Akin Gump
STRAUSS HAUER & FELD LLP

MATTHEW R. NICELY
+1 202.887.4046 fax: +1 202.887.4288
mnicely@akingump.com

October 28, 2021

Inv. No. TA-201-075 (Extension)

NON-CONFIDENTIAL VERSION

Confidential Business Information has been deleted from pages 9-10, 12-24, 26-28, 31-35, 37-38, 43-45, 47-49, 54-78, 86, 89-90, 94, 102-108, 110-111, 118, Exhibit List, Appendix A, Appendix B, and in Exhibits 9, 28, 34, 58-63, 91, 97-98, 101, 120, 122.

VIA ELECTRONIC FILING (EDIS)

The Honorable Lisa R. Barton
Secretary to the Commission
U.S. International Trade Commission
500 E Street, SW
Washington, DC 20436

Re: *Crystalline Silicon Photovoltaic Cells (Whether or Not Partially or Fully Assembled into Other Products),* Inv. No. TA-201-075 (Extension): Prehearing Brief of Solar Energy Industries Association and REC Americas LLC

Dear Secretary Barton:

On behalf of Solar Energy Industries Association ("SEIA") and REC Americas LLC, we enclose for filing the Prehearing Brief in the above referenced proceeding.

Pursuant to 19 C.F.R. § 201.6, we respectfully request proprietary treatment for confidential business information bracketed in the text. The release of the information for which we seek proprietary treatment is proprietary information of other parties or information designated as confidential in the Commission's Prehearing Report.

In accordance with 19 C.F.R. § 201.8(d), the signed original of this document is filed electronically. No paper copies are submitted to the International Trade Commission pursuant to the Commission's Temporary Change to Filing Procedures.[1] This submission has been served on all other interested parties as set forth in the attached certificate of service pursuant to 19 C.F.R. § 206.8(b).

Please contact us if you have any questions regarding this submission, or require additional information.

Respectfully submitted,

/s/ Matthew R. Nicely
Matthew R. Nicely
Julia K. Eppard
Daniel M. Witkowski
Sydney L. Stringer

Akin Gump Strauss Hauer & Feld LLP
Counsel to Solar Energy Industries Association ("SEIA") and REC Americas LLC

[1] *Temporary Change to Filing Procedures*, 85 Fed. Reg. 15,797 (Int'l Trade Comm'n Mar. 19, 2020).

CERTIFICATION OF COUNSEL

In accordance with the Commission's rules, I, Matthew R. Nicely, of Akin Gump Strauss Hauer & Feld LLP, counsel to Solar Energy Industries Association ("SEIA") and REC Americas LLC., do hereby certify that, to the best of my knowledge and belief, information identical to that for which proprietary treatment has been requested in this submission is not available to the general public, pursuant to 19 C.F.R. § 201.6(b)(3)(iii).

Furthermore, in accordance with 19 C.F.R. § 207.3(a), I hereby certify that: (1) I have read the attached submission, and (2) based on the information made available to me by the aforementioned company, I have no reason to believe that this submission contains any material misrepresentation or omission of fact, and (3) the information contained in this submission is accurate and complete to the best of my knowledge.

Signature

October 27, 2021

Date

PUBLIC SERVICE LIST

I, Matthew R. Nicely, hereby certify that a copy of the attached submission has been served this day, via electronic mail, upon the following persons:

/s/ Matthew R. Nicely

Matthew R. Nicely
Akin Gump Strauss Hauer & Feld LLP
2001 K Street, NW
Washington, DC 20006

Date: October 28, 2021

On behalf of Hanwha Q CELLS USA, Inc. and Mission Solar Energy:

John M. Gurley
Arent Fox LLP
1717 K Street, NW
Washington, DC 20006
202.857.6301 – voice
202.857.6395 – fax
John.gurley@arentfox.com

On behalf of Auxin Solar Inc.:

Thomas M. Beline
Cassidy Levy Kent (USA) LLP
900 19th Street NW
Suite 400
Washington, DC 20006
202.567.2316 – voice
202.567-2301 – fax
tbeline@cassidylevy.com
records@cassidylevy.com

On behalf of Suniva, Inc.:

Christopher T. Cloutier
Schagrin Associates
900 Seventh Street, NW
Suite 500
Washington, DC 20001
202.223.1790 – voice
202.429.2522 – fax
ccloutier@schagrinassociates.com
service@schagrinassociates.com

On behalf of JA Solar International Limited, American Clean Power Association and Clearway Energy Group LLC:

Kristen H. Mowry
Mowry & Grimson, PLLC
5335 Wisconsin Ave., NW
Suite 810
Washington, DC 20015
202.688.3610 – voice
202.595.8968 – fax
trade@mowrygrimson.com

On behalf of Canadian Solar Inc., Canadian Solar (USA) Inc., Canadian Solar Solutions Inc., Canadian Solar Manufacturing (Thailand) Co., Ltd., and Canadian Solar Manufacturing Vietnam Co., Ltd. (collectively, "Canadian Solar") and Silfab Solar WA Inc., Silfab Solar USA Inc., Silfab Silar Inc., Heliene USA Inc., Heliene Inc. and Government of Canada:

Jonathan T. Stoel, Esq.
Hogan Lovells US LLP
555 Thirteenth Street, NW
Washington, DC 20004
202.637.6634 – voice
Jonathan.Stoel@hoganlovells.com

On behalf of Trina Solar Co., Ltd.:

Jonathan M. Freed
Trade Pacific PLLC
700 Pennsylvania Avenue, SE
Suite 500
Washington, DC 20003
202.223.4760 – voice
Jfreed@tradepacificlaw.com

On behalf of China Chamber of Commerce for Import and Export of Machinery and Electronic Products, LONGi, Green Energy Technology Co., Ltd. Risen Energy Co., Ltd. and GCL System Integration Technology Co., Ltd.:

Donald B. Cameron
Morris, Manning & Martin, LLP
1401 Eye Street, NW
Suite 600
Washington, DC 20005
202.216.4811 – voice
dcameron@mmmlaw.com
tradeservice@mmmlaw.com

On behalf of SunPower Corporation and SunPower Manufacturing Oregon, LLC:

John R. Magnus, Esq.
TradeWins LLC
1330 Connecticut Ave, NW
Washington, DC 20036
202.744.0368 – voice
jmagnus@tradewinsllc.net

On behalf of LG Electronics USA, Inc.:

Daniel L. Porter, Esq.
Curtis, Mallet-Prevost, Colt & Mosle LLP
1717 Pennsylvania Avenue, NW
Washington, DC 20006
202.452.7340 – voice
202.452.7333 – fax
dporter@curtis.com

On behalf of NextEra Energy Inc.:

Matt R. Nicely
Akin Gump Strauss Hauer & Feld LLP
2001 K Street, NW
Washington, DC 20006
202.887.4046– voice
mnicely@akingump.com

On behalf of the Government of Mexico:

Alberto Sandoval, Second Secretary of the Office for the Implementation of the USMCA
Mexico Embassy in the USA
1911 Pennsylvania Ave, NW
Washington, DC 20006
202.728.1600- voice
202.728.1752 – fax
Cesar.remis@economia.gob.mx
Ignacio.sandoval@economia.gob.mx

On behalf of the Government of the Republic of Turkey:

Ahmet Erkan CETINKAYIS, Acting Director
General Directorate General of Imports
T.C. Ticaret Bakanligi
Sogutozu Mah. 2176. Sk. No: 63 06530 Cankaya,
Ankara, Turkey
+90 312 222 8858 - voice
+90 312 204 8632 - fax
cetinkavisa@trade.gov.tr

On behalf of Government of Malaysia:

Norazah Abdul Jabbar, Director
Ministry of International Trade and Industry
Level 9, No. 7, Menara MITI, Jalan Sultan Haji Ahmad Shah
50480 Kuala Lumpur, Malaysia
+603 – 6208 4632 - voice
+603 – 6211 4429 – fax
alltps@miti.gov.my

On behalf of The Government of the Republic of Indonesia (GOI):

Mr. Wijayanto
Commercial Attaché
Embassy of Indonesia
2020 Massachusetts Avenue N.W.
Washington DC 20036
+1 202 660 8099 - voice
wijayanto@embassyofindonesia.org

On behalf of The Government of the Republic of Korea:
Sung-taek, Park, Minister-Counselor
Embassy of the Republic of Korea
2450 Massachusetts Ave., NW
Washington, DC 20008
202.939.6480 – voice

BEFORE THE
UNITED STATES INTERNATIONAL TRADE COMMISSION

NON-CONFIDENTIAL VERSION

CRYSTALLINE SILICON PHOTOVOLTAIC CELLS, WHETHER OR NOT PARTIALLY OR FULLY ASSEMBLED INTO OTHER PRODUCTS	)	Inv. No. TA-201-75 (Extension)

PREHEARING BRIEF of

SOLAR ENERGY INDUSTRIES ASSOCIATION ("SEIA")
and REC AMERICAS LLC

VOLUME I – NARRATIVE

Thomas J. Prusa, PhD
Professor
Department of Economics
RUTGERS UNIVERSITY

James P. Dougan
Jerrie V. Mirga
ION ECONOMICS LLC

Consultants to SEIA and REC Americas LLC

Matthew R. Nicely
Julia K. Eppard
Daniel M. Witkowski
Sydney L. Stringer

AKIN GUMP STRAUSS HAUER & FELD LLP
2001 K. Street, NW
Washington, DC 20006

Counsel to SEIA and REC Americas LLC

October 28, 2021

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INTRODUCTION

Upon taking office earlier this year, President Biden warned, "we've already waited too long to deal with this climate crisis and we can't wait any longer."[1] In 2021 alone, climate change has spurred a series of dangerous weather events throughout the United States: record-breaking heat waves in the Pacific Northwest,[2] unprecedented downpours in New York City,[3] deadly flash floods in central Tennessee,[4] widespread drought in the Western United States,[5] and the second-largest wildfire in California history (which is ongoing and has already burned nearly a million acres).[6] One of President Biden's first actions in office was to enact an executive order "to supercharge our . . . ambitious plan to confront the existential threat of climate change,"[7] a plan that experts agree requires rapid decarbonization of the entire U.S. electrical grid.[8] The Biden Administration is trying to set the United States on track to net-zero emissions by 2050, which could have "estimated long-term benefits from climate change mitigation and avoided public health costs . . . on the order of trillions of dollars."[9]

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[1] Remarks by President Biden before Signing Executive Action on Tackling Climate Change, Creating Jobs, and Restoring Scientific Integrity (Jan. 27, 2021) (**Exhibit 1**).

[2] Andrea Januta, *Pacific Northwest Heat Wave "Virtually Impossible" Without Climate Change – Research*, Reuters (July 8, 2021) (**Exhibit 2**).

[3] Aatish Bhatia & Nadja Popovich, *These Maps Tell the Story of Two Americas: One Parched, One Soaked*, NY Times (Aug. 24, 2021) (**Exhibit 3**).

[4] Aatish Bhatia & Nadja Popovich, *These Maps Tell the Story of Two Americas: One Parched, One Soaked*, NY Times (Aug. 24, 2021) (**Exhibit 3**).

[5] Aatish Bhatia & Nadja Popovich, *These Maps Tell the Story of Two Americas: One Parched, One Soaked*, NY Times (Aug. 24, 2021) (**Exhibit 3**).

[6] Brett McDonald, et al., *Inside the Massive and Costly Fight to Contain the Dixie Fire*, NY Times (Oct. 11, 2021) (**Exhibit 4**).

[7] Remarks by President Biden before Signing Executive Action on Tackling Climate Change, Creating Jobs, and Restoring Scientific Integrity (Jan. 27, 2021) (**Exhibit 1**).

[8] U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, *Solar Futures Study* (Sept. 2021) at 1 ("*Solar Futures Study 2021*") (**Exhibit 5**).

[9] *Solar Futures Study 2021* at 1-2 (**Exhibit 5**).

These ambitious and critical goals are *impossible* to achieve without widespread deployment of solar energy.[10] Just last month, the Biden Administration's Department of Energy ("DOE") released its *Solar Futures Study*, which detailed the significant role solar energy must play in decarbonizing the nation's power grid. As Secretary of Energy Jennifer M. Granholm said upon announcing the results of the study:

> The study illuminates the fact that solar, our cheapest and fastest-growing source of clean energy, could produce enough electricity to power all of the homes in the U.S. by 2035 and employ as many as 1.5 million people in the process. Achieving this bright future requires a massive and equitable deployment of renewable energy and strong decarbonization polices—exactly what is laid out in the bipartisan Infrastructure Investment and Jobs Act and President Biden's Build Back Better agenda.[11]

The study charts a goal for solar to power 40 percent of the nation's electricity by 2035.[12] To reach the new U.S. decarbonization targets, annual solar deployment must *double* during the early 2020s and *quadruple* during the late 2020s and beyond.[13] In gigawatts, this means the United States must install an average of 30 GW of solar capacity per year between now and 2025 and 60 GW per year from 2025-2030.[14] In 2021, the United States will only achieve deployment of 24 GW (including thin film), ***and solar's contribution to the nation's electricity grid is just above 4 percent***.[15] While this may sound impressive, it is at least 6 GW short of what the *Solar Futures* study says is needed to avoid the worst of climate change.

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[10] *Solar Futures Study 2021* at 1 (**Exhibit 5**).

[11] *Press Release: DOE Releases Solar Futures Study Providing the Blueprint for a Zero-Carbon Grid*, Energy.gov (Sept. 8, 2021) (**Exhibit 6**).

[12] *Solar Futures Study 2021* at 1 (**Exhibit 5**).

[13] *Solar Futures Study 2021* at 2 (**Exhibit 5**).

[14] *Solar Futures Study 2021* at 32-34 (**Exhibit 5**).

[15] Confidential Prehearing Staff Report at II-10 (Figure II-1) and II-11 ("CR"); Public Prehearing Staff Report at II-10 (Figure II-1) and II-11 ("PR").

Clearly, the U.S. solar industry has its work cut out for it, but the future of our planet—and that of our children and grandchildren—demands this kind of bold action.

Achieving the goals set forth in the DOE study, however, also demands a change in mindset with regard to trade policy. Various tariff measures on imported crystalline silicon photovoltaic ("CSPV") cells and modules, including the global safeguard measures that are the subject of this proceeding, have stunted the deployment of solar power and threaten to undermine the ability of the United States to execute this necessary shift to clean energy. In contrast, federal assistance to domestic producers, such as solar Investment Tax Credits, has the potential to accelerate U.S. production, strengthen the U.S. supply chain, expand availability of solar products to consumers, and increase the amount of clean, solar energy deployed in the United States.

Accordingly, the Solar Energy Industries Association ("SEIA") and its member REC Americas LLC submit this pre-hearing brief to demonstrate why the Commission must issue a recommendation to the President to *decline* to extend safeguard measures on CSPV cells and modules. SEIA is the national trade association for solar and solar storage industries in the United States, with more than 1,000 member companies, and it advocates for increased deployment of solar energy in the United States. SEIA and its members know, from years of tireless work, that widespread deployment of clean, reliable solar electricity is of paramount importance to combat the growing threat of climate change, but extension of safeguard measures will only delay and undermine these goals.

In **Section I** below, SEIA outlines the conditions of competition in the U.S. market, in particular the increased demand for CSPV modules in the utility-scale market, and specifically bifacial modules that can produce solar power from both sides of the panel. Assuming

sufficient supply of solar modules at prices that can successfully compete with alternative sources of energy, demand will continue to increase as the federal and state governments grant incentives to fight climate change. **Section I** also explains that domestic production cannot currently meet this increasing demand for CSPV products, particularly in the growing utility-scale segment, for which U.S. producers have extremely limited capacity.

Section II.A explains why safeguard measures on CSPV modules are no longer necessary. First, the domestic CSPV module industry has expanded its capacity but still can only supply a small fraction of overall demand, and an even tinier fraction of the utility-scale segment, which is the fastest growing sector in the market, and is critical to achieving the Administration's clean energy targets. Moreover, a study prepared by Dr. Thomas Prusa (submitted as **Appendix A**) shows that imports have not had significant price effects on the domestic industry, given their focus on different segments of the market, and that any common pricing trends across market segments are driven by the same technological advancement factors that have thankfully always driven down prices in this market so that clean sources of energy can compete against the traditional, dirty forms of energy that still dominate the grid. There is also a lack of significant volume effects on the domestic industry caused by imports. Second, one domestic producer of nonsubject solar modules (First Solar), which does compete in the utility-scale segment, has shown remarkably profitable and sustained growth, indicating that safeguard relief in the utility-scale segment in particular is unnecessary and counter-productive. Third, the modest effects of the current measures indicate that continued relief will not further improve the domestic industry's performance, especially given that any continued safeguard relief must continue to progressively liberalize. Accordingly, the Commission should recommend termination of the safeguard measures.

However, if the Commission were to recommend some form of extension of safeguard relief, it should exclude utility-scale modules—and most importantly bifacial modules—which do not injure the domestic CSPV industry because the bulk of U.S. producers do not compete in that segment of the market and those that do compete there have thrived.

Section II.B explains that continued safeguard relief on CSPV *cells* is irrational because there is no domestic CSPV cell production in the United States, so the U.S. CSPV module industry must rely on cell imports in order to produce their product.

Section III explains that, in addition to the economic effects on the domestic industry, the Commission should consider the overall social and economic costs of extending the safeguard measures when deciding whether to recommend extension. When the Commission conducts this analysis, it will see that the negative effects of the safeguard measures have far outweighed any benefits considering the adverse impact of the measures on deploying solar energy, achieving environmental goals, making solar power affordable to consumers, and creating jobs in the solar industry. Extension of the measures will compound these issues, as they make the United States a less attractive market for CSPV cells and modules and producers will begin diverting their solar cell and module production to the growing solar markets in the rest of the world where solar is more competitive with fossil fuels because governments in those countries are devoted to establishing cohesive policies to incentivize the transition to clean energy.

Section IV notes that, when deciding whether to extend the safeguard measures, the Commission should consider other investment incentives that will encourage U.S. producers to adopt larger scale and integrated production to serve the growing utility sector. Finally, **Section V** explains that extension of safeguard measures is extremely rare, and under World

Trade Organization ("WTO") rules, extension could trigger retaliation by U.S. trading partners, further worsening trade relations and putting key U.S. export industries at risk.

I. CONDITIONS OF COMPETITION

A. Demand Conditions

Demand for CSPV cells and modules is "derived from the demand for solar electricity, which is influenced by factors such as total energy consumption, cost competitiveness with traditional energy sources, the availability of Federal, state, and local incentives, environmental concerns, and a desire for national energy independence."[16] Solar is but one of many sources of energy competing in the U.S. marketplace. Technological innovation and improved production techniques have driven down the cost of CSPV solar power, boosting demand for solar cells and modules.[17] As a result, solar is competitive on the electrical grid (known as "grid parity") in many parts of the country. Solar's share of total electricity generation has increased from 2.2 percent in 2018 to 3.3 percent in 2020 and 4.1 percent in the first half of 2021.[18]

The second major driver of U.S. demand is government incentives.[19] Tax relief (particularly the federal Investment Tax Credit) and rebates offered at the federal and state levels incentivized consumers to adopt solar technology by reducing costs and bringing solar more in line with other sources of energy.[20] In particular, "{s}ince the {federal Investment Tax Credit} was enacted in 2006, the U.S. solar industry has grown by more than 10,000%—

[16] CR/PR at II-9.

[17] Richard M. Swanson, *A Vision for Crystalline Silicon Photovoltaics*, in *Progress in Photovoltaics: Research and Applications* (2006) (**Exhibit 7**).

[18] CR/PR at II-10.

[19] CR/PR at II-11 to II-12.

[20] *See* CR/PR at II-12.

creating hundreds of thousands of jobs and investing billions of dollars in the U.S. economy in the process."[21]

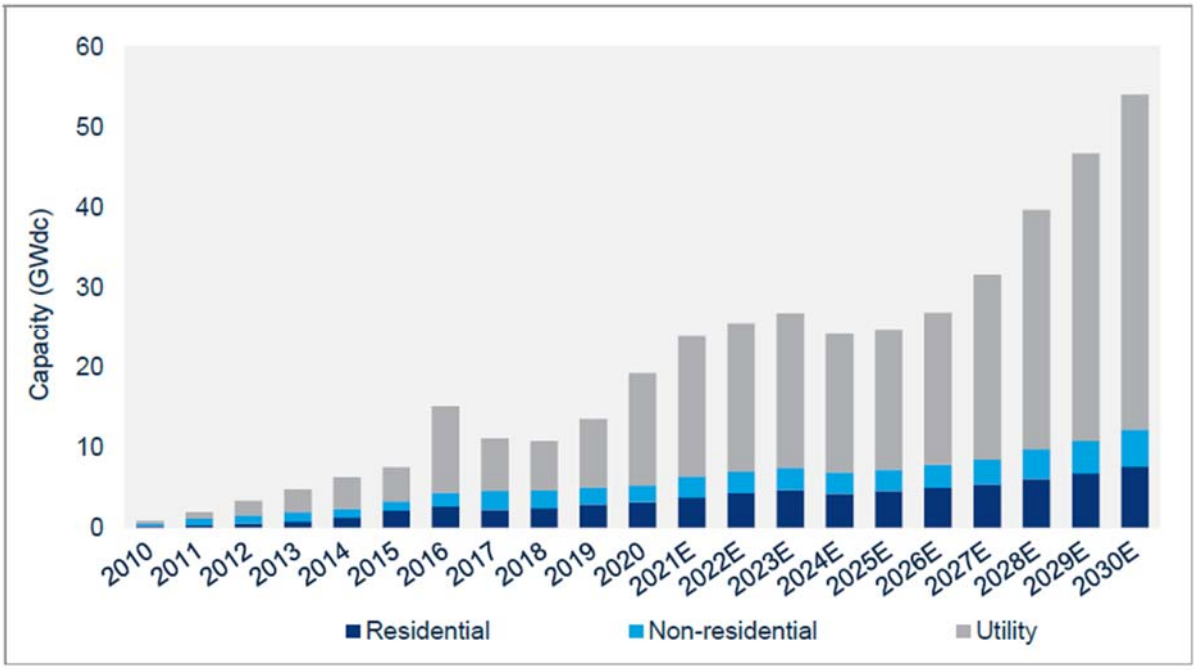
Finally, the U.S. solar market is highly segmented, made up of three segments: residential, commercial/industrial (also referred to as nonresidential), and utility-scale. Utility-scale is by far the largest. As the staff indicates in its Prehearing Report:

> According to industry publications WoodMackenzie (WoodMac) and SEIA, U.S. PV installations, including out-of-scope thin film products, increased from 10.8 GW in 2018 to 19.2 GW in 2020 . . . . The utility segment increased from 6.1 GW in 2018 to 14.0 GW in 2020, and rose from 57 percent to 73 percent of installations. The residential market segment increased from 2.4 GW to 3.2 GW, though it declined from 23 percent of the market to 17 percent. The nonresidential sector declined from 20 percent of the market to 17 percent of the market. U.S. PV installation forecasts vary, but most forecasts project U.S. installations of more than 24 GW in 2021 and an average of more than 25 GW in annual installations during 2022–25.[22]

[21] SEIA, *Solar Investment Tax Credit (ITC)* (Jan. 2021) (**Exhibit 8**).

[22] CR/PR at II-10 to II-11.

U.S. Solar PV Installations (CSPV and Thin Film)[23]



B. Supply Conditions

Since 2018, the module capacity of both domestic and foreign sources combined have increased.[24] U.S. producers of CSPV modules more than tripled their capacity and production between 2018 and 2020, accelerated by investments by several foreign module suppliers, including Hanwha Q CELLS USA, Inc. ("Hanwha Q CELLS USA"), JinkoSolar (U.S.) Industries Inc. ("JinkoSolar (U.S.)"), and LG Electronics USA, Inc. ("LGEUSA"), in new U.S. facilities.[25] Nevertheless, even though it has grown, domestic supply remains quite small in comparison to the need. In addition, the domestic industry has not focused on the utility-scale segment, which is by far the largest segment of the solar market, accounting for nearly

[23] SEIA & Wood Mackenzie, *U.S. Solar Market Insight: Full Report: 2020 Year in Review* (Mar. 2021) at 7 (**Exhibit 9**).

[24] CR/PR at II-4.

[25] CR/PR at II-5, II-8.

three-quarters of U.S. module installations in 2020.[26] According to the Prehearing Report, in 2020, U.S. producers reported selling **[ ]** of their modules (**[ ]** percent) to distributors, which sell largely to the residential or small-scale commercial segments,[27] **[ ]** percent of modules directly to the residential segment, and **[ ]** percent directly to the commercial segment—a combined **[ ]** percent.[28] As such, U.S. producers reported selling **[ ]** percent of their modules directly to the utility-scale segment.[29]

Because there is very little U.S. supply of modules for the utility-scale segment of the market, purchasers must rely on imported modules to power the huge growth in demand for utility-scale solar projects. As U.S. purchasers reported, larger wafers and high wattage bifacial products, which have become the norm in utility applications, are primarily available from foreign suppliers in India, Malaysia, the Philippines, Thailand, Vietnam, and China, while U.S. suppliers produce very little bifacial product and virtually no larger wafer modules.[30] Indeed, in 2020, importers reported directly selling **[ ]** MW (or **[ ]** percent) of their imported modules into the utility segment, a **[ ]** percentage point increase from 2018, in contrast to the **[ ]** MW (or **[ ]** percent share) of modules that U.S. producers reported selling directly into the same segment in 2020.[31] Meanwhile, the percentage of imported modules that importers sell into the residential and commercial

[26] CR/PR at I-31.

[27] *See* Affidavit of Timothy Crane, Sunrun Inc. (Oct. 26, 2021) at 2 (**Appendix B**); Affidavit of John Santo Salvo, Sunnova Energy International Inc. (Oct. 26, 2021) at 1 (**Appendix B**); Affidavit of George Hershman, SOLV Energy (Oct. 26, 2021) at 3 (**Appendix B**); Affidavit of James P. Resor, EDF Renewables Distributed Solutions, Inc. (Oct. 26, 2021) at 1 (**Appendix B**); Affidavit of Aaron Hall, Borrego Solar Systems Inc. (Oct. 25, 2021) at 1 (**Appendix B**); NextEra's Prehearing Brief (Oct. 27, 2021) at Exhibit 1 (Affidavit of Ron Reagan, NextEra Energy, Inc. at 7); CR/PR at I-42.

[28] CR/PR at II-2 (Table II-1).

[29] CR/PR at II-2 (Table II-1).

[30] CR/PR at II-18.

[31] CR/PR at II-2 (Table II-1); Shipments by Segment (**Exhibit 34**).

sectors, in addition to the amount sold to distributors—the segments into which U.S. producers sell the **[ ]** of their modules—has **[ ]** decreased from 2018 to 2020.[32]

II. EXTENSION OF THE SAFEGUARD MEASURES IS NOT NEEDED TO PREVENT OR REMEDY SERIOUS INJURY TO THE DOMESTIC INDUSTRY

Section 204(c)(1) of the Trade Act of 1974 requires the Commission to investigate and determine whether safeguard measures "continue{} to be necessary to prevent or remedy serious injury" and (2) "whether there is evidence that the industry is making a positive adjustment to import competition."[33] Section 201(b) of the statute explains further that a "positive adjustment to import competition" occurs when (a) the domestic industry "is able to compete successfully with imports" absent safeguard relief or "experiences an orderly transfer of resources to other productive pursuits" and (b) "dislocated workers in the industry experience an orderly transition to productive pursuits."[34]

Section 203(e)(1)(B)(i) of the Trade Act authorizes the President only to "extend the effective period of any action."[35] Other provisions that limit any actions continue to apply. In particular, any safeguard action "shall be phased down at regular intervals during the period in which the action is in effect" (if the action is effective for a period more than one year).[36] Therefore, the safeguard action either terminates in accordance with the President's original Proclamation or it must be further reduced during the extended period.[37]

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[32] CR/PR at II-2 (Table II-1).

[33] 19 U.S.C. § 2254(c)(1).

[34] 19 U.S.C. § 2251(b)(1).

[35] 19 U.S.C. § 2253(e)(1)(B).

[36] 19 U.S.C. § 2253(e)(5).

[37] The companies that petitioned for extension recognize these statutory requirements, as none of them has argued for higher tariff rates on modules or a lower quota or higher over-quota tariff on imported cells.

As discussed further below, in **Section III**, the Commission's analysis and determination must take into account the foundations of the safeguard statute, which require any measures to balance the social and economic costs against any benefits. For the Commission's determination to have any impact on the President's action, the Commission must consider whether continuation of the measures is not only necessary to prevent or remedy serious injury, but also strikes the proper balance between any benefits to the domestic industry and broader social and economic costs. This is important context for the Commission's findings under Section 204(c)(1).

A. Tariffs on CSPV *Modules* Are No Longer Necessary

The U.S. module industry has had almost four years of safeguard tariffs and has very little to show for it in terms of positive adjustment to import competition. As noted in the Prehearing Report:

> Purchasers were also asked if domestic producers took certain actions to make a positive adjustment to import competition since February 7, 2018. *Most purchasers reported that U.S. producers had not taken the identified actions*. Specifically, 35 of 50 purchasers reported that U.S. producers had not introduced new or innovative product; 37 of 47 reported that U.S. producers had not improved product quality; 37 of 48 reported that U.S. producers had not expanded marketing efforts, including e-commerce; 41 of 47 reported that U.S. producers had not made improvements in customer service; and 39 of 50 reported that U.S. producers had not made other efforts to adjust to import competition.[38]

In terms of module production capacity, three foreign producers broke ground in the United States, adding 2.6 GW of domestic module assembly capacity, and other smaller module producers have recently announced smaller expansions. The domestic industry gained some market share over the POI, but in a growing market that used 20.1 GW of CSPV

[38] CR/PR at II-19 (emphasis added). We note that the compiled responses at VIII-24 (Table VIII-7) have the tallies of "yes" and "no" responses reversed, but SEIA's own questionnaire compilations corroborate the results discussed at II-19.

modules in 2020,[39] domestic module capacity falls far short of overall demand. Continuing tariffs at lower rates—in accordance with the statute—will neither improve the domestic industry's position in the market nor resolve the acute supply deficit. The safeguard tariffs therefore are not an effective mechanism to facilitate the U.S. industry's positive adjustment to import competition.[40]

1. The Domestic CSPV Module Industry Has Expanded Capacity and Production, but Remains Woefully Inadequate to Satisfy Growing Demand

Module assembly in the United States has expanded since the safeguard measures were imposed, but nowhere near enough to meet demand. Total domestic industry module capacity reported in the data collected by the Commission was only 3.7 GW in 2020, which is dwarfed by apparent U.S. consumption of 20.1 GW during that same period.[41] Between 2018 and 2020 domestic module capacity grew by 2.6 GW,[42] but apparent U.S. consumption grew by 14.8 GW.[43] The supply short fall spans all segments of the market and is unlikely to improve with a few more years of even lower tariff rates on imported modules.

a. Expansion of Domestic Industry Capacity and Production Has Focused Predominantly on Residential and Commercial, Leaving the Utility-Scale Segment without Adequate Supply

Purchasers reported domestic production constraints and that "domestic capacity is insufficient to meet domestic demand."[44] Firms also reported that to the extent the domestic

[39] CR/PR at C-5, C-9 (Table C-2).

[40] *See* 19 U.S.C. § 2253(a)(2)(D) (In determining what action to take under paragraph (1), the President shall take into account . . . the probable effectiveness of the actions authorized under paragraph (3) to facilitate positive adjustment to import competition).

[41] CR/PR at C-5, C-9 (Table C-2).

[42] Moreover, as discussed in **Section II.A.3.a.** below, domestic producers did not fully utilize their U.S. capacity, deciding instead to **[ ]** significant quantities of modules.

[43] CR/PR at C-5, C-9 (Table C-2).

