

## Appendix A: Criteria to be used in the evaluation by the EFDB Editorial Board

1. The EFDB should assist countries in producing inventories that are neither over- nor underestimates so far as can be judged and in which uncertainties are reduced as far as practicable. To achieve this, a proposed emission factor or other parameter should
  - ✓ be in line with the fundamental principles and approaches of the IPCC Methodology Reports (*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, IPCC report on *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC report on *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, and *2006 IPCC Guidelines for National Greenhouse Gas Inventories*)
  - ✓ be accompanied by documentation describing the conditions of its derivation and information regarding the level of uncertainty, preferably quantified but at a minimum some qualitative indicators, to be attached to it.
  - ✓ be unbiased and as accurate as possible.
  - ✓ contribute to the EFDB by adding a value for a source not already covered or by providing a different value or an identical but independent value for an existing emission factor or parameter type. The technical information in the “properties fields” should provide the information needed to differentiate between the alternative values for emission factors or parameters for a particular source.

To meet these standards, the proposed emission factor or other parameter should be robust, applicable and documented. Each of these is briefly discussed below.

### **Is the emission factor or other parameter robust?**

2. A robust emission factor or other parameter is one that, within the accepted uncertainty, is unlikely to change if there was repetition of the original measurement programme or modelling activity. Specific issues concerning robustness are:
  - Are the measurement techniques including raw data validated and/or verified?
  - Are the modelling techniques including supporting data validated and/or verified?
  - Is the conversion (if any) from model assumptions or measurement conditions to annual or other forms of emission factors or other parameters sufficiently explained and justified?
  - Is an uncertainty assessment on the emission factor or other parameter presented?

### **Is the emission factor or other parameter applicable?**

3. An applicable emission factor or other parameter is one that matches either a specific IPCC Source/Sink Category or subcategory, or another well defined source category that can be used in a national inventory compilation. An emission factor is applicable if the source and its mix of technology, operating and environmental conditions and abatement and control technologies under which the emission factor was measured or modelled are clear and allow the user to see how it can be applied.

### **Is the emission factor or other parameter documented?**

4. For emission factors or other parameters to be transparent, access information to the original technical reference must be provided to evaluate the robustness and applicability

as described above. This can preferably be done by providing sufficient information through a scientific or technical publication in an internationally available journal or a report or book with an ISBN number. For those emission factors or other parameters where this is not available, the data provider can provide the information required to enable a judgement on its robustness and applicability as described above through technical documentation, or by sufficient information in the proposal document fields of the database to satisfy the acceptance requirements.

5. The information provided in the database should be detailed and comprehensive enough so that users may be able to evaluate the applicability to a national GHG inventory. Pivotal elements are an accurate source definition and proper information on the type and extent of validation and on known applications to date. These documentation requirements are even more important when the background document is not written in English.
6. The data provider should be encouraged to provide an electronic or hard-copy of the technical reference to the TSU at the time of data submittal or alternatively, make available this information in a publicly accessible form such as widely available scientific journals or proceedings.

## Appendix B: IPCC Source/Sink Categories and Fuel Categories

### IPCC 1996 Source/Sink Categories

Detailed description of activities included in each source/sink category can be found in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Vol.1 Reporting Instructions*, “Understanding the Common Reporting Framework”<sup>6</sup>.

In the current EFDB web version, 18 new categories are temporarily added under “5 Land-Use Change & Forestry” to accommodate default data provided in the report on *Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF)*. For details, please see the note on page 44.

