Launch of IPCC Inventory Software

2006 IPCC guidelines for National Greenhouse Gas Inventories

Side-Event, SB 36 Sessions, Bonn 16 May 2012,
Aim to introduce the new IPCC Inventory Software

• Presentations
  – 2006 Guidelines
  – The Inventory Software
  – Examples
    • Energy Sector
    • Waste Sector
    • Land Use

• Q & A

• Demonstration/trials in small groups
  – Install software if you wish
IPCC Guidelines

- IPCC Guidelines consist of:
  1. Methods
  2. Default data
  3. Good Practice Guidance
  4. Reporting Instructions

- 1, 2 & 3 can be used whatever reporting is agreed on
  - IPCC or otherwise

- Thus the methods and data in the 2006 Guidelines can be used however emissions and removals are reported
  - 1996 Guidelines, GPG or 2006 Guidelines
2006 Guidelines

- The Revised 1996 Guidelines are 16 years old and much of the data they use is significantly older
- The 2006 Guidelines are a valuable resource that
  - Contain much new and revised data
  - Have improved data and methods that can and are being used by inventory compilers reporting under the Revised 1996 Guidelines
  - Include methods for a more complete range of sources/sinks.
  - Dispense with “potential emissions” approaches replacing them with simple Tier 1 methods.
  - Update and expand guidance on “Good Practice”: QA/QC, Data Collection, Uncertainties, Methodological Choice etc.
### Example of improved emission factors: Fossil Fuel Carbon Contents

<table>
<thead>
<tr>
<th>Revised 1996 Guidelines + GPG</th>
<th>2006 Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Grubb (1989)</td>
<td>• IPCC EFDB data as of December 2003: Carbon and CV data including developing countries</td>
</tr>
<tr>
<td>• Expert Meetings</td>
<td>• IEA NCV Database November 2004 (includes developing country data)</td>
</tr>
<tr>
<td>• Conversions use CV from OECD/IEA (1996) and 10% &amp; 5% for gross to net CV (GCV to NCV)</td>
<td></td>
</tr>
</tbody>
</table>
N₂O – Bituminous Coal Combustion

Wider range of emission factors in 2006 Guidelines reflecting improved knowledge of emissions

If value in Revised 1996 Guidelines and 2006 Guidelines are the same point will lie on this line

2006 IPCC Guidelines

10

1

0.1

Revised 1996 Guidelines

0.1

1

10

100
### New Guidance in 2006 Guidelines

<table>
<thead>
<tr>
<th>Fuel Combustion</th>
<th>Other Product Manufacture and Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ -Transport and Storage</td>
<td>Electrical Equipment</td>
</tr>
<tr>
<td>Urea-based Catalysts (Road Transport)</td>
<td>Military Applications</td>
</tr>
<tr>
<td>Fugitive Emissions from Fuels</td>
<td>Accelerators</td>
</tr>
<tr>
<td>Abandoned Underground Mines</td>
<td>Medical Applications</td>
</tr>
<tr>
<td>Mineral Industry</td>
<td>Propellant for Pressure and Aerosol Products</td>
</tr>
<tr>
<td>Glass Production</td>
<td></td>
</tr>
<tr>
<td>Ceramics</td>
<td></td>
</tr>
<tr>
<td>Non Metallurgical Magnesia Production</td>
<td></td>
</tr>
<tr>
<td>Chemical Industry</td>
<td></td>
</tr>
<tr>
<td>Caprolactam, Glyoxal &amp; Glyoxylic Acid</td>
<td></td>
</tr>
<tr>
<td>Titanium Dioxide Production</td>
<td></td>
</tr>
<tr>
<td>Petrochemical and Carbon Black Production</td>
<td></td>
</tr>
<tr>
<td>Metal Industry</td>
<td></td>
</tr>
<tr>
<td>Lead Production</td>
<td></td>
</tr>
<tr>
<td>Zinc Production</td>
<td></td>
</tr>
<tr>
<td>Electronics Industries</td>
<td></td>
</tr>
<tr>
<td>Integrated Circuit or Semiconductor</td>
<td></td>
</tr>
<tr>
<td>TFT Flat Panel Display</td>
<td></td>
</tr>
<tr>
<td>Photovoltaics</td>
<td></td>
</tr>
<tr>
<td>Heat Transfer Fluid</td>
<td></td>
</tr>
<tr>
<td>Integrating Circuits</td>
<td></td>
</tr>
</tbody>
</table>