[44] CR/PR at II-7.

industry is able to supply demand, it is "in limited quantity and with delays. Three firms ([ ]) reported that domestic producers are only taking orders on products to be delivered 2-3 years out."[45]

Notably, although the safeguard measures initially spurred an expansion of domestic capacity, with Hanwha Q CELLS, JinkoSolar, and LGEUS opening their plants in 2019, practically no additional domestic capacity has been added since those plants opened. In the words of the General Manager of JinkoSolar (U.S.), one of the new entrants in the market since the safeguard measures were imposed:

> *Despite the advanced nature of our U.S. facility, that facility will only service a relatively small portion of JinkoSolar's overall business in the United States. U.S. demand is simply too large to supply with U.S. production alone.* This is true for us and for the many other U.S. producers, most of whom are relatively small. To our knowledge, the only U.S. producer with an operating plant that is significantly larger than our plant in Jacksonville is Hanwha Q Cells, which has an apparent nameplate capacity of about 1.7 GW of solar modules. As I understand the market, total U.S. demand will grow to approximately 25 GW in 2022, and total planned (much less installed) U.S. crystalline silicon PV module assembly will reach no more than one-fifth of that demand. Only a small portion of these U.S. assembled modules will be configured to service the utility-scale segment of the market, which is the largest segment by far, and the segment that must grow dramatically if President Biden's solar deployment goals over the next decade are to be achieved.[46]

According to George Hershman of SOLV Energy (formerly Swinerton Renewable Energy), the largest general constructor in the U.S. market,

> I have serious concerns about a lack of module supply in the U.S. market. Since the Section 201 tariff was implemented in February 2018, several module manufacturers have begun production of solar modules in the United States. However, as a U.S. utility-scale company that procures utility-scale modules, we have yet to see an increase in utility-scale module production capacity in any significant quantities in the U.S. market.[47]

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[45] CR/PR at II-7.

[46] Affidavit of Nigel Cockroft, JinkoSolar (U.S.) Inc. (Oct. 25, 2021) at 1-2 (emphasis added) (**Appendix B**).

[47] Affidavit of George Hershman, SOLV Energy (Oct. 26, 2021) at 2-3 (**Appendix B**).

Between 2018 and 2019, domestic capacity module capacity increased by 2,527,217 kilowatts.[48] **[ ]** of that amount is owed to the entry of Hanwha (**[ ]** kilowatts),[49] Jinko (**[ ]** kilowatts),[50] and LGEUS (**[ ]** kilowatts)[51] into the market in 2019. The capacity added by these three firms collectively is **[ ]** kilowatts in capacity, meaning that the rest of the domestic industry **[ ]** between 2018 and 2019. Between 2019 and 2020, domestic capacity increased by only 127,092 kilowatts,[52] and **[ ]**.[53] The Prehearing Report shows that since that time, domestic capacity has actually declined. Domestic capacity in interim 2021 was 134,776 kilowatts less than interim 2020.[54] If no additional capacity is added in the second half of 2021, the average annual capacity for 2021 will be lower than it was in 2019.[55] In other words, during the 18 months of safeguard relief since the end of 2019, the domestic industry reduced its module capacity, despite apparent consumption increasing by 52.0 percent between 2019 and 2020 and by a further 6.5 percent between interim 2020 and 2021.

After 18 months of stagnation in the expansion of domestic capacity since Hanwha Q CELLS, JinkoSolar, and LGEUS opened their facilities, other firms have announced expansions or additions to domestic module capacity. Assuming these announcements

[48] CR/PR Appx. C at C-6 (Table C-2).

[49] Hanwha U.S. Producer Questionnaire Response II-13.

[50] Jinko U.S. Producer Questionnaire Response II-13.

[51] LGEUS U.S. Producer Questionnaire Response II-13.

[52] CR/PR Appx. C at C-6 (Table C-2).

[53] Hanwha U.S. Producer Questionnaire Response II-13.

[54] CR/PR Appx. C at C-6 (Table C-2).

[55] Interim 2021 average capacity was 1,771,321 kilowatts. CR/PR Appx. C at C-6 (Table C-2). Doubling that amount would result in an average annual capacity of 3,542,642 kilowatts.

become a reality, once fully ramped up, total CSPV U.S. module production capacity could reach around 5.5 GW by midyear 2022.[56] But these recent announcements, which were made shortly before the safeguard measures are set to expire and still come nowhere close to meeting the demand for CSPV panels in the United States, are not dependent upon the extension of the tariffs. Mission Solar **[**

].[57] As discussed further below, Heliene USA and Silfab also recently announced plans to add capacity, **[**

].[58] Convalt Energy purchased the equipment from Sunpower's shuttered Oregon facility and announced that it plans to start production at a new facility in New York using that equipment, but there is no suggestion that this plan is contingent upon the extension of the safeguard measures.[59] Thus, although the safeguard measures initially led to increases in domestic CSPV capacity, the measures did not result in any additional capacity despite surging demand between 2019 and

[56] The Prehearing Report indicates that total domestic module capacity was 3.72 GW in 2020. Adding recently announced new capacity (Heliene USA's addition of 650 MW of capacity at its Minnesota plant, Silfab's addition of 400 MW in Washington, Convalt Energy's new 700 MW facility) will bring total domestic module capacity to around 5.47 GW by 2022. **[**

]. *See* **[** **]** U.S. Producer Questionnaire Response at II-2c, II-13. Regardless, **[**

]. *Id.* at II-14.

[57] Mission Solar U.S. Producer Questionnaire Response at II-2a; Hanwha Q CELLS USA, LGEUSA, and Mission Solar Petition (Aug. 4, 2021) at 31; *U.S. Solar Panel Manufacturers*, Solar Power World (last updated Sept. 2021) (**Exhibit 10**).

[58] **[**

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[59] Kelly Pickerel, *Convalt Energy to Open 700-MW Solar Panel Assembly Facility in New York in 2022*, Solar Power World (July 12, 2021) (**Exhibit 11**). Sunpower, the seller of the equipment that will be used by Convalt Energy, **[**

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the middle of 2021, and the recent announcements regarding capacity expansions do not depend on the safeguard tariffs remaining in place.

Furthermore, domestic CSPV capacity has been and will continue to be largely dedicated to the residential and commercial segments.[60] Consider the companies that have added or have announced additional capacity:

- In 2019, Hanwha Q CELLS USA opened a 1.7 GW module production facility in Dalton, Georgia.[61] It markets to all segments, including residential, commercial/industrial, and utility-scale markets, but reported that **[**

  ].[62] "The highest wattage module that Hanwha Q CELLS produces in the United States is 480 watts. Like the modules LG focuses on, the wattage rating on these modules is too low for {large-scale commercial} requirements."[63]

- In 2019, LGEUSA opened a new module facility in Huntsville, Alabama with an annual production capacity of 500 MW for the commercial and residential segments. According to LGEUSA's website, it offers modules for rooftop residential and commercial projects, not to ground-based utility-scale installations.[64] LGEUSA reported shipping **[**

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  LGEUSA's narrow focus was confirmed by a major market participant. **[**

[60] *See, e.g.,* Affidavit of John Santo Salvo, Sunnova Energy International Inc. (Oct. 26, 2021) at 1 (**Appendix B**) (confirming that, as one of the largest U.S. residential solar companies, some U.S. producers (Hanwha Q CELLS, LG, Solaria, Silfab, Panasonic, and JinkoSolar) are pre-qualified for residential installations, but some supply may be imported).

[61] Christian Roselund, *Hanwha Q Cells Opens the Largest Solar Factory in the Western Hemisphere*, PV Magazine (Sept. 23, 2019) (**Exhibit 12**).

[62] Hanwha Q-CELLS USA Website (**Exhibit 13**); Hanwha Q CELLS USA U.S. Producer Questionnaire Response at II-14. The Commission should note that the sample utility-scale projects on the website were completed years before Hanwha Q-CELLS USA's factory in George was in operation, implying that these projects were supplied by imported modules.

[63] Affidavit of Aaron Hall, Borrego Solar Systems Inc. (Oct. 25, 2021) at 2 (**Appendix B**).

[64] LGEUSA Website (**Exhibit 14**); *Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled into Other Products*, Inv. No. TA-201-075 (Monitoring), USITC Pub. 5021 at III-3 (Feb. 2020).

[65] LGEUSA U.S. Producer Questionnaire Response at II-14 (reporting **[**
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- In 2019, JinkoSolar (U.S.) began commercial operations at its 400 MW factory in Jacksonville, Florida, which produces 60-cell modules (for residential) and 72-cell modules (for commercial/industrial and utilities).[67] JinkoSolar (U.S.)'s shipments to utilities varied during the POI: **[ ]**.[68]

- Heliene USA has capacity to produce 150 MW in its Minnesota facility and reportedly produces 60-cell and 72-cell modules (and their half-cut equivalents).[69] With an additional investment in Minnesota (along with millions of dollars in state and local funding), Heliene USA projects to have the capacity to produce **[ ]** MW by mid-2022.[70] In 2021, Heliene USA took over the former facility of SolarTechUniversal, opening a second U.S. module assembly facility in Riviera Beach, Florida with a capacity of 100 MW of modules for the residential market.[71] Heliene USA's shipments to utilities also varied during the POI: **[ ]**.[72]

- In 2018, Silfab bought an existing plant in Washington, with module production capacity of 400 MW; Silfab opened a second 400 MW facility in August 2021 in Burlington, Washington. Both facilities produce modules for the residential and commercial segments.[73] Silfab reported **[ ]**.[74]

- In August 2021, Convalt Energy, a solar developer, announced its acquisition of SunPower's manufacturing equipment from the old SolarWorld facility in

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[66] **[ ]**.

[67] *Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled into Other Products*, Inv. No. TA-201-075 (Monitoring), USITC Pub. 5021 at III-2 (Feb. 2020).

[68] JinkoSolar (U.S.) U.S. Producer Questionnaire Response at II-14.

[69] Nichola Groom, *Canada's Heliene Opening its Second U.S. Solar Panel Factory*, Reuters (Aug. 10, 2021) (**Exhibit 15**).

[70] Chris Crowell, *Solar PV Manufacturer Heliene Will Triple its Capacity with New U.S. Facility*, Solar Builder (Sept. 13, 2021) (**Exhibit 16**); Walker Orenstein, *Minnesota's Iron Range May Soon Be Home to One of the Largest Solar Panel Manufacturing Facilities in the Country*, Energy News Network (Sept. 13, 2021) (**Exhibit 17**). **[ ]**. *See* Heliene USA U.S. Producer Questionnaire Response at II-2c.

[71] Kelly Pickerel, *Heliene Takes Over SolarTech Universal's Lease on Florida Solar Panel Manufacturing Plant*, Solar Power World (Aug. 10, 2021) (**Exhibit 18**).

[72] Heliene U.S. Producer Questionnaire Response at II-14.

[73] *U.S. Solar Panel Manufacturers*, Solar Power World (last updated Sept. 2021) (**Exhibit 10**); *Silfab Solar Doubles US Solar Panel Manufacturing Capacity*, Silfab Solar (Aug. 30, 2021) (**Exhibit 19**); Ryan Kennedy, *Silfab Doubles US Solar Panel Production Capacity*, PV Magazine (Sept. 1, 2021) (**Exhibit 20**); *Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled into Other Products*, Inv. No. TA-201-075 (Monitoring), USITC Pub. 5021 at I-40 (Table I-10) (Feb. 2020).

[74] Silfab U.S. Producer Questionnaire Response at II-14.

Hillsboro, Oregon, which assembled modules for commercial customers.[75] Convalt plans on moving the equipment from Oregon to upstate New York. Convalt Energy plans to bring 700 MW of capacity online by July 2022, an ambitious target given that "few members of the company's technical team have experience with module manufacturing."[76] Production will "stay 95% the same" as SunPower's operations, implying that most of its modules will be sold to the nonresidential commercial and industrial segment.[77] Convalt claims to have its own technology to manufacture 72-cell modules for utility-scale projects, but plans on using some of these modules for its own development projects.[78]

- Mission Solar decommissioned its production lines in 2021, with the goal of increasing its production capacity from 200 MW to **[ ]**.[79] It markets its modules for residential, commercial, government, and utility-scale applications,[80] but the company reported **[ ]**.[81] In fact, according to Borrego, "***Mission Solar has declined to provide us with modules, indicating they are booked for sale to residential projects***."[82]

- The Prehearing Report listed Philadelphia Solar among recent announcements of capacity additions.[83] However, this announcement remains speculative. According to reports as recent as September 2021, Philadelphia Solar is still discussing potential site locations with various states.[84] Philadelphia Solar's

[75] Kelly Pickerel, *Convalt Energy to Open 700-MW Solar Panel Assembly Facility in New York in 2022*, Solar Power World (July 12, 2021) (**Exhibit 11**); Kelly Pickerel, *Former SolarWorld Facility in Oregon Now Officially Transitioned to SunPower P-Series Module Production*, Solar Power World (Feb. 7, 2019) (**Exhibit 21**).

[76] Kelly Pickerel, *Convalt Energy to Open 700-MW Solar Panel Assembly Facility in New York in 2022*, Solar Power World (July 12, 2021) (**Exhibit 11**).

[77] Kelly Pickerel, *Convalt Energy to Open 700-MW Solar Panel Assembly Facility in New York in 2022*, Solar Power World (July 12, 2021) (**Exhibit 11**).

[78] Kelly Pickerel, *Convalt Energy to Open 700-MW Solar Panel Assembly Facility in New York in 2022*, Solar Power World (July 12, 2021) (**Exhibit 11**). NanoPV announced plans to invest in a new module assembly facility in Georgia, but there is no publicly available information on production capacity, what type of modules will be produced (thin film, CSPV, 60-cell, or 72-cell), or when commercial production would begin. *Solar Panel Maker Plans $36M Georgia Factory, Hiring 500*, Associated Press (Oct. 8, 2021) (**Exhibit 22**).

[79] Mission Solar U.S. Producer Questionnaire Response at II-2a; Hanwha Q CELLS USA, LGEUSA, and Mission Solar Petition (Aug. 4, 2021) at 31; *U.S. Solar Panel Manufacturers*, Solar Power World (last updated Sept. 2021) (**Exhibit 10**).

[80] Mission Solar Website (**Exhibit 23**).

[81] Mission Solar U.S. Producer Questionnaire Response at II-14.

[82] Affidavit of Aaron Hall, Borrego Solar Systems Inc. (Oct. 25, 2021) at 2 (emphasis added) (**Appendix B**).

[83] CR/PR at I-26 (Table I-11).

[84] Zachary Shahan, *Philadelphia Solar Plans 1 Gigawatt Solar Panel Factory On Back Of Biden's Solar Support*, CleanTechnica (Sept. 3, 2021), (**Exhibit 24**).

website identifies it as based in Jordan with no indication that it intends to expand production to the United States.[85]

Domestic production nonetheless remains inadequate. Even for the residential segment such expansions do not meet the needs of the U.S. market. According to **[**

]."[86] The shortage for the largest segment is particularly acute, as demand for utility-scale solar generation has grown at a faster rate than commercial and residential solar generation.[87]

The utility-scale segment in the United States more than doubled from 2018 to 2020, increasing from 6.1 GW to 14.0 GW and from 57 percent of installations to 73 percent of installations.[88] In contrast, the residential market segment increased from 2.4 GW to 3.2 GW and declined from 23 percent of the market to 17 percent.[89] These trends reflect the questionnaire responses of U.S. producers, importers, and purchasers, which show that the vast majority of the U.S. industry has noticed increased demand in the utility-scale segment that is expected to continue increasing. Ten of eleven U.S. producers (91 percent), 31 out of

[85] Philadelphia Solar Website, *Why Philadelphia Solar?* (**Exhibit 25**); Philadelphia Solar Website, *Philadelphia Solar, the First MEA-Based Solar Company, Has Been Awarded the 'Top PV Brand MENA 2021' Seal by EuPD Research* (**Exhibit 26**). The Prehearing Report also mentions Violet Solar, which does not appear to be viable. CR/PR at I-21. Violet Power has not followed through with its announced opening of cell and module production by 2021. Kelly Pickerel, *REC Silicon and New U.S. Solar Cell Company Violet Power End Partnership Before It Even Begins*, Solar Power World (April 6, 2021) ("Without a completed factory, it is unlikely those milestones will be met in 2021.") (**Exhibit 27**). There were plans for REC Polysilicon to supply Violet Solar, but the partnership was canceled in April 2021. REC Polysilicon "believes it yields greater positive outcomes for its shareholders to collaborate commercially with established, proven, active and relevant solar supply chain partners to optimize the market opportunity for competitive, low-carbon locally produced solar panels." *Id*.

[86] **[ ]** U.S. Purchaser Questionnaire Response at II-3.

[87] CR/PR at II-10.

[88] CR/PR at II-10 to II-11.

[89] CR/PR at II-11.

39 importers (79 percent), and 41 out of 48 purchasers (85 percent) reported that U.S. demand in the utility-scale segment has increased.[90] Likewise, nine out of 10 U.S. producers (90 percent), 28 out of 38 U.S. importers (74 percent), and 37 out of 49 purchasers (76 percent) expect the demand to continue increasing going forward.[91] The share of the market reflected by the utility-scale segment has grown significantly over the past decade, and the utility-scale segment is expected to remain the largest segment, by far, for the next decade.

Despite the increasing demand in the utility-scale segment, only **[ ]** percent of U.S. producers' module shipments went directly to the utility-scale segment in 2020.[92] In contrast, utility-scale installations totaled nearly 14 GW in 2020, representing 73 percent of total 19.2 GW deployment in 2020 (as estimated by SEIA and Wood Mackenzie).[93] Said differently, U.S. producers' module shipments to the utility-scale segment accounted for just **[ ]** percent of utility-scale deployment in 2020. In interim 2021, the domestic industry focused even more on the residential and commercial segments, with only **[ ]** percent of U.S. producers' module shipments going directly to the utility-scale segment.[94]

Utility-scale developers expand on the unavailability of domestic module supply in affidavits accompanying this submission. As explained by George Hershman of SOLV Energy, the largest general contractor in the U.S. market, "U.S. demand for cells and modules far exceeds current domestic production capacity, which is sold out until 2024. At present, there is not enough module production in the United States to meet the demand of my

[90] CR/PR at II-14 (Table II-6).
[91] CR/PR at II-15 (Table II-7).
[92] CR/PR II-2 (Table II-1); Shipments by Segment (**Exhibit 34**).
[93] CR/PR II-9 to II-10.
[94] CR/PR II-2 (Table II-1).

company, let alone the entire U.S. market."[95] James Resor of EDF Renewables Distributed Solutions Inc. confirmed, "{d}omestic manufacturers are incapable of supplying the utility/wholesale market in the United States. . . . Moreover, domestic producers do not have the production capacity to provide the quantity or product types (e.g., bi-facial, increasing wafer size) that we need, much less at the scheduled intervals in which we need it."[96]

Many U.S. purchasers also reported that U.S. producers are unable to meet the growing demand for modules used in utility-scale projects. As explained by **[ ]**, with regard to supply from U.S. producers, "**[**

]".[97] Indeed, although "**[**

]."[98] **[ ]** also noted that "**[**

[95] Affidavit of George Hershman, SOLV Energy (Oct. 26, 2021) at 2 (**Appendix B**).

[96] Affidavit of James P. Resor, EDF Renewables Distributed Solutions, Inc. (Oct. 26, 2021) at 2 (**Appendix B**).

[97] **[ ]** U.S. Purchaser Questionnaire Response at II-7; *see also* **[ ]** U.S. Purchaser Questionnaire Response at II-6(b) ("**[**

]."); **[ ]** U.S. Purchaser Questionnaire at II-6(b) ("**[**

].").

[98] **[ ]** U.S. Purchaser Questionnaire Response at II-6(b); *see also* **[ ]** U.S. Purchaser Questionnaire at II-6(b) ("**[**

]."); **[ ]** U.S. Purchaser Questionnaire Response at II-7 ("**[**

]."); **[ ]** U.S. Purchaser Questionnaire Response at II-7 ("**[**

].").

]."[99] According to **[** **]**, since the imposition of the safeguard measures, there has been **[**

].[100] Although "**[**

]."[101] Accordingly, as explained by **[** **]**, "**[**

]."[102]

The inability of the domestic module producers to meet the supply needs of utility-scale buyers was a serious problem during the original investigation.[103] Notably, Hanwha Q CELLS Korea, the parent company to one of the petitioners in this proceeding, submitted comments to USTR in 2018 in support of excluding certain utility-grade panels from the safeguard measure, arguing that:

> CSPV solar modules for utility scale projects in the United States are not sufficiently available from domestic sources. Utility-scale electricity providers have no viable domestic source of modules to meet their demand given the U.S. domestic industry's (1) focus on the residential and commercial segments of the

[99] **[** **]** U.S. Purchaser Questionnaire Response at II-6(b).

[100] **[** **]** U.S. Purchaser Questionnaire Response at II-15; *see also* **[** **]** U.S. Purchaser Questionnaire Response at II-3 ("**[** **]**.").

[101] **[** **]** U.S. Purchaser Questionnaire Response at II-6(b).

[102] **[** **]** U.S. Purchaser Questionnaire Response at II-7; *see also* **[** **]** U.S. Purchaser Questionnaire Response at II-6(b) ("**[** **]**.").

[103] *Crystalline Silicon Photovoltaic Cells (Whether or not Partially or Fully Assembled into Other Products)*, Inv. No. TA-201-75 (Safeguard), USITC Pub. 4739, Vol. I at 50-61 (Nov. 2017).

> U.S. solar market and (2) inability to produce utility scale modules in sufficient quantities.[104]

Hanwha Q CELLS Korea's statement that "the U.S. utility sector requires imports of solar modules because U.S. producers lack the capacity to meet current and projected demand"[105] remains true today even with the expansions by the domestic industry during the safeguard period. The fact that Hanwha Q CELLS **[ ]** of CSPV modules confirms that U.S. producers continue to be unable to meet domestic demand.[106]

As explained by several of the largest utility-scale developers in the U.S. solar industry:

> Based on bankability and production-scale requirements, there are only four domestic solar module manufacturers even capable of servicing the utility segment, including CSPV module manufacturers Hanwha Q CELLS, Jinko Solar, and LG, and thin-film solar module manufacturer First Solar. Each of these companies primarily supplies U.S. utility projects by importing solar modules from their Southeast Asian manufacturing factories. The companies are limited in what they can supply to the utility segment from U.S. production.[107]

Of the four U.S. module suppliers referenced by these utility-scale developers, only Hanwha Q CELLS USA, JinkoSolar (U.S.), and LGEUSA produce CSPV modules. As discussed above, LGEUSA devotes almost all of its U.S. production to residential and

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[104] Comments by Hanwha Q CELLS Korea Corporation before the U.S. Trade Representative, *Comments Regarding Request for Product Exclusion from the Solar Products Safeguard Measure: Half-Cell 6-Busbar Wire 144-Cell Steel Frame Modules* (Mar. 16, 2018) at 3 (**Exhibit 29**).

[105] Comments by Hanwha Q CELLS Korea Corporation before the U.S. Trade Representative, *Comments Regarding Request for Product Exclusion from the Solar Products Safeguard Measure: Half-Cell 6-Busbar Wire 144-Cell Steel Frame Modules* (Mar. 16, 2018) at 3 (**Exhibit 29**).

[106] CR/PR at I-39 (Table I-15).

[107] Letter to Honorable Jeffrey D. Gerrish, Deputy U.S. Trade Representative, from Craig Cornelius, CEO, Clearway Energy Group LLC, et al., *Re: Solar Safeguard Bifacial Module Exemption* (Aug. 7, 2019) at 1 (**Exhibit 30**). We note that LGEUSA is listed here as a possible supplier of utility-scale modules in theory, but as noted above, LGEUSA is not a realistic supplier for utility-scale projects due to its focus on residential and commercial markets.

commercial applications.[108] That leaves only Hanwha Q CELLS USA and JinkoSolar (U.S.) with the ability to supply utility-scale CSPV modules to the largest utility-scale developers. However, both companies market their capacity to all segments, including residential, commercial/industrial, and utility-scale markets, and sell most of their domestic production to non-utility-scale end uses.[109]

Despite these companies' purported ability to serve the utility-scale market, only **[ ]** reported significant U.S. shipments to utilities/developers.[110] Adding **[ ]** MW shipped to utilities/developers and the **[ ]** yields only **[ ]** MW sold directly to the utility-scale segment, which equates to **[ ]** percent of total apparent U.S. consumption in 2020.[111]

Moreover, the total amount of capacity is not the only relevant factor for utility-scale developers. Production scale and the ability to deliver within a limited time-period are critical issues as well. While a supplier might theoretically have adequate annual capacity to fill a utility-scale order, developers often require delivery of consistent supply over a period of a few months and on a timely basis. To meet this requirement, buyers must purchase from suppliers whose capacity far exceeds the buyer's needs. Today, utility-scale solar projects are

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[108] LGEUSA Website (**Exhibit 14**); *Press Release: LG Electronics Announces Plans for U.S. Solar Panel Assembly Plant*, LG Electronics USA (July 2, 2018) (**Exhibit 31**); **[ ]** U.S. Producer Questionnaire Response at II-14.

[109] Hanwha Q-CELLS USA Website (**Exhibit 13**); Kelly Pickerel, *Three Things SPW Learned after Touring JinkoSolar's Florida Panel Facility*, Solar Power World (Feb. 27, 2019) (**Exhibit 32**); *see also Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled into Other Products*, Inv. No. TA-201-075 (Monitoring), USITC Pub. 5021 at III-2 to III-3 (Feb. 2020). Given the much larger volumes demanded by utility-scale developers, it is likely that Hanwha Q CELLS USA and JinkoSolar (U.S.) will continue to service those customers using their larger foreign module assembly facilities. *See id.* at III-2.

[110] **[ ]** U.S. Producer Questionnaire Responses at II-14. **[ ]**.

[111] **[ ]** U.S. Producer Questionnaire Responses at II-14; CR/PR at C-5.

very large. According to Federal Energy Regulatory Commission ("FERC") data for projects that are at least 1 MW in size, as of December 2020, there were 180 projects with a scheduled completion date in 2021, and the average nameplate capacity for those projects was just under 54 MW.[112] More than three dozen of those projects have nameplate capacities of at least 100 MW.[113] Assuming *arguendo* that domestic suppliers were willing to dedicate 100 percent of their capacity to utility-scale projects, only two or (perhaps) three domestic module facilities could conceivably even qualify to bid for an average-sized utility-scale project. Yet this assumption is entirely academic, because no domestic module assembler—literally none—will focus exclusively on utility-scale production.

In the final analysis, domestic CSPV module makers can only service the smallest of projects. According to James Resor of EDF Renewables Distributed Solutions, Inc., one of the largest utility-scale renewable energy developers in the United States, "{t}o our knowledge, the only domestic producers that could feasibly supply modules for a utility-scale project are Hanwha and Jinko but even they would be severely limited to smaller projects with their U.S. production and likely only those projects that do not require bi-facial modules which are the standard requirement for most all utility-scale projects."[114]

Continuing safeguard relief at yet lower tariff rates will not alter this reality. Domestic producers of CSPV modules cannot credibly maintain that there has been a positive adjustment to import competition while the needs of the utility-scale segment remain—and

[112] David Wagman, "*Data Show 9.7 GW of Large-Scale Solar on Track for Delivery in 2021*," PV Magazine (Dec. 28, 2020) (**Exhibit 33**).

[113] David Wagman, "*Data Show 9.7 GW of Large-Scale Solar on Track for Delivery in 2021*," PV Magazine (Dec. 28, 2020) (**Exhibit 33**).

[114] Affidavit of James P. Resor, EDF Renewables Distributed Solutions, Inc. (Oct. 26, 2021) at 2-3 (**Appendix B**)

will remain for the foreseeable future—almost completely unaddressed by domestic sources of supply. Even if the entirety of the newly announced domestic capacity were dedicated to utility-scale, which is extremely unlikely, there would continue to be inadequate new capacity to meet the requirements of utility-scale developers. The supply gap is too large to fill, rendering any extension of the safeguard measure inutile. The purpose of the safeguard policy cannot simply be to impose costs on U.S. consumers, but that would be the result if the extension request is granted.

b. Questionnaire Data Confirm that the Domestic Industry Plays a Very Minor Role in the Utility-Scale Market Segment

As discussed at length throughout this brief, domestic module producers play a very limited role in the utility-scale segment of the U.S. CSPV market. This is because, in general, they lack the capacity to produce enough modules and deliver them on a sufficiently regular schedule to satisfy the demands of most utility-scale developers.[115] It is also because, more specifically and as discussed further below, they lack the capacity to produce the bifacial modules increasingly demanded by utility developers.

The limited role of U.S. module producers in the utility-scale segment is clearly shown by data presented in the Prehearing Report, summarized in the table below:

[115] *See supra* **Section II.A.1.a**.

U.S. Producers Play a Very Small Role in the Utility-Scale Segment[116]

		2018	2019	2020	Jan-June 2020	Jan-June 2021	
(Quantity in Kilowatts)							
U.S. Producers	[						]
Import Sources	[						]
Total	[						]
(Share of Segment Total)							
U.S. Producers	[						]
Import Sources	[						]
Total	[						]

As the data in this table demonstrate, U.S. module producers' shipments to the utility-scale segment peaked at **[ ]** kilowatts in 2020. In that same year, import sources provided **[ ]** kilowatts to the utility segment, or more than **[ ]** times the amount supplied to the utility-scale segment by U.S. producers. In the most recent period, U.S. producers' shipments to the utility-scale segment declined **[ ]**. Specifically, in interim 2021, U.S. producers' shipments to this segment declined by **[ ]** percent as compared to interim 2020. In contrast, the quantity of imports supplied to the utility-scale segment increased by **[ ]** in interim 2021, reaching **[ ]** kilowatts—a level that is **[ ]** times the amount supplied by U.S. producers.

For the utility-scale segment as a whole (i.e., combining U.S. producer and import sources), the above table shows that U.S. producers' share never exceeded **[ ]** percent. U.S. producers' share of the utility-scale segment was only **[ ]** percent in both 2018 and interim 2021. Import sources accounted for **[ ]** of the utility-scale segment—never falling below **[ ]** percent of the amount supplied to this segment.

[116] *See* Shipments by Segment (**Exhibit 34**).

Given the large projected demand for utility-scale development in the U.S. market,[117] it is obvious that even with the most generous of assumptions about future expansions in U.S. CSPV production capacity,[118] demand in the utility-scale segment will need to be supplied almost entirely from import sources.

c. Even with the Recent Capacity Expansions, the Domestic Industry Does Not Produce the Types of Modules Required by the Utility-Scale Segment, Particularly Bifacial Modules

The lack of domestic supply for the utility-scale segment is exacerbated by the fact that domestic producers do not produce the types of modules that developers require. As discussed above, a significant share of domestic production is devoted to the residential and commercial segments of the market. However, modules are not interchangeable among market segments for several reasons. As explained by **[**

], "**[**

]."[119]

As deployment in the utility-scale segment has increased, developers have increasingly turned to bifacial modules, which are not available from domestic producers for utility-scale use.[120] As explained by DOE in the *Solar Futures Study*, bifacial modules are best suited for utility-scale projects, not rooftop residential or commercial applications, which is the focus of much of the U.S. module industry:

> Bifacial modules collect light on both sides and enable major increases to energy yield. Bifacial technology is mainstream, but not dominant, in UPV {(utility-scale photovoltaic)} systems. Some bifacial gain is also available on flat-roof

[117] *See infra* **Section III.2.a.**; *see also* CR/PR at II-15 (Table II-7).

[118] CR/PR at I-25 to I-27 (Table I-10).

[119] **[ ]** U.S. Purchaser Questionnaire Response at II-5.

[120] *See, e.g.*, CR/PR at II-18.

> installations typical of commercial PV systems. No bifacial gain is available on ordinary sloped-roof residential rooftop PV systems, so adoption of bifacial technology is not expected there. In UPV and commercial PV systems, increased adoption of bifacial modules and continued optimization of the back-side performance of these modules can continue driving energy yield up.[121]

As explained by George Hershman of SOLV Energy, one of the largest solar EPCs in the country,

> Since 2018, SOLV Energy has installed 945 MW or 2,312,160 bifacial modules across six projects. SOLV Energy has installed bifacial modules in Bakersfield, California; San Antonio, Texas; Boulder City, Nevada; Los Banos, California; Cunningham, Texas; and Clawson, Utah. In all cases, the developer sought to use bifacial modules due to the higher efficiency and higher energy yield, as this allows the developer to gain more efficiency per installed module.[122]

In June 2019, the Trump Administration excluded "bifacial solar panels that absorb light and generate electricity on each side of the panel and that consist of only bifacial solar cells" from the safeguard measure.[123] The exclusion was necessary to ensure adequate supply of this key technology, which the Department of Energy noted enhanced "project feasibility" when granting the exclusion was recommended. [124] Nonetheless, the Trump Administration had second thoughts, and sought to withdraw the exclusion.[125] Following a court order due to procedural missteps,[126] the U.S. Trade Representative requested comments on the bifacial

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[121] *Solar Futures Study 2021* at 124 (**Exhibit 5**).

[122] Affidavit of George Hershman, SOLV Energy (Oct. 26, 2021) at 3 (**Appendix B**).

[123] *Exclusion of Particular Products From the Solar Products Safeguard Measure*, 84 Fed. Reg. 27,684, 27,685 (U.S. Trade Rep. June 13, 2019).

[124] Memorandum from AUSTR María Pagán to USTR Robert E. Lighthizer, *Decision Memorandum: Solar 201 Product Exclusion Request* (May 3, 2019) (Attachment: U.S. Department of Energy Solar Energy Technologies Office, *201 Exclusion Request Details* at 48-50 (June 1, 2018)) (**Exhibit 35**).

