

INCEPTION IMPACT ASSESSMENT

Inception Impact Assessments aim to inform citizens and stakeholders about the Commission's plans in order to allow them to provide feedback on the intended initiative and to participate effectively in future consultation activities. Citizens and stakeholders are in particular invited to provide views on the Commission's understanding of the problem and possible solutions and to make available any relevant information that they may have, including on possible impacts of the different options.

TITLE OF THE INITIATIVE	<i>Environmental impact of photovoltaic modules, inverters and systems</i>
LEAD DG (RESPONSIBLE UNIT)	GROW.I3 (Green and Circular Economy)
LIKELY TYPE OF INITIATIVE	<i>Commission implementing regulation (ecodesign) Commission delegated regulation (energy labelling)</i>
INDICATIVE PLANNING	<i>4th quarter 2022</i>
ADDITIONAL INFORMATION	https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12819-Environmental-impact-of-photovoltaic-modules-inverters-and-systems-Ecodesign

The Inception Impact Assessment is provided for information purposes only. It does not prejudice the final decision of the Commission on whether this initiative will be pursued or on its final content. All elements of the initiative described by the Inception impact assessment, including its timing, are subject to change.

A. Context, Problem definition and Subsidiarity Check

Context

As announced in the European Green Deal, the decarbonisation of the EU energy system is critical in order to reach climate objectives in 2030 and 2050. To this extent, a power sector must be developed that is based largely on renewable sources, complemented by the rapid phasing out of coal and by decarbonising gas. In particular, the 2018 [Renewable Energy Directive](#) establishes a binding renewable energy target for the EU for 2030 of at least 32%. In June 2021, the Commission adopted a [package of proposals 'Fit for 55'](#) to make the EU's climate, energy, land use, transport and taxation policies fit for reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. The package includes a proposal to increase the target for renewable energy. Moreover, the Commission also announced as part of the [updated industrial strategy](#) ongoing work on ecodesign measures for solar panels, including possible requirements on carbon footprint. Within this framework, photovoltaics are expected to play an important role.

The present initiative will in particular focus on the feasibility of regulatory approaches for the environmental impact of photovoltaic products (modules, inverters and systems) based on 2 existing EU acts, on:

- **ecodesign** – promoting the energy efficiency, durability, reparability and recyclability of products (Directive 2009/125/EC)
- **energy labelling** – promoting energy efficiency in products. (Regulation (EU) 2017/1369)

Problem the initiative aims to tackle

Concerning photovoltaic products (modules, inverters and systems) and their environmental impacts, the market situation is as such:

- there is a need to ensure **comparability** in the market between claims relating to **module energy yield**, module's **performance long-term degradation** and **carbon footprint**. This would help both private and public buyers. Concerning the latter category, it is noteworthy that the use of photovoltaic modules and systems to improve energy efficiency of public buildings is set to significantly increase over the next years. The public sector is perceived to take on a leadership role, acting as a catalyst for the uptake of photovoltaic modules;
- not all products on the market feature high quality and long-term energy performance;
- the manufacturing and shipment of photovoltaic modules account together for a significant share of the carbon emissions of these products, with improvement potentials that could be attained by means of design choices;

- module and inverter are manufactured and designed in such a way that it is often **difficult to repair and recycle** them;
- solar inverters have a key role to play in the **smart readiness** of homes, but this is not currently a standardised feature;
- the **energy yield of photovoltaic systems** can potentially be increased through a combination of:
 - o better design, to take into account site-specific conditions,
 - o best installation practices and,
 - o reduced losses thanks to the implementation of best practices in selecting and coupling the proper equipment with adequate cabling and maintenance.

Basis for EU intervention (legal basis and subsidiarity check)

Legal basis

- The basis for measures to promote energy efficiency is the **Energy Labelling Regulation** (based on Article 194(2) of the Treaty on the Functioning of the European Union)
- The basis for potential implementing measures under the **Ecodesign Directive** is Article 114 (internal market) of the same Treaty.

Through these two acts, the European Parliament and the EU Council have given a legislative mandate to the Commission to regulate the environmental performance of energy-related products.

Subsidiarity check

The environmental performance of photovoltaic products could potentially be regulated at national level, in the absence of shared requirements at EU level.

However, this would create regulatory obstacles to the free movement of such goods within the single market. Action at EU level therefore appears necessary, and offers added value over national action.

B. Objectives and Policy options

EU policy needs to help keep climate and environmental impacts linked to resource and energy use, and production and use of products, within planetary boundaries.

The objective of the measure is, in the context of ensuring free circulation of goods in the internal market, to contribute to energy efficiency, generation of renewable energy sources, CO₂ emission abatement and security of energy supply as well as realising a high level of environmental and consumer protection.

More specifically, the impact assessment will analyse (regulatory) solutions aimed to:

- foster module and inverter designs that have improved long-term energy yield, circularity (i.e. improved ability to be repaired and recycled) and smart readiness
- take products off the market that are of a low quality thus implying higher life cycle costs (as lower product quality entails lower yield and/or lower durability)
- close the information gap (in terms of availability and reliability) on products available on the EU market, to support the consumers and other market actors, such as SME in the recycling and reuse sectors, in getting comparable information on module energy yield, module's performance long-term degradation and life-cycle energy impacts
- optimise and increase the energy yield of small photovoltaic installations (indicatively less or equal to 20kWp) by enabling consumers to make an informed choice based on the performance of system designs offered by retailers and installers.

