October 25, 2021

The Honorable Gina Raimondo
Secretary
U.S. Department of Commerce
1401 Constitution Avenue, NW
Washington, DC 20230

DOC Case Nos. A-570-979 and C-570-980
Anti-Circumvention Inquiry (from Malaysia)
Anti-Circumvention Inquiry (from Vietnam)
Anti-Circumvention Inquiry (from Thailand)
AD/CVD Operations, E&C Office IV
PUBLIC DOCUMENT

RE: SEIA's Response to Anonymous Petitioners' October 13 Submission

Dear Secretary Raimondo:

We are compelled to respond to the anonymous petitioners' baseless case for circumvention and their untruthful attacks against the Solar Energy Industries Association (SEIA) in their October 13th response to the Department's request for basic information. Information that should have already been provided, such as who are the petitioners? Indeed, the Department's questionnaire effectively rejected petitioners' first submission by restarting the 45-day petition review period. But it also means the Department will now have more than 100 days, double the statutory minimum, to review the key legal issues in this case and determine whether petitioners have met their burden for initiation, which they have not. The Department should dismiss the petitions.

In their October 13th questionnaire response, and seemingly concerned about growing questions regarding the merits of their petitions, the anonymous companies resort to fear mongering. As outlined in SEIA's August 26, 2021, letter to the Secretary there are legitimate procedural and fairness concerns raised by the petitioners' request to remain anonymous.[1] There are also a limited number of companies who - while cloaked in the veil of anonymity - stand to gain a significant economic advantage at the expense of America's 231,000 solar workers if an investigation is initiated. If the circumvention tariffs called for by the anonymous petitioners are imposed, the U.S. solar industry will lose 46,000 jobs and forego 18GW of solar installations, conservatively.[2] It will also make it impossible to meet President Biden's climate goals. This is a high cost to pay to pad the profits of a handful of anonymous companies.

At its core, this case is not about whether the petitioners should remain anonymous, the broader U.S.-China trade conflict, or whether China uses forced labor. Rather, it is solely about whether petitioners have met their burden for initiation. And the Department must conclude that they have not. Otherwise, the Department will be forced to deviate from over a decade of established precedent in prior trade cases, expand the application of the circumvention statute beyond congressional intent,[3] seriously damage the broader U.S. solar industry, and significantly undermine the Biden Administration's climate goals.

[1] Attachment A (SEIA August 26, 2021, Letter to the Secretary); see also NextEra's Response to Petitioners' October 13, 2021, Letter (Oct. 25, 2021).

[2] SEIA's research methodology for these data is available at the Department's request.

[3] Attachment B (Senate Letter to the Secretary, Sept. 28, 2021).

Several parties have already spelled out the legal deficiencies in the anonymous petitions.[4] In summary, Commerce has clear legal authority to decline to initiate the requested anticircumvention inquiries. In addition, the Department cannot make a factual finding in this case that is wholly inconsistent with the factual finding that it made in related proceedings. To do so would be an arbitrary and capricious application of the law. Thus, based on Commerce's own factual findings, the statutory criterion under 19 U.S.C. § 1677j(b)(1)(C) cannot be satisfied, leaving no legal basis for Commerce to initiate circumvention inquiries.

We must also address the anonymous petitioners' false claims against SEIA, which call into serious question both the petitioners' intentions and their credibility. By creating a false narrative that SEIA is against domestic manufacturing or improperly aligned with foreign interests, petitioners hope to distract the Department into initiating an investigation. As we have explained to the Department directly, the mere initiation of these investigations would freeze supply chains and have a devastating effect on the U.S. solar industry. Presumably, the anonymous petitioners know this and are hoping their inflammatory rhetoric will cause the Department to initiate now and address key legal questions later. The Department has an obligation, however, to address the legal requirements for initiation during this statutory petition review period or risk further unnecessary damage to the U.S. solar industry.

Because the potential for preliminary tariffs is exacerbating global supply chain challenges that stretch far beyond the solar industry, damages have already begun and will continue until this petition is outright rejected. This means that any further delay will cause additional harm to the broader solar industry. The Department must address the legal requirements for initiation during the statutory petition review period.

SEIA Champions Domestic Solar Manufacturing

Now let's turn to SEIA's support for domestic manufacturing. Contrary to petitioners' assertions, SEIA is leading the way to an American solar manufacturing future. In May 2019, SEIA modified its bylaws to create a new Manufacturing Division and Board of Directors seat dedicated to representing domestic solar manufacturing interests. Later that year, SEIA hosted a Solar+ Manufacturing Summit attended by nearly 100 solar leaders from across the nation.[5] This summit served as the basis for SEIA's September 2020 Manufacturing White Paper, which set a goal of 100GW of domestic solar and storage manufacturing capacity by 2030.[6]

As first articulated in SEIA's Manufacturing White Paper, our country needs a new approach to growing U.S. solar manufacturing. As we have said for many years, and as has been validated time and again, tariffs are ineffective at growing solar manufacturing

[4] See, e.g., NextEra's Request to Reject Anti-Circumvention Ruling Requests and to Decline Initiation, Aug. 15, 2021; NextEra's Response to Petitioners' September 21, 2021, Letter (Sept. 27, 2021).

[5] See https://www.seia.org/events/solar-manufacturing-summit.

[6] Attachment C (SEIA Manufacturing White Paper, Sept. 2020).

capacity. What our industry requires is a suite of long-term federal investments, including:

1. Demand drivers such as a long-term extension of the solar investment tax credit with direct pay and related bonus credits for meeting certain domestic content thresholds;
2. Ongoing domestic production support, i.e., the Solar Energy Manufacturing for America Act (SEMAA), as our manufacturers and their suppliers scale operations in a hyper-competitive global environment; and
3. Incentives for private sector investments in manufacturing capacity, i.e., a refundable 48C manufacturing tax credit.

Importantly, all three categories of federal investments are required if we hope to truly compete as a nation in solar manufacturing. We need to recognize that the United States is competing for private sector investments against not only China but other countries as well.

For example, India recently announced new federal investments in solar manufacturing capacity.[7] In response, First Solar, a U.S.-headquartered solar panel manufacturer with facilities in the United States, Malaysia, and Vietnam, announced that it plans to build a $680 million solar panel factory in India.[8] Similarly, Hanwha Q CELLS, a Korean-based solar cell and panel manufacturer with facilities in the United States, Germany, China, Malaysia, and South Korea, recently announced that it was planning a $1.28 billion manufacturing investment in South Korea.[9] With the right federal investments here in America we can begin competing for these types of private sector investments as well.

As noted above, an essential element in growing domestic solar manufacturing is ongoing production support as U.S. facilities scale operations. SEIA is a lead proponent of Senator Jon Ossoff's SEMAA legislation, which would provide a tax credit for solar equipment manufactured and sold in the United States.[10] We forecast that, if enacted, SEMAA will create 27,000 direct manufacturing jobs in the solar module value chain by 2025 and 40,000 jobs by 2030.[11] Long-term federal investments like SEMAA - not tariffs - create solar manufacturing jobs.

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[7] Saurabh, *India Announces $600 Million Incentives Scheme for Solar Manufacturing*, May 8, 2021, available at https://cleantechnica.com/2021/05/08/india-announces-600-million-incentives-scheme-for-solar-manufacturing/.

[8] Dutta, Sanjay, *First Solar of US Plans $684 Million Module Plant in Tamil Nadu*, July 30, 2021, available at https://timesofindia.indiatimes.com/business/india-business/first-solar-of-us-plans-684-million-module-plant-in-tn/articleshow/84898858.cms.

[9] Bellini, Emiliano, *Hanwha Q Cells Unveils Plan to Produce Perovskite, TOPCon Solar Modules*, Sept. 14, 2021, available at https://www.pv-magazine-australia.com/2021/09/14/hanwha-q-cells-unveils-plan-to-produce-perovskite-topcon-solar-modules.

[10] Attachment D (Senator Ossoff Press Release, including quote from SEIA's President and CEO Abby Hopper, June 21, 2021).

[11] SEIA's research methodology for these data is available at the Department's request.

In support of SEMAA, at the time of its introduction, SEIA announced an additional manufacturing goal of 50GW of domestic solar manufacturing capacity by 2030, including 50GW of polysilicon, wafer, cell, module, inverter, tracker, and energy storage production capacity independently.[12] This aggressive target would create American solar manufacturing capacity equal to over 250% of the 19.2 gigawatts of solar deployed in 2020. In setting this goal, we noted that "the United States doesn't need to produce every solar component installed domestically, but we do need to fill critical gaps in our supply chain and dramatically expand domestic production capacity. The long-term health of our industry depends upon it."

SEIA also recently organized a roundtable discussion[13] and press conference[14] in Savannah, Georgia with Senator Jon Ossoff and U.S. Department of Energy Secretary Jennifer Granholm in support of domestic solar manufacturing.

Importantly, as we grow our domestic solar manufacturing base here at home, we must also recognize that it will take time to scale operations and reduce our reliance on imports, a point Secretary Granholm recognized during the Savannah press conference. It is simply absurd for petitioners to suggest that immediately shutting off imports from Malaysia, Vietnam, and Thailand, which represent more than 60% of annual domestic panel supply, will not have a devastating impact on the U.S. solar industry and slow our nation's ability to address climate change.

Our data show that in the base case, the solar industry will employ 304,000 Americans in 2023.[15] As noted above, however, the U.S. solar industry will lose 46,000 workers if circumvention tariffs are imposed, falling to 258,000 employees. In addition, U.S. solar manufacturing jobs will fall from an expected 53,000 employees to only 38,000 by 2023. We will also lose more than 18GW of solar installations over the two-year period, in addition to the tens of thousands of American solar service jobs and billions of dollars of investments. President Biden's climate goals will most certainly be derailed.

In this context, the anonymous petitioners' attempt to further disparage SEIA by suggesting that our prior market impact forecasts were overstated.[16] Again, to the contrary, the facts speak for themselves. In the Section 201 safeguard investigation, SEIA forecast that a 30% tariff would result in the loss of tens of thousands of jobs, multiple gigawatts of solar installations, and billions of dollars of investments.[17] Specifically, SEIA

[12] Attachment E (SEIA Calls for Ten-fold Increase in American Solar Manufacturing Capacity – 50GW by 2030, SEIA Press Release (June 21, 2021)).

[13] See https://www.youtube.com/watch?v=XaW-yt6okBk.

[14] See https://www.youtube.com/watch?v=Zm5j7qY_doQ.

[15] SEIA's research methodology for these data is available at the Department's request.

[16] See Anonymous Petitioners' September 29, 2021, Response to Additional Submissions at p. 2.

[17] Attachment F (excerpt from SEIA's October 6, 2017, USITC Section 201 Submission, Back-up Documentation for Remedy Modeling).

forecast that this tariff would result in the loss of approximate 2GW of solar installations annually in 2018 and 2019.[18] Unfortunately, this is exactly what happened.[19]

In contrast, the Section 201 petitioners, also represented by the anonymous petitioners' counsel, forecast that the safeguard tariffs would lead to the creation of 45,000 new manufacturing jobs.[20] In fact, the United States actually lost manufacturing jobs over the past 4 years.[21] If anyone's forecast should be called into question it is the anonymous petitioners' and their counsel's. The U.S. solar industry is paying a heavy price for the Section 201 tariffs with no gain in manufacturing jobs. If the Department were to proceed with the anonymous petitions here, the result would be even worse.

SEIA Has Taken a Global Leadership Role on Forced Labor Prevention

We must also challenge the anonymous petitioners' dishonest suggestion that SEIA is somehow in favor of forced labor. In fact, SEIA has taken a global leadership role on forced labor prevention.

Beginning in October 2020, SEIA began calling upon solar companies to move their supply chains out of the Xinjiang region of China given reports of systemic forced labor in the region.[22] On December 10, 2020, in support of the United Nations' Human Rights Day, SEIA announced a Solar Industry Forced Labor Prevention Pledge, which has been signed by nearly 300 companies representing the vast majority of solar panels sold and consumed in the United States.[23] Moreover, Chinese organizations have also unfairly attacked SEIA and its forced labor initiatives as an attempt to suppress the Chinese solar industry.[24]

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[18] Id.

[19] See SEIA & Wood Mackenzie, US Solar Market Insight Executive Summary: Q3 2021 (Sept. 2021); see also, Attachment G (SEIA Market Impact Study (2019).

[20] Attachment H (Impact of the Section 201 Remedy on Employment in the US Solar Industry, Mayer Brown (August 2017), available at https://www.wiley.law/assets/htmldocuments/REPORT_Final-Economic-Analysis-of-Section-201-Remedy.pdf (note that this document is being hosted at petitioners' counsel's website)).

[21] The solar manufacturing segment shed 5,800 jobs when it went from 36,885 workers in 2017 to 31,050 in 2020. See National Jobs Census, available at https://irecusa.org/programs/solar-jobs-census/.

[22] See Copley, Michael, *Human Rights Allegations in Xinjiang Could Jeopardize Solar Supply Chain* (Oct. 21, 2020), available at https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/human-rights-allegations-in-xinjiang-could-jeopardize-solar-supply-chain-60829945.

[23] Attachment I (SEIA Forced Labor Prevention Pledge).

[24] See *Statement on Individual US Agencies, Associations and Companies Slandering China's Xinjiang Photovoltaic Supply Chain Involving "Forced Labor"*, China Photovoltaic Industry Association and China Nonferrous Metals Industry Association's (Jan. 20, 2021), available at http://www.chinapv.org.cn/association_news/922.html. And *Chinese Solar Group Blasts US Calls to Avoid Supplies from Xinjiang*, S&P Global Market Intelligence (Feb. 8, 2021), available at https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/chinese-solar-group-blasts-us-calls-to-avoid-supplies-from-xinjiang-62496859.

SEIA also partnered with two leading solar audit firms to develop a Traceability Protocol[25] and related Buyers' Guide.[26] Released in April 2021, the Traceability Protocol includes an independent third-party audit mechanism and is designed to provide assurances to the U.S. government and purchasers that solar panels imported into the United States do not include inputs from regions or companies tied to forced labor. Companies around the globe are now instituting traceability protocols and we are aware of more than a dozen ongoing audits to assess conformance with these measures. SEIA has also begun the process for turning the Traceability Protocol into an official industry standard.

On June 24, 2021, U.S. Customs and Border Protection (CBP) issued a Withhold Release Order (WRO) against Hoshine Silicon Industry Co. Ltd. The company is based in Xinjiang and makes silica-based products used as inputs in the production of, among other things, polysilicon. Consistent with the industry's commitment to prevent forced labor in the solar supply chain, SEIA supported the Biden Administration's enforcement action[27] and is working constructively with CBP to ensure that the nation's laws prohibiting the importation of goods made with forced labor are enforced.

Lastly, there is the existential threat of climate change—and here the anonymous petitioners are notably silent. Under a baseline scenario, U.S. solar installations over the next two years will help avoid 184 million metric tons of annual emissions. If the circumvention tariffs go through, however, that number drops to 164 million metric tons. Cumulatively, this represents 20 million metric tons of missed opportunity—the equivalent of taking 4.5 million internal combustion engine cars off the road and an impact which compounds every year.

We are running out of time to address climate change and can no longer afford to hinder solar energy's massive growth potential with unnecessary tariffs that do not create any benefit for American workers

SEIA and its members are committed to a robust American solar supply chain and to adding tens of thousands of American jobs to tackle the climate crisis. We are also committed to ensuring that China be held accountable. Today, we have a once in a lifetime opportunity for unprecedented growth of clean energy and the benefits that entails, but this potential is now threatened by a few anonymous companies who hide in the shadows while casting harmful and unfair aspersions.

We respectfully ask the Department to throw out these meritless petitions and stop the self-interested efforts to halt supply chains and paralyze the American solar industry and its 231,000 U.S. workers. The climate and American workers are depending on it.

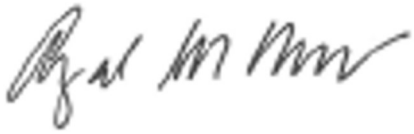
[25] Attachment J (SEIA's Traceability Protocol, April 2021).

[26] Attachment K (SEIA's Buyers' Guide, April 2021).

[27] Attachment L (U.S. Solar Industry Comments on Enforcement Action on Solar Products from Xinjiang, SEIA Press Release, June 23, 2021).

We respectfully request that this submission be added to the official record in these proceedings. Please do not hesitate to contact us if you have any questions or if additional information would be helpful.

Sincerely,



Abigail Ross Hopper, Esq.
President & CEO
Solar Energy Industries Association

Attachment A

August 26, 2021

The Honorable Gina M. Raimondo
Secretary of Commerce
14th Street & Constitution Avenue, NW
Washington, D.C. 20230

Dear Secretary Raimondo,

The Solar Energy Industries Association ("SEIA") and its members write to bring a critical issue to your attention regarding anti-circumvention petitions recently filed with the U.S. Department of Commerce ("Commerce").

Under the guise of an anti-circumvention inquiry, an unnamed group of companies identifying themselves only as the American Solar Manufacturers Against Chinese Circumvention ("A-SMACC") seeks to dramatically expand the scope of existing antidumping ("AD") and countervailing duty ("CVD") orders on crystalline silicon photovoltaic cells and modules from China ("the Orders"). Through this inquiry, A-SMACC asks Commerce to expand the scope of the Orders to include solar products completed and exported from three entirely different countries—Malaysia, Thailand, and Vietnam.

As an initial matter, SEIA emphasizes that this procedural gimmick employed by A-SMACC circumvents and evades the channels pursuant to which Commerce normally investigates supposedly unfairly priced and unfairly subsidized imports. SEIA fully recognizes Commerce's authority and responsibility to strictly enforce U.S. AD and CVD laws. But A-SMACC's efforts are a clear attempt to contort the intended purpose of the anti-circumvention laws, which are designed to prevent avoidance of AD/CVD liability through minor modifications to the production process. A-SMACC's request would force Commerce to leapfrog the normal investigation process to impermissibly entangle exports from Malaysia, Thailand, and Vietnam into China-specific AD/CVD orders.

Although SEIA and its members will fully and strongly contest A-SMACC's allegations, SEIA is particularly aggrieved by A-SMACC's request to shield the identity of its members from public disclosure. As explained below, A-SMACC's members have no legal basis to hide behind an *ad hoc* coalition created solely for the purpose of expanding trade restrictions on solar products. Accordingly, SEIA urges Commerce to order the public disclosure of A-SMACC's members.

I. SEIA and its Members Work Hand-in-Glove with the Administration on Climate Issues

SEIA is the national trade association for the solar and solar-storage industries. SEIA's 1,000-strong membership consists of manufacturers, contractors, installers, project developers, financiers, and other strategic partners. SEIA shares the Biden Administration's commitment to sustainable climate policies and solar initiatives. SEIA is dedicated to creating the framework for solar to achieve 20 percent of U.S. electricity generation by 2030, leading America's transformation to a clean energy economy, creating green energy jobs, spurring massive investment in the U.S. economy, and driving high-tech innovation across the nation. Without question, the anti-circumvention petitions filed by A-SMACC fly in the face of SEIA's goals and the Administration's commitment to clean energy.

II. A-SMACC Has No Legal Basis to Withhold the Identity of its Members

A-SMACC has asked Commerce to keep secret the identity of its members, but it has no legal basis to do so. A-SMACC seeks proprietary treatment for this information under 19 C.F.R. § 351.105(c)(11), the broadest and most vague "catch-all" provision in Commerce's regulations, claiming that "disclosure of this information could lead to retribution against these {member} companies and cause substantial harm." Not only does the cited regulation not apply to business names, A-SMACC does not provide a shred of evidence to support its assertion that its members face possible retribution. SEIA and its counsel can find no Commerce precedent for the whole-cloth withholding of the identity of each and every party making an anti-circumvention accusation. There are no circumstances unique to these proceedings that would entitle A-SMACC to do so

here. In the end, under A-SMACC's view of Commerce's regulations, the only limit on what A-SMACC might keep secret is its own imagination.

A-SMACC's failure to publicly disclose the identity of its members conflicts with Commerce's regulations in another way. Commerce requires that "all persons wishing to participate in a segment of a proceeding must file a letter of appearance," and "if the interested party is a coalition or association," "the letter of appearance *must* identify all of the members of the coalition or association." 19 C.F.R. § 351.103(d)(1) (emphasis added). Neither Commerce nor A-SMACC has license to depart from this unambiguous regulatory requirement.

For these reasons, Commerce must reject A-SMACC's attempt to shield the identity of its members from the public. A-SMACC's request conflicts with Commerce's regulations and otherwise rests on unsubstantiated and speculative claims regarding supposed substantial harm to its members. Unlawful and unsupported claims cannot outweigh the certain harm that undoubtedly will befall SEIA and its members if the identity of A-SMACC's members is withheld from the public. Thus, A-SMACC's gamesmanship is antithetical to well-settled notions of notice and due process, and it should not be allowed to disturb a playing field that Commerce has already leveled.

SEIA respectfully requests Commerce's prompt attention to this matter. Our members make decisions every day to commit tens of billions of dollars in investments – years in advance – to help American utilities, businesses, and residences transition to a clean energy economy. Commerce should not allow A-SMACC to derail the Administration's commitment to grow a clean energy economy, and SEIA's members must be given full opportunity to debunk A-SMACC's unsupported claims of circumvention.

Respectfully submitted,

Abigail Ross Hopper
President & CEO
Solar Energy Industries Association

Attachment B

United States Senate

WASHINGTON, DC 20510

September 28, 2021

The Honorable Gina Raimondo
Secretary
U.S. Department of Commerce
1401 Constitution Ave., NW
Washington, DC 20230

RE: Anonymous Petitions to Impose Tariffs on Crystalline Silicon Photovoltaic Solar Cells and Panels from Malaysia, Vietnam, and Thailand

Dear Secretary Raimondo:

We are writing to express our concerns with recent, anonymous petitions alleging illegal trade activity filed with the Department of Commerce (Commerce) that would have a devastating impact on the U.S. solar industry and American solar jobs. Given the significant negative effects of imposing new tariffs on imported solar products, we implore you to carefully assess the validity of these petitions, ensure such claims go through the proper USITC process, and determine whether it is appropriate to initiate an investigation into this matter.

On August 16, 2021, an anonymous group filed three circumvention petitions to expand the scope of existing antidumping and countervailing duty (AD/CVD) orders to include almost all crystalline silicon photovoltaic (CSPV) solar panels and cells imported from Malaysia, Vietnam, and Thailand. Expanded tariffs on products from these countries would threaten thousands of American solar jobs and seriously impede our ability to meet the nation's climate goals.

Commerce has broad discretion regarding circumvention petitions[1], and we believe this is particularly true when the Department is faced with serious procedural concerns. We ask that you carefully consider whether the anonymous petitions on solar imports represent an effort to misuse the circumvention statute to avoid a full and fair inquiry into whether CSPV cell and panel imports from Malaysia, Vietnam, and Thailand are actually subsidized or sold to the United States at less than fair value. As you know, the AD/CVD process requires petitioners to establish harm from imports during a full U.S. International Trade Commission (USITC) investigation and public hearing before the USITC Commissioners. This robust process affords interested parties the opportunity to contest petitioners' claims.

Although we are currently working to develop greater domestic solar manufacturing capacity, currently, U.S. demand for panels and cells far exceeds domestic production capacity. In the first half of 2021, imports from Malaysia, Thailand, and Vietnam accounted for 80% percent of all CSPV imports and 59% of total U.S. panel supply. New tariffs on solar products from these three

[1] 19 U.S.C. § 1677j(b)(1) provides that Commerce "may include such imported merchandise within the scope of such order" and includes a prerequisite that Commerce "determine that action is appropriate under [the anti-circumvention provision] to prevent evasion").

countries would stall many ongoing and planned U.S. solar projects, negatively impacting every segment of the U.S. solar industry and resulting in significant job losses. In particular, the tariffs would have direct impact on the almost ninety percent of solar jobs in the United States that are not in the manufacturing sector. The President's ambitious climate and solar deployment goals also would be put at serious risk given the Administration's focus on solar as a principal solution to addressing climate change.

Given the likely impact of these proposed tariffs and the procedural questions identified above, we ask that you give careful consideration to the validity of these petitions and whether it is appropriate to initiate a formal investigation in this matter.

Thank you in advance for your attention to these important issues.

Sincerely,

Jacky Rosen
United States Senator

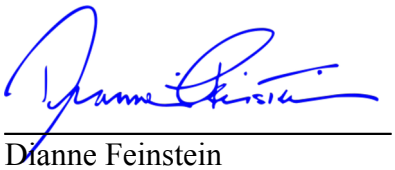
Thomas R. Carper
United States Senator

Angus S. King, Jr.
United States Senator

Michael F. Bennet
United States Senator

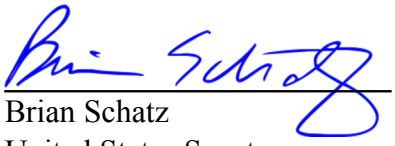
Martin Heinrich
United States Senator

Sheldon Whitehouse
United States Senator

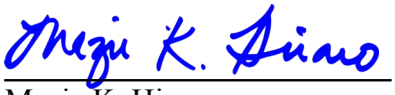


Dianne Feinstein
United States Senator

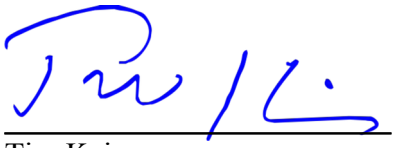
Jack Reed
United States Senator



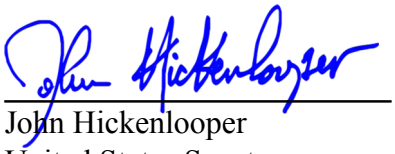
Brian Schatz
United States Senator



Mazie K. Hirono
United States Senator



Tim Kaine
United States Senator



John Hickenlooper
United States Senator

Attachment C

The Solar+ Decade &
American Renewable Energy Manufacturing

100 GW by 2030

September 2020

SEIA Solar Energy Industries Association®
www.seia.org

Introduction

SEIA has an ambitious goal – solar energy will constitute 20% of all U.S. electricity generation by 2030.[1] To reach this target, the massive growth the solar industry realized over the last decade will need to continue for the next decade. We will need to grow our industry an average rate of 18% annually and install more than 500 gigawatts ("GW") of solar projects by the end of 2030, including approximately 77 GW in 2030 alone. Achieving this goal will result in hundreds of thousands of new U.S. jobs, more than 14 million solar rooftops, and 500 million metric tons of avoided CO2 emissions. And although our industry has been slowed by the global pandemic, we still expect to meet the 20% by 2030 target.

To date, however, while the broader U.S. solar industry has and will continue to flourish, U.S. solar manufacturing has languished. It is time to seize the promise of American solar manufacturing. Consistent with the Solar+ Decade Roadmap's focus on aggressive collaboration, we must also ensure that the United States becomes a world leader in not only solar equipment but all renewable energy technologies, particularly including onshore and offshore wind and energy storage. In parallel with SEIA's goal of 20% solar energy by 2030, we are setting an additional Solar+ Decade target:

The Target

100 gigawatts of annual renewable energy manufacturing production capacity by the end of the Solar+ Decade[2]

This 100 GW target is designed to increase the United States' ability to supply not only domestic renewable energy projects but also export markets. The target also recognizes the benefits of an integrated global supply chain and an important role for imports. It is not intended to isolate U.S. renewable energy industries from the rest of the world, and we continue to recognize that tariffs are ineffective at incentivizing domestic manufacturing. In addition, the target takes into consideration the different growth potential and development stages for solar, wind, and energy storage manufacturing, with onshore wind being the most established to date.

Photo credit: PV Evolution Labs

[1] See *The Solar+ Decade 2020-2030: Roadmap for Building the Solar+ Economy*, available at https://www.seia.org/sites/default/files/2019-09/SEIA_Solar%2B_Decade_Roadmap_FINAL.pdf. Achieving this goal would put the U.S. within reach of achieving longer-term renewable energy goals such as 100% clean electricity by 2035.

[2] The Energy Storage Association has set a target of 100 GW of installed energy storage by 2030, see 100 x 30: Enabling the Clean Power Transformation, Energy Storage Association (August 2020), available at https://energystorage.org/wp/wp-content/uploads/2020/08/100x30-Empowering-Clean-Power-Transformation-ESA-Vision.pdf.

Solar Energy

The solar supply chain is diverse and starts with materials such as polysilicon, glass, polymers, steel, and aluminum. Primary finished components include solar panels, inverters, racking systems, and trackers, as well as solar thermal and concentrating solar power equipment and a host of other related products. In 2019, more than 35,000 Americans were employed in U.S. solar manufacturing facilities, most of which focus on the production of steel, racking systems, and trackers.[3] The United States currently has significant production capacity for polysilicon,[4] modest production capacity for solar panels,[5] encapsulants, backsheet, and inverters but no meaningful production capacity for ingots, wafers, cells, solar glass, machine tools, and many balance of system components. There is, thus, a tremendous opportunity to grow the U.S. solar manufacturing base across a broad category of products.

