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Ground-level ozone in the 21st century: future trends, impacts and policy implications

Summary of evidence: Dr Keith Bull
April 2007

Dr Keith Bull gave evidence to the working group in his capacity as Secretary to the UNECE Convention on Long-range Transboundary Air Pollution. A summary of the key points discussed are summarised below.

Overview

Dr Keith Bull provided a general overview of policy issues surrounding ground-level ozone including the UNECE Convention on Long-range Trans-boundary Air Pollution (CLRTAP) and the current review of its 1999 Gothenburg Protocol. He also covered the four questions posed in the Society's call for evidence to support his written submission (written evidence submission AQ/44).

Dr Bull noted that separate submissions have also been made to the Royal Society from UNECE groups including: Vegetation ICP (International Cooperative Programme), Forests ICP and various national air pollution monitoring centres. He also stressed the importance of input from EMEP (Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe) and its international centres, which were responsible for monitoring and modelling air pollution for the Convention, as well as IIASA, which is responsible for integrated assessment modelling; these were not mentioned in his written submission.

Dr Bull noted that he hoped the Royal Society work would feed into the UNECE process during the review of the Gothenburg Protocol due for completion in December 2007.

The UNECE process

Dr Bull stated that since the adoption of the Gothenburg Protocol in 1999 the science on air quality has developed considerably. The Protocol is now in its 1st review process which will take account of the updates in the science and review the effectiveness of the Protocol in achieving its objectives. The next stage after the review process is complete in December will be for Parties to decide where to go from here and whether to revise the Protocol or start a new one.

Dr Bull stated that North America was introduced into the UNECE process when it was established 60 years ago. The US and Canada were active Parties to the Convention but had not signed up to all of the Convention's Protocols. With regards to the Gothenburg Protocol, both were Signatories and the US a Party. However, the obligations for the US and Canada were different from those in Europe being based upon their negotiated bilateral agreements. With regards to the national ceilings in the Protocol that were based upon EMEP modelling, countries listed were those in the EMEP domain, essentially those that fund EMEP according to its funding Protocol and which report monitoring data to the Convention. The United States and Canada contribute only voluntary to EMEP and are not part of the EMEP modelling domain. He noted that Central Asia countries were keen to join the reporting elements of the Convention and become part of the EMEP domain; Kazakhstan has set up a monitoring station to report to EMEP.

Ground-level ozone changes over the next century
Dr Bull noted that increased controls on precursor emissions had been successful but that there were still problems highlighted in the Protocol review process that the UNECE secretariat would be drawing attention to, such as problems with fluctuations in the data that the Royal Society working group had already referred to. There was also an awareness of the increasing background ozone concentrations and there were discussions of the need for a hemispheric scale control of precursor emissions. He noted that the Convention's Task Force on Hemispheric Transport of Air Pollution was a scientific group that was considering such issues. The work completed by this group would feed into the Gothenburg Protocol review policy process.

With regards to the scientific programme of the UNECE, Dr Bull stated that there are still large scientific uncertainties in the science of the interactions of ozone with a changing climate and related issues such as the nitrogen cycle and atmospheric chemistry. There is also recognition of the policy uncertainties with regards to what action individual governments might take on emission controls.

Dr Bull noted that the timescale for policy within the UNECE was usually set for the near-future, and that policy considerations did not normally go beyond 10-15 years. However the Gothenburg Protocol review process has included consideration of the period 2020-2030 and at a recent meeting of scientists and Parties to the Convention in March (the Saltsjobaden III workshop) it was suggested that Parties consider 2050 as an 'aspirational' goal for the Protocol. This was put to the Strategy and Review Group of the CLRTAP and gained approval. Dr Bull noted that this will allow scientists to think long-term and consider modelling work for example to incorporate consideration of effects from climate change. He noted that if the Convention can make policy-makers consider this time-scale it will allow greater link-up between climate change and air quality policy.

