

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

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Hosts: Peter Andrée (Carleton University) and Ryan Katz-Rosene (University of Ottawa)

Guest: James Meadowcroft (Carleton University)

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In this episode, we speak with Dr. James Meadowcroft, Professor in both the School of Public Policy and Administration and in the Department of Political Science at Carleton University. He sheds some light on how the environment became a defining issue in the discipline of Political Science, and shares how an organization called the Transition Accelerator works to advance technological, business and social change for a more sustainable future.

Episode 2: Introduction to Ecopolitics

James Meadowcroft: Our societies have been systematically changing nature to make them better for us. Trying to, though often we then get unintended consequences that make problems worse for us. We've been doing this for thousands and thousands of years, but now, since, particularly with the great explosion in human population and the increase in technologies and the continual burning of fossil fuels we're now making changes on a scale unimaginable, and that will have very, very serious consequences if we don't deal with them.

[00:00:42] **Ryan Katz-Rosene:** Welcome to the Ecopolitics Podcast, a podcast series that tackle some of the big questions in the field of environmental politics for university students in Canada. I'm Ryan Katz-Rosene from the University of Ottawa, cohost of the show, along with Dr. Peter Andrée from Carleton University. And in this episode, we're talking with Dr. James Meadowcroft, a professor in both the school of public policy and administration and in the department of political science at Carleton University. And we want to get his help in introducing and contextualizing some of the core themes of ecopolitics in a Canadian context.

[00:01:18] **Peter Andrée:** He's written extensively on environmental politics and policy, sustainable development and the low carbon society. And in particular, James is currently the research director of the Transition Accelerator at Carleton University. I'm looking forward to him sharing a little bit about what that work is about. James, welcome to the show. Can you take a couple of minutes just to tell us how you see the field of ecopolitics or environmental politics, and how did you come to it?

[00:01:43] **James Meadowcroft:** Hi, Peter and Ryan. It's great to be here with you today to talk about this field. Well, I guess, for me, ecopolitics is all the ways, it's anything to do with the environment intersects with social and political phenomena. So it's really a very quite a broad field and for me, for

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

<https://www.ecopoliticspodcast.ca/episode-2-introduction-to-ecopolitics-2/>

instance, that's reflected in how I teach my introductory course on this issue, where we spend some weeks on environmental philosophy that deals with things like what our conceptions of nature are and how we believe a human being should behave vis-a-vis phenomena in the natural world, be they animals or ecosystems and so on. We talk about, about environmental economics, how do people value the environment. How can you put monetary value on different aspects of the environment and what do people try to do with this valuation? And then all sorts of particular areas of politics. So international politics how the environment enters into international treaties and negotiations and disputes among countries. Environmental movements and groups, how people have organized to defend endangered species or to enact create national parks or to fight against pollution, or also to fight against injustices and inequities linked to the environment.

[00:03:20] **Peter Andréé:** I'm curious to hear how you see this area of environmental politics fitting into political science as a whole.

[00:03:25] **James Meadowcroft:** It's interesting because over time this has become a more significant area of political science, but actually when I was starting my career back in the early nineties, interest in green issues and the environment was really seen as pretty much marginal to the core of political science. I mean, I remember when I was a young lecturer at Sheffield, after I'd been there a couple of years the head of department actually kind of pulled me aside for a private chat and said, I really should think about giving up interest in this topic if I wanted to, you know, make a successful career and become a professor, because he says nobody's interested in that, it doesn't change the results of elections, it doesn't interest parties. Um, give it up! Of course I didn't give it up, which I'm glad about because what happened over the intervening 25 or 30 years is that the environment has become ever more central to contemporary political discourse and argument. And in fact, today there are elections that turn quite heavily on environmental issues like climate change.

[00:04:37] **Peter Andréé:** Well, it does. And I know that you've spent a lot of time thinking carefully about how the environment has emerged on the political scene and in particular, the whole notion of sustainable development and how that's become an important activity that governments all around the world are involved in to realign their various activities. So could you tell us about what the environment has become in the political agenda of governments, especially in the global north?

