Fuel classification and definitions in the 2006 IPCC Guidelines

2nd InterEnerStat Workshop
IEA, Paris
19-20 November 2007

Kiyoto Tanabe
Technical Support Unit for IPCC National Greenhouse Gas Inventories Programme

Outline

- Introduction
  - History of IPCC Guidelines
  - 2006 IPCC Guidelines
  - Requirements under UNFCCC
- Fuel classification in the 2006 IPCC Guidelines
- Definition of “Fuel Combustion”
- Non-Energy Uses of Fossil Fuels

Introduction - History

History of IPCC Guidelines

- 1995 Guidelines
- 1996 Revised IPCC Guidelines
- 2000 Good Practice Guidance and Uncertainty Management
- 2003 Good Practice Guidance for Land Use, Land-Use Change and Forestry
- 2006 IPCC Guidelines

Introduction – 2006 IPCC Guidelines

- Overview
- Vol 1: General Guidance and Reporting
- Vol 2: Energy

Classification and definitions of fuels

- Vol 3: Industrial Processes and Product Use (IPPU)

Guidance on non-energy uses of fossil fuels

- Vol 4: Agriculture, Forestry and Other Land Use (AFOLU)

Guidance on an alternative method to estimate activity data for fuel wood use

- Vol 5: Waste

Guidance on methods to estimate emissions from waste incineration

Introduction – UNFCCC Requirements

- 1996 Guidelines (+GPGs)
  - Annex I Parties “shall” use 1996GLs and GPGs
  - Non-Annex I Parties:
    - “should” use 1996GLs [Dec 17/CP.8]
    - “are encouraged to” use GPGs [Dec 13/CP.9]
- 2006 Guidelines
  - Not yet approved by UNFCCC for use as a whole
  - Nevertheless, 2006GLs may assist Parties in fulfilling their inventory reporting requirements under the UNFCCC

However…

- Individual methods in 2006GLs can be used within the 1996/UNFCCC reporting guidelines
  - “… Users are encouraged to go beyond these minimum default methods where possible, …” (1996GLs Vol.1 Overview)
  - Remember!! The 2006GLs are:
    - An **evolutionary** development
    - Authors’ best methodologies available (accepted by IPCC)

Fuel Classification in 2006 GLs (1)

- Common terms and definitions of fuels are necessary for countries to describe emissions from fuel combustion activities, consistently.
- A list of fuel types based primarily on the IEA definitions. (*Table 1.1 in Chapter 1, Vol.2*)
  - Efforts were made by authors to harmonize the IEA questionnaire in 2005 and the Energy volume of 2006 Guidelines.
- Default net calorific values (NCVs) in TJ/Gg and default carbon content for all the fuel types are provided. (*Tables 1.2 & 1.3 in Chapter 1, Vol.2*)

Fuel Classification in 2006 GLs (2)

- Six major categories
  - Liquid (Crude oil and petroleum products)
  - Solid (Coal and coal products)
  - Gas (Natural gas)
  - Other Fossil Fuels
  - Peat
  - Biomass
- Peat was classified as solid fossil fuel in the 1996 IPCC GLs, but NOT as a fossil fuel in the 2006 IPCC GLs.
  - Although peat is not strictly speaking a fossil fuel, its greenhouse gas emission characteristics have been shown in life cycle studies to be comparable to that of fossil fuels.
  - Therefore, the CO_2 emissions from combustion of peat are included in the national emissions as for fossil fuels.

Fuel Classification in 2006 GLs (3)

- Liquid (Crude oil and petroleum products)

Crude Oil
Orimulsion
Natural Gas Liquids (NGLs)
Gasoline
- Motor Gasoline
- Aviation Gasoline
- Jet Gasoline

Jet Kerosene
Other Kerosene
Shale Oil
Gas/Diesel Oil
Residual Fuel Oil
Liquefied Petroleum Gases

Ethane
Naphtha
Bitumen
Lubricants
Petroleum Coke
Refinery Feedstocks
Other Oil
- Refinery Gas
- Waxes
- White Spirit & SBP
- Other Petroleum Products

Fuel Classification in 2006 GLs (4)

- Solid (Coal and coal products)

Anthracite

Coking Coal

Other Bituminous Coal

Sub-Bituminous Coal

Lignite

Oil Shale and Tar Sands

Brown Coal Briquettes

Patent Fuel

Coke

- Coke Oven Coke and Lignite Coke
- Gas Coke

Coal Tar

Derived Gases

- Gas Works Gas
- Coke Oven Gas
- Blast Furnace Gas
- Oxygen Steel Furnace Gas

Fuel Classification in 2006 GLs (5)

