First Solar

November 4, 2022

Via Electronic Submission

The Honorable Lily L. Batchelder
Assistant Secretary for Tax Policy
Department of the Treasury
1500 Pennsylvania Avenue NW
Washington, DC 20220

Mr. William M. Paul
Principal Deputy Chief Counsel and
Deputy Chief Counsel (Technical)
Internal Revenue Service
1111 Constitution Avenue NW
Washington, DC 20224

Internal Revenue Service
CC:PA:LPD:PR (Notice 2022-47, Notice 2022-50, Notice 2022-51)
Room 5203, P.O. Box 7604, Ben Franklin Station
Washington, DC 20044

Re: Comments in Response to Notices 2022-47, 2022-50, and 2022-51

Dear Madame Secretary and Mr. Paul:

First Solar, Inc. ("First Solar") is pleased to present comments on certain energy tax credit provisions of the Inflation Reduction Act of 2022, P.L. 117-169 ("IRA") in response to Notices 2022-47, 2022-50, and 2022-51, in cooperation with its tax counsel, Hunton Andrews Kurth LLP. As the world's largest thin-film solar manufacturer that has been **investing in America** since 1999, First Solar has already responded to the IRA by announcing its intent to expedite the expansion of its U.S. footprint to over 10GWdc capacity with the development of **additional U.S. manufacturing facilities** which will further fuel job creation to a total 3,000 direct and 15,000 indirect and induced jobs by 2025, publicly applauded by President Biden and Senate Majority Leader Schumer.

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First Solar's commitment to providing U.S.-manufactured, **responsibly-produced** eco-efficient solar modules, critical components in advancing the fight against global climate change, will be **propelled by swift and specific guidance** implementing the IRA. While Congress incentivized a broad investment in American clean energy development through its enactment of the IRA, as a recognized leader in the U.S.'s sustainable energy future, First Solar's investment in the same preceded these incentives. First Solar's **"Responsible Solar"** initiative is not a mere tagline—it represents First Solar's fundamental philosophy guiding its investment in U.S. manufacturing, innovation, and recycling.

First Solar is **unique** among the world's ten largest solar manufacturers for being the **only US-headquartered** company and for not using a crystalline silicon (c-Si) semiconductor. Developed at R&D labs in California and Ohio, First Solar's **advanced thin-film photovoltaic (PV) modules** feature a layer of cadmium telluride semiconductor that is only 3% the thickness of a human hair, and represent the next generation of solar technologies by providing a competitive, high-performance, ultra-low-carbon alternative to conventional c-Si PV panels. From raw material sourcing and manufacturing through end-of-life module recycling (using a closed-loop semiconductor recovery for use in new modules), First Solar's approach to technology embodies **sustainability** and a **responsibility** towards people and the planet.

As **America's Solar Company**, First Solar is proud to be a leader in providing comprehensive comments to assist the Internal Revenue Service ("IRS") and the U.S. Department of Treasury ("Treasury") with their charge to quickly develop IRA implementation guidance, replete with the requisite "uptakes and guardrails." Timely and detailed guidance is **critical to the success** of the IRA. To that end, as a substantial stakeholder, we are pleased to share our thoughts and concerns, wrapped in real-life facts and scenarios. Our overall response to the Notices has naturally separated into a two-part series of detailed briefing papers on the § 45X Credit and related issues and Domestic Content, which reflect the intensive analysis we have performed in response to the IRA. We also provide a **priority guidance request list** (below), which summarizes the key areas of necessary guidance, as identified by First Solar.

1. **Application of the 45X Credit Results in Parity Among U.S. Manufacturers**

   As an American vertically-integrated manufacturer that produces multiple, integrated eligible components (e.g., integrated solar modules), First Solar seeks confirmation that a taxpayer will be treated as having sold an eligible component to an unrelated person if such component is "integrated, incorporated, or assembled" into another eligible component which is then sold to an unrelated person. Thus, the total applicable credit is the **sum of**

the credit amounts generated by each eligible component, thereby placing a vertically-integrated U.S. manufacturer in parity with a non-integrated manufacturer. This application is consistent with the legislative history to § 45X (introduced as the Solar Energy Manufacturing for America Act on June 21, 2021).

Congress intended to directly incentivize U.S. advanced manufacturing of eligible solar components, to create thousands of American jobs, and to address the inequalities associated with Chinese competition. First Solar seeks guidance that defines the terms "produced" and "production" consistently with the Congressional intent to **incentivize only US-based manufacturing** and production. Specifically, guidance should apply definitions and rules similar to those that the Federal Transit Administration ("FTA") has developed, in its rulemaking and guidance under the Buy America Act ("BAA"), to ensure that **U.S. manufacturing processes are not insubstantial**—for each solar energy component to be treated as "produced within the United States" as required by § 45X(d)(2). First Solar understands the importance of an equilibrium between incentives and penalties, and the resulting "uptakes and guardrails." In that same vein, First Solar seeks guidance on per-watt measurements (e.g. "per direct current watt") and calculations that **prevent variation and promote standardization**. Given that a solar manufacturer has no control over where its module will be installed, credits provided on a per-watt basis should be tied to a standard method of determining the wattage of a solar cell or module (e.g., front-side DC wattage based on Standard Testing Conditions), to prevent taxpayers (e.g., bifacial cell producers) from claiming **improper and excessive credit amounts**.

2. **Direct Pay Must Equally Incentivize Taxpayers throughout the 10-Year Period**

Congress recognized the need for an immediate realization of the tax benefit to spur reinvestment in domestic manufacturing, with respect to both new and existing facilities, and thus included a critical 5-year direct payment election provision. The § 45X credit for solar energy manufacturing is available for a 10-year period beginning in 2023 (with a phaseout initiated in 2030). Consistent with Congressional intent, First Solar seeks confirmation that the direct payment election may be made for a **subsequent 5-year period** (i.e., two elections that cover the full 10-year period). Additionally, First Solar seeks confirmation that a taxpayer may claim **direct pay on an applicable facility basis**, allowing a taxpayer to make a direct pay election in multiple years for multiple facilities. Congress intended to **equally incentivize taxpayers** with existing manufacturing facilities, and taxpayers building new manufacturing facilities, so the facility-by-facility approach is necessary.

The § 6417 direct pay statute does not address the administrative function, including how the direct payment is applied and refunded to a taxpayer. Guidance needs to clarify that, in the case of a corporation, the credit is treated in the same manner as an estimated tax payment or a refundable tax credit, and a taxpayer should be able to account for the § 45X credit in making their quarterly estimated payments.

3. **Application of Domestic Content Rules to Incentivize True U.S. Manufacturing Rather than 'Minor Manufacturing'**

As an established, vertically-integrated U.S. solar manufacturer, First Solar anticipates that its modules will enable its customers to qualify for the 10-percent domestic content bonus credit under § 45(b)(9)(B), and § 48(a)(12)(A). Given the complexity of properly applying the BAA and FTA rules to the IRA, as Congress intended, First Solar separately and thoroughly analyzes the domestic content provision in its briefing paper.

First Solar requests guidance that limits the over-application of the BAA rules, and also separately applies them to steel or iron, and manufactured projects, such that **steel or iron must be 100% U.S. origin** while **manufactured products that are components** of a qualified solar facility or energy project must be **partly U.S. origin** (i.e., 40%-55% of the applicable percentage of the total costs of all manufactured products). First Solar seeks definitional guidance (1) as to a "**manufactured product**" under the IRA, which is the same as a "manufactured product" that is a component of the qualified facility or energy project, (2) as to a **qualified solar facility** which includes all the property necessary to generate electricity, and (3) as to a **solar energy project** which corresponds to the established definition of solar "energy property" (excluding certain property that is not steel, iron, or a manufactured product).

To navigate the "uptakes and guardrails" of the domestic content bonus, First Solar requests confirmation of the application of the FTA standards in determining a sufficient level of **manufacturing (versus mere assembly)**, as well as the use of the term "end product" by reference to "manufactured product" and "product" consistent with FTA guidance.

First Solar

The IRA marks a pivotal turning point for America's role in the fight against irreversible climate change. **With over 20 years of manufacturing experience, an expected $ 4 billion of cumulative U.S. investment, 6.5 million square feet of manufacturing space on U.S. soil, a commitment to over 3,000 direct jobs in four states by 2025, $1.5 billion spent on R&D, and approximately 50 GW of modules sold worldwide,** First Solar is more than an established solar company. First Solar, and its experienced tax counsel, welcome the opportunity to engage with Treasury and the IRS, to offer their factual and technical insight, in support of their task to develop implementation guidance for the IRA's tax credit provisions.

Sincerely,

Mark R. Widmar
Chief Executive Officer
First Solar, Inc.

Briefing Paper
Comments in Response to
Notice 2022-47 & Notice 2022-50

Section 45X Advanced Manufacturing Credit – Solar Eligible Components

HUNTON
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Briefing Paper
Comments in Response to Notice 2022-47 & Notice 2022-50
Section 45X Advanced Manufacturing Credit – Solar Eligible Components

November 4, 2022

The Inflation Reduction Act of 2022, P. L. 117-169 ("IRA") provides tax credits for manufacturing of specified solar energy components, including solar modules, photovoltaic ("PV") cells and wafers, and other solar components under § 45X of the Internal Revenue Code ("Code").[1] Section 45X applies to solar energy components produced and sold after December 31, 2022. IRA, § 13502(c). Section 45X also applies to other eligible components, including wind energy components, inverters, qualifying battery components, and applicable critical minerals, although this paper focuses on solar energy components. Taxpayers require guidance on the application of § 45X to solar energy components, including with respect to:

1. The application of the § 45X credit to a vertically-integrated manufacturer that produces multiple, integrated eligible components (e.g., integrated solar modules) and the meaning of the terms "integrated, incorporated, or assembled" in § 45X(d)(4) with respect to the sale of integrated components;

2. the meaning of terms "produced" and "production," the application of § 45X(d)(2), which limits the § 45X credit to the production of eligible components within the United States, and the need for "guardrails";

3. the meaning of the term "sale" with respect to the timing of the § 45X credit;

4. the need for a standard definition for "direct current watt basis," which is used in § 45X(b)(1)(A) to calculate the credit amount for solar energy components, and the need for guardrails;

5. the application of the § 45X credit to novel advanced solar module manufacturing technologies such as tandem modules;

6. the application of the § 45X credit to tellurium, an "applicable critical mineral," and conversion to cadmium telluride, and calculation of the credit amount;

7. the application of § 45X(c)(1)(B) to advanced energy projects under § 48C;

8. the application of the direct payment election under § 6417 to the § 45X credit, which may be claimed by a taxable entity, including the time period to which the election is applicable, investments in new advanced manufacturing facilities which produce eligible components, the administrative process and timing of the payment under § 6417, the excessive payment rules in § 6417(d)(6), and the transfer of credits under § 6418.

These issues are described together as the "Guidance."

[1] All Section (§) references are to the Code as amended by the Inflation Reduction Act of 2022, P. L. 117-169.

Background

The § 45X credit for any taxable year is an amount equal to the *sum of the credit amounts* determined under § 45X(b) with respect to each eligible component (as defined in § 45X(c)) which is produced by the taxpayer, and during the taxable year, sold by the taxpayer to an unrelated person. Under § 45X(c)(1), the term "eligible component" is defined to include "any solar energy component," which includes solar modules, PV cells, PV wafers, solar grade polysilicon, torque tubes or structural fasteners (i.e., solar tracker components), and polymeric backsheets. § 45X(c)(3)(A). These terms are defined in § 45X(c)(3)(B) as follows:

> *Photovoltaic cell*. The smallest semiconductor element of a solar module which performs the immediate conversion of light into electricity.
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> *Photovoltaic wafer*. A thin slice, sheet, or layer of semiconductor material of at least 240 square centimeters—(i) produced by a single manufacturer either directly from molten or evaporated solar grade polysilicon or deposition of solar grade thin film semiconductor photon absorber layer, or through formation of an ingot from molten polysilicon and subsequent slicing and (ii) which comprises the substrate or absorber layer of one or more PV cells.
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> *Polymeric backsheet*. A sheet on the back of a solar module which acts as an electric insulator and protects the inner components of such module from the surrounding environment.
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> *Solar grade polysilicon*. Silicon which is suitable for use in PV manufacturing and purified to a minimum purity of 99.999999% silicon by mass.
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> *Solar module*. The connection and lamination of PV cells into an environmentally protected final assembly which is suitable to generate electricity when exposed to sunlight and ready for installation without an additional manufacturing process.
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> *Solar tracker components*. A solar tracker is a mechanical system that moves solar modules according to the position of the sun and to increase energy output. A torque tube is a structural steel support element (including longitudinal purlins) which is part of a solar tracker, is of any cross-sectional shape, may be assembled from individually manufactured segments, spans longitudinally between foundation posts, supports solar panels and is connected to a mounting attachment for solar panels (with or without separate module interface rails), and is rotated by means of a drive system. A structural fastener is a component which is used to connect the mechanical and drive system components of a solar tracker to the foundation of such solar tracker, to connect torque tubes to drive assemblies, or to connect segments of torque tubes to one another.

As the above listing illustrates, in the case of solar energy components, § 45X applies to a broad range of current and potential solar energy technologies. Currently, there are two principal types of solar technology – thin film and crystalline silicon solar modules – but other current and future technologies may utilize the § 45X credit with respect to the solar energy components that

are listed above. The underlying goal of § 45X is to create parity among technologies. In the case of each solar technology, the final manufactured product is the solar module.[2]

A solar module consists of multiple solar energy components under § 45X. In the case of thin-film technology, the solar module includes thin-film PV cells and wafers classified, together with the environmentally protected final assembled solar module (which is itself a manufactured component and not merely the combination of the other components), as solar energy components, and includes other items not listed in § 45X(c)(3). These components and items are integrated, incorporated, or assembled into a solar module as part of a fully-integrated thin-film manufacturing process under one roof.[3] In the case of a crystalline silicon technology, the solar module includes solar grade polysilicon (a material), crystalline silicon PV wafers and cells, and polymeric backsheets classified, together with the environmentally protected final assembled solar module, as solar energy components, and includes other items not listed in § 45X(c)(3). These components and items are integrated, incorporated, or assembled into a solar module product as part of a multi-step, predominantly multi-location "batch processing."

The thin-film technology involves a unique and advanced U.S. manufacturing process, which transforms raw materials into a finished solar module – as part of a fully integrated, automated, and continuous process – consistent with the Congressional intent under § 45X of creating an efficient and advanced domestic supply chain for solar energy components. The manufacturing process for crystalline silicon solar modules, on the other hand, is different. Currently, the manufacturing process for crystalline silicon involves multiple steps and often involves multiple manufacturers and suppliers (including at the wafer and cell stage) before the final assembly of the solar module. Crystalline silicon solar modules represent more than 90% of the global market. On the other hand, First Solar, Inc. is the principal manufacturer of thin-film solar modules. The underlying intent of § 45X was to create parity between the two principal types of technology and to cause the rapid scale up of other advanced thin-film technologies. In addition, § 45X is intended to incentivize existing U.S. solar manufacturing and to create a U.S.-based supply chain for current and future solar technologies, including U.S.-based manufacturing and production of solar-grade polysilicon, wafers, cells, and polymeric backsheets. Again, the underlying intent of § 45X is to create parity among all solar energy technologies – existing and new.

Section 45X(b) sets forth the credit amounts for each eligible component, including the solar energy components described above. Subject to the phaseout provision (described later below), the amount determined under § 45X(b) with respect to any eligible component, *including any eligible component it incorporates*, is equal to—

[2] Torque tubes or structural fasteners are components of the solar tracker system. As the definition of "solar tracker" in § 45X denotes, the tracker system and its components are not a part of the solar module but move solar modules to track the sun and create more efficiencies in power generation.

[3] A thin-film solar module includes cadmium telluride, a material that is deposited to form the semiconductor layer in manufacturing a thin-film solar module and that is produced from the conversion of tellurium, a critical mineral under § 45X(c)(6)(U). It is an analogous material to solar grade polysilicon used in a crystalline silicon module.

(a) in the case of a thin film PV cell or a crystalline PV cell, an amount equal to the product of 4 cents, multiplied by the capacity of such cell (expressed on a per direct current watt basis);
(b) in the case of a PV wafer, $12 per square meter;
(c) in the case of solar grade polysilicon, $3 per kilogram;
(d) in the case of a polymeric backsheet, 40 cents per square meter;
(e) in the case of a solar module, an amount equal to the product of 7 cents, multiplied by the capacity of such module (expressed on a per direct current watt basis);
(f) in the case of a torque tube, 87 cents per kilogram; and
(g) in the case of a structural fastener, $2.28 per kilogram.

These amounts are subject to phaseout rules in § 45X(b)(3) with phaseout percentages for any eligible component sold of 75% for 2030, 50% for 2031, and 25% for 2032, with full phaseout after 2032. Eligible components also include "applicable critical minerals" relevant to advanced manufacturing, § 45X(c)(1)(A)(v), including "tellurium," which is—(i) converted to cadmium telluride, or (ii) purified to a minimum purity of 99% tellurium by mass. § 45X(c)(6)(U). The credit amount with respect to critical minerals such as tellurium is an amount equal to 10% of the costs incurred by the taxpayer with respect to production of such mineral. § 45X(b)(1)(M).