[125] *Withdrawal of Bifacial Solar Panels Exclusion to the Solar Products Safeguard Measure*, 84 Fed. Reg. 54,244 (Oct. 9, 2019).

[126] *See Invenergy Renewables LLC v. United States*, \ 422 F. Supp. 3d 1255 (Ct. Int'l Trade Dec. 5, 2019). As a result of the preliminary injunction, the exclusion remained in effect from June 13, 2019 until October 25, 2020, the effective date of Presidential Proclamation 10101, which withdrew the exclusion in order to get around the U.S. Court of International Trade's preliminary injunction on USTR's action. *See Proclamation 10101 of October 10, 2020: To Further Facilitate Positive Adjustment to Competition From Imports of Certain Crystalline Silicon Photovoltaic Cells (Whether or Not Partially or Fully Assembled Into Other Products)*, 85 Fed. Reg. 65,639 (Oct. 16, 2020).

exclusion. The vast majority of comments favored maintenance of the exclusion, and a number of comments urged maintenance of the bifacial exclusion on the basis that bifacial modules are essential to the utility-scale segment.

Invenergy explained that, because of the difference in energy output, it "cannot simply replace planned bifacial modules with monofacial modules on large scale projects where offtake contracts have been entered into without significant changes to the project design, including the necessary acquisition of additional land, which in many cases may not be feasible."[127] Also, because fewer bifacial panels are needed to produce the same electricity as compared to monofacial panels, using bifacial panels on large solar developments creates significant project cost savings in the form of fewer expenses on cables, racking, and labor, thus making solar energy competitive with alternative sources of energy such as fossil fuels.[128] Furthermore, bifacial modules also take up less land as compared to monofacial panels with similar output, and provide additional protection from the elements and better degradation warranties, which owners can monetize through improved energy production.[129] "Simply put, monofacial modules are not an adequate substitute for bifacial ones."[130]

Clearway likewise explained that there are "certain benefits that only bifacial modules can provide in the utility sector, thus rendering monofacial modules inadequate as

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[127] Letter from Art Fletcher, Invenergy LLC, to the Honorable Jeffrey Gerrish, Deputy U.S. Trade Representative, Office of the U.S. Trade Representative, *Re: Comments on the Exclusion of Bifacial Solar Products from the Measure on Solar Products (Docket No. USTR-2020-0001)* (Feb. 17, 2020) at 10 (**Exhibit 36**).

[128] Letter from Art Fletcher, Invenergy LLC, to the Honorable Jeffrey Gerrish, Deputy U.S. Trade Representative, Office of the U.S. Trade Representative, *Re: Comments on the Exclusion of Bifacial Solar Products from the Measure on Solar Products (Docket No. USTR-2020-0001)* (Feb. 17, 2020) at 11 (**Exhibit 36**).

[129] Letter from Art Fletcher, Invenergy LLC, to the Honorable Jeffrey Gerrish, Deputy U.S. Trade Representative, Office of the U.S. Trade Representative, *Re: Comments on the Exclusion of Bifacial Solar Products from the Measure on Solar Products (Docket No. USTR-2020-0001)* (Feb. 17, 2020) at 11 (**Exhibit 36**).

[130] Comments by Clearway Energy Group LLC before the U.S. Trade Representative, *Responsive Comments on the Exclusion of Bifacial Solar Panels from the Safeguard Measure on Solar Products (USTR-2020-0001*) (Feb. 27, 2020) at 15 (**Exhibit 37**).

substitutes."[131] Clearway explained why redesigning a project to use monofacial modules might critically affect that project's viability:

> Bifacial modules increase total energy production at a minimum 4-9% over the equivalent monofacial modules, which is a significant increase. This allows developers to maximize energy production in the useable land area that has been obtained. As such, on large scale projects designed for bifacial modules, where offtake contracts have already been entered into, a redesign in order to use monofacial modules would require significant changes to the project design, which could affect the project's viability.[132]

SEIA similarly explained that bifacial and monofacial solar panels have "limited substitutability . . . in utility-scale versus residential/commercial applications."[133] SEIA presented supporting evidence, showing the price, weight, and energy production capacity differences between bifacial and monofacial solar panels.[134]

Despite the critical demand for bifacial modules for utility-scale installations, the domestic industry has limited capability to produce the bifacial modules. Prehearing Report Table III-6 indicates that bifacial modules accounted for only a **[ ]** share of domestic module production over the POI, ranging from **[ ]** percent to **[ ]** percent, and amounting to only **[ ]** percent on a weighted average basis over the period.[135]

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[131] Comments by Clearway Energy Group LLC before the U.S. Trade Representative, *Responsive Comments from the Exclusion of Bifacial Solar Panels from the Safeguard Measure on Solar Products (USTR-2020-0001*) (Feb. 27, 2020) at 15 (**Exhibit 37**).

[132] Comments by Clearway Energy Group LLC before the U.S. Trade Representative, *Responsive Comments from the Exclusion of Bifacial Solar Panels from the Safeguard Measure on Solar Products (USTR-2020-0001*) (Feb. 27, 2020) at 15 (**Exhibit 37**)

[133] Comments by Solar Energy Industries Association ("SEIA") before the U.S. Trade Representative, *Comments on the Exclusion of Bifacial Solar Panels from the Safeguard Measure on Solar Products (USTR-2020-0001*) (Feb. 17, 2020) at 18 (**Exhibit 38**).

[134] Comments by Solar Energy Industries Association ("SEIA") before the U.S. Trade Representative, *Comments on the Exclusion of Bifacial Solar Panels from the Safeguard Measure on Solar Products (USTR-2020-0001*) (Feb. 17, 2020) at 18-21 (**Exhibit 38**)

[135] CR/PR at III-19 (Table III-6). U.S. producers' bifacial module production was **[ ]** kilowatts in 2018, **[ ]** kilowatts in 2019, **[ ]** kilowatts in 2020, and **[ ]** kilowatts in interim 2021 for a total of **[ ]** kilowatts over the POI. Total module production was **[ ]** kilowatts in 2018, **[ ]** kilowatts in 2019, **[ ]** kilowatts in 2020, and **[ ]** kilowatts in interim 2021 for a total of **[ ]** kilowatts over the POI. **[ ]** kilowatts / **[ ]** kilowatts = **[ ]** percent.

Domestic producers accounted for an even smaller share of overall consumption of bifacial modules, ranging from only **[ ]** percent to **[ ]** percent, and amounting to only **[ ]** percent on a weighted average basis over the period.[136]

U.S. Producers Play a Very Small Role in the Bifacial Segment[137]

		2018	2019	2020	Jan-June 2020	Jan-June 2021	
(Quantity in Kilowatts)							
U.S. Producers	[						]
Import Sources		37,389	2,264,777	7,842,762	3,141,731	7,106,993	
Total	[						]
(Share of Segment Total)							
U.S. Producers	[						]
Import Sources	[						]
Total	[						]

Again, even with extraordinarily generous assumptions about future growth in domestic industry capacity for bifacial production, it is absurd to think that the domestic industry could ever satisfy more than a trivial portion of demand for bifacial modules. Even if demand stagnated (which is unlikely) and the domestic industry's bifacial production *tripled*, it would still hold **[ ]** percent of the market.[138]

[136] CR/PR at III-23 (Table III-11), V-15 (Table V-7). Note that these figures represent U.S. producers' U.S. shipments and U.S. importers' imports. U.S. producers' bifacial module shipments were **[ ]** kilowatts in 2018, **[ ]** kilowatts in 2019, **[ ]** kilowatts in 2020, and **[ ]** kilowatts in interim 2021 for a total of **[ ]** kilowatts over the POI. Total estimated bifacial module consumption was **[ ]** kilowatts in 2018, **[ ]** kilowatts in 2019, **[ ]** kilowatts in 2020, and **[ ]** kilowatts in interim 2021 for a total of **[ ]** kilowatts over the POI. **[ ]** kilowatts / **[ ]** kilowatts = **[ ]** percent.

[137] CR/PR at III-23 (Table III-11), V-15 (Table V-7). Note that these figures represent U.S. producers' U.S. shipments and U.S. importers' imports.

[138] If, for example (using figures from the table above), the domestic industry's 2020 shipments of bifacial of **[ ]** kilowatts tripled to **[ ]** kilowatts, that would account for only **[ ]** percent of total U.S. bifacial consumption in 2020 of **[ ]** kilowatts.

[

] report that no bifacial modules are produced in **[** **]**.[139]

Domestic capacity to produce bifacial modules in the United States is limited, particularly for the utility-scale segment of the market.

- Auxin Solar offers bifacial modules (among other products) for residential and commercial use, but the company has only 150 MW of total production capacity at its California facility.[140] Auxin Solar's profile on industry websites also indicates that the company "has an international customer base for its panels and mounting racks and it has developed turnkey commercial and residential solar systems in Europe, Australia, and America,"[141] suggesting that the capacity available for bifacial production for U.S. consumers is less than its stated plant capacity. In fact, Auxin indicated that the largest amount of bifacial modules it produced in the last three years was just **[** **]**, and Auxin did not report **[** **]**.[142]

- SolarTech Universal (which was recently acquired by Heliene USA) produced 60-cell bifacial modules in Florida, but the firm's very small 80 MW of production capacity was focused on the residential and commercial sectors.[143]

- Mission Solar has 200 MW of total capacity at its San Antonio, Texas manufacturing facility, producing 60-cell and 72-cell modules primarily for the residential and commercial markets.[144] Mission Solar's **[**

  ], which indicates that **[**

  ].[145] This is confirmed by Mission's **[**

  ].[146]

Taking all the domestic facilities together, there is only one conclusion—there is effectively zero capacity in the United States to produce bifacial modules for utility-scale use.

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[139] **[** **]** U.S. Producer Questionnaire Responses at II-13.

[140] *U.S. Solar Panel Manufacturers*, Solar Power World (last updated Sept. 2021) (**Exhibit 10**); Auxin Solar Website (**Exhibit 39**)

[141] *See, e.g.*, *Auxin Solar Inc.*, ISolarWorld (*last accessed* Oct. 19, 2021) (**Exhibit 40**).

[142] **[** **]** U.S. Producer Questionnaire Response at II-13, II-14.

[143] SolarTech Universal Website (**Exhibit 41**).

[144] Mission Solar Website (**Exhibit 23**).

[145] Mission Solar U.S. Producer Questionnaire Response at II-13.

[146] Mission Solar U.S. Producer Questionnaire Response at II-14.

According to James Resor of EDF Renewables Distributed Solutions, Inc. (a leading utility-scale developer):

> U.S. manufacturers cannot meet our needs in the utility sector because they do not have full product offerings for the utility market. In the last two years, EDF-R has seen an increase in the use of bi-facial modules in utility-scale projects such that the use of such bi-facial modules is essentially a specific requirement. The additional 6-10% energy production from bi-facial modules compared to mono-facial modules is essential in most cases for the economics of very competitive utility-scale projects as are other product enhancements (e.g., larger wafers) which U.S. producers can not provide. However, U.S. producers do not manufacture utility-scale bi-facial modules at all or at any meaningful scale.[147]

Narrative responses to the Commission's questionnaires also confirm the lack of U.S.-produced bifacial modules, which are often—and increasingly—used in utility-scale projects. The Prehearing Report noted that "{s}everal firms also indicated that bifacial products (particularly higher wattage bifacials) were very limited in the United States, with most availability coming from India, Malaysia, Philippines, Thailand, and Vietnam."[148] **[ ]** attributes the inability of domestic producers to produce **[ ]**.[149] Accordingly, for purchasers like **[ ]**, whose **[ ]**, they can only **[ ]**.[150] Moreover, according to **[**

[147] Affidavit of James P. Resor, EDF Renewables Distributed Solutions, Inc. (Oct. 26, 2021) at 3 (**Appendix B**).

[148] CR/PR at II-18.

[149] **[ ]** U.S. Purchaser Questionnaire Response at II-6(b); *see also id.* at II-3 ("**[ ]**.").

[150] **[ ]** U.S. Purchaser Questionnaire Response at II-3.

], even **[**

].[151]

Moreover, U.S. module assemblers do not produce sufficient quantities of large format (72-cell or equivalent) modules that utility-scale developers demand.[152] It is well established that 60-cell modules (or their equivalent) are produced for the residential and/or commercial segments and 72-cell modules (or their equivalent) are primarily produced for utility-scale.[153] Residential and commercial rooftop systems use 60-cell modules because of their smaller size and high conversion efficiency.[154] Larger modules (measured as either 72-cell/144 half-cut cell or by surface area of greater than or equal to 1.9 m^2) are required for utility scale because of their greater power generation and their ability to compete on price with other sources of energy.[155] Larger modules provide higher power output per module, which allows a reduction in the required balance of system ("BOS") and electrical BOS components and, most importantly, lower installation costs.[156] Larger formats means fewer modules to ship (and

[151] **[** **]** U.S. Purchaser Questionnaire Response at II-3; *see also id.* at II-6(b) ("**[**

].").

[152] *See, e.g.*, **[** **]** U.S. Purchaser Questionnaire Response at II-3 ("**[**

].").

[153] CR/PR at II-1 ("Residential and small commercial solar installations typically use 60-cell/120 half-cut cell modules, often with a high conversion efficiency, due to their smaller size. Larger commercial projects and utility-scale projects typically use 72-cell/144 half-cut cell modules because they are usually less expensive to install due to lower labor and balance of system costs."); *see also* Affidavit of James P. Resor, EDF Renewables Distributed Solutions, Inc. (Oct. 26, 2021) at 2 (**Appendix B**) (stating that utility-scale developers require 72-cell solar modules (or equivalent such as 144 half-cut cell); Affidavit of Aaron Hall, Borrego Solar Systems Inc. (Oct. 25, 2021) at 1 (**Appendix B**) (As a developer of large-scale 1-10 MW commercial projects, "{w}e exclusively purchase 72-cell modules and increasingly bifacial modules, which have extremely limited availability domestically and are not a possible source for us because these producers cannot accommodate the size of our projects. We require larger format modules in order to reduce the balance of system costs and to increase the financial viability of our projects.").

[154] CR/PR at II-1.

[155] CR/PR at II-1.

[156] CR/PR at II-1.

often more watts per shipping container), fewer modules to mount on fewer trackers or fixed-tilt racks (and more watts per tracker row), and fewer strings to connect to achieve the same installed capacity of the power plant. Additionally, larger formats mean fewer systems to operate and maintain once the plant is up and running. The result is decreased capital expenditures, lower levelized cost of electricity, and higher net present value.

For the same reasons, developers of large-scale commercial installations (1-10 MW) rely on larger format 72-cell modules. As explained by Aaron Hall, President of Borrego Solar Inc., the nation's largest EPC for commercial and wholesale distributed solar:

> Borrego Solar has consistently contacted domestic producers to supply modules, but they either do not produce the type of modules that we require or do not have the availability to fill our orders. We exclusively purchase 72-cell modules and increasingly bifacial modules, which have extremely limited availability domestically and are not a possible source for us because these producers cannot accommodate the size of our projects. We require larger format modules in order to reduce the balance of system costs and to increase the financial viability of our projects.[157]

Furthermore, the larger form factor 72-cell modules result in lower cost of electricity to U.S. electricity ratepayers. Hanwha Q CELLS Korea's own exclusion request affirms these facts. In particular, Hanwha Q CELLS Korea argued that their larger modules are "exclusively designed and optimized for utility scale applications" and mounting, voltage, and size dimension, and weight all mean the larger modules "cannot be used for residential" applications.[158]

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[157] Affidavit of Aaron Hall, Borrego Solar Systems, Inc. (Oct. 25, 2021) at 1-2 (**Appendix B**).

[158] Comments by Hanwha Q CELLS Korea Corporation Before the U.S. Trade Representative, *Request for Product Exclusion from the Solar Products Safeguard Measure: Half-Cell 6-Busbar Wire 144-Cell Steel Frame Modules* (Mar. 16, 2018) at 1 (**Exhibit 29**).

The domestic industry places a heavy focus on serving the residential segment, which relies on 60-cell modules and their equivalent. According to John Santo Salvo of Sunnova Energy International Inc., a leading solar and energy storage provider,

> The vast majority of residential solar installations are on pitched rooftops. Because of the nature of pitched rooftops, these residential installations require 60-cell (or equivalent) modules, with an aesthetically pleasing design (triple black—black backsheets, black frames, and black cells), low voltage (48 to 500 volts), and minimum wattage of 340-350 watts. We maintain the minimum wattage to ensure that installations do not include outdated technology. These requirements are distinct from other segments of the market like commercial and utility scale. In addition, 60-cell modules are preferable to 72-cell modules for typical rooftop installations because larger modules are more difficult to handle and install on a pitched roof and the roof area is constrained, requiring fewer solar modules at higher efficiencies.[159]

James Resor of EDF Renewable Distributed Solutions Inc. explained that "most domestic suppliers have focused on the residential and commercial market, which have smaller-scale projects and higher profit margins."[160] George Hershman of SOLV Energy also stated that "{t}he revenue margins in direct generation (i.e., residential and commercial) solar modules are higher, due to the need for higher efficiency panels, as they cover a smaller surface area, as well as general module customization."[161] Similarly, during the mid-term review, Craig Cornelius, CEO of Clearway Energy Group LLC, confirmed that the domestic industry instead focused on producing smaller modules for the residential and commercial segments, which command higher margins.[162] The Prehearing Report indicates that in 2020, **[ ]** percent of U.S. producers' domestic shipments went directly to the residential segment,

[159] Affidavit of John Santo Salvo, Sunnova Energy International Inc. (Oct. 26, 2021) at 1-2 (**Appendix B**).

[160] Affidavit of James P. Resor, EDF Renewables Distributed Solutions, Inc. (Oct. 26, 2021) at 2 (**Appendix B**).

[161] Affidavit of George Hershman, SOLV Energy (Oct. 26, 2021) at 3 (**Appendix B**).

[162] Affidavit of Craig Cornelius, Clearway Energy Group LLC, Inv. No. TA-201-75 (Monitoring) (Nov. 26, 2019) at 2 (**Exhibit 42**)

while **[ ]** percent went to distributors.[163] Utilities and developers normally do not purchase modules through distributors, meaning that **[ ]** of modules produced by the domestic industry were for the residential and/or commercial segment.[164]

Finally, utility-scale installations require 1,500-volt ("1500V") modules and smaller format modules are rarely rated for such high voltage. A higher voltage module is an innovation that increases the power produced by a solar installation. As explained by IHS Markit:

> The rationale for pushing toward higher voltages in PV systems is actually rooted in rather basic science and the classroom taught relationship between electrical power (P), current (I) and voltage (V) – "P=IV". This formulaic relationship indicates that to deliver a fixed amount of power, the amount of current required reduces as the voltage increases. It happens to be that electrical losses are also less at lower levels of current. For the same reason that high voltages are used when sending electricity long distances along transmission lines, PV system voltages have been increasing wherever possible in order to reduce electrical losses in the system, therefore increasing the yield of the system. In addition, the ability to create longer—and therefore fewer—strings also simplifies systems and can reduce the number of other components required (e.g. string combiners), aiming to reduce the overall cost of a system.[165]

Increasing yield and reducing balance of system costs have led to the widespread adoption of 1500V modules by utility-scale projects, which are constantly seeking to reduce costs to stay competitive.[166] Residential and commercial segments, on the other hand, generally do not use 1500V modules:

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[163] CR/PR at II-2 (Table II-1).

[164] Affidavit of Timothy Crane, Sunrun Inc. (Oct. 26, 2021) at 2 (**Appendix B**); Affidavit of John Santo Salvo, Sunnova Energy International Inc. (Oct. 26, 2021) at 1 (**Appendix B**); Affidavit of George Hershman, SOLV Energy (Oct. 26, 2021) at 3 (**Appendix B**); Affidavit of James P. Resor, EDF Renewables Distributed Solutions, Inc. (Oct. 26, 2021) at 1 (**Appendix B**); Affidavit of Aaron Hall, Borrego Solar Systems Inc. (Oct. 25, 2021) at 1 (**Appendix B**); NextEra's Prehearing Brief (Oct. 27, 2021) at Exhibit 1 (Affidavit of Ron Reagan, NextEra Energy, Inc. at 7).

[165] *Over 100 GW of 1500 Volt Solar Inverters to be Shipped in Next 3 Years* , IHS Markit (2019) at 3 (**Exhibit 43**).

[166] *Higher Voltage Standards Help Reduce LCOE for PV Systems*, IHS Markit (2020) (**Exhibit 44**).

> While 1500V is becoming the standard in large-scale PV systems, the adoption in roof-top systems is lagging behind. In such systems, the deployment of 1500V is limited by safety standards, building codes and electricity regulations. Local regulations may allow such systems in commercial buildings in certain circumstances, but a general broad rollout is not expected. Use of 1500V systems in the residential sector is not anticipated within the foreseeable future.[167]

U.S. product safety standards require that a 1500V PV system's components (which include but are not limited to the PV module, inverter, cabling and connectors) are certified for 1500V applications. Because of the higher voltage, 1500V systems are subject to more stringent material and spacing requirements.[168] The combination of safety standards, building codes, and electricity regulations means that 1000V (or less) panels are used in the residential segment. Given that the domestic industry focuses on that segment, it logically follows that the domestic industry will devote a significant percentage of its capacity to producing 1000V or lower modules, which normally are not used in utility-scale applications.

The safeguard measures clearly have not encouraged positive adjustment to service the largest segment of the U.S. market. Expansions by module producers during the safeguard period have not relieved the severe deficit in domestic supply for the utility-scale segment. Planned expansions also will not adequately address the supply shortfall of key technologies. Therefore, extension of the measures is not warranted.

d. Imports Had No Significant Volume or Price Effects, Meaning Tariffs Are Not Needed to Remedy or Prevent Serious Injury to the Domestic Industry

Analysis of price and monthly shipment data indicates that removing the safeguard tariff on modules will not harm the domestic industry. As discussed above, the majority of

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[167] *Over 100 GW of 1500 Volt Solar Inverters to be Shipped in Next 3 Years*, IHS Markit (2019) at 4 (**Exhibit 43**).

[168] Letter from James Ellington, Ellington Advanced Facilities Consulting, LLC, to Edward Gresser, Office of the U.S. Trade Representative, *Re: Comments in Support of 1,500 Volt Bifacial Module Exclusion Request (USTR-2018-0001-0041)* (Apr. 16, 2018) (**Exhibit 45**).

imports is sold to the utility-scale segment, whereas the domestic industry predominantly sells to the residential and commercial segments. Technology and specifications differ among the segments, particularly between the residential and utility-scale segments. As explained further below, prices for modules designed for utility-scale do not affect the prices of modules for rooftop installations that are predominantly residential. For the same reasons, imports do not have a significant volume effect on domestic production. In fact, the domestic industry increased U.S. shipments before, during, and after the bifacial exclusion was in effect. The period of the bifacial exclusion, therefore, serves as a natural experiment, which demonstrates that tariffs are not needed and therefore should terminate.

i. Economic Analysis Shows that Utility-Scale Pricing Does Not Affect Rooftop Pricing

SEIA provides as **Appendix A** a study prepared by Dr. Thomas Prusa of Rutgers University, using proprietary pricing data for the U.S. photovoltaic market for the 2011-2020 period to study the pricing dynamics for CSPV 72-cell and 60-cell modules as a proxy for comparing the prices of residential versus utility-scale CSPV modules. *The analysis shows that changes in the price of 72-cell modules do not cause changes in the price of 60-cell modules.* The analysis also demonstrates that the prices of 60-cell modules do not influence the price of 72-cell modules. Rather, the results suggest that alternative causal forces—such as long-term reductions in the cost of production (e.g., falling polysilicon prices) and relentless technological change—drive the pricing trends for *both* 72-cell and 60-cell modules. In the CSPV market, correlation between the prices of 60-cell and 72-cell modules definitely does not imply causation. While the CSPV market has moved to larger and larger format modules for both residential and utility-scale projects, the analysis of 60-cell and 72-cell module pricing confirms the segmented nature of the two markets. Changes in pricing for

utility-scale modules (i.e., larger format, heavier, higher voltage, increasingly bifacial) have no demonstrable impact on prices of residential modules.

Dr. Prusa concluded that the segmented nature of the solar market is a key reason for the finding. 72-cell modules and 60-cell modules do not compete with each other for approximately 90 percent of U.S. sales. The utility-scale segment, accounting for about 70 percent of U.S. solar demand, almost exclusively uses large format modules, of which 72-cell modules are the most popular form factor. By contrast, the residential segment, accounting for about 20 percent of U.S. solar demand, almost exclusively uses smaller format modules, of which 60-cell modules are the dominant form factor. Effectively, the highly segmented nature of the domestic market makes 60-cell and 70-cell modules a proxy for modules destined to the residential (where domestic producers primarily sell) and utility-scale segments, respectively.

Furthermore, the impact on domestic producers of the bifacial module exclusion from the Section 201 tariffs can be inferred from the long-term pricing patterns for 72-cell and 60-cell modules. The bifacial exclusion raises the specter of pricing spillover from bifacial modules to monofacial 60-cell modules. *However, the statistical analysis finds no support for a finding of pricing spillover from imported bifacial modules to domestically produced 60-cell modules*.

The spillover issue is critical for a proper assessment of the impact, if any, of the bifacial exclusion on domestic module makers. There is no evidence showing that there is pricing spillover from 72-cell bifacial modules to 72-cell monofacial modules. But, even if one were to assume such a pricing spillover exists, the fact that the domestic module makers concentrate on producing 60-cell modules implies this type of alleged spillover would have had little or no effect on domestic module makers. Bifacial cells are used almost exclusively

in 72-cell modules and domestic producers devote very little of their capacity to 72-cell monofacial modules. Rather, the critical issue is whether there is pricing spillover from 72-cell bifacial modules to 60-cell monofacial modules. Given the domestic industry's emphasis on 60-cell modules, this type of spillover is the only way domestic module makers could be materially affected by the bifacial exclusion. That the data provides no evidence of spillover from 72-cell to 60-cell modules implies the bifacial exclusion did not harm domestic producers. Market segmentation again is critical to this finding.

Dr. Prusa's analysis demonstrates that tariffs on imported 72-cell modules are not needed. The domestic industry is focused on the residential and commercial segments, which use smaller 60-cell (or equivalent) modules. Imports are predominantly larger 72-cell (or equivalent) modules sold to the utility-scale segment.[169] The domestic industry does not need protection from these imports because there is no cause-and-effect relationship between prices for the different products.

ii. The Period of the Bifacial Exclusion Is a Natural Experiment Demonstrating that the Safeguard Tariff Is Ineffective

Imports of bifacial modules were excluded from the safeguard tariff from June 13, 2019 to October 25, 2020. Petitioners have asserted the bifacial exclusion reduced demand for domestically produced CSPV modules. Data collected in the Prehearing Report prove this assertion is baseless. The data show the industry grew robustly before and after the exclusion was granted.

[169] *See supra* **Section II.A.1.c**.

As seen in the following figure, the domestic industry shipped **[ ]** KW of monofacial modules in April 2019 and **[ ]** KW in May 2019.[170] Shipments in April and May 2019 were about **[ ]** KW more than domestic shipments in the first five quarters (15 months) of the review, January 2018 to March 2019.[171] The data clearly show the domestic module industry was growing prior to the exclusion.

The data also show the domestic module industry continued to grow after the bifacial exclusion was granted until the COVID-19 crisis hit. Consider the following. First, in each of the first nine months following the bifacial exclusion the domestic industry shipped more monofacial modules than it did in May 2019, the last full month before the bifacial exclusion was granted. Second, domestic shipments averaged **[ ]** KW during the first nine months of the exclusion.[172] This exceeds average monthly domestic shipments in the three quarters prior to the exclusion by **[ ]** KW.[173] Third, overall, during the first nine months of the bifacial exclusion the domestic industry's monofacial shipments grew by **[ ]** percent.[174] Growth of this magnitude soundly contradicts any suggestion the domestic industry was not growing.

[170] CR/PR at III-26, III-27 (Table III-13).
[171] CR/PR at III-26, III-27 (Table III-13).
[172] CR/PR at III-26, III-27 (Table III-13).
[173] CR/PR at III-26, III-27 (Table III-13).
[174] Comparing domestic production in March 2020 with May 2019.

Domestic Monofacial Shipments (Monthly), KW[175]

Then, in mid-March 2020 everything changed. Domestic module assembly dropped precipitously in April and May 2020. But this fall had nothing to do with the bifacial exclusion and everything to do with the COVID-19 pandemic. The Prehearing Report confirms this. Purchasers reported domestic producers suffered "COVID-related shipping delays and production constraints."[176] This was due to health precautions here in the United States and also supply shortages (notably cells) from the foreign supply chain.[177] In fact, the Prehearing Report notes that COVID-19 related issues were the most frequently cited change

[175] CR/PR at III-26, III-27 (Table III-13).

[176] CR/PR at II-7.

[177] CR/PR at IV-13 to IV-14.

in the conditions of competition during the period of investigation.[178] [ ] stated "[

].”[179] [ ] stated "[

]”[180] [ ] stated "[

].”[181]

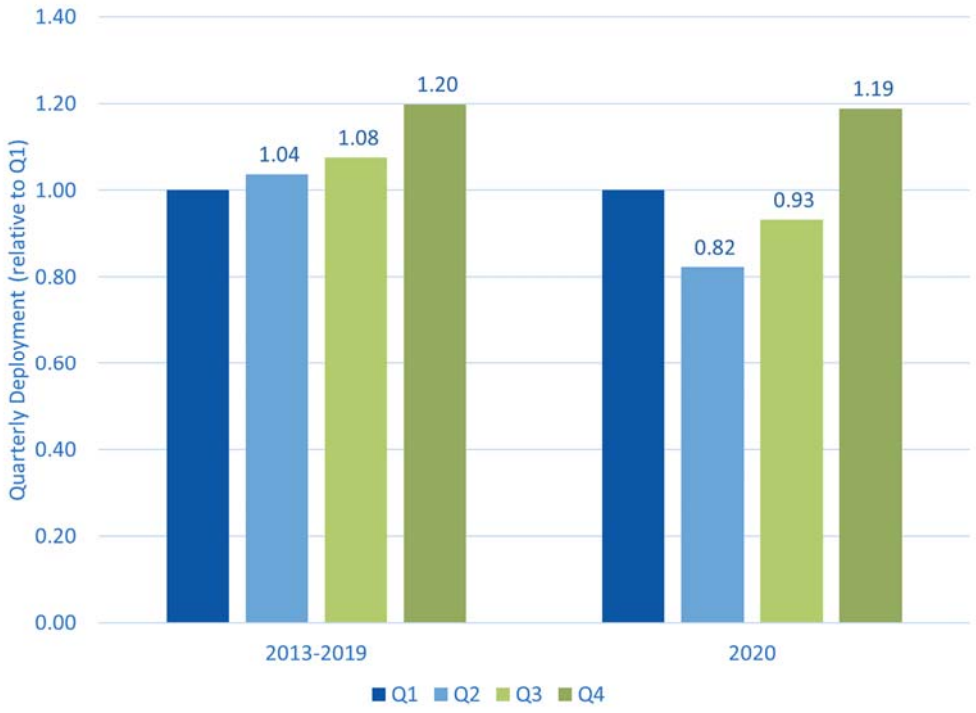
The COVID-19 pandemic also caused a demand shock on the domestic industry. This can be seen by comparing deployment trends in 2020 with trends in prior years (see figure below). The comparison makes it clear that COVID-19 had a significant impact on deployment, in particular on residential deployment.

The typical pattern is for deployment numbers to grow over the calendar year, with the fourth quarter being by far the largest quarter of deployment. This pattern is true for all three segments, residential, nonresidential, and utility-scale. The figure below depicts the trend for the residential segment as this is the segment most relevant for domestic module makers. As shown below, over the 2013-2019 period the first quarter was the lowest deployment quarter, with second quarter residential deployment 4 percent higher than during the first quarter, third

[178] CR/PR at II-18.
[179] CR/PR at III-9.
[180] CR/PR at IV-14, n.27.
[181] CR/PR at IV-14, n.27.

quarter deployment 8 percent higher than in the first quarter, and fourth quarter deployment 20 percent higher than in the first quarter. Similar trends are found in the nonresidential and utility-scale segments.

