

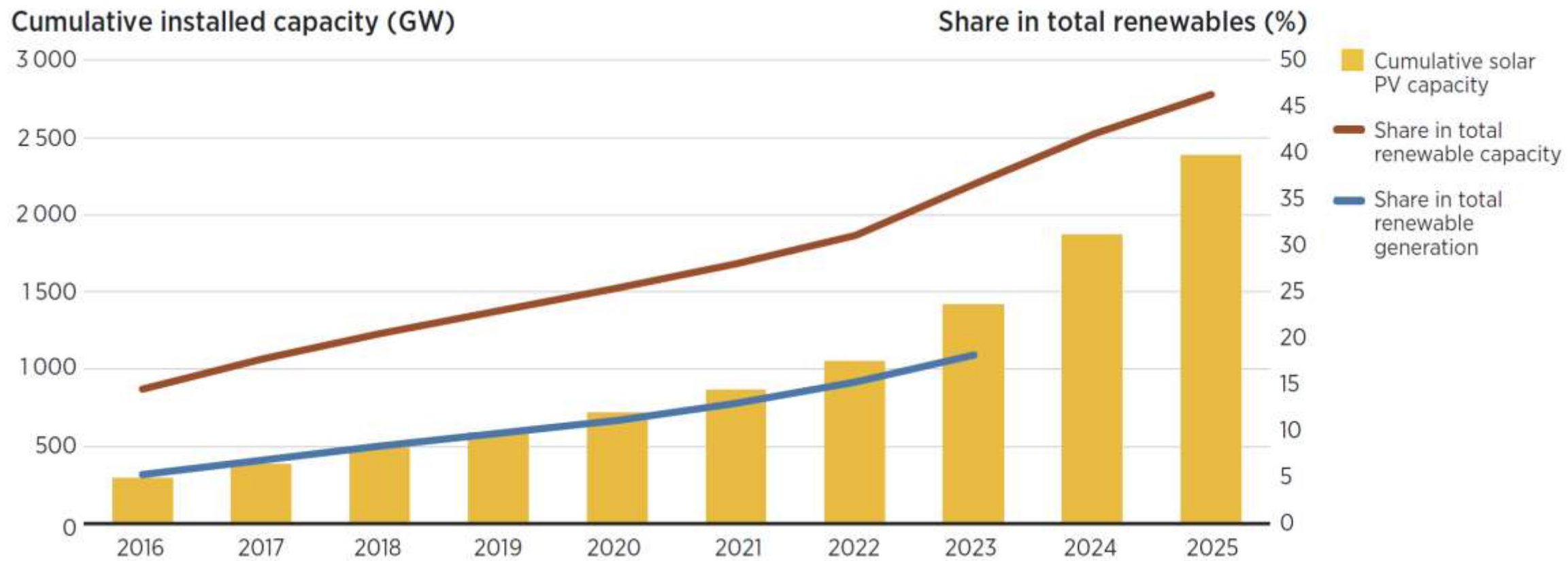
End-of-life management of solar PV and the circular economy: A global perspective

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Global solar PV deployment has been increasing significantly

