Appendix C: Indicator Fact Sheet on nitrogen emissions

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http://www.helcom.fi/environment2/ifs/ifs2007/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 most of the HELCOM Contracting Parties were lower in 2005 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adopted its first Recommendation on Monitoring of Airborne Pollution Load (HELCOM Recommendation 11/1), which was later superseded by the Recommendations 14/1 and 24/1.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 nitrogen oxides aned ammonia 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 Acidificationon, 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 SO_2, 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 2005, 18% of nitrogen oxides (NOx) emissions

from international shipping traffic were deposited to the Baltic Sea. Current estimates indicate systemtic 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 – 2005 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**.

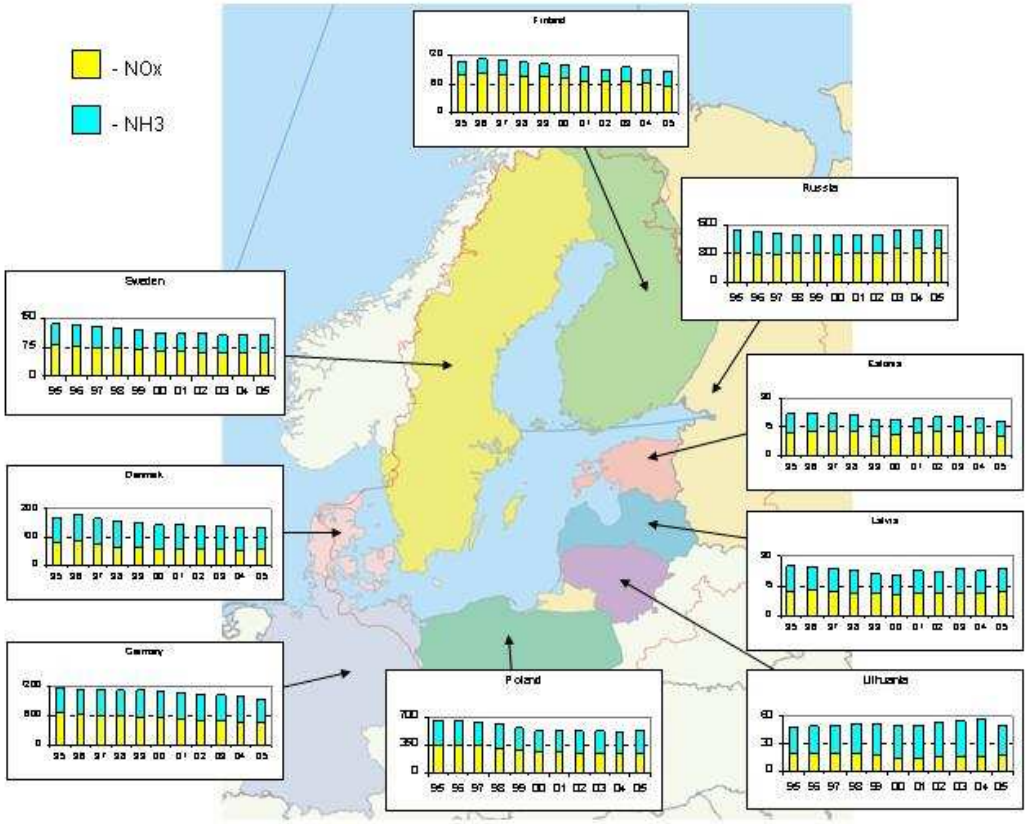

Figure 1. Map of annual atmospheric emissions of nitrogen oxides, ammonia and total nitrogen from individual HELCOM Contracting Parties in the period 1995 – 2005. Units: ktonnes N/yr. **Note**: Different scales have been used for the various countries. The data cover emissions from all countries, except for Russia, where only emissions from the area covered by EMEP are included. **Click image to enlarge.**

