



*Norwegian
Meteorological Institute
met.no*

*Emission data review 2007
Inventory improvements and reporting*

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Outline

- Introduction
- Feedback from 2007 review
- Major findings
- Statistics
- Gridded data
- Conclusions and further work

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Convention on Long-range Transboundary Air Pollution

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Co-operative programme for monitoring and evaluation of the long-range transmission of air pollutants in Europe

TECHNICAL REPORT
MSC-W 1/2007

Inventory Review 2007

Emission Data reported to LRTAP Convention and NEC Directive

Stage 1 and 2 review

Review of gridded data and

Review of PM inventories in Belarus, Republic of Moldova, Russian Federation and Ukraine

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Differences between replacements and reported national total emissions

PM2.5 Mg

1000
500
100
50
0
-10

EEA & MSC-W



Party feedback to 2007 review

- Errors in x-pollutant and timeliness
SORRY!
- Parties find the country specific review reports usefull. However time (and resources) have come to make some changes
 - **IEFs:** Strenghtened IEF tests should replace current IEF and x-pollutant tests. Use LRTAP Activity data consistent with emissions. Source of AD important.
 - **Time series:** Are highly non-linear, hence anomalous with linear regression methods. Improvements needed for this important test to be more significant.
 - **Comparisons:** Refine "East-West" reports and threasholds. Show only differences that are not explainable by differences in GLs (fuel, aviation/navigation) and deadlines
 - **Other:** Insitu visits
- Guidebook: EFs lacking; Hg from the transport subsectors, PMs from agriculture

