

To the European Commissioner for the Internal market Thierry BRETON,  
CC: To the Director-General Kerstin JORNA, Directorate-General For Internal Market, Industry,  
Entrepreneurship & SMEs

Date: February 7, 2024

**From the European PV manufacturing industry:**

## **A request for Ecodesign and Energy Label legislation that serves the environment and European solar PV manufacturing**

---

On behalf of the European photovoltaic (PV) manufacturing industry, we by this letter urge you to change the currently proposed methodologies for the Ecodesign and Energy Label legislations, and if that can be achieved set carbon footprint thresholds for PV modules to enter the EU market. We have actively participated in the stakeholder process regarding the inclusion of solar PV modules in Ecodesign and Energy Label regulations since the start in 2019 and wish to reiterate our key positions with this letter to ensure the Ecodesign and Energy Labelling regulations fit their purpose.

The Ecodesign Directive has the potential to encourage a shift towards more sustainable PV products, but only if it is based on an effective and proven methodology. If that is achieved, we welcome the inclusion of PV modules (incl. the CO<sub>2</sub>-contributions of all ingredients), inverters, tracking and other systems into the two regulations, seeing it as an excellent opportunity to establish proper practices for these products to enter the EU market. With solar energy expected to become the world's primary energy source in the coming decades, it is crucial that solar PV materials are manufactured in an environmentally and socially responsible manner.

**As the Commission legislative process is concluding, we would like to stress that our below three recommendations are crucial for the competitiveness of the European photovoltaic (PV) manufacturing industry. The willingness of the European Commission to embrace these recommendations will play a pivotal role in shaping the regulations so that they do not only resonate with EU values, but also provide high environmental standards as a positive differentiator, instead of a competitive disadvantage, for European manufacturers. This leadership has the potential to not only propel Europe forward but also inspire other jurisdictions to adhere to a set of standards that are both minimal and aspirational. It is essential to recognize that achieving a transition to a greener economy extends beyond the mere exclusion of a small fraction of the worst modules from the EU market. What is truly required are more stringent standards. We firmly believe that adopting this approach will not jeopardize the attainment of EU targets; instead, it will serve as a catalyst, compelling both EU and non-EU manufacturers to elevate their practices and enhance their credentials.**

**Firstly**, we are concerned about the proposed Product Environmental Footprint Category Rules (PEFCR) methodology for calculating the carbon footprint of the PV modules on a kilowatt-hour (kWh) basis, which leaves room for manipulation through lifetime, degradation, and green energy certificate uncertainties. To minimize the risk for greenwashing, the carbon footprint should be calculated on a kilowatt-peak (kWp) cradle-to-gate basis. This carbon footprint calculation method has successfully been used in the French national government specification for solar and wind power facility tenders for more than a decade. Due to its track record, this approach is also used in Norway, USA and South Korea — making it an internationally unified approach to carbon footprint assessment of PV. It also forms the basis for the carbon footprint criteria in the globally recognized Electronic Product Environmental Assessment Tool (EPEAT) ecolabel for solar.

**Secondly**, the published Ecodesign draft version, allows complete usage of green certificates/Power Purchase Agreements (PPAs), allowing manufacturers — including those heavily reliant on fossil fuels — to obtain a

carbon footprint classification that does not accurately reflect the climate impact of their manufacturing processes. As such green certificates outside the EU and USA often lack traceability, and therefore credibility, it is of utmost importance to limit such energy certificates to an absolute maximum of 25% and only allow the national grid emission factors for the rest from reliable and reputable sources, such as the International Energy Agency. To address this issue, we strongly recommend considering the use of EPEAT instead, which imposes clear limitations on market-based energy usage and employs stricter control mechanisms compared to the proposed PEFCR version.

If the aforementioned methodology shift is not feasible, as an alternative (although not an optimal solution) we urge the European Commission not to allow — or at least impose strict limitations on — usage of green certificates/PPAs in the PEFCR methodology, ensuring that referred energy use aligns with the national grid's verified emissions data. This means assessing a module based on the carbon-embedded energy mix of its manufacturing country, promoting transparency similar to schemes like the French system for public tenders.

**Thirdly**, the current design of the Energy Label in the latest proposal published by the European Commission focuses only on energy yield (kWh/m<sup>2</sup>/a), which neglects factors such as reducing production-related emissions, recyclability, and durability. An effective Energy Label for PV module should be based on embodied carbon or energy. An Energy Label based on energy yield would only score high efficiency modules well but not modules with low embedded carbon footprint or energy, or benefit modules with a long lifetime. We strongly recommend modifying the proposal to include a label that integrates all manufacturing stage carbon content or, alternatively, discloses primary energy use data in the manufacturing stage, instead of a label that basically only takes into account the efficiency of the modules while disregarding the manufacturing inputs and the durability of the modules. If this adjustment is not possible, we advocate for eliminating the introduction of an energy label for PV modules.