Residential Deployment, Quarterly (Relative to First Quarter)
2013-2019 vs. 2020[182]



Compare the 2013-2019 seasonal pattern with what occurred in the COVID-19 plagued 2020. As seen, residential deployment fell by 18 percent in the second quarter and by 7 percent in the third quarter (as compared to 2020's pre-pandemic first quarter). Clearly, homeowners did not want unfamiliar people (e.g., sales, installation, inspectors, etc.) coming to their homes, especially in the early stage of the pandemic when concerns about modes of transmission were high and conflicting information about the virus was being given. As detailed in **Exhibit 120**, the decline in demand associated with COVID-19 explains the fall in

[182] SEIA & Wood Mackenzie, *U.S. Solar Market Insight: Full Report: 2020 Year in Review* (Mar. 2021) (**Exhibit 9**).

domestic monofacial shipments. If shipments in Q2-2020 and Q3-2020 had been similar to the demand patterns over the 2013-19 period, domestic CSPV shipments of monofacial modules would have grown by **[ ]** percent relative to their levels in 2019. There is no evidence that the bifacial exclusion had anything to do with changes in domestic monofacial production and sales in 2020. Further, we note that by the fourth quarter of 2020, residential deployment had recovered to its pre-COVID pattern of growth with deployment **[ ]** percent larger than in the first quarter, nearly identical to its long-run pattern (**[ ]** percent increase). Finally, additional evidence of the recovery of demand by late in 2020 can be seen by observing what happened to domestic monofacial shipments after the exclusion was *removed* in October 2020 average monthly domestic monofacial shipments following the removal of the bifacial exclusion was **[ ]** KW—virtually the same as domestic shipments during the last five months when the bifacial exclusion was in place, **[ ]** KW.[183] Meanwhile, monthly imports of bifacial panels were higher after re-imposition of safeguard duties on these products than they were when the exclusion was in effect.[184]

2. The Domestic Industry that Most Directly Competes with the Largest Volume of Imports Is Performing Very Well and Does Not Need Protection

The uselessness of continued safeguard protection is well demonstrated by the fact that the company that competes most directly with imported utility-scale modules has thrived over the past four years. That company is First Solar. As one member of the domestic industry put it, "**[**

]."[185]

[183] CR/PR at III-26, III-27 (Table III-13) (comparing November 2020-June 2021 with June 2020-October 2020.
[184] CR/PR at V-24 (Table V-10).
[185] **[ ]** U.S. Producer Questionnaire Response at IV-11.

Although First Solar produces nonsubject thin-film modules, its modules are used predominantly for the utility-scale sector,[186] to which most CSPV imports are devoted and which the domestic CSPV module industry is woefully unable to serve, as discussed above. In recent years, First Solar has performed extremely well, including when imported bifacial modules—which are used mostly for utility-scale projects—were excluded from the safeguard measures. Thus, any recommendation for extension of CSPV safeguard measures should include an exclusion for utility-scale modules because they do not cause harm to the domestic industry.

a. The Only U.S. Producer Manufacturing Utility-Scale Modules in Any Significant Quantities Is First Solar

The U.S. Department of Energy has recognized that "{c}rystalline silicon is the incumbent technology against which alternatives are compared. CdTe {(i.e., cadmium telluride or thin-film technology)} has been a successful competitor, especially in the United States."[187] CSPV and thin-film are both commonly used in utility-scale projects.[188] "**[**

]."[189]

Firms reported that CdTe is in direct competition with CSPV products, "with **[** **]**

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[186] CR/PR at II-22.

[187] *Solar Futures Study 2021* at 126 (**Exhibit 5**).

[188] Kelly Pickerel, *With Larger Module, First Solar Aims to Compete with Traditional Crystalline*, Solar Power World (**Exhibit 46**).

[189] **[** **]** U.S. Producer Questionnaire Response at IV-11; *see also* **[** **]** U.S. Producer Questionnaire Response at IV-11 ("**[**

]."); **[** **]** U.S. Producer Questionnaire Response at IV-11 ("**[**

]."); **[** **]** U.S. Producer Questionnaire Response at IV-11 ("**[**

]."); **[** **]** U.S. Producer Questionnaire Response at IV-11 ("**[** **]**.").

stating that this is true for the utility segment of the market only, and that thin film CdTe modules "are unsuitable for residential or commercial rooftop applications due to their low conversion efficiency, high weight, and incorporation of the hazardous material cadmium."[190]

As the largest segment of the U.S. market, utility-scale CSPV modules are the largest volume of imports.[191] First Solar is the only U.S. PV producer making utility-scale modules in significant quantities. In 2020, its Ohio manufacturing facilities had 2.2 GW of nameplate capacity for its leading line of utility-scale modules, Series 6.[192] Though thin-film modules are not subject to the safeguard measures, they are directly competitive with imported CSPV modules. As discussed above, although certain CSPV module producers may have the ability to supply utility-scale modules, based on bankability and production-scale requirements, U.S. CSPV module producers have instead focused their U.S. production on the residential and commercial markets.[193] Thus, as a practical matter, First Solar is the U.S. producer that most directly competes with imported utility-scale CSPV modules.[194]

b. The Bifacial Exclusion Demonstrated that the Domestic Industry Is Not Harmed by Import Competition

Between June 2019 and October 2020, bifacial CSPV modules entered the United States duty free as a result of the exclusion of bifacial solar panels from the safeguard measures.[195] Bifacial CSPV modules are deployed almost exclusively in the utility-scale

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[190] CR/PR at II-22.

[191] *See supra* **Section II.A.1**.

[192] First Solar, *Investor Overview* (July 29, 2021) (**Exhibit 47**).

[193] *See supra* **Section II.A.1.a**.

[194] *See, e.g.*, **[** **]** U.S. Producer Questionnaire Response Att. 1 at IV-11 ("**[** **]**.").

[195] *See Exclusion of Particular Products From the Solar Products Safeguard Measure*, 84 Fed. Reg. 27,684, 27,685 (June 13, 2019), *withdrawn by Presidential Proclamation 10101 of October 10, 2020*, *To Further*

sector because installation on rooftops does not allow bifacial modules to generate much power through the backside panel.[196] As a result, the U.S. solar module industry experienced a natural experiment that tested whether U.S. companies competing with imported utility-scale CSPV modules are harmed by import competition. Because First Solar is the U.S. producer that most directly competes with imported utility-scale CSPV modules, any adverse impact from the bifacial exemption would be reflected in First Solar's financials.

First Solar has thrived over the past three and one-half years. According to its 2020 annual report, gross profit increased from 17.9 percent in 2019 to 25.1 percent in 2020, "primarily due to higher gross profit on third-party module sales and improved throughput of {First Solar's} manufacturing facilities."[197] Moreover, net sales from First Solar's modules segment increased by $275.9 million in 2020.[198] First Solar's U.S. production facilities drove the company's exceptional performance. According to the annual *U.S. Solar Market Insight* publication, domestic production of solar modules reached a record high 4.3 GW in 2020 of which 1.4 GW was thin film.[199] First Solar's 1.2 GW capacity expansion in its manufacturing facility in Northwest Ohio comprised a "significant portion of this sector's YoY growth."[200]

Facilitate Positive Adjustment to Competition From Imports of Certain Crystalline Silicon Photovoltaic Cells (Whether or Not Partially or Fully Assembled Into Other Products), 85 Fed. Reg. 65,639 (Oct. 16, 2020). USTR previously attempted to withdraw the bifacial exclusion in October 2019 and April 2020. *See Withdrawal of Bifacial Solar Panels Exclusion to the Solar Products Safeguard Measure*, 84 Fed. Reg. 54,244 (Oct. 9, 2019); *Determination on the Exclusion of Bifacial Solar Panels From the Safeguard Measure on Solar Products*, 85 Fed. Reg. 21,497 (Apr. 17, 2020), *vacated by Invenergy Renewables LLC v. United States*, 476 F. Supp. 3d 1323, 1340, 1352 (Ct. Int'l Trade 2020).

[196] *See supra* **Section II.A.2.b**.

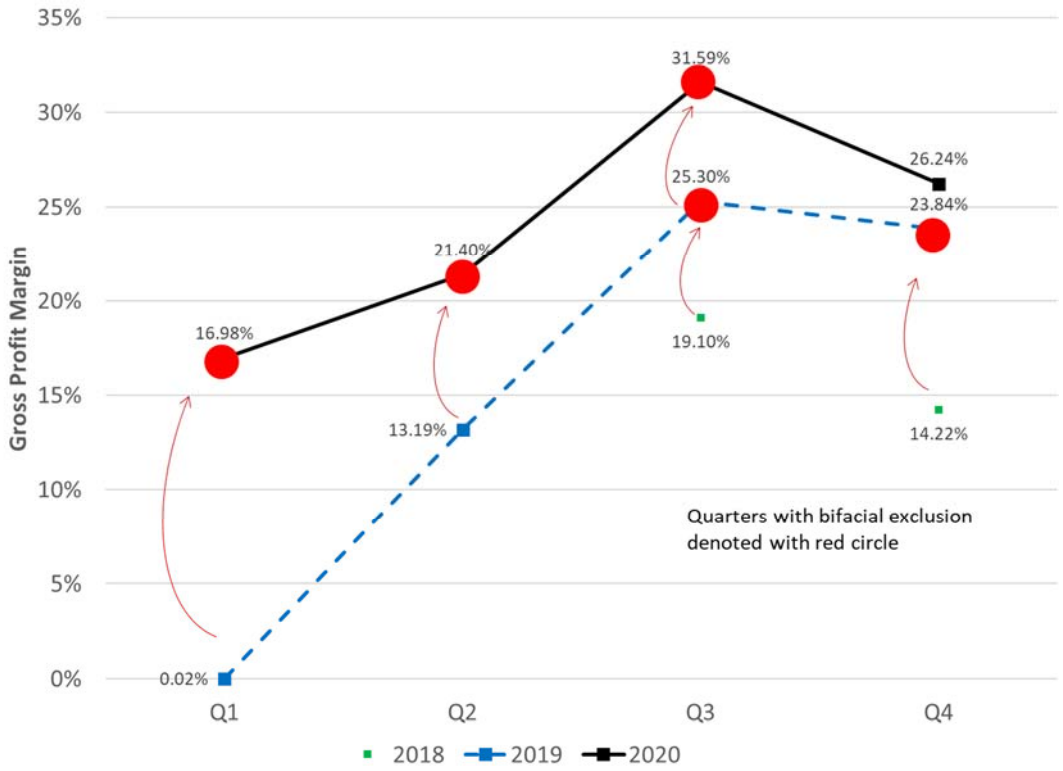
[197] First Solar 2020 Annual SEC Form 10-K at 62 (**Exhibit 48**).

[198] First Solar 2020 Annual Form 10-K at 61 (**Exhibit 48**)

[199] SEIA & Wood Mackenzie, *U.S. Solar Market Insight: Full Report: 2020 Year in Review* (Mar. 2021) at 50 (**Exhibit 9**).

[200] SEIA & Wood Mackenzie, *U.S. Solar Market Insight: Full Report: 2020 Year in Review* (Mar. 2021) at 50 (**Exhibit 9**).

First Solar – Growing Profit Margins Every Quarter during Bifacial Exemption[201]



First Solar's strong performance is even clearer when we look at its quarterly results. First Solar reported strong positive gross profits in each quarter when the bifacial exclusion was in effect, averaging profit margins over 22 percent.[202] Moreover, First Solar experienced steadily *increasing* profits during the period of the bifacial exclusion. As seen in the figure above, in each quarter from Q2 2019 through Q3 2020, First Solar reported increased year-over-year gross profit margins.[203] For example, First Solar's gross profit margin in Q1-2020 was 16.98 percent as compared to just 0.02 percent in the same quarter in 2019; its margin in Q2-2020 was 21.40 percent as compared to 13.19 percent in the same quarter in 2019. Thus,

[201] First Solar First Solar Annual SEC Form 10-K (2018, 2019, 2020 Excerpts) (**Exhibit 49**).

[202] *First Solar Income Statement & Balance Sheet*, MarketBeat (last updated Sept. 16, 2021) (**Exhibit 50**).

[203] First Solar Annual SEC Form 10-K (2018, 2019, 2020 Excerpts (**Exhibit 49**).

First Solar's success in recent years was not the result of the protection offered by the safeguard measures. First Solar even told its investors as much, stating that it "hasn't really been influenced by the 201 tariffs because of the bifacial exemption."[204] Finally, as explained below, First Solar continues to thrive and has invested in future capacity expansions. Duty-free imports of utility-scale CSPV modules would therefore not be expected to harm First Solar or the domestic CSPV module industry in the future.

First Solar expects continued financial success, and therefore continues to "look to extend {its} advantages in the utility scale market."[205] Through July 2021, First Solar has accomplished record year-to-date bookings of 9.0 GW, including 4.1 GW in Q2 2021.[206] First Solar also claims that demand for its Series 6 product, a panel designed for utility-scale projects, has created an approximate 17 GW contracted backlog for deliveries in 2021 through 2024.[207] Moreover, it has reinvested its strong earnings in utility-scale production facilities. In August 2021, First Solar broke ground on a $680 million manufacturing facility in Lake Township, Ohio that will increase U.S. capacity by 3.3 GW.[208] The facility will commence operations in 2023, indicating that First Solar expects continued profitability *regardless of whether the CSPV cells are subject to safeguard duties*.[209] First Solar's long-term strategic plan includes "providing utility-scale PV solar energy solutions in key geographic markets that {First Solar} believe{s} have a compelling need for mass-scale PV solar electricity,

[204] First Solar Q1 2021 Earnings Call Tr. (Apr. 30, 2021) (**Exhibit 51**).

[205] First Solar Q2 2021 Earnings Call Tr. (July 29, 2021) (**Exhibit 52**).

[206] First Solar Q2 2021 Earnings Call Tr. (July 29, 2021) (**Exhibit 52**).

[207] First Solar, *Investor Overview* (Feb. 25, 2021) (**Exhibit 53**).

[208] *Press Release: First Solar Breaks Ground on New $680m, 3.3 GW Ohio Manufacturing Facility*, First Solar (Aug. 17, 2021) (**Exhibit 54**).

[209] *Press Release: First Solar Breaks Ground on New $680m, 3.3 GW Ohio Manufacturing Facility*, First Solar (Aug. 17, 2021) (**Exhibit 54**).

including markets throughout the United States, Japan, Europe, India, and certain other strategic markets."[210]

Thus, First Solar has performed very well even while the imported CSPV modules that compete most directly with its thin-film modules were not subject to safeguard duties, and First Solar expects that it will continue to thrive in the market for utility-scale modules regardless of whether the safeguard duties are extended.

c. Imports of Thin-Film Modules, which Escape Safeguard Duties, Have Increased Rapidly Since the Safeguard Measures Were Imposed

Imports of thin-film modules have increased rapidly since the safeguard measures on CSPV modules were imposed. Whereas CSPV modules are subject to import duties, thin-film modules are outside the scope of the safeguard measures and therefore may be imported into the United States without additional duties. More than 3.9 GW of thin-film modules were imported in 2020 compared to 1.5 GW imported in 2018—a 160 percent increase.[211]

First Solar has been the primary beneficiary of increased imports of thin-film modules. In addition to its U.S. production of thin-film modules, First Solar imports thin-film modules from its manufacturing facilities in Malaysia and Vietnam.[212] The company also announced plans to invest $683 million for a new 3.3 GW manufacturing facility in India.[213] The United States is clearly an important market for First Solar, not only for its U.S. production but also

[210] First Solar Annual 2020 SEC Form 10-K at 56 (**Exhibit 48**).

[211] Note that official U.S. import statistics only have data on thin-film imports since July 2018. The value for full-year 2018 is based on annualizing thin-film imports for the last six months of 2018. Alternatively, comparison of second half 2018 with second half 2020 yields a similar growth in thin-film imports (an increase of 146 percent). U.S. Import Statistics (**Exhibit 55**).

[212] First Solar Q2 2021 Earnings Call Tr. (July 29, 2021) (discussing trends in freight prices for shipments from First Solar's manufacturing facilities in Malaysia and Vietnam to U.S. customers) (**Exhibit 52**).

[213] Uma Gupta, *The Long Read: First Solar Goes to India*, PV Magazine (Oct. 2, 2021) (**Exhibit 56**).

its significant imports,[214] both of which have thrived while safeguard measures have been in place (with and without the bifacial exclusion). Importantly, however, protection of nonsubject domestic and imported product is most definitely not the purpose the safeguard law.

3. Continued Safeguard Relief Will Not Improve the Domestic CSPV Module Industry's Performance

However the Commission views the data, the domestic CSPV industry has had mixed performance since the safeguard measures were imposed. Trade and operations indicators varied by producer and fluctuated throughout the POI. This is true for new entrants and legacy producers with operations at the time of the original investigation. Imports are not a threat to the domestic industry. Rather, as discussed above, imports are a necessity to satisfy demand, in all segments of the market, particularly in segments the domestic producers do not serve. Indeed, ***[***

]. As a result, continued tariffs at lower rates will not promote significant improvement in the domestic industry, but instead will continue to dampen demand to the detriment of the domestic industry and the broader U.S. solar industry.

a. Module Producers, Both Old and New, Have Shown Mixed Performance, Irrespective of Safeguard Measures

Information gathered in the U.S. producers' questionnaires and presented in the Commission's Prehearing Report demonstrates that the health of the domestic module industry has not markedly improved during the nearly four years of relief afforded by the

[214] Including imports and domestic production, the U.S. market accounted for 77 percent of First Solar's revenue from 2016 through 2020. David Feldman, et al., *H1 2021: Solar Industry Update*, NREL (June 22, 2021) at 26 (**Exhibit 57**).

safeguard measures. Based on this experience, there is no reason to believe that extending the safeguard measures will yield an improvement in the industry's performance.

The table below provides information on the location of U.S. module producers' establishments and whether they were a module producer in 2018 or became a module producer after 2018. While three companies (i.e., Hanwha Q CELLS USA, JinkoSolar (U.S.), and LGEUS) started up operations since February 2018, two companies (i.e., Panasonic and SunPower) ceased operations and a third company (i.e., Suniva,) ceased production in 2017. Thus, on a net basis, the industry gained at most one new module producer since 2018.

U.S. Producers of CSPV Modules[215]

Company	Location		Module Production in 2018?	Module Production in Interim 2021?	Module Production in 2020 (kilowatts)		Comments
Auxin Solar Inc. ("Auxin")	California	[				]	Founded in 2008.
Hanwha Q Cells USA, Inc. ("Hanwha Q CELLS USA")	Georgia	[				]	Began production in February 2019.
Heliene USA Inc. ("Heliene")	Florida	[				]	Plant opened prior to 2018.
Jinko Solar (U.S.) Industries Inc. ("JinkoSolar (U.S.)")	Florida	[				]	Began commercial production in early 2019.
LG Electronics U.S.A., Inc. ("LGEUS")	Alabama	[				]	Began commercial production in February 2019.
Mission Solar Energy LLC ("Mission")	Texas	[				]	Plant opened in 2014.
Panasonic Solar North America ("Panasonic")	New York	[				]	Announced in February 2020 that it would end cell and module production by the end of May 2020.
PowerFilm, Inc. ("PowerFilm")	Iowa	[				]	Plant opened in 2018.

[215] CR/PR at I-24 to I-25 (Table I-10), at III-2 to III-7, III-16 (Table III-4); U.S. Producers' Questionnaire Responses at II-13.

Company	Location		Module Production in 2018?	Module Production in Interim 2021?	Module Production in 2020 (kilowatts)		Comments
SBM Solar Inc. ("SBM")	North Carolina	[				]	Plant opened prior to 2018.
Silfab Solar WA Inc. ("Silfab")	Washington	[				]	Bellingham plant was built in 2017; Silfab purchased the plant in August 2018.
Suniva, Inc. ("Suniva")	Georgia (cell production); Michigan (module production)	[				]	Cell production began in 2008; module production began in 2015; production ceased in April 2017; exited bankruptcy in April 2019.
SunPower Manufacturing Oregon, LLC ("SunPower")	Oregon	[				]	Plant opened in 2008; October 1, 2018 acquired certain assets of Solar World; retired cell line by beginning of 2019; announced in January 2021 that it would cease module production at Hillsboro OR facility.
Tesla, Inc. ("Tesla")	New York	[				]	Facility opened in 2014; volume production began in 2019.

Of the [ ] companies reporting module production throughout the period (i.e., in 2018 and in interim 2021), two companies are not included in the following discussion because:

- [ ] for this company were not included in the Prehearing Report;[216] and
- [ ] for this company were not included in the Prehearing Report.[217]

[216] CR/PR at I-33 n.129.

[217] CR/PR at I-33 n.129

If all U.S. module producers are considered together, their performance since 2018 appears to have improved by a very slim margin. Specifically, as shown in Prehearing Report Table C-2, U.S. module producers' market share in terms of quantity increased from 8.5 percent in 2018 to 9.9 percent in interim 2021. However, U.S. producers' market share worsened between interim 2020 and interim 2021, from 10.7 percent to 9.9 percent. Moreover, after reaching a high of 14.6 percent in 2019, U.S. producers' market share declined to 10.6 percent in 2020.[218] Simply comparing U.S. producers' market shares at the beginning and end of the period glosses over the decline that has occurred since 2019.

A simplistic end-to-end comparison also disguises the fact that even this minimal improvement by U.S. producers is largely due to the newer entrants (i.e., Hanwha Q CELLS USA, JinkoSolar (U.S.), and LGEUS), which started commercial production in the United States in 2019. As described below, the companies that have produced modules since 2018, when the safeguard measures were implemented, have exhibited mixed results (i.e., the indicators for these companies did not uniformly improve). In many instances, companies' performance was the reverse of what would be expected with safeguard measures in place. This fact underscores that nearly four years of the safeguard measures have not produced the desired effect and there is no basis to conclude that there would be a different outcome if the measures were to be extended.

i. Module Producers in 2018

Exhibit 58 (Production, Utilization) shows that, of the companies reporting data in 2018,[219] production declined for **[ ]** companies (**[ ]**) between 2018

[218] CR/PR Appx. C at C-5, C-6 (Table C-2).

[219] The companies reporting data in 2018 are: **[ ]**.

and 2020. [ ] of the seven companies experienced a decline in production between 2019 and 2020 (i.e., all companies except [ ]), and [ ] of the seven companies experienced a decline in production between the interim periods (i.e., all companies except [ ]). Cumulatively, the module production of these seven companies declined by [ ] percent between the interim periods, from [ ] kilowatts to [ ] kilowatts. [ ] of these companies experienced increased production in all of the periods under review.[220] Capacity utilization for these companies likewise was mixed:

Capacity Utilization[221]

		Change 2018-2020 (ppt)	**Change 2018-2019 (ppt)**	**Change 2019-2020 (ppt)**	**Change Interim 2020-Interim 2021 (ppt)**	
Auxin	[					]
Heliene	[					]
Mission	[					]
Panasonic	[					]
SBM	[					]
Silfab	[					]
SunPower	[					]
Total	[					]

Thus, while the capacity utilization rate for all module producers shows [ ] over the period under review, this cannot be taken at face value.[222] As

[220] Production, Utilization (**Exhibit 58**).

[221] All figures are from **Exhibit 58 (Production, Utilization)**, which is sourced from the Prehearing Report at III-5 and III-6 (Table III-4).

[222] CR/PR at III-16 (Table III-4) shows that, for all module producers, capacity utilization was [ ] percent in 2018, [ ] percent in 2019, [ ] percent in 2020, and [ ] percent in January-June 2021. The figures in **Exhibit 58** differ slightly from Prehearing Report Table III-4 because [ ].

demonstrated above, **[ ]** of the companies that produced modules in the first year of the safeguard measures experienced such **[ ]** in the utilization of their capacity.

Exhibit 59 (Shipments) similarly shows mixed results for those companies that produced modules at the beginning of the safeguard measures. Looking at the quantity of U.S. shipments by these companies, **[ ]** of the companies' U.S. shipments increased steadily over the period.

U.S. Shipments[223]

		Change 2018-2020	Change 2018-2019	Change 2019-2020	Change Interim 2020-Interim 2021	
Auxin	[					]
Heliene	[					]
Mission	[					]
Panasonic	[					]
SBM	[					]
Silfab	[					]
SunPower	[					]
Total	[					]

Again, there is no consistent trend among these companies, nor is there evidence that the safeguard measures resulted in improvements to their performance. Taken together, these companies' U.S. shipments grew by **[ ]** percent between 2018 and 2020, but then **[ ]** declined by **[ ]** percent between interim 2020 and interim 2021.

U.S. shipment average unit values ("AUVs") are also shown on **Exhibit 59 (Shipments)**. Here, **[ ]** companies experienced steadily declining AUVs, but **[ ]** companies experienced increased AUVs during one or more of the periods under review. On a weighted average basis these companies' AUVs declined by **[ ]**

[223] All figures are from **Exhibit 59 (Shipments)**, which is sourced from U.S. Producers' Questionnaire Responses at Table II-13.

percent from 2018 to 2020 and by [ ] percent between the interim periods. This is not surprising. As explained below, the pace of technological change in the solar industry is akin to that in the semiconductor industry, where technologically driven cost reductions cause prices to decline, in accordance with Swanson's Law.

U.S. Shipment Average Unit Values ("AUVs")[224]

		Change 2018-2020	Change 2018-2019	Change 2019-2020	Change Interim 2020-Interim 2021	
Auxin	[					]
Heliene	[					]
Mission	[					]
Panasonic	[					]
SBM	[					]
Silfab	[					]
SunPower	[					]
Total	[					]

Employment indicia are provided in **Exhibit 60 (Employment)**. Collectively, the seven companies that produced modules in 2018 gained [ ] production and related workers ("PRWs") between 2018 and 2020, but lost [ ] PRWs between 2019 and 2020, and lost [ ] PRWs between interim 2020 and interim 2021. For the full period, the number of PRWs employed by these companies fell by [ ] employees, from [ ] PRWs in 2018 to [ ] employees in interim 2021. Within this group of companies, [ ] company ([ ]) increased the number of its PRWs in every period. This result is not what would be expected if the safeguard measures had been effective.

Selected financial data (net sales, operating income (loss), operating margin) are provided in **Exhibit 61 (Financial Data)**. The net sales trends are mixed and largely mirror

[224] All figures are from **Exhibit 59 (Shipments)**, which is sourced from U.S. Producers' Questionnaire Responses at Table II-13.

those discussed above for U.S. shipments. With respect to operating income, **[ ]** companies posted operating profits at any point—**[ ]** in 2019, 2020, and interim 2020, **[ ]** in 2019, interim 2020 and interim 2021, and **[ ]** in 2018. **[ ]** is the **[ ]** company within this group that improved from an operating loss (in 2018) to an operating profit in both 2019 and 2020, although its performance in interim 2021 worsened, as it again had an operating loss in interim 2021. **[ ]** improved from an operating loss in 2018 to an operating profit in 2019, although it posted an operating loss in 2020 before again posting an operating profit in interim 2021. **[ ]** all had operating losses in every year or interim during this period.[225]

The operating margins for these companies sometimes improved from one period to the next and sometimes they did not. The operating margin data are shown in the table below:

Operating Margins[226]

Company		2018	2019	2020	Interim 2020	Interim 2021	
Auxin	[						]
Heliene	[						]
Mission	[						]
Panasonic	[						]
SBM	[						]
Silfab	[						]
SunPower	[						]
Total	[						]

Taken together, the operating margin for these companies improved between 2018 and 2020, but this masks a decline between 2019 and 2020. Additionally, there was an overall decline of **[ ]** percentage points between interim 2020 and interim 2021.

[225] All figures are from **Exhibit 61 (Financial Data)**, which is sourced from the Prehearing Report Appendix G at G-4, G-8, and G-13 (Table G-1).

[226] CR/PR Appx. G at G-4 and G-13 (Table G-1).

Collectively, the capital expenditures by the companies that produced modules in 2018 declined from **[ ]** million in 2018 to **[ ]** million in 2020, but rose between the interim periods, from **[ ]** million to **[ ]** million. These data are provided in **Exhibit 62 (Capex, R&D)**. As with the other indicia, we see mixed results for the companies that have had the full benefit of the safeguard measures.

Capital Expenditures ($1,000)[227]

		Change 2018-2020	Change 2018-2019	Change 2019-2020	Change Interim 2020-Interim 2021	
Auxin	[					]
Heliene	[					]
Mission	[					]
Panasonic	[					]
SBM	[					]
Silfab	[					]
SunPower	[					]
Total	[					]

With regard to research and development ("R&D") expenses, **[ ]**, reported any spending on R&D during the period, which is extraordinary since one purpose of the safeguard measures is to afford U.S. producers time to adjust to developments in the market, such as adopting new and emerging technologies.

The foregoing discussion of the indicia for those companies that produced modules in 2018, and therefore had the benefit of the full period of relief under the safeguard measures, demonstrates that these companies' performance did not uniformly improve. Rather, the results were mixed from one company to another, and from one indicator to another. There is no historical evidence that these companies were able to improve their performance while the

[227] All figures are from **Exhibit 62 (Capex, R&D)**, which is sourced from the Prehearing Report at IV-20 (Table IV-5) and at IV-22 (Table IV-7).

safeguard measures have been in effect. These companies are not making a positive adjustment to import competition and continued measures at lower and lower duty rates will do nothing to improve their situation.

ii. **Module Producers After 2018**

As described above, three companies have begun producing modules more recently (i.e., Hanwha Q CELLS USA, JinkoSolar (U.S.), and LGEUS). Mixed results are also observed for these companies, providing additional evidence that there is no basis for extending the safeguard measures:

- For production (**Exhibit 58**), while **[ ]** of these companies' production increased between 2019 and 2020 and also between the interim periods, **[ ]** production declined **[ ]**, by **[ ]** percent between interim 2020 and interim 2021. **[ ]** capacity utilization accordingly dropped **[ ]**, from **[ ]** percent in interim 2020 to **[ ]** percent in interim 2021.[228]

- These same results occurred for U.S. shipments (**Exhibit 59**), as the quantity of **[ ]** U.S. shipments declined by **[ ]** percent between the interim periods.[229]

- For AUVs (**Exhibit 59**), **[ ]** experienced a decline in their AUVs between 2019 and 2020 and then again between the interim periods. However, **[ ]** AUVs increased **[ ]** in 2020 and in interim 2021.[230]

- The number of PRWs (**Exhibit 60**) for **[ ]** companies increased between 2019 and 2020. In interim 2021, however, **[ ]** saw an increase in employment while **[ ]** saw a decrease in employment.[231]

- With respect to operating profits (losses) (**Exhibit 61**), **[ ]** was profitable in 2019 and 2020, but then posted an operating loss in interim 2021. **[ ]** posted operating losses in every

[228] All figures are from **Exhibit 58 (Production, Utilization)**, which is sourced from the Prehearing Report at III-15 and III-16 (Table III-4).

[229] U.S. Producers' Questionnaire Responses at Table II-13; Shipments (**Exhibit 59**).

[230] U.S. Producers' Questionnaire Responses at Table II-13; Shipments (**Exhibit 59**).

[231] **Exhibit 60 (Employment)**, which is sourced from U.S. Producers' Questionnaire Responses at Table II-17.

period. **[ ]** operating margin worsened between the interim periods, from **[ ]** percent in 2020 to **[ ]** percent in 2021. **[ ]** operating margin also worsened, from **[ ]** percent in interim 2020 to **[ ]** percent in interim 2021. However, **[ ]** operating margin improved from **[ ]** percent in interim 2020 to **[ ]** percent in interim 2021.[232]

- **[ ]** capital expenditures (**Exhibit 62**) steadily declined in each period, while **[ ]** capital expenditures declined through full year 2020 but then increased in interim 2021 as compared to interim 2020. **[ ]** R&D expenses increased in 2020 and in interim 2021. **[ ]** R&D expenses increased in 2019 and 2020, and then decreased in interim 2021 as compared to interim 2020. **[ ]** reported no R&D expenses in any period.[233]

With regard to these companies' investments, it is noteworthy that **[ ]** companies produced any modules using bifacial cells during the period under review.[234] As discussed below, developers in the utility-scale segment have increasingly turned to bifacial modules as these modules are best suited for such projects. The **[ ]** bifacial modules by the newer module producers means that they are unable to service this important and growing segment of the market.[235]

While the newer companies generally performed better than those that were producing modules back in 2018, it is clear that the newer companies could have produced more modules in the United States and thus U.S. producers' market share could have been significantly better. This is because these companies or their affiliated companies **[ ]** quantities of modules, even though their U.S. module production facilities are

[232] All figures are from **Exhibit 61 (Financial Data)**, which is sourced from the Prehearing Report Appendix G at G-4, G-8, and G-13 (Table G-1).

[233] All figures are from **Exhibit 62 (Capex, R&D)**, which is sourced from the Prehearing Report at IV-20 (Table IV-5) and at IV-22 (Table IV-7).

[234] U.S. Producers' Questionnaire Responses at Table II-13.