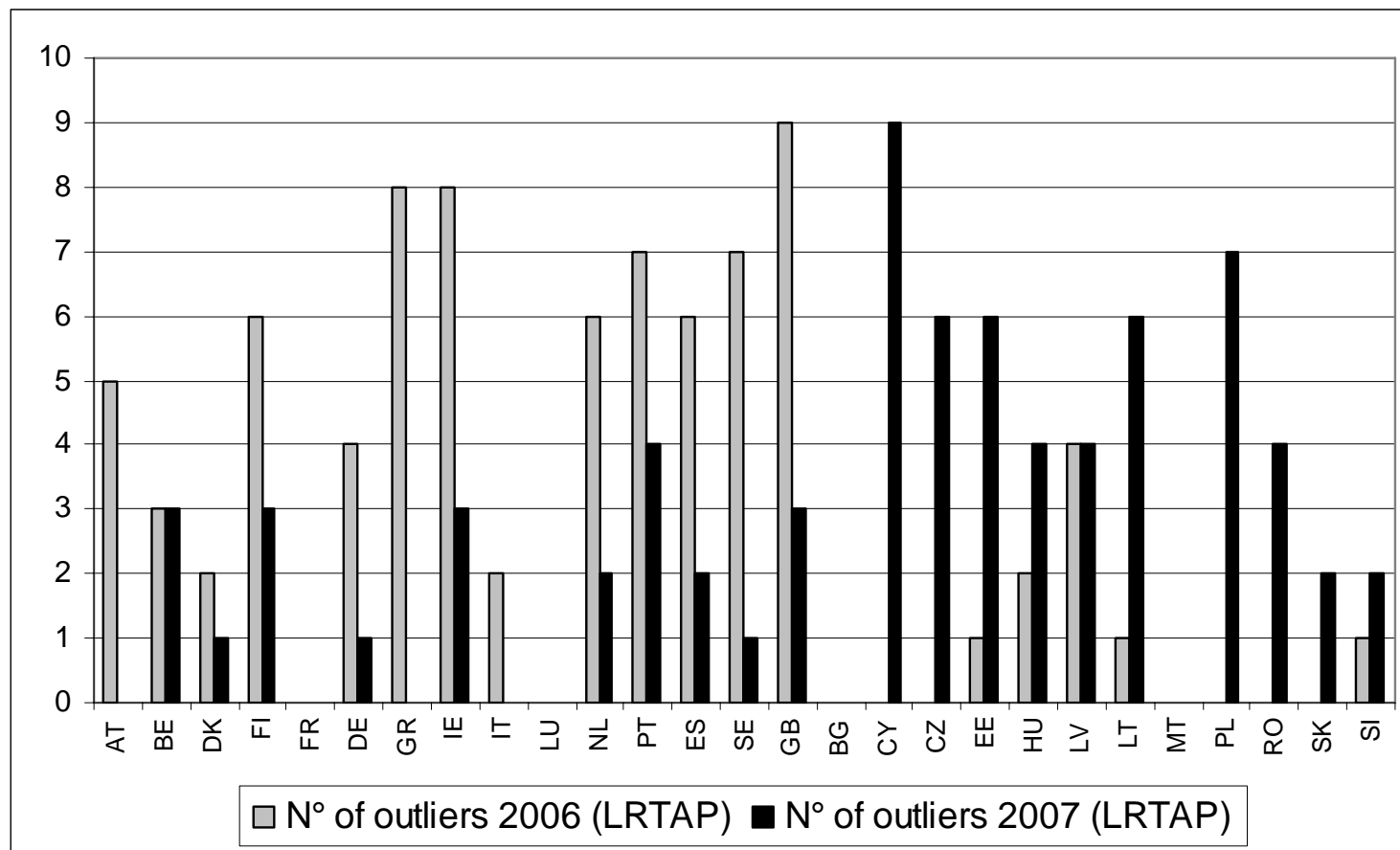
MSC-W feedback



- Non really substantial errors were detected in 2007
- "Outliers" could readily be explained
- Review tests need to be upgraded to reflect the maturity level of (most) inventories (Ref. Dick Derwent) and to continue to be helpful in inventory improvement
- Review replies are useful to highlight differences in inventoring praxis between countries and years (e.g. extrapolation for "not important", years yield lower accuracy)
- Review results are difficult to use for data compilers and scientific work and could be more valuable also for inventory improvement



Example of progress: IEF "outliers" EU-27





PROPOSALS

- Initiate a flagging system for emission and activity data
- Make the explained "outliers" readily available to different users along with the officially reported data
- Review tests also aiming at quantifying the uncertainty in sectors and inventories

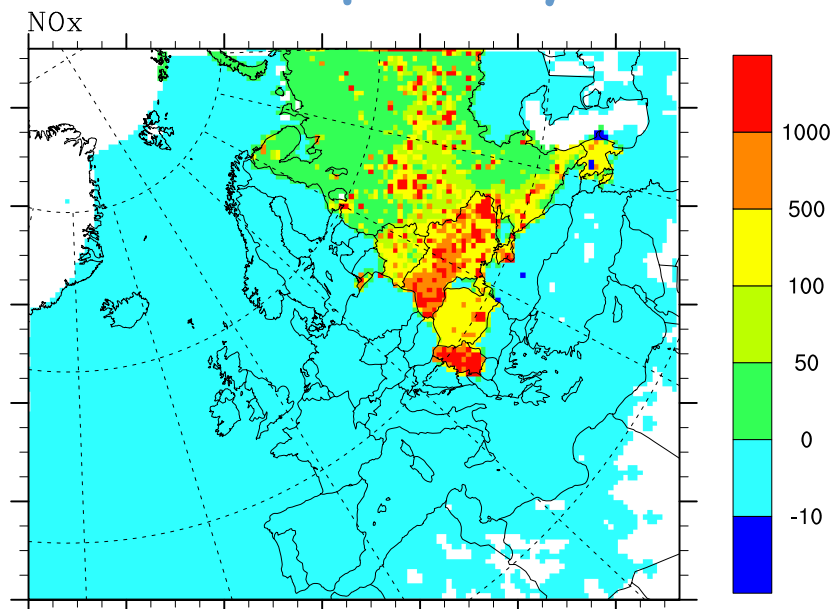


Major findings - EECCA countries

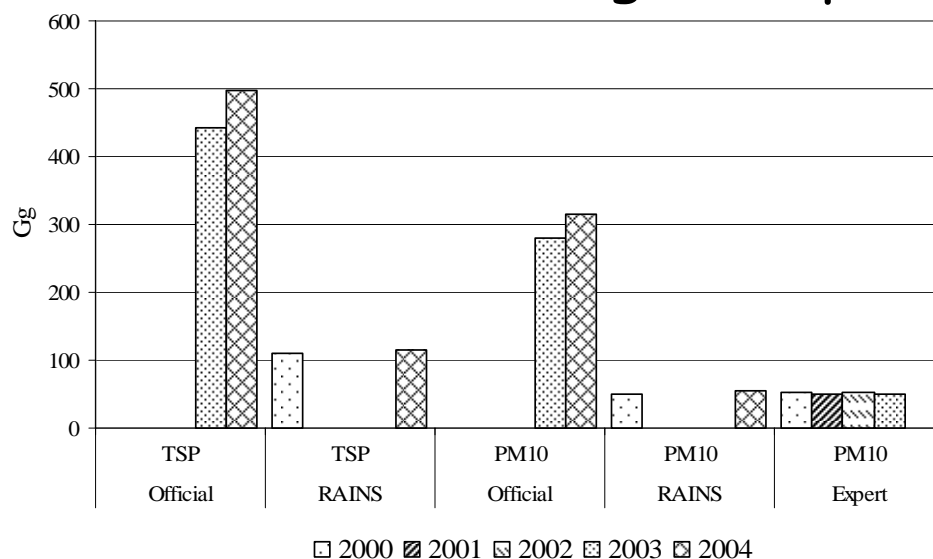
- Lack of reporting
- Low data quality
- Reporting obligation for Parties to the Convention
- Many Parties report according to Protocols only
- Await reply from WGSR



