Emission reporting: requirements, estimations and tools

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Federal Environmental Agency / Dep. I 2.6 - Emissionssituation
Requirements
(a practical approach)
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
<table>
<thead>
<tr>
<th>NFR Aggregation for Guiding and EPS (ENPI)</th>
<th>NFR Code</th>
<th>Description</th>
<th>Group</th>
<th>Main Pollutants (from 2000)</th>
<th>Particulate Matter (from 2000)</th>
<th>Main pollutant</th>
<th>Priorities Heavy Metals (from 2000)</th>
<th>Other Heavy Metals (from 2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1a</td>
<td>A1a</td>
<td>Public Electricity and Heat Production</td>
<td>DE</td>
<td>220.256</td>
<td>2,173.67</td>
<td>29.301</td>
<td>2.23801</td>
<td>0.00789</td>
</tr>
</tbody>
</table>
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 TCOO page.

For complete and current emission data please refer to the EPA 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.

1. Executive Summary
2. Introduction
   2.1 National Inventory Background
   2.2 Institutional Arrangements
   2.3 Inventory Preparation Process
   2.4 Methods and Data Sources
   2.5 Key Categories
   2.6 QA/QC and Verification methods
   2.7 General Uncertainty Evaluation
   2.8 General Assessment of Completeness
3. Explanation of Key Trends
4. Energy
5. Industrial Processes
6. Solvent and other Product Use
7. Agriculture
8. Land Use and Land-Use Change
9. Waste
10. Other
11. Recalculations and Improvements
12. Projections

IIR References
IIR Annexes
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 and analysis
- Automatic data transfer with other software
- Recalculation, access control, documentation, data history, quality control

Excel won’t do.
Estimation
Tier I: Simple method
Tier II: Advanced method
Tier III: Detailed method

Guidebook

Tier I: Simple method

\[ AD \times EF_{\text{Pollutant}} = EM_{\text{Pollutant}} \]

\[ 2000 \ [\text{tons of steel}] \times 4.6 \ [\text{g lead per t steel}] = 9.2 \ [\text{kg of lead}] \]
Tier II: Advanced method

\[
\text{AD}_{\text{Tech1}} \times \text{EF}_{\text{Tech1, Pollutant}} = \text{EM}_{\text{Tech1, Pollutant}}
\]

\[
\text{AD}_{\text{Tech2}} \times \text{EF}_{\text{Tech2, Pollutant}} = \text{EM}_{\text{Tech2, Pollutant}}
\]

\[
\ldots
\]

