 5, *** percent for pricing product 6, *** percent for pricing product 7, and *** percent for pricing product 8. For subject imports from Taiwan, prices for pricing product 1 declined *** percent during the POI. During the same period, there were declines of *** percent for pricing product 2, *** percent for pricing product 4, *** percent for pricing product 5, *** percent for pricing product 6, and *** percent for pricing product 7. CR/PR at Tables E-26 to E-33.

²⁴⁴ CR at V-3; PR at V-2; USITC Pub. 4360 at 34.

earlier in the POI,²⁴⁵ ***,²⁴⁶ product life cycles (which respondents allege mean further price reductions to account for the introduction of successive generations of higher wattage modules with lower absolute input costs),²⁴⁷ the larger share of the U.S. CSPV market accounted for by utilities during the POI (and utilities' reportedly heightened sensitivity to prices due to the relatively higher share of their total costs accounted for by CSPV modules).²⁴⁸ Given the multitude of factors exerting downward pressure on U.S. prices during the POI, we cannot conclude that subject imports depressed the domestic industry's prices to a significant degree.

We also considered whether cumulated subject imports prevented increases in the price of the domestic like product that otherwise would have occurred. The domestic industry's ratio of COGS to net sales was high between January 2011 and June 2014 despite the fact that the domestic industry's unit COGS declined overall during the POI.²⁴⁹ Due to the various factors exerting downward pressure on U.S. prices during the POI and declining raw material cost trends described above, we would not have expected the domestic industry to raise prices. Therefore, we cannot conclude that imports from China and Taiwan prevented the domestic industry from implementing price increases, that otherwise would have occurred, to a significant degree.

Consequently, we find that subject imports undersold the domestic like product to a significant degree, allowing the significant volume of cumulated subject imports to increase significantly relative to apparent U.S. consumption and production and take significant market share from the domestic industry.

²⁴⁵ See, e.g., CR/PR at Figure V-1 (showing declines in polysilicon prices).

²⁴⁶ CR at VI-10 to VI-14; PR at VI-3 to VI-5.

²⁴⁷ In general, as technology improved, the price of PV products has trended downward since the 1990s, despite a period of increasing prices between 2003 and 2008. USITC Pub. 4360 at 34; CCCME's Posthearing Brief at 2, 9, Exhibit 4 at 10-11, 13-14; CCCME's Prehearing Brief at 22-26, 51-54.

²⁴⁸ CR at I-27 to I-31, II-6 to II-11, II-40 to II-42; PR at I-21 to I-24, II-5 to II-8, II-30; CR/PR at Table II-14.

²⁴⁹ The domestic industry's COGS-to-net-sales ratio was *** percent in 2011, *** percent in 2012, *** percent in 2013, *** percent in interim 2013, and *** percent in interim 2014. The domestic industry's unit COGS declined from \$*** per kW in 2011 to \$*** per kW in 2012, and \$*** per kW in 2013, and was \$*** per kW in interim 2013 and \$*** per kW in interim 2014. CR/PR at Table C-4.

E. Impact²⁵⁰

Section 771(7)(C)(iii) of the Tariff Act provides that in examining the impact of subject imports, the Commission “shall evaluate all relevant economic factors which have a bearing on the state of the industry.”²⁵¹ 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.”²⁵²

We find that the significant volume of subject imports from China and Taiwan, which were highly substitutable for the domestic like product, undersold the domestic like product at significant margins, and competed against the domestic industry in all market segments with all forms of CSPV products, had a significant adverse impact on the domestic industry during the POI. At the outset, we address CCCME’s argument that we should not rely on period-to-period changes to assess the domestic industry’s condition in these investigations because the domestic industry’s data are based on a different grouping of domestic producers at the beginning of the POI than in subsequent years. A number of domestic producers ceased operating, closed their production facilities, and/or declared bankruptcy during the POI, which has affected data coverage of the domestic industry, particularly for 2013 and interim 2014.²⁵³ Understandably, firms that are no longer operating did not submit questionnaire responses in the final phase of these investigations, but where possible we have included questionnaire data submitted in the preliminary phase of these investigations or during the *CSPV 1*

²⁵⁰ The statute instructs the Commission to consider the “magnitude of the dumping margin” in an antidumping proceeding as part of its consideration of the impact of imports. 19 U.S.C. § 1677(7)(C)(iii)(V). In its final determinations of sales at less than fair value, Commerce found antidumping duty margins of 26.71 to 165.04 percent for imports from China, and 11.45 to 27.55 percent for imports from Taiwan. 79 Fed. Reg. at 76973; 79 Fed. Reg. at 76969; CR at I-7; PR at I-5 to I-6. Additionally, in its final countervailing duty determination regarding imports from China, Commerce found that eight programs conferred countervailable subsidies, including (1) grant programs; (2) provision of inputs for less-than-adequate remuneration; (3) provision of land for less-than-adequate remuneration; (4) preferential loans and directed credit; (5) tax benefit programs; (6) VAT rebates on purchases of Chinese-made equipment; (7) export guarantees and insurance for green technology; and (8) export credit subsidies. Commerce assigned subsidy rates of 27.64 percent to Wuxi Suntech Power Co., Ltd; 49.79 percent to Changzhou Trina Solar Energy Co., Ltd.; and 38.72 percent to all others. 79 Fed. Reg. at 76964; Issues and Decision Memorandum for Final Countervailing Duty Determination (Dec. 15, 2014); CR at I-6 to I-7; PR at I-5.

²⁵¹ 19 U.S.C. § 1677(7)(C)(iii); *see also* SAA at 851 and 885 (“In material injury determinations, the Commission considers, in addition to imports, other factors that may be contributing to overall injury. While these factors, in some cases, may account for the injury to the domestic industry, they also may demonstrate that an industry is facing difficulties from a variety of sources and is vulnerable to dumped or subsidized imports.”).

²⁵² 19 U.S.C. § 1677(7)(C)(iii); *see also* SAA at 851, 885.

²⁵³ CR at III-4 at n.5; PR at III-4 at n.5; CR/PR at Table III-2.

investigations.²⁵⁴ Regardless, the fact that a number of firms no longer operate is certainly relevant to our inquiry. While we consider changes over the POI herein, we also conclude that the domestic industry performed poorly each year of the POI, as well as in interim 2013 and in interim 2014. Stated differently, even though imports of certain CSPV products from China became subject to antidumping and countervailing duty orders in late 2012 and receded from the market, and despite strong demand conditions, the domestic industry's trade and financial indicators were poor in 2011, 2012, 2013, interim 2013, and interim 2014.

During the POI, as apparent U.S. consumption flourished,²⁵⁵ the domestic industry made fewer U.S. shipments,²⁵⁶ experienced small and declining net sales quantities,²⁵⁷ and held a small and declining share of the U.S. market.²⁵⁸

Despite strong and increasing demand, the domestic industry reduced its overall production capacity between 2011 and 2013.²⁵⁹ A number of U.S. firms began CSPV manufacturing operations during the POI, but a substantial number of domestic producers shuttered their facilities.²⁶⁰ Between 2011 and 2013, the domestic industry produced limited and declining volumes of CSPV products relative to apparent U.S. consumption,²⁶¹ and it operated at very low capacity utilization.²⁶² The domestic industry laid off numerous production and related workers during this period.²⁶³

²⁵⁴ See, e.g., CR at III-1 n.1, VI-1 n.3; PR at III-1 n.1, VI-1 n.3.

²⁵⁵ Apparent U.S. consumption increased from *** in 2011 to *** in 2012, and *** in 2013, and was *** in interim 2013 and *** in interim 2014. CR/PR at Table C-4.

²⁵⁶ The domestic industry's U.S. shipments progressively declined from *** MW in 2011 to *** MW in 2012, and *** MW in 2013, although they were lower (*** MW) in interim 2013 than in interim 2014 (*** MW). CR/PR at Table C-4.

²⁵⁷ The domestic industry's net sales were *** MW in 2011, *** MW in 2012, *** MW in 2013, *** MW in interim 2013, and *** MW in interim 2014. CR/PR at Table C-4.

²⁵⁸ The domestic industry's market share fell from *** percent in 2011 to *** percent in 2012 and *** percent in 2013, and was *** percent in interim 2013 and *** percent in interim 2014. CR/PR at Table C-4.

²⁵⁹ The domestic industry's average production capacity was *** MW in 2013 compared to *** MW in 2011, and was *** MW in interim 2013 and *** MW in interim 2014. CR/PR at Table C-4. We note that the domestic industry's production of CSPV modules declined more rapidly than the decline in the domestic industry's production capacity. CR/PR at Table C-4.

²⁶⁰ See, e.g., CR at III-4 at n.5; PR at III-4 at n.5; CR/PR at Table III-2.

²⁶¹ The domestic industry produced *** MW in 2011, *** MW in 2012, *** MW in 2013, *** MW in interim 2013, and *** MW in interim 2014. Its end-of-period inventories decreased from *** MW in 2011 to *** MW in 2012, and then to *** MW in 2013, and were *** MW in interim 2013 and *** MW in interim 2014. Its export quantities, ***, declined overall between 2011 and 2013 but were higher in interim 2014 than in interim 2013, and as a share of domestic production increased between 2011 and 2012 and between interim periods. CR/PR at Table C-4.

²⁶² The domestic industry's capacity utilization was *** percent in 2011, *** percent in 2012, *** percent in 2013, *** percent in interim 2013, and *** percent in interim 2014. CR/PR at Table C-4.

²⁶³ The average number of PRWs was *** in 2011, *** in 2012, *** in 2013, *** in interim 2013 and *** in interim 2014. Hourly wages increased overall, and productivity fluctuated. Hourly wages increased from \$*** in 2011 to \$*** in 2012, and \$***, and were \$*** in interim 2013 and \$*** in

Indeed, despite strong and increasing demand and declining SG&A expenses, the domestic industry's financial condition was consistently poor during the POI.²⁶⁴ Manufacturing CSPV products is capital intensive and technologically sophisticated; notwithstanding the need to invest continuously to improve technology, increase manufacturing efficiencies, and lower costs,²⁶⁵ the domestic industry was able to devote only limited resources to capital expenditures and R&D.²⁶⁶ Several domestic producers recognized asset write-offs and/or costs related to the closure of their production facilities, asset impairments, and/or inventory revaluations when balance sheet costs assigned to inventories exceeded market or net realizable values.²⁶⁷ The domestic industry's net sales values also were low and declining.²⁶⁸ Faced with low and declining net sales values and low and declining market shares and capacity utilization, the domestic industry incurred operating losses during the entire POI.²⁶⁹

As previously discussed, the significant and growing volume of subject imports undersold the domestic like product and took market share from the domestic industry. As a result, the domestic industry limited its output, laid off workers, and experienced low and declining revenues. As the volume of low-priced subject imports increased, the poor performance the domestic industry experienced at the beginning of the POI persisted and in some instances deteriorated further notwithstanding increasing demand and sharp declines in the volume of nonsubject CSPV products from China after antidumping and countervailing duties were imposed on those products in 2012.

interim 2014. The industry's productivity was *** kW/hour in 2011, *** kW/hour in 2012, *** kW/hour in 2013, *** kW/hour in interim 2013, and *** kW/hour in interim 2014. CR/PR at Table C-4.

²⁶⁴ The domestic industry's SG&A declined from \$*** in 2011 to \$*** in 2012 and \$*** in 2013, and were \$*** in interim 2013 and \$*** in interim 2014. Spreading these expenses over a declining volume of domestic production resulted in an overall increase in SG&A unit values. CR/PR at Table C-4.

²⁶⁵ Petitioner's Prehearing Brief at 95-96; CR at VI-2; PR at VI-1.

²⁶⁶ CR at VI-16 to VI-17 & n.22; PR at V-6 & n.22. The domestic industry's capital expenditures for CSPV modules declined from \$*** in 2011 to \$*** in 2012, and \$*** in 2013, and were \$*** in interim 2013 and \$*** in interim 2014. The domestic industry's R&D expenditures for CSPV modules were \$*** in 2011, \$*** in 2012, \$*** in 2013, \$*** in interim 2013, and \$*** in interim 2014. The domestic industry's capital expenditures for CSPV cells also declined overall and were \$*** in 2011 to \$*** in 2012, and \$*** in 2013, and were \$*** in interim 2013 and \$*** in interim 2014. R&D expenditures for CSPV cells were \$*** in 2011, \$*** in 2012, \$*** in 2013, \$*** in interim 2013, and \$*** in interim 2014. CR/PR at Table C-4, Table VI-4 (excluding *** and Suntech).

²⁶⁷ CR at VI-3 to VI-4 at n.7, VI-10 to VI-16, VI-18 to VI-19; PR at VI-2 at n.7, VI-2 to VI-6, VI-7; CR/PR at Table VI-1 at nn.1-2. A number of U.S. CSPV cell producers that submitted questionnaire responses in the preliminary phase of the *CSPV 1* investigations had exited the market by the time of the final phase of those investigations. *CSPV 1* CR at III-4 at n.5, Tables III-2 to III-4 (referring to 2011 closures and bankruptcies for Evergreen, Calisolar, Solar Power). Throughout the current POI, the domestic industry's CSPV cell operations continued to experience losses. CR/PR at Table VI-1; *CSPV 1* CR at Table C-1. Moreover, ***, and ***. CR at VI-3 n.7, VI-12 to VI-14 & nn.12, 16; PR at VI-2 n.7, VI-4 to VI-5 & nn.12; CR/PR at Table VI-1 & nn.1-2.

²⁶⁸ The domestic industry's net sales were \$*** in 2011, \$*** in 2012, \$*** in 2013, \$*** in interim 2013, and \$*** in interim 2014. CR/PR at Table C-4.

²⁶⁹ Its operating losses were \$*** in 2011, \$*** in 2012, \$*** in 2013, \$*** in interim 2013, and \$*** in interim 2014. CR/PR at Table C-4.

We have considered whether factors other than cumulated subject imports had an impact on the domestic industry during the POI so as to not attribute to subject imports any injury caused by the other factors. As discussed above, the record does not support respondents' claims of attenuated competition between the domestic industry and subject imports.

Respondents further allege that domestic producers made a "bad bet" on monocrystalline instead of multicrystalline CSPV technology and were slow to introduce higher wattage products with efficiencies comparable to CSPV products available from subject producers, which they argue led to the domestic industry's poor performance over the POI. Whereas most of the domestic industry's U.S. shipments were monocrystalline CSPV products, the domestic industry also sold multicrystalline CSPV products, and importers of subject merchandise from China and Taiwan also supplied both monocrystalline and multicrystalline products to the U.S. market.²⁷⁰ The domestic industry and importers of subject merchandise from China and Taiwan both supplied products in a range of wattages to the U.S. market.²⁷¹ Indeed, subject imports of CSPV products undersold the domestic like product for both technologies, regardless of the wattage.²⁷² Moreover, rather than "demanding" multicrystalline products as respondents suggest, purchasers often do not specify a particular technology (monocrystalline versus multicrystalline CSPV products) in their RFPs.²⁷³ Indeed, monocrystalline and multicrystalline products compete for sales to and were sold to purchasers in all segments of the U.S. market, as discussed above.²⁷⁴ The record also shows that almost all purchasers reported U.S. CSPV modules as being superior or comparable in terms of conversion efficiency and quality.²⁷⁵ Indeed, other producers have also "bet" on monocrystalline technology, including some producers of subject merchandise.²⁷⁶ For these reasons, the record does not show that the domestic industry's product mix explains its poor performance.

²⁷⁰ See, e.g., CR/PR at Tables E-26 to E-34.

²⁷¹ See, e.g., CR/PR at Tables E-26 to E-34. Purchasers in all market segments in the U.S. market also purchased a variety of wattages of CSPV products during the POI. CR/PR at Table II-3.

²⁷² See, e.g., CR/PR at Tables E-26 to E-34.

²⁷³ Petitioner's Posthearing Brief at 10; Hearing Tr. at 62 (Kaplan), 80-84 (Dulani, Brightbill, Shaver, Clark, McKechnie), 109-113 (Johnson, Dulani, Shaver, McKechnie).

²⁷⁴ CR/PR at Tables II-3, II-4, Tables E-26 to E-34; see also, e.g., CCCME Posthearing Brief at Answers to Commissioner Pinkert's Question 7, Exhibit 7 (showing consideration of monocrystalline and multicrystalline products for the same sale in the utility segment). Purchasers in all market segments in the U.S. market also purchased a variety of wattages of CSPV products during the POI. CR/PR at Table II-3.

²⁷⁵ CR/PR at Table II-23.

²⁷⁶ TPIA reported that the industry in Taiwan produces approximately 30 percent monocrystalline CSPV cells and 70 percent multicrystalline cells. At the same time, it acknowledges an industry report that producers in Taiwan are starting to shift towards monocrystalline cells such that monocrystalline cell capacity will account for 30 to 40 percent of total CSPV cell capacity in Taiwan by 2015. TPIA's Posthearing Brief at Exhibit 1 at 20. CCCME's members have focused on serving large utility purchasers with multicrystalline modules, but it concedes that there are some who predict that high-efficiency multicrystalline modules will be the technology that provides the best value in the future.

We have also closely examined the role of nonsubject imports in these investigations. Nonsubject imports accounted for a generally declining share of the U.S. market during the POI. Most of these imports involved CSPV products from China that became subject to antidumping and countervailing duty orders in late 2012, and then declined substantially thereafter. U.S. imports from nonsubject countries other than China (including Malaysia, Mexico, Philippines, Singapore, and Korea) generally declined during the POI and never accounted for more than *** percent of apparent U.S. consumption.^{277 278} Furthermore, unlike subject imports, CSPV imports from nonsubject sources other than China frequently oversold the domestic like product.²⁷⁹

Respondents also point to the need for CSPV products to attain grid parity to compete with electricity generated from natural gas and thin film products. The record indicates that increased hydraulic drill fracturing of shale expanded the supply of natural gas in the United States; caused natural gas prices to decline substantially from 2010 to 2012; reduced the levelized cost of electricity generated by natural gas; and increased demand for natural gas-fueled electricity during periods of peak energy consumption.²⁸⁰ The price of natural gas for electricity generation, however, increased in 2013, peaked in February 2014, and is projected to remain higher than at its 2012 levels.²⁸¹ As an alternative renewable solar energy source of electricity, thin-film products are less efficient than CSPV products and would be less attractive for many residential and commercial applications, which still collectively account for a sizeable share of the U.S. market. Thin film may be acceptable for utility applications in projects without

whereas others predict that monocrystalline products ultimately will be the prevalent technology. *Id.* at Exhibit 2 at 7-8, 27-28.

²⁷⁷ CR/PR at Table C-4; CR at IV-10; PR at IV-7 to IV-8. Available importer questionnaire data do appear to provide lower coverage of imports from nonsubject sources than official import statistics. As CCCME pointed out, however, official import statistics overstate imports because, for example, they include out-of-scope products such as thin film imports from the Malaysian facility of the world's largest thin film manufacturer (FirstSolar) in addition to nonsubject imports of CSPV modules assembled in Malaysia from CSPV cells made in third countries that are imported by SunEdison. As CCCME noted, it would be difficult to segregate out-of-scope merchandise from official import statistics. CCCME's Posthearing Brief at Exhibit 1 at 2-3; CR at IV-1 at n.2; PR at IV-1 at n.2. Furthermore, the parties agree that importer questionnaires provide very high if not complete coverage of CSPV imports from China and Taiwan, and as noted above, China was the largest source of nonsubject imports during the POI.

²⁷⁸ Based on the evidence in these investigations, regardless of whether CSPV products constitute a commodity for purposes of a *Bratsk/Mittal* analysis, Vice Chairman Pinkert finds that nonsubject imports would not likely have replaced the subject imports had the subject imports exited the U.S. market during the POI. Nonsubject imports from China came under antidumping and countervailing duty orders in 2012, and their U.S. market share fell precipitously thereafter. Nonsubject imports from other countries were quite small, accounting for less than *** percent of apparent U.S. consumption. CR/PR at Table C-4.

²⁷⁹ CR/PR at Appendix D.

²⁸⁰ CR at II-29 to II-30; PR at II-21 to II-22; CR/PR at Figure II-10; USITC Pub. 4360 at 22. The majority of questionnaire respondents reported that natural gas prices have declined while prices of coal and other conventional energy sources either increased or stayed the same since 2011. CR at II-30; PR at II-22; CR/PR at Table II-7.

²⁸¹ CR at II-29 to II-30; PR at II-21 to II-22; CR/PR at Figure II-10.

space restrictions, as indicated above, but utilities tend to be price-sensitive purchasers, as discussed above.²⁸² As even CCCME appears to recognize,²⁸³ reduced polysilicon raw material costs and incentive programs have contributed to lower prices for electricity generated by CSPV products and made CSPV products more competitive with other sources of electricity, including natural gas and thin film.²⁸⁴ Questionnaire respondents generally did not report a link between prices of electricity generated by other sources and demand or prices for CSPV products.²⁸⁵ Furthermore, the need to meet grid parity applies to CSPV products made in the United States, China, and Taiwan, and grid parity does not explain the significant increase in subject imports or the significant underselling of the domestic like product by subject imports.

Finally, we do not find that changes in incentive programs explain the domestic industry's condition. These programs are directed at systems owners, as opposed to any particular domestic or foreign manufacturer of CSPV products.²⁸⁶ Although some programs have expired, others continue.²⁸⁷ Moreover, any decline in incentives has not led to declines in apparent U.S. consumption. Instead, apparent U.S. consumption continued to be robust throughout the POI, including in states most affected by changes in incentive programs, such as California.²⁸⁸

Consequently, none of the alternative causes that respondents have raised can explain the poor and often declining performance of the domestic industry during the POI. We therefore find that cumulated subject imports have had a significant adverse impact on the domestic industry. Accordingly, we determine the domestic industry is materially injured by reason of subject imports from China and Taiwan.

²⁸² CSPV 1, USITC Pub. 4360 at 11.

²⁸³ CCCME points to an industry publication that attributes "the recent surge in utility procurement" of CSPV products over natural gas-generated electricity to the following: "utility-scale solar is cheaper than building some new natural gas plants;" "utility-scale solar serves as a hedge against natural gas price volatility;" "it's a strategic shift to remove coal from utilities' generation resource mix;" and "EPA's coal ash rule is requiring early retirement of certain utilities' coal fields." CCCME also refers to a *New York Times* article reporting that for "the solar and wind industries in the United States, it has been a long-held dream: to produce energy at a cost equal to conventional sources like coal and natural gas. That day appears to be dawning." CCCME's Posthearing Brief at Exhibit 1 at 14-15 (emphasis in brief); *id.* at 19-20.

²⁸⁴ CR at V-1 to V-2, VI-10 to VI-14; CR/PR at Figure V-1; PR at V-1 to V-2, VI-3 to VI-5; USITC Pub. 4360 at 22, 28.

²⁸⁵ A plurality of importers and purchasers reported that prices of U.S. conventional energy sources have increased demand for CSPV products in all market segments, and a plurality of U.S. producers and purchasers reported that changes in the price of U.S. conventional energy have no impact on the price of solar-generated electricity. CR at II-31; PR at II-23 to II-24; CR/PR at Table II-7 to II-9.

²⁸⁶ For example, two major Federal tax incentive programs were the Federal Investment Tax Credit and the Grant in Lieu of Tax Credit (or Section 1603 program). State and local authorities also provided a variety of incentives during the POI. CR at II-32 to II-38; PR at II-24 to II-29; CR/PR at Table II-10.

²⁸⁷ CR at II-32 to II-38; PR at II-24 to II-29; CR/PR at Table II-10.

²⁸⁸ CR at II-32 to II-39; PR at II-24 to II-29; CR/PR at Tables II-10 to II-13.

VII. Conclusion

For the reasons stated above, we determine that an industry in the United States is materially injured by reason of subject imports of CSPV products from China and Taiwan that Commerce has determined were sold in the United States at less than fair value and subsidized by the government of China.

Separate and Dissenting Views of Chairman Meredith M. Broadbent

Based on the record in the final phase of these investigations, I find that an industry in the United States is materially injured by reason of imports of crystalline silicon photovoltaic (“CSPV”) modules from China and Taiwan that the U.S. Department of Commerce (“Commerce”) has determined are sold in the United States at less than fair value and subsidized by the government of China. There was a significant increase in low-priced subject imports of CSPV modules between January 2011 and June 2014 (the “period of investigation” or “POI”), leading the U.S. CSPV module industry to experience a decline in production and shipments of CSPV modules during a period of rapidly increasing demand.

I further find that an industry in the United States is neither materially injured nor threatened with material injury by reason of imports of CSPV cells from Taiwan that Commerce has determined are sold in the United States at less than fair value.¹ Subject imports of cells from Taiwan increased comparatively modestly during the POI. Moreover, the record indicates that imported CSPV cells fill a necessary role as the primary source of supply to independent U.S. module producers without integrated cell operations, as U.S. cell producers are primarily focused on internal consumption of cells for their own downstream module production, transfers to related producers overseas, and other exports.²

In reaching these determinations, I join and adopt all sections of the Views of the Commission, including sections I-II.B, and III.A, and sections IV-VI as they pertain to subject imports of CSPV modules only.³ I write separately with respect to the definition of the domestic like products and domestic industries, and in finding no material injury or threat thereof caused by subject imports of CSPV cells.

¹ The scope of the investigations on imports from China does not include CSPV cells because they are within the scope of existing antidumping and countervailing duty orders on U.S. imports of other CSPV products from China. 79 Fed. Reg. 76970, 76971 (Dec. 23, 2014) (scope of current antidumping duty investigation on imports from China); 79 Fed. Reg. 76962, 76963 (Dec. 23, 2014) (scope of current countervailing duty investigation on imports from China); 77 Fed. Reg. 73018 (Dec. 7, 2012) (antidumping duty order on imports from China); 77 Fed. Reg. 73017 (Dec. 7, 2012) (countervailing duty order on imports from China).

² I would note that the imposition of an antidumping duty order on subject imports of CSPV cells may undermine the development of viable standalone U.S. module producers simply because they operate under a different supply chain strategy from the two integrated producers. This, in turn, may harm not only the long-term health and innovation of U.S. CSPV module manufacturing in the United States, but also the competitiveness of solar energy in general. Innovations in areas specific to module production, such as in electrical circuitry and transmission systems, for example, will be key to sustainability of this industry in its effort to reach “grid parity” with other energy sources.

³ Within the Views of the Commission, unless stated otherwise, the analysis of the market and industry producing CSPV products is based on data for the U.S. market and industry producing CSPV modules, including any discussion of U.S. shipments, volumes of imports, market share, apparent U.S. consumption, pricing data, and industry output and financial indicia. See CR/PR at Table C-4.

I. Domestic Like Product

In the final phase of these investigations, TPIA asked the Commission to define CSPV cells and CSPV modules as separate domestic like products based on a semifinished domestic like product analysis.⁴ This is the first instance in any investigation on CSPV products that a party has made such a request. CCCME takes “no position” on TPIA’s request for two domestic like products.⁵ SolarWorld asks the Commission to define a single domestic like product that includes CSPV cells and modules for the reasons articulated in its prior determinations.⁶

In its December 16, 2014 final determinations, Commerce defined the subject imports from China as imported modules and laminates produced in China from CSPV cells made in any country other than China.⁷ This definition represents a significant change from the scope in *CSPV 1*, which provided that cell production in China established that the article was subject merchandise from China.⁸ The scope of the instant investigation concerning subject imports from Taiwan, like the scope in *CSPV 1*, defines articles as subject merchandise only if the cell is produced in Taiwan; however, where the country of origin definitions for the scopes of the current investigations from China and Taiwan conflict (i.e., where a cell produced in Taiwan is further assembled into a module in China), the country of module assembly (China) is the country of origin.⁹ Because Commerce has here defined a scope for China that is different from its scope in *CSPV 1*, because there are differences between the two scopes in these current investigations, and because this is the first instance in which a party has argued for separate

⁴ Specifically, TPIA points to similar arguments SolarWorld made before Commerce and the CIT to support a request that Commerce define two classes or kinds of subject merchandise. TPIA argues that CSPV cells have different physical characteristics and functions than CSPV modules, because lamination prevents thin CSPV cells from cracking and breaking or oxidizing and degrading due to air exposure. Additionally, it claims that single CSPV cells lack sufficient power and components to generate and transmit the amount of electricity required for residential, commercial, utility, and off-grid applications. It asserts that module assembly involves a large number of workers, significant technical expertise, and highly automated and sophisticated operations. It contends that module assembly, which accounts for the majority of labor costs and involves substantial capital investments and processing time, adds significant value to the finished module. TPIA argues that CSPV cells serve different markets (module assemblers or integrated firms’ internal captive consumption) than modules (distributors, residential/commercial installers, and utility developers). It asserts that competition between U.S. and subject producers occurs primarily in the module channel of distribution, given that merchant market sales of CSPV cells account for such a small share of total CSPV product purchases. TPIA’s Posthearing Brief at 2-3; TPIA’s Prehearing Brief at 6-13.

⁵ CCCME’s Posthearing Brief at Exhibit 1 at 1.

⁶ Petitioner’s Posthearing Brief at 3, Exhibit 1 at 63-68; Petitioner’s Prehearing Brief at 6-7.

⁷ 79 Fed. Reg. 76962-63 (Dec. 23, 2014) (countervailing duty); 79 Fed. Reg. 76970-71 (Dec. 23, 2014) (antidumping duty).

⁸ 79 Fed. Reg. 76962-63, 76970, 76971 (Dec. 23, 2014); 77 Fed. Reg. 73017-18 (Dec. 7, 2012).

⁹ I note that Commerce did not issue draft scope language defining country of origin based on module production until October 3, 2014, and did not finalize its fully revised separate scopes until its final determinations on December 16, 2014. CR at I-17-18; PR at I-13-14; 79 Fed. Reg. 76962, 76963 (Dec. 23, 2014) (countervailing duty); 79 Fed. Reg. 76970, 76971 (Dec. 23, 2014) (antidumping duty).

like product determinations for cells and modules, I believe it is appropriate to reexamine, in this instance, whether cells and modules should be considered separate like products.¹⁰

CSPV cells are intermediate products that are ultimately processed, along with other inputs, into CSPV modules for use in solar electricity generating systems. In determining whether products at different stages of processing that are vertically related to each other should be included in the same like product, the Commission has generally applied a semifinished like product analysis.¹¹

Because no party requested that the Commission define CSPV cells and CSPV modules as separate like products in their comments on the draft questionnaires for the final phase of these investigations, the Commission did not survey market participants on whether cells and modules should be considered separate like products in its questionnaires. The Commission's analysis of this issue, therefore, is limited to the available record information and parties' arguments. Nonetheless, the record contains sufficient evidence to conduct a semifinished like product analysis, which I find supports a determination that CSPV cells and CSPV modules are separate domestic like products.

Dedication to production of downstream article: CSPV cells are generally used in the production of CSPV modules,¹² although they can also be used in building integrated photovoltaics (BIPV), which are building materials that incorporate solar cells, such as solar shingles or solar windows.¹³ While cells produced in the United States are practically dedicated to the production of downstream modules, this factor is not by itself dispositive of the question

¹⁰ In the preliminary phase of *CSPV 1*, the Commission performed the semifinished like product analysis and defined cells and modules as a single domestic like product. *Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Preliminary), USITC Pub. 4295 (Dec. 2011) at 10-11. In the final phase of *CSPV 1*, I, like the other Commissioners, made the same determination, referencing the analysis of the preliminary determination and finding that the record continued to support the preliminary analysis. *Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Preliminary), USITC Pub. 4360 (Nov. 2012) at 6. The Commission did not address the issue of whether CSPV cells and modules were separate domestic like products during the preliminary phase of these investigations, and continued to find a single domestic like product coextensive with the scope. *Certain Crystalline Silicon Photovoltaic Products from China and Taiwan*, Inv. Nos. 701-TA-511 & 731-TA-1246-1247 (Preliminary), USITC Pub. 4454 (Feb. 2014) at 7-8.

Commerce did not expand the scope in the current CSPV investigations to include thin-film products, and therefore I continue to find that the domestic like product definition should not be expanded to include thin-film products.

¹¹ In the semifinished like product analysis, the Commission examines the following: (1) whether the upstream article is dedicated to the production of the downstream article or has independent uses; (2) whether there are perceived to be independent markets for the upstream and downstream articles; (3) differences in the physical characteristics and functions of the upstream and downstream articles; (4) differences in the costs or value of the vertically differentiated articles; and (5) significance and extent of the processes used to transform the upstream into the downstream articles. *See, e.g., Drill Pipe and Drill Collars from China*, Inv. Nos. 701-TA-474 and 731-TA-1176 (Preliminary), USITC Pub. 4127 (Mar. 2010) at 7 (involving green tubes and finished drill pipe).

¹² CR at III-9 & n.7; PR at III-6 & n.7; Petitioner's Prehearing Brief at 6-7.

¹³ CR at I-24; PR at I-19.

of whether there are two separate like products,¹⁴ particularly when there is a fully separate and independent market for the upstream article.

Separate markets for upstream and downstream articles: In my view, the record shows that there is a significant distinction between the independent market for CSPV cells and the greater market for CSPV modules in the United States. The commercial market for modules is comprised of a broad variety of distributors, installers, and utility companies that serve the on-grid residential, nonresidential, and utility sectors as well as off-grid consumers, all of whom demand the finished hardware necessary for the conversion of sunlight into electricity.¹⁵ Cells ultimately serve the same consumers, but not directly: they are either internally consumed or exported for further processing into modules, or they are sold commercially to independent module producers. While the independent market for cells was only served sparingly by the domestic producers of cells and supplied primarily by imports during the period of investigation,¹⁶ this separate market is no less significant simply because the two domestic cell producers did not actively participate there in substantial volumes.¹⁷ In fact, because the commercial market for cells is necessary for the survival of standalone U.S. module producers, I consider the existence of that market to be a critical factor in establishing two separate like products.

*Differences in physical characteristics and functions:*¹⁸ Physically, cells are considerably different from modules. Cells are 5 by 5 inches or 6 by 6 inches, while modules are generally

¹⁴ The Commission has previously found semifinished and finished articles to be separate like products even when the semifinished article was wholly dedicated for use in the production of the finished article. *See Tart Cherry Juice and Tart Cherry Juice Concentrate from Germany and Yugoslavia*, Inv. Nos. 731-TA-512-513 (Preliminary), USITC Pub. 2378 (May 1991) at 8-12. In addition, the Commission has found that no single factor within the semifinished product analysis is determinative. *See, e.g., Oil Country Tubular Goods from Argentina, Austria, Italy, Japan, Korea, Mexico, and Spain*, Inv. Nos. 701-TA-363-364 and 731-TA-711-717 (Preliminary), USITC Pub. 2803 (Aug. 1994) at 4; *Erasable Programmable Read Only Memories ("EPROMS") from Japan*, Inv. No. 731-TA-288 (Preliminary), USITC Pub. 1778 (Nov. 1985) at 7.

¹⁵ CR at I-22, I-27, and I-42; PR at I-18, I-21, and I-31.

¹⁶ CR/PR at Table III-7 and Table E-12.

¹⁷ *See, e.g., EPROMS from Japan*, Inv. No. 731-TA-288 (Preliminary), USITC Pub. 1660 (March 1985) at 4-5 ("the Commission may consider...whether there exists...an independent commercial market for the article at an earlier stage of production. (emphasis added). The Commission has previously found semifinished and finished articles to be separate like products even where the majority of the domestically produced upstream articles was internally consumed for the production of downstream articles where there was an important independent market for the upstream article. *See, e.g., Certain Special Quality Hot-Rolled and Semifinished Carbon and Alloy Steel Products from Brazil*, Inv. No. 731-TA-572 (Preliminary), USITC Pub. 2537 (July 1992) at 12-15.

¹⁸ The remaining three factors typically considered by the Commission in its semifinished like product analysis are used to establish whether there is physical and functional resemblance between the upstream and downstream articles, in part by considering any actual qualitative differences and in part by considering the extent of the processing required to transform the unfinished product into its finished form.

around 62 to 78 inches long and 32 inches wide and weigh between 34 and 62 pounds.¹⁹ Within the module, cells are soldered together and encapsulated between a backing material and a glass front.²⁰ These protective materials are unique to modules, as cells by themselves oxidize and degrade due to air exposure, and are so thin that they would quickly break during use in outdoor environments.²¹ A frame is often added as well as a junction box, which 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.²² Modules are therefore considerably larger, heavier, and more durable than cells, and contain more components.

A cell's basic function is the conversion of sunlight into electricity. However, in order to generate a useful amount of electricity from cells to the electrical grid or a battery, typically 60 to 72 cells are conductively soldered and protected within the body of a module. A cell by itself can typically generate between 3 and 4.5 watts, while a module can typically generate between 120 and 400 watts.²³ In addition, while both cells and modules can generate electricity, cells cannot by themselves transmit electricity to the grid or to a battery. The junction box and inverter and/or charge controller of the module are required for the transmission of electricity.²⁴ As stated by SolarWorld in the prior investigations before Commerce, "a *** cell cannot function at all in any meaningful or useful way, until it is assembled into a module/panel."²⁵ In sum, I find that there are significant physical and functional differences between CSPV cells and CSPV modules.

Processes used to manufacture the downstream article from the upstream article: There are five principal stages in the manufacture of finished CSPV modules, which 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.²⁶ Module assembly is the most labor-intensive stage, but increasingly incorporates highly automated processes.²⁷ Modules are produced by soldering cells together into strings, combining strings into a rectangular matrix of cells, laminating the matrix within glass and backing material, and soldering the frame and electrical components on to the laminate.²⁸ In sum, I find that the process used to manufacture modules using CSPV cells and other inputs is substantial.

¹⁹ CR at I-22-23; PR at I-18.

²⁰ CR at I-23; PR at I-18.

²¹ TPIA Prehearing Brief at 9, Exhibit 2.

²² CR at I-23; PR at I-18.

²³ CR at I-23; PR at I-18.

²⁴ CR at I-23; PR at I-18.

²⁵ TPIA Prehearing Brief at 10.

²⁶ CR at I-32; PR at I-25. For example, SolarWorld, the largest U.S. producer of cells, recently divested itself from its in-house production of ingots and wafers, and now imports those products for use in its U.S. cell operations. SolarWorld uses its finished cells to produce modules in the United States, and also exports cells to its ***. CR at III-9 n. 6; PR at III-6; EDIS Doc. 545611.

²⁷ CR at I-39; PR at I-29.

²⁸ CR at I-39-40; PR at I-29; TPIA Prehearing Brief at 11-12.

The relative cost or value of the vertically differentiated articles: As the final two steps in the production of finished CSPV products, both CSPV cell and CSPV module production contribute similar amounts of value added to their underlying inputs. Based on questionnaire responses, the value added by U.S. cell-producing operations ranged from *** percent to *** percent during the period of investigation, while the value added by U.S. module-producing operations ranged from *** percent to *** percent.²⁹ Cells only accounted for between *** percent and *** percent of the raw material costs of modules during the period of investigation.³⁰ Furthermore, the average unit value of U.S. commercial shipments of domestically produced modules was between *** percent and *** percent higher than the average unit value of U.S. commercial shipments of domestically produced cells during the period of investigation.³¹

Summary: Only one of the five factors generally considered by the Commission in its semifinished like product analysis clearly lends itself to a single domestic like product definition: the fact that practically all CSPV cells produced in the United States are ultimately used in the production of modules. However, there is a significant separate market for cells that is independent of the market segments in which modules are sold. On balance, the evidence on the record presents clear differences between cells and modules in terms of characteristics and function. Finally, cell and module production are both substantial processing steps in the supply chain that add significant value to the final product. Consequently, I define CSPV cells as a separate domestic like product from CSPV modules.

II. Domestic Industries

A. In General

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.”³² 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.³³ Based on my determination that there are two domestic like

²⁹ CR/PR at Table VI-1 and Table VI-3. These value added calculations (the ratio of direct labor and other factory costs to total cost of goods sold) exclude SG&A expenses, which are far more substantial for U.S. cell-producing activities than for U.S. module-producing activities, but reflect events which are not inherently related to the true value added associated with cell and module production.

³⁰ CR at VI-11; PR at VI-4.

³¹ CR/PR at Table III-7 and Table III-8.

³² 19 U.S.C. § 1677(4)(A).

³³ *Polyvinyl Alcohol from China, Germany, Japan, Korea & Singapore*, Inv. Nos. 731-TA-1014 to 1018 (Preliminary), USITC Pub. 3553 at 10 (Oct. 2002); *Ferrovandium from China and South Africa*, Inv. Nos. 731-TA-986 to 987 (Preliminary), USITC Pub. 3484 at 7 & n.35 (Jan. 2002); *Certain Welded Large Diameter Line Pipe from Japan*, Inv. No. 731-TA-919 (Final), USITC Pub. 3464 at 10 n.53 (Nov. 2001); (Continued...)

products, I define two corresponding domestic industries: U.S. producers of CSPV cells and U.S. producers of CSPV modules. I consider whether any producer of the domestic like products should be excluded from the domestic industries pursuant to 19 U.S.C. § 1677(4)(B). Section 1677(4)(B) of the Tariff Act allows the Commission, if appropriate circumstances exist, to exclude from a domestic industry producers that are related to an exporter or importer of subject merchandise or which are themselves importers.³⁴ Exclusion of such a producer is within the Commission's discretion based upon the facts presented in each investigation.³⁵

B. Domestic Industry Producing Cells

No U.S. producer of CSPV cells qualifies as a related party in these investigations. Neither of the U.S. producers of CSPV cells imported subject cells from Taiwan during the period of investigation, nor was either affiliated with any producer or exporter in Taiwan.³⁶ No party argued otherwise. Because there are no related parties that produce CSPV cells, I define the domestic industry as all U.S. producers of CSPV cells, consisting of SolarWorld and Suniva.

C. Domestic Industry Producing Modules

In the final phase of these investigations, I conclude that several U.S. CSPV module producers qualify as related parties by virtue of their imports of subject modules and/or corporate relationships.³⁷ I do not find appropriate circumstances exist to exclude most of these U.S. module producers from the domestic industry because they appear to be acting principally as U.S. producers of CSPV modules rather than as U.S. importers of subject merchandise.³⁸ I reach different conclusions, however, with respect to *** and Suntech. These firms imported sizeable and growing volumes of finished CSPV modules at levels that exceeded their U.S. production of CSPV modules before ***, indicating that their interests were primarily

(...Continued)

Certain Carbon Steel Plate from China, Russia, South Africa, and Ukraine, Inv. Nos. 731-TA-753 to 756 (Final), USITC Pub. 3076 at 9 (Dec. 1997).

³⁴ 19 U.S.C. § 1677(4)(B).

³⁵ See *Torrington Co. v. United States*, 790 F. Supp. at 1168; *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).

³⁶ CR/PR at Table III-5 and Table E-7.

³⁷ CR/PR at Table III-5, Table ***.

³⁸ See, e.g., CR/PR at Table III-5, Table ***. I recognize that U.S. module assembler *** imported sizeable volumes of CSPV modules relative to its U.S. production of CSPV modules. However, no party argued in favor of excluding *** from the domestic industry as a related party. Moreover, ***. Unlike *** and Suntech, which ***, *** maintained its interest in domestic production, as evidenced by the fact that the firm *** during the POI, and ***. The firm ***. Additionally, the firm *** the petitions, and it does not appear to have benefitted from its importing activities. CR/PR at Table VI-3, Table E-*** and note.

in importing rather than production in the United States during the period of investigation, as discussed below.

***: ***, a U.S. module assembler that accounted for *** percent of U.S. production of CSPV modules by kilowatts (kW) during the POI, is a related party based on its imports of subject ***.³⁹ On balance, I determine to exclude *** from the domestic CSPV module industry. *** stated that its ***⁴⁰ ***.⁴¹ The firm imported ***,⁴² and *** its operating performance was ***.⁴³ The firm *** capital expenditures *** research and development (“R&D”) expenses during the POI.⁴⁴ ***.⁴⁵

Suntech: Suntech is a related party because it imported *** during the period of investigation.⁴⁶ Additionally, Suntech is a wholly owned subsidiary of Suntech Power Holdings Co. of California, which in turn is a wholly owned subsidiary of Suntech Power Holdings Co., Ltd. of China, which has several subsidiaries producing CSPV products in China.⁴⁷ I determine to exclude Suntech from the domestic CSPV module industry as a related party. Suntech accounted for *** percent of U.S. production of CSPV modules by kilowatts in 2011.⁴⁸ Suntech, which is not currently in business in the United States, did not provide a U.S. producer questionnaire response in these investigations. In the prior investigations, however, Suntech ***.⁴⁹ There is no information regarding Suntech’s more recent financial performance, but its

³⁹ CR/PR at Table III-1.

⁴⁰ U.S. Producer Questionnaire.

⁴¹ CR/PR at Table III-2. *** U.S. production of CSPV modules totaled *** kW in 2011, *** kW in 2012, *** kW in 2013, *** kW in interim 2013, and *** kW in interim 2014. CR/PR at Table E-3.

⁴² *** reported importing ***. The firm’s total imports of finished modules exceeded its U.S. module production operations throughout the POI, further suggesting the firm’s primary interest as an importer of CSPV modules rather than a U.S. producer of CSPV modules. The firm’s imports of subject CSPV modules from *** were *** kW in 2011, *** kW in 2012, *** kW in 2013, *** kW in interim 2013, and *** kW in interim 2014, meaning that its imports of finished CSPV modules from ***, alone, exceeded its U.S. production of CSPV modules in 2013 by ***, and it ***. CR/PR at Table E-3.

⁴³ Its ratio of operating income to net sales was *** percent in 2011, *** percent in 2012, *** percent in 2013, and *** percent in interim 2013, whereas the domestic industry’s average was *** percent in 2011, *** percent in 2012, *** percent in 2013, and *** percent in interim 2013. U.S. Producer Questionnaire; CR/PR at Table VI-3.

⁴⁴ In terms of capital expenditures, it invested \$*** in 2011 and \$*** in 2012. Its R&D expenditures totaled ***. U.S. Producer Questionnaire.

⁴⁵ CR/PR at Table III-1.

⁴⁶ CR/PR at Table III-17 n.11.

⁴⁷ *CSPV 1* Views at 20.

⁴⁸ *CSPV 1* Views at 21.

⁴⁹ Suntech’s U.S. CSPV module production was *** kW in 2010, *** kW in 2011, *** kW in the first six months of 2011, and *** kW in the first six months of interim 2012. Suntech’s imports from China of CSPV modules within the scope of the *CSPV 1* investigations were *** kW in 2010, *** kW in 2011, *** kW in the first six months of 2011, and *** kW in the first six months of 2012; it imported *** kW of finished modules made from Taiwanese cells in the first six months of 2012. *CSPV 1* Views at 21; *CSPV 1* CR at Table III-8.

financial performance in the prior investigations ***.⁵⁰ Although the firm reported investing ***.⁵¹

Based on my definition of the domestic like product and my findings above, I define the domestic CSPV module industry as all U.S. producers of modules except for Suntech and ***.⁵²

III. No Material Injury by Reason of Subject Imports of CSPV Cells from Taiwan

I join the Views of the Commission in its discussion of the legal standards relevant to the material injury determinations and the conditions of competition in the U.S. market for CSPV cells and CSPV modules. I note the following additional conditions of competition concerning the U.S. market for CSPV cells.

First, U.S. demand for CSPV cells is directly affected by the consumption of cells in U.S. CSPV module production, which in turn is affected by demand factors addressed in the Views of the Commission, such as competition between solar energy and other sources of energy, the availability of government incentives, and demand drivers specific to each of the market segments which consume CSPV modules. The volume of U.S. module production is also affected by other conditions, such as competition with imports of modules, opportunities for module producers to export, and closure of module producers' facilities. Due to adverse conditions with respect to import competition, export opportunities, and independent module operations, U.S. production of modules declined substantially. U.S. module producers reduced their U.S. shipments of modules by 48.3 percent between 2011 and 2013 in the face of substantial volumes of both subject and nonsubject imports of modules.⁵³ In addition, U.S. exports of modules declined during the period of investigation, falling 84.5 percent between 2011 and 2013.⁵⁴ Finally, numerous U.S. module producers have ceased operating, closed their production facilities, or reduced operations during the period of investigation.⁵⁵ In light of these factors, U.S. production of modules declined by 67.7 percent between 2011 and 2013.⁵⁶

⁵⁰ Suntech's ratio of operating income to net sales was ***. *CSPV 1* at 21; *CSPV1 CR* at Table VI-4.

⁵¹ Suntech invested \$***. *CSPV 1 Views* at 21; *CR/PR* at Table III-2.

⁵² The decision to exclude these two related parties from the domestic industry does not have a significant impact on my analysis of material injury and causation, because exclusion does not significantly change the trends in the domestic industry's overall performance during the POI due to the small size of the two firms' production operations relative to the overall CSPV module industry.

⁵³ *CR/PR* at Table C-2.

⁵⁴ *CR/PR* at Table C-2.

⁵⁵ For example, ***; ***; BP Solar shuttered its manufacturing facility and exited the solar industry in 2012; Helios Solar Works suspended operations in September 2013; ***; MX Solar shuttered its U.S. manufacturing facility in 2012; ***; Schott shuttered its U.S. manufacturing facility in 2012; Sharp shuttered its U.S. production facility in 2014; Siliken Manufacturing filed for bankruptcy in January 2013; Solar Power Industries sold off its solar assets and exited the solar industry in September 2012; ***; and ***. *CR* at III-4 at n.5; *PR* at III-4 at n.5; *CR/PR* at Table III-2.

⁵⁶ *CR/PR* at Table C-2.

This in turn led to a sharp reduction in apparent U.S. consumption of CSPV cells during the POI.⁵⁷

Second,⁵⁸ the domestic CSPV cell industry is vertically integrated and is focused on U.S. module production and exports. The majority of domestically produced CSPV cells are internally consumed by the same producers in their module producing operations.⁵⁹ In addition, both U.S. producers exported substantial volumes of CSPV cells.⁶⁰ Neither U.S. producer competed for substantial commercial sales to the U.S. market (the “U.S. commercial market”), which was primarily served by imports.⁶¹ Consequently, while U.S. producers accounted for *** percent of overall apparent U.S. consumption of cells during the 2011 to 2013 time period, they accounted for between *** percent of the U.S. commercial market for cells during that same period.⁶²

A. Volume of Subject Imports of Cells

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.”⁶³

Subject imports of cells from Taiwan increased throughout the period of investigation from 84.4 MW in 2011 to 167.6 MW in 2012, before declining to 99.0 MW in 2013, for an

⁵⁷ CR/PR at Table III-7 and Table E-12. Apparent U.S. consumption of CSPV cells, by quantity, decreased from *** megawatts (MW) in 2011 to *** MW in 2013, and was *** MW in interim 2013 and *** MW in interim 2014. Apparent U.S. consumption of cells decreased *** percent between 2011 and 2013, and was *** percent lower in interim 2014 than in interim 2013.

⁵⁸ I consider whether the statutory captive production provision requires my primary focus to be on the merchant market when I assess market share and factors affecting the financial performance of the domestic CSPV cell industry. The Commission applies the captive production provision, 19 U.S.C. § 1677(7)(C)(iv), if, as a threshold matter, “domestic producers internally transfer significant production of the domestic like product for the production of a downstream article and sell significant production of the domestic like product in the merchant market.” None of the parties argue that the captive production provision applies.

I find that the captive production provision does not apply in these investigations because the threshold provision is not satisfied. Whereas internal consumption accounted for *** of the reported volume of U.S. producers’ total shipments from 2011 to 2013, commercial (merchant market) shipments accounted for only *** of U.S. producers’ total shipments during this period. CR/PR at Table III-7. I consequently determine not to apply the statutory captive production provision.

⁵⁹ CR at III-9 & n.7; CR/PR at Table III-7. Between *** percent of shipments were internally consumed for U.S. module-producing operations. See EDIS Doc. 545611. (***)

⁶⁰ CR at III-9 & n.7; CR/PR at Table III-7. Between *** percent of total shipments were exported to related firms. Between *** percent of total shipments were exported to unrelated firms. SolarWorld *** and ***. CR at III-9 n. 7; PR at III-6 & n.7.

⁶¹ CR at III-9 & n.7; CR/PR at Table III-7. Between *** percent of U.S. producers’ total shipments of cells were sold to the U.S. commercial market between 2011 and 2013.

⁶² CR/PR at Table III-7 and Table E-12.

⁶³ 19 U.S.C. § 1677(7)(C)(i).

overall increase of 17.3 percent.⁶⁴ In terms of the total CSPV cells market, subject imports had a market share of *** percent in 2011, *** percent in 2012, and *** percent in 2013.⁶⁵ Subject imports generally exchanged market share with nonsubject imports throughout the period of investigation, as nonsubject imports (including Chinese cells which were within the scope of the *CSPV 1* investigations) accounted for *** percent of the total cells market in 2011, *** percent in 2012, and *** percent in 2013.⁶⁶

While Taiwan became a more substantial supplier of cells to the U.S. market during the period of investigation, the domestic industry retained roughly the same level of market share. The domestic industry's U.S. shipments of CSPV cells, including internal consumption, accounted for *** percent of the total CSPV cells market in 2011, *** percent in 2012, and *** percent in 2013.⁶⁷ The domestic industry accounted for a relatively small share of the U.S. commercial market, accounting for *** percent of U.S. commercial shipments in 2011, *** percent in 2012, and *** percent in 2013.⁶⁸ Despite its relatively minor presence in the U.S. commercial market for CSPV cells, the domestic industry was actually able to increase its share of this market.

In view of the foregoing, I find that the volume and the increase in the volume of subject imports of cells is significant both in absolute terms and relative to consumption in the United States. However, I note that the volume of subject imports did not displace U.S. cell producers' U.S. shipments during the POI, given the lack of market share loss for the domestic industry and the domestic industry's focus on internal consumption and exports as opposed to U.S. commercial shipments.

B. Price Effects of Subject Imports of Cells

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

⁶⁴ CR/PR at E-12. Subject imports were 72.7 MW in interim 2013 and 26.4 MW in interim 2014, a decline of 63.7 percent.