Data quality - EECCA



RU: Contradicting example



- Underestimation: 30%
- Inconsistency: Road transport & Agriculture
- PM data: Preliminary character; Incomplete and lack of size distribution



Major findings - Completeness I

SECTOR
data

- Large difference in completeness in 1980s and 1990s

	sox	nox	nmvoc	nh3	co
1990/1980	2.6	2.8	4.6	4.0	3.1

- Time series XX-2005; ~20% difference

Pollutant	Time series xx-2005	% of total (26/16/6 yrs)	Max-Min % (1 year)	Base year %
SO2	1980	54	22-80	69
	1990	72		
NO2	1980	53	18-80	69
	1990	70		
NMVOC	1980	43	8-69	63
	1990	62		
NH3	1980	43	12-69	59
	1990	61		
CO	1980	50	16-78	
	1990	68		
PM10	2000	52	47-59	
	1990	35		
PM2.5	2000	51	43-59	
	1990	34		



Major findings - Completeness II

- After the review of the 1990-2005

Pollutant	Time series		BEFORE review	AFTER review	Change (%)
	xx-2005				
SO2	1990	72	60	12	
NO2	1990	70	60	10	
NMVOC	1990	62	58	4	
NH3	1990	61	51	10	
CO	1990	68	47	21	
PM10	2000	52	44	8	
PM2.5	2000	51	44	7	

Maximum completeness of the EMEP inventory is still only 60%



Major findings - Completeness III

- Consequences
 - Policy
 - Compliance
 - Research



Ways of assessing uncertainty

- Bottom up tier 1 and Monte Carlo tier 2 (IIRs)
- Comparison with (independent) estimates

Country/Pollutant	SOx	NOx	NMVOC	NH3	CO	Estimation Technique
Czech Republic	15-25	15-25	20-30	15-25		IPCC(2000), Tier 1
Denmark	7	16	39	-	44	IPCC(2000), Tier 1
Finland	3	12	22	24	28	IPCC(2000), Tier 2 Monte Carlo
France	4.3	23	34	26	38	IPCC(2000), Tier 1
Netherlands	6.1	15		17		IPCC(2000), Tier 2 Monte Carlo
Norway	4	12	18	21		Statistical Methods
United Kingdom	3	8	10	20	20	IPCC(2000), Tier 2 Monte Carlo