**Table B-1 IPCC 1996 Source/Sink Categories**

<b>IPCC Code</b>	<b>IPCC Name</b>
<b>1</b>	<b>Energy</b>
1A	Fuel Combustion Activities
1A1	Energy Industries
1A1a	Public Electricity and Heat Production
1A1a1	Public Electricity Generation
1A1a2	Public Combined Heat and Power Generation (CHP)
1A1a3	Public Heat Plants
1A1b	Petroleum Refining
1A1c	Manufacture of Solid Fuels and Other Energy Industries
1A1c1	Manufacture of Solid Fuels
1A1c2	Other Energy Industries (please specify)
1A2	Manufacturing Industries and Construction (ISIC)
1A2a	Iron and Steel
1A2b	Non-Ferrous Metals
1A2c	Chemicals
1A2d	Pulp, Paper and Print
1A2e	Food Processing, Beverages and Tobacco
1A2f	Other (please specify)
1A3	Transport
1A3a	Civil Aviation
1A3a1	International Aviation
1A3a2	Domestic
1A3b	Road Transportation
1A3b1	Cars
1A3b2	Light Duty Trucks
1A3b3	Heavy Duty Trucks and Buses
1A3b4	Motorcycles
1A3b5	Evaporative Emissions from Vehicles
1A3c	Railways
1A3d	Navigation
1A3d1	International Marine (Bunkers)
1A3d2	National Navigation
1A3e	Other Transportation
1A3e1	Pipeline Transport
1A3e2	Off-road

<sup>6</sup> The electronic copy is available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs4.htm>

IPCC Code	IPCC Name
1A4	Other Sectors
1A4a	Commercial/Institutional
1A4b	Residential
1A4c	Agriculture/Forestry/Fishing
1A4c1	Stationary
1A4c2	Off-road Vehicles and Other Machinery
1A4c3	Fishing
1A5	Other
1A5a	Stationary
1A5b	Mobile
1B	Fugitive Emissions from Fuels
1B1	Solid Fuels
1B1a	Coal Mining
1B1a1	Underground Mines
1B1a2	Surface Mines
1B1b	Solid Fuel Transformation
1B1c	Other (please specify)
1B2	Oil and Natural Gas
1B2a	Oil
1B2a1	Exploration
1B2a2	Production
1B2a3	Transport
1B2a4	Refining/Storage
1B2a5	Distribution of Oil Products
1B2a6	Other (please specify)
1B2b	Natural Gas
1B2b1	Production/Processing
1B2b2	Transmission/Distribution
1B2b3	Other leakage
1B2c	Venting and Flaring
1B2c1	Oil
1B2c2	Gas
1B2c3	Combined
1B2d	Other (please specify)
<b>2</b>	<b>Industrial Processes</b>
2A	Mineral Products
2A1	Cement Production
2A2	Lime Production
2A3	Limestone and Dolomite Use
2A4	Soda Ash Production and Use
2A5	Asphalt Roofing
2A6	Road Paving with Asphalt
2A7	Other (please specify)
2B	Chemical Industry
2B1	Ammonia Production
2B2	Nitric Acid Production
2B3	Adipic Acid Production
2B4	Carbide Production
2B5	Other (please specify)

<b>IPCC Code</b>	<b>IPCC Name</b>
2C	Metal Production
2C1	Iron and Steel Production
2C2	Ferrous Alloys Production
2C3	Aluminium Production
2C4	SF6 Used in Aluminium and Magnesium Foundries
2C5	Other (please specify)
2D	Other Production
2D1	Pulp and Paper
2D2	Food and Drink
2E	Production of Halocarbons and Sulphur Hexafluoride
2E1	By-product Emissions
2E2	Fugitive Emissions
2E3	Other (please specify)
2F	Consumption of Halocarbons and Sulphur Hexafluoride
2F1	Refrigeration and Air Conditioning Equipment
2F2	Foam Blowing
2F3	Fire Extinguishers
2F4	Aerosols
2F5	Solvents
2F6	Other (please specify)
2G	Other (please specify)
<b>3</b>	<b>Solvent and Other Product Use</b>
3A	Paint Application
3B	Degreasing and Dry Cleaning
3C	Chemical Product, Manufacture and Processing
3D	Other
<b>4</b>	<b>Agriculture</b>
4A	Enteric Fermentation
4A1	Cattle
4A1a	Dairy
4A1b	Non-Dairy
4A2	Buffalo
4A3	Sheep
4A4	Goats
4A5	Camels and Llamas
4A6	Horses
4A7	Mules and Asses
4A8	Swine
4A9	Poultry
4A10	Other (please specify)
4B	Manure Management
4B1	Cattle
4B1a	Dairy
4B1b	Non-Dairy
4B2	Buffalo
4B3	Sheep
4B4	Goats
4B5	Camels and Llamas
4B6	Horses
4B7	Mules and Asses

