Appendix G: Indicator Fact Sheet on PCDD/F emissions

(copy from the HELCOM web pages:
http://www.helcom.fi/environment2/ifs/ifs2006/en_GB/pcddfemissions/)

Dioxin and furan atmospheric emission in the Baltic Sea region

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1.1.1 Key message

Annual emissions of dioxins and furans have decreased during the period from 1990 to 2004 in most of the HELCOM countries. The most significant drop of PCDD/F emissions can be noted for Sweden (39%), Estonia (34%) and Russia (34%). Some decrease of emission can also be noted for Denmark (16%) and Poland (9%). For Finland, Latvia, Lithuania, and Germany the level of PCDD/F emissions in 2004 is higher than emissions of 1990.

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 in emissions of dioxins and furans from anthropogenic sources of HELCOM countries to the atmosphere. These emissions represent the pressure of emission sources on the atmosphere of the Baltic Sea region and subsequently on the Baltic Sea aquatic environment.

1.1.2.2 Policy relevance and policy reference

HELCOM adopted a Recommendation in May 2001 for the cessation of hazardous substance discharges/emissions by 2020, with the ultimate aim of achieving concentrations in the environment near to background values for naturally occurring substances and close to zero for man-made synthetic substances.

On the European level the relevant policy to the control of emissions of PCDD/Fs to the atmosphere is being taken in the framework of UN ECE Convention on Long-Range Transboundary Air Pollution (CLRTAP). The Executive Body of CLRTAP adopted the Protocol on Persistent Organic Pollutants on 24 June 1998 in Aarhus (Denmark). According to one of the basic obligations, Parties to the Convention shall reduce their emissions of PCDD/Fs below their levels in 1990. The Protocols has been signed by 36 and ratified by 28 countries and has been entered into force in 2003.

1.1.2.3 Assessment

Annual emissions of dioxins and furans have decreased during the period from 1990 to 2004 in most of the HELCOM countries (Figure 2). The most significant drop of PCDD/F emissions can be noted for Sweden (39%), Estonia (34%) and Russia (34%). Some decrease of emission can also be noted for Denmark (16%) and Poland (9%).

For some of the HELCOM countries the level of PCDD/F emissions in 2004 is higher than emission of 1990. PCDD/F emission of Finland has increased from 1990 to 2004 by 7%. Significant increase of emission can be noted for Latvia (156%) and Lithuania (92%). In accordance with the data officially reported by Germany the value of annual emission for 2004 is almost three times higher the emission of 1990. The reason of this difference is connected with the gaps in submitted sectoral distribution of emission. In particular, data on emission for the sector Petroleum refining were reported for 2000-2004 and were not estimated for the previous period 1990-1999.

Thus total PCDD/F emission of HELCOM countries in 2004 is higher than the emission of 1990 by 60% (Figure 1). The character of temporal variation shown in Figure 1 is mostly determined by the variation of PCDD/F emission of Germany as the most significant contributor to total PCDD/F emission of HELCOM countries.

In 2004 total annual PCDD/F emissions of HELCOM countries amounted to 4.6 kg TEQ. Among the HELCOM countries the largest contributions to total annual PCDD/F emission of HELCOM countries belong to Germany (71%) followed by Russia (14%) and Poland (11%). Maps of the Baltic Sea Region and time-series of annual total PCDD/F emissions of HELCOM countries are shown on Figure 2. The diagrams on the maps also show the fractions of emissions deposited to the Baltic Sea. The highest fractions belong to Denmark and Sweden (about 20%), and the lowest one to Russia (about 0.5%).