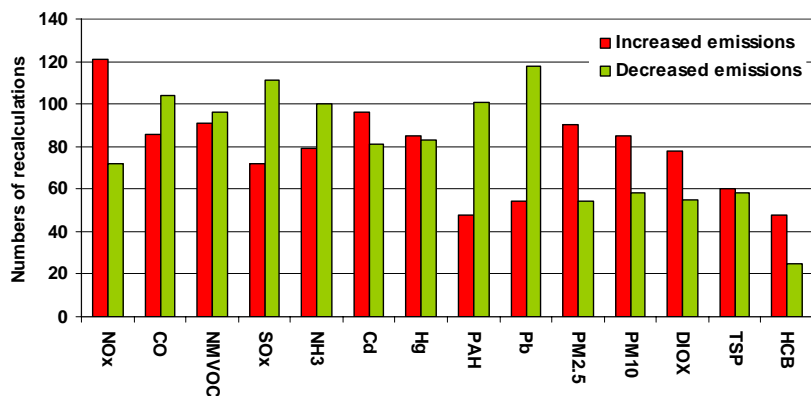
RAINS: 30% difference in ECCA

- Recalculations

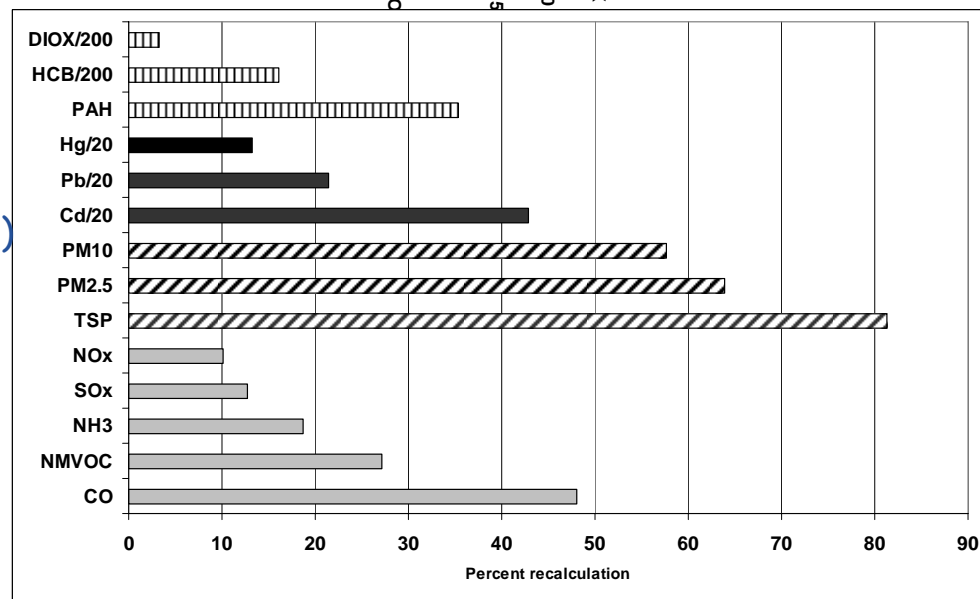
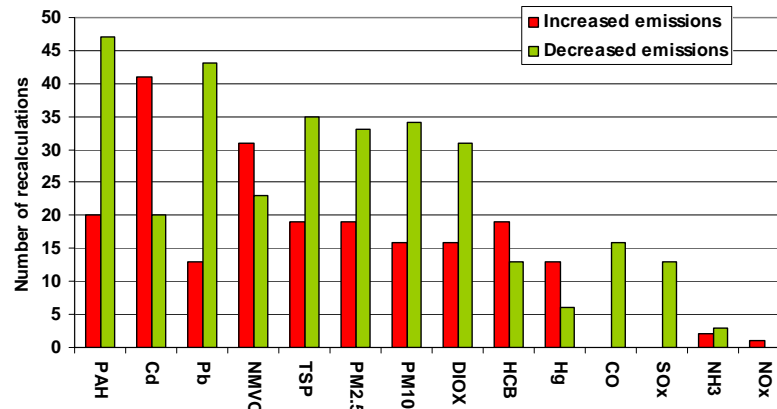


