Emission reporting: requirements, estimations and tools

ZSE
ZENTRALES SYSTEM EMISSIONEN

Dr. Kevin Hausmann

Federal Environmental Agency / Dep. I 2.6 - Emissionssituation

Central Emission System

Reviews

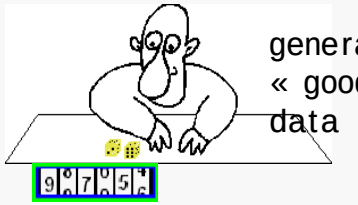
UNFCCC
UNECE
EC / EEA
etc.

Action plan

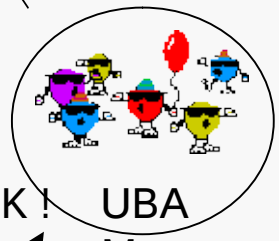
FAL Federal Agricultural Research Centre
Umwelt Bundes Amt
DESTATIS wissen.nutzen.
Engineers (experts !)
AGEB AG Energiebilanzen

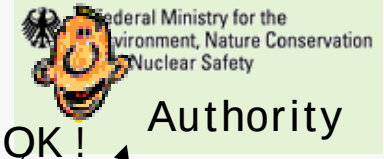
Several solutions (good practices ?)

no hope ?


generate « good » data

launch inquiries


OK ! UBA Mai/Juni

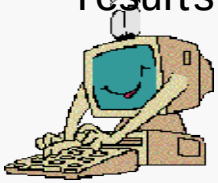

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
Authority
OK !

more in-depth investigation, or search for new method

start again

collect new data

results


data treatment

report (NIR)

