Task Force on National Greenhouse Gas Inventories

IPCC Expert Meeting on Use of Models and Measurements in GHG Inventories

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Side Event, 29 November 2010, Cancun

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Introduction

- The expert meeting considered the use of models and measurements for all sectors in greenhouse gas emission inventories.
  - ❖ Essentially these are Tier 3 approaches
- In the light of experience to date, the meeting compiled a report on experience and the lessons learnt, particularly related to transparency so that inventory compilers addressing these issues can benefit from this experience.

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Measured data

- Measured data underlie both models and facility level data.
- Measurements may be made at individual plant covering all or part of specific sub-sectors, and the meeting noted that there are an increasing number of reporting systems that combine such measured data with other facility level information.
  - ❖ Measurements may be of emissions, fuel used, fuel quality etc.
- In general, models use measured data for calibration, evaluation and validation to estimate those emissions or removals that cannot be easily otherwise obtained, and so extend limited information to cover national emissions and removals.

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Why use models and facility level data?

- The use of this data in inventories provides significant opportunities to improve the overall quality and, usually, accuracy of the inventory, through, amongst other things,
  - i. reducing uncertainty and improving uncertainty estimates in the national inventory
  - ii. improving spatial and temporal resolution of data and further disaggregating data categories
  - iii. improving potential to correctly estimate impacts of mitigation on national inventories by, for example, reflecting any mitigation effects from measurements or by improving inventory stratification
- Therefore their use in the national inventory should be encouraged.

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Transparency – key issue

- The key issue identified in the use of both models and facility level data, is transparency
  - ❖ While approaches to ensuring transparency, documenting and reporting lower Tier approaches are clearly given in the IPCC Guidelines, the use of models and facility level data is only discussed more generally as the specifics depend on national circumstances
  - ❖ The 2006 IPCC Guidelines do provide the overall approach to transparently documenting and reporting these types of data.
- The meeting noted that clearer descriptions of the approaches used to derive national emissions would help ensure the results are understandable and credible and that recent experience provides useful guidance to inventory compilers on how to do this.

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Transparency - reporting

- Models
  - Basis and type of model
  - Application and adaptation of the model
  - Main equations/processes
  - Key assumptions
  - Domain of application
  - How the model parameters were estimated
  - Description of key inputs and outputs
  - Details of calibration & model evaluation
  - Uncertainty and sensitivity analysis
  - QA/QC
  - References to peer-reviewed literature
- Facility Level Data
- Institutional arrangements
  - Legal basis
  - Elements covered
  - Criteria for data selection
  - QA/QC
  - Confidentiality
- Category-specific
  - Category emissions
  - Implied emission factor
  - Uncertainty
  - How completeness and time series consistency are ensured

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Model considerations

- For models the following should be considered:
  - reasons for model selection
  - interpretation of model results
  - calibration and parameterisation
  - evaluation of model methods, processes and results
  - comparisons with lower tiers and measurements
  - uncertainty and sensitivity analysis

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Facility level data considerations

- For facility level data:
  - do the facility level data definitions match those of the inventory and how has this matching been achieved
  - does the dataset completely cover a reporting category and if not how this gap has been filled
  - how has time series consistency between the facility level data and estimates for earlier years has been achieved
  - and how might these data enhance the quality of inventories

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How to encourage the use of this data

- The meeting also considered how the use of these methods can be encouraged
  - The main barriers to the adoption of complex models are the need for enhanced financial resources and institutional capacity
  - Access to suitable models, and the ability to modify them, remains a barrier to their use
- The participants also noted that the use of models requires a significant, sustained and dedicated effort over the lifetime of the model to collect and update high quality and reliable data at a suitable resolution and to maintain and adapt suitable models.

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Summary

- Inventories can be improved by the use of facility level data and more complex models
  - This data can reduce uncertainty, improve stratification and spatial and temporal resolution, and/or better represent mitigation
  - Models and facility level data are based on, amongst other things, measurements
  - Use of models in inventories implies a long-term commitment to collect and update high quality and reliable data at a suitable resolution and to maintain the model
  - If facility level data is used this needs to be matched with more conventional emission inventory data to complete time series and to estimate all emissions from a sector

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Summary (cont'd.)

- Care needs to be taken to ensure the use of either models or facility level data is consistent with the inventory as a whole and that time series consistency is maintained
- Transparency is key to using and reporting these data in a clear and credible way
- The IPCC Guidelines outline how this should be done, however:
  - The Guidelines do not give practical detail or examples
  - Recent experience can learnt from
- The meeting report (under preparation) gives:
  - Suggestions for reporting transparently based on experience to date
  - Topics to be considered and reported in the use of this data

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Thank you

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