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Government support for wind farms, such as this one in Texas, could help to create thousands of green jobs after the pandemic.

After COVID-19, green investment must deliver jobs to get political traction

Ryan Hanna, Yangyang Xu & David G. Victor

Analysis of past recoveries shows a low-carbon reboot matters more for climate than does the brief emissions crash.

The most precipitous contraction of the global economy in a century has seen carbon emissions plummet. By the end of this year, emissions are likely to be 8% less than in 2019 (ref. 1) – the largest annual percentage drop since the Second World War (see go.nature.com/3gej8th).

To avert a global recession, governments are injecting trillions of dollars into stimulating their economies. The International Monetary Fund anticipates economic recovery by the end of this year, provided there are no further

large outbreaks of disease². If nothing else changes, then emissions will tick upwards once more, as they have after each recession since the first oil shock of the early 1970s. The analysis we present here examines past recoveries to find lessons that help to plot a low-carbon path out of this one.

Breaking the historical iron law that links economic growth to carbon emissions requires energy supplies to be decarbonized, and is essential to stop global warming. But we must be honest. Nothing in history suggests

that emissions can drop fast enough to limit warming to 1.5 °C above pre-industrial levels – an aspirational goal of the Paris agreement, which is up for review over the next few years. This would mean cutting emissions by an amount similar to that delivered by the current economic catastrophe every year for the next decade³. We need more pragmatic goals.

The way in which governments spend stimulus monies now will dictate how global warming plays out. Views differ. Some political analysts hope that the COVID-19 pandemic will be a wake-up call that catalyses political action⁴ – a blunt reminder that the largest threats to prosperity, such as climate change, require respect for science and global engagement. Others see the opposite: national governments turning inwards, narrowing their focus to immediate concerns such as securing health, jobs and the economy, rather than the planet.

So far, the latter approach seems to be winning⁵. Rather than boosting green investment, in the past ten weeks, the United States, Mexico, South Africa and other nations have relaxed laws controlling pollution and standards for vehicle energy efficiency. The US rollback on fuel economy rules, finalized in March, will commit the nation to higher transport emissions – now the largest source of warming gases in the United States – for a decade or more. That's worrisome. Because carbon dioxide lingers in the atmosphere for more than a century, the long-term trajectory of emissions over many years determines how much CO₂ stock accumulates. A brief lull is instructive, but we must urgently build on it to limit long-term warming.

In this crisis, any climate-mitigation plan must deliver on the public's immediate needs or it will not fly. Luckily, there are sweet spots that can deliver and save hundreds of thousands of jobs⁶ – such as investing in renewables and energy efficiency, and preserving the existing fleet of zero-emission nuclear power plants.

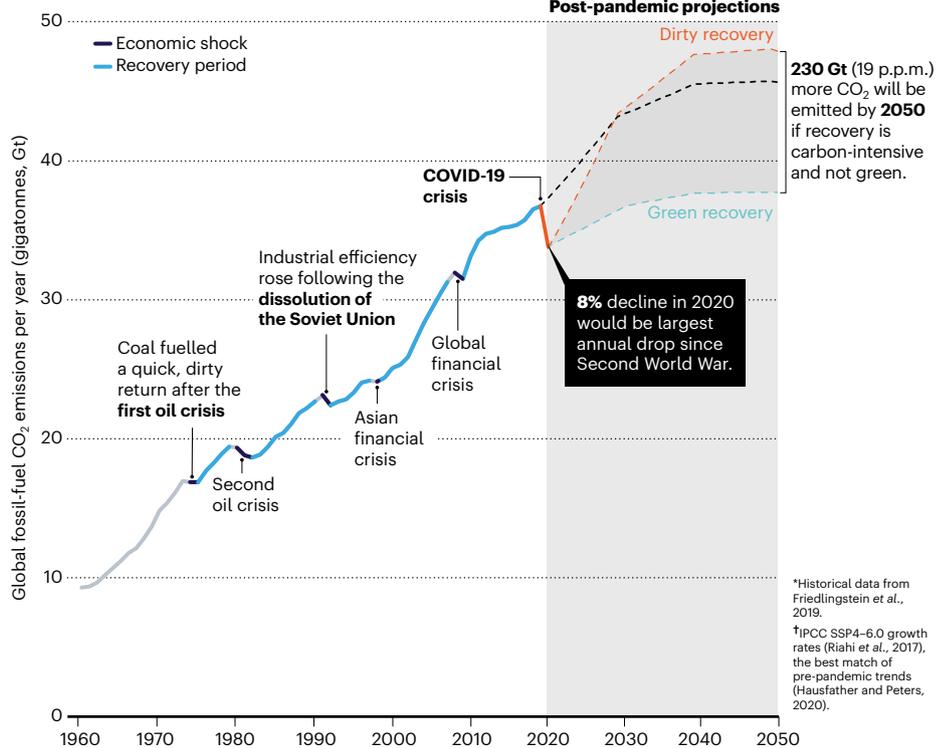
Climate activists and analysts recognize that massive government spending can be channelled to their favoured causes, as happened in the economic stimulus after the financial crisis of 2008 (ref. 7). What they have not grasped is just how severely the politics have shifted – away from long-term aspirations, such as protecting the climate for the decades ahead, and towards restoring jobs and wealth right now. Without political realism, this opportunity for green recovery will be squandered.