<b>IPCC Code</b>	<b>IPCC Name</b>
4B8	Swine
4B9	Poultry
4B10	Anaerobic
4B11	Liquid Systems
4B12	Solid storage and Dry Lot
4B13	Other (please specify)
4C	Rice Cultivation
4C1	Irrigated
4C1a	Continuously Flooded
4C1b	Intermittently Flooded
4C1b1	Single aeration
4C1b2	Multiple aeration
4C2	Rainfed
4C2a	Flood prone
4C2b	Drought prone
4C3	Deep Water
4C3a	Water depth 50 – 100 cm
4C3b	Water depth 100 cm
4C4	Other (please specify)
4D	Agricultural Soils
4E	Prescribed Burning of Savannas
4F	Field Burning of Agricultural Residues
4F1	Cereals
4F2	Pulse
4F3	Tuber and Root
4F4	Sugar Cane
4F5	Other (please specify)
4G	Other (please specify)
<b>5</b>	<b>Land-Use Change &amp; Forestry</b>
5A	Changes in Forest and Other Woody Biomass Stocks
5A1	Tropical Forests
5A1a	Wet/very moist
5A1b	Moist, short dry season
5A1c	Moist, long dry season
5A1d	Dry
5A1e	Mountain moist
5A1f	Mountain dry
5A1g	Plantations
5A1h	Other (please specify)
5A2	Temperate Forests
5A2a	Coniferous
5A2b	Broadleaf
5A2c	Plantations
5A2d	Other (please specify)
5A3	Boreal Forests
5A3a	Mixed broadleaf/Coniferous
5A3b	Coniferous
5A3c	Forest tundra
5A4	Grasslands/Tundra
5A5	Other (please specify)

<b>IPCC Code</b>	<b>IPCC Name</b>
5B	Forest and Grassland Conversion
5B1	Tropical Forests
5B1a	Wet/very moist
5B1b	Moist, short dry season
5B1c	Moist, long dry season
5B1d	Dry
5B1e	Mountain moist
5B1f	Mountain dry
5B1g	Plantations
5B1h	Other (please specify)
5B2	Temperate Forests
5B2a	Coniferous
5B2b	Broadleaf
5B2c	Plantations
5B2d	Other (please specify)
5B3	Boreal Forests
5B3a	Mixed broadleaf/Coniferous
5B3b	Coniferous
5B3c	Forest tundra
5B4	Grasslands/Tundra
5B5	Other (please specify)
5C	Abandonment of Managed Lands
5C1	Tropical Forests
5C2	Temperate Forests
5C3	Boreal Forests
5C4	Grasslands/Tundra
5C5	Other (please specify)
5D	CO2 Emissions and Removals from Soil
5E	Other (please specify)
5-FL	Forest Land
5-FL-1	Forest Land Remaining Forest Land
5-FL-2	Land Converted to Forest Land
5-CL	Cropland
5-CL-1	Cropland Remaining Cropland
5-CL-2	Land Converted to Cropland
5-GL	Grassland
5-GL-1	Grassland Remaining Grassland
5-GL-2	Land Converted to Grassland
5-WL	Wetlands
5-WL-1	Wetlands Remaining Wetlands
5-WL-2	Land Converted to Wetlands
5-SL	Settlements
5-SL-1	Settlements Remaining Settlements
5-SL-2	Land Converted to Settlements
5-OL	Other Land
5-OL-1	Other Land Remaining Other Land
5-OL-2	Land Converted to Other Land
<b>6</b>	<b>Waste</b>
6A	Solid Waste Disposal on Land
6A1	Managed Waste Disposal on Land
6A2	Unmanaged Waste Disposal Sites
6A3	Other (please specify)

6B	Wastewater Handling
6B1	Industrial Wastewater
6B2	Domestic and Commercial Wastewater
6B3	Other (please specify)
6C	Waste Incineration
6D	Other (please specify)
<b>7</b>	<b>Other (please specify)</b>

**<Note on Processing Data from GPG-LULUCF>**

In processing data of emission factors and other parameters from the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF)*, 18 new categories were added under “5 Land-Use Change & Forestry” in the list of "IPCC Category". These categories consist of 6 land use categories in GPG-LULUCF namely: Forest land (5-FL), Cropland (5-CL), Grassland (5-GL), Wetlands (5-WL), Settlements (5-SL), and Other land (5-OL). Each land use category is further sub-categorized into two based on the status and recent history of land use. Thus, for instance, for Forest land (5-FL), the sub-categories are: Forest land Remaining Forest land (5-FL-1) and Land Converted to Forest land (5-FL-2). These categories correspond to the sections and subsections of Chapter 3 of *GPG-LULUCF*. Linkage between these categories and the 1996 IPCC Guidelines’ reporting categories is elaborated in Section 3.1.2 of *GPG-LULUCF* (pages 3.11-3.14).

