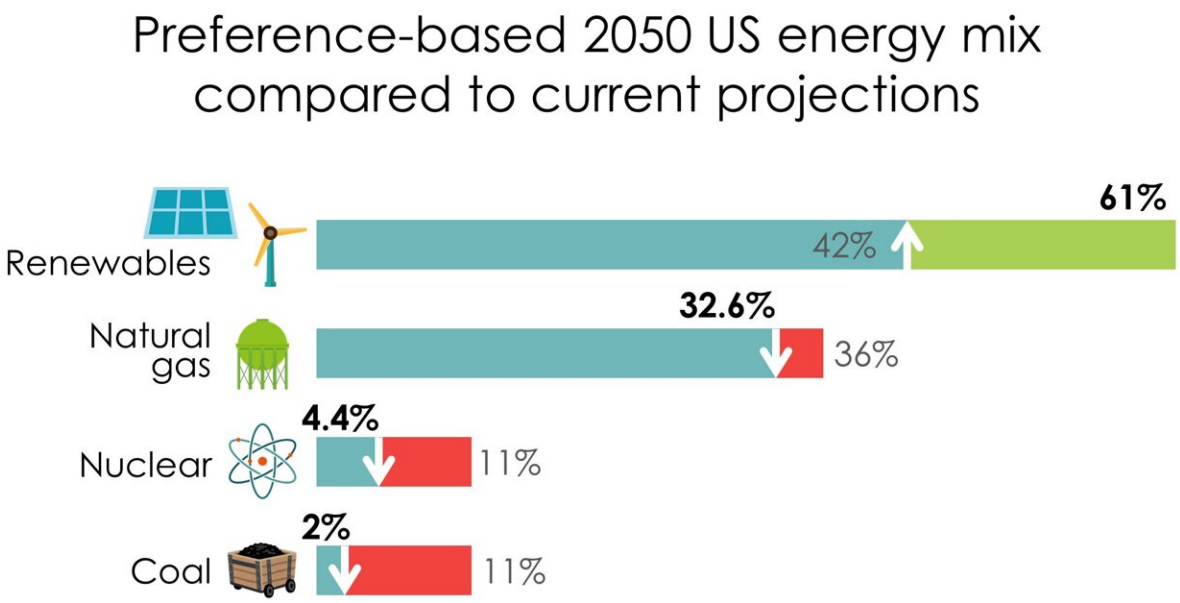
Listening to the people results in a more sustainable future energy system

July 29 2022



This graphic shows the fraction of different types of electricity sources in the US in 2050 based on an energy mix plan that takes into account the preferences and demographics of various racial groups, with projections by the US Energy Information Administration based on current plans and policies for comparison (values in gray). Developed by a research team led by Kyushu University based on a 2020 survey of 3,000 people in the US, the preference-based plan includes 50% more energy from renewable sources than current projections. Allowing such bottom-up approaches that consider the preferences of the population to influence policymaking could help to realize emission and climate goals in the future. Credit: Kyushu University

As policymakers around the world aim to cut carbon emissions and meet climate goals, new research points to a critical group whose opinions could help to shape energy planning for the better: the consumers.

By taking into account the demographics and preferences of US racial groups, clarified through a nationally representative survey of 3,000 US residents, researchers led by Kyushu University created a 'desirable' electricity generation mix for 2050 that includes 50% more energy from renewable sources than projections based on current plans and policies.

"In the US, consumers are being given more and more ways to choose their energy provider, so listening to and understanding these voices is crucial," says Andrew Chapman, associate professor at Kyushu University's International Institute for Carbon-Neutral Research (I^2CNER) and leader of the study.

"In light of this, we set out to develop an energy plan that incorporates the broad range of voices and the rapidly shifting demographics of the US and then compared it with the current top-down plan in which energy goals are set by policymakers."

To develop their energy plan, the international team of researchers from Kyushu University, Nagasaki University, and the University of Illinois at Urbana-Champaign surveyed 3,000 people in the US in 2020 on their preferences, awareness, priorities, and other opinions regarding energy technologies, policies, and issues.

Considering only future construction projects needed to replace power plants at the end of their life and to meet predicted growth in energy consumption, they allocated roughly 2.4 billion kWh of electricity generating capacity out to the year 2050 based on the preferences of each racial group and the predicted future racial demographics of the country.

The resultant energy mix includes nearly 61% renewable-based electricity compared to 42% envisaged under the projected 2050 energy mix according to the US Energy Information Administration based on current plans and policies.

On the other hand, nuclear power is reduced by over half and coal-based generation by over three quarters in the researchers' plan compared to the projections. Natural gas is similar in both cases, indicating that consumers are aware of the practical need for a stable energy supply.

"There appears to be strong support for a further emphasis on technologies that will help to achieve emission and climate goals when planning the future energy system, as indicated by a strong desire to move away from fossil and nuclear toward renewables," notes Chapman.

"Though each racial group prefers different sources in the future energy mix, all groups recognize the need for a stable energy supply, combining natural gas with their preference for renewables, led by solar and wind."

Differences in regional preferences also emerged. For example, along the west coast, there was significantly higher importance placed on dealing with climate change and realizing an equitable energy system. In the future, such input could be used to shape energy plans that leverage divisions among power grids across the US.

The researchers note that their plan's allotment of hydroelectric and geothermal generation could be unrealistic because of how long such projects take to plan and implement. Furthermore, respondents consistently indicated a healthy economy as one of their priorities, so balancing costs and employment opportunities must also be considered in energy system design.

"In addition to consumer preferences seeming to support more renewables than current plans, we also found that preferences were linked to awareness, which is likewise strongly linked to education," comments Chapman. "Thus, energy education is likely to be another important aspect for achieving carbon reduction goals and encouraging participatory energy system design."

The research is published in *Energy Economics*.

More information: Andrew Chapman et al, Cultural and demographic energy system awareness and preference: Implications for future energy system design in the United States, *Energy Economics* (2022). DOI: 10.1016/j.eneco.2022.106141

Provided by Kyushu University