Eligible components do not include any property which is produced at a § 45X manufacturing facility if the basis of any property which is part of such facility is taken into account for purposes of the qualified advanced energy project credit allowed under § 48C after the date of the enactment of the IRA (Aug. 16, 2022). § 45X(c)(1)(B). Section 45X(d)(2) provides that sales of eligible components are taken into account under § 45X *only* with respect to eligible components the production of which is *within the United States or a U.S. possession*. Section 45X(d)(4) addresses the sale of integrated components and provides that for purposes of the § 45X credit, a person is treated as having sold an eligible component to an unrelated person if such component is integrated, incorporated, or assembled into another eligible component which is sold to an unrelated person.

Under § 6417(a), an "applicable entity" may make an election to receive a payment in lieu of specified credits—namely, "such entity shall be treated as making a payment against [income tax] (for the taxable year with respect to which such credit was determined) equal to the amount of such credit." The term "applicable entity" is defined narrowly to include only tax-exempt entities. § 6417(d)(1)(A). This election is also available to taxable entities (not tax-exempt) for three credits, including § 45X, with respect to any taxable year in which the taxpayer has, after December 31, 2022, produced eligible components under § 45X. § 6417(d)(1)(D). The taxable entity is then treated as an "applicable entity" for purposes of § 6417 for such taxable year but only with respect to the § 45X credit. If a taxpayer makes this election for any taxable year, the taxpayer is treated as having made such election for each of the 4 succeeding taxable years ending before January 1, 2033 (thus, the election applies to a total 5-year period). § 6417(d)(1)(D)(ii)(I). Any payment election must be made not later than the due date (including extensions) for the tax return for the taxable year for which it is made, § 6417(d)(3)(A)(i)(II), and the payment is treated as made on the later of the due date (without regard to extensions) of the tax return for the taxable year or the date on which the return is filed, § 6417(d)(4)(B).

The Secretary may require information or registration as the Secretary deems necessary as a condition of, and prior to, any amount being treated as a payment for purposes of preventing duplication, fraud, improper payments, or excessive payments under § 6417. § 6417(d)(5). Section 6417(d)(6) provides special rules for an "excessive payment," including repayment of any excessive payment determined by the Secretary and a 20% penalty amount.

Section 6418 allows an eligible taxpayer (i.e., a taxable entity) to elect "to transfer all (or any portion specified in the election) of an eligible credit," including the § 45X credit. § 6418(a), (f)(1)(vi), (2). In the case of the § 45X credit, a taxpayer would normally elect the direct payment under § 6417. However, if the direct payment election were not available for any taxable year, then presumably the taxpayer would want to utilize a portion of the credit against its own tax liability and elect to transfer (sell) the remaining portion of the credit to another taxpayer or other taxpayers.

Discussion

A. Production and Sale of Integrated Solar Energy Components. A single, vertically-integrated manufacturer may be involved in the production of multiple solar energy components that are eligible for the § 45X credit and that ultimately result in the final manufactured component, the solar module. Congress specifically contemplated the sale of integrated eligible components and the availability of the full range of credit amounts for each of the listed solar eligible components. Qualification for the credit for each of the eligible components included in an integrated end component is made clear in the following provisions. First, § 45X(a)(1) provides that the total credit allowed under that section is "an amount equal to *the sum of the credit amounts*" corresponding to each eligible component under § 45X(b). (Emphasis added.) This language demonstrates that Congress contemplated a single taxpayer may be eligible for multiple credit amounts for manufactured components under § 45X(b). Second, § 45X(b)(1) also recognizes the integration of eligible components, stating specifically that "the amount determined ... with respect to any eligible component, *including any eligible component it incorporates*, shall be equal to ... [the specified amounts for each eligible component]." (Emphasis added.) Third, § 45X(d)(4) directly addresses the sale of integrated components. Section 45X(d)(4) provides:

> (4) SALE OF INTEGRATED COMPONENTS.—For purposes of this section, a person shall be treated as having sold an eligible component to an unrelated person if such component is integrated, incorporated, or assembled into another eligible component which is sold to an unrelated person.

Thus, a single solar module manufacturer may be eligible for multiple credit amounts under § 45X for each solar energy component that it produces and integrates, incorporates, or assembles into a solar module that is then sold to an unrelated person. *See* M. Sapirie, *Tax Notes*, 1968 (Vol. 176, Sept. 26, 2022) ("Section 45X(d)(4) also allows manufacturers that perform several steps of the supply chain internally to benefit as if the separate steps were performed by unrelated parties....") (citing comments from Hannah Hawkins, KPMG).

Under § 45X, the total credit is equal to the *sum of the credit amounts* for each eligible component produced and sold by the taxpayer to an unrelated person. Applying § 45X(d)(4), a taxpayer should be treated as having sold an eligible component (e.g., a PV wafer and/or a PV cell) to an unrelated person if such component is integrated, incorporated, or assembled into another eligible component (e.g., solar module) which is sold to an unrelated person. The examples provided below illustrate the application of these rules.

> Example 1. VIM is a vertically-integrated manufacturer of thin-film solar modules. The manufacturing process for thin-film solar modules is a fully-integrated manufacturing process that starts with a sheet of glass, proceeds to semiconductor deposition, achieves production of the PV wafer, proceeds to production of the PV cells, and ultimately produces the fully-integrated, thin-film solar module, the final product that is available for sale by the manufacturer. Under § 45X, assuming each of those components is produced in the United States and satisfies the corresponding definitions in § 45X(c)(3)(B), VIM is entitled to the sum of the credit amounts for (i) the PV wafer ($12 per square meter), (ii) each PV cell (4 cents, multiplied by the capacity of each such cell), and (iii) the solar module (7 cents, multiplied by the capacity of such module). In recognition of the parity intended and created by § 45X, the same result would apply to a vertically-integrated manufacturer of crystalline silicon modules (assuming each eligible component is manufactured in the United States).
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> Example 2. X is a manufacturer of crystalline silicon solar modules. X purchases the PV cells and other items used in its manufacturing process from unrelated parties. Although X may integrate, incorporate, or assemble the PV cells and other items into the final solar module product for sale to an unrelated person, X did not produce the wafers, cells, or any other eligible components used in the production of the solar module. Under these facts, X is entitled only to the sum of the credit amounts for the non-integrated solar module (7 cents, multiplied by the capacity of such module). The unrelated parties that produced and sold the PV cells and any other integrated or non-integrated components such as the PV wafers would be eligible for the credit amounts applicable to those eligible components (assuming they are produced in the United States and otherwise satisfy the requirements of § 45X).
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> Example 3. Y is another manufacturer of crystalline silicon solar modules. However, Y purchases the wafers and certain other items used in its manufacturing process from unrelated parties, but manufactures its crystalline silicon PV cells in the United States and then integrates, incorporates, or assembles those PV cells and the other items into the final solar module product (also produced in the United States with the cells) that it then sells to an unrelated person. Under these facts, Y is entitled to the sum of the credit amounts for (i) each crystalline silicon PV cell (4 cents, multiplied by the capacity of each such cell), and (ii) the solar module (7 cents, multiplied by the capacity of such module).

It is imperative that the Guidance confirm this understanding of § 45X with respect to vertically-integrated solar module manufacturers so that there is certainty as to the proper credit amounts. The total sum of the credit amounts for the vertically-integrated solar manufacturer should be the

same as if the integrated solar energy components were manufactured separately by different manufacturers. Vertically-integrated manufacturers create efficiencies by performing multiple steps in the solar supply chain and should be incentivized in the same manner as other manufacturers who perform only one or several steps in that chain. On the contrary, a failure to recognize and correctly apply the statutory references to the integration of eligible components and provide the full range of credit amounts, accordingly, would disincentivize and penalize this level of vertical integration and the creation of efficiencies. Importantly, as discussed earlier, it is clear that Congress recognized the two principal solar technologies and made every effort in the statute to create parity between those two technologies and with respect to other existing and emerging solar technologies. That is, the thin-film solar technology, by definition, is vertically-integrated, which Congress no doubt understood when it added § 45X(d)(4). A failure to allow the multiple credit amounts for each of the integrated eligible components, in the case of thin-film solar modules, would not only penalize that technology but would destroy the parity for U.S. manufacturing that Congress clearly wanted.

Notice 2022-47, sec. 3.01(2), 2022-43 IRB 1, requests comments from taxpayers regarding the determination of the terms "integrated, incorporated, or assembled," as used in § 45X(d)(4). As described above, this rule addresses the sale of integrated components by a single, vertically-integrated manufacturer that produces and sells an integrated solar module that also consists of other solar energy components (e.g., PV wafers and cells) that the manufacturer produces in a fully-integrated manufacturing process. The legislative history to § 45X(d)(4) demonstrates its application to an integrated solar module, as well as the integration of other eligible components in § 45X. The terms "integrated, incorporated, or assembled" should be read in this light. Those terms also should be read in conjunction with the definition of "produced" and "production," as discussed in the next section. Thus, § 45X(d)(4) reflects the integration, incorporation, or assembly through sufficient manufacturing processes of multiple, eligible components (e.g., wafers and cells) into another eligible component (e.g., a solar module).

Requested Guidance: The Guidance should address and confirm the following items with respect to the integration of solar energy components:

- The Guidance should confirm that the § 45X credit is the sum of the credit amounts for each eligible component produced and sold by the taxpayer to an unrelated person.

- The Guidance should confirm that a taxpayer will be treated as having sold an eligible component to an unrelated person if such component is *integrated, incorporated, or assembled* into another eligible component which is sold to an unrelated person.

- The Guidance should confirm that a fully vertically-integrated solar module manufacturer is entitled to the sum of the credit amounts for each eligible component that is integrated into the solar module, including the credit amounts for the PV wafer, cell, and solar module – in the case of a fully vertically-integrated thin-film module manufacturer – and the credit amounts for polysilicon, the PV wafer, cell, polymeric backsheet, and solar module – in the case of a fully vertically-integrated crystalline silicon module manufacturer; provided, however, that all other requirements of § 45X are satisfied with

respect to each solar energy component including that production of each solar energy component has occurred within the United States.

- The terms "integrated, incorporated, or assembled," as used in § 45X(d)(4), should be interpreted to mean an integrated eligible component (such as a solar module) that incorporates any secondary component (such as PV wafers and/or cells), each of which is produced and sold by a single, vertically-integrated manufacturer.

B. Meaning of the Terms "Produced" and "Production" in § 45X. In order to qualify for the § 45X credit, each eligible component must be *produced* by the taxpayer and the *production* of each eligible component must occur within the United States or a U.S. possession under § 45X(d)(2). Section 45X does not otherwise define the terms "produced" or "production," or how "production" of each eligible component is determined under § 45X(d)(2). However, in the context of § 45X, the terms "produced" and "production" should be construed in a manner consistent with the *manufacturing* purpose of the statute. In enacting § 45X, it is clear Congress intended to directly incentivize *domestic advanced manufacturing* of eligible components, including at each level of the supply chain for solar energy components.

The original SEMA bill[4] specifically addressed the domination of the solar supply chain by Chinese manufacturers and described the purposes of the credit to include "incentivizing domestic production necessary for producing solar energy technologies and creating tens of thousands of American jobs," "[to] spur the U.S. solar industry to expand manufacturing capacity, create clean jobs nationally," "[b]ring[] manufacturing jobs back to the U.S. and create[] tens of thousands of American clean energy jobs," and "[h]elp[] the U.S. become competitive in a solar global market..."[5] These same objectives are echoed in numerous public statements from the Senate and House floors and by Senators and Members elsewhere.

The Guidance should define the terms "produced" and "production," and apply § 45X(d)(2), in a manner that is consistent with this intent to incentivize U.S.-based manufacturing and production only. Specifically, the term "produced in the United States" is defined elsewhere in the IRA, in the domestic content bonus provisions (§ 45(b)(9)(B)), by reference to the Buy America Act ("BAA") rules. The Guidance should apply similar definitions and rules to those that the Federal Transit Administration ("FTA") has developed, in its rulemaking and guidance under the BAA, to ensure that there are significant manufacturing processes for each solar energy component to be treated as "produced within the United States" – as expressly required by § 45X(d)(2). Although § 45X does not explicitly reference the BAA regulations or the domestic content rules in § 45(b)(9)(B), it is imperative that the definition "production of which is within the United States" align with the domestic content definitions consistent with Congress' intent and, importantly, to directly address the potential abuse where one or more eligible components under § 45X are not subjected to sufficient manufacturing processes in the United States. Consistent with the BAA, in order for a component to be "produced" or qualify as "production" within the United States under § 45X(d)(2), the component must have been substantially transformed and altered, and not subjected to some form of minor manufacturing or

[4] *See* Senate Bill 2140, June 21, 2021, the Solar Energy Manufacturing for America Act ("SEMA").
[5] *Available at* https://www.ossoff.senate.gov/wp-content/uploads/2021/06/21.06.21_Solar-bill-one-pager-3.pdf.

combining process, within the United States. A more detailed discussion of the BAA rules and FTA guidance is provided in the separate briefing paper on domestic content.[6]

Section 45X(d)(2) refers to sales being taken into account *only* "with respect to eligible components the production of which is within ... the United States..." This language should be read to refer to each eligible component for which a credit amount is claimed – at each level of the solar supply chain that is incentivized with a credit amount under § 45X(b) – and not merely with respect to an aggregation of components. The following example illustrates this analysis:

> Example. Manufacturer, A, is engaged in the manufacturing of solar modules within the United States. The solar modules incorporate PV wafers and cells that are assembled at A's factory in the United States. However, the wafers and cells are manufactured by A's affiliate outside of the United States, are imported by A into the United States, and incorporated by A into its solar module. Assuming the solar module undergoes sufficient manufacturing processes in order to be treated as produced within the United States, A's solar module may qualify for the credit amount set forth in § 45X(b)(1)(E) (i.e., 7 cents, multiplied by the capacity of such module). However, the production of the PV wafers and cells does not occur within the United States. Rather, the sale of those components manufactured overseas is not taken into account in accordance with § 45X(d)(2), and A does not receive any additional credit amounts for those individual components. Section 45X(d)(4) does *not* apply to treat the sale of the integrated solar module as eligible for the credit amounts for the integrated components (i.e., the PV wafers and cells) that are produced outside of the United States because those components would not be eligible for the § 45X credit if they were sold separately from the solar module by A or another party. A does receive the § 45X credit for the solar module, however, because it was produced in the United States, after applying the general rules of § 45X.

Requested Guidance: The Guidance should address and confirm the following items with respect to the application of § 45X(d)(2):

- The Guidance should confirm that the terms "produced" and "production" mean the same thing as manufacturing in the context of § 45X and adopt rules for determining whether sufficient manufacturing processes have occurred within the United States – at the eligible component level – similar to the FTA rules and guidance under the BAA which apply for purposes of the domestic content provisions in the IRA.

- The Guidance should confirm that the determination of whether "production" of eligible components has occurred within the United States for purposes of § 45X(d)(2) is made at the individual component level (e.g., wafer, cell, solar module, etc.).

- The Guidance should confirm that if a solar component such as a PV wafer or cell is manufactured overseas, that component would not be eligible for the separate credit amount under § 45X(b)(1), without regard to whether the component is subsequently

[6] *See* Briefing Paper, Comments in Response to Notice 2022-51, Domestic Content Bonus – Sections 45, 48, 45Y, 48E, Qualified Solar Facilities and Solar Energy Projects.

integrated, incorporated, or assembled into a solar module produced within the United States.

C. Meaning of the Terms "Sale" and "Sold" under § 45X. In order to qualify for the § 45X credit, each eligible component not only must be produced by the taxpayer, it must be *sold by such taxpayer* to an unrelated person *during the relevant taxable year*. § 45X(a)(1). Thus, the timing of the § 45X credit depends on the timing of the sale of each eligible component by the taxpayer. The § 45X credit is allowable within the taxable year when the sale occurs.

The terms "sale" and "sold" have an established meaning in the tax law, and they should be interpreted consistently in the context of the § 45X credit. Specifically, these terms should be interpreted consistent with the rules under § 451 for determining the timing of income inclusion under the accrual method of accounting. Under those rules, income is includible in gross income when all the events have occurred which fix the right to receive such income and the amount thereof can be determined with reasonable accuracy ("all events test"). Treas. Reg. § 1.451-1(a). Under the all events test, the U.S. Tax Court has explained the timing of the sale as follows:

> At what point in time a sale takes place is to be determined from the totality of the circumstances. While no single factor is controlling, passage of title is perhaps the most significant factor to be considered, although the transfer of possession is also significant. *Commissioner v. Segall*, 114 F.2d 706, 709-710 (6th Cir. 1940), *cert. denied* 313 U.S. 562 (1941). The objective is to determine at what point in time the seller acquired an unconditional right to receive payment under the contract. *Lucas v. North Texas Lumber*, 281 U.S. 11, 13 (1930).

