

Appendix C: Indicator Fact Sheet on nitrogen emissions

(copy from the HELCOM web pages:

http://www.helcom.fi/environment2/ifs/ifs2006/en_GB/Nemissions/)

Nitrogen emissions to the air in the Baltic Sea area

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1.1.1 Key message



Annual emissions of nitrogen oxides and annual emissions of ammonia from the HELCOM Contracting Parties were lower in 2004 than in 1995.

1.1.2 Results and Assessment

1.1.2.1 Relevance of the indicator for describing the developments in the environment

This indicator shows the levels and trends of annual nitrogen oxides and ammonia emissions from anthropogenic sources in HELCOM Contracting Parties into the air. The emissions of nitrogen oxides and ammonia represent the pressure of emission sources on the atmosphere of the Baltic Sea basin and catchment.

1.1.2.2 Policy relevance and policy reference

The HELCOM Ministerial Declaration of 1988 called for a 50 % reduction in discharges of nutrients to air and water by 1995 with 1987 as a base year. The 1992 Helsinki Convention and the 1998 Ministerial Declaration reaffirmed the need to further reduce discharges; leading to the adoption of several relevant Recommendations concerning measures to reduce emissions from point sources and diffuse sources. In 1990 HELCOM adopted its first Recommendation on Monitoring of Airborne Pollution Load (HELCOM Recommendation 11/1), which was later superseded by the Recommendations 14/1 and 24/1.

On the European level the relevant policy to the control of emissions of heavy metals to the atmosphere is being taken in the framework of UN ECE Convention on Long-Range Transboundary Air Pollution (CLRTAP) and in the EU NEC Directive. The Executive Body of CLRTAP adopted the Protocol to Abate Acidification, Eutrophication and Ground Level Ozone in Gothenburg (Sweden) on 30 November 1999. The Protocol sets 2010 emission ceilings for four pollutants: sulphur, NO_x, VOCs and ammonia. According to the Gothenburg Protocol, European NO_x and ammonia emissions should be reduced by at least 41% and 17%, respectively, compared to their levels in 1990. This Protocol entered into force in on 17 May 2005. The national emission ceilings set by EU NEC Directive in 2001 for SO₂, NO_x, VOC and ammonia emissions are designed with the aim of meeting the interim environmental objectives.

1.1.2.3 Assessment

Emissions from outside the Baltic Sea region add to the nitrogen loads entering the Baltic, as do emissions from the ships. In 2004 emissions of nitrogen oxides (NO_x) from international shipping traffic were estimated to account for approximately 8% of the total nitrogen deposition entering the Baltic Sea. Current estimates indicate systematic annual increase of these emissions in the range 2-3%.

Time series of nitrogen oxides, ammonia and total nitrogen annual emissions in the period 1995 – 2004 are shown, for all HELCOM Contracting Parties, in **Figure 1**. Time series of nitrogen oxides, ammonia and total nitrogen annual emissions for the same period, in percent of 1995 emissions, are shown in **Figure 2**.