**Ecodesign and Energy Labelling legislations, which set carbon footprint thresholds for PV modules to enter the EU market, have the potential to uphold the competitive advantage of the European PV manufacturing value chain, and could, to some extent counteract the weaker environmental laws outside the EU. But this if — and only if — the carbon footprint calculation methodology prevents greenwashing and closes loopholes for manipulation. If this cannot be achieved, and foreign manufacturers are allowed to buy themselves a lower carbon footprint through cheap green certificates that are less strict than the EU equivalents, or by manipulating warranties etc., the implementation of the Ecodesign legislation would have a detrimental effect on the European PV industry.**

Please find in Appendix 1 and Appendix 2 technical details and reasoning, from scholar experts in the area of techno-economic and ecological analyses, that support the positions stated in this letter.

We encourage regulations that support the environment and set an example for a clean transition, while the simultaneously fostering and strengthening the most sustainable European solar manufacturing industry. The aforementioned recommendations would help prevent greenwashing and better fulfil the original intent and environmental objectives of the Ecodesign and Energy Label legislations.

## European associations in the PV value chain

Johan Lindahl  
Secretary General  
European Solar Manufacturing  
Council



Michael Parr  
Executive Director  
Ultra Low Carbon Solar Alliance



Christopher Case  
President  
PV thin a.i.s.b.l.



## European PV research organisations and institutes

Greg Arrowsmith  
Secretary General  
Association of European  
Renewable Energy Research  
Centres (EUREC)



Adel El Gammal  
Secretary General  
European Energy Research Alliance  
(EERA)



Justin Wilkes  
Executive Director  
Environmental Coalition on  
Standards (ECOS)



Prof. Dr. Ralf Preu  
Director, Division Photovoltaics —  
Production Technology  
Fraunhofer ISE



Prof. Dr. Ivan Gordon  
Department Director IMOMEC  
IMEC



Prof. Dr. Rutger Schlatmann  
Director Institute PvcomB  
Helmholtz-Zentrum Berlin für  
Materialien und Energie GmbH



Dr. Pierre-Jean Ribeyron  
Deputy director for technology  
CEA LITEN



## European manufacturers in the PV value chain

Christian Westermeier  
Vice President Customer & Quality  
Management  
Wacker Chemie AG



Erik Løkke-Øwre  
CEO  
Norsun AS



NorSun

Gunter Erfurt  
CEO  
Meyer Burger Technology AG



MEYER BURGER

Lucas Weiss  
CEO  
Voltec Solar SAS



Anja Lange  
Managing Director  
First Solar GmbH



Benjamin Trinkerl  
CEO  
Heckert Solar GmbH



Jan Jacob Boom-Wichers  
CEO  
Holosolis SAS



Pierre-Emmanuel Martin  
Chairman  
Carbon Solar SAS



Chris Case  
CTO  
Oxford PV



Alessandro Barin  
CEO  
FuturaSun S.r.l



Sébastien Mahieu  
Managing Director  
Belga Solar S.r.l.



Julius Sakalauskas  
CEO  
SoliTek Cells JSC



Paul Toulouse  
General Manager  
SYSTOVI



Ivan Higuera  
CEO  
Gransolar Group



Luciano Lauri  
President  
Sunerg Solar Energy S.r.l.



Cornelius Paul  
Founder & CTO  
Autarq GmbH



Sven Lindström  
CEO  
Midsummer AB



Davor Sutija  
CEO  
NexWafe GmbH



Laura Sartore  
CEO  
Ecoprogetti S.r.l



Yun Luo  
CEO  
Rosi Solar SAS



Niels Schreuder  
Public Affairs Director  
AGC Glass Europe



Marco Saladin | Philipp Zahn  
Managing Directors  
M10 Solar Equipment GmbH



Davide Zanatta  
CEO  
Fly Solartech Solutions SRL



Robert Grant  
CEO  
Gas Recovery and Recycle Ltd



Mark Rossetto  
CEO  
MRP S.r.l



Gerry Knoch  
Managing Director  
Exateq GmbH



Adam Podgorski  
CEO  
Green 14



Laetitia Brottier  
Co-founder  
DualSun



Bill Mulligan  
CEO  
Maxeon



## Appendix 1

**What criticism is there of the current draft of the EcoDesign Regulation and the Energy Labelling Directive for PV modules and systems, and what corrections do we find necessary?**

### **EcoDesign Directive**

The currently foreseen "Methodology for assessing the CO<sub>2</sub> footprint of a PV module" is based on the PEFCR (Product Environmental Footprint Category Rules Guidance) and calculated in g CO<sub>2</sub>-eq/kWh. The methodology allows up to 100% of the purchase of electricity from renewable energies via power purchase agreements (PPAs) or green energy attribute certificates (EACs).

