CAN THE ELECTRICITY GRID BE CARBON-FREE BY 2035?

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The nation's electricity grid is undergoing profound changes and, as a consequence, facing many challenges that include a shift from conventional sources of electricity, such as coal, and an increasing dependence on lower-carbon and carbon-free sources of electricity, especially wind and solar power. One of President Biden's goals is to achieve a carbon-free grid by 2035. Unless there are major technology breakthroughs, this goal means the elimination of coal and natural gas to produce electricity within the next 15 years, even though fossil fuels produce more than 60 percent of the nation's electricity.

What are some of the challenges that must be overcome in order to decarbonize the grid?

ADDING TRANSMISSION

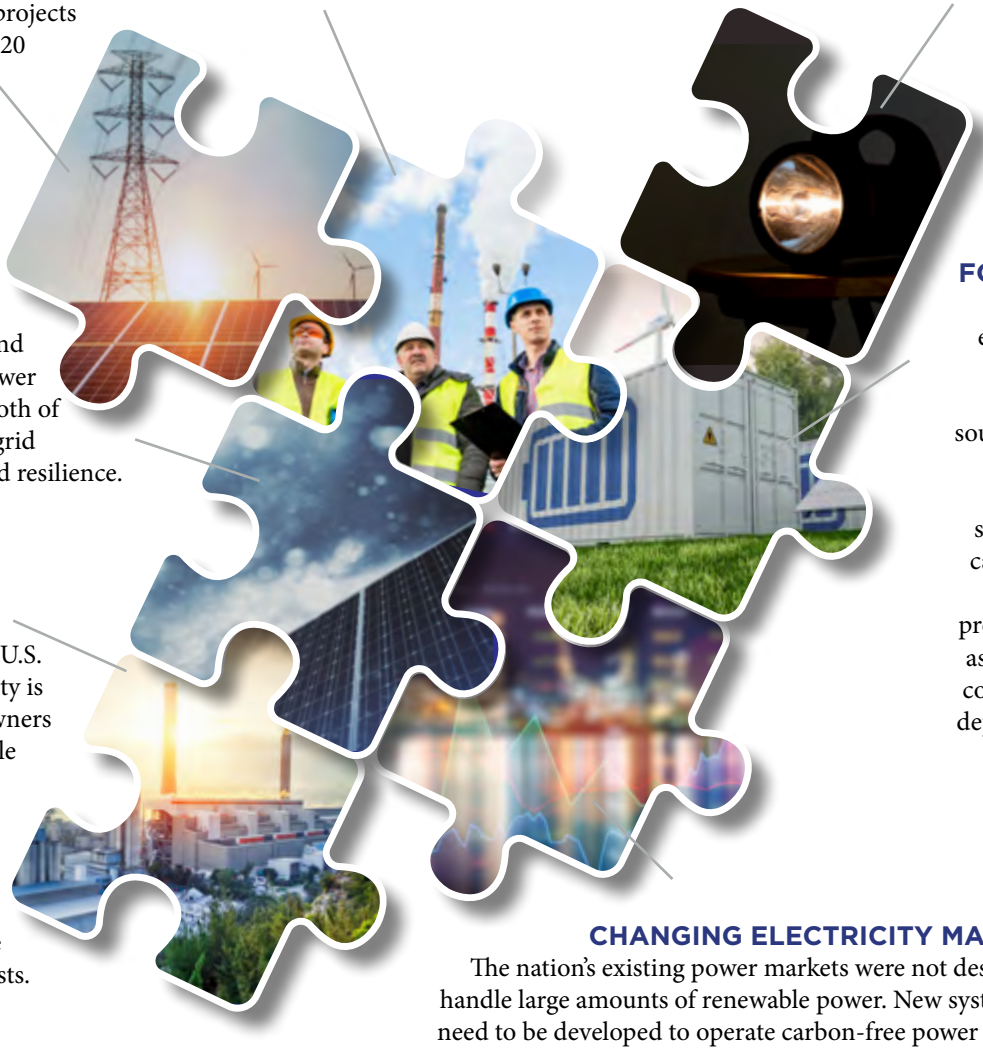
Hundreds of billions of dollars will be needed to build and upgrade the transmission system to carry more electricity from wind and solar. An MIT study found transmission capacity will need to be doubled, and recent transmission projects have taken as long as 17-20 years to complete.

PROTECTING JOBS

More than 185,000 jobs are supported by coal-fired electric power generation. All would be at risk, as would some of the 686,000 jobs supported by the natural gas industry.

HAVING ELECTRICITY AT ALL TIMES

Wind and solar can produce electricity only when the wind is blowing and the sun is shining. Lack of solar power when the sun goes down contributed to California's power blackouts and emergency measures last summer. Conventional electricity sources, like coal, will be needed for the foreseeable future to back up wind and solar.



MAINTAINING FUEL SECURITY & FUEL DIVERSITY

The electricity grid will become less fuel secure and less fuel diverse as the power sector is decarbonized. Both of these attributes help the grid maintain its reliability and resilience.

AVOIDING STRANDED COSTS

More than 30 percent of U.S. electric generating capacity is less than 20 years old. Owners will seek to be made whole for these investments if they are forced to retire early to decarbonize the grid. Other businesses involved in the energy supply chain also face the likelihood of stranded costs.

ALLOWING TIME FOR TECHNOLOGY

The gap between electricity demand and wind and solar output must be filled by other sources of electricity. The cost of battery storage is dropping but it is still expensive. Carbon capture, utilization, and storage (CCUS) shows promise, but it is risky to assume it can be proven cost effective and widely deployed within 15 years without significant investment and incentives from the federal government.

CHANGING ELECTRICITY MARKETS

The nation's existing power markets were not designed to handle large amounts of renewable power. New systems will need to be developed to operate carbon-free power markets.

These and other challenges will have to be overcome to decarbonize the grid and, at the same time, maintain reliable, resilient, and affordable supplies of electricity. That is why a goal of a carbon-free electricity grid by 2035 is not likely to be achievable.

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