What if we treated the climate emergency as seriously as we treated COVID–19?

In an edited version of **Prof Alice Larkin**'s presentation to SGR's Responsible Science conference, she highlights the importance of social and economic change in responding to the climate emergency.

I've learnt two important lessons so far from the pandemic. The first is that change can take place quickly and the second is that government and societal priorities can shift dramatically to tackle an emergency.

My third observation is not a lesson as such but something that has sparked my interest. It is that, in the same way that climate science and scientists find themselves scrutinised for clear facts when policy makers are faced with the need to engage with the science, so our medical colleagues find themselves and their science also thrust into this spotlight.

It is even more the case now that they too are now tackling some of the same economic questions, in the terms of the 'GDP versus science' debate that many climate researchers have been dealing with for decades.

Policy-makers don't yet consider climate change an emergency

So what can be harnessed from these lessons to tackle the climate emergency? The pandemic became all-consuming, leading to rapid policy, social and media responses that I suspect hasn't been experienced by any of us before in our lifetimes. As such, it draws attention to how little credence has been given to the term 'emergency' in a climate rather than a COVID-19 context.

First, on the speed of response and government priorities, I've spent the last 18 years trying to understand the scale of the climate emergency and how our energy systems need to transform to minimise cumulative carbon emissions. 'Energy systems' can sound technical but basically it means how you and I use energy every day, what we use it for, when we use it, how much we use, and where it comes from. The climate emergency that we are facing is so great that mitigating the damage we are doing now, and the damage that will be done in the future, requires much more than just incrementally increasing the amount of renewable energy on our national grid, for example.

We need to consider all the ways we consume energy, from travelling to heating our homes, from cooking to industrial manufacturing of goods. Critically, we need to do this rapidly because greenhouse gases are accumulating. That's why it's not just about technology. We know a wide variety of technical solutions exist for cutting CO_2 but some will take decades to be sufficiently widespread to make the difference that is needed in the next five or ten years or, indeed, was needed during the last decade.

I come from a physical sciences and modelling background, but have spent most of my career working with engineers and social scientists. That's how I know that the potential shown by modelling theoretically an idealised technology – such as bio-energy with carbon capture and storage – and how it might cut CO_2, is very different to the much more complicated, actual and widespread, rapid implementation of new infrastructure in society.

There are many examples that we are familiar with, the construction of new nuclear facilities, the retrofitting of technologies for heating in every single UK home, designing and deploying an extensive fleet of electric vehicles and charging points, and perhaps most importantly in the current debate, the largescale rollout of new, largely unproven CO_2 removal and storage technologies.

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That is why we need to pay close attention to the geographical governance and social context within which we are expecting technologies to be rapidly deployed, contexts that are much more challenging to articulate well, if at all, in a numerical model. This is also why it matters how much energy we consume in total. If we can consume less then we won't need to transform as much of our high carbon infrastructure, or indeed deploy new unproven technologies to remove CO_2 from our atmosphere that our energy consumption has put there.

The importance of behaviour change

But cutting energy consumption or demand is rarely the focus of CO_2 mitigation discussions, as the debate on decarbonising the aviation industry testifies, which at an official level rarely if ever mention curtailing our flying. Consuming less energy has taken a back seat in policy debates compared to decarbonising our energy supply. One of the reasons is that it requires changes to individual and collective behaviour, attitudes and expectations.

Another is that it requires us to make large upfront strategic investment choices for the long term, and pay more attention to issues of justice and equity. Tackling behaviour, inequality and redirecting investments for future generations are all seemingly more politically sensitive than a focus on large, scalable technologies in the short-term, capital spend and aspects that challenge the pretence of security provided by protecting GDP growth in wealthy nations. But they are also aspects where COVID-19 responses have illustrated change, and the potential willingness to shift what we do, what we invest in and how quickly this needs to happen. All these are now close to the surface of revealed possibilities.

There are probably very few who haven't changed one of their individual common practices or habits during lockdown. It might be a lower frequency of traveling to work or a way of getting in the weekly shop, or a walk taken more regularly done to boost well-being.

Collective and community-based behaviours have changed, and there are higher expectations, for example, on people being more available to attend meetings online – which might not always be a good thing! But I sense also that there is a more diverse group of people who are willing to interact in those meetings then they would in other settings.

Some of us now know more of our neighbours, and some of us might be sharing activities to avoid more individual trips to the shops. At a national level, the government's budget plans have been thrown up in the air with finance being redirected to fund schemes constructing hospitals, infrastructures or maintaining public transport systems when demand is falling through the floor.

So, we've learnt from COVID–19 that people can work and live differently. We can accept less commuting, less flying, less buying material goods and all energy consuming activities. But I'm not trying to pretend that change hasn't been extremely tough for many. We've accepted these changes because we know there is a threat to human society. If we actually recognise the climate emergency as being like the pandemic, similarly a threat to human society, then will we see action that is commensurate with the shifts that we really need?

It requires us to pause and rethink every investment made, every job created, every policy measure on the table, every descion that we find ourselves part of. But we need to take on the learning that has presented itself due to this rapid societal change. Then we can embed where we need to pay attention to societal concerns and any potential backlash or inertia. Then perhaps the trend in rising CO_2 emissions could start to be overturned and done so sustainably.

Following the science?

