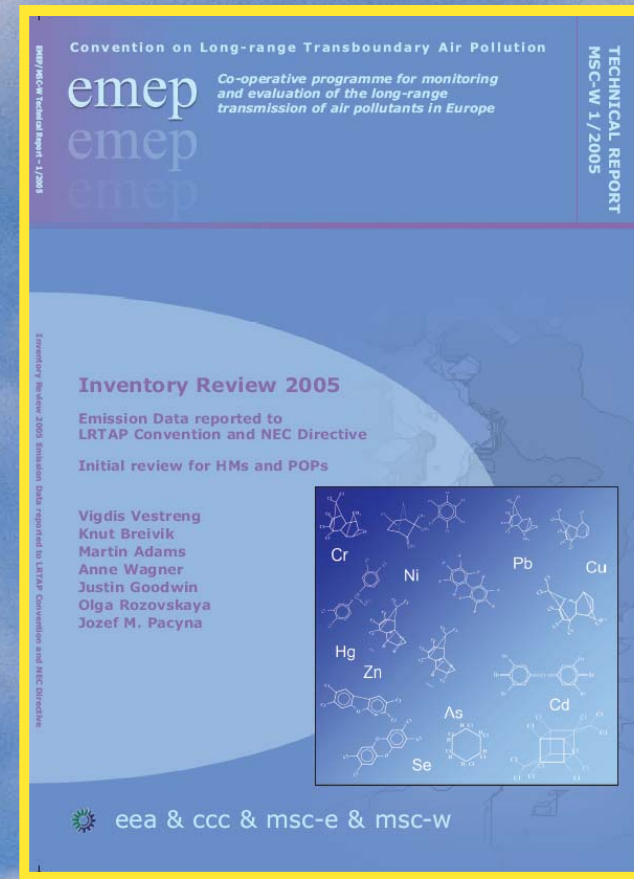




Meteorologisk  
institutt  
met.no



# Inventory Review 2005

Vigdis Vestreng, Met.no/MSC-W

6<sup>th</sup> Joint UNECE Task Force & EIONET WS on Emission Inventories and Projections, Rovaniemi 19-20 October 2005

# Inventory Review 2005



## I. Initial review for HMs and POPs

CCC:	Knut Breivik and Jozef M. Pacyna
MSC-E:	Olga Rozovskaya
MSC-W:	Vigdis Vestreng

## II. Emission data reported to LRTAP Convention and NECD

MSC-W:	Vigdis Vestreng
ETC/ACC:	Martin Adams, Anne Wagner and Justin Goodwin



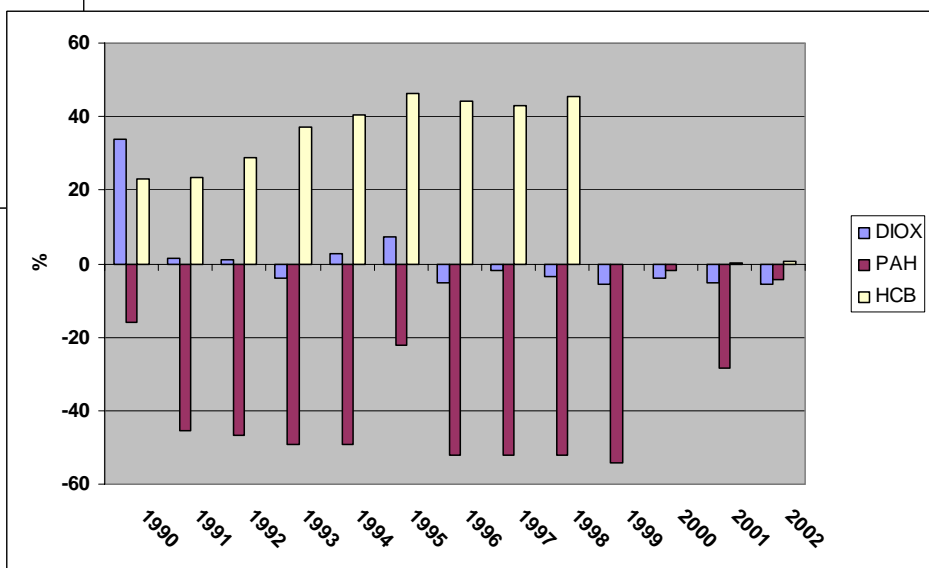
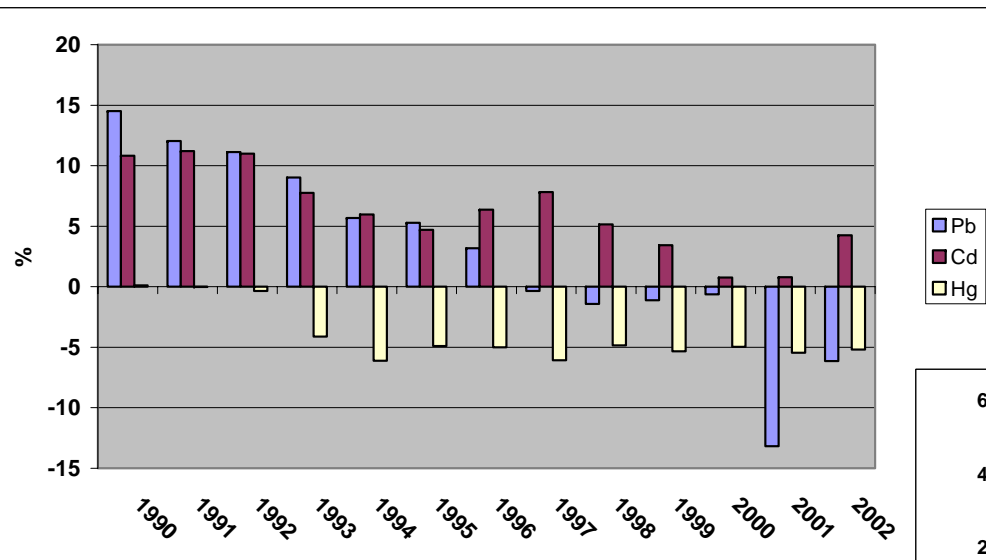
## High uncertainties in the calculated emissions of HMs and POPs