[235] As discussed earlier, the COVID-19 pandemic had an impact on the domestic module industry. However, all individual company indicators did not move uniformly, whether in 2020 or in interim 2021. Accordingly, the existence of the pandemic cannot be the sole driver of companies' performance beginning in 2020.

operating at levels that are **[ ]**. In 2020, **[ ]** capacity utilization was **[ ]** percent, **[ ]** capacity utilization was **[ ]** percent, and **[ ]** capacity utilization was **[ ]** percent.[236]

Yet, **[ ]**. Hanwha Q CELLS USA's module **[ ]** (see chart below) were **[ ]** kilowatts in 2019, rising to **[ ]** kilowatts in 2020. Meanwhile, its capacity utilization was **[ ]** percent in 2019 and **[ ]** percent in 2020. This means that Hanwha Q CELLS USA's **[ ]** were **[ ]** kilowatts in 2019 and **[ ]** kilowatts in 2020. It also had **[ ]** in the interim periods.[237] Hanwha Q CELLS USA cites its **[ ]**.[238]

But Hanwha Q CELLS USA had U.S. production capacity that was **[ ]**; it could have **[ ]** than it actually did. Thus, Hanwha Q CELLS USA's rate of capacity utilization reflects a business decision on Hanwha Q CELLS USA's part, and in no way indicates underutilization that would warrant an extension of the safeguard measures.

[236] CR/PR at III-16 (Table III-4).

[237] Source for all figures is **Exhibit 63 (Company [ ])**, which is sourced from the Prehearing Report at III-15 and III-16 (Table III-4), F-3 (Table F-2), F-4 (Table F-4), F-8 (Table F-11), and U.S. Producers' Questionnaire Responses at II-13.

[238] CR/PR Appx. F at F-9 (Table F-13).

Hanwha Q CELLS USA [ ]
[ ][239]

[

]

LGEUS' module **[ ]** (see chart below) were **[ ]** kilowatts in 2019, rising to **[ ]** kilowatts in 2020. Meanwhile, its capacity utilization was **[ ]** percent in 2019 and **[ ]** percent in 2020. This means that LGEUS' **[ ]** were **[ ]** kilowatts in 2019 and **[ ]** kilowatts in 2020. It also had **[ ]** in the interim periods.[240] LGEUS

[239] **Exhibit 63 (Company [ ])**, which is sourced from the Prehearing Report at III-15 and III-16 (Table III-4); Appendix F at F-3 (Table F-2), F-4 (Table F-4), F-8 (Table F-11); and U.S. Producers' Questionnaire Responses at II-13.

[240] Source for all figures is **Exhibit 63 (Company [ ])**, which is sourced from the Prehearing Report at III-15 and III-16 (Table III-4); Appendix F F-3 (Table F-2), F-4 (Table F-4), F-8 (Table F-11); and U.S. Producers' Questionnaire Responses at II-13.

explains **[**

][241] Yet, and in particular with reference to reason (1) cited by LGEUS, it had U.S. production capacity that was **[** **]** and therefore the company could have **[** **]** than it actually did. As with the other newer companies, LGEUS' rate of capacity utilization reflects a business decision on LGEUS' part, and in no way indicates that an extension of the safeguard measures is warranted.

[241] CR/PR Appx. F at F-9 (Table F-13).

LGEUS [ ][242]

[

]

JinkoSolar (U.S.)'s module **[ ]** (see chart below) were **[ ]** kilowatts in 2019, rising to **[ ]** kilowatts in 2020. Meanwhile, its capacity utilization was **[ ]** percent in 2019 and **[ ]** percent in 2020. This means that JinkoSolar (U.S.)'s **[**

]

were **[ ]** kilowatts in 2019 and **[ ]** kilowatts in 2020. It also had **[**

[242] **Exhibit 63 (Company [ ])**, which is sourced from the Prehearing Report at III-15 and III-16 (Table III-4) and Appendix F at F-2 (Table F-3), F-4 (Table F-4), and F-8 (Table F-11).

] in the interim periods.[243] JinkoSolar (U.S.) cites its **[**

][244] JinkoSolar (U.S.)'s rate of capacity utilization thus reflects a business decision, and does not indicate that an extension of the safeguard measures is warranted. In fact, JinkoSolar (U.S.) **[ ]** such an extension.[245]

[243] Source for all figures is **Exhibit 63 (Company [ ])**, which is sourced from the Prehearing Report at III-15 and III-16 (Table III-4); Appendix F at F-3 (Table F-2), F-4 (Table F-4), F-8 (Table F-11); and U.S. Producers' Questionnaire Responses at II-13.

[244] CR/PR at F-9 (Table F-13).

[245] CR/PR at I-34 (Table I-13).

JinkoSolar (U.S.) [ ]
[ ][246]
[

]

Collectively, these three companies [ ] increasing volumes of modules during the full years of the period under review. Such [ ] rose from [ ] kilowatts in 2019 to [ ] kilowatts in 2020. Their [ ] amounted to [ ] kilowatts in 2019, [ ] kilowatts in 2020, [ ] kilowatts in interim 2020, and [ ] kilowatts in interim 2021. Had these [ ] the U.S. module industry's capacity utilization would have been [ ] percent in 2019, [ ] percent in 2020, [ ] percent in interim 2020, and [ ] percent in interim

[246] **Exhibit 63 (Company [ ])**, which is sourced from the Prehearing Report at III-15 and III-16 (Table III-4) and Appendix F at F-2 (Table F-3), F-4 (Table F-4), and F-8 (Table F-11).

2021.[247] This is a conservative calculation of the impact of **[ ]** on the domestic module industry as it only incorporates the **[ ]**. U.S. module producers cannot credibly argue that their capacity utilization rates signify a need for an extension of the safeguard measures; as demonstrated above, U.S. module producers could have achieved much higher rates of capacity utilization were it not for their decision to **[ ]**.[248]

b. Continued Tariffs Will Not Prevent or Remedy Serious Injury in the Future

Extension of the safeguard measures simply is not necessary to prevent or remedy serious injury. The safeguard tariffs on imported modules have had only modest effects over the last 3.5 years. As discussed above in **Section II.A.3.a**, domestic producers' performance varied from company to company and from indicator to indicator, with no indication that the safeguard tariffs have led to a uniform improvement since their implementation. Most notably, the largest U.S. module producers **[ ]**, despite **[ ]**, demonstrating that even U.S. producers recognize that imports continue to play a much needed role in the U.S. market.

One key aspect of the domestic industry that has not changed with the safeguard measures is the shortfall in adequate domestic production capacity. In a market where 19.2

[247] Company **[ ]** (**Exhibit 63**).

[248] This analysis also provides important context for the following quote from the Prehearing Report at II-5: "Based on available information, U.S. producers of CSPV modules have the ability to respond to changes in demand with large changes in the quantity of shipments of U.S.-produced CSPV modules to the U.S. market. The main contributing factors to this degree of responsiveness of supply include increasing capacity and production, some available capacity, and some inventories." When weighing how such a statement affects their analysis, the Commission should consider that most of the available domestic capacity that would allow for such a response resides with **[ ]**.

GW of PV was deployed in 2020,[249] domestic CSPV module production capacity totaled no more than a quarter of that demand.[250] Its actual shipments were far smaller, serving only about 10 percent of demand.[251] With or without safeguard measures, the largest U.S. module producers will continue **[ ]**. Indeed, as shown above, these companies **[ ]**. Whatever their business reasons for doing so, and even though their U.S. plants have unutilized capacity, the fact is these companies lack adequate domestic production capacity to meet demand in all segments of the U.S. market, particularly utility-scale that represents the vast majority of solar deployment in the United States. This will not change with continued safeguard measures at lower and lower duty rates.

Another market factor that is unlikely to change with the extension of safeguard measures is the consistent long-term decline in prices, led by the rapid pace of technological change in terms of efficiency gains and industrial production scale, known as Swanson's Law. As explained in the original safeguard investigation, the pace of technological change in the solar industry is akin to that in the semiconductor industry. In 2006, Richard M. Swanson, co-founder of SunPower Corporation, published a white paper that explained the rise of solar power produced from photovoltaics as a result of lower costs.[252] Specifically, Swanson demonstrated that over a 25-year period, solar cell and module costs had declined as the cumulative volume of shipments increased. These technologically driven cost reductions have

[249] CR/PR at II-10 to II-11.

[250] David Feldman & Robert Margolis, *H2 2020 Solar Industry Update*, NREL (Apr. 6, 2021) at 43 (**Exhibit 64**).

[251] CR/PR at C-6 (Table C-2).

[252] Richard M. Swanson, *A Vision for Crystalline Silicon Photovoltaics*, in *Progress in Photovoltaics: Research and Applications* (2006) (**Exhibit 7**).

caused prices to decrease by about 10 percent per year over more than two decades.[253] Despite recent input cost increases, discussed in more detail in **Section II.A.2.b**, the long-term price trend has led to the widespread adoption of solar as a renewable source of electricity.

There is no reason to think that continued safeguard tariffs at necessarily lower rates will change these market realities in the future. Announced domestic capacity expansions will not be sufficient to fill the supply gap and technological change will continue to advance. Given that the domestic industry did not respond to the safeguard measure to the degree to allow it to supply more than a small fraction of domestic PV demand, safeguard protection is no longer needed and extension is not warranted.

There also is no clear consensus of the need to continue the measures. Not all domestic producers **[ ]**. The **[ ]** U.S. producers that reported **[ ]** shipments to utilities/developers **[ ]**. **[ ]**.[254] Furthermore, **[ ]** anticipates **[ ]** in its U.S. production, shipments, or inventories if the safeguard measures terminate, indicating that the company's **[ ]**.[255] Indeed, the company said as much during the midterm review. Nigel Cockroft, JinkoSolar (U.S.)'s general manager, stated:

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[253] *See* Sandra Enkhardt, *Solar Costs Set to Continue Falling According to ITRPV Roadmap*, PV Magazine (April 28, 2020) (**Exhibit 65**).

[254] **[ ]** U.S. Producer Questionnaire Response at I-3; II-14; CR/PR at I-34 (Table I-13).

[255] **[ ]** U.S. Producer Questionnaire Response at II-2c.

> I understand that the Commission is investigating whether to extend the safeguard measures, including how the U.S. module producers will fare once the safeguard tariffs are removed in February 2022. ***Obviously, we planned for this when we built our plant in Jacksonville—after all, no one builds a plant thinking it will shut down three years later.*** We know we will be able to compete in the U.S. market post safeguard tariffs for a couple reasons. First, our company has a reputation for excellence and we do not have to compete solely on the basis of price. Second, we have a history of keeping pace with technological change; based on our experience and expertise, our U.S facility will do the same.
>
> I do not fear the end of the safeguard tariffs, as Jinko values the strengthening of market demand that will accompany their termination. In fact, I believe that extending the safeguards beyond when U.S. solar module customers have anticipated will reduce the overall U.S. market size for our U.S. produced product.[256]

[**]** reported that **[** **]**.[257] In other words, according to **[** **]**, termination of the safeguard measures will have no adverse consequences. Similarly, another domestic producer, **[** **]**, reported that the safeguard relief **[** **]**.[258] Moreover, beyond alleviation of the severe costs to the broader U.S. solar industry discussed further in **Section III**, there are advantages to termination of the measures. **[** **]** reported that "**[** **]**."[259] The same would be true for other domestic producers, a benefit that can only be achieved through termination of the measures.

[256] Affidavit of Nigel Cockroft, JinkoSolar (U.S.) (Oct. 25, 2021) at 2 (emphasis added) (**Appendix B**).

[257] **[** **]** U.S. Producer Questionnaire Response at II-2c.

[258] **[** **]** U.S. Producer Questionnaire Response at II-4. **[** **]** produces modules for **[** **]**. *Id.* at III-16.

[259] **[** **]** U.S. Producer Questionnaire Response at II-2c.

4. Any Recommendation for Extension of CSPV Safeguard Measures Should Include an Exclusion for Utility-Scale Modules, Which Do Not Cause the Domestic CSPV Industry Harm

Regarding the domestic CSPV industry's failure to adjust positively to the requirements of the utility-scale segment, the evidence is clear. The domestic industry can supply no more than a small fraction of the modules demanded for utility-scale projects, and it cannot supply the volume of bifacial modules that are increasingly required by this segment. The American solar industry is projected to need 18.5 GW of utility-scale modules in 2022 to supply planned projects.[260] Actual demand is likely to be even greater with the Biden Administration's recently announced plan to increase solar deployment at a rate three to four times faster than the current rate by 2030.[261]

Extension of the safeguard measures for modules required by the utility-scale sector results in a penalty to that segment of the solar industry with no corresponding benefit whatsoever to domestic module producers. It would also jeopardize the investments utility-scale solar developers are prepared to continue to make in American energy production. Those investments create business opportunities throughout the solar supply chain, including for American steel, racking, mounting, and tracker manufacturers, and their desirability should not be undermined.

B. Continued Safeguard Relief on CSPV *Cells* Will Be Counterproductive

No matter what the Commission recommends with respect to the safeguard measures on CSPV modules, it would be irrational to continue any measures on CSPV cells. In the words of **[**

[260] SEIA & Wood Mackenzie, *U.S. Solar Market Insight: Full Report: 2020 Year in Review* (Mar. 2021) at 37 (**Exhibit 9**)

[261] *See infra* **Section III.A.1.a**.

]."[262]

Extension of the safeguard relief on cells is not warranted, considering the history of this case. Suniva, the original petitioner for safeguard relief, has not been in operation since the original investigation, yet it is one of the petitioners of this extension proceeding. On April 17, 2017, Suniva filed for Chapter 11 bankruptcy with assets valued at $10-$50 million and liabilities at $100-$500 million.[263] At that time, Shunfeng International Clean Energy, Ltd., Hong Kong was the majority shareholder and asset management firm SQN agreed to provide financing as part of the bankruptcy.[264] In 2018, SQN won an auction for Suniva's technology, licenses, and manufacturing equipment.[265] According to bankruptcy court filings, it is evident that Suniva's business strategy has been to hold itself out as a potential producer of solar cells only in order to establish eligibility for a settlement payout, not so that it can actually resume production.[266]

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[262] **[ ]** U.S. Producer Questionnaire Response at I-3.

[263] *In Re Suniva, Inc.*, Chapter 11, Case No. 17-10837 (KG) (D. Del. 2017) at 3-4 (**Exhibit 66**).

[264] *In Re Suniva, Inc.*, Chapter 11, Case No. 17-10837 (KG) (D. Del. 2017) at 3-4 (List of Equity Security Holders and Corporate Ownership Statement) (**Exhibit 66**); Christian Roselund, *Suniva Files for Chapter 11 Bankruptcy*, PV Magazine (April 18, 2017) (**Exhibit 67**).

[265] Tracy Rucinski, *In Wind-Down, Bankrupt Suniva Wants to Abandon Solar Panels*, Reuters (June 20, 2018) (**Exhibit 68**).

[266] Letter from SQN Asset Servicing, LLC to Suniva, Inc., Suniva, Inc.–AD/CVD Settlement (Aug. 6, 2018) (**Exhibit 69**); Memorandum of Law in Support of Motion for Emergency and Preliminary Injunctive Relief, Exhibit 2 (Declaration of James M. Modak, CFO of SQN Capital Management, LLC (Aug. 8, 2018) at 3-4) (**Exhibit 70**); Jeff Montgomery, *Suniva Ch. 11 Plan, DIP Lender Deal Confirmed In Del.*, Law360 (April 9, 2019) ("In all, Suniva exits bankruptcy with about $1 million of cash, subject to liens, along with a chance to receive funds from the government's potential trade settlement and a leasehold interest in manufacturing equipment needed for a company attempt to restart operations.") (**Exhibit 71**).

Press reports have speculated Suniva's involvement in the safeguard case was essentially an attempt by its hedge fund owner to get an interested party to buy it out. Suniva owed more than $51 million to SQN Capital Management ("SQN") in its bankruptcy proceeding. As such, SQN financed the Section 201 petition. On May 3, 2017, the President of SQN, Jeremiah Silkowski, wrote to China Chamber of Commerce for Import and Export of Machinery and Electronic Products ("CCCME") offering to sell Suniva's manufacturing equipment to any interested Chinese purchasers. Mr. Silkowski stated in that letter that if SQN were able to sell the equipment that secured its investment, then SQN "would have no interest in providing additional funding to Suniva" and that "the Trade Case would have to be withdrawn . . . ." *See* Prehearing Brief China Chamber of Commerce for

Suniva admits in its extension petition that it "had indefinitely suspended its operations" for domestic production since early 2017 and that "Suniva is not currently producing."[267] The Commission's Monitoring Report noted that Suniva's cell production operations ceased in May 2017 and its module assembly capacity was liquidated in April 2017, prior to the completion of the Commission's original investigation in November 2017 and, therefore, also prior the imposition of the safeguard measure on CSPV cells and modules in February 2018.[268] The Commission also explained that as of December 31, 2019, despite the safeguard measure having been in place for nearly two years, Suniva had not resumed production.[269] Suniva has also acknowledged that the company's value is "speculative."[270] "Many of {Suniva's} assets have been sold off in pieces, and some equipment is strewn as scrap behind unused loading docks."[271]

In the context of this history, Suniva's assertions regarding its viability as a domestic cell producer are not credible. Despite claiming to have the largest CSPV cell factory in the Western Hemisphere,[272] it has not produced anything since before the safeguard measures

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Import and Export of Machinery and Electronic Products, Solar Energy and Photovoltaic Products Branch (Aug. 8, 2017) at 3-4 (quoting letter from Jeremiah Silkowsiki, President, SQN to Legal Service Department, CCCME (Exhibit 2)), (Frank Andorka, Extortion Attempt Undercuts Suniva's Trade Case, PV Magazine (May 22, 2017) (Exhibit 3)) (**Exhibit 72**); Frank Andorka, *Squeeze Attempt Undercuts Suniva's Trade Case (Full Letter Embedded)*, PV Magazine (May 22, 2017) (**Exhibit 73**).

[267] *See* Petition Requesting Extension of Safeguard Relief Pursuant to Section 204 of the Trade Act of 1974 (Aug. 2. 2021) at 2 n.2, 5; *see also* Suniva U.S. Producer Questionnaire Response at II-2a. ("**[**

].").

[268] *Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled into Other Products*, Inv. No. TA-201-075 (Monitoring), USITC Pub. 5021 at I-45 (Feb. 2020).

[269] *Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled into Other Products*, Inv. No. TA-201-075 (Monitoring), USITC Pub. 5021 at I-38 (Feb. 2020).

[270] {Proposed} Second Amended Disclosure Statement for Chapter 11: Plan of Reorganization for Suniva, Inc. Proposed by the Debtor (filed Mar. 8, 2019) at 3 n.4 (**Exhibit 74**).

[271] Ken Edelstein, *Solar Tariffs Giveth and Taketh—But Suniva Sits Idle*, The Kendeda Fund (Dec. 21, 2018) (**Exhibit 75**).

[272] Suniva U.S. Producer Questionnaire Response at II-2c.

were imposed.[273] In a fast-paced, technologically advanced, and ever-evolving industry such as solar products, the viability of Suniva's dormant manufacturing capacity is questionable at best. Even so, Suniva admits that "**[**

]."[274]

President Trump determined that a zero in-quota tariff was the appropriate remedy for cells because of the lack of domestic cell manufacturing.[275] Now, considering the current state of the industry, it makes no sense to impose any quota on cells going forward. There continues to be no domestic CSPV cell production despite a critical need to increase supply of modules to all segments, especially in light of the U.S. Department of Energy targets. The Commission should recommend that the safeguard measure on CSPV cells terminates so that U.S. module producers have no barriers to access imported cells. Termination of the cell TRQ is warranted in accordance with Section 203(e)(2), which provides that any action is limited "only to the extent the cumulative impact of such action does not exceed the amount necessary to prevent or remedy the serious injury."[276] Domestic module manufacturing is dependent on imported cells. Overall, there is clearly a greater benefit to unlimited access to imported cells.

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[273] *See* Petition Requesting Extension of Safeguard Relief Pursuant to Section 204 of the Trade Act of 1974 (Aug. 2. 2021) at 2 n.2, 5 (stating that Suniva "had indefinitely suspended its operations" for domestic production since early 2017 and that "Suniva is not currently producing."); *see also* Suniva U.S. Producer Questionnaire Response at II-2a, II-12, II-25 ("**[**

]"; "**[**

]"; and "**[**

]").

[274] Suniva U.S. Producer Questionnaire Response at II-2c.

[275] *See infra* **Section III.A.1.a**.

[276] 19 U.S.C. § 2253(e)(2).

Section 204(c)(1) also predicates extension on a finding that "there is evidence that the industry is making a positive adjustment to import competition."[277] There is no evidence that the domestic industry "is making" a positive adjustment to import competition with respect to cells, given that all CSPV cell production has ceased. Vague and speculative claims regarding a desire to produce cells, which the Commission has heard before, does not constitute evidence of an active and ongoing adjustment. Maintaining any safeguard measure with respect to cells would be contrary to the statute.

III. EXTENSION IS ALSO NOT WARRANTED BECAUSE THE SOCIAL AND ECONOMIC COSTS OF THE SAFEGUARD MEASURES HAVE EXCEEDED THE BENEFITS

The statute directs the Commission to investigate whether extension of the safeguard measure is necessary, then report to the President on its investigation and determination.[278] Ultimately, the President has the authority to determine whether or not to extend safeguard measures.[279] Yet, an overarching principle of the safeguard statute, explicitly stated in the very first provision of Section 201, is that the action taken by the President must "provide greater economic and social benefits than costs."[280] President Trump acknowledged as much when issuing the initial proclamation in this case.[281]

Furthermore, the statute makes clear that this requirement is ongoing. The requirement in Section 201 for action to "provide greater economic and social benefits than

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[277] 19 U.S.C. § 2254(c)(1).

[278] 19 U.S.C. §§ 2254(c)(1)-(3).

[279] 19 U.S.C. § 2253(e)(1)(B).

[280] 19 U.S.C. § 2251(a).

[281] *Proclamation 9693 of January 23, 2018: To Facilitate Positive Adjustment to Competition From Imports of Certain Crystalline Silicon Photovoltaic Cells (Whether or Not Partially or Fully Assembled Into Other Products) and for Other Purposes*, 83 Fed. Reg. 3541, 3542 (Jan. 25, 2018) (citing Trade Act § 203(a)(1)(A); 19 U.S.C. § 2253(a)(1)(A)).

costs" applies to all action taken "in accordance with this part" (i.e., Sections 201 through 205 of Trade Act, 19 U.S.C. §§ 2251-2255) and "all appropriate and feasible action within {the President's} power."[282] Thus, the overarching requirement in Section 201 applies to the President's power to extend the safeguard measure under Section 203(e)(1)(B)(i), 19 U.S.C. § 2253(e)(1)(B)(i). Section 203 directs the President to account for "*the short- and long-term economic and social costs of the actions . . . relative to their short- and long-term economic and social benefits* and other considerations relative to the position of the domestic industry in the United States economy."[283] This involves consideration of "*factors related to the national economic interest of the United States*" including "*the effect of the implementation of actions* ***under this section*** *on consumers and on competition in domestic markets*."[284] Importantly, actions under "this section" (i.e., Section 203) include extension under Section 203(e)(1)(B).[285]

Congress clearly contemplated that safeguard measures might fail to confer a net benefit in some Section 201 cases and therefore be inappropriate. This is precisely that kind of case, because positive adjustment to import competition has been minimal—indeed, woefully inadequate with respect to the utility-scale sector—while the costs of the tariffs in the solar sector itself are overwhelming. The safeguard tariffs have slowed the process of moving toward a sustainable energy future. Thus, the point is not merely that the costs of the tariffs to the consumer are in excess of the benefits, though that alone is enough to justify termination. The problem here is even worse, because the costs of the tariffs are actually

[282] 19 U.S.C. § 2251(a).
[283] 19 U.S.C. § 2253(a)(2)(E) (emphasis added).
[284] 19 U.S.C. § 2253(a)(2)(F)(ii) (emphasis added).
[285] 19 U.S.C. § 2253(e)(1)(B).

undermining an objective that should be shared by everyone involved in the solar business: to create more opportunities for solar energy to flourish. The tariffs are therefore self-defeating.

As discussed further below, all of the factors considered by the President in regard to remedy in a Section 201 investigation remain relevant to his decision following the Commission's extension report. Whereas Section 203(a)(1) directs that the President "shall take" appropriate action following an affirmative finding by the Commission in an initial safeguard investigation, Section 203(e)(1)(B) provides that the President "may extend the effective period" of a safeguard measure following an affirmative determination by the Commission in an extension investigation.[286] As the U.S. government's "trade think tank," the Commission should use its expertise to report to the President on the costs and benefits of extension so that he is fully informed and can best execute his discretionary statutory authority in the event that the Commission issues an affirmative finding with respect to the two criteria listed in Section 204(c)(1).

A. The Measures Should Be Eliminated Because the Adverse Impact Far Outweighs Any Benefits Gained

The U.S. Department of Energy touts the benefits of solar energy in the United States on its website:

> ***Solar power is more affordable, accessible, and prevalent in the United States than ever before.*** From just 0.34 GW in 2008, U.S. solar power capacity has grown to an estimated 97.2 gigawatts (GW) today. This is enough to power the equivalent of 18 million average American homes. Today, over 3% of U.S. electricity comes from solar energy in the form of solar photovoltaics (PV) and concentrating solar-thermal power (CSP).
>
> Since 2014, the average cost of solar PV panels has dropped nearly 70%. Markets for solar energy are maturing rapidly around the country since solar

[286] *Compare* 19 U.S.C. § 2253(a)(1), *with* 19 U.S.C. § 2253(e)(1)(B)(i).

> electricity is now economically competitive with conventional energy sources in most states.
>
> Solar's abundance and potential throughout the United States is staggering: PV panels on just 22,000 square miles of the nation's total land area—about the size of Lake Michigan—could supply enough electricity to power the entire United States. Solar panels can also be installed on rooftops with essentially no land use impacts, and it is projected that more than one in seven U.S. homes will have a rooftop solar PV system by 2030.
>
> . . . Moreover, ***the solar industry is a proven incubator for job growth throughout the nation. American solar jobs have increased 167% over the past decade, which is five times faster than the overall job growth rate in the U.S. economy.*** There are more than 250,000 solar workers in the United States in fields spanning manufacturing, installation, project development, trade, distribution, and more.[287]

Despite the clear benefits associated with solar energy and the progress this particular sector of the energy market has made in the last decade, which have paid substantial environmental and employment dividends, the solar safeguard measures have unquestionably impeded solar's full potential in the United States. Extension of the safeguard measures is therefore not warranted when such costs are weighed against the minimal benefits to the small number of U.S. module assemblers, which only employ a couple thousand workers.

1. The Social and Economic Costs of Extension—in Terms of Environmental Goals, Cost to Consumers, and Job Loss—Are Too High and Outweigh the Limited Benefit to the Domestic Industry

The safeguard statute is designed to take into account the short- and long-term social cost of an action in relation to the social benefits.[288] In this case, the costs far outweigh the benefits. The solar industry is literally trying to save the planet. Tariffs only stand in the way by slowing growth of solar deployment and undermining efforts to replace fossil fuels with cleaner renewable energy. Tariffs also add to the cost of solar systems and therefore increase

[287] *Solar Energy in the United* States, U.S. Dep't of Energy: Solar Energy Technologies Office (emphasis added) (**Exhibit 76**).

[288] 19 U.S.C. § 2253(a)(2)(E).

the cost of electricity to consumers. To the extent that tariffs make solar uneconomic in certain areas of the country, the safeguard measures also reduce options for consumers. Reduced deployment also results in lost jobs along the solar supply chain. These social and economic costs are simply too great and do not justify extension of the safeguard measures.

a. Extension of the Safeguard Measures Is Entirely Inconsistent with (and Will Likely Undermine) the Administration's Clean Energy Goals

President Biden has made the reduction of fossil fuels and transition to clean energy a core objective of his administration. One of his first acts as president was to issue an executive order that insisted on a government-wide approach to combatting climate change, stating that the federal government must "drive assessment, disclosure, and mitigation of climate pollution and climate-related risks in every sector of our economy."[289] As part of these policies, President Biden announced that the United States would aim to reduce greenhouse gas pollution by 50 to 52 percent from 2005 levels by 2030.[290] To achieve these goals, the Biden Administration has emphasized the importance of investing in critical infrastructure, particularly in solar energy, that will help combat climate change, and it is working to enact an infrastructure bill into law that includes significant investment in solar deployment.[291] The Biden Administration noted that "{t}o reach a largely decarbonized electricity sector by 2035, solar deployment would need to accelerate to three to four times faster than the current rate by 2030," and that reaching these goals "requires historic

[289] *Executive Order 14008 of January 27, 2021: Tackling the Climate Crisis at Home and Abroad*, 86 Fed. Reg. 7619, 7622 (Feb. 1, 2021).

[290] *Fact Sheet: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies*, WhiteHouse.gov (Apr. 22, 2021) (**Exhibit 77**).

[291] *See Fact Sheet: Bipartisan Infrastructure Deal and Build Back Better Agenda Present Bright Future for Solar Power, Good Jobs, and More Affordable Energy*, WhiteHouse.gov (Aug. 17, 2021) (**Exhibit 78**).

investments to accelerate deployment of residential, commercial, and utility-scale solar systems, including in disadvantaged and low-income communities."[292]

In connection with the Biden Administration's policies related to solar energy, in September 2021, DOE released a study showing how the United States could shift almost half of its electricity to solar energy by 2050.[293] According to the *Solar Futures Study*, transitioning to clean energy broadly, and solar energy in particular, can result in emissions reductions, climate change mitigation, and air quality improvement, in addition to creating abundant, low-cost electricity that will benefit Americans across all socioeconomic backgrounds.[294] However, to achieve these ambitious goals to decarbonize the U.S. energy system, the United States must transform its current electrical grid, which the DOE estimates will require annual solar deployment to ***double*** in the early 2020s and ***quadruple*** by the mid to late 2020s and beyond.[295] That amounts to 30 GW of solar capacity per year between now and 2025 and 60 GW per year from 2025-2030.[296] Of that, the United States will need to deploy a minimum of 103 GW of distributed solar (i.e., residential and commercial) by 2030[297] and 377 GW of utility-scale solar.[298] In other words, current U.S. climate policy

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[292] *Fact Sheet: Bipartisan Infrastructure Deal and Build Back Better Agenda Present Bright Future for Solar Power, Good Jobs, and More Affordable Energy*, WhiteHouse.gov (Aug. 17, 2021) (**Exhibit 78**).

[293] *See generally Solar Futures Study 2021* (**Exhibit 5**).

[294] *Solar Futures Study 2021* at 79-80 (**Exhibit 5**).

[295] *Solar Futures Study 2021* at 2 (**Exhibit 5**).

[296] Press Release: *DOE Releases Solar Future Study Providing the Blueprint for a Zero-Carbon Grid*, Energy.gov (Sept. 8, 2021) (**Exhibit 6**); *see also* Ivan Penn, *From 4% to 45%: Biden Offers Ambitious Blueprint for Solar Energy*, NY Times (Sept. 8, 2021) (**Exhibit 79**).

[297] Sean Rai-Roche, *US Must Deploy 103GW of Distributed Solar by 2030 to Hit Climate Targets, Says Report*, PV Tech (Oct. 8, 2021) (**Exhibit 80**).

[298] At a rate of 30 GW per year until 2025 and 60 GW per year until 2030, the Biden Administration's plan calls for 480 GW of solar to be deployed by the end of 2030. *See* Press Release: *DOE Releases Solar Future Study Providing the Blueprint for a Zero-Carbon Grid*, Energy.gov (Sept. 8, 2021) (**Exhibit 6**).

virtually guarantees that demand for solar products will steadily and significantly increase for at least the next several decades.

The *Solar Futures Study* acknowledges that reaching its targets would require a monumental effort and an immediate acceleration of solar deployment.[299] Moreover, the *Solar Futures Study* notes that cost-competitive solar products are "vital" to achieving the solar energy targets.[300] Even as demand for solar products continues to explode, the supply chain in the United States has been marred by higher costs[301] to the detriment of solar deployment.[302] Domestic production alone cannot meet the growing demand for solar energy, and continued trade restrictions on imported CSPV cells and modules could restrict large-scale deployment of solar systems needed to meet these ambitious climate goals.[303] In other words, extending the safeguard measures would undermine and contradict the Administration's climate change agenda.

b. The Cost to the Consumer, in Terms of Higher Electricity Rates, Is Far Greater than the Minimal Benefits to the Domestic Industry

Any safeguard action must take into account the effect on consumers.[304] Section 204(c)(2) directs the Commission to afford "interested parties and consumers" the opportunity to testify in proceedings where the Commission is considering its recommendation on

[299] *See Solar Futures Study 2021* at 2 (**Exhibit 5**).

