Services to support the update of the EMEP EEA Emission Inventory Guidebook, in particular on methodologies for black carbon emissions

TFEIP meeting, May 14-15 2013
Istanbul, Turkey

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Outline

› Changes and comments relevant for C&I EP
  › Task 1
  › Task 2
  › Task 3
  › Task 4
  › Task 5

› Conclusions
Task 1 – Changes

› Everything!

› Sources covered:
  › Fuel combustion (1A1, 1A2 and 1A4)
  › Fugitive emissions (1B1 and 1B2)
  › Industrial processes (2A, 2B, 2C and 2D)
  › Agriculture (4F)
  › Waste (6C and 6D)

› BC EFs were incorporated in the vast majority of EF tables

› For some sources, e.g. brown coal consumption, it was not possible to find an EF, hence BC is listed as NE

› A description of BC was added in different chapters
Task 1 – Comments

› Comments regarding BC were provided by:
  › UK
  › Germany
  › Sweden
  › TFEIP – EP leaders

› Approximately 30 comments received

› Editorial

› EF specific

› More fundamental
Editorial (1)

› Use of units
  › Should be harmonised – Different preferences
  › For stationary combustion % of PM is the common way of referring in literature
  › For transport mainly fractions are used in literature
  › Is this difference acceptable?

› If a BC EF is not provided it should be listed as NE or NA

› The text description of BC should be improved

› More explanation of the measurement techniques should be included
Editorial (2)

- In 6Ca the BC EF is expressed as % of TSP rather than PM$_{2.5}$ – Caused by no available PM size distribution. The reference also provides BC share as % of TSP and this has therefore been used.

- Improved reference to the Speciate database.
EF specific

- BC for brown coal combustion was listed as NA
  - The choice was based on three articles reporting none or very small BC shares from brown coal
  - Reviewer suggested using values for hard coal – Based on the available literature this does not seem reasonable
  - BC will be indicated as NE rather than NA in the EF tables
Fundamental issues (1)

- “EC should be used rather than BC”
  - In literature the two terms are used synonymously
  - The updated Gothenburg Protocol refers to BC
  - The ongoing political discussions uses BC
  - The title of the project was directly referring to BC

- “BC is an additional double counting in terms of the “total carbon” calculation. There is no integrated overview and analysis of the carbon flow”
  - True. However, the same issue is relevant for many other carbon-containing pollutants currently reported
Fundamental issues (2)

- “Uncertainties of EC and OC emission factors are very high. Since they are expressed as a share of PM 2.5, which is itself connected with very high uncertainties. (PM2.5 emission factors are usually based on just a few measurements of the dust)”

- Basically agree, but not sure how this can be addressed. It is clear that this is a first edition of BC guidance that will need to be updated/expanded as more information becomes available
Fundamental issues (3)

“We believe that our current knowledge is not sufficient to create time series for EC or OC. There is no information about the influence of abatement technology and measurement procedures over time.”

- Valid point
- In the literature search only very limited information is available on the impact of particle abatement and whether the reduction in BC is proportional to the reduction in PM
- More information is available for transport
- In the discussion papers this issue was covered and at the moment, there is no way of preparing this guidance based on the limited data available
Task 2 – Changes

› Very broad task!!
› The task was **not** intended to be an update of all chapters
› Many improvements made
  › Clarification of the derivation of the current EFs
  › Improved completeness by adding EFs for pollutants previously listed as NE or NA
  › Improved consistency by, to the extent possible, choosing EFs from the same source across pollutants
› Difficult in many chapters due to the use of unpublished literature
› Not possible to go in-depth with all changes
Task 2 – Comments

- Comments regarding consistency changes for sector 1A (excluding 1A4) were provided by:
  - UK
  - Germany
  - Sweden
  - Ireland
  - Poland
  - The Netherlands
  - CONCAWE
  - TFEIP EP leaders

- 61 comments received for 1A
Comments received

- The comments could be grouped in the following categories:
  - Editorial
  - Overarching
  - EF specific
Editorial

› Proposed editorial changes:
  › Suggestions to clarify formulations
  › Add text and footnotes to specific tables
  › Correction/harmonising of units
  › Further elaborating on the changes to fuel groups presented in the start of chapter 1A1, 1A2 and 1A4

› All proposals were addressed in updating the chapters for the final version
Overarching

- Table 3-3 and others. More than a little surprised that factors have changed where same references applied as in previous guidebook. I was part of the group that did the 2009 revision and am happy to accept corrections but, as far as I am aware, we have not been asked for clarification or justification for factors in current guidebook chapter. It will be difficult to replicate factors where multiple factors are in the sources used but some of the differences seem very large.

- The aim of the discussion papers were to eliminate all doubt on the derivation of the EFs and thereby increasing reproducibility.

