

Topic 2e – International agreements for air quality

[MUSIC PLAYING] Once you start considering pollution, this is not the problem of one country, is it?

Well, pollution is a so-called transboundary problem. And we need local national, regional, and international laws which control the gases that are called pollutants and the amount of which coming out. Now some pollutants, like short-lived climate pollutants, are toxic as well as being impacting on climate OK? And examples of that are the oxides of nitrogen, ozone, the trace constituent aerosol. All these things, in particular aerosols, when you breathe them, the little ones that go into your lung cross the lung and enter the cardiovascular system.

These pollutants, they are indeed no respecters of national boundaries, and they're certainly not a respecter of the boundaries between islands like Great Britain and Europe. They flow between. And a good example of this was the sulphur dioxide pollution, which resulted in the lakes in Scandinavia becoming acidic, the fish dying, and the people losing a source of income and also food. That has been much improved upon by desulphurisation. That's an example of a success story, like the ozone, stratospheric ozone is a success story in terms of pollution control.

But massive amounts of the world are still uncontrolled. And a good example of this is nitrous oxide, laughing gas, which is not controlled; emissions from farming, from agro industry. And this is a growing problem. This is a greenhouse gas. So in the troposphere it's very long-lived, but in the atmosphere it's both a greenhouse gas and it releases oxides of nitrogen, which is 70% a determinant in controlling stratospheric ozone. So there we have a so-called double whammy.

The European Union has a two-strand approach of tackling air quality. One is setting air quality limit values and target values for the air that we breathe. The other strand is dealing with emissions at source. So for example, large industry, the road transport sector, making sure that we have emission standards in place to drive improvement, both technological and environmental.

It's clear of course there's no magic solution to addressing the problem of air pollution. What we see is that action is needed at three different levels of governance. So at the international level, at the national level, and also at the local level. All three aspects are very important to address air pollution.

So for example, international actions are designed to reduce the transboundary movement of air pollution; national actions are needed to put in place laws for companies to follow; and local action in cities target specific sectors. For example, the road traffic sector is an important source of much air pollution in European cities-- measures the address emissions

from the sector through, for example, traffic calming measures, low emission zones can be very helpful at the urban scale to help improve air quality.

Many cities across Europe are putting in place some quite innovative and new ways of tackling the problem of air pollution from local sources. In Copenhagen, for example, it's renowned as a city for cyclists. The city has really invested in cycling infrastructure to allow a high fraction of daily commuters to take bicycles to work. In the peak summer time period, for example, more than 50% of people in Denmark and Copenhagen are traveling to work on their bicycles.

They've also put in place incentive schemes for electric vehicles. So increasingly, this is happening, the infrastructure is being rolled out, and we see the uptake of electric vehicles, of car sharing schemes is something that the city is actively pushing here.

Other cities, for example, some in Eastern Europe, face different challenges. Here the sources of air pollution are different. So for example, burning of wood, of domestic fuel in households can be a very important pollution source, particularly in the wintertime. In addition, they also have sources such as road traffic to deal with, but here the access to funds to support some of the infrastructure developments may not be as easy. And so the government's solutions accordingly, much more complex and sometimes difficult to reach.

Some big cities, such as London, do face very complex problems in trying to achieve these legally required limits of air pollution. What we see in London, it's a mix of different emission sources contributing to the problem. We have, for example, many people traveling into London each day, businesses, freight, all coming into London, as well as the local communities, populations using cars for their local transport or mobility needs.

One of the things that is needed is, of course, options for people. So for example, investments in public transport to allow to give people a second option on how they choose to travel both into London, but also around the city.

The air quality challenge in London is particularly difficult. Many initiatives have been tried and are planned to help improve the air quality there. The low emission zone, for example, has been in place for a number of years. It's been expanded. And it has delivered I think a much greater public awareness of the need of similar measures to effectively address air quality.

The Clean Air Act I think originally was designed to stop these smog episodes that London was quite famous for through the 1940s, 1950s. And that was a means to reducing pollution inside large cities and preventing these high pollution episodes from starting.

We know statistics show that approximately 40,000 people in the UK alone are affected by air quality issues every year. And this scales up then across European countries and globally

to about 4.6 million people being affected and their health being affected by the air that they're breathing.

Measuring air pollution at the street level in urban environments, particularly in large megacities such as London, and this also applies in other built up environments around the world, it's really important to understand how emissions from, say, traffic and also local sources within a city, what that means for air quality within the city framework, if you like. But then that also feeds into things like emissions inventories from cities and different countries.

And that data then feeds into a global system, such as the one we run in the Copernicus Atmosphere Monitoring Service, by providing detailed up-to-date information on what a city is actually emitting and putting into the atmosphere. And we can then use that to then predict how that pollution might change over the course of a few days, but also where that pollution might go when it's moved downwind from the city source in the first place.

So you have this scaling up that you start with a measurement on a street, it's integrated into a model, and it becomes part of a global model. But then that can come back down to the individual, can't it? And that's the sort of thing-- CAMS data is being used for that a lot more.

Yeah, so it has to go-- it goes in both ways, I mean, so in a city like London, you also have the issues related to pollution, which is not produced within the city, but is coming from elsewhere. And that might be somewhere else in the United Kingdom, but it might also be from another country, either in Europe but even further afield in North America.

And what we can do with our Copernicus system is we can use satellite data to evaluate the larger scale distribution of pollutants and the transport of those pollutants from one region to another. And we're using satellite data for doing that. But of course, satellite data can't see what's going on at the street level in London.

And so it works both ways in that we can use that bigger picture data if you like from Copernicus to then drive regional scale air quality forecasting for Europe. But then as an extra step, that data can be further downscaled if you like using various apps for your mobile phone, which then give you more detailed information specific to your town or city or even your street within London in terms of the air that you're breathing and the quality of it.

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