The Ecopolitics Podcast – Episode 2.12: Metaphors for Climate Governance (TRANSCRIPT)

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Guests: Matthew Hoffman (University of Toronto) and Steven Bernstein (University of Toronto)

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INTRO: In this episode, which is a re-broadcast of an episode from Season 1, we speak with Steven Bernstein, Distinguished Professor of Global Environmental and Sustainability Governance, University of Toronto, and Matthew Hoffmann, Professor of Political Science, University of Toronto, about carbon lock-in (the ways in which our culture currently reinforces our use of fossil fuels) and two different metaphors for thinking about how we might challenge the carbon lock-in mindset both locally and internationally.

[00:00:00] **Matthew Hoffman:** We're seeing transformation, whether we want it or not. I think that the evidence of climate impacts is just ever-growing and the speed at which we're facing transformation of our world is becoming ever more clear. I mean, in the before pandemic times, everybody was worried about the burning of the Amazon and the burning of Australia.

[00:00:21] And so this transformation is happening. And the question is what are we going to do to change the way that humanity functions to maintain some version of climate stability and safety?

[00:00:40] **Peter Andrée:** Welcome to the Ecopolitics Podcast, season two, Global Ecopolitics. This podcast series tackles some of the big questions in the field of global environmental politics. I'm Peter Andrée from Carleton University. And my co-host for the show is Dr. Ryan Katz-Rosene from the University of Ottawa.

[00:00:59] In this episode, Ryan will be speaking with Dr. Matthew Hoffman, Professor of political science at the University of Toronto, and with Dr. Steven Bernstein, distinguished Professor of global environmental and sustainability governance at the University of Toronto. Both co-direct the Environmental Governance Lab at the Munk School of Global Affairs and Public Policy along with Dr. Teresa Kramarz.

[00:01:22] We'll be talking about a few key concepts today in this episode related to the study of environmental politics and climate change governance, in particular, including ideas like the global commons, decarbonization, and the idea of lock-in, or carbon lock-in. Matt and Steven recently coauthored an article in the journal Nature Climate Change, called 'Climate Politics, Metaphors, and the Fractal Carbon Trap'.

[00:01:47] It offers a really good foundation for the discussion we're going to have today. This episode was first recorded in August of 2020 and included in season one of the Ecopolitics Podcast. We thought the content was so important for our second season on Global Ecopolitics that we decided to revisit the conversation for season two.

[00:02:09] **Ryan M. Katz-Rosene:** Okay. So I'm going to dive right in here, guys and ask you a question about a term we hear a lot about in the study of environmental politics, and that is the 'commons', or in some cases we hear about 'common pool resources', and some of the listeners on this show might be familiar with the idea of the 'tragedy of the commons', or perhaps they've heard of that term.

[00:02:31]So I want to take a step back and ask one of you, maybe Matt, if you don't mind, to help us define what a 'commons' is in the first place and how that idea relates to the study of environmental politics.

[00:02:45] **Matthew Hoffman:** So the 'commons' is the idea that you have shared resources. And whether we're talking about common pool of resources or public goods, essentially you have a group of people that are sharing resources.

[00:02:56] And there's technical definitions about who can use the resources and if someone uses the resources, does that deplete them or not? But I think the general idea is that you have something that's shared in common and when it's applied to climate change - what people are really talking about there if they say climate change is a problem of the global commons or is a common pool of resource - it's this notion that in order to have a stable climate, everybody has to contribute action to making that possible.

[00:03:32] And one of the best ways to, I think illustrate that, is this notion of the Carbon Budget that people might've seen in the news. So with the Carbon Budget, scientists have essentially calculated how much carbon dioxide humanity can pump into the atmosphere and maintain a stable climate and stay within relatively safe levels.

[00:03:56] Although, what we're seeing these days with climate impacts is that we might already be exceeding some of those safe levels. But essentially that Carbon Budget, therefore, is the collective or common resource for all of humanity. And so this is what they're really referring to is that this is something that we share as a community and as a global community.

[00:04:20] **Ryan M. Katz-Rosene:** And in your article, if I can get you to continue Matt, you both refer to the global commons as a metaphor for, I suppose, the current dominant thinking in the governance of climate change and you emphasize that it hasn't really worked or that this metaphor is maybe problematic. So why isn't the global commons metaphor working when it comes to climate change governance?

