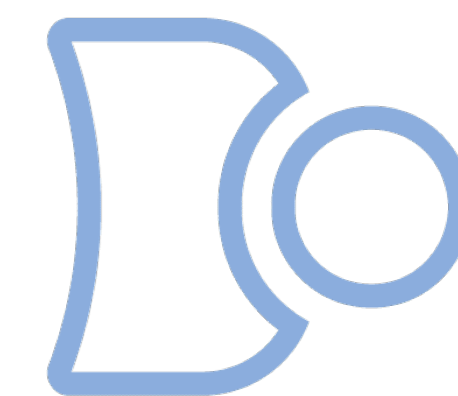
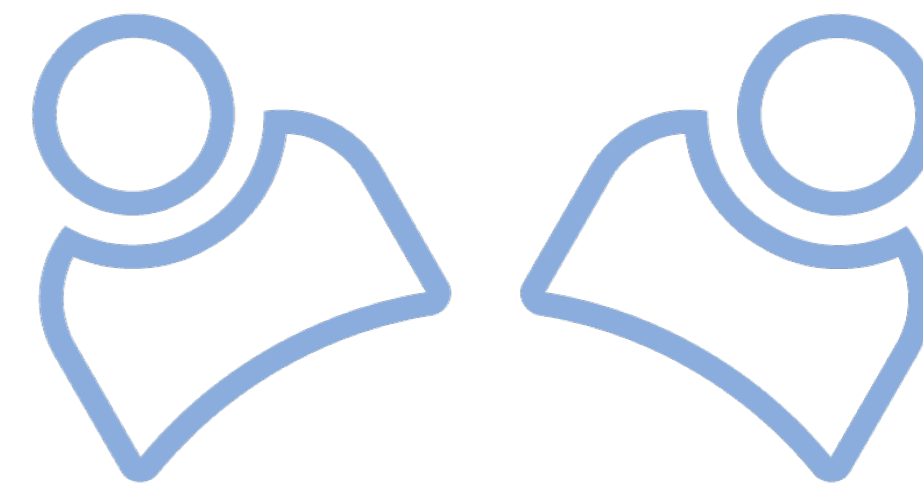


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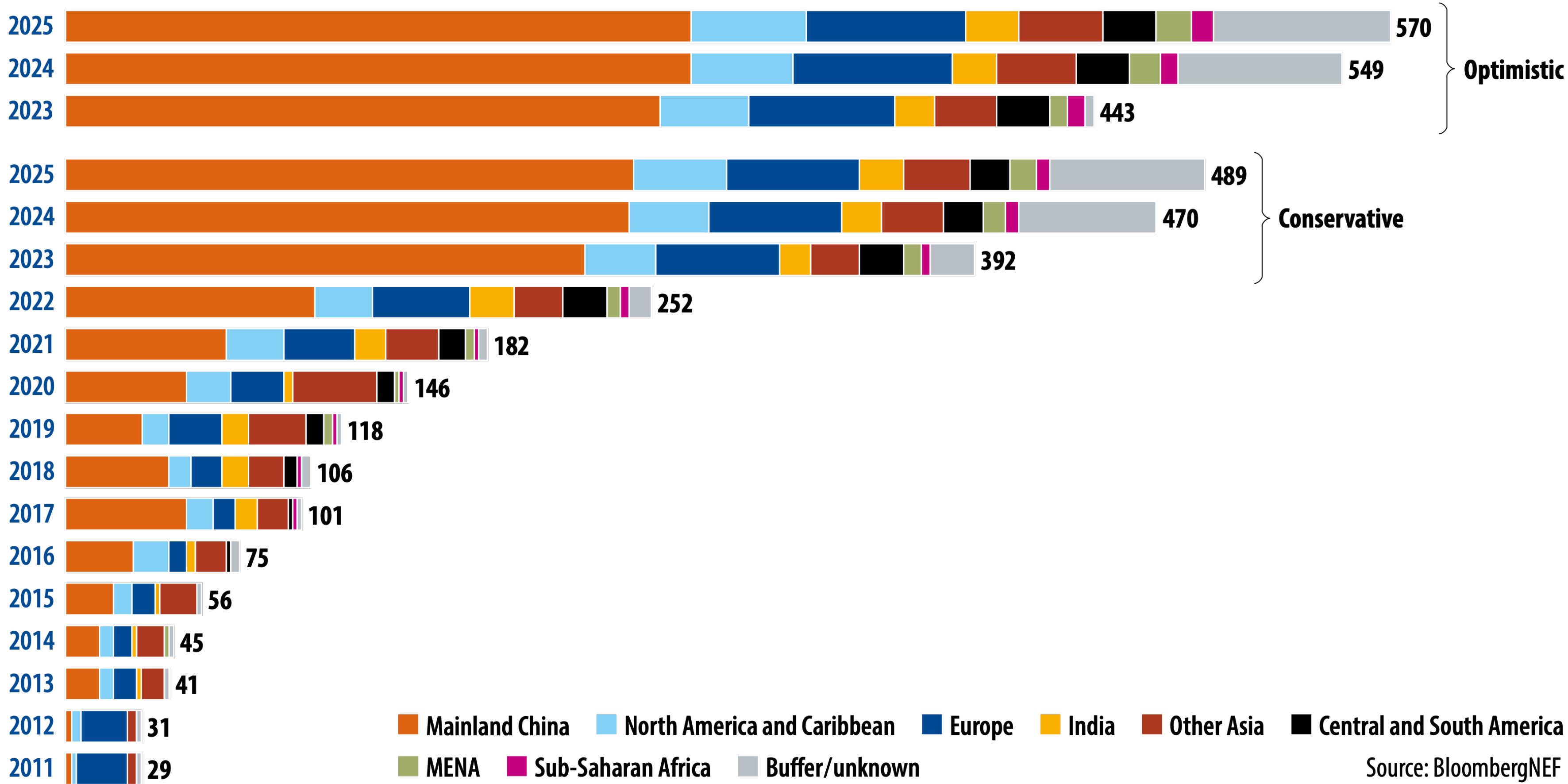


Europe 2023

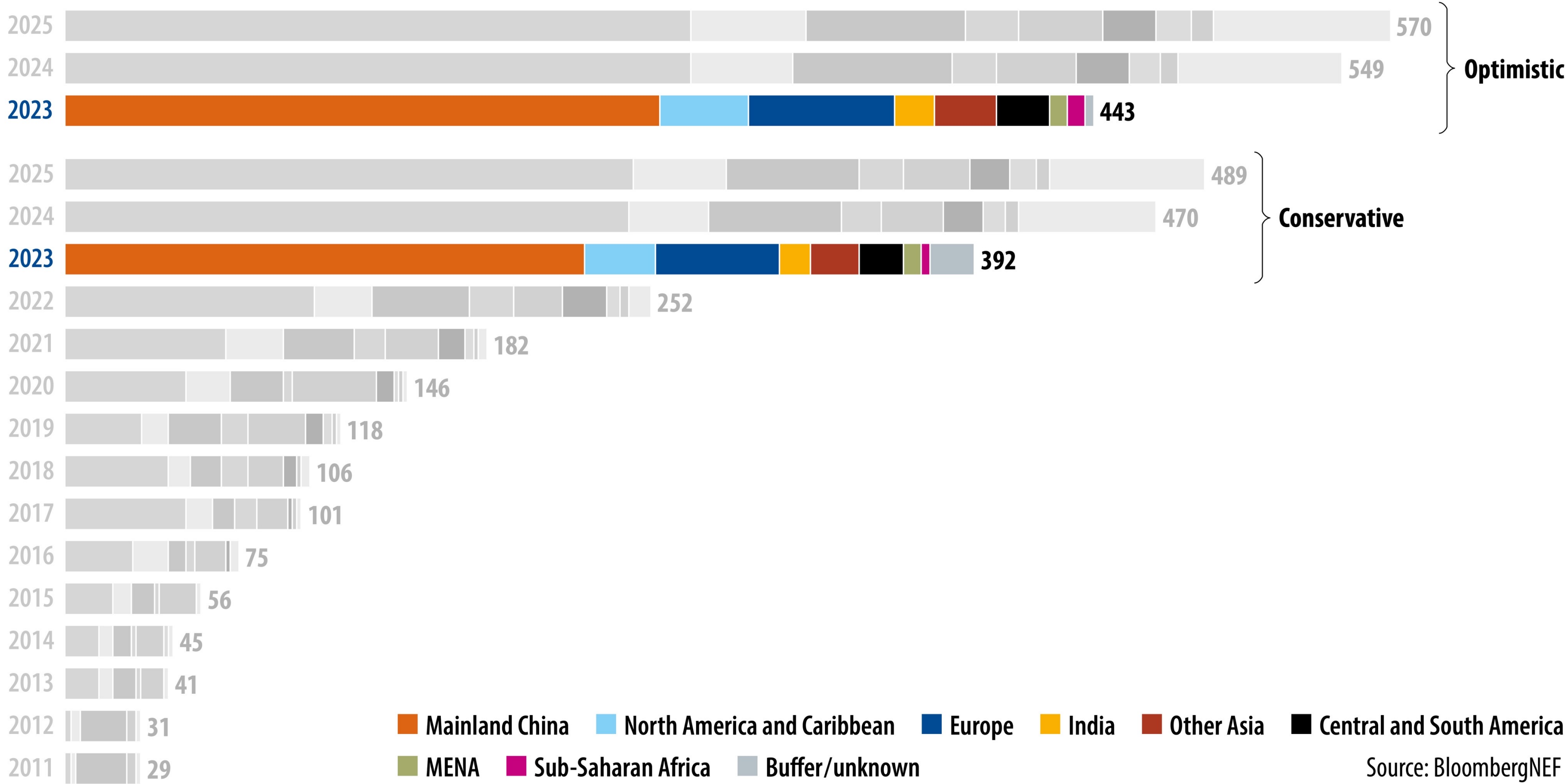
“Solar photovoltaic installations and electric vehicle sales are perfectly in line with what we said they should be, **to be on track to reach net zero by 2050, and thus stay within 1.5C.**”