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

<https://www.ecopoliticspodcast.ca/episode-2-introduction-to-ecopolitics-2/>

[00:05:01] **James Meadowcroft:** So I'll answer your question, Peter, but in a slightly roundabout way in the sense that I'll start back in kind of before the 1950s and today the environment is so closely integrated to everything that we do. If you open a newspaper, you'll see half a dozen articles dealing with it, or look at them online and so on. And you can't imagine a platform of a political party that doesn't deal with certain kinds of environmental issues. But the truth is that the environment, as we know it, is a kind of, as a kind of political conception is actually a reasonably recent phenomenon.

[00:05:44] If you go back to the 1930s, the 40s and the 50s, you will hardly find the word environment even used in the way in which we use it today. Of course, environment meant surroundings. But what happens in the 1960s is for a variety of reasons, a bunch of issues that are seen before as separate like air pollution, national parks, conservation of nature, begin to be pulled together and linked in this word of, this kind of conception of environment. And the way I characterize it as it is the environment, as it emerges in the late 1960s and early seventies is kind of all that surrounds us that sustains humanity, but that we are in the process of screwing up. So the environment is kind of a vulnerable thing, which is essential to sustain us, and yet being threatened by our very activity. And what happens then is the groups that were quite disparate - some group trying to fight against local air pollution, or preserve a local lake or beauty spot - suddenly begin to see themselves as oh, this isn't just the bad quality in my town. This is saving the environment from the harm that industrial civilization is doing it. So this becomes very powerful and it's interesting that it's exactly at this time, the late 60s and early 70s, that the industrialized countries, within the span of about five or six years, the major ones all create environment ministries or environment agencies. They create expert committees of scientists to provide advice to government and many of them pass national clean air acts or national clean water acts, and then a few years later waste toxic waste management acts and so on. So suddenly once you begin to think of the environment in this way, then you, the kind of question is, well, how do we protect it?

[00:07:52] Well, then we turn to the state or government. So it makes sense to set up a ministry, to protect the environment from the kind of ravages of industrial civilization. And what happens over the next 20 or so years, governments, and it's almost coordinated within the OECD, pass a whole raft of regulations, which actually did make a lot of sense difference over time and cleaning up some of the worst abuses for instance lead contamination in the environment. And yet after 20 years, so now we're talking into the 1990s, more problems kept coming. And some of those that were being dealt with were

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

<https://www.ecopoliticspodcast.ca/episode-2-introduction-to-ecopolitics-2/>

very persistent and not dealt with at all. And this, in the kind of 1990s, late 80s, 90s, led to a reformulation or rethinking of how the environment and how we can protect it could take place.

[00:08:56] And that was when the idea of sustainability or sustainable development started to come to the fore. And what the kind of critics of this first generation of environmental policy said was, well, the early instinct in the early seventies or late sixties was, We have a problem. We'll set up a ministry and it will deal with the problem. Just the way we've set up a ministry of transport or whatever, to deal with particular problems and the regulations that they passed, as I said, made some difference. But the problem with that is that all the other ministries were busy trashing the environment. Basically it's like a, you know, a gentleman running behind an elephant with a broom, trying to sweep up the mess because the ministry of transport looks and says, well, we need roads. We have transport problem. Let's build the roads and the ministry of mines said We need mines, let's build mines. And they were kind of trashing the environment as a byproduct of their activity with one junior ministry trying to rectify the situation. So then really the idea came to the fore that what we need to do is integrate environmental considerations early in the decision making process. That's to say when we make decisions about development, integrate the environment in a way that, so that we consider both economic development, social equity, and social issues.

[00:10:21] But also environmental issues in the very making of that, of those decisions. So maybe we realize, well, wait, maybe we should build a better system of transport than just roads. If we're going to have mines, what we have to think from the beginning about disposal of the mine waste and so on.

[00:10:38] **Ryan Katz-Rosene:** That's a good basis to start from. And you've given a really good history, really of sort of the evolution of thought in terms of how we're thinking about sustainability and environment within the political sphere. You've told us about how this is all encompassing issue in many ways, and also spawning new challenges as we're kind of working to find ways of integrating environmental considerations into policy.

