
One of the world's leading geo-engineering proponents, Harvard Professor David Keith

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Interview with David Keith, Professor of Applied Physics at the Harvard School of Engineering and Applied Sciences, from Calgary: A leading scientist in the field of geo-engineering.

Transcript

TONY JONES, PRESENTER: Earlier today I spoke with geoengineering expert David Keith, Professor of Applied Physics at the Harvard School of Engineering and Applied Sciences. He was in Calgary, Canada.

David Keith, thanks for joining us.

DAVID KEITH, APPLIED PHYSICS AND ENVIRONMENTAL ENGINEERING, HARVARD: Great to be here.

TONY JONES: Now scientists originally calculated that the major impact of global warming would happen towards the end of this century, so geoengineering was considered to be something far off in the distant and really science fiction for most people. Why the urgency now? Why has the debate changed?

DAVID KEITH: I think the debate's changed really because the sort of taboo that we wouldn't talk about it has been broken. So, people have actually known you could do these things for better or for worse for decades, actually since the '60s, but people were sort of afraid to talk about them in polite company for fear that just talking about it would let people off the hook so they wouldn't cut emissions.

And that fear was broke a few years ago and so now kind of all the research is pouring out really because effectively

had been suppressed, not by some terrible suppressor, but by a fear of talking about it.

TONY JONES: So what do you think would actually drive the world's superpowers or a collective of nations to decide to actually do this, to go ahead and begin the process of planning and preparing for a geoengineering project?

DAVID KEITH: Very, very hard to guess. I mean, essential thing to say about this is that technology is the easy part; the hard part is the politics. Really deeply hard and almost unguessable. At this point we have no regulatory structure whatsoever and no treaty structure, so it's really unclear what would - how such a thing would be controlled.

TONY JONES: Do you have any sort of idea at all what kind of timescale there might be before governments are forced to seriously consider this? Is it 10, 20, 30, 50 years?

DAVID KEITH: Well, forced is a very fuzzy word, so a popular thing to say in this business is to say that we would do it in the case of a climate emergency. But that's kind of easy to say. In a case of emergency we should do all sorts of wild things, but it's not clear what an emergency is. So I'm a little sticky with the word forced. But I think it could happen any time from a decade from now to many, many decades hence.

The big question right now really is: should we do research in the open atmosphere? Should we go outside of the laboratory and begin to actually tinker with the system and learn more about whether this will work or not. And I'm somebody who advocates that we do do such research.

And one thing that research may show is that this doesn't work as well as we think. And my view is: whether you're somebody who hopes this will work or hopes it doesn't, more knowledge is a good thing.

TONY JONES: So if you were given the go-ahead to do research and the funds to do it, because I imagine it would be very expensive, what would you actually do?

DAVID KEITH: It's not very expensive actually to begin to do little in-situ experiments. So I am working on one and many other people are. So what we would do - the experiment that I'm most involved with would look at a certain aspect of stratospheric chemistry, of the way that the ozone layer is damaged and we'd be looking at whether or not and how much increase of water vapour in the stratosphere, which may happen naturally, and also the increase of sulphate aerosols if we geoengineered might damage the ozone layer.

Basically, how much damage there would be and how we could fix it. And that experiment would be done in a very, very small amount of material; we're talking, like, a tonne of material, so small compared to what an aircraft does travelling across the Pacific. And the cost of it would be a few millions to 5 million kind of money, which on the scale of big atmospheric research projects is actually not that much. I mean, the total climate research budget is billion class.

TONY JONES: Is it clear now or is it becoming clearer that the best strategy if you wanted to go to a global scale would be literally flooding the stratosphere with sulphate particles?

DAVID KEITH: I think the honest answer has to be that we don't know, that you need to do the research in order to have strong opinions about what's the right answer. I would say, you know, if you really put a gun to my head and said, "What's the very most likely thing to work right now?" that's probably it. And the reason is because it mimics what nature has done.

So we have big volcanoes that put sulphur in the stratosphere and we know something about the bad impacts of that and we know something about what it does to cool the planet. And so it seems pretty likely that since we'd be

putting in much less than nature puts in, at least for the first half century or more, that we could actually do something and control the risks.

TONY JONES: Yes, I guess you mentioned volcanic activity and that's what scientists are basing, I suppose, their knowledge on now. What we've seen from volcanic activity is - and you can go back to '91 and Mount Pinatubo, which actually caused a fairly sudden drop in global temperatures because it blanketed the atmosphere in that way, but it also had, evidently, climate change effects itself, so there are clearly dangers here.

DAVID KEITH: For sure. There are a bunch of dangers. There are both the dangers of kind of side effects like ozone loss or interfering with atmospheric chemistry in other ways. There's the basic fact that this is not a perfect compensation for CO₂.

