

First Solar comments on SASB standard: SOLAR TECHNOLOGY & PROJECT DEVELOPERS

The following submission is associated with SASB's 2017 Public Comment period, ending 31 January 2018.

TOPIC	ACTIVITY METRIC	CATEGORY	UNIT OF MEASURE	CODE	First Solar Comments
	Total capacity of photovoltaic (PV) solar modules sold	Quantitative	Megawatts (MW)	RR0102-A	As a PV solar module manufacturer and vertically integrated developer of PV solar power systems, we may sell modules directly to third parties or as part of a system. As a result, the commercial "sale" of a module may not be immediately recognized in our financial statements pursuant to applicable accounting rules (e.g., US GAAP). Given such complexities, sustainability reporting metrics tied to sales of modules may be less meaningful than comparable production based metrics. In addition disclosing the volume sold would provide insight into our manufacturing costs and place us at a competitive disadvantage.
	Total capacity of photovoltaic (PV) solar modules produced	Quantitative	Megawatts (MW)	RR0102-B	See comment above regarding the potential benefits of production based metrics as compared to sales based metrics.
	Total capacity of completed solar energy systems	Quantitative	Megawatts (MW)	RR0102-C	
	Total project development assets	Quantitative	U.S. Dollars (\$)	RR0102-D	

TOPIC	ACCOUNTING METRIC	CATEGORY	UNIT OF MEASURE	CODE	First Solar Comments
Energy Management in Manufacturing	Total energy consumed, percentage grid electricity, percentage renewable	Quantitative	Gigajoules (GJ), Percentage (%)	RR0102-01	
Water Management in Manufacturing	(1) Total water withdrawn and (2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	Quantitative	Cubic meters (m3), Percentage (%)	RR0102-02	
	Discussion of water management risks and description of strategies and practices to mitigate those risks	Discussion and Analysis	n/a	RR0102-03	
Hazardous Materials Management	Amount of hazardous waste, percentage recycled	Quantitative	Metric tons (t), Percentage (%)	RR0102-04	This section is confusing hazardous materials with hazardous waste by incorrectly defining hazardous materials in terms of RCRA's definition of hazardous waste. For substances used in manufacturing and the product itself, please refer to NSF 457's definition of declarable substance groups and declarable substances in accordance with IEC 62474, as well as industry-specific substances: arsenic compounds, antimony compounds, and beryllium compounds. NSF/ANSI 457 Sustainability Leadership Standard for Photovoltaic Modules is the industry's first sustainability standard and was developed through a multi-stakeholder process which included PV companies, investors, the scientific community, NGOs, and members of the public.
	Number and aggregate quantity of reportable spills, quantity recovered	Quantitative	Number, Kilograms (kg)	RR0102-05	
Ecological Impacts of Project Development	Project development asset impairments associated with community or ecological impacts	Quantitative	U.S. Dollars (\$)	RR0102-06	Such detailed financial information is not required to be disclosed under US GAAP. Also, we suggest not using US dollars to quantify the effects of this metric as the measurement of an impairment charge involves a number of considerations beyond potential community or ecological impacts. The metric would also need to be normalized on a per MW basis for it to be meaningful.
	Description of efforts in solar energy system project development to address community and ecological impacts	Discussion and Analysis	n/a	RR0102-07	
Management of Energy Infrastructure	Average price of solar energy (1) photovoltaic (PV) modules and (2) completed utility-scale systems	Quantitative	U.S. Dollars per watt (\$/W)	RR0102-08	Please delete this metric. We would be unable to disclose this as the price and cost of a PV module and PV system are considered sensitive information and would place us at a competitive disadvantage. We are unable to disclose financial information beyond what is currently contained in our 10-K.
Integration & Related Regulations	Description of risks associated with integration of solar energy into existing energy infrastructure and discussion of efforts to manage those risks	Discussion and Analysis	n/a	RR0102-09	
	Discussion of risks and opportunities associated with energy policy and its impact on the integration of solar energy into existing energy infrastructure	Discussion and Analysis	n/a	TA10-04-01	
Product Lifecycle Environmental Impacts	Percentage of products sold that are recyclable or reusable	Quantitative	Percentage (%)	RR0102-11	Although this section is titled product life cycle environmental impacts, it only deals with the end-of-life stage. Please refer to section 7 of NSF 457 which provides a more comprehensive overview of the most relevant PV life cycle impacts. As it currently stands, this section should be renamed as "end-of-life environmental impacts" since this is the only life cycle stage that is in fact covered here.
	Weight of end-of-life material recovered, percentage of recovered materials that are recycled	Quantitative	Metric tons (t), Percentage (%)	RR0102-12	