Hallmark Cards, Inc. v. Comm'r, 90 T.C. 26, 32 (1988). In general, the tax authorities analyze the "benefits and burdens of ownership" to determine when the above requirements have been satisfied. Thus, a "sale" occurs and is effective when there has been a present transfer of the benefits and burdens of ownership and all conditions precedent to the transfer of ownership have been satisfied. *Hammerstrom v. Comm'r*, 60 T.C. 167, 183 (1997); Rev. Rul. 69-93, 1969-1 C.B. 139. Under the tax ownership rules, all the facts and circumstances are considered, including the transfer of the risk of loss, to determine when the benefits and burdens of ownership have passed from the seller of the eligible component(s) to the purchaser. These principles are well-established and understood by taxpayers and tax practitioners in the context of tax ownership issues. They should be applied in a similar manner here to determine when the "sale" has occurred for § 45X purposes and the taxable year in which the credit is allowable.

Two additional items require discussion here. First, the effective date for § 45X provides that the credit applies to "components produced and sold after December 31, 2022." IRA § 13502(c). This language raises a question whether eligible components currently in production, but which are completed and sold after December 31, 2022, qualify for the § 45X credit. During the consideration of the Senate Amendment for the IRA, Senator Warner addressed a specific question on this issue to Chairman of the Senate Finance Committee, Senator Wyden, during a colloquy on the Senate floor:

> Mr. WARNER. Mr. President, I ask unanimous consent to engage in a colloquy with Senator WYDEN for clarification regarding a tax provision included in the bill currently before the Senate.
>
> With regard to the advanced manufacturing tax credit, it is the intention that section 45X, as established by section 13502 of the Inflation Reduction Act, is intended to apply to components for which production was completed after December 31, 2022, and are sold to an unrelated party after December 31, 2022?
>
> In other words, the credit should be available to the entirety of eligible components currently underway if those components are concluded after 2022. For example, an offshore wind vessel that began construction in 2019 and was completed at a date after December 31, 2022, would be eligible for the credit applied to the full cost of production of the vessel and not just for the portion completed after December 31, 2022.
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> Mr. WYDEN. I thank the Senator for his inquiry. That is correct. The credit is intended for any eligible components produced and sold after December 31, 2022, regardless of the portion of the component that was produced before January 1, 2023.

Cong. Rec. Sen. at S4166 (Aug. 6, 2022). In the absence of reports from the relevant tax-writing committees, the colloquy above should be accorded weight and reflective of congressional intent and part of the legislative history of the IRA. Accordingly, taxpayers should be entitled to claim the full credit amounts for eligible components that are in the process of being produced but not yet completed in 2022, and which are later completed and sold after December 31, 2022.

Second, under § 45X(a)(3), a taxpayer is treated as selling components to an unrelated person if such component is sold to such person by a person related to the taxpayer. Under § 45X(d)(1), persons are treated as related to each other if such persons would be treated as a single employer under the § 52(b) regulations. The IRS has recognized a similar rule in the context of the § 45 production tax credit. *See, e.g.*, Notice 2010-54, sec. 3.06, 2010-40 IRB 40; Notice 2008-60, sec. 4, 2008-30 IRB 178. Thus, under this rule, if one subsidiary (or other corporate affiliate) of the taxpayer produces an eligible component within the United States under § 45X, and then the taxpayer or a separate subsidiary (or corporate affiliate) of the taxpayer either sells the eligible component or an integrated end component produced in the United States to an unrelated person, the taxpayer should be eligible for the full § 45X credit.

Requested Guidance: The Guidance should address and confirm the following items with respect to the terms "sale" and "sold," as used in § 45X:

- The Guidance should define the terms "sale" and "sold," for the purpose of determining the timing of the § 45X credit, consistent with the well-established federal income tax accounting rules under § 451 and an analysis of the benefits and burdens of ownership to determine when tax ownership shifts from the seller to the buyer—i.e., at what point in time the taxpayer acquired an unconditional right to receive payment from the purchaser of the eligible component(s).

- The Guidance should confirm that eligible components, the production of which is underway prior to January 1, 2023 (i.e., work in progress), qualifies for the § 45X credit

(and the corresponding direct payment, if an election is made, under § 6417), provided those components are completed and sold after December 31, 2022.

- The Guidance should confirm that the taxpayer is eligible for the full § 45X credit without regard to whether an eligible component is produced by a person related to the taxpayer (i.e., a subsidiary or corporate affiliate), provided the eligible component and any integrated end product are produced within the United States and sold to an unrelated person by the taxpayer (or a separate subsidiary or corporate affiliate of the taxpayer).

D. Direct Current Watt Basis – Solar Energy Components. Under § 45X(b)(1), the credit amounts for the solar module and the PV cell are calculated as a fixed amount of 7 cents and 4 cents, respectively, multiplied by the capacity of the module and cell "expressed on a per direct current watt basis." However, § 45X does not define the term direct current watt basis or otherwise provide any guidance as to how this calculation is determined across varying technologies and products.

A standard method for determining the wattage of a PV cell or solar module is required in order to prevent improper or excessive credit amounts. For example, standardization is critical to ensure that manufacturers of "bifacial" solar cells and modules do not overstate credit amounts based on bifacial wattage beyond the typical manner in which those types of cells and modules are sold. Bifacial modules suggest that they can produce solar power from the front and back sides of a solar module, as opposed to monofacial modules which produce solar power only from its single front-face, but it is not clear that all modules described as "bifacial" actually produce incremental energy gains.[7] This use of bifacial modules, without proper standardization, may lead to overstatement of the § 45X credit. Other similar situations could also result in potential overstatement of the credit amounts.

"Standard Test Conditions" or "STC" is an industry-wide standard to determine the nameplate capacity (expressed in direct current watts) of PV cells and solar modules. Standard test conditions are defined as the solar irradiation of one kilowatt (kW) per square meter, a module temperature of 25 degrees Celsius and a solar irradiation of 1000 W/m^2. *See* U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, *Understanding Solar Photovoltaic System Performance*, at pp. v, 3 (Dec. 2021).[8] In the solar industry, the nameplate capacity and warranty for a solar module are determined by "front side" wattage measured at STC. Even in the case of a bifacial module, the nameplate capacity (expressed in direct current watts) is sold on the basis of STC-measured front side wattage.[9] It is imperative

[7] PI Berlin, *Delivering on the Promise of Bifacial Modules*, at 1, *available at* https://www.pi-berlin.com/wp-content/uploads/2021/05/PI-Berlin-WhitePaper-Delivering-on-the-Promise-of-Bifacial-Modules.pdf: "Bifacial modules performing as expected is not a given. Many manufacturers regard the bifacial gain as an added benefit passed on to the buyer at very little added cost. That means specifications are often poorly defined, very little testing is conducted and bifacial power guarantees may be nonexistent."

[8] *Available at* https://www.energy.gov/sites/default/files/2022-02/understanding-solar-photo-voltaic-system-performance.pdf.

[9] PI Berlin, at pp. 2, 4, *supra* fn. 7, confirms that certification has limited value for a bifacial module: "The tolerance on bifacial coefficients can be very broad, if defined at all. Manufacturers usually specify bifacial coefficients as a range, not a single fixed number. This is because the bifacial coefficient will naturally vary from module to module but, unlike front side power, modules are not sorted or ground according to their rear side power

that the § 45X credit amounts for PV cells and solar modules be calculated and verified on the basis of front-side direct current wattage at STC. Otherwise, a bifacial cell and module manufacturer may seek to claim a higher wattage due to the assumed but unverified benefit of rear-side wattage – which may or may not be captured in the field. Insofar as a solar module manufacturer has no control over where the modules will be installed, and importantly whether such location will allow for theoretical backside energy performance, a manufacturer should only earn the § 45X credit on a verifiable basis that is tied to the front-side STC measurement – which is the basis on which the module is sold to actual customers.

An additional item requires discussion here, regarding the measurement of PV cell wattage. Under § 45X(b)(1)(A), "[i]n the case of a thin film photovoltaic cell or a crystalline photovoltaic cell, [the credit amount is] an amount equal to the product of—(i) 4 cents, multiplied by (ii) the capacity of such cell (*expressed on a per direct current watt basis*)." (Emphasis added.) The statute references both thin film and crystalline PV cells with respect to the measurement of cell wattage but does not address potential differences between the two technologies at the PV cell level. Importantly, due to the distinct manufacturing processes between crystalline silicon technology and thin-film technology, specifically the batch process for crystalline silicon technology and the continuous process for thin-film technology, as addressed in the Background section above, the methodology of measuring the wattage of each type of cell may be different.[10] For crystalline silicon cell technology, wattage may be individually measured at STC prior to sorting groups of cells into groups of similar capacities. For thin-film cell technology and some crystalline silicon cell processes, in contrast, wattage is not measured individually, but instead is calculated after the fully-integrated thin-film module wattage is measured at STC by dividing the integrated module wattage by the number of PV cells per module.[11]

Requested Guidance: The Guidance should confirm and/or clarify the following matters regarding the calculation of the credits amounts for solar energy components under § 45X(b)(1):

- The Guidance should require the use of Standard Test Conditions, which is an industry-wide standard to verify the credit amounts for PV cells and solar modules.

- Bifacial modules that are sold on the basis of their front-side STC measurement present the possibility of overstated credit amounts if permitted to add rear-side nominal wattage amounts that are variable and not subject to STC measurement. The Guidance should expressly address the potential for improper or excessive credit amounts being allowed in these situations.

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or bifacial coefficient. ... To certify a bifacial module today, the performance of the rear side of the module is not considered."

[10] *See* U.S. Department of Energy, *Solar Photovoltaics: Supply Chain Deep Dive Assessment, U.S. Department of Energy Response to Executive Order 14017, "America's Supply Chains*, sec. 2.4..1, pp. 35-36 (describing crystalline silicon module fabrication and "binning" of cells), sec. 2.8.2.1, pp. 67-68 & Fig. 73 (describing thin-film technology module fabrication) (Feb. 24, 2022), *available at* https://www.energy.gov/sites/default/files/2022-02/Solar%20Energy%20Supply%20Chain%20Report%20-%20Final.pdf.

[11] The number of cells per thin film solar module may be easily determined by counting the rows on the front side of the module, or by referencing the datasheet for the module.

- The Guidance should expressly address the distinct nature by which PV cell wattage is measured with respect to some crystalline silicon technology and thin-film technology. Specifically, (1) cell wattage for the crystalline silicon technology may be measured individually at STC prior to sorting groups of cells into groups of similar capacities, and (2) cell wattage for the thin-film cell technology and some crystalline silicon cell processes is not measured individually, but instead is calculated after the fully-integrated thin-film module wattage is measured at STC by dividing the integrated module wattage by the number of PV cells per module. The credit amounts for the PV cells under § 45X(b)(1)(A) should be calculated using these STC measurements for the two technologies.

E. Application of § 45X to Tandem Modules. A "tandem module" is a solar module featuring two types of cells situated on top of one another and made of different semiconductor materials with differing band gaps. The "top cell" absorbs one section of the solar spectrum to convert sunlight into electricity. The "bottom cell" absorbs another section of the solar spectrum to convert sunlight into electricity. The purpose of a tandem solar module is to increase efficiency beyond what could occur from either of the individual PV cells. One cell features a high bandgap for absorbing high energy photons and the other cell features a lower bandgap that is shifted to absorb lower energy photons. Together, the two cells absorb a wider range of the wavelengths from sunlight. Importantly, the tandem solar module requires two distinct PV cells.

A tandem solar module is a future technology that is not currently produced by any solar manufacturers in commercial volume production but may be available in the United States market at some point during the § 45X credit period. There are presently two designs for manufacturing a tandem solar module. The first design is a monolithically-integrated tandem module. A monolithic design is achieved through a series of deposition and etching steps. The monolithic design requires an additional layer to create a transparent tunneling junction between the two junctions, together forming a single, multi-junction cell. The second design involves a mechanically-stacked tandem solar module. A stacked design consists of two isolated PV cells, each manufactured through separate processes and mechanically integrated together as part of the final module assembly. The two designs are different and should be treated differently for purposes of the § 45X credit. Importantly, in the case of the monolithically-integrated tandem module, the manufacturing process results in *only one multi-junction PV cell*. On the other hand, the mechanically-stacked tandem module employs a manufacturing process that results in *two different PV cells*.[12]

The tandem solar module is one example of *advanced technology manufacturing* that the § 45X credit was intended to encourage and incentivize. In the case of a mechanically-stacked tandem module, the § 45X credit should take into account the multiple PV cells (and integrated

[12] It is important to note that the tandem solar module is fundamentally different than the "bifacial module," described earlier, which features one type of semiconductor cell that can absorb light from both sides. A bifacial module has a "sunny side" that absorbs sunlight, but which also has a rear-side that may be able to absorb a variable level of light, assuming the environmental conditions of its location allow absorption to occur (as discussed earlier). Unlike the tandem module, *the bifacial solar module involves only one PV cell, and not two PV cells like the tandem solar module*. With respect to a bifacial module, it is only one PV cell, and only one type of semiconductor.

PV wafers for each). The following examples illustrate the differing treatment of the different types of tandem modules described above under § 45X:

> Example 1. VIM, a vertically-integrated manufacturer, produces thin-film solar modules as part of a fully-integrated manufacturing process (as described earlier). As part of VIM's deployment of new advanced technology, VIM manufactures a tandem solar module that uses a mechanically-stacked tandem design (described above) utilizing a thin-film cell and a crystalline silicon PV cell. Based on this design, the manufacturing process results in two different PV cells (and the associated PV wafers) ("cell A" and "cell B"), which are integrated, incorporated, or assembled into an integrated solar module within the meaning of § 45X(d)(4). VIM sells the integrated tandem solar module to an unrelated person. For purposes of calculating the § 45X credit, assuming the components noted otherwise satisfy the corresponding definitions in § 45X(c)(3)(B), VIM is entitled to the sum of the credit amounts for (i) the PV wafers ($12 per square meter) produced with respect to both cell A and cell B, (ii) the individual credit amount for cell A, a thin-film PV cell (4 cents, multiplied by the capacity of such cell), (iii) the individual credit amount for cell B, a crystalline silicon PV cell (4 cents, multiplied by the capacity of such cell), and (iv) the integrated tandem solar module (7 cents, multiplied by the capacity of such module).
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> Example 2. X, another solar manufacturer, produces tandem solar modules using a monolithic multi-junction cell design (as described above) and sells those solar modules to an unrelated person. The manufacturing process for the monolithic design results in only one multi-junction PV cell ("cell C"). For purposes of calculating the § 45X credit, assuming the components noted otherwise satisfy the corresponding definitions in § 45X(c)(3)(B), X is entitled to the sum of the credit amounts for (i) the PV wafer ($12 per square meter) produced with respect to cell C, (ii) the individual credit amount for cell C, a crystalline silicon PV cell (4 cents, multiplied by the capacity of such cell), and (iii) the integrated tandem solar module (7 cents, multiplied by the capacity of such module).

Requested Guidance: The Guidance should recognize that an integrated tandem solar module, which is manufactured using a mechanically-stacked design and that results in two PV cells that convert sunlight into electricity within the meaning of § 45X(c)(3)(B)(i) and which is sold to an unrelated person, is eligible for the sum of the credit amounts for the integrated tandem solar module, the two PV cells, and the incorporated PV wafers for the two PV cells.

F. Application of § 45X to Critical Mineral Tellurium. Section 45X(b)(1)(M) provides credit amounts for the critical minerals listed in § 45X(c)(6), including "tellurium," § 45X(c)(6)(U), which is used to produce cadmium telluride (CdTe) – a key material used in the manufacturing process for thin-film PV technology.[13] Specifically, CdTe is deposited as part of the semiconductor layer in the initial steps of the solar manufacturing process. Tellurium is defined under § 45X(c)(6)(U) in two circumstances – one, the tellurium is converted to CdTe, or, two, it is purified to a minimum purity of 99% tellurium by mass. Under § 45X(b)(1)(M), the

[13] *See* U.S. Dept. of Energy, Office of Energy Efficiency & Renewable Energy, Solar Energy Technologies Office, *Cadmium Telluride*, *available at* https://www.energy.gov/eere/solar/cadmium-telluride.

credit amount for any "applicable critical mineral," including tellurium, is "an amount equal to 10 percent of the costs incurred by the taxpayer with respect to production of such mineral."

Tellurium is a chemical element that is used in various applications, including with respect to CdTe thin-film solar modules. Tellurium is a byproduct of copper mining wherein it is refined to a minimum purity of 99% tellurium by mass – which satisfies the statutory requirements in § 45X(c)(6)(U). A solar module manufacturer will purchase the refined tellurium and compound the mineral to produce cadmium telluride for use in the thin-film photovoltaic manufacturing process. The application of § 45X to a critical mineral such as tellurium is unclear and requires guidance.