hunt out confidential data

spend long nights

external experts

Copyright: Jean-Pierre Fontelle

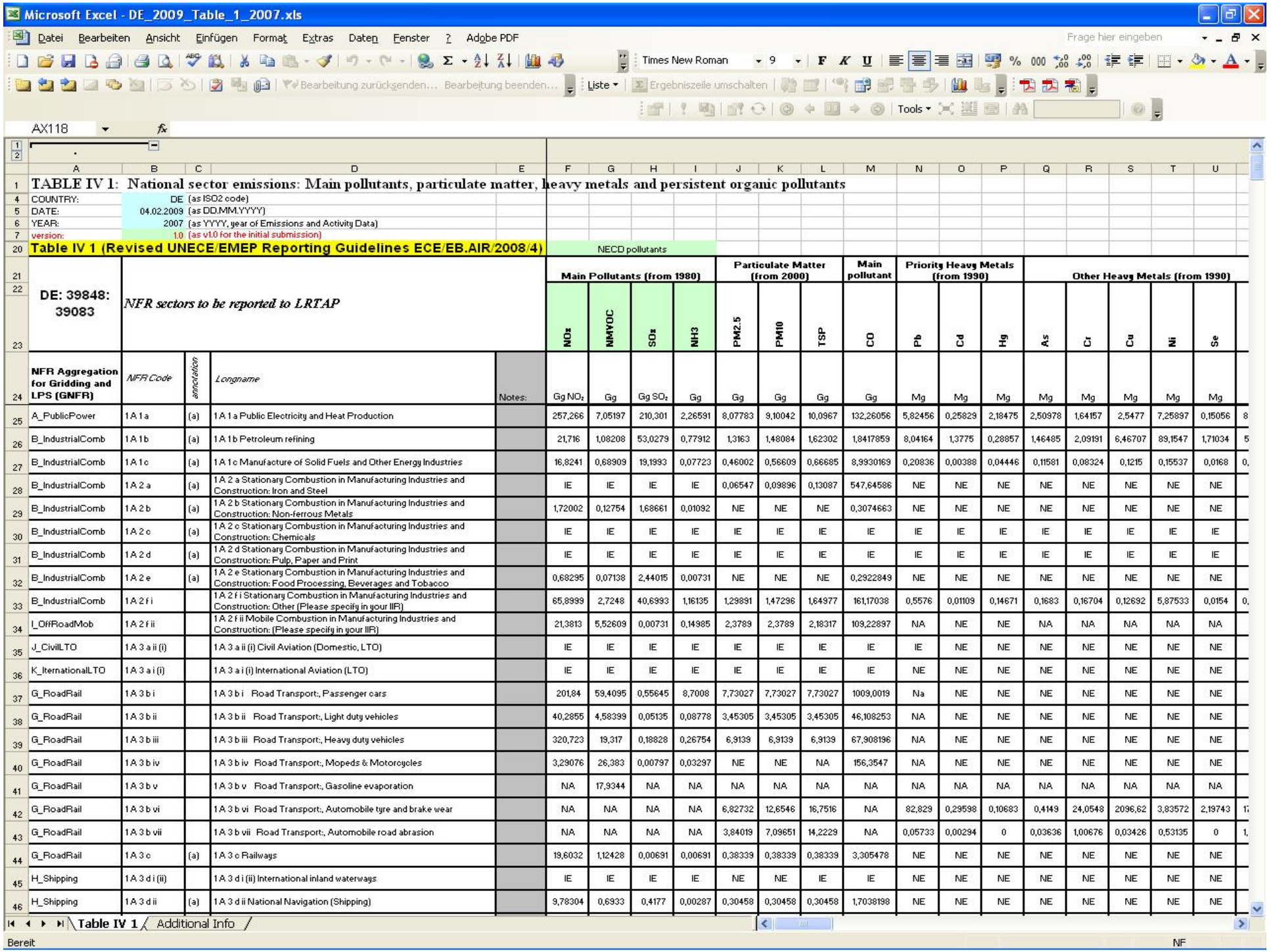
Requirements

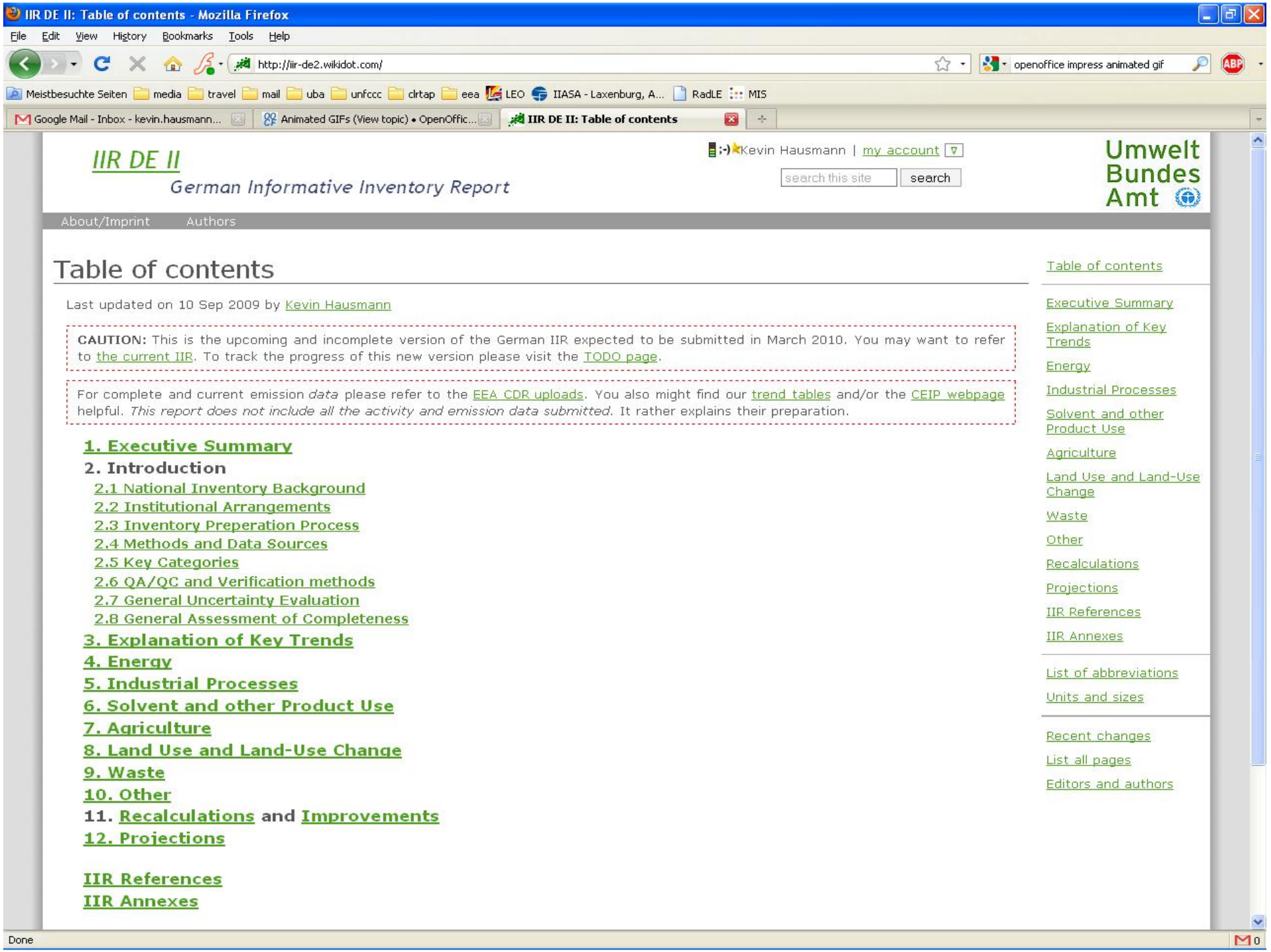
(a practical approach)