The impact assessment will consider different policy options for achieving these objectives, such as:

- option 1 – **no action** (i.e. business as usual)
- option 2 – **self-regulation** (if proposed by stakeholders)
- option 3 – **mandatory specific and/or generic ecodesign requirements** (according to Annex I and/or Annex II of the Ecodesign Directive 2009/125/EC)
- option 4 – **energy labelling** according to the Energy Labelling Regulation 2017/1369
- option 5 – a combination of **ecodesign** requirements and **energy labelling**
- option 6 - a combination of **ecodesign** requirements, **energy labelling** and **EU Green Public Procurement** criteria (with specific reference to the latter, as the procurement of PV systems for grid connected power

generation by public authorities could act as a catalyst to increase local residential photovoltaic system installations and to create demand for green solar electricity).

C. Preliminary Assessment of Expected Impacts

Likely economic impacts

A thorough cost-benefit analysis will be undertaken.

The impact on users (e.g. prices, demand, social costs) and industry (profitability, investment level, etc.), will be assessed, covering the whole value chain of the products in question (original equipment manufacturers, repair operators, installers, recycling sector, etc.). Preliminary estimations indicate that lower life cycle costs could be attained by decreasing the environmental impact of photovoltaic products. This could be attained by a) decreasing the environmental impact – while keeping a high quality process – of the manufacturing phase, b) placing on the market products and systems featuring a higher energy yield, c) ensuring proper maintenance during the operational life, and d) including circular economy requirements, as design for repairing and recycling.

Moreover, the criteria referred to under Article 15.5 of the Ecodesign Directive will be screened, in particular product affordability, functionality and the life cycle cost of the product, industry's competitiveness and non-imposition of proprietary technology on manufacturers.

Likely social impacts

The impact assessment will assess in detail if there are specific social impacts linked to this initiative, e.g. from the employment point of view throughout the whole value chain (original equipment manufacturers, repair operators, installers, recycling sector, etc.).

The criteria referred to under Article 15.5 of the Ecodesign Directive on impacts on health and safety aspects will be screened.

Likely environmental impacts

The main benefits would be improving the environmental performance as well as the energy yield of these products, thus increasing the share of renewable energy, while concurrently reducing their overall environmental footprint. Preliminary estimations indicate that the yield of the stock of photovoltaic installations in 2030 would increase by ~14TWh (a 6% increase when compared to the business-as-usual situation) in presence of a market with more environment-friendly products; this would also be accompanied by a 4% decrease in their Gross Energy Requirement (i.e. in the amount of energy resources consumed in making available the products on the market).

Likely impacts on fundamental rights

No impacts expected.

Likely impacts on simplification and/or administrative burden

The regulations would be directly applicable in all Member States, resulting in no costs for national administrations for transposition into national legislation. The impact assessment will investigate possible impacts on administrative burden (as referred to under Article 15.5 of the Ecodesign Directive), although a significant part of the market is formed by players that already provide some (non-standardised) information on the performance and on other quality aspects of the photovoltaic products. Therefore, the additional administrative burden impact is not expected to be significant.

D. Evidence Base, Data collection and Better Regulation Instruments

Impact assessment

To support the preparation of this initiative and to inform the Commission's decision, the Commission will carry out an impact assessment.

Evidence base and data collection

A preparatory study on the environmental impact of photovoltaic products was carried out by the Joint Research Centre ('Preparatory study for solar photovoltaic modules, inverters and systems') and published in 2020. It concluded that, improvements in energy yield, long-term performance and circularity of photovoltaic modules, inverters and systems could be ensured by (mandatory) legal instruments, acting at both component and system level.

Further research work from the Joint Research Centre shed light on the supporting standards and transitional methods for the calculation and testing of the performance of photovoltaic products.

In early 2021, a technical as well as preliminary legal analysis on the feasibility of ecodesign and energy labelling requirements for photovoltaic products has been published and discussed with stakeholders.

Consultation of citizens and stakeholders

A mix of targeted and public consultation tools and activities will be used, as described below:

- As part of the preparatory study, **3 stakeholder meetings** were organised. The main participants were from relevant industrial sectors, standardisation bodies and environmental and consumer organisations.
- During the preparation of the impact assessment, a meeting of the **Ecodesign Consultation Forum** (as required by Article 18 of the Ecodesign Directive) will be convened.

This Forum is composed of 30 Member States and 30 stakeholder organisations (business, environmental NGOs, consumer organisations, standardisation bodies and additional expert observers when required).

The documents with the draft policy proposals will be sent, with sufficient notice, to all Forum members and all legitimate stakeholders (via CIRCABC), and this consultation process will continue until the planned meeting of the Forum, and beyond, as the policy measures are progressively refined.

- A **public consultation** will be launched to collect stakeholders' views on issues such as the expected effect of potential legislative measures on product performance, as well as on businesses and on users. This consultation will be announced on <https://ec.europa.eu/info/consultations>.
- **individual (ad hoc) consultations** will be also held with selected stakeholders (e.g. on specific technical aspects) on a continuous basis

For more details – including a summary of the responses to the public consultation and an analysis of all the consultation activities – see the [dedicated webpage for this consultation](#).

Will an implementation plan be established?

No, the regulation is directly applicable in all Member States.

Uniform implementation of ecodesign and energy labelling measures is facilitated by several initiatives, especially European administrative cooperation on market surveillance.