Wind Energy

In contrast to the U.S. solar manufacturing supply chain, the U.S. onshore wind industry has a relatively strong manufacturing base, though it also relies significantly on imports.[6] For wind projects recently installed in the United States, domestically-manufactured content is highest for nacelle assembly (>90%), towers (75-90%), and blades and hubs (50-70%), but is much lower (<20%) for most components internal to the nacelle.[7]

In addition, though still in its infancy relative to onshore wind, offshore wind equipment manufacturing provides significant growth potential.[8] Indeed, the U.S. offshore wind industry presents "a nearly $70 billion CAPEX opportunity in the offshore wind power supply chain over the next decade."[9]

[3] See *2019 National Solar Jobs Census*, The Solar Foundation, available at https://www.thesolarfoundation.org/national/

[4] There is approximately 70 kilotons of U.S. polysilicon capacity, sufficient for the production of more than 20 GW of solar modules annually.

[5] There is approximately 7 GW of U.S. solar panel assembly capacity. In contrast, annual U.S. solar panel consumption is expected to exceed 19 GW in 2020, an annual domestic solar panel supply shortfall of 12 GW, underscoring the importance of solar panel imports in the near-term.

[6] See 2018 Wind Technologies Market Report, U.S. Department of Energy, Office of Renewable Energy and Energy Efficiency ("*DOE Wind Technologies Report*"), p. 19, available at https://www.energy.gov/eere/wind/downloads/2018-wind-technologies-market-report. Wind turbine key components include blades, shafts, tower, gearbox, and generator, which together contain around 8,000 parts.

[7] Id

[8] See Stephanie A. McClellan, Ph.D., *Supply Chain Contracting Forecast for U.S. Offshore Wind Power*, Special Initiative on Offshore Wind, White Paper (March 2019) ("*Offshore Wind Power*"), p. 6, available at https://cpb-us-w2.wpmucdn.com/sites.udel.edu/dist/e/10028/files/2020/01/SIOW-White-Paper-Supply-Chain-Contracting-Forecast-for-US-Offshore-Wind-Power-FINAL.pdf; Julian Jackson, *How to Develop the U.S. Supply Chain* (March 9, 2020), available at https://www.offshorewind.biz/2020/03/09/how-to-develop-the-us-supply-chain/

[9] See *Offshore Wind Power*.

Energy Storage

Energy storage is a game-changer for increasing grid-scale renewable energy integration and penetration. Because storage has the ability to capture energy for discharge at a later time, it can provide capacity, energy voltage and frequency regulation, fast ramping services, and load shifting, and stack those services with high precision. Storage will become indispensable to all players in the electricity sector – from the network operators who can call on storage providers to ease congestion and avoid capacity curtailment, to end users, who can make better use of the electricity they generate by consuming or injecting it on the grid when demand peaks cause prices to surge. Energy storage technologies include batteries, thermal storage, mechanical energy storage, hydropower, and hydrogen. Today, lithium-ion batteries are the predominant technology on the market.[10] According to Wood Mackenzie, "more than 99 percent of storage capacity installed in the third quarter of 2019 used lithium-ion batteries."[11]

The United States has an established and growing battery manufacturing base, with several facilities in place, including Tesla's 20 GWh per year Gigafactory Nevada, the highest volume battery plant in the world.[12] Additional plants are announced or under construction.[13] Domestic cell manufacturing is growing as well.[14] However, the domestic availability of key metals for batteries, including nickel, manganese, and cobalt, is limited.[15] Further, the domestic availability of key metals for batteries, including nickel, manganese, and cobalt, is limited.[14] Growing the domestic supply chain for lithium-ion batteries should therefore also include investments in mining, processing, and manufacturing.

The U.S. Department of Energy ("DOE") has recognized both the importance and challenge of building a domestic energy storage supply chain in a highly-competitive global market. In response, earlier this year, DOE announced the Energy Storage Grand Challenge, which sets goals for the United States to reach by 2030, including: (i) a comprehensive R&D portfolio; (ii) robust technology transfer ecosystem; (iii) best in class data and analytics; (iv) manufacturing and supply chain focused on new technologies, recyclability, and energy independence; and (v) a strong energy storage workforce.[16]

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[10] Lithium-ion batteries can incorporate a variety of materials that affect the voltage, discharge rate, and lifespan. The exact composition and manufacturing process for lithium-ion batteries varies depending on the end-use. At its core, however, a lithium-ion battery is comprised of four components: positive electrode ("anode"), negative electrode ("cathode"), electrolyte, and separator. The cathode stores and releases the lithium ions while the anode collects the ions and determines the capacity and voltage of the battery. An electrolyte facilitates the movement of lithium ions from the cathode to the anode. And the separator keeps apart the anode and cathode.

[11] Julian Spector, *What Would It Take for the U.S. to Become an Energy Storage Manufacturing Powerhouse?*, available at https://www.greentechmedia.com/articles/read/can-the-us-claim-dominance-in-energy-storage-manufacturing

[12] See *Tesla Gigafactory*, available at https://www.tesla.com/gigafactory

[13] See, e.g., Eileen Abbott, *New Battery Plant Planned for U.S.* (March 31, 2020), available at https://thehill.com/changing-america/sustainability/energy/490368-new-battery-plant-planned-for-us

[14] See, e.g., Tesla 10-Q (April 22, 2020), at pages 53-54, available at https://ir.tesla.com/static-files/bbc6e137-897a-4543-857a-59c5c2dbeadc

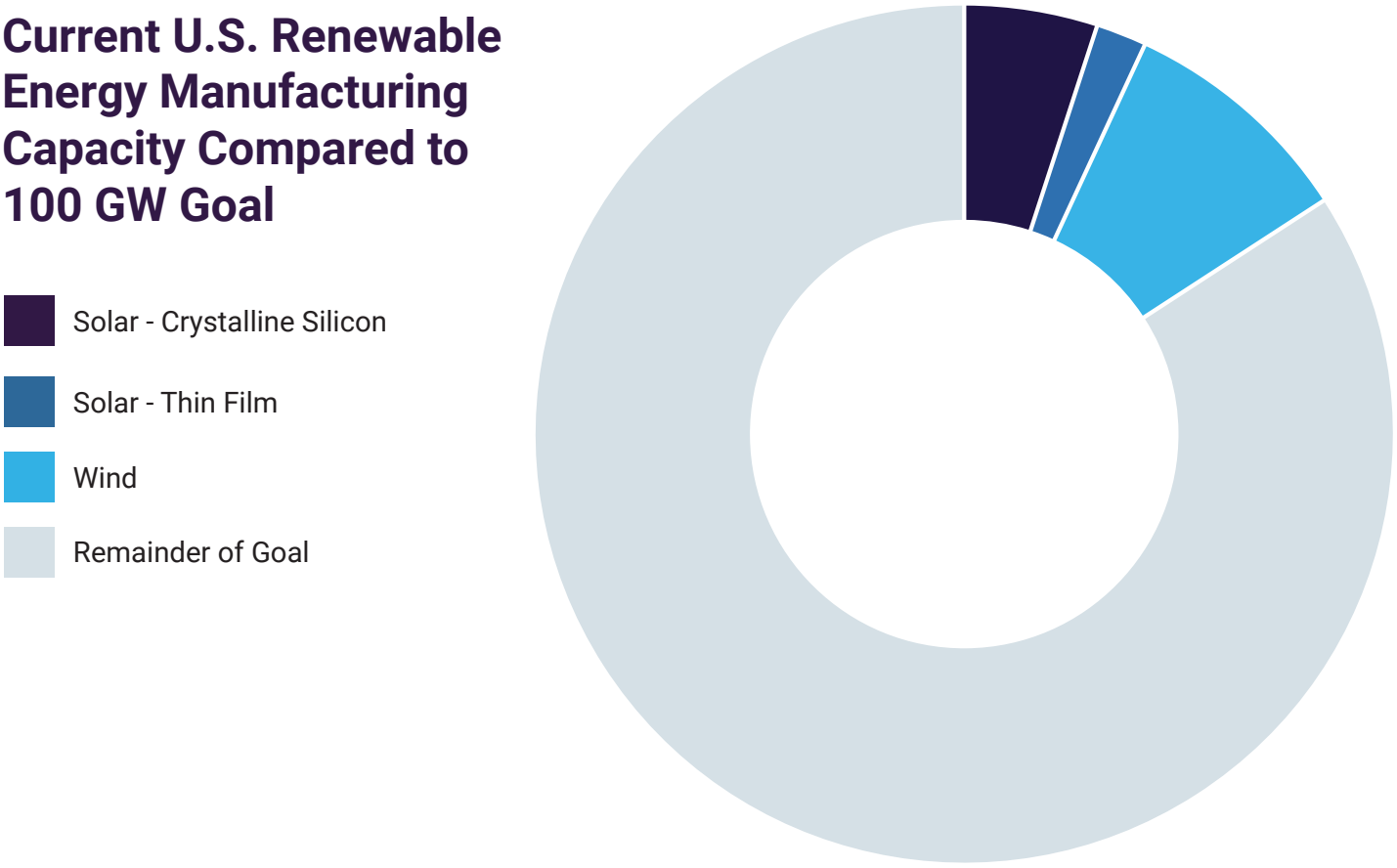
[15] See *Written Testimony of Simon Moores, Managing Director, Benchmark Mineral Intelligence*, available at https://www.energy.senate.gov/public/index.cfm/files/serve?File_id=9BAC3577-C7A4-4D6D-A5AA-33ACDB97C233

[16] See *U.S. Department of Energy Launches Energy Storage Grand Challenge*, U.S. Department of Energy (January 8, 2020), available at https://www.energy.gov/articles/us-department-energy-launches-energy-storage-grand-challenge. DOE also recently announced that it is "soliciting proposals from the National Laboratories and industry partners that pursue radical innovations for American battery manufacturing leadership." Energy Department to Fund National Laboratories to Establish Industry Partnerships for Battery Manufacturing Innovation, Office of Energy Efficiency & Renewable Energy, U.S. Department of Energy (June 18, 2020), available at https://content.govdelivery.com/accounts/USEERE/bulletins/29176bc. DOE indicates that it "will directly fund the National Laboratories to establish public-private partnerships that solve engineering challenges for advanced battery materials and devices, with a focus on de-risking, scaling, and accelerating adoption of new technologies." Id. And on August 24, 2020, DOE announced the selection of 13 projects for battery manufacturing innovation, see Energy Department Selects National Laboratories to Establish Industry Partnerships for Battery Manufacturing Innovation, Office of Energy Efficiency & Renewable Energy, U.S. Department of Energy (August 24, 2020) available at https://www.energy.gov/eere/articles/energy-department-selects-national-laboratories-establish-industry-partnerships.

Current U.S. Manufacturing Capacity

The United States needs to significantly expand its manufacturing investments to reach 100 GW of renewable manufacturing capacity. As of June 2020, U.S. polysilicon capacity exceeds 20 GW, but there is no active domestic production of ingots, wafers, or cells. The U.S. can assemble approximately 7 GW of solar panels per year, enough to meet roughly one-third of U.S. market demands today, though over half of that capacity came online in 2019.[17] Significant investment will be required across the supply chain in order to reach our 2030 target and ensure global competitiveness. Wind manufacturing capacities stand at 15 GW for nacelles, 9.2 GW for blades, and 8.9 GW for towers as of 2018.[18] And U.S. factories have recently made less than 2 GWh/year of lithium ion batteries for energy storage, though this number is expected to increase significantly in the near term.[19]

Current U.S. Renewable Energy Manufacturing Capacity Compared to 100 GW Goal



[17] First Solar, Hanwha Q CELLS, JinkoSolar, and LG opened module assembly facilities with a combined capacity of more than 4 GW.

[18] See *DOE 2018 Wind Technologies Market Report*, U.S. Department of Energy, Office of Renewable Energy and Energy Efficiency, p. viii, available at https://www.energy.gov/eere/wind/downloads/2018-wind-technologies-market-report

[19] Most of the energy storage manufactured in the U.S. is for electric vehicles. For example, Tesla's Gigawatt factory can manufacture up to 35 GWh per year, but the company only deployed 1.65 GWh for energy projects in 2019. See Tesla's 2019 SEC 10-K report, available at https://ir.tesla.com/node/20456/html

U.S. Renewable Energy Manufacturing & Economic Recovery

The COVID-19 crisis will have a lasting impact on the U.S. economy. But the crisis also presents opportunities for renewal and growth—to rebuild better. American renewable energy industries, and solar in particular, will help lead U.S. economic recovery given their unique ability to create high-paying jobs quickly and competitively.[20] As we move forward, however, we must ensure that the promise of American renewable energy manufacturing is not overlooked.

There are multiple benefits to growing domestic renewable energy manufacturing, including jobs, economic development, and promoting the United States' leadership in advanced technologies and innovation, as well as high-quality standards and conformity assessment programs. While manufacturing results in fewer direct jobs than the services sector, it has the highest jobs multiplier effect of any sector of the U.S. economy. "For every $1.00 spent in manufacturing, another $2.74 is added to the economy."[21] In addition, for "every one worker in manufacturing, there are another five employees hired elsewhere."[22]

Manufacturing investment also presents an opportunity for cost reduction. With some of the best research laboratories in the world, it will be essential to leverage existing U.S. R&D resources to advance these technologies. For example, National Laboratories offer testing facilities, technology transfer, and in-house experts to help manufacturers improve and commercialize their products. The United States must also continue to leverage its broader technology and innovation ecosystem, including regional and local incubators and the venture capital investment community.

A strong U.S. renewable energy manufacturing base and export competitiveness can also enable the United States to support its friends' and allies' development needs. Access to affordable, reliable electricity is key for improving health and economic development in developing nations.[23] In fact, the World Bank has recognized that renewable energy technologies "offer tremendous opportunity to deliver more service with a lower energy investment" to developing nations.[24]

Energy Security

Renewable energy industries will play an increasingly important role in ensuring U.S. energy independence and national security. Indeed, the U.S. Department of Homeland Security recently made clear that solar, wind, and energy storage are part of the nation's critical infrastructure.[25] And as demonstrated during the COVID-19 pandemic, it is important that the U.S. have a robust and resilient domestic supply chain for critical infrastructure equipment.

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[20] See Sonia Aggarwal and Mike O'Boyle, *Rewiring the U.S. for Economic Recovery ("Rewiring the U.S. for Economic Recovery")*, Energy Innovation Policy and Technology LLC (June 2020), available at https://energyinnovation.org/wp-content/uploads/2020/06/90-Clean-By-2035-Policy-Memo.pdf

[21] National Association of Manufacturers (NAM calculations using 2018 IMPLAN data), available at https://www.nam.org/facts-about-manufacturing/

[22] Id

[23] *Access to Energy is at the Heart of Development*, World Bank (April 18, 2018), available at https://www.worldbank.org/en/news/feature/2018/04/18/access-energy-sustainable-development-goal-7

[24] Id

[25] CISA Guidance on Essential Critical Infrastructure Workers, ver. 3.1, Cybersecurity & Infrastructure Security Agency, U.S. Department of Homeland Security (May 19, 2020), available at https://www.cisa.gov/sites/default/files/publications/Version_3.1_CISA_Guidance_on_Essential_

While U.S. renewable energy industries currently employ hundreds of thousands of Americans, the past decade has exposed the challenges U.S. manufacturers face from intense global competition and foreign government intervention in export markets. For example, U.S. polysilicon manufacturers face an existential crisis because there are no domestic customers for their products, i.e., ingot or wafer manufacturers, and U.S. polysilicon companies are effectively barred from selling into China, where nearly all ingot manufacturers are currently located. In contrast, in the absence of competition from the United States, Chinese polysilicon manufacturers greatly expanded their production capacity with the support of the Chinese government, thereby significantly improving their global competitiveness.

As solar and its sister industries increasingly become part of the backbone of the American economy, it is essential to the nation's continued economic health, global competitiveness, and energy security that we are not overly reliant on imports. We must put into place long-term incentives for supporting the growth of U.S. renewable energy manufacturing and encourage both U.S. and foreign manufacturers to invest in U.S. production capacity.

Carbon Reduction

Climate change is one of the defining issues of our time. We are entering a confluence of circumstances where climatic events that cause significant damages are influencing public opinion. These changing dynamics are leading to a greater emphasis on clean energy as a solution for reducing carbon emissions. As renewable, carbon-free resources, solar, wind, and energy storage are certainly part of any market or policy solution to address climate change.

Accounting for the cost of carbon in electricity generation provides an opportunity to enhance and accelerate renewable energy markets. The sooner we see carbon policies in place, the faster we pull forward renewable energy investment and deployment opportunities for the next decade. In this context, expanding U.S. renewable energy manufacturing will also help lower the carbon footprint of renewable energy equipment given shortened supply chains and the United States' cleaner energy mix relative to competing countries.

Federal Investments

As noted above, there are multiple benefits to growing U.S. renewable energy manufacturing, including the expansion of jobs, increased economic development, and helping to ensure the United States continues to be a technology leader. Renewable energy manufacturing, however, is an intensely competitive sector globally and overseas manufacturers are often aided by significant support from local and national governments, including direct subsidies and low-cost loans. If we hope to compete in this environment, the U.S. government must also invest in its manufacturers.

Federal investments must focus, first and foremost, on leveraging private sector investments. For example, the DOE Loan Programs Office's "estimated $39 billion loan and loan guarantee authority could leverage as much as $100 billion of private investments in innovative approaches to modernizing energy infrastructures across all energy sectors."[26] Federal investments must also be long-term in nature, in this case, over the course of a decade. In addition, these investments must include both supply and demand incentives. Indeed, without sufficient supply and demand certainty for domestic products, investment in manufacturing becomes too risky for investors in such a globally-competitive environment. As we have seen over the past decade, one without the other cannot sustain a strong U.S. renewable energy manufacturing base in the face intense global competition.

[26] *Rewiring the U.S. for Economic Recovery*, Energy Innovation Policy and Technology LLC (June 2020), available at https://energyinnovation.org/wp-content/uploads/2020/06/90-Clean-By-2035-Policy-Memo.pdf

To help further the discussion on incentivizing long-term investments in American renewable energy manufacturing capacity, we offer the following proposals:

Step change increase in renewable energy R&D funding
DOE's 17 National Laboratories are powerhouses of science and technology whose researchers tackle some of the world's toughest challenges. Significantly increased funding for these national institutions is necessary for regaining our overall renewable energy manufacturing edge and maintaining U.S. innovation leadership.

Long-term federal tax policies to support projects utilizing U.S.-manufactured equipment, materials, or components
This would both incentivize purchases of U.S. equipment while also offering long-term certainty to manufacturers.

Refundable tax credit for investments in U.S. manufacturing facilities
Tax credits are typically non-refundable and only useful to those with sufficient tax liability. Many manufacturers, especially new companies, may not have enough taxable income to utilize such a credit. This was one lesson from the Section 48C manufacturing tax credit program.

Loan guarantees
For every dollar loaned through the DOE's loan guarantee program, $2.50 of private investment went to the borrower. Loan guarantees effectively de-risk a project and increase investor comfort to finance burgeoning industries.

Low interest loans
In the private sector, low interest loans typically go to large businesses with high credit and an established relationship with the lender. This is one reason why the U.S. Small Business Administration ("SBA") had to set up a program to help small businesses access affordable loans under $5.5 million. Manufacturers, however, require much larger loans to achieve sufficient scale to effectively compete. Congress should establish a renewable energy version of the SBA's program that offers loans of up to $100 million.

Forgivable loans tied to job creation
This model was recently adopted in response to the COVID-19 crisis and has been effective for many companies.

Creation of a federal renewable energy bank
The availability of low-cost financing is a critical factor for achieving cost-competitive renewable energy manufacturing. A federal renewable energy bank would help secure low-cost capital for renewable energy manufacturers at favorable rates and terms.

Significantly expanded prize competitions, including grants and national lab use certificates
These prizes can significantly defray R&D expenses. Prizes could also take the form of favorable treatment in government procurement contracts.

Export loan guarantees competitive with foreign governments programs
U.S. exporters are increasingly at a disadvantage when competing with foreign suppliers given relatively generous foreign government export assistance programs.

Establish a rebate program for U.S. renewable energy equipment production

The intent here is to improve U.S. manufacturing competitiveness and incentivize demand for domestic solar producers. This program could also be tied to minimum efficiency and/or quality standards.

Help transition fossil fuel workers to solar

Establish a solar manufacturing specific program under the Economic Development Administration's Public Works Program. directed toward the loss of jobs in fossil fuel communities and/or opportunity zones.[27]

Direct the Department of Commerce to develop a National Renewable Energy Manufacturing Strategy

The roadmap would include industry specific chapters including solar, wind, and energy storage, as well as specific manufacturing targets for each segment.

SEIA's target of 100 GW of annual renewable energy manufacturing capacity by 2030 is not about picking winners or losers or favoring domestic products over imports. Rather, it is a recognition that a strong renewable energy manufacturing base is good for America's economic well-being – it supports the long-term health and safety of our country by enabling us to build critical infrastructure here at home.

[27] See e.g., *Assistance for Coal Communities (ACC)*, U.S. Economic Development Agency, U.S. Department of Commerce, available at https://www.eda.gov/coal/

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The Solar Energy Industries Association® (SEIA) is leading the transformation to a clean energy economy, creating the framework for solar to achieve 20% of U.S. electricity generation by 2030. SEIA works with its 1,000 member companies and other strategic partners to fight for policies that create jobs in every community and shape fair market rules that promote competition and the growth of reliable, low-cost solar power. Founded in 1974, SEIA is a national trade association building a comprehensive vision for the Solar+ Decade through research, education and advocacy.

SEIA Solar Energy Industries Association®

Attachment D

Sen. Ossoff Introduces Legislation to Rapidly Boost American Solar Manufacturing

June 21, 2021

Sen. Ossoff's "Solar Energy Manufacturing for America Act" will create new tax credits to rapidly boost American solar manufacturing, accelerate the transition to clean energy, and support American energy independence

Legislation would create tens of thousands of American jobs

Georgia hosts largest solar manufacturer in Western Hemisphere

Sen. Ossoff continues to lead on clean energy, pushing for ***generational*** **(https://www.ossoff.senate.gov/press-releases/sen-ossoff-on-infrastructure-clean-energy-investment-it-is-our-generational-obligation/)** *investment*

Co-sponsored by Senators Warnock, Bennet, Stabenow

Washington, D.C. — Today, U.S. Senator Jon Ossoff introduced the *Solar Energy Manufacturing for America Act* to rapidly boost American solar manufacturing, accelerate the transition to clean energy, and support American energy independence. Sen. Ossoff has focused on making Georgia a national leader in clean energy technology and the United States the world leader in clean energy.

The legislation is co-sponsored by Senators Reverend Raphael Warnock (D-GA), Michael Bennet (D-CO), and Debbie Stabenow (D-MI).

Demand for solar energy is skyrocketing as the world transitions away from fossil fuels, but China dominates the solar supply chain. Sen. Ossoff's legislation will boost American solar to create American clean energy jobs, better compete with Chinese manufacturers, and support American energy independence.

The *Solar Energy Manufacturing for America Act* would provide tax credits for American manufacturers at every stage of the solar manufacturing supply chain, from production of polysilicon to solar cells to fully assembled solar modules.

Sen. Ossoff's office projects the legislation would create tens of thousands of American solar jobs, based on **analysis and estimates (https://www.nrel.gov/docs/fy21osti/79758.pdf)** from the National Renewable Energy Laboratory (NREL).

The Q CELLS plant in Dalton, Georgia, which produces solar panels and arrays, is the largest solar manufacturing facility in the Western Hemisphere.

"I'm working to boost American solar manufacturing and accelerate the transition to clean energy," **Sen. Ossoff said.** "This bill will create tens of thousands of American jobs, support

energy, **Sen. Ossoff said.** "This bill will create tens of thousands of American jobs, support American energy independence, and accelerate the transition from fossil fuels to clean energy."

"This is exactly the kind of policy the United States needs to scale the solar manufacturing sector and compete on the world stage. This proposal would create tens of thousands of good-paying manufacturing jobs across America in places like our home of Dalton, Georgia," **said Scott Moskowitz, Director of Market Intelligence and Public Affairs at Hanwha Q CELLS North America.** "Further, the *Solar Energy Manufacturing for America Act* will help to diversify the entire solar supply chain, increasing the United States' energy security while allowing us to competitively meet domestic and global solar energy demand. Solar is the future and Senators Ossoff, Warnock, Stabenow and Bennet are paving the way to help make Georgia and the United States a world leader in clean energy manufacturing. We look forward to working with him to turn this into law."

"I am proud to join my brother Senator Ossoff in co-sponsoring this important legislation that will bring good-paying jobs to Georgia, and help position our state to become a global leader in solar and clean energy technology," **said Senator Reverend Raphael Warnock**. "By creating tax incentives for every step of the solar manufacturing supply chain, we can pave the way for a greener tomorrow while lowering manufacturing costs and creating clean energy jobs. Georgia can help tackle the climate crisis head on, and I look forward to working with Senator Ossoff to make this bill law."

"Colorado has led the way on solar power, demonstrating the clear economic benefits of investing in this industry," **said Sen. Bennet.** "To compete on the global stage with countries like China, we should ensure long-term growth of America's solar industry by supporting domestic solar manufacturing at every stage. This legislation is one of our best opportunities to create good-paying jobs, improve our infrastructure, and secure our supply chain all while tackling climate change. I look forward to working with my colleagues to get this done."

"Too much of our current solar power manufacturing is overseas. This makes no sense when we have some of the best workers in the world that can compete with anyone," **said Senator Stabenow**. "Our bill doubles down on American-made solar products and their components so more of them are made here, while also helping us to address the climate crisis. It's a win-win for Michigan."

"As a Georgia-based solar energy company, we are thrilled to support Senator Ossoff's forward-thinking legislation to boost domestic manufacturing of solar technology," **said Stan Allen, CEO of SolAmerica Energy**. "It's critically important for us as a nation to move toward clean energy solutions to protect our environment and create good-paying jobs, and Georgia is perfectly positioned to take advantage of solar as an energy source. We look forward to working with Senator Ossoff to pass this bill and help install solar energy across Georgia and the entire country."

"We strongly support Senator Ossoff's manufacturing proposal and commend his leadership on this critical topic," **said Abigail Ross Hopper, president and CEO of the Solar Energy Industries Association (SEIA)**. "This legislation is an important step for spurring domestic manufacturing across all key elements of the solar supply chain and we look forward to helping it advance through Congress. In support of Senator Ossoff's proposal, we are today setting a target of 50 gigawatts of annual domestic solar production capacity by 2030, including polysilicon, wafers, cells and modules, racking and trackers and inverters. It is time to seize the promise of American solar manufacturing."

The bill is supported by Q-CELLS America, Hemlock Semiconductors, LG Electronics USA, REC Silicon ASA, Wacker Polysilicon North America, Sunpreme Energy International Inc., First

REC Silicon ASA, Wacker Polysilicon North America, Sunnova Energy International Inc., First Solar, Mission Solar, Leading Edge Equipment Technologies, Auxin Solar, Swift Solar, 1366 Technologies, Silfab Solar, Heliene, and the Ultra Low Carbon Solar Alliance.

Click here (http://www.ossoff.senate.gov/wp-content/uploads/2021/06/21.06.21_SEMA.pdf) to read the *Solar Energy Manufacturing for America Act*.

Click here (http://www.ossoff.senate.gov/wp-content/uploads/2021/06/21.06.21_Solar-bill-one-pager-3.pdf) for a fact sheet on the *Solar Energy Manufacturing for America Act*.

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Attachment E

SEIA Calls for Ten-fold Increase in American Solar Manufacturing Capacity – 50GW by 2030

Monday, Jun 21 2021

Press Release

WASHINGTON, D.C. — **Following is a statement by Abigail Ross Hopper, president and CEO of the Solar Energy Industries Association (SEIA), in support of Senator Jon Ossoff's proposal for an advanced solar manufacturing production credit:**

"We greatly appreciate Senator Ossoff's leadership and support for domestic manufacturing. While the broader U.S. solar industry continues to flourish, America's solar manufacturing sector has languished. Senator Ossoff's proposal recognizes this reality. Now is the time to seize the promise of American solar manufacturing.

"Solar energy manufacturing is intensely competitive globally, and overseas manufacturers are often aided by significant support from local and national governments through a variety of public investments. If we want to compete in this environment, the U.S. government must also invest in its manufacturers across the entire supply chain, and these investments must be long-term and multi-faceted. Companies need a suite of pro-manufacturing policy options

designed to provide demand certainty, incentivize investments in production capacity and support ongoing factory production. Senator Ossoff's proposal will create a production-linked tax credit for the solar industry, which will be critical to our long-term success.

"Today, in support of Senator's Ossoff's proposal and our aim to reach 100 GW of annual renewable energy manufacturing capacity, we are setting a solar-specific target of 50 gigawatts of annual domestic production capacity by 2030. This aggressive goal would create American solar manufacturing capacity equal to over 150% of the 19.2 gigawatts of solar deployed in 2020 and covers all key elements of a solar energy system, including polysilicon, ingots and wafers, cells and modules, racking and trackers and inverters.

"The United States doesn't need to produce every solar component installed domestically, but we do need to fill critical gaps in our supply chain and dramatically expand domestic production capacity. The long-term health of our industry depends upon it."

###

About SEIA®:

The Solar Energy Industries Association® (SEIA) is leading the transformation to a clean energy economy, creating the framework for solar to achieve 20% of U.S. electricity generation by 2030. SEIA works with its 1,000 member companies and other strategic partners to fight for policies that create jobs in every community and shape fair market rules that promote competition and the growth of reliable, low-cost solar power. Founded in 1974, SEIA is the national trade association for the solar and solar + storage industries, building a comprehensive vision for the Solar+ Decade through research, education and

advocacy. Visit SEIA online at www.seia.org and follow @SEIA on Twitter, LinkedIn and Instagram.

