

‘A kind of dark realism’: Why the climate change problem is starting to look too big to solve



Smoke and steam billow from Belchatow Power Station, Europe's largest coal-fired power plant, operated by PGE Group, on Wednesday near Belchatow, Poland. (Kacper Pempel/Reuters)

By [Steven Mufson](#)

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In the daunting math of climate action, people's choices and government policies aren't adding up.

Solar panels are being nailed to rooftops, colossal wind turbines bestride the plains and oceans, and a million electric vehicles are on U.S. roads — and it isn't enough. Even if the world did an unlikely series of about-faces — halting deforestation, going vegetarian, paying \$50-a-ton carbon taxes, boosting energy efficiency, doubling car mileage, and more — it would not be enough.

“There's no silver bullet,” said Andrew Jones, co-founder of the modeling firm Climate Interactive. “There's silver buckshot: many actions in many domains.”

As the 24th U.N. conference on climate change kicked off in Poland this week, a steady drumbeat of scientific reports have sounded ominous alarms. [One warned](#) of the need to curb global warming to 1.5 degrees Celsius — 2.7 degrees Fahrenheit — over preindustrial levels instead of the widely accepted target of 2 degrees Celsius. [Another warned](#) of the growing gap between the commitments made at earlier U.N. conferences and what is needed to steer the planet off its current path to calamitous global warming. And on Wednesday [still another said](#) that annual emissions, which are supposed to be heading down, rose to the highest levels on record.

If it sounds downbeat, that's because it is.

The world has waited so long that preventing disruptive climate change requires action “unprecedented in scale,” the U.N. Intergovernmental Panel on Climate Change (IPCC) said in an October report.

William Nordhaus, the Yale University professor who just won the Nobel Prize for his work on the economics of climate change, recently [described his outlook](#): “I never use the word ‘pessimism’; I always use the word ‘realism,’ but I'd say it's a kind of dark realism today.”

Climate scientists and policy experts realize that they walk a fine line between jolting consumers and policymakers into action and immobilizing them with paralyzing pessimism about the world's ability to hit climate targets.

“If you're driving on a highway and the car in front of you stops short, and you slam on the brakes and realize that you're going to hit the guy no matter what, that's not the time to take your foot off the brake,” said John Sterman, a professor of management at the Massachusetts Institute of Technology's business school. “And you certainly don't step on the gas.”

Sterman said the world has missed the chance to contain warming without huge disruptions. “Now, it's technically possible to do that, but we don't have the policies in place,” he said. “That's discouraging. But that just means we have to redouble our efforts.”

It's not that corporations and governments haven't attacked the problem or made breathtaking advances in energy technology. The [cost of solar has plunged](#) 78 percent for utility-scale projects since 2010. Over the same period, the cost of wind electricity fell nearly a quarter; the biggest turbines offshore now have arms weighing roughly 35 tons each that stretch [nearly two football fields](#) across.



Power-generating windmill turbines occupy a wind park in Moeuvres near Cambrai, France, on Nov. 12. (Pascal Rossignol/Reuters)

Even China is making some progress. While its rapidly growing economy keeps emissions rising overall, it is coughing out less carbon dioxide for every unit of economic output.

But effective policy is lacking. Nordhaus advocates a whopping carbon tax, which would kill off most coal, sharply reduce driving and boost demand for more fuel-efficient vehicles.

Getting such a carbon tax adopted in the United States, however, is hard to imagine. Washington state voters in November rejected a \$15-a-ton carbon “fee” after Big Oil companies poured more than \$31 million into the state to block the measure. BP, which had endorsed a \$40-a-ton nationwide tax, gave the most to defeat the bill.

Congress hasn't shown any appetite for a carbon tax, either. A proposal to impose a \$40-a-ton carbon tax and return the revenue to people in dividends has not caught fire yet.

In France, President Emmanuel Macron had to back away from proposed fuel-tax increases this week

after protests rocked his country.

In an email, Nordhaus said that hitting the 2-degree target would require global carbon dioxide prices of about \$250 a ton in 2020, rising rapidly after that. “This assumes that all major countries are onboard and that economies can handle a large fiscal and trade shock in which energy expenditures rise by about \$2 trillion in a few years.”

Nordhaus has blamed the lack of climate-policy progress on the strong incentive for what economists call “free-riding.”

“People free-ride when they jump the turnstile on the subway,” he said. “Nations free-ride in military treaties such as NATO when they enjoy the benefits of the strong U.S. military to protect them while doing little to pay for the common defense.”

And when it comes to climate change, he said, free-riding is “particularly pernicious.”

That’s partly because international organizations lack the authority to enforce rules on wayward nations. At the climate conference in Poland, several major countries will admit to missing the targets they agreed to at the Paris conference three years ago. One example is Brazil, whose President-elect Jair Bolsonaro, the “tropical Trump,” has talked about clearing part of the Amazon for roads and development. That would damage the world’s lungs — the trees that absorb carbon dioxide and pump out oxygen at high rates.

There’s lots of carbon to absorb. The world will need to sustain consumers’ habits and living standards while replacing the energy industry’s massive infrastructure. Every day, the world burns about 100 million barrels, or 4.2 billion gallons, of oil — up about 2 percent from the year before.

