

Researchers analyze 1,500 climate policies to find what works—these are the lessons for Australia

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Almost 35 years have passed since the Intergovernmental Panel on Climate Change released its [first assessment report](#). It found human

activities were substantially increasing concentrations of carbon dioxide (CO₂) and other gases in the atmosphere, which was warming the global climate.

Since then, countries around the world have introduced a slew of policies designed to reduce [greenhouse gas emissions](#). But what actually worked?

This question is at the heart of a [landmark new paper](#) by German researchers. They analyzed 1,500 [climate policies](#) implemented around the world over the past two decades, and found only a small fraction were effective.

Importantly, they found most [emissions reduction](#) relied on a mix of policies. The results point to a way forward for Australia, where an economy-wide carbon price is currently politically impossible.

Untangling the policy labyrinth

At a global level, emissions-reduction policies have [yet to produce](#) the sustained reduction in CO₂ emissions needed to hold global heating below 2°C.

So it's important to understand how well, or badly, emissions-reduction policies in various countries have worked.

A few ad hoc observations can be made. For example, Australia's carbon emissions fell during the brief period of the Gillard Labor government's carbon price, then rose when the Abbott government removed the policy. It is not hard to identify causality here.

Rarely is the cause for success or failure so clear-cut. Globally, in the past few decades, various policies have been introduced, modified, and in some cases, abandoned. It can be seemingly impossible to disentangle

their effects.

But a new paper attempts this task.

'Difference in difference'

The research was led by Annika Stechemesser from Germany's Potsdam Institute for Climate Impact Research. It employs a standard technique for determining the effects of a policy intervention, known as the "differences in differences" approach.

This approach compares changes in outcomes over time between two groups. If a policy was ineffective, the differences between the groups should stay the same over time. If the gap changes in the expected direction, the policy is assumed to be effective.

The method was applied most famously in [a 1994 study](#) in the United States by economists David Card and Alan Krueger. They compared fast-food restaurants in New Jersey, where minimum wages were increased, with those in Pennsylvania, where wages were unchanged.

They found the rise in the minimum wage had no effect on the number of people employed by restaurants. The analysis led to a radical change in thinking about minimum wages.

But that analysis involved a single change. The Potsdam team sought to distinguish the effects of more than 1,500 climate policy interventions, implemented across 41 countries over two decades.

It required sorting through a huge volume of data, while applying the "differences in differences" approach. The researchers did this using artificial intelligence.

They analyzed four sectors: buildings, electricity, industry and transport. They examined eight kinds of policy interventions, primarily focused on:

- pricing policies, such as carbon taxes and permits that can be bought and sold
- regulation, such as bans, building codes and [energy efficiency](#) rules
- applying or removing subsidies, such as governments paying property owners to install rooftop solar, or removing tax breaks for the fossil fuel industry.

What the research found

The researchers identified 63 cases where climate policies had led to large emissions reduction.

Unsurprisingly, though a little disappointingly, no "silver bullet" policy emerged. Rather, most successful cases—at least in developed economies—were the result of two or more policies working together.

This might mean, for example, a fuel efficiency mandate for vehicles, combined with subsidies to help develop a network of charging stations for electric vehicles.

The study also found successful policy mixes vary across sectors. For example, in developed countries, pricing was particularly effective policy in sectors dominated by profit-oriented companies, such as electricity and industry. But a mix of incentives and regulations worked best in the buildings and transport sectors.

And countries have different needs, depending on income. In developing countries, for example, pricing interventions did not lead to large emission reductions in the electricity sector. This may change, however,

as China gradually [develops carbon markets](#).

The researchers have made the data available to the public in a [handy tool](#). It is easily searchable by sector and country.

The strength of this approach is the ability to integrate analysis across many different countries. However, this global approach precludes a fine-grained analysis for each country.

For example, because Australia's carbon pricing scheme was so short-lived, and its effects rapidly reversed, the differences-in-differences analysis did not capture its significance.

What can Australia learn?

The research is an impressive effort to distill lessons from the mass of confusing data surrounding climate policy.

The findings would once have been unwelcome news to the economics profession, which in the past has largely advocated for one stand-alone policy applied across the economy—most commonly, putting a price on carbon.

Carbon prices are not a complete solution, but they are important. [Research in 2020](#) showed countries with carbon prices, on average, had annual carbon emissions growth rates two percentage points lower than countries without a carbon price.

Unfortunately, in Australia, the federal Coalition is resolutely opposed to any kind of price-based measure to cut emissions. And following the Gillard government's politically bruising experience over the [carbon price](#), the Albanese government is allergic to any mention of such policies.

So, while price-based mechanisms are, theoretically, the ideal way to cut emissions, most economists now accept there's no point holding out for it. If a combination of measures in different parts of the economy is the best we can do, it's better than nothing. The important task is to reduce emissions.

The political constraints on price-based policy mean Australia must push harder on other policy approaches—namely regulations and subsidies—to reach net-zero by 2050.

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