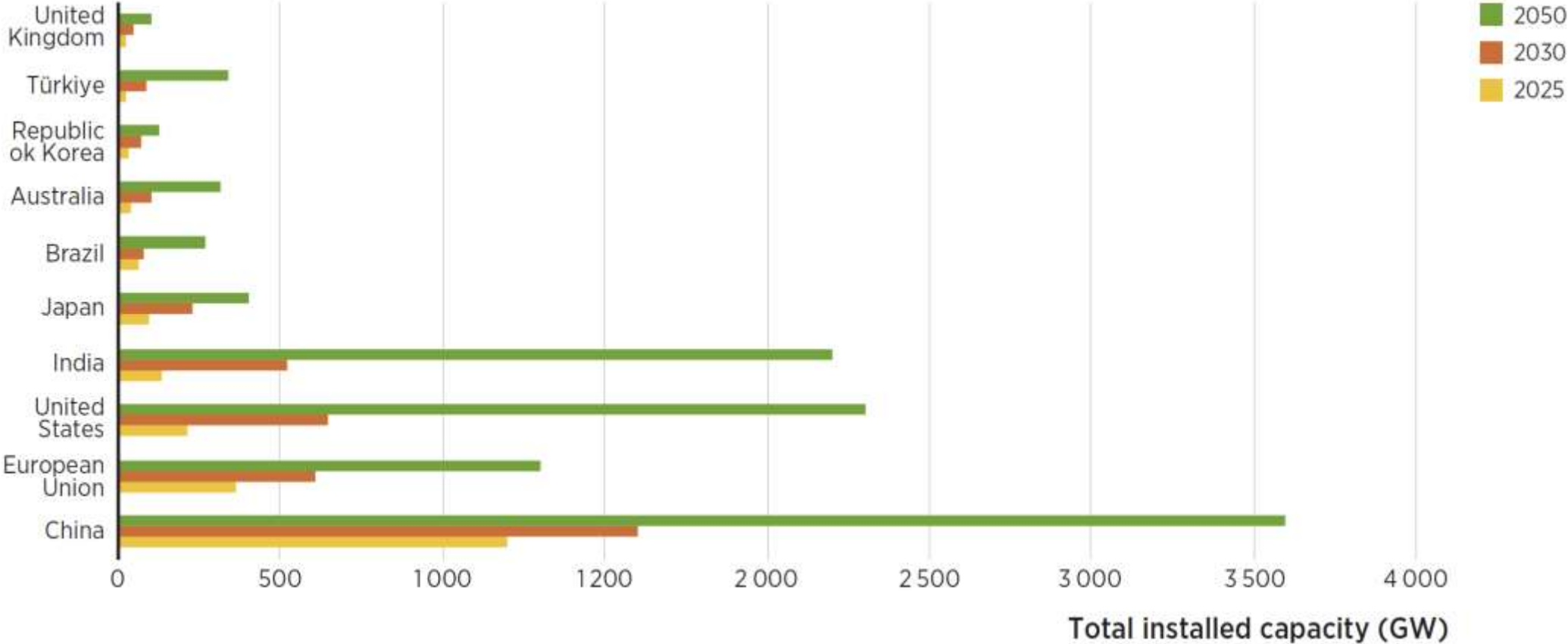
Global solar PV installed capacity, share in total renewable capacity and electricity generation globally, 2016-2025



Source: IRENA, 2026

An accelerated deployment is needed to support the energy transition

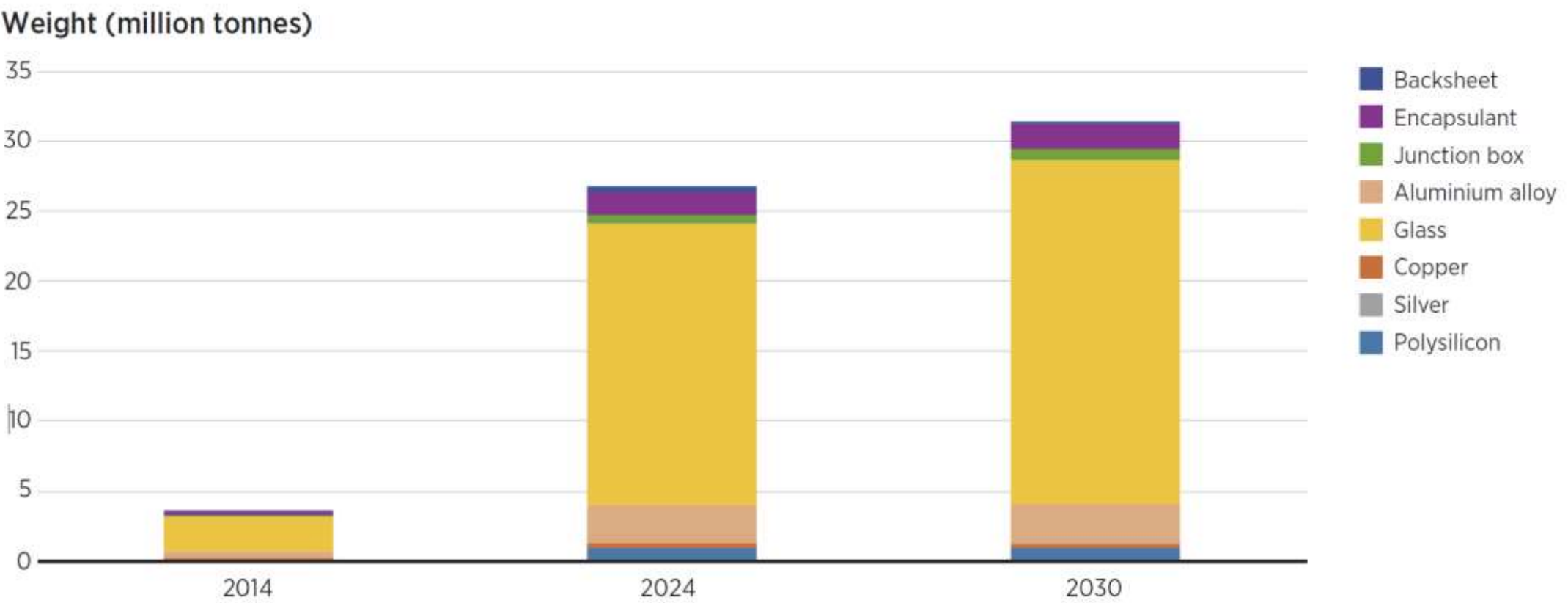
Cumulative solar PV installations in selected markets by the end of 2025 and estimates for 2030 and 2050 in IRENA's 1.5°C Scenario