—Fatih Birol, Executive Director, International Energy Agency
September 2023

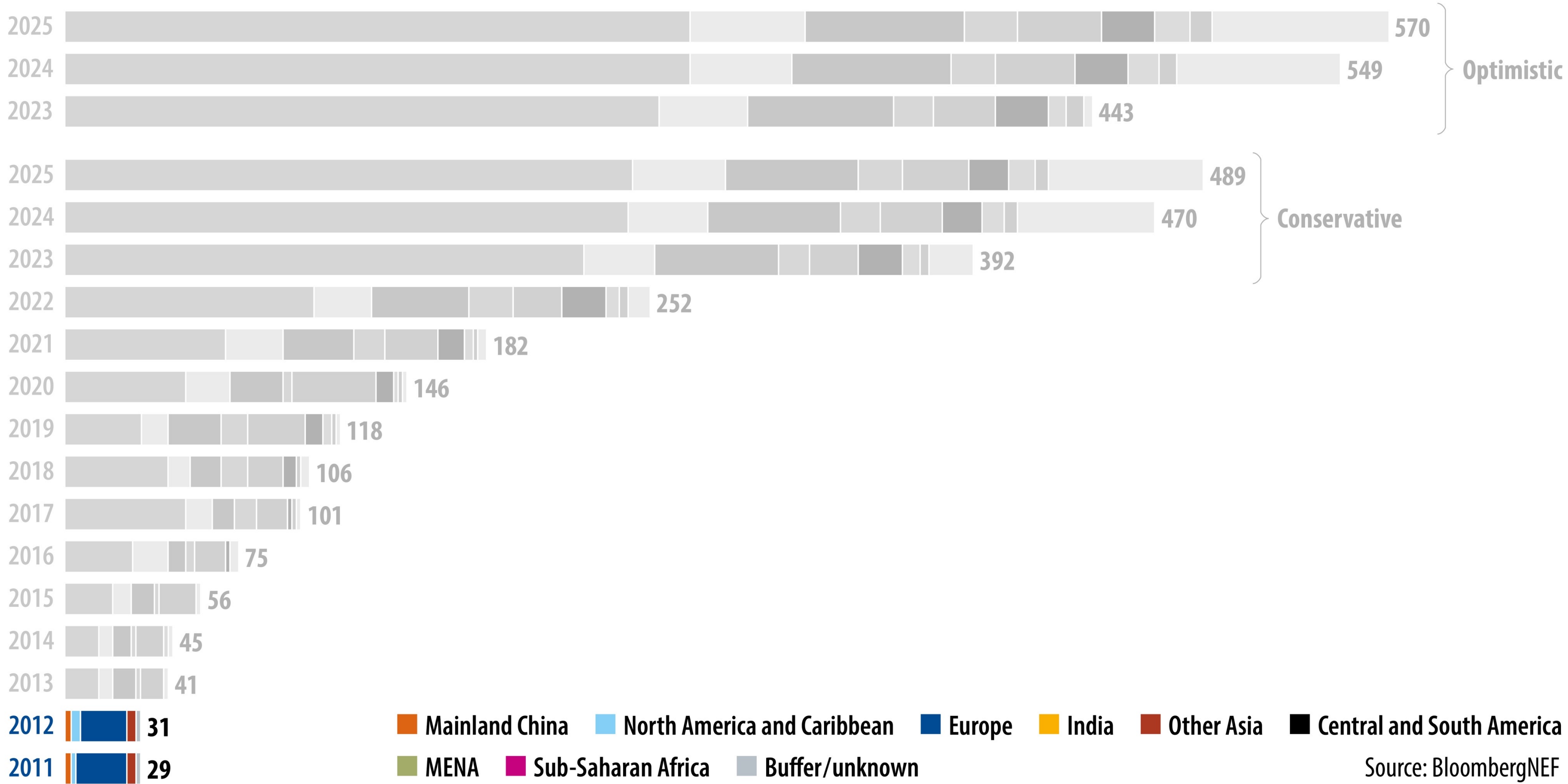
Global PV installation forecast



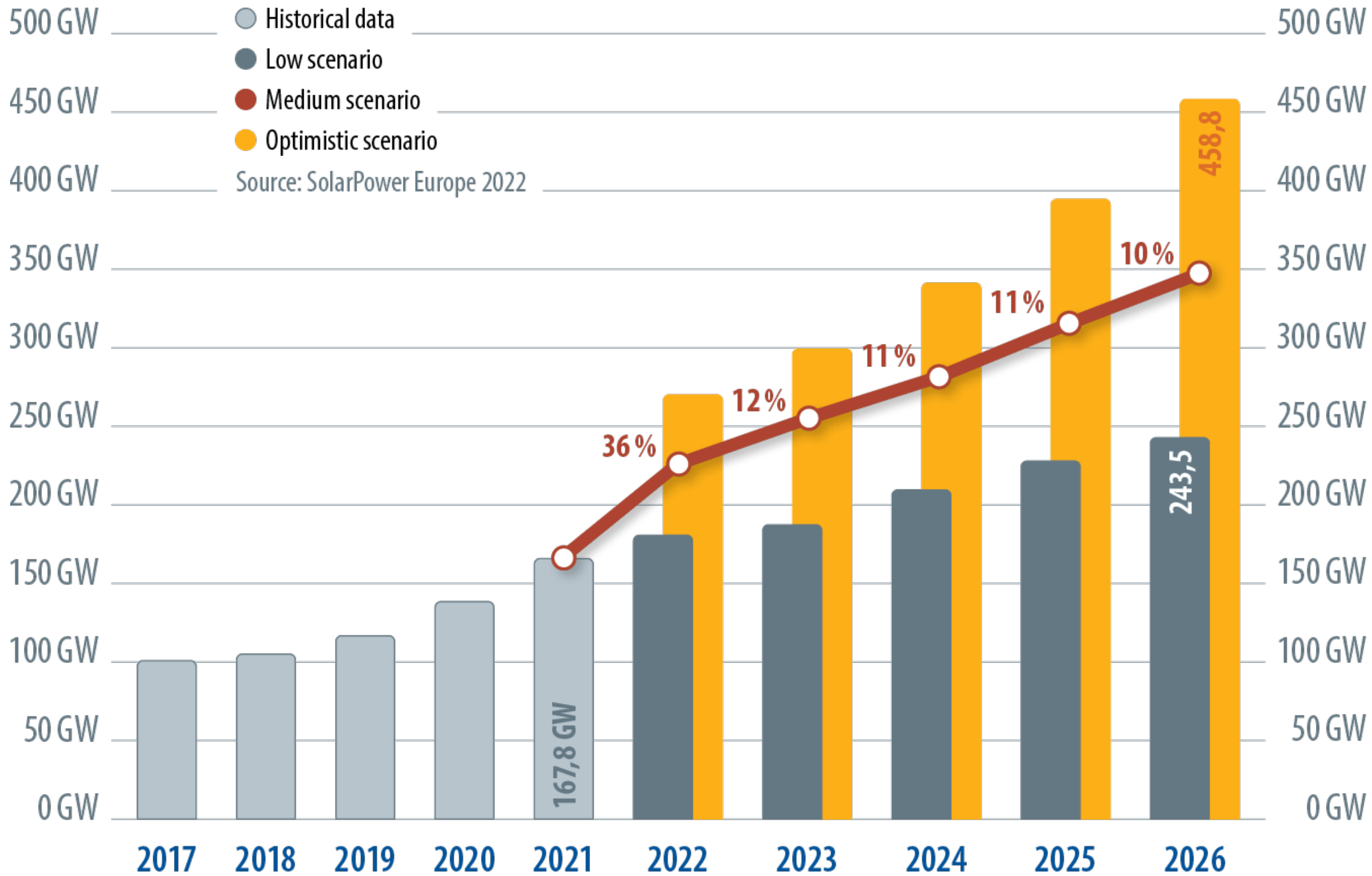
Global PV installation forecast



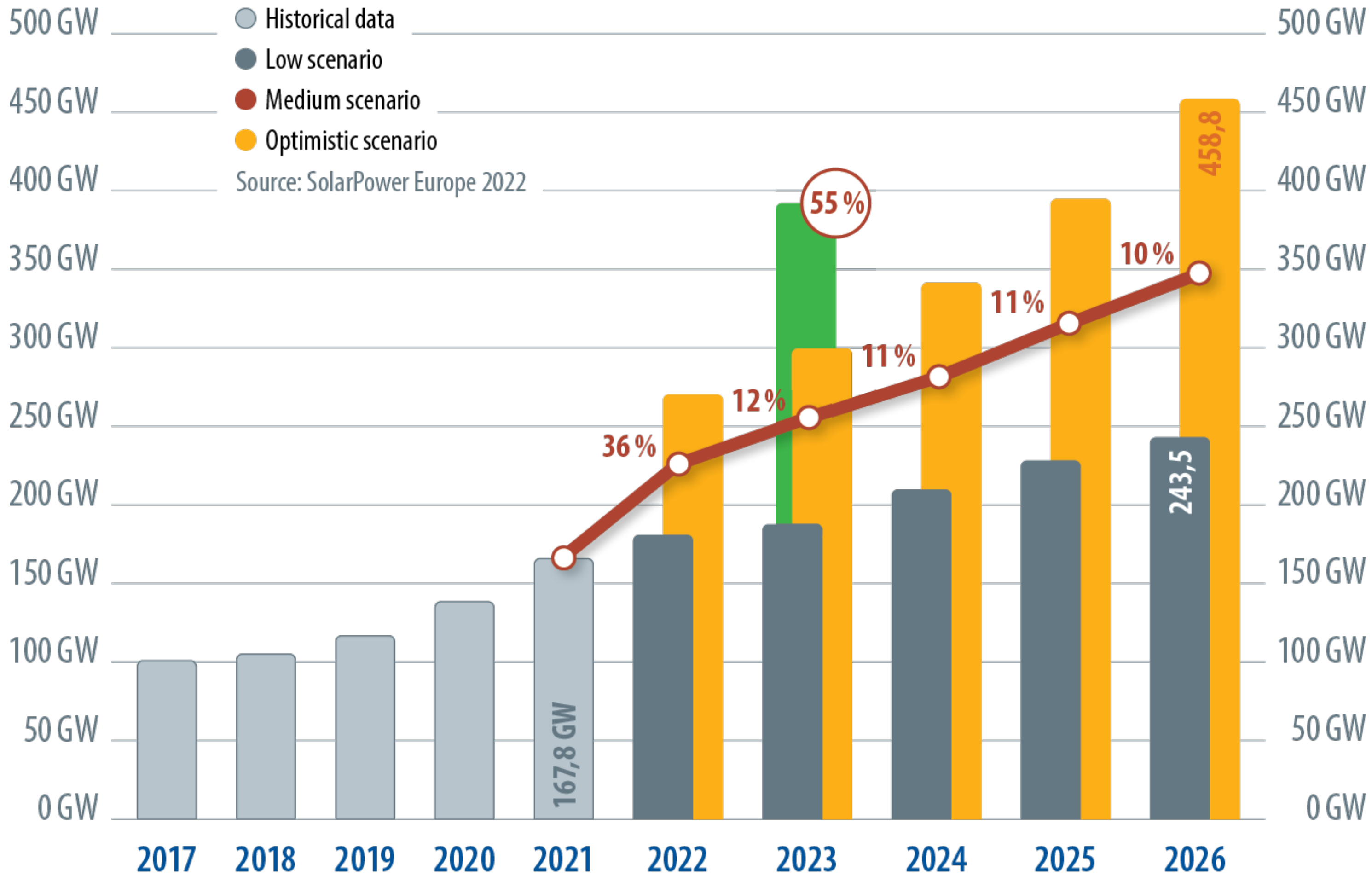
Global PV installation forecast



Scenarios for the development of the global pv market 2022 to 2026



Scenarios for the development of the global pv market 2022 to 2026



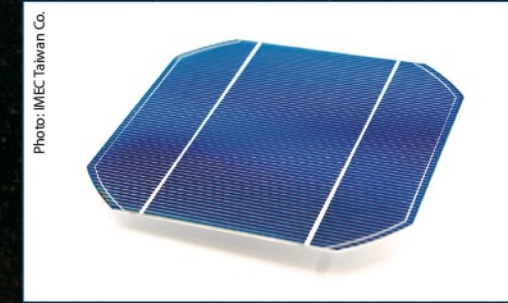
300 GW campaign launched in September 2012. The target was set to achieve 300 GW of global installations by 2025.

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Markets & Trends

Latin America: How Chile's mining industry is proving an unlikely ally to photovoltaics. *Page 44*



Industry & Suppliers

Taiwan: U.S. sanctions have delivered demand to Taiwanese cell makers, but is it enough? *Page 76*



Storage & Smart Grids

Vanadium: The world wakes up to the value of vanadium as a booster of battery storage. *Page 150*

pv magazine

PHOTOVOLTAIC MARKETS & TECHNOLOGY

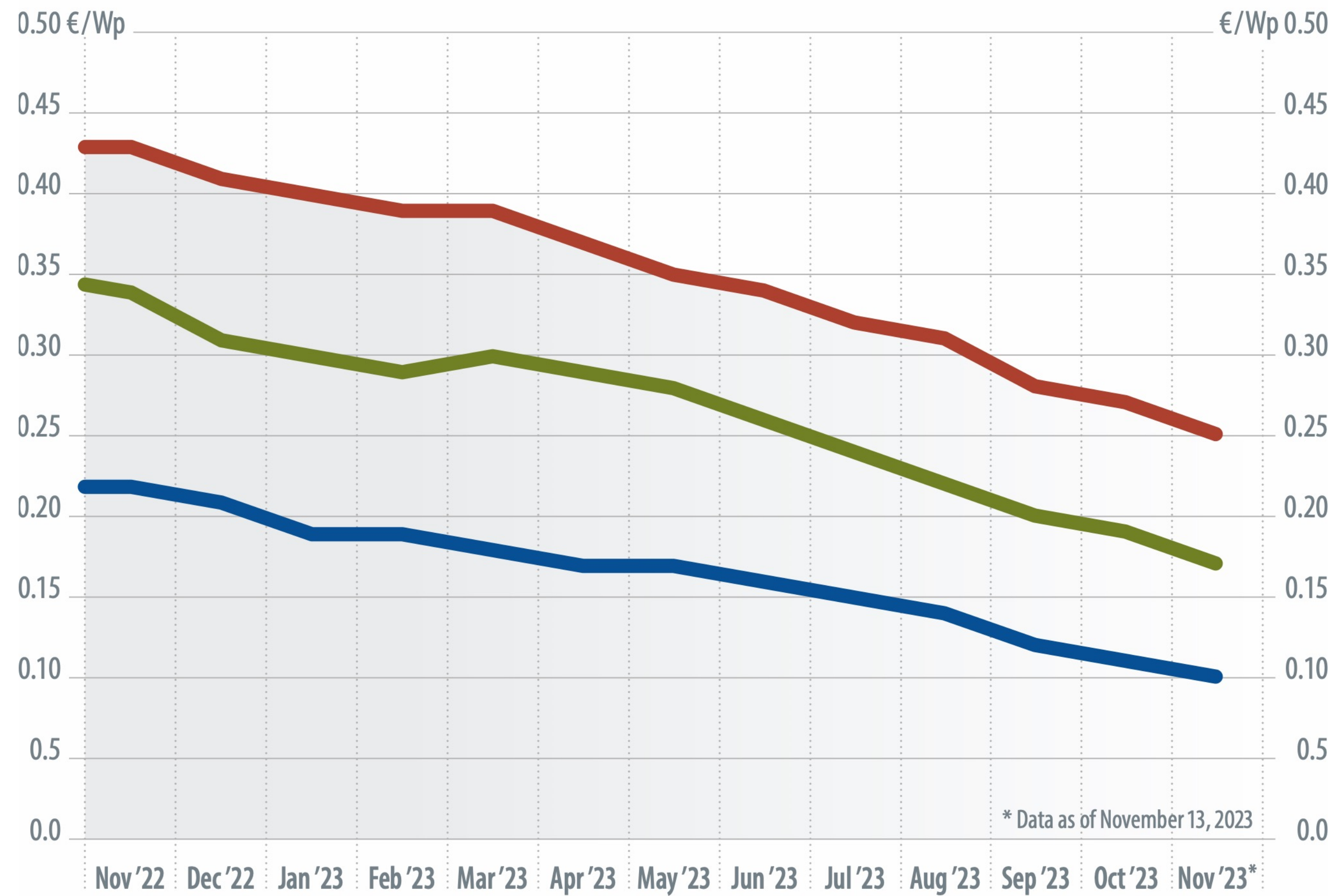
Burning ambition

300 GW a year: Let's make it happen. *Page 28*

Photo: photos.com

How did we get here?