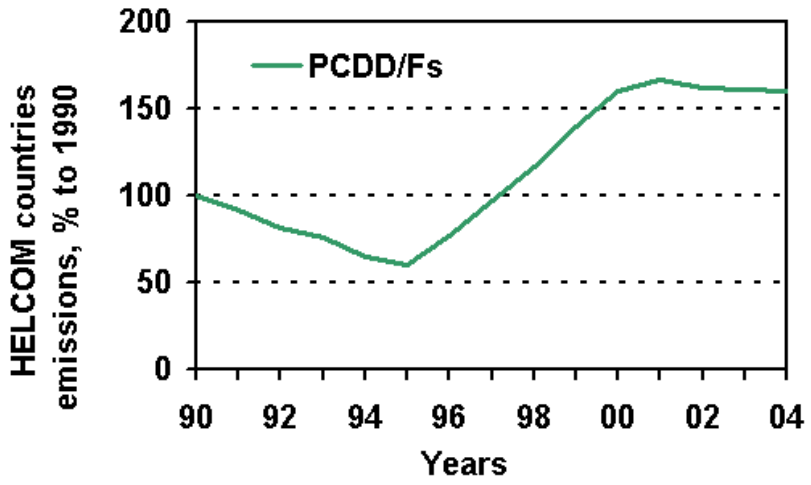

Figure 1. Total annual emissions of PCDD/Fs to air from HELCOM countries in period 1990-2004 (% of 1990).