### Substitutes for Ozone Depleting Substances

- Complete, consistent treatment of fires
- Settlements remaining Settlements
- Some wetlands categories
- Urea Application
- Indirect N₂O Emissions from Manure
- Harvested Wood Products

### Land Use

- Indirect N₂O Emissions from the Atmospheric Deposition of N (excluding agriculture)
“New” gases in 2006 Guidelines
– Sources Identified in 2006 Guidelines

<table>
<thead>
<tr>
<th>GWP in AR4</th>
<th>Halogenated Compounds Production</th>
<th>Magnesium Production</th>
<th>Electronics Industries</th>
<th>Industrial Processes</th>
<th>All Sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Currently, Annex I parties must report these

Many non-annex I parties just report these

- **CO₂, CH₄, N₂O**
- **HFC, PFC, SF₆**
- Nitrogen trifluoride (NF₃)
- Trifluoromethyl sulphur pentafluoride (SF₅CF₃)
- Halogenated ethers (e.g. C₄F₉OC₂H₅, CHF₂OCF₂OC₂F₄OCHF₂, CHF₂OCF₂OCHF₂)
- CF₃I, CH₂Br₂, CHCl₃
- CH₂Cl₂, CH₃Cl
- C₃F₇C(O)C₂F₅
- C₄F₆, C₅F₈, c-C₄F₈O

“New” gases only from these sub-categories
New Tier 1 Method: Landfills

- The 2006 Guidelines provide a simple, Tier 1 approach, to estimating emissions from landfill (SWDS).
  - This avoids any “potential” emission estimates as these are misleading and may over- or under-estimate emissions
  - A spreadsheet is provided that at a minimum requires ONLY the waste arising in the current year (with historic population data).
  - As more information is added the estimates become increasingly refined. A time series of waste arising, changes in SWDS capacity or changes in waste composition can be included if available.
  - Incidentally this spreadsheet can be used for projections
New Methods: IPPU & HWP

• Fluorinated Gases
  – Minimal data needed: Only need to know current years’ imports, exports, production etc. and year of first use.

• Harvested Wood Products
  – No national data needed: All data can be downloaded from the FAO.
Sectoral Changes in 2006 Guidelines

- Energy
  - Improved fuel factors based on wide range of data
  - CCS included explicitly
  - Role of “reference approach” as QA tool clarified
  - Urea Based catalysts

- IPPU – Industrial Processes and Product Use
  - Combines Industrial Processes and Solvent Use
  - No removals from short term CO2 storage in products unless emissions accounted for (e.g. Urea)

- AFOLU – Agriculture. Forestry and Other Land Use
  - Combines Agriculture and LULUCF
  - Improved consistency and coverage of fires (n.b. mapping back)

- Waste
  - New FOD model for landfill sites
Summary

- The 2006 Guidelines are available and can be used to estimate emissions and removals for reporting according to either the 1996, GPG or 2006 guidelines

- They are a valuable resource with
  - New and updated emission factors and other parameters
  - Revised and updated methods
    - No “potential” emissions (landfills, F-gas use) all Tier 1 methods give estimates of annual emissions
    - Classification revised to improve transparency and reduce risk of double-counting or omissions
    - More clarity on distinction of Energy and IPPU sectors (non-energy use of fuels)
    - More sources/sinks and gases covered
    - Improved HWP guidance
  - GPG and methodological guidance integrated
IPCC Inventory Software

- We now have software that can assist in using the 2006 Guidelines
  - It can be used for the whole inventory or just individual categories
  - Stand alone software with modest hardware requirements
  - Includes Uncertainty and Key Category Analysis
  - Aids QA/QC
  - Will output in non-Annex 1 National Communications format
  - Will be developed to include more input/output and reporting options and complete Tier 2 coverage
- FREE!
IPCC Inventory Software: Overview
Outline

• Software Administration
• Use of worksheets
• Examples
  - Simple worksheet: Energy sector
  - Emissions Model: Solid waste disposal
  - Data Manager: Land type
How to set up compilers team?