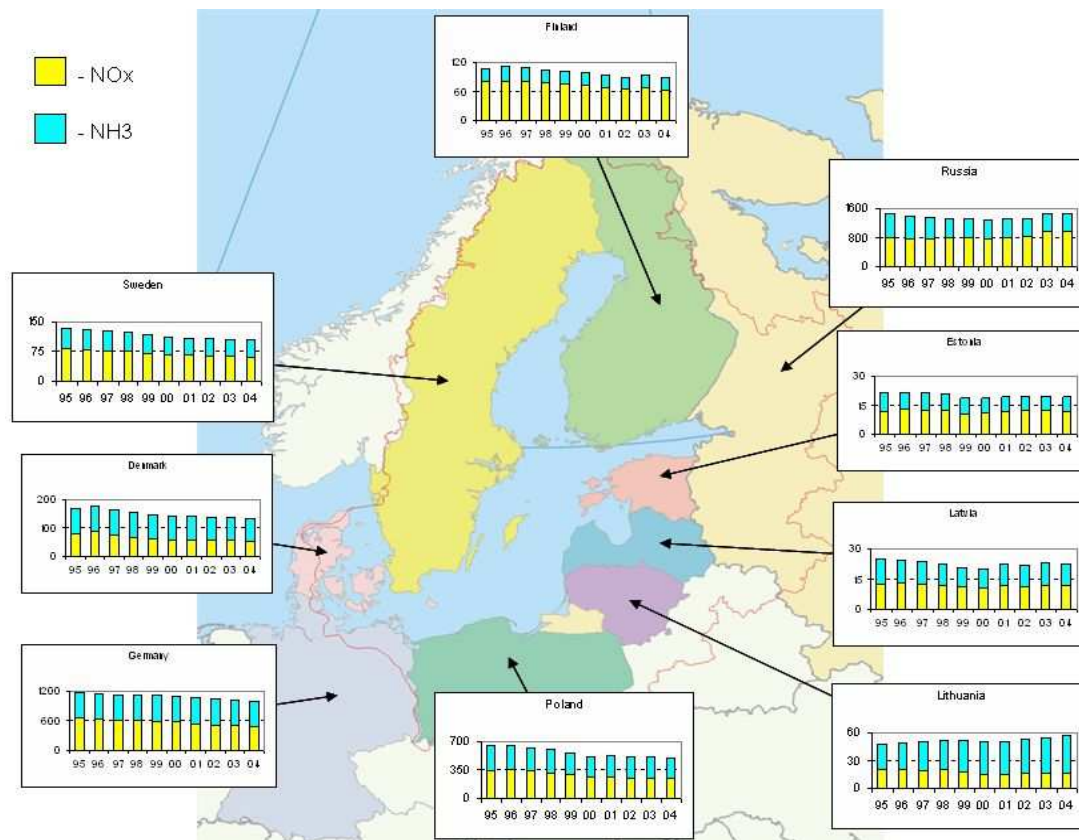


Figure 1. Map of annual atmospheric emissions of nitrogen oxides, ammonia and total nitrogen from individual HELCOM Contracting Parties in the period 1995 – 2004. Units: ktonnes N/yr. **Note:** Different scales have been used for the various countries. The data cover emissions from all countries, except for Russia, where only emissions from the area covered by EMEP are included. **Click image to enlarge.**