Fuel categories used in the EFDB are based on, but not identical to, the basic fuels hierarchy presented in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Vol.1 Reporting Instructions*, “Understanding the Common Reporting Framework”<sup>7</sup>

**Table B-2 Fuel 1996 Categories**

<b>Fuel Name</b>
LIQUID -> Crude Oil
LIQUID -> Orimulsion
LIQUID -> Natural Gas Liquids
LIQUID -> GASOLINE -> Motor Gasoline
LIQUID -> GASOLINE -> Aviation Gasoline
LIQUID -> GASOLINE -> Jet Gasoline
LIQUID -> Jet Kerosene
LIQUID -> Other Kerosene
LIQUID -> Shale Oil
LIQUID -> Diesel Oil
LIQUID -> Gas Oil
LIQUID -> Residual Fuel Oil
LIQUID -> Liquefied Petroleum Gas (LPG)
LIQUID -> Ethane
LIQUID -> Naphtha
LIQUID -> Bitumen
LIQUID -> Lubricants
LIQUID -> Petroleum Coke
LIQUID -> Refinery Feedstock
LIQUID -> Refinery Gas
LIQUID -> Paraffin Waxes
LIQUID -> White Spirit/Industrial spirits (SBP)
LIQUID -> Other Oils
SOLID -> Peat
SOLID -> Lignite/Brown Coal
SOLID -> Other Sub-Bituminous Coal
SOLID -> Anthracite
SOLID -> Coking Coal
SOLID -> Other Bituminous Coal
SOLID -> Oil Shale
SOLID -> COKE -> Coke Oven Coke
SOLID -> COKE -> Other cokes from solid fuels
SOLID -> Coal-derived tars and oils
SOLID -> BKB/PATENT FUEL -> Patent Fuel
SOLID -> BKB/PATENT FUEL -> Brown Coal Briquettes
SOLID -> DERIVED GASES -> Coke Oven Gas
SOLID -> DERIVED GASES -> Blast Furnace Gas
SOLID -> DERIVED GASES -> Gas Works Gas
SOLID -> DERIVED GASES -> Other gases and mixtures from coal-derived carbon
GAS -> Natural Gas

<sup>7</sup>The electronic copy is available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs4.htm>

Fuel Name
OTHER FUELS -> Municipal Solid Waste (Garbage)
OTHER FUELS -> Industrial Waste
OTHER FUELS -> Fuel mixtures (fossil and biomass) <sup>a, b</sup>
OTHER FUELS -> Waste Gas (especially chemical industry)
OTHER FUELS -> Other Wastes (specify nature) <sup>c</sup>
OTHER FUELS -> Hydrogen
BIOMASS -> SOLID -> Wood/Wood Waste
BIOMASS -> SOLID -> Agricultural Waste (corncoobs, straw, etc...)
BIOMASS -> SOLID -> Charcoal
BIOMASS -> SOLID -> Other solid biomass
BIOMASS -> LIQUID -> Bio-Alcohol
BIOMASS -> LIQUID -> Sulphur Lies (Black Liquor)
BIOMASS -> LIQUID -> Sewage Sludge
BIOMASS -> LIQUID -> Other liquid biomass
BIOMASS -> GAS -> Landfill Gas
BIOMASS -> GAS -> Sludge Gas (Sewage Gas)
BIOMASS -> GAS -> Other Biogas

- a) When making a data proposal for this fuel type, the data provider must specify the details concerning composition of the mixture of fuel in the “Parameters/Conditions” property field.
- b) This fuel type is meant for emission factors or other parameters for non-CO<sub>2</sub> gases. As regards parameters on CO<sub>2</sub> such as CEF (Carbon Emission Factor), it is advisable for data providers to input data on each fuels separately rather than data on the mixture of those fuels.
- c) This category includes tires, hospital/clinical waste and hazardous waste. The data provider must specify the details concerning composition of the mixture of fuel in the “Parameters/Conditions” property field.