Pollutant	Uncertainty Total emission [%]	Pollutant	Uncertainty Total emission [%]
SO <sub>2</sub>	7	As	120
NO <sub>x</sub>	16	Cr	131
NMVOC	38	Cu	226
CO	43	Ni	114
TSP	417	Se	109
PM10	432	Zn	185
PM2.5	445	<b>B[a]P</b>	<b>988</b>
<b>Pb</b>	<b>117</b>	<b>B[b]F</b>	<b>968</b>
<b>Cd</b>	<b>281</b>	<b>B[k]F</b>	<b>976</b>
<b>Hg</b>	<b>231</b>	<b>IND</b>	<b>993</b>

Estimated uncertainty in Danish emissions, 2003 (Illerup et al., May 2005)

Good Practice

# Reported HMs and POPs are also subject to largest re-calculations



Change in reported national totals for priority HMs and POPs from 2005 and 2004 submissions

# Comparison with Expert Estimates



	Cadmium		Mercury		Lead		PAHs		PCBs		HCB			PCDD/Fs		
	TNO	EMEP	TNO	EMEP	TNO	EMEP	TNO	EMEP	TNO	EMEP	TNO	NILU	EMEP	TNO	EMEP	NILU
AM	NE	X	NE	0.01	NE	11.0	NE	X	NE	X	NE	NE	X	NE	X	NE
AT <sup>[1]</sup>	5.11	1.51	4.27	2.16	2.2	2.1	243.4	17.5	1319	NE	1	81	93	85	161	142
BA	0.41	X	0.22	X	8.6	X	47.8	X	128	X	20	NE	X	9	X	NE
BE	9.91	7.80	8.86	6.66	716.3	565.9	818.0	199.4	5202	NE	213	73	18	616	624	520
BG	8.41	28.25	6.91	13.20	316.2	435.9	55.0	677.3	317	258	0	400	544	154	554	67
BY	6.59	15.19	0.09	0.96	735.7	1595.3	191.0	X	600	X	0	570	X	106	X	107
CA	NE	93.57	NE	35.18	NE	1214.5	NE	667.4	NE	X	NE	NE	88.9	NE	436	NE
CH	4.24	4.20	6.82	6.80	519.9	520.0	96.0	X	1644	X	4	59	0	242	242	242
CS	8.31	X	3.86	X	597.0	X	171.7	X	435	X	50	NE	X	112	X	NE
CY	0.20	0.20	0.30	0.30	0.9	81.0	0.2	X	44	X	0	NE	X	1	1 <sup>[6]</sup>	NE
CZ	12.04	4.34	9.34	7.52	338.2	269.4	259.2	751.6	1995	773	70	NE	X	224	1252	216
DE <sup>[2]</sup>	31.5	NE	113.37	NE	2347.6	1619.6	419.8	0.7	42956	43579	86	1700	86	1196	1196	1623

Extract from inter-comparison of estimated emission national totals in 1990 (t/y except for PCB, HCB (kg/y) and PCDD/F (g I-TEQ/y)).