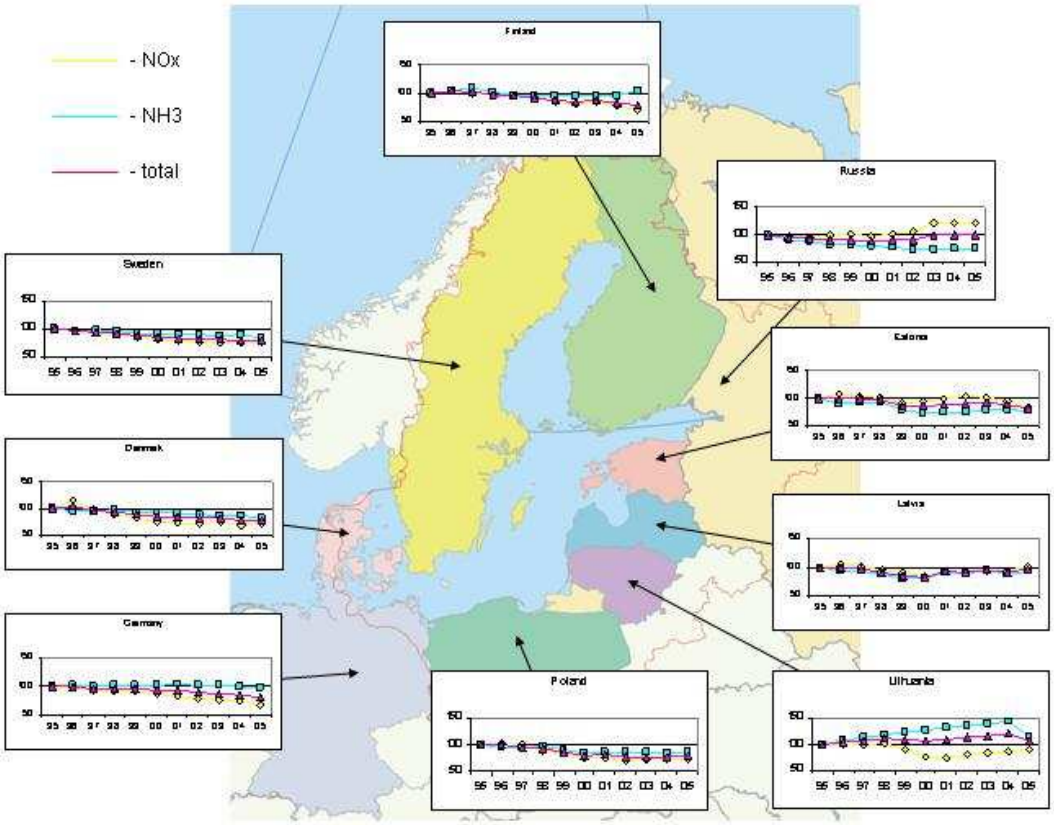

Figure 2. Map of annual atmospheric emissions of nitrogen oxides, ammonia and total nitrogen from individual HELCOM Contracting Parties in the period 1995 – 2005, in percent of 1995 emissions. **Note**: The data cover emissions from all countries, except for Russia, where only emissions from the area covered by EMEP are included. **Click image to enlarge.**

For most of the countries, a decline can be seen in the period 1995 – 2005 . The opposite trend can be noticed for ammonia emissions from Finland and Lithuania and nitrogen oxides emissions from Latvia and Russia. A reduction for the emissions from the Baltic Sea region in the years 1995 – 2005 is more signifficant 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 2005.

In all HELCOM Contracting Parties, except Latvia and Russia, nitrogen oxides emissions are lower in 2005 than in 1995 with the most significant drop of nitrogen oxides emissions in Germany – 32%. A reduction, in the considered period, can be also noticed in Finland (31%), Poland (28%), Denmark (26%), Sweden (24%), Estonia (17%) and Lithuania (11%). Nitrogen oxides emissions in Latvia are 1% and in the Russian Federation 20% higher in 2005 than in 1995.

Ammonia, emissions in all HELCOM Contracting Parties, except Finland and Lithuania are lower in 2005 than in 1995, by 4% to 26%. Compared to 1995, ammonia emissions in Finland and Lithuania are respectively, 4% and 46% higher in 2005.