EU spot market module prices by technology



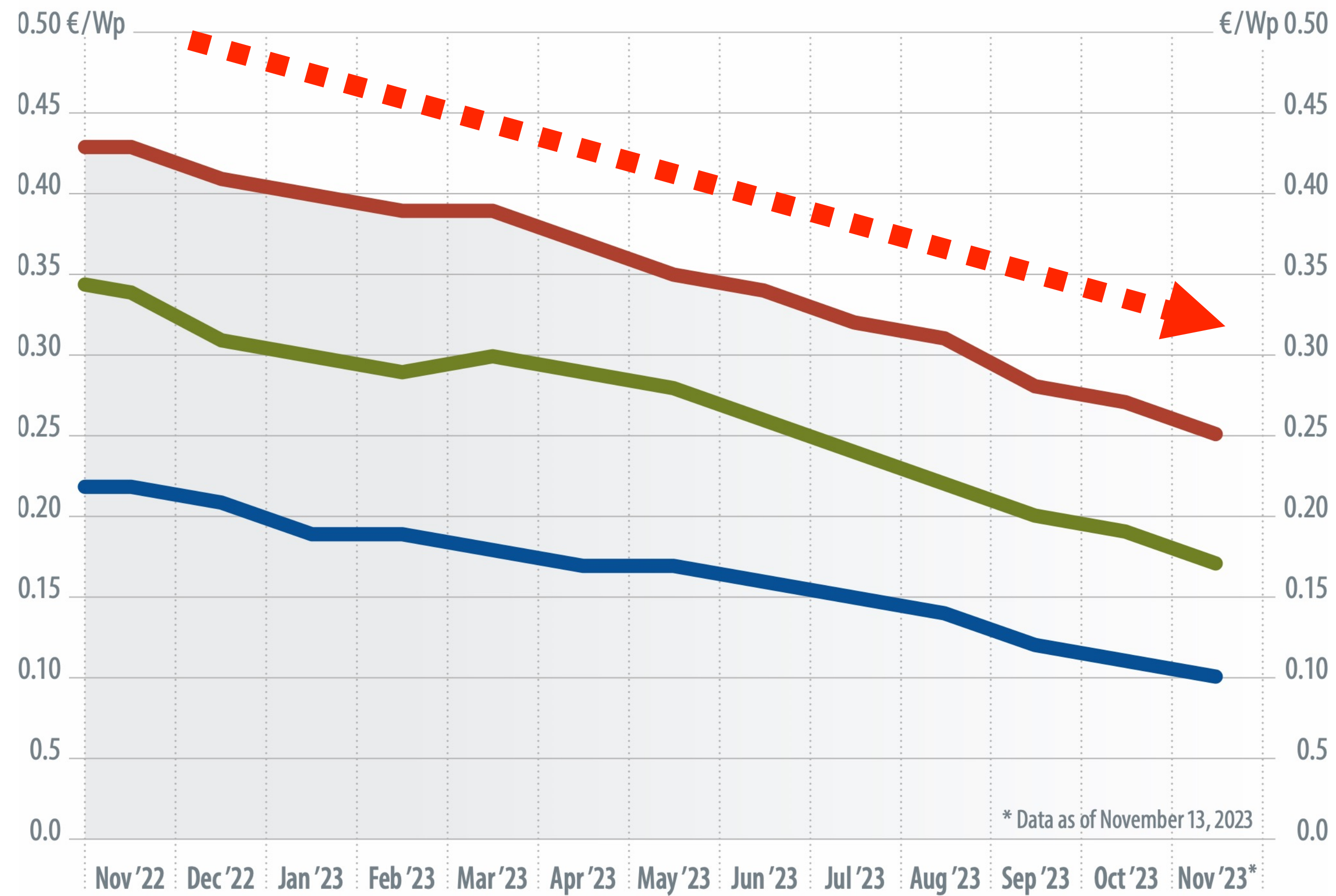
Crystalline modules

(mono-/poly-Si) average net prices (€/Wp)

- High efficiency:** Crystalline modules with mono- or bifacial HJT, N-type TOPCon or IBC (Back Contact) cells and combinations thereof which have efficiencies higher than 21 percent.
- Mainstream:** Standard modules, typically with poly- or monocrystalline cells (also PERC) which are mainly used in commercial PV systems and which have an efficiency of up to 21 percent.
- Low cost:** Factory seconds, insolvency goods, used or low-output modules (crystalline), products with limited or no warranty, which usually also have no bankability.

More information: www.pvXchange.com

EU spot market module prices by technology



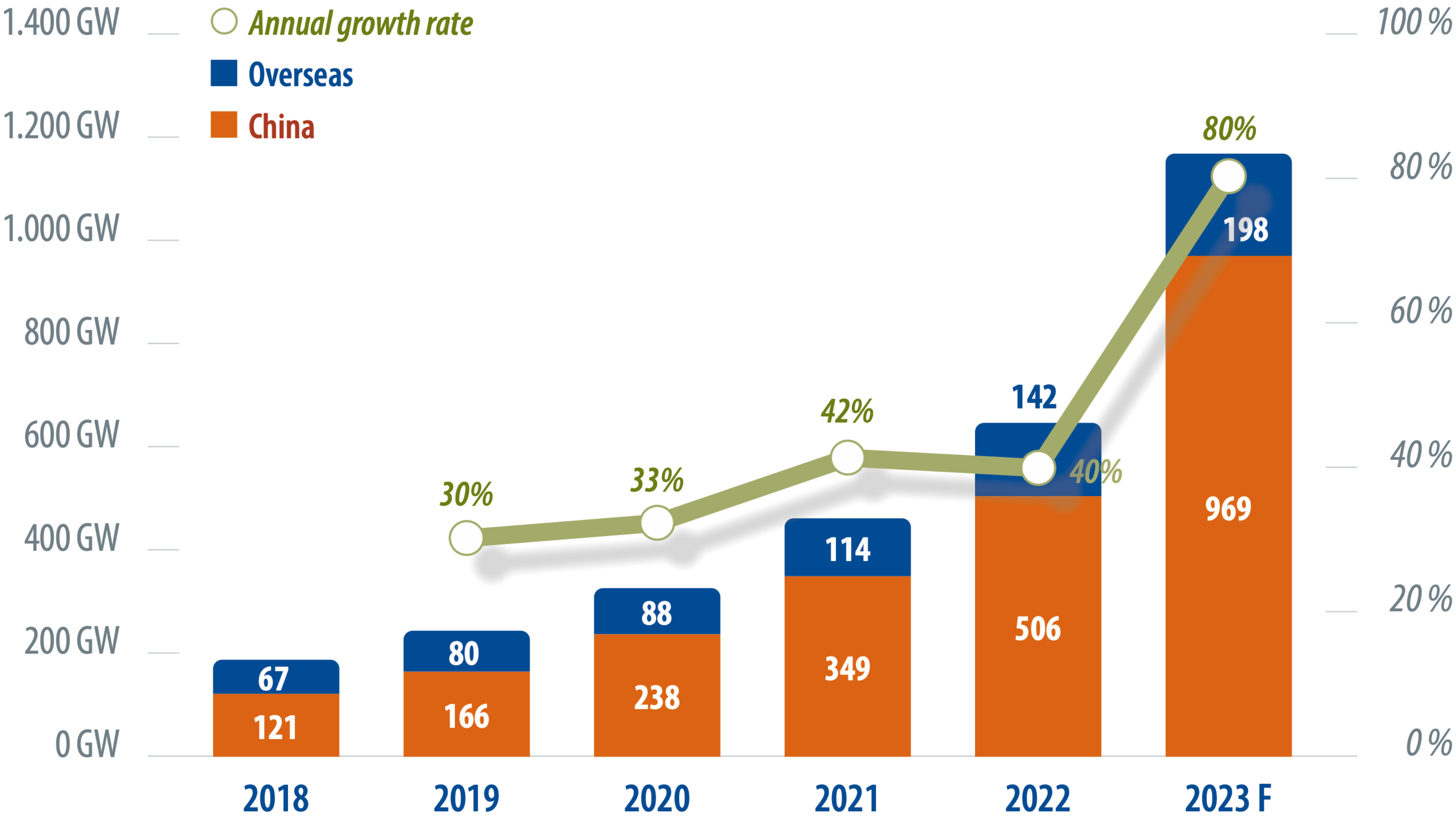
Crystalline modules

(mono-/poly-Si) average net prices (€/Wp)

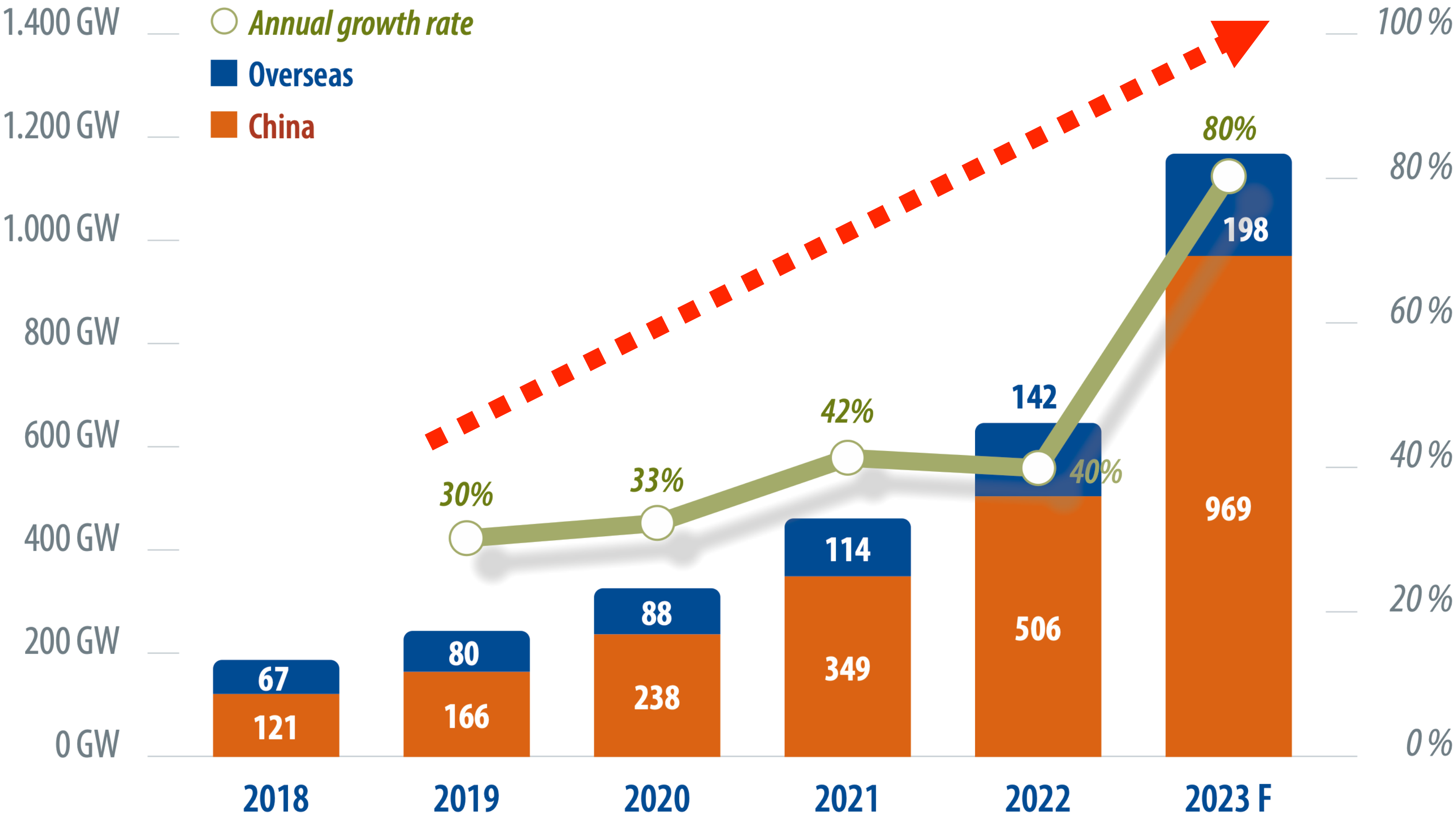
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Module capacity forecast