Media Contact:

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Tags

Manufacturing Solar Manufacturing Incentives Federal Policy

Related News

Tuesday, Aug 17, 2021

Solar Industry Comment on White House Call for Solar Investments

WASHINGTON, D.C. — Today President Biden and the U.S. Department of Energy released an Issue Brief on solar energy research, deployment and workforce priorities. The report details a number of priorities that are important to the solar industry.

Monday, Aug 02, 2021

American Climate Leadership: A Long-Term Commitment to Clean Energy

If Congress prioritizes smart, long-term solar policies, we can tackle the climate crisis and ensure a bright future for generations of Americans to come.

Tuesday, Jul 20, 2021

Supply Chain Woes Call Attention to Solar Manufacturing Possibilities

The U.S. solar industry achieved a critical milestone this year, surpassing 100 gigawatts (GW) of installed electric generating capacity. While the industry continues to experience tremendous growth, rising costs in the solar sector pose a major threat to this momentum. Fortunately, there are smart policy solutions, like investments in domestic manufacturing

manufacturing, that can help.

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Attachment F

An analysis of the impact of PV module pricing on demand for PV in the United States

27 September 2017

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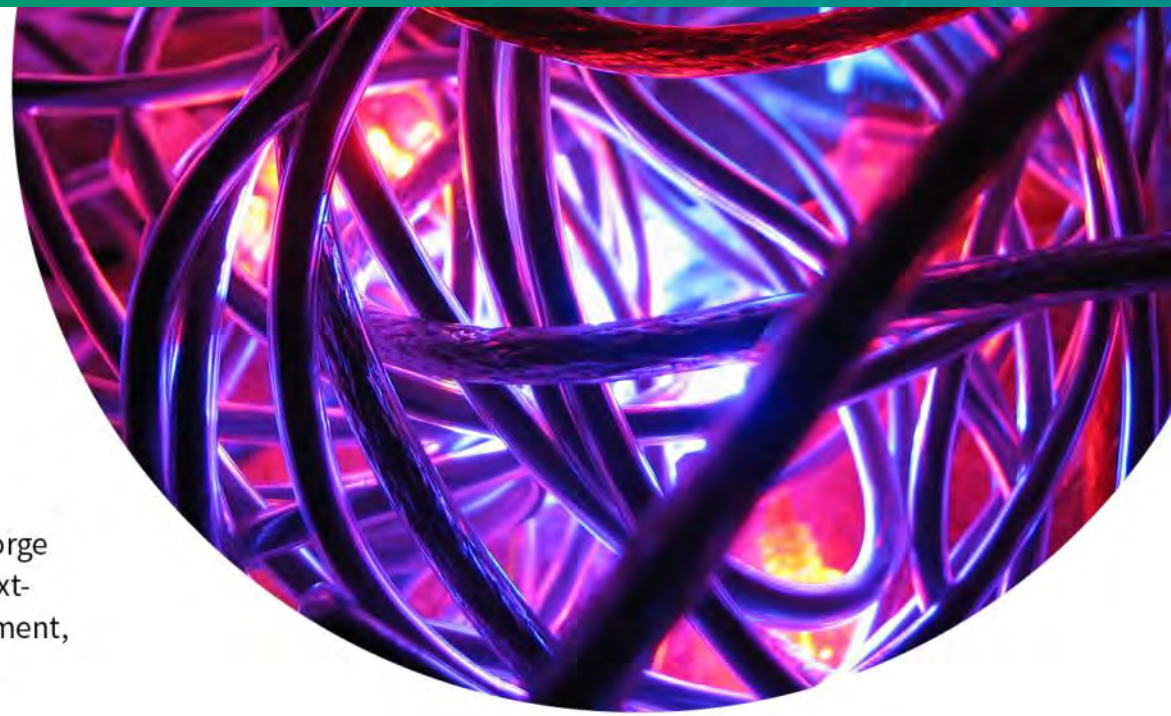

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We are the leading source of information, insight and analytics in critical areas that shape today's technology ecosystem—from materials and components, to devices and equipment, to end markets and consumers.

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Methodology

Note: all data included in this analysis refers to the market in terms of MW-DC installations (e.g. the volume of PV modules installed, not inverters).

Methodology for reference case scenario

- The IHS Markit solar analyst team comprehensively researches all parts of the solar supply chain and industry. Hundreds of interviews with key industry personnel from all regions and areas of the supply chain are carried out on ongoing basis and real primary shipment data is collected from suppliers every quarter. This is combined with an ongoing survey and analysis of major system integrators in all significant solar markets.
- Publicly released financial and operational data and consolidated sales data from hundreds of solar suppliers is supplemented by the collecting and analyzing of a huge range of relevant secondary information (e.g. utility and government releases) using IHS Markit's expert internal analysts and hours of interviews (many face-to-face).
- IHS Markit collects detailed shipment information from all leading inverter suppliers each quarter. The close correlation between inverter shipments and installations (compared to module shipments) and the variation of inverter types between different sizes and types of installation enables the use of this valuable dataset for cross-checking and modelling of market sizes by system type.
- Future market sizes are modelled based on assumptions regarding introductions and amendments to incentive schemes, price reductions/increases of components, and other information gathered during interviews.
- IHS Markit employs an iterative combination of demand and supply analysis to create the supply chain forecast. Derived demand as it cascades through the supply chain nodes is combined with supply/capacity analysis, and an assessment of costs, prices, and competitiveness.
- IHS Markit consolidates all of this research to provide detailed data and forecasts for the entire solar supply chain from upstream trends to downstream installation activity.

Methodology for alternative scenarios

- Based on developing trade policy that could be implemented in 2018, IHS Markit has modeled the impact various PV module price increases ($0.10/W, $0.20/W, $0.30/W, and $0.40/W) could have on PV deployments in the US market, based on the relative change in attractiveness within each state market compared to the reference case (No Tariff) scenario. The reference case scenario is based on the Q2 2017 edition of IHS Markit Technology's North America Solar Market Tracker, published in June.
- In order to perform this analysis, IHS Markit modeled US PV system prices on a state-by-state basis and analyzed the attractiveness of the resulting levelized cost of energy (LCOE) for PV in each state. State market drivers such as renewable portfolio standards (RPS), incentives, net metering, and economic competitiveness were considered.
- Note that the model does not account for how the timing of project development might shift in response to significant policy deadlines. For example, a rush to complete systems prior to a policy deadline may shift demand from one year to an earlier year in a given scenario, but the overall deployment numbers are expected to remain the same during the forecast period.

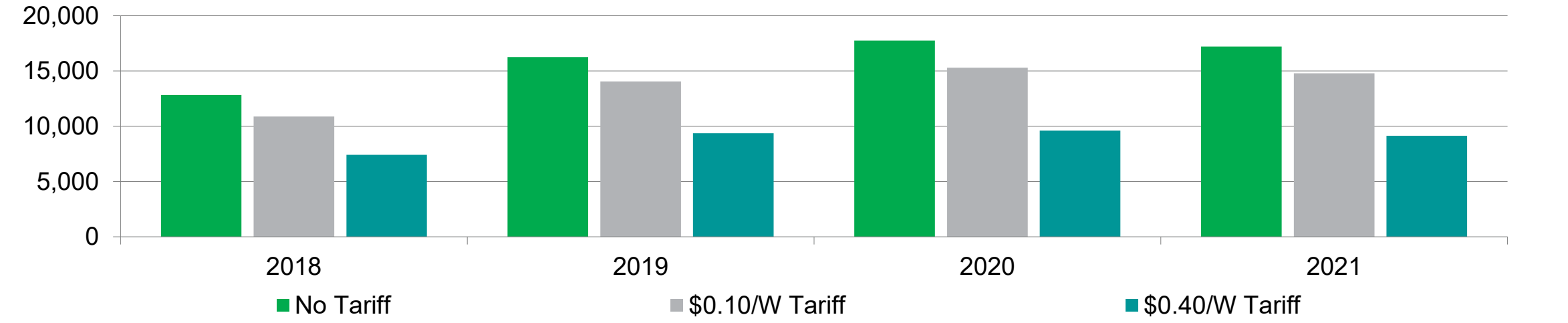
Summary of key US PV market deployment forecast scenarios

USA PV market deployment scenarios

Scenario	GWdc Installed (2018 – 2021)	Reduction vs Reference Case (MW / %)
Reference case	64 GW	N/A
Tariff scenario (plus $0.10/W)	55 GW	- 9,066 MW / 14%
Tariff scenario (plus $0.40/W)	36 GW	- 28,550 MW / 45%

Source: IHS Markit

Annual PV deployment scenarios in the United States (MWdc)



Source: IHS Markit

Under IHS Markit's reference case scenario, the US PV market is forecast to install 64 GW of PV from 2018 to 2021

IHS Markit's reference case originates from the Q2 2017 edition of IHS Markit Technology's North America Solar Market Tracker forecast from June

After breaking all previous records by installing nearly 16 GW of PV in 2016, IHS Markit forecasts the US PV market will decline by 26% in 2017 to install 11.8 GW

- Core markets such as California, North Carolina, and Nevada are expected to drive demand for utility-scale PV (even though they will slow down in 2017) in addition to demand from emerging markets such as Texas and Florida. The US utility-scale PV market is forecast to decline by 40%, installing 6.9 GWdc.
- Notably, the late extension of the Federal investment tax credit (ITC) at the end of 2015 led to the advanced development and deployment of utility-scale PV capacity in 2016 that would have otherwise been deployed in 2017 or later, which is a primary driver of lower demand in 2017.

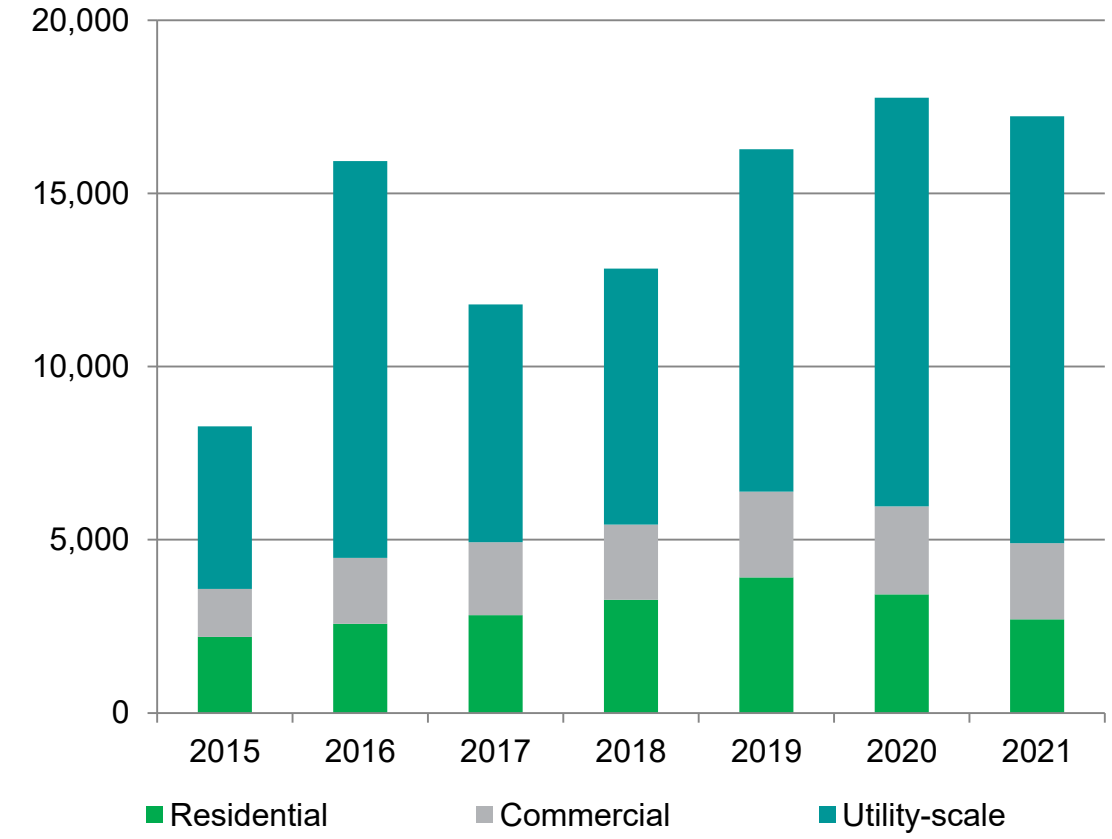
IHS Markit forecasts the US market will grow by 9% in 2018 to reach 12.8 GWdc

- Growth is largely expected to stem from the distributed residential and small to medium commercial segments while the utility-scale PV segment is forecast to experience limited growth. Significant upside exists as utility-scale project origination continues to mature and supply chain uncertainty incentivizes developers and investors to pull projects forward into 2018.

From 2019 to 2021, IHS Markit forecasts the US market will install 51.3 GWdc of PV, increasingly dominated by demand for utility-scale PV

- 2019 is forecast to be a significant growth year across all market segments, as utility procurement, corporate and public RFPs, RPS demand, and the ITC stepdown converge to generate significant demand in the US market.
- 2019 is also forecast to be a peak year for residential and commercial PV demand, as the reduced value of the ITC and further net metering and rate-design changes hit core distributed markets from 2020.

Annual PV installations in the United States – reference case (MW)



Source: IHS Markit

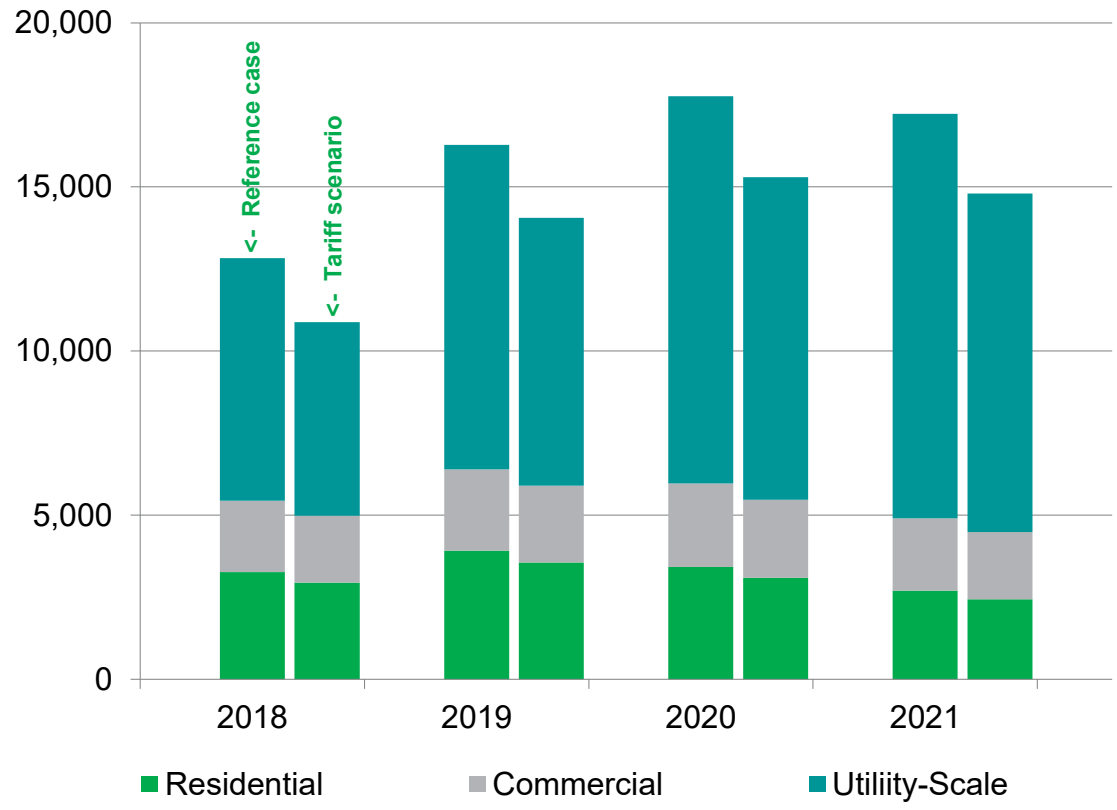
Under the $0.10/W tariff scenario, the United States is forecast to install 9 GW less than the reference case

Modeling the reduced attractiveness of residential, commercial, and utility-scale PV in each state under the tariff scenario (a $0.10/W module price increase) results in a 9 GW reduction to the forecast for PV deployments from 2018 to 2021 - a 14% reduction.

- The reduction primarily stems from the utility-scale segment and markets that lack supportive government mandates or incentives to deploy PV or other renewables. Specifically, the utility-scale deployment projection during the period has been reduced by 17%. IHS Markit predicts demand will be lower for utility-scale PV outside of policy mandated programs, such as voluntary utility and corporate deployments, primarily due to the reduced economic competitiveness of the technology in several key markets.
- The impact on residential and commercial segments is projected to be softer, primarily because the effective module price does not represent as much of the total system price compared to utility-scale systems. Still, the projections for the segments have been reduced by 10% and 6% respectively from 2018 to 2021. Demand for rooftop PV will be impacted, but the economic competitiveness of residential and commercial PV is projected to remain relatively attractive for customers in many markets during the time period under the scenario.

Under the tariff scenario, IHS Markit forecasts the United States will install 34 GW of utility-scale PV and 21 GW of distributed residential and commercial PV.

Annual PV installations in the United States – reference case vs. $0.10/W tariff scenario by system type (MW)



Source: IHS Markit

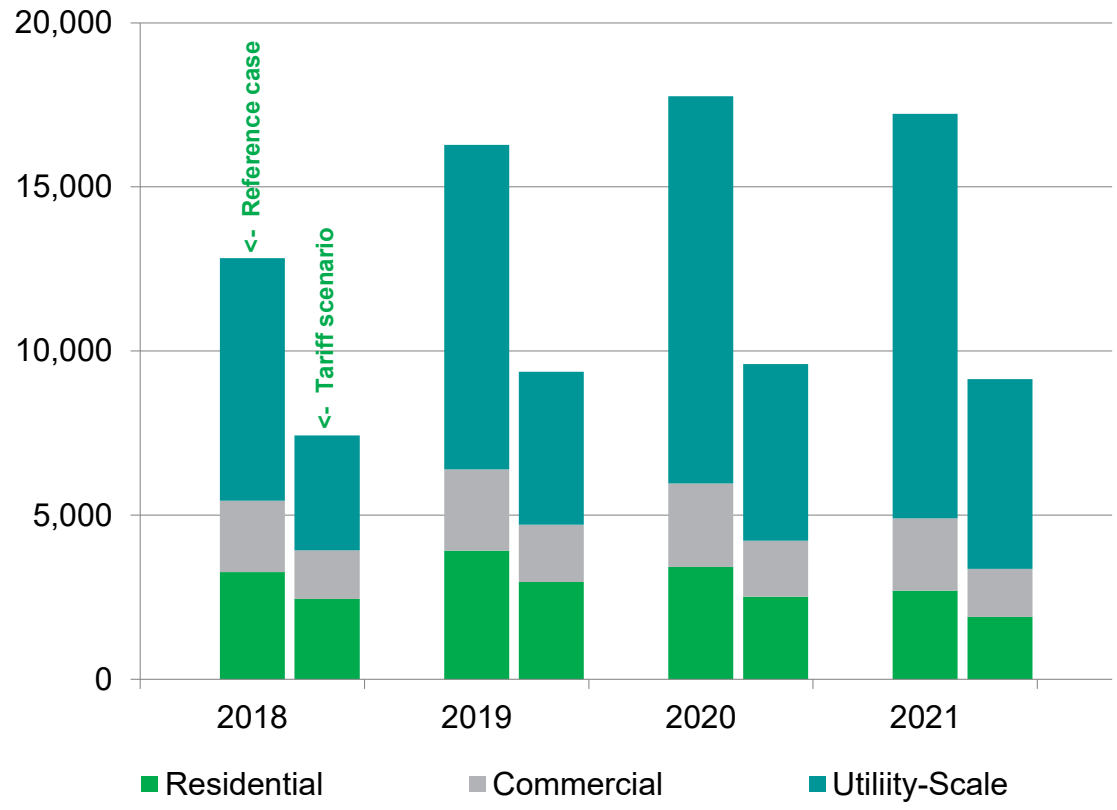
Under the $0.40/W tariff scenario, the United States is forecast to install 29 GW less than the reference case

Modeling the reduced attractiveness of residential, commercial, and utility-scale PV in each state under the tariff scenario (a $0.40/W module price increase) results in a 29 GW reduction to the forecast for PV deployments from 2018 to 2021 - a 45% reduction.

- Similar to the $0.10/W scenario, the utility-scale segment is projected to experience the majority of the impact, particularly in markets that lack supportive government mandates or incentives to deploy PV or other renewables. Specifically, the utility-scale deployment projection during the period has been reduced by 53% compared to the reference case. Major utility-scale growth markets such as Florida, Texas, and Georgia are projected to experience much of the impact due to the reliance on economic competitiveness in such markets. Many projects that were planned under previous price forecasts during the time period prior to the introduction of new tariffs are at risk of being terminated.
- Also similar to the $0.10/W scenario, the impact on the residential and commercial segments is projected to be softer compared to the utility-scale segment, but projections for the segments have been significantly reduced by 26% and 32% respectively from 2018 to 2021 to account for lower demand that would be caused by PV module price increases. Because state and local incentives for rooftop installations have decreased significantly over the last few years as the cost of PV has fallen, significant module price increases are projected to reduce demand for both residential and commercial PV in many markets as customers are not likely to consider the required investment to install PV to be attractive during the period. Specifically, many emerging markets that were likely to grow from 2018 to 2021 under the reference case price forecast are not likely to become economically viable during the period.

Under the tariff scenario, IHS Markit forecasts the United States will install 19 GW of utility-scale PV and 16 GW of distributed residential and commercial PV.

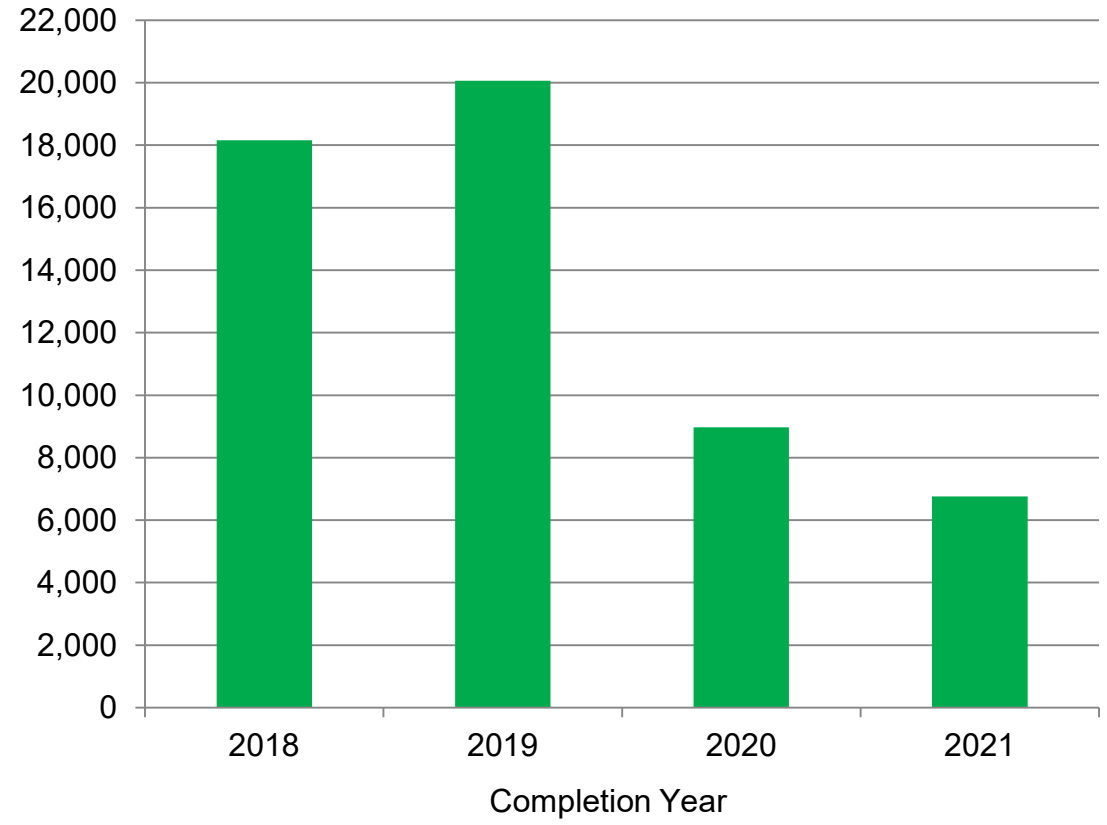
Annual PV installations in the United States – reference case vs. $0.40/W tariff scenario by system type (MW)



Source: IHS Markit

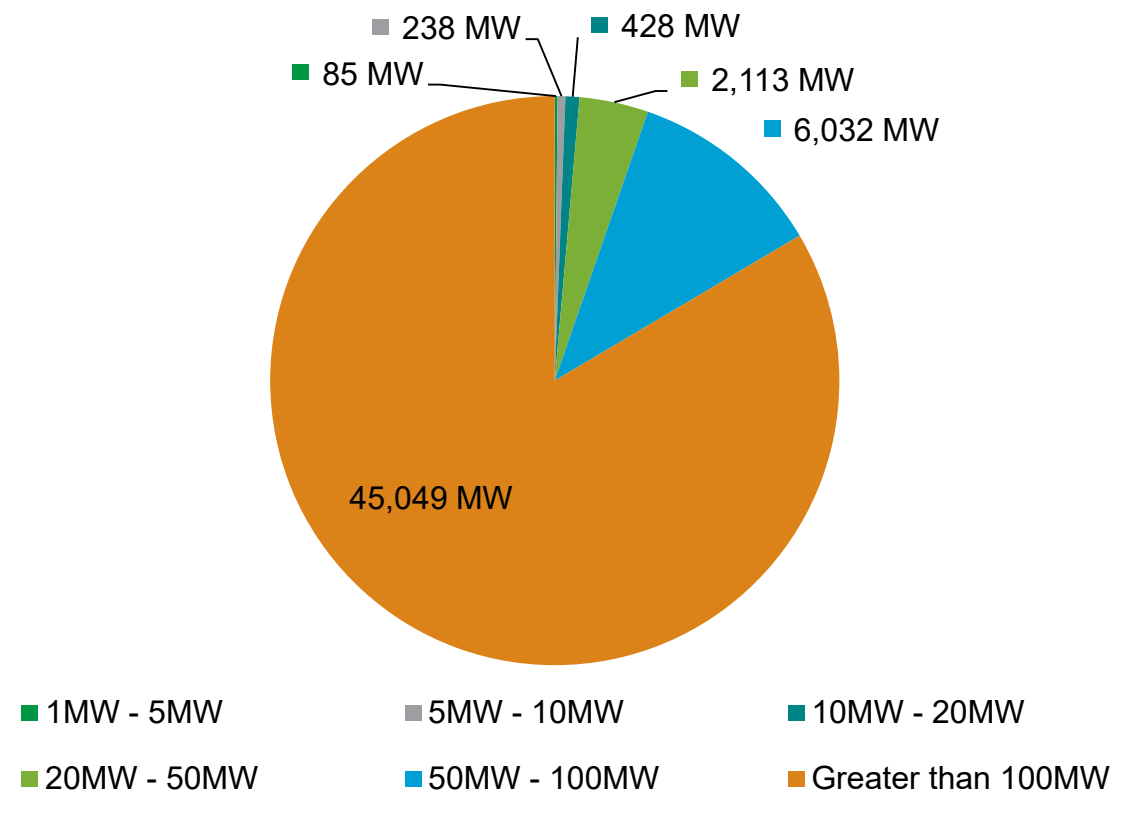
54 GW of PV projects under development from 2018 to 2021 are at risk of being negatively impacted by the trade-restrictive remedy under section 201

United States -- Megawatt-scale PV project pipeline (2018 to 2021) (MWdc)



Source: IHS Markit Solar Deal Tracker (September 2017) © 2017 IHS Markit

United States -- Megawatt-scale PV project pipeline by system size (2018 to 2021) (MWdc)