[00:04:47] **Matthew Hoffman:** So one of the big issues is if you treat climate change as a problem of the global commons, it creates what we call a collective action problem. And the essential features of that are that everybody has to contribute and that my contribution to the problem, to solving the problem, is essentially dependent on your contribution.

[00:05:10] So if you aren't going to pay the price to reduce carbon dioxide emissions, then I'm going to feel like I shouldn't either. And so everybody, therefore, is looking at what everybody else is doing. And one of the key features of a collective action problem is that everybody has an incentive to free ride or to essentially let someone else pay the costs of producing the public good in this case, or producing a stable climate of paying for the emissions reductions.

[00:05:43] And so what you have if it's a global commons, if climate change, if solving climate change, is seen as a global commons, is that everybody is expected to contribute to solve the problem, everybody has an incentive to free ride, to let someone else pay for fixing or keeping a stable climate.

[00:06:03] And in this case, in this particular kind of global commons problem of climate change, you have a lot of major players, the United States, China, India, not really wanting to act or having very different ideas about what to do. And so you have a structure of a problem where everybody has incentive to free ride and you have to overcome that.

[00:06:27] And you have major players that don't really want to take significant action or have very different ideas about what counts as significant action. And so what we've seen over the last 25 years is this creates an insoluble collective action problem.

[00:06:43] **Ryan M. Katz-Rosene:** Interesting and tell us a little bit more about that in reference, or maybe I'll ask Steven to jump in there, and we'll talk about some of the metaphors that you propose or the metaphor that you propose as a potential solution in a second.

[00:07:00] But you also raised this idea of carbon in your article and I'm wondering maybe Steven, if you can tell us a little bit about what that really means, what are some examples of carbon in different countries?

[00:07:13] **Steven Bernstein:** Sure, I'd be happy to do that. But maybe I can just step back for just a little bit and add to some things Matt said. I think that he really nicely laid out this thinking about thinking about a stable climate as a kind of global commons problem.

[00:07:28] And I think that one of the things that we discuss in the article is that this metaphor of a commons is a very powerful metaphor that is quite useful for lots of different international problems. And we talk about, in a very specific way, say something like fish stocks that have this attribute of commons; people have access to them, but you know, you can deplete them. And we think about it even in areas like international trade about this problem of free riding and if one country doesn't lower their tariffs than another country is sort of cheating, and other countries will not want to do it and so on.

[00:08:04] And what Matt laid out is the political difficulties with climate change in particular, of thinking about the problem in this way and getting countries to solve it because there's all these questions about who is responsible, who is to blame, what's the just solution? Countries are worried that if they contribute, another country won't, and they'll be taken advantage of and so on.

[00:08:27] But moving now to your question about lock-in, one of the big things that motivated us was that not only is it really difficult if we think about the problem like a commons, whereas other problems, it's good to think about them that way and think about how to get cooperation.

[00:08:43]But the very nature of climate change, a human-induced climate change, is that the commons doesn't help us very much in thinking about the productive way in which to actually address the underlying problem and that leads to your question about lock-in.

[00:09:00] If we think about what causes carbon lock-in, it's not that states at some point in history decided that they were going to be locked into the use of fossil fuels or of this kind of energy - it's something that occurred because the internal combustion engine, and discovering lots of oil reserves, and different ways to produce energy and coal, and so on - that are very carbon intensive and economies were built around these things, cultural practices, the sort of power and development of states are built around them, and our own behaviors and our attachment to things like cars, and so on and so forth.

[00:09:37] So there are multiple systems and behaviors that are locked into the use of carbon. And so when we think about ways to address climate change, as opposed to thinking of states are just going to decide to cooperate or not to deal with it, what we're actually talking about is how to overcome carbon lock-in or transform away from carbon lock-in, and that requires lots of different things to happen, not just states deciding that's what they're going to do.

[00:10:07] **Ryan M. Katz-Rosene:** I think if I understand correctly, you suggest that the commons metaphor leads to a particular focus on emissions reductions as opposed to decarbonization, which in contrast, gets at that issue of carbon lock-in. Is that a fair analysis? Is that a fair comparison?

[00:10:24] **Steven Bernstein:** Yes, so I think that's a good way to put it.