Requested Guidance: The Guidance should address and confirm the following items with respect to the application of the § 45X credit to tellurium:

- The Guidance should confirm that the § 45X credit is available for the costs incurred by the taxpayer for (i) the conversion of tellurium into cadmium telluride, or (ii) the refining of tellurium to a minimum purity of 99% by mass. The Guidance should confirm that the § 45X credit is incremental for the two processes (i.e., the credit is available for either or both the conversion and/or the refining of tellurium).

- The Guidance should confirm that the § 45X credit is available to multiple parties that perform the conversion of tellurium into CdTe or refine the tellurium to a minimum purity of 99% by mass – i.e., a mining company that refines the tellurium and a manufacturer that converts the tellurium into CdTe may both qualify for the § 45X credit for their respective costs incurred.

- The Guidance should confirm that a solar module manufacturer that produces the CdTe through conversion of the tellurium may claim the § 45X credit based on the costs incurred by the manufacturer with respect to the conversion process, if the manufacturer produces and sells an integrated solar module in which the CdTe is incorporated – even though the CdTe is not separately sold by the manufacturer. In this respect, we note that CdTe is the effective equivalent of the solar grade polysilicon, which is listed as a solar energy component and is incorporated into a crystalline silicon solar module as part of the manufacturing process of that type of solar module. Allowing the solar manufacturer of a thin-film solar module to claim a § 45X credit on the basis of its costs incurred in the production of CdTe creates parity and neutrality between the two solar technologies. This interpretation is supported by the application of § 45X(d)(4) with respect to integrated solar modules and the precise definitions in § 45X(b) and (c) for the solar energy components and credit amounts.

- The Guidance should clarify how the credit amounts for applicable critical minerals such as tellurium are calculated. Specifically, the costs incurred by the taxpayer with respect to production of tellurium (in converting it to CdTe and refining the mineral) should be based on the application of § 263, with respect to acquisition costs (i.e., its bill of materials) for the tellurium to the taxpayer, together with all direct and indirect

costs allocable to the production of the purified tellurium and CdTe under the uniform capitalization rules of § 263A.

G. Interplay of § 45X Credit and § 48C Credit. Under § 45X(c)(1)(B), the term "eligible component" for purposes of the § 48X credit does not include "any property which is produced at a facility if the basis of any property which is part of such facility is taken into account for purposes of the credit allowed under section 48C after the date of the enactment of this section [i.e., August 16, 2022]." This provision restricts the availability of the § 45X credit where the credit under § 48C is allowed with respect to the basis of property (e.g., equipment) that is used in the manufacturing facility where eligible components are produced under § 45X. The basis of property is generally its cost under § 1012 and may include costs that are capitalized into basis under § 263 (costs to acquire or improve property) and § 263A (direct and indirect costs that are allocable to production). The § 48C credit for any taxable year is an amount equal to 30% of the taxpayer's qualified investment with respect to any qualifying advanced energy project. The taxpayer's qualified investment is the basis of eligible property placed in service by the taxpayer during such taxable year which is part of the qualifying advanced energy project. § 48C(b)(1). Eligible property is defined in § 48C(c)(2)(B) to include tangible personal property, or other tangible property (not including a building or its structural components) but only if such property is used as an integral part of the qualified § 48C facility. Section 48C, as amended by the IRA, lists a number of new qualifying advanced energy projects, including projects that are relevant to solar module manufacturers. For example, § 48C includes projects that engage in the recycling of solar modules and other property designed to be used to produce energy from the sun, § 48C(c)(1)(A)(i)(I), which may be co-located adjacent to or on the same site as a facility that produces eligible components under § 45X. The recycling of used solar modules is not only environmentally responsible, it is a source of cadmium telluride – which can be beneficially reused in the thin-film solar module manufacturing process.

Requested Guidance: The Guidance should confirm that the co-location of § 48C qualifying advanced energy projects adjacent to or at the same geographical site as an advanced manufacturing facility should not result in any disallowance of the § 45X credit provided that the § 48C credit is not allowed (i.e., claimed) with respect to the basis of any property in the manufacturing facility that is used in the production of any § 45X eligible components. The Guidance should include examples to illustrate the application of § 45X(c)(1)(B), such as:

> Example 1. VIM manufactures integrated solar modules at its manufacturing facility located at Site B within the United States. After August 16, 2022, VIM builds a new solar module recycling facility at Site B. VIM is awarded and claims a credit under § 48C with respect to its qualified investment in the eligible property comprising the new recycling facility. The § 48C facility recycles the used solar modules and extracts cadmium telluride which is used beneficially in the manufacturing process of new integrated solar modules in the module manufacturing facility or at other manufacturing locations. VIM will claim § 45X credits with respect to PV wafers, cells and modules produced by the manufacturing facility that may utilize the recycled cadmium telluride. The § 48C credit is not claimed with respect to the basis of any property that is used in the production of any § 45X eligible components in the solar module manufacturing facility. Section 45X(c)(1)(B) should not apply to disallow any § 45X credits under these facts.

Example 2. Same facts as Example 1 except that VIM co-locates a dedicated R&D line that is eligible for the § 48C credit and is built on the same site as the solar module manufacturing facility, which is used in the production of eligible components for purposes of § 45X. The R&D line is used to test new types of solar modules and other advanced technology or products. No § 45X credit is claimed specifically with respect to any material that is produced in the R&D line for which the § 48C credit is claimed. The § 48C credit is not claimed with respect to the basis of any property that is used in the production of any § 45X eligible components in the solar module manufacturing facility. Section 45X(c)(1)(B) should not apply to disallow any § 45X credits under these facts. The same result would apply if the R&D line is co-located within the same building as the solar module manufacturing facility, provided the § 48C credit is not claimed with respect to the basis of any property that is used in the production of any § 45X eligible components in the solar module manufacturing facility. That is, the building that houses the production line and the R&D line is not otherwise eligible property for purposes of § 48C and could not be claimed as eligible property under § 48C.

Example 3. VIM manufactures integrated solar modules at its manufacturing facility located at Site B within the United States. After August 16, 2022, P builds a new glass manufacturing facility that is either co-located in the same geographical location as Site B or at a different location. The glass that is produced in the glass facility will be sold by P to VIM and used in the manufacturing process of VIM's solar modules. P is treated as a partnership for federal tax purposes, and VIM owns a partnership interest in P. The glass manufacturing facility is eligible for the § 48C credit with respect to any qualified investment made by P in the eligible property used to manufacture the glass. VIM may be allocated a portion of the § 48C credit as a partner in P. The § 48C credit is not claimed with respect to the basis of any property that is used in the production of any § 45X eligible components in the solar module manufacturing facility. Section 45X(c)(1)(B) should not apply to disallow any § 45X credits with respect to any eligible components produced at VIM's module manufacturing facility under these facts. The same result would apply even if VIM owns or leases the glass manufacturing facility – provided the § 48C credit is not claimed by VIM or any other person with respect to the basis of any property that is used in the production of any § 45X eligible components in the solar module manufacturing facility.

H. Application of the Direct Payment Election under § 6417 to the § 45X Credit. Section 45X is one of only three credits (along with the § 45V clean hydrogen credit and the 45Q carbon oxide sequestration credit) in the IRA for which taxpayers are eligible to elect a direct payment under § 6417 in lieu of claiming the § 45X credit. In allowing a payment election for the § 45X credit, it is clear that Congress recognized the need to provide an immediate and recurring cash incentive for domestic manufacturing of eligible components, including solar energy components, with respect to both existing and new advanced manufacturing facilities. It is critical, therefore, that the Guidance interpret § 6417 in a manner that is consistent with the obvious intent of Congress and to develop flexible and timely rules for administering the direct payment for § 45X and other applicable tax credits. To this end, the application of § 6417 is unclear and requires clarification in a number of key areas.

First, the § 45X credit is available for a 10-year period – beginning in the 2023 calendar year and extending through the 2032 calendar year – but begins to phase out beginning with the 2030 calendar year. However, § 6417(d)(1)(D)(ii)(I) provides that if the taxpayer makes the direct payment election for the § 45X credit "with respect to any taxable year, such taxpayer shall be treated as having made such election for each of the 4 succeeding taxable years ending before January 1, 2033" – i.e., 5 taxable years. Section 6417(d)(1)(D)(ii)(II) then addresses a taxpayer's election to revoke this election and provides that, once revoked, the election to revoke may not be subsequently revoked during this 5-year period. Although the statute addresses making the election and subsequent revocation during the 5-year period, the statute does not expressly prohibit or address whether an election may be made for a subsequent 5-year period – i.e., through the 2032 calendar year – consistent with the 10-year credit period under § 45X. The Guidance should clarify whether the direct payment election is available for a second 5-year period, or otherwise is limited to a single 5-year period under § 6417(d)(1)(D)(ii)(I).

Second, the statute is unclear with respect to the § 45X credit as to whether it applies on a taxpayer basis, or applies on a facility-by-facility basis. There are strong policy reasons why § 6417 should be interpreted in the Guidance to apply on a facility-by-facility basis – importantly, the underlying intent of the IRA and § 45X, specifically, is to create a robust U.S. domestic supply chain that will bring manufacturing of renewable energy components onshore and fuel the development and construction of numerous renewable projects across the country and to create enduring, high-paying U.S. jobs. A number of U.S. domestic manufacturers are currently supplying these demands – prior to the enactment of the IRA – and some manufacturers have already responded to Congress' call to action by announcing the building of new advanced manufacturing facilities. Section 45X and § 6417 should apply equally to taxpayers that are manufacturing eligible components at existing manufacturing facilities and to taxpayers that make investments in new manufacturing facilities.

For those existing U.S. companies, companies that are in the process of building new facilities, and companies that may domesticate multiple new manufacturing facilities, the direct payment election should be available for the full 5-year period for each new facility that is built and placed in service under § 45X. This interpretation is consistent with the application of the § 6417 payment election to taxpayers with respect to other production tax credits ("PTCs"), such as the carbon oxide sequestration credit under § 45Q, § 6417(d)(3)(C)(i), and the clean hydrogen credit under § 45V, § 6417(d)(4)(D)(i), which are applied on a facility-by-facility basis. Similarly, with respect to applicable entities that are tax-exempt entities, the direct payment election is made separately with respect to each facility in the case of other PTCs (*see* § 6417(d)(3)(A)-(E)). The same should apply to the § 45X credit.

Importantly, the statute repeats in multiple places that the election is made separately with respect to a facility or property, generally. Specifically, § 6417(c)(1) provides that "[i]n the case of any applicable credit determined *with respect to any facility or property* held directly by a partnership or S corporation, any election under subsection (a) shall be made by such partnership or S corporation." (Emphasis added.) Section 6417(c)(2) provides that "[i]n the case of *any facility or property* held directly by a partnership or S corporation, no election by any partner or shareholder shall be allowed under subsection (a) with respect to any applicable credit determined *with respect to such facility or property*." (Emphasis added.) Section 6417(d)(6)(C)

provides that "the term 'excessive payment' means, *with respect to a facility or property for which an election is made under this section for any taxable year*, an amount equal to the excess of—(i) the amount treated as a payment which is made by the applicable entity under subsection (a), or the amount of the payment made pursuant to subsection (c), *with respect to such facility or property for such taxable year*, over (ii) the amount of the credit which ... would be otherwise allowable ... under this title *with respect to such facility or property for such taxable year*." (Emphasis added.) The above provisions are presumptively applicable to § 45X.

The statute should be read consistently with respect to these provisions and with respect to the credit for production from advanced manufacturing facilities under § 45X. While Congress did not address the § 45X credit in the context of the election provisions under § 6417(d)(3), the application of the § 45X credit should be read *in pari materia* with its companion credits under §§ 45Q and 45V, for taxpayers, and with respect to other PTCs, generally, for other applicable entities, as well as the general provisions applicable to partnerships, S corporations, and excessive payments. The Guidance should confirm that the 5-year period under § 6417(d)(1)(D)(ii)(I) applies on a facility-by-facility basis, rather than on a taxpayer basis, such that both existing and new manufacturing facilities are properly incentivized consistent with Congressional intent.

Third, § 6417(a)(1) provides generally that the taxpayer is treated as making a payment against income taxes for the taxable year of the election, and § 6417(d)(4)(B) then provides that the payment is treated as made on the later of the due date or filing date of the income tax return. The statute does not address how the direct payment is applied and refunded to the taxpayer. The Guidance should clarify that, in the case of a corporation, the credit is treated in the same manner as an estimated tax payment or a refundable tax credit on Schedule J, Part III – Payments and Refundable Credits, of the Form 1120, U.S. Corporation Income Tax Return, and either treated directly as a payment included in "Total payments" or as a refundable credit that is then included in line 33 (from the 2021 Form 1120), or its equivalent, and then used to calculate the "Amount owed" in line 35 and the "Overpayment," if any, in line 36. Any overpayment would either be creditable against any other outstanding tax liabilities, refundable to the taxpayer, or creditable against estimated taxes for the following taxable year. Taxpayers also should be able to account for the § 45X credit in making their quarterly estimated tax payments, beginning in the first quarter of 2023, even though the payment is not deemed effective until the later of the due date or filing date of the applicable income tax return.

Fourth, § 6417(d)(5) provides: "As a condition of, and prior to, any amount being treated as a payment which is made by an applicable entity under subsection (a), the Secretary *may* require such information or registration as the Secretary deems necessary for purposes of preventing duplication, fraud, improper payments, or excessive payments under this section." (Emphasis added.) It is important that the Guidance address the concerns set forth by Congress in § 6417(d)(5) and adopt sensible procedures that prevent abuse that would undermine the statutory goals of the IRA. We fully support such procedures. At the same time, as noted earlier, it is important that taxpayers receive their direct payments for production of eligible components under § 45X on a timely basis. Taxpayers have responded to the § 45X credit by accelerating production to keep up with demand for solar energy components and by announcing substantial investments in new manufacturing facilities. The timeliness of the direct payment is

essential to this production and new investments in U.S. advanced manufacturing. In this regard, it is important that the Secretary exercise the discretion provided by Congress in § 6417(d)(5) with this objective in mind and not impose an unnecessary review process that may delay direct payments and create uncertainty for solar manufacturers.

As Congress has suggested, the concerns expressed in the statute may be addressed with information provided by the taxpayer with its tax return or a registration process. If registration is required, it may be accomplished by the registration of the taxpayer through the Data Universal Numbering System (DUNS) and/or System for Awards Management (SAM), which has been used in other federal programs. With respect to the production of eligible components at an advanced manufacturing facility under § 45X, the information required to address Congress' stated concerns should be relatively simple and straight-forward, allowing the IRS to immediately identify and to address errors and abuse.

The Guidance should not implement a preliminary review or audit process by the IRS or any other agency, as a condition of, and prior to, making any direct payment. This type of process would have a detrimental effect on the rapid infusion of capital into renewable energy projects, including advanced manufacturing production under § 45X. If some form of review process is deemed necessary by the Secretary, then the review process should be a "first look" review to verify that all legal requirements have been satisfied, that the taxpayer is an applicable entity, that the credit claimed is an applicable credit, that the sum of the credit amounts has been calculated correctly, and that there is no evident disqualifying factor, improper payment, or excessive payment with respect to the applicable facility or eligible component under § 45X. Any "first look" review should be conducted in a timely manner in advance of any tax return filings by the transferee taxpayer(s). Factual issues, if any, should be addressed in a manner consistent with regular IRS examination selection and procedures. The direct payment should not be a factor, in and of itself, for selection for examination. In any event, any "first look" or other administrative review process should be limited in nature consistent with Congressional intent and should be conducted in a timely manner in advance of any tax return filings by the taxpayer.

Under § 6417(a), a taxable entity is treated as having made a payment against its income taxes as of the later of the due date (without extensions) of the tax return for the taxable year or the date the tax return is actually filed. § 6417(d)(4)(B). Insofar as § 6417 treats an elective payment as an income tax payment, and deems it to be made as of the specific return dates noted, the provisions of subtitle F of the Code should apply to the deemed payment in the same manner as if an actual payment of tax had been made with the applicable tax return. As noted earlier, the payment should be applied against any taxes due on the return with the remaining portion either refunded to the taxpayer or applied against estimated taxes for the subsequent taxable year. If there is any delay in the payment to the taxpayer, beyond the designated tax payment date set forth in § 6417(d)(4)(B), then the overpayment rules of § 6611 should apply and overpayment interest at the rate described in § 6621 should apply from such date.

Requested Guidance: The Guidance should address and confirm the following items with respect to the application of the direct payment election for the § 45X credit:

- The Guidance should clarify whether a taxpayer's direct payment election with respect to § 45X production applies only to the 5-year period under § 6417(d)(1)(D)(ii)(I), or whether the taxpayer is entitled to make a second direct payment election for a subsequent 5-year period – consistent with the 10-year period for the § 45X credit.

- The Guidance should clarify, regardless of the limitation in § 6417(d)(1)(D)(ii)(I), that the taxpayer is entitled to make the direct payment election on a facility-by-facility basis – in particular, with respect to new manufacturing facilities brought online in response to the Congressional mandate under § 45X.

- The Guidance should clarify that the § 45X credit may be applied as a reduction to any quarterly estimated tax payments (without penalty) and to offset any taxes that are reported on the taxpayer's income tax return for any taxable year in which a payment election under § 6417 is made. Any § 45X credit in excess of the taxpayer's taxes (after other credits and payments to tax are accounted for) should be refunded to the taxpayer similar to excess estimated tax payments or refundable credits.