Central Emission System

1. Estimate emissions
2. Put the correct number into the right cell of the NFR templates
3. Describe calculation in IIR
4. Submit to UNECE/CLRTAP by 15th of February (data) and 15th of March (report)

http://www.ceip.at


Microsoft Excel - DE_2009_Table_1_2007.xls
Datei Bearbeiten Ansicht Einfügen Format Extras Daten Fenster ? Adobe PDF
Frage hier eingeben
Times New Roman 9
Bearbeitung zurücksenden... Bearbeitung beenden... Liste Ergebniszelle umschalten
Tools
AX118
TABLE IV 1: National sector emissions: Main pollutants, particulate matter, heavy metals and persistent organic pollutants
COUNTRY: DE (as ISO2 code)
DATE: 04.02.2009 (as DD.MM.YYYY)
YEAR: 2007 (as YYYY, year of Emissions and Activity Data)
version: 1.0 (as v1.0 for the initial submission)
Table IV 1 (Revised UNECE/EMEP Reporting Guidelines ECE/EB.AIR/2008/4)
NECD pollutants
DE: 39848: 39083
NFR sectors to be reported to LRTAP
Main Pollutants (from 1980)
Particulate Matter (from 2000)
Main pollutant
Priority Heavy Metals (from 1990)
Other Heavy Metals (from 1990)
NOx NMVOC SOx NH3 PM2.5 PM10 TSP CO Pb Cd Hg As Cr Cu Ni Se
NFR Aggregation for Gridding and LPS (GNFR)
NFR Code
annotation
Longname
Notes:
Gg NOx Gg Gg SOx Gg Gg Gg Gg Mg Mg Mg Mg Mg Mg Mg Mg
A_PublicPower 1 A 1 a (a) 1 A 1 a Public Electricity and Heat Production 257,266 7,05197 210,301 2,26591 8,07783 9,10042 10,0967 132,26056 5,82456 0,25829 2,18475 2,50978 1,64157 2,5477 7,25897 0,15056
B_IndustrialComb 1 A 1 b (a) 1 A 1 b Petroleum refining 21,716 1,08208 53,0279 0,77912 1,3163 1,48084 1,62302 1,8417859 8,04164 1,3775 0,28857 1,46485 2,09191 6,46707 89,1547 1,71034
B_IndustrialComb 1 A 1 c (a) 1 A 1 c Manufacture of Solid Fuels and Other Energy Industries 16,8241 0,68909 19,1993 0,07723 0,46002 0,56609 0,66685 8,9930169 0,20836 0,00388 0,04446 0,11581 0,08324 0,1215 0,15537 0,0168
B_IndustrialComb 1 A 2 a (a) 1 A 2 a Stationary Combustion in Manufacturing Industries and Construction: Iron and Steel IE IE IE IE 0,06547 0,09896 0,13087 547,64586 NE NE NE NE NE NE NE
B_IndustrialComb 1 A 2 b (a) 1 A 2 b Stationary Combustion in Manufacturing Industries and Construction: Non-ferrous Metals 1,72002 0,12754 1,68661 0,01092 NE NE NE 0,3074663 NE NE NE NE NE NE NE
B_IndustrialComb 1 A 2 c (a) 1 A 2 c Stationary Combustion in Manufacturing Industries and Construction: Chemicals IE IE IE IE IE IE IE IE IE IE IE IE IE IE IE
B_IndustrialComb 1 A 2 d (a) 1 A 2 d Stationary Combustion in Manufacturing Industries and Construction: Pulp, Paper and Print IE IE IE IE IE IE IE IE IE IE IE IE IE IE IE
B_IndustrialComb 1 A 2 e (a) 1 A 2 e Stationary Combustion in Manufacturing Industries and Construction: Food Processing, Beverages and Tobacco 0,68295 0,07138 2,44015 0,00731 NE NE NE 0,2922849 NE NE NE NE NE NE NE
B_IndustrialComb 1 A 2 f i 1 A 2 f i Stationary Combustion in Manufacturing Industries and Construction: Other (Please specify in your IIR) 65,8999 2,7248 40,6993 1,16135 1,29891 1,47296 1,64977 161,17038 0,5576 0,01109 0,14671 0,1683 0,16704 0,12692 5,87533 0,0154
I_OffRoadMob 1 A 2 f ii 1 A 2 f ii Mobile Combustion in Manufacturing Industries and Construction: (Please specify in your IIR) 21,3813 5,52609 0,00731 0,14985 2,3789 2,3789 2,18317 109,22897 NA NE NE NA NA NA NA NA
J_CivilLTO 1 A 3 a ii (i) 1 A 3 a ii (i) Civil Aviation (Domestic, LTO) IE IE IE IE IE IE IE IE IE NE NE NE NE NE NE NE
K_InternationalLTO 1 A 3 a i (i) 1 A 3 a i (i) International Aviation (LTO) IE IE IE IE IE IE IE IE NE NE NE NE NE NE NE NE
G_RoadRail 1 A 3 b i 1 A 3 b i Road Transport:, Passenger cars 201,84 59,4095 0,55645 8,7008 7,73027 7,73027 7,73027 1009,0019 Na NE NE NE NE NE NE NE
G_RoadRail 1 A 3 b ii 1 A 3 b ii Road Transport:, Light duty vehicles 40,2855 4,58399 0,05135 0,08778 3,45305 3,45305 3,45305 46,108253 NA NE NE NE NE NE NE NE
G_RoadRail 1 A 3 b iii 1 A 3 b iii Road Transport:, Heavy duty vehicles 320,723 19,317 0,18828 0,26754 6,9139 6,9139 6,9139 67,908196 NA NE NE NE NE NE NE NE
G_RoadRail 1 A 3 b iv 1 A 3 b iv Road Transport:, Mopeds & Motorcycles 3,29076 26,383 0,00797 0,03297 NE NE NA 156,3547 NA NE NE NE NE NE NE NE
G_RoadRail 1 A 3 b v 1 A 3 b v Road Transport:, Gasoline evaporation NA 17,9344 NA NA NA NA NA NA NA NA NA NA NA NA NA NA
G_RoadRail 1 A 3 b vi 1 A 3 b vi Road Transport:, Automobile tyre and brake wear NA NA NA NA 6,82732 12,6546 16,7516 NA 82,829 0,29598 0,10683 0,4149 24,0548 2096,62 3,83572 2,19743
G_RoadRail 1 A 3 b vii 1 A 3 b vii Road Transport:, Automobile road abrasion NA NA NA NA 3,84019 7,09651 14,2229 NA 0,05733 0,00294 0 0,03636 1,00676 0,03426 0,53135 0
G_RoadRail 1 A 3 c (a) 1 A 3 c Railways 19,6032 1,12428 0,00691 0,00691 0,38339 0,38339 0,38339 3,305478 NE NE NE NE NE NE NE NE
H_Shipping 1 A 3 d i (ii) 1 A 3 d i (ii) International inland waterways IE IE IE IE NE NE IE IE NE NE NE NE NE NE NE NE
H_Shipping 1 A 3 d ii (a) 1 A 3 d ii National Navigation (Shipping) 9,78304 0,6933 0,4177 0,00287 0,30458 0,30458 0,30458 1,7038198 NE NE NE NE NE NE NE NE
Table IV 1 Additional Info
Bereit
NF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Last updated on 10 Sep 2009 by Kevin Hausmann
CAUTION: This is the upcoming and incomplete version of the German IIR expected to be submitted in March 2010. You may want to refer to the current IIR. To track the progress of this new version please visit the TODO page.
For complete and current emission data please refer to the EEA CDR uploads. You also might find our trend tables and/or the CEIP webpage helpful. This report does not include all the activity and emission data submitted. It rather explains their preparation.
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Done

