Photovoltaics at multi - terawatt scale: Waiting is not an option

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Abstract

A major renewable-energy milestone occurred in 2022: Photovoltaics (PV) exceeded a global installed capacity of 1 TW_{dc}. But despite considerable growth and cost reduction over time, PV is still a small part of global electricity generation (4 to 5% for 2022), and the window is increasingly closing to take action at scale to cut greenhouse gas (GHG) emissions while meeting global energy needs for the future. PV is one of very few options that can be dispatched relatively quickly, but discussions of TW-scale growth at the global level may not be clearly communicating the needed size and speed for renewable-energy installation. A major global risk would be to make poor assumptions or mistakes in modeling and promoting the required PV deployment and industry growth and then realize by 2035 that we were profoundly wrong

on the low side and need to ramp up manufacturing and deployment to unrealistic or unsustainable levels.

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