### **IPCC 2006 Source/Sink Categories**

Detailed description of activities included in each source/sink category can be found in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, Volume 1, Chapter 8, Section 8.5 “Classification and Definition of Categories”<sup>8</sup>.

**Table B-3 IPCC 2006 Source/Sink Categories**

IPCC Code	IPCC Name
1	Energy
1.A	Fuel Combustion Activities
1.A.1	Energy Industries
1.A.1.a	Main Activity Electricity and Heat Production
1.A.1.a.i	Electricity Generation
1.A.1.a.ii	Combined Heat and Power Generation (CHP)
1.A.1.a.iii	Heat Plants
1.A.1.b	Petroleum Refining
1.A.1.c	Manufacture of Solid Fuels and Other Energy Industries
1.A.1.c.i	Manufacture of Solid Fuels

<sup>8</sup> The electronic copy is available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>

1.A.1.c.ii	Other Energy Industries
1.A.2	Manufacturing Industries and Construction
1.A.2.a	Iron and Steel
1.A.2.b	Non-Ferrous Metals
1.A.2.c	Chemicals
1.A.2.d	Pulp, Paper and Print
1.A.2.e	Food Processing, Beverages and Tobacco
1.A.2.f	Non-Metallic Minerals
1.A.2.g	Transport Equipment
<b>IPCC Code</b>	<b>IPCC Name</b>
1.A.2.h	Machinery
1.A.2.i	Mining (excluding fuels) and Quarrying
1.A.2.j	Wood and wood products
1.A.2.k	Construction
1.A.2.l	Textile and Leather
1.A.2.m	Non-specified Industry
1.A.3	Transport
1.A.3.a	Civil Aviation
1.A.3.a.i	International Aviation (International Bunkers)
1.A.3.a.ii	Domestic Aviation
1.A.3.b	Road Transportation
1.A.3.b.i	Cars
1.A.3.b.i.1	Passenger cars with 3-way catalysts
1.A.3.b.i.2	Passenger cars without 3-way catalysts
1.A.3.b.ii	Light-duty trucks
1.A.3.b.ii.1	Light-duty trucks with 3-way catalysts
1.A.3.b.ii.2	Light-duty trucks without 3-way catalysts
1.A.3.b.iii	Heavy-duty trucks and buses
1.A.3.b.iv	Motorcycles
1.A.3.b.v	Evaporative emissions from vehicles
1.A.3.b.vi	Urea-based catalysts
1.A.3.c	Railways
1.A.3.d	Water-borne Navigation
1.A.3.d.i	International water-borne navigation (International bunkers)
1.A.3.d.ii	Domestic Water-borne Navigation
1.A.3.e	Other Transportation
1.A.3.e.i	Pipeline Transport
1.A.3.e.ii	Off-road
1.A.4	Other Sectors
1.A.4.a	Commercial/Institutional
1.A.4.b	Residential
1.A.4.c	Agriculture/Forestry/Fishing/Fish Farms
1.A.4.c.i	Stationary
1.A.4.c.ii	Off-road Vehicles and Other Machinery
1.A.4.c.iii	Fishing (mobile combustion)
1.A.5	Non-Specified
1.A.5.a	Stationary
1.A.5.b	Mobile
1.A.5.b.i	Mobile (aviation component)
1.A.5.b.ii	Mobile (water-borne component)
1.A.5.b.iii	Mobile (Other)
1.A.5.c	Multilateral Operations