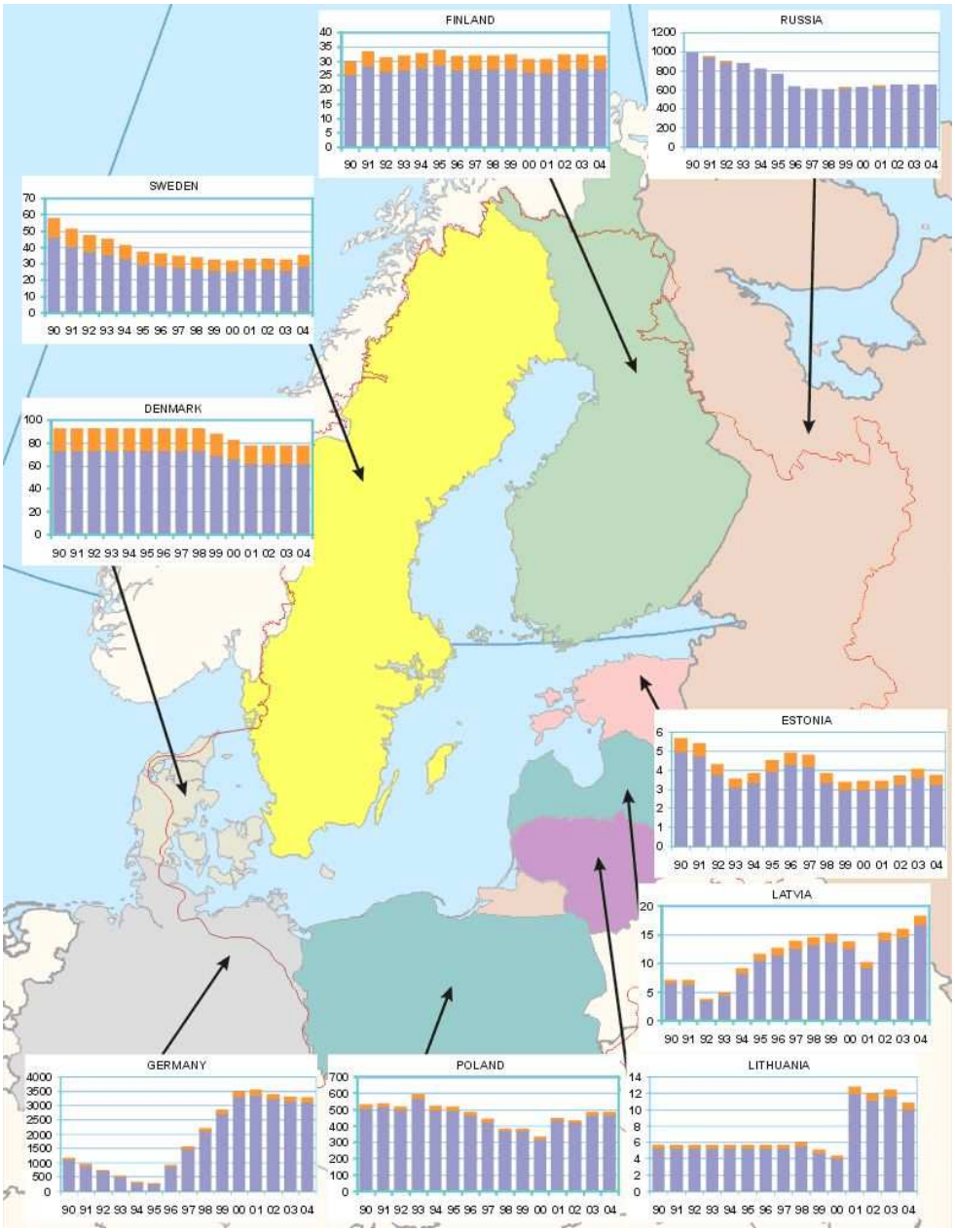

Figure 2: Map of PCDD/F emissions of HELCOM Contracting Parties (CP) to air as totals in tonnes/year for the period 1990-2004. Red sections of the bars identify the fraction of emission deposited to the Baltic Sea. (The emission data of the CP refer to the total area of the CP except for Russian Federation, for which emissions from the territory of Russian Federation within the EMEP domain is used). Note: different scales have been used for different countries! **Click image to enlarge!**

1.1.3 Data

Table 1. Total annual PCDD/F emissions from anthropogenic sources of HELCOM countries in period from 1990 to 2004. Values of emissions estimated using interpolation or extrapolation are shaded. Units: g TEQ/year.

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Denmark	93	93	93	93	93	93	93	93	93	88	83	78	78	78	78
Estonia	6	5	4	4	4	5	5	5	4	3	3	3	4	4	4
Finland	30	33	31	32	33	34	32	32	32	32	31	31	32	32	32
Germany	1152	944	736	528	320	260	904	1548	2192	2837	3481	3531	3396	3303	3277
Latvia	7	7	4	5	9	12	13	14	15	15	14	10	15	16	18
Lithuania	6	6	6	6	6	6	6	6	6	5	4	13	12	12	11
Poland	529	535	517	592	520	515	484	440	381	381	333	447	433	482	483
Russia	991	947	901	878	825	769	637	614	606	625	631	643	655	655	655
Sweden	58	51	48	45	42	37	36	35	34	32	32	33	33	32	35
Total (HELCOM CPs)	2871	2622	2340	2182	1850	1729	2209	2786	3363	4018	4612	4789	4658	4615	4592

1.1.4 Meta data

1.1.5 Technical information:

1. Source:

EMEP/MSC-E UN ECE Secretariat

2. Description of data:

Annual total emissions of dioxins and furans were officially reported to the UN ECE Secretariat by HELCOM countries. These data can be obtained from the EMEP emission database WEBDAB: http://webdab.emep.int.

3. Geographical coverage:

European region

4. Temporal coverage:

Data on PCDD/F emissions are available for the period 1990 - 2004. Some of the HELCOM countries submitted part of the data for this period. Denmark submitted data for 1998, 1999 and 2001-2003. Germany submitted data for the period 1990-2004. However the analysis of these data splitted by source sectors revealed some gaps in the reported information, in particular, emissions for the sector Petroleum refining (1A1b) were reported only for 2000-2004. Lithuania submitted data for 1997-2004. Russia did

not report the information on emission for 2001, 2003, and 2004. Values of emission for missing years were obtained using interpolation or extrapolation.

5. Methodology and frequency of data collection:

National data on PCDD/F 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.

1.1.6 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, uncertainties in national emissions

7. Uncertainty:

The level of uncertainty of official data on PCDD/F emission was reported by HELCOM countries is available for Finland. Among other European countries information on uncertainties of reported emission is available for Austria, France, and the United Kingdom. The uncertainty of reported data on PCDD/F emissions expressed as percentage relative to mean value of emission is as follows: Finland: -47% - +46% Austria: -55% - +120% France: -50% - +50% UK: -50% - +100%.

8. Further work required: Further work is required on filling gaps in time series of emissions and reducing their uncertainties.

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

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