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.

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Denmark	76,9	88,3	74,3	67,3	62,5	57,1	55,9	55,0	57,5	52,2	56,6
Estonia	11,7	12,6	12,2	11,8	10,5	11,2	11,5	12,2	11,9	11,2	9,8
Finland	78,5	81,6	78,8	76,4	75,2	71,6	66,9	63,2	66,2	62,3	54,0
Germany	648,6	624,0	601,3	590,3	583,0	564,5	536,5	509,5	488,4	473,0	439,0
Latvia	12,4	13,0	12,4	11,8	11,1	10,5	11,5	11,2	11,6	11,8	12,5
Lithuania	19,7	19,5	19,3	19,9	17,5	14,8	14,3	15,6	16,0	16,6	17,5
Poland	341,2	351,5	339,0	301,6	290,0	255,0	258,1	242,3	246,0	244,8	246,8
Russia	782,2	754,0	737,4	773,8	784,3	747,9	785,7	821,2	945,0	941,4	941,4
Sweden	82,3	79,3	76,0	73,6	70,0	66,1	64,2	62,6	61,7	60,1	62,4
HELCOM CP	2053,5	2023,9	1950,8	1926,5	1904,2	1798,7	1804,6	1792,7	1904,3	1873,4	1840,1

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

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Denmark	93,7	90,5	90,3	91,4	87,2	86,8	86,1	83,7	80,4	80,6	76,2
Estonia	10,0	9,1	9,2	9,2	7,9	7,3	7,4	7,5	7,9	8,0	7,6
Finland	28,7	29,9	31,0	29,2	27,3	27,2	27,3	27,4	27,3	27,4	29,8
Germany	528,8	531,4	524,2	530,0	534,9	531,9	543,1	534,7	533,9	527,6	510,1

Latvia	12,4	11,8	11,6	10,8	9,8	10,0	11,2	11,1	11,7	10,9	11,5
Lithuania	28,1	29,7	31,4	32,7	34,2	35,8	36,8	38,0	39,0	40,1	32,5
Poland	311,3	298,9	287,4	303,9	280,0	264,4	270,5	267,7	265,6	260,6	268,9
Russia	689,3	627,5	611,9	566,6	551,8	546,0	525,4	504,8	504,8	511,4	511,4
Sweden	52,5	50,5	50,8	50,2	48,4	47,9	46,6	46,8	46,1	46,5	43,1
HELCOM CP	1754,8	1679,2	1647,7	1623,9	1581,5	1557,3	1554,4	1521,7	1516,8	1513,1	1491,2

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

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Denmark	170,6	178,8	164,6	158,7	149,8	143,9	142,0	138,7	138,0	132,7	13,8
Estonia	21,7	21,7	21,4	21,0	18,4	18,4	18,9	19,7	19,8	19,2	17,4
Finland	107,2	111,4	109,8	105,6	102,5	98,8	94,2	90,6	93,5	89,7	83,8
Germany	1177,4	1155,4	1125,4	1120,3	1118,0	1096,4	1079,6	1044,3	1022,2	1000,6	949,3
Latvia	24,9	24,8	24,0	22,6	21,0	20,4	22,8	22,3	23,3	22,7	24,0
Lithuania	47,7	49,2	50,7	52,6	51,6	50,6	51,1	53,6	55,0	56,8	50,0
Poland	652,5	650,5	626,5	605,5	570,0	519,4	528,5	509,9	511,6	505,4	515,7
Russia	1471,5	1381,5	1349,3	1340,4	1336,0	1293,9	1311,2	1326,0	1449,8	1452,8	1452,8
Sweden	134,8	129,8	126,9	123,8	118,5	114,0	110,8	109,4	107,8	106,5	105,5
HELCOM CP	3808,3	3703,1	3598,6	3550,5	3485,7	3355,9	3359,0	3314,4	3421,0	3386,5	3331,3

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 - 2005.

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/.

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