Source: IRENA, 2026

The material demand is also expected to increase significantly

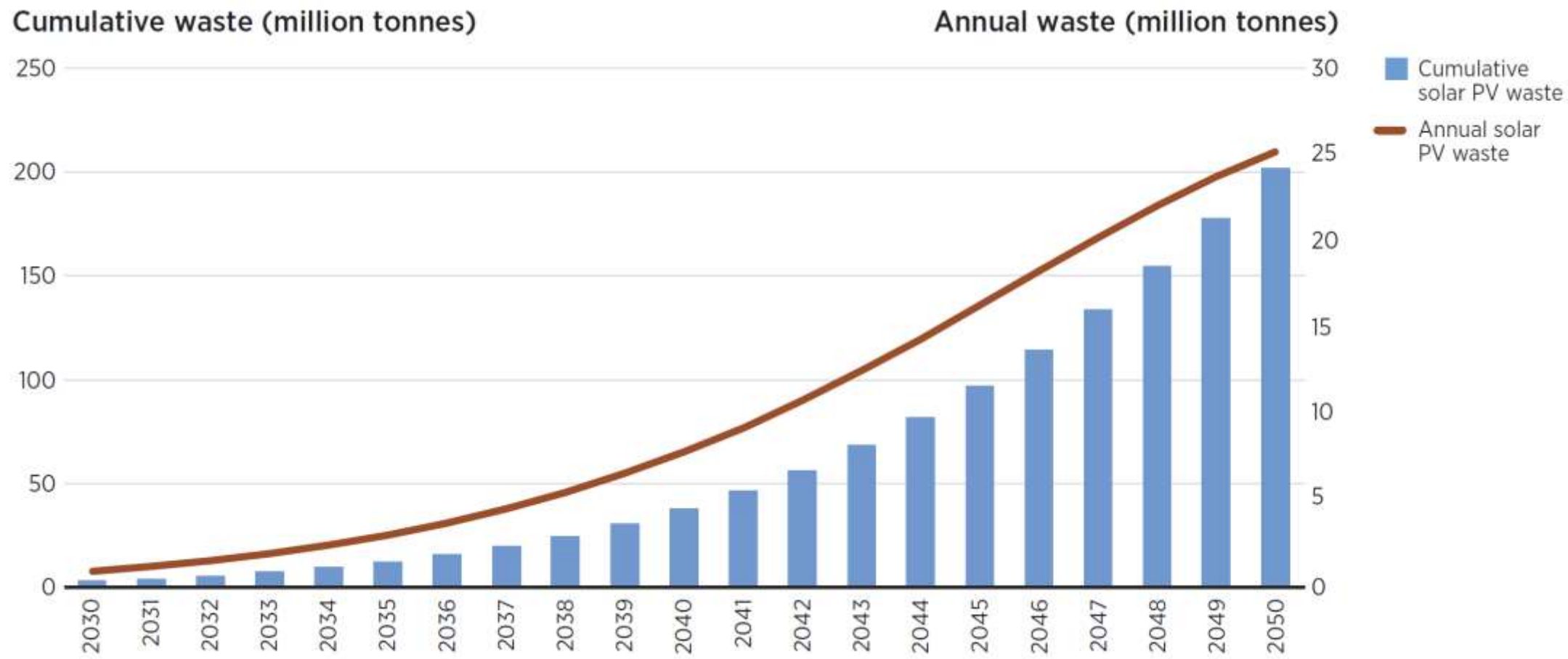
Material consumption for solar module production, 2014, 2024 and estimation for 2030