	Discussion of approach to manage use, reclamation, and disposal of hazardous materials	Discussion and Analysis	n/a	RR0102-13	This section incorrectly defines hazardous materials in terms of RCRA's definition of hazardous waste. hazardous materials is not the same as hazardous waste and should not be lumped in the same category. If this section is intended to be about end-of-life impacts of PV, it should focus on end-of-life recycling and disposal, not materials used in the product. In this case, we suggest changing this disclosure to "The registrant shall discuss its approach and strategies to design its products for high-value recycling." Please refer to section 9.1.3 of NSF 457. High-value recycling involves recovering at least 90% of the glass and 90% of the semiconductor material. Discussion on hazardous materials should fall under the "hazardous materials management (RR0102-04)" section instead.
Materials Sourcing	Percentage of materials costs for items containing critical materials	Quantitative	Percentage (%)	TA10-05- 01	Suggest changing metric to "Percentage recycled input material used". We would be unable to disclose percentage of material costs as this is sensitive information.
	Discussion of the management of risks associated with the use of critical minerals	Discussion and Analysis	n/a	TA10-05- 02	
	Discussion of the management of environmental risks associated with the polysilicon supply chain	Discussion and Analysis	n/a	RR0102-16	

Industry Standard	Disclosure Topic (e.g., Systemic Risk Management)	Accounting metric code (e.g., FN0102-02)	Line of disclosure, where relevant (e.g., .09)	Technical Agenda Item, where relevant (e.g. 4-10)	Comment
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Water Management in Manufacturing- (1) Total water withdrawn and (2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	RR0102-02	0.05	0.12	Please note that it may be difficult to quantify water that has evaporated. Please refer to latest draft GRI water standard 303-3: "When water consumption cannot be measured directly, it can typically be calculated as total water withdrawal minus the sum of total water discharge and change in water storage (C = W - (D+ΔS), where ΔS can be calculated by subtracting the volume of water storage at the beginning of the reporting period from the volume of water storage at the end of the reporting period. If the reporting organization does not keep water in storage, it can report the change in water storage (ΔS) as zero."
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Water Management in Manufacturing- (1) Total water withdrawn and (2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	RR0102-02	0.05	0.13	Please also add the NSF 457 (sustainability standard for PV) definition of water stress: The WBCSD Global Water Tool defines areas where water supply per capita is less than 1,700 m3/year as "water-stressed".
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Hazardous Materials Management	n/a	Description		Please revise the second sentence to the following: Environmentally sensitive materials such as lead, cadmium, selenium, silver, copper, arsenic, antimony and beryllium compounds are common in both crystalline silicon and thin film PV technologies. This section is confusing hazardous materials management with hazardous waste disposal which are two different things. This section appears to be about substances used in manufacturing and the product but it instead focuses on hazardous waste recycling and disposal. Please refer to section 5 of NSF 457 and its criteria on management of substances which addresses: declarable substances in the product, declarable substances in manufacturing, and the avoidance of high-GWP gas emissions that may result from either manufacturing or cleaning operations. As described in NSF 457, the most relevant high-GWP gases for photovoltaic manufacturing are nitrous oxide (N2O) and fluorinated greenhouse gases (F-GHGs). Fluorinated greenhouse gases refer to sulfur hexafluoride (SF6), nitrogen trifluoride (NF3), any fluorocarbon, any hydrofluorocarbon; any perfluorocarbon; any fully fluorinated linear, branched, or cyclic alkane, ether, tertiary amine, or aminoether; any perfluoropolyether; and any hydrofluoropolyether. Examples of F-GHGs include, but are not limited to, CF4, C2F6, C3F8, c-C4F8, C4F8O, CHF3, CH2F2, NF3, and SF6.
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Hazardous Materials Management- An	RR0102-04	0.24		This standard is confusing hazardous materials with hazardous waste. This section is meant to be about hazardous materials management and substances used in manufacturing and the product itself but it instead focuses on hazardous waste disposal. Please clearly define what hazardous waste is consistent with RCRA, which includes both listed and characteristic waste (not just characteristic). For substances used in manufacturing and the product itself, please refer to NSF 457's definition of declarable substance groups and declarable substances in accordance with IEC 62474, as well as industry-specific substances: arsenic compounds, antimony compounds, and beryllium compounds.
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Hazardous Materials Management- An	RR0102-04	0.25		Disclosures on hazardous waste should not fall under the hazardous materials management section. Hazardous materials and hazardous waste are two different things, see comment above. Please also align with GRI standard 306-2 which defines reuse and recycling as separate waste destinations. The percentage of hazardous waste recycled should be calculated as the weight of hazardous waste recycled divided by the total weight of hazardous waste.

SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Hazardous Materials Management- An	RR0102-04	0.26		Please clearly define what hazardous waste is consistent with RCRA. RCRA covers both characteristic and listed hazardous waste, not just characteristic. As explained above, this section is confusing hazardous materials with hazardous waste. Disclosures on hazardous waste should not fall under the hazardous materials management section. Hazardous materials and hazardous waste are two different things.
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Community & Ecological Impacts of Project Development- Project development asset impairments associated with community or ecological impacts	RR0102-06	0.33		Such detailed financial information is not required to be disclosed under US GAAP. Also, we suggest not using US dollars to quantify the effects of this metric as the measurement of an impairment charge involves a number of considerations beyond potential community or ecological impacts. The decision to not pursue a project is typically based on financial reasons such as PPA economics, rather than community and environmental impacts. The metric would also need to be normalized on a per MW basis for it to be meaningful.
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Community & Ecological Impacts of Project Development- Description of efforts in solar energy system project development to address community and ecological impacts	RR0102-07			
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Management of Energy Infrastructure Integration & Related Regulations- Average price of solar energy (1) photovoltaic (PV) modules and (2) completed utility-scale systems	RR0102-08	0.41		Please note that we would be unable to disclose this as the price and cost (\$/W) of a PV module and PV system are considered sensitive information. We are unable to disclose financial information beyond what is currently contained in our 10-K.
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Product Life cycle Environmental Impa	n/a	Description		Please note that Product life cycle environmental impacts implies all stages of a product's life cycle from raw material sourcing to manufacturing, operation and end-of-life disposal and recycling. This section only deals with end-of-life impacts. Additionally, recycling is important for all PV technologies as it minimizes life cycle impacts, recovers environmentally sensitive, valuable, and energy intensive materials. Suggest rephrasing the first sentence: " Solar panels contain energy intensive, environmentally sensitive and valuable materials that can be recovered at end-of-life. "
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Product Life cycle Environmental Impacts- Weight of end-of-life material recovered, percentage of recovered materials that are recycled	RR0102-12	0.57		Please note that since PV modules typically have a lifetime of 25+ years, most modules being recycled today are either manufacturing scrap, warranty returns or modules that have been damaged in the field. Therefore, please also include manufacturing scrap i.e. " <i>The registrant shall disclose the weight, in metric tons, of materials recovered, including those recovered through recycling services, product take-back programs, and refurbishment services, and as manufacturing scrap.</i> " The last bullet should also be revised to the following for clarity: "The scope of disclosure excludes products and parts that are in warranty and have been collected for repairs and then redeployed. "
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Product Life cycle Environmental Impacts- Discussion of approach to manage use, reclamation, and disposal of hazardous materials: <i>The registrant shall discuss its strategies to manage the use of hazardous materials</i>	RR0102-13	0.60		This section is confusing hazardous materials with hazardous waste. This section incorrectly defines hazardous materials in terms of RCRA's definition of hazardous waste. Solar PV modules do not contain hazardous waste. Discussion on materials used in the product does not belong in the end-of-life impacts section, instead it should be moved to the "hazardous materials management" section. For substances used in manufacturing and the product itself, please refer to NSF 457's definition of declarable substance groups and declarable substances in accordance with IEC 62474, as well as industry-specific substances: arsenic compounds, antimony compounds, and beryllium compounds.
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Product Life cycle Environmental Impacts- Discussion of approach to manage use, reclamation, and disposal of hazardous materials: <i>The registrant shall discuss its approach to design for reducing use of hazardous materials or substituting them with non-hazardous materials and its strategies to mitigate risks associated with the use of hazardous materials.</i>	RR0102-13	0.61		As mentioned above, this section is confusing hazardous materials with hazardous waste by incorrectly defining hazardous materials in terms of RCRA's definition of hazardous waste. PV modules do not contain hazardous waste. This belongs in the "hazardous materials management" section. With regards to substituting materials, please align with section 5.1.5 of NSF standard 457 which addresses alternatives assessment.
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Product Life cycle Environmental Impacts- Discussion of approach to manage use, reclamation, and disposal of hazardous materials: <i>The registrant should identify which hazardous materials are used in its products</i>	RR0102-13	0.62		Suggest aligning with section 5 of NSF 457, the industry's first sustainability standard for PV modules: Change " <i>The registrant should identify which hazardous materials are used in its products</i> " to " The registrant should identify whether the product contains IEC declarable substances and/or industry-specific substances: arsenic compounds, antimony compounds, and beryllium compounds. " Again, this disclosure belongs in the "hazardous materials management" section.

SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Product Life cycle Environmental Impacts- Discussion of approach to manage use, reclamation, and disposal of hazardous materials: <i>The registrant shall discuss its approach to design and strategies to increase the disposal or reclamation of hazardous materials in the product end-of-life stage, including take-back programs and direct contracts with third-party hazardous waste reclamation services.</i>	RR0102-13	0.63		As mentioned above, this section is confusing hazardous materials with hazardous waste by incorrectly defining hazardous materials in terms of RCRA's definition of hazardous waste. Please change "The registrant shall discuss its approach to design and strategies to increase the disposal or reclamation of hazardous materials in the product end-of-life stage, including take-back programs and direct contracts with third-party hazardous waste reclamation services" to "The registrant shall discuss its approach and strategies to design its products for high-value recycling." Please refer to section 9.1.3 of NSF 457. High-value recycling involves recovering at least 90% of the glass and 90% of the semiconductor material.
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Product Life cycle Environmental Impacts- Discussion of approach to manage use, reclamation, and disposal of hazardous materials: <i>The registrant shall describe the root cause and its corrective actions for any incidences when its use, reclamation, and/or disposal of hazardous materials deviated from its expected outcomes, such as those resulting in a release to the environment (i.e., those disclosed in RR0102-05), regulatory non-compliance, and/or human health and safety impacts.</i>	RR0102-13	0.64		This belongs in the "hazardous materials management section"
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Material Sourcing- Percentage of materials	TA10-05-01	0.65		We would not be able to disclose percentage of material costs for proprietary and commercial reasons. We instead propose this section focuses on discussion of managing risks associated with the use of critical materials. If a quantitative metric is needed, we recommend "Recycled input materials used".
SOLAR TECHNOLOGY & PROJECT DEVELOPERS	Standards Outcome Report- End of life	n/a	n/a	n/a	The following statement is factually incorrect and should be corrected or deleted: "First Solar several years ago was criticized for use of cadmium in their panels and Japan refused to import them. First Solar offering product end of life management was a response to this concern. Will grow in importance." 1) First Solar has been committed to responsible product life cycle management since the company's inception. First Solar was the first PV company in the industry to establish a global PV module recycling program in 2005 (long before the company started modules in Japan). 2) Japan never refused to import First Solar thin film cadmium telluride modules. 3) First Solar continues to provide global recycling services to its customers and has more than a decade of experience in operating high-value PV module recycling facilities which recover approximately 90% of glass for reuse in new glass products and more than 90% of the semiconductor for reuse in new First Solar modules.

For your reference, please find below a copy of NSF/ANSI 457 (2017) Sustainability Leadership Standard for Photovoltaic Modules.