



# Future developments of renewable energy

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The rapid maturation of wind and solar power has been nothing short of astonishing. Not long ago, the development of new solar and wind farms was typically driven by small regional players, and the cost was significantly higher than that of a coal plant. Today, the cost of renewables has plummeted, and many solar and wind projects are undertaken by large multinational companies, which often also announce staggering development targets.

This article is a collaborative effort by Florian Heineke, Nadine Janecke, Holger Klöner, Florian Köhn, Humayun Tai, and Raffael Winter, representing views from McKinsey's Electric Power & Natural Gas Practice.

Over the past decade, the growth of renewable energy has consistently and dramatically outperformed nearly all expectations (Exhibit 1). Upward corrections of estimates have become something of a ritual.

This race to build additional solar and wind capacity increases the pressure on developers to execute efficiently and heightens competition for finite resources. Still, the three winning capabilities we identified three years ago as important for building or expanding a renewables business are even more critical now. They form the bedrock required to tackle upcoming challenges:

Leveraging these capabilities as a strong foundation, successful renewables developers must navigate an increasingly complex and competitive landscape. Specifically, they will have to focus on and address four emerging challenges:

Renewables developers will need to act decisively to prepare for these upcoming challenges. In a series of future articles, we provide detailed insights on each of these pressures and share potential ways players can take action.

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The acceleration in clean, renewable energy power generation comes not a moment too soon for policymakers



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and advocates concerned with climate change caused by greenhouse gas emissions.

At 2023's United Nation's Climate Change Conference (COP28), governments set a goal to triple global renewables power capacity by 2030. This will ideally help advance decarbonization, mitigate climate change and achieve net-zero emissions, according to the IEA (link resides outside ibm ).

Broad policy measures notwithstanding, policy support often varies depending on the type of renewable energy in question. Let's take a closer look at several types of renewable energy resources and the trends taking shape in each category.

In 2023, solar photovoltaic energy made up three-quarters of renewable capacity additions around the world, according to the IEA. Capacity growth stemmed from both utility-scale plants and consumer adoption of distributed PV systems--on-site solar power generation at homes and businesses--accounted for the other half (link resides outside ibm ).

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