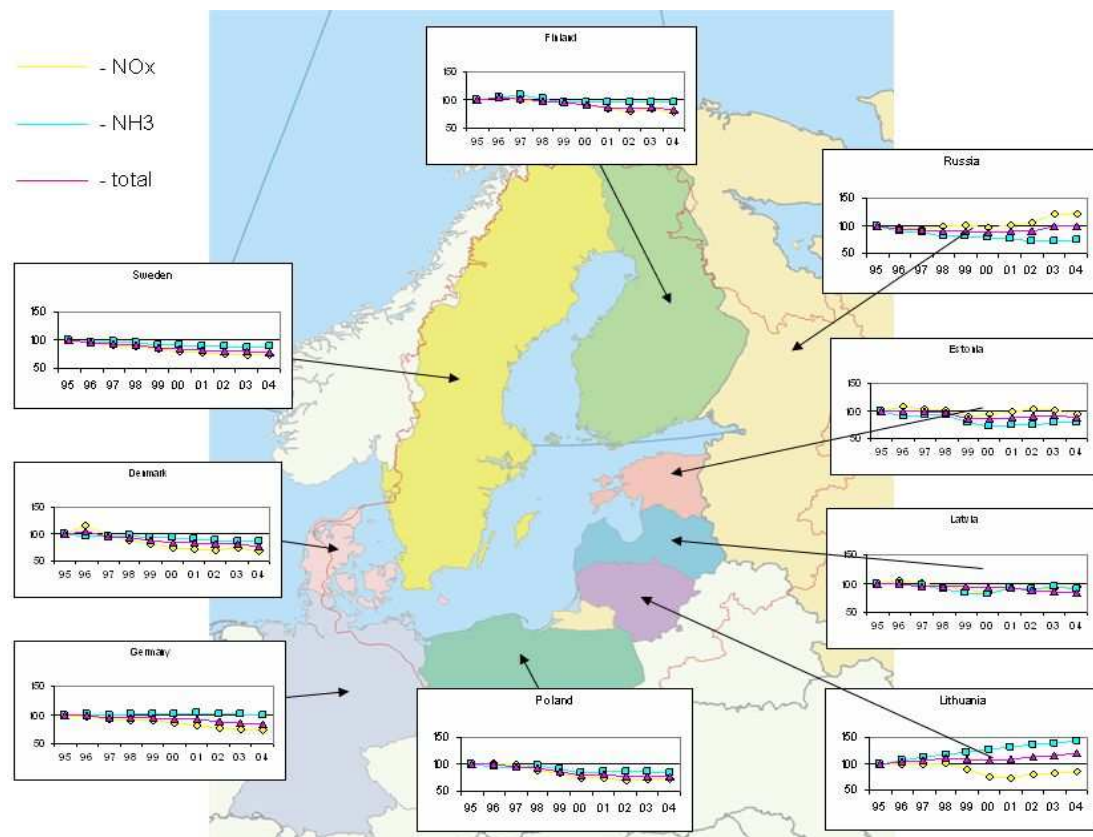


Figure 2. Map of annual atmospheric emissions of nitrogen oxides, ammonia and total nitrogen from individual HELCOM Contracting Parties in the period 1995 – 2004, in percent of 1995 emissions. **Note:** The data cover emissions from all countries, except for Russia, where only emissions from the area covered by EMEP are included. **Click image to enlarge.**

For all except two countries, a decline can be seen in the period 1995 – 2004. The opposite trend can be noticed for ammonia emissions from Lithuania and nitrogen oxides emissions from Russia. A reduction trend for the emissions from the Baltic Sea region in the years 1995 – 2004 is more significant for nitrogen oxides emissions than for ammonia emissions. However, it should be taken into account that nitrogen oxide emissions from the international ship traffic on the Baltic Sea showed an increasing trend in the considered period and they will also tend to increase after 2004.

In all HELCOM Contracting Parties, except Russia, nitrogen oxides emissions are lower in 2004 than in 1995 with the most significant drop of nitrogen oxides emissions in Denmark – 32%. A reduction, in the considered period, can be also noticed in Poland

(28%), Germany (27%), Sweden (27%), Finland (21%), Lithuania (15%), Latvia (5%) and Estonia (4%). Nitrogen oxides emissions in the Russian Federation are 20% higher in 2004 than in 1995.

For ammonia, emissions in all HELCOM Contracting Parties, except Germany and Latvia are lower in 2004 than in 1995, by 4% to 26%. Compared to 1995, ammonia emissions in Germany remain on the same level in 2004, whereas in Latvia ammonia emissions are 43% higher in 2004.

For all HELCOM Contracting Parties, except Lithuania, the reductions of total nitrogen emissions can be observed in the period 1994 – 2004.

1.1.3 Data

Table 1. National total emissions of nitrogen oxides from individual HELCOM Contracting Parties in the period 1995 – 2004. Units: ktonnes N/yr.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Denmark	76.9	88.3	74.3	67.3	62.5	57.1	55.9	55	57.5	52.2
Estonia	11.7	12.6	12.2	11.8	10.5	11.2	11.5	12.2	11.9	11.2
Finland	78.5	81.6	78.8	76.4	75.2	71.6	66.9	63.2	66.2	62.3
Germany	648.6	624	601.3	590.3	583	564.5	536.5	509.5	488.4	473
Latvia	12.4	13	12.4	11.8	11.1	10.5	11.5	11.2	11.6	11.8
Lithuania	19.7	19.5	19.3	19.9	17.5	14.8	14.3	15.6	16	16.6
Poland	341.2	351.5	339	301.6	290	255	258.1	242.3	246	244.8
Russia	782.2	754	737.4	773.8	784.3	747.9	785.7	821.2	945	941.4
Sweden	82.3	79.3	76	73.6	70	66.1	64.2	62.6	61.7	60.1
HELCOM CP	2053.5	2023.9	1950.8	1926.5	1904.2	1798.7	1804.6	1792.7	1904.3	1873.4

