Energy Transition: Renewables Remain The Cornerstone Of Future Power Generation

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Editor's Note: This report is one in a five-part series providing insights on developments in the energy transition.

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Key Takeaways

- Renewables are forecast to increase to 60% of power generation in Europe by 2030, and possibly approach 40% in the U.S. and China according to S&P Global Commodity Insights (Platts), but still account for only 18% of global energy demand.
- Continued policy support remains important to reduce credit risks from volatile and potentially declining long-term power prices as the share of zero- or low-marginal-cost plants increases.
- Security-of-supply considerations further support an accelerated renewables rollout, notably in Europe, while back-up facilities, including from power plants fuelled by natural gas, may play an increasing role in the coming decades as the share of intermittent renewable power generation rises.

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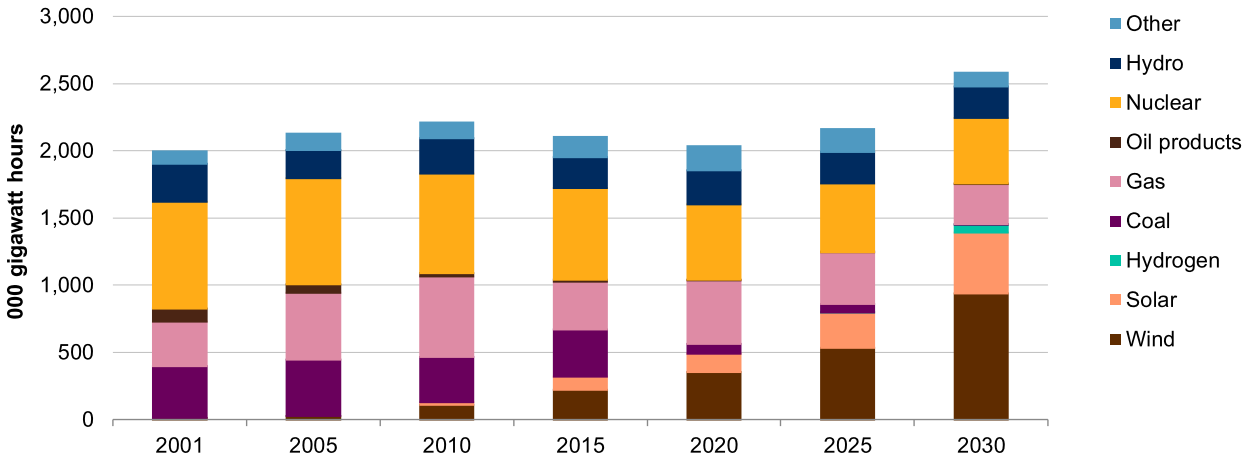
Renewable energy sources (solar, wind, and hydro) account for the majority of annual investments in power generation. Yet they still represented only 13% of global primary energy consumption in 2020, according to S&P Global Commodity Insights (Platts). Climate policies, cost competitiveness, and the strategies of power companies and investors will likely help this share increase to 18% by 2030 (two-thirds wind and solar, one-third hydro). This means that, by then, renewable energy could equate 60% of the primary energy previously sourced from oil, versus only about 25% a decade ago.

The growth and importance of renewables in the power generation mix is however significantly higher. S&P Global Commodity Insights (Platts)' reference scenario puts the share of renewables in 2030 at more than 60% of the power mix in Western Europe, up from around 35% today, and

38% each in the U.S. (up from 23%) and China (up from 30%). As part of that increase, the projected expansion of solar and wind capacity is even more impressive, almost doubling this decade to 47% by 2030 in Europe (versus 25% in 2020), 32% in the U.S. (up from 12%), and 24% in China (up from 11%).