Differences in the compounds included as PAHs and PCBs in the different estimates can partly help to explain deviations.

# Key source analysis

## Significant changes from 1990 to 2003



Component		Year	Key source categories (Sorted from high to low from left to right)									
H E A V Y  M E T A L S  P O P S	Pb	1990	R.T, Passenger cars (68.0)	R.T Light Duty (7.3)	Metal Prod. (3.3)	Waste (2.6)	1A2a (1.7)	1A1a (1.7)	1A2b (1.4)	1A3b iv (1.1)	1A2f (1.1)	2B5 (0.7)
		2003	Metal Prod. (21.3)	Manuf. Ind.,other (12.3)	Manuf. Ind., Iron and Steel (10.8)	1A2b (7.9)	1A1a (3.9)	Resid. Plants (3.7)	1A3b i (3.4)	2B5 (1.2)	1A3a ii (ii) (1.1)	1A3a ii (i) (0.7)
	Cd	1990	Waste (12.7)	Electricity and heat (8.3)	Metal Prod. (7.9)	1A2b (6.0)	1A2f (2.9)	1A2a (2.4)	1A1b (2.2)	1A3d ii (1.4)	1A4a (1.2)	1A3b vi (1.1)
		2003	Metal Prod. (15.3)	Electricity and heat (9.3)	Non- ferrous (6.4)	1A1b (5.3)	1A2f (4.7)	1A3b vi (4.6)	Resid. Plants (2.1)	1B1b (2.1)	1A2a (2.0)	Waste (1.1)
	PAHs	1990	Other ind. Proc (21.5)	Metal Prod (18.7)	Solvent other (10.0)	1A4bi (6.3)	1A3bi (4.6)	4F (2.1)	1A3biii (2.5)	3A (1.3)	1A2b (2.1)	1B1b (1.2)
		2003	Resid. plants (20.4)	Solvent other (11.2)	Metal prod. (11.2)	2G (8.2)	1A3bi (2.7)	1A2b (2.1)	1A3biii (1.8)	4F (1.4)	6C (1.3)	1A3bii (1.1)

Extract from Key Source analysis: example for Heavy Metals and PAHs  
 Further in depth reviews should help to identify specific source categories for which the empirical basis needs to be improved



# Individual country reviews



Increased bilateral communication with Parties  
Individual country reviews prepared in May 2005 and available in internet  
18 Parties had replied by 1st July