⁶⁵ CR/PR at Table III-7 and Table E-12. Subject imports had a market share of *** percent in interim 2013 and *** percent in interim 2014.

⁶⁶ CR/PR at Table III-7 and Table E-12. Nonsubject imports had a market share of *** percent interim 2013 and *** percent in interim 2014.

⁶⁷ CR/PR at Table III-7 and Table E-12. Domestic producers' U.S. shipments of cells, including internal consumption, accounted for *** percent of the market in interim 2013 and *** percent of the market in interim 2014.

⁶⁸ CR/PR at Table III-7 and Table E-12. Domestic producers' U.S. shipments of cells accounted for *** percent of the commercial market in interim 2013 and *** percent of the commercial market in interim 2014. The sharp decline in U.S. producers' U.S. commercial shipments in interim 2014 occurred during the period of the lowest volume of subject imports. The record indicates that the U.S. cell producers shifted away from supplying external customers with CSPV cells in 2014 as a result of the implementation of effective trade relief. EDIS Doc. 545611.

(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.⁶⁹

I find that, given the high substitutability between the domestic like product and subject imports and the stated importance of price by most purchasers, competition in the U.S. commercial market for CSPV cells primarily depends on price. For more discussion on these issues, see the discussion of substitutability within the Views of the Commission.

In investigations where there are no meaningful U.S. commercial shipments of a domestic like product within a certain specification, the Commission typically will not collect price comparison data under that specification, even if there are appreciable levels of imports. Although TPIA requested in its comments on the draft questionnaires for the final phase of these investigations that the Commission include a pricing product for CSPV cells,⁷⁰ the Commission did not implement this request because there were only limited U.S. commercial sales of CSPV cells by the domestic industry. Without U.S. commercial shipments, a meaningful price could not be established for the domestic like product. Generally, to analyze underselling, I do not consider average unit values of U.S. shipments to be as probative as quarterly pricing data, given potential differences in product mix and particularly where the volume of U.S. producers' U.S. commercial shipments is small. I note, however, that the average unit value of subject imports from Taiwan was higher than the average unit value of the domestic like product throughout the period of investigation, with the exception of interim 2014, when U.S. producers' U.S. commercial shipments of cells were only ***.⁷¹ Thus, I do not find that the limited data on the record indicate significant underselling of the domestic like product by subject imports of cells.

I also considered whether subject imports of CSPV cells from Taiwan depressed prices of the domestic like product to a significant degree. The average unit value of the domestic industry's U.S. commercial shipments of CSPV cells fell by *** percent between 2011 and interim 2014 and the average unit value of subject imports of CSPV cells from Taiwan fell by *** percent.⁷² At the same time, in light of my finding that subject imports did not undersell the domestic like product and the lack of significant sales of domestically produced CSPV cells in the U.S. commercial market, the record does not establish that the subject imports had significant

⁶⁹ 19 U.S.C. § 1677(7)(C)(ii).

⁷⁰ TPIA Comments on Draft Questionnaires.

⁷¹ CR/PR at Table III-7 and Table E-12. The average unit value of subject imports of CSPV cells from Taiwan was \$*** per kW in 2011, \$*** per kW in 2012, \$*** per kW in 2013, \$*** per kW in interim 2013, and \$*** per kW in interim 2014. The average unit value of U.S. producers' U.S. shipments of cells was \$*** per kW in 2011, \$*** per kW in 2012, \$*** per kW in 2013, \$*** per kW in interim 2013, and \$*** per kW in interim 2014.

⁷² Id.

price depressing effects on domestic prices. Additionally, as discussed in the Views of the Commission, several factors other than subject imports contributed to the declines in prices for all CSPV products, including dramatically declining polysilicon prices;⁷³ a shift in SolarWorld's ingot and wafer sourcing to external sources;⁷⁴ and technological improvements.⁷⁵ In addition to these factors, declining U.S. demand for CSPV cells, particularly in the U.S. commercial market, also likely contributed to U.S. price declines.⁷⁶

I also considered whether imports of subject CSPV cells from Taiwan prevented increases in the price of the domestic like product which otherwise would have occurred. The domestic industry's ratio of cost of goods sold ("COGS") to net sales was high throughout the POI, but declined substantially.⁷⁷ The domestic CSPV cell industry's unit COGS fell by *** percent between 2011 and 2013, which was an even greater decline than the *** percent decrease in the average unit value of U.S. commercial shipments.⁷⁸ Due to this and the other factors contributing to U.S. price declines during the POI, as described above, I would not have expected the domestic CSPV cell industry to raise prices. Thus, I do not find that subject imports of CSPV cells from Taiwan prevented increases in the price of the domestic like product that otherwise would have occurred to a significant degree.

Consequently, I find that there has not been significant underselling of the domestic like product by subject imports and I find that subject imports have not depressed prices of the domestic like product or prevented increases of prices of the domestic like product which otherwise would have occurred to a significant degree.

D. Impact of Subject Imports of Cells⁷⁹

Section 771(7)(C)(iii) of the Tariff Act provides that in examining the impact of subject imports, the Commission "shall evaluate all relevant economic factors which have a bearing on

⁷³ See, e.g., CR/PR at Figure V-1 (showing declines in polysilicon prices).

⁷⁴ CR at VI-10 to VI-14; PR at VI-3 to VI-5.

⁷⁵ In general, as technology improved, the price of CSPV products has trended downward since the 1990s, despite a period of increasing prices between 2003 and 2008. USITC Pub. 4360 at 34; CCCME's Posthearing Brief at 2, 9, Exhibit 4 at 10-11, 13-14; CCCME's Prehearing Brief at 22-26, 51-54.

⁷⁶ CR/PR at Table III-7 and Table E-12. Apparent U.S. consumption of CSPV cells, by quantity, decreased from *** MW in 2011 to *** MW in 2013, and was *** MW in interim 2013 and *** MW in interim 2014. Apparent U.S. consumption of cells decreased *** percent between 2011 and 2013, and was *** percent lower in interim 2014 than in interim 2013. Consumption of CSPV cells in the U.S. commercial market decreased from *** MW in 2011 to *** MW in 2013, and was *** MW in interim 2013 and *** MW in interim 2014. Consumption of CSPV cells in the U.S. commercial market decreased *** percent between 2011 and 2013, and was *** percent lower in interim 2014 than in interim 2013.

⁷⁷ The domestic industry's COGS to net sales ratio was *** percent in 2011, *** percent in 2012, *** percent in 2013, *** percent in interim 2013, and *** percent in interim 2014. CR/PR at Table VI-1.

⁷⁸ CR/PR at Table III-7 and Table VI-1.

⁷⁹ The statute instructs the Commission to consider the "magnitude of the dumping margin" in an antidumping proceeding as part of its consideration of the impact of imports. 19 U.S.C. § 1677(7)(C)(iii)(V). In its final determinations of sales at less value, Commerce found antidumping duty margins of 11.45 to 27.55 percent for imports from Taiwan. CR at I-7; PR at I-5-6.

the state of the industry.”⁸⁰ 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.”⁸¹

The condition of the U.S. CSPV cell industry was weak during the period of investigation, and output-related indicators exhibited substantial declines. The U.S. industry’s production of CSPV cells fell by *** percent between 2011 and 2013,⁸² while total U.S. capacity to produce CSPV cells increased by *** percent.⁸³ As a result, capacity utilization rates declined from *** percent in 2011 to *** percent in 2013, although they were *** percent in interim 2014.⁸⁴ U.S. producers’ inventories of CSPV cells also declined by *** percent between 2011 and 2013.⁸⁵ The number of workers employed in the CSPV cell producing industry fell from *** in 2011 to *** in 2013,⁸⁶ while hours worked, wages paid, and productivity all declined as well.⁸⁷ The domestic industry was able to devote only limited resources to capital expenditures and R&D.⁸⁸

The primary cause of the decline in output was reduced shipments, particularly U.S. shipments. U.S. producers’ U.S. shipments of CSPV cells fell by *** percent between 2011 and

⁸⁰ 19 U.S.C. § 1677(7)(C)(iii); *see also* SAA at 851 and 885 (“In material injury determinations, the Commission considers, in addition to imports, other factors that may be contributing to overall injury. While these factors, in some cases, may account for the injury to the domestic industry, they also may demonstrate that an industry is facing difficulties from a variety of sources and is vulnerable to dumped or subsidized imports.”).

⁸¹ 19 U.S.C. § 1677(7)(C)(iii); *see also* SAA at 851, 885.

⁸² CR/PR at Table III-4. U.S. production of cells was *** MW in 2011, *** MW in 2012, *** MW in 2013, *** MW in interim 2013, and *** MW in interim 2014.

⁸³ CR/PR at Table III-4. U.S. capacity to produce cells was *** MW in 2011, *** MW in 2012, *** MW in 2013, *** MW in interim 2013, and *** MW in interim 2014.

⁸⁴ CR/PR at Table III-4. Capacity utilization rates were *** percent in 2011, *** percent in 2012, *** percent in 2013, *** percent in interim 2013, and *** percent in interim 2014.

⁸⁵ CR/PR at Table III-9. U.S. cell producers’ inventories were *** MW in 2011, *** MW in 2012, *** MW in 2013, *** MW in interim 2013, and *** MW in interim 2014.

⁸⁶ CR/PR at Table III-18. The number of production-related workers employed in the cell-producing industry was *** in 2011, *** in 2012, *** in 2013, *** in interim 2013, and *** in interim 2014.

⁸⁷ CR/PR at Table III-18. Hours worked were from *** hours in 2011, *** hours in 2012, *** hours in 2013, *** hours in interim 2013, and *** hours in interim 2014. Wages paid were *** in 2011, *** in 2012, *** in 2013, *** in interim 2013, and *** in interim 2014. Productivity was *** kW/hour in 2011, *** kW/hour in 2012, *** kW/hour in 2013, *** kW/hour in interim 2013, and *** kW/hour in interim 2014.

⁸⁸ The domestic industry’s capital expenditures for CSPV cells declined overall and were \$*** in 2011 to \$*** in 2012, and \$*** in 2013, and were \$*** in interim 2013 and \$*** in interim 2014. R&D expenditures for CSPV cells were \$*** in 2011, \$*** in 2012, \$*** in 2013, \$*** in interim 2013, and \$*** in interim 2014. CR/PR at Table VI-4.

2013,⁸⁹ driven entirely by declining internal consumption of cells in downstream module production, which fell by *** percent between 2011 and 2013.⁹⁰ By contrast, the very minor portion of U.S. shipments that were U.S. commercial shipments to independent module producers increased slightly by *** percent from 2011 to 2013.⁹¹ U.S. exports to related and unrelated firms also increased, rising *** percent from 2011 to 2013.⁹²

Therefore, the only factor that adversely affected U.S. domestic output during the POI and corresponding declines in employment, capacity utilization, and investment, other than a draw-down of inventories, was reduced internal consumption of cells used in the production of modules. As discussed above in the section concerning conditions of competition, the overall U.S. market for modules expanded over the period of investigation, but U.S. producers, including SolarWorld and Suniva, experienced substantially lower U.S. shipments of modules in addition to lower exports of modules.⁹³ Due to lower sales and production of CSPV modules, the two U.S. integrated module producers had less need for their own CSPV cells, resulting in financial deterioration of their cell-producing operations.⁹⁴

I join the Views of the Commission in attributing declining output in the U.S. CSPV module industry to subject imports of modules, but do not attribute that injury to subject imports of cells. In fact, because subject and nonsubject imports of cells were the nearly exclusive suppliers of the independent U.S. module producers, they provided the only means by which that segment of the domestic module industry could remain in operation. To the more relevant question here of whether subject imports of cells adversely impacted the U.S. CSPV cell industry, I find that subject imports did not increase in a manner that took market share

⁸⁹ CR/PR at Table III-7. U.S. shipments of cells were *** MW in 2011, *** MW in 2012, *** MW in 2013, *** MW in interim 2013, and *** MW in interim 2014.

⁹⁰ CR/PR at Table III-7. Internal consumption of cells by the domestic cell producers' module-producing operations was *** MW in 2011, *** MW in 2012, *** MW in 2013, *** MW in interim 2013, and *** MW in interim 2014.

⁹¹ CR/PR at Table III-7. U.S. commercial shipments of cells were *** MW in 2011, *** MW in 2012, *** MW in 2013, *** MW in interim 2013, and *** MW in interim 2014.

⁹² CR/PR at Table III-7. U.S. exports of cells were *** MW in 2011, *** MW in 2012, *** MW in 2013, *** MW in interim 2013, and *** MW in interim 2014.

⁹³ CR/PR at Table C-4.

⁹⁴ The domestic industry's CSPV cell operations continued to experience gross losses during the POI based on its limited revenue from exports, U.S. commercial sales, and transfers, although these gross losses declined over the POI and became a marginal gross profit in interim 2014. Substantially greater operating income losses were largely driven by SG&A expenses which were ***. CR/PR at Table VI-1 and Table VI-3. The record clearly indicates that the lower production and capacity utilization of the U.S. CSPV cell industry resulted in CSPV cell manufacturing assets becoming impaired. ***, and ***. CR at VI-3 n.7, VI-12 to VI-14 & nn.12, 16; PR at VI-2 n.7, VI-4 to VI-5 & nn.12; CR/PR at Table VI-1 & nn.1-2. Three U.S. CSPV cell producers that submitted questionnaire responses in the preliminary phase of the CSPV 1 investigations had exited the market by the time of the final phase of those investigations, and thus during the current POI. CSPV 1 CR at III-4 at n.5, Tables III-2 to III-4 (referring to 2011 closures and bankruptcies for Evergreen, Calisolar, and Solar Power). The evidence on the record does not suggest that these firms closed due to imports subject to the current investigations. *** CSPV 1 CR at VI-1 at n.1 and Table VI-4 at n.2.

from the domestic industry, and that the domestic industry was able to actually increase its minimal shipments within the U.S. commercial market. In addition, I have found that the evidence does not indicate that subject imports of CSPV cells undersold the domestic like product to a significant degree, nor did they lead to significant price depression or price suppression of the domestic like product. I find that subject imports of CSPV cells from Taiwan have not had a significant adverse impact on the domestic industry; rather, the deterioration of the domestic industry's condition was the result of downstream factors affecting its vertically integrated CSPV module production. Accordingly, I determine that the domestic industry is not materially injured by reason of subject imports of CSPV cells from Taiwan.

IV. No Threat of Material Injury by Reason of Subject Imports of CSPV Cells from Taiwan

A. Legal Standard

Section 771(7)(F) of the Tariff Act directs the Commission to determine whether the domestic industry is threatened with material injury by reason of the subject imports by analyzing 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.”⁹⁵ The Commission may not make such a determination “on the basis of mere conjecture or supposition,” and considers the threat factors “as a whole” in making its determination whether dumped or subsidized imports are imminent and whether material injury by reason of subject imports would occur unless an order is issued.⁹⁶ In making my determination, I consider all statutory threat factors that are relevant to these investigations.⁹⁷

⁹⁵ 19 U.S.C. § 1677(7)(F)(ii).

⁹⁶ 19 U.S.C. § 1677(7)(F)(ii).

⁹⁷ These factors are as follows:

(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,

(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,

...

(Continued...)

B. Analysis

1. Likely Volume

As discussed above, I find the volume of subject imports of CSPV cells from Taiwan to be significant during the period of investigation. Nevertheless, I find that the significant subject import volume, and increase in that volume, did not have a significant adverse impact on the domestic industry. Specifically, subject imports from Taiwan increased from 84.4 MW in 2011 to 167.6 MW in 2012, and then declined to 99.0 MW in 2013.⁹⁸ Subject imports of CSPV cells played an important role within the U.S. commercial market serving U.S. module producers, and exchanged market share with imports of CSPV cells from China which were subject to the prior investigations and other nonsubject imports. Throughout the period, the domestic industry did not meaningfully compete for sales to the U.S. commercial market, and primarily used CSPV cells for its own internal consumption that consistently accounted for half of total apparent U.S. consumption of CSPV cells during the POI. Moreover, the domestic CSPV cell industry's share of the U.S. commercial market, despite being consistently very small, actually increased during the POI.

Given that the significant and increasing volume of subject imports did not adversely impact the domestic industry during the POI, my inquiry now turns to whether there are factors that will lead to a likely increase in the volume of subject imports. The capacity to produce CSPV cells in Taiwan increased during the POI and is projected to increase further, but this did not lead to levels of subject imports that caused injury to the industry during the POI, and will not likely do so in the imminent future.⁹⁹ Although unused capacity increased between 2011

(...Continued)

(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).

19 U.S.C. § 1677(7)(F)(i). To organize my analysis, I discuss the applicable statutory threat factors using the same volume/price/impact framework that applies to my material injury analysis. Statutory threat factors (I), (II), (III), (V), and (VI) are discussed in the analysis of subject import volume. Statutory threat factor (IV) is discussed in the analysis of subject import price effects. Statutory factors (VIII) and (IX) are discussed in the analysis of impact. Statutory (VII) concerning agricultural products is inapplicable to these investigations.

⁹⁸ CR/PR at Table E-12. Subject imports further decreased from 72.7 MW in interim 2013 to 26.4 MW in interim 2014.

⁹⁹ CR/PR at Table VII-7. The Taiwan industry's capacity increased from 5.1 gigawatts (GW) in 2011 to 6.3 GW in 2012, then to 7.5 GW in 2013. It was 3.7 GW in interim 2013 and 4.4 GW in interim 2014. It is projected to be 8.5 GW in 2014 and 8.8 GW in 2015.

and 2012, it was lower in 2013 than in either year, and was lower in interim 2014 than in interim 2013. It is projected to decline further in 2014 and further still in 2015.¹⁰⁰

While a majority of the production of CSPV cells in Taiwan was exported during the POI,¹⁰¹ the ratio of subject export shipments to the United States as a share of total shipments was very low and declined over the period.¹⁰² Therefore, the data indicate that the United States is a relatively insignificant export market for the subject imports. As discussed above, consumption of CSPV cells in the United States decreased over the period of investigation. By contrast, consumption of CSPV cells in foreign markets has increased, according to evidence provided by U.S. firms in these investigations.¹⁰³ Thus, it is likely that the attractiveness of the U.S. market relative to third-country markets and home markets will continue to decline.

For the foregoing reasons, I conclude that there is no likelihood of substantially increased imports of subject merchandise from Taiwan in the imminent future. However, even if subject imports from Taiwan were to increase somewhat, I do not find that any such increase would likely threaten material injury to the domestic industry given that the significant volume of subject imports did not cause material injury to the domestic industry over the period of investigation.¹⁰⁴

¹⁰⁰ CR/PR at Table VII-7. The Taiwan industry's capacity utilization decreased from 74.2 percent in 2011 to 72.8 percent in 2012, and then improved to 84.8 percent in 2013. It was 74.2 percent in interim 2013 and 90.9 percent in interim 2014. It is projected to be 89.5 percent in 2014 and 92.9 percent in 2015.

¹⁰¹ CR/PR at Table VII-10. The Taiwan industry's export shipments represented 85.6 percent of total shipments in 2011, 85.0 percent in 2012, and 87.1 percent in 2013. They represented 86.2 percent of total shipments in interim 2013 and 87.4 percent in interim 2014.

¹⁰² CR/PR at Table VII-7. The Taiwan industry's export shipments to the United States as a share of total shipments was 4.6 percent in 2011, 5.7 percent in 2012 and 2.4 percent in 2013. This share was 3.8 percent in interim 2013 and 0.6 percent in interim 2014.

¹⁰³ CR at II-28; PR at II-21.

¹⁰⁴ I do not find any likelihood that foreign producers' ability to produce other products on the same equipment used in the production of CSPV cells will lead to increased shipments of CSPV cells to the United States. *** responding producers from Taiwan reported that no other products could be produced using the same machinery and equipment used in the production of CSPV products, cells or modules. CR at II-23; PR at II-18.

I also do not find any likelihood that inventories of subject merchandise held in the United States or in Taiwan will lead to increased shipments of CSPV cells to the United States. U.S. importers' inventories were equivalent to, at most, *** percent of U.S. imports in each year and interim period during the POI. CR/PR at Table VII-11. Inventories of subject CSPV cells held in Taiwan decreased from an equivalent of 5.2 percent of total shipments in 2011 to 3.8 percent in 2013, and were 3.9 percent in interim 2013 and 3.8 percent in interim 2014. CR/PR at Table VII-7.

The evidence on the record does not indicate any third-country barriers that would limit Taiwan producers' ability to export CSPV cells.

2. Likely Price Effects

In my discussion above, I did not find significant underselling by the subject imports. I also did not find that the subject imports had significant price depressing or price suppressing effects. There is no evidence in the record that suggests that conditions of competition in the U.S. commercial market for cells — which is where subject imports compete — will change significantly in the future. For these reasons and based on my findings regarding the likely volume of subject CSPV cells, I find that the subject imports are unlikely to enter at prices that would have significant depressing or suppressing effects on domestic prices, or that would likely increase demand for further imports.

3. Likely Impact

As discussed above, the domestic industry has experienced declines in output and other related impact indicia, but I have found no significant causal relationship between the subject imports and the domestic industry's performance during the period. Nothing in the record of these investigations gives me reason to believe that any further deterioration of the condition of the domestic industry will be by reason of the subject imports in the imminent future.¹⁰⁵

In view of the foregoing, I conclude that an industry in the United States is not threatened with material injury by reason of subject imports of cells from Taiwan.

V. Conclusion

For the reasons stated above, I determine that an industry in the United States is not materially injured or threatened with material injury by reason of subject imports of CSPV cells from Taiwan that are sold in the United States at less than fair value.

¹⁰⁵ As discussed above, subject imports of CSPV cells largely competed for the U.S. commercial market for cells, while domestic producers' cell shipments were largely internally consumed or exported. Thus, in the absence of significant direct competition between the domestic like product and the subject imports, I find that subject imports of CSPV cells have had no significant actual or 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. In addition, I note that Petitioner asserted that the domestic industry leads technological innovation in the market for all CSPV products. Petitioner Posthearing Brief at 12-13, Exhibit 1 at 26.

PART I: INTRODUCTION

BACKGROUND

These investigations result from petitions filed on December 31, 2013, by SolarWorld Industries America, Inc.,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 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	Petitions filed with Commerce and the Commission; institution of Commission investigations (79 FR 1388, January 8, 2014)
January 23, 2014	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 26	Commission’s preliminary determinations (79 FR 12221, March 4, 2014)
June 10	Commerce’s preliminary countervailing duty determination (79 FR 33174)
July 31	Commerce’s preliminary antidumping determinations (79 FR 44395, 44399)
July 31	Commission’s scheduling of final phase investigations (79 FR 50696, August 25, 2014)
December 8	Commission’s hearing
December 16	Commerce’s final determinations (79 FR 76962, 76966, 76970, December 23, 2014)
January 21	Commission’s vote
February 5, 2015	Commission’s determinations and 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 Effective October 1, 2014, SolarWorld Industries America, Inc. changed its name to SolarWorld Americas, Inc. (“SolarWorld”). The petitions state that they are 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 Appendix B contains a list of witnesses that appeared at the Commission’s hearing.

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, 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 modules⁵ totaled approximately \$2.1 billion and 2.9 million kilowatts⁶ in 2013. The Commission received questionnaire responses from 9 firms that produce CSPV products in the United States, which accounted for all known U.S. CSPV cell production⁷ and 90.6 percent of U.S. CSPV module production in 2012.⁸ The Commission received questionnaire responses from 48 U.S. firms that reported importing CSPV products from China, Taiwan, and nonsubject countries during the period of investigation.

U.S. producers' U.S. shipments of CSPV modules totaled 236,701 kilowatts valued at \$207 million in 2013, and accounted for 8.1 percent of apparent U.S. consumption by quantity (10.0 percent by value). Subject U.S. imports of CSPV modules from China totaled 361,976 kilowatts in 2013, and accounted for 12.4 percent of apparent U.S. consumption by quantity (11.8 percent by value).⁹ U.S. imports of CSPV modules from Taiwan totaled 2,014,466 kilowatts in 2013, and accounted for 69.2 percent of apparent U.S. consumption by quantity (66.5 percent by value). U.S. imports from all other sources combined totaled approximately 232,320 kilowatts, and accounted for 8.0 percent of apparent U.S. consumption by quantity (9.8 percent by value).¹⁰ CSPV cells and modules are generally used in integrated solar power generating systems for large utilities and commercial and residential roof-top applications.

⁵ In order to avoid the issue of double counting CSPV cells that are consumed to make CSPV modules, 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 2,895 megawatts or 2.9 gigawatts. A megawatt is 1,000 kilowatts. A gigawatt is 1,000 megawatts or 1 million kilowatts.

⁷ SolarWorld and Suniva are the only known firms that produced CSPV cells in the United States during the period of investigation.

⁸ Based on a comparison of U.S. producers' reported production of CSPV modules in 2012 with total 2012 U.S. production of modules of 437.71 megawatts as reported in Energy Information Administration (EIA), Solar Photovoltaic Cell/Module Shipments Report 2012, December 2013, p. 10. The EIA has not yet released 2013 U.S. solar industry data.

⁹ U.S. imports from China that are subject to the existing antidumping and countervailing duty orders as a result of the Commission's prior investigations in *Crystalline 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. Subject U.S. imports from China presented in this report not subject to the prior orders are those CSPV modules that meet the petitioner's "two out of three" country of origin rule. See, *infra*, *Part I, Scope Issues in the preliminary phase of these CSPV Solar Investigations, and Part IV*.

¹⁰ U.S. import volumes and market shares in this paragraph are based on the application of petitioner's "two out of three" country of origin rule. On December 16, 2014, Commerce announced its
(continued...)

SUMMARY DATA AND DATA SOURCES

A summary of data collected in these investigations on the CSPV module market in the United States is presented in appendix C, table C-1. U.S. industry data are based on questionnaire responses of two U.S. producers of CSPV cells and nine U.S. producers of CSPV modules that accounted for all known U.S. production of CSPV cells and 90.6 percent of CSPV module production in 2012. 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 E presents trade and pricing data that required adjustment subsequent to Commerce's decision to refine the definition of the scope of these investigations from the original scope announced in its notices of initiation and preliminary antidumping and countervailing duty determinations, which utilized the petitioner's "two out of three" rule, to its final scope definition.¹¹

PREVIOUS AND RELATED INVESTIGATIONS¹²

In November 2012, the Commission completed antidumping and countervailing duty investigations on crystalline silicon photovoltaic solar cells and modules from China.¹³ Those investigations resulted from SolarWorld's petitions filed on October 19, 2011. The petitions provided a scope definition that included CSPV cells and modules from China.¹⁴ The Commission determined that the U.S. industry was materially injured by reason of imports of these products from China that Commerce found were sold at LTFV in the U.S. market and subsidized by the Government of China. Commerce also determined that the country of origin of CSPV modules was the country of manufacture of its CSPV cells. Antidumping and

(...continued)

final determinations and scope definitions, which eliminated the "two out of three" rule. Trade and pricing data affected by this change in the scope are presented in appendix E, tables E-1 through E-25 and Appendix C, table C-2.

¹¹ Trade and pricing data in the body of this report use the scope language that Commerce published in its notices of initiation and its preliminary antidumping and countervailing duty determinations, which included petitioner's "two out of three" rule.

¹² On May 1, 2014, the U.S. Department of Justice issued an indictment against members of the People's Liberation Army of China, which included 31 counts including conspiracy to commit computer fraud and abuse, economic espionage, trade secret theft, etc. The indictment alleges that defendants gained unauthorized access to the computers of U.S. businesses with the intent to steal business confidential information and trade secrets. According to the indictment, SolarWorld is named as one of those firms whose computers were compromised. *U.S. vs. Wang Dong*, U.S. District Court, Western District of Pennsylvania, Criminal No. 14-118, May 1, 2014.

¹³ *Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012.

¹⁴ The scope of the present investigations explicitly excludes those products covered by the existing antidumping and countervailing duty orders issued in these prior investigations.

countervailing duty orders were put in place in December 2012 on CSPV cells and modules from China.¹⁵

NATURE AND EXTENT OF SUBSIDIES AND SALES AT LTFV

Countervailable subsidies

On December 16, 2014, Commerce announced its final affirmative determination in its countervailing duty investigation on CSPV products from China. Commerce determined that producers and exporters of CSPV products in China are receiving countervailable subsidies from the Government of China.¹⁶ Commerce’s subsidy rates are shown in the tabulation below.

Producer/exporter	Subsidy rate
Wuxi Suntech Power Co., Ltd.	27.64
Changzhou Trina Solar Energy Co., Ltd.	49.79
All others	38.72

Source: Countervailing Duty Investigation of Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China: Final Affirmative Countervailing Duty Determination, 79 FR 76962, December 23, 2014.

Sales at LTFV

On December 16, 2014, Commerce announced its final affirmative determinations in its antidumping duty investigations on CSPV products from China and Taiwan. The estimated weighted-average dumping margins (in percent *ad valorem*), as reported by Commerce range

¹⁵ 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 petitions because 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. *See, infra, Scope Issues.*

¹⁶ *Countervailing Duty Investigation of Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China: Final Affirmative Countervailing Duty Determination, 79 FR 76962, December 23, 2014.* Commerce has found that eight programs administered by the Government of China confer countervailable subsidies including (1) grant programs, (2) provision of inputs for less than adequate remuneration, (3) provision of land for less than adequate remuneration, (4) preferential loans and directed credit, (5) tax benefit programs, (6) VAT rebates on purchases of Chinese-made equipment, (7) export guarantees and insurance for green technology, and (8) export credit subsidies. *Issues and Decision Memorandum for the Final Determination in the Countervailing Duty Investigation of Certain Crystalline Silicon Photovoltaic Products from the People's Republic of China*, Christian Marsh, Deputy Assistant Secretary for Antidumping and Countervailing Duty Operations, December 15, 2014.

from 26.71 percent to 165.04 percent for China¹⁷ and 11.45 percent to 27.55 percent for Taiwan.¹⁸

THE SUBJECT MERCHANDISE

Commerce's scope

In its notice of initiation, Commerce defined the scope of these investigations as follows:¹⁹

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, 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

¹⁷ *Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China: Final Determination of Sales at Less Than Fair Value*, 79 FR 76970, December 23, 2014.

¹⁸ *Certain Crystalline Silicon Photovoltaic Products From Taiwan: Final Determination of Sales at Less Than Fair Value*, 79 FR 76966, December 23, 2014.

¹⁹ On October 3, 2014, Commerce issued a proposed scope clarification and invited comments from the parties. On December 16, 2014, Commerce issued its final determinations and final scope definitions. The scope definitions issued in its final determinations differed from both the scope definition in its notices of initiation and its October 3, 2014, scope clarification. See, *infra*, for further discussion of this issue and section, *Commerce's final scope definitions* for the final scope definitions.

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 10,000mm² 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 petitions on CSPV solar products because of a “loophole” that developed in the scope of the prior investigations on CSPV cells and modules. Petitioner intended the scope of the prior 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 10,000mm² 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.²⁰

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 notices of initiation and invited parties to comment on the revision during the 20 day scope comment period. Commerce stated in its notices 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

²⁰*Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012, p. 5.

*inputs from third-country markets, or merchandise processed in third-country markets.*²¹

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 encompassed 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, and that the November 7, 2011 scope revision to Commerce clarified 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 considering the 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 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 effectuate its decision, Commerce added the following language to the scope of those 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.²² In its final determinations,

²¹*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; *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules from the People’s Republic of China: Initiation of Countervailing Duty Investigation*, 76 FR 70966, November 16, 2011.

²²*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*,

(continued...)

Commerce did not modify the definition of the scope of the investigations from its preliminary determinations.²³ Petitioner stated that a large increase in U.S. imports of category (3) products, namely CSPV modules assembled in China using CSPV cells manufactured in Taiwan, necessitated the present investigations.

Scope Issues in the preliminary phase of 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:²⁴

- (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).²⁵

(...continued)

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).

²³See *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).

²⁴Petitioner's postconference brief, exh. 1, p. 1.

²⁵Commerce, 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 process. *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 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

(continued...)

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”²⁶

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 the country in which the module assembly occurred.²⁷ The production processes in question are: (1) ingot manufacture, (2) wafer manufacture, and (3) module assembly. The “two out of three” rule, alternatively stated, requires that the following steps occur in one country: (1) module assembly, and at least one of the following: (2) ingot production, (3) wafer production, or (4) partial cell production.²⁸ If the “two out of three” rule is satisfied then the country of origin of the CSPV module is the country that meets the rule regardless of the country of origin of the CSPV cell. Therefore, CSPV modules assembled in China (or Taiwan) using cells that 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 were completed in a third country.²⁹ 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

(...continued)

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.

²⁶ In the preliminary phase of these investigations, 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.” These concepts originated in petitioner’s January 13, 2014 submission to Commerce and were further discussed at the Commission’s preliminary staff 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.

²⁷ 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.

²⁸ “Partial cell manufacture” is addressed *infra*, under the heading “partially manufactured cells.”

²⁹ Petitioner’s postconference brief, exh. 1, p. 1. At the time, 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.

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.³⁰

In the preliminary phase of these investigations, 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.³¹ 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 argued that this rule should be disregarded because ingot and wafer may not confer country of origin, and if it did, such an approach would conflict with Commerce's country of origin rule.³² Taiwanese respondents also opined that petitioner's "two out of three" rule would be impossible to implement by U.S. Customs.³³

³⁰*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.

³¹Chinese 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.

In the preliminary phase of these investigations, petitioner did not address the potential conflict of its "two out of three" rule and the country of origin rule promulgated by Commerce in its prior investigations. 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 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 brief, exh. 10.

³²Chinese Respondents' postconference brief, pp. 4-8.

³³Taiwanese Respondents' postconference brief, p. 4.

“Partially Manufactured” cells

Petitioner asserted that the second sentence of the initiated 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 initiated scope as “cells where the manufacturing process begins in the subject country and is completed in another country.” According to the petitioner, there are a number of opportunities in the cell production process to stop production and ship to another country, including many of the sub-processes described in the petitions under “cell conversion.”³⁴

Scope Issues in the final phase of these CSPV Solar Investigations

In its preliminary antidumping and countervailing duty determinations, Commerce retained the same scope language as in its notices of initiation. That is, for purposes of its preliminary determinations, Commerce applied petitioner’s “two out of three” rule to determine country of origin of CSPV modules.³⁵ On October 3, 2014, however, Commerce issued draft scope language and invited party comments. Commerce stated that its draft scope

³⁴Petitioner’s postconference brief, exh. 1, p. 3-4. Petitioner conceded 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.”)

In the final phase of these investigations, the Commission asked producers of CSPV cells in China and Taiwan whether their cell conversion process occurred in more than one country. Of the 26 CSPV cell producers in China, *** reported that its cell conversion process occurred in both ***. Of the 12 CSPV cell producers in Taiwan, *** reported that its cell conversion process occurred in more than one country. Foreign producer questionnaire, responses to questions II-11(b) and II-18(b).

³⁵ Chinese respondents reiterated their objection to petitioner’s “two out of three” rule in the final phase of these investigations. They argued that the rule is “unlawful” because (1) it leads to contradictory results with Commerce’s established country of origin rule from the prior solar investigations, and (2) it would be impossible for U.S. Customs to enforce and administer. Chinese respondents observed that when applying Commerce’s country of origin rule from its prior solar investigations, there are no subject U.S. imports from China. Chinese respondents’ prehearing brief, pp. 6-7.

language intended to clarify the scope and make clear that the following two product categories were included in the scope of these investigations:³⁶

(1) For the PRC investigations, subject merchandise includes all modules, laminates and/or panels assembled in the PRC that contain crystalline silicon photovoltaic cells produced in a customs territory other than the PRC.

(2) For the Taiwan investigation, subject merchandise includes all modules, laminates and/or panels assembled in Taiwan consisting of crystalline silicon photovoltaic cells produced in Taiwan or a customs territory other than Taiwan.¹ In addition, subject merchandise will include modules, laminates, and panels assembled in a third- country, other than the PRC, consisting of crystalline silicon photovoltaic cells produced in Taiwan.

¹ *The scope of the Taiwan investigation and the PRC investigations would continue to exclude any products covered by the existing AD and CVD orders on crystalline silicon photovoltaic cells, whether or not assembled into modules, from the PRC.*

The apparent effect of the October 3rd draft scope clarification language, as issued by Commerce, is to eliminate the “two out of three” rule and instead determine the country of origin of CSPV modules by the country of module assembly.³⁷ Therefore, the country of CSPV module assembly would confer country of origin to the CSPV module.³⁸

Commerce’s final scope definitions

On December 16, 2014, Commerce announced its final determinations and scope definitions.³⁹ The scope of these investigations, as defined by Commerce, is:

³⁶ *Antidumping and Countervailing Duty Investigations of Certain Crystalline Silicon Photovoltaic Products from the People's Republic of China and the Antidumping Duty Investigation of Certain Crystalline Silicon Photovoltaic Products from Taiwan: Opportunity to Submit Scope Comments*, Howard Smith, Program Manager, Enforcement and Compliance, U.S. Department of Commerce, October 2, 2014.

³⁷ The proposed scope clarification would continue to include CSPV cells from Taiwan and CSPV modules from third countries that contain cells from Taiwan.

³⁸ Commerce does not address the apparent contradiction between this country of origin rule and the country of origin rule it promulgated in its prior investigations, whereby module assembly did not constitute “substantial transformation,” and therefore, the country of origin of the cell conferred country of origin to the module.

³⁹ *Certain Crystalline Silicon Photovoltaic Products from the People's Republic of China: Issues and Decision Memorandum for the Final Determination of Sales at Less Than Fair Value*, Christian Marsh, Deputy Assistant Secretary for Antidumping and Countervailing Duty Operations, December 15, 2014, pp. 3-4; *Certain Crystalline Silicon Photovoltaic Products from Taiwan: Issues and Decision Memorandum*

(continued...)

China Scope: *The merchandise covered by this investigation is 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 includes modules, laminates and/or panels assembled in China consisting of crystalline silicon photovoltaic cells produced in a customs territory other than China.*

Subject merchandise includes modules, laminates and/or panels assembled in China consisting of 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 modules, laminates and/or panels assembled in China, consisting of crystalline silicon photovoltaic cells, not exceeding 10,000mm² in surface area, that are permanently integrated into a consumer good whose function is other than power generation and that consumes the electricity generated by the integrated crystalline silicon photovoltaic cells. Where more than one module, laminate and/or panel is permanently integrated into a consumer good, the surface area for purposes of this exclusion shall be the total combined surface area of all modules, laminates and/or panels that are integrated into the consumer good.

Further, 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, laminates and/or panels, from China.¹

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

(...continued)

for the Final Determination of Sales at Less Than Fair Value, Christian Marsh, Deputy Assistant Secretary for Antidumping and Countervailing Duty Operations, December 15, 2014, pp. 4-30.

HTSUS subheadings are provided for convenience and customs purposes; the written description of the scope of this investigation is dispositive.

¹See *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).

Taiwan Scope: *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.*

Subject merchandise includes crystalline silicon photovoltaic cells of thickness equal to or greater than 20 micrometers, having a p/n junction formed by any means, whether or not the cell has undergone other processing, including, but not limited to, cleaning, etching, coating, and/or addition of materials (including, but not limited to, metallization and conductor patterns) to collect and forward the electricity that is generated by the cell.

Modules, laminates, and panels produced in a third-country from cells produced in Taiwan are covered by this investigation. However, modules, laminates, and panels produced in Taiwan from cells produced in a third-country are not covered by 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 10,000mm² in surface area, that are permanently integrated into a consumer good whose function is other than power generation and that consumes the electricity generated by the integrated crystalline silicon photovoltaic cells. Where more than one cell is permanently integrated into a consumer good, the surface area for purposes of this exclusion shall be the total combined surface area of all cells that are integrated into the consumer good.

Further, also excluded from the scope of this 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 ("China"). Also excluded from the scope of this investigation are modules, laminates, and panels produced in China from crystalline silicon photovoltaic cells

produced in Taiwan that are covered by an existing proceeding on such modules, laminates, and panels from China.

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.

Essentially, in its final determinations, Commerce adopted its October 3 scope clarification with respect to U.S. imports from China, thereby eliminating the “two out of three” rule, but refined somewhat the scope as to U.S. imports from Taiwan compared to the scope in its October 3rd memorandum. The third paragraph of the final scope definition for Taiwan, which contains the modification, states:

Modules, laminates, and panels produced in a third-country from cells produced in Taiwan are covered by this investigation. However, modules, laminates, and panels produced in Taiwan from cells produced in a third-country are not covered by this investigation.

Thus, CSPV modules assembled in third countries containing Taiwanese cells are included in the scope whereas CSPV modules assembled in Taiwan containing cells from third countries are not within the scope of these investigations.⁴⁰ Under the October 3rd scope clarification, CSPV modules assembled in Taiwan containing cells from third countries would have been deemed U.S. imports from Taiwan. Appendix E, p. E-4 presents a table that presents the effect on U.S. imports of the various scope definitions.

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.⁴¹ 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.

⁴⁰ U.S. imports of CSPV cells from Taiwan are still included within the scope of this investigation. CSPV modules assembled in China from cells produced in Taiwan are excluded from the scope of the Taiwan investigation, but within the scope of the China investigations.

⁴¹ Generally, CSPV cells enter under HTS 8541.40.6030 and CSPV modules under 8541.40.6020.

THE PRODUCT⁴²

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.⁴³

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.⁴⁴ Most cells are five inches by five inches or six inches by six inches and have an output of 3 to 4.5 watts.⁴⁵

Figure I-1

CSPV cell (left) and module (right)



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

⁴² Unless otherwise noted, information in this section is from *Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012.

⁴³ 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. Petitions, Vol. 1, pp. 29–30.

⁴⁴ 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>.

⁴⁵ 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.⁴⁶ 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.⁴⁷ 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.⁴⁸ 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).⁴⁹

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 (figure I-3).⁵⁰ The average conversion efficiency of monocrystalline modules globally (based on the year first introduced) *** from *** in 2010 to *** in 2012, while the average conversion efficiencies of new models

⁴⁶ Petitions, Vol. 1, pp. 16, 29.

⁴⁷ From USITC Publication 4360; see also SolarWorld, “Energy for You and Me” brochure, p. 14.

⁴⁸ From USITC Publication 4360; see also EPIA, *Solar Generation 6*, 2011, p. 20; Petition, p. 25.

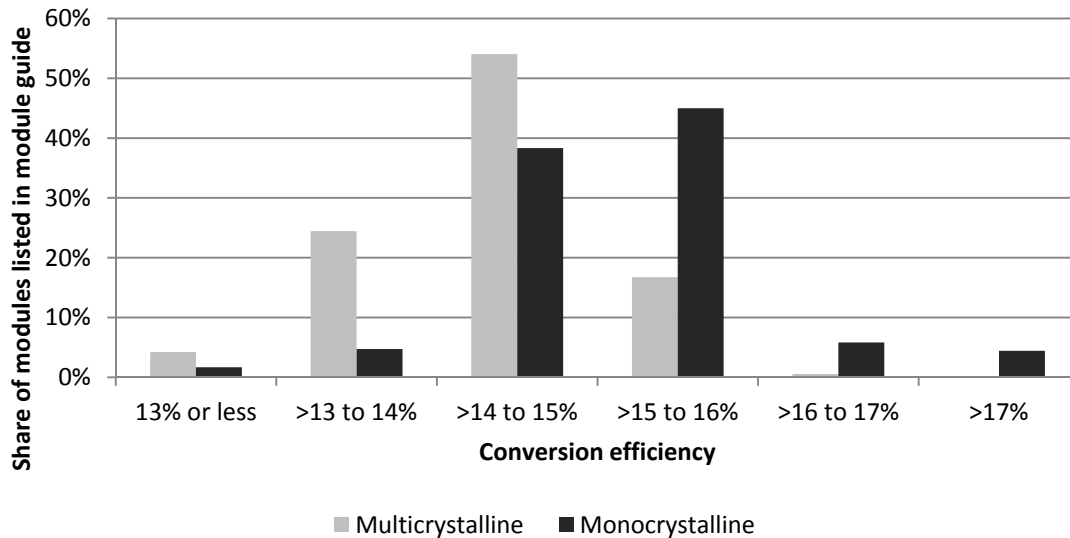
⁴⁹ Petitions, Vol. 1, p. 12.

⁵⁰ 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.

of multicrystalline modules *** from *** in 2010 to *** in 2012.⁵¹ For those modules available on the U.S. market, one 2012-13 module guide indicates that the average conversion efficiency for monocrystalline modules was 15.2 percent, while the average efficiency for multicrystalline modules was 14.3 percent.⁵² The average conversion efficiency of modules shipped in the U.S. was flat during 2011-12 at 16 percent, though data are not available by module type.⁵³

Figure I-3

CSPV: Efficiencies of modules available in the United States, 2012–13



Source: *Home Power*, “2012-2013 PV Module Buyer’s Guide,” <http://www.homepower.com/web-xtras> (accessed October 8, 2014); Home Power website, <http://www.homepower.com/online-pv-module-guide> (accessed October 8, 2014).

Note: Only includes modules listed in *Home Power’s* online PV module guide. “Products included have rated outputs of 200 W or higher, were eligible for the CSI program per SB1 Guidelines as of June 15, 2012, and were offered by companies with a physical presence in the United States that includes sales offices and product warehousing.”

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

⁵¹ Data are for modules available globally. Data from 2013 only includes partial year data, and may not be representative of all new modules introduced in that year. Siemer, Jochen and Beate Knoll, “Still More than Enough,” *Photon International*, February 2013, pp. 72–73.

⁵² Only includes modules listed in Home Power’s online PV module guide. “Products included have rated outputs of 200 W or higher, were eligible for the CSI program per SB1 Guidelines as of June 15, 2012, and were offered by companies with a physical presence in the United States that includes sales offices and product warehousing.” Home Power, “2012-2013 PV Module Buyer’s Guide,” <http://www.homepower.com/web-xtras> (accessed October 8, 2014); Home Power website, <http://www.homepower.com/online-pv-module-guide> (accessed October 8, 2014).

⁵³ EIA, *Solar Photovoltaic Cell/Module Shipments Report 2011*, September 2012, p. 7; EIA, *Solar Photovoltaic Cell/Module Shipments Report 2012*, December 2013, p. 7.

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 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,⁵⁴ and the racking on which the system is installed.⁵⁵

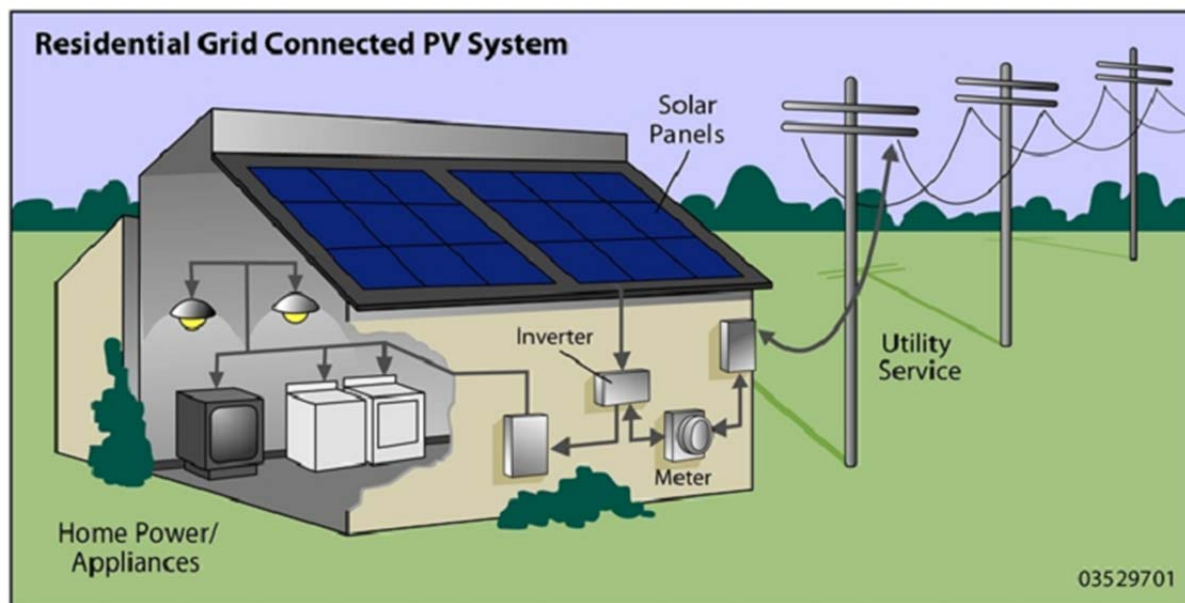
Residential grid-connected systems are installed at individual homes. CSPV modules are typically installed on the roof, though they can also be ground-mounted, and connected to an inverter. The system can use a central inverter, which converts the power from multiple modules, or each module can have its own microinverter attached. In residential installations, the electricity generated by the system is used for power in the individual home (figure I-4). 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 6.1 kilowatts (kW) in 2013.⁵⁶

⁵⁴ USITC, *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, p. 3-1.

⁵⁵ 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 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.

⁵⁶ The average size was 5.7 kW in 2010 and 2011, and 6.2 kW in 2012. 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; Larry Sherwood, *U.S. Solar Market Trends 2013*, July 2014, p. 15.

Figure I-4
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-5).⁵⁷ A second type of system uses rack mounts, which “allow for a variety of specific tilt angles. The PV array can be set at an optimal tilt angle based on the site’s latitude or, if adjustable racks are chosen, repositioned seasonally to optimize energy output.”⁵⁸ 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.⁵⁹ “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.”⁶⁰

⁵⁷ Mayfield, Ryan, “Rack & Stack—PV Array Mounting,” *Home Power Magazine*, January 31, 2012.

⁵⁸ Mayfield, Ryan, “Rack & Stack—PV Array Mounting,” *Home Power Magazine*, January 31, 2012.

⁵⁹ 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.

⁶⁰ Wesoff, Eric, “Zep Finds Its Groove with an Innovative Mounting System for PV Modules,” *Greentech Media*, October 5, 2011.

Figure I-5
Residential grid-connected CSPV system

* * * * *

Nonresidential systems are installed at commercial, industrial, government, and similar buildings and sites (figure I-6). Nonresidential installations are typically larger than residential installations, with an average size of 109 kW in 2013, though there can be significant variation in size—the largest installation in 2013 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.⁶¹

Figure I-6
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-7). These systems are generally ground-mounted and currently tend to use central inverters rather than microinverters.⁶² 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,

⁶¹ The average size installation is up from 81 kW in 2010, but down from 120 kW in 2012. 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; Larry Sherwood, *U.S. Solar Market Trends 2013*, July 2014, p. 16.

⁶² 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.

as compared to the 600 volt systems generally installed in residential and nonresidential systems in the United States.⁶³

Figure I-7

La Ola PV plant, a utility CSPV system on Lanai, Hawaii



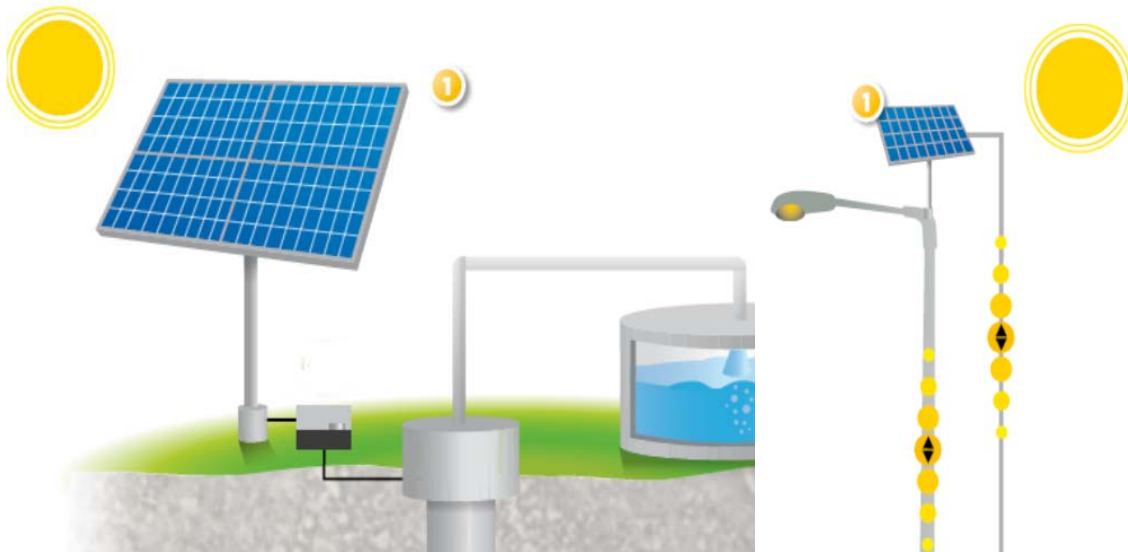
Source: Photo courtesy of DOE/NREL, credit Jamie Keller.

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-8). 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.⁶⁴

⁶³ 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, 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.

⁶⁴ From USITC Publication 4360; see also SolarWorld, “Sunmodule for Off-grid Systems,” pp. 3–6.

Figure I-8
Off-grid water pumping system (left) and light system (right)



1. Module

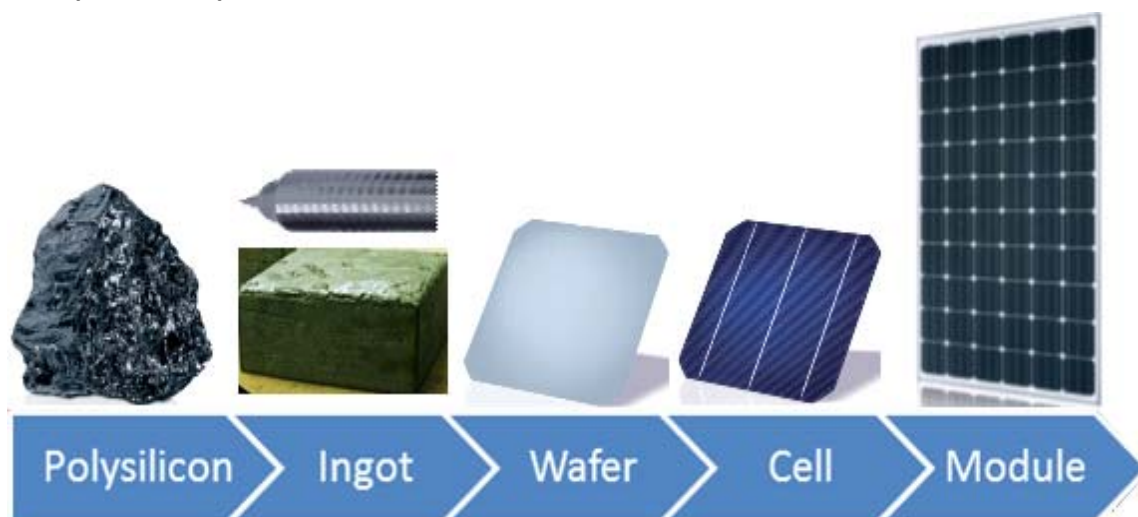
Source: SolarWorld, "Sunmodule for Off-grid Systems," 3.