Source: IRENA, 2026

End-of-life solar PV panels is expected to surpass 200 million tonnes by 2050

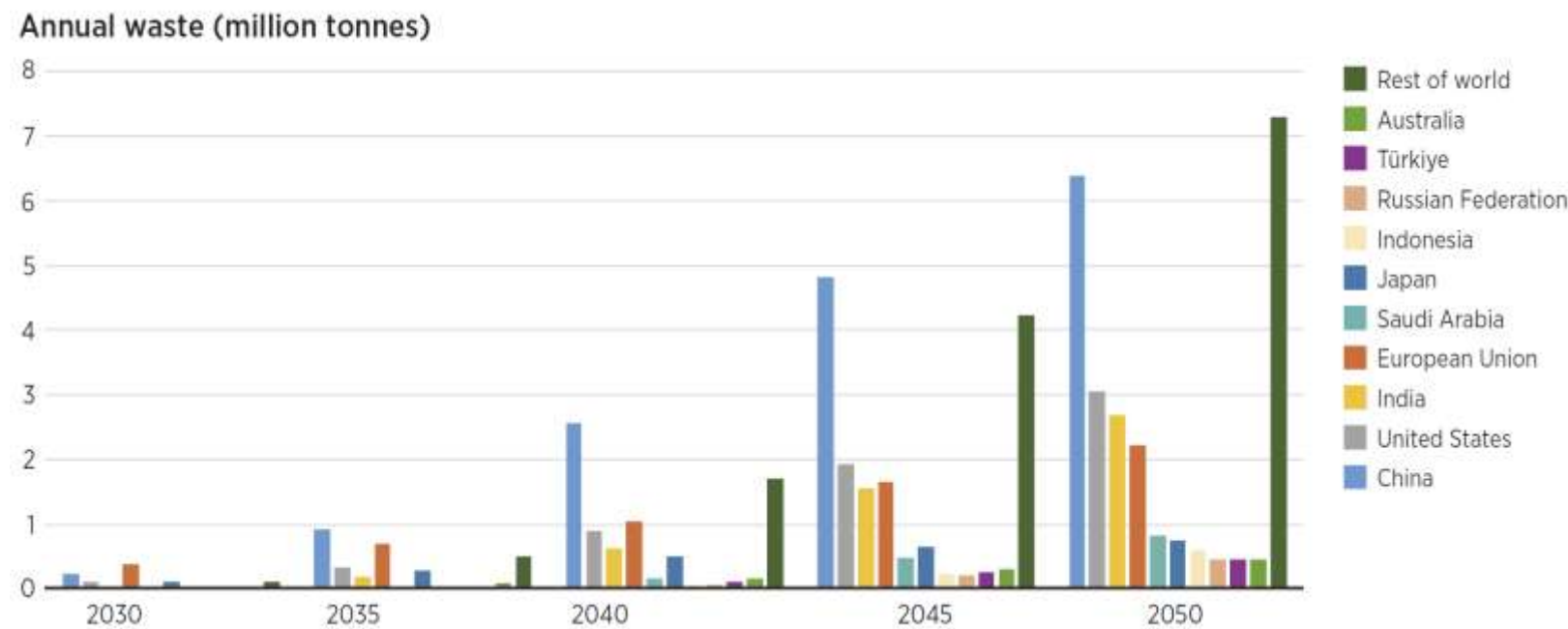
Estimation on cumulative and annual end-of-life solar PV panels from 2030 to 2050, globally, 1.5°C Scenario