[00:11:05] I want to turn to a more specific discussion, about maybe environmental politics in the Canadian context and a particular issue within the sphere of environmental politics that might be of interest to you. So I suppose a way of asking this is, you know, what's an issue that relates to an ecopolitics that preoccupies you from day to day in your work as an environmental political scientist?

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

<https://www.ecopoliticspodcast.ca/episode-2-introduction-to-ecopolitics-2/>

[00:11:32] **James Meadowcroft:** I would say the issue that most absorbs me on a day to day basis, is that of the transition to a low carbon economy. And that obviously relates to climate change. But I would like to just mention a couple of other issues, that I think are also important, but that we tend to forget about.

[00:11:55] In some ways, air pollution is the beginning in terms of national environmental policy. There was a lot of air pollution regs earlier in the 20th century, but it was mainly cities that solved the problem. So Toronto, for instance, had a big air pollution problem. The fogs in London are well known and so on. So since air pollution was mainly understood as a local problem, it was handled locally. What happened in the 1970s that people began to understand the larger dimensions of air pollution that pollution could be transported between North America and Europe, between England and the continent and so on. And there, you had the emergence of issues like acid rain, for instance, which was very important in the Canadian context as a focus for the environmental movement and then eventually regulations and interactions between Canada and the United States and so on.

[00:13:00] One of the interesting things about this, and I referred earlier to the fact that some things we've made real progress on, and sulfur dioxide emissions is one of those examples because it causes acid rain. It came particularly from emissions from coal powered coal electricity plants. That has been, in Canada but also elsewhere in the OECD, dramatically reduced. Not just reduced as a percentage of our production or GDP or something like that, but absolutely reduced to quite a low level compared to what it was 30 or 40 years ago.

[00:13:44] And yet in some ways, air pollution is constantly bringing new problems to the fore, where we realize we haven't really cracked the issue. And two things I'd highlight there - one is that with the increasing advance in medicine and epidemiology and so on, we understand that air pollution is way more damaging than people thought it was 50 years ago or even a decade ago. So now we know that air pollution, particularly particulates, don't just cause asthma, they cause cardiovascular issues, they may be linked to dementia, there are a whole series of issues and I was heard a recent, interview with a scientist who said she'd been, this is a bit gruesome, but dissecting bodies of young children. And she had not found a tissue in their body that did not have particulates contaminating it, from the brain to the lungs to the kidney and so on.

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

<https://www.ecopoliticspodcast.ca/episode-2-introduction-to-ecopolitics-2/>

[00:14:53] **Ryan Katz-Rosene:** And that's air pollution and we haven't even gotten to climate change and carbon dioxide, although they're interrelated.

[00:15:00] **James Meadowcroft:** Absolutely. But just to finish up on the air pollution thing. So one side of it is we understand it's much more dangerous now than we did before. And there's some evidence, for instance, in the recent COVID crisis that people in areas with high pollution had much higher mortality rates than people in lower pollution areas. But the other thing is we keep finding new pollutants that we didn't know about. So for instance, the latest one is microplastics. Which get chewed up in teensy little fibers and then blowing into the air. And there are scientists recently, who've been looking at plastic fallout over London and Paris and so on. And we know now that these microplastics make it into the human body, but there's not, we don't yet have research about what it does, but the assumption has to be, is it probably isn't particularly good for us.

[00:15:59] So I would say that air pollution we've done an enormous amount on, but it hasn't gone away. And I guess the other example, there is nitrous oxide emissions. People may have heard of the Volkswagen scandal where Volkswagen was tricking the testing on diesel engines. So many European cities in particular, cause there are more diesels there, have quite bad air quality. And when I say they tricked the tests, they did trick the test, but the test had also been designed in such a way that they were kind of almost inviting you to trick them since the way they test engines is put a car up on a block, tell the car it's about to be tested, test it for 30 minutes. And that's it. There was no actual testing like on hills or in rain or in cold weather.

