

# Climate change and Permafrost Carbon Feedback demand urgent action – and much more research

## Report on the 4th Permafrost Carbon Feedback Intervention Roadmap Dialogue

We know enough – and not nearly enough.

That statement might seem like a perverse consensus, but it well describes the points of agreement in a sometimes-argumentative 4<sup>th</sup> Dialogue of the Permafrost Carbon Feedback Action Group (March 24, 2021). John Holdren, Professor of Environmental Policy at the Harvard Kennedy School of Government and former Director of the Obama White House Office of Science and Technology Policy made the case: “We already know enough to know what to do.” We know, categorically, that humans have triggered a planetary warming trend that demands an urgent global campaign of decarbonization. “We simply need to get on with it.”

We also know the intensifying potential of thawing permafrost – a fragile storehouse containing twice as much carbon as in all the earth’s atmosphere. But we don’t know how quickly permafrost is thawing, how fast it is emitting greenhouse gases, or what countermeasures might mitigate the problem. So, Holdren said: “We need to increase research and development on advanced technologies that would enable us to do a better and bigger job. We need to invest in adaptation technologies, because we cannot stop climate change in its tracks. No matter what we do, we are going to be adapting to the actual harm from climate-related impacts for a long time to come.”

The privately funded Permafrost Carbon Action Group convened this dialogue series precisely to address these questions, assembling expert panelists and attracting hundreds of leading academics, government policy makers, technology investors, climate change activists and media from around the world to four virtual symposia, addressing the science, technology, economics, policy, social and ethical implications of permafrost thaw.

The first dialogue (March 4) surveyed **Why Permafrost Carbon Matters** and garnered easy agreement: thawing global permafrost is releasing an increasing amount of the greenhouse gases carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>), reinforcing atmospheric warming.

The second dialogue (March 11), **Avoiding Permafrost Thaw: Managing Temperature**, considered whether we have the capacity to limit permafrost thaw – and whether we should. (Yes and, tentatively, yes.) It also introduced the concept of an Arctic Premium for interventions that might prove more effective if applied directly at high latitudes.

The third dialogue (March 18) focused more deeply on the question, **Are Permafrost Thaw Interventions Possible?** Again, the response was positive but provisional. Global decarbonization, which could slow permafrost thaw, is both possible and crucial to avoid a global catastrophe. Local interventions might also be possible, though none are known to be effective at scale.

The fourth dialogue, **Priorities for Research, Policy and Investment** (March 24), sought to consider a path forward, and included the following presenters:

**John Holdren**, Professor of Environmental Policy, Harvard Kennedy School of Government; former Director of the Obama White House Office of Science and Technology Policy

**Andrew Weaver**, Professor, School of Earth and Ocean Sciences SEOS Climate Modelling Group, University of Victoria

**David Keith**, Gordon McKay Professor of Applied Physics, Harvard Paulson School of Engineering; and Applied Sciences and Professor of Public Policy, Harvard Kennedy School

**Natan Obed**, President, Inuit Tapiriit Kanatami, The National Representational Organization Protecting and Advancing the Rights and Interests of Inuit in Canada ([www.itk.ca](http://www.itk.ca))

**Pam Pearson**, Director, International Cryosphere Climate Initiative

**Ben Abbott**, Assistant Professor of Ecosystem Ecology, Department of Plant and Wildlife Sciences, Brigham Young University

**Dana Tizya-Tramm**, Chief, Vuntut Gwitchin Government, Yukon Territory

**Elizabeth May**, Member of Parliament for Saanich-Gulf Islands and Parliamentary Leader, Green Party of Canada

**Michael Kergin**, Senior Advisor, Bennett Jones LLP; former Canadian Ambassador to the United States and Cuba

Presentations ranged around three broad issues: the extent of the permafrost problem; who has (or should have) managerial responsibility; and, how and in what forums advocates can best advance the permafrost issue.