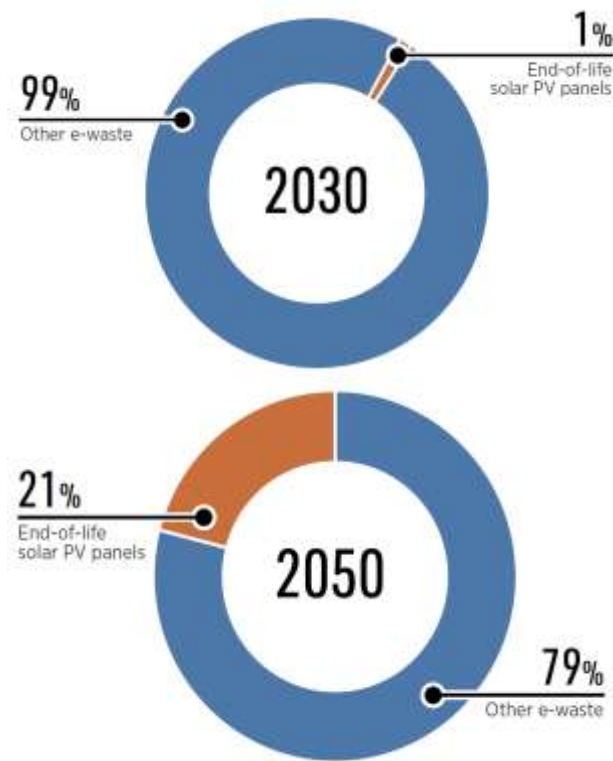
Source: IRENA, 2026

Countries are expected to address million tonnes of decommissioned solar panels

Annual end-of-life solar PV panels in selected markets, 1.5°C Scenario, 2030-2050



Share of end-of-life PV compared to total e-waste globally, 2030 and 2050



Source: IRENA, 2026

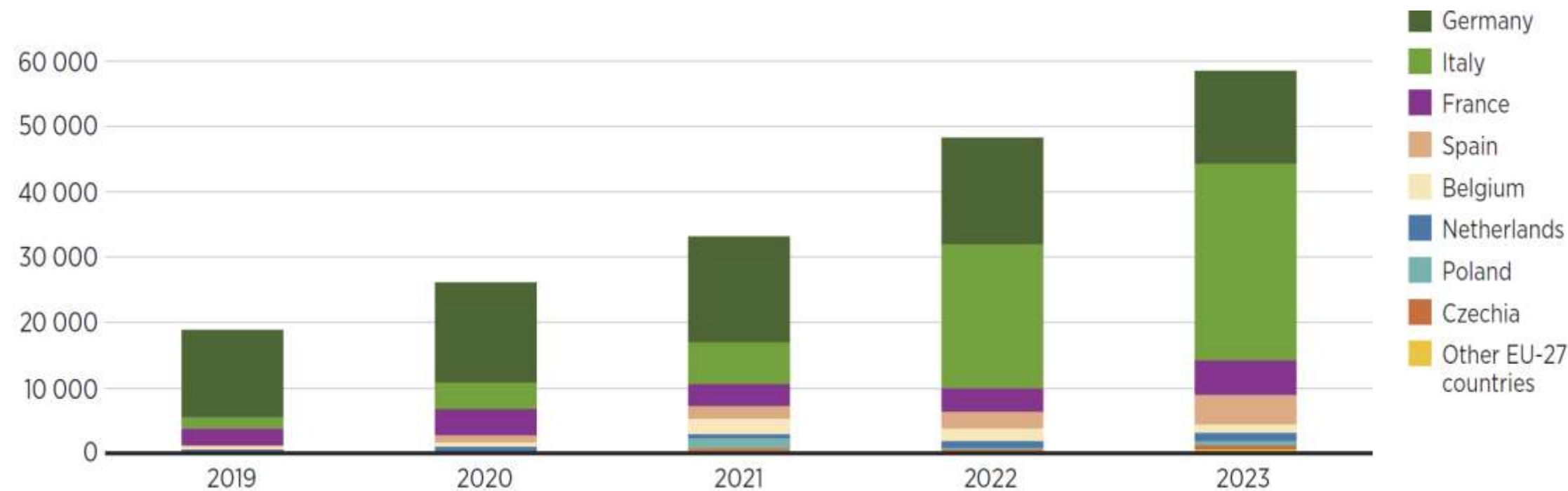
Current treatment of end-of-life solar vary in different markets