[299] *See Solar Futures Study 2021* at 2 (**Exhibit 5**).

[300] *Solar Futures Study 2021* at 168 (**Exhibit 5**).

[301] The Prehearing Report documents that U.S. prices are far higher than global prices. *See* CR/PR at VII-2 (Figure VII-2).

[302] *See* Brian Eckhouse & Jennifer A. Dlouhy, *Escalating U.S.-China Solar Rift Threatens Biden Green Goals*, BloombergNews (Aug. 17, 2021) (**Exhibit 81**).

[303] *See, e.g.*, Gavin Bade, *Solar Trade Woes Cast a Pall Over Biden's Climate Goals*, Politico (Sept. 28, 2021) (**Exhibit 82**).

[304] 19 U.S.C. § 2253(a)(2)(F)(ii).

extension. There would be no reason to specify input by consumers and other interested parties if the Commission did not consider the effect on consumers in its deliberations about recommending an extension of the safeguard measure or not.

Before discussing the cost-benefit tradeoff if the tariff is extended, it is important to first review the costs and benefits over the last 3.5 years. Since February 2018, very little has occurred on the "benefits" side of the equation. As discussed above, there have been no achievements for the U.S. CSPV cell-making business – no new cell capacity, no new cell jobs.[305] With respect to modules, 1,250 workers were added.[306] While the benefits of the safeguard protection have been modest, the costs have been extraordinarily high. U.S. consumers have paid an estimated ***$2.6 billion*** in tariffs on imported modules since February 2018.[307] This implies a cost of $1.3 million per CSPV job or $2.1 million per new CSPV job created. Given that less than $200 million in wages were paid to module assembly production workers over the entire 2018-2020 period, the cost to benefit ratio (in terms of wages) of the safeguard tariff policy is more than ten to one.[308]

Remarkably, this staggering implied cost per job created likely understates the costs. Consider that despite the increase in module assembly jobs over the last three and a half years,

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[305] [

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[306] CR/PR at III-29 (Table III-17). Based on public reports of 650 jobs at Hanwha Q CELLS USA (Georgia), 200 jobs at JinkoSolar (U.S.) (Florida), and 160 jobs at LGEUSA (Alabama). *See Press Release: Grand Opening of Hanwha Q-CELLS in Georgia Spotlights Western Hemisphere's Largest Solar Panel Manufacturing Facility, Responsible for 650 jobs and Daily Output of 12,000 Solar Modules*, Hanwha (Oct. 2, 2019) (**Exhibit 83**); Christian Roselund, *Inside JinkoSolar's Jacksonville Factory*, PV Magazine (Feb. 26, 2019) (**Exhibit 84**); Jerry Underwood, *LG Electronics to Open Alabama Solar Panel Plant, Creating 160 Jobs*, Made in Alabama (June 27, 2018) (**Exhibit 85**).

[307] *Trade Statistics*, U.S. Customs and Border Protection (last modified Sept. 24, 2021) (**Exhibit 86**).

[308] CR/PR at III-29 (Table III-17).

the United States has lost 2,676 solar *manufacturing* jobs since 2018 and lost 12,866 *total solar* jobs due to the deployment effects of the safeguard tariffs.[309] As SEIA argued at the time of the original investigation, jobs in solar are driven by deployment. The fact is deployment drives overall employment and also solar manufacturing employment. This is because cell and module production require relatively few workers per MW in contrast to other parts of the solar supply chain. Inverters, wiring, racking, footings and posts, etc. all hire U.S. workers and their employment needs are driven by deployment. By raising the costs of solar deployment, the safeguard protection has reduced, not created, domestic employment. Thus, at the end of the day, the U.S. solar industry overall actually has fewer manufacturing jobs, fewer overall jobs, and U.S. consumers have therefore paid billions of dollars in extra costs for nothing.

The cost-benefit tradeoff looks even grimmer going forward. With respect to the benefit side of the equation, given that the tariff level under the extension must be less than its original level, it is unrealistic to expect a greater impact from the extension than occurred since February 2018. Just as it did in briefs and at the hearings four years ago, Petitioners will likely assert that four more years of protection will bring about the solar production and employment resurgence. After all, in 2017, the Petitioners predicted the solar safeguard measures would create more than 45,000 new manufacturing jobs.[310] Yet, as SEIA explained during the remedy proceedings in 2017, the Petitioners' economic model was farfetched and

[309] SEIA, The Solar Foundation, IREC, & BW Research Partnership, *National Solar Jobs Census 2020* (May 2021) at 3, 8-9 (**Exhibit 89**).

[310] Mayer Brown, *Impact of the Section 201 Remedy On Employment in the US Solar Industry* (Aug. 2017) (**Exhibit 90**).

contrived.[311] The Petitioners' rosy promises were nearly all unfulfilled. Given Petitioners' track record of making fanciful predictions, the Commission should discount Petitioners' statements and instead look at what has actually happened since February 2018.

Looking forward and assuming the next four years produces another 1,000 module jobs, how does this job creation compare with the costs of extending the safeguard measures? Consumer costs can be directly computed using three pieces of data: (i) expected deployment during the 2022-2025 timeframe; (ii) expected module prices in each year; and (iii) the Petitioners' requested safeguard tariffs (17 percent in 2022, 16 percent in 2023, 15 percent in 2024, and 14 percent in 2025). For each segment the additional cost to U.S. consumers is calculated as:

$$Cost_{segment} = (Deployment) \times (Base\ Module\ Price) \times (Tariff)$$

The total cost of extending the safeguard tariff is the sum across the three segments:

$$Cost_{total} = Cost_{residential} + Cost_{commercial} + Cost_{utilityscale}$$

Exhibit 91 contains all key information to compute the costs for each segment. The bottom-line cost estimates (as presented in the exhibit) are shown in the following table:

Consumer Cost of Extending the Safeguard Tariff ($ millions)

	2022	2023	2024	2025	4-year Total
Residential	$403	$396	$297	$265	$1,360
Commercial	$155	$146	$122	$106	$528
Utility-Scale	$1,312	$1,337	$881	$727	$4,257
Total	**$1,869**	**$1,878**	**$1,300**	**$1,097**	**$6,145**

[311] Prehearing Brief of SEIA and Sunpower Corp., Inv. No. TA-201-75 (Remedy) (Sept. 28, 2017), at Appendix A, Annex E (Commentary on Mayer Brown's Job Creation Study) (**Exhibit 121**).

The consumer cost of the proposed extension of the safeguard tariffs is nothing short of astonishing. In *every* year the consumer cost exceeds $1 billion and approaches $2 billion in 2022 and 2023. ***Overall, the four-year cost of the extension to U.S. consumers exceeds $6.1 billion.*** Of that total, $1.36 billion is due to higher costs for residential solar consumers, $528 million for commercial solar, and a stunning $4.257 billion from the utility-scale segment. There is no denying that the safeguard tariff is a tax that will cost U.S. ratepayers billions of dollars, but with very little benefit.

Generously assuming a similar number of new jobs will be created during the extension period as were created in the last 3.5 years, this implies a consumer cost of over $6 million per job created during the extension period, a figure more than twice the estimate of the cost per job during the last 3.5 years.[312]

Several U.S. purchasers confirm that the solar safeguard measures have increased the cost of electricity produced from solar energy:

- **[ ]**: "**[**

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- **[ ]**: "**[**

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[312] $6.1 billion cost / 1,000 jobs = $6.1 million per job.

[313] **[ ]** U.S. Purchaser Questionnaire Response at II-16 (emphasis added); *see also id.* at II-11 ("**[**

].").

[314] **[ ]** U.S. Purchaser Questionnaire Response at II-15.

- [ ]: "[ ]."[315]
- [ ]: "[ ]."[316]
- [ ]: "[ ]."[317]
- [ ]: "[ ]."[318]
- [ ]: "[ ]."[319]

The evidence that the costs have greatly exceeded the benefits over the last three and a half years is overwhelming. Extending safeguard protection will only produce an even greater disparity in costs versus benefits. There is no justification for continuing the safeguard tariff.

[315] [ ] U.S. Purchaser Questionnaire Response at II-11. [ ]: "[ ]." [ ] U.S. Purchaser Questionnaire Response at II-11.

[316] [ ] U.S. Purchaser Questionnaire Response at II-11.

[317] [ ] U.S. Purchaser Questionnaire Response at II-11.

[318] [ ] U.S. Purchaser Questionnaire Response at II-11.

[319] [ ] U.S. Purchaser Questionnaire Response at II-11.

c. Less Deployment than Would Have Occurred without the Tariffs Has Cost U.S. Jobs throughout the Solar Supply Chain

The safeguard measures have not achieved what President Trump intended. "In announcing Section 201 tariffs, President Trump promised they would buoy U.S. solar manufacturing and create 'lots of really great jobs with products that are going to be made in the good old USA.'"[320] In reality, the safeguard measures have caused more harm than good. ***Overall, the U.S. solar industry has lost almost 13,000 jobs since the safeguard measures were imposed in 2018, in addition to almost 20,000 projected new solar jobs that were never realized.***[321]

Before the safeguard investigation in 2017, employment in the broader U.S. solar industry was expanding rapidly, growing by 178 percent from 2010 to 2016 or by more than 166,000 jobs (from 93,502 to 260,077 jobs).[322] The Solar Foundation had predicted the trend to continue, expecting solar employment to reach 263,293 jobs by the end of 2018.[323] Yet, under the safeguard measures, the U.S. solar industry did not reach its full potential. In 2017 and 2018, the U.S. solar industry lost jobs for the first time since 2010.[324] The total number of jobs increased modestly in 2019, but declined again in 2020.[325] The COVID-19 pandemic no

[320] Emma Foehringer Merchant, *The Status of US Solar Manufacturing, One Year after Tariffs*, *Greentech Media* (Feb. 25, 2019) (**Exhibit 92**).

[321] During the midterm review of the safeguard measures, SEIA prepared an impact study demonstrating the high cost of the tariffs on imported modules. SEIA projected the loss of 62,000 jobs that otherwise would have been created from 2017 to 2021. As discussed further below, although SEIA accurately projected lost deployment in 2018-2020, installations in 2021 are expected to exceed what was projected even without the safeguard measures due to unforeseen circumstances, particularly extension of the federal income tax credit in late 2020, accounting for the lower actual job loss.

[322] The Solar Foundation, *National Solar Jobs Census 2017* at 8 (**Exhibit 93**).

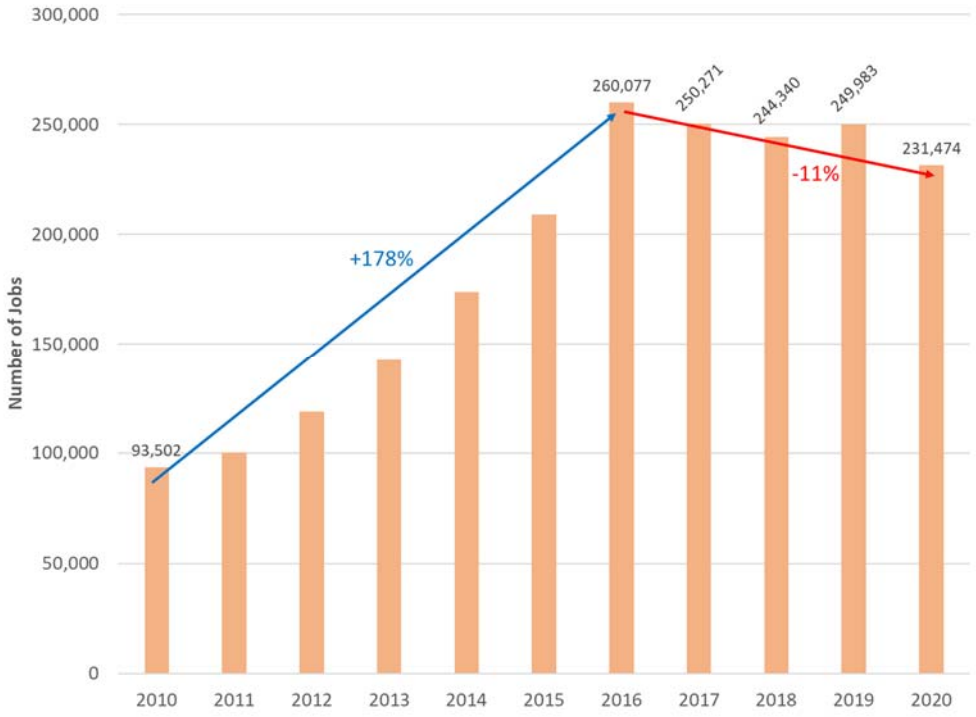
[323] The Solar Foundation, *National Solar Jobs Census 2017* at 5 (**Exhibit 93**).

[324] The Solar Foundation, *National Solar Jobs Census 2017* at 8 (**Exhibit 93**); The Solar Foundation, *National Solar Jobs Census 2018* at 13 (**Exhibit 87**).

[325] The Solar Foundation, *National Solar Jobs Census 2019* (Feb. 2020) at 23 (**Exhibit 88**); SEIA, The Solar Foundation, IREC, & BW Research Partnership, *National Solar Jobs Census 2020* (May 2021) at 3 (**Exhibit 89**).

doubt contributed to the more recent job losses,[326] but the overall trend following the high mark of 2016 (the year before the safeguard petition was filed) reversed years of significant growth in solar industry employment.

Number of Jobs in the Broader U.S. Solar Industry[327]



Many of the lost jobs during the safeguard period are directly attributable to the tariffs on imported modules. According to the Solar Foundation:

> In 2018, one of the key factors behind the decline in solar jobs was the impact of the Section 201 tariffs imposed on solar modules and cells in February of that year. Starting in early 2017 when the trade petition was pending, developers opted to delay many utility-scale projects due to industry uncertainty, supply shortages, and increasing module prices. Ultimately, the delays resulted in less

[326] SEIA, The Solar Foundation, IREC, & BW Research Partnership, *National Solar Jobs Census 2020* (May 2021) at 3 (**Exhibit 89**).

[327] SEIA, The Solar Foundation, IREC, & BW Research Partnership, *National Solar Jobs Census 2020* (May 2021) at 5 (**Exhibit 89**).

installed capacity than previously expected in 2018 and a corresponding loss in jobs.[328]

Although module production in the United States has expanded under the safeguard measures, this has not translated into more American manufacturing jobs. During the period when the safeguard measures have been in effect, ***solar manufacturing jobs actually declined by 7.9 percent***.[329]

Number of U.S. Solar Industry Jobs by Market Segment[330]

	2018	2019	2020	Change 2018-2020	% Change 2018-2020
Installation and Project Development	155,157	162,126	154,610	-547	-0.4%
Manufacturing	33,726	34,423	31,050	-2,676	-7.9%
Wholesale Trade and Distribution	29,243	29,798	25,663	-3,580	-12.2%
Operations and Maintenance	11,164	11,583	10,177	-987	-8.8%
All Others	13,053	12,053	10,073	-2,980	-22.8%

The majority of job losses occurred in downstream sectors because manufacturing, which comprises more than cell and module production, represents less than 14 percent of total solar employment in the United States. By one estimate, "of the total 229,055 person-days needed to develop a solar PV plant of 50 MW, only 22 per cent are associated with manufacturing, compared with 56 per cent associated with services such as operations and maintenance and installation and grid connection."[331]

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[328] The Solar Foundation, *National Solar Jobs Census 2019* (Feb. 2020) at 15 (**Exhibit 88**).

[329] The Solar Foundation, *National Solar Jobs Census 2018* at 13 (**Exhibit 87**); The Solar Foundation, *National Solar Jobs Census 2019* (Feb. 2020) at 23 (**Exhibit 88**); SEIA, The Solar Foundation, IREC, & BW Research Partnership, *National Solar Jobs Census 2020* (May 2021) at 3, 8 (**Exhibit 89**).

[330] The Solar Foundation, *National Solar Jobs Census 2018* at 13 (**Exhibit 87**); The Solar Foundation, *National Solar Jobs Census 2019* (Feb. 2020) at 23 (**Exhibit 88**); SEIA, The Solar Foundation, IREC, & BW Research Partnership, *National Solar Jobs Census 2020* (May 2021) at 3, 8 (**Exhibit 89**). The all others segment includes fields such as finance, legal, research, advocacy and communications. *Id.* at 8.

[331] International Renewable Energy Agency, *Trading into a Bright Energy Future* (2021) at 20 (**Exhibit 94**).

Furthermore, cell and module production are highly automated and account for a small fraction of solar manufacturing jobs. There are substantially more manufacturing jobs along the broader solar supply chain, for example in the production of such essential equipment as racking, tracking, inverters, and mounting systems, than there are in cell and module production.[332] As shown in the table above, there were 31,050 U.S. solar manufacturing jobs in 2020.[333] In 2020, there were approximately 2,000 jobs in the domestic cell and module industries combined.[334] In other words, the domestic cell and module production account for less than 10 percent of all solar manufacturing jobs and about 1.0 percent of all jobs in the broader solar industry. Because most domestic solar manufacturing jobs are tied to deployment, not domestic cell and module production, safeguard protection hurts manufacturing employment. Combining the job losses for solar manufacturing reported by The Solar Foundation with the increase in module assembly jobs reported in the Prehearing Report, we find that three solar manufacturing jobs were lost for each module assembly job created.[335] Thus, "job creation" or even "manufacturing job creation" cannot be the justification for extending the safeguard tariffs.

An important reason for the minimal role of cell and module production jobs in overall solar manufacturing is the high level of automation in the module production process.

> "Due to high production volumes and limited margins, overall equipment effectiveness is of utmost importance." To address those challenges, many manufacturers have invested in robotics and other state-of-the-art automation.

[332] The Solar Foundation, *National Solar Jobs Census 2018* at 38 (**Exhibit 87**); The Solar Foundation, *National Solar Jobs Census 2019* (Feb. 2020) at 30 (**Exhibit 88**) .

[333] SEIA, The Solar Foundation, IREC, & BW Research Partnership, *National Solar Jobs Census 2020* (May 2021) at 3 (**Exhibit 89**).

[334] CR/PR at III-29 (Tables III-16 and III-17).

[335] The Solar Foundation reports a net job loss in manufacturing of 2,676 between 2018 and 2020. The Prehearing Report finds that 1,250 module jobs were created between 2018 and 2020. CR/PR at III-29 (Table III-17). This implies the total job losses in solar manufacturing (other than in module assembly) is 3,926. This implies a three to one ratio in jobs lost to jobs created in solar manufacturing.

> "Automation is critical to solar panel manufacturing, because the components require precise alignment and high precision{.}" . . . "*More than 75 percent of the production process can be automated*."[336]

For example, "{a}utomation also plays a key role at Heliene Solar Inc. The Canadian company operates a plant in Mountain Iron, MN, that *uses minimal human interaction* on its assembly lines to ensure quality. The plant has the capacity to produce 1,200 solar modules per day. '*{We have} dedicated ourselves to developing the most robotized systems in the industry*,' claims Martin Pochtaruk, president of Heliene.'"[337] LGEUSA's module facility in Huntsville, Alabama is also highly automated. "'Many of our processes are automated, from the loading of parts to the packaging of finished goods,' says John Taylor, senior vice president of LG Electronics USA. 'Advanced automation processes and robotics help us maximize productivity and minimize deviations to assure the highest quality.'"[338] Similarly, JinkoSolar (U.S.)'s new module facility in Florida has been described as "state-of-the art."[339] "Soldering is completely automated. Robots place and attach junction boxes. Artificial intelligence is used to find any microcracks in modules before they're laminated. Machines sort and box modules for shipment."[340] As a result, the safeguard measures have a limited impact on job growth in manufacturing.

Looking ahead, the country needs hundreds of thousands more solar workers to reach the Biden Administration's clean energy goals. According to the U.S. Department of Energy,

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[336] Austin Weber, *Shining a New Light on Solar Module Assembly*, Assembly (Aug. 3, 2020) (emphasis added) (**Exhibit 95**).

[337] Austin Weber, *Shining a New Light on Solar Module Assembly*, Assembly (Aug. 3, 2020) (emphasis added) (**Exhibit 95**).

[338] Austin Weber, *Shining a New Light on Solar Module Assembly*, Assembly (Aug. 3, 2020) (**Exhibit 95**).

[339] Kelly Pickerel, *Three Things SPW Learned after Touring JinkoSolar's Florida Panel Facility*, Solar Power World (Feb. 27, 2019) (**Exhibit 32**).

[340] Kelly Pickerel, *Three Things SPW Learned after Touring JinkoSolar's Florida Panel Facility*, Solar Power World (Feb. 27, 2019) (**Exhibit 32**).

"by 2035, solar energy has the potential to power 40% of the nation's electricity, drive deep decarbonization of the grid, and ***employ as many as 1.5 million people***—without raising electricity prices."[341] Extending the safeguard tariffs would undermine these goals and potentially deny these opportunities for job growth.

2. Trade Restrictions Have Dampened Demand and Reduced Deployment at a Severe Economic Cost to the U.S. Solar Industry

Since the original investigation, SEIA had predicted that safeguard measures would increase the cost of solar systems, making solar less economic and thereby reducing the growth in deployment. The safeguard tariffs on imported modules have had exactly that result. Although demand has increased, fewer installations occurred than would have otherwise, unjustifiably slowing the growth of solar as a clean, renewable source of electricity. The economic cost of those missed opportunities is far greater than the small increase in domestic module capacity since the safeguard measures were imposed. The measures should be allowed to terminate and put the solar industry back on a trajectory to meet the nation's clean energy goals.

a. Absent Adequate Domestic Supply of Solar Modules, the Safeguard Measures Slowed Growth, as There Are Fewer Solar Installations than There Would Have Been without the Tariffs

Before the safeguard investigation in 2017, the solar industry experienced years of consistent growth in U.S. deployment, fueled by "strong federal policies like the solar Investment Tax Credit, rapidly declining costs, and increasing demand across the private and public sector for clean electricity."[342]

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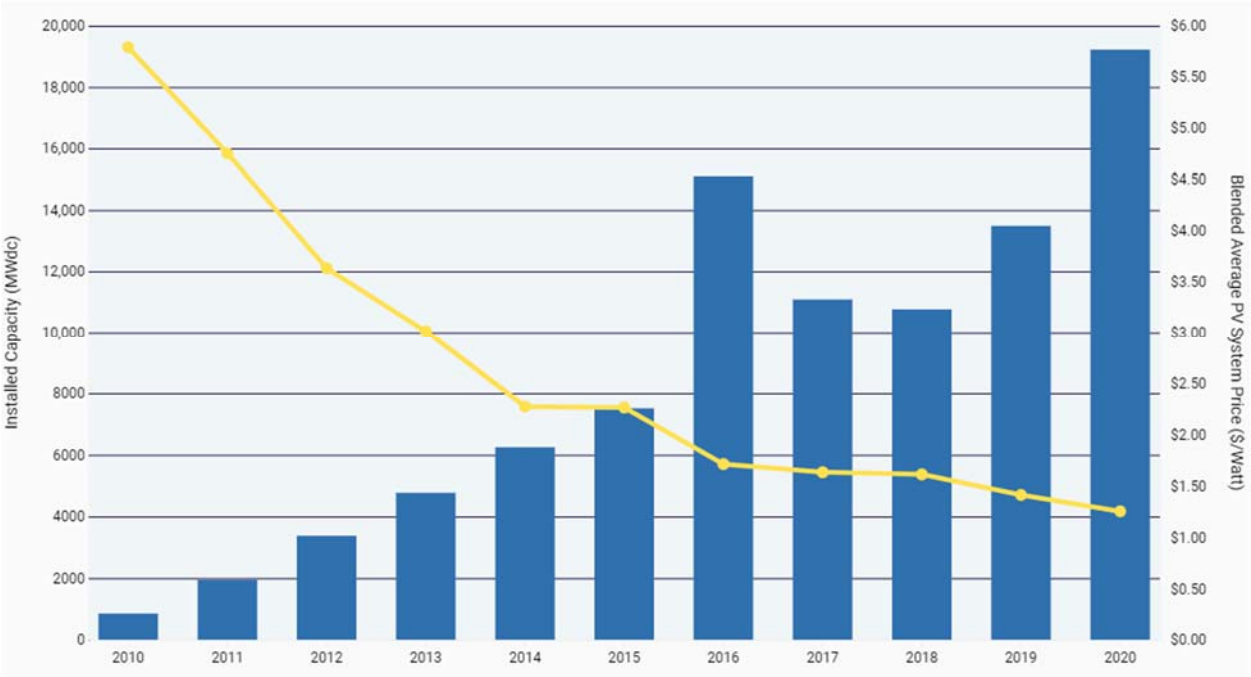
[341] *Press Release: DOE Releases Solar Futures Study Providing the Blueprint for a Zero-Carbon Grid*, Energy.gov (Sept. 8, 2021) (emphasis added) (**Exhibit 6**).

[342] SEIA, *Solar Industry Research Data* (**Exhibit 96**).

U.S. Solar PV Price Declines and Deployment Growth[343]



After years of dynamic growth, however, total solar installations declined for the first time in 2017 and 2018.[344] The decline was a direct result of the safeguard investigation. In 2018, GTM Research adjusted down its demand forecasts by 13 percent a few months after the President's announcement, as "uncertainty surrounding the Section 201 tariffs caused many projects to be shelved this year."[345] The Solar Foundation also acknowledged that the pipeline of projects slowed down once the tariffs were put in place on imported modules.[346]

[343] SEIA, *Solar Industry Research Data* (**Exhibit 96**).

[344] SEIA & Wood Mackenzie, *U.S. Solar Market Insight: Full Report: 2018 Year In Review* (Mar. 2019) at 6 (**Exhibit 97**); GTM Research & SEIA, *U.S. Solar Market Insight Full Report: 2017 Year in Review* (Mar. 2018) at 6 (**Exhibit 98**).

[345] GTM Research & SEIA, *U.S. Solar Market Insight Full Report: 2017 Year in Review* (Mar. 2018) at 7 (**Exhibit 98**).

[346] The Solar Foundation, *National Solar Jobs Census 2019* (Feb. 2020) at 16 ("Once the tariffs were established, however, the industry was able to factor the impacts into their business plans and the pipeline of projects began to build up again, *though at a slower rate than had been expected prior to initiation of the trade dispute*.") (emphasis added) (**Exhibit 89**).

As a result, there was a significant opportunity cost because installments fell far short of their potential. SEIA's consistent message from the beginning of the original investigation, through the remedy phase and midterm review, and now here at the extension proceeding is that the solar tariffs result in less deployment than there would be without tariffs. Simply put, solar competes to be the power source chosen and tariff costs change the calculus for many homeowners and many developers seeking to build power plants for utilities.

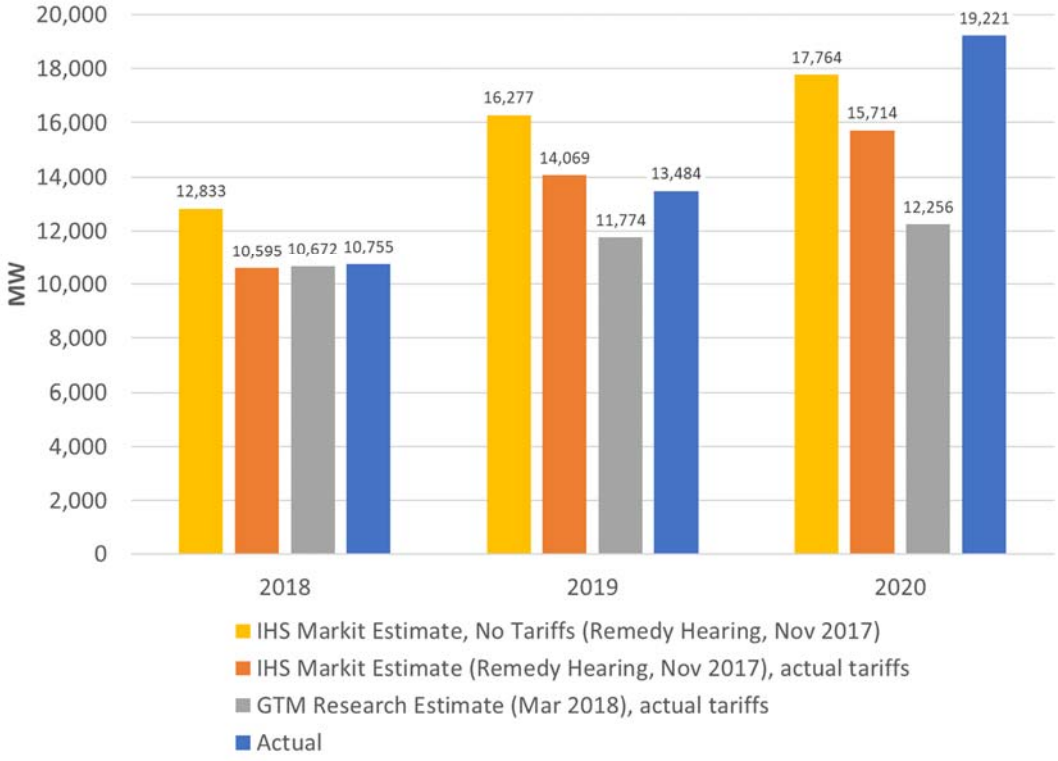
The figure below shows deployment projections based on the modeling that SEIA presented to the Commission at the remedy hearing.[347] There are several independent market analysts who offer deployment models of the U.S. solar market, and two of the leading entities are IHS Markit and GTM Research. At the remedy phase, SEIA contracted with IHS Markit to perform a deployment analysis of the safeguard tariffs. Because of the considerable uncertainty regarding the actual policy that would emerge, IHS Markit performed several simulations. The simulations were defined in cents per watt rather than percentage of import price, but ranged from the equivalent of 20 percent to 130 percent (based on different pricing). The wide range of modeling scenarios was necessary because Petitioners had proposed tariffs far in excess of the 50 percent maximum allowed under the statute. The figure includes IHS Markit's estimate of deployment without any tariffs and the computed impact of the actual declining tariff policy (calculated by interpolating the reported IHS Markit deployment forecasts to match the actual tariffs).[348] In addition, shortly after President Trump announced the policy, GTM Research performed its own deployment analysis for its regular publication

[347] SEIA Posthearing Brief, Inv. No. 201-075 (Remedy) (Oct. 11, 2017) at Exhibit 2 (Excerpt of Joint Respondents' Presentation, Safeguard Investigation Hearing on Remedy) (**Exhibit 99**).

[348] **Exhibit 100** contains all the deployment figures.

Solar Market Insight (jointly published with SEIA).[349] The GTM Research deployment results based on the announced safeguard tariffs were published in March 2018 and are also presented in the figure. Finally, for comparison, the figure includes actual deployment for each year.

Projected Solar Deployment
(with and without Safeguard Measures) and Actual Deployment
(Quantity in MW)[350]



As the chart makes clear, any suggestion by Petitioners that SEIA's forecasts were inaccurate is demonstrably false. In fact, in retrospect it is now clear IHS Markit's forecasts were not only far more accurate than the exaggerated claims made by Petitioners but also

[349] SEIA & Wood Mackenzie, *US Solar Market Insight Full Report: 2018 Year in Review* (March 2019) (**Exhibit 97**).

[350] Deployment Forecasts 2014-2021 (**Exhibit 100**); *see also* SEIA's Posthearing Submission of Methodology and Data for SEIA's Impact Study (Dec. 9, 2019) (**Exhibit 101**); SEIA & Wood Mackenzie, *US Solar Market Insight Executive Summary: Q3 2021* (Sept. 2021) (**Exhibit 102**).

more accurate than those produced by GTM Research in March 2018. For each year one can compare the IHS Markit forecast (presented to the Commission in November 2017), the GTM Research forecast (made in March 2018), and actual deployment. As seen, for 2018 IHS Markit predicted 10,595 MW of deployment and GTM Research predicted 10,672 MW of deployment. Actual deployment in 2018 was 10,755 MW. In other words, IHS Markit's forecast was just one percent less than actual deployment while GTM Research's forecast was less than one percent off. Finally, relative to deployment that would have occurred in 2018 had there been no tariffs, the IHS Markit modeling implies over 2 GW of deployment was lost in 2018 (12,833 MW versus 10,755 MW).

The results for 2019 confirm the accuracy of the results SEIA presented to the Commission in November 2017. For 2019, IHS Markit predicted 14,069 MW of deployment. At the remedy hearing in 2017, the Petitioners suggested SEIA's forecasted impact of the tariff was overly pessimistic.[351] Petitioners were flat-out wrong. SEIA's November 2017 estimate was more bullish than what actually happened, predicting 585 MW greater deployment than in fact occurred. The tariffs continued to hurt deployment. The deployment model implies more than 2.2 GW of deployment was lost in 2019.