Chart 1

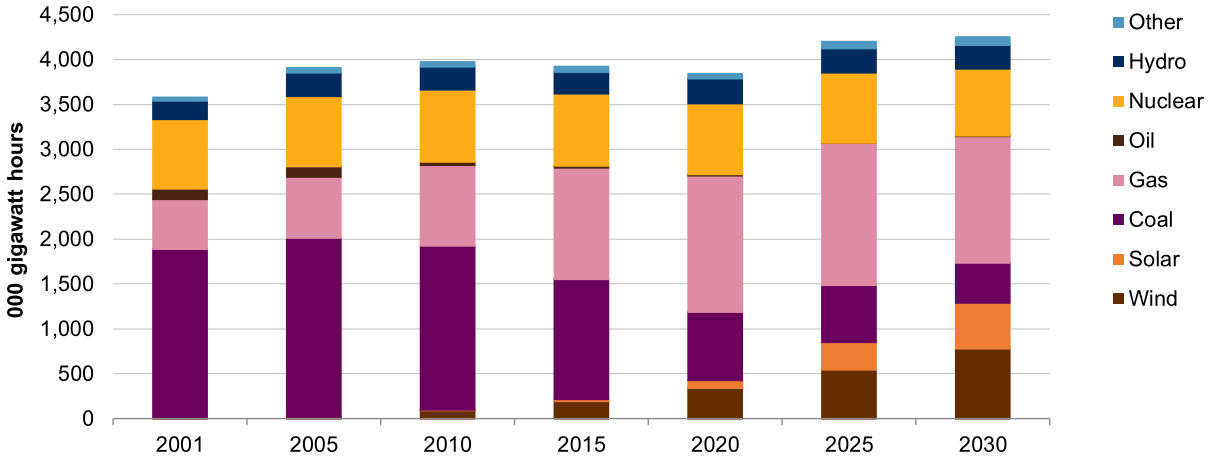
Western Europe's Power Generation Mix



CCUS--Carbon capture, usage, and storage. Source: S&P Global Commodity Insights - Global Integrated Energy Model

Chart 2

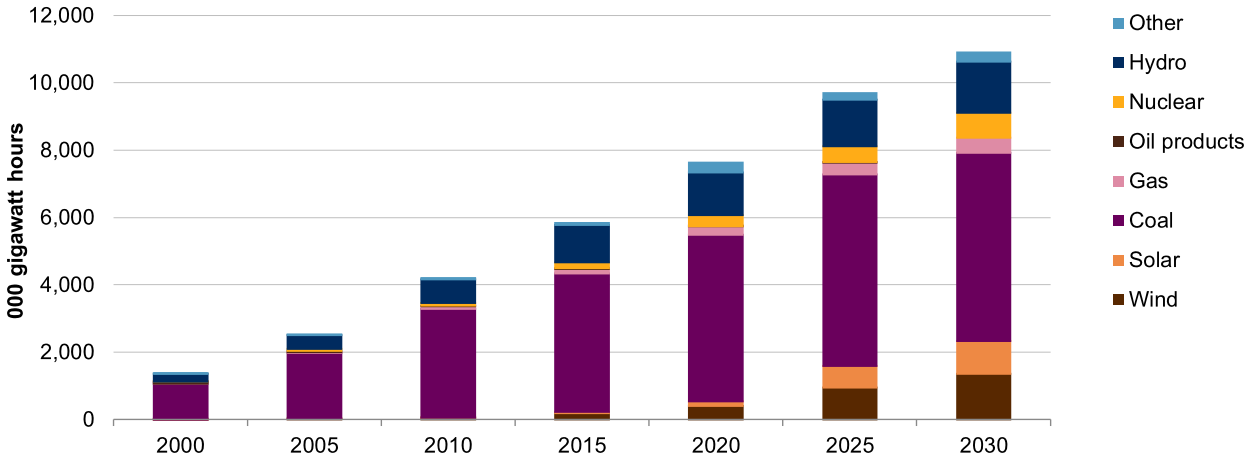
U.S. Power Generation Mix



Source: S&P Global Commodity Insights - Global Integrated Energy Model

Chart 3

China's Power Generation Mix



Source: S&P Global Commodity Insights - Global Integrated Energy Model

Capacity Additions Lag Energy Demand Growth And A 2 Degree Pathway

Despite ongoing growth in renewables, gas- and coal-fired power generation continues to rise. This is due to steadily increasing power demand in developing markets (notably China and India), combined with global electrification trends, such as switching to electric vehicles and demand from a growing number of data centers including for bitcoin mining. What's more, in many markets there are still few incentives to build new renewables capacity to replace older fossil-fuel power plants that are fully depreciated, and the cost of carbon is not fully accounted for, in our view.

Accelerating the expansion of renewables generation, in line with limiting global warming to less than 2 degrees per year, would require significant additional momentum beyond market economics. S&P Global Commodity Insights' (Platts') 2-degree scenario would require renewable energy generation from solar, wind, and hydro in 2050 to be almost double that expected in the reference case.