Submit to the EIONET

Central Data Repository

http://cdr.eionet.europa.eu

and

Send notification form to

CEIP and UNECE secretariat

Technical Requirements

- High number of values in many timeseries
- Concurrent users
- Extensive calculation scripts
- Complex reports ar
- Automatic data tran
- Recalculation, access ata history, quality contro

à Excel won‘t do

Estimation

Tier I: Simple method

Tier II: Advanced method

Tier III: Detailed method

Guidebook

http://www.eea.europa.eu/themes/air/emep-eea-air-pollutant-emission-inventory-guidebook/emep

Tier I: Simple method

$$AD \times EF_{Pollutant} = EM_{Pollutant}$$

2000 [tons of steel] x 4.6 [g lead per t steel] =
9.2 [kg of lead]

Tier II: Advanced method

$$AD_{Tech1} \times EF_{Tech1,\ Pollutant} = EM_{Tech1,\ Pollutant}$$
$$AD_{Tech2} \times EF_{Tech2,\ Pollutant} = EM_{Tech2,\ Pollutant}$$
$$\ldots$$

(TechX = Sinter, Pig Iron, Stellmaking etc.)

Tier III: Detailed method

Use facility data

What method (Tier I - III) do I choose?

Use the decision tree in the Guidebook, most of the time key category sources require higher tiers!