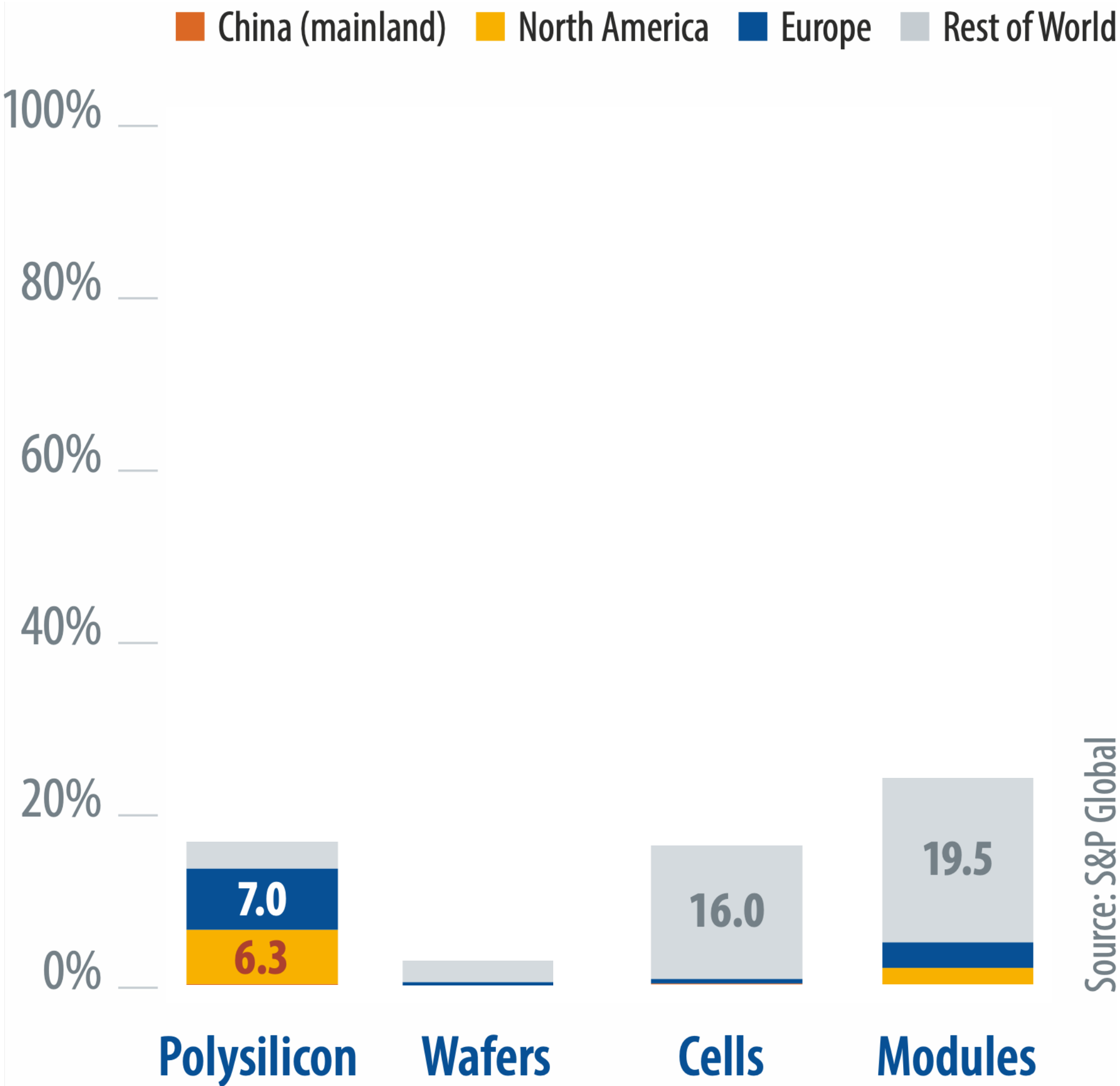


Module capacity forecast



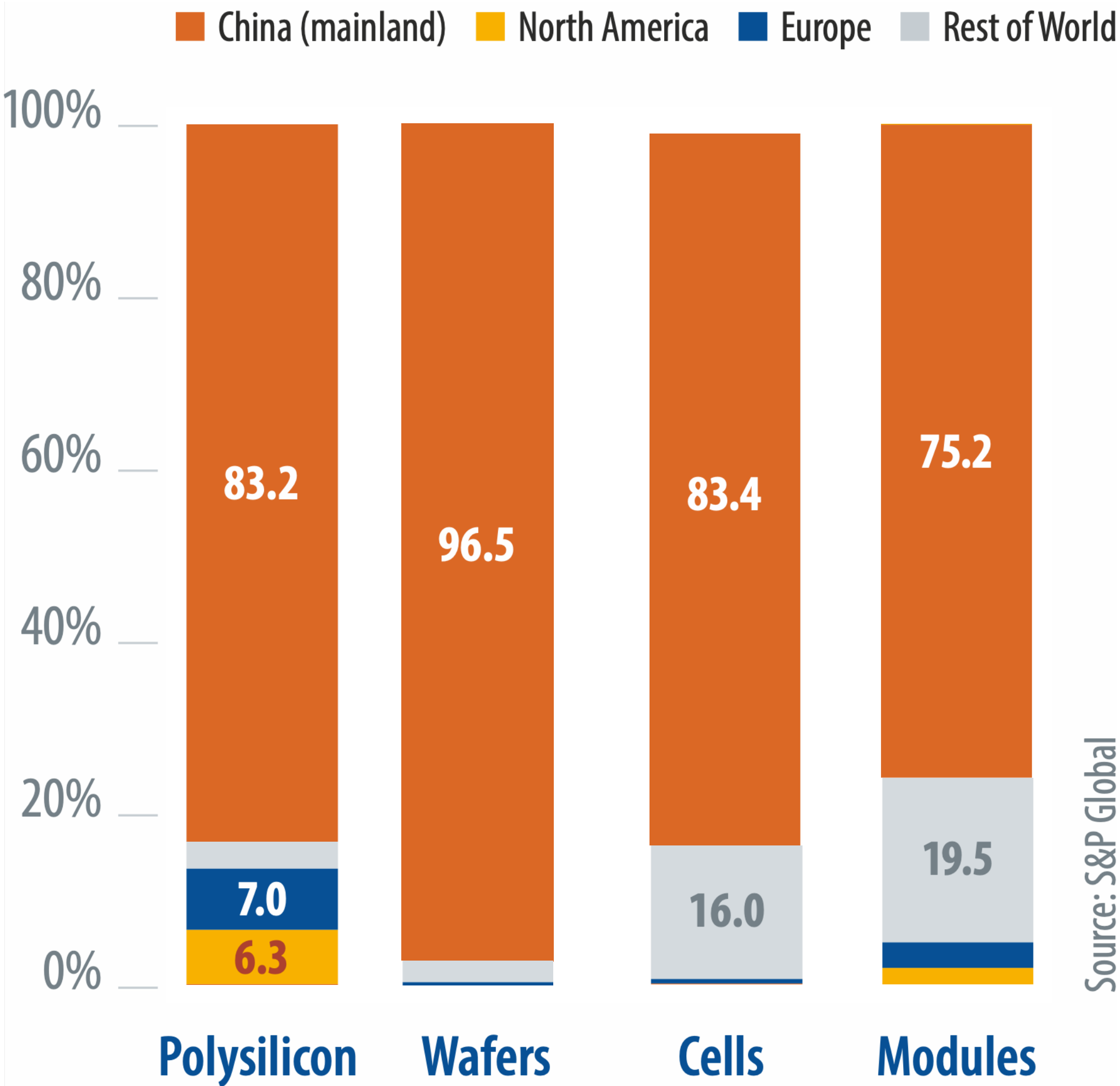
Manufacturing matters

Global PV module production capacity by value chain step, 2022



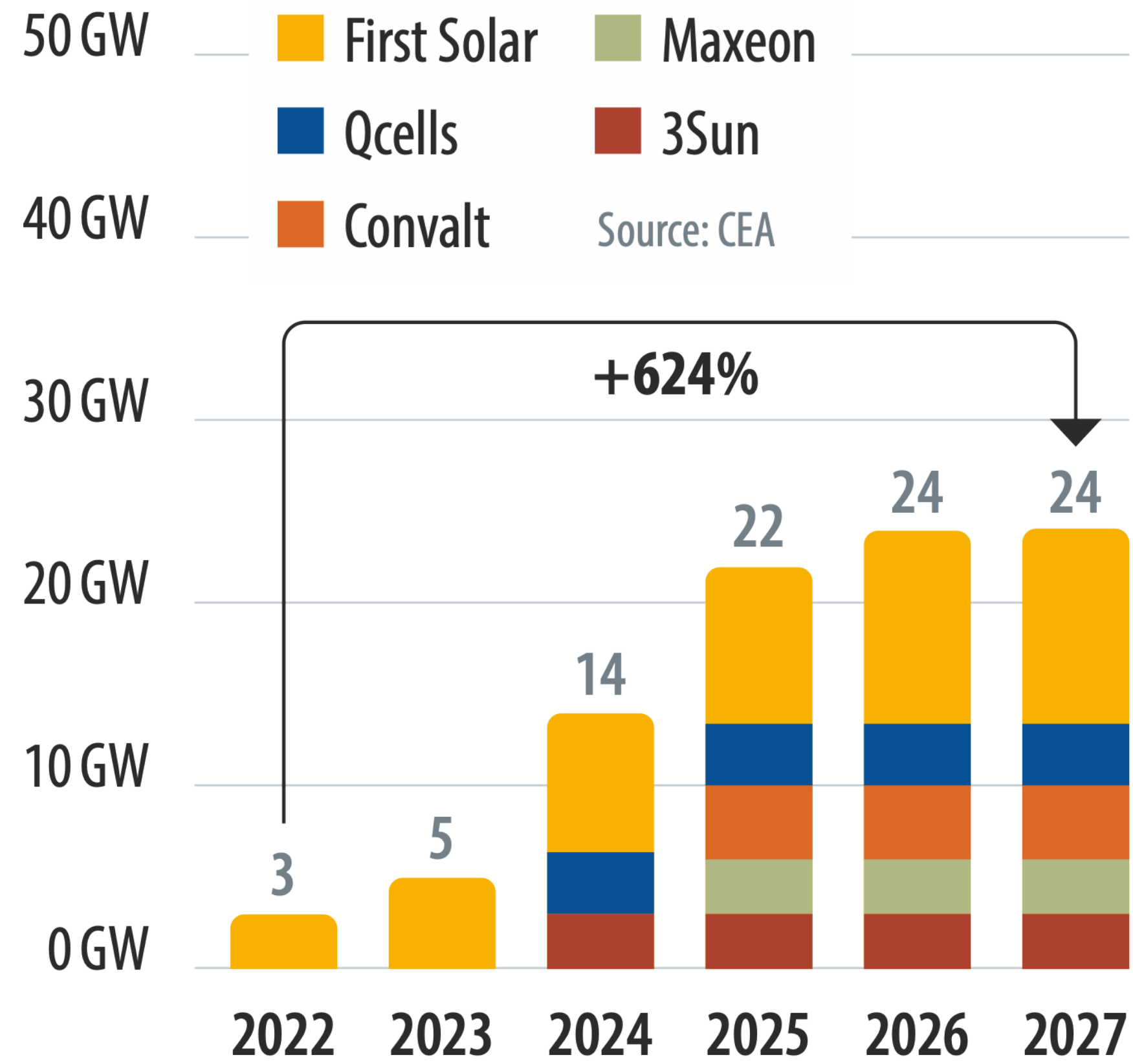
Source: S&P Global

Global PV module production capacity by value chain step, 2022

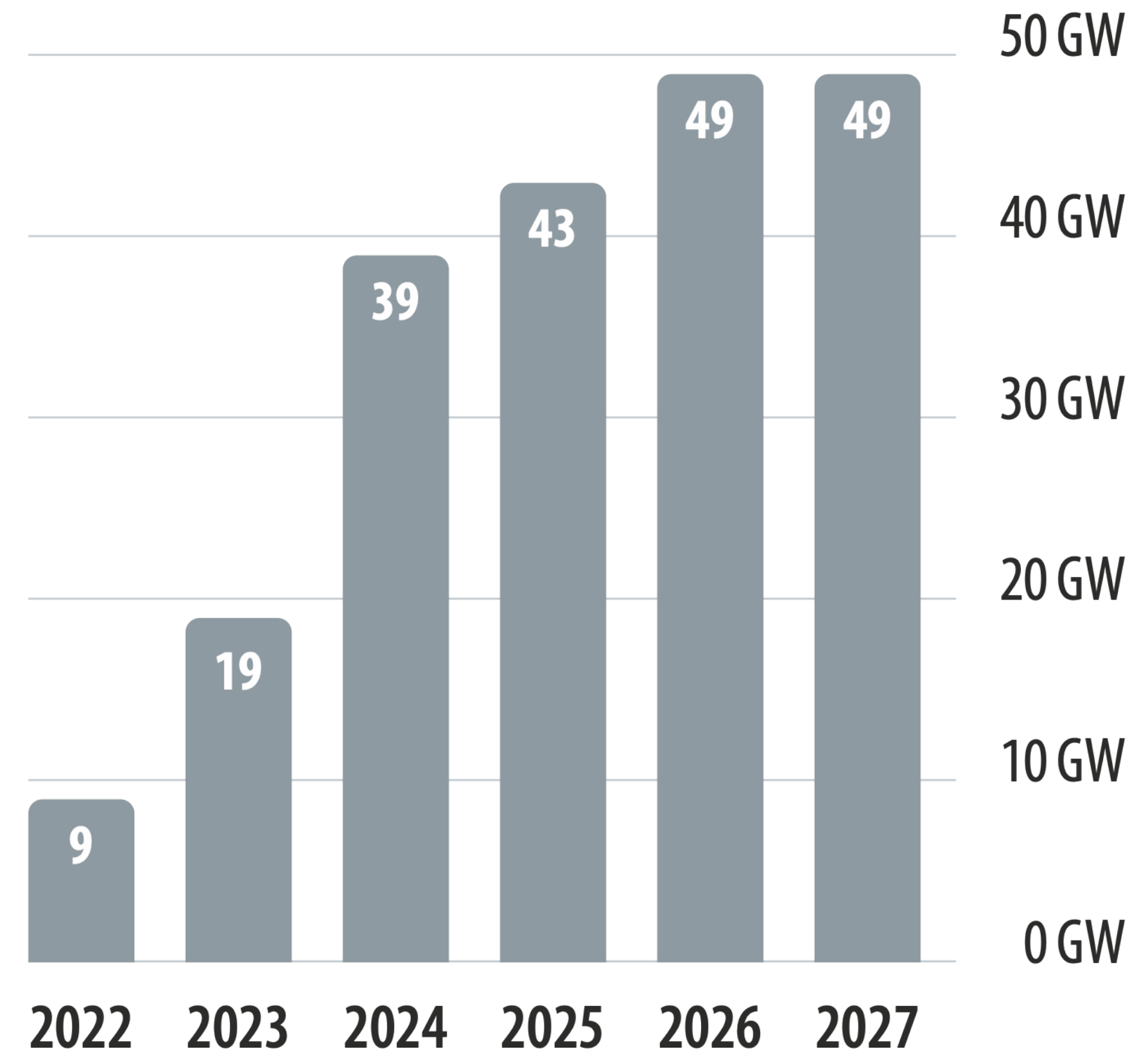


Source: S&P Global

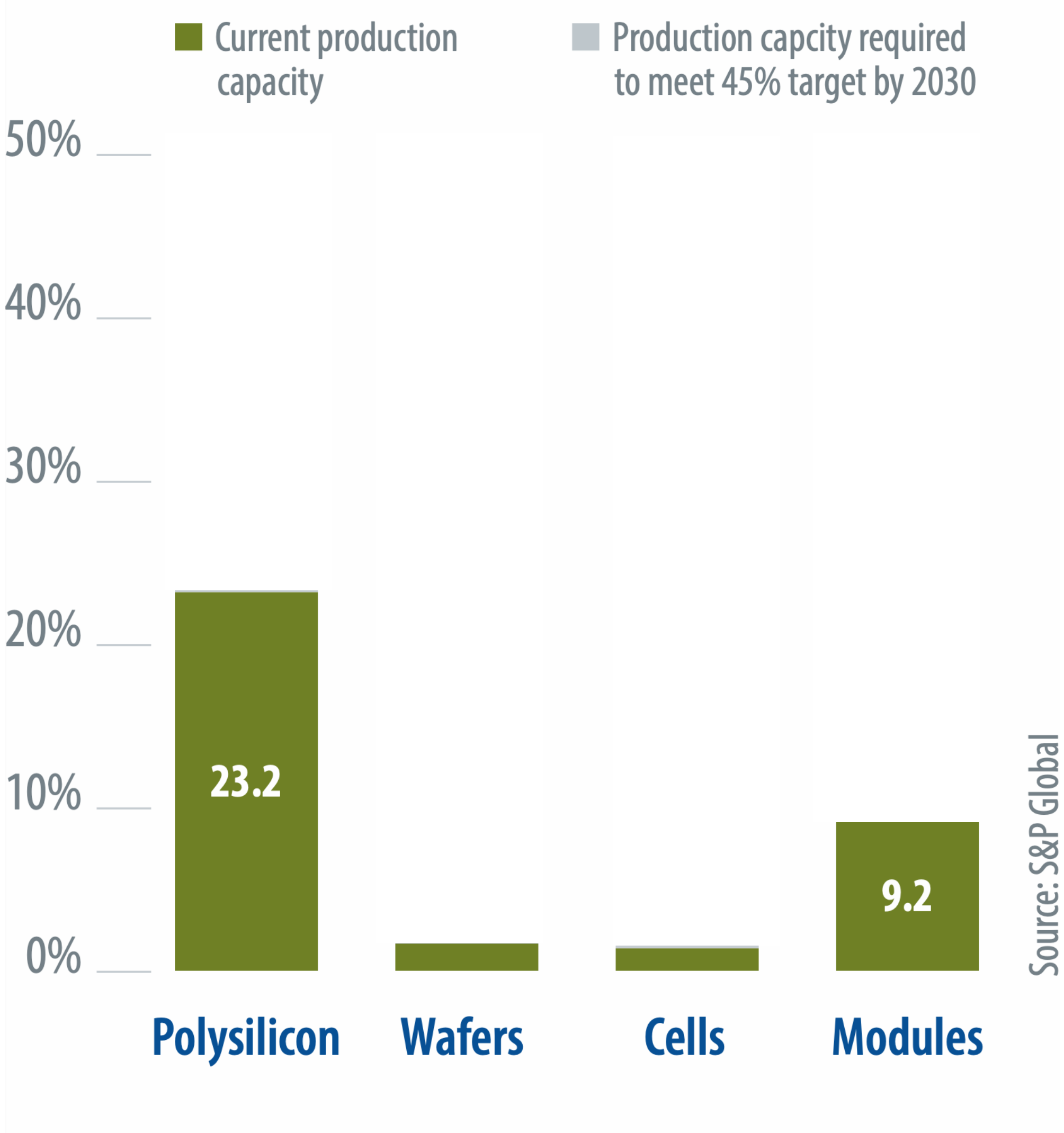