Supportive Policies Remain Needed To Foster Growth

Renewable power generation has become competitive, especially in the current environment where fossil fuel prices are at record highs. However, we see that the solar and wind power industry still requires wide-ranging policies that foster further growth, including investment in auxiliary technologies such as storage, grid upgrades, and interconnections. For example, attaining permits for renewables projects is often cited as a major hurdle in the U.S. and Europe. To address this, and in view of the urgency resulting from the Russian gas crisis, Europe's recent REPowerEU plan now includes a proposal for "renewables go-to zones" and initiatives to limit legal recourse against new generation plants and grid buildups, as in Germany.

S&P Global Ratings believes policies to facilitate long-term price visibility for renewables

investments are key to reducing credit risks and financing costs. In the U.S., credit-supportive price visibility is often provided through power purchase agreements with utilities, which often result from renewable portfolio standards set by states. In Europe, a competitive auction process is mostly used for renewables, which has yielded a fixed price outcome or contracts for difference over 15-20 years and essentially acts as a swap of a long-term spot price into a fixed price, rather than as a subsidy. Even though the cost of renewables has decreased, and is now competitive relative to that of other power generation sources, any unmitigated exposure to long-term power prices (and hourly capture rates) would unlikely be in line with investment-grade credit characteristics. This is because such exposure would make cash flows of renewable projects subject to significant uncertainty, similar to those of other merchant-type power projects. S&P Global Commodity Insights (Platts) expects power prices in Western Europe to decline sharply over the next decade, assuming gas prices start returning to normal levels. This is because of the rising share of zero- or low-marginal-cost plants in the generation mix.

Key renewables objectives for Europe, the U.S., and China by 2030

Russia's invasion of Ukraine has added new impetus for Europe to double down on its energy transition targets. The goal of reducing dependence on Russian gas and promoting energy independence now complements the region's push toward net zero. The REPowerEU strategy has raised the target for the share of renewables (including hydro) to meet energy demand to 45%, compared with 40% in the previous "Fit for 55" plan. To this end, REPowerEU aims to have 1,236 gigawatts (GW) of wind and solar generation capacity online by 2030, up from about 350 GW of installed capacity today.

In the U.S., the increasing bifurcation of political views is hampering support for climate-oriented policies. A recent U.S. Supreme Court decision curtailed--though did not end--the Environmental Protection Agency's ability to regulate power sector GHG emissions under the Clean Air Act. From the standpoint of renewable energy growth, the budget reconciliation agreement, known as the Inflation Reduction Act of 2022, opens the door to clean energy investments across the next decade, including new and expanded clean energy tax credits. This notwithstanding, renewables growth in the U.S. should remain underpinned by cost competitiveness and decarbonization strategies of many utility companies. Moreover, state legislation, such as renewable portfolio standards is not affected by the court's decision. Based on S&P Global Commodity Insights (Platts)' reference case, we foresee installed wind and solar capacity reaching 510 GW by 2030, up from 225 GW at the end of 2021.

We expect that China will deliver on or surpass the target in its recently announced 14th five-year plan. The plan includes a target of renewables (excluding hydro) to cover 18% of primary energy consumption by 2025. This requires 1,100 GW of installed wind and solar power capacity, almost double the currently installed capacity of about 640 GW (330 GW from wind and 307 GW solar photovoltaic) at year-end 2021, and is already close to the official target of 1,200 GW by 2030. Given that China has been adding 100 GW of renewables capacity per year, its 2030 target is therefore well within reach and likely to be exceeded. The power market is mainly led by state-owned enterprises with limited funding issues.