Central Emission System

Component	2007 Key source categories (Sorted from high to low from left to right)										Total (%)	Not listed
SOx	1A1a (42.6%)	1A1b (10.8%)	1A2fi (8.3%)	1A4bi (7.6%)	2C1 (7.2%)	2B5a (6.2%)	1A1c (3.9%)	1A4ai (2.9%)	2A7d (2.1%)	1B2b (2.0%)	93.5	2
NOx	1A3biii (25.0%)	1A1a (20.0%)	1A3bi (15.7%)	1A2fi (5.1%)	1A4bi (4.2%)	1A4cii (3.3%)	4D1a (3.2%)	1A3bii (3.1%)	2C1 (2.5%)	4G (2.5%)	84.7	7
NH3	4B1a (26.0%)	4B8 (22.2%)	4B1b (20.7%)	4D1a (13.3%)	4B9a (2.8%)	4D2c (2.5%)	4B9c (2.2%)	4B9b (2.1%)	4B6 (1.9%)	1A3bi (1.4%)	95.1	0
NMVOC	3D2 (25.5%)	3A3 (23.3%)	4B8 (7.6%)	4B1a (6.3%)	4B1b (5.1%)	1A3bi (4.6%)	3C (3.8%)	3B1 (3.4%)	1A4bi (2.7%)	1A3biv (2.1%)	84.3	10
CO	1A3bi (26.9%)	1A4bi (18.5%)	1A2a (14.6%)	2C1 (13.2%)	1A2fi (4.3%)	1A3biv (4.2%)	1A1a (3.5%)	1A2fii (2.9%)	2C3 (2.7%)	1A4ai (2.6%)	93.4	1
TSP	2G (30.0%)	2C1 (16.7%)	1A4bi (8.7%)	2A7d (7.8%)	1A3bvi (6.5%)	1A3bvii (5.5%)	3D3 (4.0%)	1A1a (3.9%)	1A3bi (3.0%)	1A3biii (2.7%)	88.6	6
PM10	2G (16.7%)	2C1 (13.7%)	1A4bi (10.9%)	4D2a (9.3%)	1A3bvi (6.3%)	3D3 (5.1%)	2A7d (4.9%)	4B8 (4.7%)	1A1a (4.5%)	1A3bi (3.8%)	79.9	9
PM2.5	1A4bi (20.0%)	3D3 (9.9%)	2C1 (9.0%)	2G (7.7%)	1A1a (7.7%)	1A3bi (7.4%)	1A3biii (6.6%)	1A3bvi (6.5%)	1A3bvii (3.7%)	1A3bii (3.3%)	81.7	9
Pb	1A3bvi (77.8%)	1A1b (7.6%)	1A4bi (6.8%)	1A1a (5.5%)							97.7	0
Hg	1A1a (54.0%)	2A1 (23.3%)	1A1b (7.1%)	1A4bi (6.5%)	1A2fi (3.6%)	1A3bvi (2.6%)					97.3	0
Cd	1A1b (54.3%)	1A4bi (19.6%)	1A3bvi (11.7%)	1A1a (10.2%)							95.8	0
DIOX	2C1 (50.5%)	1A4bi (14.8%)	1A4ai (10.4%)	1A1a (6.3%)	2C5a (4.0%)	2C3 (2.3%)	1B1b (2.1%)	2C5d (2.0%)	1A2fi (1.6%)	1A3bi (1.4%)	95.5	0
PAH	1A4bi (89.9%)	2A1 (2.0%)	1B1b (1.7%)	2C1 (1.6%)							95.3	0
HCB	1A4bi (39.4%)	1A1a (35.0%)	2A1 (14.9%)	1A4ai (4.6%)	1A1c (3.5%)						97.3	0

Finished? Wait! There is more:

Projections

Recalculation

Uncertainties

Spatial Mapping (aka Gridding)