[00:16:51] **Ryan Katz-Rosene:** There should have been a pop quiz. I had one of those so-called green diesel VWs. But James, if I can sort of ask you about to maybe get to the heart of the matter of the political aspect of this, or even the political economic aspect of this. You know, we live in a particular political economic context in Canada. We have certain types of industries that have been favoured. We have a long political economic history in this country, organized around resource extraction and production of certain resources, which have contributed to the problems you're talking about air pollution, other types of pollution and climate change, which we haven't delved into yet. But maybe you can give us a sense, and especially, you know, the listener, the student listener in particular, how that Canadian political economic context shapes some of these issues that, you know, that keep keep you up at night, so to speak.

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

<https://www.ecopoliticspodcast.ca/episode-2-introduction-to-ecopolitics-2/>

[00:17:57] **James Meadowcroft:** Yeah, certainly, and maybe I'll use it as an excuse to talk a little bit about climate change then. So we know that globally climate changes is a problem. To solve it, we've got to basically stop emitting greenhouse gases into the atmosphere. And that means moving away from fossil fuels that have powered industrial civilization for the past 200 years.

[00:18:26] So Canada, as you say, has had a very, has a resource dependent industry. And we today have a very carbon intensive lifestyle. So you can see that in two ways. I mean, one is, we actually have a big fossil fuel extraction industry, mainly oil and gas in particular, We all know well about the tar sands and that's a big, has been a big contributor to economic growth in this country, but also if you look at the carbon intensity of our economic output, this is not just the oil and the gas, but how much, how much greenhouse gases we emit for every dollar of output that we produce. Canada has one of the most intensive carbon intensive economies in the world. The reason is for this people often say, Oh, well, we're a big country. So you have to travel a lot or, we're a cold country, so we have to heat a lot. And of course, both of those are true, but the main reason is because our economy, as you said, is resource intensive and high carbon in that sense has actually been a competitive advantage over the past hundred years.

[00:19:47] So Canada did not compete with Germany, say, on making the best machine tools, or the United States on having a rocket industry or, whatever, or even cultural industries. What we had competed on is providing natural resources and doing the resource processing, which has high energy needs. So Canada is swimming in energy. We've got hydro, we got fossil fuels, we got wind, we got solar, we got wood, you know, from coast to coast. And cheap energy and cheap land were the two fundamental things that built the Canadian economy, and the cheap land contrasts directly with the experience in the United Kingdom or Germany, or even France, where land is, you know, has high values and people have to be very careful -

[00:20:40] I mean, look at how our cities are built. Yes, we have skyscrapers downtown, but then we roll out big box stores, one story things, miles and miles. But of course it has a big energy penalty. These buildings have high, comparatively high carbon footprint and low occupancy rates. So there is an important path dependence or historical element in why we are in the place that we are today.

[00:21:10] **Peter Andréé:** I wanted to ask you about the transition to the low carbon economy. You've been eloquently I think explaining why Canada has had a rather high carbon budget. And I know your

work is really about thinking about how we turn this ship. And maybe in responding to that, I said at the beginning that you've been involved in this project called the Transition Accelerator. Can you tell us a bit more about how that fits into your understanding of where we need to go now?

[00:21:35] **James Meadowcroft:** So, last year, over the past, maybe it's even a bit more. I worked with, a number of colleagues in different parts of the country to create a new, not for profit organization called the Transition Accelerator. And this, the kind of mission of this organization is to accelerate Canada's response to the problem of climate change, to decarbonize the economy, but particularly to link these challenges, this challenge, to other transformation processes that are taking place in the economy as a whole. A lot of my academic work over the last decade has been working on what in the literature they call socio-technical transitions. And these are transitions or big changes in major systems of social provisioning. And so I'll give you an example would be the mobility system. How we get, how we get around, the agro food system is another example, the electricity system. So if we look at technological development over a longer span, say 200 years or something like that, what we see is that mostly development in these systems that are both social and technical, proceeds by incremental change. There are gradual improvements that make the way things function more efficient over time. But that periodically basically they go through much more dramatic system reconfigurations.