[00:10:26]And I think - and actually I will attribute this to Matt because it's his way of thinking about it, which I think makes a lot of sense - which is emission reductions are a symptom and decarbonization is the underlying problem, and gets much more at: yes, obviously emissions of greenhouse gases are a direct cause of climate change.

[00:10:50]But the changes we need aren't simply reducing those emissions, it's changing the systems and practices that are leading to those emissions.

[00:11:00] **Ryan M. Katz-Rosene:** So then you turn to, in your article, and you introduce this idea of the 'global fractal' as a new metaphor. And I think you position this as a different metaphor, a different way of thinking about this challenge, thinking about the challenge of decarbonization, rather than just this collective action dilemma about who's gonna reduce emissions, and why should I reduce emissions if that other country X, Y, and Z aren't reducing their emissions? can you tell, I mean, that's an interesting concept, this idea of the fractal, where did this idea come from and what does that really get at, this metaphor of the global fractal? And I'll turn that back to you, Matt.

[00:11:39] **Matthew Hoffman:** Yeah, and so if you start, if you change your focus from thinking about emissions reductions to think about decarbonization, one of the things that you immediately recognize is that lock-in, carbon lock-in - which by the way was developed by a sociologist named Gregory Unruh - this concept.

[00:12:00] But you notice that this lock-in, this dependence on fossil energy, happens at multiple scales. Families, households, are locked into the use of carbon. Cities are locked into the use of fossil energy, provinces, countries. And what you also notice is that they're locked in similar ways, that at every level there are overlapping dynamics that are making the use of fossil energy so natural. It's about cultural dynamics, it's about political, social, technological, economic - all of these different forces are overlapping and reinforcing the use of fossil energy.

[00:12:40] And this is actually quite a clear characteristic of fractal systems. If you look at fractal systems in nature, whether it's the spiral of a nautilus shell or a river delta, one of the key characteristics of fractal systems is something called 'self similarity'. And that's the notion that no matter what scale you look at a fractal pattern, it looks the same or it looks very similar. And so we noticed that when we started thinking about carbon lock-in as the core challenge, that lock-in at multiple levels follow similar patterns.

[00:13:18] And a second piece of a fractal system, that's really important, is that if you look at fractal patterns, they are interdependent across scales. And so micro level patterns reinforce macro level patterns, and the reverse is true as well; macro patterns reinforce micro level patterns. And this is certainly the case when it comes to carbon lock-in.

[00:13:45] So a city, like Toronto or Ottawa, will be locked into the use of fossil energy because of urban design, or available transportation technologies, how citizens choose to move around the city, building codes, utility infrastructure, all these sort of overlapping, social, economic, technological, and political factors. But of course, Canada is locked into the use of fossil energy as well because of industrial policy, histories of resource use, transportation policy, choices made by Canadian consumers.

[00:14:20] And so you see this sort of similar overlapping dynamics, but of course, the fact that Toronto is locked into carbon reinforces the fact that Canada is locked into carbon, and vice versa. And so we saw that this notion of a fractal system really seemed to characterize the kind of challenge and the kind of problem that we're facing when it comes to trying to disrupt carbon lock-in. And when it comes to ultimately, therefore, trying to move progressively forward on climate change.

[00:14:55] **Ryan M. Katz-Rosene:** So just to ground this a little bit, I mean, that really makes sense. And I really liked that imagery of the spiral, these multiscalar dynamics here where you can have something like an individual, myself for instance, feeling compelled that I really need that combustion engine vehicle to get to work because there's no tr viable public transit systems. And then you go a couple of scales up and all of a sudden you have a provincial or federal government advocating, saying that we need to continue to produce oil because people are still buying internal combustion engine vehicles. So, I think that really helps to explain this idea of lock-in, but is it so simple, I don't mean to use that term, but

how do we then talk about the solution side of things? Because is the suggestion of the global fractal that the same dynamics that kind of lock us into carbon are the same type of multiscalar relationships that we'll see in the process of decarbonization?

[00:15:55] So another way of asking that question is: are you proposing that we will see the opposite of carbon lock-in? So I suppose we could call that decarbonization, is that going to also be a dynamic that we see shared and mutually reinforcing between these different scales? And I'll throw that to you, Steven.

[00:16:17] **Steven Bernstein:** So that's the big question or one big question that and I and others are really trying to get at in our research. And the shortish answer is that it is precisely those dynamics that we are looking for in multiple sets of initiatives that are being undertaken in order to try to decarbonize.