On the extent of the problem, both Andrew Weaver and David Keith questioned the notion (expressed in previous dialogues) that thawing permafrost might emit large amounts of carbon that are not anticipated in current global estimates. Weaver (a climate change modeler and former lead author for reports of the Intergovernmental Panel on Climate Change) and Keith insisted the permafrost carbon feedback is already captured in climate models, though Keith acknowledged “it may well be that those feedbacks are underrepresented.”

A scientific and policy leader in geoengineering, Keith also made the case for solar radiation management (SRM) as a climate intervention. He said, “Even cutting emissions to zero tomorrow does not deal with the climate risk. There is evidence that a combination of emissions cuts and solar geoengineering might be significantly safer than emissions cuts alone.” But, he added, we need “much more research, both science and social science,” because, while SRM might be effective, “that doesn’t mean it’s a good idea, because there is lots we don’t know about the feedbacks and uncertainties. But I think that promise is there.”

Pam Pearson countered by saying the threat of permafrost carbon feedback remains underappreciated. Quoting from studies by Ted Schuur (from the University of Northern Arizona and a presenter in the first dialogue), Pearson said that if carbon releases were reported as if the permafrost area were its own country, those emissions would be equal to Japan’s. If earth’s average temperature reaches 1.5 degrees Celsius above pre-industrial, permafrost emissions would equal India’s. Up two degrees,

“we’re reaching a level of about the entire E.U. But if we go to three or four degrees, we’re looking at annual emissions that are the size of the U.S. or China.”

Reinforcing Keith’s geoengineering caution, Pearson said, “We should not mislead ourselves, though, that we can solve these problems, or take huge risks of creating new ones. For example, some of the solar radiation management efforts that involve sulfate injection, they dim the sun. And that might decrease temperatures, but it also decreases the ability of plants to grow because of the lack of sunlight. That could then impact the ability of plants in northern regions to absorb the carbon that comes out of permafrost thaw emissions.” It’s not just the extent of the problem, but the nature, Pearson said: “It’s a slow leak. It’s not a methane bomb,” but “once the permafrost thaws, even if it refreezes, it’s going to continue emitting for as long as a couple of 100 years.”

Addressing who should influence our response, Pearson stressed “the importance of engaging local communities, and especially Indigenous communities meaningfully in these kinds of discussions. And the key word here is *meaningful*: these consultations need to occur openly and transparently, and resolve in action that follows those discussions.”

Ben Abbot said it’s an issue of environmental injustice, “where northern peoples are disproportionately experiencing the consequences of global climate change, though they have not contributed to that problem, they are not the main drivers.”

Two northern Indigenous speakers made the matter personal. Dana Tizya-Tramm described his traditional territory – 54,000 square kilometres, 120 kilometres east of the Alaska border and 100 kilometres north of the Arctic Circle, and a population of about 230. “Permafrost,” he said, “is quite literally holding our lands together.” But despite a 30,000-year oral tradition, southern academics are more likely to study the landscape than listen to his people, and policy makers listen hardly at all.

Natan Obed said: “Nation states and non-governmental organizations tend to want a certain statement from indigenous peoples. You want to hear how bad it is. It’s like: ‘Give me the gory details about how climate change is affecting the well-being and the sustainability and the self determination of your people. And now go away and let us do our work, and we will bring out that example, to our own benefit, in our own time.’” Obed said, “That model excludes us from participation. It also belittles us.” He said he does not want to be “the canary singing in the coal mine, alone. I also want to be a part of the way in which we solve this challenge.”

Obed said, “It’s easy [for academics] to come into a community and do your research and go home and talk about it to your peers ... It’s a very different thing to host you, and to have to talk again and again about things like seeing a place where your family has hunted and harvested for time immemorial, which now doesn’t exist anymore because of permafrost thaw. The lake isn’t there anymore; it’s just this pile of mud on the tundra.”

Tizya-Tramm pointed to a lake in Crow Flats, drained by permafrost thaw. “It was Alma Lake, and that was my elder Norma Cathy’s family’s traditional lake. For generations, upon generations, they had occupied this area, and she was decimated as a person. She was in tears.”