- The Guidance should adopt flexible procedures for taxpayers to supply information necessary to verify the payment amount and to prevent errors and abuse. Procedures should be limited to information supplied with the taxpayer's tax return or registration as Congress has suggested in the statute. The Guidance should not impose any preliminary review or audit process that impedes the ability of taxpayers to receive their direct payment for incentivized production under § 45X on a timely and efficient basis. The Guidance should apply the procedures under subtitle F of the Code to direct payments. In particular, taxpayers should be entitled to overpayment interest from the date prescribed under § 6417(d)(4)(B), in the case of any delay and consistent with the overpayment procedures under § 6611.

I. Excessive Payment/Penalty. Section 6417(d)(6) provides rules relating to an excessive payment, which is defined generally as the excess of the amount of the direct payment over the amount of the credit allowable for any taxable year with respect to a facility or property for which an election is made under § 6417. Section 6417(d)(6) describes a process whereby the Secretary makes a determination of an excessive payment, which may result in an increase in the tax imposed on the taxpayer equal to the sum of the amount of the excessive payment and an amount equal to 20% of this payment. The 20% penalty may be waived if it is determined that the excessive payment resulted from reasonable cause. The statute provides no further guidance regarding the determination of the excessive payment. Importantly, § 6417(d)(6) does not address the procedures applicable to this determination and the conduct of any review or examination by the IRS or other agency. These matters should be clarified in the Guidance.

For example, § 6417(d)(6)(A) states only that the taxpayer's income tax is increased but does not address the assessment and collection of this tax. Other provisions in the Code and the IRA, such as the penalty for prevailing wages in § 45(b)(7)(B), include a specific reference to deficiency procedures and state that those procedures do not apply. *See* § 45(b)(7)(B)(ii). On the other hand, § 6417(d)(6)(A) says nothing about deficiency procedures. Those procedures should apply in the case of an excessive payment under § 6417. The taxpayer making a payment election should have the same right to challenge and appeal any adverse determination by the

IRS or other agency as taxpayers generally have the right to do. The taxpayer should have the right to appeal any determination of an excessive payment to the IRS Independent Office of Appeals and deficiency procedures should apply to any determination of an excessive payment – allowing the taxpayer to petition the U.S. Tax Court.

Further, § 6417(d)(6)(A) states that "the tax imposed on such [applicable] entity ... for the taxable year in which such determination is made shall be increased by an amount..." This language requires clarification. Specifically, the term "taxable year" should be clarified to mean the taxable year in which the applicable credit (i.e., the § 45X credit) was allowable, and not to some later period in which the determination is made. That is, the taxpayer should only be responsible for a single deficiency in tax with respect to the same tax amount corresponding to an applicable credit claimed on a tax return and not be subject to multiple audits and taxes for the same credit. The statutory language requires clarification through Guidance.

Finally, § 6417(d)(6)(B) does not define the term "reasonable cause." In particular, § 6664 includes a reasonable cause exception to accuracy-related penalties otherwise applicable to income tax underpayments under § 6662. Numerous tax cases and other authorities have applied this exception and the factors for establishing reasonable cause under § 6664 are relatively well-established. Treas. Reg. § 1.6664-4(b) describes the facts and circumstances that are taken into account to establish reasonable cause, stating generally:

> The determination of whether a taxpayer acted with reasonable cause and in good faith is made on a case-by-case basis, taking into account all pertinent facts and circumstances. ... Generally, the most important factor is the extent of the taxpayer's effort to assess the taxpayer's proper tax liability. Circumstances that may indicate reasonable cause and good faith include an honest misunderstanding of fact or law that is reasonable in light of all of the facts and circumstances, including the experience, knowledge, and education of the taxpayer.

The regulation continues with specific examples and circumstances. Treas. Reg. § 1.6664-4(c) addresses whether a taxpayer has reasonably relied in good faith on advice (including the opinion of a professional tax advisor) as to the taxpayer's treatment of tax items.

Requested Guidance: The Guidance should confirm and/or clarify the following matters with respect to the determination of an excessive payment and the 20% penalty amount:

- The Guidance should provide specific procedures for the examination of any direct payment election for a § 45X credit and any determination of an excessive payment, including the application of the procedures under subtitle F of the Code and the assessment and collection of any excessive payment and penalty amount.

- The Guidance should specify that deficiency procedures (subchapter B of chapter 63 of the Code) apply to any determination of an excessive payment, including with respect to the amount of the excessive payment and the 20% penalty amount. The Guidance should provide all of the normal rights belonging to the taxpayer to challenge and appeal any adjustment to an applicable credit (i.e., § 45X credit) or deficiency in tax.

- The Guidance should clarify that only one tax deficiency and penalty may be determined with respect to the same credit and payment – i.e., no "stacking" of taxes and penalties.

- The Guidance should define the term "reasonable cause" consistent with other contexts under the Code in which this term is used in waiving penalties (e.g., § 6664).

J. Transfer of Tax Credits – Section 6418. The statute does not specifically address whether the transferor taxpayer may offset its income tax liability with a portion of an eligible credit, including the § 45X credit, and transfer the remaining portion of the credit to another taxpayer. Nonetheless, § 6418(a)(1) refers to the "transfer of all (*or any portion* specified in the election) of an eligible credit." (Emphasis added.) Section 6418(d), which addresses the taxable year in which the credit is taken into account, similarly refers to "any credit (*or portion thereof*) with respect to which an election is made" under § 6418(a)(1). (Emphasis added.) As well, § 6418(e)(1) and (2) both refer to "any portion of an eligible credit" with respect to the timing of a transfer election and the prohibition on additional transfers. This language is also repeated in § 6418(g)(1), (2), and (3) for additional information, excessive credit transfers, and recapture, respectively. Based on this language and repetition, the statute clearly contemplates that a transferor taxpayer may retain part of the credit to use against its own tax liability and transfer the rest. Likewise, this language also contemplates the transfer of a credit to multiple transferees and not to a single transferee. The terms "eligible credit" and "transferee taxpayer" should not be read as a limitation on transferability. *Cf.* 1 U.S.C. § 1 ("In determining the meaning of any Act of Congress, unless the context indicates otherwise—words importing the singular include and apply to several persons, parties, or things; words importing the plural include the singular"). Considering that the volume of eligible credits potentially available under the IRA may impact absorption by taxpayers and the need to incentivize timely investment, it is important that the Guidance recognize and support the flexibility of the transfer election.

Requested Guidance. The Guidance should confirm that the transferor taxpayer may transfer only a portion of any eligible credit, including the § 45X credit. This would include the transferor taxpayer retaining a portion of the credit for use against its own income tax liability and transfer the remaining portion. Guidance also should confirm that the transferor taxpayer may transfer any portion of an eligible credit to multiple transferees.

* * *

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Briefing Paper
Comments in Response to Notice 2022-51

Domestic Content Bonus – Sections 45, 48, 45Y, 48E Qualified Solar Facilities and Solar Energy Projects

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Briefing Paper
Comments in Response to Notice 2022-51
Domestic Content Bonus -- Sections 45, 48, 45Y, 48E
Qualified Solar Facilities and Solar Energy Projects

November 4, 2022

The Inflation Reduction Act of 2022, Pub. L. 117-169 ("IRA") reinstated the investment tax credit ("ITC") for solar energy projects under § 48 of the Internal Revenue Code ("Code"),[1] extended the production tax credit ("PTC") under § 45 to include energy generated from qualified solar facilities, and added new ITC and PTC provisions under § 48E and § 45Y for zero-emission solar facilities placed in service after 2024. With respect to these provisions, the IRA also provides increased credit amounts and bonuses, including a domestic content bonus for qualified solar facilities and solar energy projects. Taxpayers require guidance on the application of the domestic content bonus to qualified solar facilities and solar energy projects, including (i) the application of the Buy America Act ("BAA") rules under 49 CFR 661, (ii) the general application of the domestic content rules, and with respect to the definition of "manufactured product" under § 45(b)(9)(B)(iii), (iii) the definition of a qualified solar facility under § 45 and a solar energy project under § 48 for purposes of the domestic content requirements, (iv) the identity of the manufactured products in a qualified solar facility or solar energy project, and what constitutes manufacturing in the United States with respect to solar components, (v) the application of the rule for steel and iron under § 45(b)(9)(B)(ii) and the identity of steel and iron items in a qualified solar facility or solar energy project, and (vi) determination of the "total costs" of "manufactured products" to determine domestic content under § 45(b)(9)(B)(iii) (these issues together to be addressed in "Guidance").[2]

Background

The IRA provides a domestic content bonus for any § 45 qualified solar facility up to 10% of the credit amount otherwise available for the PTC. § 45(b)(9)(B). The full value of the domestic content bonus is available if the taxpayer also satisfies the prevailing wage and apprenticeship rules. For example, the full PTC rate for solar facilities placed in service after December 31, 2021 is $27.50 per megawatt hour ("MWh"). The domestic content bonus will increase the full PTC rate to $30.25 per MWh. Section 45Y provides similar domestic content rules as § 45(b)(9)(B) for the PTC for qualified solar facilities placed in service after December 31, 2024. § 45Y(g)(11)(B).

The IRA provides a bonus for a § 48 solar energy project which satisfies the domestic content requirements. § 48(a)(12)(A). The domestic content requirements for a solar ITC energy project is based on "rules similar to the rules of section 45(b)(9)(B)." § 48(a)(12)(B). The full value of the domestic content bonus is available if the taxpayer also satisfies the prevailing wage and apprenticeship rules. For example, the full ITC rate for energy projects

[1] All Section (§) references to the Code are as amended by the Inflation Reduction Act of 2022, Pub. L. 117-169.
[2] In general, this paper references the domestic content rules in § 45(b)(9)(B), which are cross-referenced by § 48(a)(12)(B) with respect to the ITC under § 48, which is then cross-referenced by § 48E(a)(3)(B) for purposes of the § 48E credit. Section 45Y(g)(11)(B) applies the same general rules as § 45(b)(9)(B).

placed in service after December 31, 2021 is 30% of eligible basis. The domestic content bonus will increase the full ITC rate by 10 percentage points to 40% of eligible basis. § 48(a)(12)(C)(ii). Section 48E provides similar domestic content rules as § 48(a)(12) for qualified solar facilities placed in service after December 31, 2024. § 48E(a)(3).

The domestic content requirement is satisfied "with respect to any qualified facility if the taxpayer certifies to the Secretary (at such time, and in such form and manner, as the Secretary may prescribe) that any steel, iron, or manufactured product which is a component of such facility (upon completion of construction) was produced in the United States *(as determined under section 661 of title 49, Code of Federal Regulations)*." § 45(b)(9)(B)(i) (emphasis added). The reference in the statute to section 661 of title 49, Code of Federal Regulations, is to the regulations promulgated and administered by the Federal Transit Administration ("FTA") under the BAA. In the case of steel or iron, the domestic content requirement is "applied in a manner consistent with section 661.5 of title 49, Code of Federal Regulations," which again references the BAA regulations. § 45(b)(9)(B)(ii). In the case of manufactured products, § 45(b)(9)(B)(iii) provides:

> For purposes of clause (i), *the manufactured products which are components of a qualified facility upon completion of construction* shall be deemed to have been produced in the United States if not less than the adjusted percentage (as determined under subparagraph (C)) of the total costs of all such manufactured products of such facility are attributable to manufactured products (including components) which are mined, produced, or manufactured in the United States.

For purposes of §§ 45, 48, and 48E, the "adjusted percentage" for qualified solar facilities and energy projects is 40%. For purposes of the § 45Y credit, § 45Y provides adjusted percentages, ranging from 40% to 55%, depending on when construction of the qualified solar facility begins.

In the case of a utility-scale solar facility, the electricity-generating process from the photovoltaic ("PV") solar modules to the power grid is described as follows. A utility-scale solar facility can consist of millions of individual solar modules depending on its size. The solar modules generate electricity as sunlight hits the solar modules, which convert the solar radiation into direct current ("DC") electricity. The DC electricity flows into the inverters, where it is converted into alternating current ("AC") electricity and travels through transformers, where the voltage is boosted for delivery onto the transmission grid.

The solar modules are mounted via module interface brackets (or similar items) to either fixed tilt or tracking structures that, together with other structural components, make up solar arrays. If the facility includes a tracking system that tilts the solar modules to follow the sun, the modules are mounted to the tracking system by way of the torque tubes and/or structural fasteners (*see* § 45X(c)(3)(B)(vi) and (vii), defining these terms). The tracking system may include actuator posts, actuator arms, and bearings fitted to the underside of each row of the solar modules. Additional structural components making up solar arrays may include steel posts (driven or drilled into the ground), steel rails, steel racking, steel module interface brackets, bearings, and connectors. The DC power from the solar arrays (assembled in rows) is collected from the solar modules through a series of electrical wires that are combined and connected in

combiner boxes as part of a DC collection system (DC wires and cables), as well as controller boxes and other similar electrical equipment.

The output of the solar modules is gathered via the DC collection system, and then it is delivered from the combiner boxes to inverters (a large-scale solar facility could include hundreds of inverters), where the inverters convert the DC into AC electricity so that the electricity can be later transmitted to the electric grid. The inverters may be mounted on a steel skid or concrete pad, and/or sit on top of a concrete vault that feeds the electrical wiring and cables to and from the inverters and transformers. The inverters and transformers may be referred to as power conversion stations or "PCSs." The AC electricity from the inverters may be then routed from the inverters to low- or medium-voltage transformers, generally at the same location to condition the power by increasing the voltage of the electricity for transmission through the AC collection system (AC wires and cables) to a combining switchgear, that also may be mounted on a steel skid or concrete pad, and/or a concrete vault. The switchgear consists of multiple switches and breakers that combine the output of AC electricity from the various inverters in what is often referred to as a "block" (a solar farm may consist of multiple blocks). The power is then transmitted by underground collection lines and/or overhead collection lines (which may be supported by steel poles) to an onsite substation, wherein the voltage is further stepped up before transmission to the electricity grid – in some cases, by way of a generation tie ("gen-tie") line to an offsite substation and then to the overhead transmission lines for further routing to the locations of use.

Other assets at the project site may include an operations and maintenance ("O&M") building, operations control systems, other buildings or enclosures, earthen structures, drainage and storm water control facilities (concrete and earthen), access roads, internal roads (paved or unpaved), meteorological and monitoring equipment, parking surfaces for employees or visitors, and fencing.

The solar modules are the electricity-generating assets at the solar facility. The modules are manufactured and delivered preassembled to the project site for installation. Our separate paper on the § 45X credit describes the solar modules and technology in more detail.[3] Section 45X(c)(3)(B) provides industry-based definitions for the PV cells, PV wafers, polymeric backsheets, solar grade polysilicon, solar modules, solar trackers, torque tubes, and structural fasteners used with respect to solar modules.

Discussion

A. Application of Buy America Act Rules. As § 45(b)(9)(B)(i) denotes, the determination of domestic content is required to be made under the BAA regulations, 49 CFR 661, which apply generally to federally-funded transportation projects. The BAA, first enacted in 1978, includes well-established rules in the regulations and substantial guidance in the form of rulings from the FTA interpreting those rules. The regulations and guidance promulgated by the FTA with regard to the BAA requirements present a very clear analogue for Treasury and the IRS in interpreting the domestic content requirements in § 45(b)(9)(B) of the Code.

[3] *See* Briefing Paper, Comments in Response to Notice 2022-47 & Notice 2022-50, Section 45X Advanced Manufacturing Credit – Solar Eligible Components.

Notice 2022-51, sec. 3.03(1)(a), 2022-43 IRB 331, requests comments regarding what regulations, if any, under 49 CFR 661 (such as 49 CFR 661.5 or 661.6) should apply in determining whether the domestic content requirements are satisfied. We believe that the applicable regulations under 49 CFR 661 are:

(1) 49 CFR 661.3, which provides relevant definitions for component, end product (with examples in Appendix A thereto), manufactured product, manufacturing process, system, and United States; and

(2) 49 CFR 661.5, which provides the general requirements for steel and iron in 49 CFR 661.5(b)-(c), as directly referenced in § 45(b)(9)(B)(ii), and manufactured products in 49 CFR 661.5 in determining whether components are manufactured in the United States.

Section § 45(b)(9)(B)(i) requires the taxpayer to certify to the Secretary (at such time, and in such form and manner, as the Secretary may prescribe) that the domestic content requirements were satisfied. 49 CFR 661.6 provides certification requirements that are applicable to the procurement of steel, iron, or manufactured products. Those certification requirements apply to certificates submitted by bidders or offerors with respect to a bid or request for proposals under 49 CFR 661.13(b). Those regulations have limited relevance to the IRA's domestic content requirements. Rather, any certification by the taxpayer should be made on the applicable tax return on which the associated bonus credit is claimed. No special certification by the taxpayer should be necessary, so long as the taxpayer maintains sufficient records to substantiate the domestic content of the qualified facility or energy project.