Major findings - Uncertainty

All recalculations



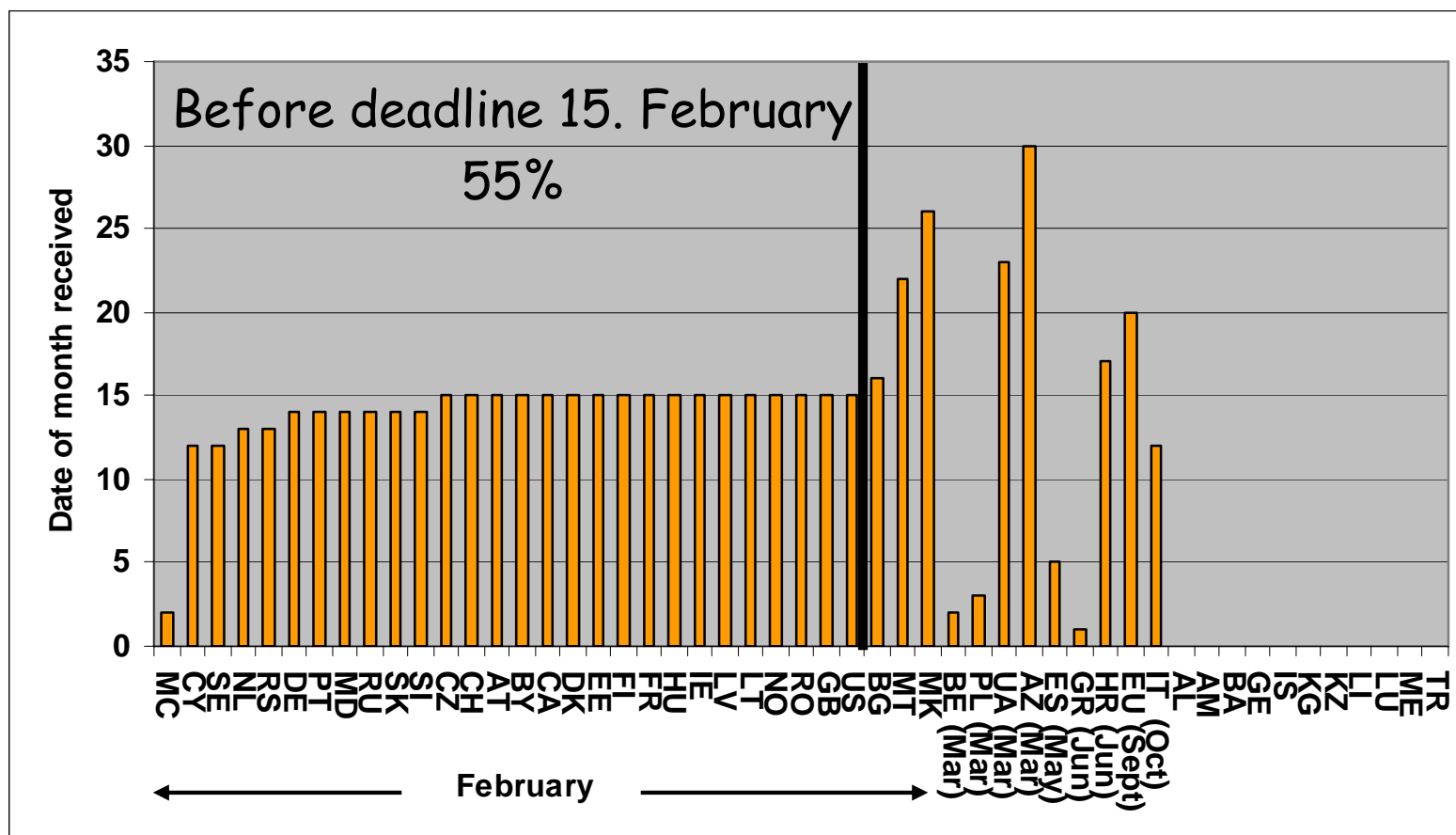
Significant recalculations



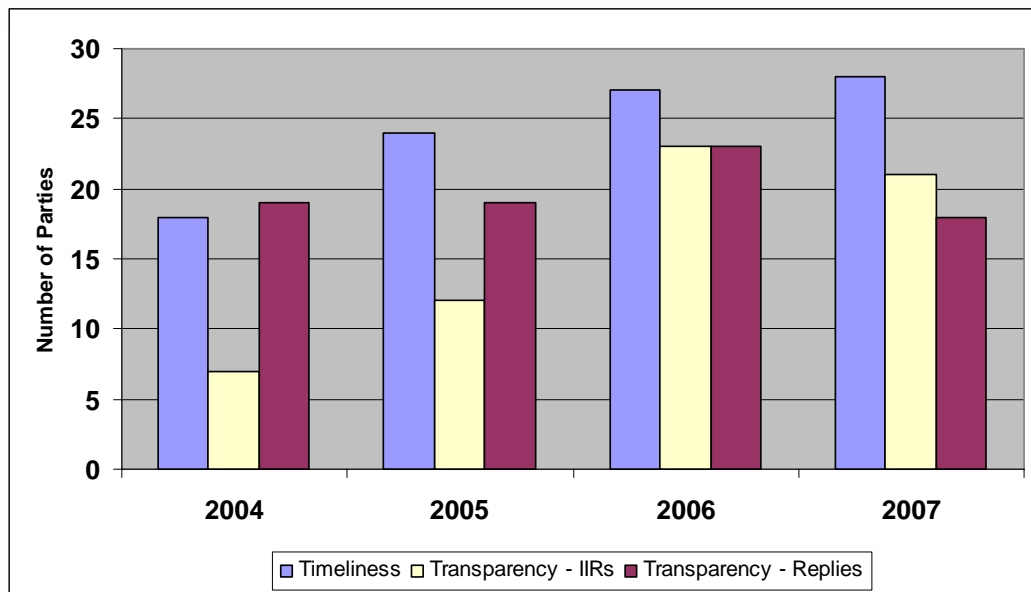
The size range of recalculations by pollutant (%) (/20 and /200 indicate division by 20 and 200 respectively for purposes of axis scaling).



