

# EUROPEAN SPACE SECTOR FEEDBACK ON THE ECODESIGN DG GROW SOLAR PV REGULATORY INITIATIVES

**Reference:** *European Commission public consultation (23.9.-16.12.2022) on potential measures for regulating the photovoltaic (PV) modules, inverters, and systems*

This is the joint contribution of the European Space Industry, represented by ASD-EUROSPACE – with the support of European and national space agencies – to the European Commission’s (COM) public consultation on potential measures for regulating photovoltaic products in order to manage their environmental impacts under the EU’s *Ecodesign Directive 2009/125/EC*<sup>1</sup> and the *Energy labelling Regulation (EU) 2017/1369*<sup>2</sup>. It has been prepared with the support of the Materials and Processes Technology Board of the European Space Components Coordination (ESCC MPTB).<sup>3</sup>

The two Commission initiatives aim to make solar PV products more energy efficient, extend their lifetime (i.e. make them less prone to damage) and improve their material efficiency (i.e. making them more recyclable). Our interpretation is that the potential measures are only meaningful in the context of the terrestrial on-ground applications.

---

<sup>1</sup> Available at [https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12819-Ecodesign-European-Commission-to-examine-need-for-new-rules-on-environmental-impact-of-photovoltaics\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12819-Ecodesign-European-Commission-to-examine-need-for-new-rules-on-environmental-impact-of-photovoltaics_en).

<sup>2</sup> Available at [https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12820-Energy-labelling-European-Commission-to-examine-need-for-new-rules-on-environmental-impact-of-photovoltaics\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12820-Energy-labelling-European-Commission-to-examine-need-for-new-rules-on-environmental-impact-of-photovoltaics_en).

<sup>3</sup> See MPTB is a partnership between the European Space Agency (ESA), national space agencies, and the European space industry represented by ASD-EUROSPACE; it is chaired at present by ESA. The European Defence Agency (EDA) is an observer.

## ABOUT SOLAR PV PRODUCTS DESIGNED TO BE SENT INTO SPACE

Solar PV products designed to be sent into space are critical for EU-funded applications such as Copernicus earth observation satellites, Galileo navigation satellites and other missions strategic to Europe. They have key design drivers which are significantly different from Earth-based PV systems. Firstly, a key driver is the need to reduce solar array mass, and to increase the power generated per unit area. Secondly satellite solar panels need protection against ionizing radiation. There are four sources of radiations: The Earth's radiation belts (also called Van Allen belts), galactic cosmic rays (GCR), solar wind and solar flares. Solar panels will experience efficiency degradation over time as a result of these types of radiation. In addition, they have to be capable to stand thousands of thermal vacuum cycles in orbit where the temperature, according to the mission profile, may vary from -150 °C to more than 120 °C, in case of scientific missions even wider temperature extremes. They also have to resist to the mechanical solicitations mainly linear accelerations and vibrations during launch and orbital manoeuvres. Because of all these constraints the PV products used for space have design solutions, including technologies and materials, which are quite different from those for terrestrial applications.

## RATIONALE FOR NON-APPLICABILITY OF THE SOLAR PV REGULATORY INITIATIVES

As stressed only recently, the European Space Sector recognises and is working proactively to address the environmental impact of space activities both on Earth and in space, taking into account the specificities of space products.<sup>4</sup> This being said, it is clear that any legal requirements in this respect must be **applicable, relevant** and **fit for purpose** for our products.

**With regard to the present European Commission initiative, we have analysed the available information and legal bases. As a result, it is our understanding that the potential measures for Solar PV are only meaningful in the context of terrestrial on-ground applications and would thus not apply to equipment designed to be sent into space, incl. as part of satellites, probes, capsules, etc.. For reasons of legal certainty, we herewith kindly ask the Commission to clarify this scope exclusion explicitly in any implementing measure(s).**

The potential measures would not apply to equipment designed to be sent into space for a number of reasons, which **independently from each other** justify the scope exclusion:

First of all, the Ecodesign Directive 2009/125/EC (Article 1(3)) and the Energy labelling Regulation (EU) 2017/1369 (Article 1(2)(b)) do not apply to *“means of transport for persons*

---

<sup>4</sup> See <https://euospace.org/euospace-welcomes-product-specific-approach-of-new-eu-ecodesign-framework-proposal-strategic-role-and-specificities-of-space-products-highlighted>.

*or goods*”, according to its Article 1(3). This also includes launchers as well as satellites, as clarified early on by the European Commission in the context of Directive 2002/95/EC on the Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS).<sup>5</sup> The non-application covers products that are specifically constructed only for application in (non-stationary) means of transport, regardless if the product itself contributes to the movement.<sup>6</sup> As explained above, Solar PV are bespoke for space applications.

Secondly, we understand that the potential measures only apply to products (newly) **installed (and used) in Europe (the EU)**, as evident from the reference<sup>7</sup> to the Product Environmental Footprint Category Rules (PEFCR) for photovoltaic modules used in photovoltaic power systems for electricity generation (Version 1.2 – February 2020).<sup>8</sup> This excludes Solar PVs for applications in space.

