Interview

Kupers on Complexity & Climate Solutions

Roland Kupers' new book proposes a whole-systems approach to climate mitigation using the frame of complex systems.

by Christian Roselund April 2020

Roland Kupers is a consultant on complexity, resilience, and the energy transition, as well as serving as a fellow at the Institute for Advanced Studies at the University of Amsterdam. His new book *A Climate Policy Revolution: What the Science of Complexity Reveals about Saving Our Planet* suggests a whole-systems approach to climate mitigation, prompting readers to look at solutions through the frame of complex systems.

Energy Transition Magazine: Obviously there are a lot of books about the climate crisis and our response being written or recently published. Yours takes a different tack to many of them. Can you summarize why the frame of complexity is critical for addressing the climate crisis and more specifically, critical for finding the right solutions?

Roland Kupers: There are three core reasons. The first thing is that you could, in principle, tackle climate change with top-down action as a standard recipe, but the main issue is that we simply aren't doing that.

In the opening of the book, I describe why: Liberal Democratic governments are not wired to take systemic actions except in the case of pandemics and perhaps financial crises. For climate change they don't. And authoritarian leaders generally have not been so inclined. So the book is asking, can we expand our toolset? Can we frame policy differently?

The second reason is that I think having a better understanding of interconnected systems is crucial. Sometimes the solution to climate change is framed like we'd replace every brown electron with a green electron, and life would carry on unchanged. But the energy system is not independent of other societal systems. In fact, it's one of the most deeply interconnected systems with every other bit of society and with nature, so therefore only in theory can you think of changing it in isolation, with everything else around it staying the same. So understanding how the energy system is interconnected with other systems and how to influence it from outside, is critical.

The third reason, finally, is that 40 years ago we may have had the luxury of doing gradual climate policy, but this is no longer the case. We have procrastinated for too long, and now we have a climate emergency. One of the beautiful things about complex systems is they open a window onto how non-linear change occurs. How can you think of changes that snowball across networks. And we desperately need the capability to change things nonlinearly.

Those are three important reasons I wrote the book.

ETM: So let's go to one of those: the opening the windows on nonlinear change. You state on page 14 that a fundamental property of complex systems is that small causes can have large effects. How do advocates or policymakers or others identify those levers that are most likely to have that nonlinear scaling?

Kupers: That's not easy, as there's not a generic answer for every single problem. But one of the good things is that we now have over 30 years of complexity science behind us. There is really a set of useful tools that people can use.

There is some basic modeling that you can use. There are policy makers who actually are quite good at this intuitively, by inclination or training.

And running experiments: if you identify an area in which you think there is potential for nonlinear scaling, you try some things. For example, one of the important outcomes for climate policy would be to reduce our red meat consumption rather drastically. Now, in theory, you could tax red meat or make it illegal but in the real world that will never happen. You can't and you shouldn't.

On the other hand, you see that the percentage of vegetarians, vegans or flexitarians between countries is drastically different. In the Netherlands 3 percent of the people are vegetarian, in Austria, 14. Why?

So you could run experiments of social contagion, small-scale experiments about how you could propagate the change in taste so that people eat less meat. And the great thing about that, of course, is that anybody who eats less meat actually finds that you don't actually regret it. It's very different from a government stepping in, taxing or banning it.

If your tastes change because your children or your friends, encourage you to do so, there's really no price to pay. And those things can snowball. We know that as a classic viral effect—which is a little bit of a loaded term these days—but these kind of taste changes can occur fairly rapidly.

This is where you would have to do a little bit of social network modeling and there is already reasonable amount of science to fall back on. And then run your experiments, fine-tune your models and figure out what works. This isn't a uniform process and different cultures will require different measures. But it is important to know that such non-linear change is possible. Identify problems that have this potential for snowballing, and then experiment and tweak. It's not easy, but doing public policy well isn't easy at the best of times.

ETM: Let's get to the simple top-down approaches. You've observed that there's a shortage of authoritarian leaders willing to implement them. It also seems that they simply might not be as effective as changes that take into account complex systems for a variety of reasons which you lay out in the book. But I also think that so many people gravitate towards simple, top-down approaches is because they're easy to understand. How do you counter that tendency?

Kupers: The first thing I think is to argue that I'm not at all opposed to top-down interventions in principle. They certainly work, but they also have some downsides. If somebody had an effective way to outlaw coal plants by next year, I would say, go for it. Most collateral effects will be worth it.

But the reality is that we don't know how to do that. So I framed complexity as a complementary frame, another set of tools, rather than saying that top down is bad, and needs to be replaced. It's just we literally need every possible option, because repeating what top-down measures are needed accomplishes very little.