[00:16:42] So in the same way that, as you say, carbon lock-in is overlapping and reinforcing, and so on - when we look at an initiative a city with a decarbonization plan, or a particular policy like building codes, or carbon labeling, or carbon markets - when we look, we don't just look at what is the potential of that particular initiative to lead to emission reductions, to get back to this difference between reductions and decarbonization, we look at whether or not it then can produce dynamics that will have affects that create support for other kinds of policies or will build capacity or incentives or knowledge that can then be used to say, to scale up that initiative or to lead to other kinds of changes that might be supportive of decarbonization.

[00:17:38]So we in fact are looking at those patterns and I guess the broader point is that our research and others has shown that is very unlikely that there's going to be a kind of magic bullet. I mean, what the fractal does imply and we think is accurate, is that it's going to take action and initiatives at multiple scales at multiple levels.

[00:17:59] And what's important is whether or not these particular initiatives have these recursive and kick-in these various kinds of dynamics that will then lead to the scaling and what we call 'entrenchment', that they'll be durable over time that can help undermine or disrupt carbon lock-in.

[00:18:20] **Matthew Hoffman:** Yeah. So it's definitely a more complicated set of solutions than a single treaty, like Kyoto Protocol or a Paris Agreement, that we think is implied by looking at carbon lock-in and decarbonization as the problem.

[00:18:35] But this is also where the global fractal is, we think, a useful metaphor. If those dynamics are right, if these levels are also interdependent, it's not just the lock-in that's interdependent and reinforcing. We hypothesize or have a conjecture that the interdependence that is locking us into fossil energy can actually be used to work for us, to work for decarbonization.

[00:19:02] So, in other words, if you decarbonize Toronto, if you're able to put in place the kind of initiatives that Steven was talking about, to seriously reduce the dependence on fossil energy in Toronto or Ottawa, that is going to alter what carbon lock-in looks like for the whole country of Canada.

[00:19:22] And so that interdependence, it can be used not just to lock systems in, but it also can potentially be used to spread disruption - what Steven was talking about there in terms of scaling and entrenchment is the disruption to carbon lock-in could spread through a global fractal as well.

[00:19:42] **Ryan M. Katz-Rosene:** That's a really interesting idea. And I have one other way of referring to that challenge, or I've seen this on social media, but the idea that exponential growth in consumption of fossil fuels in particular has gotten us into this mess. But perhaps a more hopeful way of thinking about getting out of the mess is that we will hopefully see exponential growth in these kinds of solutions and ways of dealing with carbon lock-in.

[00:20:07] I do want to shift directions a little bit here to, well, to get back to this issue of the interlocking scales and maybe you don't - well, I'm curious to hear your answer on this in particular, Matt and I know you've written about this a little bit on social media - but we have discussed with some of the other guests on this podcast, the relationship between individual forms of action on climate change and collective scale action or regulatory action.

[00:20:34]And I know that's not exactly what you're getting at with the different scales of action in terms of the fractal, but does that debate relate at all to the fractal lens of decarbonization? Is there a role for the individual? Is the individual a scalar sort of level involved in the global fractal?

[00:20:57] **Matthew Hoffman:** I think it certainly can be. But I think that one thing that the fractal lens kind of reveals is really the connectedness and that we need to get beyond the sort of either or, and really think about the connectedness of individual and structural action. So if you decide to take individual action, is it disrupting the carbon in your own life and in any sort of way, is it reducing the dependence of your household on fossil energy?

[00:21:28] Sometimes, yes, sometimes marginally, but even more important, is it possible to see how it can catalyze even in a small way, disruption of carbon in broader systems? And even sometimes - and this is where some of these debates can get problematic because they sometimes veer towards purity debates - but they also, I think, unless you start to think about connections, you also don't realize that sometimes action, and this is something that our research reveals, that sometimes actions taken with the best of intentions to decarbonize or reduce emissions in one place, can actually end up reinforcing carbon lock-in and in other levels. And so the fractal fork is forces you to think about those kinds of connections, right?

[00:22:21] And so, I mean, natural gas, this isn't about individuals, but natural gas is a great example of this. If we got rid of all coal fired power plants in North America and switched everything to natural gas, we would reduce emissions, but that actually might end up reinforcing and strengthening the broader carbon in our continental energy system, which might make it even more difficult to decarbonize and act on climate change.