Manufacturing processes

There are five principal stages to manufacture CSPV products. 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-9). 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. ***.⁶⁵ The ingot and wafer production process differs for monocrystalline and polycrystalline cells, as discussed below.

⁶⁵ Field notes, visit to SolarWorld, Hillsboro, OR, August 23, 2012.

Figure I-9
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 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

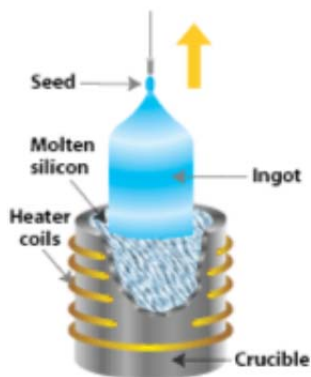
In the Czochralski process⁶⁶ for producing crystals used in monocrystalline wafers, polysilicon rocks are first placed into a quartz crucible along with a small amount of boron,

⁶⁶ The Czochralski process is discussed here as it was used by the petitioner and several of the respondents. Another process is the float-zone process which “produces purer crystals than the

(continued...)

which is used to provide a positive electric orientation (figure I-10). 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. ***.⁶⁷

Figure I-10
Czochralski process



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

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.

***.⁶⁸

Ingots and wafers for multicrystalline cells

For multicrystalline ingots,⁶⁹ 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,

(...continued)

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.

⁶⁷ Field notes, visit to SolarWorld, Hillsboro, OR, August 23, 2012.

⁶⁸ Field notes, visit to SolarWorld, Hillsboro, OR, August 23, 2012.

⁶⁹ 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, which ceased production in 2011.

the polysilicon is “cast into multicrystalline ingots under precise heating and cooling conditions.”⁷⁰

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 monocrystalline 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-11). ***.⁷¹ The main phases of cell production are as follows⁷²:

- **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 creates a positive-negative, or P/N, junction—a critical partition in the functioning of a PV cell.”⁷³

Figure I-11

CSPV cells: Texturing (left) and diffusion furnace (right)

* * * * *

- **Edge isolation:** A thin layer of silicon is then removed from the edge of the cell to separate the positive and negative layers.

⁷⁰ 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; Chunduri, Shraavan Kumar, “More Quasi than Mono,” *Photon International*, June 2012, pp. 150–157.

⁷¹ Field notes, visit to SolarWorld, Hillsboro, OR, August 23, 2012.

⁷² 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; Field notes, visit to SolarWorld, Hillsboro, OR, August 23, 2012.

⁷³ SolarWorld, “Energy for You and Me” brochure, p. 12.

- **Coating:** Next, a silicon nitride antireflective coating is added to the PV cells to increase the absorption of sunlight (figure I-12).
- **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-12
CSPV cells: Silicon nitride deposition (left) and printing (right)

* * * * *

- **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.”⁷⁴
- **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-13).

Figure I-13
CSPV cells: Testing (left) and sorting (right)

* * * * *

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-14).⁷⁵ 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.

⁷⁴ JA Solar, “Form 20-F,” April 16, 2013, p. 41.

⁷⁵ From USITC Publication 4360; see also Spire Website, <http://www.spirecorp.com/spire-solar/turnkey-solar-manufacturing-lines/> (accessed January 31, 2014).

Figure I-14

CSPV modules: Example automated assembly process between stringing and lamination

* * * * *

DOMESTIC LIKE PRODUCT ISSUES

In the present investigations and the Commission's prior CSPV solar investigations, the following domestic like product issues have been raised: (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 included within the definition of the domestic like product. The Commission addressed Issue (1) in the preliminary phase of its prior solar investigations and Taiwanese respondents raise it again in the final phase of the current investigations. Issue (3) was addressed by the Commission in the final phase of its prior solar investigations and respondents raised it in the preliminary phase, but did not pursue it in the final phase of the current investigations. The Commission addressed Issue (2) in the preliminary phase of its prior solar investigations and no party has raised the issue in either phase of the present investigations. Therefore, because issues (1) and (3) were raised in the current investigations, both are discussed more fully below.

CSPV cells vs CSPV modules

In the final phase of these investigations, Taiwanese respondents argued that CSPV cells and modules should be defined as separate domestic like products.⁷⁶ They claimed that because CSPV cells and modules are an intermediate and a downstream product that the Commission customarily engages its "semifinished" product analysis to determine whether the semi-finished and downstream products are separate domestic like products.⁷⁷ In its semifinished products analysis, the Commission examines the following: (1) whether the upstream article is dedicated to the production of the downstream article or has independent uses; (2) whether there are perceived to be independent markets for the upstream and downstream articles; (3) differences in the physical characteristics and functions of the upstream and downstream articles; (4) differences in the costs or value of the vertically differentiated articles; and (5) significance and extent of the processes used to transform the upstream into the downstream articles.

⁷⁶ In the final phase of these investigations, Chinese respondents have taken no position as to whether CSPV cells and modules should be two separate domestic like products. Chinese respondents' posthearing brief, exh. 1, p. 1.

⁷⁷ Taiwanese respondents' prehearing brief, pp. 7-13; Taiwanese respondents' posthearing brief, pp. 2-3. Taiwanese respondents first raised this issue in its prehearing brief in the final phase of these investigations. They did not raise this issue in the final phase questionnaire comment period. Therefore, no questions specifically relating to the semifinished analysis factors appeared in the Commission's questionnaires to market participants.

First, Taiwanese respondents argued that CSPV cells and modules are sold in different markets. CSPV cells are either internally consumed or sold to module assemblers to produce CSPV modules. CSPV modules, however, are sold to distributors, residential and commercial installers, and utilities.⁷⁸ Petitioner argued that both CSPV cells and modules are the building blocks of creating electrical power generation systems which are then turn sold to the same markets in the residential, commercial, and utility segments.⁷⁹

Second, Taiwanese respondents argued that CSPV cells and modules have different physical characteristics and uses. They observed that a CSPV cell is typically 5 inches by 5 inches and generates 3 to 4.5 watts whereas a CSPV module is much larger and generates much more wattage. Further, CSPV cells are generally used to produce CSPV modules whereas CSPV modules are used to generate electricity.⁸⁰ Petitioner argued that CSPV cells and modules ultimately are used for the same purpose, namely, to convert sunlight into electricity and that CSPV modules are merely cells strung together to produce higher wattages.⁸¹

Third, Taiwanese respondents argued that significant processing is required to transform CSPV cells into a CSPV module. Citing petitioner, they state that module assembly involves significantly more processing, material inputs, time, and cost than the cell conversion process.⁸² Petitioner argued that the production of the CSPV cell is far more capital intensive than the assembly of modules and represents *** percent of total cost of goods sold for modules produced by U.S. producers in 2013.⁸³

Fourth, Taiwanese respondents' argued that the module assembly process adds significant value and cost to the final CSPV module. They observed that in 2013, the unit value of CSPV modules was *** percent higher than the unit value of CSPV cells.⁸⁴

In the preliminary phase of the prior investigations, the Commission declined to define CSPV cells and modules as separate domestic like products and found that:

The record indicates that nearly all CSPV cells are dedicated to the production of PV modules; both cells and modules are sold in similar markets; both CSPV cells and modules share the same primary physical characteristics; cells represent a substantial portion of the cost and the value of a finished module; and cells undergo only one major production

⁷⁸ Taiwanese respondents' prehearing brief, pp. 7-8; Taiwanese respondents' posthearing brief, p. 2.

⁷⁹ Petitioner's posthearing brief, exh. 1, p. 64.

⁸⁰ Taiwanese respondents' prehearing brief, pp. 8-10; Taiwanese respondents' posthearing brief, p. 2.

⁸¹ Petitioner's posthearing brief, exh. 1, pp. 63-64 (citing the Commission's views in its prior investigations, "the physical characteristics and functions of cells and modules essentially are the same. .").

⁸² Taiwanese respondents' prehearing brief, p. 12; Taiwanese respondents' posthearing brief, p. 3 (citing petitioner's brief submitted at the Department of Commerce).

⁸³ Petitioner's posthearing brief, exh. 1, p. 67 (citing the prehearing report at V-1).

⁸⁴ Taiwanese respondents' prehearing brief, p. 11; Taiwanese respondents' posthearing brief, p. 3

step before transformation into modules. We therefore define cells and modules as one domestic like product.⁸⁵

CSPV products vs. Thin Film solar products⁸⁶

The petitioner contended that the Commission should find one domestic like product coextensive with the scope of the investigations as identified by Commerce.⁸⁷ In the preliminary phase of these investigations, 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.⁸⁸

In the Commission's prior investigations of CSPV cells and modules, respondents also argued in favor of expanding 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:

⁸⁵ *Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Preliminary), USITC Pub. 4295, December 2011, p. 11.

⁸⁶ "Thin film solar products" are generally thin film cells and modules that 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 (μ c-Si) to convert sunlight to electricity. 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. 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. 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. *Crystalline Silicon Photovoltaic Cells and Modules from China*, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final), USITC Pub. 4360, November 2012, pp. I-26-I-28.

⁸⁷ Petitioner's prehearing brief, pp. 6-7; 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.

⁸⁸ Chinese Respondents' postconference brief, exh. 1, pp. 15-19; Taiwanese Respondents' postconference brief, exh. A, pp. 1-2.

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.⁸⁹

In the preliminary phase of these investigations, the Commission again determined not to expand the domestic like product to include thin film solar products. It stated:

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 facilities, manufacturing 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.⁹⁰

In the final phase of these investigations, no respondent party requested that the Commission collect data regarding thin film solar products during the draft questionnaire comment period.⁹¹ Nor has any respondent pursued this argument in its prehearing or posthearing briefs or at the Commission's hearing. Therefore, no data regarding the U.S. thin film solar products industry are presented in this report.

⁸⁹*Crystalline 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.

⁹⁰*Certain Crystalline Silicon Photovoltaic Products from China and Taiwan*, Inv. Nos. 701-TA-511 and 731-TA-1246-127 (Preliminary), USITC Pub. 4454, February 2014, pp. 9-10.

⁹¹*Comments of Final Phase Draft Questionnaires*, Neil Ellis, Sidley & Austin, September 2, 2014; *Comments on Draft Questionnaires*, Walter Spak, White & Case, September 2, 2014.

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, and may be used in 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 products is derived from the demand for solar electricity. Installations of PV systems have grown at a rapid rate in recent years. In 2013, the United States was the world’s third-largest market, behind China and Japan.³ Demand for CSPV products has increased and is expected to continue to grow in the United States. PV installations increased 458 percent from 2010 to 2013. This growth continued in the first quarter of 2014, with PV installations up 79 percent over the same quarter in 2013.⁴ Industry experts anticipate that the United States will install 6.5 GW of PV systems, an increase of 36 percent from 2013 and nearly double the market size in 2012.⁵ While there has been growth in the overall market for CSPV products, demand trends vary across geographic markets, market segments, and customer types.

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 influence its price.

Apparent U.S. consumption of CSPV modules increased substantially during the period, increasing from 1.6 million kilowatts in 2011 to 2.9 million kilowatts in 2013, and showed

¹ Petitions, Vol. I, 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 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 1998-2013, Lawrence Berkeley National Laboratory, 2014, p. 8.

⁴ Solar Energy Industries Association (“SEIA”), “Executive Summary,” U.S. Solar Market Insight, Q1 2014, p.3.

⁵ SEIA, “Executive Summary,” U.S. Solar Market Insight, Q2 2014, p. 4.

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).

continued growth during the 2014 interim period. Overall, apparent U.S. consumption increased 77.1 percent from 2011 to 2013.

U.S. PURCHASERS

The Commission received 53 usable purchaser questionnaire responses from firms that bought CSPV products during January 2011-June 2014. Fifty-two firms provided useable purchase data, and these firms collectively reported CSPV cell purchases totaling \$126,000 (213 kilowatts) and CSPV module purchases totaling \$668.7 million (1.0 million kilowatts) for 2013.^{8,9} Three purchasers reported limited quantities of CSPV cell purchases and fifty-two firms reported purchases of CSPV modules. The largest purchaser of CSPV modules was ***, a residential and commercial installer, which accounted for *** percent of 2013 module purchases by quantity.¹⁰ The second largest module purchaser was ***, a utility developer, which accounted for *** percent of 2013 module purchases by quantity.¹¹ Other notable module purchasers were ***, a utility developer, ***, a residential installer and distributor, and ***, a commercial installer and module distributor, each accounting for approximately *** percent of 2013 module purchases by quantity, respectively.

Twenty-four responding purchasers reported that they were commercial installers, 16 were residential installers, 11 were utility developers, 17 reported that they were distributors, 2 were retailers, 1 worked with U.S. military and golf cart applications, 1 was a third-party reseller, 1 was an export management company,¹² 1 worked in solar R&D/prototyping, and 1 was an integrator into complete solar lighting systems.

⁸ Purchasers were requested to report annual purchases of cell and modules from domestic, subject and nonsubject sources during January 2011-June 2014. Purchasers were not requested to identify the country source of the ingot/wafer when determining the country of origin of their purchases of cells and modules. Data were collected based on the country of exportation of the module and not on the country of origin of the cell.

⁹ Three purchasers (***) reported quantities of their CSPV module purchases but did not provide value data for these purchases. Their purchases have been included in the total volume of modules purchases for 2013 but are not reflected in the total value.

¹⁰ *** reported that *** percent of its purchases of modules were from subject countries, *** percent was domestic product, and *** percent was from nonsubject sources in 2013.

¹¹ *** reported that *** percent of its purchases of modules were from subject countries with the remaining *** percent from nonsubject countries in 2013.

¹² *** reported that it exports domestic solar mounting systems and electrical products for solar projects overseas.

CHANNELS OF DISTRIBUTION

CSPV modules are generally sold to distributors, residential and commercial installers, and utility/developers. U.S. producers sold to all four channels of distribution, but sold primarily to distributors and commercial installers during the period of investigation (table II-1).¹³ U.S. importers' commercial shipments of imports from China were sold to only commercial installers in 2011. During 2012-13, U.S. importers' commercial shipments of imports from China were sold to all four channels, but sold primarily to commercial installers in 2012 and to utility/developers in 2013. U.S. importers' commercial shipments of imports from Taiwan were sold to all four channels, with more than half of their shipments sold to residential installers in 2011 and primarily to residential installers, commercial installers, and utility/developers in 2012-2013.¹⁴ U.S. importers' commercial shipments of nonsubject imports from China¹⁵ were sold to all four channels, with the largest share sold to commercial installers. U.S. importers' commercial shipments of imports from all other sources were sold to all four channels, but the shares fluctuated throughout the period.

¹³ CSPV cells are typically internally consumed to produce solar modules or sold to companies that fabricate modules or panels. Petitions, Vol. I, p. 27. 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.

¹⁴ During the preliminary phase of these investigations, Taiwan respondents reported that Taiwan producers typically focus more on the residential and commercial segments of the market. Conference transcript, p. 226 (Kobes).

¹⁵ These imports are currently subject to duties pursuant to the prior 2012 antidumping and countervailing duty orders on CSPV cells and modules.

Table II-1**CSPV modules: U.S. producers' and importers' U.S. shipments, by sources and channels of distribution, 2011-2013, January-June 2013, and January-June 2014¹**

Item	Calendar year			January-June	
	2011	2012	2013	2013	2014
	Share of quantity (percent)				
U.S. producers' commercial U.S. shipments to: Distributors	24.8	41.1	44.1	33.3	56.0
Residential installers	4.7	3.5	5.8	5.5	5.7
Commercial installers	52.9	41.3	30.6	24.5	34.9
Utilities/developers	17.6	14.0	19.5	36.7	3.5
Total	100.0	100.0	100.0	100.0	100.0
U.S. importers' commercial U.S. shipments of imports from China (subject) to: Distributors	0.0	0.5	0.02	0.1	0.1
Residential installers	0.0	34.3	10.5	17.5	10.5
Commercial installers	100.0	51.1	23.3	15.5	40.3
Utilities/developers	0.0	14.1	66.2	66.9	49.1
Total	100.0	100.0	100.0	100.0	100.0
U.S. importers' commercial U.S. shipments of imports from Taiwan to: Distributors	16.4	8.5	10.2	15.0	7.0
Residential installers	60.7	21.5	26.8	25.2	29.1
Commercial installers	19.8	32.5	32.2	29.7	40.0
Utilities/developers	3.1	37.5	30.8	30.1	23.9
Total	100.0	100.0	100.0	100.0	100.0
U.S. importers' commercial U.S. shipments of imports from China (nonsubject) to: Distributors	7.2	5.7	14.3	17.5	3.0
Residential installers	19.0	12.1	10.0	7.9	11.6
Commercial installers	42.1	46.2	42.6	30.3	27.5
Utilities/developers	31.6	35.9	33.1	44.2	57.9
Total	100.0	100.0	100.0	100.0	100.0
U.S. importers' U.S. shipments of imports from all other sources to: Distributors	11.3	6.1	18.9	32.8	34.7
Residential installers	45.8	12.8	23.0	3.3	13.3
Commercial installers	16.7	21.1	35.5	50.8	34.7
Utilities/developers	26.2	59.9	22.7	13.2	17.3
Total	100.0	100.0	100.0	100.0	100.0

¹ U.S. importers' data presented in table II-1 were compiled using the scope definitions announced by Commerce in its notices of initiation and in its preliminary countervailing and antidumping duty determinations. These data have been modified to reflect the scope definitions in Commerce's final determinations and are presented in appendix E at table E-1.

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

Market Segments

Petitioner notes that within the channels of distribution (distributors, installers, and utilities/developers), there are three main market segments:¹⁶

- (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 six firms combined accounting for less than one-third of the U.S. market in 2012.¹⁷ Some residential installations may be owned by a third-party lessor who sells the electricity to a residential client.¹⁸

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 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.¹⁹ According to industry representatives, larger installation firms may have several advantages including: 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.²⁰

The utility market segment consists primarily of installations owned by utility companies or third parties where the electricity is generated for a power grid.²¹ Utility project

¹⁶ Petitions, Vol. I, p. 27.

¹⁷ 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.

¹⁸ According to SEIA, 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.

¹⁹ 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.

²⁰ *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, pp. 3-12 and 3-13.

²¹ 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.

development is more concentrated among a smaller number of firms, with the top five utility project developers accounting for 59 percent of U.S. projects completed in 2012.²² The large growth in the utility market has been driven in large part by state renewable portfolio standard requirements.

All three market segments (residential, commercial, and utility) have experienced considerable growth in both the number of installations and the total wattage of installation projects during the period of investigation. Sixteen residential installers, 24 commercial installers, and 10 utility developers reported the number installations and the total wattage of their installation projects that used CSPV products. The number of installation projects in all three market segments increased significantly over the period (table II-2). However, the residential market saw the largest increase in the number of installation projects, increasing by approximately 307 percent between 2011 and 2013.²³ According to industry experts, the residential market accounted for *** percent of the entire U.S. solar market in 2013.²⁴

Table II-2
CSPV products: Purchasers' reported number of installations by market segment, 2011-2013, January-June 2013 and January-June 2014

Item	2011	2012	2013	Jan-June 2013	Jan-June 2014	Period changes	
						2011-2013 (percent)	Interim 2013-Interim 2014 (percent)
Residential market	10,951	21,288	44,590	16,233	29,732	307.2	83.2
Commercial market	800	886	1,097	301	399	37.1	32.6
Utility market	30	47	54	31	35	80.0	12.9

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

By purchasers' reported total wattage, the utility market is the largest market for CSPV products (figure II-1).²⁵ Installation projects in the utility market, by wattage, increased 75 percent from 278,364 kilowatts in 2011 to 488,258 kilowatts in 2013. There was rapid growth in the residential market, with residential installation projects, by wattage, increasing 327 percent from 64.6 million kilowatts in 2011 to 276.0 million kilowatts in 2013. Growth in the residential market outpaced the commercial market in January-June 2014. The commercial market grew

²² 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.

²³ The residential market has seen the most consistent growth of any market segment in the last few years. SEIA, "Executive Summary," U.S. Solar Market Insight, Q2 2014, p.4.

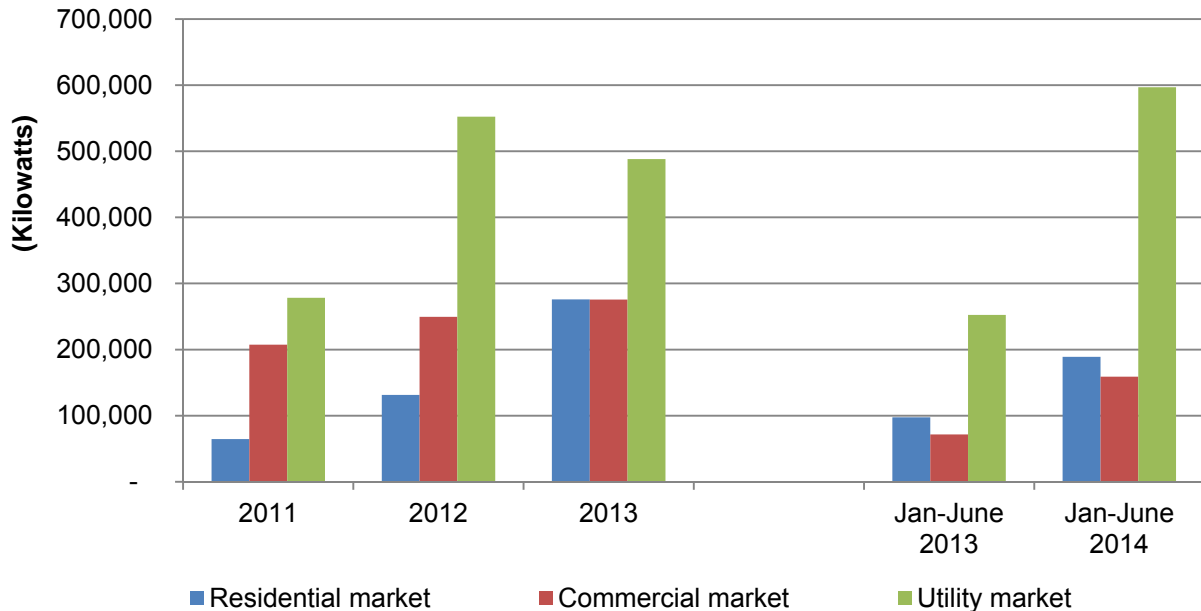
²⁴ Petitioner's posthearing brief, exhibit 1, p. 39. ***.

²⁵ This is a relatively new development; utility installations did not account for the largest share of the U.S. CSPV market in the prior investigations. *Crystalline Silicon Photovoltaic Cells and Modules from China, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final)*, Publication 4360, 2012, table II-1, and figure II-1.

moderately over the period.²⁶ Installation projects in the commercial market, by wattage, increased 33 percent from 207,361 kilowatts in 2011 to 275,612 kilowatts in 2013.

Figure II-1

CSPV products: Purchasers' reported installation projects in kilowatts, by market segment, 2011-2013, January-June 2013 and January-June 2014



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

Modules of varying watt ranges are sold in all three market segments. U.S. producers and importers reported their firm's sales, by market, for 2013. As seen in table II-3, U.S. producers and importers sold most price products, which encompassed CSPV modules with peak power wattage ranging from 220 watts to 315 watts, to all three market segments.²⁷ The residential segment purchased CSPV modules in the lower watt ranges. U.S. producers' sales of modules ranging from 255 to 265 watts accounted for *** percent of residential installers' purchases; and importers' sales of modules ranging from 240 to 250 watts accounted for 79.9 percent of residential installers' purchases. The utilities segment purchased CSPV modules from both the lower and higher watt ranges. However, *** percent of U.S. producers' sales and 58.0 percent of importers sales to utility/developers were of modules in the highest watt range (300-315 watts).

²⁶ According to SEIA, difficulties with financing, along with other "non-scaling costs" may have contributed to the limited growth in the commercial sector. SEIA, "Executive Summary," U.S. Solar Market Insight, Q2 2014, p.4.

²⁷ Two U.S. producers and one importer provided sales data for 60 cell multicrystalline modules with peak power wattage between 220 to 240 watts. One U.S. producer and 8 importers reported price data for 72 cell multicrystalline modules with a peak power wattage of between 280 to 295 watts. These sales quantities were included under product 1 and product 7, respectively, in tables II-3 and II-4.

Table II-3

CSPV products: Sales of U.S.-produced and imported CSPV modules, by market segment, 2013

Item	Residential installers	Commercial installers	Utility/Developers	Distributors
	<i>Shares of reported U.S. sales (percent)</i>			
Sales of U.S.-produced CSPV modules:				
Products 1-2 (240-250 watts)	***	***	***	***
Products 3-4 (255-265 watts)	***	***	***	***
Products 5-6 (270-280 watts)	***	***	***	***
Products 7-8 (300-315 watts)	***	***	***	***
Total	100.0	100.0	100.0	100.0
Sales of imported CSPV modules:				
Products 1-2 (240-250 watts)	79.9	37.7	6.7	60.3
Products 3-4 (255-265 watts)	8.4	4.3	0.9	12.9
Products 5-6 (270-280 watts)	1.3	6.5	34.4	0.0
Products 7-8 (300-315 watts)	10.3	51.5	58.0	26.8
Total	100.0	100.0	100.0	100.0

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

U.S. producers' and importers' sales, by pricing product, to each channel of distribution for 2013 are shown in table II-4. U.S. producers sold product 1 to all channels of distribution; U.S. producers' sales of products 2, 4, and 6 (all monocrystalline modules) were primarily to distributors; domestic product 3 was primarily to residential and commercial installers; U.S. producers' sales of product 7 were primarily to commercial installers; and more than a third of domestic products 7 and 8 were to utility/developers. Almost half of importers' sales of product 1 were sold to residential installers; most of U.S. importers' products 2, 6, and 8 were sold to commercial installers; and the majority of importers' product 5 and 7 were sold to utility/developers.

Table II-4

CSPV modules: Sales of domestic product and subject imports sold in the U.S. market to each channel of distribution, by pricing product, 2013

Item	Product 1 ¹	Product 2	Product 3	Product 4	Product 5	Product 6	Product 7 ²	Product 8
	Multi 240 W- 250 W	Mono 240 W - 250 W	Multi 255 W- 265 W	Mono 255 W- 265 W	Multi 270 W- 280 W	Mono 270 W- 280 W	Multi 300 W- 315 W	Mono 300 W- 315 W
	Shares of reported U.S. sales (percent)							
Sales of U.S.-produced CSPV modules:								
Residential installers	***	***	***	***	***	***	***	***
Commercial installers	***	***	***	***	***	***	***	***
Utility/Developers	***	***	***	***	***	***	***	***
Distributors	***	***	***	***	***	***	***	***
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sales of imported CSPV modules:								
Residential installers	47.2	42.3	36.0	45.5	2.0	0.0	5.5	0.0
Commercial installers	28.9	51.7	28.6	19.9	12.3	100.0	35.5	94.2
Utility/Developers	6.8	0.1	8.2	4.4	85.7	0.0	52.2	0.0
Distributors	17.1	5.9	27.2	30.2	0.0	0.0	6.8	5.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total sales of domestic and subject CSPV modules:								
Residential installers	45.8	35.6	37.6	21.3	2.0	17.2	5.3	0.0
Commercial installers	29.0	42.4	30.5	16.1	12.3	16.5	37.3	58.6
Utility/Developers	7.0	1.4	7.1	4.2	85.7	7.1	51.0	29.6
Distributors	18.1	20.6	24.7	58.3	0.0	59.2	6.5	11.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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

GEOGRAPHIC DISTRIBUTION

U.S. producers and importers reported selling CSPV products to all regions in the contiguous United States (table II-5). U.S. producers reported that 8.8 percent of sales were within 100 miles of their production facility, 59.9 percent between 101 and 1,000 miles, and 31.3 percent of sales were over 1,000 miles. Importers of CSPV products from China reported that 19.2 percent of sales were within 100 miles of their U.S. point of shipment, 42.7 percent between 101 and 1,000 miles, and 38.1 percent over 1,000 miles. Importers of CSPV products from Taiwan reported that 34.3 percent of sales were within 100 miles of their U.S. point of shipment, 43.7 percent between 101 and 1,000 miles, and 22.0 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.²⁸

**Table II-5
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	U.S. imports from	
		China	Taiwan
Northeast	8	30	19
Midwest	7	22	17
Southeast	7	24	13
Central Southwest	5	23	15
Mountains	6	27	17
Pacific Coast	10	31	22
Other	5	21	15
Present in all contiguous regions	3	17	11

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 and some inventories; supply responsiveness is somewhat constrained due to limited alternative markets and an inability to switch from production of alternative products to CSPV products.

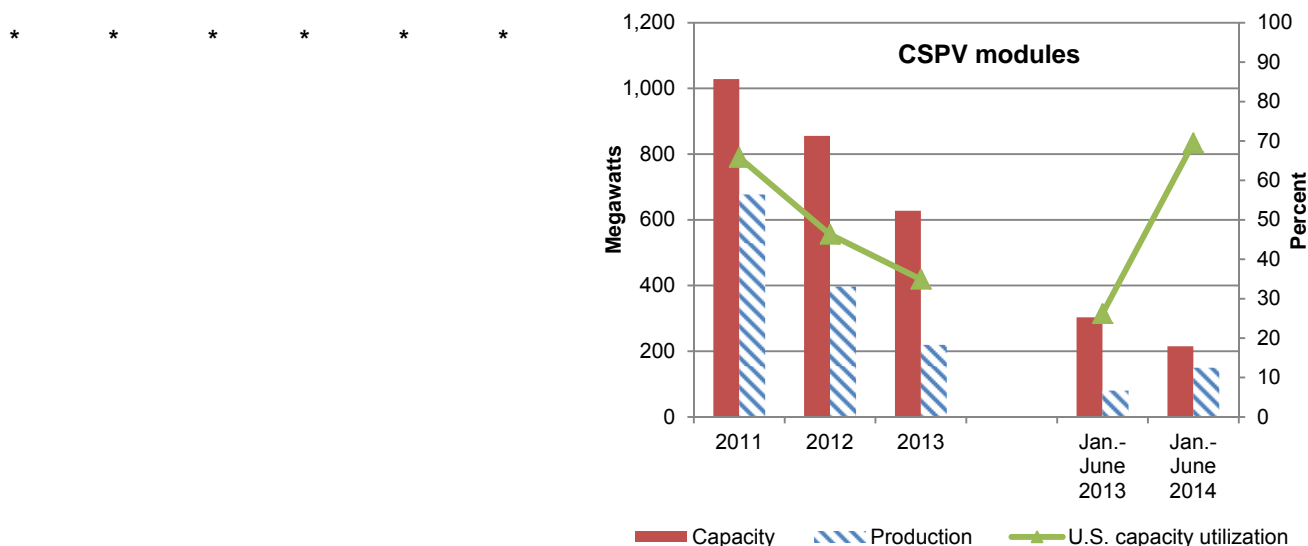
Industry capacity

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 2011 to *** percent in 2013 and was *** percent in interim 2013 but *** percent in interim 2014. For U.S.-produced CSPV modules, capacity utilization fell from 65.8 percent in 2011 to 34.9 percent in 2013; capacity utilization was substantially higher in interim 2014 (69.5 percent) than in interim 2013 (26.2 percent). As shown in figure II-2, while U.S. producers' overall capacity for CSPV cells increased from 2011 to 2013, production generally fell

²⁸ SEIA, "2013 Year-in- Review, Executive Summary," U.S. Solar Market Insight, 2017, p. 8.

throughout the period. U.S. producers' overall capacity and production for CSPV modules fell from 2011 to 2013. This moderately-low level of capacity utilization suggests that U.S. producers may have substantial capacity to increase production of CSPV products in response to an increase in prices.

Figure II-2
CSPV products: U.S. production, capacity, and capacity utilization of CSPV cells and modules, 2011-2013, January-June 2013 and January-June 2014



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

Alternative markets

U.S. producers have a limited ability to shift shipments between the U.S. market and other markets in response to price changes for CSPV products. U.S. producers' exports of CSPV cells to unrelated firms, as a percentage of total shipments, increased irregularly from *** percent in 2011 to *** percent in 2013; U.S. producers' exports of CSPV cells were higher in interim 2013 (*** percent) compared to interim 2014 (*** percent).²⁹ U.S. producers' exports of CSPV modules to unrelated firms, as a percentage of total shipments, decreased from *** percent in 2011 to *** percent in 2013 and were lower in interim 2014 (*** percent) compared to interim 2013 (*** percent).

²⁹ U.S. producers reported that most of their exports were shipped to related firms. U.S. producers' exports of CSPV cells to related firms, as a percentage of total shipments, was *** percent in 2013. U.S. producers' exports of modules to related firms were lower, accounting for *** percent in 2011 and falling to *** percent in 2013. See *Part III* for additional information.

Inventory levels

U.S. producers may have some ability to respond to changes in demand with changes in the quantity shipped from inventories. U.S. producers' inventories of CSPV cells, as a ratio to total shipments, decreased irregularly from *** percent in 2011 to *** percent in 2013; the ratio of inventories to total shipments were higher in interim 2014 (*** percent) compared to interim 2013 (*** percent). U.S. producers' inventories of CSPV modules, as a ratio to total shipments, decreased from 20.9 percent in 2011 to 8.9 percent in 2013; the ratio of inventories to total shipments were lower in interim 2014 (7.9 percent) compared to interim 2013 (13.5 percent).

Production alternatives

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

Supply constraints

Four of ten responding producers reported that their firms were unable to supply CSPV products since 2011. Both *** reported that demand for CSPV products has outpaced manufacturing capacity.³⁰ *** stated that it and other U.S. producers are seeking to reopen and expand capacity. *** reported that it was unable to provide a particular CSPV product to the U.S. military due to the limited availability of 5" mono cells, which are primarily produced in China and are subject to antidumping duties. *** stated that due to the preliminary duties placed on Taiwan cells, supply has been limited and *** only provides *** with low-grade cells.

Half of responding purchasers (24 of 48) reported that their suppliers were unable to supply CSPV products since 2011. Several purchasers reported that the AD and CVD duties have disrupted supply. Other firms noted the fluctuating demand that can outpace the available supply. *** reported that SolarWorld placed it on allocation.³¹ *** reported the Suniva couldn't supply it with the amount of high efficiency cells it needed. SunEdison stated that SolarWorld primarily produces CSPV cells for its internal production of modules and does not offer meaningful quantities of cells for external sale.³² *** reported that there have been various shortages of UL-approved modules due to the certification process. Several purchasers reported that they lost an order due to suppliers shifting product to markets with higher prices. *** reported that project orders have been cancelled by the producer, and it suspects that the product was shipped to the Japanese market where prices are higher. *** reported that module availability and prices have been extremely volatile, making it difficult to assure pricing and stable inventory levels during the project development process. *** reported that rapidly declining prices have outpaced the production schedules of its vendors. *** stated that CSPV products have long lead times, and with the fluctuating availability and market conditions, it

³⁰ According to petitioner, ***. Petitioner's posthearing brief, p. 82.

³¹ However, petitioner reported that ***. Petitioner's posthearing brief, exhibit 1, p. 82.

³² Hearing transcript, p. 165 (Shaw).

often is forced to find a different vendor that has available product when a project is ready for construction.

Subject imports from China

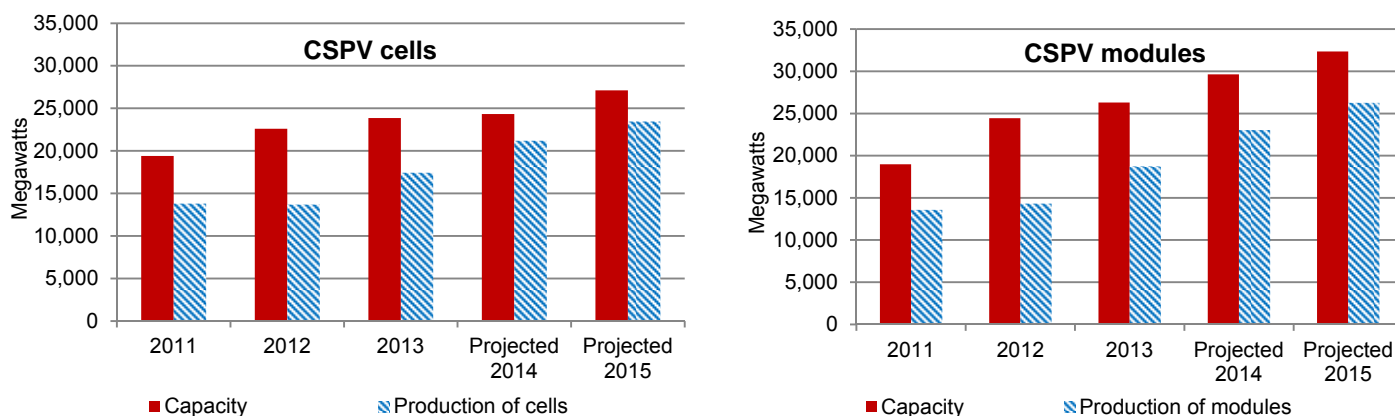
The Commission received 47 questionnaire responses from Chinese producers.³³ Based on available information, producers of CSPV products from China have the ability to respond to changes in demand with large changes in the quantity of shipments of CSPV products to the U.S. market. The main contributing 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 for both CSPV cells and CSPV modules increased during the period of investigation. Chinese production and capacity levels for both CSPV cells and modules are shown in figure II-3. Capacity utilization for CSPV cells increased from 71.1 percent in 2011 to 73.1 percent in 2013 and was 58.2 percent and 77.9 percent in interim 2013 and interim 2014, respectively.

For CSPV modules, Chinese producers' capacity utilization decreased irregularly from 71.5 percent in 2011 to 71.1 percent in 2013; capacity utilization was 57.9 percent and 69.7 percent in interim 2013 and interim 2014, respectively. The decrease in capacity utilization for CSPV modules was driven by increases in total capacity that outpaced China's production levels. Based on questionnaire responses, both Chinese capacity and production levels of CSPV products are estimated to increase in 2015.

Figure II-3
CSPV products: Chinese production and capacity for CSPV cells and modules, 2011-2013, and projected 2014-2015



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

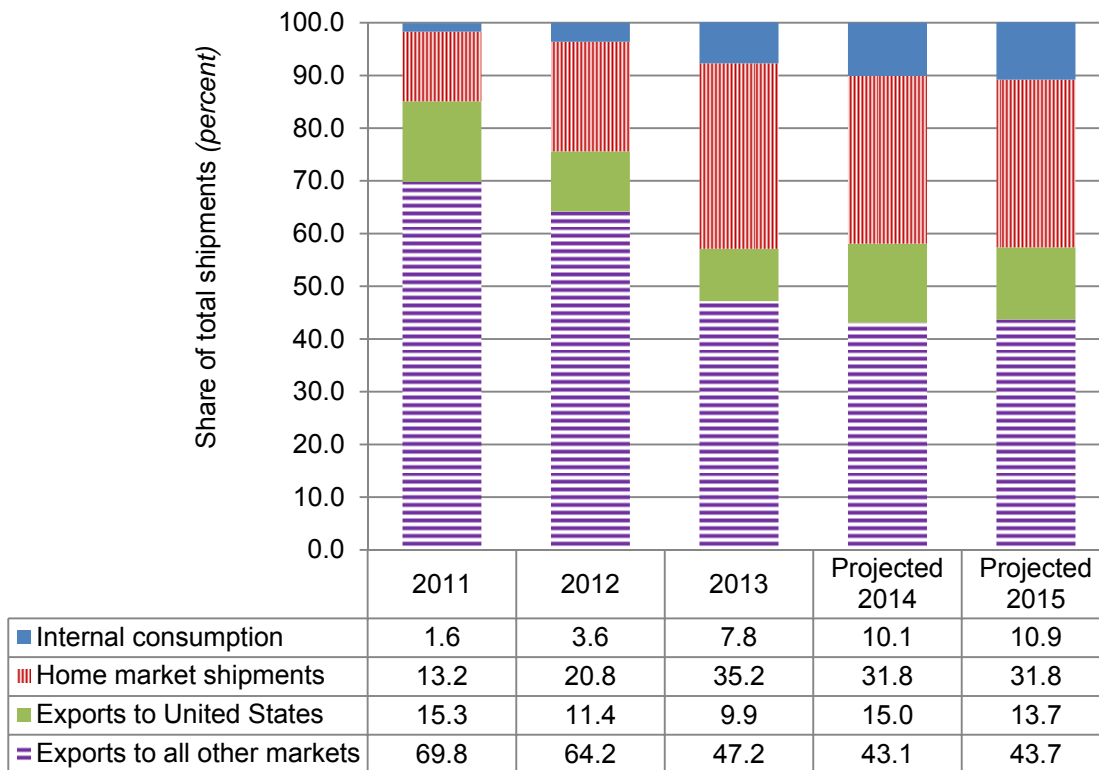
³³ Based on industry reports, the 47 responding Chinese producers account for an estimated *** percent of total CSPV cell production and *** percent of total CSPV module production in China in 2013. See *Part VII* for more information.

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 producing CSPV modules. Approximately four-fifths of Chinese producers' CSPV cells were internally consumed during the period of investigation. Exports of CSPV cells, as a percentage of total shipments, increased irregularly from 5.0 percent in 2011 to 6.6 percent in 2013. Home market shipments of CSPV cells (as a percentage of total shipments) fell from 13.8 percent in 2011 to 9.4 percent in 2013.

However, the vast majority of Chinese-produced CSPV modules were exported during the period (figure II-4). Shipments of CSPV modules to the United States decreased from 15.3 percent in 2011 to 9.9 percent in 2013. Shipments of CSPV modules to all other markets decreased from 69.8 percent in 2011 to 47.2 percent in 2013.

Figure II-4
CSPV products: Shares of total shipments of CSPV modules by Chinese producers, 2011-2013, and projected 2014-2015



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

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 decreased from 3.6 percent in 2011 to 2.8 percent in 2013. For CSPV modules, the ratio of inventories as a share of total shipments increased from 6.4 percent in 2011 to 6.7 percent in 2013.

Production alternatives

The majority of Chinese producers reported that no other products could be produced using the same machinery and equipment used in the production of CSPV products. However, *** Chinese producers reported that they produce thin-film modules.

Subject imports from Taiwan

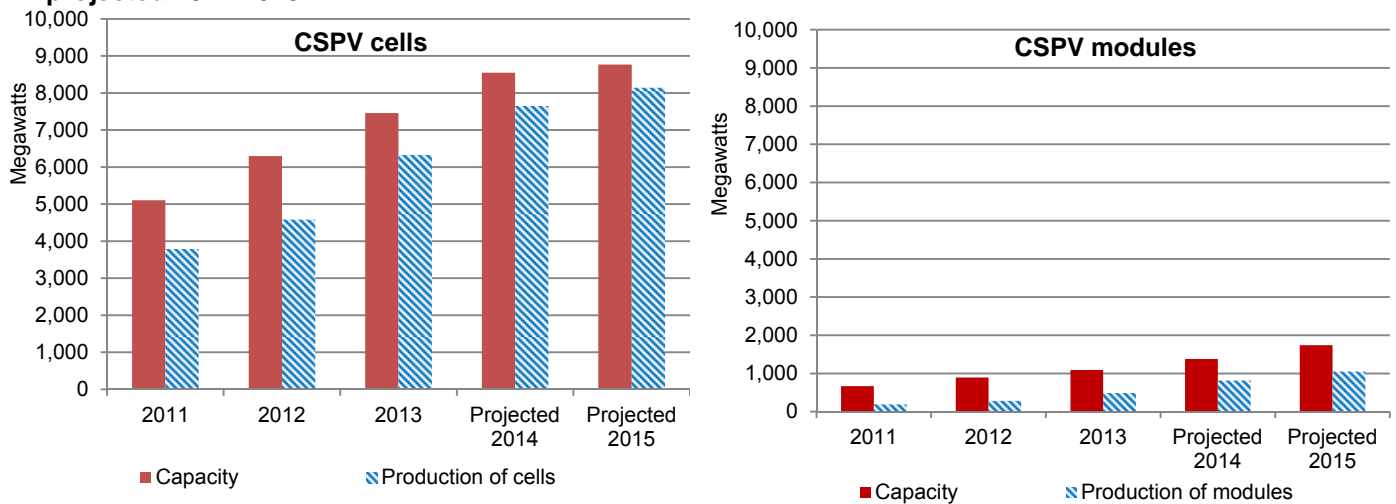
The Commission received 17 questionnaire responses from Taiwan producers.³⁴ Based on available information, producers of CSPV products from Taiwan have the ability to respond to changes in demand with large changes in the quantity of shipments of CSPV products to the U.S. market. The main contributing factors to this degree of responsiveness of supply are the availability of unused capacity and existence of alternate markets; supply responsiveness is somewhat constrained due to limited inventories and an inability to shift from production of alternative products.

Industry capacity

Taiwan producers' capacity for both CSPV cells and CSPV modules increased during the period of investigation and is projected to increase in 2015 (figure II-5). Capacity utilization for CSPV cells increased from 74.2 percent in 2011 to 84.8 percent in 2013; capacity utilization was higher in interim 2014 (90.9 percent) compared to interim 2013 (74.2 percent). Questionnaire respondents estimate that capacity utilization for CSPV cells will be 89.5 percent in 2014. For CSPV modules, Taiwan producers' capacity utilization increased from 29.1 percent in 2011 to 44.9 percent in 2013; capacity utilization was higher in interim 2014 (64.5 percent) compared to interim 2013 (34.3 percent).

³⁴ Based on industry reports, the 17 responding Taiwan producers accounted for approximately *** percent of total CSPV cell production and *** percent CSPV module production in Taiwan in 2013. See *Part VII* for more information.

Figure II-5
CSPV products: Taiwan production and capacity for CSPV cells and modules, 2011-2013, and projected 2014-2015



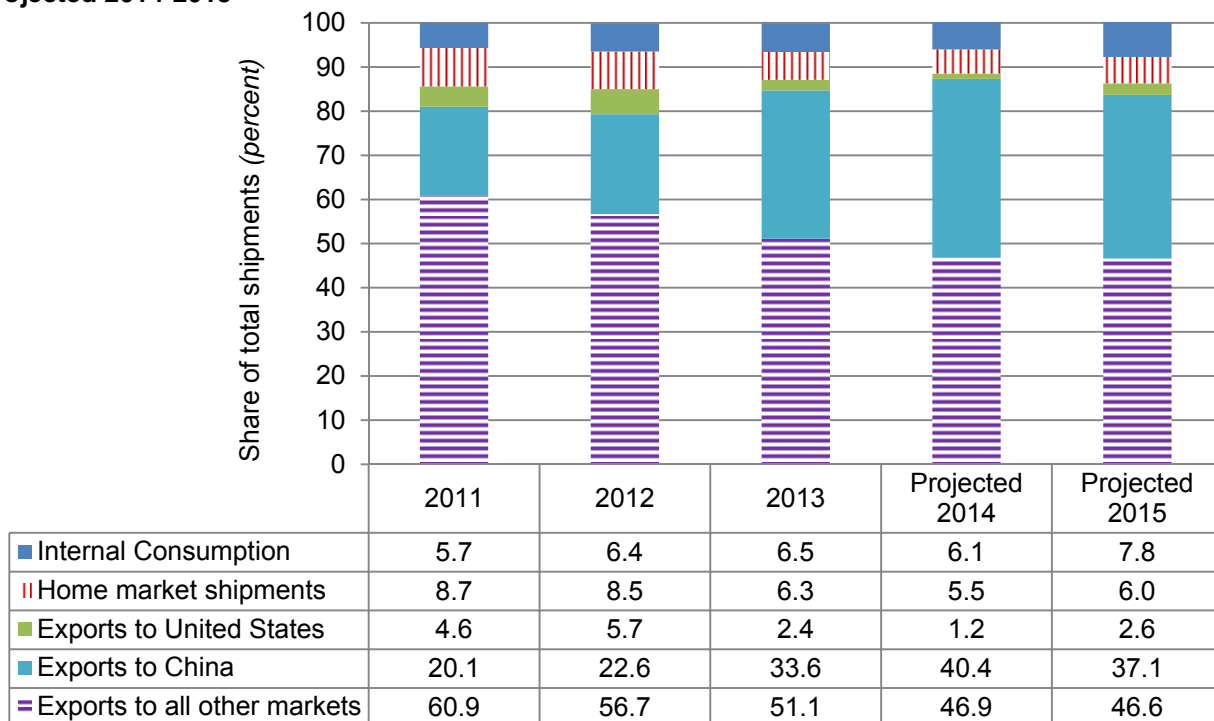
Source: Compiled from data submitted in response to Commission questionnaires.

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.³⁵ The overwhelming majority of Taiwan producers’ shipments of CSPV cells were exported (figure II-6). Total exports of Taiwan-produced CSPV cells, as a share of total shipments, increased from 85.6 percent in 2011 to 87.1 percent in 2013. China was Taiwan’s largest export market; exports of Taiwan-produced CSPV cells to China, as a share of total shipments, increased from 20.1 percent in 2011 to 33.6 percent in 2013 and are projected to continue to increase. Similarly for CSPV modules, Taiwan producers reported that the majority of their total module shipments were exported to other markets (figure II-7). Total exports, as a share of total shipments, decreased from 75.7 percent in 2011 to 59.9 percent in 2013. Shipments of CSPV modules to the United States increased from 2011 to 2012 and then fell in 2013.

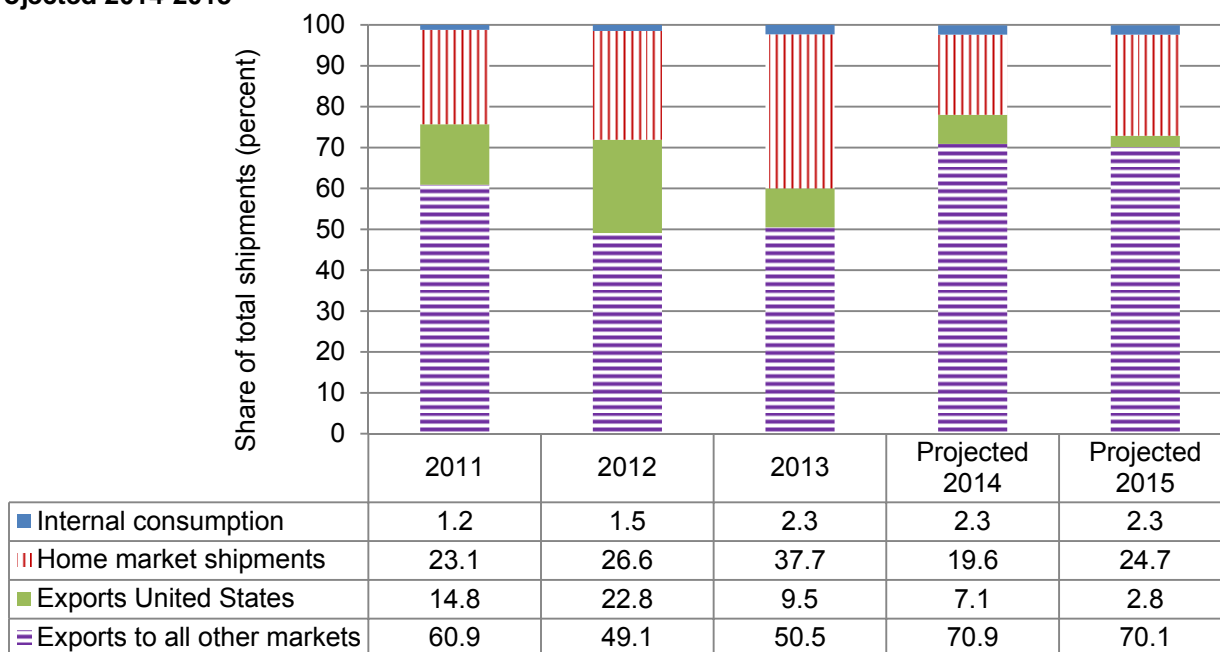
³⁵ According to Robert Kobes of AUO, a Taiwanese producer, the history of Taiwan has been primarily as an exporter. The majority of shipments from Taiwan are exported to Japan which currently has a rapidly growing market, as well as China and the United States. Conference transcript, p. 183 (Kobes).

Figure II-6
CSPV products: Shares of total shipments of CSPV cells by Taiwan producers, 2011-2013, and projected 2014-2015



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

Figure II-7
CSPV products: Shares of total shipments of CSPV modules by Taiwan producers, 2011-2013, and projected 2014-2015



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

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 decreased from 5.2 percent in 2011 to 3.8 percent in 2013. For CSPV modules, the ratio of inventories as a share of total shipments increased from 5.7 percent in 2011 to 8.5 percent in 2012 and then fell to 4.7 percent in 2013.