Therefore also, the **draft ecodesign requirements** (such as design for reliability, design for repair, disassembly requirements, reference to the three European reference climatic conditions ‘temperate coastal’, ‘temperate continental’ and ‘subtropical arid’ / middle-European climate) in the Commission working document<sup>9</sup> are **not applicable to PV sent to and used in space**, and which do not return to Earth after their end of life. Accordingly, the Life Cycle Assessment (LCA) for space products is much different, requiring various adaptations.<sup>10</sup>

---

<sup>5</sup> European Commission, Directorate-General Environment, The Director-General, Frequently Asked Questions on Directive 2002/95/EC on the Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) and Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE), May 2005, page 5: *“The opinion of the Commission is that excluded from the scope of the RoHS Directive is the equipment which part of another type of equipment that does not fall within the scope of this Directive. Therefore, equipment that is specifically designed to be installed in airplanes, boats and **other means of transport (including satellites)** is considered to fall outside the scope of the RoHS Directive.”*

<sup>6</sup> European Commission, Frequently Asked Questions (FAQ) on the Ecodesign Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products and its Implementing Regulations, last updated December 2019, pages 14-15 and 24; available [here](#).

<sup>7</sup> In the WORKING DOCUMENT ON A POTENTIAL COMMISSION REGULATION (EU) .../... of XXX laying down ecodesign requirements for photovoltaic modules and photovoltaic inverters pursuant to Directive 2009/125/EC of the European Parliament and of the Council; recital (13).

<sup>8</sup> Available at [https://ec.europa.eu/environment/eussd/smgp/pdf/PEFCR\\_PV\\_electricity\\_feb2020\\_2.pdf](https://ec.europa.eu/environment/eussd/smgp/pdf/PEFCR_PV_electricity_feb2020_2.pdf); page 18 under heading ‘3 PEFCR scope’: *“The photovoltaic module analysed is installed in Europe [...]”*.

<sup>9</sup> See [footnote 7](#).

<sup>10</sup> Related work is done for example as part of the *EcoDesign* branch of the ESA *Clean Space Office*, which includes work on space-specific adaptations to the LCA approach; see ESA, Corporate Responsibility and Sustainability, Report 2020-21, page 36, available [here](#).

## PROPOSED EXEMPTION CLAUSE

Consistent with several other existing EU legal provisions which have clarified a scope exclusion for space products,<sup>11</sup> the non-applicability of ecodesign measures on Solar PV to space products would be appropriately included in the existing draft list of products, by adding that:<sup>12</sup>

*“2. This Regulation shall not apply to the following products:*

*[...]*

*Equipment designed to be sent into space.”*

## FINAL REMARK

We would like to emphasise that the present exclusion position is related specifically to the existing Ecodesign Directive 2009/125/EC and the potential implementing measures for Solar PV being examined under it. We are aware that space products are generally covered under the Commission proposal of 30 March 2022 for a Regulation establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC<sup>13</sup>. We have recently shared our feedback<sup>14</sup> on this proposal, welcoming the overall objectives and product-specific approach of this new proposal which acknowledges in its recital (16):

*“Similarly, the space industry is strategic for Europe and for its technological non-dependence. As space technologies operate in extreme conditions, any ecodesign requirements for space products should balance sustainability considerations with resilience and expected performance.”*

---

<sup>11</sup> *Batteries* Directive 2006/66/EC Article 2(2)(b); Article 1(3)(b) of the Commission proposal of 10.12.2020 for a new *Batteries* Regulation (COM(2020) 798 final); *RoHS* Directive 2011/65/EU Article 2(4)(b); *WEEE* Directive 2012/19/EU Article 2(4)(a); *Mercury* Regulation (EU) 2017/852 Article 8(1)(b).

<sup>12</sup> See [footnote 7](#).

<sup>13</sup> [https://environment.ec.europa.eu/publications/proposal-ecodesign-sustainable-products-regulation\\_en](https://environment.ec.europa.eu/publications/proposal-ecodesign-sustainable-products-regulation_en).

<sup>14</sup> See [footnote 4](#).

*Kind regards,*



*Pierre LIONNET*  
*Research and Managing Director*  
*ASD-EUROSPACE*

[Pierre.lionnet@eurospace.org](mailto:Pierre.lionnet@eurospace.org)  
+33-(0)1 44 42 00 70

**This contribution has been prepared with the support of the Materials and Processes Technology Board of the European Space Components Coordination (ESCC MPTB). It reflects the best knowledge available from experts in their field, thanks in particular to the support of ASD-EUROSPACE, the following corporations represented in the MPTB:**

**AIRBUS DEFENCE AND SPACE, ARIANEGROUP, AVIO, BEYOND GRAVITY, MT AEROSPACE, OHB SYSTEM, THALES ALENIA SPACE, TESAT SPACECOM, TNO**

**and space agencies:**

**AGENZIA SPAZIALE ITALIANA (ASI), CENTRE NATIONAL D'ETUDES SPATIALES (CNES), DEUTSCHES ZENTRUM FÜR LUFT- UND RAUMFAHRT (DLR), EUROPEAN SPACE AGENCY (ESA)**

**Other MPTB participants are the EUROPEAN DEFENCE AGENCY (EDA), LEONARDO COMPANY and MAP SPACE COATINGS as observers; and REACHLaw a consultancy supporting the group on health, environmental and other sustainability requirements in the EU and beyond.**