[00:23:16] So I'll give you an example. I call these things sociotechnical systems because they're both social and technical. So if you just think about the electricity system, for example, right. It's a bunch of wires that connect power dams and power plants through transformers, and they end up in people's houses and then charge your mobile phone or run the dishwasher or whatever. So it's a technical system, but it's also a social system because it involves relations between all sorts of entities. So there are power producers that have legal relations with distribution companies. There are laws that regulate who can plug in what to the system. There are all sorts of rules of thumb by which engineers decide what's allowed and what isn't allowed. There are property rights, who owns what and who owes what to whom. So if you think about all our big systems, like the transport system, based around the car, they have all these dense social regulations and rules and relationships, as well as the physical connection between oil going into the gas, gasoline going into the tank of your car and so on. So these big systems if we look back in history, we see that there are lots of examples where they changed in a major way. So think about the birth of the modern automobile.

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

<https://www.ecopoliticspodcast.ca/episode-2-introduction-to-ecopolitics-2/>

[00:24:39] So we replaced a system that was largely horse-drawn transport, or perhaps streetcars, with a system of independent cars owned by, you know, mostly by individual families or companies driven with an internal combustion engine powered with gasoline. And as we built out the automotive economy, once Ford had kind of mastered, mass production, this automobile system transformed our cities. Suddenly people could live in suburbs and work a long way from home. It changed the way people have vacations. Before people had to take the railroad and stay in a railroad hotel. Now the motel was born and so on and so on. And linked into the system, we have garages and companies and loan companies, and that in further advertising industry, the traffic police tickets system, parking lots, the whole structure of physical of our cities changed.

[00:25:42] So this that's an example of such a sociotechnical transition, but there are others too. The shift from sailing ships to steam ships, the emergence of modern manufacturing, the digital revolution that we'd be going through over the past 30 years. So the basic idea of the Transition Accelerator is to say, we can learn from these major transitions. And we can draw lessons for the sorts of changes we need to do in order to engage with climate change. Because when we look at the magnitude of the climate question, it's clear that it's not just about cutting a few emissions here or there, it's not just marginal changes to these systems. We have grown so dependent over the past couple of hundred years on fossil fuels that if we want a system that works without fossil fuels, we need to dramatically change those systems.

[00:26:39] **Peter André:** Yeah and it's not just a theoretical idea. It's also being picked up by governments all over the world who are starting to think about zero carbon economies by certain dates like 2050, or even sooner. So there's a lot at stake, isn't there, in making these transitions.

[00:26:54] **James Meadowcroft:** Absolutely. And I mean, now the kind of latest expression is net zero by mid century so that in other words, squeeze carbon emissions out completely. Or if there are any residual ones, they have to be counterbalanced with some form of carbon absorption like planting trees or something like this. So in it's work the accelerator basically tries to link the low carbon transition with other disruptive forces that are going on in these different sectors. So if you think about the personal transport sector, for instance, which has been based on cars now for a century in Canada, all sorts of things are shaking up the sector. So there's the emergence of electric vehicles. There is the possibility of self driving vehicles. There are new business models for car sharing like Uber and Lyft. There's the fact that increasingly young people are not so obsessed with getting their first car as they

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

<https://www.ecopoliticspodcast.ca/episode-2-introduction-to-ecopolitics-2/>

were 30 or 40 years ago. And so these things are starting to change the sector to make it very dynamic and fluid. So for the accelerator, what we want to do is work with innovators in business in government to say, How do we accelerate these changes, for instance, the electrification of personal transport, so that the results will be good for society and good for the environment.

[00:28:22] **Ryan Katz-Rosene:** You know, you mentioned the word disruption, James, and, you know, and seeking good outcomes for society. One of the things we talked about earlier in our introductory episode to this podcast was how, you know, one of the focuses of eco politics is to discuss winners and losers. And so maybe one question for you about the Transition Accelerator is, you know, how do you, how do you take into account the losers in transition? I imagine that when we're advocating a transition away from fossil fuels and we talked about earlier, how Canada has been fundamentally dependent on the fossil fuel sector. How do you do that in a way that is just, that accounts for, you know, the interest and the people and the real, you know, families that are impacted by that kind of a transition.

