Without fully implementing net-zero pledges, the world will miss climate goals

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In a new study, led by Imperial College London and published in *Science*, researchers ranked 90% of global net-zero greenhouse gas emissions pledges as providing low confidence in their full implementation.

The researchers recommend nations make their targets legally binding and back them up with long-term plans and short-term implementation policies to increase the likelihood of avoiding the worst impacts of climate change.

Lead researcher Professor Joeri Rogelj, director of research for the Grantham Institute at Imperial, said, "Climate policy is moving from setting ambitious targets to implementing them. However, our analysis shows most countries do not provide high confidence that they will deliver on their commitments. The world is still on a high-risk climate track, and we are far from delivering a safe climate future."

Assigning confidence

Climate goals set out in the Paris Agreement include keeping temperature rises well below 2°C above the average temperature before the industrial revolution and ideally below 1.5°C. The main way to achieve this is the reach net-zero greenhouse gas emissions as soon as possible, where any remaining emissions are effectively offset.

Most countries have set net-zero goals and Nationally Determined Contributions (NDCs)—non-binding national plans proposing climate actions. Taking these plans at face value, and assuming they will all be fully implemented, gives the world a chance of keeping warming to 1.5 to 2^0C. But taking current policies only, with no implementation of net-zero pledges, means models predict temperature rises could be as much as 2.5 to 3^0C by 2100, with warming still increasing.

To reduce the uncertainty in which of these scenarios is likely to happen, the team, including researchers from the UK, Austria, U.S., Netherlands, Germany, and Brazil, assigned a "confidence" to each net-zero policy. They assessed 35 net-zero targets, covering every country with more than 0.1% of current global greenhouse gas emissions.

The confidence assessment was based on three policy characteristics: whether the policy was legally binding, whether there was a credible policy plan guiding implementation, and whether short-term plans would already put emissions on a downward path over the next decade.

Based on this, policies were given "higher," "lower" or "much lower" confidence of being fully implemented. Some regions scored highly, including the European Union, the United Kingdom and New Zealand, but around 90% scored lower or much lower confidence, including China and the US, which together account for more than 35% of current emissions.

Modeling emissions

From this assessment, the team modeled five scenarios of future greenhouse gas emissions and resulting temperatures. These were: considering only current policies (the most conservative scenario); only adding in policies that have a high confidence of being implemented; adding policies with high and low confidence; adding all policies regardless of confidence as if they are implemented; and a scenario where all policies are fully implemented and all NDCs are met (the most forgiving scenario).

The most conservative scenario had the largest uncertainty, with a range of 1.7 to 3°C and a median estimate of 2.6°C. The most optimistic scenario has a range of 1.6 to 2.1°C, with a median estimate of 1.7°C. This might suggest that, if all net-zero policies are fully implemented, the Paris Agreement goals are within reach. However, with so many policies ranked in the low-confidence end of the scale, this would be wishful thinking in absence of further efforts.

Co-author Taryn Fransen, from the World Resources Institute in Washington DC, and the Energy and Resources Group at the University

of California–Berkeley, said, "Climate change targets are by their nature ambitious—there's no point in setting a target for a foregone conclusion. But implementation must follow."

Catalyzing action

Only twelve out of 35 net-zero policies are currently legally binding, and the researchers say increasing this number would help ensure the policies survive long-term and catalyze action. Countries also need clear implementation pathways for different sectors, outlining exactly what changes are needed and where the responsibility lies.

Co-author Dr. Robin Lamboll, from the Center for Environmental Policy at Imperial, said, "Making targets legally binding is crucial to ensure long-term plans are adopted. We need to see concrete legislation in order to trust that action will follow from promises."

The team included researchers from Imperial College London (UK) the International Institute for Applied Systems Analysis (Austria), the World Resources Institute (US), the University of California–Berkeley (US), the Netherlands Environmental Assessment Agency, the Institute for Environmental Studies (Netherlands), the NewClimate Institute (Germany), the Copernicus Institute of Sustainable Development (Netherlands), and the Universidade Federal do Rio de Janeiro (Brazil).

More information: Joeri Rogelj, Credibility gap in net-zero targets leaves world at high risk, *Science* (2023). DOI: 10.1126/science.adg6248. www.science.org/doi/10.1126/science.adg6248

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