Scientists also fail to recognize that oral traditions and stories are, themselves, a kind of technology, Obed said. “One of our elders told her grandchildren, ‘I am so glad that I was able to tell you these stories today, because now that you know these stories, our ancestors are able to live through you.’”

Scientists may discount human emotion in a search for objective empiricism, “but our emotions are a human technology, and an evolutionary right.”

Tizya-Tramm concluded: “I’ve been to [UNFCCC conferences], and I tell you, I will not leave climate action to international negotiators. It’s very hard for a person who is experiencing these things to have those talks really devoid and empty of some of the substance I would have liked to have seen there.”

Several other presenters also worried about the low profile of Arctic issues and lack of climate urgency. Pam Pearson said her organization established the first cryosphere pavilion at a UNFCCC conference only in 2019.

John Holdren said that when the Paris agreement was reached in 2015, “A lot of people asked me, ‘You must be delighted, given how hard you’ve been working on climate change issues since the 1970s.’ And I said, ‘Yeah, I’m delighted we finally got this done. It’s a big step forward. But it’s a step that we should have done 25 years earlier. We knew enough in 1990 ... we lost 25 years of muddling about, in part because of disinformation and misinformation about the reality and magnitude of the threat, in part because of the tendencies of political decision makers that if something is not going to bring a benefit in less than two, four or six years, maybe it’s not worth doing.’”

Elizabeth May noted that her daughter, whom she carried around as a baby at the founding conference of the UNFCCC, will turn 30 this year. “And we emitted more greenhouse gases between 1990 and Paris than we did between the beginning of the Industrial Revolution and 1990.” Canada, which promised in 1997 to reduce its emissions by 6% from 1990 levels, is, instead, *up* 21%, while EU emissions are down 44% and US emissions up just 3.5%. “These [emission increases] are not just tragic, these are criminal actions, because we knew better.” Now, May added, “The people who had the least to do with creating the problem face the worst consequences” – including those too young to intervene or yet unborn. “It’s an intergenerational equity issue. How much are we willing to take the moral responsibility for what children and grandchildren and great grandchildren experience?”

On the question of which international organizations might best address permafrost issues, Pearson pointed to the Arctic Council, “the one forum where six permanent representatives of Indigenous groups sit at the table with the eight governments and so have direct representation.” She also expressed hopes for “something jointly from Canada and the US ... and also Russia, which is starting to talk about permafrost land.”

David Keith suggested Canada could have particular influence championing research on climate interventions. “There is a real role for the small democracies to work together with some of those who are most affected by climate change, especially the poor countries of the global south.”

Ex-diplomat Michael Kergin outlined a three-part strategy for bringing such issues to government: first, the issue must be of national significance, affecting a country’s national context, and/or having a capacity to diminish safety and security; second, it must be urgent, or at least realistically predictable; and third, the solution must be broadly aligned with government policies and objectives. Initial messages must be clear, concise, and digestible (with detail and technical information to follow). And again, you must appeal to government self-interest, pointing out where harm will result if government doesn’t act. Finally, you must access key actors, both executive and political.

Kergin suggested that the current situation is promising because, aside from COVID-19, climate change may be U.S. President Joe Biden’s highest priority. Biden’s climate czar, John Kerry, is a former

Secretary of State and a former chair of the Arctic Council. And Biden has a potential ally in Republican Senator from Alaska, Lisa Murkowski. Kergin said Murkowski is “a gas and oil defender – her state has those resources.” But she is also sensitive to Alaska’s Indigenous population.

Kergin was also encouraging about the degree to which the government of Canadian Prime are moving to align climate goals with the more-ambitious agenda of the new American administration. And he pointed out that there are powerful climate champions in the Canadian Cabinet. Foremost is Minister for Environment and Climate Change Canada Jonathan Wilkinson, who opened the first session of the PCFAG Dialogues. Others include Minister of Crown-Indigenous Relations Carolyn Bennett, Minister of Northern Affairs Dan Vandal, Minister of Natural Resources Seamus O’Regan, and Minister of Innovation, Science and Industry François-Philippe Champagne.

