Renewable energy policies actually work



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For most of the industrial era, a nation’s carbon emissions moved in lock step with its economy. Growth meant higher emissions. But over the past decade or so, that has changed. Even as the global economy continued to grow, carbon emissions remained flat or dropped a bit.

It would be simple to ascribe this trend o the explosion in renewable energy, but reality is rarely so simple. Countries like China saw explosive growth in both renewables and fossil-fuel use; Germany and Japan expanded renewables even as they

slashed nuclear power; and in the United States, the federal government has been MIA, leading to a chaotic mix of state and local efforts. So it’s worth taking a careful look into what exactly might be causing the drop in emissions.

That’s precisely what an international group of researchers has now done, analyzing what’s gone on in 79 countries, including some that have dropped emissions, and others that have not. The researchers find that renewable energy use is a big factor, but so is reduced energy use overall. And for both of these factors, government policy appears to play a large role.

Who’s losing?

The researchers started by identifying countries that show a “peak and decline” pattern of carbon emissions since the 1990s. They came up with 18, all but one of them in Europe—the exception is the United States. For comparison, they created two different control groups of 30 countries, neither of which has seen emissions decline. One group saw high GDP growth, while the second saw moderate economic growth; in the past, these would have been associated with corresponding changes in emissions.

Within each country, the researchers looked into whether there were government energy policies that could influence the trajectory of emissions. They also examined four items that could drive changes in emissions: total energy use, share of energy provided by fossil fuels, the carbon intensity of the overall energy mix, and efficiency (as measured by energy losses during use).

On average, emissions in the decline group dropped by 2.4 percent over the decade between 2005 and 2015.

Half of this drop came from lowering the percentage of fossil fuels used, with renewables making a large contribution;

another 35 percent came from a drop in energy use. But the most significant factor varied from country to country. Austria, Finland, and Sweden saw a drop in the share of fossil fuels within their energy mix. In contrast, a drop in total energy use was the biggest factor for France, Ireland, the Netherlands, Spain, and the United Kingdom. The US was an odd one out, with all four possible factors playing significant roles in causing emissions to drop.

For the two control groups, however, there was a single dominant factor: total energy use counted for 75 and 80 percent of the change in the low- and high-economic growth groups, respectively. But there was considerably more variability in the low-economic growth group. All of the high-growth group saw increased energy use contribute 60 percent of the growth in emissions or more. In contrast, some of the low-growth group actually saw their energy use drop.

Policy-driven change

So why are some countries so successful at dropping their emissions? Part of it is likely to be economic growth. While the countries did experience economic expansion over the study period, the growth was quite low (a bit over 1 percent), which implies that a booming economy could potentially reverse this progress.

But that’s likely to be only part of the answer. By 2015, the countries in the group that saw declining emissions had an average of 35 policies that promoted renewable energy and another 23 that promoted energy efficiency. Both of those numbers are significantly higher than the averages for the control groups. And there’s evidence that these policies are effective. The number of pro-efficiency policies correlated with the drop in energy use, while the number of renewable policies correlated with the drop in the share of fossil fuels.

The control group of rapidly expanding economies did see an effect of renewable energy policies in that the fraction of fossil-fuel use dropped—emissions went up because the total energy use expanded faster than renewables could offset it. Similarly, conservation policies correlated with a drop in the energy intensity of per unit of GDP. So in both those cases, the evidence is consistent with policies keeping matters from being worse than they might have been otherwise.

Overall, the evidence is clearly consistent with the idea that pro-renewable and efficiency policies work, lowering total energy use and the role of fossil fuels in providing that energy. But we haven't reached the point where they have a large-enough impact that they can consistently offset the emissions associated with economic growth. And even in countries where overall emissions do drop, the effect isn't large enough to help them reach the sort of deep emissions cuts needed to reach the goals set forth in the Paris Agreement.

The analysis isn't sufficient to tell us what would need to change in order to see more consistent and dramatic effects. Additional or stronger policies might do the trick, but it's also possible that they'll hit a ceiling. In addition, policies not considered here—those promoting carbon capture, for example—might ultimately become critical.

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