Most of that goes into the gas tanks of cars and trucks; there are nearly 270 million on the road in the United States alone. Those cars last an [average of 11.6 years](#), according to the Transportation Department, meaning that replacing the fleet with more-efficient or electric vehicles would take a long time.



Vehicles travel along a highway during a polluted day in Beijing on Sunday. (Wu Hong/EPA-EFE/Shutterstock)



Chinese women wear masks on Sunday. (Wu Hong/EPA-EFE/Shutterstock) A Chinese migrant worker walks near a power plant on Sunday. (Wu Hong/EPA-EFE/Shutterstock)

In November, the number of electric vehicles in the United States hit the 1 million mark. But that was three years later than President Barack Obama's target, first issued in 2009. And that makes only a small dent in the nation's greenhouse gas emissions. Thanks to the [growth in the car market](#), in 2016 there were nearly 12 million more cars with internal combustion engines emitting greenhouse gases than there were in 2008.

The math on coal is just as grim. Global coal consumption is running at [more than 5 billion tons annually](#). In the United States alone, coal [fills 4.4 million](#) rail cars every year. Closing down U.S. and European coal-fired power plants, which are 40 years old on average, could happen, but the average age of coal plants in Asia is just 11 years, thus locking in Asian coal use for decades.

A project off the coast of Belgium provides a good example of the need to run to stand still.

In November, a joint venture of [Vestas, the world's largest maker of wind turbines](#), and MHI, a unit of Mitsubishi, announced that it would provide 23 of its new biggest turbines to a project in the Belgian North Sea. The massive turbines can power 137,471 German homes, the company said.

Yet the number of [German dwellings grew](#) by 245,000 in 2017.

Royal Dutch Shell chief executive Ben van Beurden noted in 2014 that solar and wind provide about 1 percent of the world's energy. "How on earth do we think that 1 percent is going to become 90 percent of a system twice as big as what it is by the middle of the century?" he asked. "It won't happen."

Even with large advances in renewable energy, he said, the share of world energy met by oil and gas would decline from 85 percent to 75 percent by the middle of the century, a time when the IPCC said net carbon dioxide emissions should drop to zero.

"I think the real challenge is not so much how do we accelerate renewables but more about how do we decarbonize the system we have," van Beurden said.

Companies already know how to take carbon dioxide from the air and stuff it below the earth's surface. But it's expensive, and unless it's used for enhanced oil recovery, it makes no economic sense without large subsidies or a carbon tax large enough to make capture worth it.

"Like a married couple that has put off saving for the future for too long, at some point it becomes nearly impossible to retire comfortably," Nigel Purvis, co-founder of the advocacy group Climate Advisers, wrote in 2015. "Given where global emissions are today and the urgency of reducing

emissions, we just don't have time for a system that gradually increases climate ambition every five years — the numbers simply don't work.”

While Obama had called the Paris deal “a turning point,” the U.N. Environment Program reported in November that seven major countries, including the United States, are falling short of the actions they pledged to take.

The UNEP report also says that after three years of relatively stable emissions, global greenhouse emissions were up 1.2 percent in 2017.

Purvis now says his views haven't changed. But, he pleaded, “don't cast me as a pessimist.”

He said: “I am an optimist by nature, and I am blown away by progress in certain sectors. If you had told me 10 years ago that wind or solar would be as cheap as they are, I wouldn't have believed you.”



Chinese fishermen sit Nov. 14 next to a photovoltaic power station built on top of fish ponds in Yangzhou, in China's eastern Jiangsu province. (AFP/Getty Images)

His assessment hasn't discouraged people who say that the world needs — and will inevitably develop — a breakthrough technology. They fall into a long tradition of people who place their faith in American inventiveness and know-how.

“We need the basic research, but we have to pair that with people willing to fund high-risk breakthrough energy companies,” said Microsoft co-founder Bill Gates on the website of Breakthrough Energy Ventures, a \$1 billion private fund in which he has invested. He said “that's what gives us the chance of having a solution that really lets us not having to give up energy usage and yet not damage the environment. I am optimistic.”

One of the earliest climate change models was drawn up in 2004 by a pair of Princeton University professors — Robert Socolow, an engineer, and Stephen Pacala, an ecologist. Their 50-year scenario was positive: “Humanity already possesses the fundamental scientific, technical and industrial know-how to solve the carbon and climate problem for the next half-century,” they wrote. They said that no breakthrough was necessary.

In their model, a series of “wedges” could alter the trajectory of rising temperatures. [The wedges](#) included things such as: scaling up wind capacity tenfold; covering an area the size of New Jersey with solar panels; doubling the fuel efficiency of all cars; tripling the world's capacity of nuclear power; halting global deforestation; or planting new forests over an area the size of the Lower 48 United States.

“I like to say that we decomposed a heroic challenge into a limited set of monumental tasks,” Socolow later wrote.

In 2011, Socolow wrote that the number of wedges needed had increased from seven to nine. In an interview, he said it is now approaching 10.

He now prefers to call climate action a horse race. At the moment, wind and solar are running ahead faster than expected, while nuclear power and carbon capture are trailing behind.

The 2-degree target, he hopes, won't set people up for an inevitable letdown. “My worry is that people will start talking about game over and a line being crossed over irreparably. Climate change is not like that.”



Spodek Hall, the venue for the U.N. climate summit, stands behind barriers Nov. 27 in Katowice, Poland. (Bartek Sadowski/Bloomberg News)