Reliance On China For Equipment And Raw Materials Poses Risks

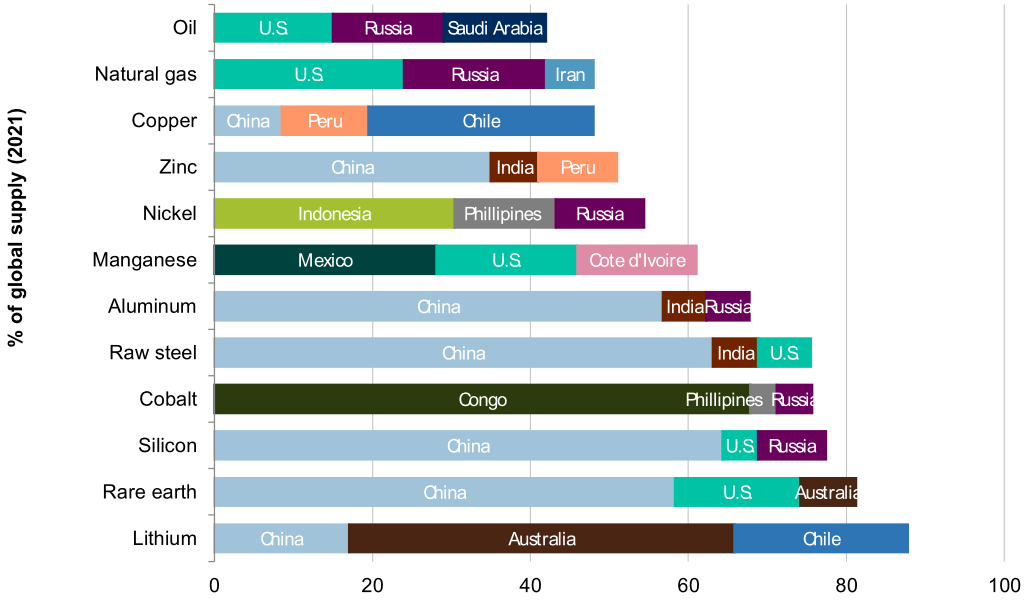
Recent supply chain issues have hampered renewables growth, but we believe this should be more manageable in the medium term. Despite accounting for about half of global annual installations, China dominates the global solar supply chain. High dependence on China for raw materials key to the energy transition has also been underscored by the International Energy Agency (see chart 4).

There is, however, no one-to-one comparison with dependence on oil- or gas-producing countries, since once renewable power plants are installed, the dependence on China reduces significantly because wind and solar are indigenous fuel sources. Still, U.S. and European governments are already considering alternative suppliers outside China as well as the onshoring of key strategic investments, such as batteries and related lithium mining semiconductors, and photovoltaic solar

panels.

Chart 4

Top Three Mining Countries
Total mineral and material production compared to fossil fuels



Source: International Energy Agency; U.S. Geological Survey.

Grid Stability And Affordability Will Remain High On The Political Agenda

As more fossil fuel plants close due to age or environmental mandates, and the share of renewables in the power mix expands, there will be a need for flexible dispatchable power that addresses the intermittent nature of renewables. Low-carbon solutions, including batteries can address short-term supply needs but are unlikely to cope with major seasonal fluctuations in energy demand.

However, these solutions still come with a high price tag, which needs to be added to the cost of renewable generation to arrive at an all-in cost of providing firm power that is available at all times. The more likely interim solution, therefore, may be to steadily increase the contribution from renewables, while adding gas-fired peaking plants or providing a capacity payment mechanism to existing gas- or coal-fired plants to allow them to act as back-up capacity and be available during periods of low power output from renewables.

Likewise, interconnections will play a key role in reducing intermittency risks, since they link markets with different resource mixes. For example, in Europe there is significant renewables

generation in Denmark (74% of total generation in 2021), but grid stability is supported by a comprehensive interconnection network across the region, which is now even being expanded with the U.K. The development of such networks requires, however, long commissioning time frames.

Affordable and reliable power is likely to be an increasing area of focus for all countries.

- The European Commission and Parliament have just approved certain (peak) natural gas power plants to be designated as green sustainable investments.
- In the U.S., California--where renewables now account for 33% of power generation--could delay the closure of the Diablo Canyon nuclear plant after the state faced rolling blackouts and increased fluctuations in renewable output. Other states that have a lower proportion of renewables are also running into issues. The mid-continent region operator, MISO, has just issued a warning about blackouts for Michigan and there have been some deferrals of coal retirements.
- China is supporting coal supply in 2022 to ensure power stability, but factoring into the equation an affordable energy transition. Last year, the country's commercial and industrial sectors experienced power shortages. China is using a combination of tariffs and measures such as "dual-control" (see "China will establish dual control system for cutting emissions, carbon intensity: Xi," published Jan. 27, 2022, on spglobal.com) to fuel growth of renewables while still supporting firm power from coal.

This report does not constitute a rating action.