[00:29:18] **James Meadowcroft:** So you're absolutely right. One of those lessons that we can learn from past transitions, you know, the emergence of modern agriculture with fertilizer based, or the shift away from horse transport or whatever is there are always, winners and losers. And even if society as a whole gains from the advance, so very few of us would like to go back to kind of getting out and brushing down the horse and saddling it up to go to work, cars are much more convenient. Even if society gains, there are always groups, could be workers, it can be owners of businesses, but it could also be whole regions who are disadvantaged by what can for society as a whole be a positive transition. So for the work of the accelerator, and it's clearly an important political issue, as you suggest we need to see how do we, how do we manage these processes? So the collateral damage, if you like, is minimized. And so that, for instance, with workers that we develop alternative industries and forms of employment, we provide retraining for people so they can occupy other jobs and so on. I mean, in Canada and the fossil fuel sector, it's really clear because a couple of provinces, I mean, many provinces produce fossil fuels, but particularly Alberta and Saskatchewan, perhaps to some extent, Newfoundland are really heavily dependent on the fossil fuel industry. And as those industries shrink in the future, it's going to cause us significant, economic disruption. I mean, one thing to note, however, is that the fossil fuel industry in particular is itself a cyclical industry, and Alberta for instance, has had a cycle of booms and busts ever since oil was first kind of discovered and the industry developed there. And recently we have seen one of those busts accentuated with the COVID-19 crisis.

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

<https://www.ecopoliticspodcast.ca/episode-2-introduction-to-ecopolitics-2/>

[00:31:36] **Peter Andréé:** So, James, can you give us a practical example where you with the Transition Accelerator project, you've been thinking through potentially supporting one of these transition pathways that also has these, co-benefits not just about the environment, but also about health or economic wellbeing in this country. And maybe given what Ryan was just pointing out around potential losers in transitions, can you talk about how the work that you've been doing really thinks about their needs and how to bring that into the process of transition?

[00:32:06] **James Meadowcroft:** I mean, the pathways that we've started work on so far, one is around hydrogen as a fuel source for heavy trucking, but also for some difficult to decarbonize, heavy industry sectors in Canada, like steel and cement and so on. We're also working on integration of the power systems in the northeast of North America. And we're also working around buildings and improving the heating systems and the cooling systems and the insulation and so on. In buildings, buildings offer one of the kind of biggest, if you look at the biggest emissions sectors in Canada, it's fossil fuel production, it's transport, followed very quickly by buildings. Of course there's some from the AgriFood system and so on.

[00:33:02] In each of those three examples, there are elements that touch this just transition, if you like, issue that you're raising. For instance, the hydrogen economy, one of the things that is appealing about this for the, this is for really heavy trucks, the biggest, the tandem things that roar up and down the high highways out West, they're rather difficult to electrify with batteries because the batteries are actually so heavy it significantly compromises the load that the can take. And they also take a long time time to recharge, which isn't good for these sorts of heavy freight movements. So it turns out that hydrogen works quite well as a fuel for these trucks.

[00:33:47] But one of the interesting things is that you can make hydrogen both from electrolysis that's to say from renewables, if you have wind which is blowing when nobody needs the power, you can use the excess power to make hydrogen, from windmills or solar or whatever. But you can also make it from through something called methane reforming, which basically takes natural gas and makes it into hydrogen. Now, the way they do it now has lots of GHG emissions, but there's no reason you couldn't do carbon capture and storage on that and reduce the, you know, 90% plus of the emissions. So if you develop hydrogen as a fuel source for heavy trucks out west it would offer a lifeline, if you like, to the existing oil and gas industry. In other words, it offers them a pathway towards being net zero, where

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

<https://www.ecopoliticspodcast.ca/episode-2-introduction-to-ecopolitics-2/>

they would no longer produce bitumen from the tar sands and export that, they could instead, ultimately become a net zero energy exporter, which could be electricity, or it could also be hydrogen.