Statistics - Timeliness



Statistics - Transparency



- Timeliness increase
- Transparency decrease

IIRs vary in:

Length, structure and content

US (2007): 2 Pages

GB (2005): 431 Pages

CHALLENGE:

Better utilization of all the information

IIRs 2007	Replies 2007
AT	AT
BG	BE
BY	CH
CY	CY
CZ	CZ
DK	DE
ES	DK
FI	GB
FR	HU
HU	LV
LT	MC
LV	MT
MC	NL
NL (2004 data)	NO
NO	PT
PL	SE
RO	SK
SE	US
SI	
SK	
US	
In addition	
BE (2006)	
EC (2006)	
GB (2005)	
MD (2005)	
Serbia and Montenegro (2006)	
Total: 26 (50%)	



Gridded data

- Improved quantity and quality

- **Preliminary** tests on:

Format

Internal consistency

Boundaries

Completeness

$PM_{coarse} = PM_{10} - PM_{2.5} \geq 0$

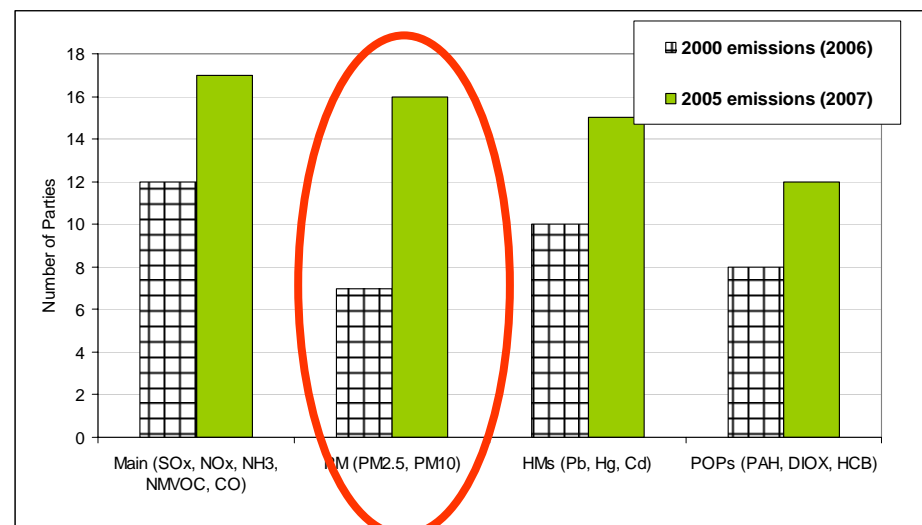
Cross-pollutant

LPS consistent with GL definition

- Encountered problems related to all these simple testes
- Substantial bi-lateral activity (94%)
- Only 32% of EMEP area is covered by official data

➔ **Develop and implement standardized tests according to new GL in due time for 2012 5-yearly reporting.**

Parties requested to report 1990, 95, 2000, 05, 10 in the new sectors



Conclusions and further work I



- Country specific review reports are appreciated and should continue but changes are needed
- Large volumes of data and additional information is submitted. More resources must be spent to digest and disseminate the essence
- Reporting obligations should be clarified by WGSR
- More attention to the less mature inventories to improve completeness
- The completeness and quality of emission data for the 1980s should receive more attention
- TFEIP focus and Guidebook improvements helps to increase completeness and accuracy
- 40% of the EMEP inventory, and 70% of the EMEP area is covered by non-official estimates.

Conclusions and further work II



- The very high number of inventory submissions, together with the large amount of additional data (IIRs and replies) calls for increased efforts from EMEP/TFEIP to digest and share available information
- Most inventories are now at a level where tests (including gridded data) need to be strengthened to be really helpful in inventory improvement work
- The tests should better pinpoint and quantify problems in the inventories
- Development of a databank to keep easy track of already explained "outliers" and quality flagging of emissions and activity data should be available to serve users of the EMEP data
- Quality of the non-offical data (both sector data and gridded data) should be assessed





Question/comments to my conclusions?

Why don't you report emission data?

Why don't you take actively part in the review?