Rhymes of history

In terms of scale, the ongoing recession already exceeds any we've seen in modern times. Unemployment in the United States,

SHOCK AND RECOVERY

Emissions* from fossil fuels dip during recessions as the world economy slows. The rate of growth during recovery depends on whether green or dirty technologies supplant old infrastructure.



hard to measure because it is soaring so quickly, was 16% last month and is still rising. (About one-quarter of the US workforce didn't have jobs at the peak of the Great Depression in the 1930s.)

History doesn't repeat itself, but, as many have said, it often rhymes. The world has experienced five major economic shocks

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since the first oil crisis, which began in late 1973 (see 'Shock and recovery'). Four of these slowed the rise of emissions. For example, our analysis shows that during the recovery from the second oil crisis, which began in 1979, emissions growth fell by one-third. They went from 3.6% per year during 1976–79 to 2.4% per year during 1983–90. The next big recession was triggered by the break-up of the Soviet Union in 1991. It saw the trajectory flatten by another one-third, to 1.6% per year during 1994–97.

The 1998 Asian financial crisis was the exception. After a short recession, emissions growth doubled during a decade of rapid industrial expansion. This was the period of the phenomenal rise of China, which promoted heavy manufacturing and exports, all fuelled by coal. History's rhythm skipped as the global economic order shifted. It returned with the next shock: after the global financial crash of 2008, emissions growth halved to 1.6% per year over the next decade.

Indeed, the past decade has seen the longest period of flattened emissions since the Second World War. This era coincided with sustained economic growth. It is politically easier for governments to focus on long-term goals such as climate change (as many governments did) when economies are expanding. Furthermore, up to 15% of the global stimulus funding injected after the 2008 financial crisis went into developing and deploying green technologies⁷.

The United States invested in smart meters and launched programmes to innovate in batteries, renewables and carbon capture. China and others did the same, strengthening their commitment to wind and solar technologies (which tumbled in cost by roughly 70%

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and 90%, respectively, in the decade after; see go.nature.com/2u2jres). It also helped that economies shifted towards services such as digitization – these generate a lot more value using much less energy and emit less.

Shocks, although painful, are political and industrial turning points if they come with incentives for low-carbon infrastructure. For example, emissions fell by 15% in the decade following the reunification of West and East Germany. This was because East Germany was exposed to Western technology and investment, along with incentives for efficiency. After the 1973 and 1979 oil shocks, high energy prices encouraged companies to invest in more-efficient production. Such change is not guaranteed. The oil crises also led governments to find local fuels to replace imported oil. That was a boon for coal: its extra emissions partly offset the gains from energy efficiency.

Choices ahead

When economies rise from the current shock, which rhyme will they follow, if any? Will stimuli defend old practices, or boost even dirtier ones? Or will this opportunity tilt the emissions curve downwards, once and for all?