## *Timeliness of submissions - Improves*

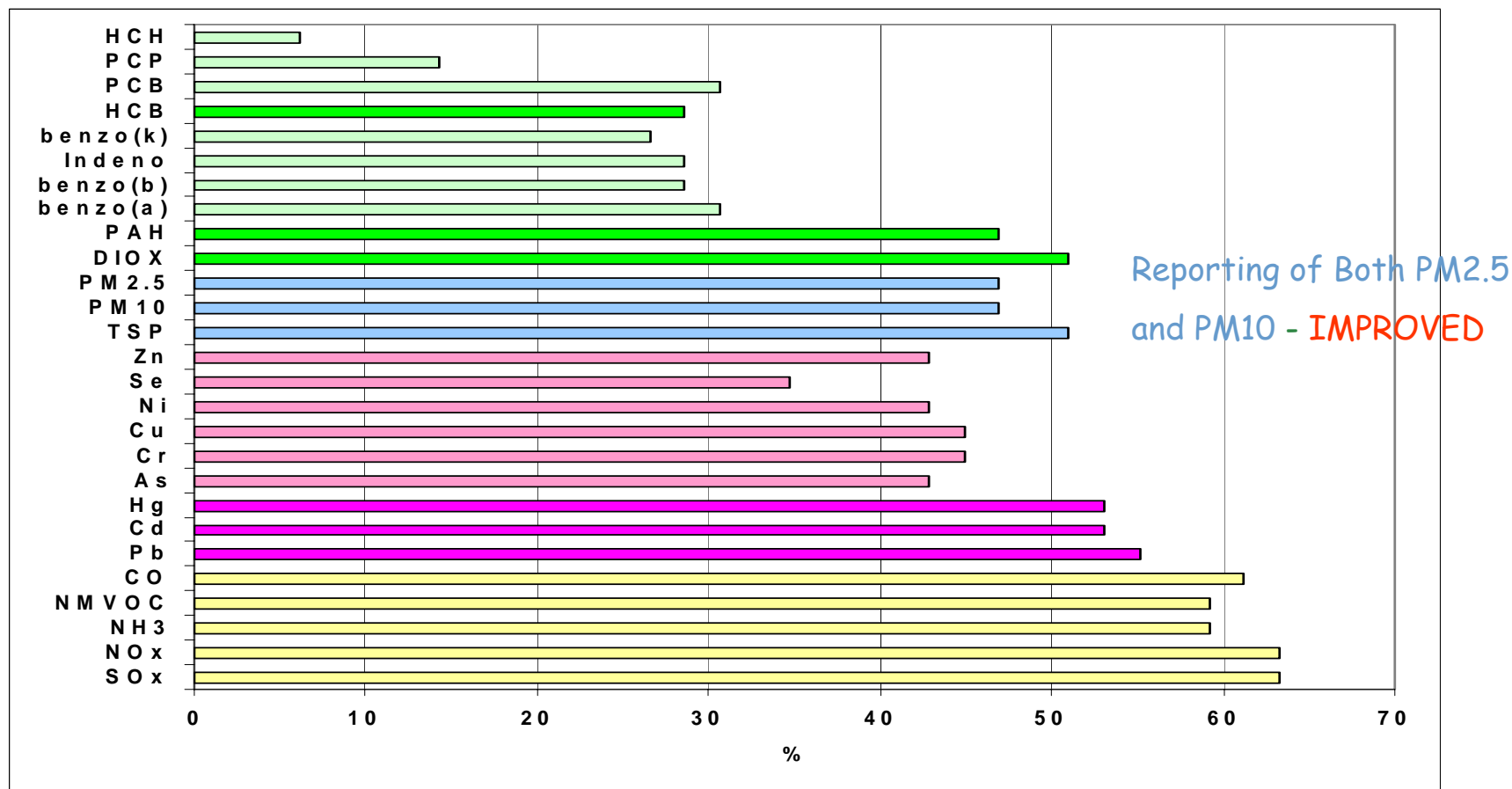
- CLRTAP: 49% (24 Parties) of submissions from Parties were received by the reporting deadline (15 February 2005). This is an improvement in timeliness of 11% or six Parties
- NEC: 9 of the submissions from EU15 Member States were received on time (6 in 2004). Only five of the new EU10 MS submitted, and of these, 3 submissions were received by the reporting deadline.

## *Format of submissions - Improvement*

- CLRTAP: All submissions, except Armenian, were received in NFR format.
- NEC: Of the Member States that had reported NEC emissions data by 1 June all used the required new NFR format for reporting except 1.