Source: IHS Markit Solar Deal Tracker (September 2017) © 2017 IHS Markit

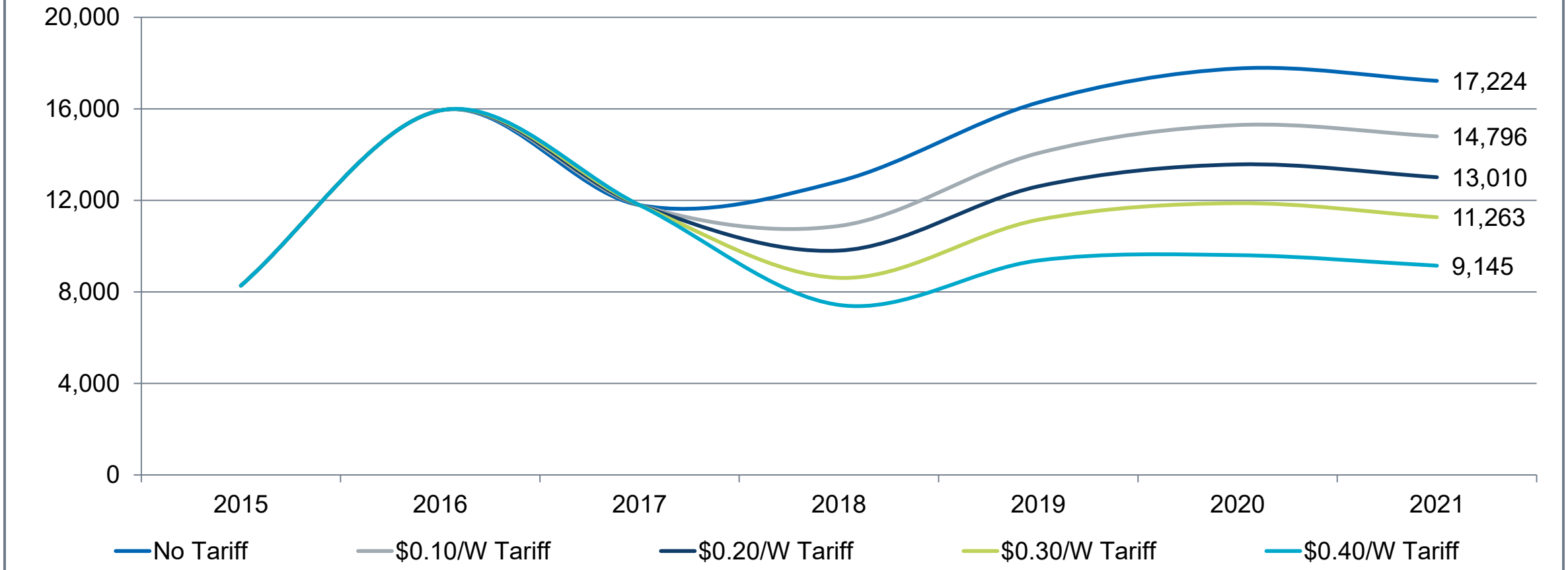
Appendix: Deployment forecast scenario summaries (1)

US market PV deployment scenarios		
Scenario	**GWdc Installed (2018 – 2021)**	**Reduction vs Reference Case (MW / %)**
Reference case	64 GW	N/A
Tariff scenario (plus $0.10/W)	55 GW	- 9,066 MW / 14%
Tariff scenario (plus $0.20/W)	49 GW	- 15,104 MW / 24%
Tariff scenario (plus $0.30/W)	43 GW	- 21,198 MW / 33%
Tariff scenario (plus $0.40/W)	36 GW	- 28,550 MW / 45%

Source: IHS Markit

Appendix: Deployment forecast scenario summaries (2)

US market PV deployment forecast scenarios (MWdc)



Source: IHS Markit

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Attachment G

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Lost Jobs, Lost Deployment and Lost Investments

Solar Energy Industries Association

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- **62,000 fewer jobs** from 2017 through 2021
- **10.5 gigawatts (GW)** of lost solar deployment
  - Enough to power 1.8 million homes and avoid 26 million metric tons of carbon dioxide emissions
- **$19 billion** in lost investment
- SEIA's 2017 market impact analysis accurately forecast these losses

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- In early 2017, a domestic cell and module manufacturer submitted a petition to the U.S. International Trade Commission (USITC) seeking protection from imports.
- The petitioner's proposed remedy would have effectively doubled the cost of crystalline silicon photovoltaic (c-Si PV) products in the United States.
- The investigation itself created great uncertainty for U.S. solar businesses and significantly disrupted the U.S. market in 2017 and 2018.
- In January 2018, the president signed an order imposing "safeguard" tariffs on c-Si PV imports, including a tariff rate quota for cells, from all countries for four years:

2018	2019	2020	2021
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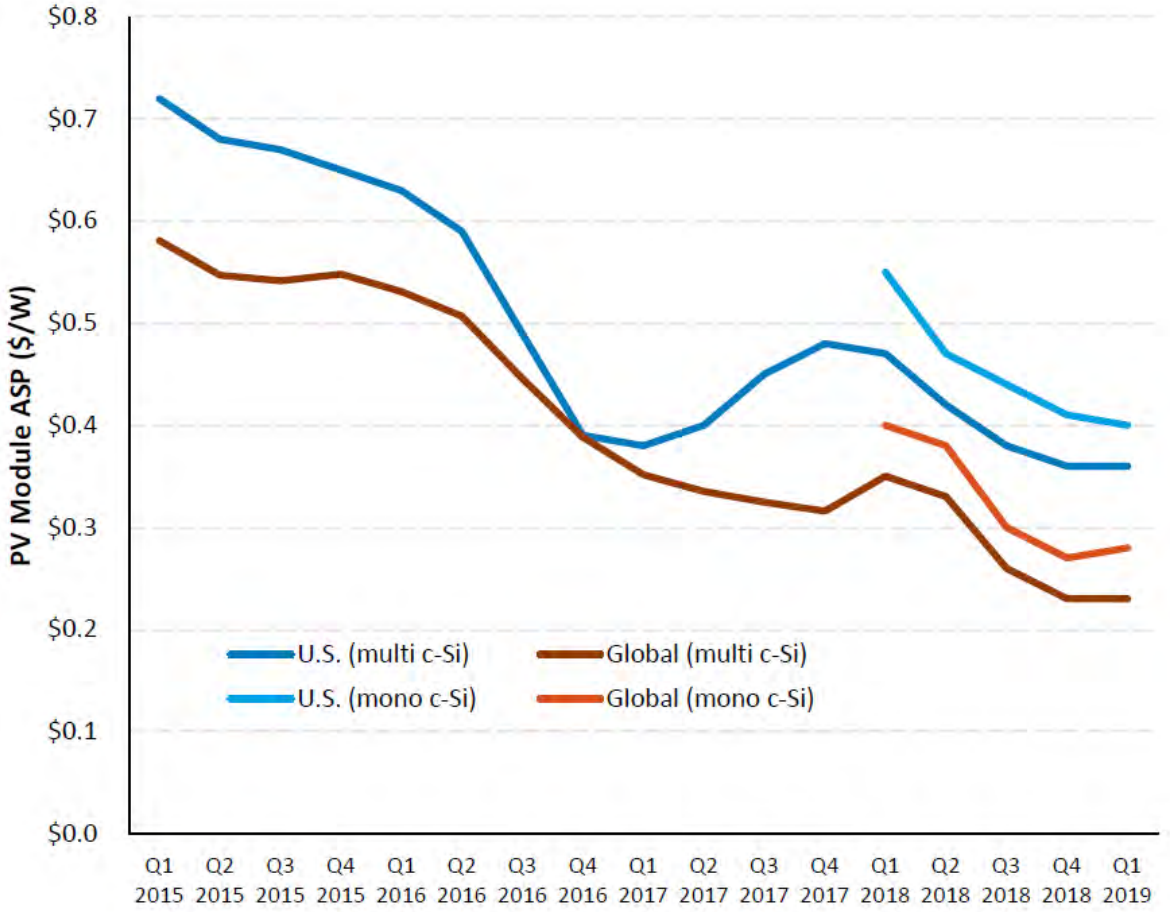

Technology advances have helped lower solar prices around the world.

In the United States, however, price declines have been significantly undercut by the safeguard tariffs—with U.S. prices now among the highest in the world.

Higher prices reduce the size of the addressable market by pushing economics in favor of substitutes (existing generation, gas and wind) in marginal markets.

Source: NREL, *Q1/Q2 2019 Solar Industry Update*

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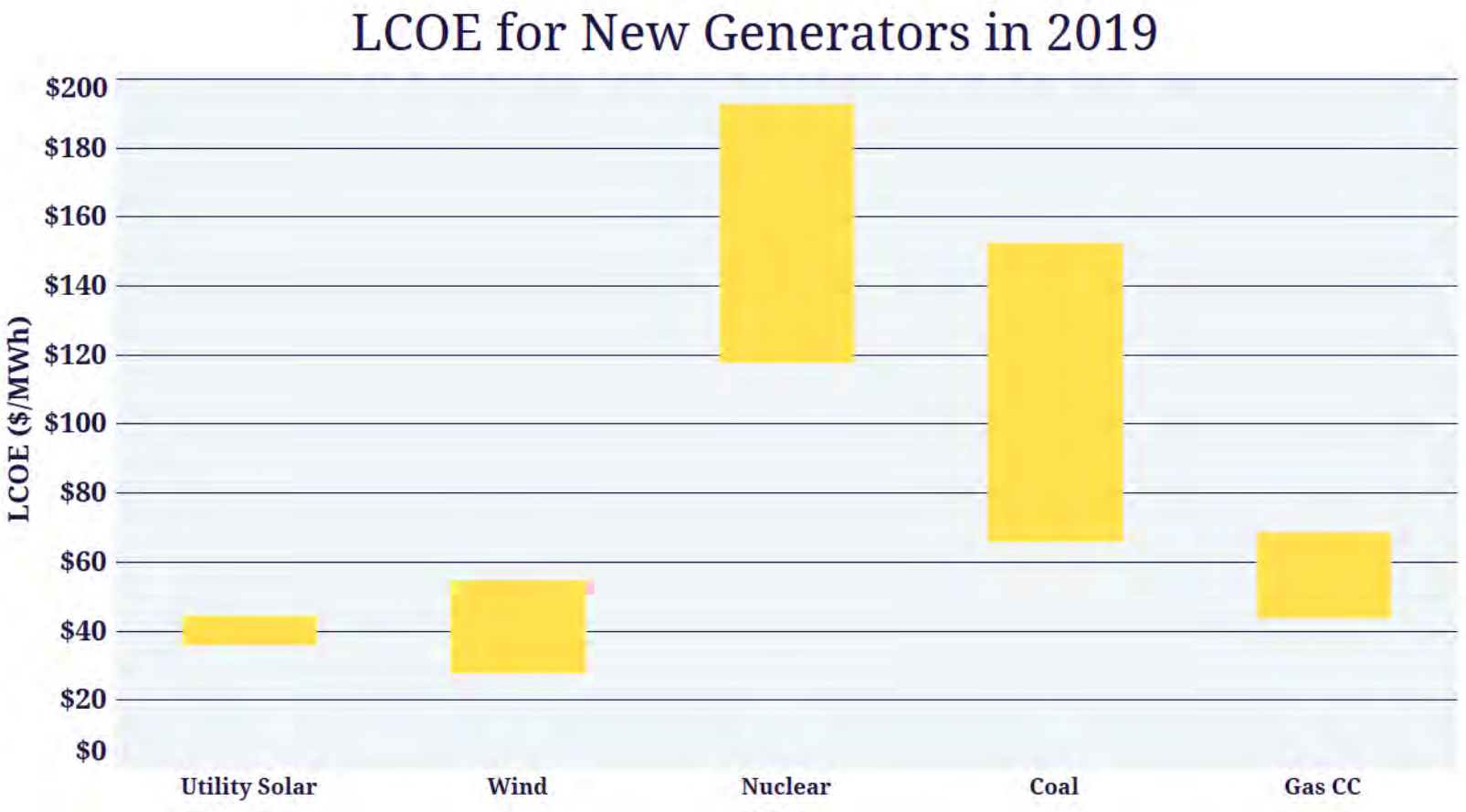

Source: Lazard's Levelized Cost of Energy Analysis – Version 13.0

Solar energy competes with all other forms of electricity generation.

In general, utility companies, homeowners and businesses choose to buy solar electricity when it is the most cost-effective option, though non-price factors may also spur solar adoption.

The adverse impact of tariffs is most pronounced in markets where solar has just achieved grid parity.

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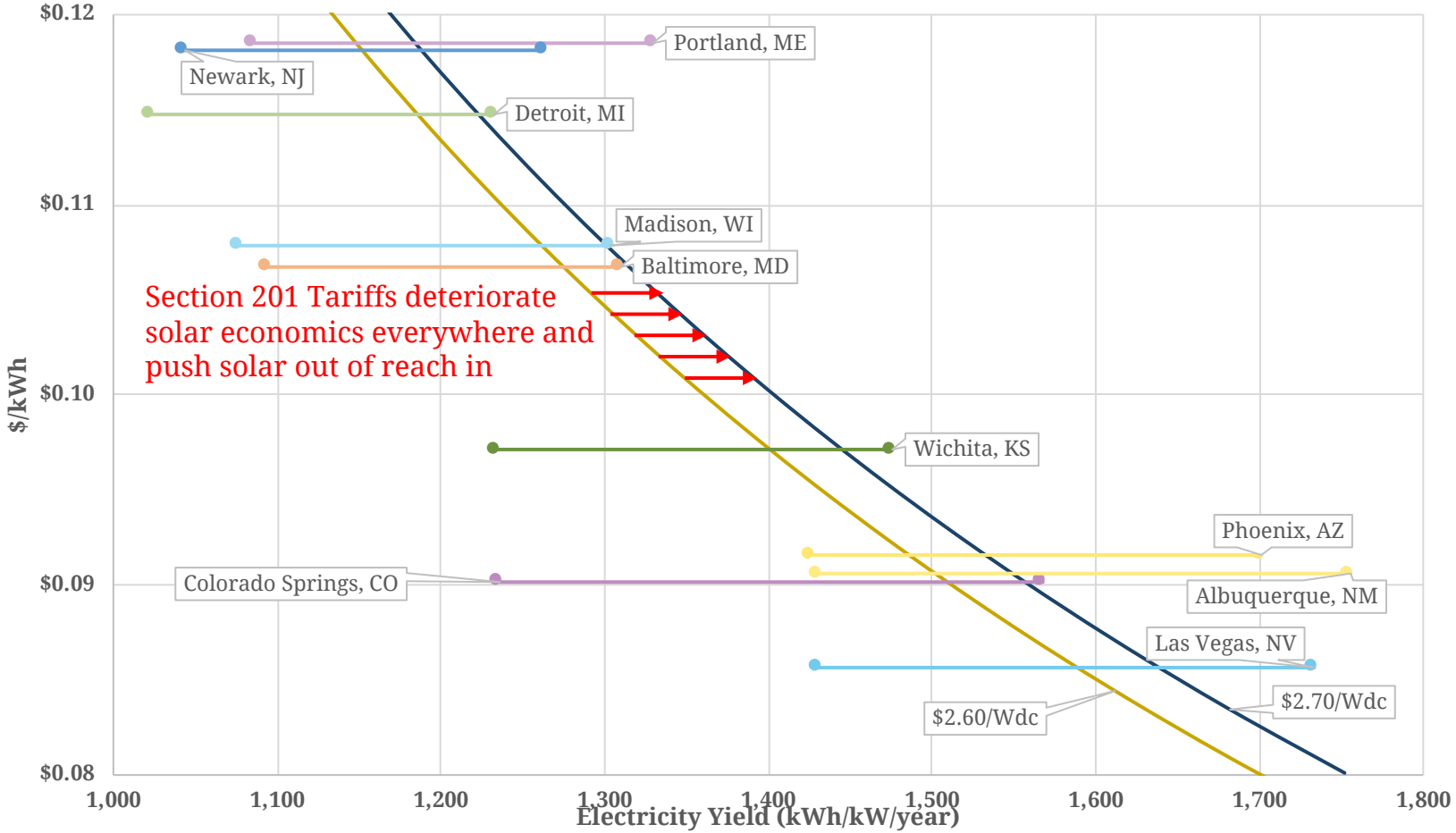
LCOE by Installed PV Price and Residential Hurdle Rate for Select Cities and Installed Costs



Solar energy must be price competitive with other forms of electricity generation and retail electricity rates.

The Section 201 tariffs significantly undercut price gains from technology advancements and **slow the pace of solar adoption** by shifting costs out of reach for many consumers.

Some geographies remain resilient but more expensive while increased costs push marginal markets out of reach.

More information about this chart can be found on slide 18.

SEIA Solar Energy Industries Association®

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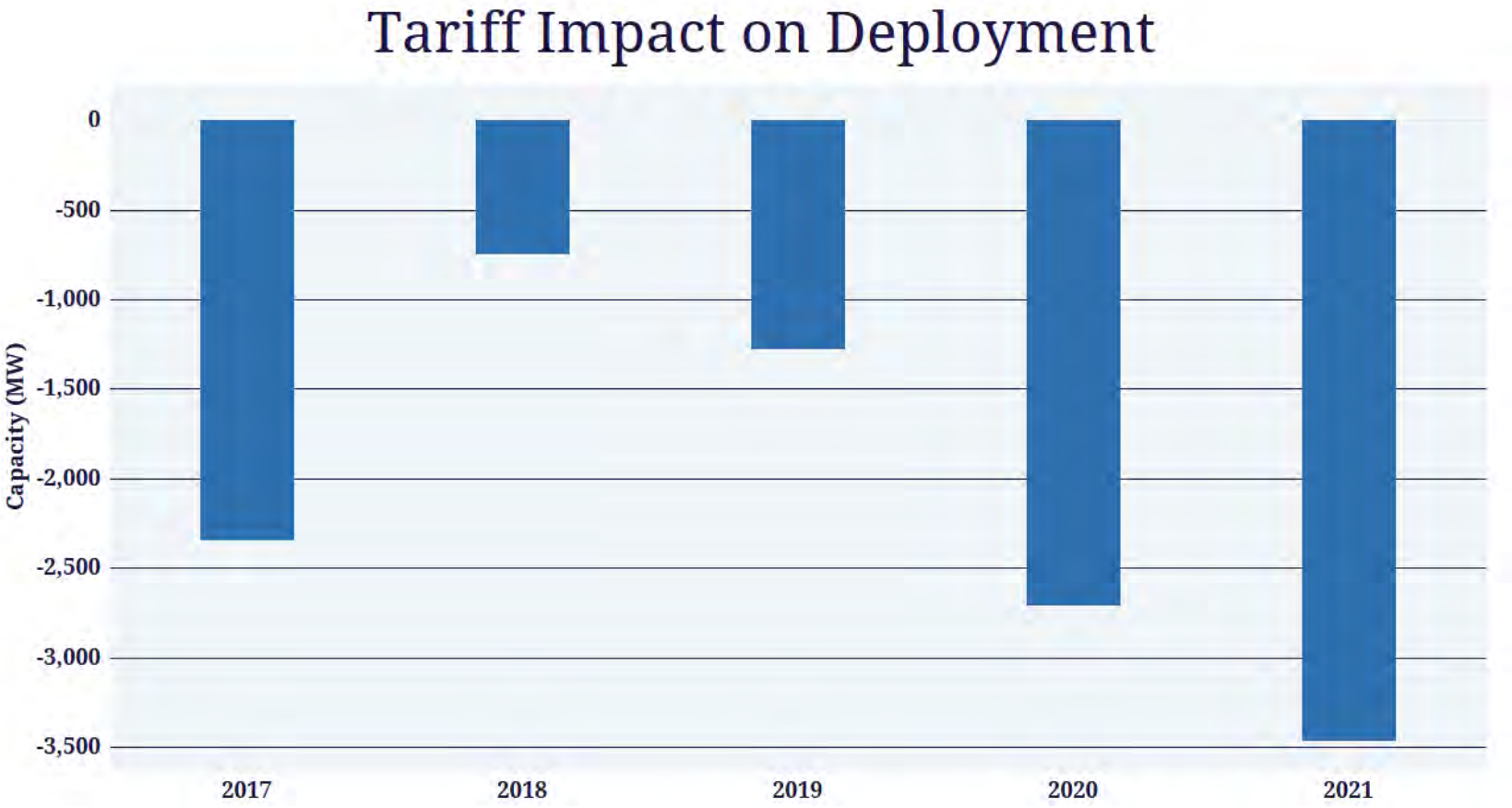

Source: SEIA

Uncertainty caused the market to **lose out on 3 GW of installations** as rumors and actual tariffs disrupted contracts in 2017 and 2018.

The safeguard tariffs **reduce the market for new projects by 7.5 GW** from 2019 - 2021.

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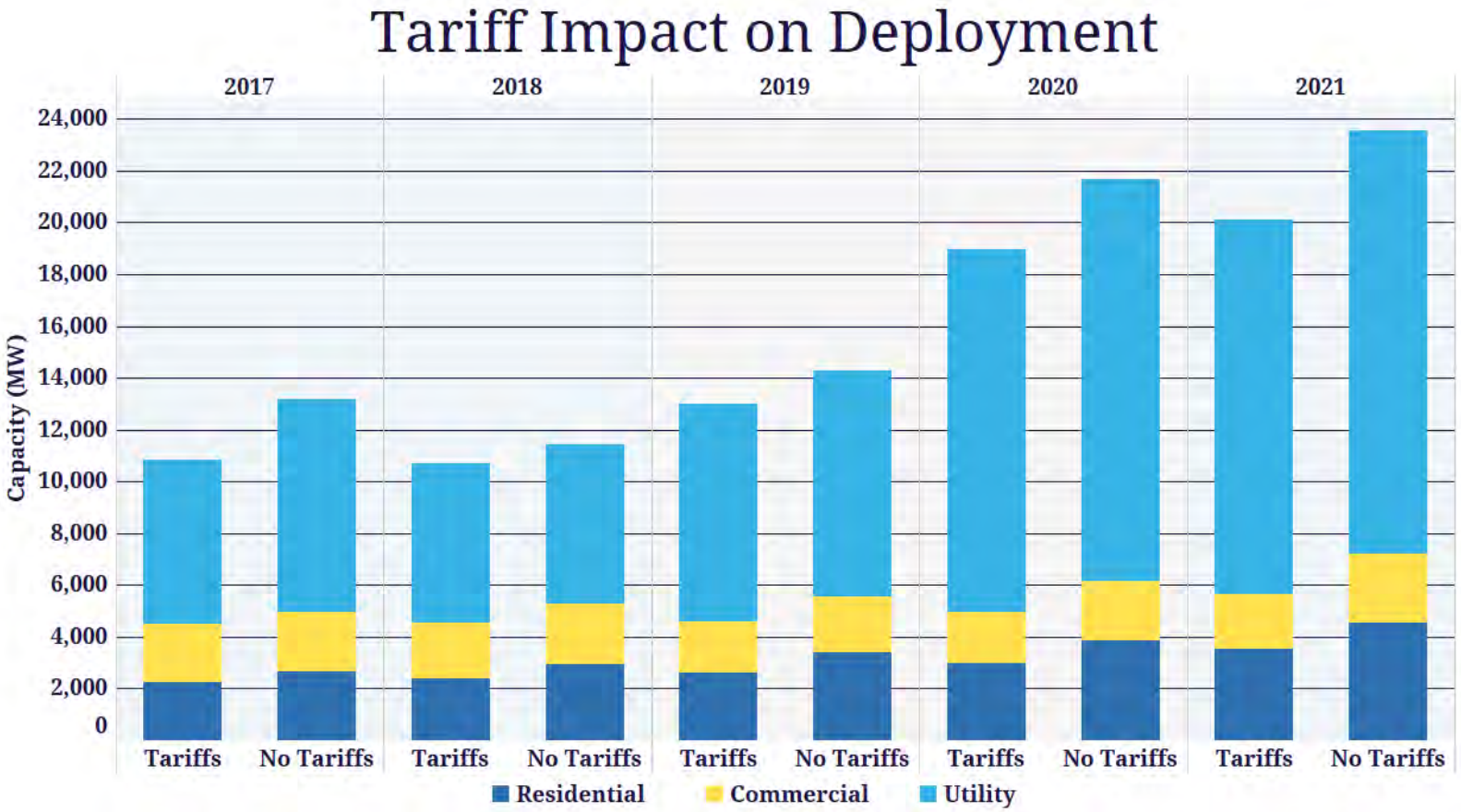

Source: SEIA

The U.S. solar market would be much better off without the tariffs.

The tariffs offset gains from state policy initiatives and technology advancements.

Deployment grow in later years industry growth opportunity is fueled by expansion into territories with less policy support for renewable deployment.

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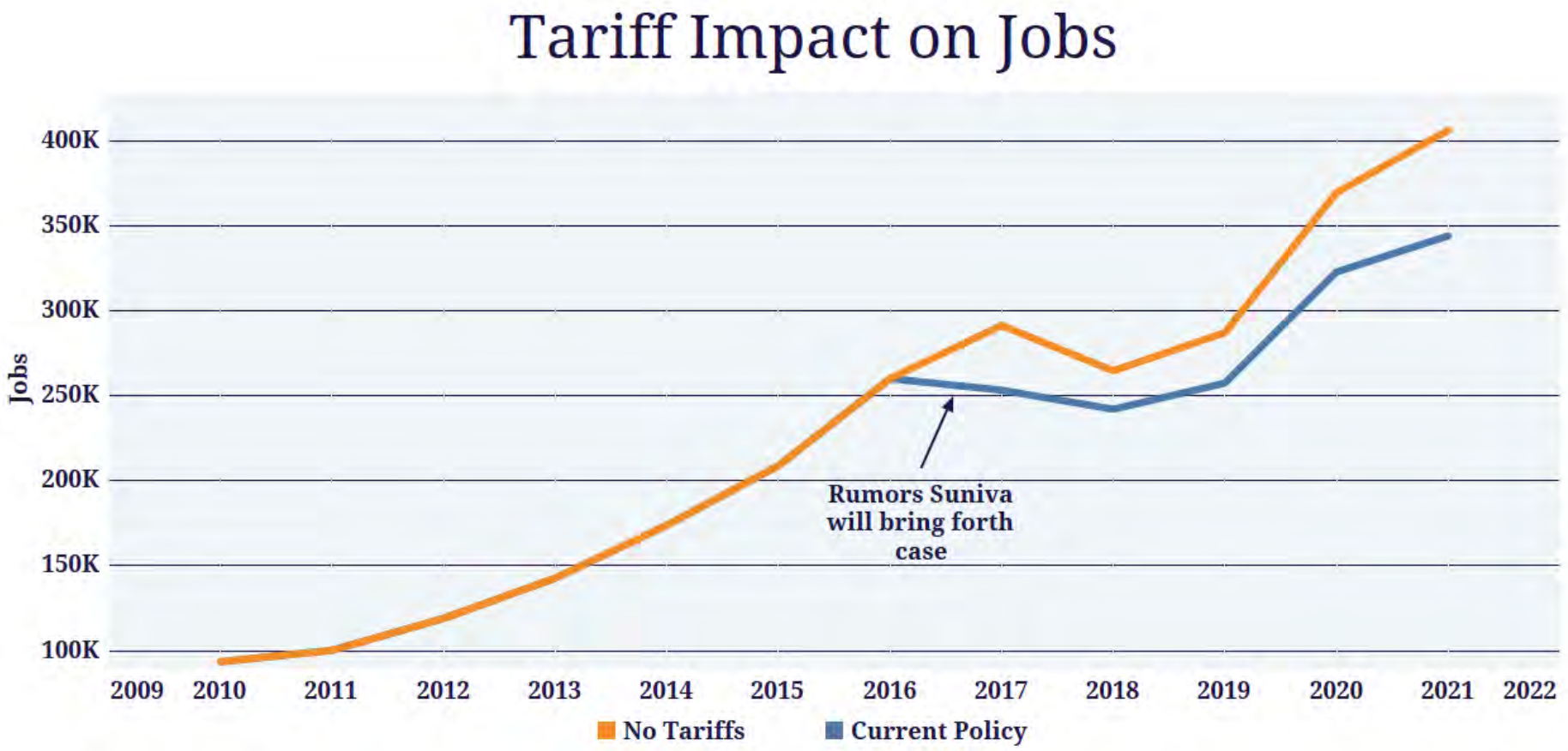

Source: SEIA

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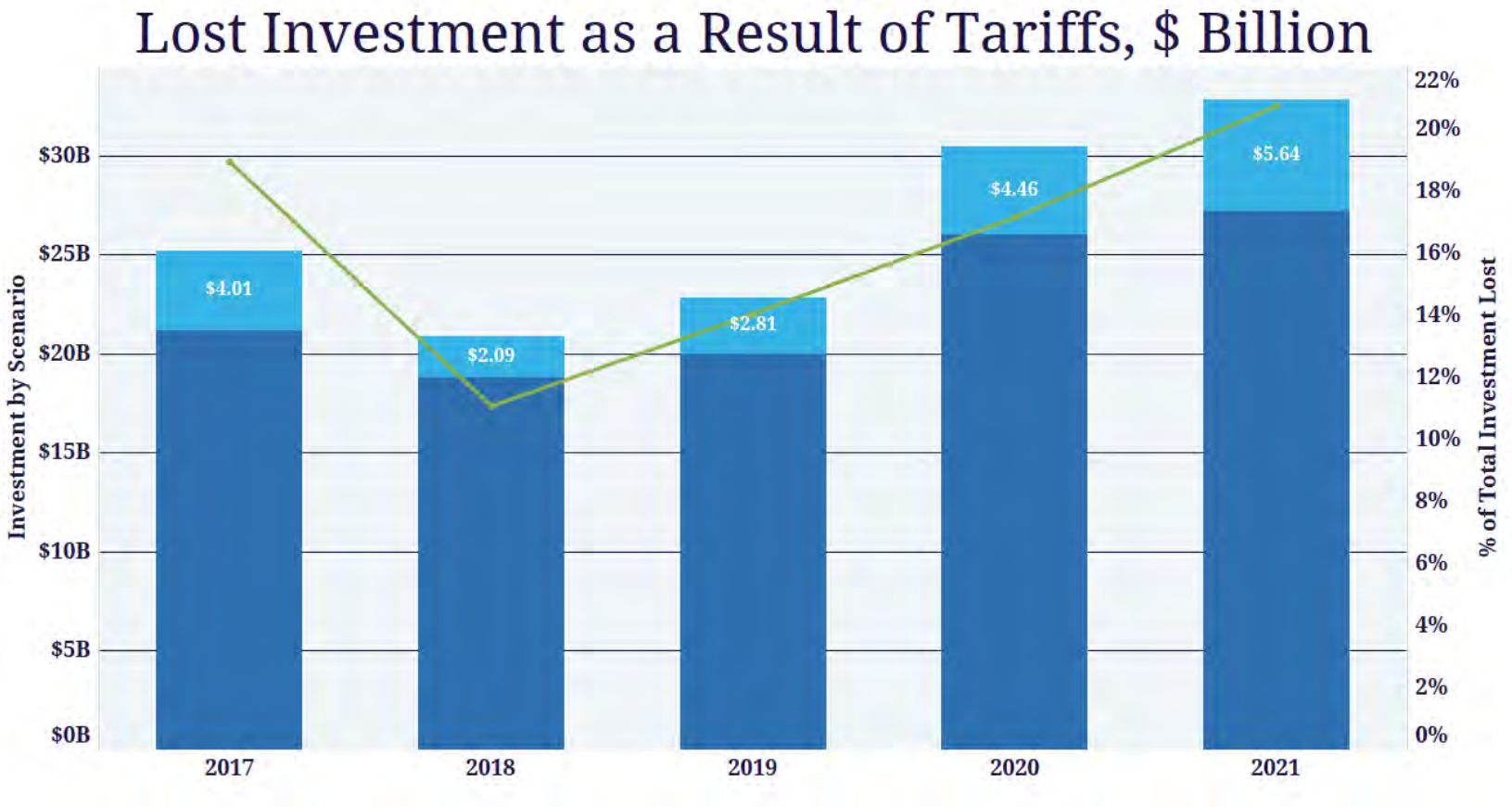

Source: SEIA

The tariffs result in $2-$5 billion annually and $19 billion total in lost investment from 2017 – 2021.