U.S. cell manufacturing capacity outlook



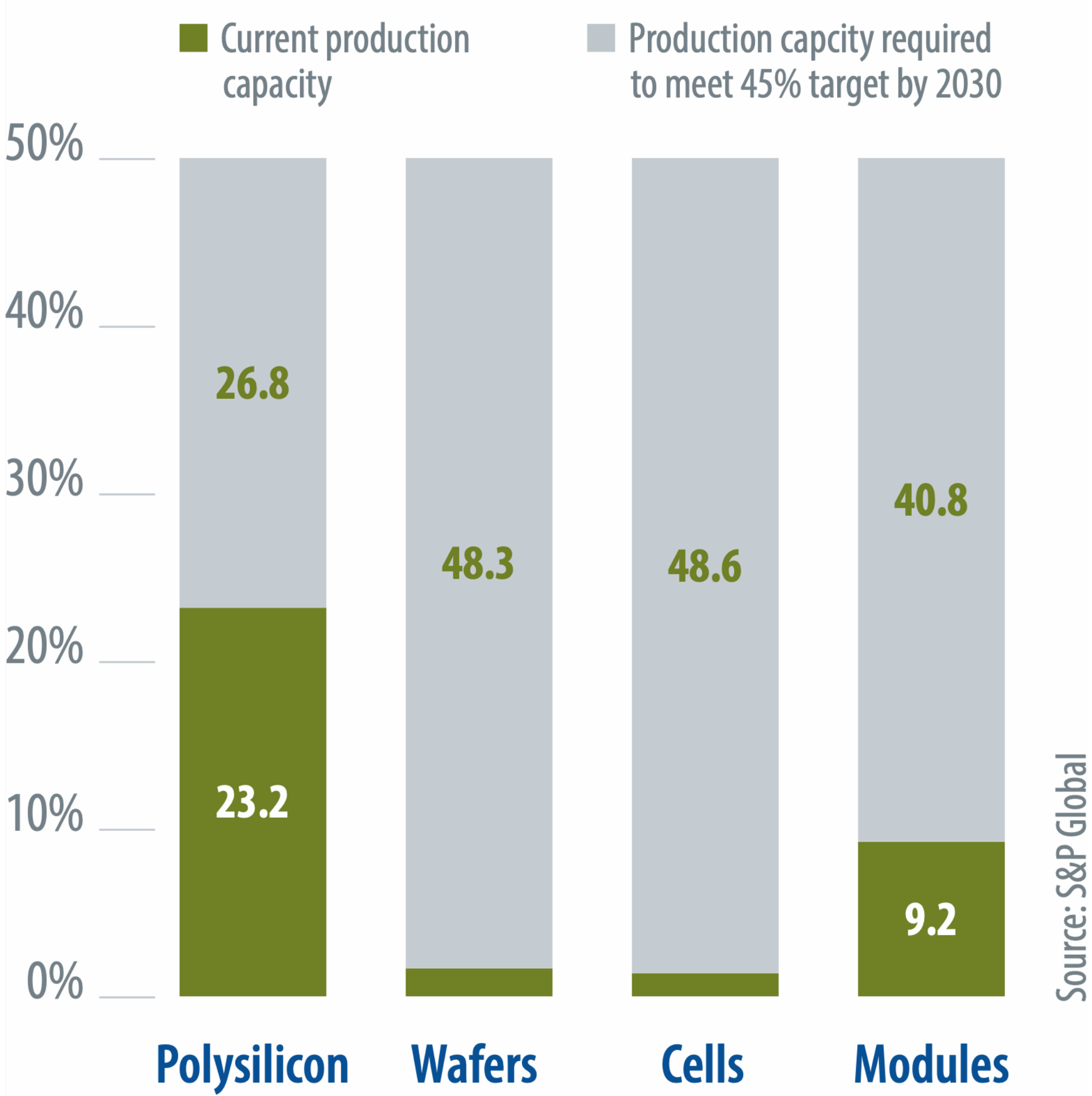
U.S. module manufacturing capacity outlook



European solar manufacturing capacity — current and target.



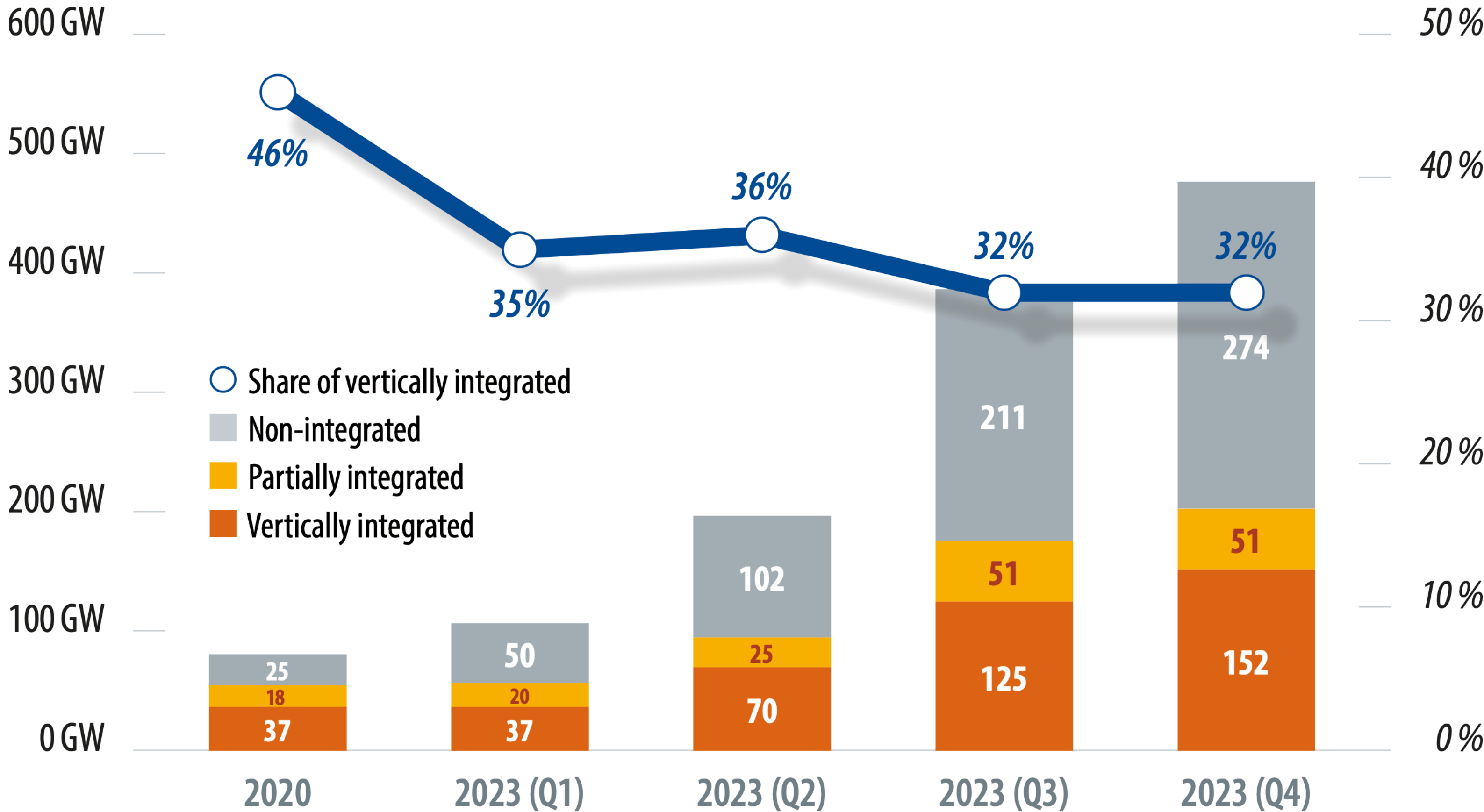
European solar manufacturing capacity — current and target.



Technological developments

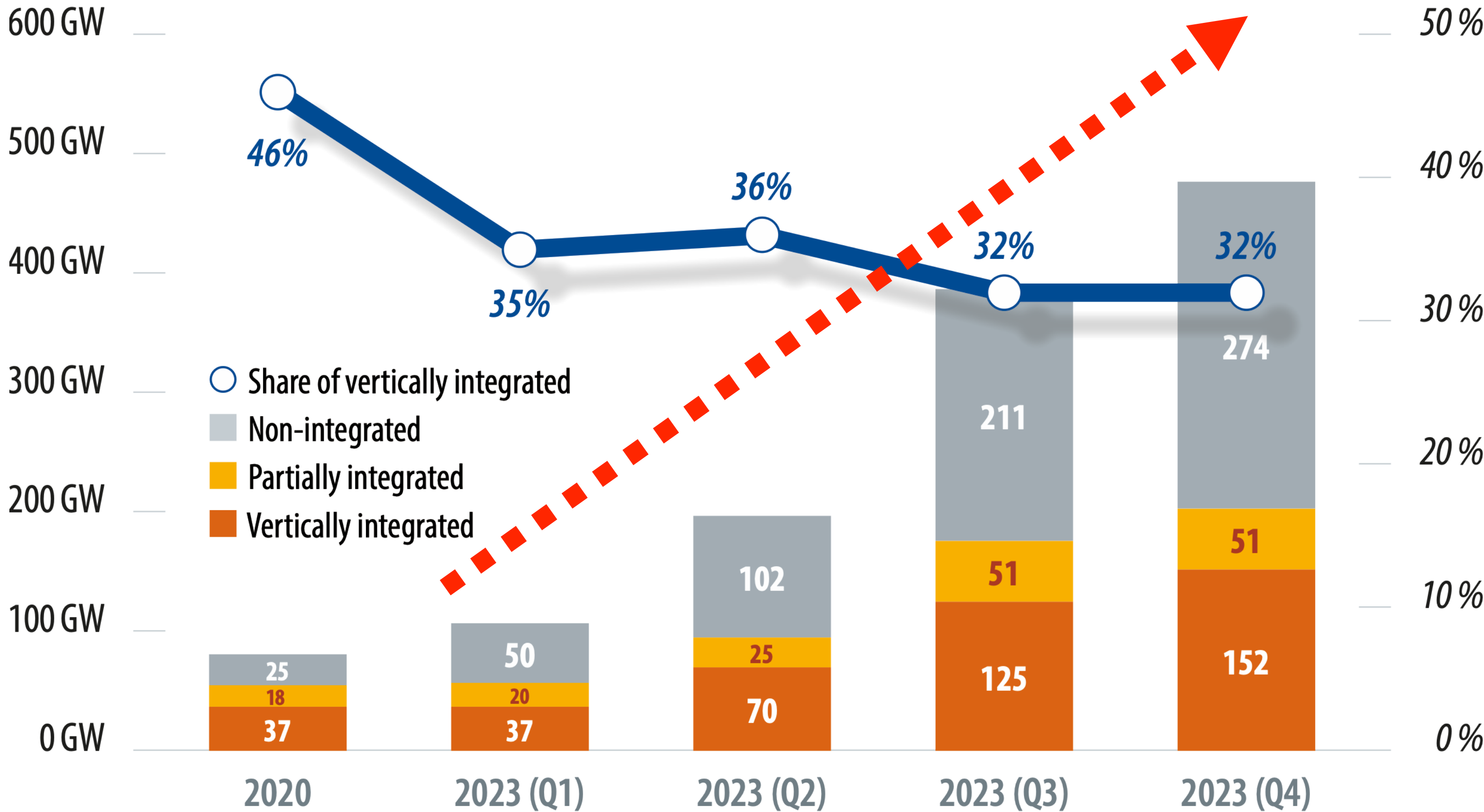
Estimate for TOPCon capacity growth

Source: InfoLink "New Technology Market Report"