[00:35:02] So there's a political aspect to this hydrogen pathway to help both kind of neutralize the opposition from the big vested interests, but also to provide opportunities for employment and for jobs in a decarbonizing economy. And just to give an example of the work we've done, that we've just recently created something called the heartlands taskforce on hydrogen for Alberta, and we've got involved the mayors of Edmonton, Wood Buffalo, and four other regions plus provincial plus federal officials and the academic experts and various stakeholders. And they're all discussing, you know, could there be a hydrogen future, a net zero hydrogen future for Alberta looking forward. A much simpler example around buildings, and this is something where the taskforce for resilient recovery post COVID that I've been involved in, one of our proposals was that the government should spend several billion dollars establishing a fund to retrofit buildings in Canada to make them more energy efficient, and this is an example of something that it's good for climate change, because it will reduce the emissions from natural gas, from building heating and stuff like that. But it's also particularly good for poor and lower income families because they spend a disproportionate amount of their income on heating expenses in winter. and we even propose in that proposal, we suggest particular funds to favor low income communities in this retrofit program. So that's another way where you can dovetail something that is to do with decarbonizing and moving towards a low carbon economy and something that deals, engages directly with equity issues today.

[00:37:06] **Peter Andréé:** This has been a really fascinating conversation, James. We've gone all over the place, from a kind of history of how the environment came onto the political scene in the 1960s and seventies. And one of the things I was going to point out in relation to that is that just around that time, that human beings first saw these photographs of the earth from space and actually saw the potential for fragility of this environment that we rely on the biosphere floating around in the darkness of space.

[00:37:31] I think that's all part of what that political moment was in the late sixties and early seventies. And then you've taken us right through how air pollution is a domestic issue and a transboundary issue and some of the successes in addressing issues like sulfur dioxide. I think it's easy for students to feel like nothing has progressed in this field over time but in fact, there's a lot of good news stories as we look back over how environmental issues have emerged and been dealt with politically and socially. And then you've really brought us into your current work with the Transition Accelerator to a low carbon

The Ecopolitics Podcast - S01E02: Introduction to Ecopolitics

<https://www.ecopoliticspodcast.ca/episode-2-introduction-to-ecopolitics-2/>

economy. You and your colleagues are really trying to identify how socio-technical transitions work, how they work historically, and how can we harness the lessons from that in trying to move forward transitions right now. You've also done a great job of addressing Ryan's question of the potential losers and those transitions and how you ensure that transitions are just. So maybe the last thing that I just want to ask you is if listeners want to know more about the Transition Accelerator, where should they look?

[00:38:35] **James Meadowcroft:** I mean, the two things I could suggest one is that you can look up my profile at Carleton, that's one starting place. And the other is that the Transition Accelerator does have a website. If you just google transitionaccelerator.ca you will be led to this website. I guess if I you didn't quite invite me to do this Peter, but if I had a concluding remark to say which, which I think I'd like to emphasize and I really try to emphasize to my students.

[00:39:09] I think that two things to understand - one is that the trajectory on which we're on in which the human impact on the environment has only grown over time, we've been on that for a very, very long time. So latest research suggests that thousands of years ago, human beings began to have a significant impact on the environment. We changed the distribution of species. We changed the way watercourses flow. We altered ecosystems and in a way that has had lasting consequences. So one hand we'd been at this a very, very long time. But the other thing is to say that particularly since, you know, the past over the past 50 or 60 years, maybe since the end of world war two or something like that. Since about 1950, there's been a step change in the pace and character of the transformation that we're bringing to the natural world.

[00:40:16] **Ryan Katz-Rosene:** Thank you for that concluding note, James, and yeah, the time is now to act sort of a common refrain for the end of these episodes, but really appreciate your taking the time to speak with us and to help us introduce some of the big themes relating to eco politics and that we should probably wrap things up for this episode of the Ecopolitics Podcast. But I want to remind listeners to make sure to check out the other episodes in the series, which are available at the website, ecopoliticspodcast.ca.

[00:40:51] And don't forget to like us on social media, share your feedback, get in touch. We'd love to hear from listeners and hear what you think. So thank you, James. Thank you, Peter. Thank you to the listener. And once again, look forward to chatting with you all during the next episode.