2020 is the only year IHS Markit's estimates were off by more than a few hundred megawatts. Deployment in 2020 was clearly stronger than either IHS Markit or GTM Research predicted. The unanticipated increase in demand in 2020 is attributable to several developments that were unforeseen in 2017. First, until very late in the year (December 28, 2020) developers had assumed the Investment Tax Credit would fall from 26 percent in 2020 to 22 percent on January 1, 2021. Developers, basing their deployment decisions on the

[351] Excerpt of ITC Remedy Hearing Transcript (Oct. 3, 2017) at 382 (**Exhibit 103**).

existing tax law, opted to accelerate the development of certain projects in order to capture the additional four percent savings on total system costs (a savings which far exceeded the cost of the safeguard tariff on modules). This demand-pull driven by the tax code was also observed in 2016 when a similar phenomenon occurred due to concerns of an expiring Investment Tax Credit. As it turned out, the federal Investment Tax Credit for solar energy systems was extended in late December 2020 for another two years.[352] However, until late December, developers made business decisions assuming the tax credit would drop to 22 percent for systems installed in 2021. Given the myriad of tasks that need to be completed in order to qualify for the Investment Tax Credit—land acquisition, project design, multiple levels of regulatory approval, module procurement, and even module delivery—long lead times are a necessity. The complex machinations of the tax code and project planning encouraged deployment beyond what either IHS Markit or GTM Research anticipated.

Second, the pandemic caused massive disruptions in 2020, halting mostly residential projects for a time in the second quarter, but demand subsequently increased during late 2020 and into 2021 as homeowners spent more time at home and devoted more savings to home improvement.[353] The complex demand dynamics created by COVID and the subsequent stimulus packages were not captured by either IHS Markit or GTM Research.

Third, increased residential demand is also attributable to power outages from extreme weather events, such as wildfires in California and deep freezes and floods in the South and Southeast, causing homeowners increasingly to turn to solar as an alternative source of

[352] SEIA, *Solar Investment Tax Credit (ITC)* (Jan. 2021) (**Exhibit 8**).

[353] Liam Stoker, *US Residential Solar Prices Fall by Largest Amount Since 2017*, PV Tech (Aug. 17, 2021) (**Exhibit 104**). Utility-scale timelines were largely not impacted by COVID.

electricity.[354] Again, these types of demand shocks were not something modelers in 2017 could have anticipated. As shown in **Exhibit 100**, both IHS Markit and GTM Research deployment results for 2020 with respect to the commercial and residential segments were largely accurate; the only segment they misjudged was utility-scale. Yet, even with all the unexpected developments the demand-side modeling in the IHS Markit and GTM Research models suggests that even as strong as deployment was in 2020, it would have likely be 2 GW larger but for the safeguard tariffs.[355]

Over the entire three-year period, the results are an impressive confirmation of the accuracy of IHS Markit/SEIA's prior analysis. IHS Markit/SEIA's predicted 40.4 GW of deployment over the three years with the safeguard tariffs and 46.9 GW without the safeguard tariffs. This implies the safeguard tariffs caused the U.S. solar industry to lose 6.5 GW of deployment that would have otherwise occurred.

SEIA also submitted an updated impact study for the midterm review, which again projected lost deployment throughout the safeguard period.[356] The results in that updated SEIA analysis were consistent with SEIA's previous submission and were again remarkably accurate. That updated study implies that ***over 2018 to 2020, the U.S. solar industry lost almost 5.5 GW of potential deployment that would have otherwise occurred***.

Market participants have confirmed these results. According to Ron Reagan of NextEra Energy Inc., the largest utility in the country and **[**

[354] Pippa Stevens, *Extreme Weather Events Are Pushing Consumers to Solar and Residential Storage*, CNBC (Aug. 25, 2021) (**Exhibit 105**).

[355] The difference in IHS Markit's estimates for 2020 deployment is 2 GW.

[356] SEIA's Posthearing Submission of Methodology and Data for SEIA's Impact Study (Dec. 10, 2019) (**Exhibit 101**).

],[357] "{t}he future imposition of additional costs—such as through duties imposed under a safeguard measure—can transform an economically viable project into one that fails, thus contributing to the overall demand destruction caused by the safeguard measure."[358] George Hershman of SOLV Energy explained that "{o}ver the years, trade restrictions have led to reduced orders, fewer installations, cancelled projects, lost revenue, and reduced employment across all sectors of the domestic solar industry. SOLV Energy has experienced this firsthand."[359] Similarly, according to James Resor of EDF Renewables Distributed Solutions, Inc., a leading solar developer:

> In our experience, although demand in the utility-scale sector has grown and continues to grow, the tariffs have prevented our firm from installing the number of projects that we could have absent the tariffs. Tariffs add costs and uncertainty into the market which reduces demand. This is because we have to increase our price and/or shift more risk to the potential purchaser of electricity from a solar project to cover the added cost of tariffs to a point where such potential purchasers may not accept those terms.[360]

Also, as reported in 2018 when the safeguard measures were imposed:

> President Donald Trump's tariff on imported solar panels has led U.S. renewable energy companies to cancel or freeze investments of more than $2.5 billion in large installation projects, along with thousands of jobs, the developers told Reuters.
>
> . . . "***Solar was really on the cusp of being able to completely take off***," said Zoe Hanes, chief executive of Charlotte, North Carolina solar developer Pine Gate Renewables.
>
> . . . ***Leading utility-scale developer Cypress Creek Renewables said it had been forced to cancel or freeze $1.5 billion in projects*** — mostly in the Carolinas, Texas, and Colorado — because the tariff raised costs beyond the level where it could compete, spokesman Jeff McKay said.

[357] CR/PR at I-41.

[358] NextEra's Prehearing Brief (Oct. 27, 2021) at Exhibit 1 (Affidavit of Ron Reagan, NextEra Energy, Inc. at 5).

[359] Affidavit of George Hershman, SOLV Energy (Oct. 26, 2021) at 4 (**Appendix B**).

[360] Affidavit of James P. Resor, EDF Renewables Distributed Solutions, Inc. (Oct. 26, 2021) at 3 (**Appendix B**).

> . . . ***Developer Southern Current has made similar decisions on about $1 billion of projects***, mainly in South Carolina, said Bret Sowers, the company's vice president of development and strategy.
>
> . . . Pine Gate, meanwhile, will complete about half of the 400 megawatts of solar installations it had planned this year and has ditched plans to hire 30 permanent employees, Hanes said. The company also withdrew an 80-megawatt project that would have cost up to $150 million from consideration in a bidding process held by Southern Co. utility Georgia Power. It pulled the proposal late last year when it learned the Trump administration was contemplating the tariff. "It was just not feasible," Hanes said.[361]

The cost in terms of lost opportunities during the safeguard period far outweighs the small gains in domestic module capacity. *Even as a domestic module producer, JinkoSolar (U.S.) opposes extension of the safeguard measures because "extending the safeguards beyond when U.S. solar module customers have anticipated will reduce the overall U.S. market size for our U.S. produced product."*[362] **[** **]** reported "**[** **]**."[363] This imbalance between lost opportunities and the gain to domestic capacity is deepened when one realizes that two of the lead Petitioners in this extension proceeding, Hanwha Q CELLS USA and LGEUSA, **[** **]**.[364] How are the gigawatts of lost deployment justified when the parties seeking an extension of protection are primarily **[** **]** producing here in the United States?

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[361] Reuters, *Billions in US Solar Projects Have Been Shelved after Trump Panel Tariff*, CNBC (June 7, 2018) (emphasis added) (**Exhibit 106**).

[362] Affidavit of Nigel Cockroft, JinkoSolar (U.S.) Inc. (Oct. 25, 2021) at 2 (**Appendix B**).

[363] **[** **]** U.S. Producer Questionnaire Response at IV-4; *see also id.* at IV-6 ("**[** **]**.").

[364] *See supra* **Section II.A.3.b**.

Similarly, U.S. purchasers widely acknowledged the negative effects that tariffs had on solar deployment:

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[365] [ ] U.S. Purchaser Questionnaire Response at II-15.

[366] [ ] U.S. Purchaser Questionnaire Response at II-15.

[367] [ ] U.S. Purchaser Questionnaire Response at II-3.

[368] [ ] U.S. Purchaser Questionnaire Response at II-16.

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[369] [ ] U.S. Purchaser Questionnaire Response at II-15.
[370] [ ] U.S. Purchaser Questionnaire Response at II-15 (emphasis added).
[371] [ ] U.S. Purchaser Questionnaire Response at II-15 (emphasis added).
[372] [ ] U.S. Purchaser Questionnaire Response at II-15 (emphasis added).
[373] [ ] U.S. Purchaser Questionnaire Response at II-4.
[374] [ ] U.S. Purchaser Questionnaire Response at II-4.

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[375] [ ] U.S. Purchaser Questionnaire Response at II-15.
[376] [ ] U.S. Purchaser Questionnaire Response at II-11 (emphasis added).
[377] [ ] U.S. Purchaser Questionnaire Response at II-15.
[378] [ ] U.S. Purchaser Questionnaire Response at II-15 (emphasis added).
[379] [ ] U.S. Purchaser Questionnaire Response at II-16.
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[381] [ ] U.S. Purchaser Questionnaire Response at II-11.
[382] [ ] U.S. Purchaser Questionnaire Response at II-15.
[383] [ ] U.S. Purchaser Questionnaire Response at II-15.
[384] [ ] U.S. Purchaser Questionnaire Response at II-15.
[385] [ ] U.S. Purchaser Questionnaire Response at II-15.
[386] [ ] U.S. Purchaser Questionnaire Response at II-15.
[387] [ ] U.S. Purchaser Questionnaire Response at II-15.

b. The Effect of the Safeguard Measures Has Been Accentuated as a Result of Other Cost Increases along the Solar Supply Chain

The U.S. solar industry has faced detrimental cost increases, unrelated to the safeguard measures.

> Over the last several quarters, critical components for solar equipment—polysilicon, steel, aluminum, semiconductor chips, copper and other metals—have become increasingly supply-constrained. The dynamics around each commodity are nuanced. But increasing demand for solar, combined with pandemic-related macroeconomic realities (such as increased shipping costs, microchip availability, and a residential home renovation boom) have led to increased commodity prices and delivery delays.[388]

There are also layers of tariffs on CSPV products and components that add to the cost of solar systems. CSPV cells and modules from China have been subject to antidumping and countervailing duties since 2012.[389] Section 301 duties have applied to imports of CSPV products from China since August 2018, but also "{v}arious components used in CSPV module production, such as frames, junction boxes, and backsheets, are also subject to the additional 25-percent ad valorem duties, as are certain balance of system components such as inverters."[390] Section 232 duties were imposed on steel and aluminum imports in March

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[388] SEIA, *U.S. Solar Market Insight Executive Summary Q2 2021* (June 15, 2021) at 6 (**Exhibit 107**); *see also* Kelsey Goss, *US Solar PV System Costs Increase in 2021*, Wood Mackenzie (Sept. 2, 2021) ("Average solar module prices increased in Q2 2021 by 15% from Q1 as a result of increased polysilicon, aluminium, glass, and freight costs for shipments to the US. Freight costs have also heavily impacted tracker prices, DDP to the US, especially for products that are imported rather than sourced locally.") (**Exhibit 108**).

[389] *Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China: Countervailing Duty Order*, 77 Fed. Reg. 73,017 (Dep't Commerce Dec. 7, 2012); *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 Fed. Reg. 73,018 (Dep't Commerce Dec. 7, 2012); *Certain Crystalline Silicon Photovoltaic Products From the People's Republic of China: Antidumping Duty Order; and Amended Final Affirmative Countervailing Duty Determination and Countervailing Duty Order*, 80 Fed. Reg. 8592 (Dep't Commerce Feb. 18, 2015).

[390] *Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled into Other Products*, Inv. No. TA-201-075 (Monitoring), USITC Pub. 5021 at I-9 (Feb. 2020).

2018.[391] "{S}teel is used in balance of systems components (such as tracking systems on which modules are mounted) for solar installations" and "aluminum is used as an input in CSPV module production, as discussed below, and in balance of system components such as racking and mounting systems."[392] These added costs compound supply-related cost increases to the detriment of the solar industry.

[**]** confirmed the negative effect of cost increases. "**[**

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[391] *Proclamation 9705 of March 8, 2018: Adjusting Imports of Steel Into the United States*, 83 Fed. Reg. 11625 (Mar. 15, 2018); *Proclamation 9704 of March 8, 2018: Adjusting Imports of Aluminum Into the United States*, 83 Fed. Reg. 11619 (Mar. 15, 2018).

[392] *Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled into Other Products*, Inv. No. TA-201-075 (Monitoring), USITC Pub. 5021 at I-7 to I-8 (Feb. 2020) (citations omitted).

[393] **[** **]** U.S, Producer Questionnaire Response at II-4.

[394] **[** **]** U.S, Producer Questionnaire Response at IV-8.

[395] **[** **]** U.S. Producer Questionnaire Response at II-4.

[396] **[** **]** U.S. Producer Questionnaire Response at IV-12.

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Yet, **[** **]** asserts that:

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Safeguard measures *are not* intended to remedy injury caused by factors other than subject imports.[399] Rather, increased input costs that challenge solar's viability as an alternative source of energy are a reason to remove the safeguard measure, not continue the tariffs. The Commission should consider the compounding effect of increased material costs and Section 301 tariffs, which weighs in favor of terminating the safeguard measures.

B. Increasing Global Demand Will Compound the Negative Effects of the U.S. Safeguard Measures

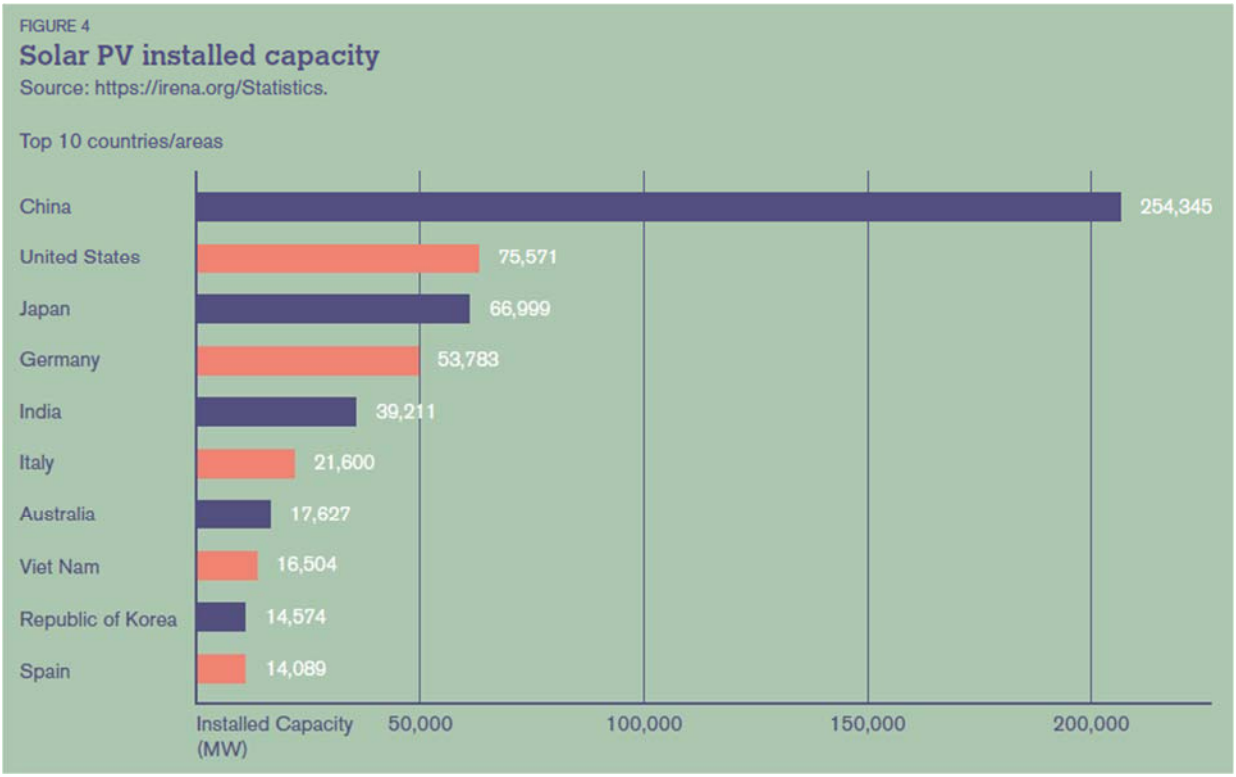
Global demand for solar is strong and is expected to increase as countries impose policies to promote renewable sources of energy, demanding more of the world's CSPV cell and module production and leaving less for the United States. According to the International Renewable Energy Agency, "{i}n 2018, two-thirds of new solar PV installations worldwide occurred in Asia, followed by Europe and North America. At the country level, China

[397] **[** **]** U.S. Producer Questionnaire Response at II-4

[398] **[** **]** U.S, Producer Questionnaire Response at IV-8.

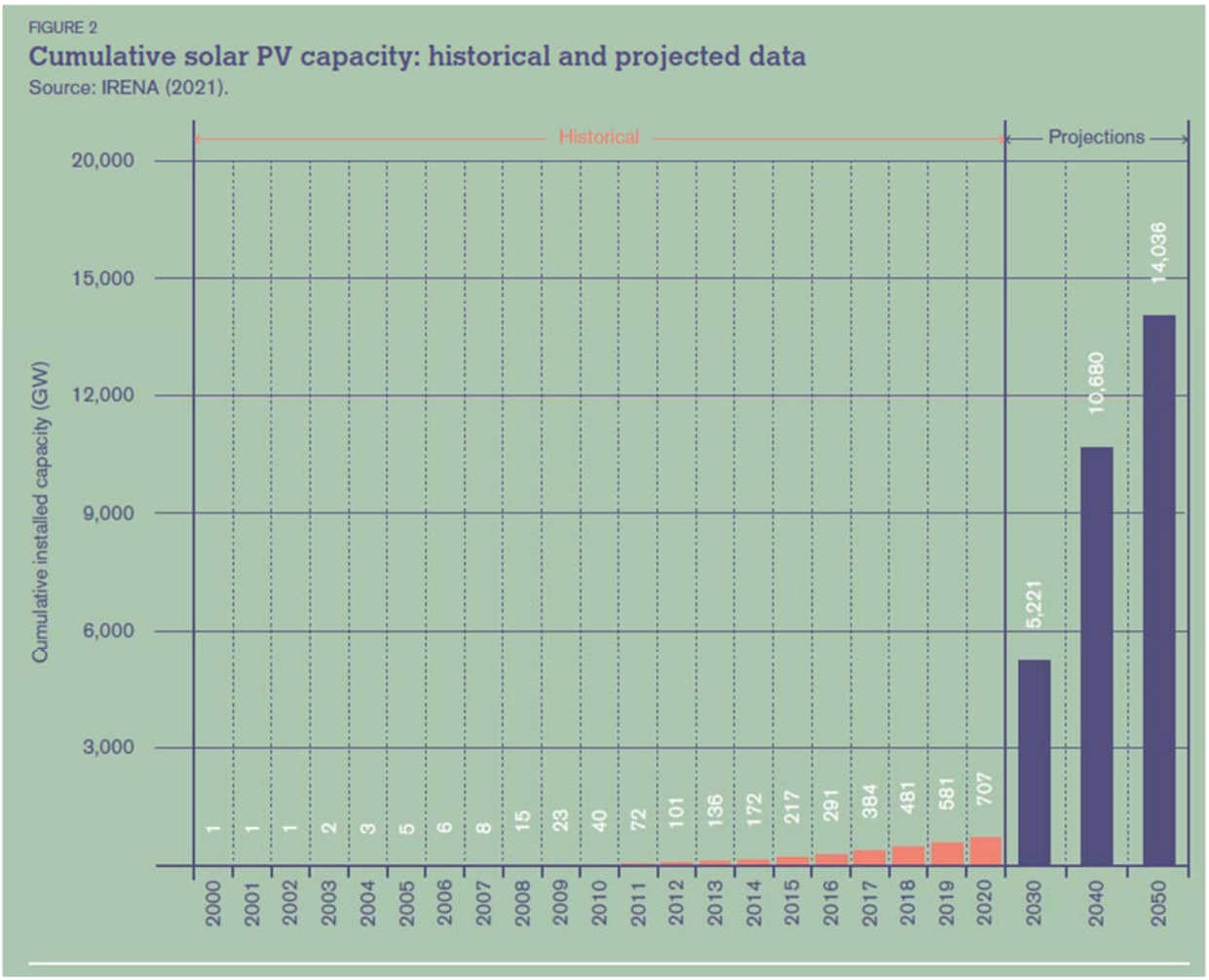
[399] *See* 19 U.S.C. § 2251(a) (If the Commission determines that "*an article is being imported into the United States in such increased quantities as to be a substantial cause of serious injury*, or the threat thereof, to the domestic industry producing an article like or directly competitive with the imported article, the President . . . shall take all appropriate and feasible action within his power which the President determines will facilitate efforts by the domestic industry to make a positive adjustment to import competition and provide greater economic and social benefits than costs.") (emphasis added).

spearheads the group of countries with the largest PV deployment, followed by Japan, the United States and Germany (Figure 4 {below}).”[400]



“Investments in solar PV grew massively from US$ 77 billion in 2010 to US$ 114 billion in 2018, and are expected to reach US$ 165 billion by 2030.”[401] As shown below, cumulated installed solar capacity is projected to reach 14 terawatts by 2050.[402]

[400] International Renewable Energy Agency, *Trading into a Bright Energy Future* (2021) at 8 (**Exhibit 94**).
[401] International Renewable Energy Agency, *Trading into a Bright Energy Future* (2021) at 8 (**Exhibit 94**).
[402] International Renewable Energy Agency, *Trading into a Bright Energy Future* (2021) at 9 (**Exhibit 94**).



There are plans for massive solar installations around the globe. For example, an Australian-Singapore group announced plans for a 20 GW solar farm in Australia and hinted at other similar-sized projects that are already in the pipeline.[403]

Governmental policies to combat climate change promote demand for solar. Following a recent report by Intergovernmental Panel on Climate Change, the United Nations Secretary General called for solar capacity to quadruple to reach a net zero emissions

[403] David Carroll, *Developer Calls World's Largest Solar+Storage Project 'the First of Many' to Come*, *PV Tech* (Sept. 24, 2021) (**Exhibit 109**).

trajectory by mid-century.[404] The International Energy Agency ("IEA") recently released its annual World Energy Outlook report, ahead of the multi-national COP26 Climate Change Conference in Glasgow planned for November 2021.

> Following last year's report, which labelled solar as the "new king" of power, the new research forecasts "strong growth" for renewables in each of the IEA's three scenarios, reflecting policy support in more than 130 countries and the success of solar PV and wind in becoming established as the cheapest and most competitive sources of new electricity in most markets.[405]

However, more investment in solar is needed to meet global climate change goals. According to the IEA, "{w}hile solar PV and wind deployment will far outstrip additions from other electricity sources over the next decade, clean energy progress is still lagging behind what is needed to put global emissions into sustained decline towards net zero . . . ."[406] Net zero emissions by 2050 would require annual solar PV capacity additions to increase from 248 GW in 2020 to more than *one terawatt* in 2030.[407] The goal is ambitious, but the IEA stresses that the investments in solar are achievable. "More than 40% of the required emissions reductions would come from measures that the IEA says would pay for themselves, such as installing solar or wind in places where they are now the most competitive electricity generation technologies."[408]

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[404] Jules Scully, *Solar and Wind Should Quadruple This Decade in Response to 'Code Red' IPCC Climate Warning*, PV Tech (Aug. 9, 2021) (**Exhibit 110**).

[405] Jules Scully, *Solar and Wind to Dominate New Installs But Clean Energy Progress 'Still Far Too Slow' – IEA*, PV Tech (Oct. 13, 2021) (**Exhibit 111**).

[406] Jules Scully, *Solar and Wind to Dominate New Installs But Clean Energy Progress 'Still Far Too Slow' – IEA*, PV Tech (Oct. 13, 2021) (**Exhibit 111**).

[407] Jules Scully, *Solar and Wind to Dominate New Installs But Clean Energy Progress 'Still Far Too Slow' – IEA*, PV Tech (Oct. 13, 2021) (**Exhibit 111**).

[408] Jules Scully, *Solar and Wind to Dominate New Installs But Clean Energy Progress 'Still Far Too Slow' – IEA*, PV-Tech (Oct. 13, 2021) (**Exhibit 111**).

Furthermore, although China is the world's largest supplier of CSPV products,[409] termination of safeguard measure will not introduce large volumes of product from China. China's domestic CSPV capacity first services its gigantic home market, which is the world's largest solar market, representing approximately one-third of global installations annually.[410] In addition, as discussed above in **Section III.A.2.b**, imports of CSPV products from China will continue to be limited, as they remain subject to two antidumping orders, two countervailing duty orders, and Section 301 (List 1) duties. Thus, fear of China does not justify extension of the safeguard measures. The United States is not a target for substantially increased imports from China—or any other country—if the safeguard measures terminate. The measures only worsen the supply shortage for CSPV modules in the United States.

IV. THE INDUSTRY DOES NOT NEED TARIFFS, BUT INSTEAD OTHER, BETTER FORMS OF INVESTMENT INCENTIVES THAT WILL ENCOURAGE LARGER SCALE AND INTEGRATED PRODUCTION

According to the Solar Foundation, "{s}olar energy has the potential to expand even more dramatically in the new decade, but this will require policy support at the federal and state levels. A comprehensive strategy to support renewable energy growth and address climate change is vital to our future."[411] As discussed above in **Section III.A.1.a**, the Biden Administration has a plan to invest in solar energy to combat climate change.[412] The U.S.

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[409] *Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled into Other Products*, Inv. No. TA-201-075 (Monitoring), USITC Pub. 5021 at at I-21 to I-22 (Feb. 2020) (citing International Energy Agency).

[410] *Crystalline Silicon Photovoltaic Cells, Whether or Not Partially or Fully Assembled into Other Products*, Inv. No. TA-201-075 (Monitoring), USITC Pub. 5021 at I-18 (Table I-5) (Feb. 2020); *see also id.* at I-19 ("EnergyTrend, which projects 125.5 GW of PV module demand in 2019, forecasts that China will account for 33 percent of demand, followed by the United States (11 percent), India (9 percent), Japan (6 percent), and Vietnam (6 percent).").

[411] The Solar Foundation, *National Solar Jobs Census 2019* (Feb. 2020) at 16 (**Exhibit 88**).

[412] *See Fact Sheet: Bipartisan Infrastructure Deal and Build Back Better Agenda Present Bright Future for Solar Power, Good Jobs, and More Affordable Energy*, WhiteHouse.gov (Aug. 17, 2021) (**Exhibit 78**).

Department of Energy estimates that "{f}or the U.S. to develop a domestic PV module manufacturing supply-chain at the scale of 50 GW/year by 2030 (assuming 85% c-Si) would require $9 billion–$21 billion of CapEx by 2030."[413] Extension of the safeguard measures will not help achieve that level of investment. Since the safeguard measures were imposed, the U.S. government has collected over ***$2.6 billion*** in tariffs on imported modules,[414] but these funds have gone to the general treasury, not towards investment in domestic manufacturing.

Tariffs have not created a domestic integrated supply chain, only a few highly automated module assembly plants employing an additional thousand employees. The safeguard measures also cannot be credited entirely for new domestic module assembly capacity in the United States. According to PV Magazine, "{i}t's a safe bet to say that {new module facilities} would not have happened without the Section 201 tariffs giving a relative edge to product made in the United States. *But as every one of these companies has told pv magazine, they also probably would not have happened without the changes to the U.S. tax code under the tax reform rammed through by Republican majorities in Congress in late 2017*."[415]

Continuing to impose tariffs on imported modules is not the answer. Other options, such as grants, loan guarantees, or the import license fee mechanism proposed by SEIA during the original investigation, would have been more constructive, directing funds to the domestic industry for investment and expansion. The federal Investment Tax Credit, in particular, has

[413] *Solar Futures Study 2021* at 171 (**Exhibit 5**).

[414] U.S. Customs and Border Protection, *Trade Statistics* (last modified Sept. 24, 2021) (**Exhibit 86**).

[415] Christian Roselund, *Hanwha Q Cells Opens the Largest Solar Factory in the Western Hemisphere*, PV Magazine (Sept. 23, 2019) (emphasis added) (**Exhibit 12**).

been one of the most important federal policies to incentivize clean energy in the United States.[416] "Since the {Investment Tax Credit} was enacted in 2006, the U.S. solar industry has grown by more than 10,000%—creating hundreds of thousands of jobs and investing billions of dollars in the U.S. economy in the process."[417]

SEIA has also been a strong advocate for non-tariff measures, such as the federal Investment Tax Credit, to support domestic manufacturing and to increase domestic production in the future, and it has set a goal to increase domestic solar manufacturing to 100 GW by 2030 to "seize the promise of American solar manufacturing" and "ensure that the United States becomes a world leader in not only solar equipment but all renewable energy technologies."[418] To achieve these goals, SEIA advocates for long-term federal investment, including demand drivers such as the solar Investment Tax Credit, incentives for private sector investments in manufacturing capacity, and ongoing domestic production support, i.e., the Solar Energy Manufacturing for America Act ("SEMAA").[419] SEIA has been an instrumental advocate for SEMAA, a bill sponsored by Senator Jon Ossoff (D-GA) and currently pending before the U.S. Congress, which would provide a tax credit to U.S. manufacturers of solar equipment that sell their equipment in the United States.[420] On October 8, 2021, SEIA held a roundtable discussion with Senator Ossoff and DOE Secretary Jennifer Granholm in support

[416] SEIA, *Solar Investment Tax Credit (ITC)* (Jan. 2021) (**Exhibit 8**). A tax credit of 26 percent is available for solar systems on residential and commercial properties during 2021 and 2022. The rate steps down to 22 percent in 2023. In 2024, the rate will be 10 percent for commercial and utility-scale and the credit will be phased out for residential.

[417] SEIA, *Solar Investment Tax Credit (ITC)* (Jan. 2021) (**Exhibit 8**).

[418] SEIA, *The Solar+ Decade & American Renewable Energy Manufacturing* (Sept. 2020) (**Exhibit 112**).

[419] *See* Letter from Abby Ross Hopper, President & CEO, SEIA, to the Honorable Gina M. Raimondo, *SEIA's Response to Anonymous Petitioners' October 13 Submission* (Oct. 25, 2021) (**Exhibit 113**).

[420] *See* Letter from Abby Ross Hopper, President & CEO, SEIA, to the Honorable Gina M. Raimondo, *SEIA's Response to Anonymous Petitioners' October 13 Submission* (Oct. 25, 2021) (**Exhibit 113**).

of SEMAA and domestic solar manufacturing generally,[421] after which Scott Moskowitz, the director of Market Intelligence and Public Affairs at Hanwha Q Cells USA, thanked SEIA directly "for setting up this discussion and championing this landmark bill."[422]

The domestic industry agrees that government incentives are key to continued growth of solar. **[** **]** reported in its questionnaire response that:

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Similarly, **[** **]** reported:

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Even if we ignore for the moment that the safeguard measures did not spur the domestic solar production renaissance that the original Petitioners (Suniva and SolarWorld)

[421] *See* Letter from Abby Ross Hopper, President & CEO, SEIA, to the Honorable Gina M. Raimondo, *SEIA's Response to Anonymous Petitioners' October 13 Submission* (Oct. 25, 2021) (**Exhibit 113**).

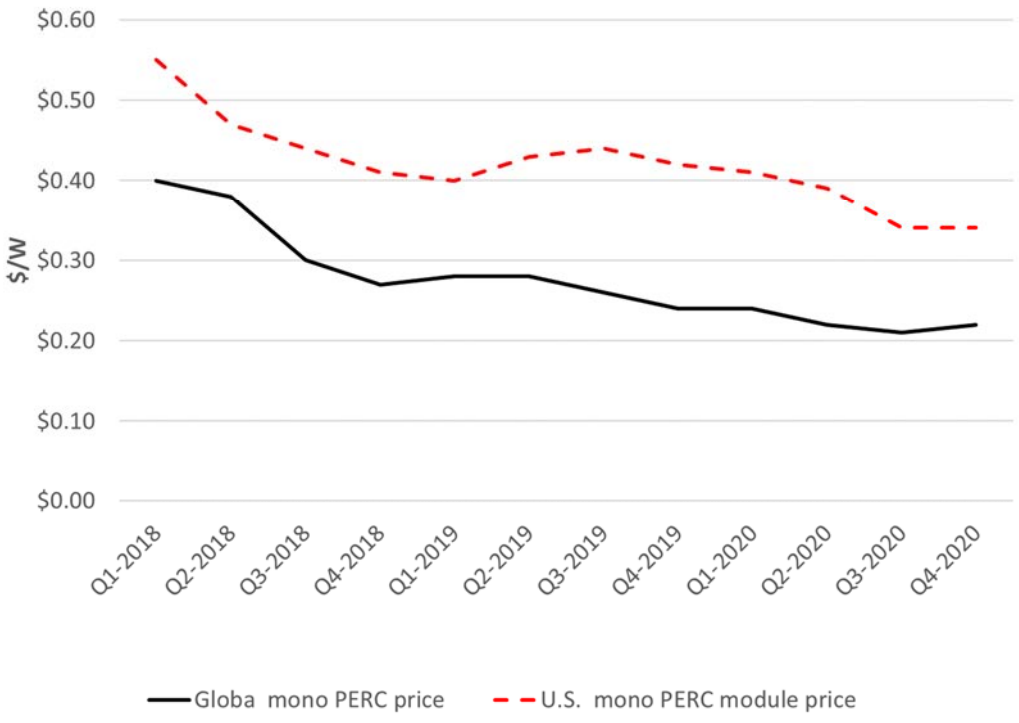
[422] Scott Moskowitz, LinkedIn (Oct. 8, 2021) (**Exhibit 114**).