I turn now to what we might take or learn from the ways in which the science and the scientists associated with COVID-19 have been plunged into the spotlight. It was reported by the BBC that, early on, the government prominently flagged that it was following the science. What can we learn from how this has been playing out? Similar to climate change, there is a reasonable understanding of the short-term impacts of COVID-19 on people, just as there is a good understanding of the rising CO_2 emissions on temperatures and sea level rise.

Also, similarly, the wider societal outcomes of both rising CO_2 and the pandemic have become much less clear. There are similarities with regard to climate mitigation and tackling the virus at an early stage. The targeted test and trace systems and lockdowns led to a decline in infections. Likewise for CO_2 emissions, a reduction in energy consumption while low carbon technologies are deployed will reduce the production of CO_2 emissions. But, as mentioned, reduction of energy consumption or investing in the scaling of low carbon technology is needed, but runs into our seemingly immovable attachment with protecting GDP growth.

This is similar to our approach to tackling the virus, where there is the added complication that there are limits to medical capacity, requiring trade-offs between different health concerns, COVID-19 treatments vs cancer treatments – but isn't this the same problem? Investments in additional medical capacity could cover both, but this is chosen not to be prioritised. The other contrast between the pandemic and the climate emergency is that the science behind tackling the rise of COVID-19 infections is less advanced than the science and interdisciplinary understanding of CO_2 mitigation options.

As a plethora of climate change mitigation measures are overlooked on the basis of their potential impact on GDP growth, the academic community has even increasingly come up with evermore speculative options to feed into their models and scenarios, and technologies that paint a rosier picture and avoid wider shifts in society or, heaven forbid, a focus on equity and the distribution of high carbon activities.

At the time of writing, the COVID-19 debate doesn't appear to have reached that point yet, but perhaps there are lessons for our colleagues in medicine to be learnt from the climate field in this regard. There will always be a range of scientific views on high profile issues and they will end up being scrutinised in the popular press by policy-makers and commentators alike. But when policy-makers, for example, hold up GDP growth as a red light, suggesting it is unquestionable, our scientific understanding and judgment mustn't be clouded as a consequence. While our models can be made to show theoretically that speculative options offer ways out within the political 'red lines', we must be true to our areas of expertise and avoid our judgment being clouded by policy-makers' enthusiasm for political expediency.

Transforming society

So if we were to respond to the climate emergency with the same significance as the pandemic what should or shouldn't we be doing?

Firstly, we need to recognise the positives and opportunities presented by the large-scale societal shift we've been seeing. We need to learn the lessons from the societal concerns that have

emerged, the backlash or inertia to COVID-19-related measures, and the focus on what matters most to people: friends and family, jobs, time. Bringing our physical and social scientists and engineers together, we must build this new understanding into our dialogue with policy-makers for the benefit of the climate debate.

Secondly, we need to encourage government and decision-makers to rethink every investment made and every job created, every policy measure on the table and every decision they make or even that we find ourselves a part of, and ask does it reduce energy demand? Will it provide a sufficiently rapid transition to a low carbon energy system? Clear investment at this pivot point could positively transform systems away from fossil fuels while simultaneously improving employment, equality and health and well-being.

Thirdly, we need to challenge the impact of apparent red lines, overcoming our obsession with GDP growth in wealthy nations.

Exploring alternative measures or prosperity is essential at this moment and this debate could take on new momentum. Space to challenge this obsession has now been created. Not only has COVID-19 given us lessons that we can learn from but it has also created a flux in our everyday routines. We all need to take advantage of this flux to develop and influence a sufficiently deep, rapid but sustainable response to the climate emergency.

If we don't take advantage of this moment in a time where we have demonstrated that society can accept deep changes, then we will pass up our opportunity of a lifetime to help future generations.

***Alice Larkin** is a Professor in Climate Science and Energy Policy as part of the Tyndall Centre for Climate Change Research, and Head of the School of Engineering at the University of Manchester.*

For more details of the SGR conference, including web-links to the videos and slide presentations, see p.40.

How a just transition can speed up the race to net-zero

Prof Nick Robins, London School of Economics, looks at the dynamics of a just transition away from fossil fuels.

If there is one thing that the brutality of the COVID-19 pandemic has taught us, it's the importance of shared endeavour in the face of a disruptive shock. The same is true for the existential threat of climate change, whose physical impacts are already disrupting lives and livelihoods across the world, spurring countries, companies and communities to step up the race to net-zero.

Long championed by the trade union movement, the just transition is now also becoming a shared endeavour. In 2015, the Paris Agreement recognised the imperative of placing the interests of workers and communities centre-stage so that decarbonisation brings decent work and quality jobs. All the evidence suggests that the creation of the net-zero economy offers huge potential to create both more and better jobs, thereby contributing to ending the poverty and inequality that hold back the global economy.

Looking at energy, for example, the sector employed almost 58 million people worldwide in 2017. According to IRENA, this could rise to 100 million under its Transforming Energy Scenario, which would set the energy system on the path needed to keep the rise in global temperatures to well below 2°C and closer to 1.5°C during this century. This generates 15% more jobs than IRENA's conventional Planned Energy scenario, led by renewables, energy efficiency as well as power grids and energy flexibility. This shift is already underway with renewable energy jobs growing by 500,000 to 11.5 million in 2019.

This expansion in employment, achieved in ways that provide fair incomes for workers and better prospects for communities, will not happen automatically, however. Too often, the climate agenda has been socially blind, introducing policy interventions with little regard for the impacts on employment, or indeed on consumers. As one of the *gilets jaunes* protesters in France

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