### **Criticism:**

#### **A) Inclusion of up to 100% green PPA/Energy Attribute Certificate allows for "green washing".**

The inclusion of green PPAs/Energy Attribute Certificates allows "greenwashing", as global certificates cannot always be verified (including a risk of double counting). This makes it possible, for example, for Chinese manufacturers to have a lower CO<sub>2</sub> footprint than modules made in Europe or even Norway. Thus, manufacturers from the EU will perform worse than Chinese manufacturers misusing PPAs and EACs.

### **Recommendation:**

1. A CO<sub>2</sub> footprint calculation based on the globally recognized "Electronic Product Environmental Assessment Tool" EPEAT ecolabel methodology for solar, which limits green electricity purchases (PPA, ...) up to 25% in addition to the national electricity mix. This allows for a fair comparison of European and Chinese manufacturers and improves the consistency of regulations between Europe and the USA.
2. If a switch to the EPEAT methodology is not feasible, a cap with a maximum allowance (of e.g. of 25%) for the inclusion of Green Energy Attribute Certificate (like renewable PPAs) must be set, to avoid green washing.
3. For the electricity consumption, the calculation of the CO<sub>2</sub> footprint must be based on the national grid electricity mix and respective emission factors to minimize cheating.
  - a) In this case, we propose using look-up tables with CO<sub>2</sub>-eq emissions for each value chain step and respective manufacturing country (as existing ones from the IEA), which everybody has to use (as e.g. mandatory for the French public tenders' carbon footprint certification as well as within EPEAT 'Path A').
  - b) Look-up tables would need to include some key product parameters as wafer thickness, recycled silicon content, including the frame, as is done in EPEAT.

#### **B) CO<sub>2</sub> footprint calculation with functional unit "g CO<sub>2</sub>-eq/kWh" allows for manipulation.**

A calculation of the CO<sub>2</sub> footprint in g CO<sub>2</sub>-eq/kWh allows for manipulation due to lifetime and degradation uncertainties between different manufacturers. Furthermore, the current threshold of 25 g CO<sub>2</sub>-eq/kWh is too high and would not exclude any product from the market and should therefore be lowered.

### **Recommendation:**

1. Calculation of the CO<sub>2</sub> footprint in kg CO<sub>2</sub>-eq/kW<sub>p</sub> to eliminate manipulation of lifetime, degradation and irradiation uncertainties.
2. If a calculation of the CO<sub>2</sub> footprint in CO<sub>2</sub>-eq/kWh is chosen

- a) lifetime, degradation, and irradiation should be fixed in the calculation to avoid green washing and
  - b) a minimum required threshold on product and performance warranty must be set, to avoid products with low quality entering the market.
3. Current threshold (25 g CO<sub>2</sub>-eq/kWh) is too high and should start with 18 g CO<sub>2</sub>-eq/kWh (and further lowered over time).

### **C) Product Quality / Module lifetime energy yield for CO<sub>2</sub>-eq calculation is unpractical**

The planned EcoDesign Regulation provides for a quality check according to IEC 61215. This is not an improvement to today's standard. In addition, the degradation is to be determined from field measurements or, alternatively, a degradation of 1.0%/a is assumed for all products. Due to the duration and the innovation cycles, field measurements do not seem to be practicable, which means that all products are of the same quality (using 1%/a degradation). Accordingly, a quality-oriented differentiation of the products is not possible for the customer, which ignores central goals of resource and energy efficiency.

#### **Recommendation:**

1. Annual degradation and service life from performance warranties.
2. Clear definition of minimum performance warranty criteria required as service life and degradation guarantees have been continually increased in recent years, not only because of qualitative improvements, but also due to competition. Not all warranties guarantee the same!

### **Energy Label Directive**

The Energy Label classes are determined based on initial annual energy output of a module in kWh/m<sup>2</sup>/a. An Energy Label based strictly on energy yield would favour high efficiency modules from carbon intensive regions rather than incentivizing the reduction of energy consumption-related emissions. Since PV energy use and emissions take place during manufacturing and not in the use phase, an effective Energy Label for PV module should be based on embodied carbon or energy.

#### **Criticism:**

1. Using the modules' energy yield in the first year of the use phase as determining factor, while disregarding the manufacturing inputs, is not in the spirit of the energy label to reduce energy consumption-related emissions (emissions take place in manufacturing and not in the use phase, PV module versus refrigerator)
2. Carbon-intensive Chinese modules with higher nameplate efficiency do better than low carbon European modules (access to more efficient solar cells and larger wafer sizes).
3. Ratings will be listed in European [EPREL data base](#), and would mislead buyers into thinking European PV modules are less eco-efficient than modules from carbon intensive regions.

#### **Recommendation:**

1. Eliminate Energy Label for PV modules.
2. Adapt Energy Label to take manufacturing inputs into account through either a
  - a) Rating according to the embedded CO<sub>2</sub> footprint (based on the same methodology proposed above for the EcoDesign Directive)
  - b) Rating according to the embedded primary energy being used for producing the PV module, including all ingoing materials.
  - c) Please note: Appendix 2 show above-described measures with explanatory notes.