[423] **[** **]** U.S. Producer Questionnaire Response at IV-6.

[424] **[** **]** U.S. Producer Questionnaire Response at IV-9.

promised, there is yet another reason why the Commission should not extend the tariff and instead recommend a different policy to President Biden. The safeguard tariff policy imposes tremendous costs on consumers with very little return. The figure below graphs the consumer price of mono PERC (monofacial) modules in the U.S. and globally. U.S. prices are much higher than the global average price. Over the three-year period U.S. prices were, on average, $0.14/W more expensive. U.S. trade policies toward imported CSPV, most notably the safeguard tariffs, have made solar projects in the United States far less competitive than solar projects elsewhere around the globe. This is bad for U.S. consumers and bad for the environment as higher prices mean fewer homeowners will install panels on their rooftops and old power plants that spew carbon will remain in operation longer.

Global and U.S. Module Prices[425]



[425] CR/PR VII-2 (Figure VII-2).

If the justification of the safeguard policy was the desire to spur a certain amount of domestic CSPV production, a tariff on consumers is an extremely inefficient policy to achieve this goal. This is a well-known result from international economics dating back to a seminal paper written in 1957.[426] Simply put, while a tariff can incentivize domestic production, it comes with an added cost of higher prices for consumers. The figure above demonstrates that stark reality.

It is generally the case that the costs imposed on domestic consumers far outweigh the producer benefit. That has certainly been the case over the last three and one-half years as U.S. consumers have paid $2.6 billion in tariffs and there has been far less than $300 million in new module investments.[427] That implies a nearly 9x dollar cost-to-benefit ratio. Alternatively, if one prefers the job metric, as discussed in **Section III.A.1.c**, the cost per cell/module job created during the safeguard period is an astronomical $2.1 million per new job. The imbalance is stunning.

The fact that tariffs are a very poor way to incentivize domestic production is a fundamental result in economics. The following excerpts from some of the most respected undergraduate trade textbooks all make this point:

> Commercial policy can affect the economy in a variety of ways—by changing prices, outputs, employment, and incomes. Tariffs (and import quotas or other forms of trade restriction) are not the only weapons available to governments for

[426] W. M. Corden, *Tariffs, Subsidies, and the Terms of Trade*, Economica 24 (Aug. 1957) at 235-42 (**Exhibit 115**).

[427] Based on public reports, $200 million was invested by Hanwha Q CELLS (Georgia), $50 million by JinkoSolar (U.S.) (Florida), and $28 million by LGEUSA (Alabama). *See Press Release: Grand Opening of Hanwha Q-CELLS in Georgia Spotlights Western Hemisphere's Largest Solar Panel Manufacturing Facility, Responsible for 650 jobs and Daily Output of 12,000 Solar Modules*, Hanwha (Oct. 2, 2019) (**Exhibit 83**); *Three Things SPW Learned after Touring JinkoSolar's Florida Panel Facility*, Solar Power World (Feb. 27, 2019) (**Exhibit 32**); Christian Roselund, *Inside JinkoSolar's Jacksonville Factory*, PV Magazine (Feb. 26, 2019) (**Exhibit 84**); Jerry Underwood, *LG Electronics to Open Alabama Solar Panel Plant, Creating 160 Jobs*, Made in Alabama (June 27, 2018) (**Exhibit 85**).

influencing the economy. Taxes or subsidies on sales, production, consumption, or incomes of particular groups can also be employed. ***

The objective is assumed to be a production goal. This can be achieved at a lower cost in terms of forgone real income if the instrument used focuses precisely on this goal. *A production subsidy does exactly that, whereas a tariff (needlessly) distorts prices to consumers.*[428]

If a country decides that the public welfare necessitates the maintenance of a semiconductor industry or aircraft industry, would it not be better just to subsidize it directly, rather than preventing imports of a product? The purpose of a domestic production subsidy is to encourage the output and thus vitality of import-competing producers… *Tariffs and quotas involve larger sacrifices in national welfare than occur under an equivalent subsidy*.[429]

The reason that the production subsidy has a lower deadweight loss . . . is that consumer decisions have not been affected at all . . . The production subsidy increases the quantity supplied by Home producers . . . but the production subsidy does so without raising the price for Home consumers. ***

This finding is an example of the *targeting principle*: to achieve some objective, it is best to use the policy instrument that achieves the objective most directly. *If the objective of the Home government is to increase cotton supply, for example, and therefore benefit cotton growers, it is better to use a production subsidy.*[430]

Suppose that for some political reason the government is determined to increase production in the import-competing sector relative to the level it attains in free trade. One reason the government might wish to do this is that some minimum level of production in the import-competing sector is viewed as important for national security reasons, as might be the case with steel, oil, or semiconductors. Given this objective, the important economic question is, what is the least-cost method of achieving it? *The problem with an import tariff is that it acts as a tax on consumption, in addition to serving as a subsidy to production. Might it not be better to use a direct output subsidy instead? The answer is definitely yes*. . . .[431]

It is less costly to protect the import-competing industry with a production subsidy than with a tariff because the tariff imposes an additional consumption

[428] Trade Literature (Richard E. Caves, Jeffrey A. Frankel, and Ronald W. Jones, *World Trade and Payments: An Introduction*, 9th Ed., Addison-Wesley (2001) at 195-96) (emphasis added) (**Exhibit 116**).

[429] Trade Literature (Robert J. Carbaugh, *International Economics*, 15th Ed., Cengage Learning (2015) at 161-62) (emphasis added) (**Exhibit 116**).

[430] Trade Literature (Robert C. Feenstra and Alan M. Taylor, *International Trade*, 5th Ed., Worth Publishers (2021) at 330) (emphasis added) (**Exhibit 116**).

[431] Trade Literature (James R. Markusen, James R. Melvin, William H. Kaempfer, Keith E. Maskus, *International Trade: Theory and Evidence*, McGraw-Hill (1995) at 251) (emphasis added) (**Exhibit 116**).

> cost . . . . *{A}production subsidy is more efficient than a tariff because it avoids the unnecessary consumption cost*.[432]

It is imperative that the Commission inform the President that the attempt to use tariff policy to spur domestic production has failed, and that alternative policies involving direct production incentives currently being considered by the President and Congress is a far better choice.[433]

V. EXTENSION OF ANY SAFEGUARD MEASURE IS AN EXTRAORDINARY ACTION AND RISKS RETALIATION BY OTHER TRADING PARTNERS

A. Extension Is Extremely Rare—Only One of Two Prior U.S. Safeguard Extension Investigations Resulted in Extension

Extensions of safeguard measures are exceedingly rare. Since the addition of Section 204(c) to the Trade Act in 1994, the Commission has only recommended to extend safeguard measures on two occasions, which were almost twenty years apart.[434] In only one of those cases, *Large Residential Washers*, did the President actually extend the safeguard measures.[435] In the only other case in which the Commission recommended an extension of the safeguard measure, *Wheat Gluten*, the Bush Administration declined to extend the safeguard measure, noting that extending the safeguard would have triggered retaliation under WTO rules.[436] Instead of extending the quota established under the original *Wheat Gluten* safeguard

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[432] Trade Literature (Miltiades Chacholiades, *International Economics*, McGraw-Hill (1990) at 158) (emphasis added) (**Exhibit 116**).

[433] Even First Solar, which has thrived in the presence of the safeguard measures, *see* **Section II.A.2.c**, *supra*, recognizes the value of non-tariff measures. In a call with investors, First Solar CEO Mark Widmar noted that, as the safeguard measures were set to expire "we continue to advocate for and {sic} industrial policy that identifies clean tech manufacturing as a national strategic priority to advance U.S. energy independence. We believe this type of policy would be promoted through incentive . . . for domestic manufacturing, continued investment in advance, technologies." *See* First Solar Q1 2021 Earnings Call Tr. (Apr. 30, 2021) (**Exhibit 51**).

[434] *See Large Residential Washers: Extension of Action*, Inv. No. TA-201-076 (Extension), USITC Pub. 5144 (Dec. 2020); *Wheat Gluten: Extension of Action*, Inv. No. TA-204-4 (Extension), USITC Pub. 3407 (Apr. 2001).

[435] *See Proclamation 10133 of January 14, 2021: To Continue Facilitating Positive Adjustment to Competition from Imports of Large Residential Washers*, 86 Fed. Reg. 6541 (Jan. 21, 2021).

[436] *See* USTR Press Release, *Bush Administration Helps Wheat Gluten Industry Restore Its Competitiveness*, Office of the U.S. Trade Representative (June 1, 2001) (**Exhibit 117**).

measure, the Bush Administration established a two-year program administered by the U.S. Department of Agriculture that would allow eligible U.S. wheat gluten producers to receive lump sums as they increased their competitiveness in the market.[437] At the time the Bush Administration announced this program, it noted that the measure "is an example of how we can use our trade laws to help industries meet import competition, without risks to American exporters."[438]

B. Under the WTO Safeguards Agreement, Trading Partners May Retaliate After Three Years of a Safeguard Action; Retaliation Is Even More Likely with Extension

The Trade Act requires any safeguard action to take into account "the impact on United States industries and firms as a result of international obligations regarding compensation."[439] In accordance with Article 8.1 of the WTO Safeguards Agreement, "{a} Member proposing to apply a safeguard measure or seeking an extension of a safeguard measure shall endeavor to maintain a substantially equivalent level of concessions and other obligations to that existing under GATT 1994 between it and the exporting Members which would be affected by such a measure . . . ." After a safeguard measure is applied, consultations with affected WTO Members should take place regarding compensation for the "adverse effects of the measure on their trade." Under Article 8.2, affected Members may suspend substantially equivalent concessions or obligations (i.e., retaliate) no later than 90 days after the measure is applied if agreement on compensation is not reached. However,

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[437] *See Program to Assist U.S. Producers in Developing Domestic Markets for Value-Added Wheat Gluten and Wheat Starch Products*, 66 Fed. Reg. 30,801, 38,801-02 (June 8, 2001).

[438] USTR Press Release, *Bush Administration Helps Wheat Gluten Industry Restore Its Competitiveness*, Office of the U.S. Trade Representative (June 1, 2001) (**Exhibit 117**).

[439] 19 U.S.C. § 2253(a)(2)(F)(iii).

Article 8.3 provides that the right of suspension may not be exercised for the first three years that a safeguard measure is in effect.

When the solar safeguard measure took effect in 2018, ten WTO Members requested consultations with the United States: China, Chinese Taipei (Taiwan), the European Union, Japan, Korea, Malaysia, the Philippines, Singapore, Thailand, and Vietnam.[440] An agreement on compensation was not reached.[441] China, Japan, and Korea took the step to notify to the WTO, within the initial 90-day period, of their intention to retaliate after three years of the safeguard measure, or on February 7, 2021.[442] Korea additionally noted that the U.S. safeguard measure affects over $1 billion of annual imports from Korea. Having notified the proposed suspension, China, Japan, and Korea reserved the right to retaliate as of February 7, 2021.

In addition, the other seven WTO Members—Taiwan, the European Union, Malaysia, the Philippines, Singapore, Thailand, and Vietnam—may yet have the ability to suspend concessions even if they did not reserve their right to retaliate within the first 90 days of the safeguard measure. Article 8.2 of the WTO Safeguards Agreement refers to application of a safeguard measure *or extension of a measure*, triggering Members' rights to seek trade compensation at either time. In addition, the provision in Article 8.3 regarding suspension of concessions is not limited to initial safeguard measures, and there is no textual basis in the Agreement requiring Members to reserve the right to retaliate. This means that all ten WTO Members may have had the right to retaliate as of February 7, 2021.

[440] WTO Results of Consultations (**Exhibit 118**).
[441] WTO Results of Consultations (**Exhibit 118**).
[442] WTO Notifications of Suspension (**Exhibit 119**).

If the safeguard measure is extended, the same procedural rules apply as for the initial measure. Thus, the United States would have to enter into new consultations with affected WTO Members and would be subject to retaliation as a result of the extended safeguard. In case of extension, the seven WTO Members that did not reserve the right to retaliate during the first 90-day period may in any case have the right to retaliate following a notification to that effect to the WTO no later than 90 days after the extension will be applied. This is because all requirements of the Safeguards Agreement for retaliation have been met: the safeguard has applied for more than three years, consultations are likely to prove ineffective, and the decision to retaliate will be made no later than 90 days after the extension is applied.

In addition, it is possible that other affected WTO Members that did not respond initially to the first safeguards will request consultations with the United States following a decision to extend the safeguards. If consultations prove ineffective, those WTO Members may have the right to retaliate as well.

The volume of trade at risk from retaliation is significant, likely targeting key U.S. export industries. Since the safeguard measures were imposed, over $15 billion in CSPV cells and modules have been imported into the United States,[443] exposing billions of dollars of U.S. exports to increased duties in retaliation.

[443] CR/PR Appx. C at C-8 (Table C-3).

CONCLUSION

For the foregoing reasons, extension would cause more social and economic harm than benefit to the domestic CSPV industry. Therefore, the Commission should make a negative determination because extension of the safeguard measures is not warranted in accordance with the safeguard statute.

Respectfully submitted,

/s/ Matthew R. Nicely
Matthew R. Nicely
Julia K. Eppard
Daniel M. Witkowski
Sydney L. Stringer

Akin Gump Strauss Hauer & Feld LLP

Counsel to Solar Energy Industries Association ("SEIA") and REC Americas LLC

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LIST OF ATTACHMENTS

APPENDIX A:

Testing for the Inter-Relationship of Pricing for 60-Cell and 72-Cell Modules,
Thomas J. Prusa, PhD

Attachments to Appendix A:

1. Author's CV
2. Granger, C.W.J., "Investigating casual relations by economic models and cross-spectral methods," Econometrica 37
3. Scott Van Pelt, Andrew Barron Worden, Anthony Assal, "Optimal mounting configuration for bifacial solar modules on single axis trackers," GameChange Solar, December 4, 2018
4. Dickey, D.A. & Fuller, W.A., "Distribution of the Estimators for Autoregressive Time Series with a Unit Root" Journal of the American Statistical Association 74 (366) (1979)
5. Phillips, P.C.B. & Perron, P., "Testing for a Unit Root in Time Series Regression," Biometrika 75 (2)
6. Ryan, K.F. and Giles, D.E.A., (1998), "Testing for unit roots in economic time series with missing observations", Fomby, T.B. and Carter Hill, R. (Ed.) Messy Data (Advances in Econometrics, Vol. 13, Emerald Group Publishing Limited, Bingley
7. Prehearing Brief of SEIA and Sunpower Corp., Inv. No. TA-201-75 (Injury) (Aug. 8, 2017), Appendix A (Excerpt)
8. Chris Deline, Silvana Ayala Peláez, Bill Marion, Bill Sekulic, Michael Woodhouse, and Josh Stein, Bifacial PV System Performance: Separating Fact from Fiction. NREL
9. Xiaojing Sun, "Global bifacial module market report 2019," Wood Mackenzie Power & Renewables (to be treated as confidential due to subscription copyright agreement), September 2019
10. Xiaoting Wang, "Bifacial Modules: If You Book Them, They Will Come," Bloomberg NEF, October 15, 2019
11. Pelaez, S.A., C. Deline, P. Greenberg, J. Stein, and R.K. Kostuk. 2018. "Model and Validation of Single-Axis Tracking with Bifacial Photovoltaics: Preprint." Golden, CO: National Renewable Energy Laboratory
12. National Institute for Occupational Safety and Health (NIOSH), Applications Manual for the Revised NIOSH Lifting Equation (Sept. 2021) (Excerpt)

APPENDIX B:

Affidavits of:

- Aaron Hall, Borrego Solar Systems, Inc. (Oct. 25, 2021)
- James P. Resor, EDF Renewables Distributed Solutions, Inc. (Oct. 26, 2021)
- Nigel Cockroft, JinkoSolar (U.S.) Inc. (Oct. 25, 2021)
- George Hershman, Solv Energy (FKA Swinerton Renewable Energy) (Oct. 26, 2021)
- John Santo Salvo, Sunnova Energy International Inc. (Oct. 26, 2021)
- Timothy Crane, Sunrun, Inc. (Oct. 26, 2021)

EXHIBITS TO PREHEARING BRIEF		
Exhibit	**Description**	**CBI/Public**
1	Remarks by President Biden before Signing Executive Action on Tackling Climate Change, Creating Jobs, and Restoring Scientific Integrity (Jan. 27, 2021)	Public
2	Andrea Januta, *Pacific Northwest Heat Wave "Virtually Impossible" Without Climate Change – Research*, Reuters (July 8, 2021)	Public
3	Aatish Bhatia & Nadja Popovich, *These Maps Tell the Story of Two Americas: One Parched, One Soaked*, NY Times (Aug. 24, 2021)	Public
4	Brett McDonald, et al., *Inside the Massive and Costly Fight to Contain the Dixie Fire*, NY Times (Oct. 11, 2021)	Public
5	U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, *Solar Futures Study* (Sept. 2021)	Public
6	*Press Release: DOE Releases Solar Future Study Providing the Blueprint for a Zero-Carbon Grid*, Energy.gov (Sept. 8, 2021)	Public
7	Richard M. Swanson, *A Vision for Crystalline Silicon Photovoltaics*, in *Progress in Photovoltaics: Research and Applications* (2006)	Public
8	SEIA, *Solar Investment Tax Credit (ITC)* (Jan. 2021)	Public
9	SEIA & Wood Mackenzie, *U.S. Solar Market Insight: Full Report: 2020 Year in Review* (Mar. 2021)	CBI
10	*U.S. Solar Panel Manufacturers*, Solar Power World (last updated Sept. 2021)	Public
11	Kelly Pickerel, *Convalt Energy to Open 700-MW Solar Panel Assembly Facility in New York in 2022*, Solar Power World (July 12, 2021)	Public
12	Christian Roselund, *Hanwha Q Cells Opens the Largest Solar Factory in the Western Hemisphere*, PV Magazine (Sept. 23, 2019)	Public
13	Hanwha Q-CELLS USA Website	Public
14	LGEUSA Website	Public
15	Nichola Groom, *Canada's Heliene Opening its Second U.S. Solar Panel Factory*, Reuters (Aug. 10, 2021)	Public
16	Chris Crowell, *Solar PV Manufacturer Heliene Will Triple its Capacity with New U.S. Facility*, Solar Builder (Sept. 13, 2021)	Public
17	Walker Orenstein, *Minnesota's Iron Range May Soon Be Home to One of the Largest Solar Panel Manufacturing Facilities in the Country*, Energy News Network (Sept. 13, 2021)	Public
18	Kelly Pickerel, *Heliene Takes Over SolarTech Universal's Lease on Florida Solar Panel Manufacturing Plant*, Solar Power World (Aug. 10, 2021)	Public

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21	Kelly Pickerel, *Former SolarWorld Facility in Oregon Now Officially Transitioned to SunPower P-Series Module Production*, Solar Power World (Feb. 7, 2019)	Public
22	*Solar Panel Maker Plans $36M Georgia Factory*, *Hiring 500*, Associated Press (Oct. 8, 2021)	Public
23	Mission Solar Website	Public
24	Zachary Shahan, *Philadelphia Solar Plans 1 Gigawatt Solar Panel Factory On Back Of Biden's Solar Support*, CleanTechnica (Sept. 3, 2021)	Public
25	Philadelphia Solar Website, *Why Philadelphia Solar?*	Public
26	Philadelphia Solar Website: *Philadelphia Solar, the First MEA-based Solar Company, Has Been Awarded the 'Top PV Brand MENA 2021' Seal by EuPD Research*	Public
27	Kelly Pickerel, *REC Silicon and New U.S. Solar Cell Company Violet Power End Partnership Before It Even Begins*, Solar Power World (Apr. 6, 2021)	Public
28	SEIA & Wood Mackenzie, *U.S. Solar Market Insight Q3 2021* (Sept. 2021)	CBI
29	Comments by Hanwha Q Cells Korea Corporation Before the U.S. Trade Representative, *Request for Product Exclusion from the Solar Products Safeguard Measure: Half-Cell 6-Busbar Wire 144-Cell Steel Frame Modules* (Mar. 16, 2018)	Public
30	Letter to Honorable Jeffrey D. Gerrish, Deputy U.S. Trade Representative, from Craig Cornelius, CEO, Clearway Energy Group LLC, et al., *re: Solar Safeguard Bifacial Module Exemption* (Aug. 7, 2019)	Public
31	*Press Release: LG Electronics Announces Plans for U.S. Solar Panel Assembly Plant*, LG Electronics USA (July 2, 2018)	Public
32	*Three Things SPW Learned after Touring JinkoSolar's Florida Panel Facility*, Solar Power World (Feb. 27, 2019)	Public
33	David Wagman, *Data Show 9.7 GW of Large-Scale Solar on Track for Delivery in 2021*, PV Magazine (Dec. 28, 2020)	Public
34	Shipments by Segment	CBI
35	Memorandum from AUSTR María Pagán to USTR Robert E. Lighthizer, *Decision Memorandum: Solar 201 Product Exclusion Requests* (May 3, 2019) (Attachment: U.S. Department of Energy Solar Energy Technologies Office, *201 Exclusion Request Details* at 48-50 (June 1, 2018)) (Excerpt)	Public

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Exhibit	**Description**	**CBI/Public**
36	Letter from Art Fletcher, Invenergy LLC, to the Honorable Jeffrey Gerrish, Deputy U.S. Trade Representative, Office of the U.S. Trade Representative, *Re: Comments on the Exclusion of Bifacial Solar Products from the Measure on Solar Products (Docket No. USTR-2020-0001)* (Feb. 17, 2020)	Public
37	Comments by Clearway Energy Group LLC before the U.S. Trade Representative, *Responsive Comments on the Exclusion of Bifacial Solar Panels from the Safeguard Measure on Solar Products (USTR-2020-0001*) (Feb. 27, 2020) at 15	Public
38	Comments by Solar Energy Industries Association ("SEIA") before the U.S. Trade Representative, *Comments on the Exclusion of Bifacial Solar Panels from the Safeguard Measure on Solar Products (USTR-2020-0001*) (Feb. 17, 2020)	Public
39	Auxin Solar Website	Public
40	*Auxin Solar Inc.*, SolarWorld (last accessed Oct. 19, 2021)	Public
41	SolarTech Universal Website	Public
42	Affidavit of Craig Cornelius, Clearway Energy Group LLC, Inv. No. TA-201-75 (Monitoring) (Nov. 26, 2019)	Public
43	*Over 100 GW of 1500 Volt Solar Inverters to be Shipped in Next 3 Years*, IHS Markit (2019)	Public
44	*Higher Voltage Standards Help Reduce LCOE for PV Systems*, IHS Markit (2020)	Public
45	Letter from James Ellington, Ellington Advanced Facilities Consulting, LLC, to Edward Gresser, Office of the U.S. Trade Representative, *Re: Comments in Support of 1,500 Volt Bifacial Module Exclusion Request* (USTR-2018-0001-0041) (Apr. 16, 2018)	Public
46	Kelly Pickerel, *With Larger Module, First Solar Aims to Compete with Traditional Crystalline*, Solar Power World (Aug. 2, 2016)	Public
47	First Solar, *Investor Overview* (July 29, 2021)	Public
48	First Solar Annual 2020 SEC Form 10-K (Excerpt)	Public
49	First Solar Annual SEC Form 10-K (2018, 2019, 2020) Excerpts	Public
50	*First Solar Income Statement & Balance Sheet*, MarketBeat (last updated Oct. 26, 2021)	Public
51	First Solar Q1 2021 Earnings Call Tr. (Apr. 30, 2021)	Public
52	First Solar Q2 2021 Earnings Call Tr. (July 29, 2021)	Public
53	First Solar, *Investor Overview* (Feb. 25, 2021)	Public
54	*Press Release: First Solar Breaks Ground on New $680M, 3.3GW Ohio Manufacturing Facility*, First Solar (Aug. 17, 2021)	Public
55	U.S. Import Statistics	Public

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56	Uma Gupta, The Long Read: First Solar Goes to India, PV Magazine (Oct. 2, 2021)	Public
57	David Feldman, et al., *H1 2021: Solar Industry Update*, NREL (June 22, 2021)	Public
58	U.S. Module Producers Production, Utilization	CBI
59	U.S. Module Producers Shipments	CBI
60	U.S. Module Producers Employment	CBI
61	U.S. Module Producers Financial Data	CBI
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63	Company **[ ]**	CBI
64	David Feldman & Robert Margolis, *H2 2020 Solar Industry Update*, NREL (Apr. 6, 2021)	Public
65	Sandra Enkhardt, *Solar Costs Set to Continue Falling According to ITRPV Roadmap*, PV Magazine (April 28, 2020)	Public
66	*In Re Suniva, Inc*., Chapter 11, Case No. 17-10837 (KG) (D. Del. 2017)	Public
67	Christian Roselund, *Suniva Files for Chapter 11 Bankruptcy*, PV Magazine (Apr. 18, 2017)	Public
68	Tracy Rucinski, *In Wind-Down, Bankrupt Suniva Wants to Abandon Solar Panels*, Reuters (June 20, 2018)	Public
69	Letter from SQN Asset Servicing, LLC to Suniva, Inc., *Suniva, Inc.– AD/CVD Settlement* (Aug. 6, 2018)	Public
70	Memorandum of Law in Support of Motion for Emergency and Preliminary Injunctive Relief, Exhibit 2 (Declaration of James M. Modak, CFO of SQN Capital Management, LLC (Aug. 8, 2018))	Public
71	Jeff Montgomery, *Suniva Ch. 11 Plan, DIP Lender Deal Confirmed In Del*., *Law360* (April 9, 2019)	Public
72	Prehearing Brief of the China Chamber of Commerce for Import and Export of Machinery and Electronic Product, Solar Energy and Photovoltaic Products Branch (Aug. 8, 2017)	Public
73	Frank Andorka, "Squeeze Attempt Undercuts Suniva's Trade Case (Full Letter Embedded)," PV Magazine (May 22, 2017)	Public
74	{Proposed} Second Amended Disclosure Statement for Chapter 11: Plan of Reorganization for Suniva, Inc. Proposed by the Debtor (filed Mar. 8, 2019)	Public
75	Ken Edelstein, *Solar Tariffs Giveth and Taketh—But Suniva Sits Idle*, The Kendeda Fund (Dec. 21, 2018)	Public

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77	*Fact Sheet: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies*, WhiteHouse.gov (Apr. 22, 2021)	Public
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81	Brian Eckhouse & Jennifer A. Dlouhy, *Escalating U.S.-China Solar Rift Threatens Biden Green Goals*, BloombergNews (Aug. 17, 2021)	Public
82	Gavin Bade, *Solar Trade Woes Cast a Pall Over Biden's Climate Goals*, Politico (Sept. 28, 2021)	Public
83	*Press Release: Grand Opening of Hanwha Q-CELLS in Georgia Spotlights Western Hemispheres Largest Solar Panel Manufacturing Facility, Responsible for 650 jobs and Daily Output of 12,000 Solar Modules*, Hanwha (Oct. 2, 2019)	Public
84	Christian Roselund, *Inside JinkoSolar's Jacksonville Factory*, PV Magazine (Feb. 26, 2019)	Public
85	Jerry Underwood, *LG Electronics to Open Alabama Solar Panel Plant, Creating 160 Jobs*, Made in Alabama (June 27, 2018)	Public
86	*Trade Statistics*, U.S. Customs & Border Protection (last modified Sept. 24, 2021)	Public
87	Solar Foundation, *National Solar Jobs Census 2018*	Public
88	Solar Foundation, *National Solar Jobs Census 2019* (Feb. 2020)	Public
89	SEIA, Solar Foundation, IREC, & BW Research Partnership, *National Solar Jobs Census 2020* (May 2021)	Public
90	Impact of the Section 201 Remedy on Employment in the US Solar Industry, Mayer Brown (Aug. 2017)	Public
91	Costs of Protection	CBI
92	Emma Foehringer Merchant, *The Status of US Solar Manufacturing, One Year After Tariffs*, Greentech Media (Feb. 25, 2019)	Public
93	Solar Foundation, *National Solar Jobs Census 2017*	Public
94	International Renewable Energy Agency, *Trading into a Bright Energy Future* (2021)	Public

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96	SEIA, *Solar Industry Research Data*	Public
97	SEIA & Wood Mackenzie, *U.S. Solar Market Insight Full Report: 2018 Year in Review* (Mar. 2019)	CBI
98	GTM Research & SEIA, *U.S. Solar Market Insight Full Report: 2017 Year in Review* (Mar. 2018)	CBI
99	SEIA Posthearing Brief, Inv. No. 201-075 (Remedy) (Oct. 11, 2017), Exhibit 2 (Excerpt of Joint Respondents' Presentation, Safeguard Investigation Hearing on Remedy)	Public
100	Deployment Forecasts 2014-2021	Public
101	SEIA Posthearing Submission of Methodology & Data for SEIA Impact Study (Dec. 9, 2019)	CBI
102	SEIA & Wood Mackenzie, *US Solar Market Insight Executive Summary: Q3 2021* (Sept. 2021)	Public
103	U.S. International Trade Commission Hearing Transcript, Inv. No. 701-075 (Remedy) (Nov. 15, 2017) (Excerpt)	Public
104	Liam Stoker, *US Residential Solar Prices Fall by Largest Amount Since 2017*, PV Tech (Aug. 17, 2021)	Public
105	Pippa Stevens, *Extreme Weather Events Are Pushing Consumers to Solar and Residential Storage*, CNBC (Aug. 25, 2021)	Public
106	Reuters, *Billions in US Solar Products Have Been Shelved After Trump Panel Tariff*, CNBC (June 7, 2018)	Public
107	SEIA & Wood Mackenzie, *U.S. Solar Market Insight Executive Summary Q2 2021* (June 15, 2021)	Public
108	Kelsey Goss, *US Solar PV System Costs Increase in 2021*, Wood Mackenzie (Sept. 2, 2021)	Public
109	David Carroll, *Developer Calls World's Largest Solar Storage Project 'the First of Many' to Come*, PV Tech (Sept. 24, 2021)	Public
110	Jules Scully, *Solar and Wind Should Quadruple this Decade in Reponse to 'Code Red' IPCC Climate Warning*, PV Tech (Aug. 9, 2021)	Public
111	Jules Scully, *Solar and Wind to Dominate New Installs But Clean Energy Progress 'Still Far Too Slow' – IEA*, PV Tech (Oct. 13, 2021)	Public
112	SEIA, *The Solar+ Decade & American Renewable Energy Manufacturing* (Sept. 2020)	Public
113	Letter from Abby Ross Hopper, President & CEO, SEIA, to the Honorable Gina M. Raimondo, *SEIA's Response to Anonymous Petitioners' October 13 Submission* (Oct. 25, 2021)	Public
114	Scott Moskowitz, LinkedIn (Oct. 8, 2021)	Public

EXHIBITS TO PREHEARING BRIEF		
Exhibit	**Description**	**CBI/Public**
115	W.M. Corden, *Tariffs, Subsidies, and the Terms of Trade*, Economica 24 (Aug. 1957)	Public
116	Trade Literature	Public
117	USTR Press Release, *Bush Administration Helps Wheat Gluten Industry Restore Its Competitiveness*, Office of the U.S. Trade Representative (June 1, 2001)	Public
118	WTO Results of Consultations	Public
119	WTO Notifications of Suspension	Public
120	Impact of COVID on Shipments	CBI
121	Prehearing Brief of SEIA and Sunpower Corp., Inv. No. TA-201-75 (Remedy) (Sep. 28, 2017), at Appendix A, Annex E (Commentary on Mayer Brown's Job Creation Study).	Public
122	*H1 2021 U.S. Solar PV System Pricing*, Wood Mackenzie	CBI