Different end-of-life management routes for solar PV panels



EU remains one of the few markets with reported end-of-life solar PV

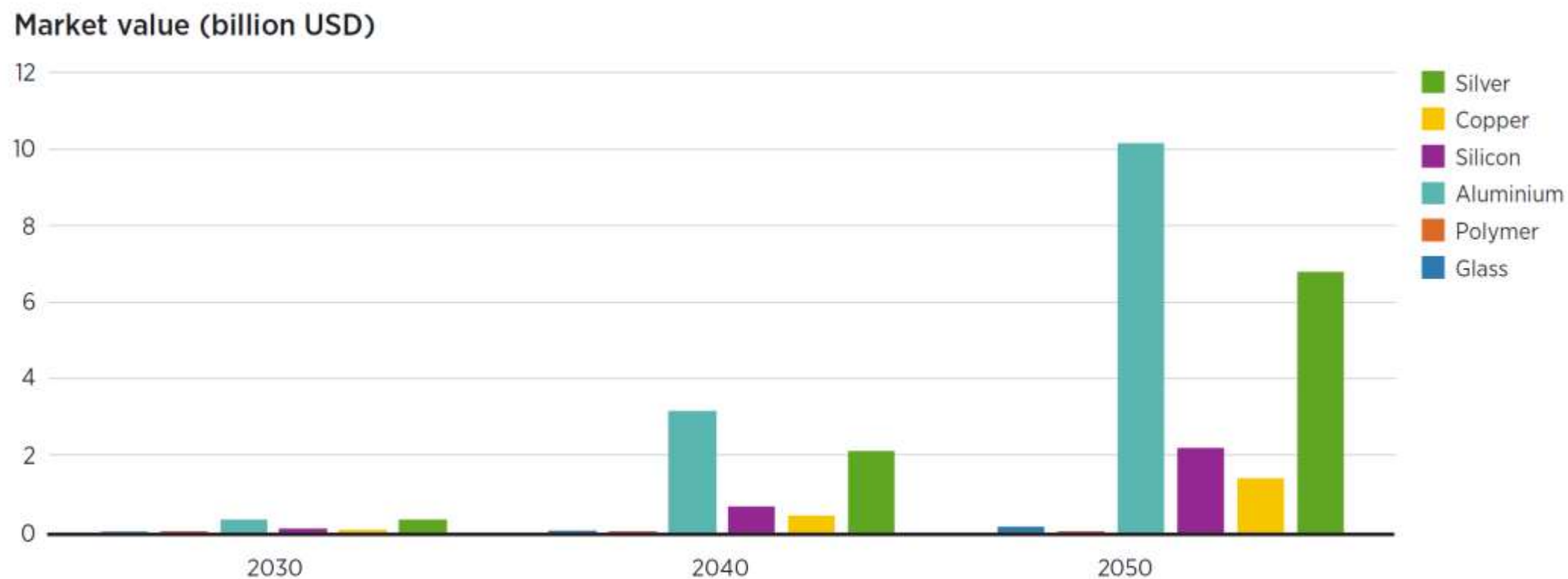
Reported collection of end-of-life solar PV panels in the European Union, 2019-2023