The provisions for rolling stock under 661.11 (e.g., railcars, subway cars, and the like) provide different rules from the relevant provisions under 49 CFR 661.3 and 661.5. While the rolling stock provisions offer guidance on certain topics (discussed below), which the FTA has applied under 49 CFR 661.3 and 661.5, those provisions have limited relevance to the domestic content requirements under the IRA and should not be directly applied.

Finally, 49 CFR 661.7 provides general and project-specific waivers that are applicable to the BAA requirements under 49 CFR 661.3 and 661.5. Those waivers should not be applied in the context of a domestic content "bonus" under § 45(b)(9)(B) – in particular, with respect to manufactured products (which already include a 60% "waiver" for foreign products). Congress specifically addressed waivers in the context of the phaseout for the payment election under § 6417 for tax-exempt entities in § 45(b)(10)(D). Congress did not otherwise indicate any intention to provide any additional waivers under 49 CFR 661.7. The waiver provisions under 49 CFR 661.7 should not apply under § 45(b)(9)(B)(i), generally. Allowing a waiver for a "bonus" credit, when a substantial waiver is already provided for manufactured products through the adjusted percentage is counterintuitive to the purpose of the IRA domestic content rules.

Requested Guidance. Guidance under IRC § 45(b)(9)(B) should follow Congress' expressed intent that domestic content requirements for steel, iron and manufactured products that are a component of a qualified facility or energy project are determined in a manner consistent with the BAA rules of section 661 of title 49, Code of Federal Regulations. The

Guidance should limit the application of the BAA rules to determining whether steel, iron and manufactured products are produced or manufactured in the United States. The Guidance should not apply § 45(b)(9)(B) as a wholesale importation of 49 CFR 661 – specifically, as it applies to certifications, waivers, rolling stock, and certain other provisions of that section.

B. General Application/Definition of "Manufactured Product". The general rule in § 45(b)(9)(B)(i) requires the taxpayer to certify that "any steel, iron, or manufactured product *which is a component* of such facility (upon completion of construction) was produced in the United States (as determined under [49 CFR 661])." (Emphasis added.) Section 45(b)(9)(B)(ii) then provides rules for steel and iron, which requires those items to be analyzed under 49 CFR 661.5. Section 45(b)(9)(B)(iii) then provides rules for "manufactured products," which requires those products to be separately analyzed. Specifically, § 45(b)(9)(B)(iii) treats *the manufactured products which are components of a qualified facility or an energy project* as U.S. origin if not less than 40% (or other adjusted percentage under § 45Y) of *the total costs of all such manufactured products of such facility or energy project* are attributable to manufactured products (including components) which are mined, produced, or manufactured in the United States.

As these provisions indicate, the general rule requires all steel, iron, or manufactured product which is a component of a qualified solar facility or solar energy project to be produced (i.e., manufactured) in the United States. This general rule is consistent with the BAA rules, which require those same items to be 100% U.S. manufactured. The statute then separately analyzes steel and iron from manufactured products. Steel and iron must be 100% produced in the United States, subject to the referenced BAA regulations under 49 CFR 661.5. Under the special rule in § 45(b)(9)(B)(iii), manufactured products that are components of the qualified facility or energy project, however, may be deemed to be treated as U.S. origin for purposes of the general rule if not less than 40% (or other adjusted percentage under § 45Y) of such products are manufactured in the United States. The statute is clear that the "manufactured products" against which the adjusted percentage is applied is with respect to *the components that are manufactured products*. Thus, the term "manufactured product" is synonymous with a manufactured component under the FTA regulations. The manufactured products in § 45(b)(9)(B)(iii) are not the qualified facility or the energy project itself. Rather, the term manufactured products in § 45(b)(9)(B)(iii) refers to the manufactured components that are incorporated into the qualified solar facility or the energy project – consistent with the statutory language. As the statutory scheme lays out, steel and iron are different from "manufactured products" and, therefore, are not analyzed as manufactured products under § 45(b)(9)(B)(iii). As explained later, manufactured components of a qualified facility or energy project include only those components that are manufactured outside of the project construction site – i.e., at a manufacturing facility – and not at the site itself. Thus, pouring concrete at the project site is not "manufacturing," and such concrete is not a "manufactured product" under § 45(b)(9)(B)(iii).

Requested Guidance: The Guidance should confirm and/or clarify the following matters regarding the general application of § 45(b)(9)(B) and the definition of "manufactured product":

- The domestic content rules are applied separately with respect to (A) steel and iron, and (B) manufactured products. Subject to § 45(b)(9)(B)(ii) and 49 CFR 661.5,

steel or iron must be 100% U.S. origin. Manufactured products that are components of the qualified solar facility or solar energy project may be foreign origin, in part, provided the adjusted percentage (e.g., 40% to 55%) of the total costs of all such manufactured components are attributable to manufactured components that are U.S. origin. Steel or iron, which is subject to § 45(b)(9)(B)(ii) and 49 CFR 661.5(b)-(c), is excluded from the determination of the adjusted percentage of manufactured products under § 45(b)(9)(B)(iii). Similarly, any construction materials, which are not delivered to the site as manufactured products, are also excluded from the determination of the adjusted percentage of manufactured products under § 45(b)(9)(B)(iii).

- Guidance should confirm that the term "manufactured product" under the IRA refers explicitly to manufactured products that are *components of the qualified facility or energy project*. Thus, § 45(b)(9)(B)(iii) should be applied with respect to the total costs of the manufactured components of the qualified facility or energy project, and not including separately classified steel or iron, and not to the qualified facility or energy project as a whole or some intermediate category.

- Manufactured products, for this purpose, should be determined in a manner consistent with manufactured components under the FTA regulations.

C. Qualified Facility and Energy Property for Domestic Content Purposes. For purposes of applying the domestic content provisions, as the discussion above reflects, it is important to define the term "qualified facility" for purposes of §§ 45, 45Y, and 48E and the term "energy project" under § 48 in order to determine the scope of application of the domestic content requirements. The scope of property to which the domestic content requirements apply will necessarily vary based on whether the solar energy property is a "qualified facility" or "energy project" under those Code sections.

The term "qualified facility" is generally limited to the assets necessary to the production of electricity in the case of § 45. For example, the term "qualified facility" has a settled meaning with respect to a wind facility. Rev. Rul. 94-31, 1994-1 CB 16, is clear that the property comprising the "facility" is quite narrow. Rev. Rul. 94-31 ruled that "each wind turbine together with its tower and supporting pad . . . is a separate facility" and "[e]ach of these facilities is a qualified facility. . ." Rev. Rul. 94-31 explains:

> A wind turbine together with its tower and supporting pad comprise *the property on the windfarm necessary for the production of electricity from wind energy*. Moreover, each wind turbine on the windfarm can be separately operated and metered and can begin producing electricity when it is mounted atop a tower. Thus, the term "facility" under section 45(c)(3) means the wind turbine, together with the tower on which the wind turbine is mounted and the pad on which the tower is situated. [Emphasis added.]

Rev. Rul. 94-31 expressly defines the components and property that comprise the "facility" for purposes of § 45(d)(1). Rev. Rul. 94-31 also specifically lists in the fact section the property, including the balance of plant that makes up the windfarm. This property includes transformers,

roadways, fencing, on-site power collection systems, and monitoring and meteorological equipment. However, the ruling section defines the "facility" narrowly to include only the specific components noted above – i.e., the wind turbine together with its tower and supporting pad – and omits the other windfarm property from the definition of qualified facility.

In ILM 200347024 (Jan. 21, 2003), the IRS Office of Chief Counsel expounded on Rev. Rul. 94-31, and the definition of the "facility." The memorandum describes Rev. Rul. 94-31 as follows:

> Revenue Ruling 94-31, 1994-1 C.B. 16, provides the Service's published position on what is a qualified facility for purposes of § 45(c)(3) (an analogous provision to § 29—both provisions are production credits as distinguished from the § 48(l) energy credit, which was an investment credit). This revenue ruling addresses a wind farm used to generate electricity from wind energy. While noting the array of equipment used to operate the wind farm and deliver the final product, the revenue ruling concludes, in part, that the term "facility" under § 45(c)(3) means the wind turbine (which includes blades, gear box, generator and a control and a communication mechanism), together with the tower on which the wind turbine is mounted and the pad on which the tower is situated. The revenue ruling further concludes that each wind turbine together with its tower and supporting pad is a separate facility. *This definition is quite narrow, excluding from the term facility support and delivery assets such as transformers, on-site power collection systems, monitoring and meteorological equipment, and site improvements such as roadways and fencing. While the entire wind farm may be an integrated generating plant, for purposes of the energy credit, a turbine, a tower, and a pad constituted a facility*. [Emphasis added.]

Tracking the emphasized language from the Chief Counsel memorandum above, the IRS has ruled in the context of a wind facility that "[t]his definition [of the facility] is quite narrow, excluding from the term facility support and delivery assets such as transformers, on-site power collection systems, monitoring and meteorological equipment, and site improvements such as roadways and fencing." PLR 201205005 (Nov. 3, 2011) (determining placed-in-service date for wind turbines and analyzing Rev. Rul. 94-31 in context of defining a facility).

The IRS has similarly narrowly defined other types of qualified facilities for purposes of § 45. In Notice 2006-88, sec. 3.01, 2006-2 CB 686, the IRS defined the "qualified facility" for production of electricity from open-loop biomass as follows:

> For purposes of § 45(d)(3), an open-loop biomass facility is a power plant consisting of *all components necessary for the production of electricity from open-loop biomass (and, if applicable, other energy sources)*. Thus, a qualified open-loop biomass facility includes all burners and boilers (whether or not burning open-loop biomass), any handling and delivery equipment that supplies fuel directly to and is integrated with such burners and boilers, steam headers, turbines, generators, and all other depreciable property necessary to the production of electricity. *The facility does not include (i) property used for the collection, processing, or storage of open-loop biomass before its use in the*

> *production of electricity, (ii) transformers or other property used in the transmission of electricity after its production, or (iii) ancillary site improvements, such as roadways and fencing, that are not necessary to the production of electricity*. Each power plant that is operated as a separate integrated unit is treated as a separate facility for purposes of § 45(d)(3).

Notice 2006-88, Section 3.01 (emphasis added).

The "qualified facility" for purposes of the domestic content bonus credit should be defined consistent with the established definition of such facilities for purposes of § 45. In the case of a qualified solar facility, applying these principles, the property necessary for production of the electricity would include the PV solar modules, the mounting hardware, and the individual solar arrays, the DC electricity collection system, and the inverters that convert the DC electricity generated by the solar modules into usable AC electricity that can be transmitted ultimately to the power grid. Thus, the qualified facility should be defined in a similar manner to include the property necessary to generate electricity up to and including the inverter. *See* Notice 2018-59, sec. 7.01(1), 2018-28 IRB 196. Thus, the "qualified facility" would be the property from the solar modules through the inverters – i.e., the power conversion stations where the DC electricity is converted into AC electricity. The qualified facility, in these circumstances, would include the low- to medium-voltage transformer that is typically included with the inverters as part of the power conditioning equipment on the same skid.

The qualified solar facility should be limited to the components necessary for the production of electricity from the solar resource and should not include other higher-voltage transformers for AC electricity, the AC collection system, any onsite substation, or other property used in the transmission of electricity after the production of electricity, and ancillary site improvements such as earthen or concrete structures, roadways, and fencing that are not necessary to the production of electricity. The same definition of a "qualified facility" should be applied with respect to the PTC under § 45Y.

In contrast, the definition of "energy property" included in an energy project under § 48 is broader and includes all of the tangible personal property and other tangible property (excluding a building and its structural components) integral to the energy project. As noted above, the domestic content bonus for § 48 applies to an "energy project" based on "[r]ules similar to the rules of section 45(b)(9)(B) . . ." § 48(a)(12)(B). An "energy project" is defined in § 48(a)(9)(A)(ii) as follows: "the term 'energy project' means a project consisting of one or more energy properties that are part of a single project." Thus, the term "energy project" keys off the well-established term "energy property," which includes solar electricity generation equipment. § 48(a)(3)(A)(i). Section 48(a)(5) provides that certain § 45 qualified facilities, including solar facilities under § 45(d)(4), can elect to be treated as "energy property" and claim ITC under § 48 in lieu of the PTC. In the case of a § 45 qualified facility for which the ITC election is made, the term "qualified property" means property which is tangible personal property, or other tangible property (not including a building or its structural components), but only if such property is used as an integral part of the qualified investment credit facility with respect to which depreciation (or amortization in lieu of depreciation) is allowable. *See* § 48(a)(5)(D)(i).

This definition of "qualified property" for purposes of an electing § 45 qualified facility tracks the definition of qualified energy property for other energy property under § 48, including solar energy property already eligible for the ITC under § 48. *See* Treas. Reg. § 1.48-1 (§ 38 property defined as tangible personal property or other tangible property (not including a building or its structural components), which is depreciable, and where such property is integral to the qualified activity, such as the production of electricity). In general, the eligible property only extends to the substation at which the electrical voltage is stepped up to transmission voltage. *See* Treas. Reg. § 1.48-9(d)(3) ("solar energy property used to generate electricity includes only equipment up to (but not including) the stage that transmits or uses electricity."); CCA 201122018 (June 3, 2011) (designating which property associated with the substation is eligible property). In the case of the ITC under § 48, in the context of a solar energy facility, the term "energy project" should be applied in a manner consistent with the definition of "energy project" above. Transmission assets like the gen-tie, the offsite substation, fencing, and similar non-qualified assets are not part of the energy project. Similar principles should be applied to a qualified solar facility with respect to the ITC under § 45E.[4]

Requested Guidance: The Guidance should confirm the following matters regarding the terms "qualified facility" and "energy project" under §§ 45, 45Y, 48, and 48E for solar energy:

- Guidance should confirm that a qualified solar facility for purposes of §§ 45 and 45Y includes the property necessary to generate electricity up to and including the inverter and would include the low- to medium-voltage transformer on the inverter skid – consistent with the well-established and narrow definition of "qualified facility" for PTC purposes. Other higher-voltage transformers, as well as other items beyond the inverters such as the AC collection system, monitoring and meteorological equipment, and site improvements (roadways and fencing) should not be treated as part of the "qualified facility" to determine domestic content. *See* Notice 2006-88, sec. 3.01, 2006-2 CB 686; ILM 200347024 (Jan. 21, 2003).

- Guidance should confirm that the term "energy project" for purposes of the ITC under § 48, in the case of a solar energy facility, corresponds to the definition of "energy property" and includes the whole of the qualified investment credit property, including all of the eligible property in the project through the associated substation where the electricity is stepped-up to transmission voltage. However, it is important to note that certain property that qualifies for the ITC would not be taken into account for domestic content purposes under § 45(b)(9)(B)(ii) or (iii), because it is not steel or iron, or a manufactured product, such as service roads, storm water management, drainage facilities, earthen or concrete pads, and similar onsite constructed items. A similar scope of property would apply for § 48E purposes.

D. Steel and Iron Requirements. The statute specifically refers to 49 CFR 661.5, in applying the domestic content requirements to steel or iron, which provides, generally, that "[a]ll steel and iron manufacturing processes must take place in the United States...." 49 CFR 661.5(b). These requirements apply to:

[4] In the case of § 48E, the "qualified facility" is defined, most importantly, by reference to "qualified property" which definition tracks the well-established definition of ITC-eligible energy property for purposes of § 48.

> all construction materials made primarily of steel or iron and used in infrastructure projects such as transit or maintenance facilities, rail lines, and bridges. *These items include, but are not limited to, structural steel or iron, steel or iron beams and columns, running rail and contact rail. These requirements do not apply to steel or iron used as components or subcomponents of other manufactured products....*

49 CFR 661.5(c) (emphasis added). The BAA does not provide a specific percentage threshold for measuring whether construction materials are made *primarily* of steel or iron. *See* FTA Final Rule, Buy America Requirements, 61 Fed. Reg. 6299, 6300 (Feb. 16, 1996). Rather, the FTA applies these requirements only to steel or iron that provides a structural, load-bearing, or support function.[5] Under the BAA rules, the steel or iron requirements do not apply to steel or iron used as components or subcomponents of other manufactured products. 49 CFR 661.5(c). Rather, in those circumstances, the item is analyzed under the manufactured products standard provided in 49 CFR 661.5(d) (discussed in more detail below).[6]

Requested Guidance. Guidance should confirm and/or clarify the following matters with respect to steel or iron used in a qualified facility:

- Consistent with FTA interpretations, the Guidance should confirm that any steel or iron requirements should be limited to construction materials made primarily of steel or iron that have a structural, load-bearing, or support function to the qualified facility.

- Guidance should confirm that steel or iron used in components or subcomponents of manufactured products is not subject to separate steel or iron requirements for domestic content, consistent with 49 CFR 661.5(c), but rather is subject to the manufactured product rules under 49 CFR 661.5(d).

