How state policymakers can use data from novel study to meet climate goals

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How many electric vehicles should be on the road in each state, and across the country, in 2030, 2040 and 2050 to meet climate goals? How much land will be needed for solar or wind farms? How large will the energy-sector workforce need to be?

Princeton University has released the final report of its Net-Zero America (NZA) study, which answers these questions and others about

what it will take for the U.S. to transform its energy systems and set the country on a pathway to net-zero emissions by midcentury. Accompanying the release is a new digital tool that gives policymakers and other state-level stakeholders access to the data to inform local decisions.

With world leaders now convening for the United Nations Climate Change Conference in Glasgow, known as COP26, the newly published report and tool provide a gauge to understand how various emissions-reducing strategies are likely to affect jobs, health, land use and other factors critical to U.S. residents.

"The good news is that there is a set of actions that can be taken in the 2020s to support a net-zero pathway for the longer-term, regardless of which path to net-zero the country ultimately follows. This means that states can make big investments this decade with confidence that they will deliver value over the long term," said Chris Greig, one of the study's principal investigators and the Theodora D. '78 & William H. Walton III '74 Senior Research Scientist at the Andlinger Center for Energy and the Environment.

The authors said data from the digital tool can provide context for understanding implications of new emission-reduction pledges and investments. The data provide yardsticks against which national and state-level progress toward a net-zero future can be measured.

The tool allows users to investigate in detail each of the report's five scenarios for stopping the buildup of greenhouse gases in the atmosphere, the outcome known as net-zero, examining data for years between now and 2050.

Other questions about getting to net-zero that the data answer, for individual states and for the country as a whole, include these: How

many premature deaths due to road-vehicle air pollution will be avoided? How much capital will need to be invested in new transmission lines? And how many jobs will be lost and gained in the energy sector across the country?

The newly published report and data are an update to the Net-Zero America interim report released in December 2020. The final report includes some revised figures and a full set of supporting annexes. The final report and website provide all final data sets from the study, which journalists, policymakers and other stakeholders can explore to better understand how different decisions will affect their communities. The website also provides state-by-state data sheets as downloadable PDFs.

"Our study shows that a transformation to net-zero is possible by 2050, affordable, and brings economic and health benefits across the country," said author Jesse Jenkins, assistant professor of mechanical and aerospace engineering and the Andlinger Center for Energy and the Environment.

"Some states are better positioned than others depending on their geography, existing industries, and reliability of sun and wind, among other considerations. We've taken all this into account to help guide policymakers in understanding what routes to net-zero will be best for their constituencies," said Jenkins.

The research team has also distilled key data into a downloadable PDF listing of outcomes for 2030 and 2050 for each state across several key metrics and all five net-zero scenarios developed in the study. The metrics include premature deaths avoided by improved air quality, the dollar value of those avoided deaths, amount of land use change and number of energy-sector jobs.

"The Biden Administration has committed the United States to reducing

greenhouse gas emissions by 50-52% by 2030 (relative to 2005) and to net-zero by 2050. Meeting these goals is crucial to national security and will transform America," said Eric Larson, an author of the study and senior research engineer at the Andlinger Center for Energy and the Environment. "Our study provides granular, state-by-state guidance on what reaching these goals might involve and how local areas stand to benefit from that transformation," said Larson.

Building on the Net-Zero America study, Jenkins has established a new project, the rapid energy policy evaluation and analysis toolkit, or REPEAT project, that assesses federal policies in real time, as they are proposed, to help policymakers and the public understand what various climate policy options mean for the American people. This toolkit has revised and automated the modeling tools and methods developed in NZA and improves their usefulness for ongoing federal policy analysis.

"With these tools, based on the NZA study, we can track America's progress on the path to net-zero as policy and regulations are made," said Jenkins.

The first REPEAT assessment, published this month, evaluates the just-passed infrastructure bill and the "Build Back Better" bills under consideration in Congress.

The Net-Zero America study was led by faculty and researchers at the Andlinger Center for Energy and the Environment and the High Meadows Environmental Institute (HMEI). The study has provided the framework and methodology for similar studies being launched in other countries. A Net-Zero Australia study is now in progress, led by University of Melbourne and University of Queensland researchers, on which Princeton researchers are collaborating.

More information: netzeroamerica.princeton.edu/? …

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