[00:22:50] And I think people need to think about this at the individual level as well, to be thinking about connections. What is it disrupting and what is it reinforcing? If I take action to insulate my home more, or if I change my light bulbs or fly less, and most of those things are

good, but marginal actions to take. But I think that thinking about the connections is a way to get beyond the sort of, it's all about individual action and consumer behavior, and we can't do anything so everybody should just do whatever they want.

[00:23:26] Ryan M. Katz-Rosene: My reading certainly was that this offers a nice window into the idea of mutually enforcing behaviors at different scales. And that we can't just pin all our hopes on changes at the level of individual consumption, but that we need to talk about the interconnectedness between these different scales and it's a good way to put it in terms of making sure that it's not just about one scale or one level of action, but bringing these forms of action to other scales, up-scaling action, if you will.

[00:23:54]Okay. So, I want to also get to another question that popped up when I was reading your article, which is about how specific we're going to be about the idea of decarbonization. And I raise this because I've recently read a book by Mark Jaccard who's a colleague of ours at Simon Fraser University, who I'm sure you're both familiar with. And he has claimed that fossil fuels are a bit of a myth. Maybe he's being a little provocative, but he does have a book titled Sustainable Fossil Fuels, so maybe not so much, but he's saying it's a myth that we need to entirely get rid of fossil fuels, that we need to keep every last drop of fossil fuel within the Earth's crust to have a stable climate.

[00:24:41] And he's essentially saying - he's not in favor of fossil fuels and the burning of them - but he's suggesting that the real issue is about how they relate within the broader technological sphere. So if you have a technology like coal, a coal fired power plant that is paired with carbon capture and sequestration, that if this system works as it's supposed to, and you have the carbon being scrubbed out of this coal and being burried, that the net impact is essentially carbon neutral.

[00:25:14] So I think he's talking about the need to focus on, to include a suite of energy technologies, including fossil fuels, so long as they're paired with these sort of techno fixes, which can allow us to maintain carbon neutrality.

[00:25:31] So that's a long way of asking Steven, I'll turn this to you, is there a role for fossil fuels, some limited amount of fossil fuels, in a decarbonized world? Or do we really need to start thinking about how we're literally going to keep every last drop of fossil fuels, maybe not today or maybe not in the next 5-10 years, but eventually see a world where we are not digging any of this stuff up and burning it?

[00:26:03] Steven Bernstein: So thank you, Ryan, for turning to me for the very simple question. And, Mark Jaccard's a very smart guy and these are challenging arguments. So I guess I feel like this might be a bit of sidestepping it, but it's maybe a slightly different way of looking at it. So I think there's a couple of things to keep in mind.

[00:26:23]One is that I think, as in Matt's answer to the previous question, it may not be productive to have these kinds of either or debates. I don't think anyone would imagine that we can just tomorrow say that we're no longer going to use fossil energy. So I think that there's an acknowledgement that even as we build, even as we go through a transformation, which I hope that we do and there's some evidence that we're at least starting to, that fossil

fuels will hopefully be a diminishing part of our infrastructure and energy use and so on. But that there's going to be a various amount of time when will be part of the mix.

[00:27:12] But to switch the discussion just a little bit. There's a couple of important things to take in mind, which is where maybe I don't quite agree with Jaccard. So the first is that time is running out and I think that there is a danger in framing the discussion in the way that he does to say, well, then the policy response is they're always going to be here so let's not panic, let's not have these sort of radical solutions, everything in the ground, that's misplaced.

[00:27:41] When I think that the science tells us that indeed, quick very rapid in historical terms, transformation is needed and we're just naive. It doesn't matter what we think and whether we have these debates or not, the science tells us climate change will occur and it's occurring at a very rapid pace.

[00:28:01] The second thing that I think is important to keep in mind, is that these kinds of discussions then tend to lead to, well, what do we have to do then? And I think that's one of the areas in which Matt, the work that Matt and I are doing, tries to change that discussion from here's a suite of policies - that we have to have a carbon price, we have to reduce emissions by this much, companies should do this, countries should do that, and here's the carbon budget - and so by 2050, we need to do this and so on and so forth.

