

Immediate fossil fuel phaseout could arrest climate change – study

Scientists say it may still technically be possible to limit warming to 1.5C if drastic action is taken now

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The study found there is a 66% chance of staying below 1.5C above pre-industrial levels if immediate action is taken. Photograph: Alamy

Climate change could be kept in check if a phaseout of all fossil fuel infrastructure were to begin immediately, according to research.

It shows that meeting the internationally agreed aspiration of keeping global warming to less than 1.5C above pre-industrial levels is still possible. The scientists say it is therefore the choices being made by global society, not physics, which is the obstacle to meeting the goal.

The study found that if all fossil fuel infrastructure – power plants, factories, vehicles, ships and planes – from now on are replaced by zero-carbon alternatives at the end of their useful lives, there is a 64% chance of staying under 1.5C.

In October, the **Intergovernmental Panel on Climate Change** said the difference between 1.5C of warming and the earlier international target of 2C was a significantly lower risk of drought, floods, heatwaves and poverty for hundreds of millions of people.

Christopher Smith, of the University of Leeds, who led the research, said: “It’s good news from a geophysical point of view. But on the other side of the coin, the [immediate fossil fuel phaseout] is really at the limit of what we could possibly do. We are basically saying we can’t build anything now that emits fossil fuels.”

Nicholas Stern, of the London School of Economics, who was not part of the research team, said: “We are rapidly approaching the end of the age of fossil fuels. This study confirms that all new energy infrastructure must be sustainable from now on if we are to avoid locking in commitments to emissions that would lead to the world exceeding the goals of the Paris agreement.”

The study, **published in the journal Nature Communications**, used computer models to estimate by how much global temperatures would rise if a fossil fuel infrastructure phaseout began immediately. The lifespan for power plants was set at 40 years, cars an average of 15 years and planes 26 years. The work also assumes a rapid end to beef and dairy consumption, which is responsible for significant global emissions.

In this scenario, the models suggest carbon emissions would decline to zero over the next four decades and there would be a 66% chance of the global temperature rise remaining below 1.5C. If the phaseout does not begin until 2030, the chance is 33%.

The analysis did not include the possibility of tipping points such as the sudden release of huge volumes of methane from permafrost, which could spark runaway global warming.

The scientists accept their scenario is at the extreme end of ambition, but said it was important to know that meeting the 1.5C target was still physically possible and dependent on the choices made now and in the coming years. “The climate system is not stopping you [hitting the target], global society is stopping you,” Smith said.

Other work, using a different approach, has also shown that keeping within the 1.5C limit is possible if radical action is taken immediately. In some sectors, zero-carbon technology already exists, such as renewable energy. But in others, such as aviation, it does not. “Maybe the solution here is flying less,” Smith said.

Prof Dave Reay, of the University of Edinburgh, who also was not part of the research team, said: “Whether it’s drilling a new gas well, keeping an old coal power station open, or even buying a diesel car, the choices we make today will largely determine the climate pathways of tomorrow. The message of this new study is loud and clear: act now or see the last chance for a safer climate future ebb away.”

Smith’s personal belief is that global heating will surpass 1.5C. “We are going the right way, but I don’t think we will do enough, quickly enough. I think we are heading for 2C to 2.5C.”

But he added: “If you don’t have a goal, you are not going to get anywhere. If you have a target that is really hard to achieve and you miss it slightly, that is better than wandering aimlessly into a future climate that is no good for anybody.”

One simple -- but really hard -- solution to stop climate change

By [Jen Christensen](#), CNN

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Source: CNN

US carbon emissions on the rise again 06:24

(CNN) There may actually be a way to keep the worst of climate change at bay, but it's going to take a herculean effort, according to [a new study](#) published Tuesday in the journal Nature Communications.

Climate change is well underway already, the time to act and limit its [human causes](#) is now, many studies have shown. This latest report maps out what it may take to get there.