- Gas
  - Natural Gas
- Other Fossil Fuels
  - Municipal Wastes (non-biomass fraction)
  - Industrial Wastes
  - Waste Oils
- Peat
  - Peat
- Biomass
  - Solid Biomass
    - Wood/Wood Waste
    - Sulphite Lyes (Black Liquor)
    - Other Primary Solid Biomass
    - Charcoal
  - Liquid Biomass
    - Biogasoline
    - Biodiesels
    - Other Liquid Biofuels
  - Gas Biomass
    - Landfill Gas
    - Sludge Gas
    - Other Biogas
  - Other non-fossil fuels
    - Municipal Wastes (biomass fraction)

Definition of "Fuel Combustion"

- For inventory purposes, ***fuel combustion*** is defined as
  - *the intentional oxidation of materials within an apparatus that is designed to provide heat or mechanical work to a process, or for use away from the apparatus.*

- This definition aims to separate the combustion of fuels for distinct and productive energy use:
  - from the heat released from the use of hydrocarbons in chemical reactions in industrial processes, or
  - from the use of hydrocarbons as industrial products.

- Further details on demarcation between Energy and IPPU can be found in Chapter 1, Vol.3 of 2006GLs.

Non-Energy Uses of Fossil Fuels (1)

- How to estimate as well as how to allocate CO_2 emissions from non-energy use of fossil fuels are discussed in Volume 3 of the 2006 GLs.
- Three types of non-energy use are considered.
  - Feedstock:
    - Used as raw materials in chemical conversion processes in order to produce primarily organic chemicals and, to a lesser extent, inorganic chemicals (especially ammonia) and their derivatives (OECD/IEA/Eurostat, 2004).
  - Reductant:
    - Used directly as reducing agent for production of metal and inorganic chemicals, or
    - Used indirectly via the intermediate production of electrodes used for electrolysis for metal production.
  - Non-energy product:
    - Used directly (i.e., without chemical conversion) for their physical or diluent properties or which are sold to the chemical industry as chemical intermediate.

Non-Energy Uses of Fossil Fuels (2)

TABLE 1.2
TYPES OF USE AND EXAMPLES OF FUELS USED FOR NON-ENERGY APPLICATIONS

Type of use	Example of fuel types	Product/process	Chapter
Feedstock	natural gas, oils, coal	ammonia	3.2
	naphtha, natural gas, ethane, propane, butane, gas oil, fuel oils	methanol, olefins (ethylene, propylene), carbon black	3.9
Reductant	petroleum coke	carbides	3.6
	coal, petroleum coke	titanium dioxide	3.7
	metallurgical cokes, pulverised coal, natural gas	iron and steel (primary)	4.2
	metallurgical cokes	ferroalloys	4.3
	petroleum coke, pitch (anodes)	aluminium [1]	4.4
	metallurgical coke, coal	lead	4.6
	metallurgical coke, coal	zinc	4.7
Non-energy product	lubricants	lubricating properties	5.2
	paraffin waxes	misc. (e.g., candles, coating)	5.3
	bitumen (asphalt)	road paving and roofing	5.4
	white spirit[2], some aromatics	as solvent (paint, dry cleaning)	5.5

[1] Also used in secondary steel production (in electric arc furnaces) (see Chapter 4.2).
[2] Also known as mineral turpentine, petroleum spirits, industrial spirit ('SBP').

National Greenhouse Gas Inventories Programme - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.ipcc-nggip.iges.or.jp/index.html

Getting Started Latest Headlines BBC NEWS | News F... Google

WMO

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

National Greenhouse Gas Inventories Programme

UNEP

IPCC web sites

- Organization
- Technical Support Unit
- Publication
- Meetings
- Emission Factor Database (EFDB)
- Links
- Electronic Discussion Group (EDG)
- Contact Us

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) in 1988. Its main objective was to assess scientific, technical and socio-economic information relevant to the understanding of human induced climate change, potential impacts of climate change and options for mitigation and adaptation. The IPCC has completed three assessment reports, developed methodology guidelines for national greenhouse gas inventories, special reports and technical papers. For more information on the IPCC, its activities and publications, please see the IPCC homepage.

The IPCC National Greenhouse Gas Inventories Programme (IPCC-NGGIP) had been undertaken since 1991 by the IPCC WG I in close collaboration with the Organisation for Economic Co-operation and Development (OECD) and the International Energy Agency (IEA).

...more about IPCC-NGGIP

Thank you!

- Good Practice Guidance for Land Use, Land-Use Change and Forestry
- Definitions and Methodological Options to Inventory Emissions from Direct Human-induced Degradation of Forests and Devegetation of Other VegetationTypes
- Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories

...more publications

http://www.ipcc-nggip.iges.or.jp/

COP10/SB21 | Future Meetings

Done | Proxy: IGES