1.5C cap on warming saves global economy trillions: study

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Failing to cap global warming at two degrees Celsius or less could cost the world economy tens of trillions of dollars over the next 80 years, researchers warned Wednesday.

Four-fifths of countries and 90 percent of the global population, in other words, stand to reap major economic benefits by avoiding costs linked to higher temperatures, they reported in the journal *Nature*.

Such costs stem from more frequent and severe extreme weather, lower yields in agriculture, and negative health impacts.

The 196-nation Paris climate treaty calls for holding the rise in Earth's surface temperature to "well under" 2 C (3.6 degrees Fahrenheit), and 1.5 C if possible.

The lower target was included in light of severe climate impacts after only 1 C of warming, including deadly heatwaves, droughts, and storms surges made more destructive by rising seas.

A UN special report due in October will detail likely damage in a 1.5 C world, and help leaders decide if the target is within reach.

But few efforts have been made to quantify the impact of different temperature goals on long-term economic growth.

"Achieving the more ambitious Paris goals is highly likely to benefit most countries—and the global economy overall—by avoiding more severe economic damage," said senior author Noah Diffenbaugh, a professor at Stanford University's School of Earth.

Over the course of the century, the global economy in a 1.5 C world would generate an additional 20 trillion dollars in GDP compared to one in which temperatures rise by 2 C, the study found.

There would be exceptions: the economies of Russia, Canada, Nordic and Baltic nations, and central Europe would all take a hit in a 1.5 C scenario.

Diffenbaugh and colleagues made their calculations by studying how economic performance over the last 50 years, measured by GPD, matched changes in temperature around the world.

Then, using climate model projections, they calculated how overall economic output is likely to change in the coming decades as temperatures warm to different levels—1.5 C, 2 C and 3 C.

GDP a 'useful metric'

Voluntary national pledges to reduce greenhouse gas emissions, annexed to the Paris Agreement, would see the thermometer go up 3 C by 2100, the UN has estimated.

That scenario—described by many scientists as catastrophic—would lower per capita economic output up to 25 percent by century's end, according to the study.

Outside experts reacted favourably to the research but noted the findings depend heavily on underlying assumptions.

"GDP is a useful metric to assess the benefits of limiting global warming," said Wolfram Schlenker, a professor at the Columbia University's Earth Institute.

But predicted impacts of global warming would be even greater, he said, "if the non-market benefits of reduced fossil-fuel use—for human health and ecosystems, for example—were considered."

Nor does the Stanford team allow for the possibility of catastrophic changes, such as an acceleration in the melting of the Greenland or Antarctic ice sheets, which could lift sea levels by many metres in the coming centuries.

At the same time, however, the study may underestimate the costs associated with engineering a wholesale shift to a low-carbon global economy.

"The results should be interpreted with caution," said Bob Ward, policy director at the Grantham Research Institute on Climate Change and the Environment in London.

"They have not taken into account the additional costs of reducing emissions to meet the stronger [1.5 C] target, which could be substantial, particularly if negative emissions technologies are needed."

Scientists say it is unlikely the 2 C target—much less 1.5 C—can be met solely by reducing carbon pollution, giving rise to the need to pull excess CO2 out of the air.

But all of the "negative emissions" technologies proposed so far remain problematic.

More information: Marshall Burke et al. Large potential reduction in economic damages under UN mitigation targets, *Nature* (2018). DOI: 10.1038/s41586-018-0071-9

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