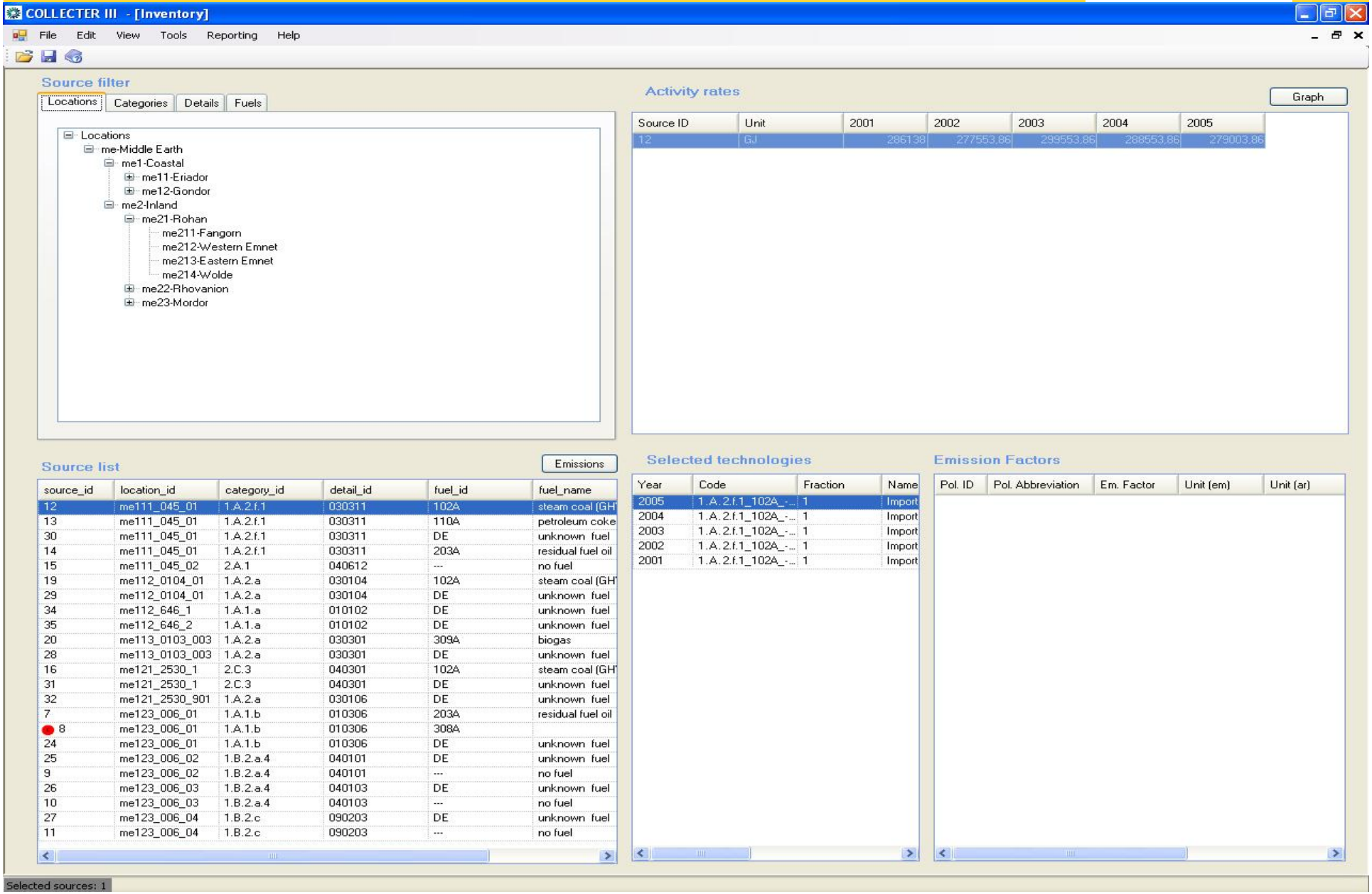
…

Tools

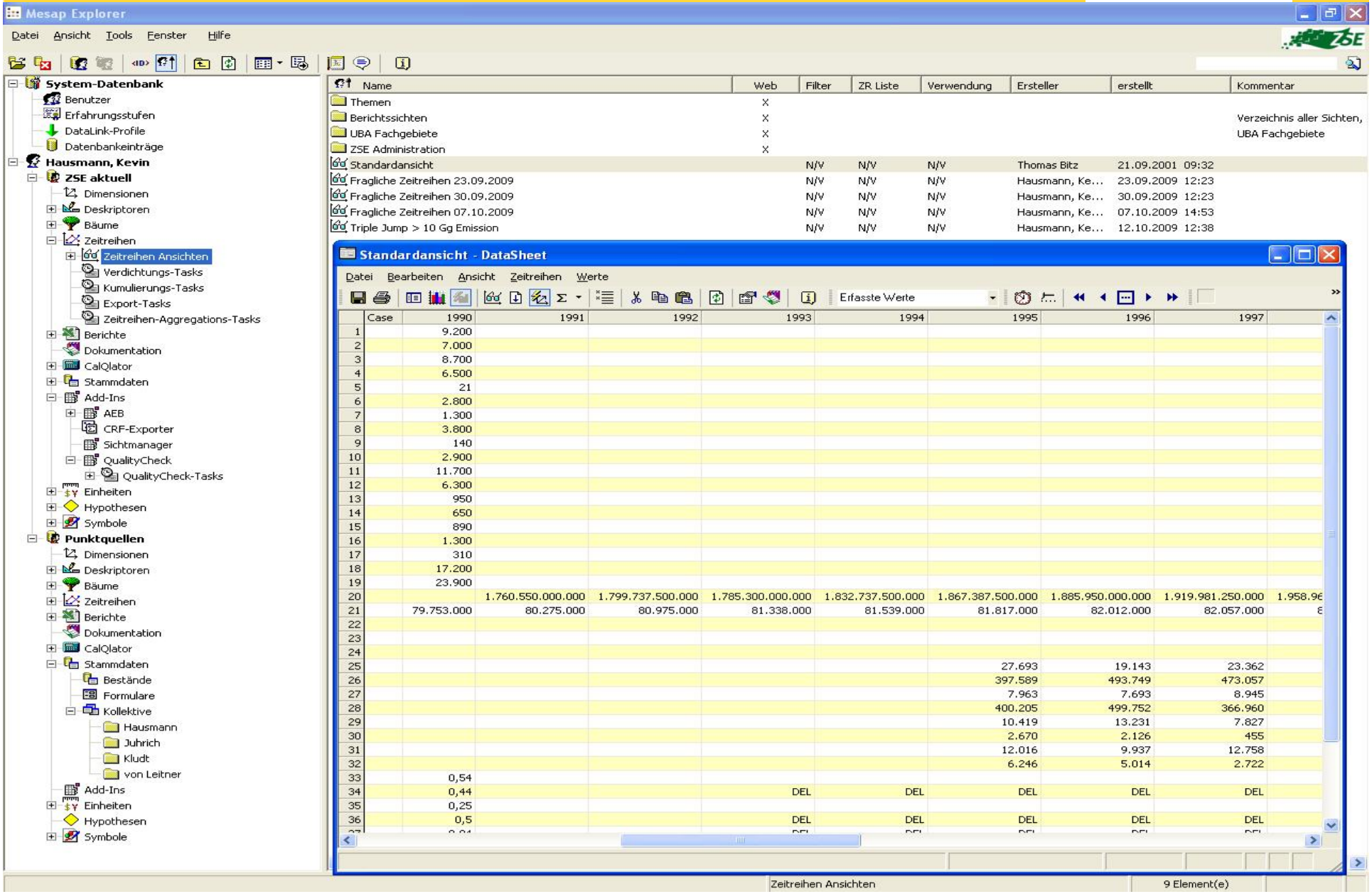
Central Emission System

- Excel/Access
- Collecter/Reporter
  - http://www.air.sk/en/corinair.php
- MESAP
  - http://www.seven2one.de
- Self-build solution

Central Emission System



Central Emission System



Central Emission System

	Excel/Access	MESAP	CollectER/ReportER
Representation of the complete time series	o	++	-
Representation of the data retrieval process	o	+	--
Support for custom reporting	-	++	--
Fast and direct help and support	o	+	+
Easy to fulfil hardware and software needs	+	-	+
Data history recording	-	+	-
Recalculation	+	+	o
Documentation	+	++	o
Support for uncertainties	-	o	-
Support for QA/QC	o	o	-
Simplicity in terms of IT	+	-	o
Simplicity in terms of the process	+	-	+
Low price	+	-	o
Localizability	-	-	-
Multi user functionality and access control	-	++	-
Accessible via inter -/intranet	--	+	--
Ability to build up a complete inventory for all pollutants	-	++	+
Support for data import and export	o	+	+