Solar cell and module tariffs are **costing the country more than $10.5 million per day** in unrealized economic activity.

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- After overcoming the 2017-2018 market shock caused by the Section 201 investigation, the solar industry has resumed moderate growth supported by hundreds of policy actions taken by state and local governments. (See DSIRE Insight, *50 States of Grid Modernization Q1 2019 Report).*
- **The 201 tariffs significantly reduce the efficacy of those policies**.
- The approximately 2,000 new jobs in CSPV module manufacturing jobs must be weighed against 62,000 lost employment opportunities, 10.5 GW of lost deployment and $19 billion in lost investments.
- Each new solar panel manufacturing job cost the U.S. 31 service jobs, 5.3 MW of deployment, and nearly $9.5 million in investments — this is a bad deal for America.

Methodology

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- Two scenarios:
  1. **Current policy**: shows market conditions under the safeguard tariffs.
  2. **No tariffs**: estimates the outcomes of a market without the safeguard tariffs or investigation leading to the safeguard tariffs. (Note that this scenario does not assume the removal of AD/CVD tariffs or Section 301 tariffs on products from China that also impact the U.S. solar market.)
- **Jobs analysis**: employed National Renewable Energy Laboratory's (NREL) Jobs and Economic Development Impact (JEDI) to model both scenarios.

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- Current policy scenario:
  - Forecasts deployment under the current safeguard tariff schedule.
    - Tariffs at 30% in 2018, 25% in 2019, 20% in 2020, 15% in 2021 and no extension of the safeguard tariffs beyond the initial 4-year term.
  - Assumes no exclusion for bifacial PV modules.
    - The exclusion was revoked on October 9th, 2019. (Though the revocation is currently under court review, the risk posed means the market is currently treating it as revoked.)
  - Assumes no tariffs on thin-film photovoltaic products.
    - Thin-film PV is outside the scope of the Section 201 investigation and not subject to the tariffs applied to c-Si PV.

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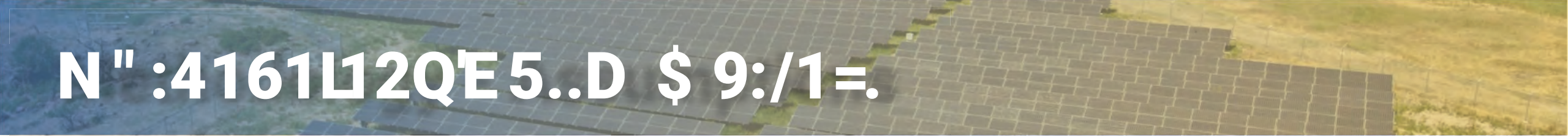
- No tariffs scenario:
  - Considers only the removal of the Section 201 tariffs on c-Si PV products.
  - Assumes no changes to the AD/CVD tariffs on crystalline silicon photovoltaic (c-Si PV or CSPV*) imposed on products from China/Taiwan.
  - Assumes no changes to Section 301 tariffs on goods from China impacting the solar industry.
  - Assumes no changes to Section 232 tariffs on steel and aluminum.

*Note: in all the U.S. International Trade Commission investigations into, the commission and litigants have used the abbreviation “CSPV”. That abbreviation is not widely used outside of the USITC context. “c-Si” PV is the most common industry abbreviation.



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- Deployment:
  - Current Policy: Wood Mackenzie and SEIA *Solar Market Insight* report for 2019 Q4 forecast.
  - No Tariffs: Derived Wood Mackenzie and SEIA *Solar Market Insight* report forecasts from issues: 2019 Q4, 2016 Year in Review and 2017 Year in Review. The section 201 tariffs were the only major national solar policy change between the 2016 Year in Review forecast (produced prior to news of the 201 investigation) and the 2017 Year in Review forecast (produced in February 2018, after tariffs were announced).
- Prices (From Wood Mackenzie):
    - Residential, Commercial, and Utility by Year
  - Consistent between scenarios.
    - The only material difference between the scenarios was the imposition of tariffs and, while the price of the products to the end customer increased, that price increase is the result of a tax, not marginal investment. Accounting for module prices in this way is important to ensure meaningful results from the JEDI model.
  - Operations and maintenance (O&M) prices derived from National Renewable Energy Laboratory's 2019 Annual Technology Baseline.

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- JEDI Jobs Modeling:
  - Input/Output model: Input deployment and component cost parameters.
  - JEDI returns estimates for employment by job category in full-time-equivalent figures.
  - Employment levels for installation and wholesale trade are driven by deployment-related expenditures (annual installations) in each year.
  - Employment levels in operations and maintenance (O&M) are driven by expenditures for maintaining the overall operating PV fleet (i.e. cumulative installed capacity).

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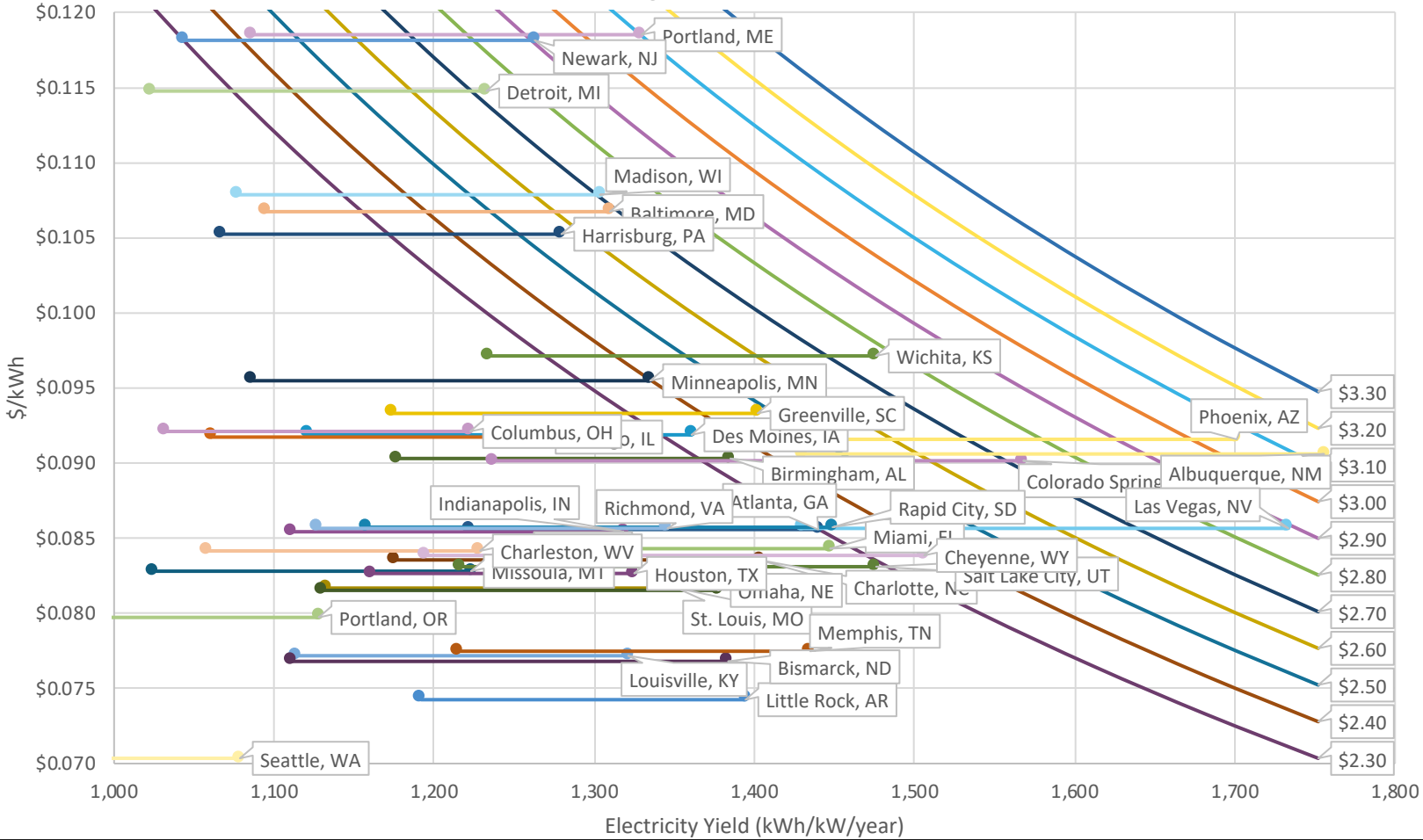

How to read this chart:

* Curves represent levelized cost of electricity (LCOE) at different insolation (horizontal axis). Each isometric curve represents a different installed cost for a PV system at $0.10/W increments.
* The vertical position of the horizontal lines represent the LCOE that solar must be below for solar adoption to occur (hurdle rate) for selected cities.
* Horizontal lines represent the spectrum of possible energy yields in each city for PV installed on homes in each city.
- The right end of each horizontal line represents the ideal system in each city: system facing due south with almost no shading.
- The left end of each line represents a less ideal PV system: roof facing due west with 10% shading. (Note this is not the worst possible configuration.)
- Points on a horizontal line that are above an isometric cost curve, are in the money at that installed price.

Assumptions:

* Federal Investment Tax Credit set at 30%.
* Weighted Average Cost of Capital set at 8%
* No state incentives.
* Full retail net metering.
* Utility rates approximated using state average revenue

For press inquiries, please contact:

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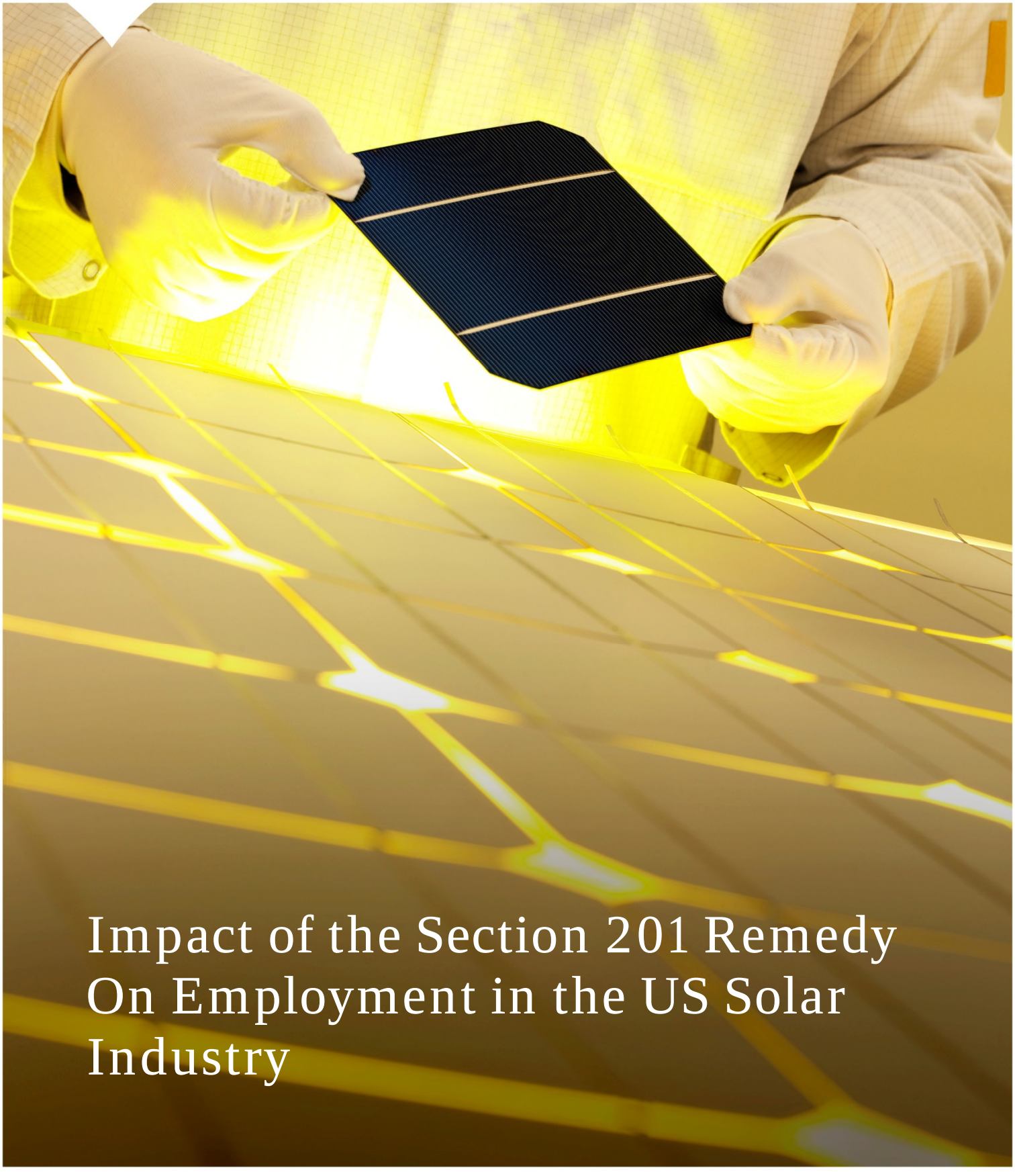
mlyons@seia.org | (202) 556-2872

Attachment H

MAYER·BROWN

August 2017



Impact of the Section 201 Remedy On Employment in the US Solar Industry

Net Increase of Between at least 115,000 and 144,000 Jobs Across Entire US Solar Industry.

US Solar Manufacturing Employment Could Grow by 45,000 New Jobs

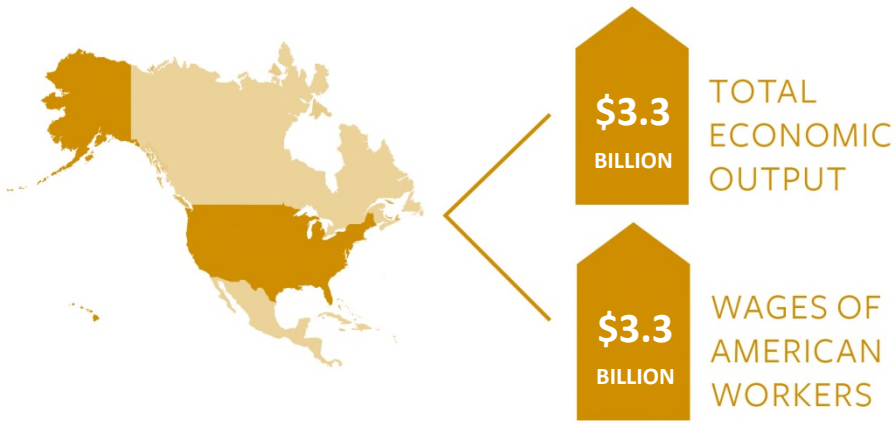
144,000 US SOLAR INDUSTRY JOBS

45,000 MANUFACTURING JOBS

Summary

An affirmative finding by the US International Trade Commission and the imposition of effective remedies in its Section 201 investigation on imports of solar cells and modules would result in a net gain in employment of at least between 114,796 and 144,298 jobs for the US solar industry, including the upstream industries that manufacture critical components used in the production of solar cells and modules over the next five years. This job growth includes as many as 45,000 US manufacturing jobs in the solar cell and module manufacturing segment and the upstream sectors that cell and module manufacturing supports. It also includes an increase of 98,020 US non-manufacturing jobs, including 65,830 US installer jobs.[1]

Estimates that include the restoration of existing manufacturing capacity, plus the likelihood of at least 2 GW of new US production capacity to come online in the US would increase US solar cell and module manufacturing employment by between 37,500 and 45,500 and increase economic output and wages paid by $2.5 billion and $3.3 billion each. Further, the imposition of effective remedies would ensure American companies continue and increase R&D and capital investment in the US, which would generate significant economic benefits that are not captured in the job and economic output estimates noted above.



[1] These estimates differ from analysis released by the Solar Energy Industry Association (SEIA) because of a difference in baselines. SEIA's analysis compared projected jobs without a remedy and without including the impact of lost manufacturing jobs to projected jobs with a remedy imposed. Thus, SEIA's analysis compares two projections with no reference to actual jobs. This analysis uses actual job levels in 2015 as its baseline. 2015 employment data represent the latest data available from the National Solar Jobs Census.

Background

The global surge in low priced imports has caused US Solar cell and module manufacturers to shut down and lay off thousands of Americans from good paying, full time jobs. The surge in imports is the result of massive overcapacity, particularly in Asia and driven first by significant, illegal subsidization of Chinese producers as well as subsequent efforts by Chinese producers to develop manufacturing capacity in third-countries, such as Malaysia, Vietnam and Thailand, as a means of avoiding trade measures imposed to level the playing field for US manufactures and remedy the dumping of subsidized imports from China. This growth in production capacity has resulted in a massive and growing global overcapacity.[2]

The global surge in imports has decimated the US solar manufacturing sector even as demand in the US for solar power has grown significantly. The negative impact on the US solar sector is widespread. As noted by Greentech Media "[T]he brutal year for many businesses: Public solar companies are getting thrashed, module oversupply is causing severe financial pain for manufacturers, and even downstream companies who've benefited from cheaper equipment and growing demand have struggled."[3] Since 2010, installed solar capacity in the United States has grown from 929 MW in 2010 to 14.8 GW in 2016.[4] Yet at the same time, US solar manufacturing jobs and production has been decimated. The strong increase in US demand has been met overwhelmingly by imports. In 2010, the Solar Foundation estimated that there were 24,916 jobs in the solar manufacturing sector.[5] Had the US manufacturing sector captured a proportional share of the increase in demand, then US employment in the solar manufacturing sector should have nearly doubled to 40,418 jobs in 2016. Instead, employment in the US solar manufacturing sector has been slashed as the surge in low-priced imports has filled demand.

Imposition of effective remedies under the Section 201 investigation can restore the US market to an economically rational state, allow US manufacturers to compete on a level playing field against imports and restore and increase American manufacturing jobs, while continuing to grow jobs in the downstream installation segment, and related financing, development and complementary manufacturing segments.

In order to estimate the total increase in jobs and economic benefits from the imposition of effective remedies this analysis starts with a review of the impact of the remedies proposed in the petition on market prices and installations. This is then supplemented with an analysis on the upstream industries that support the US solar manufacturing sector using the Regional Input-Output Modeling System (RIMS II), developed and maintained by the Bureau of Economic Analysis (BEA), Department of Commerce.

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[2] See, PV Tech, "Global solar PV manufacturing capacity expansion plans rebound in Q1" (Apr. 12, 2017).

[3] A Journey to the Center of the Solar Industry, Podcast by Stephen Lacey, June 7, 2017, GTM, available at https://www.greentechmedia.com/articles/read/a-journey-through-the-solar-industry.

[4] 2016 National Solar Jobs Census, The Solar Foundation, p. 7, available at http://www.thesolarfoundation.org/national/

[5] 2010 National Solar Jobs Census, The Solar Foundation, p 11, available at http://www.thesolarfoundation.org/national/

Estimate of Solar Installations and Non-Manufacturing Jobs

GTM Research has estimated that as a result of the remedies proposed in the petition market prices for installed solar systems would stabilize at late-2015/early-2016 levels and installed US solar capacity would increase by at least 36 GW over the 2018 to 2022 time period. The GTM analysis suffers from significant flaws, fails to account for the impact of any new US manufacturing growth and likely significantly understates the rate of growth in installed capacity that would occur if an effective remedy is imposed. [6] However, solely for the purposes of this analysis we have incorporated GTM's forecast knowing that this forecast likely underestimates the increase in installed capacity and therefore employment levels in the non-manufacturing segments of the industry.

GTM's projection of an additional 36 GW of new installed capacity represents an increase of 44 percent in installed capacity compared to the prior five year period (2011-15) during which approximately 25 GW of capacity was added.[7] Between 2011 and 2015, non-manufacturing jobs in the solar industry increased by 102,002 or 134 percent.[8] Of this amount, 67,428 of the new jobs were installer jobs and installer jobs increased by approximately 128 percent. Thus, an increase in installed US capacity of approximately 25 GW is associated with an increase in non-manufacturing employment in the US solar sector of approximately 100,000 jobs. Applying a similar trend analysis to the projected increase in capacity of 36 GW over the five year period 2018-22 results in an increase of 98,020 new non-manufacturing jobs over 2015 levels.[9] Of these jobs 65,830 are estimated to be installer jobs.[10]

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[6] US Solar Outlook Under Section 201: The Trade Case's Impact on US Solar Demand, GTM Research, June 2017, at Figure 1.2 p. 5, available at https://www.greentechmedia.com/research/report/us-solar-outlook-under-section-201. For example, GTM Research's worst case estimate that an additional 25 GW of new capacity would be installed between 2018 and 2022 is based on an error in its methodology where it double-counted the impact of the REMEDY PROPOSED IN THE 201 PETITION. Further, it should be noted that even GTM's projected increase of 36 GW in installed capacity is lower than prior GTM analysis. Application of 2015 price levels to prior GTM forecasts of installations result in a projected increase of installed capacity of over 37 GW.

[7] 2015 National Solar Jobs Census, The Solar Foundation, p. 20, available at http://www.thesolarfoundation.org/wp-content/uploads/2016/10/TSF-2015-National-Solar-Jobs-Census.pdf.

[8] Ibid at 11.

[9] Calculation applies ratio of the projected increase in installed capacity to the increase in capacity 2015 times the number of non-manufacturing jobs in 2015 (or (2022 net installation/2015 net installations) * 2015 jobs). There are a number of alternative methods that could be used to estimate the rate of growth in non-manufacturing jobs over the 2018-22 period. The method used here applies conservative assumptions about the relationship between installed capacity and non-manufacturing job growth. Under this method there is assumed to be no increase in non-manufacturing jobs until projected installations increase at a greater rate than 2015 installations. 2015 installation levels represent record level installations. Alternative methods, such as simply extrapolating out historical rates of growth, would result in even larger increases in non-manufacturing employment levels. Regardless of which method is applied, in every instance, non-manufacturing employment increases relative to 2015 levels.

[10] Calculation applies ratio of installer jobs to total non-manufacturing jobs for the 2011-15 period to the total of new non-manufacturing jobs projected for the 2018-22 period.

Estimate of US Cell and Module Manufacturing Jobs

Solar cell and module manufacturing are high value-added operations that pay high-wages to full-time employees. Solar cell and module manufacturing also support high-wage, full-time jobs in the upstream industries that support cell and module manufacturing. These sectors, including aluminum extrusions, silicon crystals, and electronic components, would benefit from the increased demand that a restored US solar manufacturing sector would generate. This results in the cell and module manufacturing sector having a high multiplier effect or the measure of the sector's impact on the broader US economy. In comparison, as noted by the Solar Foundation, installer jobs "represent the end of the solar value chain" and as a result have a much lower multiplier effect than the cell and module manufacturing sector.[11]

, it is appropriate to rely upon the methodology developed by the Bureau of Economic Analysis (BEA) of the US Department of Commerce in estimating the impact on the US economy of a restoration of US cell and module manufacturing. Specifically, the analysis uses BEA's Regional Input-Output Modeling system (RIMS II) methodology and multipliers.[12]

As a first step in the analysis, the model estimates the economic impact of restoration to full operating capacity and production of existing US cell and module production capacity, specifically 970 MW of US cell manufacturing capacity and 865 MW of US module manufacturing capacity.[13] The analysis assumes total cell production costs of between $0.22 and $0.33 per watt and module production costs of between $0.22 and $0.24 per watt.[14] BEA multipliers were used to calculate the additional economic impact that the increased demand generated by the operation of these production facilities would have on the broader US economy. [15] Thus, the BEA models report both the direct economic impact and the indirect economic impact that is derived from demand for the goods and services necessary to support the direct economic activity. The industry multipliers were taken from the BEA RIMS database.[16] In very short order, a remedy that at a minimum restores existing US solar cell and module production capacity would result in an increase of at least between 12,429 to 16,141 manufacturing jobs; [17] and as detailed below, projections show at least 2 GW of new US production capacity, and thus US solar cell and module manufacturing employment would increase by between 37,500 and 45,500.

In addition to restoration of existing capacity, it is highly likely that imposition of an effective remedy and stabilization of price levels in the US would result in substantial new investment in U. S. solar cell and module manufacturing capacity. This investment in new production capacity would create significant new US

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[11] 2016 National Solar Jobs Census, The Solar Foundation, p. 17, available at http://www.thesolarfoundation.org/national/.

[12] See generally https://blog.bea.gov/tag/rims-ii/. Model specifications and applications were derived from BEA publications: http://www.bea.gov/scb/pdf/regional/perinc/meth/rims2.pdf and http://bea.gov/regional/pdf/rims/RIMSII_User_Guide.pdf.

[13] These estimates are based on restoration of full capacity and production of Suniva facilities in Georgia and Michigan and SolarWorld facilities in Oregon as well as an estimate that an additional 50 MW of idled cell production and 115 MW of idled module production across the US are restored, or approximately 50 percent of idled capacity.

[14] These costs estimates are based on surveys of US and foreign producers, market analysis services, and US government research publications.

[15] Specifically, the BEA multipliers used are taken from the NAICS sectors 334413 and 33131B. The analysis incorporates BEA Type II multipliers as the analysis assumes the majority of the wages and benefits paid are consumed in the region.

[16] See BEA RIMS II Online Order and Delivery system, available at https://www.bea.gov/regional/rims/rimsii/

[17] These estimates assume only existing, but idled capacity is operating at full capacity and even then only a limited percentage of idled capacity is restarted.

manufacturing employment. Under an assumption that effective remedies induce sufficient additional investment to increase US cell production capacity to 3 GW and US module capacity to 2.6 GW, US cell and module manufacturing employment would increase by between 37,515 and 45,491 restored and new manufacturing jobs. Economic output and wages paid in the cell and module manufacturing sectors would increase by between $2.5 and $3.3 billion each.

Conclusion

The significant increase in installed US solar capacity, the restoration of US manufacturing and the increase in jobs and US economic output should put to rest any concerns that the 201 petition will damage the US solar market.[18] Indeed, the analysis prepared by GTM Research shows that significant increases in installed capacity would continue and non-manufacturing job growth would continue at a rapid pace, growing by over 80 percent. In addition, US cell and module manufacturing production and employment would be restored which would also benefit manufacturing jobs in the supporting upstream sectors. Therefore, the impact of the imposition effective remedies under Section 201 would restore thousands of US manufacturing jobs and would result in a net increase in US jobs, wages, and economic output.

[18] http://www.seia.org/news/seia-statement-solarworld-joining-section-201-trade-case

Attachment I

September 20, 2021

Solar Industry Forced Labor Prevention Pledge

We, the undersigned companies and organizations, state our firm opposition to the use of forced labor within the solar supply chain. We hereby commit to helping ensure that the solar supply chain is free of forced labor and raising awareness within the industry on this important issue. To assist in these efforts, we support the development of an industry-led solar supply chain traceability protocol as a tool for identifying the source of primary raw materials and inputs and tracking their incorporation into finished products, including solar modules.