# Individual country reviews: Completeness of 2003 national emissions is lowest for POPs

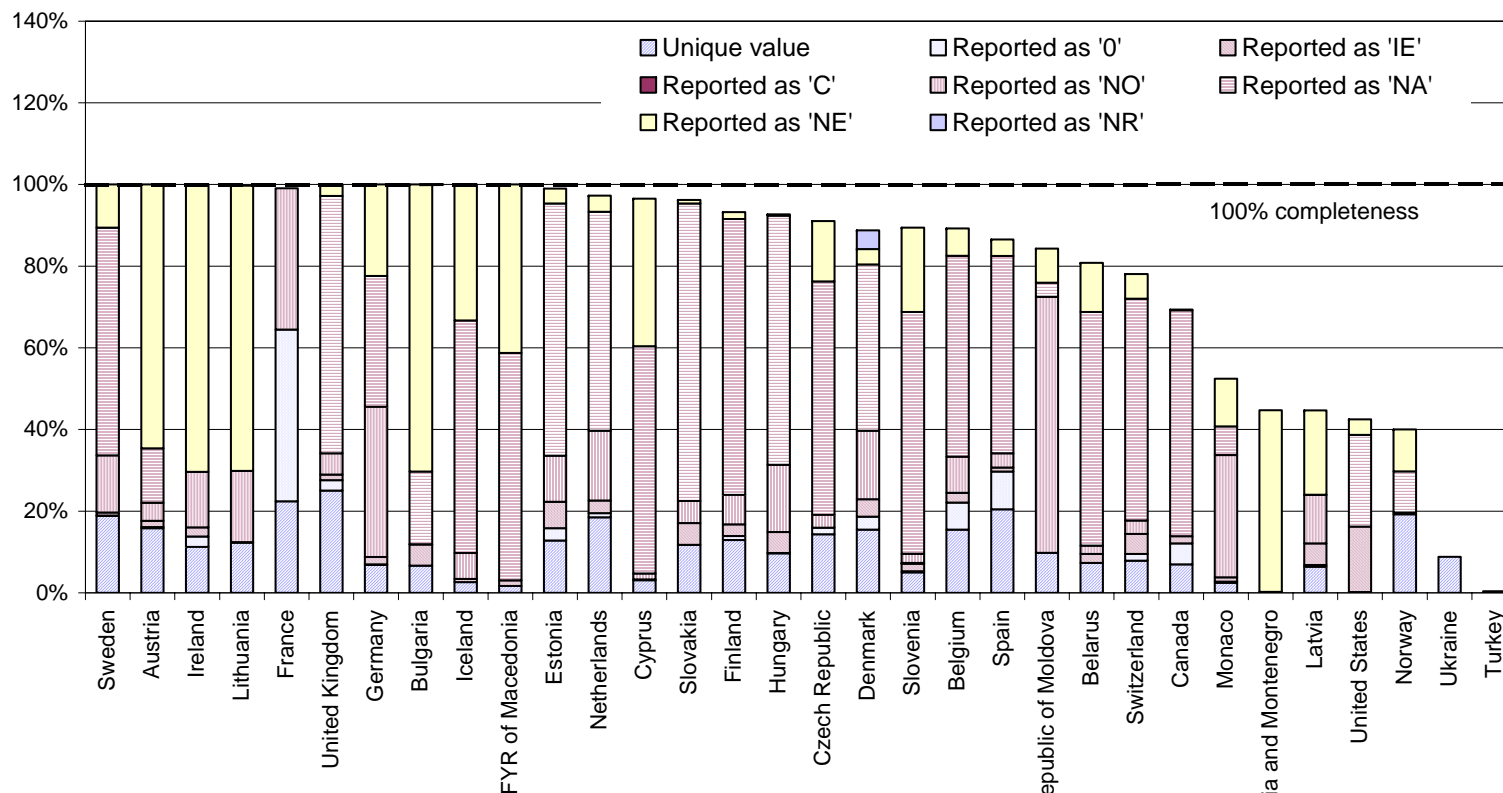


National total emissions reported from