

Topic 3e - The Vienna Convention and Montreal Protocol – an exemplar for international policy

[MUSIC PLAYING] I've heard a lot about the ozone hole, and that's always held up as the example of, we can have international cooperation that works. When the chemists first discovered these chlorofluorocarbons, they thought this was the wonder chemical of the modern industrial age. Take us through from the start of that story right the way through to now, because it was only sometime after that that the downsides became apparent.

Well the issue is, perhaps, in general on this area, is thinking end to end. You have to think about the consequences of the things you're using, not just the fantastic properties that they may have. So chlorofluorocarbon has lots of good properties. It's less toxic. So for use in refrigeration, which was where the major application initially was, or one of its major applications, that's a really good use for it. And if it leaks, people are not becoming ill, in industrial complexes or at home. So that's a tremendous advantage of it as a material.

Unfortunately, when it gets into the stratosphere, it becomes a bad gas, because it releases ozone depleting substances. Now, the timeline was in the late 1960s, people recognized, first of all, that oxygen and nitrogen in the stratosphere control the amount of ozone there. This was Paul Crutzen's work in large part, but also Harold Johnson at Berkeley. And this stimulated some interest. And actually, Jim Lovelock had, in the early 1970s, discovered that the amount of chlorofluorocarbons, which began to be made in the late 1920s, early 1930s, was about equal on his measurements to the total amount that had been released.

Milliner and Roland, they discovered, or made the proposal that these gases would be destroyed in the stratosphere and would destroy stratospheric ozone. So this was in the 1970s. Now, initially the story was that, yeah, we should control the amount of these compounds. And the chemical industry supported, actually, quite a lot of research, as well as paying for people to destroy the credibility of scientists suggesting these things. It was known as the ozone wars. But there was a kind of, you would say, a peace treaty when it was agreed that it would be controlled, and this was the beginning of the 1980s. But then the discovery of the ozone hole by Joe Farman, John Shanklin, Brian Gardiner from British Antarctic Survey, this completely put all that on its head. And there was a tremendous push to do something. And there's a thing called the United Nations Vienna Convention on Ozone Depleting Substances. But this has a-- it's Montreal Protocol. And in 1987, this protocol was signed. And in the intervening time and a series of amendments, this has become progressively stricter.

And very recently, actually last year, it extended its control to also poly-fluorocarbon compounds, which are actually greenhouse gases. So actually, the Montreal Protocol is a success story in that politically, it's met the objective of stopping the release of chlorofluorocarbons and related species. It will unfortunately take 50 years before these long-lived species are then taken out of the atmosphere. In addition, these compounds are

greenhouse gases. And in case of the so-called PFCs, poly-fluorocarbon compounds, these are very strong climate gases so greenhouse gases, and these are now also banned.

So the Montreal Protocol, it's a success story because it's doing the politics that are needed to stop ozone depleting substances being released, and in addition, is probably making more reduction of greenhouse gases than the failed Kyoto Protocol, which started in 1992 with the Rio meeting. The new Paris agreement has yet to kick in. So we've got one problem, which has been a good story. It shows that people can work together internationally attacking the problems of this century to make this planet sustainable by having agreements to control issues which are trans boundary by their very nature. And the atmosphere doesn't care whether it's the UK, Germany, or the USA, or China. It's the reactions and the physics that are determined not by politicians.

That's a good story. We also have quite a good story, or a positive story, in terms of acid deposition. And this is another United Nations Convention which has been applied particularly well in Europe. This is a long range convention on pollution, basically, and it attempts to stop trans boundary pollution being moved around, and this addresses, then, oxides of nitrogen, sulfur dioxide, the things that create acids, the precursors, and also photochemical smog and winter smog issues. Acid deposition is a winter smog issue. So this is, in Europe at least, it's been quite well-controlled. But in the rest of the world, it's just beginning to happen. And so in Europe we have some success, but we're still in very much a man-modified system.

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