- Also, it is very difficult to respond when no specific details are provided.
EF specific (1)

› Why should tier 1 EFs for 1A2 be based on 1A4
  › Tier 1 EFs for 1A2 is currently taken as the tier 1 EFs from 1A4a
  › We have continued this practice, but the values were not incorporated due to timing issues
  › Our preference will be to continue the current practice of duplicating EFs from 1A4a to 1A2

› Deletion of table 4-7 in chapter 1A1
  › Based on the fact that most EFs were in fact not for LPG but for natural gas and that the remaining few when investigating the reference were either also natural gas or were almost identical
  › Change supported by CONCAWE
EF specific (2)

- Inconsistency between NOx tier 1 EFs for natural gas and gas oil in 1A1a
  - The values are taken directly from the reference (AP-42)
  - While it does seem inconsistent, there is no way to remedy this situation

- EFs for non-ferrous metals (1A2) have changed very little
  - Strange occurrence – has not been updated during the project
  - The EFs in the GB2009 text do not match the EFs when extracting from the EF database – The original reference of the EFs were analysed and the precise values as provided by the reference were used
EF specific (3)

› The PCDD/F EF for natural gas in 1A1 is inappropriate
  › The EF has not been proposed as part of the current project
  › The EF is referenced to UNEP, which mentions that it is for light oil/natural gas
  › The proposal has been to delete the EF and consider PCDD/F as NE
  › Project team decided not to delete this EF since it was part of the GB and would need discussions within the TFEIP
Task 3 – Changes (1)

› Domestic solvent use
  › Significant changes improving both completeness and accuracy
  › Improved category consistency and continuity between Tier 1 and Tier 2
  › New and updated EFs were implemented for domestic solvent use
  › To the extent possible the Tier 2 EFs were updated so to no longer being expressed per person but rather per mass of product of mass of solvent
  › Improved description of the data sources used in establishing the EFs
  › EFs primarily based on IIRs from countries with advanced methodologies for estimating emissions from solvent use
Task 3 – Changes (2)

- Other solvent and other product use
  - Significant changes improving both completeness and accuracy
  - Improved category consistency and continuity between Tier 1 and Tier 2
  - New and updated EFs were implemented for other solvent use
  - Many new source categories were included in the chapter and Tier 2 EFs were provided
  - Improved the overview of the chapter and the description of some of the source categories
  - EFs primarily based on IIRs from countries with advanced methodologies for estimating emissions from solvent use
  - Updated EFs for tobacco smoking and added EFs for the use of fireworks
Task 3 - Comments

- Comments were received from:
  - Spain
  - Switzerland
  - TFEIP EP leaders

- Editorial (5)
- EF specific (20)
- Major changes (0 or maybe 1: Table 3-1 3D2)
Task 4 – Changes (1)

› Many changes to the chapter – however most EFs did not change dramatically

› No updates to the chapter on data quality
  › Tables of national emission limits including information from EN305

› No updates to the existing annexes
  › Collection of EFs – many from unpublished references
  › More national emission limit values

› It should be discussed within the TFEIP whether this information should be updated, deleted or just remain in the current state
Task 4 – Changes (2)

- Previous version contained almost exclusively references to the previous EMEP/CORINAIR GB
  - Updated EFs and references for biomass, liquid and gaseous fuels
  - Few updates for solid fuels since very few data were available to improve the EFs
- The influence on measured PM emission data depending on the applied measurement techniques (dilution) have been further discussed in the GB
- Chapter on activity expanded to include more guidance for estimating the activity data
Task 4 – Comments

- Comments were received from:
  - UK
  - TFEIP EP leaders
- The comments were mainly editorial
- Two comments related to Chapter 4 “Data quality”. No action will be taken
- All other comments were addressed in the final chapter
Task 5 – Changes (1)

Covered the following chapters:

- 1B1a Coal mining and handling
- 2A7a Quarrying and mining of minerals other than coal
- 2A7b Construction and demolition
- 2A7c Storage, handling and transport of mineral products
- 2C5f Storage, handling and transport of metal products
- 6A Solid waste disposal on land

For 1B1a changes were made that improved both completeness and accuracy by including EFs for all particle size fractions and by including EFs from mining.

For 2A7a worst case TIER 1 EF from CEPMEIP has been implemented; for Tier 2 low and high level EF have adapted from CEPMEIP.
Task 5 – Changes (2)

- For 2A7b references to US-EPA, AP-42 methodologies have been introduced.
- For 2A7c new Tier 2 methodologies have been implemented for uncontrolled and controlled storage as well as uncontrolled handling based on Dutch experiences.
- For 2C5f new Tier 2 methodologies have been implemented for uncontrolled and controlled storage as well as uncontrolled handling based on Dutch experiences.
- For 6A there was previously no methodology in the GB, Tier 1 EFs incorporated in the GB and a Tier 3 methodology.
Task 5 – Comments

- Comments were received from:
  - ES
  - HU
  - NL
  - TFEIP leaders

- Editorial comments

- Valuable NL comments on interpretation of Dutch report. The chapters were revised
Conclusions

- Improvements made to many of the chapters under C&I
- However, many GB chapters are still in need of updates and there is also a need for continuous improvement
Thank you for your attention