different countries: 49 Parties correspond to 100%





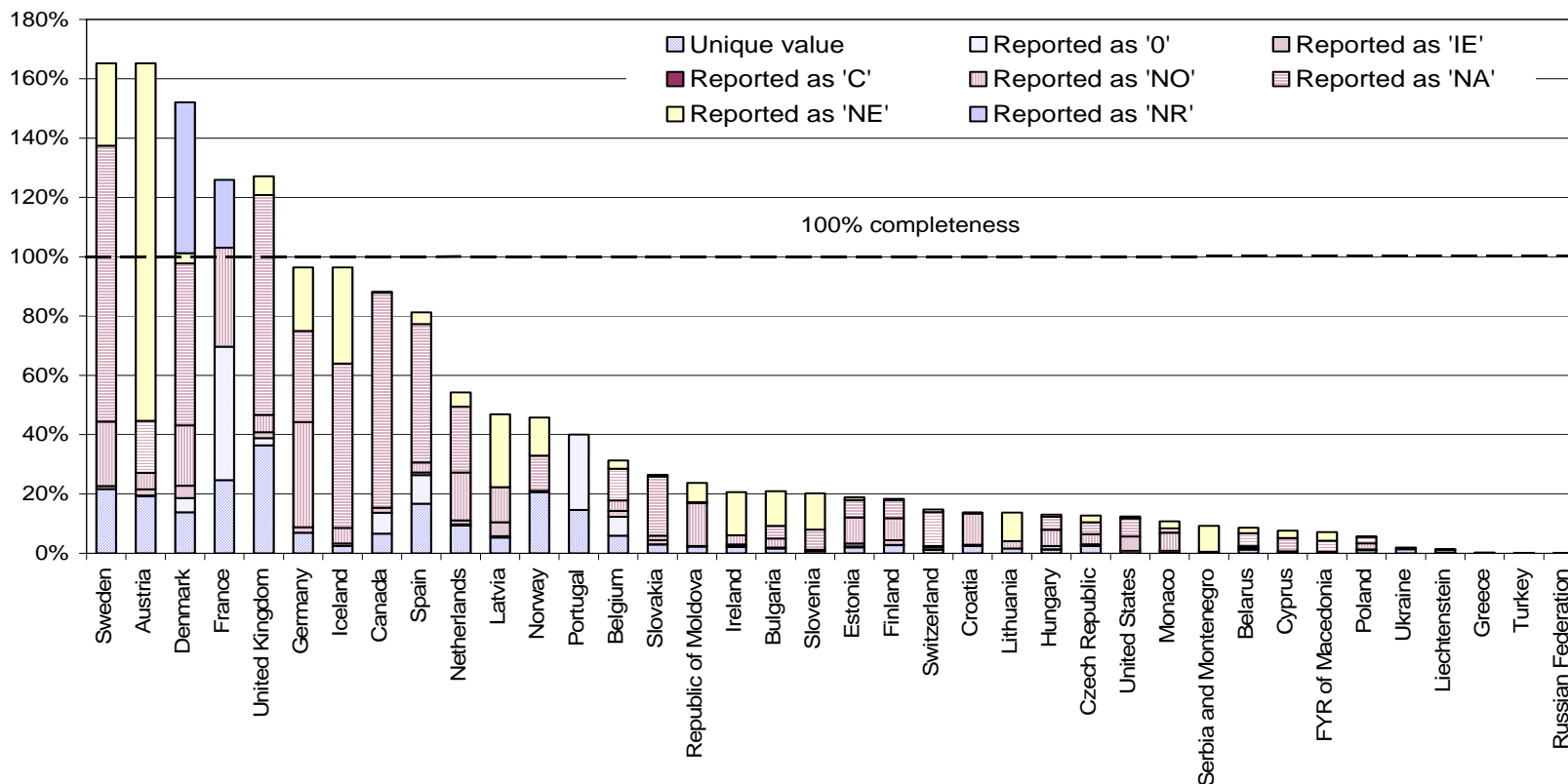
# Individual country reviews: Large differences in completeness for year 2003