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

Half of responding importers (21 of 42) 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 and the preliminary duties placed on Taiwan earlier this year. Two importers reported that their dependency on cells from Taiwan has limited their ability to fulfill orders. Two importers noted the lack of availability of non-Chinese cells that can be used in small panels. *** reported supply constraints during times of spiked demand, such as the period before the expiration of the Treasury 1603 cash grant. It also reported that its related producer in China has decreased the supply allocated for the U.S. market when other markets have higher prices. Additionally, *** reported that it will decline sales or will refrain from bidding on a project if it is unable to realize its “pricing guidance and contribution margin.” *** reported that shortages in December 2011 and December 2012 led to allocation. *** reported that its inventory has lapsed at times due to supply chain issues caused by the AD and CVD duties. It reported that project orders had to be reallocated to other manufacturers in mid-production to avoid duties. *** 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 ***. 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.³⁶

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 those imports from China that are already subject to duties, nonsubject imports accounted for *** percent of apparent consumption in 2013.

³⁶ A feed-in-tariff offers a guarantee of payments to solar electricity developers for the electricity they produce.

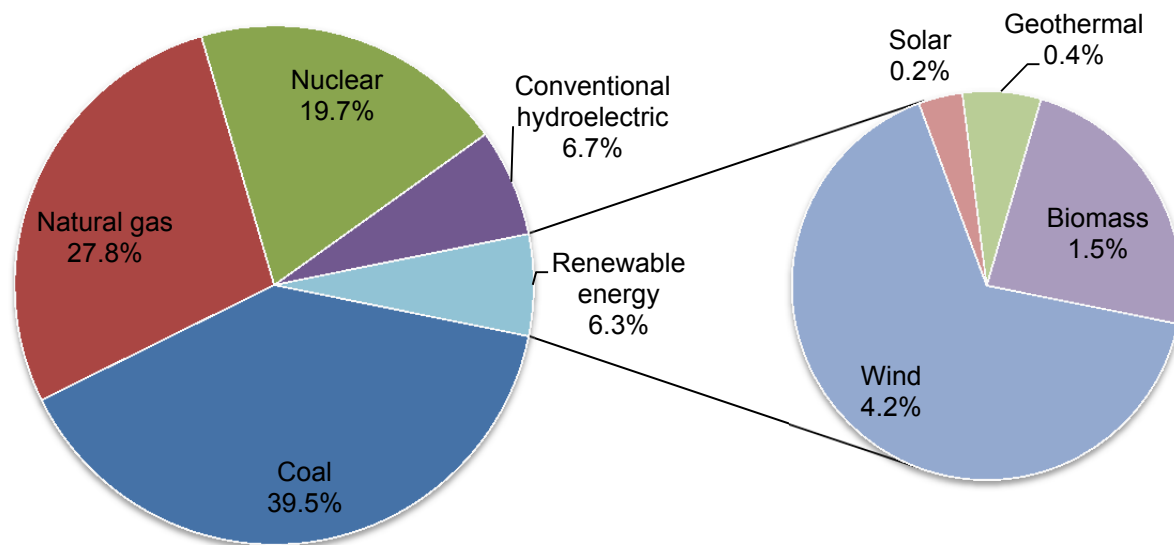
U.S. demand

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 availability 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, with coal and natural gas accounting for approximately two-thirds of all electricity generated in 2013 (figure II-8). Renewable energy sectors (excluding hydroelectric) accounted for 6.3 percent of electricity generated in the United States in 2013, with solar energy accounting for only a fraction of the total share (0.2 percent). However, the share of electricity generated from renewable energy sources, such as solar, has been steadily increasing. While solar generated electricity is one of the smallest sectors, it has grown 409 percent from 2011-2013 (figure II-9).

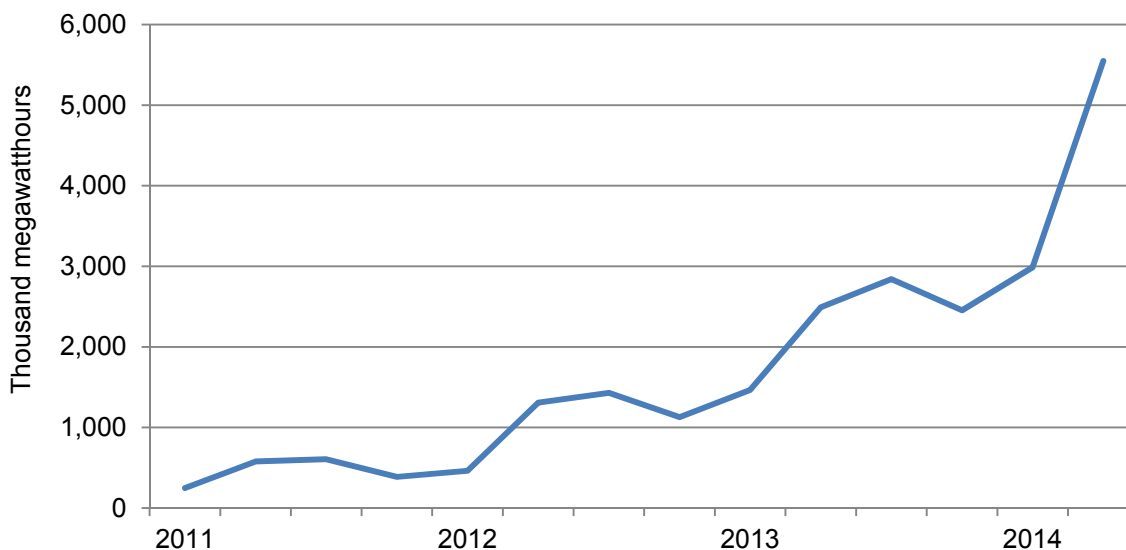
Figure II-8
Net U.S. electricity generation, by sector, 2013



Source: U.S. Energy Information Administration, <http://www.eia.gov/electricity/data/browser/>, retrieved October 22, 2014.

Figure II-9

Net U.S. electricity generated by solar, quarterly, January 2011-June 2014



Source: U.S. Energy Information Administration, <http://www.eia.gov/electricity/data/browser/>, retrieved October 22, 2014.

Demand trends

The majority of firms reported an increase in U.S. demand for CSPV products since 2011 (table II-6). Most firms attributed the increased demand to lower module and CSPV system prices as well as Federal, state, and local incentive programs. Firms also attributed the increased demand to a growing interest in green energy, increased financing options such as leases and power purchase agreement (PPA) programs, increased module efficiency, increased consumer education and confidence in CSPV products, and projects' returns are meeting and exceeding required return benchmarks.³⁷ Importer *** stated that there has been a shift from mega-sized (50-100MW) utility installations to distributed generation installations (10 MW or less) and medium-scale commercial installations. Importer *** stated that increased U.S. demand is at least partially attributed to the development of new business models such as leasing programs which better align the savings and cost of a PV system. Importer and purchaser *** 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."

³⁷ According to importer ***, project returns are driven by declining costs of levelized cost electricity from a PV system, lower risk premiums required by investors, low general financing costs and more investors entering the PV market.

Table II-6**CSPV products: Firms' responses regarding U.S. demand, by number of responding firms**

Item	Number of firms reporting			
	Increase	No change	Decrease	Fluctuate
Demand inside the United States:				
U.S. producers	8	0	2	0
Importers	37	1	3	3
Purchasers	34	2	7	0
Demand outside the United States:				
U.S. producers	5	0	1	2
Importers	24	2	4	8
Purchasers	13	3	2	1
Demand for purchasers' final products:				
Purchasers	21	3	6	2

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

The majority of firms reported that demand for CSPV products outside the United States has increased since 2011 (table II-6). 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.³⁸ Several firms noted that demand for CSPV products in China, Japan and in the Asia Pacific region in general is growing rapidly. Several firms indicated that demand in the EU has fallen and reported that the economic recession in Europe and the fluctuating incentives have resulted in fluctuating or falling demand.³⁹

The majority of purchasers (21 of 32) reported that the demand for their firms' final products incorporating CSPV products has increased since 2011. The majority of purchasers reported that the increased demand for installations has increased their demand for CSPV products.

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 is driven by the levelized cost of electricity for solar electricity. Electricity providers using renewable energy sources seek to achieve "grid parity" with other sources of electricity.⁴⁰ The levelized cost of

³⁸ 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).

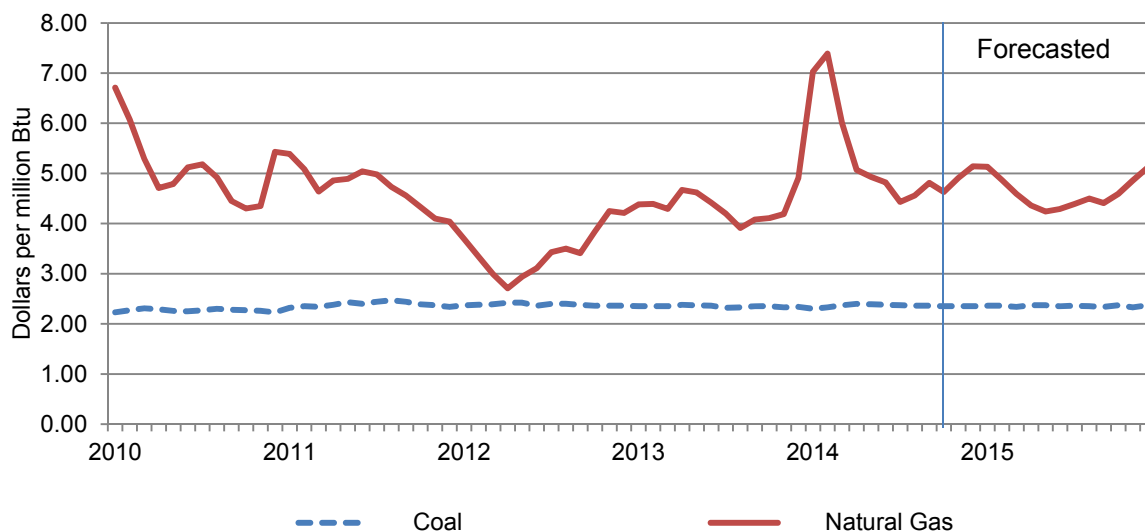
³⁹ According to petitioner, solar demand in Germany and Italy, two of the largest European solar markets, decreased by about 55 percent between 2012 and 2013 and demand in these countries is expected to continue to fall. Petitioner's postconference brief, p. 7.

⁴⁰ 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.

electricity varies state-by-state, by time of day, and by the availability of other electricity sources.^{41 42} As shown in figure II-10, the general trend of the price of coal used for electricity generation has remained unchanged since 2010 and its price is forecasted to stay stable through 2015. The price of natural gas used for electricity generation declined substantially from 2010 to 2012, but increased in 2013, peaking in February 2014. Natural gas is projected to remain higher than its 2012 levels.

Figure II-10

Average cost of coal and natural gas for electricity generation, monthly, January 2010-September 2014 and projected October 2014-December 2015



Source: “Short-Term Energy Outlook, January 2014- U.S. Energy Prices Table 2,” *U.S. Energy Information Administration*, retrieved October 31, 2014.

Firms indicated how prices for U.S. conventional energy sources have changed since 2011 (table II-7). The majority of firms reported that prices of natural gas have declined while prices for coal and other conventional energy sources have either increased or stayed the same since 2011.

⁴¹ Conference transcript, pp. 150-153 (Button and Morrison).

⁴² 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 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-7
CSPV products: Firms' responses regarding the changes in price of U.S. conventional energy since 2011, by energy source

Item	Increase	No change	Decrease	Fluctuate
Price of natural gas				
U.S. producers	1	0	6	1
Importers	3	3	21	6
Purchasers	7	3	17	6
Price of coal				
U.S. producers	2	4	2	0
Importers	9	10	5	7
Purchasers	11	7	3	6
Price of all other conventional energy				
U.S. producers	1	4	1	1
Importers	7	8	3	9
Purchasers	14	4	2	6

Source: Compiled from data submitted in response to Commission questionnaires

A plurality of importers and purchasers reported that prices of U.S. conventional energy sources have increased demand for CSPV products in all the market segments (residential, commercial, and utility) (table II-8). However, several firms stated that the increase in demand for CSPV products is due to lower system costs, increased availability of financing programs, and regulatory policies (such as renewable portfolio standards) or government incentives, rather than changes in the price of conventional energy.

Table II-8
CSPV products: Firms' responses regarding the effect of conventional energy prices on U.S. demand for CSPV products since 2011, by market segment

Item	Increase	No change	Decrease	Fluctuate
Effect on residential demand				
U.S. producers	1	3	3	2
Importers	16	9	4	6
Purchasers	14	7	1	5
Effect on commercial demand				
U.S. producers	2	2	4	2
Importers	16	8	5	6
Purchasers	13	7	4	6
Effect on utility demand				
U.S. producers	2	2	4	2
Importers	14	7	6	8
Purchasers	10	9	4	6

Source: Compiled from data submitted in response to Commission questionnaires

A plurality of U.S. producers and purchasers reported that changes in the price of U.S. conventional energy has no impact on the price of solar generated electricity (table II-9). Two producers reported that the decrease in price of solar generated electricity has been driven by falling system prices, improved financing mechanisms and overall CSPV market competition and not falling prices of conventional energy. Almost half of responding importers (17 of 33) reported that falling conventional energy prices have placed downward price pressure on solar generated electricity. However, several firms stated that there is no correlation between conventional energy prices and prices of solar generated electricity. Importer *** stated that “While increases in the price of conventional energy increase the demand for solar generated electricity, there is not a causal relationship with the price; the price of solar generated electricity is more affected by the installed cost of the PV system as well as financing costs.” *** stated that “Continued low prices for natural gas have placed increased financial pressure and high regulatory scrutiny on the direct competition between solar energy and natural gas for wholesale or utility-scale contracts.” U.S. purchaser *** stated that at this stage, it is difficult to separate the price impacts on PV-generated energy from local and national regulatory policies and incentives versus alternative fuel costs.

Table II-9

CSPV products: Firms’ responses regarding how changes in the price of U.S. conventional energy have affected the price of solar generated electricity since 2011

Item	Increase	No change	Decrease	Fluctuate
U.S. producers	1	5	1	2
Importers	0	8	17	8
Purchasers	4	13	13	7

Source: Compiled from data submitted in response to Commission questionnaires

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-10). 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-10

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 have been under construction by end of 2013.
Investment tax credit (ITC)	A 30 percent tax credit for solar system on residential and commercial properties.	Project must be commissioned by end of 2016 for 30 percent tax credit; 10 percent tax credit 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 for commercial solar projects	Project must be under construction by the end of 2011 and completed by the end of 2016.
Loan guarantee program (DOE 1705 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”)⁴³ and feed-in-tariffs (“FITs”).⁴⁴ 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.⁴⁵ Most RPSs also set up a market for tradeable certificates.⁴⁶ 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

⁴³ 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.

⁴⁴ 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.

⁴⁵ KPMG, “Taxes and incentives for renewable energy,” September 2013, pp. 53-54. In 2011, California increased its RPS goals to 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.

⁴⁶ A Solar Renewable Energy Certificate (“SREC”) is created for each megawatt-hour of electricity generated from solar energy systems. A large customer or retailer of electricity required to meet renewable energy targets can purchase a certificate in lieu of deploying on MW-h of its own. Renewable energy generators can also sell certificates to entities covered by RPS. “SREC” markets have emerged in the United States, New Jersey being the largest. Prices of tradable certificates can be volatile. NREL, “Solar Renewable Energy Certificate Markets: Status and Trends,” November 2011.

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.⁴⁷

Net metering allows residential and commercial customers who generate their own electricity from solar to feed electricity they do not need back into the grid. In some states, utilities may offer net metering programs voluntarily or as a result of regulatory decisions. Differences between states' legislation and implementation mean that the benefits of net metering can vary widely for solar customers in different areas of the United States.⁴⁸ There are more than 20 states with some form of net energy metering legislation or regulation currently in process.⁴⁹

Firms were asked how the changes in the level or availability of Federal, state, and local government incentives have changed since 2011 (table II-11). Firms' responses were varied with most firms indicating that the level or availability of Federal incentives has either not changed or has declined. Some firms stated that while some Federal incentive programs have expired, new incentives have become available. Several importers and purchasers reported that the Federal Investment Tax Credit ("ITC") has been in place and will remain at a rate of 30 percent until the end of 2016. Firms reporting a decline in Federal incentives most often cited the curtailment of the Treasury 1603 cash grant.⁵⁰ Importer *** stated that once the cash grant portion of the Treasury 1603 program expired, "utilizing the 1603 program relied on developer's ability to obtain tax equity which remains limited."

Table II-11

CSPV products: Firms' responses regarding the level or availability of Federal, state, and local government incentives for CSPV products since 2011

Item	Increase	No change	Decrease	Fluctuated
Federal government incentives				
U.S. producers	1	3	5	0
Importers	4	16	16	4
Purchasers	3	24	18	1
State and local government incentives				
U.S. producers	2	0	6	1
Importers	9	2	21	9
Purchasers	4	11	30	2

Source: Compiled from data submitted in response to Commission questionnaires

Most firms reported that the level or availability of state and local incentives has declined since 2011. Most importers and purchasers that reported a decrease attributed it to

⁴⁷ Petitioner's postconference brief, p. 46.

⁴⁸ SEIA, "Net Metering," <http://www.seia.org/policy/distributed-solar/net-metering>.

⁴⁹ SEIA, "U.S. Solar Market Insight Report," Q1 2014, p. 4.

⁵⁰ Projects eligible under the Treasury cash grant program 1603 were required to begin construction by the end of 2011 and finish by 2016. The grants were available for commercial solar projects.

the declining availability to the California Solar Initiative, as well as price declines in SRECs.⁵¹ Several firms reported that the availability of state incentives varies across the United States. *** stated that “Incentives in some solar markets, such as California, New Jersey and Hawaii have decreased, while others (such as in Massachusetts and the Carolinas) have increased.” According to industry experts, PV installations in California continue to grow despite the fact that the state is transitioning away from state-level incentives.⁵² The PV market is characterized by varying state incentives. As some states decrease their incentives others such as Massachusetts, North Carolina and New York have introduced new incentives.⁵³

Table II-12

CSPV products: Firms’ responses regarding the effect of Federal, state, and local government incentives on demand for CSPV products since 2011

Item	Increase	No change	Decrease	Fluctuated
Federal government incentives				
U.S. producers	2	5	3	0
Importers	6	15	9	10
Purchasers	7	19	13	8
State and local government incentives				
U.S. producers	3	4	3	0
Importers	8	9	9	14
Purchasers	5	14	18	9

Source: Compiled from data submitted in response to Commission questionnaires

Firms were asked how the changes in the level of Federal, state, and local government incentives have affected the demand for CSPV products since 2011 (table II-12). For Federal incentives, firms’ responses were varied with a plurality of firms reporting that the changes in the level of Federal incentives did not change the demand for CSPV products since 2011. One producer, *** reported that, “Incentives have shifted but overall demand is relatively the same.” Firms that indicated a decrease in demand due to Federal incentives most often attributed the decline to the curtailment of the Treasury 1603 cash program. However, firms that indicated an increase in demand for CSPV products due to Federal incentives most often attributed the increase to the Federal Investment Tax Credit. Importer and purchaser, *** reported that despite declines in Federal incentives (such as the Treasury 1603 cash grant, manufacturing tax credits and loan guarantee programs) demand for CSPV products continues to increase.

Firms’ responses were more varied with respect to the impact of state and local government incentives on the demand for CSPV products. Several importers noted that FITS

⁵¹ In June 2014, the CSI General Market Program had installed 83 percent of its 1,750 MW program goal for 2016 with another 13 percent of the goal reserved in pending projects. *CA Solar Initiative Report 2014*. In August 2014, California resumed procurement activities to meet RPS for later years: 2019, 2020. SEIA, “Executive Summary,” U.S. Solar Market Insight, Q2 2014, p. 10.

⁵² SEIA, “2013 Year in Review-Executive Summary,” U.S. Solar Market Insight, 2014, pp. 12-13.

⁵³ SEIA, “Executive Summary,” U.S. Solar Market Insight, Q1 2014, p. 10.

and RPSs vary from state to state. Importer *** noted that in some states, such as California, incentives have expired or the available funding is reduced which has decreased demand for CSPV products; but in other states such as in Massachusetts, 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 and that these decreases in incentives have placed a cost pressure on installation systems. Several purchasers noted that low “SREC” prices have reduced the demand for CSPV products. *** reported that a reduction in state incentives across the U.S. has led to a decrease in demand for CSPV products. Importer *** reported that, “The cost of inputs to produce CSPV products has decreased, which, to some extent has compensated for the price pressures caused by the declining availability of government incentives. Therefore, demand for CSPV products has remained steady or increased.”

Firms were asked how the changes in the availability of government incentives have affected the price of solar generated electricity since 2011 (table II-13). While firms were asked to address the impact of incentives on the price of solar generated electricity, many only commented on the price impact of CSPV systems. Firms’ responses were mixed, with a plurality of firms indicating that incentives have decreased the price of solar generated electricity. *** reported a decrease in price as a result of price declines in PV equipment and improved financing mechanisms. Several importers noted that government incentive programs allowed PV system costs to decrease, further enabling the price for solar generated electricity to decrease. *** reported that, “Federal incentive programs have accelerated the demand for PV systems since January 2011. This accelerated demand has driven improvements in overall CSPV system cost, reducing the price of solar generated electricity.” One producer, *** reported that CSPV system prices are driven more by market competition than by government incentives. Several purchasers reported that government incentives allowed for improved financing options and have increased the overall demand for solar generated electricity, but stated that the decrease in the price of solar electricity is more a result of declining PV system costs. A few purchasers noted that government incentives were but one aspect affecting the price declines for solar electricity. One purchaser, *** reported that, “In general, state and local incentives have diminished but price has continued a downward trend.”

Table II-13
CSPV products: Firms’ responses regarding how changes in the availability of government incentives have affected the price of solar generated electricity since 2011

Item	Increase	No change	Decrease	Fluctuated
U.S. producers	2	3	2	2
Importers	4	6	18	12
Purchasers	7	10	16	10

Source: Compiled from data submitted in response to Commission questionnaires

Most U.S. producers and purchasers reported that changes in the price of solar generated electricity do not affect the prices of CSPV modules. Importer and purchaser *** stated that “The cost components of the module affect the price of the CSPV module. The price of the system's generated electricity has no effect on the price of the module.” Several firms reported an inverse relationship: the price of CSPV modules is a large factor in the price of solar electricity. Declining CSPV module prices translate directly into less expensive solar generated electricity. However, four of nine responding U.S. producers, 23 of 41 responding importers,

and 15 of 42 responding purchasers reported that changes in the price of solar generated electricity affect the price of CSPV modules. Importer *** reported that "When overall solar generated electricity can be reduced through other cost variables such as installation costs, financing costs, BOD components, etc., then the solar industry can afford higher priced CSPV modules. Unfortunately, as both state and federal incentives have gone away, the cost of developing projects has not decreased as rapidly as the other cost components which have forced CSPV pricing to go down." Importer *** reported that "Electricity generated by all methods is connected in the marketplace, and a decline in price of one typically impacts the others. To reduce the cost of solar generated electricity, the cost of the system itself must be reduced. This means that the cost of each component must also be reduced. Since solar modules have usually been the largest material cost component of a solar system it has historically been expected that CSPV modules should bear the greatest burden of price reduction. This expectation/trend has been proven over the last ten years and can be easily tracked by looking at the individual system component costs over that period of time." Importer *** stated that "The price of solar-generated electricity has been on a steady decline for a decade. This has created increased demand for CSPV modules, which in turn has led to increased supply of modules, and increased competition in the industry. All of that has led to more production capacity and economies of scale and lower prices of CSPV modules to end-users."

Business cycles

The majority of U.S. producers (8 of 9), importers (27 of 37), and purchasers (24 of 40) indicated that the market for CSPV products was subject to business cycles and reported seasonal fluctuations due to weather conditions as well as incentive program deadlines. A plurality of 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.

The majority of U.S. producers (4 of 5) and importers (17 of 27) and nearly half of responding purchasers (14 of 30) indicated that the market was subject to distinct conditions 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, firms' bankruptcies, utility rebates, customers' recognition of solar as an energy source, and falling prices of alternative power products including conventional energy (e.g. natural gas) and other renewable energy sources (e.g. wind power).

The majority of U.S. producers (7 of 9), importers (24 of 34), and purchasers (17 of 32) indicated that there have been changes to the business cycle and conditions of competition since 2011. Specifically, firms identified increased competition, tight global inventory levels, firm consolidation via mergers and bankruptcies, more competitive financing options, the expiration of the Treasury 1603 cash grant program, the newly imposed duties on CSPV cells from China, and declining raw material prices as well as declining prices of CSPV products and systems.

End uses, cost shares, and installed costs

CSPV products account for a large share of the cost of the end-use products in which they are used. The primary end use for CSPV cells are modules, and for modules, the primary end use is 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. Firms reported the share of the total production cost of the end use products (modules, residential systems, commercial systems, and utility systems) that is accounted for by CSPV products (table II-14). Seven U.S. producers, 23 importers, and two purchasers reported that the cost share of CSPV products in a module averaged 50 to 92.0 percent. For residential systems, five U.S. producers, 20 importers, and 9 purchasers reported that the average cost share of CSPV products was between 26.6 to 35.0 percent. For commercial systems, six U.S. producers, 20 importers, and 14 purchasers reported that the average cost of CSPV products was between 35.8 and 38.5 percent. For utility systems, four U.S. producers, 16 importers, and 10 purchasers reported that the average cost share of CSPV products was between 39.8 and 49.4 percent.

Table II-14
CSPV products: Firms' responses regarding the percent of total production cost that is accounted for by CSPV products

Item	Module		Residential system		Commercial system		Utility system	
	Reported ranges	Average	Reported ranges	Average	Reported ranges	Average	Reported ranges	Average
Producer	50-100	78.6	20-47	26.6	25-47	35.8	30-50	39.8
Importer	50-100	92.0	10-60	35.0	20-100	38.5	25-100	45.6
Purchaser	20-100	50.0	21-50	30.9	22-80	37.2	30-100	49.4

Source: Compiled from data submitted in response to Commission questionnaires

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 SEIA, 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.^{54 55} 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-11). Declining system prices largely reflect falling module prices. Non-module costs (e.g. inverters, mounting hardware, labor, permitting fees, overhead, taxes, and installer profit), have also fallen. However, because

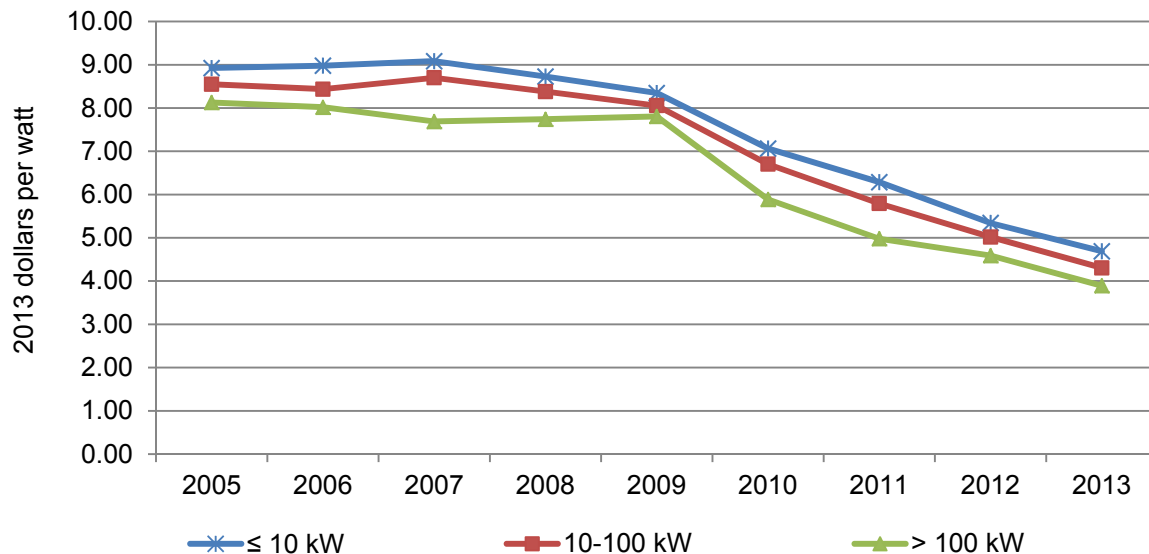
⁵⁴ *Crystalline Silicon Photovoltaic Cells and Modules from China, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final)*, Publication 4360, 2012, p. 107, SEIA, "U.S. Solar Market Insight Report", Q2 2010, p. 11; and SEIA, "U.S. Solar Market Insight Report", Q3 2013, p. 14.

⁵⁵ In utility systems, modules account for a larger percentage of the total system cost. Chinese respondents estimated that modules account for 40 percent of the total installed cost for a utility project. Therefore, according to petitioner, price is particularly the most important purchasing decision for purchasers in the utility segment. Petitioner's posthearing brief, p. 12. Chinese respondent's posthearing brief, exhibit 2: Responses to questions from Commissioner Pinkert, p. 14.

module prices have fallen significantly more than non-module costs, non-module costs have grown in their relative share of the total installed system cost.⁵⁶ 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.

Figure II-11

Average installed price of residential and commercial PV systems, by system size, 2005-2013



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 1998-2013, Lawrence Berkeley National Laboratory, 2014, p. 13.

Substitute products

The majority of firms reported that non-solar renewable energy products could not be substituted for CSPV products at the initial purchase decision. However, 2 of 10 U.S. producers, 19 of 42 importers, and 5 of 51 purchasers indicated that there were non-solar renewable energy substitutes for CSPV products. The most often identified non-solar renewable energy substitute product for CSPV products was wind turbines. Twelve of 20 importers indicated that the change in wind energy prices affects the price of CSPV generated energy. The remaining five importers reported that wind turbines did not affect the price of CSPV modules, citing the lack of direct competition for most installations, and the different geographical markets between the two types of renewable products.⁵⁷ Other substitutes cited by firms include biomass, geothermal, and hydro. U.S. producer *** reported that wind power and hydro could

⁵⁶ 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 1998-2013, Lawrence Berkeley National Laboratory, 2014, pp. 15-16.

⁵⁷ Two importers and two purchasers indicated that wind turbines were a substitute for CSPV products but reported that they had no knowledge of wind turbines’ impact on CSPV prices.

be considered substitutes however it noted that they are not directly competitive for most installations and that they do not affect the price of CSPV products.

Firms were asked if other solar energy products could be substituted for CSPV products at the initial purchase decision. Half of responding producers (5 of 10), most importers (24 of 41) and 15 of 52 responding purchasers identified other solar energy products that are substitutes for CSPV products. The most often cited solar energy substitute for CSPV products was thin film. Four of 5 U.S. producers, 9 of 26 importers, and 6 of 15 purchasers reported that prices for thin film did not affect the price of CSPV products.⁵⁸ Several firms stated that thin film and CSPV products are direct substitutes; therefore, changes in thin film prices affect prices of CSPV modules. *** noted that the relative price gap between the lower efficiency thin film products and CSPV products has closed over the period of investigation. Other solar energy substitutes cited by firms include concentrated solar and solar thermal.

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

U.S.-produced CSPV products are primarily sold from inventory. U.S. producers reported that 92.4 percent of their commercial shipments came from inventories, with lead times averaging 30 days. The remaining 7.6 percent of their commercial shipments was produced-to-order, with lead times averaging 45-100 days. Importers of CSPV products from China reported that 25.8 percent of their sales came from U.S. inventories and 0.1 percent of their sales came from foreign inventories.⁵⁹ The remaining 74.1 percent of their sales of Chinese product was produced to order. Importers of CSPV products from Taiwan reported that 24.3 percent of their sales came from U.S. inventories and 0.1 percent of their sales came from foreign inventories.⁶⁰ The remaining 75.6 percent of sales of Taiwan product was produced to order. Importers

⁵⁸ One importer and two purchasers identified thin film as a substitute for CSPV products but reported that they had no knowledge of the impact of thin film on CSPV prices.

⁵⁹ These shares are driven by the response of the largest importer of Chinese product, *** which reported that it shipped 20 percent of its sales from inventories, and the remaining 80 percent was produced-to-order. Of the 22 importers that reported shipping sales from inventories, ten reported that at least 70 percent of their commercial shipments were shipped from inventories.

⁶⁰ These shares are driven by the three largest importers of Taiwan product, ***, which reported that at least 70 percent of their commercial shipments were produced to order. Of the 20 importers that reported shipping sales from inventories, seven reported that at least 70 percent of their commercial shipments were shipped from inventories.

reported that lead times for sales of imports from U.S. inventories averaged 7-60 days; lead times of sales of CSPV products held in foreign inventories averaged 30-60 days. Importers reported that lead times of sales of CSPV products that were produced to order averaged 6-8 weeks.

Knowledge of country sources

Thirty-six purchasers indicated they had marketing/pricing knowledge of domestic product, 43 of Chinese product, 17 of Taiwan product, and 19 of nonsubject countries (Canada, Germany, Malaysia, Mexico, Japan, Singapore, South Korea, and Turkey).

As shown in table II-15, most purchasers and their customers “always” or “usually” make purchasing decisions based on the producer and “sometimes” or “never” make purchasing decisions based on country of origin. Of the 21 purchasers that reported that they always make decisions based the manufacturer, 10 firms cited bankability, module efficiency, and high quality. Other reasons include a preference for domestic product and available capacity.

Table II-15

Product: Purchasing decisions based on producer and country of origin, by number of reporting firms

Purchaser/Customer Decision	Always	Usually	Sometimes	Never
Purchaser makes decision based on producer	21	16	7	8
Purchaser’s customers make decision based on producer	5	9	16	9
Purchaser makes decision based on country	6	7	17	18
Purchaser’s customers make decision based on country	2	5	21	11

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

Factors Affecting Purchasing Decisions

Available information indicates that purchasers consider a variety of factors when purchasing CSPV products. As shown in table II-16, while price, quality, and availability were cited most frequently as being important factors in their purchase decisions, other factors such as bankability are also important considerations. Price was most frequently cited as both the first-most important factor (23) and the second-most important factor (13), and availability was most frequently cited as the third-most important factor (17).

Table II-16

Product: Ranking of factors used in purchasing decisions as reported by U.S. purchasers, by number of reporting firms

Factor	First	Second	Third	Total
Price	23	13	13	49
Quality	14	9	3	26
Availability	1	9	17	27
Bankability	5	5	4	14
Other ¹	9	16	15	40

¹ Other factors include contracts, domestic supplier, local supplier, product characteristics, ability to finance, country of manufacturing, sale terms, tier-one ranking, and product range for the first factor; product efficiency, sales terms, supplier reliability, extension of credit, capacity, custom panels, reliability, product longevity, and product line for second factor; and country of manufacturer, technical specifications, warranty, contract terms, extension of credit, reliability of supply, and UL/IEC listed for the third factor.

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

A plurality of purchasers (22 of 52) reported that they only sometimes purchase the lowest-priced product for their purchases; 18 reported “usually”, 9 reported “never” and 3 reported “always”.

When asked if they purchased product from one source although a comparable product was available at a lower price from another source, 28 purchasers reported reasons including product quality, warranty, “Buy America” provisions, installer/customer preferences, bankability, reliability of supplier, and supply availability. *** stated that since the inception of its residential lease program in 2011, it has standardized its purchases to a panel produced by *** and purchased through ***. It noted that for its commercial program, the EPC contractor makes the purchasing decisions on the project.

Thirteen of 48 purchasers reported that certain types of product were only available from a single source. *** noted that 5” monocrystalline cells are only available from either China or Taiwan. *** reported that 72-cell modules with 1,000 volts are not available in the United States. *** reported that lower wattage 36 and 72 cell modules used in off grid applications are generally only produced in Asia (China, Taiwan, and India).

Importance of specified purchase factors

Purchasers were asked to rate the importance of 19 factors in their purchasing decisions (table II-17). The factors rated as “very important” by more than half of responding purchasers were price (51 firms), availability (50), reliability of supply (50), product consistency (45), warranty (45), quality meets industry standards (40), delivery time (38), wattage efficiency (31), delivery terms (31), and extension of credit (28).

Table II-17**CSPV products: Importance of purchase factors, as reported by U.S. purchasers, by number of responding firms**

Factor	Number of firms reporting		
	Very important	Somewhat important	Not important
Availability	50	3	0
Cell count (60, 72, 90 cell modules)	25	16	10
Delivery terms	31	19	2
Delivery time	38	15	0
Discounts offered	26	23	3
Extension of credit	28	14	10
Minimum quantity requirements	14	13	25
Module racking system	7	21	23
Packaging	11	23	18
Price	51	2	0
Product consistency	45	6	1
Product range	12	26	14
Quality exceeds industry standards	23	28	1
Quality meets industry standards	40	12	0
Reliability of supply	50	3	0
Technical support/service	24	23	5
Warranty	45	7	1
Wattage efficiency	31	22	0
U.S. transportation costs	18	24	10

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

Factors determining quality

U.S. purchasers identified various principal factors they considered in determining the quality of CSPV products. Reported factors included output efficiency, power output, long-term performance degradation, output tolerances, warranty, appearance (matching cell colors and frame structure), quality of bill of materials, consistency of performance, durability, flash testing, passed micro-crack inspection, or third-party testing, and UL certification.

Technical parameters

Module cell count

A plurality of purchasers (25 of 51) indicated that cell count was a “very important” purchasing factor. Purchasers estimated their firms’ total 2013 purchases of CSPV modules by module size and the market in which the purchased modules were used (table II-18). Approximately 53.5 percent of firms’ total 2013 purchases were 60-cell modules. Purchasers reported that they primarily purchased 60-cell modules for residential projects, with 99.5 percent of all residential projects utilizing 60-cell modules in 2013. Approximately 46.4 percent of firms’ total 2013 purchases were 72-cell modules. These modules were used predominantly in commercial and utility projects, accounting for 68.1 percent and 98.1 percent, respectively, of module purchases by market segment.

Table II-18
CSPV products: U.S. purchasers' shares of CSPV modules, by module cell count, 2013

Module cell count	Residential	Commercial	Utility	Total
	Shares of module cell count by market segment (percent)			
60 cell module	99.5	31.8	1.9	53.5
72 cell module	0.2	68.1	98.1	46.4
90 cell module	0.0	0.0	0.0	0.0
Other cell counts	0.3	0.1	0.0	0.1
Total	100.0	100.0	100.0	100.0
Shares of market segments by module cell count (percent)				
60 cell module	82.0	17.0	1.0	100.0
72 cell module	0.2	42.0	57.8	100.0
90 cell module	0.0	0.0	0.0	0.0
Other cell counts	88.9	11.1	0.0	100.0
Total	44.0	28.6	27.3	100.0
Number of firms				
60 cell module	22	20	2	29
72 cell module	3	21	6	26
90 cell module	0	0	0	0
Other cell counts	4	2	0	5
Total	25	28	7	40

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

Monocrystalline and multicrystalline cells

As discussed in *Part I*, there are two main types of CSPV cells: monocrystalline silicon and multicrystalline silicon. Monocrystalline cells typically have a higher conversion efficiency (ranging from 15-20 percent)⁶¹ but are more expensive to produce. Aesthetically, monocrystalline cells have a consistent black coloring while multicrystalline cells have a speckled blue appearance.⁶² Multicrystalline cells tend to have a lower conversion efficiency (ranging from 13-16 percent) and are less expensive than monocrystalline cells of the same wattage.⁶³

U.S. purchasers reported that the majority of their module purchases were multicrystalline, accounting for approximately 84.4 percent of total 2013 purchases (table II-19).⁶⁴ All

⁶¹ CCCME's prehearing brief, page 18.

⁶² Both monocrystalline and multicrystalline modules can be made with either a black back sheet or a white back sheet depending on the aesthetic preference of the customer. Hearing transcript, p. 92 (Dulani).

⁶³ See pp. V-27-V-28 for additional information.

⁶⁴ According to petitioner, the production of monocrystalline modules will increase in the future because of their greater efficiencies capabilities in the future. However, Chinese respondents contend that multicrystalline modules offered the best value and stated that multicrystalline cells have achieved rapid improvements in cell efficiencies during the POI. They stated that the efficiency gap between monocrystalline and multicrystalline needs to expand in order for monocrystalline to offer a better

(continued...)

seven purchasers of modules that were used in utility projects reported purchasing only multi-crystalline.⁶⁵ The commercial segment accounted for the largest share of monocrystalline modules, totaling 27.2 percent.

Table II-19
CSPV products: U.S. purchasers' shares of CSPV modules, by cell type, 2013

Cell type	Residential	Commercial	Utility	Total
	Shares of module cell type by market segment (percent)			
Monocrystalline	17.9	27.2	0.0	15.6
Multi-crystalline	82.1	72.8	100.0	84.4
Total	100.0	100.0	100.0	100.0
Shares of market segment by module cell type (percent)				
Monocrystalline	50.7	49.3	0.0	100.0
Multi-crystalline	43.1	24.4	32.5	100.0
Total	44.3	28.3	27.4	100.0
Number of firms				
Monocrystalline	17	15	0	22
Multi-crystalline	21	23	7	35
Total	24	27	7	39

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

Monocrystalline CSPV modules reportedly are preferred where space is limited (requiring a higher cell efficiency to obtain the desired wattage) and where aesthetics are important.⁶⁶ U.S. purchasers reported that 50.7 percent of their purchases of monocrystalline CSPV modules were used in residential rooftop projects, with the remaining 49.3 percent of monocrystalline modules used in commercial projects. However, according to the petitioner, purchasers do not generally specify the type of cell (monocrystalline or multicrystalline) in their RFPs.⁶⁷ In addition, it argues that monocrystalline and multicrystalline modules compete head-to-head for use on the same projects.⁶⁸

Voltage

The majority of 600-volt UL modules are used in residential projects and accounted for 56.9 percent of total 2013 purchases (table II-20). The majority of 1000-volt UL modules are

(...continued)

value. Chinese respondents' posthearing brief, exhibit 2: Responses to questions from Commissioner Pinkert, pp. 27-28.

⁶⁵ According to Chinese respondents, multicrystalline CSPV modules are strongly preferred in utility applications because of their lower cost, lack of space constraints, and aesthetics are not considered important.

⁶⁶ Chinese respondents' prehearing brief, p. 21. Hearing transcript, pp. 85-86 (Brightbill).

⁶⁷ Hearing transcript, pp. 62, 80, and 87 (Kaplan, Dulani, and Clark).

⁶⁸ It stated that pricing for monocrystalline products affects the pricing for multicrystalline products, and vice versa. Petitioner's posthearing brief, p. 10.

used in commercial and utility projects and accounted for 43.0 percent of total purchases in 2013.

Table II-20
CSPV products: U.S. purchasers' shares of CSPV modules, by voltage, 2013

Voltage	Residential	Commercial	Utility	Total
	Shares of voltage module per market segment (percent)			
600-volt UL module	94.5	31.4	22.3	56.9
1000-volt UL module	5.2	68.5	77.7	43.0
Other voltage	0.3	0.0	0.0	0.1
Total	100.0	100.0	100.0	100.0
	Shares of market segment per voltage module (percent)			
600-volt UL module	73.6	15.7	10.7	100.0
1000-volt UL module	5.3	45.1	49.6	100.0
Other voltage	89.6	10.4	0.0	100.0
Total	44.3	28.3	27.4	100.0
	Number of firms			
600-volt UL module	20	19	1	28
1000-volt UL module	5	17	7	24
Other voltage	3	2	0	4
Total	24	27	7	39

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

Mounting systems

A plurality of purchasers (23 of 51) reported that module racking systems were “not important” in purchasing decisions (table II-17). According to purchaser Mountain View, mounting preferences are never requested by the end-user or specified in the RFP.⁶⁹ Zep-compatible mounting systems were used almost exclusively in the residential market.⁷⁰ Five of 21 purchasers reported purchasing Zep-compatible systems which accounted for 45.9 percent of all residential purchases (table II-21). Most firms reported purchasing modules that used other mounting systems, regardless of the market segment.

⁶⁹ Hearing transcript, p. 129 (McKechnie). According to purchaser Petersen Dean, a residential installer, it is “fairly indifferent to racking as long as it’s code compliant.” Hearing transcript, pp. 129-130 (Clark).

⁷⁰ The Zep mounting system is a proprietary solar panel mounting system used primarily in the residential market. SolarCity purchased ZepSolar in 2013. Conference transcript, pp. 137, 177 (Stanton). SolarCity reported that *** percent of its purchases for residential systems used Zep-compatible systems.

Table II-21
CSPV products: U.S. purchasers' shares of CSPV modules, by mounting technology, 2013

Mounting technology	Residential	Commercial	Utility	Total
	Shares of mounting technology per market segment (percent)			
Zep-compatible	45.9	0.0	0.4	21.6
Other quick mounting systems	3.7	20.0	2.1	6.5
Other	50.4	80.0	97.5	72.0
Total	100.0	100.0	100.0	100.0
	Shares of market segment per mounting technology (percent)			
Zep-compatible	99.4	0.0	0.6	100.0
Other quick mounting systems	26.6	62.7	10.7	100.0
Other	32.6	22.5	44.8	100.0
Total	46.6	20.3	33.1	100.0
	Number of firms			
Zep-compatible	5	0	1	6
Other quick mounting systems	5	11	1	11
Other	14	12	5	21
Total	21	23	7	34

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

Bankability

When describing the role of bankability in their customers' purchasing decisions, many purchasers reported that bankability was especially important for large scale or commercial projects because these types of projects typically require financing. According to ***, bankability is the willingness of banks to finance a project based on the demonstrated quality and warranty terms. *** stated that "bankability is a primary consideration for anyone selling a project to an investor or another group." *** stated that "bankability is driven by the third-party ownership funds that drive power purchase agreements ("PPAs") and lease volume. A module manufacturer's appearance on the funds' approved vendor list is a key element in our decision-making." Several purchasers referred to product warranties when discussing the role of bankability in purchasing decisions.

Financing

The majority of purchasers (47 of 53) reported that a producer or importer has not offered financing when a purchaser bought CSPV products. Two firms *** reported the purchases were on a consignment agreement. Purchasers' payment terms varied from 15 to 120 days from delivery date.

The use of third-party ownership, through PPAs or leasing agreements, is used in residential, commercial, and utility market segments. According to SEIA, third-party ownership

in the residential solar sector has increased, particularly over the last one to two years.⁷¹ Even as costs of solar residential systems decline, purchasing a solar system is not always a viable option for many customers. Under a third-party lease agreement, customers have little or no upfront costs to install a solar system. In addition to third-party ownership, an increasing number of installers have partnered with national and regional banks to provide loans to customers to purchase the PV systems outright.⁷²

Power purchase agreements work in a similar manner. The solar company will install and maintain the panels at a residential or commercial site, and the customer agrees to pay the company a predetermined price for the electricity generated by the system. U.S. purchaser *** reported using PPAs in its large-scale utility operations for investor-owned public utilities, municipalities, or cooperative associations that serve residential and commercial customers. The steady income generated by these lease agreements over the 20 year term makes them attractive to investors. Banks will often fund the purchase of the systems through solar companies, and as a return on the investment, receive the tax credits and a negotiated share of the monthly payments.

Supplier certification

Twenty-nine of 51 responding purchasers reported that they require suppliers of CSPV products to become certified or qualified to sell to their firm. Qualification times ranged from two to 730 days, with 17 of 29 purchasers reporting qualification times of 30 to 90 days.⁷³ Two purchasers reported conducting a factory audit of potential suppliers to examine the manufacturing process, test for quality control, verify product specifications, and review the reliability testing and certification. Purchasers reported considering the following qualities when qualifying a new supplier: financial strength and bankability of supplier (14 firms), product meeting industry standards (7), quality of product (12), product reliability and warranty (7), suppliers' ability to offer competitive pricing (4), capability to produce a customer specific product design (4), customer service (2), and reputation of supplier (2).

Twelve of 48 purchasers responding reported that domestic or foreign suppliers had failed in their attempts to qualify product, or had lost their approved status since 2011. Reasons reported for failure to qualify included not meeting certain quality, price competitiveness, and financial strength and bankability standards and inability or willingness to produce product designed to meet customers' product specifications. Firms also reported that they would not

⁷¹ SEIA estimates that third-party owned residential systems have driven anywhere from 56 percent (Massachusetts) to 90 percent (Colorado) of residential installations in mature state markets. SEIA, "U.S. Solar Market Insight, Q2 2014, p. 8.

⁷² SEIA, "U.S. Solar Market Insight, Q2 2014, p. 8. SolarCity announced that it offer customers in 8 states loans to buy home solar systems, with monthly payments based on how much electricity the systems produce. "SolarCity Join Rivals in Lending Solar Panels to Clients," *New York Times*, October 8, 2014.

⁷³ One purchaser reported a qualification time of 730 days and noted that extensive product testing must take place in the field for up to six months. Four purchasers reported qualification times of approximately two weeks or less. One purchaser reported a qualification time of 120 days; two purchasers reported that number of days will vary.

qualify some suppliers due to being high risk or “proven to be untrustworthy.” Firms that reported suppliers losing certification cited bankruptcy (***) and insufficient factory audits (***)).

Changes in purchasing patterns

Purchasers were asked about changes in their purchasing patterns from different sources since 2011 (table II-22); reasons reported for changes in purchasing patterns included tariff uncertainty, price, specifications of project, lowest bid earned contract, product range, reliability of supplier, plant closures; and availability. Most purchasers (33 of 51) reported that they had changed suppliers since 2011. Specifically, firms dropped or reduced purchases from suppliers because of lack of supply, price, changed technologies; bankruptcy proceedings, and AD and CVD duties. Firms added or increased purchases because of price, quality; availability; and purchasing shift to American-made products. Twenty-four of 49 responding purchasers reported that new suppliers have entered the market since 2011 and indicated the following firms: BYD; CSUN; Lightway; Sunrise Global Solar Energy; SolarPark; Recom; S-Energy; Silevo; Talesun; Vikram; and Znshine Solar. Several firms stated that hundreds of firms have entered the market since 2011.

Table II-22
Product: Changes in purchase patterns from U.S., subject, and nonsubject countries

Source of purchases	Did not purchase	Decreased	Increased	Constant	Fluctuated
United States	20	14	6	6	5
China	8	16	19	7	5
Taiwan	28	3	9	6	3
Other	20	7	12	5	4

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

Twenty of 52 purchasers reported that they or their customers have specifically ordered CSPV products from one country in particular over other possible sources of supply. The majority of purchasers indicated that they have preferred domestically-produced products over other sources. *** stated that its customers want modules from U.S. companies. *** stated that a small percentage (less than 5 percent) of its customers have a preference for U.S.-produced products.

Importance of purchasing domestic product

Thirty-eight of 52 purchasers (accounting for 96.0 percent of total reported purchases) reported that purchasing U.S.-produced product was not an important factor in their purchasing decisions. Eleven purchasers reported that a portion of their domestic purchases were required by law (ranging from 2 to 100 percent of their purchases).⁷⁴ Eleven purchasers

⁷⁴ Purchasers required by law to buy domestic accounted for 2.1 percent of total reported purchases. Only one of these purchasers (***) reported buying 100 percent of the domestic product.

reported that domestic purchases were required by their customers (ranging from 1 to 15 percent of their purchases),⁷⁵ and three purchasers reported other preferences for domestic product. Reasons cited for preferring domestic product included: purchases for a project that was under the “Buy America” program and a project completed for a school with a domestic product preference.

Comparisons of domestic products, subject imports, and nonsubject imports

Purchasers were asked a number of questions comparing product produced in the United States, subject countries, and nonsubject countries. First, purchasers were asked for a country-by-country comparison on the same 19 factors (table II-23) for which they were asked to rate the importance. Most responding purchasers reported that U.S. product was comparable to product from China for all characteristics except for availability, price, and reliability of supply. For availability, 17 purchasers rated the products as comparable, 17 rated the U.S. product as inferior, and 5 rated U.S. product as superior. For reliability of supply, 18 purchasers rated the products comparable, 12 purchasers rated U.S. product inferior and 7 purchasers rated U.S. product as superior. For price, purchasers reported that China was superior (lower-priced) to domestic product. Similarly, most responding purchasers reported that U.S. product was comparable to product from Taiwan for all characteristics except for availability and price. For availability, 12 purchasers rated the products as comparable, 9 rated the U.S. product as inferior, and 5 rated U.S. product as superior. For price, purchasers reported that Taiwan was superior (lower-priced) compared to U.S. product.

Most purchasers reported that U.S. and nonsubject product were comparable on all factors except for price, for which the product from nonsubject countries was rated as superior (lower-priced). The majority of purchasers reported that product from China was comparable to product from Taiwan on all factors. Most purchasers reported that product from China was comparable to product from nonsubject countries on all factors except for price, for which the product from China was rated as superior. The majority of purchasers reported that product from Taiwan was comparable to product from nonsubject countries on all factors.

⁷⁵ Purchasers required by the customer to buy domestic accounted for 1.9 percent of total reported purchases.

Table II-23

CSPV products: Purchasers' comparisons between U.S.-produced and imported product

Factor	Number of firms reporting								
	U.S. vs. China			U.S. vs. Taiwan			U.S. vs. Nonsubject countries		
	S	C	I	S	C	I	S	C	I
Availability	5	17	17	5	12	9	3	13	9
Cell count (60, 72, 90 cell modules)	3	25	9	4	16	5	2	18	5
Delivery terms	6	25	6	6	13	4	5	19	1
Delivery time	10	21	7	8	13	4	6	14	5
Discounts offered	2	19	16	2	16	5	1	18	4
Extension of credit	2	25	11	3	15	5	3	18	3
Minimum quantity requirements	4	28	5	2	19	4	2	20	2
Module racking system	6	25	3	5	17	2	2	18	1
Packaging	4	30	2	3	20	0	3	21	0
Price ¹	0	8	31	3	7	16	1	10	15
Product consistency	8	26	5	3	17	4	1	20	3
Product range	3	24	10	3	15	6	2	20	3
Quality exceeds industry standards	7	30	2	4	17	3	3	20	2
Quality meets industry standards	9	28	2	4	17	3	2	23	0
Reliability of supply	7	18	12	6	13	5	4	16	4
Technical support/service	11	25	2	8	15	2	4	18	3
Warranty	8	30	1	4	21	0	2	23	0
Wattage efficiency	9	26	5	4	19	3	1	21	3
U.S. transportation costs ¹	11	26	1	8	17	0	7	17	0

Table continued.