- Guidance should classify the steel or iron items of a solar facility that are structural in nature and subject to 49 CFR 661.5(b). In general, in the case of a solar facility, these structural items would include the posts, rails, structural fasteners, racking, module interface brackets, skids, poles (overhead electric lines), rebar and meshing (used in onsite construction of concrete pads and foundations), and similar structural items. These items are designated in the Attachment to this briefing paper (which provides information classified by "end product" – i.e., the qualified solar facility or solar energy project, "components," and "subcomponents," as well as by structural steel and iron, consistent with the FTA regulations and the IRA, and other undesignated property).[7]

- Guidance should confirm that items such as nuts, bolts, flanges, screws, washers, cabinets, covers, shelves, clamps, fittings, sleeves, tie wire, spacers, door hinges, and

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[5] *See* FTA Guidance Letters, KONE Elevators (Jan. 8, 2015), *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/kone-elevators-january-08-2015; Southern California Edison (SCE) (Apr. 30, 2014), *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/southern-california-edison-sce-april-30-2014.

[6] *See, e.g.*, KONE Elevators, *supra* fn. 5 (elevator guide rails and doorframes made primarily of steel or iron are treated as subcomponents of the manufactured-component elevator and not subject to 49 CFR 661.5(c)-(d)).

[7] *See* FTA Guidance Letter, Southern California Edison (SCE), *supra* fn. 5.

similar items that are made of steel or iron are non-structural in nature and/or subcomponents of manufactured products (e.g., steel/iron materials used in solar modules), and, therefore, those items are not subject to any steel or iron requirements.[8]

E. Manufactured Products/Manufacturing Process

Under 49 CFR 661.5(d), for a manufactured product to be considered produced in the United States:

(1) All of the manufacturing processes for the product must take place in the United States; and

(2) All of the components of the product must be of U.S. origin. A component is considered of U.S. origin if it is manufactured in the United States, regardless of the origin of its subcomponents.

In applying this rule, the FTA requires the categorization of items as manufactured end products, components, or subcomponents and, based upon the categorization of any item, the rule above may differ.[9] Although 49 CFR 661.5(d) refers to "manufactured product" and "the product," numerous FTA guidance letters substitute the term "manufactured end product."[10] As an example, the FTA treats the procurement of construction projects as the procurement of a manufactured end product subject to 49 CFR 661.5, and the main elements incorporated into the project at the job site are the components.[11] "As with all manufactured products, BAA requires all of the manufacturing processes to take place in the United States and all of the components of the product to be of U.S. origin. A component is considered of U.S. origin if it is manufactured in the United States, regardless of the origin of its subcomponents."[12]

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[8] *See, e.g.*, T. Wyatt, Transportation Research Board, Transit Cooperative Research Program, *Legal Research Digest 49: Updated Guide to Buy America Requirements—2015 Supplement*, at 24 (May 2017) (citing FTA, Buy America—Frequently Asked Questions, https://www.transit.dot.gov/funding/procurement/third-party-procurement/buy-america); *see also* FTA Guidance Letter, Southern California Edison (SCE), *supra* fn. 5 (attached designation of components and subcomponents) (listing, for example, the following items as subcomponents: "Assembly and attachment materials (such as: washers, screws, nuts, bolts, clips, fittings, clamps, brackets, fasteners, pins, deadends, plates, ties, couplers, elbows, tees, nipples, bushings, gaskets, o-rings, splices ... housings, boxes, covers, shelves)" and similar listed subcomponents).

[9] *See, e.g.*, KONE Elevators, *supra* fn. 5; *see also* FTA Guidance Letter, New York Metropolitan Transportation Authority, June 20, 2013, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/new-york-metropolitan-transportation-authority-june-20-2013.

[10] *See, e.g.*, FTA Guidance Letters, LACMTA Buy America Compliance, Subcontractor (Modula, Inc.) Vertical Lift Modules, June 23, 2017, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/los-angeles-county-metropolitan-transportation-authority-august; Securiplex's Water Mist Fire Suppression System for the Second Avenue Subway Project, Aug. 24, 2015, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/fta-letter-mta-securiplex-fire-suppression-systems; Los Angeles County Metropolitan Transportation Authority, Aug. 21, 2013, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/los-angeles-county-metropolitan-transportation-authority-august; Charlotte Area Transit System, Aug. 8, 2013, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/charlotte-area-transit-system-august-08-2013; New York Metropolitan Transportation Authority, *supra*, fn. 9.

[11] *See, e.g.*, FTA Guidance Letter, NYMTA, Aug. 3, 2011, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/nymta-august-03-2011.

[12] *Id.* (citing 49 CFR 661.5(d)).

The term "end product" means "any vehicle, structure, product, article, material, supply, or *system*, which directly incorporates constituent components at the final assembly location..., and which is ready to provide its intended end function or use without any further manufacturing or assembly change(s)." 49 CFR 661.3 (emphasis added). The term "system" is further defined, in part, as "a machine, product, or device, or a combination of such equipment, consisting of individual *components*, whether separate or interconnected by piping, transmission devices, electrical cables or circuitry, or by other devices, which are intended to contribute together to a clearly defined function." *Id.* (emphasis added). The term "component" means "any article, material, or supply, whether manufactured or unmanufactured, that is directly incorporated into the end product at the final assembly [i.e., installation] location." *Id.* A preassembled item that is manufactured offsite and then delivered to the final assembly location (i.e., the project construction site) is a single component and the various pieces and elements contained within it are classified as subcomponents.[13] The term "subcomponent" is not defined under 49 CFR 661.3, but the FTA has defined it as "those lower-level items that are incorporated into a component through a manufacturing process."[14] The FTA does not designate items or materials below the subcomponent level.[15]

The term "manufactured product" under the BAA is defined as "an item produced as a result of the manufacturing process." 49 CFR 661.3. "Manufacturing process" means:

> the application of processes to alter the form or function of materials or of elements of the product in a manner adding value and transforming those materials or elements so that they represent a new end product functionally different from that which would result from mere assembly of the elements or materials.

Id. This definition is critical to distinguishing components from subcomponents under 49 CFR 661.5(d). Subcomponents may be of foreign origin, but "[i]f no manufacturing processes occur at the component level, then those processes must occur in the U.S. at the subcomponent level. Mere assembly is insufficient to satisfy the manufactured product requirements of 49 C.F.R. 661.5."[16]

The FTA (its predecessor, the Urban Mass Transportation Administration), in its rulemaking, has stated that "[t]he key element of this definition [manufacturing of components] is the alteration of subcomponents to form a new product," and provides the following examples comprising manufacturing processes:

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[13] *Cf. S.J. Amoroso Constr. Co. v. U.S.*, 26 Cl. Ct. 759, 768 (1992), *affd.*, 12 F.3d 1072, 1087 (Fed. Cir. 1993).
[14] *See, e.g.,* FTA Guidance Letter, Delta Composites LLC, Jan. 23, 2015, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/delta-composites-llc-january-23-2015.
[15] *See, e.g.*, KONE Elevators, *supra* fn. 5.
[16] FTA Guidance Letter, KONE Inc., Apr. 9, 2012, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/kone-inc-april-09-2012; *see also* 49 CFR 661.3 (definition of "manufacturing process"); FTA Guidance Letters Santa Cruz Metro, Feb. 9, 2015, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/santa-cruz-metro-february-09-2015; Otis Elevator, Aug. 23, 2013, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/otis-elevator-august-23-2013.

> The processes of alteration may include forming, extruding, material removal, welding, soldering, etching, plating, material deposition, pressing, permanent adhesive joining, shot blasting, brushing, grinding, lapping, finishing, vacuum impregnating, and, in electrical and electronic pneumatic, or mechanical products, the collection, interconnection, and testing of various elements.

Final Rule, Buy America Requirements, 56 Fed. Reg. 926, 929 (Jan. 9, 1991). Although this specific explanation was given with respect to rolling stock (e.g., railcars, subway cars, and the like) under 49 CFR 661.11, the FTA has applied this same analysis of what is meant by the alteration and transformation of subcomponents in its guidance letters under 49 CFR 661.5.[17] FTA guidance requires, among other things, that subcomponents be installed, integrated, and interconnected to create the manufactured component, and beyond mere assembly.[18] Thus, "[i]n order to disregard the foreign origin of subcomponents under the FTA Buy America provision, the subcomponents must have been substantially transformed (rather than merely assembled) into domestic components via manufacturing processes at a location in the United States."[19] In this manner, the FTA rules distinguish between a minor manufacturing or combining process. For example, the FTA has rejected attempts to classify components as subcomponents where the parts in question are imported into the United States "highly manufactured," and then undergo "the use of welding solely for purposes of joining the metal pieces together" without any other meaningful manufacturing processes.[20] In that situation, the foreign parts have not undergone sufficient manufacturing in the United States.

The following example provides an illustration of a manufacturing process involving PV solar modules and various subcomponents:

> Example. VIM is a vertically-integrated solar module manufacturer with manufacturing facilities located within the United States. VIM's manufacturing process starts with a sheet of substrate glass. The glass is then prepped for deposition of materials by grinding the edges. The substrate glass is then subject to vapor deposition of an absorber layer, inter-diffusion of doping materials, application of heat treatment, acid etching, back contact sputter deposition and further heat treatment (collectively, semiconductor deposition). After the semiconductor deposition process is completed, the now altered item is subject to multiple manufacturing processes to form the PV cells that include laser etching for PV cell isolation and the deposition of an insulator between the PV cells. Additional laser etching of the PV cell to create interconnect pathways, sputter deposition

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[17] *See, e.g.*, FTA Guidance Letters, Delta Composites LLC, *supra* fn. 14; San Francisco Municipal Railway, Dec. 7, 2010, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/san-francisco-municipal-railway-december-07-2010; Applicability of FTA's Buy America Rules to a Traffic Signal System, *available at* https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/buy-america/116556/carter-huffer-2011-06-08.pdf.

[18] *See, e.g.*, FTA Guidance Letters, Otis Elevator, *supra* fn. 16; San Francisco Municipal Railway, *supra* fn. 17; Yonkers Contracting/ThyssenKrupp Elevator, Dec. 7, 2010, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/yonkers-contractingthyssenkrupp-elevator-december-07-2010.

[19] *See* Transit Cooperative Research Program, *Updated Guide to Buy America Requirements—2015 Supplement*, p. 16, *supra* fn. 8 (citing 49 CFR 661.5(d)(2)).

[20] FTA Guidance Letter, Siemens Transp. Systems, Inc., June 3, 2003, *available at* https://www.transit.dot.gov/regulations-and-guidance/buy-america/siemens-transportation-june-03-2003.

of the rear conductor, and further laser etching of the rear cell isolation is then completed in order to connect the PV cells in a series to create the desired current and voltage. The manufacturing process then proceeds to wiring and finishing processes, including the installation of module interconnection bussing, edge sealing, encapsulation and lamination, application of the cover glass, flash testing, deposition of anti-reflective coating, attachment of the junction box, performance testing, framing, and labeling the manufactured product/component, the PV solar module. Based on the above facts, the PV solar module (i.e., the manufactured product/component) and its constituent subcomponents (e.g., the PV wafers and cells, as well as other articles, materials, or supplies used in the manufacturing process described above) has been produced as a result of a manufacturing process within the meaning of the FTA regulations and represents domestic content for purposes of the IRA.

It is important that the Guidance properly distinguish between the situation above, which involves sufficient manufacturing at the subcomponent level and at the integrated component level, and situations in which items are imported, are classified as subcomponents, but undergo no meaningful manufacturing in the United States (i.e., "manufacturing light" scenarios) at either the subcomponent or component levels. For example, in the case of solar modules, some technologies involve multiple steps and often occur in multiple locations. The Guidance should identify situations in which key subcomponents of a solar module (such as the cell) or other manufactured products are manufactured overseas and then imported into the United States and only minimal manufacturing activities occur with respect to such subcomponents within the United States.

The intention of the IRA, generally, and the domestic content provisions specifically, is to incentivize purchases from a U.S. supply chain, fueling continued investment to onshore a robust renewable energy component manufacturing sector, thereby creating enduring, high-paying U.S. manufacturing jobs and securing the Nation's domestic energy supply. As President Biden noted in his remarks regarding the passage of the IRA, "we're going to build a future — the future — here in United States of America with American workers, with American companies, with American-made products."[21] Permitting items to be imported into the U.S., to be classified as subcomponents, but undergo no meaningful manufacturing in the United States, would destroy the intention of Congress and the Administration and unduly benefit those foreign affiliates whose domestic entities are providing minor onshore production under the guise of U.S. manufacturing. It is worth emphasizing that Congress added the domestic content provisions in a number of provisions in the IRA, including with respect to the multiple credits noted earlier, expressing its intent that U.S. manufacturing and U.S. jobs were critical to taxpayers' entitlement to a *bonus credit*. While some use of foreign subcomponents is inevitable and permitted under the IRA, the Guidance must take appropriate steps to enforce this *domestic content*.

Consistent with the FTA authorities above, in the case of a § 45 or 45Y facility, the end product is the qualified solar facility, and, in the case of a § 48 or 48E facility is the solar energy project. As discussed earlier, the manufactured product definition does not apply to the qualified facility or energy project as a whole, i.e., a manufactured end product, but to the components of

[21] *See* https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/09/13/remarks-by-president-biden-on-the-passage-of-h-r-5376-the-inflation-reduction-act-of-2022/.

such facility or project that are manufactured products. As detailed above, the term "component" includes any article, material or supply that is separately delivered to the project site to be incorporated into the end product, i.e., the qualified solar facility (§§ 45 or 45Y) or solar energy project (§ 48 or 48E). Accordingly, any component that is delivered to the project site must fall into the category of (i) manufactured product, (ii) steel or iron, or (iii) other construction material, such as poured concrete, that is not a manufactured product or steel or iron. It would be incorrect to treat the end product, i.e., the qualified facility or energy project, as a single manufactured product.

It is worth emphasizing that the term "component" includes any article, material or supply that is separately delivered to the project site to be incorporated into the end product, i.e., the qualified solar facility or solar energy project. Thus, any preassembled item that is manufactured offsite and then delivered to the final installation location (i.e., the project construction site) is a single component and the various pieces and elements contained within it are classified as subcomponents. The origin or cost of any subcomponents is irrelevant to the domestic content determination. Thus, in the case of a qualified solar facility or solar energy project, a solar module that is manufactured offsite and then delivered to the project construction site as a preassembled item would be treated as a single component and the various pieces and elements contained within it would be classified as subcomponents (e.g., PV wafers, cells, steel/iron items, aluminum, glass, wiring, and other materials) assuming sufficient manufacturing processes at the solar module component level have occurred (as noted above).

It is also worth emphasizing that onsite construction activities generally do not constitute manufacturing processes for purposes of the FTA rules. This is the case even if items delivered to the site (namely, imported items) are subjected to welding or other normal processes that are construction, by their nature, and not manufacturing, or if specialty tradesmen and workers are involved in the construction process. To this end, the rolling stock regulation provides guidance in this circumstance. Under 49 CFR 661.11(d), "[a] *component may be manufactured at the final assembly location if the manufacturing process to produce the component is an activity separate and distinct from the final assembly of the end product*." (Emphasis added.) This definition corresponds to the definitions of component, manufactured product, and manufacturing process under 49 CFR 661.3. Namely, a component that is a manufactured product must be produced as a result of the manufacturing process. A component is manufactured offsite and delivered as a preassembled item to the final installation location (i.e., the project site) for incorporation into the end product. Subcomponents should not be permitted to be converted into U.S. manufactured products by being delivered to the project site and then being subjected to some form of construction activity. This interpretation would turn the BAA rules on their head. Likewise, concrete pads and foundations, as well as similar items, which are not delivered to the project site but rather are formed at the site, should not be treated as manufactured products under § 45(b)(9)(B)(iii). This treatment could result in almost all assets at the site being treated as manufactured products. These items should generally be classified as construction materials, and not manufactured products that are components of the qualified facility or energy project.

Requested Guidance. Guidance should confirm and/or clarify the following matters with respect to manufactured products used in a qualified facility and the manufacturing process:

- Guidance should confirm that the manufactured product rules in 49 CFR 661.5 apply to determine whether manufactured products that are components of the qualified solar facility or solar energy project are produced in the United States.

- Guidance should confirm that the same categorization of items is made in a similar manner as the FTA guidance – i.e., a qualified solar facility or solar energy project is categorized in terms of the end product(s), the manufactured products or components, and the subcomponents. Guidance should also confirm, consistent with FTA guidance for construction projects, that the references to "manufactured product" and "product" in 49 CFR 661.5(d) are to the end product, such that (i) all of the manufacturing processes for all manufactured components must take place in the United States, 49 CFR 661.5(d)(1), and (ii) all of the manufactured components must be of U.S. origin i.e., the components are manufactured in the United States (subject to the 40% to 55% rule).

- Guidance should confirm, consistent with 49 CFR 661.5(d)(2), that the origin of the subcomponents of a component which is a manufactured product is disregarded for domestic content purposes; provided, however, that there are sufficient manufacturing processes that occur at the component level. Guidance should adopt standards similar to those used by the FTA in its rulemaking and guidance for determining whether there has been sufficient manufacturing processes at the component level.