*Completeness of submissions by country, all pollutants*  
*Note differences in the amount of reported emission values*  
*Good internal consistency of the reported values*



# Individual country reviews: large differences in completeness of timeseries



*Completeness of time series of submissions by country, 1980-2003*

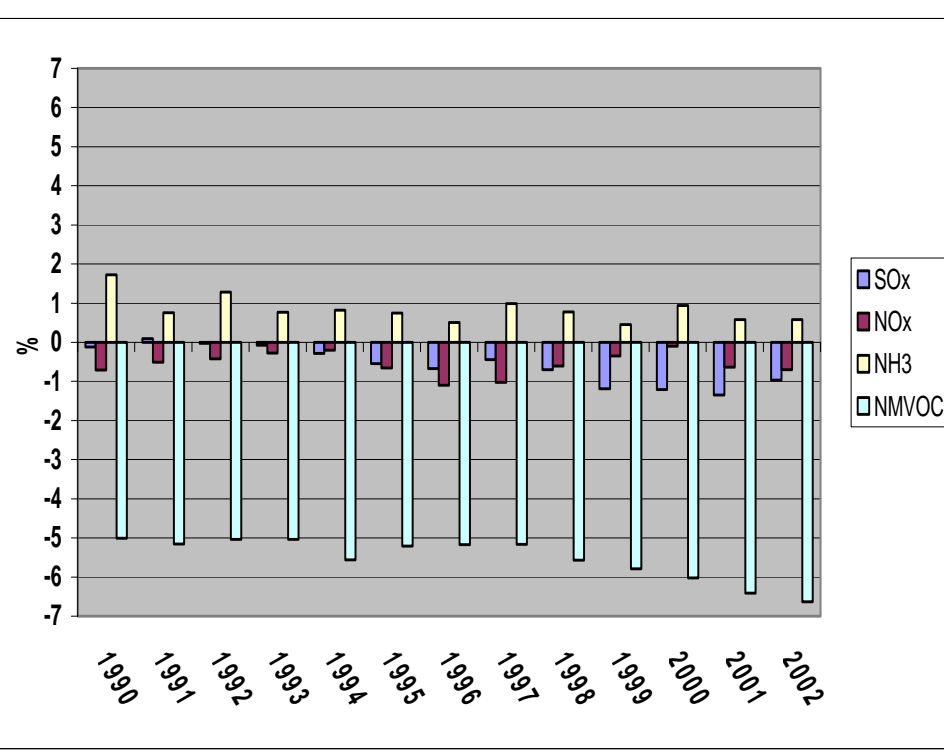
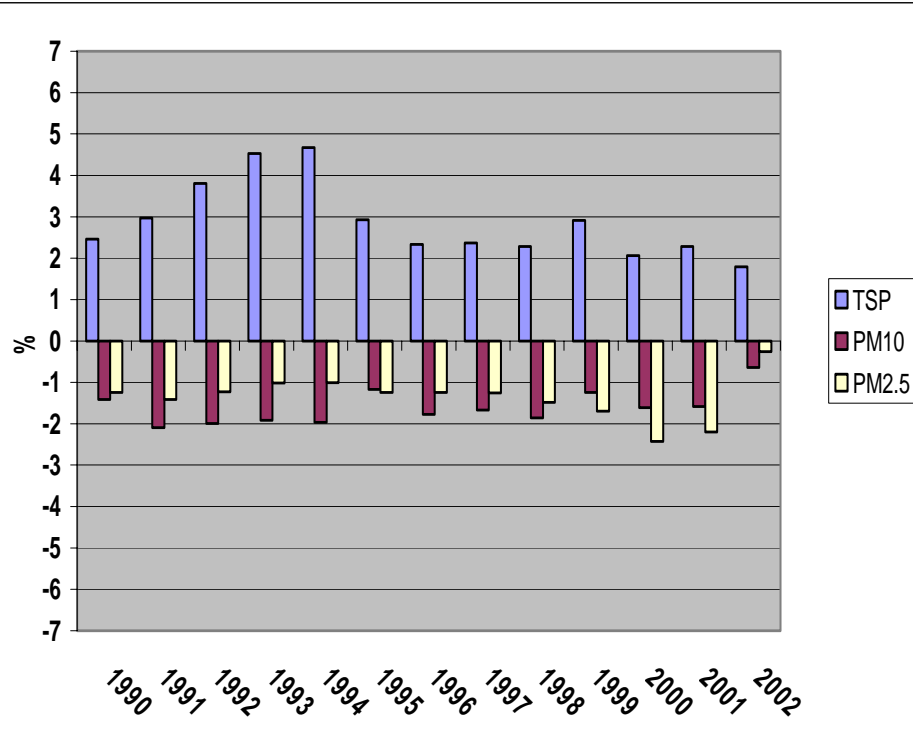
*Generally good consistency of the timeseries*



## LRTAP and NEC Inventory Comparability

- Five countries had differences of larger than  $\pm 0.1$  % in reporting of national totals to LRTAP and to NEC
- The analysis of inventory comparison and memo items reported revealed that countries are not yet sufficiently informed about the difference in the reporting requirements under the NEC Directive and under the LRTAP Convention.
- A check to find out if Parties report transport emissions according to Fuel Consumed or Fuel Sold, showed that all but one of the thirteen Parties that provided this information (e.g. via their IIRs) reported according to Fuel Consumed in at least one sector.

# Recalculations for Main Pollutants and PM



*NMVOC recalculations due to forestry and biogenic sources*

*PM recalculations need further comparison with the CAFÉ\_Baseline results*



## Main conclusions from 2005 review

- *Improved communication and feed back to Parties and Member States through the bilateral individual country reviews*
- *Increased transparency in the emission data submissions (IIR from countries also contribute) and good level of consistency*
- *The completeness of the reports still remains a problem, specially for PM, HMs and POPs*
- *Recommendation for in-depth reviews of the accuracy of emissions of PM, HM, and POPs*
  - Cooperation with EU*
  - Work plan 2006 (PM focus)*

# 2005 review

## Main conclusions (II)



- The relative importance of PAHs and PCCD/Fs, as well as HMs, from residential plants is increasing at the expense of emissions from various other sources, such as metal production.
- For POPs and HMs, there are inconsistencies in the numbers of sources reported and, specially for POPs, there are significant inconsistencies in the speciation of the reported species.
- Further in depth reviews should help to identify specific source categories for which the empirical basis needs to be improved
- For POPs from industrial chemicals and pesticides, a mass balance approach may be used as an alternative methodology to evaluate atmospheric emissions.