Table II-23 --Continued

Product: Purchasers' comparisons between U.S.-produced and imported product

Factor	Number of firms reporting								
	China vs. Taiwan			China vs. Nonsubject			Taiwan vs. Nonsubject		
	S	C	I	S	C	I	S	C	I
Availability	8	16	0	9	15	1	3	11	2
Cell count (60, 72, 90 cell modules)	2	21	0	5	20	0	2	13	1
Delivery terms	3	20	0	5	20	0	2	12	1
Delivery time	3	19	1	4	19	1	1	13	1
Discounts offered	4	18	0	6	16	1	1	13	1
Extension of credit	4	18	1	3	20	2	1	12	2
Minimum quantity requirements	3	19	1	4	19	2	1	14	1
Module racking system	1	19	0	3	18	0	2	10	1
Packaging	1	21	1	1	23	1	2	12	1
Price ¹	8	13	2	14	11	0	5	10	1
Product consistency	1	20	3	3	21	1	1	13	1
Product range	2	18	2	6	19	0	1	13	1
Quality exceeds industry standards	1	19	3	2	20	3	3	12	1
Quality meets industry standards	1	20	2	2	23	0	1	14	1
Reliability of supply	6	16	1	6	18	1	2	11	3
Technical support/service	3	19	1	5	20	0	1	13	2
Warranty	1	21	1	1	22	2	1	14	1
Wattage efficiency	2	17	5	4	18	3	1	13	2
U.S. transportation costs ¹	2	21	0	2	23	0	1	14	1

¹ A rating of superior means that price/U.S. transportation costs is generally lower. For example, if a firm reported "U.S. superior," it meant that the U.S. product was generally priced lower than the imported product.

Note.-- S=first listed country's product is superior; C=both countries' products are comparable; I=first list country's product is inferior.

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

Comparison of U.S.-produced and imported product

In order to determine whether U.S.-produced product can generally be used in the same applications as imports from China and Taiwan, U.S. producers, importers, and purchasers were asked whether the products can "always," "frequently," "sometimes," or "never" be used interchangeably. As shown in table II-24, the majority of firms reported that domestic CSPV products and CSPV product imported from China and Taiwan are "always" or "frequently" interchangeable. The majority of firms also reported that domestic CSPV products are "always" or "frequently" interchangeable with CSPV products from nonsubject countries. Furthermore, the majority of firms reported that CSPV products from China and CSPV product from Taiwan are "always" or "frequently" interchangeable.

Table II-24

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

Country pair	U.S. Producers				U.S. importers				U.S. purchasers			
	A	F	S	N	A	F	S	N	A	F	S	N
United States vs. China	3	4	3	0	10	20	6	3	12	20	12	1
United States vs. Taiwan	3	4	3	0	9	17	6	3	10	15	9	1
China vs. Taiwan	6	3	1	0	12	15	5	1	12	12	8	0
United States vs. Other	3	3	2	0	5	17	9	2	7	16	7	1
China vs. Other	5	2	1	0	7	17	8	1	7	13	8	0
Taiwan vs. Other	5	2	1	0	7	16	7	1	6	8	8	0

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

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

Several responding purchasers noted that the interchangeability assessment assumed the same voltage, technical, and physical specifications. Purchaser *** reported that while products from different countries are frequently interchangeable, it never uses two products from different countries in the same application. *** also noted that design changes are costly, take time, and must be re-permitted; therefore, it is difficult to interchange CSPV products once a project has begun. Purchaser *** reported that the interchangeability of CSPV products from all three countries is based on the relative bankability of the supplier. It noted that CSPV products from a tier 1 Chinese supplier would be interchangeable with a large U.S. installer; however, CSPV product from a tier 1 supplier would not be interchangeable with CSPV product from a new Chinese supplier. Purchaser *** stated that very few firms outside of China and Taiwan produce 36 and 72 cell modules with wattages below 200. Purchaser *** stated that CSPV products from the United States are never interchangeable with modules from Malaysia or China because domestic modules do not meet the higher power module and wattage specifications that it requires.

As can be seen from table II-25, 34 of 38 responding purchasers reported that domestically-produced product “always” or “usually” met minimum quality specifications.⁷⁶ Forty of 44 responding purchasers reported that CSPV product from China “always” or “usually” met minimum quality specifications. Twenty-four of 27 responding purchasers reported that CSPV product from Taiwan “always” or “usually” met minimum quality specifications.

⁷⁶ However, SunEdison contends that U.S. producers are unable to supply the high efficiency cells and high wattage modules that it uses for its projects. Hearing transcript, pp. 162-163 (Shaw).

Table II-25**CSPV products: Ability to meet minimum quality specifications, by source and number of reporting firms¹**

Source	Always	Usually	Sometimes	Rarely or never
United States	19	15	3	1
China	15	25	3	1
Taiwan	8	16	3	0
Other	6	9	2	0

¹ Purchasers were asked how often domestically produced or imported product meets minimum quality specifications for their own or their customers' uses.

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

In addition, producers, importers, and purchasers were asked to assess how often differences other than price were significant in sales of product from the United States, subject, or nonsubject countries. As seen in table II-26, 5 of 9 responding U.S. producers, 20 of 40 responding importers, and 17 of 44 responding purchasers reported that differences other than price were "sometimes" or "never" important in comparing U.S. and Chinese product. However, 4 U.S. producers, 20 importers, and 27 purchasers reported that differences other than price were "always" or "frequently" important in comparing U.S. and Chinese product. When comparing U.S. and Taiwan product, 5 of 9 responding U.S. producers, 22 of 36 responding importers, and 16 of 35 responding purchasers reported that differences other than price were "sometimes" or "never" important in comparing U.S. and Taiwan product. The remaining 4 U.S. producers, 14 importers, and 19 purchasers reported that differences other than price were "always" or "frequently" important in comparing U.S. and Taiwan product. The most commonly identified factors other than price were availability, product range, wattage specifications, quality, and reliability of supply.

Table II-26**Product: Significance of differences other than price between CSPV products produced in the United States and in other countries, by country pairs**

Country pair	U.S. Producers				U.S. importers				U.S. purchasers			
	A	F	S	N	A	F	S	N	A	F	S	N
United States vs. China	1	3	5	0	11	9	16	4	16	11	16	1
United States vs. Taiwan	0	4	5	0	8	6	19	3	12	7	15	1
China vs. Taiwan	3	2	3	1	6	6	18	5	8	3	16	3
United States vs. Other	1	2	4	0	4	7	15	4	9	6	15	1
China vs. Other	2	2	3	0	4	6	17	3	6	4	16	2
Taiwan vs. Other	2	2	3	0	4	5	16	3	5	3	13	1

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

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

ELASTICITY ESTIMATES

This section discusses elasticity estimates; parties were encouraged to comment on these estimates in their prehearing or posthearing briefs but did not provide any comments.

U.S. supply elasticity

The domestic supply elasticity⁷⁷ for product measures the sensitivity of the quantity supplied by U.S. producers to changes in the U.S. market price of product. The elasticity of domestic supply depends on several factors including the level of excess capacity, the ease with which producers can alter capacity, producers' ability to shift to production of other products, the existence of inventories, and the availability of alternate markets for U.S.-produced product. Analysis of these factors earlier indicates that the U.S. industry has the ability to greatly increase or decrease shipments to the U.S. market; an estimate in the range of 6 to 8 is suggested.

U.S. demand elasticity

The U.S. demand elasticity for product measures the sensitivity of the overall quantity demanded to a change in the U.S. market price of product. This estimate depends on factors discussed earlier such as the existence, availability, and commercial viability of substitute products, as well as the component share of the product in the production of any downstream products. Based on the available information, the aggregate demand for product is likely to be elastic; a range of -1.0 to -1.5 is suggested.

Substitution elasticity

The elasticity of substitution depends upon the extent of product differentiation between the domestic and imported products.⁷⁸ Product differentiation, in turn, depends upon such factors as quality (e.g., chemistry, appearance, etc.) and conditions of sale (e.g., availability, sales terms/ discounts/ promotions, etc.). Based on available information, the elasticity of substitution between U.S.-produced product and imported product is likely to be in the range of 3 to 5.

⁷⁷ A supply function is not defined in the case of a non-competitive market.

⁷⁸ The substitution elasticity measures the responsiveness of the relative U.S. consumption levels of the subject imports and the domestic like products to changes in their relative prices. This reflects how easily purchasers switch from the U.S. product to the subject products (or vice versa) when prices change.

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 100.0 percent of total 2013 U.S. CSPV cell production, and 18 U.S. producers that produce CSPV modules¹, which accounted for approximately 90.6 percent of total 2012 U.S. production of CSPV modules.²

¹In the present CSPV solar investigations, the Commission received questionnaire submissions from nine U.S. producers, two of which accounted for all known 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 investigations 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 investigations, staff has consolidated the data submitted by these firms in the prior investigations into the current trade and financial databases presented in this report. The firms whose prior data are being used are: ***. Collectively, their data accounted for *** percent of total U.S. production of CSPV modules in 2012.

***.

²Based 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. The EIA has not yet released 2013 U.S. solar industry data.

U.S. PRODUCERS

The Commission sent producers' questionnaires to 166 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 9 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 7 firms 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.

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

⁴In the prior CSPV solar investigations, the petitioner asked the Commission to define the domestic industry as U.S. producers of CSPV cells and CSPV modules because U.S. producers of CSPV modules engage in sufficient production related activities in the United States to be included in the domestic industry. It cited extensive capital investment, research, and development necessary to 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. In the preliminary phase of these investigations, the Commission continued to treat U.S. module assemblers as producers of the domestic like product. *Certain Crystalline Silicon Photovoltaic Products from China and Taiwan*, Inv. Nos. 701-TA-511 and 731-TA-1246-127 (Preliminary), USITC Pub. 4454, February 2014, p. 10 fn. 39.

Table III-1

CSPV products: U.S. producers of CSPV cells and CSPV modules, their positions on the petition, production locations, and shares of reported production, 2011-January-June 2014

Firm	Production location(s)	Share of reported production	Position on petition
U.S. producers of CSPV cells			
SolarWorld ¹	Hillsboro, OR Camarillo, CA	***	Petitioner
Suniva	Norcross, GA	***	***
Total		100.0	
U.S. producers of CSPV modules			
Kyocera Solar	Scottsdale, AZ	***	*** ***
Motech Americas ²	New Castle, DE	***	***
SBM Solar	Concord, NC	***	*** ***
Silicon Energy	Marysville, WA Mountain Iron, MN	***	***
SolarWorld ¹	Hillsboro, OR Camarillo, CA	***	***
Solon	Tucson, AZ	***	***
Suniva	Norcross, GA	***	***
tenKsolar	Bloomington, MN	***	***
Wanxiang ³	Rockford, IL	***	*** ***
U.S. producer data from prior investigation⁴		***	
Total		100.0	

¹SolarWorld 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. SolarWorld closed its Camarillo, CA facility in September 2011.

²Motech 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.

³Wanxiang is a wholly owned subsidiary of the Wanxiang Group of Hangzhou, China.

⁴These firms include: ***.

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 identifies specific events affecting individual U.S. producers. Table III-3 shows a time line of when U.S. producers of CSPV cells 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

* * * * *

⁵Petitioner 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. (shuttered 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.

In 2014, SolarCity announced that it commenced building in 2014 a U.S. CSPV module production facility in Buffalo, New York, capable of annual module production of approximately 1 gigawatt.

Table III-3

CSPV products: Listing of U.S. firms with CSPV production facilities opening and/or closing, 2011-October 2014

	2011		2012		2013		2014		
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Nov	
1Soltech		●	Moved to larger module plant in TX						
Advanced Solar Photonics					◆	Filed for bankruptcy			
Alternative Energies Kentucky						◆	KY plant closed (not known if 1st or 2nd half 2013)		
Evergreen Solar	◆	Closed cell and module plant in MA							
Helios	●	Opened module plant in WI				◆	Halted module production		
Isofoton			●	Module plant opened in OH			◆	Module plant closed in OH	
Itek Energy		●	Approximate date module plant opened in WA				●	Announced plans to open module plant in MN in 2015	
Kyocera					◆	Layoffs at module plant in CA; indicated would end U.S. production if demand didn't increase			
Mage Solar	●	Opened module plant in GA							
Mission Solar (Nexolon)							●	Opened cell and module plant in TX	
Motech	No known changes								
MX Solar			◆	Closed module plant in NJ					
NuSun	Start IN module production			●			◆	Plant closed	
SBM Solar	No known changes								
Schott Solar			◆	Closed module plant in NM					
Sharp							◆	Ended U.S. production	
Silevo (SolarCity)							●	Broke ground on cell and module plant in NY	
Silicor Materials (Calisolar)		◆	◆	2011: Announced downsizing cell production; 2012: Sold cell equipment					
Silicon Energy		●	2011: Opened module plant in MN (in addition to WA plant)						
Siliken	◆	Closed module plant in CA							
Solar Power Industries				◆	Auctioned cells and module equipment from plant in PA				
Solaria Corp.	No known changes								
Solartec Energia							●	Announced plans to open a module plant in Texas	
Solartech Renewables							◆	Module plant closed	
SolarWorld				◆	Closed module plant in CA			●	Announced expansion of OR cell and module production
Solon Corp.		◆	2011: Closed module plant in AZ						
Suniva		●	Added module assembly at GA plant (expanded cell production, 2010, module production, 2013)				●	Started construction of module plant in MI	
SunPower	●	Opened module plant in CA (with Flextronics)							
Suntech					◆	Closed module plant in AZ			
tenKsolar	No known changes								
Transform Solar			◆	Announced will close ID cell plant					
Twin Creeks Technologies	●	MS cell plant open	◆	Company liquidated					
Wanxiang	No known changes								
	● Production capacity increase								
	◆ Production capacity decrease								

Note: This table includes plants that opened or closed during 2011–October 2014 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 9 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. SolarWorld⁶ 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 2011 to 2013 by *** percent, but was lower in January-June 2014 than in January-June 2013 by *** percent.⁸ Total U.S. production of CSPV cells decreased from 2011 to 2013 by *** percent, but was higher in January-June 2014 than in January-June 2013 by *** percent. Annual capacity utilization rates for CSPV cell production ranged from *** percent in 2011 to *** percent in 2012.

Table III-4

CSPV cells: U.S. producers' production, capacity, and capacity utilization, 2011-2013, January-June 2013, and January-June 2014

* * * * *

U.S. Producers of CSPV Modules

Of the nine responding U.S. producers, seven firms, Kyocera Solar, Motech, SBM Solar, Silicon Energy, Solon, tenKsolar, 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.⁹ 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 investigations, 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; U.S. producer questionnaire response of SolarWorld, question II-2. SolarWorld accounted for the majority of U.S. CSPV cell production, accounting for *** percent of total U.S. capacity to produce cells in 2013 and *** percent of total U.S. production of cells in 2013.

⁷ In 2013, 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 2013, 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 ***. U.S. producer questionnaire responses of SolarWorld and Suniva, response to questions II-7 and II-8.

⁸ ***.

⁹ Kyocera Solar, Motech, and Solon have all ceased production of CSPV modules during the period of investigation.

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 decreased from 2011 to 2013 by 39.0 percent, and was lower in January-June 2014 than in January-June 2013 by 29.1 percent. Total U.S. production of CSPV modules decreased from 2011 to 2013 by 67.7 percent, but was higher in January-June 2014 than in January-June 2013 by 87.8 percent. Annual capacity utilization rates for CSPV module production ranged from 65.8 percent in 2011 to 34.9 percent in 2013.

Table III-6

CSPV modules: U.S. producers' production, capacity, and capacity utilization, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilowatts)				
Capacity	1,028,696	855,642	627,880	303,337	214,975
Production using:					
Internally produced cells	339,267	181,410	159,726	56,996	122,557
Purchased US cells	26,757	2,569	0	0	0
US sourced cells	366,024	183,979	159,726	56,996	122,557
Chinese-sourced cells	89,227	20,580	8,302	3,183	0
Taiwanese-sourced cells	58,580	151,522	39,060	17,492	13,549
Other Foreign-sourced cells ¹	163,195	40,307	11,775	1,932	13,398
Foreign sourced cells	311,002	212,409	59,137	22,607	26,947
Total production	677,026	396,388	218,863	79,603	149,504
	Ratios and shares (percent)				
Capacity utilization	65.8	46.3	34.9	26.2	69.5
Share of production using:					
Internally produced cells	50.1	45.8	73.0	71.6	82.0
Purchased US cells	4.0	0.6	0.0	0.0	0.0
US sourced cells	54.1	46.4	73.0	71.6	82.0
Chinese-sourced cells	13.2	5.2	3.8	4.0	0.0
Taiwanese-sourced cells	8.7	38.2	17.8	22.0	9.1
Other Foreign-sourced cells	24.1	10.2	5.4	2.4	9.0
Foreign sourced cells	45.9	53.6	27.0	28.4	18.0
Total production	100.0	100.0	100.0	100.0	100.0

¹ For 2011 and 2012, a small portion of modules produced with “other foreign-sourced cells” may include modules produced with cells sourced from Taiwan. In its U.S. producer questionnaire response from the prior investigations, *** reported that the source of its cells were ***. Propriety U.S. Customs data was used to estimate what amount of its “other foreign-sourced cells” reported in the prior investigations was of Taiwanese origin. ***, its submission in the prior investigations contains production data through September 2012.

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

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

As detailed in table III-7, the volume of U.S. shipments of CSPV cells decreased by *** percent from 2011 to 2013, but was higher in January-June 2014 than in January-June 2013 by *** percent. The value of U.S. shipments decreased by *** percent from 2011 to 2013, but was higher in January-June 2014 than in January-June 2013 by *** percent. During the period of investigation, the majority of U.S. produced CSPV cells was internally consumed by their producers to manufacture CSPV modules. In 2013, U.S. producers of CSPV cells, SolarWorld and Suniva, reported that *** percent and *** percent, respectively, of their total shipments were internally consumed to produce CSPV modules.¹⁰

As shown in table III-8, the volume of U.S. shipments of CSPV modules decreased by 48.3 percent from 2011 to 2013, but was higher in January-June 2014 than in January-June 2013 by 28.2 percent. The value of U.S. shipments decreased by 74.3 percent from 2011 to 2013 and was higher in January-June 2014 than in January-June 2013 by 15.6 percent.

Table III-7

CSPV cells: U.S. producers' U.S. shipments, exports shipments, and total shipments OF CELLS, 2011-2013, January-June 2013, and January-June 2014

* * * * *

¹⁰ Suniva reported that ***.

Table III-8
CSPV modules: U.S. producers' U.S. shipments, exports shipments, and total shipments OF
MODULES, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilowatts)				
Commercial U.S. shipments	419,416	368,042	236,701	94,653	121,387
Internal consumption	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
Subtotal, U.S. shipments	458,177	393,800	236,701	94,653	121,387
Related export shipments	55,776	53,346	5,894	598	17,431
Unrelated export shipments	41,924	7,846	9,240	4,758	4,273
Total shipments	555,877	454,992	251,835	100,009	143,091
Value (1,000 dollars)					
Commercial U.S. shipments	739,983	403,657	206,961	89,007	102,883
Internal consumption	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
Subtotal, U.S. shipments	804,853	441,271	206,961	89,007	102,883
Related export shipments	104,000	64,238	3,960	438	12,877
Unrelated export shipments	73,111	9,445	8,021	4,384	3,364
Total shipments	981,964	514,954	218,942	93,829	119,124
Unit value (dollars per kilowatts)					
Commercial U.S. shipments	1,764	1,097	874	940	848
Internal consumption	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
Subtotal, U.S. shipments	1,757	1,121	874	940	848
Related export shipments	1,865	1,204	672	732	739
Unrelated export shipments	1,744	1,204	868	921	787
Total shipments	1,767	1,132	869	938	833
Share of quantity (percent)					
Commercial U.S. shipments	75.5	80.9	94.0	94.6	84.8
Internal consumption	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
Subtotal, U.S. shipments	82.4	86.6	94.0	94.6	84.8
Related export shipments	10.0	11.7	2.3	0.6	12.2
Unrelated export shipments	7.5	1.7	3.7	4.8	3.0
Total shipments	100.0	100.0	100.0	100.0	100.0
Share of value (percent)					
Commercial U.S. shipments	75.4	78.4	94.5	94.9	86.4
Internal consumption	***	***	***	***	***
Transfers to related firms	***	***	***	***	***
Subtotal, U.S. shipments	82.0	85.7	94.5	94.9	86.4
Related export shipments	10.6	12.5	1.8	0.5	10.8
Unrelated export shipments	7.4	1.8	3.7	4.7	2.8
Total shipments	100.0	100.0	100.0	100.0	100.0

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

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, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilowatts)				
CSPV cells: Inventories	***	***	***	***	***
Ratio (percent)					
Ratio of inventories to-- U.S. Production	***	***	***	***	***
U.S. shipments	***	***	***	***	***
Total shipments	***	***	***	***	***
Quantity (kilowatts)					
CSPV modules: Inventories	115,953	57,237	22,433	26,932	22,470
Ratio (percent)					
Ratio of inventories to-- U.S. Production	17.1	14.4	10.2	16.9	7.5
U.S. shipments	25.3	14.5	9.5	14.2	9.3
Total shipments	20.9	12.6	8.9	13.5	7.9

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

U.S. PRODUCERS' IMPORTS AND PURCHASES

*** of the reporting U.S. producers of CSPV modules reported U.S. imports or purchases of imports from China or Taiwan.¹¹ These firms include: ***. Tables III-10 to III-17 present

¹¹ Petitioner claimed that three firms should be excluded from the domestic industry as related parties. These firms include: (1) Suntech, (2) Motech, and (3) Wanxiang. 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. Petitions, Vol. 1, pp. 30-32; Petitioner's postconference brief, exh. 1, pp. 73-75; Petitioner's prehearing brief, pp. 8-12. Taiwanese respondents argued that appropriate circumstances do not exist to exclude U.S. modules assemblers that use CSPV cells from Taiwan. Taiwanese respondents' posthearing brief, Answers to Commissioner Questions, p. 11. Chinese respondents take no position on whether any U.S. producer should be excluded from the domestic industry as a related party. Chinese respondents' posthearing brief, exh. 3, p. 12.

Although Suntech ceased U.S. production of modules in March 2013 and did not submit a U.S. producer questionnaire in the preliminary or final phases of these investigations, Suntech did provide a U.S. producer questionnaire in the Commission's prior solar investigations. Therefore, data for Suntech's U.S. production activities for 2011 and 2012 have been compiled in the U.S. industry database.

(continued...)

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, their U.S. production, and ratio of subject U.S. imports to U.S. production. Appendix E, tables III-10 to III-17 present the data as revised for Commerce’s scope as defined in its final determination.

Table III-10

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

* * * * *

Table III-11

CSPV products: * U.S. production, subject imports, ratio to U.S. production, 2011-2013, January-June 2013, and January-June 2014**

* * * * *

Table III-12

CSPV products: * U.S. production, subject imports, ratio to U.S. production, 2011-2013, January-June 2013, and January-June 2014**

* * * * *

Table III-13

CSPV products: * U.S. production, subject imports, ratio to U.S. production, 2011-2013, January-June 2013, and January-June 2014**

* * * * *

(...continued)

In the preliminary phase of these investigations, the Commission did find appropriate circumstances to exclude Suntech from the U.S. industry and stated:

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. 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.

Certain Crystalline Silicon Photovoltaic Products from China and Taiwan, Inv. Nos. 701-TA-511 and 731-TA-1246-127 (Preliminary), USITC Pub. 4454, February 2014, p. 14.

Table III-14

CSPV products: * U.S. production, subject imports, ratio to U.S. production, 2011-2013, January-June 2013, and January-June 2014**

* * * * *

Table III-15

CSPV products: * U.S. production, subject imports, ratio to U.S. production, 2011-2013, January-June 2013, and January-June 2014**

* * * * *

Table III-16

CSPV products: * U.S. production, subject imports, ratio to U.S. production, 2011-2013, January-June 2013, and January-June 2014**

* * * * *

Table III-17

CSPV products: * U.S. production, subject imports, ratio to U.S. production, 2011-2013, January-June 2013, and January-June 2014**

* * * * *

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-18.

Table III-18

CSPV products: Average number of production and related workers, hours worked, wages paid to such employees, hourly wages, productivity, and unit labor costs, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
CSPV cells:					
Production-Related Workers (PRWs) (number)	***	***	***	***	***
Total hours worked (1,000 hours)	***	***	***	***	***
Hours worked per PRW (hours)	***	***	***	***	***
Wages paid (\$1,000)	***	***	***	***	***
Hourly wages (dollars per hour)	***	***	***	***	***
Productivity (kilowatts per hour)	***	***	***	***	***
Unit labor costs (dollars per kilowatts)	***	***	***	***	***
CSPV modules:					
Production-Related Workers (PRWs) (number)	1,869	1,572	768	633	566
Total hours worked (1,000 hours)	4,076	2,585	1,402	622	587
Hours worked per PRW (hours)	2,181	1,644	1,826	983	1,037
Wages paid (\$1,000)	83,169	57,103	34,064	14,900	14,896
Hourly wages (dollars per hour)	\$20.40	\$22.09	\$24.30	\$23.95	\$25.38
Productivity (kilowatts per hour)	0.17	0.15	0.16	0.13	0.25
Unit labor costs (dollars per kilowatts)	\$123	\$144	\$156	\$187	\$100

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

PART IV: U.S. IMPORTS, APPARENT U.S. CONSUMPTION, AND MARKET SHARES

U.S. IMPORTERS

The Commission sent U.S. importers' questionnaires to 166 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 48 firms and appear to account for all U.S. imports of CSPV products from China and Taiwan.²

Table IV-1 lists all responding U.S. importers of CSPV products, their U.S. locations, and their quantities of imports, by source, from January 2011 to June 2014.

Table IV-1
CSPV products: U.S. importers, headquarters, U.S. imports, by source and share of total U.S. imports, January 2011-June 2014

Firm	Headquarters	Share of imports by source of cells (percent)				
		Subject			Nonsubject (including China nonsubject)	
		China Modules	Taiwan Cells	Taiwan Modules	Cells (China and all others)	Modules (China previous and all others)
Adema	Santa Clara, CA	***	***	***	***	***
Alps Technology ¹	Walnut, CA	***	***	***	***	***
Ameresco	Framingham, MA	***	***	***	***	***
Andalay Solar	San Jose, CA	***	***	***	***	***
Astro Solartech	Irwindale, CA	***	***	***	***	***
AUO Green Energy	Milpitas, CA	***	***	***	***	***
BP Solar	Warrenville, IL	***	***	***	***	***
Canadian Solar	San Ramon, CA	***	***	***	***	***
Carmanah	Victoria, BC	***	***	***	***	***
China Sunergy	San Jose, CA	***	***	***	***	***
DMEGC Solar	Torrance, CA	***	***	***	***	***
Ecosolargy	Irvine, CA	***	***	***	***	***

Table continued.

¹ The following firms reported that they did not import CSPV products during the period of investigation: ***.

²Based on a comparison of the total value of 2013 U.S. imports of CSPV cells and modules from China (both subject and nonsubject imports) and Taiwan reported in the responses to the Commission's U.S. importer questionnaire (\$***) with total landed-duty paid value (\$***) of 2013 U.S. imports from China of cells and modules as reported by official Commerce import statistics (HTS 8541.40.6030 and 8541.40.6020). Questionnaire data coverage percentages may be imprecise because the official Commerce statistics may include other products not within the scope of these investigations such as thin film solar products. Also, 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.

ET Solar	Pleasanton, CA	***	***	***	***	***
Grape Solar	Eugene, OR	***	***	***	***	***
Hanwha Q Cells	Irvine, CA	***	***	***	***	***
Hanwha SolarOne	Santa Clara, CA	***	***	***	***	***
HareonSolar	San Jose, CA	***	***	***	***	***
IES Residential	Stafford, TX	***	***	***	***	***
IES (Sonepar)	San Leandro, CA	***	***	***	***	***
JA Solar	San Jose, CA	***	***	***	***	***
Jinko Solar	San Francisco, CA	***	***	***	***	***
Kyocera Solar	Scottsdale, AZ	***	***	***	***	***
Lightway	City Of Industry, CA	***	***	***	***	***
Motech Americas	New Castle, DE	***	***	***	***	***
MS Solar	Purchase, NY	***	***	***	***	***
NextEra	Juno Beach , FL	***	***	***	***	***
ReneSola	San Francisco, CA	***	***	***	***	***
SBM Solar	Concord, NC	***	***	***	***	***
SCHOTT ²	Albuquerque, NM	***	***	***	***	***
Schuco	Newington , CT	***	***	***	***	***
SF Suntech ¹	Palo Alto, CA	***	***	***	***	***
Sharp	Memphis, TN	***	***	***	***	***
Silicon Energy	Marysville, WA	***	***	***	***	***
Silver Ridge (AES Solar)	Arlington, VA	***	***	***	***	***
Solarland	Grayslake, IL	***	***	***	***	***
SolarWorld	Hillsboro, OR	***	***	***	***	***
Solatu	Vista, CA	***	***	***	***	***
Solon	Tucson, AZ	***	***	***	***	***
SUMEC	Santa Fe Springs, CA	***	***	***	***	***
SunEdison	Belmont, CA	***	***	***	***	***
Suniva	Norcross , GA	***	***	***	***	***
Sunperfect	San Jose, CA	***	***	***	***	***
Talesun	San Jose, CA	***	***	***	***	***
tenKsolar	Bloomington, MN	***	***	***	***	***
Trina Solar	San Jose, CA	***	***	***	***	***
Upsolar	San Francisco, CA	***	***	***	***	***
Wanxiang	Rockford, IL	***	***	***	***	***
Yingli	New York, NY	***	***	***	***	***
Total		***	***	***	***	***

¹ *** reported no U.S. imports during the period of investigation, but reported imports arranged for delivery after June 30, 2014.

² ***.

Note: Imports of modules are presented based on the application of the “two out of three” rule. Shares of U.S. imports of modules using Commerce’s scope definition as set forth in its final determinations are presented in Appendix E, table E-10.

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

U.S. IMPORT DATA AS REQUESTED IN THE COMMISSION'S U.S. IMPORTER QUESTIONNAIRE

Preliminary Phase

In the preliminary phase of these investigations, the Commission requested that U.S. importers report their U.S. imports under one of 12 potential product categories depending on the country of origin of the component CSPV cell.³ At the preliminary staff conference, petitioner and respondents were asked which of the 12 categories of U.S. imports they believed should be considered as subject imports and which should be considered as U.S. imports outside the scope of these investigations. The parties generally agreed that, as the scope was then defined, there would be no subject U.S. imports from China unless the imports meet the requirements of petitioner's "two out of three" and "partially manufactured" rules.⁴ Table IV-2 presents the 12 categories of U.S. import data collected in the preliminary phase. The highlighted rows are those that the petitioner designated as potentially consisting of U.S. imports that meet the requirements of its "two out of three" and "partially manufactured" rules. Other than the categories highlighted, both petitioner and respondents generally agreed as to the following designation of the U.S. import categories.⁵

³ In the preliminary phase of these investigations, the Commission requested that U.S. imports be reported divided into the following categories based on country of origin of the component cell: (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, and (12) U.S. imports of modules from all other sources containing third-country origin cells.

⁴ In the preliminary phase of these investigations, 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." These concepts originated in petitioner's January 13, 2014 submission to Commerce, were further discussed at the Commission's preliminary staff conference, and were included in Commerce's notices initiating these investigations. See, *Part I, Scope Issues in the preliminary phase of these CSPV Solar Investigations*.

⁵ In the final phase of these investigations, staff collected U.S. import data that included categories that correspond to petitioner's "two out of three" and "partially manufactured" rules. See table IV-3.

Table IV-2

CSPV products: Petitioner’s and Chinese respondents’ positions in the preliminary phase on which categories of U.S. imports are within scope of these investigations 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	
(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: Commission’s Preliminary Phase U.S. Importer Questionnaire, question II-5; Petitioner’s postconference brief, exh. 1, pp. 1-7; Chinese respondents’ postconference brief, pp. 4-8.		

Final phase

In order to properly calculate subject U.S. imports in the final phase of these investigations based on the scope definition which Commerce announced in its notices of initiation and other possible scope permutations, Commission staff requested that U.S. importers subdivide their U.S. import data into 16 categories. The four additional U.S. import categories were designed to capture those U.S. imports that meet the requirements of petitioner's "two out of three" and "partially manufactured" rules. Thus, these categories are intended to capture (1) subject merchandise, as defined using the country of origin rule Commerce announced in its notices of initiation and preliminary determinations, (2) subject imports that meet petitioner's "two out of three" and "partially manufactured" rules, and (3) nonsubject imports such as CSPV cells and modules covered by the prior CSPV investigations, which are explicitly excluded from the current investigations. In order to apply petitioner's "two out of three" rule, the Commission requested that U.S. importers report not only the country of origin of the cells themselves, but also, the country of origin of cell production inputs (ingots, wafers, and partially manufactured cells). The 16 U.S. import categories are defined in the following manner:

Country of Exportation: China:

- (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 manufactured using *Chinese* ingot, wafer, or partially manufactured cell
- (4) U.S. imports of modules from China containing Taiwanese-origin cells manufactured using *non-Chinese* ingot, wafer, or partially manufactured cell
- (5) U.S. imports of modules from China containing third-country origin cells manufactured using *Chinese* ingot, wafer, or partially manufactured cell
- (6) U.S. imports of modules from China containing third-country origin cells manufactured using *non-Chinese* ingot, wafer, or partially manufactured cell

Country of Exportation: Taiwan:

- (7) U.S. imports of cells from Taiwan
- (8) U.S. imports of modules from Taiwan containing Chinese-origin cells manufactured using *Taiwanese* ingot, wafer, or partially manufactured cell
- (9) U.S. imports of modules from Taiwan containing Chinese-origin cells manufactured using *non-Taiwanese* ingot, wafer, or partially manufactured cell
- (10) U.S. imports of modules from Taiwan containing Taiwanese-origin cells
- (11) U.S. imports of modules from Taiwan containing third-country origin cells manufactured using *Taiwanese* ingot, wafer, or partially manufactured cell
- (12) U.S. imports of modules from Taiwan containing third-country origin cells manufactured using *non-Taiwanese* ingot, wafer, or partially manufactured cell

Country of Exportation: All other countries:

- (13) U.S. imports of cells from all other sources
- (14) U.S. imports of modules from all other sources containing Chinese-origin cells
- (15) U.S. imports of modules from all other sources containing Taiwanese-origin cells
- (16) U.S. imports of modules from all other sources containing third-country origin cells

Table IV-3 presents U.S. import data as collected by the Commission in the 16 categories discussed above. The highlighted rows indicate the categories that fall under the petitioner’s “two out of three” rule.⁶ As shown, from 2012 to 2013, CSPV module producers in China did shift from using cells sourced in China to cells sourced from Taiwan subsequent to the implementation of antidumping and countervailing duty orders as a result of the prior investigations. Moreover, a portion of these cells sourced from Taiwan were manufactured with ingots or wafers from China.⁷ Therefore, CSPV modules assembled in China using these cells meet the petitioner’s “two out of three” rule, and under such rule would be deemed subject U.S. imports from China.

**Table IV-3
CSPV products: U.S. imports by categories requested in the U.S. importer questionnaire, 2011-2013, January-June 2013, and January-June 2014**

* * * * *

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 presented in the body of this report are compiled

⁶ Commerce’s October 3rd proposed scope clarification and the scope definitions in its final determinations eliminated the “two out of three” rule. See Taiwanese respondents’ prehearing brief, exh. 7 (Trade data presented applying the October 3rd scope clarification) and Appendix E (Trade and pricing data presented applying Commerce’s scope definitions announced in its final determinations).

⁷ With regard to “partial manufacturing,” as indicated earlier, only *** which accounted for *** percent of reported CSPV cell production in China, reported that its cell conversion process occurred in ***.

⁸ According to Commerce’s scope determinations in its prior solar 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 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*

(continued...)

using responses to the Commission's U.S. importer questionnaire and the application of petitioner's "two out of three" rule, which was contained in the scope definitions announced by Commerce in its notices of initiation and its preliminary antidumping and countervailing duty determinations.⁹ On December 16, 2014, however, Commerce announced its final determinations and scope definitions. The final scope definitions eliminated the "two out of three" rule and modified slightly the scope of Taiwanese imports. U.S. import data revised to reflect the final scope definition is presented in appendix E, table E-12.

As shown below in table IV-4, subject U.S. imports of CSPV products from China increased by 1,048.9 percent from 2011 to 2013 and were higher by 38.3 percent in January-June 2014 than in January-June 2013.¹⁰ U.S. imports of CSPV products from Taiwan¹¹ increased by 1,239.4 percent from 2011 to 2013 and were higher by 118.8 percent in January-June 2014 than in January-June 2013. The volume of U.S. imports from nonsubject sources (including China nonsubject products) decreased by 68.4 percent from 2011 to 2013, but was higher by 128.2 percent in January-June 2014 than in January-June 2013. The largest sources of U.S. imports of CSPV cells from nonsubject countries in 2013 were: (1) Germany, (2) Malaysia, (3) Japan, (4) Canada, and (5) Lithuania.¹² The largest sources of U.S. imports of CSPV modules

(...continued)

Taverman, Acting Deputy Assistant Secretary for Antidumping and Countervailing Duty Operations, March 19, 2012.

⁹In the preliminary phase of these investigations and the Commission's prior 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 from U.S. importer questionnaire responses reported in "kilowatts."

¹⁰ U.S. imports from China that are subject to the existing antidumping and countervailing duty orders resulting from the Commission's prior investigations in *Crystalline 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. Subject U.S. imports from China presented in the body of this report not covered by the prior orders are exclusively those CSPV modules that meet the petitioner's "two out of three" country of origin rule. See, *Part I, Scope Issues in the preliminary phase of these CSPV Solar Investigations*. There are no known subject U.S. imports CSPV cells from China.

¹¹ Total subject U.S. imports from Taiwan include U.S. imports of CSPV cells and modules. U.S. imports from Taiwan as presented in table IV-4 differ from the amount presented in appendix C, table C-1 because table C-1 presents summary data for the U.S. CSPV module industry and thus does not include U.S. imports of CSPV cells from Taiwan, which are used in the production of CSPV modules in the United States. Table C-1 depicts solely the U.S. CSPV module industry in order to avoid the double counting of imported CSPV cells that are subsequently incorporated into CSPV modules produced in the United States.

U.S. imports of CSPV cells from Taiwan increased by *** percent from 2011 to 2013 and were lower by *** percent in January-June 2014 than in January-June 2013. U.S. imports of CSPV modules from Taiwan increased by 2,644.3 percent from 2011 to 2013 and were higher by 136.1 percent in January-June 2014 than in January-June 2013.

¹² Based on data of the 2013 landed duty paid value of U.S. imports provided by Commerce.

from nonsubject countries in 2013 were: (1) Malaysia, (2) Mexico, (3) Philippines, (4) Singapore, and (5) Korea.¹³

Table IV-4

CSPV products: U.S. imports, by origin and type, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilowatts)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	31,506	81,687	361,976	157,954	218,450
Taiwan	73,405	726,050	2,014,466	769,223	1,815,846
Subtotal, subject sources	104,911	807,737	2,376,442	927,177	2,034,296
China nonsubject	959,684	682,010	65,199	7,261	172,908
All other sources	120,842	162,010	232,320	85,004	83,151
Subtotal, nonsubject sources	1,080,526	844,020	297,519	92,265	256,059
Subtotal, imports of modules all sources	1,185,437	1,651,757	2,673,961	1,019,442	2,290,355
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

Table continued.

¹³ Based on data of the 2013 landed duty paid value of U.S. imports provided by Commerce.

Table IV-4--Continued

CSPV products: U.S. imports, by origin and type, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Value (1,000 dollars)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	60,055	65,882	244,487	109,809	141,518
Taiwan	128,458	626,241	1,381,243	534,849	1,235,214
Subtotal, subject sources	188,513	692,123	1,625,730	644,658	1,376,732
China nonsubject	1,279,489	620,776	40,521	8,329	144,477
All other sources	175,140	172,623	203,843	81,592	67,554
Subtotal, nonsubject sources	1,454,629	793,399	244,364	89,921	212,031
Subtotal, imports of modules all sources	1,643,142	1,485,522	1,870,094	734,579	1,588,763
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

Table continued.

Table IV-4--Continued

CSPV products: U.S. imports, by origin and type, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Unit value (dollars per kilowatts)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	1,906	807	675	695	648
Taiwan	1,750	863	686	695	680
Subtotal, subject sources	1,797	857	684	695	677
China nonsubject	1,333	910	622	1,147	836
All other sources	1,449	1,066	877	960	812
Subtotal, nonsubject sources	1,346	940	821	975	828
Subtotal, imports of modules all sources	1,386	899	699	721	694
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

Table continued.

Table IV-4--Continued

CSPV products: U.S. imports, by origin and type, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Share of quantity of product type subtotals (percent)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	2.7	4.9	13.5	15.5	9.5
Taiwan	6.2	44.0	75.3	75.5	79.3
Subtotal, subject sources	8.9	48.9	88.9	90.9	88.8
China nonsubject	81.0	41.3	2.4	0.7	7.5
All other sources	10.2	9.8	8.7	8.3	3.6
Subtotal, nonsubject sources	91.1	51.1	11.1	9.1	11.2
Subtotal, imports of modules all sources	100.0	100.0	100.0	100.0	100.0
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

Table continued.

Table IV-4--Continued

CSPV products: U.S. imports, by origin and type, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Share of quantity of source subtotals (percent)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of modules all sources	***	***	***	***	***
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

Table continued.

Table IV-4--Continued

CSPV products: U.S. imports, by origin and type, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Share of overall quantity (percent)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of modules all sources	***	***	***	***	***
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

(1) Imports of modules are presented based on the application of the “two out of three” country of origin rule. U.S. import data revised to reflect the final scope definitions are presented in appendix E, table E-12.

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

NEGLIGENCE

The statute requires that an investigation be terminated without an injury determination if imports of the subject merchandise are found to be negligible.¹⁴ 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.¹⁵

Negligibility analysis in the Preliminary phase

In the preliminary phase of these investigations, petitioner, citing U.S. import statistics from Commerce¹⁶ as well as questionnaire data, argued that U.S. imports from China and Taiwan are not negligible. Petitioner claimed that 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.¹⁷

In the preliminary phase of these investigations, respondents argued that according to the scope definition in these investigations, there are no subject U.S. imports from China; and

¹⁴Sections 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)).

¹⁵ Section 771 (24) of the Act (19 U.S.C § 1677(24)).

¹⁶ 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 orders and are explicitly excluded from the scope of these investigations 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.

¹⁷ In petitioner's negligibility computations in the preliminary phase, it was assumed that all or a vast majority of U.S. imports of modules from China after 2011 were manufactured with CSPV cells originating from Taiwan assuming an economic incentive for Chinese module producers to evade antidumping and countervailing duties imposed by the antidumping and countervailing duty orders on their modules with cells of Chinese origin.

therefore, U.S. imports from China are negligible.¹⁸ Petitioner and Chinese respondents generally agreed as to which U.S. import categories are subject and which are nonsubject.¹⁹ 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.²⁰ Chinese respondents argued that the petitioner's rules cannot be administered by U.S. Customs, 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.²¹

In the preliminary phase of these investigations, the Commission did not find U.S. imports from China or Taiwan to be negligible and stated:

{W}e 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 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. 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.²²

Negligibility analysis in the Final phase²³

China

In the final phase of these investigations, the Commission collected U.S. import data in categories that will allow the application of petitioner's "two out of three" and "partially manufactured" rules. 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 highlighted in table IV-5, subject U.S. imports of CSPV modules from China (those modules that

¹⁸ Chinese postconference brief, pp. 4-8.

¹⁹ See table IV-2.

²⁰ Petitioner's postconference brief, exh. 1, pp. 1-7. In the preliminary phase, petitioner conceded that it was unable at that time to quantify what share of Taiwanese or third country cells are made with Chinese ingots or wafers. The record in the preliminary phase did show that ***.

²¹ Chinese postconference brief, pp. 4-8; Chinese respondents' prehearing brief, p. 9.

²² *Certain Crystalline Silicon Photovoltaic Products from China and Taiwan, Inv. Nos. 701-TA-511 and 731-TA-1246-127 (Preliminary)*, USITC Pub. 4454, February 2014, pp. 18-19.

²³ Data relevant to the analysis of negligibility that reflect Commerce's scope definitions as announced in its final determinations are provided in Appendix E, table E-13.

meet the requirements of the “two out of three” rule) accounted for *** percent of total U.S. imports for January-December 2013, which is the most recent 12-month period for which data are available that precedes the filing of the petition.

Taiwan

As shown in table IV-5, U.S. imports of CSPV cells and modules from Taiwan accounted for *** percent of total U.S. imports for January-December 2013.

Table IV-5

CSPV products: U.S. imports, by share, by import category, 2011-2013, January-June 2013, and January-June 2014

* * * * *

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.²⁴ 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.²⁵

Taiwanese respondents argued that U.S. imports of Taiwan and China should not be cumulated with U.S. imports from China for two reasons.²⁶ First, they argued that because the

²⁴ Petitioner’s prehearing brief, pp. 12-17.

²⁵ Official import statistics (2014), Monthly U.S. import statistics and U.S. imports statistics by port of entry provided by Commerce; Petitioner’s postconference brief, exh. 1, pp. 78-83; Petitioner’s prehearing brief, pp. 12-17; Petitioner’s posthearing brief, exh. 1, pp. 9-14.

²⁶ In the preliminary phase of these investigations, Taiwanese respondents presented two additional arguments for not cumulating U.S. imports from Taiwan with those from China that they did not specifically advance in the final phase. These arguments included: (1) 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 an 8-10 percent price premium in the global market, and (2) 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. Taiwanese respondents’ postconference brief, p. 11.

scope definition of U.S. imports from Taiwan as stated by Commerce differs from that of China, the Commission lacks the legal authority to cumulate citing section 771(7)(G)(i) of the Tariff Act of 1930 as statutorily requiring a common scope.²⁷ Second, they argue that producers in Taiwan and China participate in different markets and service different customers. Taiwanese producers, manufacturing primarily CSPV cells, 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.²⁸ Chinese respondents have not raised any issues with regard to cumulation of subject imports.²⁹

In the preliminary phase of these investigations, the Commission cumulated U.S. imports from China and Taiwan, stating:

{W}e 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.³⁰

APPARENT U.S. CONSUMPTION

Data on apparent U.S. consumption of CSPV modules³¹ are presented in table IV-6. Data presented in the body of this report regarding apparent U.S. consumption assume the

²⁷ Taiwanese respondents' prehearing brief, pp. 14-16; Taiwanese respondents' posthearing brief, pp. 3-6. Alternatively, Taiwanese respondents argued that the Commission should decline to exercise its discretion to cumulate U.S. imports from Taiwan and China because of the scope differences. Taiwanese respondents' prehearing brief, pp. 16-23; Taiwanese respondents' posthearing brief, pp. 6-8.

Petitioner argued that subject merchandise from Taiwan and China does share a common scope. It further argued that in the event the Commission finds that the scope definitions differ, it has cumulated U.S. imports of subject countries with differing scopes in prior investigations. Petitioner's posthearing brief, exh. 1, pp. 49-61 (citing *Certain Paintbrushes from China and Indonesia, Inv. No. 731-TAA-857-858 (Preliminary)*, USITC Pub. No. 3237 (September 1999), pp. 9-11 and *Sugar from the European Union; Sugar from Belgium, France, and Germany; and Sugar and Syrups from Canada, Invs. Nos. 104-TAA-7, AA1921-198-200, and 731-TA-3 (Review)*, USITC Publication 3238 (September 1999), pp. 14-15.

²⁸ Taiwanese respondents' postconference brief, pp. 9-12; Taiwanese respondents'

²⁹ Chinese respondents' postconference brief, exh. 1, p. 20-21; Chinese respondents' posthearing brief, exh. 3, p. 1.

³⁰ *Certain Crystalline Silicon Photovoltaic Products from China and Taiwan, Inv. Nos. 701-TA-511 and 731-TA-1246-127 (Preliminary)*, USITC Pub. 4454, February 2014, p. 21.

³¹ Throughout the main body of this report and in appendix C, table C-1, apparent U.S. consumption and U.S. market shares are measured using the data compiled for CSPV modules. The use of solely CSPV
(continued...)

application of petitioner's "two out of three" rule, which was contained in the scope definition announced by Commerce in its notices of initiation and in its preliminary antidumping and countervailing duty determinations. On December 16, 2014, however, Commerce announced its final determinations and scope definitions. The final scope definitions eliminated the "two out of three" rule and modified slightly the scope of Taiwanese imports from the scope definitions that Commerce proposed in its October 3rd memorandum. Data showing apparent U.S. consumption revised to reflect the final scope definition are presented in appendix E, table E-14.

In table IV-6 below, from 2011 to 2013, the quantity of apparent U.S. consumption of CSPV modules increased by 77.1 percent and was higher by 116.5 percent in January-June 2014 than in January-June 2013. From 2011 to 2013, the value of apparent U.S. consumption decreased by 15.2 percent, but was higher by 105.9 percent in January-June 2014 than in January-June 2013.

(...continued)

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 2013, SolarWorld reported that *** percent of its total shipments were commercial sales of CSPV cells while Suniva reported that *** percent of its total shipments of CSPV cells were commercial sales. 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 if 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, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilowatts)				
U.S. producers' U.S. shipments of CSPV modules	458,177	393,800	236,701	94,653	121,387
U.S. imports of CSPV modules from.-- China subject	31,506	81,687	361,976	157,954	218,450
Taiwan	73,405	726,050	2,014,466	769,223	1,815,846
Subtotal, subject imports	104,911	807,737	2,376,442	927,177	2,034,296
China nonsubject	959,684	682,010	65,199	7,261	172,908
All other sources	120,842	162,010	232,320	85,004	83,151
Subtotal, nonsubject imports	1,080,526	844,020	297,519	92,265	256,059
Total imports	1,185,437	1,651,757	2,673,961	1,019,442	2,290,355
Apparent U.S. consumption	1,643,614	2,045,557	2,910,662	1,114,095	2,411,742
	Value (1,000 dollars)				
U.S. producers' U.S. shipments of CSPV modules	804,853	441,271	206,961	89,007	102,883
U.S. imports of CSPV modules from.-- China subject	60,055	65,882	244,487	109,809	141,518
Taiwan	128,458	626,241	1,381,243	534,849	1,235,214
Subtotal, subject imports	188,513	692,123	1,625,730	644,658	1,376,732
China nonsubject	1,279,489	620,776	40,521	8,329	144,477
All other sources	175,140	172,623	203,843	81,592	67,554
Subtotal, nonsubject imports	1,454,629	793,399	244,364	89,921	212,031
Total imports	1,643,142	1,485,522	1,870,094	734,579	1,588,763
Apparent U.S. consumption	2,447,995	1,926,793	2,077,055	823,586	1,691,646

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

U.S. MARKET SHARES

Data on U.S. market shares for CSPV modules are presented in table IV-7. Data presented in the body of this report regarding U.S. market shares assume the application of petitioner's "two out of three" rule, which was contained in the scope definition announced by Commerce in its notices of initiation and in its preliminary antidumping and countervailing duty determinations. On December 16, 2014, however, Commerce announced its final determinations and scope definitions. The final scope definitions eliminated the "two out of three" rule and modified slightly the scope of Taiwanese imports from the scope definitions that Commerce proposed in its October 3rd memorandum. Data showing U.S. market shares revised to reflect the final scope definition are presented in appendix E, table E-15.

In table IV-7 below, from 2011 to 2013, U.S. producers' market share decreased by 19.7 percentage points based on volume and by 22.9 percentage points based on value. U.S. producers' market share based on volume was lower by 3.5 percentage points in January-June 2014 than in January-June 2013 and lower by 4.7 percentage points based on value. From 2011 to 2013, subject U.S. imports from China increased their market share based on volume by 10.5 percentage points and by 9.3 percentage points based on value. U.S. market share of subject U.S. imports from China based on volume was lower by 5.1 percentage points in January-June

2014 than in January-June 2013 and lower by 4.7 percentage points based on value. U.S. imports from Taiwan increased their U.S. market share by 64.7 percentage points from 2011 to 2013 based on volume and 61.3 percentage points based on value. U.S. market share of U.S. imports from Taiwan based on volume was higher by 6.2 percentage points in January-June 2014 than in January-June 2013 and higher by 8.1 percentage points based on value. The U.S. market share of U.S. imports from nonsubject sources (including China nonsubject products) decreased by 55.5 percentage points from 2011 to 2013 based on volume and 47.7 percentage points based on value. U.S. market share of U.S. imports from nonsubject sources based on volume was higher by 2.3 percentage points in January-June 2014 than in January-June 2013 and higher by 1.6 percentage points based on value.

Table IV-7

CSPV modules: U.S. consumption and market shares, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilowatts)				
Apparent U.S. consumption	1,643,614	2,045,557	2,910,662	1,114,095	2,411,742
Market share by quantity (percent)					
U.S. producers' U.S. shipments of CSPV modules	27.9	19.3	8.1	8.5	5.0
U.S. imports of CSPV modules from.--					
China subject	1.9	4.0	12.4	14.2	9.1
Taiwan	4.5	35.5	69.2	69.0	75.3
Subtotal, subject imports	6.4	39.5	81.6	83.2	84.3
China nonsubject	58.4	33.3	2.2	0.7	7.2
All other sources	7.4	7.9	8.0	7.6	3.4
Subtotal, nonsubject imports	65.7	41.3	10.2	8.3	10.6
Total imports	72.1	80.7	91.9	91.5	95.0
Value (1,000 dollars)					
Apparent U.S. consumption	2,447,995	1,926,793	2,077,055	823,586	1,691,646
Market share by quantity (percent)					
U.S. producers' U.S. shipments of CSPV modules	32.9	22.9	10.0	10.8	6.1
U.S. imports of CSPV modules from.--					
China subject	2.5	3.4	11.8	13.3	8.4
Taiwan	5.2	32.5	66.5	64.9	73.0
Subtotal, subject imports	7.7	35.9	78.3	78.3	81.4
China nonsubject	52.3	32.2	2.0	1.0	8.5
All other sources	7.2	9.0	9.8	9.9	4.0
Subtotal, nonsubject imports	59.4	41.2	11.8	10.9	12.5
Total imports	67.1	77.1	90.0	89.2	93.9

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

RATIO OF IMPORTS TO U.S. PRODUCTION

Table IV-8 presents data on the ratio of U.S. imports to U.S. production. Data presented in the body of this report regarding ratios of U.S. imports to U.S. production assume the application of petitioner's "two out of three" rule, which was contained in the scope definition announced by Commerce in its notices of initiation and in its preliminary antidumping and countervailing duty determinations. On December 16, 2014, however, Commerce announced its final determinations and scope definitions. The final scope definitions eliminated the "two out of three" rule and modified slightly the scope of Taiwanese imports from the scope definitions that Commerce proposed in its October 3rd memorandum. Data showing ratios of U.S. imports to U.S. production revised to reflect the final scope definition are presented in appendix E, table E-16.