But you are right that the narrative of top-down measures seduces people. And I think that the current pandemic is the illustration of many of these dynamics. For example, you see, the top-down intervention such as ordering everybody to stay at home and not leave the house, such as in France and in Italy, and in the UK.

What the Netherlands, Sweden, to some extent Germany have done it is much more of a complexity-aligned approach, whereby you state what outcomes you're trying to reach, but you basically and empower people to make to make judgments themselves. So you leave quite a lot of things open, and you do you try to steer the system rather than specifically tell the individual agents what to do. You give them a sense the outcome and they self-organize to get to get in that direction. This is clearly culturally dependent, and it depends on the type of system you are intervening in. We need to get more skilled at debating how policy aligns with the type of system one has—for pandemics, but also for the climate emergency.

ETM: This brings up another interesting part of the book. You reference this experiment with wallets left on café tables, and note that in many nations social norms play a factor in how people act. In some nations, people would return the wallets with money. In other nations, the rate of return is lower, as the social norms are different. Can you talk about the idea of norms and normative behavior, how that plays in the complexity approaches?

Kupers: Change in complex systems is an emergent property from the individual agents. People have collective behavior, but that collective behavior really depends on how the individuals act. Their actions are strongly driven by the norms they hold, and these in turn depend on the norms people close to them hold.

A practical illustration from the book is the adoption of home solar PV. It is very clearly contagious with similar mathematics as a pandemic, but a good one. If your neighbor installs solar panels on his or her roof, you are more likely to do so as well.

And why is it? Because you talk to your neighbors, because we interact. I have had this experience in my house in Amsterdam. People come up to you and ask: why have you done that? Does it make economic sense?And are you now also a vegetarian? And so why do you still drive a Porsche?

It becomes a question of identity. Because this is quite easy to measure and model, with satellite images, scientists have quantified how quickly solar panels spread across cities. Like in pandemics you have super-spreaders, you have people who are popular, and influence lots of other people.

But you see that the speed of the spread is different by city. And that it is closely correlated with the health of the social fabric and the local social norms. If people trust each other a lot, if there are healthy and vibrant communities, it'll spread more quickly. And if it's the kind of city or the kind of neighborhood where people don't have much contact or don't trust each other very much, then it goes much more slowly.

This is true for most social norms. They are contagious, literally like a virus. And social norms matter a lot to the specific example of adopting solar panels. But also for many other climate-related issues. We briefly touched upon the social norm of how much meat you eat, which is also very contextual. How might that change?

But the question also extends, for example, to consumerist social norms. It very clear that we over-consume, certainly in the Western developed nations, which is a norms thing, not some inbred human tendency. If you go back to the 1930s, there are these beautiful quotes by Keynes and other economists that never in their wildest dreams did they imagine that such run-away consumerist habits would emerge.

They really thought that above a certain threshold of wealth, people would start furiously writing poems to each other and drawing watercolors of nature. Now, it's a bit of a projection of some of these upper-class folks at the time, but the principle holds.

Norms really do matter for climate policy and they don't just appear in a vacuum. We collectively manufacture norms, and they're the consequence of particular policies we put in place. There's a beautiful example in the United States, when the GIs returned from World War II, there were elaborate incentives for individual home ownership, largely conditional upon building suburban houses.

That has triggered the development of suburbia, the urban sprawl and its associated traffic patterns. Which then, of course, became a social norm. People wanted to live in a suburb rather than in the dense inner city. But those are tastes that, in a sense, were manufactured through policy.

And so in the book, I encourage us to think about how our policy choices manufacture new social norms, either purposefully or by accident. So let's be purposeful about enabling tastes that are more climate-friendly.

ETM: That really helps to break down the false dichotomy that's been out there in public arguments about the energy transition between top-down policy approaches, and what is often dismissively referred to as lifestyle changes. But what you're saying here is that these sorts of lifestyle changes can have much larger impacts.

Kupers: They can have an enormous impact. But I think that people are sometimes viscerally opposed to them, often because you don't want somebody else to tell you to change your lifestyle. In most countries, but particularly in America, this is a big deal in. And I do understand that.

So what I'm trying to explain in the book is that if lifestyle changes come about through network contagion from your friends, from influencers et cetera, then it doesn't seem like imposition. It just feels like you have a new set of tastes that you didn't have before and you generally like your own tastes.

If instead of liking blue, all of a sudden, you like yellow, you'd be perfectly happy liking yellow because that's your taste. That's very different from somebody telling you can't buy a blue shirt anymore; you can only buy yellow shirts from now on. The difference in how you bring about such lifestyle changes is absolutely crucial.