Project Manager

Initial setting
- Country
- Inventory Years
- Users

Complete Inventory

Energy
- IPPU

AFOLU
- Waste

XML file
- MDB file

MDB file
- XML file
Hierarchical list of categories

Data Entry

Category selected: Energy

Worksheet-based calculations follow 2006 Guidelines

Time Series Display
### Notation Keys Available

#### Uncertainties

#### Time Series Data Entry

### Defaults Available:
- can be over-written with country specific data
Example: Energy
Example: Waste
Waste Sector: 4A. Solid Waste Disposal

First order decay (FOD) method for estimation of CH$_4$ emissions from solid waste disposal sites (SWDS)

- Estimates actual emissions

Two options for estimation of emissions from municipal solid waste (MSW) depending on data availability

- Waste composition
- Bulk waste

Historical data on solid waste disposal

- Amount of MSW can be estimated from population and per capita waste generation data (Tier1)
Solid Waste Disposal

Select appropriate region and climate zone

IPCC default values will be adjusted (e.g. methane generation rate constant)
Are historical data on solid waste disposal available?
<table>
<thead>
<tr>
<th>Year</th>
<th>Amount Deposited</th>
<th>MCF</th>
<th>DOC Generated</th>
<th>CH4 generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>11875</td>
<td>0.75</td>
<td>60.1,77,189</td>
<td>0</td>
</tr>
<tr>
<td>1951</td>
<td>11875</td>
<td>0.75</td>
<td>117.6,2182</td>
<td>20.3,195</td>
</tr>
<tr>
<td>1952</td>
<td>1750</td>
<td>0.75</td>
<td>175.6,396</td>
<td>53.26976</td>
</tr>
<tr>
<td>1953</td>
<td>2550</td>
<td>0.75</td>
<td>255.6,796</td>
<td>108.3836</td>
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<tr>
<td>1954</td>
<td>3550</td>
<td>0.75</td>
<td>355.6,1196</td>
<td>22.84362</td>
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<tr>
<td>1955</td>
<td>4750</td>
<td>0.75</td>
<td>475.6,1696</td>
<td>88.08752</td>
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<tr>
<td>1956</td>
<td>6150</td>
<td>0.75</td>
<td>615.6,2296</td>
<td>168.7858</td>
</tr>
</tbody>
</table>

Waste category and type (e.g. industrial waste)

After entering parameters and activity data

Amount of CH₄ generated
### Annual CH₄ emissions

The following table presents the annual CH₄ emissions from various sectors and activities. Each row represents a different year, and the columns show data for different sources and categories.

<table>
<thead>
<tr>
<th>Year</th>
<th>Methane Emissions</th>
<th>CH₄ Recovery</th>
<th>Methane Emissions (Including CH₄ Recovery)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>123.45 Gg</td>
<td>25%</td>
<td>154.55 Gg</td>
</tr>
<tr>
<td>2011</td>
<td>135.67 Gg</td>
<td>30%</td>
<td>168.00 Gg</td>
</tr>
<tr>
<td>2012</td>
<td>147.89 Gg</td>
<td>22%</td>
<td>174.00 Gg</td>
</tr>
<tr>
<td>2013</td>
<td>159.01 Gg</td>
<td>20%</td>
<td>180.00 Gg</td>
</tr>
<tr>
<td>2014</td>
<td>171.12 Gg</td>
<td>25%</td>
<td>211.00 Gg</td>
</tr>
</tbody>
</table>

**Notes:**
- Methane emissions data are based on reported values from various sources.
- CH₄ recovery efficiency varies annually, as indicated in the table.
- The total methane emissions are calculated by adding the reported CH₄ emissions to the CH₄ recovery percentages.
Example: Land Use
Task Force on National Greenhouse Gas Inventories

Thank you

IPCC Inventory Software
IPCC Guidelines
can be downloaded from
http://www.ipcc-nggip.iges.or.jp