Table IV-8
CSPV products: Ratio of U.S. imports to U.S. production, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilowatts)				
U.S. production of cells	***	***	***	***	***
	Ratio to U.S. production (percent)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject imports	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject imports	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
	Value (1,000 dollars)				
U.S. production of modules	677,026	396,388	218,863	79,603	149,504
	Ratio to U.S. production (percent)				
U.S. imports of CSPV modules from.-- China subject	4.7	20.6	165.4	198.4	146.1
Taiwan	10.8	183.2	920.4	966.3	1,214.6
Subtotal, subject imports	15.5	203.8	1,085.8	1,164.8	1,360.7
China nonsubject	141.7	172.1	29.8	9.1	115.7
All other sources	17.8	40.9	106.1	106.8	55.6
Subtotal, nonsubject imports	159.6	212.9	135.9	115.9	171.3
Subtotal, imports of modules all sources	175.1	416.7	1,221.8	1,280.7	1,532.0

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

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 2013, down from *** percent in 2011. Raw material costs for the production of CSPV cells accounted for *** percent of U.S. producers' total cost of goods sold during 2013, down from *** percent in 2011. 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 cells cost of goods sold in 2013, down from *** percent in 2011 (see Part VI for additional information on raw material costs).

Polysilicon is a globally-traded commodity that serves both the solar industry and the semiconductor industry as their base material.^{1 2} As the global CSPV industry has expanded, relative global demand for polysilicon has shifted from semiconductors to CSPV cells.^{3 4} According to industry reports, due to overcapacity, the price of polysilicon ingots and wafers fell 74.8 percent and 76.7 percent, respectively, from the first quarter of 2011 to the first quarter of 2013. Prices began to rebound and the price of polysilicon ingots and wafers increased 26.7 percent and 9.5 percent, respectively, from the first quarter of 2013 to the second quarter of 2014. (figure V-1).

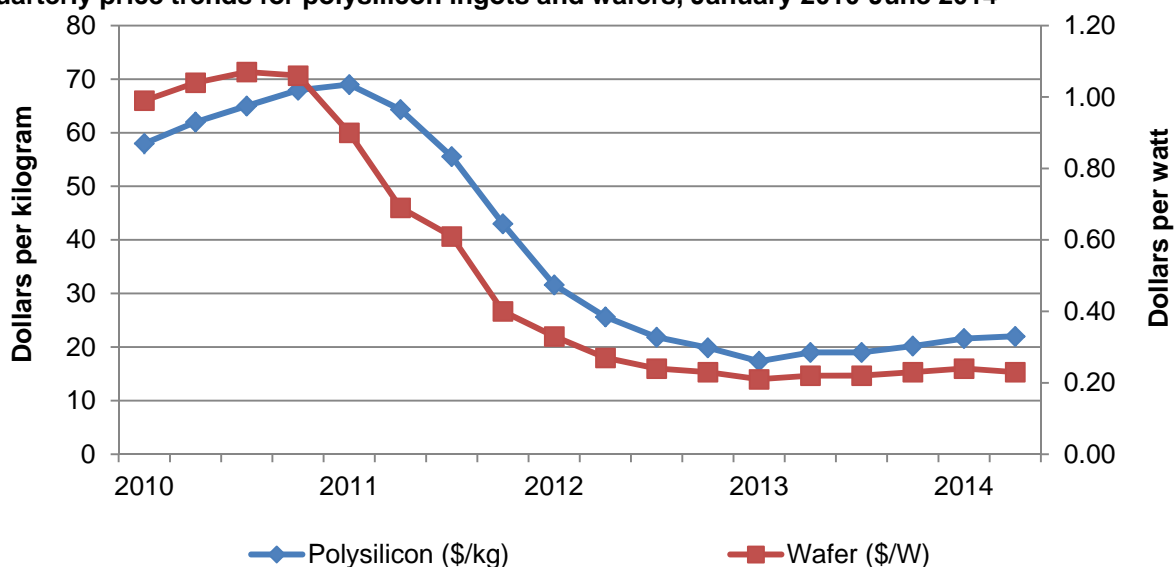
¹ Conference transcript, p. 63 (Brisner).

² According to industry reports, globally, China accounts for 35 percent of 2013 production of polysilicon, followed by the United States (24 percent), Germany (23 percent), and South Korea (12 percent), with producers in other regions (primarily Japan) making up the remaining 6 percent. GTM Research, "Polysilicon 2015-2018: Supply, Demand, Cost and Pricing," October 14, 2014.

³ Prior to 2000, 90 percent of polysilicon was used for semiconductor wafers. By 2006, the PV industry consumed approximately 50 percent of polysilicon produced. However, with the explosive growth in the PV industry, it is estimated that the PV industry accounted for 90 percent of the global polysilicon consumption in 2014. GTM Research Study for SEIA, "U.S. Solar Energy Trade Assessment 2011," p. 19; and GTM Research, "Polysilicon 2015-2018: Supply, Demand, Cost and Pricing," October 14, 2014.

⁴ The expansion of the CSPV industry contributed to a substantial polysilicon supply shortage which resulted in rising prices of polysilicon from 2003 to 2008. During the supply shortage in 2006-2008, 90 percent of the market was governed by long-term fixed supply agreements ranging from 5 to 10 years. As new polysilicon capacity came online beginning in 2008, global supply exceeded global demand and polysilicon spot and contract prices fell substantially. *Crystalline Silicon Photovoltaic Cells and Modules from China, Inv. Nos. 701-TA-481 and 731-TA-1190 (Final)*, USITC Publication 4360, November 2012, pp. V-1 to V-3.

Figure V-1
Quarterly price trends for polysilicon ingots and wafers, January 2010-June 2014



Source: GTM Research Study for SEIA, "U.S. Solar Market Insight Report," 2010-2014.

According to petitioner, non-polysilicon inputs account for more than *** percent of a module's raw material costs. The major inputs include glass, aluminum, and silver, all of which are globally traded commodities.⁵ SolarWorld reported that ***.⁶

The majority of firms (7 of 10 responding U.S. producers and 30 of 41 responding importers) reported that prices of raw materials for CSPV products have declined since 2011. Most firms indicated that the price of CSPV cells, the primary input in modules, have declined over the period. Several firms stated that the price for polysilicon has dropped significantly since 2011 and this has caused an overall decrease in the price of CSPV products. *** reported the prices for raw material inputs such as silver paste, glass, and aluminum have decreased during the period. *** reported a gradual decline in the price of backsheet and ethylene vinyl acetate used in modules.

U.S. inland transportation costs

Eight of ten responding U.S. producers and 32 of 40 importers reported that they typically arrange transportation to their customers. Most importers (32 of 41) reported that they shipped from their own storage facility. U.S. producers reported that their U.S. inland transportation costs ranged between 2 to 3 percent while importers reported U.S. inland transportation costs averaging between 2 to 10 percent.

⁵ Petitioner's posthearing brief, exhibit 1, p. 46.

⁶ According to petitioner, "****" Petitioner's posthearing brief, exhibit 1, pp. 47-48.

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 firms¹

Method	U.S. producers	Importers
Transaction-by-transaction	8	32
Contract	5	20
Set price list	4	9
Other	2	2

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 the majority of their sales were sold through short-term contracts with the remaining sales split between spot sales and long-term contract. As shown in table V-2, U.S. producers and importers reported their 2013 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, 2013

Type of sale	Share of commercial U.S. shipments (percent)		
	U.S. producers	U.S. importers	
		China	Taiwan
Long-term contracts	4.1	18.7	17.8
Short-term contracts	13.9	62.6	54.0
Spot sales	82.0	18.6	28.2

Note.--Because of rounding, figures may not add to 100 percent.

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

Five of 9 responding U.S. producers and 20 of 41 responding importers reported using short-term contracts. Two U.S. producers reported that the duration of their short-term contracts averaged one year and two reported that their short-term contracts averaged 3 months. Of the five responding U.S. producers reporting use of short-term contracts, four indicated that price could be renegotiated during the contract period; four indicated that

contracts fixed both price and quantity and one indicated that the contract fixed price only; and three reported that the contracts did not include a meet-or-release clause. Seven importers reported that the duration of their short-term contracts averaged 30 to 60 days, four reported an average duration of 90 to 120 days, and six reported an average duration of one year. Of the 20 responding importers reporting use of short-term contracts, 13 indicated that prices could not be renegotiated during the contract period; 14 indicated that contracts fixed both price and quantity; and 14 indicated that contracts did not include a meet-or-release clause.

One of 8 responding U.S. producers reported using long-term contracts, which accounted for 95 percent of its 2013 sales. It reported that its average long-term contract duration was 390 days. It indicated that price could not be renegotiated during the contract period, that it fixed both price and quantity, and did not include a meet-or-release clause. Five of 41 responding importers reported using long-term contracts. Two importers reported that the duration of their long-term contracts averaged just over one year and two reported an average duration of 540 days. Of the five responding importers reporting use of long-term contracts, four indicated that prices could be renegotiated during the contract period; 4 indicated that contracts fixed both price and quantity; and 4 indicated that contracts did not include a meet-or-release clause.

Sales terms and discounts

The majority of U.S. producers (9 of 10) typically quote prices on an f.o.b. basis, whereas responding importers were split with 20 importers selling on an f.o.b. basis and 20 selling on a delivered basis. Most U.S. producers (6 of 10) and most importers (22 of 39) do not offer any type of discount. However, four U.S. producers and 25 importers reported offering favorable pricing for higher volume distributors and integrators and annual volume discounts. Three of 10 responding U.S. producers and 15 of 39 importers reported offering quantity-based discounts,⁷ 1 producer and 7 importers reported offering volume discounts, and two importers reported offering discounts for early payments. The typical sales 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.^{8 9}

⁷ *** "***" ***.

⁸*** 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.

⁹ Five importers reported that they require cash and/or 100 percent prepayment.

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 2011-June 2014.

Product 1.—60 cell Multicrystalline silicon module, with peak power wattage between 240w to 250w, inclusive, P-max or Wp

Product 2.—60 cell Monocrystalline silicon module, with peak power wattage between 240w to 250w, inclusive, P-max or Wp

Product 3.—60 cell Multicrystalline silicon module, with peak power wattage between 255w to 265w, inclusive, P-max or Wp

Product 4.—60 cell Monocrystalline silicon module, with peak power wattage between 255w to 265w, inclusive, P-max or Wp

Product 5.—60 cell Multicrystalline silicon module, with peak power wattage between 270w to 280w, inclusive, P-max or Wp

Product 6.—60 cell Monocrystalline silicon module, with peak power wattage between 270w to 280w, inclusive, P-max or Wp

Product 7.—72 cell Multicrystalline silicon module, with peak power wattage between 300w to 315w, inclusive, P-max or Wp

Product 8.—72 cell Monocrystalline silicon module, with peak power wattage between 300w to 315w, inclusive, P-max or Wp

Four U.S. producers and 27 importers provided usable pricing data for sales of the requested products, although not all firms reported pricing for all products for all quarters.^{10 11}

¹⁰ U.S. producer *** provided pricing data for product 1; however, its data were not included due to very high unit values that would have substantially affected price trends. It reported that ***.

¹¹ Importer *** reported that it was unable to definitely determine the origin of the wafers and ingots in Taiwanese cells that were then assembled into modules in China. Therefore, *** has assumed that half of the modules assembled in China with cells manufactured in Taiwan had wafers/ingots of Taiwan-origin and the other half of modules had ingots of Chinese-origin. Its pricing data for products 1,3, 5, and 7 are split evenly between China and Taiwan.

¹² Pricing data reported by these firms accounted for approximately 87.5 percent of U.S. producers' shipments of product, 97.0 percent of imports from China, and 74.5 percent of imports from Taiwan in 2013.

By total volume, products 1 and 7 accounted for the largest share of reported price data (34.3 and 35.9 percent, respectively). The majority of U.S. producers' price data was for sales of monocrystalline modules with products 2, 4, and 6 accounting for 77.5 percent of domestic sale volumes. Importers reported price data primarily for sales of multicrystalline modules, with products 1, 5, and 7 representing the vast majority of importers' price data sales, by volume.

Price data for products 1-8 are presented in tables V-3 to V-10 and figures V-2 to V-9. Price trend summary data are presented in table V-11.¹³ Nonsubject price data from China (covered by prior orders) and Malaysia are presented in appendix D.

¹² Three U.S. producers and ten importers provided price data for products outside the price definitions. U.S. producer and importer *** provided price data for 45 cell multicrystalline modules with a peak power wattage of 190 watts. Two U.S. producers and one importer provided price data for 60 cell multicrystalline modules with a peak power wattage between 220 to 240 watts. One importer provided price data for 60 cell multicrystalline modules with a peak power wattage between 185 to 190 watts. One producer and 8 importers reported price data for 72 cell multicrystalline modules with a peak power wattage of between 280 to 295 watts. These data were not included in the price data analysis.

*** provided pricing data for two products that fell partially outside the price definitions with nonstandard cell counts. ***. It stated that although its products *** do not exactly meet the product specifications, its modules are price competitive with the industry standard. *** reported that the cell count does not make a difference in price and that its 80 cell modules compete with the 72 cell modules on commercial projects. ***. *** producer questionnaire response, section IV-2 and importer questionnaire response, section III-2c.

In their prehearing brief, Taiwan respondents argued that *** price data for product 7 submitted in its U.S. producer questionnaire response should be excluded from the price data. It contends that the differences in cell counts can have a significant impact on pricing of the product and results in distorted comparisons between firms. Taiwan respondents did not argue to exclude *** imported pricing data submitted in its importer questionnaire response for *** which also had nonstandard cell counts. Taiwan respondents' prehearing brief, p. 39. In their posthearing brief, Taiwan respondents did not advance the argument and used *** domestic pricing data in its price analysis. Taiwan respondent's posthearing brief, exhibit 1 and 2. Staff has included *** data in the price data.

¹³ The importer price data in this section were compiled using the scope definitions announced by Commerce in its notices of initiation and in its preliminary countervailing and antidumping duty determinations. Tables V-3 to V-10 and V-12 and figures V-2 to V-9 have been modified to reflect the scope definitions in Commerce's final determinations and are presented in appendix E, tables E-17 to E-25 and figures E-1 to E-8.

***.

Table V-3

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 1¹ and margins of underselling/(overselling), by quarters, January 2011-June 2014

* * * * *

Table V-4

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 2¹ and margins of underselling/(overselling), by quarters, January 2011-June 2014

* * * * *

Table V-5

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 3¹ and margins of underselling/(overselling), by quarters, January 2011-June 2014

* * * * *

Table V-6

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 4¹ and margins of underselling/(overselling), by quarters, January 2011-June 2014

* * * * *

Table V-7

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 5¹ and margins of underselling/(overselling), by quarters, January 2011-June 2014

* * * * *

Table V-8

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 6¹ and margins of underselling/(overselling), by quarters, January 2011-June 2014

* * * * *

Table V-9

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 7¹ and margins of underselling/(overselling), by quarters, January 2011-June 2014

* * * * *

Table V-10

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 8¹ and margins of underselling/(overselling), by quarters, January 2011-June 2014

* * * * *

Figure V-2

CSPV products: Weighted-average prices and quantities of domestic and imported product 1, by quarters, January 2011-June 2014

* * * * *

Figure V-3

CSPV products: Weighted-average prices and quantities of domestic and imported product 2, by quarters, January 2011-June 2014

* * * * *

Figure V-4

CSPV products: Weighted-average prices and quantities of domestic and imported product 3, by quarters, January 2011-June 2014

* * * * *

Figure V-5

CSPV products: Weighted-average prices and quantities of domestic and imported product 4, by quarters, January 2011-June 2014

* * * * *

Figure V-6

CSPV products: Weighted-average prices and quantities of domestic and imported product 5, by quarters, January 2011-June 2014

* * * * *

Figure V-7

CSPV products: Weighted-average prices and quantities of domestic and imported product 6, by quarters, January 2011-June 2014

* * * * *

Figure V-8

CSPV products: Weighted-average prices and quantities of domestic and imported product 7, by quarters, January 2011-June 2014

* * * * *

Figure V-9

CSPV products: Weighted-average prices and quantities of domestic and imported product 8, by quarters, January 2011-June 2014

* * * * *

Price trends

Prices steadily decreased during January 2011-June 2014.¹⁴ These large price decreases occurred in all eight price products. Table V-11 summarizes the price trends, by country and by product. As shown in the table, domestic price decreases ranged from *** percent to *** percent during January 2011-June 2014 while import price decreases ranged from *** percent to *** percent.¹⁵

Table V-11

CSPV products: Summary of weighted-average f.o.b. prices for products 1-8 from the United States, China, and Taiwan

* * * * *

Price comparisons

As shown in table V-12, prices for CSPV products imported from China were below those for U.S.-produced product in *** instances; margins of underselling ranged from *** percent.¹⁶ In the remaining *** instances, prices for CSPV products from China were between *** percent above prices for the domestic product. Prices for CSPV products imported from Taiwan were below those for U.S.-produced product in *** instances; margins of underselling ranged from *** percent.¹⁷ In the remaining *** instances, prices for CSPV products from Taiwan were between *** percent above prices for the domestic product.

Table V-12

CSPV products: Instances of underselling/overselling and the range and average of margins, by product, January 2011-June 2014

* * * * *

¹⁴ Chinese respondents argue that the declining prices of CSPV modules are caused by declining raw material costs, technology improvements, and declining government incentives. Chinese respondents' prehearing brief, pp. 22-24 and posthearing brief, exhibit 1: Responses to questions from Broadbent, pp. 3-8.

¹⁵ The only price increase occurred for product 7 from China, which increased *** percent.

¹⁶ Chinese respondents argue that the price comparisons are not meaningful due to the differences in product concentration (monocrystalline versus multicrystalline) between domestic product and subject imports which resulted in a number of quarters with no sales or small sale volumes. Chinese respondents' prehearing brief, pp. 44-46 and posthearing brief, pp. 5-6.

¹⁷ Taiwan respondents argue that the instances of underselling should be discounted due to attenuated competition, nonsubject imports and improper price comparisons. Taiwan respondents' prehearing brief, pp. 36-39.

When comparing monocrystalline modules with multicrystalline modules, petitioner argues that “there is no significant cost or price differential inherent in the production or sale of monocrystalline versus multicrystalline products.”¹⁸ It argues that to the extent that monocrystalline modules cost slightly more to produce, because monocrystalline and multicrystalline modules compete head-to-head in the U.S. market on the basis of price, U.S. producers generally cannot pass on those costs to its purchasers.¹⁹ Therefore, pricing for monocrystalline products affect the pricing for multicrystalline products, and vice versa.²⁰ However, Chinese respondents argue that monocrystalline cells cost at least 20 percent more than multicrystalline cells and generally are sold at a 10 percent premium over multicrystalline because they offer higher wattages and cost more to produce. Taiwan producer Neo Solar reported that its average price of a monocrystalline module is 20 to 30 percent higher than its average price for a multicrystalline module.²¹ Nevertheless, both petitioner and Chinese respondents agree that the price premium for monocrystalline modules is only obtained when the module outputs more power than the available multicrystalline module. A monocrystalline module at the same wattage as a multicrystalline modules will be priced similarly.²²

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 or Taiwan. During the preliminary phase of these investigations, three of five responding U.S. producers reported reducing prices and rolling back announced price increases to avoid losing sales to competitors selling CSPV products from China and/or Taiwan. Two U.S. producers (***) reported that they did not reduce their prices or roll back price increases to avoid losing sales. During the final phase of these investigations, U.S. producers reported an additional 16 lost sales allegations and 1 lost revenue allegation.

The total value of the 26 lost sales allegations for CSPV products was \$*** and involved *** watts. The total value of the lost revenue allegation for CSPV products was \$*** and involved *** watts. Staff attempted to contact all of these purchasers and a summary of the information obtained follows (table V-13 and V-14).²³ Staff received responses for 6 lost sales allegations totaling \$*** and involving ***.

¹⁸ ***. Petitioner’s posthearing brief, exhibit 1, p. 17.

¹⁹ Petitioner’s posthearing brief, exhibit 1, pp. 19-21.

²⁰ Petitioner’s posthearing brief, p. 10.

²¹ Hearing transcript, p. 201 (Chiu).

²² Hearing transcript, pp. 101-102 (Dulani and Johnson). Chinese respondents’ posthearing brief, p. 13, and exhibit 1, pp. 8-9.

²³ Two additional lost sale allegations provided in the final phase of these investigations, which totaled *** and involved approximately *** watts of CSPV products, were received without a contact name, valid emails or fax numbers from the questionnaire respondent. Staff made repeated attempts to

(continued...)

Table V-13
CSPV products: U.S. producers' lost sales allegations

* * * * *

Table V-14
CSPV products: U.S. producers' lost revenues allegations

* * * * *

(...continued)

contact the producer who provided these allegations to obtain valid emails and/or fax numbers. These allegations are not reported here.

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 two primary categories: cell operations (commercial sales and transfers) and module operations.¹

The financial results on U.S. cell operations reflect Suniva and SolarWorld.² With regard to U.S. module operations, the financial results reflect eight U.S. producers that submitted U.S. producer questionnaire responses in the final-phase of these investigations, as well as the financial results of nine U.S. producers that submitted usable U.S. producer questionnaire responses in the preliminary-phase of these investigations or in the Commission's previous CSPV products investigations.³ On December 11-12, 2014, staff conducted an on-site verification of SolarWorld's U.S. producer questionnaire. Changes pursuant to verification are incorporated into this report.

As described in Part III of this report, a number of U.S. producers effectively began their CSPV 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 its U.S. cell and module operations, the majority of SolarWorld's shareholders formally approved a company-wide financial restructuring plan in August 2013, subsequently court approved in mid-January 2014, and completed on February 24, 2014.⁴ As noted in the *Cost of goods sold* section 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.

¹ The majority of U.S. producers reported their annual financial results based on calendar-year periods. *** (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). *** (reporting their financial results on the basis of International Financial Reporting Standards (IFRS)) were the exceptions.

² ***. USITC auditor preliminary-phase notes.

³ *** submitted usable U.S. producer questionnaire responses in the final-phase of the current CSPV solar products investigations. ***. USITC auditor final-phase notes.

With respect to financial results based on the Commission's previous CSPV products investigations specifically, the relevant overlapping period represents full year 2011 and first half 2012. Accordingly, for items in table VI-3 such as sales volume and value, period-to-period changes in absolute amounts between full-year 2011 and 2012 are likely overstated; i.e., due to the absence of complete financial information for U.S. producers who continued to have operations during those periods.

⁴ Conference transcript, pp.89-90 (Brinsler). Petitioner's postconference brief, Exhibit 1, p. 62. SolarWorld 2013 Annual Report, p. 40. ***. Petitioner's postconference brief, Exhibit 1, p. 62. ***. October 29, 2014 e-mail with attachment from Wiley Rein, counsel to SolarWorld, to USITC auditor.

OPERATIONS ON CSPV CELLS AND MODULES

Table VI-1 and table VI-2, respectively, present income-and-loss data for cell operations (commercial sales and transfers) and a corresponding variance analysis.⁵ Income-and-loss data for module operations are presented in table VI-3.⁶

Revenue

As described in Part III of this report, the majority of U.S. cell production is consumed by SolarWorld and Suniva in their own downstream module operations. With regard to commercial sales and transfers of cells (i.e., the activity presented in table VI-1 is limited to these categories), total sales volume fluctuated during the full-year period, reaching its highest absolute level in 2013, and then was lower in interim 2014 compared to interim 2013.⁷ For both SolarWorld and Suniva, cell *** generally represented the majority of cell revenue with SolarWorld's ***.

For the reasons described in footnote 3 on page VI-1, the pattern of module sales volume is somewhat more difficult to interpret. As shown in table VI-3, overall module sales volume was at its highest level in 2011, declined throughout the full-year period, and was somewhat higher in interim 2014 compared to interim 2013.

For cell and module operations, average sales value declined throughout the full-year period (see table VI-1 and table VI-3) with notably large declines between 2011 and 2012: (***) percent lower for cells and (***) percent lower for modules). Between 2012 and 2013, however, the rate of decline for module average sales value (***) percent) was somewhat less than the decline for cell average sales value (***) percent). Directionally, the two categories diverged at the end of the period with cell average sales value *** percent higher in interim 2014 compared to interim 2013, while module average sales value was *** percent lower.

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.

⁶ While financial ratios and average unit values can provide a useful indication of the financial condition of U.S. module operations, a variance analysis specific to module financial results 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 (see footnote 3).

⁷ ***. October 29, 2014 e-mail with attachment from Wiley Rein, counsel to SolarWorld, to USITC auditor. ***. Ibid.

Table VI-1
CSPV Cells (commercial sales and transfers): Results of operations of U.S. firms, 2011-13, January-June 2013, and January-June 2014

* * * * *

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

Table VI-2
CSPV Cells (commercial sales and transfers): Variance analysis of U.S. firms' operations, 2011-13, January-June 2013, and January-June 2014

* * * * *

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

Table VI-3
CSPV Modules: Results of operations of U.S. firms, 2011-13, January-June 2013, and January-June 2014

* * * * *

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

As compared to previous percentage declines, the lower percentage decline for average module sales value at the end of the period is generally consistent with a SolarWorld company official's statement at the staff conference that, after duties were imposed pursuant to the previous CSPV products investigations, the "pricing collapse" slowed somewhat.⁸

Declines in average cell and module sales values correspond directionally with period-to-period declines in average raw material costs (see *Cost of goods sold* section). Nonetheless and for both cells and modules, raw material costs as a ratio to sales value remained at high levels throughout the period. As shown in table VI-1 and table VI-3, raw material cost as a ratio to sales value was at its highest level for cell and module operations in 2012 (**% percent and (**% percent, respectively).

Cost of goods sold

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

⁸ Conference transcript, pp. 73-74 (Brinser). With regard to its operations in the United States, SolarWorld's 2013 Annual Report stated that ". . . the market is still fiercely competitive and the price level extremely low. Despite this, in 2013 we observed a decline in the price gap between ourselves as a quality provider, and competitors." SolarWorld 2013 Annual Report, p. 50.

primary manufacturing costs (i.e., raw material costs, direct labor, and other factory costs), COGS also includes the recognition of items such as inventory valuation adjustments (raw material and finished goods), ***, severance and shut-down costs, and to a lesser extent fixed asset impairments.⁹

For both cell and module operations, raw material accounted for the largest share of COGS throughout the period and was at its highest full-year level for both cell and module operations in 2011 (**% percent and **% percent of COGS, respectively).

While the share of total COGS accounted for by raw material cost did not change substantially for 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.¹⁰ With regard to module operations, supplemental information provided by U.S. producers indicates that the largest single component of module raw material costs was internally-produced cells, ranging from a low of **% percent in 2013 to a high of **% percent in interim 2012. In general, this is consistent with the large share of U.S. module activity accounted for by integrated producers SolarWorld and Suniva.¹¹

As the above also indicates, module raw material costs presented in table VI-3 were not homogenous from period-to-period, but instead reflect 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

⁹ 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.

¹⁰ **. USITC auditor preliminary-phase notes. With regard to the reduced share of polysilicon-related costs to total costs, and as noted in a previous section of this report, polysilicon ingot and wafer prices generally declined during 2011 through the end of 2012 and then remained at about the same level through the rest of the period. **.

¹¹ U.S. auditor final-phase notes. The supplemental information referenced here should be considered an estimate of the relative shares of internally produced cells.

¹² As noted previously, SolarWorld suspended its own ingot and wafer production in 2013 which further illustrates the changing nature of underlying raw material costs. Describing its German and U.S. production facilities, SolarWorld’s 2013 Annual report stated that “. . . we continued operational restructuring and integrated innovations into regular production to enhance efficiency and reduce costs. One key measure here was the realignment of international wafer production. As part of this, our monocrystalline wafer plant in the U.S. with a nominal capacity of 250 MW was shutdown in August 2013. We continue to use just part of the facility for research purposes.” SolarWorld 2013 Annual report, p. 55.

**. October 29, 2014 e-mail with attachment from Wiley Rein, counsel to SolarWorld, to USITC auditor.

As shown in table VI-1 and table VI-3, the share of cell and module COGS accounted for by other factory costs declined throughout much of the period. With respect to cell operations, this pattern is largely attributable to ***.¹³

With regard to module operations, the decline in average other factory costs between 2011 and 2012 reflects the exit of several U.S. producers (e.g., in 2010, Evergreen was in the process of attempting to shift its cell and module operations from the United States to China and then subsequently ceased all U.S. operations in the first quarter of 2011). To some extent the pattern also likely reflects incomplete financial results for those producers that continued to have operations but did report updated financial results to the Commission (see footnote 3 on page VI-1)

During the period SolarWorld restructured various parts of its U.S. operations in an effort to reduce costs. The extent to which the closure of SolarWorld's ingot and wafer production resulted in lower cell other factory costs was noted above. ***.¹⁴

With respect to efforts to reduce costs in general, SolarWorld noted that these included the direct elimination of facility and personnel expenses, as well as changes related to input usage and manufacturing; e.g., ***.¹⁵ With regard to the elimination of facilities, shutdown costs specific to SolarWorld's cell operations primarily reflect the closure of its high volume ingot and wafer production facility during 2013.¹⁶

Gross profit or loss

Both cell and module operations generated gross loss ratios of varying magnitudes throughout the period until interim 2014 when each category reported marginal gross profit (see table VI-1 and table VI-3). In general, the contraction/reduction of gross loss ratios during the full-year period, and positive gross profit in interim 2014, reflect the extent to which declines in average sales value were exceeded by corresponding declines in average COGS.

***.¹⁷

SG&A expenses and operating income or loss

Given that cell and module operations generated gross losses throughout most of the period, and only marginal gross profit in interim 2014, the presence of SG&A expenses, by default, resulted in operating losses for both categories.

With respect to cell operations, the notably higher level of SG&A expenses in 2011 is largely due to ***.¹⁸ With respect to module operations, and while the absolute level of SG&A

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Petitioner's postconference brief, Exhibit 1, p. 53.

¹⁶ 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 III-7. ***. October 29, 2014 e-mail with attachment from Wiley Rein, counsel to SolarWorld, to USITC auditor.

¹⁷ Ibid.

¹⁸ ***. Suniva U.S. producer questionnaire, response to III-13.

expenses declined between 2011 and 2012, the higher SG&A expense ratio in 2012, in part, reflects ***, and to a larger extent the ***.¹⁹

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 industry’s operating results (see note 2 to table VI-1 and table VI-3). In general, the most substantial non-recurring items included in “other expenses” reflect fixed asset impairments.²⁰

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 of U.S. firms, 2011-13, January-June 2013, January-June 2014

* * * * *

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

With regard to cell operations, the lower level of capital expenditures in 2011 (in large part reflecting the completion of ***) was followed by an increase in 2012 which was ***. The level of *** was at its highest level in 2011.²¹ Total module capital expenditures, accounted for ***, were substantially higher in 2011 compared to the subsequent full-year periods.

While R&D expenses for cell operations increased somewhat during the full-year period, module R&D expenses were at their highest level in 2011 and then subsequently declined.²²

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 those producers that submitted U.S. producer questionnaire responses in the current CSPV solar product investigation are presented below.

¹⁹ October 29, 2014 e-mail with attachment from Wiley Rein, counsel to SolarWorld, to USITC auditor.

²⁰ 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 IFRS and GAAP: “{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.

²¹ ***. Suniva U.S. producer questionnaire response, response III-15b.

²² ***. Petitioner’s postconference brief, Exhibit 1, pp. 53-54.

Actual negative effects

Itek Energy	***.
Kyocera	***.
Motech	***.
SBM Solar	***.
Silicon Energy	***.
SolarWorld	***.
Suniva	***.
tenKsolar	***.
Wanxiang	***.

Anticipated negative effects

Itek Energy	***.
Kyocera	***. ²³
Motech	***.
SBM Solar	***.
Silicon Energy	***.
SolarWorld	***.
Suniva	***.
tenKsolar	***.
Wanxiang	***.

²³ As indicated previously, Kyocera discontinued U.S. production in April 2013.

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 factors¹--

- (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,*

¹Section 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 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.

²Section 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 26 producers of CSPV cells in China, which accounted for approximately 69.5 percent³ of total 2013 production of CSPV cells in China.⁴ These firms are identified in table VII-1 along with each firms' cell capacity, production, and export shipments to the United States. The Commission also received questionnaire responses from 46 producers of CSPV modules in China, which accounted for approximately 73.1 percent⁵ of total 2013 production of CSPV modules in China. These firms are identified in table VII-2 along with each firms' module capacity, production, and export shipments to the United States.

³ Based on total Chinese CSPV cell production in 2013 of 25.1 gigawatts based on survey data reported to the IEA PVPS, which may be incomplete and which may include some thin film cell production. See Lu Fang, Xu Honghua, Wang Sicheng, *"National Survey Report of PV Power Applications China 2013,"* report for the International Energy Agency Photovoltaic Power Systems Programme (IEA-PVPS), October 2013, p. 14–15, <http://www.iea-pvps.org/index.php?id=93>.

⁴ China is estimated to have approximately 500 solar manufacturers. Conference transcript, p. 189 (Weiner).

⁵ Based on total Chinese CSPV module production in 2013 of *** gigawatts reported in ***. The coverage percentage may be understated because *** reported that total production data includes Chinese thin film production. Thin film production in China, however, is a relatively small percentage of its total production. See Charlie Dou, Zhai Yonghui, Wang Yibo, Jiang Yanxing, Zhang Jia, Li Hailing, Ma Liyun, Tian Lu, Sun Shitong, *"National Survey Report of PV Power Applications in China, 2013,"* IEA PVPS, September 30, 2014, p. 15 accessed at <http://www.iea-pvps.org/index.php?id=93>.

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, total shipments, and share of exports to the United States, by firm, January 2011-June 2014

Firm	Share of reported production (percent)	Capacity (kilowatts)	Production (kilowatts)	Capacity utilization (kilowatts)	Exports to the United States (kilowatts)	Total shipments (kilowatts)	Share of firm's total shipments exported to the United States (percent)
Changzhou Trina Solar	***	***	***	***	***	***	***
Canadian Solar	***	***	***	***	***	***	***
CECEP Solar Energy	***	***	***	***	***	***	***
China Sunergy	***	***	***	***	***	***	***
CHINT Solar	***	***	***	***	***	***	***
DeSolar	***	***	***	***	***	***	***
Econess Energy	***	***	***	***	***	***	***
Eoply New Energy	***	***	***	***	***	***	***
ET Solar	***	***	***	***	***	***	***
Hanwha SolarOne	***	***	***	***	***	***	***
Hengdian DMEGC	***	***	***	***	***	***	***
Jiangsu Aide Solar	***	***	***	***	***	***	***
Jiangxi Risun Solar	***	***	***	***	***	***	***
Jiangyin Hareon Power	***	***	***	***	***	***	***
Jinko Solar	***	***	***	***	***	***	***
Jinzhou Yangguang	***	***	***	***	***	***	***
LDK Solar	***	***	***	***	***	***	***
Lightway	***	***	***	***	***	***	***
Motech (Suzhou)	***	***	***	***	***	***	***
Shandong Linuo	***	***	***	***	***	***	***
Shanghai JA Solar	***	***	***	***	***	***	***
Sun Earth	***	***	***	***	***	***	***
Tainergy	***	***	***	***	***	***	***
Wuxi Suntech	***	***	***	***	***	***	***
Yingli Green Energy	***	***	***	***	***	***	***
Zhongli Talesun	***	***	***	***	***	***	***
Total	100.0	78,370,729	54,659,443	69.7	234,157	63,910,685	0.4

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, total shipments, and share of exports to the United States, by firm, January 2011-June 2014

Firm	Share of reported production (percent)	Capacity (kilowatts)	Production (kilowatts)	Capacity utilization (kilowatts)	Exports to the United States (kilowatts)	Total shipments (kilowatts)	Share of firm's total shipments exported to the United States (percent)
Canadian Solar	***	***	***	***	***	***	***
CECEP Solar Energy	***	***	***	***	***	***	***
Changzhou Almaden	***	***	***	***	***	***	***
Changzhou Trina	***	***	***	***	***	***	***
China Sunergy	***	***	***	***	***	***	***
CHINT Solar	***	***	***	***	***	***	***
DeSolar	***	***	***	***	***	***	***
Econess Energy	***	***	***	***	***	***	***
Eoply New Energy	***	***	***	***	***	***	***
ET Solar	***	***	***	***	***	***	***
Germansolar Asia	***	***	***	***	***	***	***
Hanwha SolarOne	***	***	***	***	***	***	***
Hengdian DMEGC	***	***	***	***	***	***	***
Jiangsu Aide	***	***	***	***	***	***	***
Jiangsu Sainty	***	***	***	***	***	***	***
Jiangxi Risun Solar	***	***	***	***	***	***	***
Jiangyin Hareon Power	***	***	***	***	***	***	***
Jiawei Solarchina (Shenzhen)	***	***	***	***	***	***	***
Jiawei Solarchina	***	***	***	***	***	***	***
Jinko Solar	***	***	***	***	***	***	***
Jinzhou Yangguang	***	***	***	***	***	***	***
Jumao Photonic	***	***	***	***	***	***	***
LDK Solar	***	***	***	***	***	***	***
Lightway	***	***	***	***	***	***	***
Motech (Suzhou)	***	***	***	***	***	***	***
Shandong Linuo	***	***	***	***	***	***	***
Shanghai JA Solar	***	***	***	***	***	***	***
Shenzhen Jiawei Photovoltaic	***	***	***	***	***	***	***
Shenzhen Sanyifeida	***	***	***	***	***	***	***
Shenzhen Sungold	***	***	***	***	***	***	***
Soleros	***	***	***	***	***	***	***
Star Power	***	***	***	***	***	***	***
Sumec	***	***	***	***	***	***	***
Sun Earth	***	***	***	***	***	***	***
SunEnergy	***	***	***	***	***	***	***
Sunny Apex	***	***	***	***	***	***	***

Table continued.

Tianwei New Energy	***	***	***	***	***	***	***
Wanxiang Solar	***	***	***	***	***	***	***
Wenzhou Jingri	***	***	***	***	***	***	***
Wuhan FYY	***	***	***	***	***	***	***
Wuxi Taichang	***	***	***	***	***	***	***
Wuxi Suntech	***	***	***	***	***	***	***
Wuxi Tianran	***	***	***	***	***	***	***
Yingli Green Energy	***	***	***	***	***	***	***
Zhejiang Heda	***	***	***	***	***	***	***
Zhongli Talesun	***	***	***	***	***	***	***
Total	100.0	85,321,001	57,475,045	67.4	7,589,620	58,129,319	13.1

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 capacity, production, and shipments of CSPV cells for all reporting producers in China. Collectively, Chinese foreign producers reported that CSPV cell capacity increased by 23.0 percent from 2011 to 2013, and is projected to *** percent from 2014 to 2015. They reported CSPV cell production increased by 26.4 percent from 2011 to 2013, and is projected to *** percent from 2014 to 2015. In 2013, foreign producers in China reported that 84.0 percent of their total shipments of CSPV cells were internally consumed to produce CSPV modules in China, 9.4 percent of CSPV cell shipments were to their home market, 0.5 percent of their CSPV cell shipments were exported to the United States, less than half of one percent were exported to Taiwan, and 6.1 percent were exported to other markets.

Table VII-3
CSPV cells: China's reported production capacity, production, shipments, and inventories OF CELLS,
2011-2013, January-June 2013, January-June 2014, and projections for 2014 and 2015

Item	Actual experience					Projections	
	Calendar year			January to June		Calendar year	
	2011	2012	2013	2013	2014	2014	2015
	Quantity (kilowatts)						
Capacity	19,400,681	22,591,933	23,854,057	12,374,480	12,524,058	24,324,643	27,111,760
Production	13,793,704	13,676,525	17,434,859	7,196,117	9,754,355	21,194,945	23,438,699
Purchases:							
China	1,016,038	1,464,374	1,492,365	758,507	1,033,325	2,219,550	3,219,411
Other sources	553,730	1,116,741	1,858,427	691,373	1,504,044	2,177,341	2,235,205
Total purchases	1,569,768	2,581,115	3,350,792	1,449,880	2,537,369	4,396,891	5,454,616
Total available for shipment	15,619,927	16,789,136	21,350,468	9,210,755	12,879,649	26,178,640	29,885,931
Shipments:							
Internal consumption/transfers	12,046,713	12,987,292	17,545,693	7,774,791	10,283,065	21,797,653	24,705,894
Home market shipments	2,050,790	1,987,044	1,953,427	986,150	1,349,685	1,877,433	2,090,842
Export shipments to:							
United States	64,941	50,350	108,656	29,047	10,210	10,210	0
Taiwan	6,046	89	29	28	18,081	18,504	1,000
All other markets	677,978	618,765	1,271,933	537,362	879,898	1,730,927	1,984,749
Total exports	748,965	669,204	1,380,618	566,437	908,189	1,759,641	1,985,749
Total shipments	14,846,468	15,643,540	20,879,738	9,327,378	12,540,939	25,434,727	28,782,485
End-of-period inventories	531,496	564,817	575,925	464,448	1,069,085	996,369	1,273,147
	Ratios and shares (percent)						
Capacity utilization	71.1	60.5	73.1	58.2	77.9	87.1	86.5
Inventories/production	3.9	4.1	3.3	3.2	5.5	4.7	5.4
Inventories/exports to United States	818.4	1,121.8	530.0	799.5	5,235.5	9,758.8	No exports
Inventories/total shipments	3.6	3.6	2.8	2.5	4.3	3.9	4.4
Share of total available for shipment:							
Production	88.3	81.5	81.7	78.1	75.7	81.0	78.4
China	6.5	8.7	7.0	8.2	8.0	8.5	10.8
Other sources	3.5	6.7	8.7	7.5	11.7	8.3	7.5
Total purchases	10.0	15.4	15.7	15.7	19.7	16.8	18.3
Total available for shipment	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Share of total shipments:							
Internal consumption/transfers	81.1	83.0	84.0	83.4	82.0	85.7	85.8
Home market shipments	13.8	12.7	9.4	10.6	10.8	7.4	7.3
Export shipments to:							
United States	0.4	0.3	0.5	0.3	0.1	0.0	0.0
Taiwan	0.0	0.0	0.0	0.0	0.1	0.1	0.0
All other markets	4.6	4.0	6.1	5.8	7.0	6.8	6.9
Total exports	5.0	4.3	6.6	6.1	7.2	6.9	6.9
Total shipments	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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

CSPV Modules

Table VII-4 presents data for capacity, production, and shipments of CSPV modules for all reporting producers in China. They reported CSPV module capacity increased by 38.6 percent from 2011 to 2013, and is projected to *** percent from 2014 to 2015. They reported CSPV module production increased by 37.9 percent from 2011 to 2013, and is projected to *** percent from 2014 to 2015. In 2011, Chinese module producers reported that 6.2 percent of total production used CSPV cells of Taiwanese origin, in 2013 the share of modules with CSPV cells from Taiwan had risen to 12.2 percent, and by January-June 2014, 17.0 percent of total production used CSPV cells of Taiwanese origin.⁶ In 2013, 9.9 percent of total shipments of modules by Chinese producers were exported to the United States, 35.2 percent to their home market, 7.8 percent were internally consumed, and 47.2 percent of their shipments were to other export markets.

⁶ Petitioner claimed that this increase of Chinese production of CSPV modules using CSPV cells of Taiwanese origin 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; Petitioner's prehearing brief, pp. 1-2.

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 investigations, is an effect of the increase in global demand of CSPV modules. Chinese respondents' postconference brief, exh. 1, pp. 31-32.

Chinese respondents further added that Chinese module assemblers had purchased Taiwanese cells to be used in their module assembly operations prior to the Commission's first solar investigations due to Taiwanese cell producers' reputation of manufacturing high-quality, high efficiency cells. A witness at the hearing explained:

"{W}e {Canadian Solar} have been using Taiwanese cells for many, many years before all these CVD and AD investigations in our Canadian and Chinese manufacturing. Whenever we needed to produce a highly efficient product and use cells in which simply provide a higher efficiency than other cells. So, this situation {the shift from Chinese cells to Taiwanese cells} has not happened just overnight because of a loophole or whatever. We have and had business relationships with Taiwanese manufacturers throughout the years. We have increased these volumes from time on because of the international demand for PV panels, not only in the U.S., but also in other markets."

Hearing transcript, p. 195 (Koerner).

Chinese respondents asserted that the prior business relationships between Taiwanese cell manufacturers and Chinese module assemblers also predate the prior solar investigations because Chinese module capacity exceeded Chinese cell capacity and Taiwanese cells were necessary to fill that deficit. Chinese respondents' posthearing brief, exh. 1, pp. 27-28.

Table VII-4
CSPV modules: China's reported production capacity, production, shipments, and inventories OF
MODULES, 2011-2013, January-June 2013, January-June 2014, and projections for 2014 and 2015

Item	Actual experience					Projections	
	Calendar year			January to June		Calendar year	
	2011	2012	2013	2013	2014	2014	2015
	Quantity (kilowatts)						
Capacity	18,985,680	24,434,667	26,310,980	14,110,172	15,589,674	29,635,838	32,349,266
Purchases:							
China	41,652	489,317	459,029	78,849	236,685	1,010,513	1,547,996
Other sources	39	35,550	27,000	27,000	0	45,030	80,000
Total purchases	41,691	524,867	486,029	105,849	236,685	1,055,543	1,627,996
Production:							
Using cells made by firm	10,095,176	10,776,935	13,623,230	6,047,323	7,204,800	16,754,116	18,724,649
Using cell purchased in China	1,857,578	1,782,597	2,230,534	1,030,015	1,447,878	2,588,481	3,913,121
Using Taiwan-sourced cells	848,521	1,399,909	2,276,464	871,425	1,850,757	2,948,317	2,818,555
Using third country cells with China inputs	197,282	83,681	294,515	132,500	204,208	446,484	507,820
Using third country cells	579,664	271,388	294,904	86,931	155,024	305,277	308,060
Total production	13,578,221	14,314,510	18,719,647	8,168,194	10,862,667	23,042,675	26,272,205
Total available for shipment	14,229,626	15,692,521	20,561,292	9,629,659	12,415,913	25,411,979	29,657,933
Shipments:							
Internal consumption/transfers	219,536	507,764	1,531,065	616,399	977,582	2,458,603	3,041,949
Home market shipments	1,767,725	2,962,573	6,912,956	2,269,715	2,889,007	7,713,247	8,894,318
Export shipments to:							
United States	2,045,661	1,613,498	1,942,542	766,394	1,987,919	3,650,323	3,823,802
All other markets	9,332,360	9,127,108	9,272,701	4,895,470	5,039,322	10,470,221	12,253,012
Total exports	11,378,021	10,740,606	11,215,243	5,661,864	7,027,241	14,120,544	16,076,814
Total shipments	13,365,282	14,210,943	19,659,264	8,547,978	10,893,830	24,292,394	28,013,081
End-of-period inventories	853,169	1,419,142	1,324,373	997,815	1,887,944	1,852,731	2,460,919
	Ratios and shares (percent)						
Capacity utilization	71.5	58.6	71.1	57.9	69.7	77.8	81.2
Inventories/production	6.3	9.9	7.1	6.1	8.7	8.0	9.4
Inventories/exports to United States	41.7	88.0	68.2	65.1	47.5	50.8	64.4
Inventories/total shipments	6.4	10.0	6.7	5.8	8.7	7.6	8.8
Share of production:							
Using cells made by firm	74.3	75.3	72.8	74.0	66.3	72.7	71.3
Using cell purchased in China	13.7	12.5	11.9	12.6	13.3	11.2	14.9
Using Taiwan-sourced cells	6.2	9.8	12.2	10.7	17.0	12.8	10.7
Using third country cells with China inputs	1.5	0.6	1.6	1.6	1.9	1.9	1.9
Using third country cells	4.3	1.9	1.6	1.1	1.4	1.3	1.2
Total production	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Share of total shipments:							
Internal consumption/transfers	1.6	3.6	7.8	7.2	9.0	10.1	10.9

Table Continued.

Home market shipments	13.2	20.8	35.2	26.6	26.5	31.8	31.8
Export shipments to: United States	15.3	11.4	9.9	9.0	18.2	15.0	13.7
All other markets	69.8	64.2	47.2	57.3	46.3	43.1	43.7
Total exports	85.1	75.6	57.0	66.2	64.5	58.1	57.4
Total shipments	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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

Five Largest Reporting Producers of CSPV Modules in China⁷

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 2011 to 2013, and is projected to *** from 2014 to 2015. Yingli China's reported CSPV cell production increased by *** percent from 2011 to 2013, and is projected to *** percent from 2013 to 2014. In 2013, *** 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.

Yingli China's reported CSPV module capacity increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. Its reported CSPV module production increased by *** percent from 2011 to 2013, and is projected to *** percent from 2013 to 2014. In 2013, 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 2011 to 2013, and is projected to *** from 2014 to 2015. Trina China's reported CSPV cell production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, *** 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 *** were exported to the United States.

Trina China's reported CSPV module capacity increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. Its reported CSPV module production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, it reported that *** percent of its modules were produced using its own internally

⁷Based on reported 2012 production of CSPV modules.

⁸***. Foreign producer questionnaire response of Yingli, question II-14.

consumed CSPV cells, ***.⁹ Trina China reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

Canadian Solar China

Canadian Solar China reported that *** percent of its total sales in the most recent fiscal year were sales of CSPV products. It's reported CSPV cell capacity remained constant from 2011 to 2013, and is projected to *** from 2014 to 2015. Canadian Solar China's reported CSPV cell production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, *** 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 2011 to 2013, and is projected to *** from 2014 to 2015. Its reported CSPV module production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells, ***.¹⁰ Canadian Solar 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 2011 to 2013, and is projected to *** from 2014 to 2015. Suntech's reported CSPV cell production decreased by *** percent from 2011 to 2013, but is projected to *** from 2014 to 2015.¹¹ In 2013, *** 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, *** were exported to the United States, and *** percent were exported to other markets.

Suntech's reported CSPV module capacity increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. Its reported CSPV module production decreased by *** percent from 2011 to 2013, but is projected to *** from 2014 to 2015. In 2013, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells, ***.¹² Suntech 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

⁹ ***. Foreign producer questionnaire response of Trina China, question II-14.

¹⁰ ***. Foreign producer questionnaire response of Canadian Solar China, question II-14.

¹¹ In March 2013, Suntech declared bankruptcy in China after defaulting on \$541 million in convertible bonds. The Wuxi city government in China plans to grant additional capital to aid in Suntech's restructuring. Petitioner's prehearing brief, p. 35.

¹² ***. Foreign producer questionnaire response of Suntech, question II-14.

2011 to 2013, and is projected to *** from 2014 to 2015. Jinko Solar's reported CSPV cell production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, *** 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 2011 to 2013, and is projected to *** from 2014 to 2015. Its reported CSPV module production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells, ***.¹³ Jinko Solar reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

THE INDUSTRY IN TAIWAN

The Commission received questionnaire responses from 12 producers of CSPV cells in Taiwan, which accounted for approximately 82.5 percent of 2013 total shipments of CSPV cells in Taiwan.¹⁴ These firms are identified in table VII-5 along with each firm's cell capacity, production, and export shipments to the United States. The Commission received questionnaire responses from 15 producers of CSPV modules in Taiwan,¹⁵ which accounted for approximately *** percent of 2013 total production of CSPV modules in Taiwan.¹⁶ These firms are identified in table VII-6 along with each firm's module capacity, production, and export shipments to the United States.

¹³ ***. Foreign producer questionnaire response of Jinko Solar, question II-14.

¹⁴ Based on total shipments of Taiwanese CSPV cells in 2013 of 8.3 gigawatts reported in SolarServer, "Taiwan Solar PV Cell Shipments Rise 42% in 2013 to 8.3 GW," January 29, 2014, <http://www.solarserver.com/solar-magazine/solar-news/archive-2014/2014/kw05/taiwan-solar-pv-cell-shipments-rise-42-in-2013-to-83-gw.html>. The coverage percentage may be understated because SolarServer total shipment data may include Taiwanese thin film shipments. Thin film shipments in Taiwan, however, are believed to be a relatively small percentage of total shipments.

¹⁵ The Commission received a total of 17 questionnaire responses from firms in Taiwan. *** reported that they did not produce CSPS cells in Taiwan, but did produce CSPV modules. *** reported that they produce CSPV cells in Taiwan, but not CSPV modules.

¹⁶ Based on total Taiwanese CSPV module production in 2013 of *** megawatts reported in ***. The coverage percentage may be understated because *** reported total production data includes Taiwanese thin film production. Thin film production in Taiwan, however, is a relatively small percentage of its total production.