But there are also ethical issues, right? Because a norms policy is a form of manipulation, as a policymaker you need to reflect on that. But I would say this is a manipulation for good, and also, policymakers do it all the time. The main point is that there is not a dichotomy between top-down measures and lifestyle changes, but that they interact. The policy challenge is making those interactions a productive dance, rather than a tug of war.

ETM: I want to get to the incrementalism part, because I feel like this is related. IN the conclusion, you speak about the power of incremental change. But at a time when rapid change is needed, why are incrementalist approaches acceptable and how are they successful?

Kupers: I think that's the danger of a compact book! It depends a little bit on how you understand incrementalism, right? Changes always build on each other. And part of what I'm trying to articulate in this book is that you can have revolutionary change, non-linear change, without having to tear down everything.

The traditional recipe of revolutionaries, whether it's Gavrilo Princip, an anarchist who unleashed World War I, or even plausibly the people who elected Donald Trump, in the sense that if people desire to change a system that doesn't work for them, they bring in someone who is going to tear down things.

That's one way of doing it, but it typically doesn't end well. And what the understanding of complex systems gives you is a peek behind the scenes. Revolutionary changes necessarily occur incrementally, but they're still non-linear. So you can have both of those things.

And I use the crude but actually precise example of boiling water: water goes through a phase transition at 100 degrees Celsius. Suddenly it boils, and there's this culture of focusing on tipping points, but in reality, there's an incremental buildup of temperature and you have small pockets of micro bubbles. At one point suddenly, it boils. Revolutions are created before the tipping point becomes visible; that's what we need to do purposefully to build a climate policy revolution.

But what looks like a sudden change, is actually built up from incremental steps. What I'm trying to do is reconcile the fact that for revolutionary or sudden change, you don't have to break everything. You can actually get there by changing incrementally but in the right direction and by setting the right conditions.

Words are always tricky, because they always mean different things to different people. But I mean incremental in the sense that you build on where you are, but in the understanding that having a grasp of complex systems could get you to lift-off.

So a very practical example: if we go back to solar panel propagation, or contagion; you could look at a city and figure out where are there gaps? Where in a whole neighborhood are there no solar panels. And so you could go and identify who is popular, who is the chair of the school board in a particular neighborhood, or who is very active in all sorts of local charities. And you give that person free solar panels for their roof.

This would be a small, incremental step, but one that could then kick-start the spread in that neighborhood. I meant incrementalism in this sense of a small step that has the potential to trigger system-wide change.

ETM: One more question. Your book closes on a warning to mind the collateral damage. Can you elaborate on why this is a key element of complexity approaches, and for this kind of change?

Kupers: It is less an element of the complexity approach, but a feature of the complex nature of society. Top-down policy has "unforeseen consequences" for the same reason. It has to do with the deep realization that in complex systems everything is connected to everything. And that doesn't mean you should sit down in desperation and do nothing, because it's all too hard. But you do have to realize that as soon as you're changing something major in one system, it's going to have collateral effects in other systems. And you need to deal with those and not just throw up your arms at "unforeseen consequences".

With the current pandemic policy, we see unexpected effects everywhere. Aggressive climate policy will also drive deep changes in many societal systems. In the book, there is a whole chapter with the example of the autonomous vehicle revolution. Not as a transport solution, although; it's cool and good for transport, but I describe it for the potential collateral effect in adjacent systems where it could help trigger useful transformation.

But there will also be collateral effects. In the United States taxi and truck driving is the biggest job pool for men with a relatively low access to education. Now, if that entire profession goes away because of autonomous vehicles, then you have an enormous amount of jobs that are displaced. But worse, you will have removed a stabilizing pillar of society. You could have a large group of people who, for all sorts of reasons are in that educational predicament, and no longer have access to livelihoods.

And so this is an obvious example, but you're going to have that all over the place. So if you embark on serious climate policy, that is a deep change of society in many levels, it's going to have effects on communities. And it's typically the more vulnerable parts of society that are hurt the most because they end up—just as with this pandemic, actually—being impacted disproportionately.

So it is meant as a warning not to avoid doing something, but to be very explicit in saying we're going to do collateral damage, you know, reserve the budget or get a ministry for collateral damage. Or have a process to pick those things up and then solve them as they come along.

ETM: Thank you for the interview and for the book. I found it takes a refreshing look at climate policy, and was both concise and accessible. Any closing thoughts?

Kupers: Thank you! I am very concerned about our inability to address the climate emergency at the scale required by nature, but wanted to write a fundamentally optimistic book, offering some additional options about how we might advance. Many books focus on what we should do, but that's actually quite well established, the harder question is how we get to a climate revolution, in a practical way.