Antarctica ice melt has accelerated by 280% in the last 4 decades

It posits that if the world was to phase out its "carbon-intensive infrastructure" at the end of its design lifetime starting from the end of 2018, there's a 64% chance that the planet's peak temperature can remain below the goal of 1.5 degrees Celsius (2.7 degrees Fahrenheit) above pre-industrial levels. Above that, scientists predict the planet will see even more extreme weather events such as wildfires, droughts, floods, massive animal die offs and food shortages for millions. The planet is already two-thirds of the way there, with global temperatures having [warmed about](#) 1 degree Celsius.

To keep the global median temperature within this optimal 1.5 degree-Celsius limit, according to this study, change would have to happen across all sectors, not just in the energy sector. Power plants would need to be replaced, but so would gas and diesel-fueled cars, aircraft, ships and industrial plants. Even cows would have to go -- essentially, anything that contributes to global warming.

Under this scenario, infrastructure such as power plants wouldn't have to be scrapped and replaced with a non-carbon emitting technology -- at least, not immediately. The researchers are talking about a "design lifetime." In the case of power plants, the average lifetime based on historic data, is about 40 years. The average lifetime of a car on the road now is more than 11 years, according to Consumer Reports, but could last for about 200,000 miles, or 15 years, [US estimates show](#). Once they wear out, stop working or die, they'd be replaced with technology or products that do not contribute to climate change.



What warmer oceans mean for the planet

"It seemed surprising at first that below 1.5 degrees Celsius could still be achieved with all the current infrastructure that is out there. It goes a little against conventional wisdom," said co-author [Chris Smith](#), a research fellow at the Institute for Climate and Atmospheric Science in the School of Earth and Environment, University of Leeds. "But it actually makes sense in context of the remaining "carbon budget" -- basically how much we can emit and still stay under this limit."

Smith's study doesn't determine if this would be politically or economically feasible, but it does show dozens of scenarios that demonstrate the impact certain actions could have on the global mean temperature. The study shows time matters. If the world waits until 2030 to begin to eliminate its carbon-intensive infrastructure, the probability that the world can meet this 1.5 degree C goal is below 50%, even if the rate of fossil fuel retirement was accelerated.

"(The study is) motivation to continue aiming for a zero-carbon world not long after the middle of this century," Smith said of the research results.

"Limiting temperature rise reduces the risks of irreversible damages." He adds, "the earlier we act, the less expensive the transition will be, and the lower the temperature rise is, the less climate-related damages will cost us."

In October, a stark report from the [UN Intergovernmental Panel on Climate Change](#) said governments around the world must make "rapid, far-reaching and unprecedented changes in all aspects of society" to avoid disastrous levels of global warming. It predicted the planet will reach the crucial threshold of 1.5 degrees Celsius as early as 2030.

The [United Nations'](#) research shows that [projected emissions](#) of carbon dioxide from around the world is woefully short of the goals set in the [Paris agreement](#). The [current emission](#) targets of all countries would end up creating an average global temperature rise of 3.2 degrees Celsius (5.8 degrees Fahrenheit) by 2100, according to UN research.

Emissions from the power sector, for example, have slowed down globally, although they were on the rise [in the United States](#) and that comes after a huge push for power plant development. A [2014 study](#) showed there were more coal-fired power plants built in the decade before the study than in any previous decade. Last August, the [Trump administration](#) announced it would loosen restrictions on coal-fired plants. By the US [Environmental Protection Agency's](#) own [estimate](#), the additional pollution will result in up to 1,400 more premature deaths a year as of 2030.

"The scenarios that we investigate in this study are really at the extreme optimistic end of what could be done without negative emissions or killing off power plants or cars before their time," Smith said. "While the solution we propose is technically possible, it still doesn't look particularly likely. However, I would claim that mapping it out is a good starting point, and consistent with the definition of an infrastructure commitment. It would be interesting to see if, or how, some of these results change with perhaps more real-world assumptions."

