Researchers find the national and regional impacts of US regulatory policies for mitigating climate change

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Credit: MIT

When it comes to addressing climate change, market-based policies—such as a carbon tax and cap-and-trade system—have gained little traction in the United States. Instead, U.S. policies have focused on regulating specific technologies and sectors. The recently proposed Environmental Protection Agency (EPA) rule to reduce carbon

emissions from the power sector—though a step forward for climate efforts—is no exception, according to two MIT researchers. Their assessment of the costs of different policy approaches is in a special edition of *Energy Journal*.

"The key to creating cost-effective policies is making them flexible," says Valerie Karplus, an author of the study and a member of the MIT Joint Program on the Science and Policy of Global Change. "A national cap-and-trade system applied to all sectors would limit carbon across the economy and incentivize the cheapest reductions. The EPA rule only applies to the electricity sector, making it less cost-effective. But it is certainly better than traditional piecemeal policies because it allows for some flexibility."

Karplus and her co-author Sebastian Rausch, formerly of the MIT Joint Program and now a professor at ETH Zürich, did not specifically analyze the EPA rule in their research. Instead, they compared the costs and effectiveness of traditional regulatory approaches, such as fuel economy standards, to a national cap-and-trade system. Using a U.S. regional modeling tool to assess these approaches across different regions, sectors, and income classes, Karplus and Rausch found striking cost differences between the national and sectoral approaches.

"With a broader policy, like cap-and-trade, the market can distribute the costs across sectors, technologies and time horizons, and find the cheapest solutions. So the market encourages emissions reductions from sectors like electricity and agriculture, and requires reductions from vehicles and electricity at a level that makes economic sense given an emissions target," says Karplus, who is also a senior lecturer at the MIT Sloan School of Management. "On the other hand, narrow regulations force cuts in ways that are potentially more costly and less effective in reducing emissions."

For example, fuel economy standards are typically politically attractive because they cut the amount of gasoline used—saving consumers money. But, Karplus says, the technology needed to make vehicles more efficient can be expensive, raising the purchase cost and hiding the true price tag to consumers. Additionally, improved gas mileage encourages consumers to drive more because their fuel costs are lower, Karplus says. Under a cap-and-trade system, which would set a carbon price, these same consumers would have an incentive to conserve fuel.

While significantly more expensive overall at the national level, the piecemeal regulations had more pronounced effects on specific regions and income groups, the researchers found.

As an example, they tested the economic and welfare impacts of a renewable portfolio standard, which would require states to get a specific percentage of their power supply from renewable energy sources. They found that regions with dirtier grids and without access to wind resources—such as the Mid-Atlantic, Great Lakes, and Southeast regions—experience higher welfare. Meanwhile, regions that already have substantial renewable energy—such as California, Texas, the Rocky Mountain states, and the Pacific Northwest—would be less affected.

"Along with spreading reductions across different sectors, an economy-wide cap-and-trade approach would more evenly distribute welfare impacts across regions—allowing for opportunities that make sense locally," Karplus says.

While the study suggests that a cap-and-trade system would come at a much lower cost, it hasn't been enough to pressure lawmakers to implement such a system. "Unfortunately, the most efficient policies are not the most politically feasible," Karplus says. "Even though a cap-and-trade system would cost less, the costs are very visible to businesses and consumers. The higher price tag of the sectoral policies is also more

concentrated and often goes unnoticed by the broader public. So the high costs of our current policies haven't been obvious enough to remove the political obstacles to implementing a more efficient approach."

Karplus hopes that as stakeholders recognize the costs of the increasing number of regulatory policies, a national market-based approach will gain momentum.

More information: "Markets versus Regulation: The Efficiency and Distributional Impacts of U.S. Climate Policy Proposals." Sebastian Rausch, Valerie J. Karplus. *The Quarterly Journal of the IAEE's Energy Economics Education Foundation*, Volume 35, Special Issue. www.iaee.org/en/publications/e … article.aspx?id=2595

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