The record 2020 emissions crash, by itself, will ameliorate future warming. In our analysis, even if economies restart next year on their pre-pandemic emissions trajectories, then by 2050, the shock will have prevented a cumulative 128 gigatonnes of CO₂ (GtCO₂) from reaching the atmosphere – equal to about three years of emissions at 2018 levels. That would yield lower CO₂ concentrations in the atmosphere – about 10 parts per million (p.p.m.) less than had no pandemic occurred. (For a 6% drop in emissions, as predicted by the World Meteorological Organization, the figures are 101 GtCO₂ and 8 p.p.m..)

Even more important than the drop in emissions, however, is the shape of recovery. Economies rarely bounce right back to their pre-shock state. Instead, they follow greener or dirtier paths. For example, a dirty recovery fuelled with coal, as happened in the wake of the Asian financial crisis, would quickly re-inflate CO₂ emissions so that they surpass the pre-pandemic trajectory. A greener path, similar to the searches for efficiency after the Soviet collapse or for green recovery after the 2008 crisis, would build on the carbon glitch that the pandemic has given us.

According to our analysis, whether the forthcoming recovery follows the historically green or dirty pathway amounts to a difference of 230 GtCO₂ entering the atmosphere by 2050, equivalent to a change of about 19 p.p.m. in atmospheric concentration – about twice the potential impact of the shock alone. With serious investment in decarbonization, the actual trajectory could be much lower; indeed,

bending down the emissions curve requires charting a totally new course.

Pressing realities

How can we put ourselves on the lower emissions path? First, by getting realistic about which climate projects can be delivered promptly. Political leaders – and climate activists who want to help them succeed – need to filter policy actions by what is politically viable⁶. In short, that means coming up with projects that deliver jobs and revenues quickly.

What's in? Incentives to boost the pipeline of wind and solar power plants. At the start of this year, more than 250,000 people worked in solar energy in the United States. The pandemic has since wiped out five years of job growth in this sector – jobs that will return quickly if credible

“Economies rarely bounce right back to their pre-shock state.”

investment incentives are in place.

Keeping the existing fleet of nuclear reactors⁵ open would protect tens of thousands of high-paying, highly skilled jobs. Infrastructure construction, such as erecting power lines and conducting energy retrofits for buildings and public transportation, is another large potential employer. Green infrastructure is crucial because it keeps giving the gift of lower emissions even after the crisis recedes.

What's out for the time being? Policies such as carbon taxes and technology mandates that impose new costs on customers who are already struggling financially. Also out are costly investments in abstract technologies and infrastructures that might prove transformative but which can't be scaled up quickly – such as carbon capture and hydrogen power. Progress is still possible in places where the spadework has largely been done, such as for the hydrogen demonstration network at Teesside in the United Kingdom. It is also possible where incentives are already on the books – such as a US subsidy scheme for carbon capture⁸. Research and development have a role, particularly where they are able to prime technologies for commercialization.

The European Green Deal is a good model for stimulus packages. It is a massive, €1-trillion (US\$1.1-trillion) decade-long investment plan that combines industrial growth with deep decarbonization and efficiency. So far, it has retained political support because most European governments remain committed to climate action, even in the face of the pandemic. It will need tailoring to stay focused on areas that deliver jobs rapidly.

The new realpolitik requires rethinking attitudes to existing companies. Gone are dreamy visions of demolishing old, dirty

industries and replacing them with a green nirvana of sustainable businesses. Existing firms will need to be involved in the recovery – they are ready to restart and politically powerful. A savvy political strategy would isolate only those companies whose actions egregiously undermine climate goals – conventional coal is a leading candidate – and would ensure their workers are treated justly and retrained in new areas of employment.

It will be easier to pick political and climate winners sector by sector⁹. The actions needed for steel and cement production – in which new technological systems must be tested at scale – are different from the power sector, in which the technologies are more mature. Front-loading the design and deployment of the first few zero-emissions steel mills and cement plants can help to generate employment. In the power sector, expansion of renewable technologies and power lines can absorb investment quickly. A sectoral approach can also aid cooperation across international borders, which is essential to addressing climate change, yet has suffered badly in recent years.

The world stands today at another crucial juncture for climate policy. The trillions devoted to stimulus have, so far, sought to stabilize economies and workers. With a fresh focus that looks further into the future, the next waves of spending must also help to protect the climate.

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