- Guidance should distinguish between components that have been subjected to sufficient manufacturing processes within the United States (as described in the above Example) and situations in which major subcomponents (such as PV cells) have been imported but do not undergo any substantial transformation or alteration within the United States, and are subjected only to minor manufacturing or combining processes at the component level. Guidance should adopt appropriate safeguards against "manufacturing light" situations that are contrary to the spirit of the BAA, FTA regulations, and IRA domestic content rules.

- Guidance should confirm that the final assembly location for purposes of the "end product" definition and the location where the constituent components are directly incorporated is the project site. Consistent with § 45(b)(9)(B) and § 48(b)(12), the Guidance should confirm that the "qualified facility" or "energy project" is the end product. Specifically, consistent with the definition of end product under the BAA rules, the qualified facility or energy project is the product or system that directly incorporates the constituent components at the final installation location and is ready to provide its intended end function or use without any further manufacturing or assembly change(s).

- In the case of a solar facility, Guidance should confirm that the components of the solar facility include all preassembled manufactured products delivered to the final installation location (i.e., the project site). Any subcomponents that are integrated and incorporated into such component prior to delivery to the project site should not be treated as separate components – i.e., they may be foreign-sourced without impacting the categorization at the component level so long as such subcomponents are subject to sufficient manufacturing processes at the component level within the United States. With respect to a qualified solar facility and solar energy project, the manufactured components and

subcomponents are designated, by way of illustration, in the Attachment to this briefing paper, consistent with the FTA regulations and the IRA.

- Guidance should confirm that a solar module is a "manufactured product" and "component" for purposes of § 45(b)(9)(B)(iii) and the FTA regulations – i.e., a solar module that is manufactured offsite and that is delivered to the project site as a preassembled item should be treated as a single component. Any items included within the solar module should be treated as subcomponents, provided that they have undergone sufficient U.S. manufacturing processes consistent with the FTA regulations and the discussion set forth above.

- Guidance should address onsite manufacturing activities similar to the guidance in 49 CFR 661.11(d) – i.e., components generally cannot be manufactured at the final installation location (i.e., the project construction site) unless the manufacturing process is separate and distinct from the assembly of the end product.

- Guidance should confirm that onsite construction activity, such as pouring concrete foundations, is not manufacturing and the cost of such construction activity is not taken into account in determining the adjusted percentage of manufactured products. In contrast, preformed concrete pads or enclosures for inverters or other equipment that are manufactured offsite and delivered to the project site would be manufactured products.

F. Manufactured Products/Total Costs

Under § 45(b)(9)(B)(iii), "the manufactured products which are components of a qualified facility upon completion of construction shall be deemed to have been produced in the United States if not less than the adjusted percentage [generally, 40%] ... of the total costs of all such manufactured products of such facility are attributable to manufactured products (including components) which are mined, produced, or manufactured in the United States." The relevant BAA sections, 49 CFR 661.3 and 661.5, do not include a cost-ratio or domestic-content percentage similar to the adjusted percentage in the IRA.[22] Neither the domestic content provisions in § 45(b)(9)(B) nor the relevant BAA rules include any guidance on how total costs are determined.

Nevertheless, we believe the intent of how the percentage of manufactured products should be determined is clear from the statutory language and application of the BAA rules to steel and iron, and manufactured products which are components of the qualified solar facility or solar energy project. The cost of steel and iron that are so classified is excluded from the computation. Those items are separately classified from manufactured products. The cost of all of the "manufactured products" which are components of the qualified facility or energy project are summed. In order to satisfy the manufactured product requirement, not less than 40% of the total cost of all of the manufactured products incorporated into the qualified facility or energy

[22] The rolling stock provisions in 49 CFR 661.11 include certain cost-ratio or percentage requirements for domestic content, but those provisions were adopted by Congress specifically for rolling stock in legislation enacted after the initial 1978 Buy America Act was enacted. As explained *infra* at fn. 23, those rules were not adopted for the general BAA rules and are not applied by the FTA. While some concepts from this specific rule may be relevant, the rolling stock rule generally is not applicable to the provisions that Congress referenced for qualified facilities here.

project must be of U.S. origin. Any breakdown of costs within a manufactured product which is a component is irrelevant. Cost is determined at the component level and every such component is either a U.S. manufactured product or not. Under this construct, Congress has allowed that up to 60% of the cost taken across all manufactured products does not have to be from U.S. manufactured products.

The cost of labor at the project site to construct, assemble, install, or build the qualified solar facility or solar energy project is not a cost of the manufactured product and should not be taken into account.

Requested Guidance. Guidance should confirm and/or clarify the following matters with respect to manufactured products and the analysis of total costs under § 45(b)(9)(B)(iii):

- Guidance should confirm that the 40% adjusted percentage is applied with respect to the qualified solar facility or solar energy project (i.e., the end product). Guidance should confirm that the 40% adjusted percentage compares the total costs of all the manufactured components (i.e., "the manufactured products which are components of a qualified facility [or energy project]") of U.S. origin to the total costs of all manufactured components whether of U.S. or foreign origin. This analysis is consistent with prior rulemaking under the BAA, at former 49 CFR 660.22, which provided:

  > (a) In order for a manufactured end product to be considered a domestic end product—(1) the cost of the domestic components must exceed 50 percent of the cost of all its components; and (2) the final assembly of the components to form the end product must take place in the United States.

  Final Rule, Buy America Requirements, 43 Fed. Reg. 57144, 57146 (Dec. 6, 1978).[23]

- Guidance should specifically confirm that the 40% adjusted percentage in § 45(b)(9)(B)(iii) does not require any comparison or allocation of domestic and foreign costs *at the component or subcomponent level* (i.e., that 40% of the costs of the component or subcomponent must be U.S. origin in order to be treated as domestic). Rather, if a component of the qualified solar facility or solar energy project, such as the solar module, is determined to be a manufactured product of U.S. origin, then the entire cost of that component is treated as domestic content for purposes of the cost comparison in § 45(b)(9)(B)(iii). The individual costs of subcomponents, even if of foreign origin, are included in the cost of the U.S.-manufactured component – consistent with 49 CFR 661.5(d)(2). This analysis is consistent with the prior rulemaking under former 49 CFR 660.22, which provided:

[23] In the Surface Transportation Assistance Act of 1982, Pub. L. 97-424, § 165, 96 Stat. 2097, 2136-37 (Jan. 6, 1983), Congress provided a 50% "waiver" for foreign-sourced components (similar to the above provision) for rolling stock but eliminated this standard for the general BAA rules. Thus, under current 49 CFR 661.5, the domestic manufactured product rule is 100% but, under § 45(b)(9)(B)(iii), it is generally 40%.

(b) In determining the origin of components, each component must be treated as either entirely domestic or entirely foreign, based on the place where the component is mined, produced, or manufactured. Components of unknown origin must be treated as foreign. The origin of subcomponents of components is immaterial.

- Guidance should clarify that total costs do not include property, items, or materials that are not incorporated into the qualified facility or energy project. For example, in the case of a solar facility for purposes of § 45 or 45Y, the costs of equipment and property beyond the inverters (i.e., the outer boundary of the qualified facility), such as transformers, the AC collection system, onsite substation, site improvements, and similar assets, as well as costs allocated to those assets (including any installation and labor costs), are not included in the determination of the costs of the manufactured components of the qualified facility. While the total costs of a solar energy project may be broader under § 48 or 48E, the Guidance should confirm that the total costs only include those costs related to the manufactured components that are eligible property and not transmission assets such as the gen-tie, fencing, buildings, and similar assets, and that total costs does not include installation and labor costs.

- Guidance should clarify that labor costs and similar costs incurred at the project site for the actual construction or final installation of the qualified solar facility or solar energy project (e.g., contractor and subcontractor labor costs, profit, etc.) are construction costs that are not considered in determining the costs of manufactured components. *See, e.g.*, *S.J. Amoroso Const. Co., Inc. v. U.S.*, 26 Cl. Ct. 759, 771-773 (1992). On the other hand, the Guidance should confirm that the cost of the manufactured component delivered to the project site is the total price charged by the manufacturer or other supplier to the project sponsor, developer, contractor, or owner, as the case may be. *Id.* The Guidance should confirm that costs of transporting manufactured components to the project site are included in the cost of the manufactured component. *See* 43 Fed. Reg. at 57146 (former 49 CFR 660.22(c)). In other words, the cost that is taken into account is the delivered-to-the-site cost or price to the taxpayer/owner. The manufacturer's internal costs of any item it sells is irrelevant.

* * *

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ATTACHMENT
TO
BRIEFING PAPER –
DOMESTIC CONTENT

Designation of End Products, Manufactured Products/Components, Subcomponents, and Steel and Iron*

End Product: Qualified Solar Facility The property necessary to generate electricity up to and including the inverter. Rev. Rul. 94-31, IRS Notice 2006-88, sec. 3.01, and Notice 2018-59, sec. 7.01(1)	
Manufactured Products/Components § 45(b)(9)(B)(iii)	**Subcomponents of Manufactured Products/Components**
PV solar modules	PV cells,[1] PV wafers, polymeric backsheet, various deposition materials, substrate glass, cover glass, encapsulant, semiconductor, front/back contacts, insulators, junction box, connectors, bussbar, wires, cables, frame, seals, nuts, bolts, washers, screws, clips, fittings, spacers, tape, adhesive, clamps, brackets, fasteners, pins, plates, couplers, ties, lead foil, metallic items (steel, iron, and aluminum), mounting hardware, and similar items.
Tracker system	Torque tubes, motors, actuator posts, actuator arms, bearings, wires and cables, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Combiner or junction boxes	Wires and cables, surge protection, fuses, switches, plugs, cabinets, housing, covers, hinges, handles, conduits, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Chain controller boxes	Wires and cables, cabinets, housing, covers, hinges, handles, conduits, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
DC collection system	Wires and cables, strings, clamps, fasteners, harnesses, circuits, conduits, plugs, sockets, conductors, disconnects, switches, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Concrete vaults or ballasts (if delivered to site preassembled)	Concrete and any rebar, meshing, or other internal support items, wires and cables, housing, manhole covers, inlets and outlets, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Inverters	Inverter or power conversion system (PCS) skid or pad (if delivered to site with inverters), invertor or PCS skid or pad mounted low- to medium-voltage transformer, attachments, other skid or pad mounted hardware supporting the inverter and DC/AC power conversion, other power conditioning equipment at PCS/inverter skid, wires and cables, surge protection, fuses, switches, controls, cabinets, housing, covers, hinges, handles, conduits, terminals, circuit breakers, miscellaneous encasements, miscellaneous electronics, miscellaneous hardware, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Structural Steel & Iron § 45(b)(9)(B)(ii)	
Posts (driven or drilled), rails, mounting equipment, mounting hardware (delivered to site separately from modules), racking, interface and tilt brackets, other non-mechanical steel and iron support structures, structural fasteners (tracker system), steel and iron poles, steel/iron piers, rebar, concrete meshing, driven piles, helical earth screws, bolted steel baseplates, separately-delivered skids, and any other structural, load-bearing, or supporting steel and iron.	
Construction Materials/Other Property – Not included in § 45(b)(9)(B)(ii) or § 45(b)(9)(B)(iii)	
Concrete pads, concrete foundations, concrete piers, concrete footers, other concrete structures (not delivered to site preassembled), unmanufactured components, any raw materials used and consumed in the construction process, earthen structures, drainage and stormwater control systems, fencing, operations and maintenance ("O&M") facilities, operations control systems, other buildings or enclosures, access roads, internal roads (paved or unpaved), meteorological and monitoring equipment, parking surfaces for employees or visitors, gen-tie line, offsite substation, transmission lines and facilities, etc.	

* This listing is intended to be illustrative only of certain but not all property included in a utility-scale, ground-mounted PV solar project (e.g., greater than 5 MW). Different solar technologies may involve additional or different designations.

End Product: Solar Energy Project **All tangible personal property and other tangible property (not including buildings or its structural components) up to (but not including) the stage that transmits electricity at the onsite substation.** **§ 48(a)(12)(B), § 48(a)(5)(D), Treas. Reg. § 1.48-1, -9(d)(3), and CCA 201122018**	
Manufactured Products/Components § 45(b)(9)(B)(iii)	**Subcomponents of Manufactured Products/Components**
PV solar modules	PV cells,[2] PV wafers, polymeric backsheet, various deposition materials, substrate glass, cover glass, encapsulant, semiconductor, front/back contacts, insulators, connectors, junction box, bussbar, wires, cables, frame, seals, nuts, bolts, washers, screws, clips, fittings, spacers, tape, adhesive, clamps, brackets, fasteners, pins, plates, couplers, ties, lead foil, metallic items (steel, iron, and aluminum), mounting hardware, and similar items.
Tracker system	Torque tubes, motors, actuator posts, actuator arms, bearings, wires and cables, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Combiner or junction boxes	Wires and cables, surge protection, fuses, switches, plugs, cabinets, housing, covers, hinges, handles, conduits, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Chain controller boxes	Wires and cables, cabinets, housing, covers, hinges, handles, conduits, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
DC collection system	Wires and cables, strings, clamps, fasteners, harnesses, circuits, conduits, plugs, sockets, conductors, disconnects, switches, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Concrete vaults or ballasts (if delivered to site preassembled) up to inverters	Concrete and any rebar, meshing, or other internal support items, wires and cables, housing, manhole covers, inlets and outlets, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Inverters	Inverter or power conversion system (PCS) skid or pad (if delivered to site with inverters), invertor or PCS skid or pad mounted low- to medium-voltage transformer, attachments, other skid or pad mounted hardware supporting the inverter and DC/AC power conversion, other power conditioning equipment at PCS/inverter skid, wires and cables, surge protection, fuses, switches, controls, cabinets, housing, covers, hinges, handles, conduits, terminals, circuit breakers, miscellaneous encasements, miscellaneous electronics, miscellaneous hardware, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
AC collection system	Wires and cables, strings, clamps, fasteners, harnesses, circuits, conduits, plugs, sockets, conductors, disconnects, switches, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Combining Switchgear	Switchgear skid or pad (if delivered preassembled with switchgear), other skid or pad mounted hardware supporting the switchgear, switches, breakers, wires and cables, attachments, surge protection, fuses, disconnects, switches, controls, cabinets, housing, covers, hinges, handles, conduits, terminals, circuit breakers, miscellaneous encasements, miscellaneous electronics, miscellaneous hardware, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Concrete vaults or ballasts (if delivered to site preassembled) after inverters	Concrete and any rebar, meshing, or other internal support items, wires and cables, housing, manhole covers, inlets and outlets, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Overhead AC power lines	Wires and cables, attachments, conductors, clamps, and similar smaller items such as nuts, bolts, and washers (as listed for modules).

Onsite substation components (main transformers and other manufactured electrical equipment delivered to site)	Skid or pad (if delivered preassembled with equipment), other skid or pad mounted hardware supporting the substation equipment, wires and cables, attachments, lightning and surge protection, fuses, switches, controls, cabinets, housing, covers, hinges, handles, conduits, bushings, switches, breakers, arresters, meters, miscellaneous encasements, miscellaneous electronics, miscellaneous hardware, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Meteorological or monitoring equipment	Wires and cables, switches, controls, cabinets, housing, covers, hinges, handles, conduits, and similar smaller items such as nuts, bolts, and washers (as listed for modules).
Structural Steel & Iron § 45(b)(9)(B)(ii)	
Posts (driven or drilled), rails, mounting equipment, mounting hardware (delivered to site separately from modules), racking, interface and tilt brackets, other non-mechanical steel and iron support structures, structural fasteners (tracker system), steel and iron poles, steel/iron piers, rebar, concrete meshing, driven piles, helical earth screws, bolted steel baseplates, separately-delivered skids, and any other structural, load-bearing, or supporting steel and iron.	
Construction Materials/Other Property – Not included in § 45(b)(9)(B)(ii) or § 45(b)(9)(B)(iii)	
Concrete pads, concrete foundations, concrete piers, concrete footers, other concrete structures (not delivered to site preassembled), unmanufactured components, any raw materials used and consumed in the construction process, earthen structures, drainage and stormwater control systems, fencing, operations and maintenance ("O&M") facilities, operations control systems, other buildings or enclosures, access roads, internal roads (paved or unpaved), meteorological and monitoring equipment, parking surfaces for employees or visitors, gen-tie line, offsite substation, transmission lines and facilities, etc.	

[1] As discussed at pages 13-14 of the Briefing Paper, it is important that the Guidance provide appropriate "guardrails" to address any foreign manufacturing of key subcomponents of the PV solar module. Importantly, the PV cells stand out prominently where they are *not manufactured in the United States*. It is imperative that the Guidance address situations where the PV cell, the element of the solar module that actually converts sunlight into electricity, is manufactured outside the United States and only minimal manufacturing occurs in the United States with respect to the assembly of the solar module. If sufficient manufacturing does *not* occur within the United States, and there is no substantial transformation or alteration of a subcomponent (such as the PV cell) beyond mere installation and assembly, then the foreign origin of the subcomponent is *not* disregarded under the Buy America Act rules.

[2] Same comment as footnote 1 above.