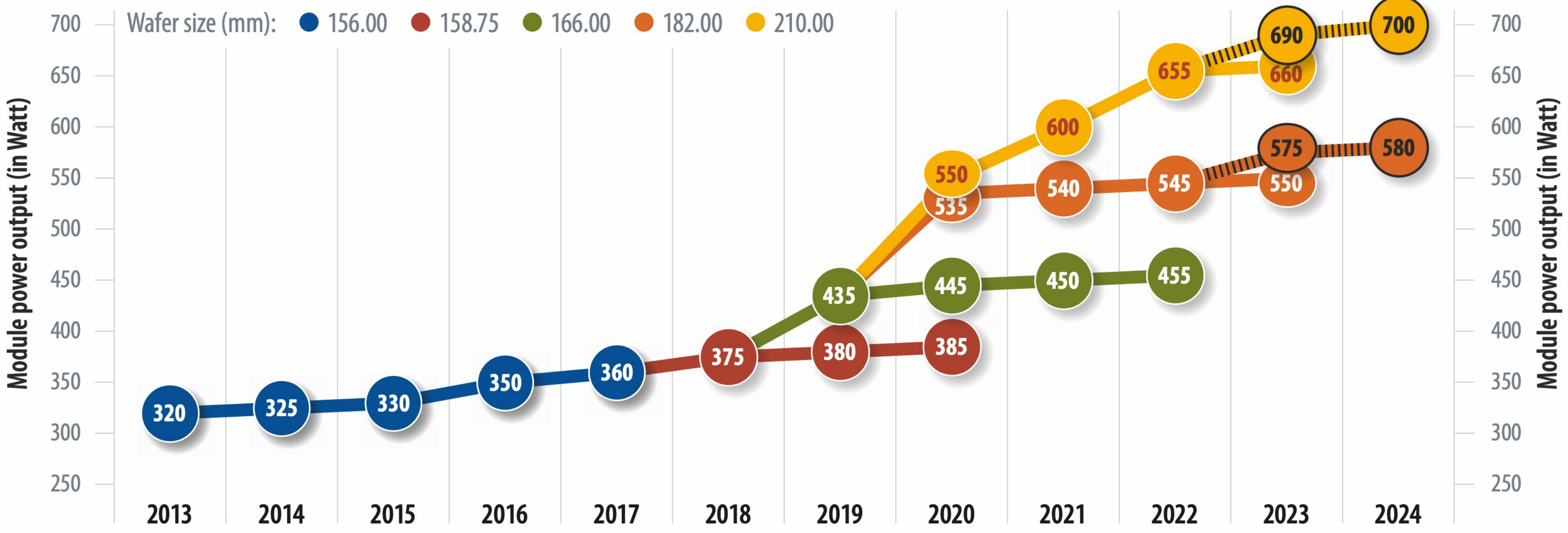
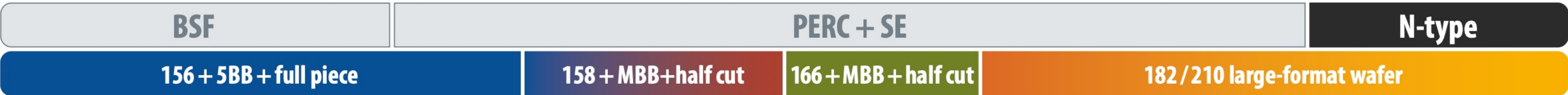


Estimate for TOPCon capacity growth

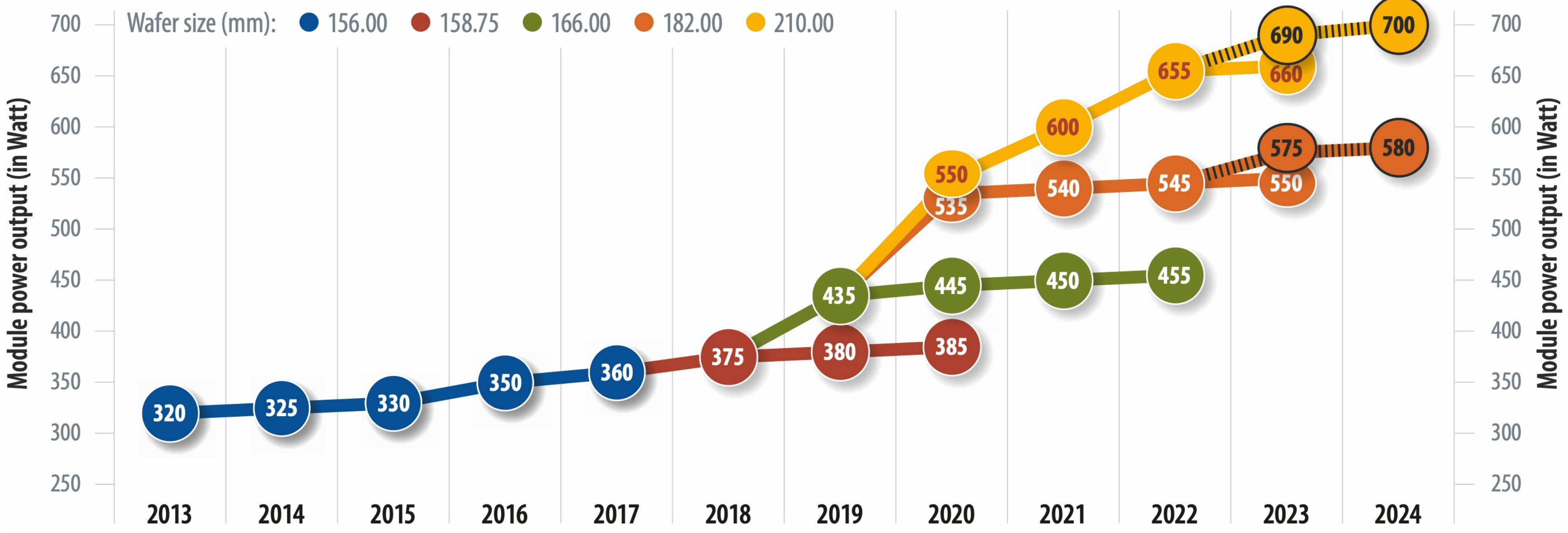
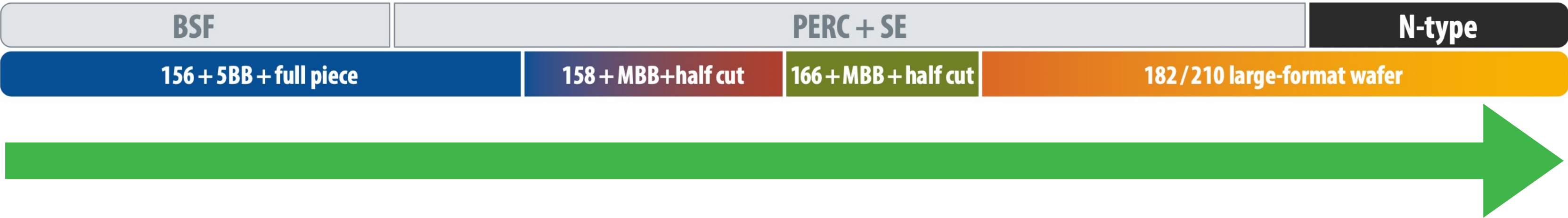
Source: InfoLink "New Technology Market Report"