[00:28:36] It's not that that stuff isn't helpful or accurate in terms of, if we did that, it would lead to the kinds of worlds that we want. Our work goes from the opposite perspective. So whether or not Mark is right or not, that carbon sequestration would work, which the evidence so far is that certainly not on the scales that he's talking about, does it work? It switches it to say, what do we need to do to intervene in the system in order to get the transformation going that needs to happen and what are the politics around that in particular?

[00:29:09] What are the changes? What kinds of things are leading to the kinds of changes that are necessary? So rather than having an abstract debate about whether carbon sequestration is going to work, we would say, what do we need to do to start transitioning away from fossil energy? And to get support for if there's still going to be need for coal, to get the kinds of support and money and investment that would be required in order to do the kinds of things that Mark thinks might be necessary in terms of if fossil energy remains part of the mix. And that's why we look at the politics of coalitions of kind of formalizing how you gain support, how you gain capacity in all kinds of different areas, and we think the fractal is useful for that purpose.

[00:29:52] **Matthew Hoffman:** Yeah, I won't leave Steven hanging on this one because I agree with him. I'm really - I may preface this by saying I'm not a sort of expert on the economics of CCS - but I'm wary of quote unquote 'solutions' that promise will be okay without transformation.

[00:30:11] Because if global scientists, climate scientists, are correct and we really need 80% reductions in emissions and essentially to be fully decarbonized by mid century, I worry what

these kind of bridge type solutions that say, we can keep doing what we're doing if we do this other technological thing, or we're going to keep doing what we're doing, but we'll do it with a slightly lower emissions fossil fuel energy.

[00:30:43] The litmus test I think of is, do taking those solutions or following those solutions, do they make it easier or harder to generate and pursue transformation? The kind of transformation we need in our energy systems, transportation systems, societies really, because we do need some sort of fairly significant transformation.

[00:31:10] And the second point I'll make is that a lot of these are solutions that are essentially maintaining the status quo or supporting the status quo. And there's a lot of reasons to not support the status quo for some of these technologies, regardless of climate change. The coal industry is not great for labor, for other environmental issues, for other health issues. Similarly, a lot of the fossil fuel industry is not great for societal equity, for justice, for issues of race, and damage to indigenous communities.

[00:31:55] And so I look at the necessity of having transformation that's not just about climate change, but it's about justice and equity as well. And so I'm wary of solutions that promise that the status quo is going to continue and that that will help us get to transformation.

[00:32:16] **Ryan M. Katz-Rosene:** Yeah. I mean, it's certainly an interesting debate. And I think one of the motivations - I don't want to be putting words or sentiments into his mouth - but I think one of the concerns is that sometimes a politics of transformation, and that is a loaded term that I suppose we could define in different ways, but I think sometimes it scares people. And it's the idea of having to change our lives, drastically change our behavior and change the way we go about doing our regular life is something that, as a counter argument, is sometimes leveled as one of these reasons why we need to maybe be a bit careful about the way that we're framing transformation or the idea of the scale of change that we need.

[00:33:03] But it sounds to me like you're both unequivocal that we really do need to be open to the idea of transformation, is revolutionary scale transformation, is that a fair claim, Matt?

[00:33:17] **Matthew Hoffman:** Yeah, I would say, and I would add two things to it, I think you summed that up well, but I would add two things to this. First is that we're seeing transformation whether we want it or not. I think that the evidence of climate impacts is just ever-growing and the speed at which we're facing transformation of our world is becoming evermore clear.

[00:33:38] And the second thing I would say, and this is, I unapologetically but with credit steal from a colleague of ours Simon Dalby at Wilfrid Laurier University. He's fond of asking about this very kind of question: what's really the radical position? Is the radical position that we continue a status quo that is essentially doing vast amounts of damage to the planet and to many communities? Or is the radical position to stop doing tha?. And I'm with him, I think the radical position is actually to continue doing, to continue pursuing the status quo when we know that the status quo is damaging.

[00:34:22] **Ryan M. Katz-Rosene:** Yeah. Well, truth be told I'm with him too, he was actually my PhD supervisor. Okay, I have a final question for both of you. And we try to end these episodes by asking about your hopes about the future and be honest here, but we were wondering about ways that you remain hopeful or maybe techniques or things that you think about that make you hopeful about the future, in particular around the idea of confronting climate change.