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, total shipments, and share of exports to the United States, by firm, January 2011-June 2014

Firm	Share of reported production (percent)	Capacity (kilowatts)	Production (kilowatts)	Capacity utilization (kilowatts)	Exports to the United States (kilowatts)	Total shipments (kilowatts)	Share of firm's total shipments exported to the United States (percent)
Big Sun Energy	***	***	***	***	***	***	***
Gintech	***	***	***	***	***	***	***
AU Optonics	***	***	***	***	***	***	***
E-Ton Solar	***	***	***	***	***	***	***
Ever Energy	***	***	***	***	***	***	***
Motech Industries ¹	***	***	***	***	***	***	***
Neo Solar Power	***	***	***	***	***	***	***
Solartech	***	***	***	***	***	***	***
Sunengine	***	***	***	***	***	***	***
Tainergy ²	***	***	***	***	***	***	***
Topcell Solar	***	***	***	***	***	***	***
TSEC	***	***	***	***	***	***	***
Total	100.0	23,215,820	18,653,379	80.3	657,337	19,996,764	3.3

¹ Itogumi Motech of Hokkaido, Japan and Motech Suzhou New Energy of Kunshan City, China are wholly owned subsidiaries of Motech Industries Co., Ltd.

² Tainergy Tech (Kunshan) Co., Ltd, of Kunshan City, Jiangsu, China is a wholly owned subsidiary of Tainergy Tech Co., Ltd. of Taoyuan Hsien, Taiwan.

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

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, total shipments, and share of exports to the United States, by firm, January 2011-June 2014

Firm	Share of reported production (percent)	Capacity (kilowatts)	Production (kilowatts)	Capacity utilization (kilowatts)	Exports to the United States (kilowatts)	Total shipments (kilowatts)	Share of firm's total shipments exported to the United States (percent)
Big Sun Energy	***	***	***	***	***	***	***
Gintech	***	***	***	***	***	***	***
Inventec	***	***	***	***	***	***	***
Anji Technology	***	***	***	***	***	***	***
AU Optronics	***	***	***	***	***	***	***
Ever Energy	***	***	***	***	_***	***	_***
Gintung Energy	***	***	***	***	***	***	***
Motech Industries	***	***	***	***	***	***	***
Neo Solar Power	***	***	***	***	***	***	***
Solartech	***	***	***	***	***	***	***
Tainergy	***	***	***	***	***	***	***
Topcell Solar	***	***	***	***	***	***	***
TSEC	***	***	***	***	***	***	***
Tynsolar	***	***	***	***	***	***	***
Win Win	***	***	***	***	***	***	***
Total	100.0	3,323,127	1,403,248	42.2	261,127	1,996,963	13.1

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 capacity, production, and shipments of CSPV cells for all reporting producers in Taiwan. Collectively, Taiwanese foreign producers reported that CSPV cell capacity increased by 46.1 percent from 2011 to 2013, and is projected to *** percent from 2014 to 2015. They reported CSPV cell production increased by 67.1 percent from 2011 to 2013, and is projected to *** percent from 2014 to 2015. In 2013, reporting foreign producers in Taiwan reported that 6.5 percent of their total shipments of CSPV cells were internally consumed to produce CSPV modules in Taiwan, 6.3 percent of CSPV cell shipments were to their home market, 2.4 percent of their CSPV cell shipments were exported to the United States, 33.6 percent were exported to China,¹⁷ and 51.1 percent were exported to other markets. *** responding CSPV cell producers in Taiwan reported that they ***, including the five largest reporting CSPV cell producers in Taiwan, Gintech, Neo Solar, Motech, Solartech, and Topcell.¹⁸

¹⁷ From 2011 to 2013, exports of CSPV cells from Taiwan to China increased 186.9 percent. In January-June 2014, exports of CSPV cells from Taiwan to China were higher by 100.6 percent than in January-June 2013. Exports of CSPV cells from Taiwan to China are projected to ***. See also Part VII, footnote 6.

¹⁸ Gintech reported that in 2013, *** percent of the wafers it used in the total production of its CSPV cells originated in China. Motech reported that in 2013, *** percent of the wafers it used in the total production of its CSPV cells originated in China. Neo Solar reported that in 2013, *** percent of the wafers it used in the total production of its CSPV cells originated in China. Topcell reported that in 2013, *** percent of the wafers it used in the total production of its CSPV cells originated in China. Solartech reported that in 2013, *** percent of the wafers it used in the total production of its CSPV cells originated in China. See Foreign producer questionnaire responses of Gintech, Motech, Neo Solar, Topcell, and Solartech, response to question II-20. See also, *infra*, Part VII, *Country of Origin of Ingots and Wafers Used in the Production of CSPV Cells*.

Table VII-7
CSPV cells: Taiwan's reported production capacity, production, shipments, and inventories OF CELLS,
2011-2013, January-June 2013, January-June 2014, and projections for 2014 and 2015

Item	Actual experience					Projections	
	Calendar year			January to June		Calendar year	
	2011	2012	2013	2013	2014	2014	2015
	Quantity (kilowatts)						
Capacity	5,106,500	6,299,500	7,459,420	3,709,670	4,350,400	8,546,780	8,767,800
Production	3,787,567	4,583,285	6,328,171	2,750,896	3,954,356	7,650,627	8,144,114
Purchases:							
China	161,084	134,463	167,745	88,151	111,629	166,971	184,000
Other sources	180,262	265,619	343,803	170,300	189,068	369,250	430,000
Total purchases	341,346	400,082	511,548	258,451	300,697	536,221	614,000
Total available for shipment	4,202,167	5,189,491	7,065,276	3,234,904	4,511,851	8,443,646	9,105,848
Shipments:							
Internal consumption/transfers	228,194	319,032	446,956	200,722	311,957	490,621	677,330
Home market shipments	347,338	423,844	434,525	215,024	216,981	441,745	520,739
Export shipments to:							
United States	182,972	283,800	165,233	115,732	25,332	94,695	223,425
China	802,639	1,124,302	2,302,427	875,002	1,755,309	3,262,565	3,216,671
All other markets	2,436,342	2,814,953	3,496,206	1,603,717	1,878,422	3,795,771	4,040,346
Total exports	3,421,953	4,223,055	5,963,866	2,594,451	3,659,063	7,153,031	7,480,442
Total shipments	3,997,485	4,965,931	6,845,347	3,010,197	4,188,001	8,085,397	8,678,511
End-of-period inventories	206,124	225,557	256,798	237,515	316,179	358,249	427,337
	Ratios and shares (percent)						
Capacity utilization	74.2	72.8	84.8	74.2	90.9	89.5	92.9
Inventories/production	5.4	4.9	4.1	4.3	4.0	4.7	5.2
Inventories/exports to United States	112.7	79.5	155.4	102.6	624.1	378.3	191.3
Inventories/total shipments	5.2	4.5	3.8	3.9	3.8	4.4	4.9
Share of total available for shipment:							
Production	90.1	88.3	89.6	85.0	87.6	90.6	89.4
China	3.8	2.6	2.4	2.7	2.5	2.0	2.0
Other sources	4.3	5.1	4.9	5.3	4.2	4.4	4.7
Total purchases	8.1	7.7	7.2	8.0	6.7	6.4	6.7
Total available for shipment	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Share of total shipments:							
Internal consumption/transfers	5.7	6.4	6.5	6.7	7.4	6.1	7.8
Home market shipments	8.7	8.5	6.3	7.1	5.2	5.5	6.0
Export shipments to:							
United States	4.6	5.7	2.4	3.8	0.6	1.2	2.6
China	20.1	22.6	33.6	29.1	41.9	40.4	37.1
All other markets	60.9	56.7	51.1	53.3	44.9	46.9	46.6
Total exports	85.6	85.0	87.1	86.2	87.4	88.5	86.2
Total shipments	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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

CSPV Modules

Table VII-8 presents data for capacity, production, and shipments of CSPV modules for all reporting producers in Taiwan. They reported CSPV module capacity increased by 63.1 percent from 2011 to 2013, and is projected to *** percent from 2014 to 2015. They reported CSPV module production increased by 151.7 percent from 2011 to 2013, and is projected to *** percent from 2014 to 2015. In 2013, 39.5 percent of all CSPV modules manufactured in Taiwan contained cells produced in Taiwan, 54.4 percent contained cells produced in China, and 6.1 percent contained cells produced in other countries. In 2013, 9.5 percent of total shipments of modules by Taiwanese producers were exported to the United States, 37.7 percent to their home market, 2.3 percent were internally consumed, and 50.5 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, 2011-2013, January-June 2013, January-June 2014, and projections for 2014 and 2015

Item	Actual experience					Projections	
	Calendar year			January to June		Calendar year	
	2011	2012	2013	2013	2014	2014	2015
	Quantity (kilowatts)						
Capacity	668,875	893,714	1,091,142	549,150	669,396	1,379,465	1,739,872
Purchases:							
China	103,641	76,798	106,163	60,062	26,340	95,971	169,296
Other sources	41,230	52,224	108,183	36,072	65,484	118,342	92,000
Total purchases	144,871	129,022	214,346	96,134	91,824	214,313	261,296
Production:							
Using cells made by firm	92,146	135,217	193,837	60,170	157,715	326,415	355,290
Using cell purchased in China	101,784	132,928	266,678	110,232	222,583	431,299	544,300
Using Taiwan-sourced cells	0	0	83	0	17,658	14,827	0
Using third country cells with China inputs	0	0	0	0	0	0	0
Using third country cells	861	18,336	29,690	18,023	33,732	47,200	152,000
Total production	194,791	286,481	490,288	188,425	431,688	819,741	1,051,590
Total available for shipment	351,445	433,359	739,039	318,964	558,102	1,067,247	1,356,600
Shipments:							
Internal consumption/ transfers	3,762	5,982	17,213	1,228	14,434	27,154	36,074
Home market shipments	71,803	107,733	276,467	120,658	153,699	228,074	385,303
Export shipments to:							
United States	45,920	92,583	69,297	23,745	53,327	83,175	44,172
All other markets	189,563	199,333	370,131	141,654	325,716	824,980	1,092,004
Total exports	235,483	291,916	439,428	165,399	379,043	908,155	1,136,176
Total shipments	311,048	405,631	733,108	287,285	547,176	1,163,383	1,557,553
End-of-period inventories	17,855	34,405	34,590	37,382	52,247	49,579	49,247
	Ratios and shares (percent)						
Capacity utilization	29.1	32.1	44.9	34.3	64.5	59.4	60.4
Inventories/production	9.2	12.0	7.1	9.9	6.1	6.0	4.7
Inventories/exports to United States	38.9	37.2	49.9	78.7	49.0	59.6	111.5
Inventories/total shipments	5.7	8.5	4.7	6.5	4.8	4.3	3.2
Share of production:							
Using cells made by firm	47.3	47.2	39.5	31.9	36.5	39.8	33.8
Using cell purchased in China	52.3	46.4	54.4	58.5	51.6	52.6	51.8
Using Taiwan-sourced cells	0.0	0.0	0.0	0.0	4.1	1.8	0.0
Using third country cells with China inputs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Using third country cells	0.4	6.4	6.1	9.6	7.8	5.8	14.5
Total production	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Share of total shipments:							
Internal consumption/ transfers	1.2	1.5	2.3	0.4	2.6	2.3	2.3
Home market shipments	23.1	26.6	37.7	42.0	28.1	19.6	24.7
Export shipments to:							
United States	14.8	22.8	9.5	8.3	9.7	7.1	2.8
All other markets	60.9	49.1	50.5	49.3	59.5	70.9	70.1
Total exports	75.7	72.0	59.9	57.6	69.3	78.1	72.9

Total shipments	100.0	100.0	100.0	100.0	100.0	100.0	100.0
-----------------	-------	-------	-------	-------	-------	-------	-------

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

Five Largest Reporting Producers of CSPV Cells in Taiwan¹⁹

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 2011 to 2013, and is projected to *** from 2014 to 2015. Gintech's reported CSPV cell production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, *** 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 remained steady from 2011 to 2013, and is projected to *** from 2014 to 2015. Its reported CSPV module production decreased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells. In 2013, it reported that *** percent of its total shipments of CSPV modules were commercial shipments to its home market and *** percent were to exports to other markets such as ***. Gintech 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 2011 to 2013, and is projected to *** from 2014 to 2015. Neo Solar's reported CSPV cell production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, *** percent of Neo 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, *** percent were exported to China, and *** percent were exported to other markets such as ***.

Neo Solar's reported CSPV module capacity increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. Its reported CSPV module production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells. In 2013, *** percent of its total shipments of CSPV modules were home market sales, *** percent were exports to the United States, and *** percent were exported to other markets, such as ***. Neo Solar reported that its largest U.S. importer of CSPV products during the period of investigation was ***.

¹⁹Based on reported total production of CSPV cells from January 2011 to June 2014.

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 2011 to 2013, and is projected to *** from 2014 to 2015. Motech's reported CSPV cell production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, *** percent of Motech's total shipments of CSPV cells were internally consumed to produce CSPV modules or transferred to related companies, *** 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 reported *** during the period of investigation. In 2013, *** 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 ***.

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 2011 to 2013, and is projected to *** from 2014 to 2015. Solartech's reported CSPV cell production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, *** 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 remained steady from 2011 to 2013, and is projected to *** from 2014 to 2015. Its reported CSPV module production increased from *** kilowatts in 2011 to *** kilowatts in 2013, and is projected to *** from 2014 to 2015. In 2013, it reported that *** percent of its modules were produced using its own internally consumed CSPV cells and *** percent of its modules were produced using cells from other firms in Taiwan. In 2013, *** 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 2011 to 2013, and is projected to *** from 2014 to 2015. Topcell's reported CSPV cell production increased by *** percent from 2011 to 2013, and is projected to *** from 2014 to 2015. In 2013, *** 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, *** percent were exports to the United States, 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 ***.

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, 2011-2013, January-June 2013, January-June 2014, and projections for 2014 and 2015

Item	Actual experience					Projections	
	Calendar year			January to June		Calendar year	
	2011	2012	2013	2013	2014	2014	2015
	Quantity (kilowatts)						
Capacity	24,507,181	28,891,433	31,313,477	16,084,150	16,874,458	32,871,423	35,879,560
Production	17,581,271	18,259,810	23,763,030	9,947,013	13,708,711	28,845,572	31,582,813
Purchases	1,911,114	2,981,197	3,862,340	1,708,331	2,838,066	4,933,112	6,068,616
Total new merchandise available for shipment	19,492,385	21,241,007	27,625,370	11,655,344	16,546,777	33,778,684	37,651,429
Shipments: Internal consumption/ transfers	12,274,907	13,306,324	17,992,649	7,975,513	10,595,022	22,288,274	25,383,224
Home market shipments	2,398,128	2,410,888	2,387,952	1,201,174	1,566,666	2,319,178	2,611,581
Export shipments to: United States	247,913	334,150	273,889	144,779	35,542	104,905	223,425
All other markets	3,923,005	4,558,109	7,070,595	3,016,109	4,531,710	8,807,767	9,242,766
Total exports	4,170,918	4,892,259	7,344,484	3,160,888	4,567,252	8,912,672	9,466,191
Total shipments	18,843,953	20,609,471	27,725,085	12,337,575	16,728,940	33,520,124	37,460,996
End-of-period inventories	737,620	790,374	832,723	701,963	1,385,264	1,354,618	1,700,484
	Ratios and shares (percent)						
Capacity utilization	71.7	63.2	75.9	61.8	81.2	87.8	88.0
Inventories/production	4.2	4.3	3.5	3.5	5.1	4.7	5.4
Inventories/exports to United States	297.5	236.5	304.0	242.4	1,948.8	1,291.3	761.1
Inventories/total shipments	3.9	3.8	3.0	2.8	4.1	4.0	4.5
Share of total available for shipment: Production	90.2	86.0	86.0	85.3	82.8	85.4	83.9
Purchases	9.8	14.0	14.0	14.7	17.2	14.6	16.1
Share of total shipments: Internal consumption/ transfers	65.1	64.6	64.9	64.6	63.3	66.5	67.8
Home market shipments	12.7	11.7	8.6	9.7	9.4	6.9	7.0
Export shipments to: United States	1.3	1.6	1.0	1.2	0.2	0.3	0.6
All other markets ¹	20.8	22.1	25.5	24.4	27.1	26.3	24.7
Total exports	22.1	23.7	26.5	25.6	27.3	26.6	25.3
Total shipments	100.0	100.0	100.0	100.0	100.0	100.0	100.0

¹ Includes export shipments to the other subject country.

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

Table VII-10

CSPV modules: China and Taiwan's reported production capacity, production, shipments, and inventories OF MODULES, 2011-2013, January-June 2013, January-June 2014, and projections for 2014 and 2015

Item	Actual experience					Projections	
	Calendar year			January to June		Calendar year	
	2011	2012	2013	2013	2014	2014	2015
	Quantity (kilowatts)						
Capacity	19,654,555	25,328,381	27,402,122	14,659,322	16,259,070	31,015,303	34,089,138
Production	13,773,012	14,600,991	19,209,935	8,356,619	11,294,355	23,862,416	27,323,795
Purchases	186,562	653,889	700,375	201,983	328,509	1,269,856	1,889,292
Total new merchandise available for shipment	13,959,574	15,254,880	19,910,310	8,558,602	11,622,864	25,132,272	29,213,087
Shipments:							
Internal consumption/transfers	223,298	513,746	1,548,278	617,627	992,016	2,485,757	3,078,023
Home market shipments	1,839,528	3,070,306	7,189,423	2,390,373	3,042,706	7,941,321	9,279,621
Export shipments to:							
United States	2,091,581	1,706,081	2,011,839	790,139	2,041,246	3,733,498	3,867,974
All other markets	9,521,923	9,326,441	9,642,832	5,037,124	5,365,038	11,295,201	13,345,016
Total exports	11,613,504	11,032,522	11,654,671	5,827,263	7,406,284	15,028,699	17,212,990
Total shipments	13,676,330	14,616,574	20,392,372	8,835,263	11,441,006	25,455,777	29,570,634
End-of-period inventories	871,024	1,453,547	1,358,963	1,035,197	1,940,191	1,902,310	2,510,166
	Ratios and shares (percent)						
Capacity utilization	70.1	57.6	70.1	57.0	69.5	76.9	80.2
Inventories/production	6.3	10.0	7.1	6.2	8.6	8.0	9.2
Inventories/exports to United States	41.6	85.2	67.5	65.5	47.5	51.0	64.9
Inventories/total shipments	6.2	9.5	6.8	6.0	8.3	7.6	8.6
Share of total available for shipment:							
Production	98.7	95.7	96.5	97.6	97.2	94.9	93.5
Purchases	1.3	4.3	3.5	2.4	2.8	5.1	6.5
Share of total shipments:							
Internal consumption/transfers	1.6	3.5	7.6	7.0	8.7	9.8	10.4
Home market shipments	13.5	21.0	35.3	27.1	26.6	31.2	31.4
Export shipments to:							
United States	15.3	11.7	9.9	8.9	17.8	14.7	13.1
All other markets	69.6	63.8	47.3	57.0	46.9	44.4	45.1
Total exports	84.9	75.5	57.2	66.0	64.7	59.0	58.2
Total shipments	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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

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, 2011-2013, January-June 2013, and January-June 2014

* * * * *

COUNTRY OF ORIGIN OF INGOTS AND WAFERS USED IN THE PRODUCTION OF CSPV CELLS

The implementation of petitioner's "two out of three" country of origin rule for CSPV modules requires that the country of origin of ingots and wafers, which are inputs used in the production of CSPV cells, be known.²⁰ In the final phase of these investigations, the Commission's foreign producer questionnaire requested data from producers of CSPV cells in China and Taiwan as to the source of their ingots and wafers in order to analyze the global trade flows of these inputs.

CSPV cell producers in China

Source of ingots for wafer production

As shown in table VII-12, producers of CSPV cells in China reported that in 2013, 92.8 percent of the ingots used in their manufacture of wafers were internally produced and 7.1 percent of ingots were purchased from other firms in China. During the period of investigation, only a small fraction was reported as imported from Taiwan and all other countries. Thus, the producers of CSPV cells in China reported that in their production of wafers they use almost exclusively ingots sourced in China.

²⁰ Ingots are used in the production of wafers. Wafers are used in the production of CSPV cells. See *Part I, Manufacturing process*.

Table VII-12

CSPV products: Chinese producers' sources of ingots used in wafer production, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilograms)				
Ingots:					
Internally produced	39,453,772	36,357,886	46,595,132	19,804,349	30,672,533
Purchased from another firm in China	1,710,074	1,792,257	3,558,194	1,496,781	1,215,355
Imported from Taiwan	21,963	0	67,599	0	0
Imported from all other sources	141,944	115	0	0	15,438
Total ingots used	41,327,753	38,150,258	50,220,925	21,301,130	31,903,326
	Quantity (pieces)				
Wafers:					
Produced from ingot inputs	1,328,537,848	1,489,719,432	1,834,399,914	823,846,804	1,181,981,528
	Share (percent)				
Share of total Ingots used:					
Internally produced	95.5	95.3	92.8	93.0	96.1
Purchased from another firm in China	4.1	4.7	7.1	7.0	3.8
Imported from Taiwan	0.1	0.0	0.1	0.0	0.0
Imported from all other sources	0.3	0.0	0.0	0.0	0.0
Total ingots used	100.0	100.0	100.0	100.0	100.0
	Ratios (pieces per kg)				
Ratio:					
Wafers to total ingots	32	39	37	39	37

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

Source of wafers for CSPV cell production

As shown in table VII-13, producers of CSPV cells in China reported that in 2013, 43.8 percent of the wafers used in their manufacture of CSPV cells were internally produced, 54.7 percent of wafers were purchased from other firms in China, and less than 1.0 percent were imported from Taiwan and all other countries, respectively. Thus, the producers of CSPV cells in China reported that in their production of CSPV cells they almost exclusively use wafers sourced in China.

Table VII-13

CSPV products: Chinese producers' sources of wafers used in CSPV cell production, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (1,000 pieces)				
Wafers:					
Internally produced	1,535,790	1,486,709	1,725,602	820,759	1,053,841
Purchased from another firm in China	1,516,926	1,667,388	2,154,781	920,586	1,243,301
Imported from Taiwan	43,368	63,303	28,010	24,276	6,987
Imported from all other sources	160,863	45,641	30,783	6,953	19,527
Total wafers used	3,256,947	3,263,041	3,939,176	1,772,574	2,323,655
	Quantity (kilowatts)				
Cells:					
Produced from wafers inputs	28,193,659	13,394,642	15,832,426	7,017,223	9,231,346
	Share (percent)				
Share of total wafers used:					
Internally produced	47.2	45.6	43.8	46.3	45.4
Purchased from another firm in China	46.6	51.1	54.7	51.9	53.5
Imported from Taiwan	1.3	1.9	0.7	1.4	0.3
Imported from all other sources	4.9	1.4	0.8	0.4	0.8
Total wafers used	100.0	100.0	100.0	100.0	100.0
	Ratios (kilowatts per 1,000 pieces)				
Ratio:					
Cells to total wafers	8.7	4.1	4.0	4.0	4.0

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

CSPV cell producers in Taiwan

Source of ingots for wafer production

As shown in table VII-14, producers of CSPV cells in Taiwan reported that in 2013, 100.0 percent of the ingots used in their manufacture of wafers were internally produced. Thus, the producers of CSPV cells in Taiwan reported that in their production of wafers they use exclusively ingots sourced in Taiwan.

Table VII-14

CSPV products: Taiwanese producers' sources of ingots used in wafer production, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilograms)				
Ingots:					
Internally produced	2,949,013	2,962,796	3,285,217	1,495,303	2,553,476
Purchased from another firm in Taiwan	0	964	0	0	0
Imported from China	0	0	0	0	0
Imported from all other sources	410	0	0	0	0
Total ingots used	2,949,423	2,963,760	3,285,217	1,495,303	2,553,476
	Quantity (pieces)				
Wafers:					
Produced from ingot inputs	135,096,769	183,501,700	202,508,050	109,915,221	108,998,091
	Share (percent)				
Share of total Ingots used:					
Internally produced	100.0	100.0	100.0	100.0	100.0
Purchased from another firm in Taiwan	0.0	0.0	0.0	0.0	0.0
Imported from China	0.0	0.0	0.0	0.0	0.0
Imported from all other sources	0.0	0.0	0.0	0.0	0.0
Total ingots used	100.0	100.0	100.0	100.0	100.0
	Ratios (pieces per kg)				
Ratio:					
Wafers to total ingots	46	62	62	74	43

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

Source of wafers for CSPV cell production

As shown in table VII-15, producers of CSPV cells in Taiwan reported that in 2013, 6.4 percent of the wafers used in their manufacture of CSPV cells were internally produced and 31.3 percent of wafers were purchased from other firms in Taiwan. CSPV cell producers in Taiwan reported that 46.5 percent of the wafers that they used in cell production were imported from China. This trade flow of wafers from China to Taiwanese cell producers would trigger the “two out of three” rule if these cells were shipped back to China and assembled into modules. Thus, the producers of CSPV cells in Taiwan reported that since the implementation of the duties pursuant to the prior solar investigation, approximately 50.0 percent of the wafers that they use in their production of CSPV cells were sourced in China.

Table VII-15

CSPV products: Taiwanese producers' sources of wafers used in CSPV cell production, 2011-2013, January-June 2013, and January-June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (1,000 pieces)				
Wafers:					
Internally produced	109,521	92,354	107,445	50,169	79,085
Purchased from another firm in Taiwan	306,198	348,990	524,873	252,990	261,170
Imported from China	344,855	526,541	780,236	367,110	507,341
Imported from all other sources	256,364	249,263	265,371	111,209	156,543
Total wafers used	1,016,937	1,217,148	1,677,924	781,477	1,004,138
	Quantity (kilowatts)				
Cells:					
Produced from wafers inputs	3,982,644	4,727,235	6,510,581	2,840,978	4,089,130
	Share (percent)				
Share of total wafers used:					
Internally produced	10.8	7.6	6.4	6.4	7.9
Purchased from another firm in Taiwan	30.1	28.7	31.3	32.4	26.0
Imported from China	33.9	43.3	46.5	47.0	50.5
Imported from all other sources	25.2	20.5	15.8	14.2	15.6
Total wafers used	100.0	100.0	100.0	100.0	100.0
	Ratios (kilowatts per 1,000 pieces)				
Ratio:					
Cells to total wafers	3.9	3.9	3.9	3.6	4.1

U.S. IMPORTERS' OUTSTANDING ORDERS

The Commission requested U.S. importers to indicate whether they imported or arranged for the importation of CSPV products after June 30, 2014. *** of the 48 reporting U.S. importers stated that they had imported or arranged for importation since June 30, 2014. Table VII-16 presents the quantity of those U.S. imports.

Table VII-16

CSPV products: U.S. importers' orders of subject imports from China and Taiwan subsequent to June 30, 2014, by source

* * * * *

ANTIDUMPING OR COUNTERVAILING DUTY ORDERS IN THIRD-COUNTRY MARKETS

The European Union

In July 2012, SolarWorld filed an antidumping duty petition with the European Commission alleging that producers of CSPV solar cells and modules²¹ in China were selling CSPV cells and modules at less than fair value.²² On September 6, 2012, the European Commission announced its initiation of an antidumping duty investigation on CSPV cells and modules from China.²³ 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.²⁴ 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.²⁵ 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 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.²⁶ The undertaking is set to expire at the end of 2015.²⁷

²¹ The scope of the EU investigation is CSPV cells and CSPV modules (regardless of the country of origin of the CSPV cell contained therein).

²² Petitioner posthearing brief, exh. 1, p. 93; Petitioner’s postconference brief, exh. 1, pp. 58-61; Chinese respondents’ posthearing brief, exh. 1, p. 11.

²³ Notice of initiation of an antidumping duty 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.

²⁴ *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 1821/2013 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.

²⁵ 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 price floor based on their contention that the price floor was too low to adequately protect the market. The appeal is ongoing. Petitioner’s postconference brief, exh. 1, p. 59.

²⁶ Petitioner’s postconference brief, exh. 1, p. 60; Petitioner’s prehearing brief, p. 26.

²⁷ Chinese respondents’ posthearing brief, exh. 1, p. 11.

India

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 2014.²⁸ In May 2014, the Indian Directorate General of Anti-Dumping and Allied Duties (“DGAD”) recommended imposing duties ranging from \$0.11-0.81 per watt on solar cells imported from the United States, China, Malaysia and Taiwan. However, the Indian Ministry of Commerce announced in September 2014 that it would not impose the duties and let the recommendation lapse.²⁹

Australia

On May 14, 2014, the Government of Australia initiated an antidumping duty investigation on crystalline silicon photovoltaic modules or panels from China. The proposed dumping margins range from 21.6 percent to 60.3 percent. A preliminary determination is currently scheduled for March 2015. A final determination has not yet been scheduled.³⁰

Canada

On December 8, 2014, the Canadian International Trade Tribunal initiated an antidumping and countervailing duty investigation on certain photovoltaic modules and laminates from China.³¹ A preliminary determination is scheduled for February 2015.

²⁸ 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

²⁹ “India Not to Impose Anti-Dumping Duty on Solar Panels: Nirmala,” Outlook India, September 10, 2014, <http://www.outlookindia.com/news/article/India-Not-to-Impose-AntiDumping-Duty-on-Solar-Panels-Nirmala/859279> accessed November 7, 2014.

³⁰ The investigation excludes CSPV cells and wafers. See Antidumping Commission, Government of Australia, <http://www.adcommission.gov.au/cases/documents/031-ADN-201438-Initiationofaninvestigationintoallegeddumping.pdf>; <http://www.adcommission.gov.au/cases/documents/094-Notice-Anti-DumpingNotice2014-06ExtentionoftimetoissueSEF.pdf> (The announced extension until March 2015).

³¹ *Notice of Commencement of Preliminary Injury Inquiry, Certain Photovoltaic Modules and Laminates*, Canadian International Trade Tribunal, Inquiry No. PI-2014-003. Canadian solar producers, Eclipsall Energy Corp., Heliene, Inc., Silfab Ontario Inc., and Solgate, Inc. filed the petition. The petition covers modules and laminates and does include thin-film modules.

China

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.³² 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.³³

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.’”³⁴

Global Demand

Annual global PV³⁵ installations increased from 24.7 gigawatts (GW) in 2011 to 38.4 GW in 2013 (55 percent) (figure VII-1). The largest markets in 2013 were China (11.8 GW, 31 percent), Japan (6.9 GW, 18 percent), the United States (4.8 GW, 12 percent), Germany (3.3 GW, 9 percent), and the United Kingdom (1.5 GW, 4 percent). This reflects a significant shift in demand from 2012, when Germany was the largest market (7.6 GW, 26 percent of installations) and Italy (3.4 GW, 12 percent) was the third largest market.³⁶ The value of global installations—

³² 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.

³³ 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.

³⁴ *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).

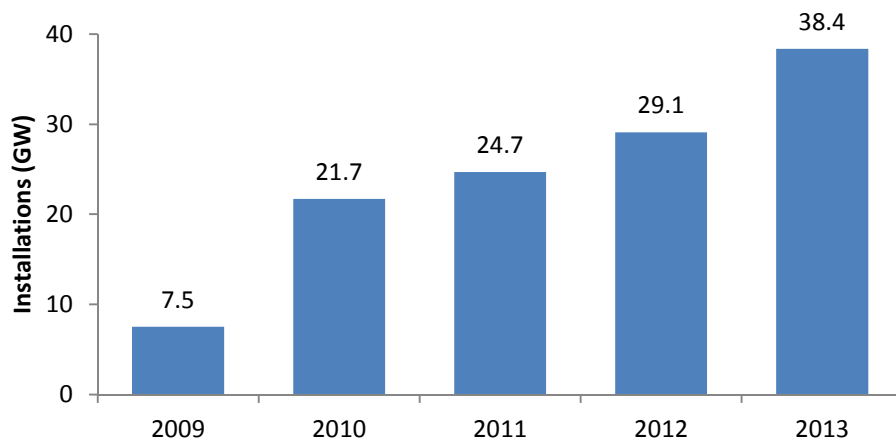
³⁵ In this section, references to CSPV are to subject products, while references to PV include both subject and nonsubject products (e.g., thin film products).

³⁶ China was the second largest market in 2012 with 12 percent of installations, and the United States was the fourth largest market with 11 percent of installations. USITC, *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, pp. 3-17-18; GTM Research and Solar Energy Industries Association (SEIA), *U.S. Solar Market Insight Report: 2013 Year in Review*, p. 3; EPIA, *Global Market Outlook for Photovoltaics 2014–2018*, 2014, pp. 18–19, 24.

including modules, balance of system equipment, and installation costs—was \$91.3 million in 2013.³⁷

Figure VII-1

Global PV installations, 2009–13



Source: USITC, *Renewable Energy and Related Services: Recent Developments*, USITC Publication 4421, August 2013, pp. 3-18; EPIA, *Global Market Outlook for Photovoltaics 2014–2018*, 2014, p. 18; GTM Research and SEIA, *U.S. Solar Market Insight Report: 2013 Year in Review*, p. 3.

Note: For 2009–11, data for Europe are estimated PV installations. For 2012 and 2013, data are grid connected capacity. Estimates of the size of the market vary. For example, the IEA estimated that 2013 installations totaled 39 to 40 GW. See IEA, Photovoltaic Power Systems Programme (PVPS), *Trends 2014 in Photovoltaic Applications, Survey Report of Selected IEA Countries between 1992 and 2013*, 2014, 9, <http://iea-pvps.org/index.php?id=92>.

Global CSPV Cell and Module Production

Global CSPV cell production increased from 23 GW in 2011 to 35 GW in 2013 (52 percent).³⁸ China-based firms accounted for 60.5 percent of global CSPV cell production in 2013, followed by companies based in Taiwan (18.8 percent), and in Japan (12.9 percent).³⁹ 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.⁴⁰

³⁷ Ron Pernick, Clint Wilder, and James Belcher, *Clean Energy Trends 2014*, Clean Edge, March 2014, p. 4.

³⁸ Totals based on Bloomberg New Energy Finance (BNEF) data. BNEF data may differ from *PV News* data for cells in prior years. *PV News* reported module production, but not cell production data for 2013.

³⁹ De Silva, Ranmali, *PV Production in 2013: An All-Asian Affair*, Bloomberg New Energy Finance, April 16, 2014, pp. 4–5.

⁴⁰ First Solar was the fifth largest producer in the Solarbuzz list, but produces thin film products. Solarbuzz, “Yingli Adds Cell Production Leadership to Module Shipment Supremacy in 2013,” News release, January 31, 2014.

Global CSPV module production increased from about 32.3 GW in 2011 to 35.8 GW in 2013 (about 11 percent).⁴¹ Global PV production capacity utilization was slightly less than two-thirds in 2013.⁴² ***.⁴³

Figure VII-2

Global PV module production by country, 2011–13

* * * * *

Malaysia

Malaysia was the largest source of nonsubject PV imports during 2011–June 2014, though most imports in 2012—the latest year available—were thin film modules, according to Energy Information Administration (EIA) data.⁴⁴ Firms in Malaysia have approximately 2.3 GW of CSPV cell production capacity and 1.0 GW of module production capacity (table VII-17).⁴⁵ Production capacity in Malaysia has *** since 2009, when CSPV cell capacity totaled ***.⁴⁶ Most PV production is exported since the market in Malaysia totaled only 48 MW in 2013.⁴⁷

⁴¹ Shyam Mehta, “Global 2013 PV Module Production Hits 39.8GW; Yingli is the Shipment Leader,” Greentech Media, April 23, 2014, <http://www.greentechmedia.com/articles/read/Global-2013-PV-Module-Production-Hits-39.8-GW-Yingli-Leads-in-Production-a>.

⁴² Based on IEA and non-IEA PVPS members. These economies accounted for most global production. IEA, PVPS, *Trends 2014 in Photovoltaic Applications, Survey Report of Selected IEA Countries between 1992 and 2013*, 2014, 47.

⁴³ ***.

⁴⁴ 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; “National Survey Report of PV Power Applications in Malaysia 2013,” 2014, p. 13; USITC DataWeb/USDOC (accessed October 7, 2014).

⁴⁵ “National Survey Report of PV Power Applications in Malaysia 2013,” 2014, p. 13; Panasonic, “Panasonic Begins Full-scale Production at 300 MW HIT Solar Module Factory in Malaysia,” News release, August 30, 2013; SunPower, “Powering a Brighter Tomorrow: Sustainability Report 2011–2013,” n.d., 9, <http://us.sunpower.com/sites/sunpower/files/media-library/reports/rp-sunpower-sustainability-report.pdf>; Sunrise Solartech Website, <http://www.ts-solartech.com/company-news/> (accessed October 8, 2014).

⁴⁶ ***.

⁴⁷ “National Survey Report of PV Power Applications in Malaysia 2013,” 2014, p. 5.

Table VII-17

CSPV cells and modules: Producers in Malaysia, 2014

Company	Cell production capacity (megawatts)	Module production capacity
AUO SunPower	>800	0
Flextronics	0	400
Hanwha Q Cells	1,100	0
Malaysian Solar Resources	0	85
Panasonic	300	300
PV Hi-Tech Solar	0	15
Solartif	0	1
Sunrise	0	100
TSSolartech	60	60
Total	>2,260	961

Source: "National Survey Report of PV Power Applications in Malaysia 2013," 2014, p. 13; Panasonic, "Panasonic Begins Full-scale Production at 300 MW HIT Solar Module Factory in Malaysia," News release, August 30, 2013; SunPower, "Powering a Brighter Tomorrow: Sustainability Report 2011–2013," n.d., 9, <http://us.sunpower.com/sites/sunpower/files/media-library/reports/rp-sunpower-sustainability-report.pdf>; Sunrise Solartech Website, <http://www.ts-solartech.com/company-news/> (accessed October 8, 2014); Hanwha Q Cells, "Hanwha Q CELLS Increases Production Capacity to 1.5 GW by the End of the Year," News release, August 7, 2014, http://group.hanwha.co.kr/content/hanwha/en/news_and_media/press_release/hanwha_q_cells_increases_production_capacity_to_1_5_gw_by_the_end_of_the_year.html.

Companies have announced plans to bring an additional production capacity online in Malaysia. Hanwha Q Cells plans to add 200 MW of cell capacity and to build an 800 MW module plant. First Solar, which already has thin film production in Malaysia, plans to start production on a 100 MW pilot line for its CSPV products in 2014.⁴⁸

Mexico

Mexico was the second largest source of nonsubject PV imports during 2011–June 2014.⁴⁹ The CSPV industry in Mexico is comprised of companies that assemble modules, primarily for export to the United States.⁵⁰ In 2013, CSPV module production capacity in

⁴⁸ Hanwha Q Cells, "Hanwha Q CELLS Increases Production Capacity to 1.5 GW by the End of the Year," News release, August 7, 2014, http://group.hanwha.co.kr/content/hanwha/en/news_and_media/press_release/hanwha_q_cells_increases_production_capacity_to_1_5_gw_by_the_end_of_the_year.html; Hanwha Q Cells, "Hanwha Q CELLS to Build 800 Megawatt Module Factory," News release, October 2014, http://www.q-cells.com/uploads/media/20141029_Hanwha_Q_CELLS_to_Build_800_Megawatt_Module_Factory_01.pdf; Tymen de Jong, "Manufacturing Update," First Solar Analyst Day, March 19, 2014, 57, http://files.shareholder.com/downloads/FSLR/3729506366x0x735349/0bb4395a-4490-4511-8784-def623b9205/FS_AnalystDay_ManufacturingUpdate.pdf.

⁴⁹ USITC DataWeb/USDOC (accessed October 7, 2014).

⁵⁰ The PV market in Mexico totaled only 45 MW in 2013. IEA PVPS, *PVPS Report Snapshot of Global PV 1992-2013*, 2014, p. 14; Blanca Diaz Lopez, "Latin America: Eager for an Industry," August 26, 2014,

(continued...)

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-18).⁵¹ Grupo IUSA also reportedly plans to open a module plant in Mexico that could eventually reach 500 MW in capacity.⁵²

Table VII-18

CSPV cells and modules: Companies assembling modules in Mexico, 2014

Company	Module production capacity (megawatts)	Headquarters
ERDM	>30	Mexico
Fox Energy (Foxconn)	350	China
Jabil Circuit	***	United States
Kyocera	150	Japan
Solartec	***	Mexico
Solarvatio	12	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. SunEdison announced an agreement with Fox Energy in April 2013 to produce PV modules in Mexico. Additional information on the current status of Fox Energy’s production in Mexico is not available.

Sources: Blanca Diaz Lopez, “Latin America: Eager for an Industry,” August 26, 2014, http://www.pv-magazine.com/news/details/beitrag/latin-america--eager-for-an-industry_100016213/#axzz3FUskmGBL; 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); SunEdison, “SunEdison, Fox Energy Sign Solar Module Manufacturing Services Agreement,” News release, April 23, 2013, <http://www.sunedison.com/wps/portal/memc/aboutus/newsroom/pressreleases/>; ***.

Philippines

The Philippines was the third largest source of nonsubject PV imports during January 2011 to June 2014.⁵³ SunPower, the primary producer in the Philippines, has 700 MW of CSPV

(...continued)

http://www.pv-magazine.com/news/details/beitrag/latin-america--eager-for-an-industry_100016213/#axzz3FUskmGBL.

⁵¹ 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); SunEdison, “SunEdison, Fox Energy Sign Solar Module Manufacturing Services Agreement,” News release, April 23, 2013,

<http://www.sunedison.com/wps/portal/memc/aboutus/newsroom/pressreleases/>; ***.

⁵² Osborne, Mark, “Mexican Conglomerate has Big PV Module Manufacturing Ambitions,” *PVTech*, September 11, 2014, http://www.pv-tech.org/news/mexican_conglomerate_has_big_pv_module_manufacturing_ambitions.

⁵³ USITC DataWeb/USDOC (accessed October 7, 2014).

cell production capacity in the Philippines, and 600 MW of module production capacity.⁵⁴ SunPower is planning to add an additional 350 MW of cell production in the Philippines, with the first production at this plant coming online in 2015.⁵⁵

⁵⁴ SunPower, "Form 10-K," February 25, 2013, p. 10.

⁵⁵ SunPower, "Powering a Brighter Tomorrow: Sustainability Report 2011–2013," n.d., 9, <http://us.sunpower.com/sites/sunpower/files/media-library/reports/rp-sunpower-sustainability-report.pdf>.

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 1388 January 8, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From China and Taiwan; Institution of Antidumping and Countervailing Duty Investigations and Scheduling of Preliminary Phase Investigations</i>	http://www.gpo.gov/fdsys/pkg/FR-2014-01-08/pdf/2014-00130.pdf
79 FR 4661 January 29, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From the People’s Republic of China and Taiwan: Initiation of Antidumping Duty Investigations</i>	http://www.gpo.gov/fdsys/pkg/FR-2014-01-29/pdf/2014-01738.pdf
79 FR 4667 January 29, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From the People’s Republic of China: Initiation of Countervailing Duty Investigation</i>	http://www.gpo.gov/fdsys/pkg/FR-2014-01-29/pdf/2014-01743.pdf
79 FR 12221 March 4, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From China And Taiwan: Determinations</i>	http://www.gpo.gov/fdsys/granule/FR-2014-03-04/2014-04677
79 FR 33174 June 10, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China: Preliminary Affirmative Countervailing Duty Determination</i>	http://www.gpo.gov/fdsys/granule/FR-2014-06-10/2014-13510
79 FR 44395 July 31, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From Taiwan: Affirmative Preliminary Determination of Sales at Less Than Fair Value and Postponement of Final Determination</i>	http://www.gpo.gov/fdsys/granule/FR-2014-07-31/2014-18055
79 FR 44399 July 31, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From the People's Republic of</i>	http://www.gpo.gov/fdsys/granule/FR-2014-07-31/2014-

	<i>China: Affirmative Preliminary Determination of Sales at Less Than Fair Value and Postponement of Final Determination</i>	18063
79 FR 44402 July 31, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China: Alignment of Final Countervailing Duty Determination With Final Antidumping Duty Determination</i>	http://www.gpo.gov/fdsys/granule/FR-2014-07-31/2014-18056
79 FR 49754 August 22, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From Taiwan: Notice of Amended Preliminary Determination of Sales at Less Than Fair Value</i>	http://www.gpo.gov/fdsys/granule/FR-2014-08-22/2014-20002
79 FR 50696 August 25, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From China and Taiwan; Scheduling of the Final Phase of Countervailing Duty and Antidumping Duty Investigations</i>	http://www.gpo.gov/fdsys/granule/FR-2014-08-25/2014-20069
79 FR 76962 December 23, 2014	<i>Countervailing Duty Investigation of Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China: Final Affirmative Countervailing Duty Determination</i>	http://www.gpo.gov/fdsys/search/pagedetails.action?granuleId=2014-30071&packageId=FR-2014-12-23&acCode=FR
79 FR 76966 December 23, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From Taiwan: Final Determination of Sales at Less Than Fair Value</i>	http://www.gpo.gov/fdsys/search/pagedetails.action?granuleId=2014-30107&packageId=FR-2014-12-23&acCode=FR
79 FR 76970 December 23, 2014	<i>Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China: Final Determination of Sales at Less Than Fair Value</i>	http://www.gpo.gov/fdsys/search/pagedetails.action?granuleId=2014-30092&packageId=FR-2014-12-23&acCode=FR

APPENDIX B
HEARING WITNESSES

CALENDAR OF PUBLIC HEARING

Those listed below appeared as witnesses at the United States International Trade Commission's hearing:

Subject: Certain Crystalline Silicon Photovoltaic Products from China and Taiwan

Inv. Nos.: 701-TA-511 and 731-TA-1246-1247 (Final)

Date and Time: December 8, 2014 - 9:30 a.m.

Sessions were held in connection with these investigations in the Main Hearing Room (room 101), 500 E Street, S.W., Washington, DC.

CONGRESSIONAL APPEARANCES:

The Honorable Ron Wyden, United States Senator, Oregon

The Honorable Richard M. Nolan, U.S. Representative, 8th District, Minnesota

OPENING REMARKS:

Petitioner (**Timothy C. Brightbill**, Wiley Rein LLP)
Respondents (**Walter Spak**, White & Case LLP; *and* **Richard Weiner**,
Sidley Austin LLP)

In Support of the Imposition of Antidumping and Countervailing Duty Orders:

Wiley Rein LLP
Washington, DC
on behalf of

SolarWorld Industries America, Inc. ("SolarWorld")

Mukesh Dulani, President, SolarWorld

Ardes Johnson, Vice President Sales, SolarWorld

Gary Shaver, President, Silicon Energy, LLC

**In Support of the Imposition of
Antidumping and Countervailing Duty Orders (continued):**

Erin Clark, President-Solar, PetersenDean

Mike McKechnie, President, Mountain View Solar

Dr. Seth T. Kaplan, Principal, Capital Trade Inc.

Timothy C. Brightbill)
Laura El-Sabaawi) – OF COUNSEL
Usha Neelakantan)

**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, Americas, Canadian Solar (USA) Inc.

Jeff Dorety, President, Trina Solar (U.S.) Inc.

John Morrison, Senior Vice President, Strata Solar LLC

Kenneth R. Button, Senior Vice President, Economic Consulting Services, LLC

Jennifer Lutz, Senior Economist, Economic Consulting Services, LLC

John P. Smirnow, Vice President of Trade & Competitiveness, Solar Energy Industries Association (“SEIA”)

Neil R. Ellis)
Richard L.A. Weiner)
Brenda A. Jacobs)
) – OF COUNSEL
Rajib Pal)
Shawn Higgins)
Kelly Rosencrans)

**In Opposition to the Imposition of
Antidumping and Countervailing Duty Orders (continued):**

White & Case LLP
Washington, DC
on behalf of

Taiwan Photovoltaic Industry Association (“TPVIA”)

Austin Chiu, General Counsel, Neo Solar Power Corporation
and Coordinator, TPVIA AD Task Force

Laylay Pan, Chief Financial Officer, Gintech Energy Corporation

Joyce Chen, Senior Associate Vice President of Procurement,
Solartech Energy Corp.

Sascha Rossmann, Vice President of Global Sales, Winaico

Jing Yu, Vice President, Winaico USA

Barry Moore, President, Moore Energy LLC

Walter J. Spak)
Jay C. Campbell) – OF COUNSEL
Adams Lee)

Perkins Coie LLP
Washington, DC
on behalf of

SunEdison, Inc. (“SunEdison”)

Polly Shaw, Vice President, NAMR Government Affairs,
SunEdison, Inc.

David S. Christy, Jr.)
) – OF COUNSEL
David J. Townsend)

**In Opposition to the Imposition of
Antidumping and Countervailing Duty Orders (continued):**

Trade Pacific PLLC
Washington, DC
on behalf of

tenKsolar, Inc.

Joel Cannon, Chief Executive Officer, tenKsolar, Inc.

Jonathan M. Freed) – OF COUNSEL

Arent Fox LLP
Washington, DC
on behalf of

Trina Solar (U.S.)

John M. Gurley) – OF COUNSEL

REBUTTAL/CLOSING REMARKS:

Petitioner (**Timothy C. Brightbill**, Wiley Rein LLP; *and* **Dr. Seth T. Kaplan**, Capital Trade, Inc.)

Respondents (**Walter Spak** and **Jay C. Campbell**, White & Case LLP; *and* **Rajib Pal**, Sidley Austin LLP)

APPENDIX C
SUMMARY DATA

Table C-1

CSPV modules: Summary data concerning the U.S. market, 2011-13, January to June 2013, and January to June 2014

(Quantity=kilowatts; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per kilowatts; Period changes=percent--exceptions noted)

	Reported data					Period changes				
	Calendar year		January to June			Calendar year			Jan-Jun	
	2011	2012	2013	2013	2014	2011-13	2011-12	2012-13	2013-14	
U.S. consumption quantity:										
Amount.....	1,643,614	2,045,557	2,910,662	1,114,095	2,411,742	77.1	24.5	42.3	116.5	
Producers' share (fn1).....	27.9	19.3	8.1	8.5	5.0	(19.7)	(8.6)	(11.1)	(3.5)	
Importers' share (fn1):										
China subject.....	1.9	4.0	12.4	14.2	9.1	10.5	2.1	8.4	(5.1)	
Taiwan.....	4.5	35.5	69.2	69.0	75.3	64.7	31.0	33.7	6.2	
Subtotal, subject.....	6.4	39.5	81.6	83.2	84.3	75.3	33.1	42.2	1.1	
China nonsubject.....	58.4	33.3	2.2	0.7	7.2	(56.1)	(25.0)	(31.1)	6.5	
All other sources.....	7.4	7.9	8.0	7.6	3.4	0.6	0.6	0.1	(4.2)	
Subtotal, nonsubject.....	65.7	41.3	10.2	8.3	10.6	(55.5)	(24.5)	(31.0)	2.3	
Total imports.....	72.1	80.7	91.9	91.5	95.0	19.7	8.6	11.1	3.5	
U.S. consumption value:										
Amount.....	2,447,995	1,926,793	2,077,055	823,586	1,691,646	(15.2)	(21.3)	7.8	105.4	
Producers' share (fn1).....	32.9	22.9	10.0	10.8	6.1	(22.9)	(10.0)	(12.9)	(4.7)	
Importers' share (fn1):										
China subject.....	2.5	3.4	11.8	13.3	8.4	9.3	1.0	8.4	(5.0)	
Taiwan.....	5.2	32.5	66.5	64.9	73.0	61.3	27.3	34.0	8.1	
Subtotal, subject.....	7.7	35.9	78.3	78.3	81.4	70.6	28.2	42.3	3.1	
China nonsubject.....	52.3	32.2	2.0	1.0	8.5	(50.3)	(20.0)	(30.3)	7.5	
All other sources.....	7.2	9.0	9.8	9.9	4.0	2.7	1.8	0.9	(5.9)	
Subtotal, nonsubject.....	59.4	41.2	11.8	10.9	12.5	(47.7)	(18.2)	(29.4)	1.6	
Total imports.....	67.1	77.1	90.0	89.2	93.9	22.9	10.0	12.9	4.7	
U.S. importers' U.S. Imports:										
China subject:										
Quantity.....	31,506	81,687	361,976	157,954	218,450	1,048.9	159.3	343.1	38.3	
Value.....	60,055	65,882	244,487	109,809	141,518	307.1	9.7	271.1	28.9	
Unit value.....	\$1,906	\$807	\$675	\$695	\$648	(64.6)	(57.7)	(16.3)	(6.8)	
Taiwan:										
Quantity.....	73,405	726,050	2,014,466	769,223	1,815,846	2,644.3	889.1	177.5	136.1	
Value.....	128,458	626,241	1,381,243	534,849	1,235,214	975.2	387.5	120.6	130.9	
Unit value.....	\$1,750	\$863	\$686	\$695	\$680	(60.8)	(50.7)	(20.5)	(2.2)	
Subject Total:										
Quantity.....	104,911	807,737	2,376,442	927,177	2,034,296	2,165.2	669.9	194.2	119.4	
Value.....	188,513	692,123	1,625,730	644,658	1,376,732	762.4	267.1	134.9	113.6	
Unit value.....	\$1,797	\$857	\$684	\$695	\$677	(61.9)	(52.3)	(20.2)	(2.7)	
China nonsubject:										
Quantity.....	959,684	682,010	65,199	7,261	172,908	(93.2)	(28.9)	(90.4)	2,281.3	
Value.....	1,279,489	620,776	40,521	8,329	144,477	(96.8)	(51.5)	(93.5)	1,634.6	
Unit value.....	\$1,333	\$910	\$622	\$1,147	\$836	(53.4)	(31.7)	(31.7)	(27.2)	
All other sources:										
Quantity.....	120,842	162,010	232,320	85,004	83,151	92.3	34.1	43.4	(2.2)	
Value.....	175,140	172,623	203,843	81,592	67,554	16.4	(1.4)	18.1	(17.2)	
Unit value.....	\$1,449	\$1,066	\$877	\$960	\$812	(39.5)	(26.5)	(17.7)	(15.4)	
Non-subject Total:										
Quantity.....	1,080,526	844,020	297,519	92,265	256,059	(72.5)	(21.9)	(64.7)	177.5	
Value.....	1,454,629	793,399	244,364	89,921	212,031	(83.2)	(45.5)	(69.2)	135.8	
Unit value.....	\$1,346	\$940	\$821	\$975	\$828	(39.0)	(30.2)	(12.6)	(15.0)	
Total imports:										
Quantity.....	1,185,437	1,651,757	2,673,961	1,019,442	2,290,355	125.6	39.3	61.9	124.7	
Value.....	1,643,142	1,485,522	1,870,094	734,579	1,588,763	13.8	(9.6)	25.9	116.3	
Unit value.....	\$1,386	\$899	\$699	\$721	\$694	(49.5)	(35.1)	(22.2)	(3.7)	
U.S. producers':										
Average capacity quantity.....	1,028,696	855,642	627,880	303,337	214,975	(39.0)	(16.8)	(26.6)	(29.1)	
Production quantity.....	677,026	396,388	218,863	79,603	149,504	(67.7)	(41.5)	(44.8)	87.8	
Capacity utilization (fn1).....	65.8	46.3	34.9	26.2	69.5	(31.0)	(19.5)	(11.5)	43.3	
U.S. shipments:										
Quantity.....	458,177	393,800	236,701	94,653	121,387	(48.3)	(14.1)	(39.9)	28.2	
Value.....	804,853	441,271	206,961	89,007	102,883	(74.3)	(45.2)	(53.1)	15.6	
Unit value.....	\$1,757	\$1,121	\$874	\$940	\$848	(50.2)	(36.2)	(22.0)	(9.9)	
Export shipments:										
Quantity.....	97,700	61,192	15,134	5,356	21,704	(84.5)	(37.4)	(75.3)	305.2	
Value.....	177,111	73,683	11,981	4,822	16,241	(93.2)	(58.4)	(83.7)	236.8	
Unit value.....	\$1,813	\$1,204	\$792	\$900	\$748	(56.3)	(33.6)	(34.3)	(16.9)	
Ending inventory quantity.....										
Inventories/total shipments (fn1).....	115,953	57,237	22,433	26,932	22,470	(80.7)	(50.6)	(60.8)	(16.6)	
Production workers.....	20.9	12.6	8.9	13.5	7.9	(12.0)	(8.3)	(3.7)	(5.6)	
Hours worked (1,000s).....	1,869	1,572	768	633	566	(58.9)	(15.9)	(51.1)	(10.6)	
Wages paid (\$1,000).....	4,076	2,585	1,402	622	587	(65.6)	(36.6)	(45.8)	(5.6)	
Hourly Wages.....	83,169	57,103	34,064	14,900	14,896	(59.0)	(31.3)	(40.3)	(0.0)	
Productivity (kilowatts per hour).....	\$20.40	\$22.09	\$24.30	\$23.95	\$25.38	19.1	8.3	10.0	5.9	
Unit labor costs (dollars per kilowatt).....	0.17	0.15	0.16	0.13	0.25	(6.0)	(7.7)	1.8	99.0	
Net Sales:	\$123	\$144	\$156	\$187	\$100	26.7	17.3	8.0	(46.8)	
Quantity.....	***	***	***	***	***	***	***	***	***	
Value.....	***	***	***	***	***	***	***	***	***	
Unit value.....	***	***	***	***	***	***	***	***	***	
Cost of goods sold (COGS).....	***	***	***	***	***	***	***	***	***	
Gross profit of (loss).....	***	***	***	***	***	***	***	***	***	
SG&A expenses.....	***	***	***	***	***	***	***	***	***	
Operating income or (loss).....	***	***	***	***	***	***	***	***	***	
Capital expenditures.....	***	***	***	***	***	***	***	***	***	
Unit COGS.....	***	***	***	***	***	***	***	***	***	
Unit SG&A expenses.....	***	***	***	***	***	***	***	***	***	
Unit operating income or (loss).....	***	***	***	***	***	***	***	***	***	
COGS/sales (fn1).....	***	***	***	***	***	***	***	***	***	
Operating income or (loss)/sales (fn1).....	***	***	***	***	***	***	***	***	***	

Notes:

fn1.--Reported data are in percent and period changes are in percentage points.

fn2.--Undefined.