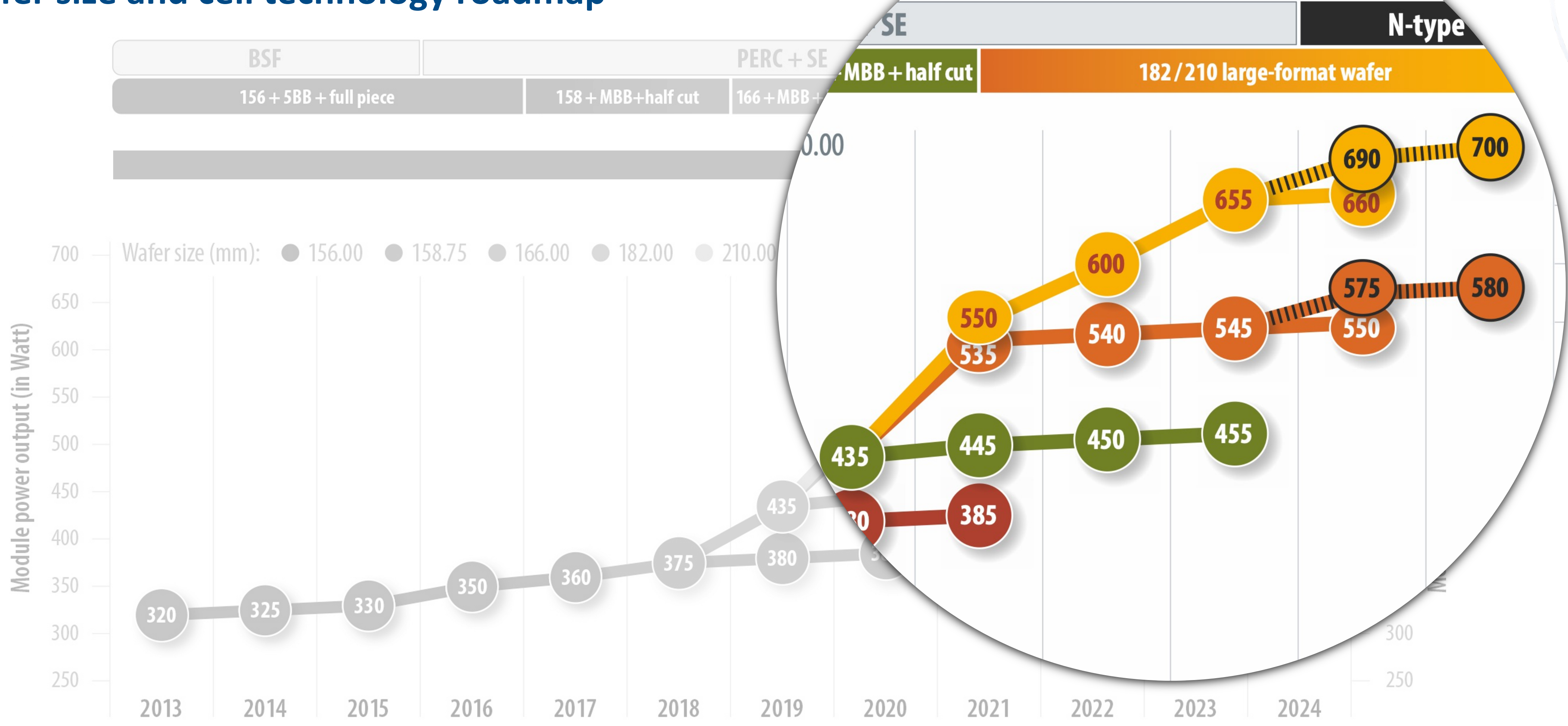
Wafer size and cell technology roadmap



Wafer size and cell technology roadmap

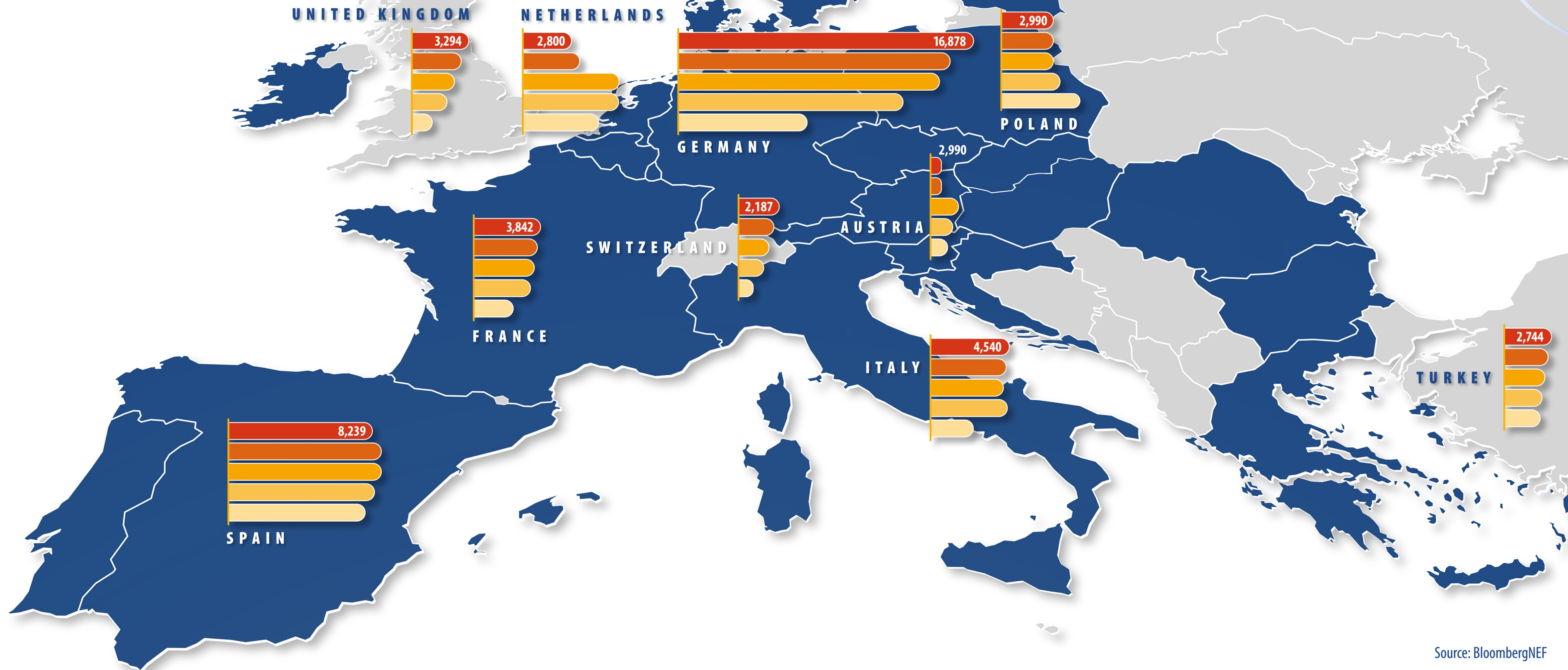


Wafer size and cell technology roadmap

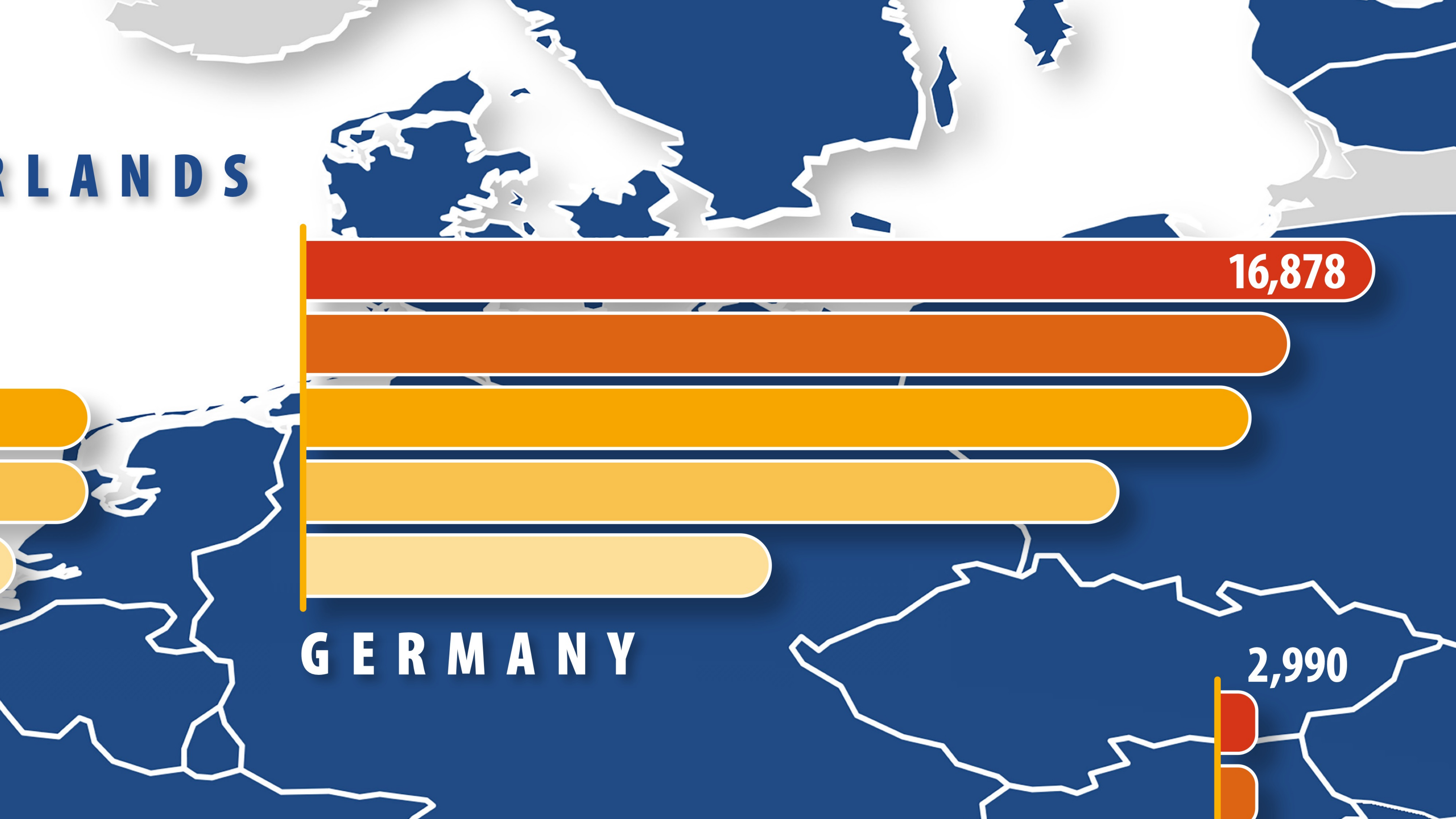


European markets

MW 2022 MW 2023 MW 2024 MW 2025 MW 2026



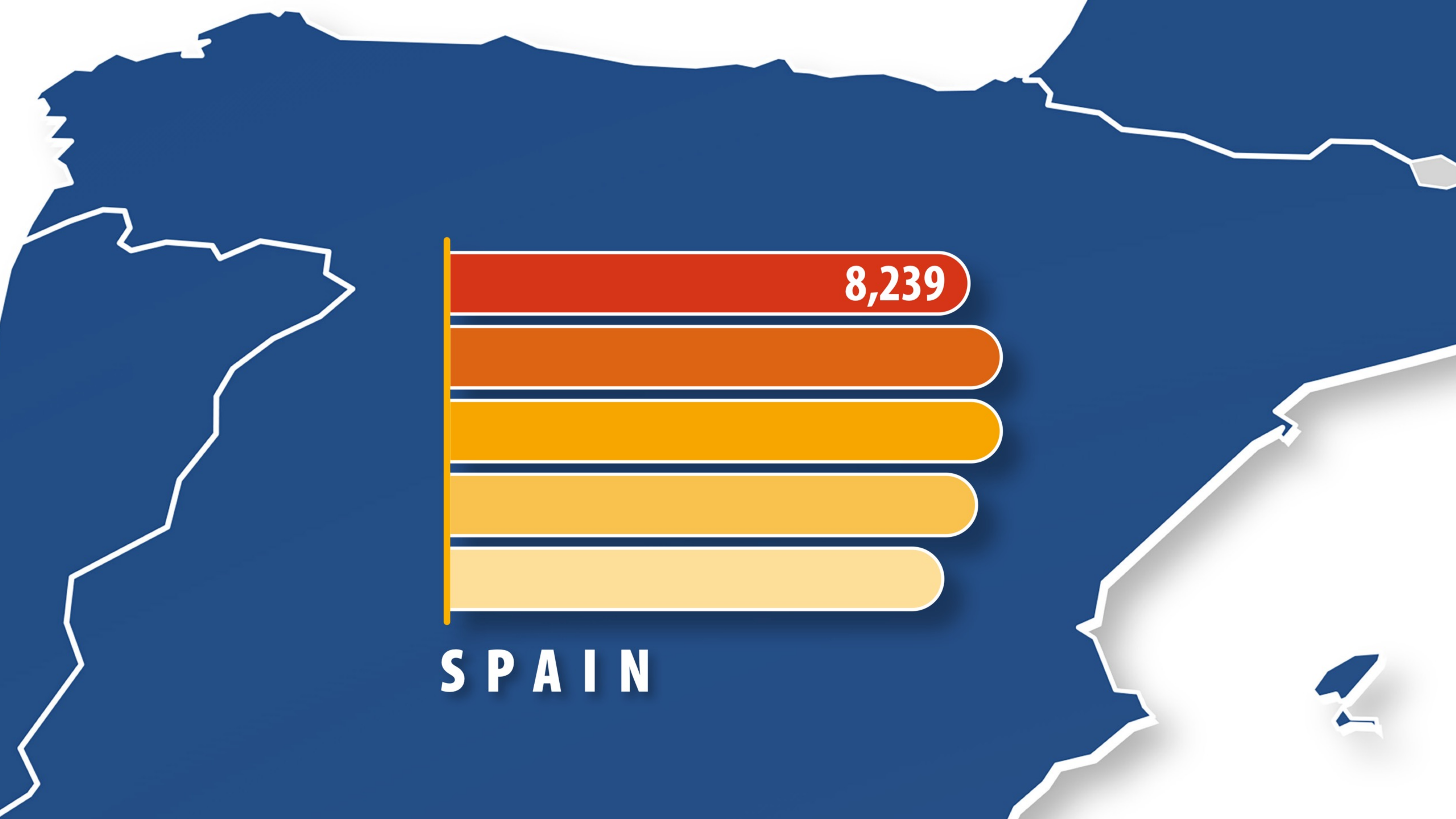
LANDS



GERMANY

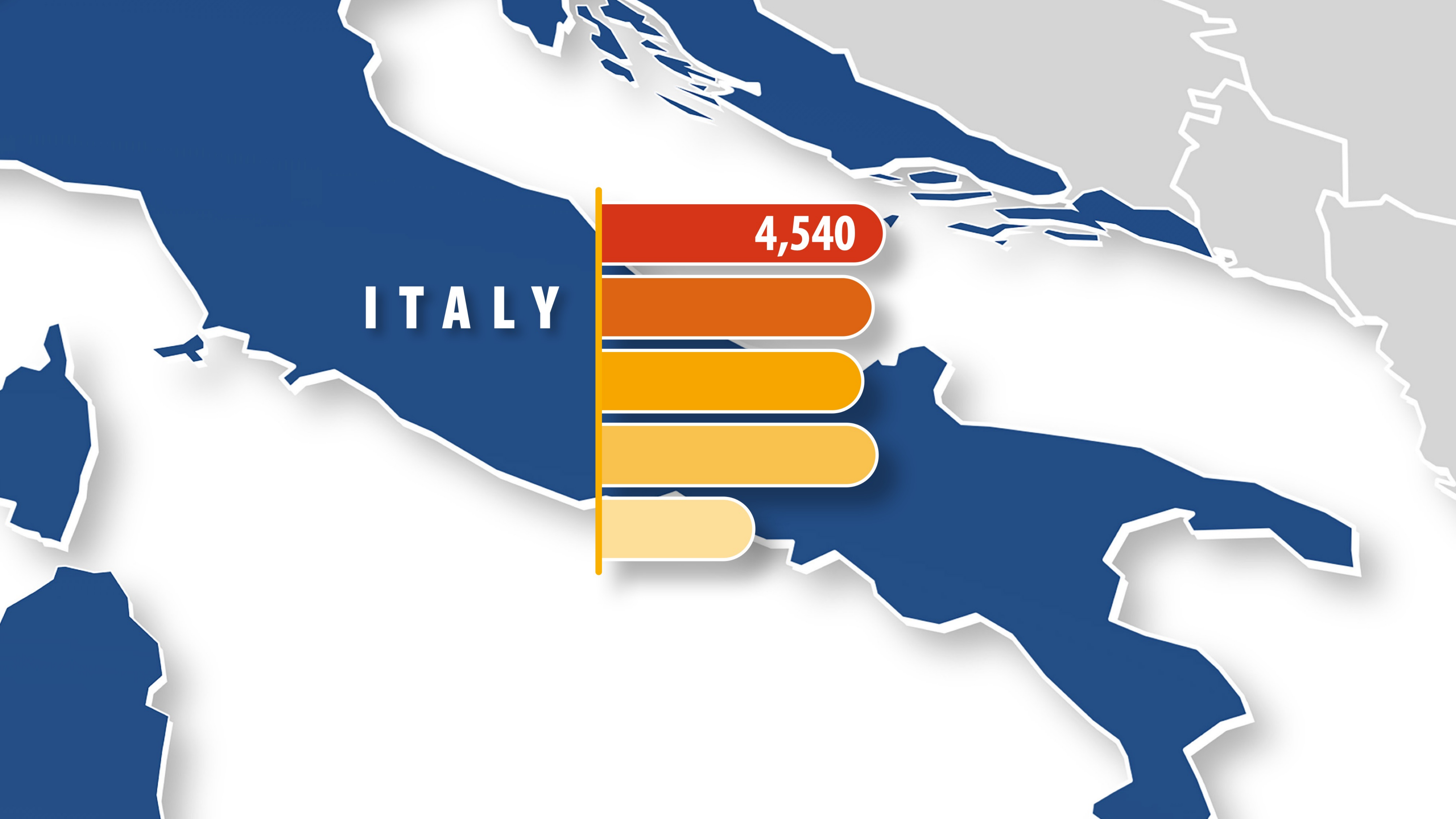
16,878

2,990



8,239

SPAIN

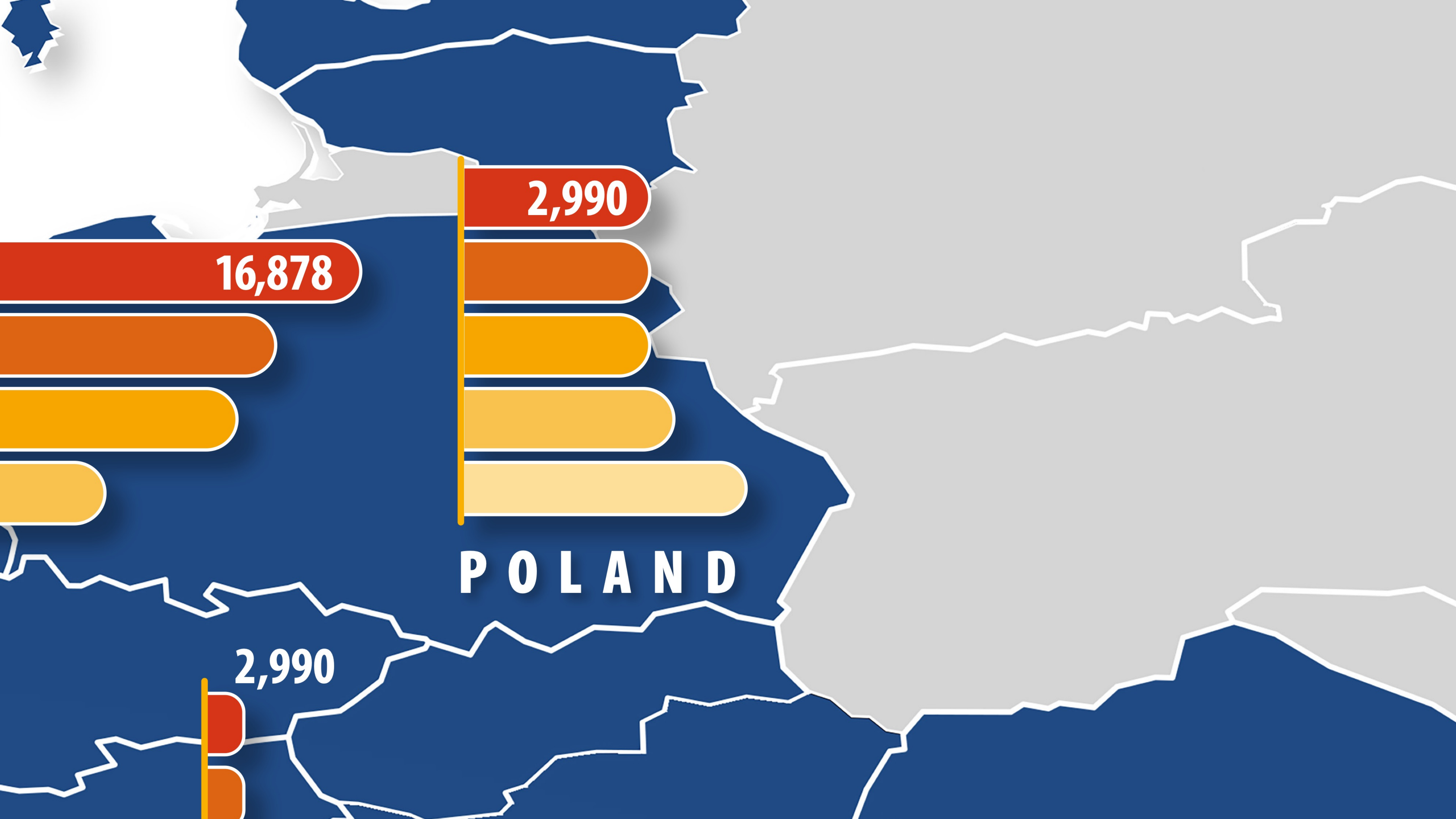