Co-operation should be sought with other international efforts such as the European Union and efforts related to the UNEP Stockholm Convention on POPs (e.g. UNEP, 2005)



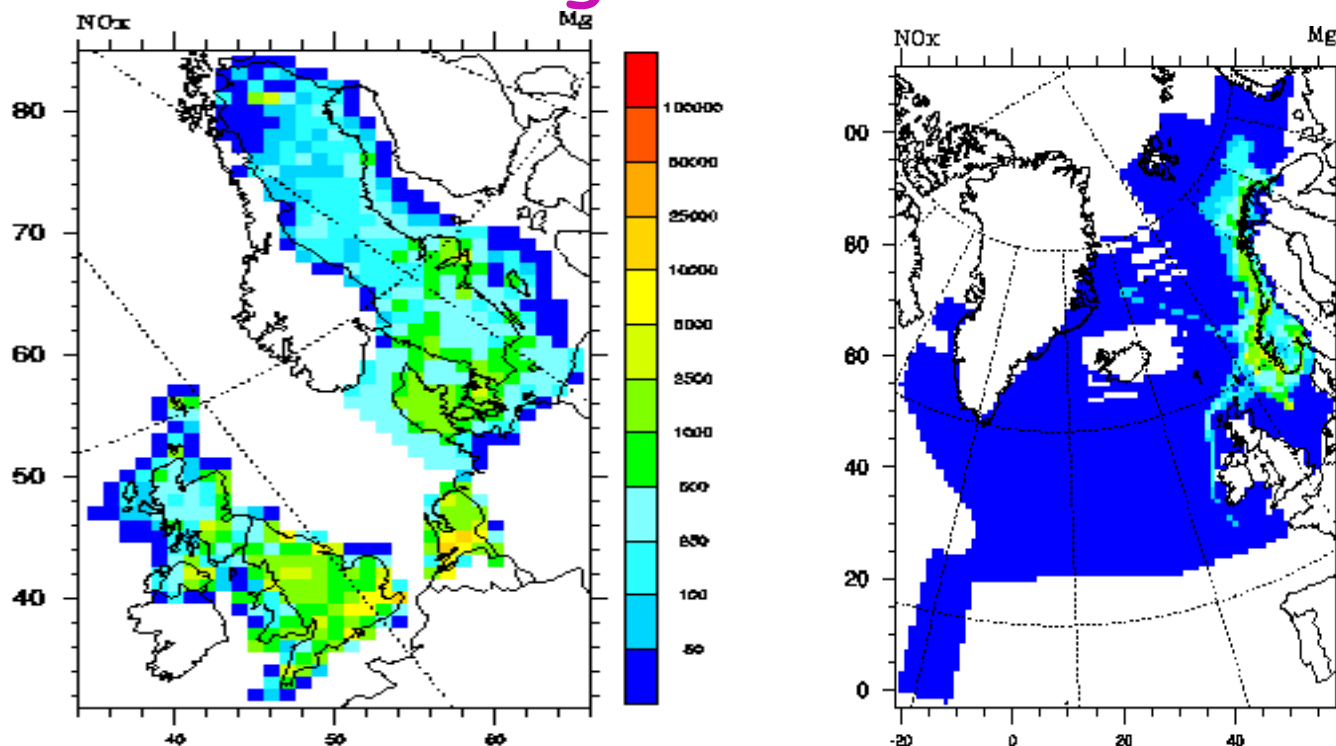


## Further work

- In depth review (ref. introductory talks and talks following this)
- Marine emissions - questionnaire on reporting on national and international navigation emissions both **total** and **gridded emissions**



# National navigation emissions



SE, DK (left) and NO (right) gridded navigation distribution

Selected examples for  $\text{NO}_x$  reporting in Off Road Transport sector (NFR8) for year 2000



# Marine emissions

- International navigation is increasing and is expected to increase in the future. Might become as important as land based for A, E, O<sub>3</sub>.
- National navigation important in itself. Location is important for exceedances implication and it is important not to double count
- 78% of Parties to LRTAP have border to the sea (38 border, 11 (AM, AT, BY, CH, CZ, KG, LI, LU, HU, MK, SK) not border
- 27 countries report on national navigation (Incl. in nat. tot) (AT, BE, CH, CA, CZ, HR, HU, DK, EE, FI, FR, DE, GR, IE, LT, MC, NL, NO, PL, PT, SK, ES, SE, TK, UA, UK, US)
- 14 countries report on international navigation (memo item) (HR, DK, EE, DE, FI, FR, IE, LV, LT, NL, PT, ES, SE, UK)
- 3 countries only (DK, NO and SE) report gridded national navigation
- Questionnaire to Parties in connection with the 2006 reporting



[http://www.emep.int/publ/reports/2005/emep\\_technical\\_1\\_2005.pdf](http://www.emep.int/publ/reports/2005/emep_technical_1_2005.pdf)