Table C-2

CSPV modules: Summary data concerning the U.S. market based on Commerce's December 16 revised scope language, 2011-13, January to June 2013, and January to June 2014

(Quantity=kilowatts; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per kilowatts; Period changes=percent--exceptions noted)

	Reported data					Period changes			
	Calendar year		January to June			Calendar year		Jan-Jun	
	2011	2012	2013	2013	2014	2011-13	2011-12	2012-13	2013-14
U.S. consumption quantity:									
Amount.....	1,643,614	2,045,557	2,910,662	1,114,095	2,411,742	77.1	24.5	42.3	116.5
Producers' share (fn1).....	27.9	19.3	8.1	8.5	5.0	(19.7)	(8.6)	(11.1)	(3.5)
Importers' share (fn1):									
China subject.....	4.6	30.8	76.2	72.5	77.4	71.6	26.2	45.4	4.8
Taiwan.....	4.3	12.1	9.7	13.4	8.9	5.4	7.8	(2.4)	(4.5)
Subtotal, subject.....	8.9	42.9	85.9	85.9	86.3	77.0	34.0	43.0	0.3
China nonsubject.....	58.4	33.3	2.2	0.7	7.2	(56.1)	(25.0)	(31.1)	6.5
All other sources.....	4.9	4.5	3.7	4.9	1.5	(1.1)	(0.3)	(0.8)	(3.4)
Subtotal, nonsubject.....	63.2	37.9	6.0	5.6	8.7	(57.3)	(25.4)	(31.9)	3.1
Total imports.....	72.1	80.7	91.9	91.5	95.0	19.7	8.6	11.1	3.5
U.S. consumption value:									
Amount.....	2,447,995	1,926,793	2,077,055	823,586	1,691,646	(15.2)	(21.3)	7.8	105.4
Producers' share (fn1).....	32.9	22.9	10.0	10.8	6.1	(22.9)	(10.0)	(12.9)	(4.7)
Importers' share (fn1):									
China subject.....	4.1	26.0	70.5	64.8	73.4	66.4	21.9	44.6	8.6
Taiwan.....	5.1	13.1	12.3	16.4	10.2	7.2	8.0	(0.8)	(6.2)
Subtotal, subject.....	9.2	39.0	82.8	81.2	83.6	73.6	29.8	43.8	2.4
China nonsubject.....	52.3	32.2	2.0	1.0	8.5	(50.3)	(20.0)	(30.3)	7.5
All other sources.....	5.6	5.8	5.3	7.0	1.8	(0.4)	0.2	(0.6)	(5.2)
Subtotal, nonsubject.....	57.9	38.0	7.2	8.0	10.3	(50.7)	(19.9)	(30.8)	2.3
Total imports.....	67.1	77.1	90.0	89.2	93.9	22.9	10.0	12.9	4.7
U.S. importers' U.S. Imports:									
China subject:									
Quantity.....	75,356	629,593	2,217,072	808,275	1,865,759	2,842.1	735.5	252.1	130.8
Value.....	100,328	500,073	1,465,188	533,611	1,241,156	1,360.4	398.4	193.0	132.6
Unit value.....	\$1,331	\$794	\$661	\$660	\$665	(50.4)	(40.3)	(16.8)	0.8
Taiwan:									
Quantity.....	70,665	247,722	282,689	148,908	214,556	300.0	250.6	14.1	44.1
Value.....	125,175	252,335	254,898	134,939	172,578	103.6	101.6	1.0	27.9
Unit value.....	\$1,771	\$1,019	\$902	\$906	\$804	(49.1)	(42.5)	(11.5)	(11.2)
Subject Total:									
Quantity.....	146,021	877,315	2,499,761	957,183	2,080,315	1,611.9	500.8	184.9	117.3
Value.....	225,503	752,408	1,720,086	668,550	1,413,734	662.8	233.7	128.6	111.5
Unit value.....	\$1,544	\$858	\$688	\$698	\$680	(55.4)	(44.5)	(19.8)	(2.7)
China nonsubject:									
Quantity.....	959,684	682,010	65,199	7,261	172,908	(93.2)	(28.9)	(90.4)	2,281.3
Value.....	1,279,489	620,776	40,521	8,329	144,477	(96.8)	(51.5)	(93.5)	1,634.6
Unit value.....	\$1,333	\$910	\$622	\$1,147	\$836	(53.4)	(31.7)	(31.7)	(27.2)
All other sources:									
Quantity.....	79,732	92,432	109,001	54,998	37,132	36.7	15.9	17.9	(32.5)
Value.....	138,150	112,338	109,487	57,700	30,552	(20.7)	(18.7)	(2.5)	(47.1)
Unit value.....	\$1,733	\$1,215	\$1,004	\$1,049	\$823	(42.0)	(29.9)	(17.4)	(21.6)
Non-subject Total:									
Quantity.....	1,039,416	774,442	174,200	62,259	210,040	(83.2)	(25.5)	(77.5)	237.4
Value.....	1,417,639	733,114	150,008	66,029	175,029	(89.4)	(48.3)	(79.5)	165.1
Unit value.....	\$1,364	\$947	\$861	\$1,061	\$833	(36.9)	(30.6)	(9.0)	(21.4)
Total imports:									
Quantity.....	1,185,437	1,651,757	2,673,961	1,019,442	2,290,355	125.6	39.3	61.9	124.7
Value.....	1,643,142	1,485,522	1,870,094	734,579	1,588,763	13.8	(9.6)	25.9	116.3
Unit value.....	\$1,386	\$899	\$699	\$721	\$694	(49.5)	(35.1)	(22.2)	(3.7)
U.S. producers':									
Average capacity quantity.....	1,028,696	855,642	627,880	303,337	214,975	(39.0)	(16.8)	(26.6)	(29.1)
Production quantity.....	677,026	396,388	218,863	79,603	149,504	(67.7)	(41.5)	(44.8)	87.8
Capacity utilization (fn1).....	65.8	46.3	34.9	26.2	69.5	(31.0)	(19.5)	(11.5)	43.3
U.S. shipments:									
Quantity.....	458,177	393,800	236,701	94,653	121,387	(48.3)	(14.1)	(39.9)	28.2
Value.....	804,853	441,271	206,961	89,007	102,883	(74.3)	(45.2)	(53.1)	15.6
Unit value.....	\$1,757	\$1,121	\$874	\$940	\$848	(50.2)	(36.2)	(22.0)	(9.9)
Export shipments:									
Quantity.....	97,700	61,192	15,134	5,356	21,704	(84.5)	(37.4)	(75.3)	305.2
Value.....	177,111	73,683	11,981	4,822	16,241	(93.2)	(58.4)	(83.7)	236.8
Unit value.....	\$1,813	\$1,204	\$792	\$900	\$748	(56.3)	(33.6)	(34.3)	(16.9)
Ending inventory quantity.....									
Quantity.....	115,953	57,237	22,433	26,932	22,470	(80.7)	(50.6)	(60.8)	(16.6)
Inventories/total shipments (fn1).....									
Quantity.....	20.9	12.6	8.9	13.5	7.9	(12.0)	(8.3)	(3.7)	(5.6)
Production workers.....	1,869	1,572	768	633	566	(58.9)	(15.9)	(51.1)	(10.6)
Hours worked (1,000s).....	4,076	2,585	1,402	622	587	(65.6)	(36.6)	(45.8)	(5.6)
Wages paid (\$1,000).....	83,169	57,103	34,064	14,900	14,896	(59.0)	(31.3)	(40.3)	(0.0)
Hourly Wages.....	\$20.40	\$22.09	\$24.30	\$23.95	\$25.38	19.1	8.3	10.0	5.9
Productivity (kilowatts per hour).....	0.17	0.15	0.16	0.13	0.25	(6.0)	(7.7)	1.8	99.0
Unit labor costs (dollars per kilowatt).....	\$123	\$144	\$156	\$187	\$100	26.7	17.3	8.0	(46.8)
Net Sales:									
Quantity.....	***	***	***	***	***	***	***	***	***
Value.....	***	***	***	***	***	***	***	***	***
Unit value.....	***	***	***	***	***	***	***	***	***
Cost of goods sold (COGS).....									
Gross profit of (loss).....	***	***	***	***	***	***	***	***	***
SG&A expenses.....	***	***	***	***	***	***	***	***	***
Operating income or (loss).....	***	***	***	***	***	***	***	***	***
Capital expenditures.....	***	***	***	***	***	***	***	***	***
Unit COGS.....	***	***	***	***	***	***	***	***	***
Unit SG&A expenses.....	***	***	***	***	***	***	***	***	***
Unit operating income or (loss).....	***	***	***	***	***	***	***	***	***
COGS/sales (fn1).....	***	***	***	***	***	***	***	***	***
Operating income or (loss)/sales (fn1).....	***	***	***	***	***	***	***	***	***

Notes:

fn1.--Reported data are in percent and period changes are in percentage points.

fn2.--Undefined.

Table C-3
CSPV modules: Summary data concerning the U.S. market, w/ exclusions *, 2011-13, January to June 2013, and January to June 2014**

(Quantity=kilowatts; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per kilowatts; Period changes=percent--exceptions noted)

	Reported data					Period changes			
	Calendar year		January to June			Calendar year			Jan-Jun
	2011	2012	2013	2013	2014	2011-13	2011-12	2012-13	2013-14
U.S. consumption quantity:									
Amount.....	***	***	***	***	***	***	***	***	***
Producers' share (fn1).....	***	***	***	***	***	***	***	***	***
Importers' share (fn1):									
China subject.....	***	***	***	***	***	***	***	***	***
Taiwan.....	***	***	***	***	***	***	***	***	***
Subtotal, subject.....	***	***	***	***	***	***	***	***	***
China nonsubject.....	***	***	***	***	***	***	***	***	***
All other sources.....	***	***	***	***	***	***	***	***	***
Subtotal, nonsubject.....	***	***	***	***	***	***	***	***	***
Total imports.....	***	***	***	***	***	***	***	***	***
U.S. consumption value:									
Amount.....	***	***	***	***	***	***	***	***	***
Producers' share (fn1).....	***	***	***	***	***	***	***	***	***
Importers' share (fn1):									
China subject.....	***	***	***	***	***	***	***	***	***
Taiwan.....	***	***	***	***	***	***	***	***	***
Subtotal, subject.....	***	***	***	***	***	***	***	***	***
China nonsubject.....	***	***	***	***	***	***	***	***	***
All other sources.....	***	***	***	***	***	***	***	***	***
Subtotal, nonsubject.....	***	***	***	***	***	***	***	***	***
Total imports.....	***	***	***	***	***	***	***	***	***
U.S. importers' U.S. Imports:									
China subject:									
Quantity.....									
Value.....	31,506	81,687	361,976	157,954	218,450	1,048.9	159.3	343.1	38.3
Unit value.....	60,055	65,882	244,487	109,809	141,518	307.1	9.7	271.1	28.9
Taiwan:									
Quantity.....	\$1,906	\$807	\$675	\$695	\$648	(64.6)	(57.7)	(16.3)	(6.8)
Value.....									
Unit value.....									
Subject Total:									
Quantity.....	73,405	726,050	2,014,466	769,223	1,815,846	2,644.3	889.1	177.5	136.1
Value.....	128,458	626,241	1,381,243	534,849	1,235,214	975.2	387.5	120.6	130.9
Unit value.....	\$1,750	\$863	\$686	\$695	\$680	(60.8)	(50.7)	(20.5)	(2.2)
China nonsubject:									
Quantity.....	104,911	807,737	2,376,442	927,177	2,034,296	2,165.2	669.9	194.2	119.4
Value.....	188,513	692,123	1,625,730	644,658	1,376,732	762.4	267.1	134.9	113.6
Unit value.....	\$1,797	\$857	\$684	\$695	\$677	(61.9)	(52.3)	(20.2)	(2.7)
All other sources:									
Quantity.....	959,684	682,010	65,199	7,261	172,908	(93.2)	(28.9)	(90.4)	2,281.3
Value.....	1,279,489	620,776	40,521	8,329	144,477	(96.8)	(51.5)	(93.5)	1,634.6
Unit value.....	\$1,333	\$910	\$622	\$1,147	\$836	(53.4)	(31.7)	(31.7)	(27.2)
Non-Subject Total:									
Quantity.....	1,080,526	844,020	297,519	92,265	256,059	(72.5)	(21.9)	(64.7)	177.5
Value.....	1,454,629	793,399	244,364	89,921	212,031	(83.2)	(45.5)	(69.2)	135.8
Unit value.....	\$1,346	\$940	\$821	\$975	\$828	(39.0)	(30.2)	(12.6)	(15.0)
Total imports:									
Quantity.....	1,185,437	1,651,757	2,673,961	1,019,442	2,290,355	125.6	39.3	61.9	124.7
Value.....	1,643,142	1,485,522	1,870,094	734,579	1,588,763	13.8	(9.6)	25.9	116.3
Unit value.....	\$1,386	\$899	\$699	\$721	\$694	(49.5)	(35.1)	(22.2)	(3.7)
U.S. producers:									
Average capacity quantity.....	***	***	***	***	***	***	***	***	***
Production quantity.....	***	***	***	***	***	***	***	***	***
Capacity utilization (fn1).....	***	***	***	***	***	***	***	***	***
U.S. shipments:									
Quantity.....	***	***	***	***	***	***	***	***	***
Value.....	***	***	***	***	***	***	***	***	***
Unit value.....	***	***	***	***	***	***	***	***	***
Export shipments:									
Quantity.....	***	***	***	***	***	***	***	***	***
Value.....	***	***	***	***	***	***	***	***	***
Unit value.....	***	***	***	***	***	***	***	***	***
Ending inventory quantity.....	***	***	***	***	***	***	***	***	***
Inventories/total shipments (fn1).....	***	***	***	***	***	***	***	***	***
Production workers.....	***	***	***	***	***	***	***	***	***
Hours worked (1,000s).....	***	***	***	***	***	***	***	***	***
Wages paid (\$1,000).....	***	***	***	***	***	***	***	***	***
Hourly Wages.....	***	***	***	***	***	***	***	***	***
Productivity (kilowatts per hour).....	***	***	***	***	***	***	***	***	***
Unit labor costs (dollars per kilowatt).....	***	***	***	***	***	***	***	***	***
Net Sales:									
Quantity.....	***	***	***	***	***	***	***	***	***
Value.....	***	***	***	***	***	***	***	***	***
Unit value.....	***	***	***	***	***	***	***	***	***
Cost of goods sold (COGS).....	***	***	***	***	***	***	***	***	***
Gross profit of (loss).....	***	***	***	***	***	***	***	***	***
SG&A expenses.....	***	***	***	***	***	***	***	***	***
Operating income or (loss).....	***	***	***	***	***	***	***	***	***
Capital expenditures.....	***	***	***	***	***	***	***	***	***
Unit COGS.....	***	***	***	***	***	***	***	***	***
Unit SG&A expenses.....	***	***	***	***	***	***	***	***	***
Unit operating income or (loss).....	***	***	***	***	***	***	***	***	***
COGS/sales (fn1).....	***	***	***	***	***	***	***	***	***
Operating income or (loss)/sales (fn1).....	***	***	***	***	***	***	***	***	***

Notes:

fn1.--Reported data are in percent and period changes are in percentage points.

fn2.--Undefined.

Table C-4
CSPV modules: Summary data concerning the U.S. market based on Commerce's December 16 revised scope, w/ exclusions *, 2011-13, January to June 2013, and January to June 2014**
 (Quantity=kilowatts; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per kilowatts; Period changes=percent--exceptions noted)

	Reported data					Period changes			
	2011	Calendar year 2012	2013	January to June 2013	2014	2011-13	Calendar year 2011-12	2012-13	Jan-Jun 2013-14
U.S. consumption quantity:									
Amount.....	***	***	***	***	***	***	***	***	***
Producers' share (fn1).....	***	***	***	***	***	***	***	***	***
Importers' share (fn1):									
China subject.....	***	***	***	***	***	***	***	***	***
Taiwan.....	***	***	***	***	***	***	***	***	***
Subtotal, subject.....	***	***	***	***	***	***	***	***	***
China nonsubject.....	***	***	***	***	***	***	***	***	***
All other sources.....	***	***	***	***	***	***	***	***	***
Subtotal, nonsubject.....	***	***	***	***	***	***	***	***	***
Total imports.....	***	***	***	***	***	***	***	***	***
U.S. consumption value:									
Amount.....	***	***	***	***	***	***	***	***	***
Producers' share (fn1).....	***	***	***	***	***	***	***	***	***
Importers' share (fn1):									
China subject.....	***	***	***	***	***	***	***	***	***
Taiwan.....	***	***	***	***	***	***	***	***	***
Subtotal, subject.....	***	***	***	***	***	***	***	***	***
China nonsubject.....	***	***	***	***	***	***	***	***	***
All other sources.....	***	***	***	***	***	***	***	***	***
Subtotal, nonsubject.....	***	***	***	***	***	***	***	***	***
Total imports.....	***	***	***	***	***	***	***	***	***
U.S. importers' U.S. Imports:									
China subject:									
Quantity.....	75,356	629,593	2,217,072	808,275	1,865,759	2,842.1	735.5	252.1	130.8
Value.....	100,328	500,073	1,465,188	533,611	1,241,156	1,360.4	398.4	193.0	132.6
Unit value.....	\$1,331	\$794	\$661	\$660	\$665	(50.4)	(40.3)	(16.8)	0.8
Taiwan:									
Quantity.....	70,665	247,722	282,689	148,908	214,556	300.0	250.6	14.1	44.1
Value.....	125,175	252,335	254,898	134,939	172,578	103.6	101.6	1.0	27.9
Unit value.....	\$1,771	\$1,019	\$902	\$906	\$804	(49.1)	(42.5)	(11.5)	(11.2)
Subject Total:									
Quantity.....	146,021	877,315	2,499,761	957,183	2,080,315	1,611.9	500.8	184.9	117.3
Value.....	225,503	752,408	1,720,086	668,550	1,413,734	662.8	233.7	128.6	111.5
Unit value.....	\$1,544	\$858	\$688	\$698	\$680	(55.4)	(44.5)	(19.8)	(2.7)
China nonsubject:									
Quantity.....	959,684	682,010	65,199	7,261	172,908	(93.2)	(28.9)	(90.4)	2,281.3
Value.....	1,279,489	620,776	40,521	8,329	144,477	(96.8)	(51.5)	(93.5)	1,634.6
Unit value.....	\$1,333	\$910	\$622	\$1,147	\$836	(53.4)	(31.7)	(31.7)	(27.2)
All other sources:									
Quantity.....	79,732	92,432	109,001	54,998	37,132	36.7	15.9	17.9	(32.5)
Value.....	138,150	112,338	109,487	57,700	30,552	(20.7)	(18.7)	(2.5)	(47.1)
Unit value.....	\$1,733	\$1,215	\$1,004	\$1,049	\$823	(42.0)	(29.9)	(17.4)	(21.6)
Non-subject Total:									
Quantity.....	1,039,416	774,442	174,200	62,259	210,040	(83.2)	(25.5)	(77.5)	237.4
Value.....	1,417,639	733,114	150,008	66,029	175,029	(89.4)	(48.3)	(79.5)	165.1
Unit value.....	\$1,364	\$947	\$861	\$1,061	\$833	(36.9)	(30.6)	(9.0)	(21.4)
Total imports:									
Quantity.....	1,185,437	1,651,757	2,673,961	1,019,442	2,290,355	125.6	39.3	61.9	124.7
Value.....	1,643,142	1,485,522	1,870,094	734,579	1,588,763	13.8	(9.6)	25.9	116.3
Unit value.....	\$1,386	\$899	\$699	\$721	\$694	(49.5)	(35.1)	(22.2)	(3.7)
U.S. producers':									
Average capacity quantity.....	***	***	***	***	***	***	***	***	***
Production quantity.....	***	***	***	***	***	***	***	***	***
Capacity utilization (fn1).....	***	***	***	***	***	***	***	***	***
U.S. shipments:									
Quantity.....	***	***	***	***	***	***	***	***	***
Value.....	***	***	***	***	***	***	***	***	***
Unit value.....	***	***	***	***	***	***	***	***	***
Export shipments:									
Quantity.....	***	***	***	***	***	***	***	***	***
Value.....	***	***	***	***	***	***	***	***	***
Unit value.....	***	***	***	***	***	***	***	***	***
Ending inventory quantity.....	***	***	***	***	***	***	***	***	***
Inventories/total shipments (fn1).....	***	***	***	***	***	***	***	***	***
Production workers.....	***	***	***	***	***	***	***	***	***
Hours worked (1,000s).....	***	***	***	***	***	***	***	***	***
Wages paid (\$1,000).....	***	***	***	***	***	***	***	***	***
Hourly Wages.....	***	***	***	***	***	***	***	***	***
Productivity (kilowatts per hour).....	***	***	***	***	***	***	***	***	***
Unit labor costs (dollars per kilowatt).....	***	***	***	***	***	***	***	***	***
Net Sales:									
Quantity.....	***	***	***	***	***	***	***	***	***
Value.....	***	***	***	***	***	***	***	***	***
Unit value.....	***	***	***	***	***	***	***	***	***
Cost of goods sold (COGS).....	***	***	***	***	***	***	***	***	***
Gross profit of (loss).....	***	***	***	***	***	***	***	***	***
SG&A expenses.....	***	***	***	***	***	***	***	***	***
Operating income or (loss).....	***	***	***	***	***	***	***	***	***
Capital expenditures.....	***	***	***	***	***	***	***	***	***
Unit COGS.....	***	***	***	***	***	***	***	***	***
Unit SG&A expenses.....	***	***	***	***	***	***	***	***	***
Unit operating income or (loss).....	***	***	***	***	***	***	***	***	***
COGS/sales (fn1).....	***	***	***	***	***	***	***	***	***
Operating income or (loss)/sales (fn1).....	***	***	***	***	***	***	***	***	***

Notes:

fn1.--Reported data are in percent and period changes are in percentage points.
 fn2.--Undefined.

APPENDIX D
NONSUBJECT COUNTRY PRICE DATA

Eighteen importers reported price data for nonsubject imports from China (covered by prior orders) for products 1-5 and 7-8, and three importers reported price data for Malaysia for products 1-4, and 7. Price data reported by these firms accounted for 18.1 percent of U.S. imports from nonsubject sources. These price items and accompanying data are comparable to those presented in tables V-3 to V-10. Price and quantity data for nonsubject China and Malaysia are shown in tables D-1 to D-7 and in figures D-1 to D-7 (with domestic and subject sources).

In comparing nonsubject country pricing data with U.S. producer pricing data, prices for product imported from China (nonsubject) and Malaysia were lower than prices for U.S.-produced CSPV product in *** instances and higher in *** instances. In comparing nonsubject country pricing data with subject country pricing data, prices for product imported from China (nonsubject) and Malaysia were lower than prices for CSPV products imported from subject countries in *** instances and higher in *** instances. A summary of margins of underselling and overselling is presented in table D-8.

Table D-1

CSPV products: Weighted-average f.o.b. prices and quantities of imported product 1¹ by quarters, January 2011-June 2014

* * * * *

Table D-2

CSPV products: Weighted-average f.o.b. prices and quantities of imported product 2¹ by quarters, January 2011-June 2014

* * * * *

Table D-3

CSPV products: Weighted-average f.o.b. prices and quantities of imported product 3¹ by quarters, January 2011-June 2014

* * * * *

Table D-4

CSPV products: Weighted-average f.o.b. prices and quantities of imported product 4¹ by quarters, January 2011-June 2014

* * * * *

Table D-5

CSPV products: Weighted-average f.o.b. prices and quantities of imported product 5¹ by quarters, January 2011-June 2014

* * * * *

Table D-6

CSPV products: Weighted-average f.o.b. prices and quantities of imported product 7¹ by quarters, January 2011-June 2014

* * * * *

Table D-7

CSPV products: Weighted-average f.o.b. prices and quantities of imported product 8¹ by quarters, January 2011-June 2014

* * * * *

Figure D-1

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 1, by quarters, January 2011-June 2014

* * * * *

Figure D-2

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 2, by quarters, January 2011-June 2014

* * * * *

Figure D-3

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 3, by quarters, January 2011-June 2014

* * * * *

Figure D-4

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 4, by quarters, January 2011-June 2014

* * * * *

Figure D-5

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 5, by quarters, January 2011-June 2014

* * * * *

Figure D-6

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 7, by quarters, January 2011-June 2014

* * * * *

Figure D-7

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 8, by quarters, January 2011-June 2014

* * * * *

Table D-8

CSPV products: Summary of underselling/(overselling), by country, January 2011-June 2014

* * * * *

APPENDIX E

**FINAL COMMERCE SCOPE DEFINITIONS:
ADJUSTED TRADE & PRICING DATA**

On October 3, 2014, Commerce issued a proposed scope clarification and invited comments from the parties. On December 16, 2014, Commerce issued its final determinations and final scope definitions. The scope definitions issued in its final determinations differed from both the scope definition in its notice of initiation and its October 3, 2014, scope clarification. The tabulation on the next page presents the effect on U.S. imports using the various scope definitions issued by Commerce.

U.S. imports of--		Prior CSPV 1 ¹ Investigations	Current CSPV 2 ² Investigations		
		Scope of Existing Orders: Cell dictates Origin	Initiated scope: Applying 2/3 rule	DOC Oct. 3 scope memo: No 2/3 rule	DOC 12/16 Final scope
Cells made in China	1	Subject China	Nonsubject China (previous orders)		
Modules made in China with cells made in China	2	Subject China	Nonsubject China (previous orders)		
Modules made in China using cells made in Taiwan (China inputs)	3	Nonsubject	Subject China		
Modules made in China using cells made in Taiwan (non-China inputs)	4	Nonsubject	Subject Taiwan	Subject China	Subject China
Modules made in China using cells made in 3 rd countries (China inputs)	5	Nonsubject	Subject China		
Modules made in China using cells made in 3 rd countries (non-China inputs)	6	Nonsubject	Nonsubject	Subject China	Subject China
Cells made in Taiwan	7	Nonsubject	Subject Taiwan		
Modules made in Taiwan using cells made in China (Taiwan inputs)	8	Subject China	Nonsubject China (previous orders)		
Modules made in Taiwan using cells made in China (non-Taiwan inputs)	9	Subject China	Nonsubject China (previous orders)		
Modules made in Taiwan using cells made in Taiwan	10	Nonsubject	Subject Taiwan		
Modules made in Taiwan using cells made in 3 rd country (Taiwan inputs)	11	Nonsubject	Subject Taiwan		Nonsubject
Modules made in Taiwan using cells made in 3 rd country (non-Taiwan inputs)	12	Nonsubject	Nonsubject	Subject Taiwan	Nonsubject
Cells made in 3 rd country	13	Nonsubject	Nonsubject		
Modules made in 3 rd countries with cells made in China	14	Subject China	Nonsubject China (previous orders)		
Modules made in 3 rd countries with cells made in Taiwan	15	Nonsubject	Subject Taiwan	Subject Taiwan ³	Subject Taiwan
Modules made in 3 rd countries with cells made in 3 rd countries	16	Nonsubject	Nonsubject		

¹ If Commerce's rule from the prior investigations (CSPV 1) (that the origin of the cell determines country of origin) applies, then there are no subject imports from China in these investigations (CSPV 2).

² Imports that are subject merchandise within the scope of the orders from the prior investigations (CSPV 1) are considered Nonsubject China in the current investigations (CSPV 2).

³ Commerce's October 3 memorandum would mostly assign country of origin based on the country where the module is assembled, except that it would treat modules made in third countries using cells made in Taiwan as Subject Taiwan.

The following tables have been modified and presented in this appendix to reflect the final scope definitions as announced by Commerce in its December 16, 2014 final determinations.¹

Part II of the Staff Report

(1) Table II-1: Channels of distribution

Part III of the Staff Report

(1) Tables III-10 to III-17: Related parties tables

Part IV of the Staff Report

(1) Table IV-1: U.S. importers

(2) Table IV-3: U.S. imports by category

(3) Table IV-4: U.S. imports

(4) Table IV-5: U.S. import shares by category (negligibility)

(5) Table IV-6: U.S. apparent consumption

(6) Table IV-7: U.S. market shares

(7) Table IV-8: Ratio of U.S. imports to U.S. production

Part V of the Staff Report

(1) Tables V-3 to V-10 and figures V-2 to V-8: Price data

(2) Table V-12: Instances of underselling/overselling

¹ Therefore, the corresponding tables in the body of the report present data using the scope language that Commerce published in its notices of initiation, which included petitioner's "two out of three" rule.

Table E-1 (equivalent to Table II-1)

CSPV products: U.S. producers' and U.S. importers' channels of distribution, 2011-13, January to June 2013, and January to June 2014

Item	Calendar year			January-June	
	2011	2012	2013	2013	2014
	Share of quantity (percent)				
U.S. producers' commercial U.S. shipments to:					
Distributors	24.8	41.1	44.1	33.3	56.0
Residential installers	4.7	3.5	5.8	5.5	5.7
Commercial installers	52.9	41.3	30.6	24.5	34.9
Utilities/developers	17.6	14.0	19.5	36.7	3.5
Total	100.0	100.0	100.0	100.0	100.0
U.S. importers' commercial U.S. shipments of imports from China (previous) to:					
Distributors	7.2	5.7	14.3	17.5	3.0
Residential installers	19.0	12.1	10.0	7.9	11.6
Commercial installers	42.1	46.2	42.6	30.3	27.5
Utilities/developers	31.6	35.9	33.1	44.2	57.9
Total	100.0	100.0	100.0	100.0	100.0
U.S. importers' commercial U.S. shipments of imports from China (current investigations based on December 16 scope language) to:					
Distributors	***	***	***	***	***
Residential installers	***	***	***	***	***
Commercial installers	***	***	***	***	***
Utilities/developers	***	***	***	***	***
Total	***	***	***	***	***
U.S. importers' commercial U.S. shipments of imports from Taiwan (based on December 16 scope language) to:					
Distributors	***	***	***	***	***
Residential installers	***	***	***	***	***
Commercial installers	***	***	***	***	***
Utilities/developers	***	***	***	***	***
Total	***	***	***	***	***
U.S. importers' U.S. shipments of imports from all other sources to:					
Distributors	11.3	6.1	18.9	32.8	34.7
Residential installers	45.8	12.8	23.0	3.3	13.3
Commercial installers	16.7	21.1	35.5	50.8	34.7
Utilities/developers	26.2	59.9	22.7	13.2	17.3
Total	100.0	100.0	100.0	100.0	100.0

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

Table E-2 (equivalent to Table III-10)

CSPV products: U.S. producers' direct imports, 2010-2012, January-September 2012, and January-September 2013

* * * * *

Table E-3 (equivalent to Table III-11)

CSPV products: U.S. producers' direct imports, 2011-13, January to June 2013, and January to June 2014

* * * * *

Table E-4 (equivalent to Table III-12)

CSPV products: U.S. producers' direct imports, 2011-13, January to June 2013, and January to June 2014

* * * * *

Table E-5 (equivalent to Table III-13)

CSPV products: U.S. producers' direct imports, 2011-13, January to June 2013, and January to June 2014

* * * * *

Table E-6 (equivalent to Table III-14)

CSPV products: U.S. producers' direct imports, 2011-13, January to June 2013, and January to June 2014

* * * * *

Table E-7 (equivalent to Table III-15)

CSPV products: U.S. producers' direct imports, 2011-13, January to June 2013, and January to June 2014

* * * * *

Table E-8 (equivalent to Table III-16)

CSPV products: U.S. producers' direct imports, 2011-13, January to June 2013, and January to June 2014

* * * * *

Table E-9 (equivalent to Table III-17)

CSPV products: U.S. producers' direct imports, 2011-13, January to June 2013, and January to June 2014

* * * * *

Table E-10 (equivalent to Table IV-1)

CSPV products: U.S. importers, their headquarters, and share of total imports, January 2011 through June 2014

Firm	Headquarters	Share of imports by source of cells (percent)				
		Subject			Nonsubject (w/ China previous)	
		China Modules	Taiwan Cells	Taiwan Modules	Cells (China and all others)	Modules (China previous and all others)
Adema	Santa Clara, CA	***	***	***	***	***
Alps Technology	Walnut, CA	***	***	***	***	***
Ameresco	Framingham, MA	***	***	***	***	***
Andalay Solar	San Jose, CA	***	***	***	***	***
Astro Solartech	Irwindale, CA	***	***	***	***	***
AUO Green Energy	Milpitas, CA	***	***	***	***	***
BP Solar	Warrenville, IL	***	***	***	***	***
Canadian Solar	San Ramon, CA	***	***	***	***	***
Carmanah	Victoria, BC	***	***	***	***	***
China Sunergy	San Jose , CA	***	***	***	***	***
DMEGC Solar	Torrance, CA	***	***	***	***	***
Ecosolargy	Irvine , CA	***	***	***	***	***
ET Solar	Pleasanton, CA	***	***	***	***	***
Grape Solar	Eugene, OR	***	***	***	***	***
Hanwha Q Cells	Irvine, CA	***	***	***	***	***
Hanwha SolarOne	Santa Clara, CA	***	***	***	***	***
HareonSolar	San Jose, CA	***	***	***	***	***
IES Residential	Stafford, TX	***	***	***	***	***
IES (Sonepar)	San Leandro, CA	***	***	***	***	***
JA Solar	San Jose, CA	***	***	***	***	***
Jinko Solar	San Francisco, CA	***	***	***	***	***
Kyocera Solar	Scottsdale, AZ	***	***	***	***	***
Lightway	City Of Industry, CA	***	***	***	***	***
Motech Americas	New Castle, DE	***	***	***	***	***
MS Solar	Purchase, NY	***	***	***	***	***
NextEra	Juno Beach , FL	***	***	***	***	***
ReneSola	San Francisco, CA	***	***	***	***	***
SBM Solar	Concord, NC	***	***	***	***	***
SCHOTT	Albuquerque, NM	***	***	***	***	***
Schuco	Newington , CT	***	***	***	***	***
SF Suntech	Palo Alto, CA	***	***	***	***	***
Sharp	Memphis, TN	***	***	***	***	***
Silicon Energy	Marysville, WA	***	***	***	***	***
Silver Ridge (AES Solar)	Arlington, VA	***	***	***	***	***
Solarland	Grayslake, IL	***	***	***	***	***
SolarWorld	Hillsboro, OR	***	***	***	***	***
Solatu	Vista, CA	***	***	***	***	***
Solon	Tucson, AZ	***	***	***	***	***
SUMEC	Santa Fe Springs, CA	***	***	***	***	***
SunEdison	Belmont, CA	***	***	***	***	***
Suniva	Norcross , GA	***	***	***	***	***

Sunperfect	San Jose, CA	***	***	***	***	***
Talesun	San Jose, CA	***	***	***	***	***
tenKsolar	Bloomington, MN	***	***	***	***	***
Trina Solar	San Jose, CA	***	***	***	***	***
Upsolar	San Francisco, CA	***	***	***	***	***
Wanxiang	Rockford, IL	***	***	***	***	***
Yingli	New York, NY	***	***	***	***	***
Total		***	***	***	***	***

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

Table E-11 (equivalent to Table IV-3)

CSPV products: U.S. imports by country of exportation and origin contained cells, 2011-13, January to June 2013, and January to June 2014

Country of exportation	Number	Calendar year			January to June	
		2011	2012	2013	2013	2014
		Quantity (kilowatts)				
U.S. imports of cells from China	1	***	***	***	***	***
U.S. imports of modules from China:						
Containing Chinese-origin cells	2	***	***	***	***	***
Containing Taiwanese-origin cells (China inputs)	3	***	***	***	***	***
Containing Taiwanese-origin cells (non-China inputs)	4	***	***	***	***	***
Containing Third-country cells (China inputs)	5	***	***	***	***	***
Containing Third-country cells (non-China inputs)	6	***	***	***	***	***
Total imports of modules exported from China	2 thru 6	***	***	***	***	***
U.S. imports of cells from Taiwan	7	***	***	***	***	***
U.S. imports of modules from Taiwan:						
Containing Chinese-origin cells (Taiwan inputs)	8	***	***	***	***	***
Containing Chinese-origin cells (non-Taiwan inputs)	9	***	***	***	***	***
Containing Taiwanese-origin cells	10	***	***	***	***	***
Containing Third-country cells (Taiwan inputs)	11	***	***	***	***	***
Containing Third-country cells (non-Taiwan inputs)	12	***	***	***	***	***
Total imports of modules exported from Taiwan	8 thru 12	***	***	***	***	***
U.S. imports of cells from All other sources	13	***	***	***	***	***
U.S. imports of modules from All other sources:						
Containing Chinese-origin cells	14	***	***	***	***	***
Containing Taiwanese-origin cells	15	***	***	***	***	***
Containing Third-country cells	16	***	***	***	***	***
Total imports of modules exported from Third countries	14, 15, & 16	***	***	***	***	***
U.S. imports of modules from China subject to current investigation based on Commerce's December 16, 2014 revised scope language (China subject)	3, 4, 5 and 6	***	***	***	***	***
U.S. imports of modules from Taiwan subject to current investigation based on Commerce's December 16, 2014 revised scope language (Taiwan)	10 and 15	***	***	***	***	***
Subject imports of modules		***	***	***	***	***
U.S. imports of modules from China subject to existing antidumping and countervailing duty orders (China nonsubject/ previous orders)	2, 8, 9 and 14	***	***	***	***	***
U.S. imports of modules from All other sources based on Commerce's December 16, 2014 revised scope language	11, 12, and 16	***	***	***	***	***
Nonsubject imports of modules		***	***	***	***	***
Total imports of modules		***	***	***	***	***

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

Table E-12 (equivalent to Table IV-4)

CSPV products: U.S. imports by origin and type, 2011-13, January to June 2013, and January to June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilowatts)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	75,356	629,593	2,217,072	808,275	1,865,759
Taiwan	70,665	247,722	282,689	148,908	214,556
Subtotal, subject sources	146,021	877,315	2,499,761	957,183	2,080,315
China nonsubject	959,684	682,010	65,199	7,261	172,908
All other sources	79,732	92,432	109,001	54,998	37,132
Subtotal, nonsubject sources	1,039,416	774,442	174,200	62,259	210,040
Subtotal, imports of modules all sources	1,185,437	1,651,757	2,673,961	1,019,442	2,290,355
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

Table continued.

Table E-12 (equivalent to Table IV-4)—Continued

CSPV products: U.S. imports by origin and type, 2011-13, January to June 2013, and January to June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Value (1,000 dollars)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	100,328	500,073	1,465,188	533,611	1,241,156
Taiwan	125,175	252,335	254,898	134,939	172,578
Subtotal, subject sources	225,503	752,408	1,720,086	668,550	1,413,734
China nonsubject	1,279,489	620,776	40,521	8,329	144,477
All other sources	138,150	112,338	109,487	57,700	30,552
Subtotal, nonsubject sources	1,417,639	733,114	150,008	66,029	175,029
Subtotal, imports of modules all sources	1,643,142	1,485,522	1,870,094	734,579	1,588,763
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

Table continued

Table E-12 (equivalent to Table IV-4)--Continued

CSPV products: U.S. imports by origin and type, 2011-13, January to June 2013, and January to June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Unit value (dollars per kilowatts)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	1,331	794	661	660	665
Taiwan	1,771	1,019	902	906	804
Subtotal, subject sources	1,544	858	688	698	680
China nonsubject	1,333	910	622	1,147	836
All other sources	1,733	1,215	1,004	1,049	823
Subtotal, nonsubject sources	1,364	947	861	1,061	833
Subtotal, imports of modules all sources	1,386	899	699	721	694
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

Table continued

Table E-12 (equivalent to Table IV-4)--Continued

CSPV products: U.S. imports by origin and type, 2011-13, January to June 2013, and January to June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Share of quantity of product type subtotals (percent)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	6.4	38.1	82.9	79.3	81.5
Taiwan	6.0	15.0	10.6	14.6	9.4
Subtotal, subject sources	12.3	53.1	93.5	93.9	90.8
China nonsubject	81.0	41.3	2.4	0.7	7.5
All other sources	6.7	5.6	4.1	5.4	1.6
Subtotal, nonsubject sources	87.7	46.9	6.5	6.1	9.2
Subtotal, imports of modules all sources	100.0	100.0	100.0	100.0	100.0
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

Table continued

Table E-12 (equivalent to Table IV-4)--Continued

CSPV products: U.S. imports by origin and type, 2011-13, January to June 2013, and January to June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Share of quantity of source subtotals (percent)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of modules all sources	***	***	***	***	***
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

Table continued

Table E-12 (equivalent to Table IV-4)--Continued

CSPV products: U.S. imports by origin and type, 2011-13, January to June 2013, and January to June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Share of overall quantity (percent)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
U.S. imports of CSPV modules ¹ from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of modules all sources	***	***	***	***	***
U.S. imports of all CSPV products (cells and modules ¹) from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject sources	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject sources	***	***	***	***	***
Subtotal, imports of cells and modules all sources	***	***	***	***	***

(1) Imports of modules are presented based classifications pursuant to scope definitions in Commerce's final determinations.

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

Table E-13 (equivalent to Table IV-5)

CSPV products: U.S. imports for negligibility, 2011-13, January to June 2013, and January to June 2014

Country of exportation	Number	Calendar year			January to June	
		2011	2012	2013	2013	2014
Quantity (kilowatts)						
U.S. imports from all sources		***	***	***	***	***
Share of quantity (percent)						
U.S. imports of cells from China	1	***	***	***	***	***
U.S. imports of modules from China:						
Containing Chinese-origin cells	2	***	***	***	***	***
Containing Taiwanese-origin cells (China inputs)	3	***	***	***	***	***
Containing Taiwanese-origin cells (non-China inputs)	4	***	***	***	***	***
Containing Third-country cells (China inputs)	5	***	***	***	***	***
Containing Third-country cells (non-China inputs)	6	***	***	***	***	***
Total imports of modules exported from China	2 thru 6	***	***	***	***	***
U.S. imports of cells from Taiwan	7	***	***	***	***	***
U.S. imports of modules from Taiwan:						
Containing Chinese-origin cells (Taiwan inputs)	8	***	***	***	***	***
Containing Chinese-origin cells (non-Taiwan inputs)	9	***	***	***	***	***
Containing Taiwanese-origin cells	10	***	***	***	***	***
Containing Third-country cells (Taiwan inputs)	11	***	***	***	***	***
Containing Third-country cells (non-Taiwan inputs)	12	***	***	***	***	***
Total imports of modules exported from Taiwan	8 thru 12	***	***	***	***	***
U.S. imports of cells from All other sources	13	***	***	***	***	***
U.S. imports of modules from All other sources:						
Containing Chinese-origin cells	14	***	***	***	***	***
Containing Taiwanese-origin cells	15	***	***	***	***	***
Containing Third-country cells	16	***	***	***	***	***
Total imports of modules exported from Third countries	14, 15, & 16	***	***	***	***	***
U.S. imports of modules from China subject to current investigation based on Commerce's scope definitions in its final determinations (China subject)	3, 4, 5 and 6	***	***	***	***	***
U.S. imports of modules from Taiwan subject to current investigation based on Commerce's scope definitions in its final determinations (Taiwan)	10 and 15	***	***	***	***	***
Subject imports of modules		***	***	***	***	***
U.S. imports of modules from China subject to existing antidumping and countervailing duty orders (China nonsubject/ previous orders)	2, 8, 9 and 14	***	***	***	***	***
U.S. imports of modules from All other sources based on Commerce's scope definitions in its final determinations	11, 12 and 16	***	***	***	***	***
Nonsubject imports of modules		***	***	***	***	***
Total imports of modules		***	***	***	***	***
China negligibility line (modules only)	3, 4, 5 and 6	***	***	***	***	***
Taiwan negligibility line (modules and cells)	7, 10, 11, 12 and 15	***	***	***	***	***
Subject negligibility line		***	***	***	***	***

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

Table E-14 (equivalent to Table IV-6)**CSPV modules: Apparent U.S. consumption, 2011-13, January to June 2013, and January to June 2014**

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilowatts)				
U.S. producers' U.S. shipments of CSPV modules	458,177	393,800	236,701	94,653	121,387
U.S. imports of CSPV modules from.-- China subject	75,356	629,593	2,217,072	808,275	1,865,759
Taiwan	70,665	247,722	282,689	148,908	214,556
Subtotal, subject imports	146,021	877,315	2,499,761	957,183	2,080,315
China nonsubject	959,684	682,010	65,199	7,261	172,908
All other sources	79,732	92,432	109,001	54,998	37,132
Subtotal, nonsubject imports	1,039,416	774,442	174,200	62,259	210,040
Total imports	1,185,437	1,651,757	2,673,961	1,019,442	2,290,355
Apparent U.S. consumption	1,643,614	2,045,557	2,910,662	1,114,095	2,411,742
	Value (1,000 dollars)				
U.S. producers' U.S. shipments of CSPV modules	804,853	441,271	206,961	89,007	102,883
U.S. imports of CSPV modules from.-- China subject	100,328	500,073	1,465,188	533,611	1,241,156
Taiwan	125,175	252,335	254,898	134,939	172,578
Subtotal, subject imports	225,503	752,408	1,720,086	668,550	1,413,734
China nonsubject	1,279,489	620,776	40,521	8,329	144,477
All other sources	138,150	112,338	109,487	57,700	30,552
Subtotal, nonsubject imports	1,417,639	733,114	150,008	66,029	175,029
Total imports	1,643,142	1,485,522	1,870,094	734,579	1,588,763
Apparent U.S. consumption	2,447,995	1,926,793	2,077,055	823,586	1,691,646

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

Table E-15 (equivalent to Table IV-7)

CSPV modules: U.S. market shares, 2011-13, January to June 2013, and January to June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilowatts)				
Apparent U.S. consumption	1,643,614	2,045,557	2,910,662	1,114,095	2,411,742
Market share by quantity (percent)					
U.S. producers' U.S. shipments of CSPV modules	27.9	19.3	8.1	8.5	5.0
U.S. imports of CSPV modules from.--					
China subject	4.6	30.8	76.2	72.5	77.4
Taiwan	4.3	12.1	9.7	13.4	8.9
Subtotal, subject imports	8.9	42.9	85.9	85.9	86.3
China nonsubject	58.4	33.3	2.2	0.7	7.2
All other sources	4.9	4.5	3.7	4.9	1.5
Subtotal, nonsubject imports	63.2	37.9	6.0	5.6	8.7
Total imports	72.1	80.7	91.9	91.5	95.0
Value (1,000 dollars)					
Apparent U.S. consumption	2,447,995	1,926,793	2,077,055	823,586	1,691,646
Market share by quantity (percent)					
U.S. producers' U.S. shipments of CSPV modules	32.9	22.9	10.0	10.8	6.1
U.S. imports of CSPV modules from.--					
China subject	4.1	26.0	70.5	64.8	73.4
Taiwan	5.1	13.1	12.3	16.4	10.2
Subtotal, subject imports	9.2	39.0	82.8	81.2	83.6
China nonsubject	52.3	32.2	2.0	1.0	8.5
All other sources	5.6	5.8	5.3	7.0	1.8
Subtotal, nonsubject imports	57.9	38.0	7.2	8.0	10.3
Total imports	67.1	77.1	90.0	89.2	93.9

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

Table E-16 (equivalent to Table IV-8)

CSPV products: U.S. imports as a ratio to U.S. production, 2011-13, January to June 2013, and January to June 2014

Item	Calendar year			January to June	
	2011	2012	2013	2013	2014
	Quantity (kilowatts)				
U.S. production of cells	***	***	***	***	***
	Ratio to U.S. production (percent)				
U.S. imports of CSPV cells from.-- China subject	***	***	***	***	***
Taiwan	***	***	***	***	***
Subtotal, subject imports	***	***	***	***	***
China nonsubject	***	***	***	***	***
All other sources	***	***	***	***	***
Subtotal, nonsubject imports	***	***	***	***	***
Subtotal, imports of cells all sources	***	***	***	***	***
	Quantity (kilowatts)				
U.S. production of modules	677,026	396,388	218,863	79,603	149,504
	Ratio to U.S. production (percent)				
U.S. imports of CSPV modules from.-- China subject	11.1	158.8	1,013.0	1,015.4	1,248.0
Taiwan	10.4	62.5	129.2	187.1	143.5
Subtotal, subject imports	21.6	221.3	1,142.2	1,202.4	1,391.5
China nonsubject	141.7	172.1	29.8	9.1	115.7
All other sources	11.8	23.3	49.8	69.1	24.8
Subtotal, nonsubject imports	153.5	195.4	79.6	78.2	140.5
Subtotal, imports of modules all sources	175.1	416.7	1,221.8	1,280.7	1,532.0

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

Table E-17 (equivalent to Table V-3)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 1, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Figure E-1 (equivalent to Figure V-2)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 1, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-18 (equivalent to Table V-4)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 2, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Figure E-2 (equivalent to Figure V-3)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 2, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-19 (equivalent to Table V-5)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 3, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Figure E-3 (equivalent to Figure V-4)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 3, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-20 (equivalent to Table V-6)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 4, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Figure E-4 (equivalent to Figure V-5)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 4, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-21 (equivalent to Table V-7)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 5, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Figure E-5 (equivalent to Figure V-6)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 5, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-22 (equivalent to Table V-8)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 6, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Figure E-6 (equivalent to Figure V-7)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 6, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-23 (equivalent to Table V-9)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 7, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Figure E-7 (equivalent to Figure V-8)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 7, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-24 (equivalent to Table V-10)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 8, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Figure E-8 (equivalent to Figure V-9)

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 8, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-25 (equivalent to Table V-12)

CSPV products: Instances of underselling/overselling and the range and average of margins, by country, January 2011 through June 2014

* * * * *

Table E-26 w/ exclusions (*)**

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 1, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-27 w/ exclusions (*)**

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 2, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-28 w/ exclusions (*)**

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 3, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-29 w/ exclusions (*)**

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 4, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-30 w/ exclusions (*)**

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 5, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-31 w/ exclusions (*)**

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 6, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-32 w/ exclusions (*)**

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 7, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-33 w/ exclusions (*)**

CSPV products: Weighted-average f.o.b. prices and quantities of domestic and imported product 8, and margins of underselling/(overselling), by quarter, January 2011 through June 2014

* * * * *

Table E-34 w/ exclusions (*)**

CSPV products: Instances of underselling/overselling and the range and average of margins, by country, January 2011 through June 2014

* * * * *