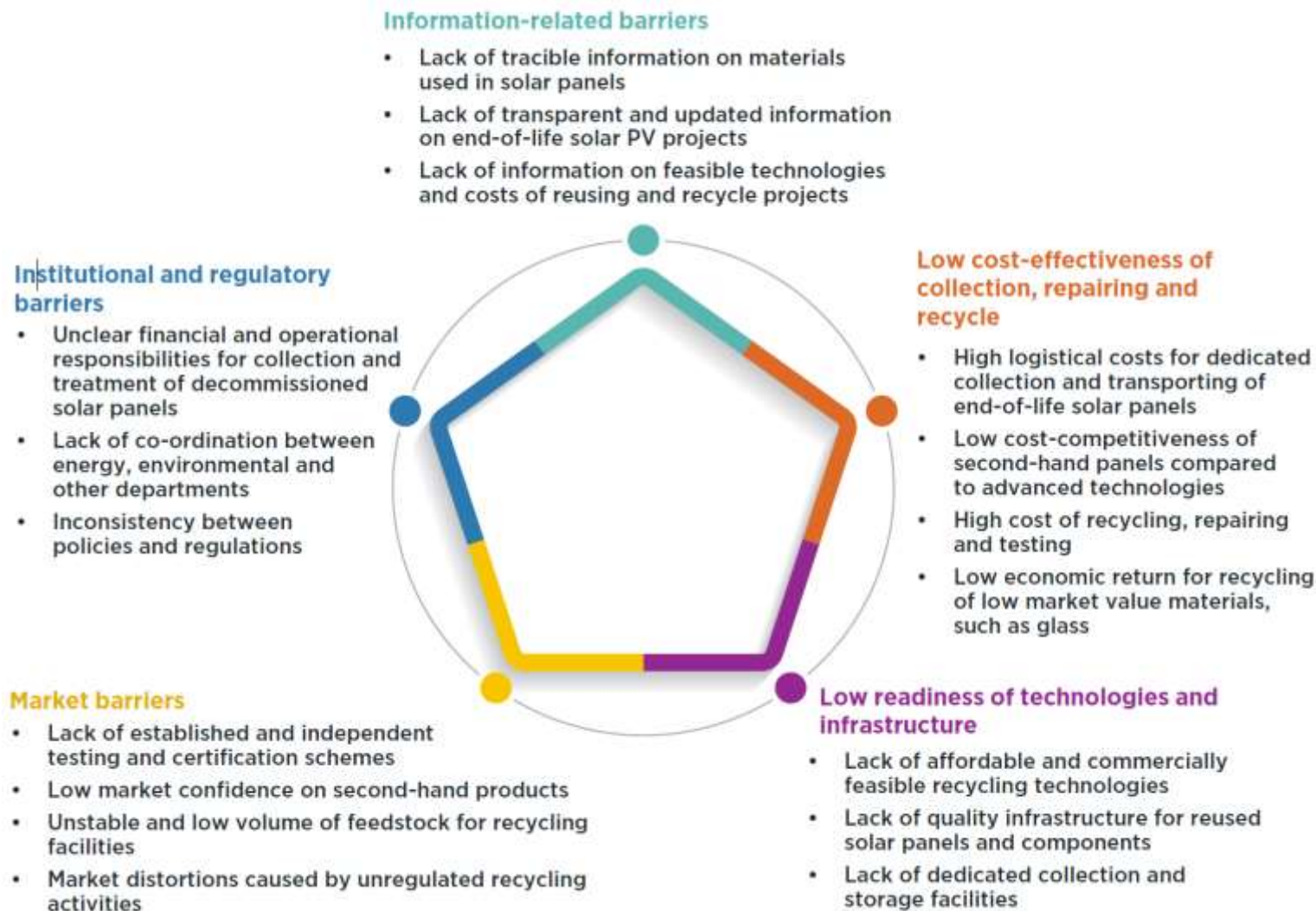
Source: IRENA, 2026

Circular economy can bring billions of economic benefits

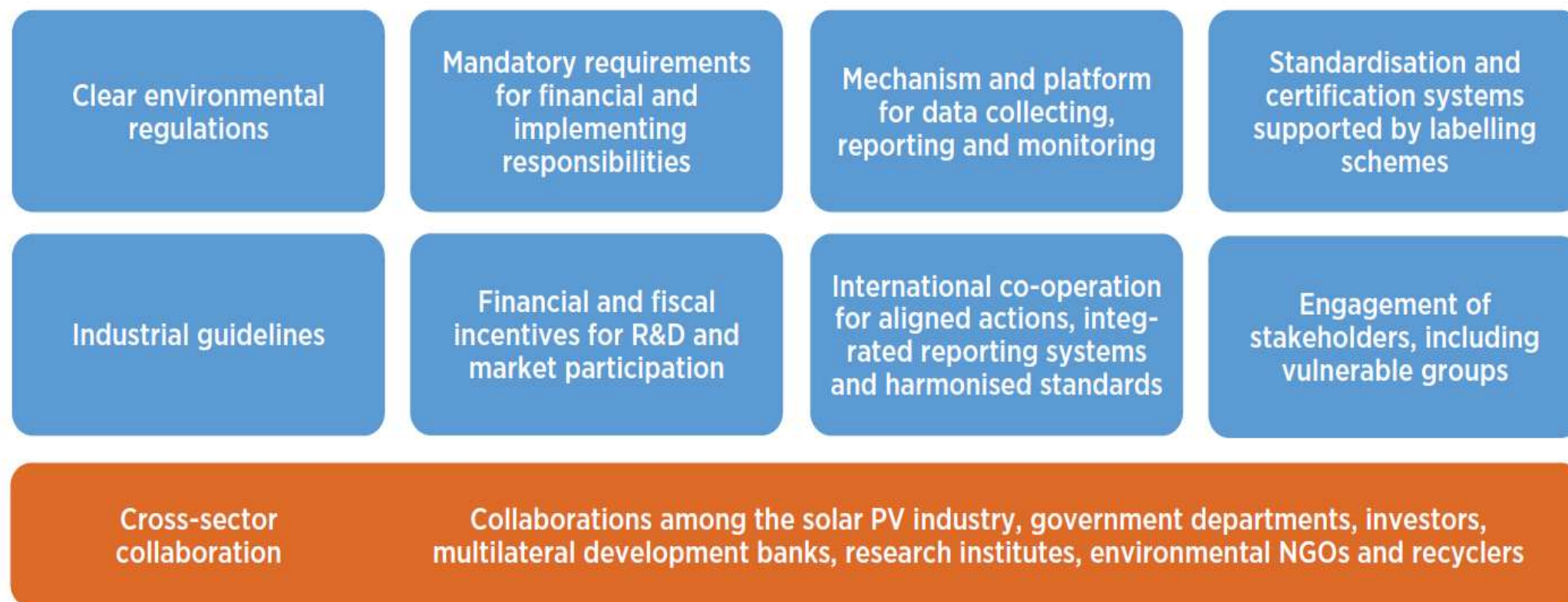
Estimate of the market value of annual recovered materials, 1.5°C Scenario, 2030, 2040 and 2050



Many barriers impede the expansion of sustainable practices



A holistic policy framework is needed to promote circular economy



Stakeholders are key for innovative and sustainable business models

	Reduce	Reuse	Recycle
Manufacturers	• Designing and manufacturing circularity-based products	• Conducting own takeback and recycling schemes or joining an industry compliance scheme • Providing transparent and traceable product information	
Solar PV project owners	• Selecting eco-friendly products	• Proper operation and regular maintenance	• Delivering end-of-life panels to certified recyclers
Governments	• Developing policies and incentives to promote circularity-based design of solar PV panels	• Clearly defining and mandating financial and operational responsibilities • Setting standards and enforcing compliance • Directing data collection and reporting work • Setting long-term targets and roadmaps	
Recycling industry	• Providing feedback to manufacturers and designers	• Participating in second-hand markets	• Sustainable recycling that aligns with environmental and social regulations
Other stakeholders	Investors, universities, research institutes, NGOs, international organisations, <i>etc.</i> • Providing knowledge, experience and other support • Promoting and sharing best practices		



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