America's low-carbon transition could improve employment opportunities for all

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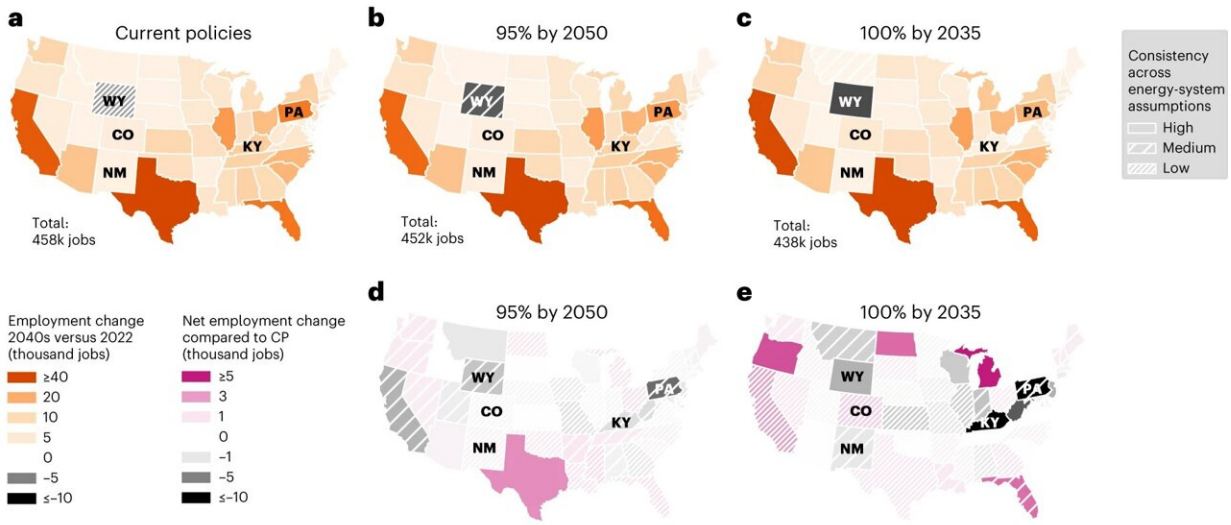

Modeled employment change and net employment change under the mid-case emission-reduction scenarios in the 2040s. Employment change (equation (7)) describes the difference of the workforce in the decade before mid-century compared to today while accounting for natural retirement. A value of 1 indicates that 1,000 new entrants would be required to deliver the transition. A value of −5 indicates that 5,000 current workers may lose their jobs in addition to natural retirement. Net employment change (equation (8)) is the employment change of an emission-reduction trajectory compared to that of the current policies trajectory. A value of 1 means that said emission trajectory creates 1,000 more jobs than current policies in the 2040s. **a**–**c**,The top row of maps shows the employment change under current policies (**a**), 95% reduction by 2050 (**b**) and 100% reduction by 2035 (**c**). States colored orange see employment growth, whereas gray states see employment decline. **d**–**e**, The bottom row of maps shows the net employment change under 95% reduction by 2050 (**d**) and

100% reduction by 2035 (**e**) compared to current policies. States colored pink see more employment under decarbonization than CP, whereas gray states see less. Hatching denotes the level of consistency across energy-system assumptions within each group. High consistency means all energy-system assumptions have the same sign of change as the mid-case. Medium and low consistencies represent more than and less than 80% of the 14 energy-system assumptions sharing the same sign as the mid-case, respectively. The base maps are from the US Census Bureau[85]. CP, current policies. Credit: *Nature Climate Change* (2023). DOI: 10.1038/s41558-023-01802-5

The U.S. is likely to see consistent job growth from the transition to net zero, but the gains will be unevenly distributed, shows a new analysis. The analysis, conducted by Imperial College London researchers and published today in *Nature Climate Change*, shows that some states will need new policies to ensure a 'just' transition.

The U.S., alongside many countries, is planning for a low-carbon future, where energy production releases little to no carbon dioxide and what is released is removed from the atmosphere, creating net-zero carbon emissions. This has been backed by new policies, including the 2022 Inflation Reduction Act, which includes large investment into domestic clean energy production.

This move to renewable energy sources is essential to curb global heating, but its impact on employment is uncertain. Now, researchers from Imperial College London have carried out an analysis to understand what kinds of jobs are likely to be created at a state level, and the societal implications of different scenarios for low carbon transitions in the US electricity system.

They found that decarbonization brings consistent job growth. However, major fossil fuel-producing states need to prepare for fewer mining jobs

by looking to create other opportunities.

Ensuring a just transition

The analysis shows lowest-skilled workers will experience more uncertain employment outcomes, so states need to plan carefully to make sure the energy transition is 'just'—fair to all. Sizable new opportunities will be available to workers with some training though, in the utilities and construction sectors.

The team also found that the renewable energy sector generally employs more women, which could boost gender equality in fossil fuel-dependent states, but not enough to disrupt the national gender status quo.

First author Judy Jingwei Xie, from the Centre for Environmental Policy and the Grantham Institute at Imperial, said, "Overall, our analysis is good news: recent policies such as the Inflation Reduction Act will lead to consistent job growth. There are some states currently very reliant on fossil fuel production that could lose out, but there are tools available for them to get ahead of the problem and take advantage of the situation to turn themselves into leaders of the clean energy revolution."

"By boosting retraining opportunities for the existing workforce and training young people in low-carbon technologies, traditional coal-producing states like Wyoming could put themselves at the forefront. The new American Climate Corps can provide these opportunities if it manages to deliver the targeted compensatory support to communities in need."

Global goals

To conduct the analysis, the team used the Regional Energy

Development System (ReEDS) energy system model developed and maintained by the US National Renewable Energy Laboratory. This includes 70 detailed future energy system scenarios, which they fed into a model of how these would impact employment across states based on their energy profile and demographics.

The wide range of scenarios included the US Long-Term Strategy, which aims for 100% reduction of electricity system carbon emissions by 2035 and showed consistently positive job growth. The team have made their code openly available, allowing integration of new policies, and the ability for models to be created for other countries and regions, as long as the right input data is available.

Co-author Dr. Iain Staffell, from the Centre for Environmental Policy at Imperial, said, "A lot of new stuff needs to be built to transform the energy system globally, and the Inflation Reduction Act in the US has created some key conditions for big companies to make this shift.

"The U.S. and China are ahead in this regard, and if we in the UK want a part of this boon, we need similar policies to incentivize the rapid shift to clean energy, which would boost employment and progress towards global goals of reducing carbon emissions."

More information: Judy Xie, Distributional labour challenges and opportunities for decarbonizing the US power system, *Nature Climate Change* (2023). DOI: 10.1038/s41558-023-01802-5.
www.nature.com/articles/s41558-023-01802-5

Provided by Imperial College London

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