Kergin said Minister of Global Affairs Canada Marc Garneau is also crucial – a former astronaut and scientist who understands the issue. Garneau interfaces with the international community and directly with the US. “And in Canada-US relations, you’re always looking for points of cooperation. ... It’s important as Canadians, being a smaller partner, to try and find where we can work with the United States in a positive, constructive way.” As well, “Canada and United States working together have greater influence when it comes time to [deal with] Russia and the Nordic states.”

Andrew Weaver, who served as a Member of the British Columbia Legislature and provincial Green Party leader, also had a three-part political prescription. First, “People need to get engaged in our democratic institutions. We are not going to solve this problem unless we put in place decision makers who are willing to take the hard steps required, and put the interests of the collective ahead of the interests of the individual.” Second, “Each and every one of us has a pocketbook: We cannot abdicate our individual responsibility in terms of guiding the market.” And third, “We must educate people about #1 and #2.” We need to get others to understand the importance of our democratic institutions, of urgent individual and collective action.

Weaver also cautioned against relying upon unproven technical interventions, the promise of which can discourage political action. “Any reason for excuse will be taken. When a politician is desperately trying to deal with myriad stakeholders, with myriad issues, all of which are immediate, and all of which will occur before the next election, it is very, very difficult to advance public policy in this regard, without public support.”

Pam Pearson concurred, saying, “I’m an ex-diplomat, I worked on environmental issues for 20 years, I know how unseriously these things were taken.” Thus, she said, “The focus needs to be on emissions reductions, because anything that tells governments that they can kick the emissions can down the road is enormously destructive.”

Looking ahead, Ben Abbott challenged those assembled to create “a community of intention that is, in a non-hypocritical way, moving towards solutions.” Optimistically, he pointed to Yale University research that “shows that there is a super majority in every county in the United States that supports investing in renewable energy. There also is a super majority, in all but one or two counties, to have more fees and costs associated with fossil fuel extraction. We need to clearly communicate that to elected officials at all levels.” Climate action “is extremely popular and it could be extremely beneficial for all people.”

Wrapping the session, Lukas Arenson from the sponsoring Canadian Permafrost Association said the CPA formed in 2018 to bring together academics, practitioners, policymakers, communities, and

indigenous organizations to help understand and address permafrost challenges. He said, “These dialogues were a great example of exactly this networking,” adding that the CPA is committed to continuing its support.

Thomas Homer Dixon, also a presenter in the first dialogue, offered the resources of the Royal Roads University Cascade Institute, of which he is founding Director. Homer-Dixon proposed two assumptions: that Indigenous communities, northern communities and other key stakeholders must be instrumental in the development of any interventions, and related governance systems; and, that rapid global decarbonization is by far the best strategy for addressing permafrost thaw. “Nothing done in the Arctic can or will diminish the importance of a rapid and just zero-carbon energy transition.”

Even so, Homer-Dixon said it is worth exploring interventions that might leverage what Dialogue #2 presenter Ted Parson called the Arctic Premium – Arctic-based strategies that are particularly powerful in preserving permafrost or increasing its capacity to absorb, rather than emit, carbon.

Other Permafrost Carbon Feedback Action Group members offered outlines for future action, details of which will be available soon. But PCFAG founder Michael J. Brown raised the call to action. He celebrated the “Community of Intent” that has already assembled, including the more than 300 delegates who participated in at least one of the four dialogues. And he concluded:

“We have learned that what’s taking place in the Arctic is not staying in the Arctic. PCF is, but one of the big feedback loops. But perhaps it’s a trigger for the rest of the world to understand the changes that the rest of the world have foisted on the Arctic and onto our northern peoples. There’s a long way to go.”