Climate and ground-level ozone
Dr Bull noted that the UNECE was aware of the potential synergies between climate change and air pollution policy and would continue to push for further integration between the two Conventions. The air pollution community is generally aware of the relationships between the two, but he believes the same is not true of the climate change communities. At a national level most countries have separate departments for climate change and air quality however some countries such as Norway and Austria have joint departments. The UNECE are trying to raise awareness of the need to consider both together - including a talk by the Director of UNECE's Environment Division to the Commission for Sustainable Development. However, there is some resistance to international integration at the national level because of the complicated nature of the climate change negotiations at present.

Impacts of ozone
Dr Bull noted that the Convention relies upon its Working Group on Effects and its International Cooperative Programmes (ICPs) as well as the joint WHO/Executive Body Task Force on Health Aspects of Air Pollution (Joint Task Force on Health) to provide Parties with expert knowledge of the effects of air pollution.

He noted that the Joint Task Force on Health is about to re-assess work on ozone from 2005. The leader of the group asked that information be made available to the Royal Society on the guidelines which are attached as an appendix to Dr Bull's written submission. They are currently revising the 2005 guidelines and their work on the health effects of ozone. This work will be important and will feed into the Gothenburg Protocol review process.

Dr Bull noted that the WHO were also planning to consider unpublished work on the synergies in effects

between high ozone concentrations and heat waves as results analysed to date suggest that ozone and heat waves have a combined adverse health effect.

Policy drivers, and gaps, science gaps and possible solutions

Following the review of the Gothenburg Protocol, Dr Bull noted that Parties will discuss the possibility of a revision of the protocol or the development of a new protocol over the following 2-3 years. It is hoped that by 2009-2010 a new protocol will be adopted, which will also take into account climate change issues, particulate matter and hemispheric transport of air pollution. Various scientific groups including the TF HTAP will be reporting to the CLRTAP at the December Executive Body meeting as part of the review. There will also be debate, following the recent suggestion of using 2050 as an 'aspirational' time horizon, about the timeframes that might be incorporated into any new legal instrument.

Dr Bull discussed integration of the UNECE process with other policies such as the current EU revision of the NEC Directive, and noted that he was optimistic about collaboration between the two groups due to strong links between the EC and UNECE. He noted however that the processes were very different and that there would be a need to ensure that decisions were harmonised. With regards to climate change policy he noted that links were not well established and that harmonisation needs additional work as current climate change strategies did not necessarily measure the impacts of mitigation measures on air pollution.

Dr Bull noted the need for globalisation of current air pollution policy. He noted that the UNECE had developed air pollution policy across the countries in its region however other regions outside UNECE considered policy on a national level with some regional collaboration. Dr Bull said that the UNECE has an outreach process and has an insight into the problems in different areas. He stressed that there is a focus on urban air pollution issues in other regions and much less focus on long-range transport or the effect of ozone on crop production. He noted that crop damage was not well understood by many countries. In addition, EC governments tend to focus on human health impacts not crops and vegetation because of agricultural overproduction issues and set aside policies, but in many non-UNECE regions crops are an important consideration and this is not always realised by governments.

Dr Bull noted that scientific links between the UNECE and other regions are good with regional scientists contributing to HTAP work however inter-regional policy is not integrated. Dr Bull informed the group that the Global Air Pollution Forum, an informal body which brings representatives of all regions together to discuss common air pollution issues, has now received Swedish funding and has great potential for increasing collaboration with countries outside the UNECE process.

Data collection

Dr Bull noted that there were problems in several non-EU countries from Eastern Europe with regards to data collection. Although scientists were keen to provide the data there was a lack of resources in governments to do the monitoring.

Ozone monitoring metrics

Dr Bull said that policy makers were aware of the drawbacks of concentration metrics for estimating vegetation damage and wanted to move to flux-based metrics as they are recognised as a more realistic measure; however the Convention's Parties were awaiting further results before a commitment could be made to change. He noted that results of integrated assessment modelling work was key to the decision.