

Thirteenth session of the IRENA Assembly

End-of-life Management of Solar PV and the Circular Economy

13 January 2023, 14:00 – 16:00 GST
St. Regis Hotel, Saadiyat Island, Abu Dhabi

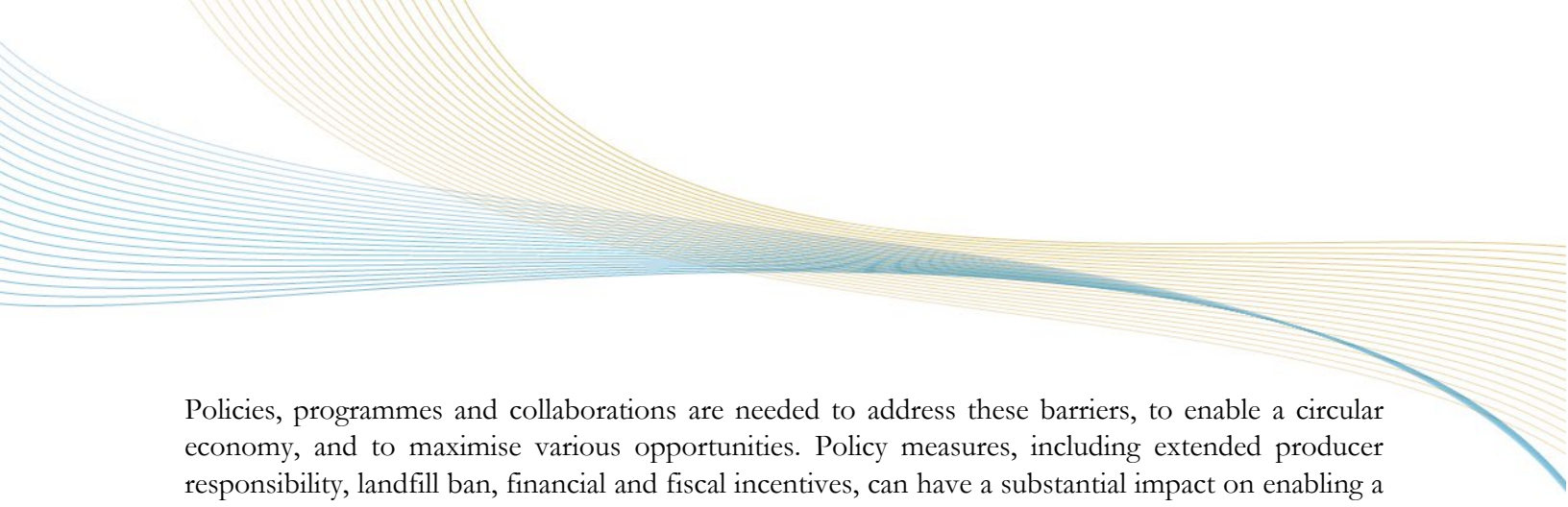
Background

Solar photovoltaic (PV) has seen massive growth over recent years. In 2021, solar PV installations reached 137 GW, making it the second largest installed renewable power generation source and contributing 28% of global renewable power total. IRENA's 1.5°C Scenario suggests that solar PV will need to contribute more than half of renewable power capacity additions from now to 2050. Existing and future solar PV deployment requires a significant supply of raw materials and presents challenges to end-of-life management after the PV panels reach the end of their service time.

Supported by the Government of Germany, IRENA has been working on the end-of-life management of renewables and circular economy. In 2016, IRENA partnered with IEA-PVPS and published the report *End-of-life Management: Solar Photovoltaic Panels*. This report was the first-ever study to assess global waste volumes of solar PV by 2050. IRENA is currently working together with the National Renewable Energy Laboratory (NREL) in the United States to develop the second edition of the study. The forthcoming report *End-of-life Management of Solar Photovoltaic in the Energy Transition: Enabling A Circular Economy* assesses global solar PV waste by 2050 in the 1.5°C Scenario, examines circular economy pathways, and analyses policies, measures and country examples.

Preliminary findings show that more than 210 million tonnes of cumulated solar PV waste will be generated by 2050 in a pathway aligning with 1.5°C climate targets. Most of the waste will come from the G20 countries. Furthermore, accelerated solar PV deployment requires a significant supply of raw materials (e.g. silicon and silver for solar cells, aluminium for frame, copper for connection and cables), adding further pressure to global supply and sustainability risks related to more intensive mining activities.

The circular economy provides a solution to address both challenges and brings many other benefits, including reduced costs and increased value, job opportunities and reduced negative environmental impacts. For example, recyclable materials from solar PV waste can exceed 7 million tonnes by 2040 and 17 million tonnes by 2050 in the 1.5°C Scenario. This can create billions of dollars of additional value. However, promoting a circular economy for solar PV faces many barriers, including limited information on PV components and waste, unclear regulations, high operational costs for reusing and recycling and low market confidence.



Policies, programmes and collaborations are needed to address these barriers, to enable a circular economy, and to maximise various opportunities. Policy measures, including extended producer responsibility, landfill ban, financial and fiscal incentives, can have a substantial impact on enabling a circular economy for solar PV. Industrial-initiated programmes and voluntary standards also have important roles to play in exploring suitable business models and demonstrating benefits.

Objectives

- Preview findings from the study *End-of-life Management of Solar Photovoltaic in the Energy Transition: Enabling A Circular Economy*, including projection of solar PV waste in the 1.5°C Scenario, circular economy approaches and best practices.
- Discuss circular economy approaches for end-of-life management of solar PV and major barriers they are facing, as well as policies and measures to enable a circular economy for solar PV.
- Exchange best practices of a circular economy for solar PV, including regulations, voluntary programmes, initiatives, and partnerships to reduce, reuse/repair/refurbish and recycle the solar PV system.
- Offer members an opportunity to provide feedback on, and further engage in, the Agency's work on end-of-life management of renewables and a circular economy.

Guiding Questions

- What are the major barriers to promoting a circular economy for solar PV (e.g. reduce, reuse/repair/refurbish and recycle)?
- What are the roles of government, industry, and non-governmental organisations in enabling the circular economy for solar PV?
- What key policies and measures have successfully overcome barriers to a circular economy and incentivised sustainable practices?
- How can IRENA support policymakers in promoting a circular economy for solar PV?

Associated Publications

[World Energy Transitions Outlook 2022](#) (2022)

[End-of-life Management: Solar Photovoltaic Panels](#) (2016)

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