

Multi-model effort highlights progress, future needs in renewable energy modeling

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Models of the U.S. electricity sector are relied upon by sector stakeholders and decision makers, but the recent surge in variable renewable energy (VRE), such as wind and solar, led a team of modeling experts to examine how these models would represent scenarios with high penetrations of VRE. Four agencies, including the U.S. Department of Energy's National Renewable Energy Laboratory (NREL), hosted two workshops that led to a new report where the teams identified areas of importance for modeling VRE, performed experiments to determine key assumptions, and compiled a set of recommendations for future research in this area.

"Having four nationally recognized modeling teams come together to discuss [renewable energy](#) modeling was tremendously valuable," said NREL Analyst and Project Lead Wesley Cole. "Through this [report](#), we are able to share what we learned from this collaborative exercise."

[Variable Renewable Energy in Long-Term Planning Models: A Multi-Model Perspective](#), is a culmination of a collaboration among the capacity expansion modeling teams from the Electric Power Research Institute (EPRI), U.S. Energy Information Administration (EIA), U.S. Environmental Protection Agency (EPA), and NREL. The report shows that improvements made across a diverse group of modeling teams led to more robust representation of VRE technologies. The report also documents differences in modeling methodologies and shows how specific improvements or modeling representations led to better representation of VRE technologies.

For example, the NREL and EIA teams showed how improved temporal resolution leads to more appropriate renewable energy capacity and energy value estimations. The EPRI and EPA teams demonstrated how avoiding improper spatial resolution can lead to more robust system cost estimates. The report also highlights 15 areas where continued research and development is needed for long-term modeling, including methods for how storage and renewable [energy](#) might interact at increased levels of penetration for each technology.

Two workshops were held by these four organizations to evaluate VRE modeling in each organization's respective capacity expansion model. The workshops covered a wide range of VRE topics, including transmission and VRE resource data, VRE capacity value, dispatch and operational modeling, distributed generation, and temporal and spatial resolution. The report summarizes the analyses and model "experiments" that were conducted as part of these workshops and explains how each team treats VRE in their respective model. The report also reviews the findings from the two workshops and emphasizes the areas where there is still need for additional research and development on analysis tools to incorporate VRE into long-term planning and decision-making, both for the respective agencies and for other electricity sector stakeholders.

Provided by National Renewable Energy Laboratory

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