(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!
<table>
<thead>
<tr>
<th>Component</th>
<th>2007 Key source categories (Sorted from high to low from left to right)</th>
<th>Total (%)</th>
<th>Not listed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOx</strong></td>
<td>1A1a (42.6%) 1A1b (10.8%) 1A2f (8.3%) 1A4bi (7.6%) 2C1 (7.2%) 2B5a (6.2%) 1A1c (3.9%) 1A4ai (2.9%) 2A7d (2.1%) 1B2b (2.0%)</td>
<td>93.5</td>
<td>2</td>
</tr>
<tr>
<td><strong>NOx</strong></td>
<td>1A3bii (25.0%) 1A1a (20.0%) 1A2f (15.7%) 1A2f (5.1%) 1A4bi (4.2%) 1A4cii (3.3%) 4D1a (3.2%) 1A3bii (3.1%) 2C1 (2.5%) 4G (2.5%)</td>
<td>84.7</td>
<td>7</td>
</tr>
<tr>
<td><strong>NH3</strong></td>
<td>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%) 1A3bii (1.4%)</td>
<td>95.1</td>
<td>0</td>
</tr>
<tr>
<td><strong>NMVOC</strong></td>
<td>3D2 (25.5%) 3A3 (23.3%) 4B8 (7.6%) 4B1a (6.3%) 4B1b (5.1%) 1A3bii (4.6%) 3C (3.8%) 3B1 (3.4%) 1A4bi (2.7%) 1A3bii (2.1%)</td>
<td>84.3</td>
<td>10</td>
</tr>
<tr>
<td><strong>CO</strong></td>
<td>1A3bii (26.9%) 1A4bi (18.5%) 1A2f (14.6%) 2C1 (13.2%) 1A2fi (4.3%) 1A3biv (4.2%) 1A1a (3.5%) 1A2fi (2.9%) 2C3 (2.7%) 1A4ai (2.0%)</td>
<td>93.4</td>
<td>1</td>
</tr>
<tr>
<td><strong>TSP</strong></td>
<td>2G (30.0%) 2C1 (16.7%) 1A4bi (8.7%) 2A7d (7.8%) 1A3biv (5.5%) 1A3bivii (5.5%) 3D3 (4.0%) 1A1a (3.9%) 1A3bii (3.0%) 1A3bii (2.7%)</td>
<td>88.6</td>
<td>6</td>
</tr>
<tr>
<td><strong>PM10</strong></td>
<td>2G (16.7%) 2C1 (13.7%) 1A4bi (10.9%) 4D2a (9.3%) 1A3biv (5.3%) 3D3 (5.1%) 2A7d (4.9%) 4B0 (4.7%) 1A1a (4.5%) 1A3bii (3.8%)</td>
<td>79.9</td>
<td>9</td>
</tr>
<tr>
<td><strong>PM2.5</strong></td>
<td>1A4bi (20.0%) 3D3 (9.9%) 2C1 (9.0%) 2G (7.9%) 1A1a (7.7%) 1A3bii (7.4%) 1A3bivi (6.6%) 1A3bivi (6.5%) 1A3bivi (3.7%) 1A3bii (3.3%)</td>
<td>81.7</td>
<td>9</td>
</tr>
<tr>
<td><strong>Pb</strong></td>
<td>1A3bivii (77.8%) 1A1b (7.6%) 1A4bi (6.8%) 1A1a (5.5%)</td>
<td>97.7</td>
<td>0</td>
</tr>
<tr>
<td><strong>Hg</strong></td>
<td>1A1a (54.0%) 2A1 (23.3%) 1A1b (7.1%) 1A4bi (6.5%) 1A2fi (3.6%) 1A3bivii (2.6%)</td>
<td>97.3</td>
<td>0</td>
</tr>
<tr>
<td><strong>Cd</strong></td>
<td>1A1b (54.3%) 1A4bi (19.6%) 1A3bivi (11.7%) 1A1a (10.2%)</td>
<td>95.8</td>
<td>0</td>
</tr>
<tr>
<td><strong>DIOX</strong></td>
<td>2C1 (50.5%) 1A4bi (14.8%) 1A4ai (10.4%) 1A1a (6.3%) 2C5a (4.0%) 2C3 (2.3%) 1B1b (2.1%) 2C5d (2.0%) 1A2f (1.5%) 1A3bii (1.4%)</td>
<td>95.5</td>
<td>0</td>
</tr>
<tr>
<td><strong>PAH</strong></td>
<td>1A4bi (69.9%) 2A1 (2.0%) 1B1b (1.7%) 2C1 (1.6%)</td>
<td>95.3</td>
<td>0</td>
</tr>
<tr>
<td><strong>HCB</strong></td>
<td>1A4bi (39.4%) 1A1a (35.0%) 2A1 (14.9%) 1A4ai (4.6%) 1A1c (3.5%)</td>
<td>97.3</td>
<td>0</td>
</tr>
</tbody>
</table>
Finished? Wait! There is more:

- Projections
- Recalculation
- Uncertainties
- Spatial Mapping (aka Gridding)
- ...
Tools
• Excel/Access
• Collector/Reporter
• MESAP
  – [http://www.seven2one.de](http://www.seven2one.de)
• Self-build solution
## Central Emission System

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

Activity data, Emission factors

Energy
Transport
Industry
Agriculture
LULUCF
Waste

Assessment, Aggregation and Analysis

UNFCCC CRF Tables
UNECE/ NFR Tables
National Reports

CES Database

MESAP Information System

\[ \text{Data Handling} \times \text{EF} \times \text{Analysis} \times \text{EM} \times \text{Calculator} \]
Central Emission System

Timeseries

<table>
<thead>
<tr>
<th>Area</th>
<th>Data type</th>
<th>Pollutant</th>
<th>Technique</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Emission</td>
<td>CO2</td>
<td>PKW</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Multi-dimensional key (categorisation)

Specific.

Data