More than 295 companies have signed this Pledge:

8minute Solar Energy
AC Power, LLC
Acciona Energy
Adapture Renewables, Inc.
Aegis Renewable Energy
AES Clean Energy
Affordable Solar
age inc.
AIONRISE
Alchemy Renewable Energy
Aligned Climate Capital
Alion Energy
Allterra Environmental, Inc.
AlsoEnergy, LLC
Alternative Energy Southeast, Inc.
Ameresco
American Design & Build, Ltd.
American Ground Screw
American Microgrid Solutions
Amicus Solar Cooperative
AMP Solar Group, Inc.
AP Solar Holdings
Apex Clean Energy Holdings, LLC
Aptos Solar Technology, LLC
Arevon
Arctic Solar Ventures Corporation
ArcVera Renewables
Artisan Electric, Inc.
Aten Solar
Aurora Solar Inc
Avangrid Renewables
Aztec Solar Inc.
BayWa r.e. US
Belltown Power Texas
Best Energy Power
Better Builder
Birdseye Renewable Energy
Black & Veatch Corporation
Blattner Energy, Inc.
Bluestem Energy Solutions
BlueWave Solar
Boralex
Borrego Solar Systems
BrightNight
Brookfield Renewable
Brooklyn Solarworks
C2 Energy Capital
CA Clean Energy LLC
California Solar Electric Systems, Inc.
Candela Renewables
Cape Fear Solar Systems, LLC
Cardno
Carolina Mountain Solar
Carolina Solar Energy, LLC
Catalyze
Catamount Solar
CED Greentech HQ
Clean Energy Associates

Clean Energy USA
Clean Power Marketing Group
CleanCapital
Clearway Energy Group
CohnReznick, LLP
CollectiveSun, LLC
Community Energy, Inc.
Connectgen LLC
Convergent Energy and Power Inc.
Core Development Group
Cottonwood Energy, LLC
Cotuit Solar, LLC
Creative Energies
Cubico Sustainable Investments
CS Energy
Cypress Creek Renewables
D.E. Shaw & Co., L.P.
DC Energy Innovations, Inc.
DEPCOM Power, Inc.
Distributed Solar Development
DNV GL
Dominion Energy
Duke Energy
Dynamic Energy Solutions
EcoPlexus, Inc.
Eden Renewables
EDF Renewable Energy
EDP Renewables
Encore Renewable Energy
Enel Green Power North America, Inc.
ENGIE North America
Enphase Energy, Inc.
EnPower Solutions
EnterSolar
Eolus Project Holdings, LLC
Excelsior Energy Capital
FAFCO, Inc.
Fire Mountain Solar LLC
Florida Solar Partners
Flywheel Development LLC
ForeFront Power Development, LLC
Freedom Forever
FTC Solar Inc.
GCL System Integration Technology, LLC
Gamechange Solar Corp.
Geoscape Solar
Gigawattinc.com
GoodWe
Green Street Power Partners, LLC
Greenskies Renewable Energy, LLC
Greenspark Solar
GRID Alternatives
Hanwha Q CELLS America Inc.
Hecate Energy
Heelstone Renewable Energy, LLC
Heliene, Inc.
Heliolytics
Hexagon Energy, LLC
Idahome Solar
Idemitsu Renewables
IGS Energy
Impact Power Solutions
Infiniti Energy Services LLC
Infrastructure and Energy Alternatives, Inc.
Ingeteam, Inc.
Innergex Renewable Energy
Inovateus Solar LLC
Intersect Power
Invenergy LLC
Ipsun Solar
IronRidge, Inc.
Irradiant Partners
JA Solar
Jiangsu Seraphim Solar System Co., Ltd.
JinkoSolar (U.S.) Inc.
JM Services, LLC
Juwi, Inc.
K2 Systems, LLC

Kendall Sustainable Infrastructure
Kiterocket
KT Black
Lightsource bp
LevelTen Energy
LG Electronics U.S.A.
LONGi Solar Technology (U.S.) Inc.
Longroad Energy Holdings, LLC
Mayfield Renewables
McCarthy Building Companies Inc.
McCauley Lyman
McKinstry
Megasol Energie AS
Merit SI, LLC
Mission Solar Energy
Morse Associates, Inc.
Mortenson
muON Marketing
Mynt Systems
Namaste Solar
NARENCO
National Grid Renewables
Natural Power Consultants
Nautilus Solar Energy, LLC
Navisun
NEC Solar
Nelnet Renewable Energy
Net Zero Solar
New East Solar Energy America, Inc.
New Energy Equity
New England Commercial Solar
Newport Solar
Nexamp, Inc.
NextEnergy Capital
Nextracker, Inc.
NM Solar Group, Inc
Novel Energy Solutions
North Carolina Solar Center
Norwich Technologies
NPM
Nucor
Obsidian Renewables, LLC
Ojjo, Inc.
OneEnergy
Orbital Solar Services
Oriden Power
Origis Usa, Inc
Orsted
Paige Electric
Panasonic Eco Solutions Company of North America
PanelClaw, Inc
Parkrr
Participant Energy, LLC
Pattern Energy Group
Pegasus Solar
PCL Construction Enterprises Inc.
PI Berlin North America, LLC
Pine Gate Renewables, LLC
Pivot Energy
Plexus Solutions
PosiGen, LLC
Positive Energy Solar
POWER Engineers, Inc.
Power Home Solar LLC
Primergy Solar
PSG Energy Group
Pure Power Contractors Inc
PV Evolution Labs
Quest Renewables
Radiance Solar, LLC
REC Americas LLC
ReneSola Power Holdings, LLC
Renewable Energy World Network
RER Energy Group
RES (Renewable Energy Systems)
ReVision Energy
RevoluSun

Roof Tech, Inc.
RP Construction Services
rPlus Energies
RRC Power & Energy, LLC
RWE Renewables Americas, LLC HQ
S-5! Metal Roof Innovations, Ltd
Safari Energy
Savion, LLC
SB Energy
Seal Solar
Seminole Financial Services
SGC Power
Shaw Solar Services
Shine Development Partners
Shoals Technologies Group
Sigora Solar
Silfab Solar
Silicon Ranch Corporation
SMA America, LLC
Sol Systems, LLC
Sol-Up USA, LLC
Solamerica Energy, LLC
Solar Alternatives Inc.
Solar Design Studio
Solar Energy International
Solar Energy Solutions
Solar Energy Systems, LLC
Solar Foundations USA, Inc.
Solar Professional Services, LLC
Solar Renewable Energy, LLC
Solar States
Solar United Neighbors
Solar Warehouse, Inc.
SolarEdge Technologies, Inc.
Solaria Corporation
Solariant Capital, LLC
Solaris Energy
Solon Corporation
South Mountain Company
Standard Solar
Stellar Energy
StraightUp Solar
Strata Solar, LLC
STS
Summit Ridge Energy, LLC
Sun Tribe Solar
SunCommon
SunEarth, Inc.
Sunergy Systems
Sunfolding
Sunlight Financial
Sunnova Energy Corporation
SunPower Corporation
Sunrun Inc.
SunShare, LLC
Sunshine Solar, LLC
SunStore Energy, LLC
SunVest Solar, Inc.
Sunwealth
Swell Energy, Inc.
Swift Current Energy
Swinerton Renewable Energy
Technicians for Sustainability, LLC
Tesla
The Horton Group
The PowerStore Inc.
Third Sun Solar
Tigo Energy, Inc.
Trina Solar (U.S.). Inc.
U.S. Light Energy
Ulteig Engineers, Inc.
Unico Solar Investors
Unicorn Solar Development
Unirac, Inc.
US Solar
Verde Solutions, LLC
Volt Energy
VSUN Solar USA, Inc.

September 20, 2021

Wanzek Construction

Warehouse Division of World Terminal and Distributing Corporation - WTDC

We Recycle Solar, Inc.

Wunder Capital

X-Elio Energy

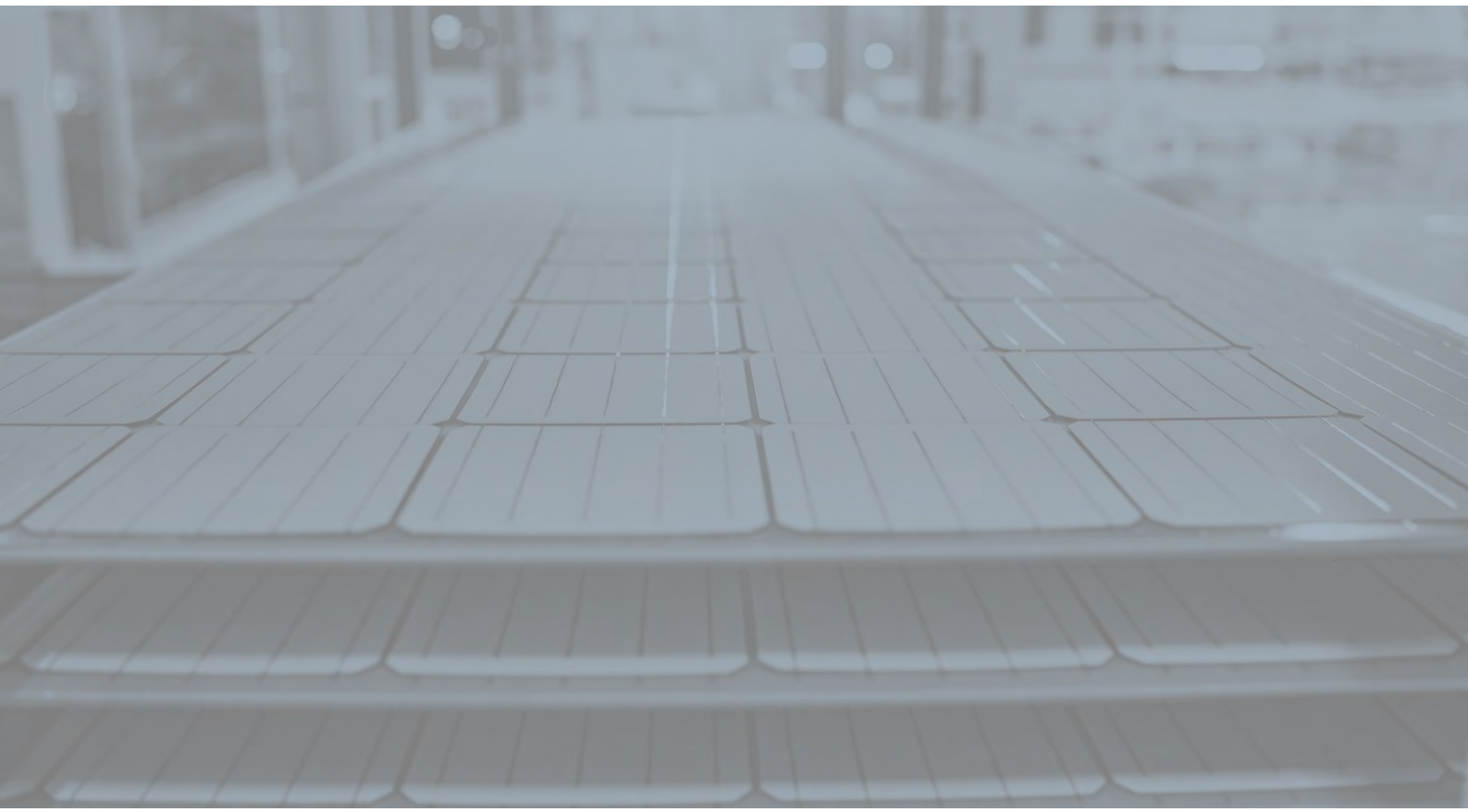
Zhongli Talesun Hong Kong, Limited

Attachment J

SOLAR SUPPLY CHAIN TRACEABILITY PROTOCOL 1.0

INDUSTRY GUIDANCE

April 2021



www.seia.org

FOREWORD

The ability to trace the provenance of components through the supply chain, from input materials to the finished product, is necessary and important for a variety of reasons. From upholding corporate social responsibility principles to quality assurance and environmental performance, robust product traceability provides openness and transparency.

The solar energy industry delivers sustainability solutions to customers by producing energy with low greenhouse gas impacts, improving energy security, and creating jobs and economic development. These considerations, however, are only part of the industry's role in sustainability. More broadly, the solar energy industry has a responsibility to mitigate and manage its full range of social and environmental impacts, which include respecting the human rights of workers, ensuring that the rights of communities and other stakeholders are respected, and making business operations safe and environmentally responsible.

To help meet these obligations, in 2013, SEIA launched the Solar Industry Commitment to Environmental & Social Responsibility (Solar Commitment). The Solar Commitment, developed through a multi-stakeholder process, is an industry code of conduct which defines common practices and expectations for environmental, health, and safety issues and related management systems. A key principle of the Solar Commitment is transparency.

In this context, the U.S. government has identified forced labor as an area of concern for the solar supply chain. U.S. solar customers are also increasingly seeking assurances that the products they purchase are truly sustainable, e.g., free of forced labor. To address these concerns and building upon the industry's existing corporate social responsibility platform SEIA has developed this Solar Supply Chain Traceability Protocol 1.0 (Protocol).

The Protocol is a set of recommended policies and procedures designed to (i) identify the source of a product's material inputs, and (ii) trace the movement of these inputs throughout the supply chain. By implementing the key principles of the Protocol, companies are better able to meet their U.S. import compliance obligations and provide customers supply chain transparency. The Protocol also incorporates an independent, third-party audit mechanism to measure a company's implementation of traceability policies and procedures.

TABLE OF CONTENTS

INTRODUCTION

Transparency of supply chains is paramount. Equipment purchasers, electricity end-users, and other stakeholders demand transparency for reasons ranging from sustainability to corporate social responsibility to import compliance. In this environment, manufacturers must have the proper systems in place to meet stakeholder needs and build trust. To assist the industry, SEIA, with the support of Clean Energy Associates (CEA) and Senergy Technical Services (STS), has developed this Solar Supply Chain Traceability Protocol 1.0 (Protocol) to help manufacturers and importers demonstrate the provenance of their products by developing and implementing a traceability program consistent with the general principles herein.

The Protocol is organized into three primary sections: (i) Principles of Transparency; (ii) Integration of Transparency into Management Systems; and (iii) Integration of Transparency into Operational Processes. The document also provides a case study applying the Protocol to the solar module supply chain and Annexes on Risk Management and Product Traceability Due Diligence.

The Protocol is also intended to help importers meet their U.S. customs law reasonable care obligations and improve an importer's ability to respond to U.S. Customs and Border Protection (CBP) requests for information and audit inquiries. By following the Protocol and producing the documentation recommended herein, an importer should be well-positioned to demonstrate both provenance (where something comes from) and avoidance (locations that are not involved in the production of the product).

Looking forward, questions will arise as suppliers implement and use the Protocol, and new challenges and needs may also come up. To that end, the Protocol will be regularly reviewed and updated to improve clarity and usability and offer additional guidance.

1. SCOPE

The Protocol is intended to have universal application across product lines intended for export to the U.S. market.

Key adopters of the Protocol will include:

- Equipment manufacturers; and
- U.S. importers.

While the Protocol focuses on the provenance of material inputs, it also recognizes the importance of independent, third-party audits and a strong corporate social responsibility and import compliance platform.

In assessing conformance, auditors shall apply a holistic approach which recognizes an organization's unique business processes. No single factor will be dispositive.

2. TERMS AND DEFINITIONS

Accountability - State of being answerable for decisions and activities to the organization's governing bodies, legal authorities, and, more broadly, its stakeholders.

Documentation - Documents and attestations sufficient to generally establish place and date of manufacture and/or transfer of goods.

Due diligence - A comprehensive, proactive process to investigate, appraise, or evaluate a product or organization. Due diligence is conducted to identify the actual and potential consequences of an organization's decisions and activities over the entire life cycle of a project or organizational activity, with the aim of avoiding and mitigating negative impacts.

Governance or management processes - Processes that provide direction and commands for the operational processes. Management processes are usually under the responsibility of the top management of the organization. Examples include planning activities, monitoring, and control processes.

Operational processes - Processes transforming inputs into outputs by providing added value. Examples include sales, design and development, purchasing, and production.

Organization - Company implementing the Protocol.

Principle - Fundamental basis for decision making or behavior.

Sphere of influence - The range and extent of relationships through which an organization can affect the decisions or activities of individuals or organizations.

Stakeholder - Individual or group that has an interest in any decision or activity of an organization.

Supporting processes - Processes supporting project execution by providing resources or other means to other processes. Supporting processes are usually cross functional.

3. PRINCIPLES OF TRANSPARENCY IN THE SUPPLY CHAIN

3.1. GENERAL THEMES: TRANSPARENCY, ACCESSIBILITY, RESPONSIVENESS

The core principles of this Protocol are derived from SEIA's Solar Environmental and Social Responsibility Commitment.

Companies and organizations that participate in international trade have a responsibility to ensure that social, environmental, and quality standards are not compromised by its decisions and activities. The organization should therefore be transparent in its decisions and activities that impact the traceability of its products.

The organization should disclose in a clear, accurate, and complete manner, and to a reasonable and sufficient degree, the policies, decisions, and activities for which it is responsible, including their known and likely impacts on product traceability.

This information should be readily available, directly accessible, and understandable to those who have been, or may be, affected in significant ways by the organization.

The information should be timely, factual, clear, and objectively presented to enable stakeholders to accurately assess the impact of the organization's decisions and activities on their respective interests.

The principle of transparency does not require that proprietary or privileged information be made public. This extends to publishing information whose disclosure would breach legal, commercial, security, or personal privacy obligations. An organization may need to disclose sensitive information to comply with relevant laws or under confidentiality and non-disclosure agreements.

All levels of the supply chain that utilize this Protocol must make reasonable efforts to cooperate in the execution of due diligence to ensure supply chain transparency. A participating organization should be transparent regarding:

- The purpose, nature, and location of its activities;
- The nature, origin, and characteristics of the materials in its products;
- How decisions are made, implemented, and reviewed, including the definition of the roles, responsibilities, accountabilities, and authorities across the different functions in the organization;
- Standards and criteria against which the organization evaluates its own performance and its suppliers' performance relating to transparency in the supply chain;
- Performance on relevant and significant issues of transparency;
- Known and likely impacts of the organization's decisions and activities on its stakeholders; and
- Its stakeholders, and the criteria and procedures used to identify, select, and engage them.

3.2. CORE ATTRIBUTES

3.2.1. ACCOUNTABILITY

An organization should be answerable for decisions and activities to the organization's governing bodies, legal authorities and, more broadly, its stakeholders. The organization should accept appropriate scrutiny and also accept a duty to respond to this scrutiny.

3.2.2. AUDITS

The organization should allow for independent, third-party audits of its supply chain to measure the organization's (i) corporate social responsibility commitments, and (ii) implementation of and compliance with traceability policies and procedures.

In assessing conformance, auditors shall apply a holistic approach which recognizes the organization's unique business processes. No single factor will be dispositive.

3.2.3. RESPECT FOR STAKEHOLDERS' INTERESTS

The organization should respect, consider, and respond to the interests of its stakeholders.

Although an organization's objectives may be limited to the interests of its owners, members, customers, or constituents, other individuals or groups may also have rights, claims, or specific interests that should be considered. Collectively, these individuals or groups comprise the organization's stakeholders.

The organization should:

- Identify its stakeholders;
- Recognize and have due regard for the interests as well as the legal rights of its stakeholders and respond to their expressed concerns;
- Recognize that some stakeholders can significantly affect the activities of the organization;
- Assess and take into account the relative ability of stakeholders to contact, engage with, and influence the organization;
- Take into account the relation of its stakeholders' interests to the broader expectations of society and to sustainable development, as well as the nature of the stakeholders' relationship with the organization; and
- Consider the views of stakeholders whose interests are likely to be affected by a decision or activity even if they have no formal role in the governance of the organization or are unaware of these interests.

3.2.4. RESPECT FOR THE RULES OF LAW

The organization should accept that respect for the rule of law is mandatory. An organization must comply with all applicable laws and regulations, including those of the final destination of its products.

The organization shall take steps to be aware of applicable laws and regulations, to inform those within the organization of their obligation to observe and implement those measures.

An organization must:

- Comply with legal requirements in all jurisdictions in which the organization operates, even if those laws and regulations are inadequately enforced;
- Know its legal obligations; and
- Periodically review its compliance with applicable laws and regulations.

3.2.5. ORGANIZATIONAL GOVERNANCE

Organizational governance can be comprised of both formal governance mechanisms based on defined structures and processes and informal mechanisms that emerge from the organization's culture and values, often influenced by the organization's leaders. Organizational governance is a core function of every organization as it is the framework for decision making within the organization.

Organizational governance is the most crucial factor in enabling an organization to take responsibility for the impacts of its decisions and activities and to integrate social responsibility throughout the organization and its relationships.

3.2.6. PRODUCT TRACEABILITY

Product traceability is the ability to trace the history, application, or location of a product. It follows the movement of a product and its components or material inputs through specified stages of production, processing, and distribution.

Implementing a product traceability system is crucial to develop and enhance transparency in the supply chain, by providing evidence of origin and characteristics of the products the organization offers.

3.2.7. SUPPLY CHAIN SECURITY

Supply chain security is the resistance to intentional acts designed to cause harm or damage to or by the supply chain.

People, goods, infrastructure, and equipment, including means of transport, should be protected against security incidents and their impact on the traceability of the products and, as a consequence, on the transparency of the supply chain.

The level of security in the supply chain should be evaluated and improved to enhance transparency in the supply chain.

3.3. DRIVERS FOR TRANSPARENCY IN THE SUPPLY CHAIN

3.3.1. GENERAL

The motivations of organizations for practicing transparency in the supply chain differ depending on the type of organization and the context in which they operate. Drivers for transparency should be analyzed to help define the transparency objectives and goals for the supply chain and to aid internal communication.

This section provides examples of drivers for the implementation of a transparency system in the supply chain.

3.3.2. EXAMPLES OF DRIVERS

3.3.2.1. Legislation and Regulations

Adherence to this Protocol should help improve a company's compliance with state and federal law.

For example, Section 307 of the Tariff Act of 1930, 19 U.S.C. § 1307 (Section 1307), prohibits the importation of merchandise mined, produced, or manufactured, wholly or in part, in any foreign country by forced or indentured labor. Such merchandise is subject to exclusion and/or seizure by the U.S. government and may lead to criminal investigation of the importer(s).

When information reasonably but not conclusively indicates that merchandise within the purview of Section 1307 is being imported, the Commissioner of U.S. Customs and Border Protection (CBP) may issue a withhold release or detention order pursuant to 19 C.F.R. § 12.42(e). If the Commissioner is provided with information sufficient to make a determination that the goods in question are subject to the provisions of Section 1307, the Commissioner will publish a formal finding to that effect in the Customs Bulletin and Federal Register pursuant to 19 C.F.R. § 12.42(f).

In responding to Section 1307 inquiries, the organization may be asked to provide information regarding the organization's import compliance practices, including:

- Policies and procedures to prevent forced labor in the supply chain, including specific language in supply contracts; and
- The extent to which the supply chain has been certified by independent auditor.

3.3.2.2. Customers

Suppliers should recognize that consumers may have a preference (or requirement) regarding where a product is made or the source of material inputs.

3.3.2.3. Competitive Advantage

In competitive markets the ability to offer goods or services considering a transparent value proposition supported by the supply chains can be a key competitive differentiator.

3.3.2.4. Innovation

Increasing transparency of the supply chain helps stimulate supply chain innovation, leading to greater shared value and new market opportunities.

3.3.2.5. Investor Confidence

Transparency in the supply chain may significantly increase the organization's rating by independent agencies and attract investment.

3.3.2.6. Supply Chain Resilience

Transparency in the supply chain could help avoid supply chain disruption resulting from, e.g., product recalls, financial penalties, or supplier failure.

3.3.2.7. Cost Optimization

Transparency in the supply chain can help identify costs savings opportunities such as economies of scale, leaner supply chain organization, and improved return on investment.

3.3.2.8. Employee Satisfaction

As satisfaction of employees is an increasing concern in many companies, transparency in the supply chain may lead to increased satisfaction, productivity, and attractivity of the company in its retention and recruitment efforts, and more generally in the employee management cycle.

3.4. ORGANIZATIONAL SPECIFICITY

Industry supply chains are highly dynamic and consist of many transformational processes and different chain of custody models. This Protocol recognizes the complexity of these supply chains and the related challenges and complexity of implementing a thorough traceability system.

The Protocol has been developed to allow individual organizations to apply the Protocol's recommendations in conformance with the organization's particular business model and its role and function in the international supply chain.

3.5. MANAGEMENT OF TRANSPARENCY IN THE SUPPLY CHAIN

3.5.1. RISK APPROACH

One key to establishing a robust supply chain transparency system resides in addressing risk – both internal and external. Risk management should therefore be integrated in the decisional and operational activities and conducted in a dynamic, iterative, and responsive manner.

The organization should identify, prioritize, and address risks to increase its resilience to events which can impede product traceability. This includes considering how suppliers are capable of meeting traceability requirements such as monitoring and auditing. It is recommended that the organization conduct an initial review to create a baseline of the risks and opportunities in relation with its products' traceability.

3.5.2. ADDRESSING IMPACTS

As the organization can cause or contribute to adverse impacts on the product traceability, it should put a strong focus on its operational processes such as:

- Its own procurement practices as well as the practices of its suppliers; and
- The design, execution, use, or disposal of the goods or services it provides or procures from external sources.

The organization should implement a due diligence process to identify and address adverse impacts on its supply chain through a structured risk management process, including taking proportionate actions to resolve adverse impacts.

3.5.3. EXERCISING INFLUENCE

The organization should identify and deploy the means to positively influence the behavior of its suppliers and other stakeholders towards an improved product traceability.

Means of influence may derive from direct control over the stakeholder(s), commercial agreements, incentives, reputational advantage, procurement collaboration with other organizations, partnerships with financial institutions, and government authorities' engagement in improvement of the public policies and regulations.

3.5.4. AVOIDING COMPLICITY

The organization should avoid in any way being complicit in wrongful acts of its personnel, management, or other organizations that can have adverse impacts on product traceability. The organization shall avoid being complicit either:

- Directly, by assisting the commission of wrongful acts;
- Beneficially, by benefitting from the commission of the wrongful acts; or
- Silently, by failing to raise the issue of wrongful acts when it becomes known to the organization.

3.5.5. CONTINUOUS IMPROVEMENT

Effective performance of the product traceability system depends in part on monitoring, review, and evaluation of business activities and resource allocation. The organization, based on the context it operates in, should identify the relevant activities that need to be monitored and reviewed by taking into consideration the impact the activities may have on product traceability, with a broad view of the entire supply chain.

The organization may make use of indicators and perform regular reviews of those indicators against defined objectives aligned with the organization's strategies and processes. Based on these regular reviews, the organization should identify ways in which it could improve the performance of product traceability. Improvements may include changes to the scope covered, targets and objectives to adapt to a changing context, evolution of resources, or deployment of new programs to address new opportunities.

3.6. RELATIONSHIP BETWEEN PRODUCT TRACEABILITY AND MANAGEMENT SYSTEMS

This document provides recommendations for organizations to increase confidence in their products' traceability. The objective is not to build a new management system in parallel to existing ones, but rather to provide recommendations that can be easily integrated into existing management systems.

The recommendations are therefore structured around international standards, e.g., ISO9001:2015, which covers governance or management processes, operational processes, and supporting processes.

The structure of the Protocol does not provide a hierarchy or a recommended structure for the product traceability system to be implemented by the organization, but rather aims at identifying similarities with existing management systems for ease of integration.

4. INTEGRATION OF TRANSPARENCY INTO MANAGEMENT SYSTEMS

4.1. CONTEXT

The organization should consider product traceability as a priority issue, internally and externally, in its contextual analysis. Stakeholders should be identified and engaged, and information relevant to material provenance monitored and reviewed.

4.2. STAKEHOLDER ENGAGEMENT

4.2.1. IDENTIFICATION

Stakeholders that have the potential to affect the organization's ability to determine the provenance of materials, and meet customer and applicable statutory and regulatory requirements, must be identified. These shall include upstream suppliers and their suppliers.

4.2.2. ENGAGING STAKEHOLDERS

Stakeholders must be informed of all obligatory, statutory, and regulatory requirements with respect to product traceability.

4.3. MANAGEMENT SYSTEM SCOPE

In determining the management system scope, the organization shall consider product traceability as an internal and external issue, and how to meet applicable obligatory, statutory, and regulatory requirements. The organization must contribute a reasonable best effort to determine material provenance.

4.4. LEADERSHIP AND ACCOUNTABILITY

Top management shall demonstrate leadership and commitment with respect to material provenance by:

- Ensuring integration of product traceability into its management system and business processes;
- Ensuring the resources needed for this additional management system aspect are available;
- Communicating the importance of product traceability and good record keeping;
- Engaging, directing, and supporting persons to contribute to the effectiveness of product traceability;
- Promoting continual improvement; and
- Being ultimately accountable for an effective product traceability process.

4.5. PLANNING

When integrating supply chain traceability into management system planning processes, the organization shall consider:

- How to ensure transparency of the supply chain;
- How to evaluate the effectiveness of the traceability process; and
- What actions to take when stakeholders cannot or will not comply with request.

4.6. RESOURCES

The organization shall determine and provide the resources needed to implement an effective material traceability program by considering the capabilities of, and constraints on, existing internal resources, and obtaining external providers when necessary. Important aspects for personnel resources with respect to material traceability are access to information.

4.7. COMPETENCIES

The organization shall determine the necessary training and competencies required for effective material traceability and ensure personnel completing tasks related to material traceability are competent based on training or experience. The organization shall maintain a training and evaluation program and retain records as evidence of competence.

