

– Atmospheric Emissions Inventory

NERI



The National Environmental Research Institute (NERI) works out the Danish atmospheric emissions inventory and reports to EU and international conventions such as the UNECE Convention on Long Range Transboundary Air Pollution (CLRTAP) and the UN Framework Convention on Climate Change (UNFCCC). The two international conventions deal with regional and global air pollution effects. The pollutants shown in the table below are reported to these conventions. The greenhouse gas emissions are also reported to EU because EU – as well as the nations – is a party to the Climate Convention.

Reported pollutants and deadlines for reporting e.g. 2001 emission data.

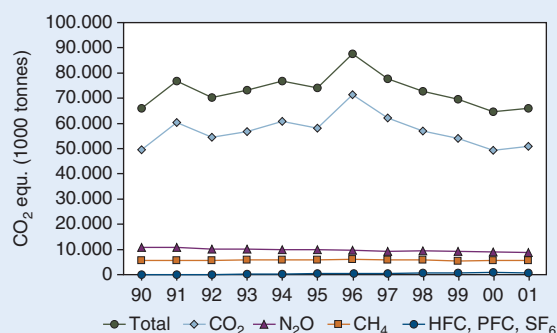
Report	Deadline	Pollutants
UNECE-convention	February 15, 2003	SO ₂ , NO _x , CO, NMVOC, NH ₃ , PM, As, Cd, Cr, Cu, Hg, Ni, Pb, Se, Zn, Dioxins, PAH
EU	December 31, 2002	CO ₂ , CH ₄ , N ₂ O, SO ₂ , NO _x , CO, NMVOC, HFCs, PFCs, SF ₆
UNFCCC	April 15, 2003	CO ₂ , CH ₄ , N ₂ O, SO ₂ , NO _x , CO, NMVOC, HFCs, PFCs, SF ₆

Greenhouse gases

The greenhouse gas emissions are estimated according to the IPCC guidelines and are aggregated in seven main sectors: Energy, Industrial processes, Solvent and other product use, Agriculture, Land use change and forestry, Waste, and Other sources. The greenhouse gases include CO₂, CH₄, N₂O, HFCs, PFCs and SF₆. The figure shows as an example the estimated total greenhouse gas emissions in CO₂-equivalents from 1990 to 2001. The emissions are not corrected for electricity trade or temperature variations. CO₂ is the most important greenhouse gas followed by N₂O and CH₄ in relative importance. The contribution from HFCs, PFCs and SF₆ is less than 1%. The greenhouse gas emissions in CO₂ equivalents are almost equal in 1990 and in 2001.

The national reporting obligations are increasing at the moment due to the requirements following the ratification and implementation of the Kyoto Protocol. The reduction targets for some countries and the future perspectives of emission trading and use of flexible mechanisms implies that the emission inventories are as precise and proofed as possible and documentation is essential.

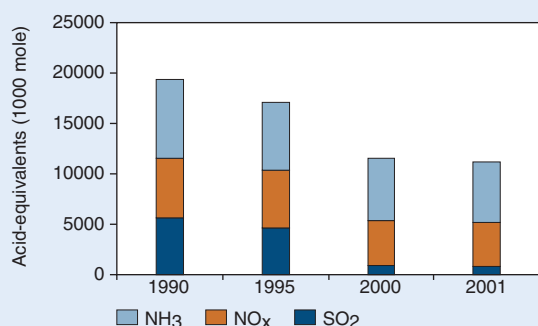
The level of detail, the demand concerning documentation and the national and international review processes of the national inventories mean that the capacity in the organisations responsible for this reporting has to be enhanced. Capacity development and application of available tools and methods to perform the inventory are instruments that can contribute to meet the demands.



Greenhouse gas emissions in CO₂-equivalents. Relative contribution in 2001 and development from 1990.

UNECE CLRTAP Convention

The emissions reported to the UNECE convention covers the acidifying gases, heavy metals and other air pollutants e.g. particulate matter. An example is the emission of acidifying gases in 2001 in terms of acid equivalents. In 1990 the relative contribution in acid equivalents was almost equal for the three gases. In 2001 the most important acidification factor in Denmark was ammonia nitrogen and the relative contributions for SO₂, NO_x and NH₃ were 7%, 39% and 54%. However, regarding long range transport of air pollution SO₂ and NO_x are still the most important pollutants.



Acidifying gases in acid equivalents. Relative contribution in 2001 and development from 1990.

The inventory of the particulate matter emission inventory is another example. This was made for the first time in 2000 and has been improved for 2001 based on Danish and international work going on these years in order to map the most important sources and to improve the source data. The inventory includes: Total emission of particles (TSP, Total Suspended Particles), emission of particles smaller than 10 µm, (PM₁₀), emission of particles smaller than 2.5 µm, (PM_{2.5}).

The transport sector is the largest source to particle emissions. For road traffic the emissions of particulate matter include both exhaust, brake and tyre wear and road abrasion. Non-industrial combustion plants contribute with 22% of the emissions of PM₁₀ and the most important source is combustion of wood in stoves and small boilers.

Projection models

The regulation of atmospheric emissions makes use of reduction targets (the Kyoto Protocol) or emission ceilings (the UNECE convention). In order to be able to follow the progress NERI develops emission projection models for the pollutants subject to targets or emission ceilings. This includes the acidifying gases, NMVOC and the green house gases. These models are used to project the progress towards the targets and to direct and investigate the possible measures to reduce emissions so as to meet the targets at the required point in time. The projection models are coupled to calculation of the economic consequences of the proposed measures.

Tools and methods

The emissions inventory is based on the CORINAIR system. The official Danish reports to UNECE for year 2001, EU for year 2001 and UNFCCC for year 2001 are available at the homepage (www.dmu.dk). The emission factors and the detailing of the emissions inventory are improved over time based on results of research and development projects. As an example the national emission factors for decentralised co-generation combustion plants has improved in collaboration with Danish partners. A Nordic network on particle emissions are currently working on improving methods on particle emissions inventories. These improvements of methods result in changes of the emission inventories and recalculation is required. Since the 1999-inventory the emission data from some of the pollutants has changed due to recalculation of the emissions from various sectors primarily agriculture, road transport and other mobile sources.

International activities and capacity building

The knowledge on emission inventory gathered at NERI is the platform from which NERI participates in international activities:

- The EU Monitoring Mechanism on greenhouse gases, where the guidelines, methodologies, etc on inventories to be prepared by the EU member states are regulated.
- The Conference of Parties (COP) to the UN Framework Convention on Climate Change and its subsidiary bodies, where the reporting, rules, etc as a consequence of UNFCCC and of the Kyoto Protocol are negotiated and settled.
- UNECE Task Force on Emission Inventories and Projections and the related expert panels.
- Advice to EU accession countries on development of their emission inventory systems. Assistance to e.g. Romania and Latvia is provided.

Further Information

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