

Limited options for meeting 2C warming target, warn climate experts

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We will only achieve the target of limiting global warming to safe levels if carbon dioxide emissions begin to fall within the next two decades and eventually decrease to zero. That is the stark message from research by an international team of scientists, led by the University of Exeter, published today (20 November) in the journal *Nature Climate Change*.

The research focuses on the scale of <u>carbon emission</u> reduction needed to keep future global warming at no more than two degrees Celsius over <u>average temperatures</u> prior to the Industrial Revolution. This <u>target</u> is now almost universally accepted as a safe limit.

The team examined the extent to which carbon emissions should be reduced, how steep this reduction needs to be and how soon we should begin. They used mathematical modelling techniques to construct a number of possible future scenarios, based on different assumptions on emissions reduction. They accounted for a likely range of climate sensitivities: the amount of warming for a given increase in <u>atmospheric carbon dioxide</u>.

The research shows how quickly emissions need to drop in the next few decades. It also highlights how remaining emissions could cause the two-degrees target to be exceeded in the long term, over the next few hundred years.

The researchers found that zero or negative emissions are compatible with this target if we reduce our <u>global carbon emissions</u> by at least three



per cent per year within the next two decades.

In a worst-case scenario of high climate sensitivity, we need to work towards negative emissions if we are to have a chance to keeping temperatures within the two-degrees target. This would mean using carbon-capture-and-storage technology combined with aggressive mitigation rates starting in the coming decade. The best-case scenario of low <u>climate sensitivity</u> allows longer delays and more conservative mitigation rates, but still requires emissions to be eventually cut by at least 90%.

The results clearly show that if we delay reducing global emissions by just ten or twenty years we will then need to make much steeper reductions in order to meet a two-degrees warming target.

Lead author Professor Pierre Friedlingstein of the University of Exeter said: "When I analysed these results, I was surprised to see so few options available to us. We know we need to tackle global warming, but our research really emphasises the urgency of the situation. The only way for us to achieve a safe future climate will be to reduce emissions by at least three per cent, starting as soon as possible. The longer we leave it, the harder it will be."

Countries currently have different targets for carbon emission reductions. For example, the US proposes a 17 per cent reduction by 2020, the EU has set a target of a 20 to 30 per cent reduction by 2020 and Australia has an objective of a five to 25 per cent reduction by 2020, depending on other countries commitment.

"The good news is that it's not too late," said co-author Professor Susan Solomon of the University of Colorado. "The interesting news is that we really need to think in the very long-term as well as the near-term. Even a small amount of remaining emissions would eventually mean



exceeding the target so we need to ensure that technologies are available to make our world carbon-free in the long run."

Provided by University of Exeter

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