4.8. AWARENESS

The organization must ensure that personnel completing tasks related to material traceability are aware of the traceability program and its objectives. Personnel must understand their contribution to the effectiveness of the traceability program, and the potential implications of not conforming to the requirements of the program.

4.9. COMMUNICATION

The organization shall determine the most effective way to communicate information relevant to the traceability program to internal and external stakeholders, including:

- What and when to communicate;
- With whom to communicate internally and externally; and
- Who communicates and on what platform(s).

4.10. DOCUMENTATION

The following information has been designated to respond to both audit inquiries and government requests for information.

4.10.1. ESSENTIAL INFORMATION

The organization should be prepared to provide information to relevant stakeholders that includes the following elements:

- Legal name of the company;
- Length of time in business;
- Company structure, including organizational chart; and
- Importer status, when relevant.

4.10.2. TRANSACTIONAL EVIDENCE

The organization should be prepared to present, at a minimum, the following documents related to the transactions throughout the supply chain that resulted in the product being imported:

- Transaction details, e.g., purchase order(s) and contracts between and among the links in the supply chain, associated commercial invoice(s) between and among the links in the chain, and proofs of payment against said invoices;
- Customs entry documents, e.g., CBP Form 7501;
- Freight forwarder notice of arrival;
- International Bill of Lading/Packing List with shipper and product description;
- Foreign inland freight documentation from the manufacturer to the Port of Export for any inter- or intra-link transaction that includes transportation across an international border; and
- Customs broker instructions.

With respect to possible evaluation by CBP of goods suspected to have been produced with forced labor, or, in the event CBP investigates a shipment due to the possibility that something in the shipment is suspected of being tied to a region connected to forced labor, CBP may request additional information.

The organization should expect even further scrutiny from CBP if goods are detained. Detention notices may request the following types of documentation (this is not an exhaustive list and additional documentation may be required):

- Affidavits from each producer in the supply chain that identify where the input material was sourced;
- List of production steps and production records for the product, including records that identify the input materials; and
- Supporting documents related to employees that could include documents related to wages and hours worked as well as daily production output from each factory in the chain.

Additional documents demonstrating social characteristics of the supply chain may also be required. For example, supporting documents related to employees that could include documents related to wages and hours worked as well as daily production output.

4.11. PERFORMANCE EVALUATION

To evaluate the performance of the traceability program, the organization shall determine:

- What must be monitored and measured;
- The methods needed to ensure valid results;

- The frequency of monitoring; and
- When the results from monitoring shall be analyzed and evaluated.

The organization shall retain documented information as evidence of traceability program compliance and performance.

4.12. IMPROVEMENT

The organization shall determine opportunities for improvement and implement actions necessary to meet stakeholders' requirements. In the event of non-conformities to the traceability program the organization will take action to control and correct the non-conformity. The organization shall review and analyze the non-conformity to determine the root cause and implement a corrective action plan to prevent reoccurrence.

4.13. GRIEVANCE MECHANISM

There shall be a grievance and reporting procedure in the event an employee suspects or becomes aware of non-compliance, which should include a non-retaliation provision.

5. INTEGRATION OF TRANSPARENCY INTO OPERATIONAL PROCESSES

5.1. PRODUCT DEVELOPMENT

The organization should factor traceability considerations into the product design process.

5.2. SUPPLY CHAIN MAPPING

The organization should be able to present a description of the entities involved in creating the product that is being imported. This description can include an illustration of the links in the supply chain in a step-by-step flow from raw materials to finished goods, i.e., supply chain map. While the map can take many forms, the essential elements of a map are illustrated here:

Figure 1: Three-step Supply Chain Map

The map should identify individual steps in the process and each step should include information about that step's entity, such as the item being produced, a description of the overall manufacturing process(es) being employed, the name of the producer, and the location of production.

In the case of multiple suppliers of the same item, the map would indicate multiple entities. In the event there are multiple production locations for an entity that are in the supply chain for the final product, the relevant locations should be identified.

Each time there is a transaction between steps in the supply chain, the importer should disclose the nature of the document that codifies the transaction, i.e., a purchase order, supply contract, etc., as well as identify the business unit of the individual who places the order.

Complex products and products with many components or suppliers can lead to complex supply chain maps. These can be simplified by addressing raw materials or intermediate items that are of particular importance, either because of location, cost, uniqueness of the time, or other factors.

A more detailed map is illustrated here:

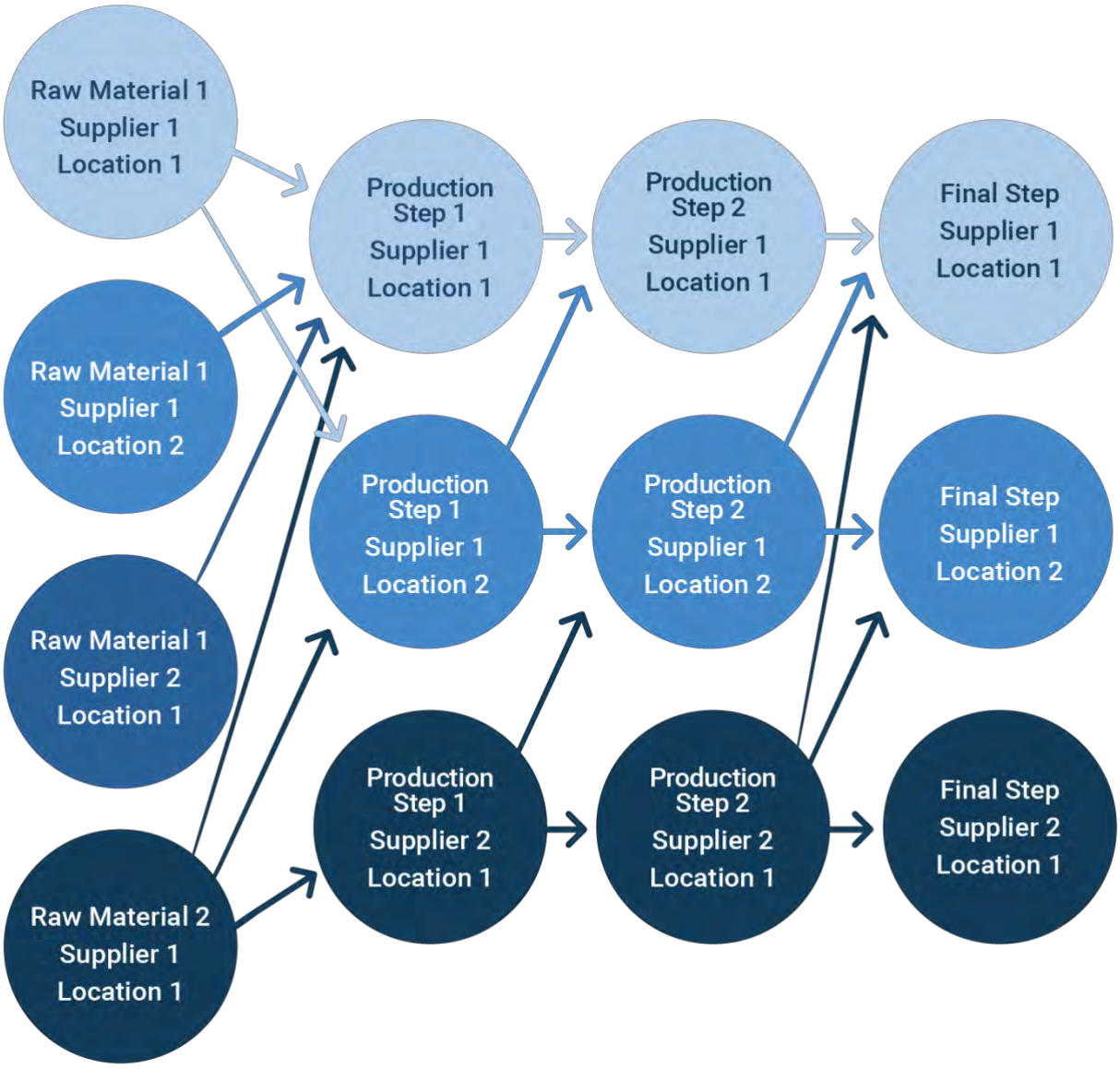


Figure 2: Multi-Location, Multi-Step Supply Chain Map

5.2.1. SUPPLY CHAIN MODELS

5.2.1.1. Mass Balance

An optional additional element of traceability is a match between what comes into a factory and what leaves the factory. For example, a factory shipping 1,000 refrigerators a week (on average) should also be able show purchase and receipt of approximately 1,000 compressors each week (on average) and the source of the

compressors. Applying this to, e.g., solar modules, for a factory that ships 3,000 modules per day (with the equivalent to 72 full-size cells per module), the factory should be bringing in approximately 6.5 million cells per month.

5.3. PROCUREMENT PROCESS

Each step in the solar module supply chain shall have a procurement process that addresses input material traceability explicitly. Documented information shall be retained that identifies specific quantities and volumes of materials, e.g., modules, cells, wafers, etc., that are transformed at each step in the supply chain and transferred between steps. Documented information may include, but is not limited to:

- Requests for quotations and quotations;
- Commercial invoices;
- Purchase orders;
- Bills of lading;
- Export packing lists;
- Airway/vessel bills;
- Dock/warehouse receipts;
- Certificates of origin;
- Warehouse inventory control;
- Production orders;
- Manufacturing / process control; and
- Finished good warehousing.

To the extent reasonably possible, unique identifiers should be used to track individual units through the supply chain. Manufacturers that use input materials from different vendors should have a robust and auditable process for demonstrating, when necessary, control and separation of materials throughout their manufacturing process.

5.4. SUPPLIERS' RELATIONSHIP MANAGEMENT

5.4.1. COMMUNICATION OF THE REQUIREMENTS

Manufacturers shall determine the necessary criteria for effectively tracing input material through their manufacturing process and communicate those requirements to their suppliers. Successful fulfillment of the requirements will provide a clear history of the input material from door-to-door at the supplier's facility as well as a clear link to the previous step in the supply chain.

5.4.2. SELECTION PROCESS

The ability and willingness of suppliers to provide traceability information shall be considered in an organization's supplier selection and qualification process. Organizations at each level of the solar module supply chain should determine and apply the criteria necessary for their suppliers to satisfactorily provide input material to their manufacturing processes. Those criteria should be periodically re-evaluated jointly with the supplier for the supplier to maintain qualification.

5.4.3. PRODUCT TRACEABILITY PERFORMANCE MONITORING

Organizations at each level in the solar module supply chain shall retain the documented information required by their customers and provide such information with shipments or when otherwise requested. Manufactures

at each level of the solar supply chain shall periodically re-evaluate the effectiveness of their suppliers' traceability programs and provide feedback in the form of corrective action requests.

5.4.4. SUPPLIERS' NONCONFORMITIES MANAGEMENT

In the event of non-conformance to the traceability program requirements by a supplier, the buyer will:

- Immediately quarantine the material in questions to prevent possible mixing of inputs;
- Take action to determine the provenance of the material in question before release; and
- Reject the material as non-conforming if true provenance cannot be determined.

If the provenance of the non-conforming material is resolved, then the buyer and supplier shall determine what actions are necessary to prevent recurrence of the non-conformance. If the non-conformance cannot be resolved, the non-conforming supplier's status as "qualified" should be reviewed according to the buyer's supplier selection process.

5.5. PRODUCTION CONTROL

5.5.1. MATERIAL CONTROL

The organization should integrate traceability and security requirements into its receiving process.

Receiving process should include as a minimum:

- Documentary review to identify the source of materials against purchase orders;
- Availability of traceability information, including where applicable access to supplier's traceability system;
- Correct identification of the materials;
- Where applicable, serialization of the materials;
- Integrity of the materials packaging;
- Presence and condition of security elements, including where applicable transportation seals; and
- Documentary review of logistic documentation including bill of lading and transportation information.

The organization should maintain records of receiving control. The receiving process shall be conducted by qualified personnel having received supply chain security training.

5.5.2. TRACEABILITY AND IDENTIFICATION

The objective of the Protocol is to identify all materials and the sources used to produce the product being imported into the United States. Since many products are produced with materials from different factories, the Protocol is designed to examine all factories in the supply chain.

At each point during the production process when an item changes ownership, location (e.g., city, province, country), or form of packaging, a unique identifier should be created and data regarding the item should be recorded and linked to the identifier, to the extent possible. That data should "move" with the item into the next step in the process. Individual steps may require more data than what is needed for traceability. At a minimum, the "moving data" should include for each material input used to produce the finished article:

- Unique identifier for each material input, e.g., lot number, serial number, etc.;
- Vendor name;
- Place of manufacture; and
- Date of manufacture.

For items that are being sold from one entity to another, the information should also include:

- Seller's name;
- Buyer's name; and
- Buyer's purchase order number.

Manufacturers should be aware that government agencies may request additional information, e.g., how labor is secured, whether labor is provided or sourced from any government program, and whether labor is sourced by the factory or via brokers of government programs.

5.5.3. BASIC TRACEABILITY SCENARIO

Supply chains do not always move information from one factory to the next and often only basic information is transferred, such as volume and product name. This Protocol seeks to define the additional information that should go from any step in the total production process to the subsequent step (or factory).

For any individual step, e.g., "N," there is factory information about date of production, factory location, product name, and product identifier. The identifier may be a serial number, a lot number (whereas a "lot" is later divided into amounts of the item as used in the factory), a container number, and eventually the buyer.

Traceability between seller and buyer is straightforward. A seller has an item with some form of identifier and production information; a buyer procures the item, with reference to the identifier and the quantity. The Protocol adds the above production information from N-1, e.g., factory location, production date.

Assume the product from N-1 goes into inventory at N. When N is in production, N should identify the specific item, e.g., lot number, serial number, etc., being pulled from inventory to make N's item.

There may be additional information such as equipment used to make the item, operators who produced the item, quality metrics collected during the production, etc. For purposes of this Protocol, the key information to be collected and made available to step N+1 from step N-1 and step n includes:

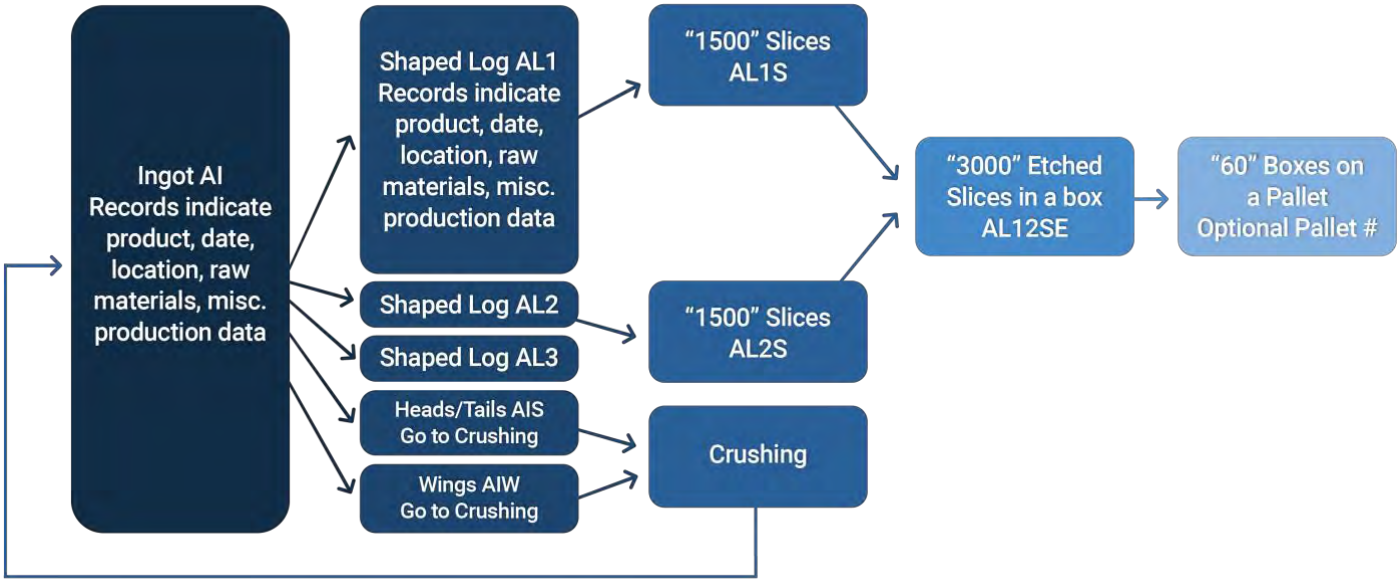
- Date of production;
- Production location (factory identification and city/town); and
- Unique identifier(s) of the materials/items going to the subsequent step.

Within a factory, there may be transformation of materials from one form into another or from an identified item to a collection of items within individual unique identifiers. This type of transformation, even if it takes place within an entity, is akin to a transaction between entities, and information about the "before" and "after" item should be collected.

For example, in the illustration below, an ingot of silicon, with a unique identifier, is shaped into "logs" (each log is given a unique identifier) that are then sliced into wafers. The wafers are not individually identified. The wafers, however, can be identified (such as by a label on a box of wafers) as having come from a particular log or batch of logs.

If wafers from different logs are combined, then a new and unique identifier should be assigned to the mixed batch and the provenance of the wafers in the batch should be linked to the batch identifier.

Figure 3: Processing Ingots and Wafers



In short, for a pallet of wafers, perhaps identified only by a unique pallet number, the purchaser of the wafers should be able to trace the provenance back to a specific ingot or ingots.

5.6. RELEASE OF PRODUCTS

The organization should integrate traceability and security requirements into its product releasing process.

The release process should include, as a minimum:

- Availability of traceability information for the products to be shipped;
- Correct identification of the product;
- Where applicable, serialization of the materials;
- Integrity of the products packaging;
- Presence and condition of security elements, including where applicable, transportation seals; and
- Documentary review of logistic documentation including bill of lading and transportation information.

The organization should have documented procedures to prevent shipment of products that have not passed through the release process.

Releasing process shall be conducted by qualified personnel having received supply chain security training.

6. REFERENCES

SEIA Solar Industry Environmental and Social Responsibility Commitment

ISO 9001:2015 (Quality Management Systems)

ISO 22095: 2020 (Chain of Custody - General Terminology and Models)

SA8000

ISO 19011:2018 (Guidelines for Auditing Management Systems)

Fair Labor Association Workplace Code of Conduct

Combatting Forced Labor: A Handbook for Employers & Business (International Labor Organization)

OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas

ANNEX A: APPLICATION OF THE PROTOCOL TO THE SOLAR MODULE SUPPLY CHAIN

1. RECOMMENDED DOCUMENTATION

Most companies across the solar module supply chain already have advanced systems in place that track materials through the various manufacturing processes. The Protocol envisions organizations' integrating product traceability to upstream suppliers into the applicable management system in such a way that will allow consumers to determine the provenance of material inputs from a specific module all the way back to the plant that produced raw materials. Organizations are responsible for developing and implementing a traceability program that facilitates the vision of the Protocol.

Weaving product traceability into the entirety of the solar module supply chain will necessarily require organizations at each level to cooperate and share sensitive information. The use of non-disclosure agreements and third parties is recommended to maintain operational and intellectual property security. The traceability program implemented by organizations should include specific metrics that are monitored, measured, and evaluated. The effectiveness of the system should be periodically reviewed to determine areas for improvement.

The logistics documents associated with each shipping unit should preserve the upstream provenance of the input material and that information should be linked to the serial number or other relevant identifier of each individual output product. Possible documents include, but are not limited to:

- Purchase orders;
- Shipping manifests;

- Bills of lading;
- Inventory lists;
- Internal delivery notes;
- Consumption records; and
- Other logistics documents.

Each production output should have a unique serial or batch number that can be used to trace input material. The unique identifier should provide access to information relevant to the production of the output product, including but not limited to:

- Production facility details;
    - Name and address of the manufacturer;
    - Names of executives and corporate officers;
    - Production capacity and employee count;
    - Order fulfillment process and timeline;
- Date and time of manufacturing;
- Production order;
- Relevant production process details, e.g., polysilicon reactor number;
- Finished goods warehouse inventory; and
- Shipping/consumption notice.

The following demonstrates the Protocol as applied to the full production cycle of a solar module, from metallurgical grade silicon to the finished solar panel. Users of the Protocol will need to decide which segments of the supply chain are relevant to their given circumstances.

1. METALLURGICAL GRADE SILICON

Inputs for production of metallurgical grade silicon (MGS) that is destined for use in solar modules should be delivered in designated, serialized shipping units. Each individual MGS output should have a unique serial number or equivalent identifier.

In addition to conservation of the provenance of the MGS output product, manufacturers should also, where necessary, maintain auditable processes for keeping input material from different sources physically separated.

2. POLYSILICON

Inputs for production of polysilicon (poly-Si) that is destined for use in solar modules should be delivered in designated, serialized shipping units. The logistics documents associated with each shipping unit should preserve the upstream provenance of the input materials and that information should be linked to the output products.

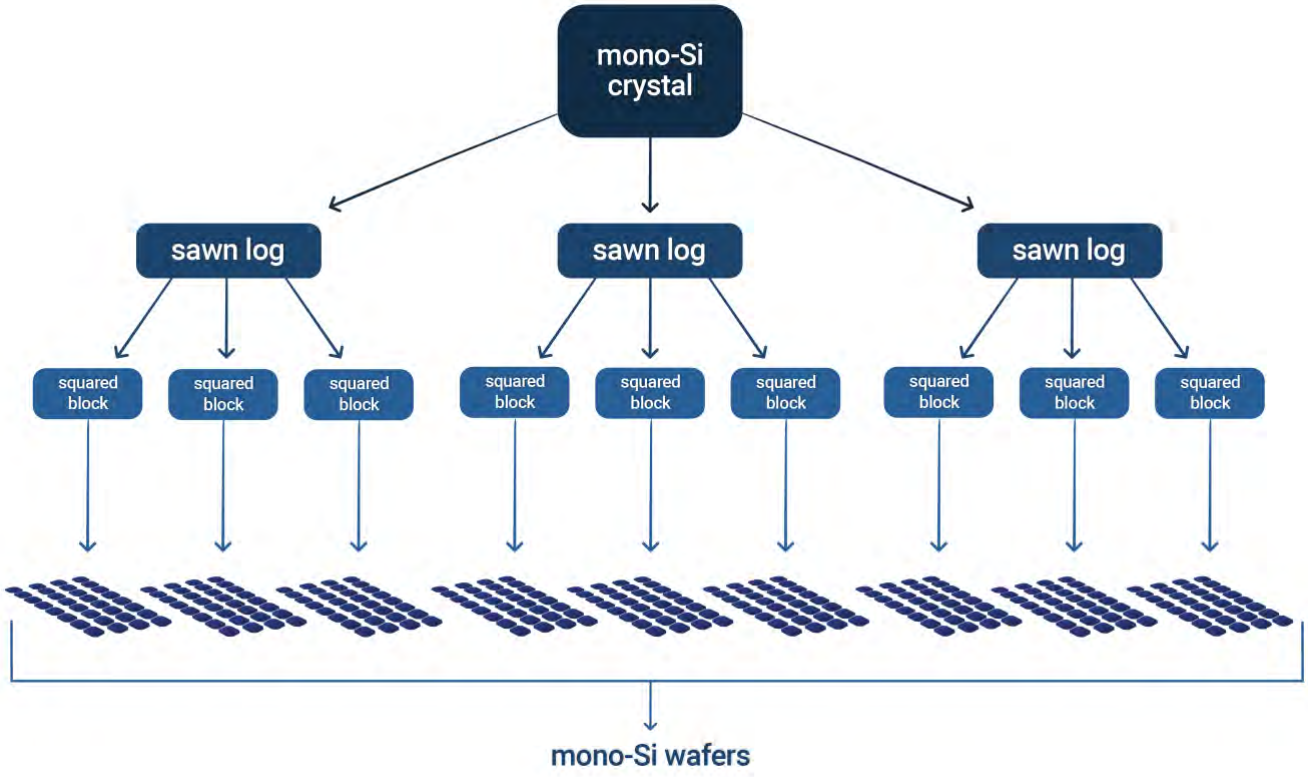
The manufacturing processes for poly-Si should include rigorous controls to prevent mixing of input material from different sources. Poly-Si outputs should be grouped and stored with clear physical and digital separation by input material. Poly-Si output material should be stored and shipped in designated and serialized shipping units. Each shipping unit should have a unique serial number that can be used to trace the input MGS material.

In addition to conservation of the provenance of the poly-Si output product, manufacturers should also maintain an auditable process for keeping input material from different sources physically separated.

3. SOLAR WAFER

Poly-Si inputs for production of monocrystalline silicon wafers destined for use in solar modules should be delivered in designated and uniquely identifiable shipping units, e.g., lot or batch number. The logistics documents associated with each shipping unit should preserve the upstream provenance of the input material and that information should be linked to the output product.

The manufacturing processes of solar wafers should include, when necessary, rigorous controls to prevent mixing of input poly-Si from different sources. Additionally, there may need to be rigorous controls to prevent mixing of intermediate products on the production floor. Each intermediate product generated during solar wafer production should be tracked with a Manufacturing Execution System (MES) that can link each intermediate product to its parent product and resulting product(s).



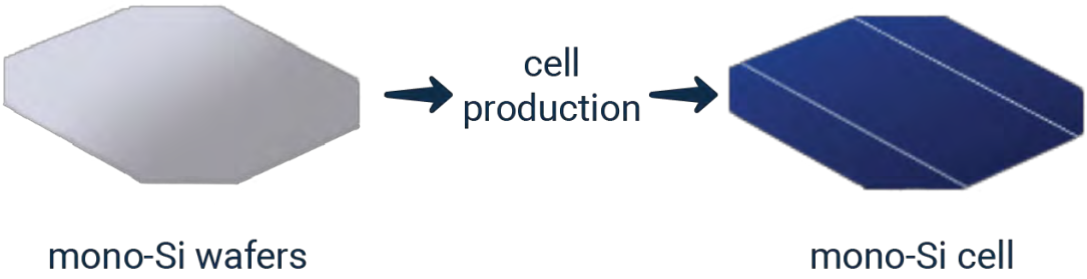
Solar wafer output material should be boxed in defined and easy to handle amounts, e.g., 100 wafers per box. Each shipping unit above should have a unique serial number that can be used to trace the input poly-Si material.

In addition to conservation of the provenance of the solar wafer output product, manufacturers should also maintain, when necessary, an auditable process for keeping input material from different sources physically separated at each intermediate step in the solar wafer manufacturing process.

4. SOLAR CELL

Solar wafer inputs for the production of solar cells should be delivered in designated and traceable shipping units. The logistics documents associated with each shipping unit should preserve the upstream provenance of the input material and that information should be linked to the output product.

Where material inputs from different sources are mixed or blended together, the manufacturing process should include rigorous controls to maintain provenance, e.g., the source of both inputs travels across the supply chain. Each intermediate product generated during solar cell production, should be tracked with a Manufacturing Execution System (MES) that can link each intermediate product to its parent product and resulting product.



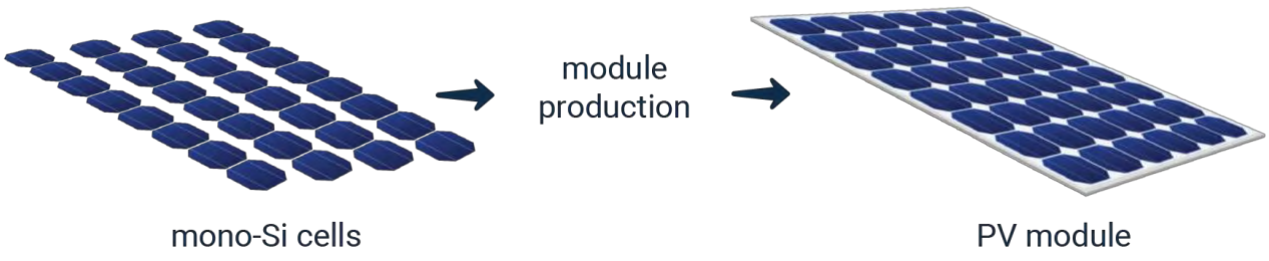
Solar cell output material should be boxed in defined and easy to handle amounts, e.g., 100 wafers per box. Boxes of cell may be combined into larger boxes which are then combined on a pallet. Each shipping unit should have a unique identifier, e.g., unique box number, that can be used to trace the input solar wafer material.

When necessary, manufacturers should also maintain an auditable process for keeping material from different sources physically separated at each intermediate step in the solar cell manufacturing process.

5. SOLAR MODULE

Solar cell inputs for production of solar modules should be delivered in designated, serialized shipping units. The logistics documents associated with each shipping unit should preserve the upstream provenance of the input material and that information should be linked to the output product.

The manufacturing processes of solar modules should include rigorous controls to prevent mixing of input cells from different sources. Additionally, there must be rigorous controls to prevent mixing of intermediate products on the production floor. Each intermediate product generated during solar module production should be tracked with a Manufacturing Execution System (MES) that can link each intermediate product to its parent product(s) and resulting product(s).



Solar module outputs should be palletized in defined amounts, e.g., 20-30 modules per pallet. Each pallet should have a unique serial number that can be used to trace the input solar cell material.