[00:34:51] And maybe one way to introduce this question is to go back to this idea of the metaphor that you invoked in your articles. So your guys' stated purpose, or one of the stated purposes of your article, is to provide new metaphors for international climate governance, in part because some of the previous metaphors and lenses haven't worked.

[00:35:13] So starting with you, Steven, are you hopeful that new ways of confronting the challenge of climate change will help us get out of this mess?

[00:35:23] **Steven Bernstein:** So I should preface this by saying, I don't like the word hope or despair, for that matter.

[00:35:31]Because I think that one of the things that has motivated me in the research is to try to think very practically. I don't know what's going to happen and I go back and forth. And I think that, as I was saying before, I react very much against this predicting: here's a solution, we can do that, or we can't do that, so we should either go full force into it or just give up. And I worry about that mentality.

[00:36:02] I think what gives me motivation to continue to do this research and to think that human societies can be quite innovative and adapt, and even in very tough times when things look very bleak, find ways out of things or at least to move forward, is precisely in the research that we do.

[00:36:21] One of the reasons that I liked the idea of the global fractal is that, in my view, it is actually describing how, at least in the last 10 years if not in the earliest days of climate change concern, how we as a species are indeed responding to this crisis.

[00:36:40]We are seeing hundreds, thousands of initiatives all over the world, attempts to deal with it, some quite on a large-scale, some on a small scale. Those alone are not going to do very much necessarily, there's not a magic bullet - but seeing that there is a widening recognition and efforts and investment and concern and individuals and the mobilization of young people and concerns about how this affects different communities who are suffering now because of climate change as Matt was talking about - these things moving together, and again, of thinking through how the politics of that can lead to a scaling of action and learning from each other and entrenching new ways of doing things, that to me is where I look for in terms of continuing to work on this problem and finding ways to move forward to address it.

[00:37:41] **Matthew Hoffman:** Yeah, I guess I'm a little less allergic to the word hope, but mostly because I take my understanding of hope from Rebecca Solnit, a historian and public intellectual, who has written a lot about hope and despair.

[00:37:55] Because she talks about hope as the uncertainty of what's going to happen, of embracing uncertainty; that despair is knowing things are going to be bad and optimism is knowing things are going to be good and hope is found in the uncertainty that you're not exactly sure what the future is going to hold. And it's that space of uncertainty that provides the opportunity for action.

[00:38:20] And Steven, I find the uncertainty and motivation to keep working on this precisely from the same place he does, that there are thousands of initiatives and millions of people working on transformation. And that this has become a truly global response to climate change in ways that have gone so far beyond the sort of classic multilateral negotiations that really characterized climate politics from the early/late 1980s through the early 2000s.

[00:38:56] And so I don't know if it's all going to work, but at least I think that the response is starting to match the nature and magnitude of the challenge. And we've got a long way to go to be sure, but I at least see some uncertainty there that gives me some hope.

[00:39:16] **Ryan M. Katz-Rosene:** Okay, well, maybe we will leave it there and end on that note. Thank you guys so much for joining in on this episode and serving as guests for the Ecopolitics Podcast. I really enjoyed hearing your thoughts and just working through your article, which I really enjoyed reading last fall when it came out and to just talk about the ins and outs of decarbonization and carbon in a deeper way than I think we usually do on a daily basis. So thank you guys so much, really appreciate your time and for sharing your thoughts and wisdom with us. So I will wrap it up there.

[00:39:52] That concludes this episode of the Ecopolitics Podcast. Don't forget to check out other episodes in the series at ecopoliticspodcast.ca. And Matt, Steven, thank you once again.

[00:40:04] **Matthew Hoffman:** Thanks so much for having us.

[00:40:05] **Steven Bernstein:** Thank you very much.

[00:40:07] **Peter Andrée:** And thank you to Ryan for hosting this episode on decarbonization. The Ecopolitics Podcast is made available under a Creative Commons License 2.0 in Canada, please share it and use it widely, we just ask that you provide appropriate attribution. Please follow us on Twitter @EcoPoliticsP.

[00:40:26] The Global Ecopolitics Podcast is produced by Nicole Bedford, support with transcription and captioning is provided by Kika Mueller, and Adam Gibbard helps us with artistic design and digital support.

[00:40:39] See you all in our next episode. Stay tuned.