3,842

FRANCE

SWITZERLAND



P O L A N D

2,990

16,878

2,990

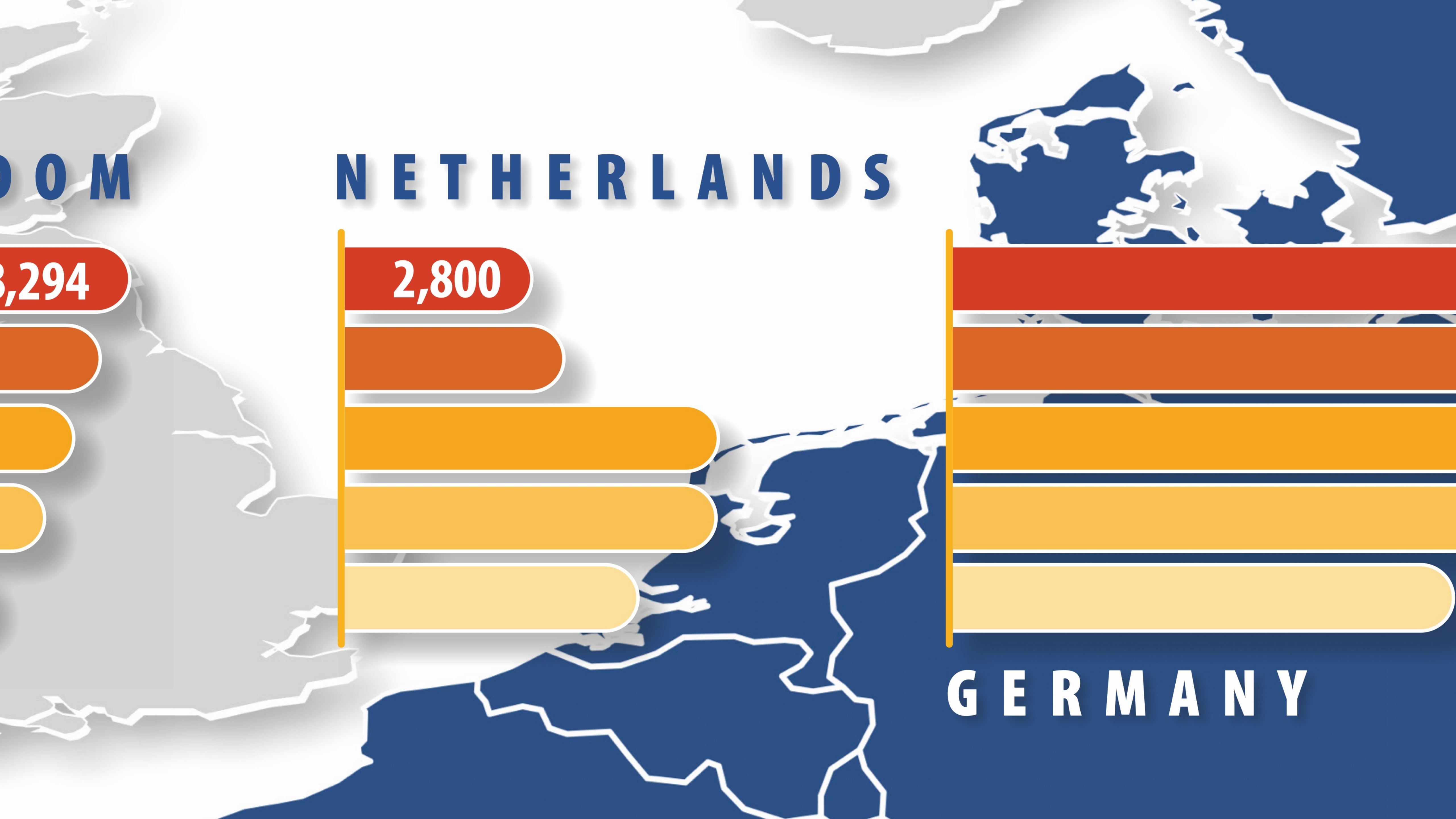
DOM

3,294

NETHERLANDS

2,800

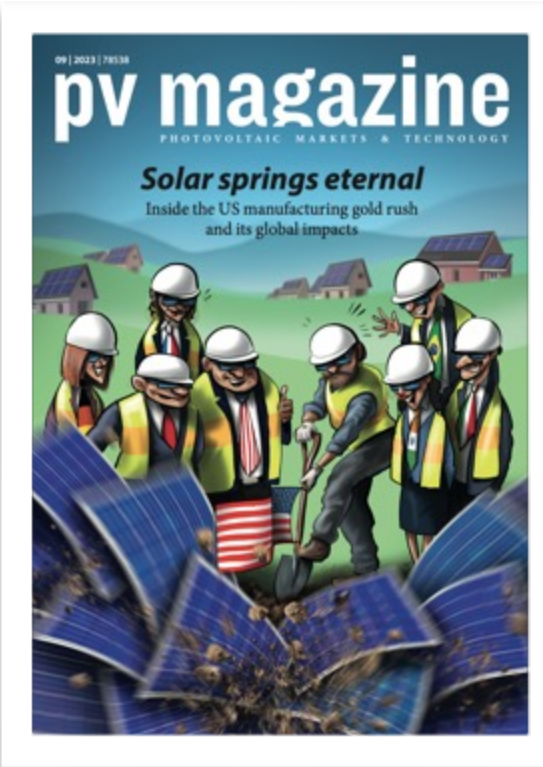
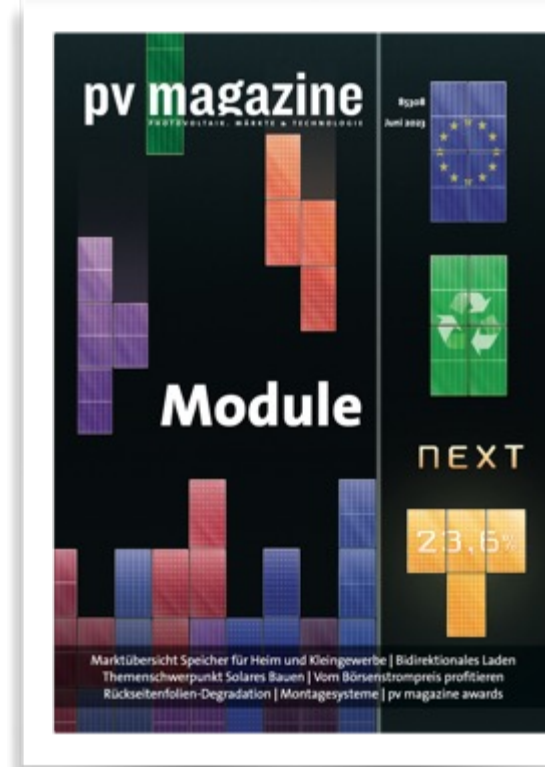
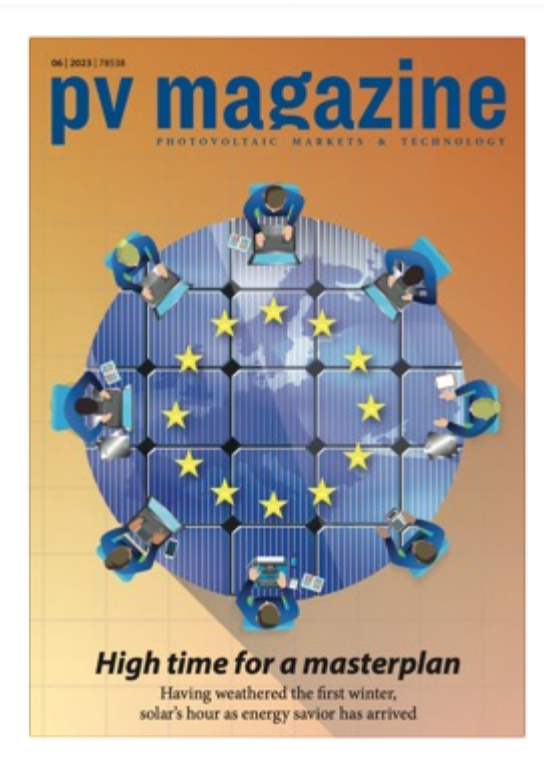
GERMANY



MW 2022 MW 2023 MW 2024 MW 2025 MW 2026

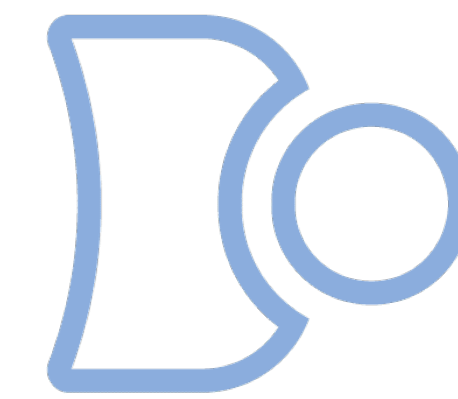
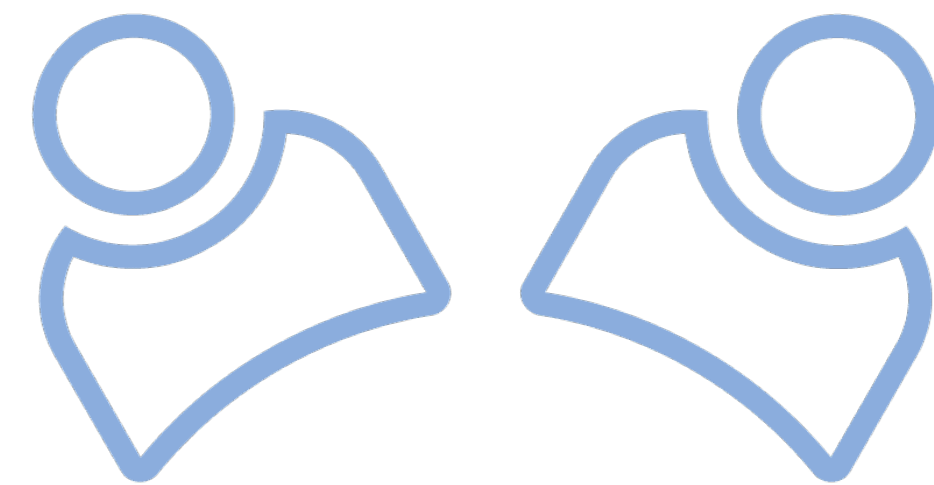


2023 in review & looking ahead to 2024



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