In addition to conservation of the provenance of the solar module output products, manufacturers should also maintain an auditable process for keeping input material from different sources physically separated at each intermediate step in the module manufacturing process.

ANNEX B: GUIDANCE ON RISK MANAGEMENT

6. RISK FACTORS

Supply chain risks can be associated with the following:

Factor	Associated risk
Planning	Failure to determine the extent, duration, number, location of the due diligence activities
Resources	Insufficient time, equipment, training for developing the due diligence program
Competence	Selection of due diligence team, insufficient competence to conduct related activities
Communication	Insufficient/ineffective communication means and channels
Information	Ineffective determination of the necessary documentation to perform a correct evaluation
	Confidentiality of the information collected
	Language, cultural and social issues
Stakeholders	Availability and cooperation of the organizations subjected to due diligence process
	Travel and auditing restrictions

7. RISK MANAGEMENT CHARACTERISTICS

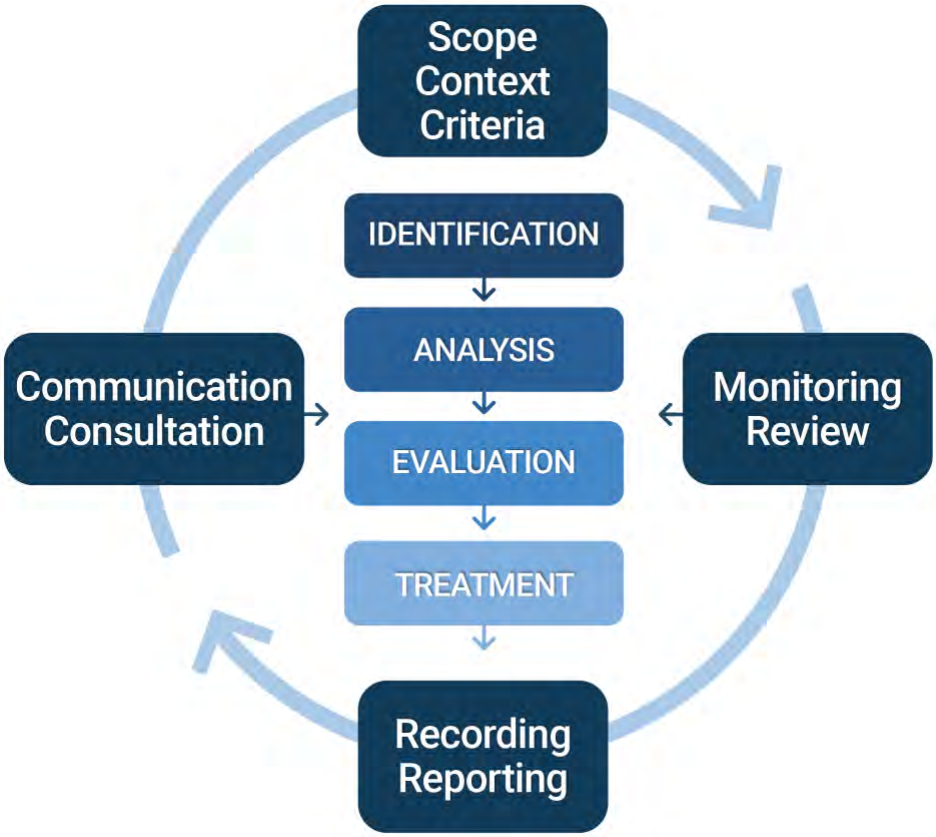
Risk management processes should have the following characteristics:

- **Integrated -** Risk management should be integrated by the organization as part of all its operational activities.
- **Structured and comprehensive -** A structured and comprehensive approach to risk management contributes to consistent and comparable results.
- **Customized -** The risk management framework and process should be customized and proportionate to the organization's external and internal context.
- **Inclusive -** Appropriate and timely involvement of stakeholders enables their knowledge, views, and perceptions to be considered.

- **Dynamic -** Risks can emerge, change, or disappear as an organization's external and internal context changes. Risk management anticipates, detects, acknowledges, and responds to those changes and events in an appropriate and timely manner.
- **Best available information -** The inputs to risk management are based on historical and current information, as well as on future expectations. Risk management takes into account any limitations and uncertainties associated with such information and expectations. Information should be timely, clear, and available to relevant stakeholders.
- **Human and cultural factors -** Human behavior and culture significantly influence all aspects of risk management at each level and stage.

8. RISK MANAGEMENT PROCESS

Risk management processes shall follow an improvement cycle based on the inputs gathered.



9. RISK IDENTIFICATION

In the risk identification phase, the organization should create an objective list of the risks taking into consideration a variety of factors, such as the nature of risk and changes in risk profile.

The organization may use different techniques such as interviews, surveys, and auditing to increase reliability in the characterizations of the risk.

It is recommended that the organization identifies risk emerging from all its stakeholders.

10. ANALYSIS AND EVALUATION

The organization should prepare a risk evaluation matrix to assess:

- **Severity -** Impact of the risk on the reliability of the product traceability through an evaluation of the consequences of the risk materialization.
- **Likelihood -** The probability of the risk to actually materialize.

During the evaluation phase, the organization shall also consider the existing measures and controls in place that might affect either the severity or the likelihood or both.

11. RISK TREATMENT

Based on the evaluation phase, the organization shall take appropriate and proportionate actions to address the identified risks.

Risk treatment may follow a gradation in the actions according to the impact or the likelihood for the risk to materialize, and should consider the following:

- Avoiding the risk by deciding not to start or continue with the activity that gives rise to the risk;
- Removing the risk source;
- Changing the likelihood;
- Changing the consequences;
- Sharing the risk, e.g., through contracts, buying insurance, etc.;
- Taking or increasing the risk to pursue an opportunity; and
- Retaining the risk by informed decision.

ANNEX C: GUIDANCE ON DUE DILIGENCE

1. DUE DILIGENCE PRINCIPLES

Due diligence is a comprehensive and proactive process to identify the actual and negative impacts of the organization's decisions and activities on supply chain transparency with the aim of avoiding and mitigating those impacts.

Due diligence may also help the organization identify opportunities to exercise influence and positively impact decisions and activities on supply chain transparency.

Due diligence should be an essential part of an organization's effort to monitor and evaluate the performance and efficiency of the various systems deployed by the organization.

1.1. CHARACTERISTICS OF DUE DILIGENCE

1.1.1. RISK BASED

The measures that the organization takes to conduct due diligence should be proportionate to the risks identified. The due diligence approach should therefore be tailored to the likelihood and the severity of the impact of risks and take into account the nature the risks.

Where it is practically not possible to address all the risks in the due diligence process, the organization should prioritize its actions according to the level of the different risks it has identified.

1.1.2. CONTEXT RELATED

The nature of the risks and threats to supply chain security may be affected by different factors such as the size of the organization, its position in the supply chain, the stakeholders involved, and social, political, and geographic context in which it operates, or the nature of its operations, including the products it purchases and delivers and the processes involved in their transformation.

The nature and extent of due diligence should be adapted to the context to effectively identify and manage the risks.

1.1.3. PREVENTIVE AND CORRECTIVE

Due diligence is intended foremost to avoid causing or contributing to the materialization of the risks identified and to prevent adverse impacts.

Where adverse impacts cannot be prevented, due diligence may be used as a means to identify potential opportunities to mitigate the risks and prevent recurrence.

1.1.4. MULTI-DIMENSIONAL

The organization should establish a defined scope for due diligence which addresses risks related to different processes, resources, or products.

1.1.5. DYNAMIC

Emergence, likelihood, and severity of risks vary in time. Therefore, due diligence should not be static but continuous and responsive to the evolution of the situation and able to respond to changes. For that purpose,

efficiency of the due diligence process should be monitored and reviewed, and if needed, improved to achieve its objectives.

1.1.6. COMMUNICATION DEPENDENT

The due diligence process involves many stakeholders whether internally in the organization or externally with business partners, authorities, auditing third parties, and other organizations having an interest or that could be affected by the organization's activities or decisions.

Communication is a major part of the due diligence process itself, and a key success factor in this process is the engagement of stakeholders. The organization should communicate timely and appropriately throughout the due diligence process.

1.2. DUE DILIGENCE FOCUS AREAS

	FOCUS AREA	DESCRIPTION
1	**MANAGEMENT SYSTEM**	
	Corporate governance	Structure, policies, and procedures
2	**INFRASTRUCTURE**	
	Facilities	Physical locations (facilities) involved in the supply chain, suitability organization
	Information technology	Ability of the system to ensure traceability
3	**PEOPLE**	
	Training and awareness	Risks, threat awareness, employee training
4	**DOCUMENTATION**	
	Data management	Storage and backup of data
5	**OPERATION**	
	Purchasing	Traceability requirements in purchasing contracts
	Design and development	Integration of traceability in products development
	Receiving of materials	Control of traceability for incoming materials
	Storage of materials and products	Management of materials and products
	Production	Identification throughout the manufacturing process

		Segregation of materials
		Non-conformity management
		Packaging
	Shipping	Dispatch, loading, shipping sealing

1.3. RISK ASSESSMENT

Prior to establishing the due diligence program, the organization should identify and evaluate the risks to prioritize and define the scope of the due diligence program. Please refer to the Annex B: Guidance on Risk Management for further information.

2. ROLES AND RESPONSIBILITIES

2.1. LEADERSHIP

Due diligence should be an integral part of the decision-making process when addressing supply chain security issues.

Top management of the organization should take ownership of due diligence by:

- Sponsoring the due diligence program;
- Providing the necessary resources needed to ensure correct implementation of the program;
- Reviewing the results of the due diligence; and
- Validating the actions needed to improve the due diligence program and ensuring their implementation.

2.2. ACCOUNTABILITY

Each organization has a responsibility to ensure traceability of the part of the supply chain under its control.

3. DUE DILIGENCE PLANNING

3.1. GENERAL

Due diligence should be carefully planned to achieve the objectives set by the organization. The organization should consider all the factors that may impact the security of the supply chain when planning and designing the due diligence process. The organization should also consider factors such as flexibility and reactivity in the due diligence process to adapt to dynamic supply chains.

3.2. ESTABLISHING A DUE DILIGENCE PROGRAM

The due diligence program should consist of:

- Identifying the scope or extent of the program, e.g., the parts of the supply chain under due diligence;

- Due diligence processes, including communication processes;
- Resources assigned to each activity and the required competence;
- Implementation schedule;
- Documentation necessary for the implementation of the program; and
- Due diligence metrics.

3.3. SCOPE OF THE DUE DILIGENCE

The scope of the due diligence should be based on and tailored to previous cycles of due diligence and review of those results, as well as the risks identified during risk analysis. For that purpose, the organization should establish a clear mapping of the supply chain.

3.4. DUE DILIGENCE CYCLE

The organization should, based on the scope and the risks identified, determine the frequency of the due diligence to be conducted.

The frequency may be adapted based on the results of previous due diligence activities and may vary in scope for the different parts of the supply chain.

The organization should conduct a full due diligence cycle annually.

3.5. DILIGENCE PROCESS DESIGN

Due diligence may be performed through different forms with different characteristics. It is understood that the different forms of due diligence may be combined to increase reliability and efficiency.

4. SUPPORT

4.1. RESOURCES

Depending on the forms of due diligence the organization has selected, it should plan for and provide the appropriate resources to conduct the due diligence process. Resources may consist of human resources, tools, and software according to the form of process selected.

The organization should consider the internal capabilities of and constraints on existing resources while developing the due diligence process.

4.2. COMPETENCIES

4.2.1. GENERAL

The organization should ensure that the necessary competencies are available within the organization to conduct the due diligence process, especially within the functions of the organization impacted by the due diligence and its impact on the decision-making process of the organization.

The organization should evaluate the existing level of knowledge available and where applicable, take the necessary action to acquire the competencies necessary to conduct the due diligence activities, through the form of training to the relevant personnel of the organization.

When determining the necessary competencies for the due diligence process, the organization should consider:

- Size, nature, complexity, products, and processes of the organization being subjected to due diligence;
- Due diligence forms and methods;
- Extent of the due diligence scope; and
- Nature and level of risks identified in the planning phase.

4.2.2. EXPECTED COMPETENCE OF DUE DILIGENCE PERSONNEL

Personnel conducting the due diligence process should possess the necessary attributes to enable them to act in accordance with the required principles. Personnel should exhibit professional and ethical behavior during the performance of due diligence.

Where due diligence is performed by a team, the organization should take into consideration the ability of the team leader to:

- Plan due diligence activities and assign tasks;
- Make effective use of resources;
- Manage the uncertainty of achieving the intended results of the due diligence;
- Protect the health and safety of the team members;
- Direct team members in their activities;
- Prevent and resolve conflicts and problems that may occur during the due diligence process; and
- Lead the team in reaching conclusions and report on findings.

Audits shall be conducted by third-party organizations who are qualified and independent of the customer-supplier relationship and free of conflicts of interest, e.g., recognition by a national public authority or an accreditation body which is a member of the International Accreditation Forum or conducts audit in conformance with ISO 19011.

4.3. COMMUNICATION

4.3.1. GENERAL

The organization should establish a communication plan to the different stakeholders of the company in relation with the due diligence process. The plan should establish:

- What to communicate;
- When to communicate;
- To whom to communicate (internally and externally); and

- How to communicate.

The organization should ensure that the communication plan considers its legal requirements and answers its interested parties' requirements. The organization should also be ready to respond to requests for communication coming from inside and outside of the organization.

4.3.2. INTERNAL COMMUNICATION ON DUE DILIGENCE

The organization should communicate the results of its due diligence process, especially to the functions of the organization involved in the management of business partners such as purchasing and quality management.

The organization should ensure that internal communication allows for improvement of the due diligence process by internal personnel.

4.3.3. EXTERNAL COMMUNICATION ON DUE DILIGENCE

The organization should communicate information relevant to the due diligence process with external stakeholders and take into account its legal requirements such as authorities' requirements during the importing/exporting process.

4.4. DOCUMENTATION

The personnel responsible for the implementation of the due diligence program should ensure that records are generated, managed, and maintained to demonstrate implementation of the program.

Specific attention should be paid to information security and the management of confidentiality while maintaining records.

Due diligence records could include:

- Schedule of due diligence activities;
- Due diligence program objectives and scope;
- Risks and opportunities identified;
- Reviews of due diligence program effectiveness;
- Due diligence reports, evidence and findings;
- Corrective actions reports;
- Competence evaluation of due diligence personnel; and
- Training records of due diligence personnel.

5. IMPLEMENTATION OF THE DUE DILIGENCE PROGRAM

5.1. OVERVIEW OF DUE DILIGENCE PROCESS

The implementation of the due diligence process will consist of the repetition of individual due diligence activities, combined and summarized to provide an overview of the whole supply chain in the scope of the due diligence program.

5.2. DUE DILIGENCE ACTIVITIES CYCLE

5.2.1. INITIATING DUE DILIGENCE ACTIVITY

The audit team should first establish a dialogue with the organization's compliance department and confirm communication channels, including:

- Confirm authority to conduct due diligence activity;
- Provide relevant information on the due diligence process (e.g., scope, criteria, methods, teams, schedule);
- Request access to relevant information to conduct due diligence activity;
- Determine applicable statutory and regulatory requirements;
- Confirm management and treatment of information, especially the management of confidentiality;
- Confirm arrangements including schedule, access, health and safety, and security;
- Confirm attendance of observers where applicable;
- Determine relevant areas of interest or concern with the organization subjected to due diligence activity

5.2.2. PREPARING DUE DILIGENCE ACTIVITIES

The organization should review the documented information collected at the initiating phase of the due diligence activity to:

- Gather information to understand the operations of the organization; and
- Establish an overview of the extent of the documentation to determine possible conformity to the due diligence criteria.

Documentation should include, but is not limited to, security related management systems documentation, procedures, work instructions, and records.

The organization should especially focus on documentation related to management of suppliers, such as code of conducts, agreements, and training material and evaluation.

5.2.3. CONDUCTING DUE DILIGENCE ACTIVITY

Auditing is recognized as an essential element of due diligence activity.

Where the due diligence activities include onsite activity such as auditing the organization should conduct an opening meeting to: (i) confirm the agreement of all participants; (ii) introduce the due diligence team and their roles; and (iii) ensure that the planned activities can be performed.

The opening meeting should be attended by the management of the organization subjected to due diligence and, where appropriate, the personnel responsible for the processes impacting supply chain security.

The organization should retain records of attendance to the opening meeting.

5.2.4. COLLECT AND VERIFY INFORMATION:

During the audit activity, the information relevant to the due diligence objectives, scope, and criteria should be collected by means of appropriate sampling and should be verified as far as practicable.

Due diligence evidence should be evaluated against the criteria to determine findings, which can demonstrate conformity or nonconformity with the due diligence criteria and provide opportunities for improvement and recommendations.

5.2.5. DETERMINE AUDIT CONCLUSIONS

Audit conclusions should address the conformity of the processes evaluated against the defined criteria and may address recommendations for improvement.

5.2.6. CONDUCT CLOSING MEETING

A closing meeting should be held to present the audit conclusions. As appropriate, the following should be explained to the auditee:

- Audit evidence collected;
- Method of reporting;
- How to address audit findings;
- Presentation of audit findings; and
- Post audit activities.

Diverging opinions regarding findings should be discussed, if possible resolved, and otherwise recorded.

The figure below shows how information is managed during due diligence activities:

5.2.7. PREPARING THE REPORT

The due diligence personnel should report the due diligence conclusions and provide complete, accurate, concise, and clear records of the due diligence activities. At a minimum, the due diligence report should include the following:

- Due diligence objectives;
- Due diligence scope, including functions and processes subjected to due diligence and where applicable exclusions;
- Identification of the team having performed due diligence activities;
- Date and locations where due diligence activities were conducted;
- Due diligence criteria;
- Due diligence findings and related evidence;
- Due diligence conclusions; and
- Any diverging opinions recorded during the closing meeting.

The due diligence report should be issued within an agreed period and distributed in accordance with the due diligence program.

5.2.8. COMPLETING DUE DILIGENCE ACTIVITIES

Due diligence is complete when all planned activities have been carried out, or when the exclusions have been duly approved by the relevant authority.

Documentation pertaining to the due diligence should be retained as evidence for follow up activities or disposed of by agreement with the organization subjected to the due diligence and applicable requirements.

Unless required by law, the organization should not disclose any information obtained during the due diligence process to other parties unless otherwise agreed by the organization subjected to the due diligence process.

5.2.9. CONDUCTING DUE DILIGENCE FOLLOW-UP

The outcome of the due diligence can, depending on its objectives, indicate the needs for corrective actions arising from issues identified during the due diligence process. Such actions and the timeframe for their implementation should be agreed upon between the relevant parties.

The implementation and effectiveness of these actions should be verified. The verification process may take the form of documented evidence or be part of a subsequent audit, depending on the nature and the severity of the issue identified.

6. DUE DILIGENCE PERFORMANCE EVALUATION

Personnel managing due diligence for the organization should ensure the evaluation of the due diligence program. Evaluation should include:

- Respect of the schedules set for the program;
- Achievement of the objectives of the due diligence program;
- Performance of the personnel involved in the due diligence program;

- Feedback from relevant interested parties, including employees, business partners, and authorities; and
- Audit reports and performance of the organizations subjected to due diligence.

7. SOCIAL COMPLIANCE SYSTEM

7.1. POLICIES AND PRACTICES

Numerous stakeholders have an interest in not only respecting the rule of law but also in pledging that products and goods bought and sold are manufactured in an ethical way, e.g., where labor is treated with respect and dignity.

The supplier should have an established environment, health, and safety (EHS) code of conduct (sometimes referred to as a code of ethics or social compliance system) that highlights, among other things, the company's position with respect to human rights and requirements for its vendors to have an equal policy regarding forced labor.

The EHS code of conduct should be available to the public and should be supported by a clear and consistent process for communicating the code to the entity's employees and vendors.

7.2. SOCIAL COMPLIANCE DUE DILIGENCE DOCUMENTS

The organization should be prepared to present the following documents:

- Audit and inspection reports;
- Factory certifications;
- Factory capabilities;
- Human resources information, such as number of employees and labor recruitment policies;
- Factory owners/corporate information;
- Production reports indicating when production took place that was used to make the final product; and
- Records indicating when raw materials were received (for raw materials that were used to make the material or the product).

8. REASONABLE CARE

CBP and importers have a "shared responsibility" for import compliance. CBP has a duty to inform the public concerning the trade community's rights and responsibilities under CBP regulations and related laws. In turn, importers must use "reasonable care" to provide documentation to CBP (see *Reasonable Care*, wherein CBP highlights key issues related to, among other topics, forced labor).[1]

[1] Available at https://www.cbp.gov/sites/default/files/assets/documents/2020-Feb/icprescare2017revision.pdf.

U.S. law prohibits the importation of goods made with forced labor. As part of their reasonable care obligations, companies should take steps to prevent forced in their supply chains and be prepared to respond to government requests for information.

For example, CBP may request copies of the supplier's EHS code of conduct and inquire specifically as to whether the code:

- Provides for freedom of association and collective bargaining;
- Prevents discrimination in employment;
- Prevents child labor, e.g., specifically prohibits forced child labor and describes the prohibited forms of child labor;
- Prevents forced labor and trafficking in persons, e.g., describes prohibited forms of forced and involuntary labor;
- Addresses fair compensation, e.g., prohibits workers from paying costs to obtain a job and prevents the withholding of wages; and
- Addresses occupational health and safety, including industrial hygiene, emergency preparedness, safety equipment, sanitation, and access to food and water.

The importer should also be prepared to describe how its EHS code of conduct is communicated throughout the organization and the supply chain, how it is monitored with respect to understanding and enforcement, and how stakeholders are asked for input. CBP may also inquire about independent third-party audits related to the code of conduct and whether the importer or any element of the supply chain has made changes to the code of conduct as a result of CBP advisory notices.

9. CONTINUOUS IMPROVEMENT

9.1. GENERAL

Personnel managing due diligence for the organization should ensure that the program is continually improved based on the evaluation conducted. The review should include:

- Results and trends of the due diligence process;
- Evolving needs and expectation of relevant interested parties;
- Due diligence program records;
- Alternative or new due diligence methods;
- Effectiveness of the actions to address risks and opportunities; and
- Confidentiality and information security.

9.1.1. NONCONFORMITY MANAGEMENT

In this section, nonconformity refers to findings identified during the due diligence process or to a nonconformity arising from the process itself.

Nonconformity arising from the process itself may include:

- Failure to perform due diligence as agreed;
- Unresolved diverging opinions on the outcome of the due diligence process;
- Reported Impartiality or ethical issues occurring during due diligence;
- Competences issues identified during the diligence process; and

- Breach of confidentiality or information security occurring the due diligence process.

The organization should establish a process, including reporting, investigating, and taking actions to determine and manage nonconformities.

When a nonconformity occurs during due diligence, the organization should as applicable:

- React timely to control the nonconformity;
- Take actions as applicable to correct the nonconformity and deal with the consequence; and
- Take actions to prevent reoccurrence of the nonconformity.

Attachment K

Solar Equipment Buyers' Guide for Supply Chain Traceability

Introduction

Deployment of renewable energy systems in the U.S. has grown rapidly over the past decade. Costs have dropped, and regulatory developments and new ownership and financing models allow more Americans than ever to choose renewable energy.

In parallel, project developers and owners, end-users (e.g., homeowners and utilities), and other stakeholders are closely examining how solar equipment is manufactured. Motivations include ensuring that the products meet quality standards, corporate social responsibility requirements, environmental considerations, and applicable laws. Consequently, manufacturers are increasingly being asked to demonstrate the provenance of not only the products they sell but also key material inputs.

In response to this need, Solar Energy Industries Association (SEIA), in collaboration with Senergy Technical Services (STS) and Clean Energy Associates (CEA), created a traceability tool or protocol designed to help increase transparency in renewable energy supply chains and increase confidence in renewable energy products.

The SEIA Traceability Protocol

The SEIA Traceability Protocol (Protocol) lays out a series of steps that a manufacturer can take to track the origin of material inputs through specified stage(s) of production, processing, and distribution, e.g., the factory location and production date of polysilicon used in a finished solar module. The Protocol aims at helping capture and making transparently available to stakeholders which companies and facilities participated in the manufacturing of renewable energy products on the market.

It is worth noting that the Protocol itself does not seek to determine other features of the product, such as product quality. Rather, it aims to equip stakeholders with trustworthy and transparent information about the supply chain.

For each "step" or "link" within the supply chain, the Protocol requires that certain information about the material inputs used within each production step is conveyed to the next step of the production process. In the event a step in the process includes multiple sources of materials, the Protocol asks for the producer to track which products use which input material and, if necessary, to segregate input materials.

In a robust implementation of the Protocol, a supplier could show the provenance of, for example, polysilicon used in a crystalline silicon photovoltaic module. This information can be used, for example, to address inquiries from U.S. Customs and Border Protection ("CBP") or customers regarding the source of material inputs.

The Protocol also recognizes that strong organizational controls must be in place to ensure compliance and, in turn, confidence in a supplier's claims. Examples of such controls include:

- Independent, third-party audits applied to internal processes and third-party suppliers;
- Corporate social responsibility codes of conduct;
- Security measures to safeguard information and prevent tampering of goods;
- Due diligence and monitoring of suppliers;
- Compliance programs;
- Trainings of employees; and
- Enforcement of policies and procedures along with corrective action plans.

Solar Equipment Buyers' Guide for Supply Chain Traceability

Role of Manufacturers in the Application of the Protocol

Manufacturers along the supply chain are responsible for implementing the Protocol.

The Protocol offers guidelines for a manufacturer to document provenance of the materials used in production, beginning with a description of the supply chain that creates the product and followed by identification of each of the components of the product and its provenance.

As applied to the solar module supply chain:

- The module assembly operation establishes the materials used to make the module and their provenance, including the cell;
- The cell operation establishes the materials used to make the cell and their provenance, including the wafer; and
- The wafer operation establishes the materials use to make the wafer and their provenance, including the polysilicon.

When the Protocol is applied at each step of manufacturing, the module supplier gains access to data from all links in the chain and can demonstrate provenance of all components.

Buyer's Role in the Protocol

While buyers may not play a direct role in implementing the Protocol, their role is important in ensuring the key principles of Protocol are applied. Below are some suggestions on how to become better informed about your supply chains:

- **Encourage suppliers to use the Protocol or a traceability solution which adopts the Protocol's essential elements**. Transparency in supply chains helps ensure that the products you purchase meet your needs. The Protocol has been designed to improve transparency in the supply chain.
- **Verify that suppliers adhere to the Protocol**. Buyers should ask whether manufacturers conduct due diligence to ensure compliance with the protocol, e.g., by providing a copy of an audit conducted by a qualified, independent third-party organization. This due diligence should also apply to the manufacturer's upstream suppliers.
- **Assess your suppliers**. Assessing suppliers upfront will help you better understand their policies and procedures, and therefore evaluate the potential risks. Below are potential questions to ask when talking with a supplier.

Key Questions to Ask Suppliers

- Do you follow the SEIA Traceability Protocol? If not, why not?
- Do you and your suppliers have a corporate social responsibility code of conduct or policy in place? If so, can you share it?
- Does your code of conduct address the areas covered by the International Labor Organization's core labor standards?
- Do you communicate your code of conduct to your suppliers?
- What steps do you take to ensure that you and your suppliers are in compliance with U.S. laws and regulations?

- Can you show where the product is manufactured and where the inputs come from? For example, can you explain where the module, cells, wafers, and polysilicon come from? Are they manufactured in locations where independent audits are allowed?
- Can you provide the most recent independent audit reports regarding your claims?
- Who conducted the audit? Was it conducted by a qualified, independent third-party organization?
- Are the audits announced or unannounced? How often are audits conducted?

Links and Additional Resources

- Solar Supply Chain Traceability Protocol 1.0
- Solar Industry Commitment to Environmental and Social Responsibility

Attachment L

U.S. Solar Industry Comments on Enforcement Action on Solar Products from Xinjiang

Wednesday, Jun 23 2021

Press Release

WASHINGTON, D.C. — **Following is a statement from John Smirnow, general counsel and vice president of market strategy at the Solar Energy Industries Association (SEIA) on the Biden Administration's enforcement action on solar products from Xinjiang:**

"The news of enforcement action on solar products coming from the Xinjiang Uyghur Autonomous Region (XUAR) is not unexpected and we fully support the Biden Administration's efforts to address any forced labor in the solar supply chain.

"The fact is, we do not have transparency into supply chains in the Xinjiang region, and there is too much risk in operating there. For that reason, in October, we began calling on solar companies to leave the region and we provided them a traceability protocol to help ensure there is not forced labor in the supply chain.

"SEIA will continue to work with the administration and our partners

to stand against forced labor and build a clean energy future we can all be proud of."

About SEIA®:

The Solar Energy Industries Association® (SEIA) is leading the transformation to a clean energy economy, creating the framework for solar to achieve 20% of U.S. electricity generation by 2030. SEIA works with its 1,000 member companies and other strategic partners to fight for policies that create jobs in every community and shape fair market rules that promote competition and the growth of reliable, low-cost solar power. Founded in 1974, SEIA is the national trade association for the solar and solar + storage industries, building a comprehensive vision for the Solar+ Decade through research, education and advocacy. Visit SEIA online at www.seia.org and follow @SEIA on Twitter, LinkedIn and Instagram.

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constraints are leading to price

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