Situation in Germany

Setup I

Activity data, Emissionfactors

- Energy
- Transport
- Industry
- Agriculture
- LULUCF
- Waste

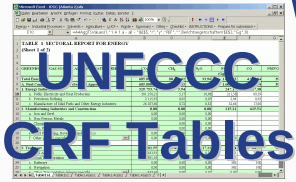
MESAP Information System

Data Handling | Pollutant Analyst | Pollutant CalQlator

AD x EF = EM

CES Database

Assessment, Aggregation and Analysis



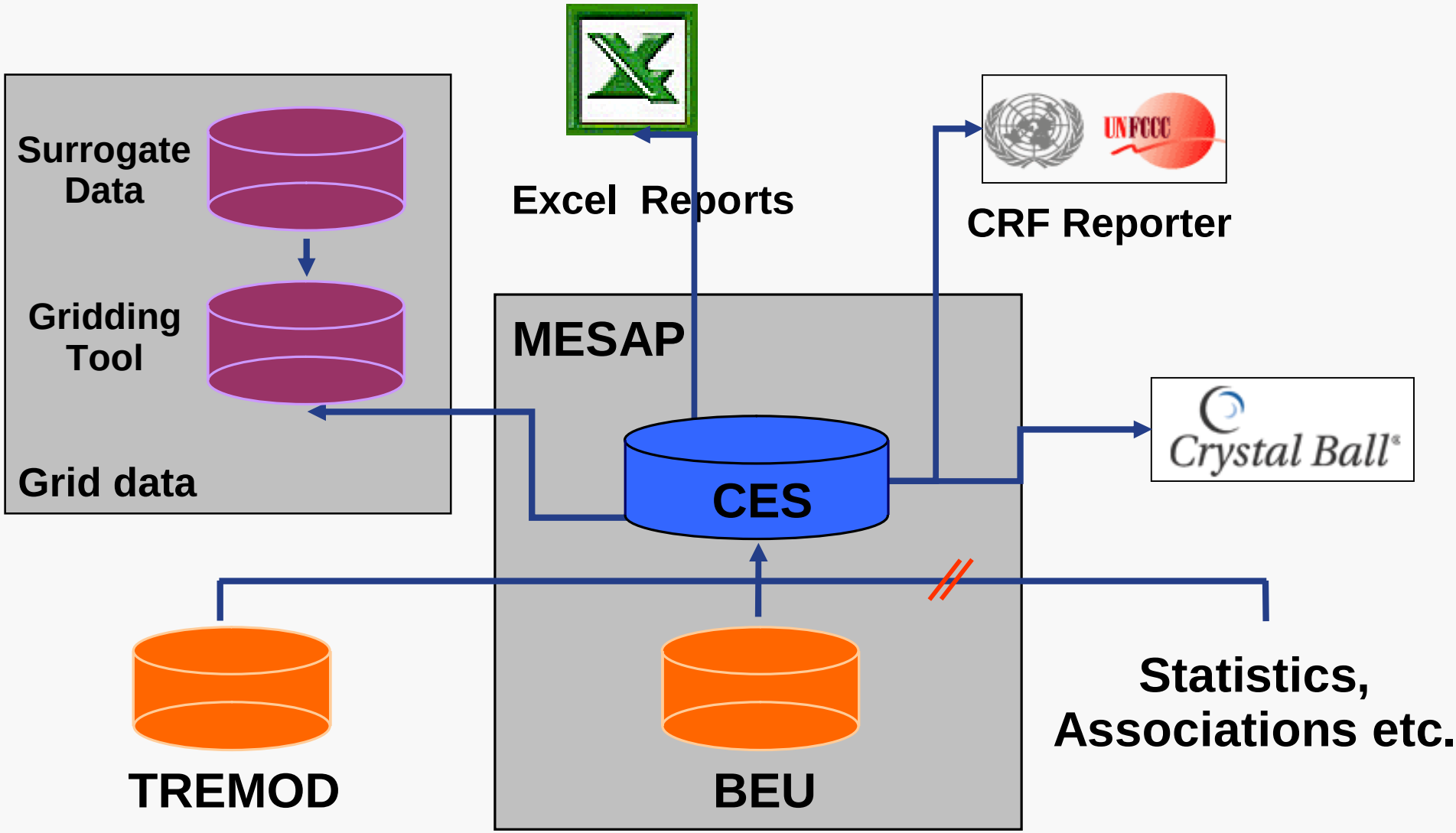
UNFCCC CRF Tables

UNECE/ NFR Tables

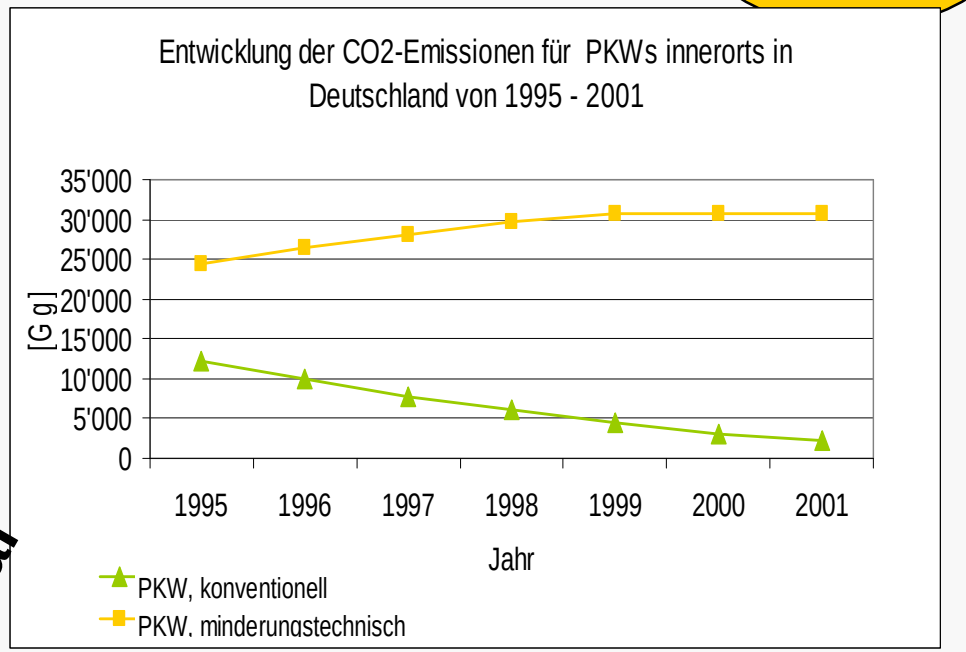
National Reports

Central Emission System

Setup II



Timeseries



Area	Data type	Pollutant	Technique		Material					2005	2006	2010
D	Emission	CO2	PKW		OK		Gg	a	REF	24'514	26'484	28'018

Multi-dimensional key (categorisation)

Specific.

Data