Fossil fuel industry must 'implode' to avoid climate disaster, says top scientist

'The age of carbon is over' and a transition to a greener economy is inevitable, says Hans Joachim Schellnhuber, adviser to the German government and Pope Francis

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An "induced implosion" of the fossil fuel industry must take place for there to be any chance of avoiding dangerous global warming, according to one of the world's most influential climate scientists.

Professor Hans Joachim Schellnhuber, an adviser to the German government and Pope Francis, said on Friday: "In the end it is a moral decision. Do you want to be part of the generation that screwed up the planet for the next 1,000 years? I don't think we should make that decision."

Schellnhuber was speaking at a major [science conference](#) in Paris, taking place before a [crunch UN summit](#) in December, also in the city, at which nations must seal a deal on global warming. World leaders were sent a stark message in the communique issued by the conference, which warned that the opportunity to avoid disaster is rapidly diminishing.

Laurence Tubiana, France's climate change ambassador, said the aim of the UN summit is to send a signal that the transition from coal, oil and gas to a low-carbon economy is inevitable. If the aim is achieved, Tubiana told the Guardian, "you will see a massive acceleration [to a greener economy], particularly on the investment side in the next five years".

The conference was addressed by Nobel prize-winning economist Joseph Stiglitz, who said the fossil fuel industry faced big challenges: "A mixture of many different changes going on – consumption patterns, civil society, political action – will be disruptive to the carbon economy."

Stiglitz, Schellnhuber and Tubiana all expressed support for the [global divestment campaign](#), which lobbies investors to sell their stocks in the biggest fossil fuel companies. "I fully support the divestment movement," said Schellnhuber. "Do you want to be part of an economy that is destroying the world, or part of an economy that protects creation?"

Tubiana said the recent call by [major European oil and gas companies for a price to be put on carbon pollution](#) was partly the result of the "very important" divestment movement. She said: "Oil companies are like canaries in the mine. When there is no danger they are silent, but when they feel danger and opportunity they make a move."

The [Guardian is divesting from fossil fuels](#) and is [campaigning for the world's biggest health charities](#), the Bill & Melinda Gates Foundation and the Wellcome Trust, to do the same.

The Paris conference was attended by more than 2,000 scientists from 100 countries. Schellnhuber told the delegates: "In order to stay below 2C (3.6F) [the internationally agreed limit for global warming], or even 3C, we need to have something really disruptive, which I would call an induced implosion of the carbon economy over the next 20-30 years. Otherwise we have no chance of avoiding dangerous, perhaps disastrous, climate change."

"The promise of the fossil fuel age has never been fulfilled," he said. "We still have 2bn people living on \$2 (£1.30) a day – that is crazy." He called for two strong messages to come from December's UN summit: that "the age of carbon is over" and that "it is not the poor of the world who will pay for the transition".

To achieve these outcomes, Schellnhuber said: "We need a global social movement and it is already happening." He said the best analogy for the transition from

dirty to clean energy was the abolition of slavery, which was fundamentally driven by ethical concerns.

The scientists' communique said that tackling climate change is economically affordable, but that nations "waiting on the sidelines" will cause the costs to rise. It said global warming is already inflicting damage across the globe and that failing to act will lock in the dangers.

Stiglitz backed the affordability of tackling climate change: "Creating a green economy is not only consistent with economic growth, it can promote economic growth," especially when there is a lack of demand in the global economy.

He said the best option for an enforceable climate deal was for willing countries to introduce carbon taxes and then penalise nations refusing to do the same with border taxes on their exported goods.

A voluntary agreement could not solve the climate crisis, he said: "The atmosphere is a public good – all want to get the benefits, but no one wants to pay the cost." He also dismissed carbon markets as being too prone to political lobbying: "It is basically giving away money."

Stiglitz said it was unsurprising that a **carbon price** has proven hard to implement on a worldwide scale. "If you own fossil fuel assets, and the impact of any global agreement on climate change is going to push their value down, you are going to resist, using whatever tactics. But the interests of global society have to overcome these narrow special interests."

• This article was amended on 13 July 2015 because an earlier version incorrectly converted a 2C increase to 36F. This has been corrected to 3.6F.