Table 2. National total emissions of ammonia from individual HELCOM Contracting Parties in the period 1995 – 2004. Units: ktonnes N/yr.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Denmark	93.7	90.5	90.3	91.4	87.2	86.8	86.1	83.7	80.4	80.6
Estonia	10	9.1	9.2	9.2	7.9	7.3	7.4	7.5	7.9	8
Finland	28.7	29.9	31	29.2	27.3	27.2	27.3	27.4	27.3	27.4
Germany	528.8	531.4	524.2	530	534.9	531.9	543.1	534.7	533.9	527.6
Latvia	12.4	11.8	11.6	10.8	9.8	10	11.2	11.1	11.7	10.9
Lithuania	28.1	29.7	31.4	32.7	34.2	35.8	36.8	38	39	40.1
Poland	311.3	298.9	287.4	303.9	280	264.4	270.5	267.7	265.6	260.6
Russia	689.3	627.5	611.9	566.6	551.8	546	525.4	504.8	504.8	511.4
Sweden	52.5	50.5	50.8	50.2	48.4	47.9	46.6	46.8	46.1	46.5
HELCOM CP	1754.8	1679.2	1647.7	1623.9	1581.5	1557.3	1554.4	1521.7	1516.8	1513.1

Table 3. National total emissions of total nitrogen from individual HELCOM Contracting Parties in the period 1995 – 2004. Units: ktonnes N/yr.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Denmark	170.6	178.8	164.6	158.7	149.8	143.9	142	138.7	138	132.7
Estonia	21.7	21.7	21.4	21	18.4	18.4	18.9	19.7	19.8	19.2
Finland	107.2	111.4	109.8	105.6	102.5	98.8	94.2	90.6	93.5	89.7
Germany	1177.4	1155.4	1125.4	1120.3	1118	1096.4	1079.6	1044.3	1022.2	1000.6
Latvia	24.9	24.8	24	22.6	21	20.4	22.8	22.3	23.3	22.7
Lithuania	47.7	49.2	50.7	52.6	51.6	50.6	51.1	53.6	55	56.8
Poland	652.5	650.5	626.5	605.5	570	519.4	528.5	509.9	511.6	505.4
Russia	1471.5	1381.5	1349.3	1340.4	1336	1293.9	1311.2	1326	1449.8	1452.8
Sweden	134.8	129.8	126.9	123.8	118.5	114	110.8	109.4	107.8	106.5
HELCOM CP	3808.3	3703.1	3598.6	3550.5	3485.7	3355.9	3359	3314.4	3421	3386.5

1.1.4 Meta data

1.1.4.1 Technical information

1. Source: EMEP/MSC-W, UN ECE Secretariat.
2. Description of data: Annual total emissions of nitrogen oxides and ammonia were officially reported to the UN ECE Secretariat by the HELCOM Contracting Parties.
3. Geographical coverage: European region.
4. Temporal coverage: Data on lead, cadmium, and mercury emissions are available for the period 1995 - 2004.
5. Methodology and frequency of data collection: National data on emissions are annually submitted by countries Parties to CLRTAP Convention to the UN ECE Secretariat; the methodology is based on combination of emission measurements and emission estimates based on activity data and emission factors. Submitted data are passing through QA/QC procedure and stored in the UN ECE/EMEP emission database at EMEP/MSC-W.

1.1.4.2 Quality information

6. Strength and weakness: Strength: data on emissions are annually submitted, checked and stored in the database; Weakness: gaps in time series of national emissions.
7. Uncertainty. No official information about the uncertainty of provided nitrogen emission data have been sent to EMEP from both EMEP and HELCOM Contracting Parties.
8. Further work required: Further work on emission uncertainty is required.

For reference purposes, please cite this indicator fact sheet as follows:

[Author's name(s)], [Year]. [Indicator Fact Sheet title]. HELCOM Indicator Fact Sheets 2006. Online. [Date Viewed], http://www.helcom.fi/environment2/ifs/en_GB/cover/.

Last updated: 14 September 2006.