So for example, carbon dioxide makes the ocean more acidic and doing these things to cool the planet will do nothing to correct that. So in the end we will have to cut emissions no matter what, but the fact that we have to cut emissions in the long run doesn't mean that we might not want to do things in the short run that actually provide real protection, if in fact they do, protecting people from heat stress or protecting the Arctic from melting.

So I think we need to get out of the kind of extreme either/or that says you only do this if you can't cut emissions. That's nonsense. Cutting emissions we need to do in order to reduce the risks over the next century or two, but we still might want to do some of this in order to reduce the risks over the next half century and those are really quite distinct things.

TONY JONES: Let's talk about the risks of actually doing it on a global scale because you've been pretty frank about that. You've actually said you could easily imagine a chain of events that would extinguish life on Earth. Now what would be that potential chain of events from using this kind of technology?

DAVID KEITH: Yes, I probably got quoted a little out of context there. I think there are sort of theoretically possible ways that could happen, but I don't think there's a socially plausible way it could happen. So, you might in principle be able to put up enough reflective aerosols - probably not sulphates, actually; I think it won't work with sulphates - but some other engineered aerosol.

And if you did that for 100 years and reflected away sort of 8 per cent of the sunlight, whereas the amount people are talking about doing is more like 1 per cent, then in principle you could actually freeze the oceans over, as happened some good chunk of a billion years ago, and that would be devastating. But I think that the chance of people doing that would sort of be a global suicide is so remote as not to be a serious worry.

I think the reason I've occasionally said that is that it illustrates the kind of power that this technology grants us. And I think for better, for worse, what this technology gives us is this enormous kind of leverage and power to alter the climate and to do it with a very small amount of money or material and that power should frighten us, I think, and it presents real deep problems for governance.

So unlike the problem of CO₂ emissions, which is changing the climate, but which is a product of human actions all over the planet. Every individual person flying or driving a car or using electricity around the planet contributes to carbon dioxide.

If you talk about putting sulphates or some other engineered particle in the stratosphere, the issue is that a very small number of people in principle could do it and have this kind of huge leverage to affect the whole climate in this profound way. And that's what raises the very hard challenge of governance.

TONY JONES: Yes, is there a fear raised by what you're saying that some country, a superpower, China, for example,

has been suggested, could actually do something like this unilaterally and thereby create conflict over the whole idea of geo-engineering?

DAVID KEITH: Yes, it's certainly possible. So, there's no question it's technically possible to do it unilaterally. So, the actual materials you need, the aircraft and engineering you need to do this are something that would be in reach easily of any of the G20 states. It's not hard to do. You could buy the equipment from many aeronautical contractors.

So in that sense it could be done unilaterally. I think that there are scenarios under which it would happen in the real world unilaterally, but I don't think we should - I mean, I think you can exaggerate that possibility.

But, you know - so, for example, I think if nothing was done to manage emissions and if climate impacts really fell strongly on, say, India - which might actually happen from heat stress on crops - you could imagine India doing it unilaterally. But there's a kind of a hard and an easy unilateralism.

So if a country in a really kind of wanton way just starts it with no consultation, that would be clearly ugly, bad, could create conflict, but I think there are also kinds of unilateralism where you're not formally doing it in a legal multinational way, but where you do it with lots of consultation. And in that situation what might happen is a small number of countries might do it and many other countries might publicly say, "We wish we were involved in the decision," and privately say, "We're pretty happy somebody's doing this because actually it will reduce climate risk and then this other group will take the liability."

TONY JONES: And final question, because you probably - if someone decided to do this, even if a group of nations decided to do this, there'd be tremendous scepticism in the public and you would, I imagine, get widespread protests, particularly when people realise that with sulphate particles in the atmosphere you'd actually change the colour of the sky, which has a really big psychological effect on people, you would imagine.

How serious first of all would that change of colour be if you really were able to do it on a global scale and would you expect protests?

DAVID KEITH: I think the change of colour would probably be invisible. I think it wouldn't happen. So people have published papers where they get that, but only where they assume a quite large amount of geoengineering. They assume that geoengineering compensates all of the effect of climate change, which I think is a kind of nonsense policy.

So in a more plausible policy where you gradually wrap this up, compensating only part of the global warming (inaudible), to kind of balance risks and benefits and where you gradually use more advanced particles, maybe starting in 50 years, I think you never see a change in colour.

So I think that's a bit of a unlikely circumstance. But I do think it's clear that people will protest because there are going to be winners and losers, just as there are under climate change. So it's important to say that putting CO2 in the atmosphere, which we're doing, creates winners and losers and this will again.

TONY JONES: David Keith, we'll have to leave you there. Fascinating to hear from you. We thank you very much for taking the time to come and talk to us.

DAVID KEITH: Thanks very much.

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