1.B	Fugitive emissions from fuels
1.B.1	Solid Fuels
1.B.1.a	Coal mining and handling
1.B.1.a.i	Underground mines
1.B.1.a.i.1	Mining
1.B.1.a.i.2	Post-mining seam gas emissions
1.B.1.a.i.3	Abandoned underground mines
1.B.1.a.i.4	Flaring of drained methane or conversion of methane to CO2
1.B.1.a.ii	Surface mines
<b>IPCC Code</b>	<b>IPCC Name</b>
1.B.1.a.ii.1	Mining
1.B.1.a.ii.2	Post-mining seam gas emissions
1.B.1.b	Uncontrolled combustion and burning coal dumps
1.B.1.c	Solid fuel transformation
1.B.2	Oil and Natural Gas
1.B.2.a	Oil
1.B.2.a.i	Venting
1.B.2.a.ii	Flaring
1.B.2.a.iii	All Other
1.B.2.a.iii.1	Exploration
1.B.2.a.iii.2	Production and Upgrading
1.B.2.a.iii.3	Transport
1.B.2.a.iii.4	Refining
1.B.2.a.iii.5	Distribution of oil products
1.B.2.a.iii.6	Other
1.B.2.b	Natural Gas
1.B.2.b.i	Venting
1.B.2.b.ii	Flaring
1.B.2.b.iii	All Other
1.B.2.b.iii.1	Exploration
1.B.2.b.iii.2	Production
1.B.2.b.iii.3	Processing
1.B.2.b.iii.4	Transmission and Storage
1.B.2.b.iii.5	Distribution
1.B.2.b.iii.6	Other
1.B.3	Other emissions from Energy Production
1.C	Carbon dioxide Transport and Storage
1.C.1	Transport of CO2
1.C.1.a	Pipelines
1.C.1.b	Ships
1.C.1.c	Other (please specify)
1.C.2	Injection and Storage
1.C.2.a	Injection
1.C.2.b	Storage
1.C.3	Other
2	Industrial Processes and Product Use
2.A	Mineral Industry
2.A.1	Cement production
2.A.2	Lime production
2.A.3	Glass Production
2.A.4	Other Process Uses of Carbonates
2.A.4.a	Ceramics

2.A.4.b	Other Uses of Soda Ash
2.A.4.c	Non Metallurgical Magnesia Production
2.A.4.d	Other (please specify)
2.A.5	Other (please specify)
2.B	Chemical Industry
2.B.1	Ammonia Production
2.B.2	Nitric Acid Production
2.B.3	Adipic Acid Production
2.B.4	Caprolactam, Glyoxal and Glyoxylic Acid Production
<b>IPCC Code</b>	<b>IPCC Name</b>
2.B.5	Carbide Production
2.B.6	Titanium Dioxide Production
2.B.7	Soda Ash Production
2.B.8	Petrochemical and Carbon Black Production
2.B.8.a	Methanol
2.B.8.b	Ethylene
2.B.8.c	Ethylene Dichloride and Vinyl Chloride Monomer
2.B.8.d	Ethylene Oxide
2.B.8.e	Acrylonitrile
2.B.8.f	Carbon Black
2.B.9	Fluorochemical Production
2.B.9.a	By-product emissions
2.B.9.b	Fugitive Emissions
2.B.10	Other (Please specify)
2.C	Metal Industry
2.C.1	Iron and Steel Production
2.C.2	Ferroalloys Production
2.C.3	Aluminium production
2.C.4	Magnesium production
2.C.5	Lead Production
2.C.6	Zinc Production
2.C.7	Other (please specify)
2.D	Non-Energy Products from Fuels and Solvent Use
2.D.1	Lubricant Use
2.D.2	Paraffin Wax Use
2.D.3	Solvent Use
2.D.4	Other (please specify)
2.E	Electronics Industry
2.E.1	Integrated Circuit or Semiconductor
2.E.2	TFT Flat Panel Display
2.E.3	Photovoltaics
2.E.4	Heat Transfer Fluid
2.E.5	Other (please specify)
2.F	Product Uses as Substitutes for Ozone Depleting Substances
2.F.1	Refrigeration and Air Conditioning
2.F.1.a	Refrigeration and Stationary Air Conditioning
2.F.1.b	Mobile Air Conditioning
2.F.2	Foam Blowing Agents
2.F.3	Fire Protection
2.F.4	Aerosols
2.F.5	Solvents
2.F.6	Other Applications (please specify)

2.G	Other Product Manufacture and Use
2.G.1	Electrical Equipment
2.G.1.a	Manufacture of Electrical Equipment
2.G.1.b	Use of Electrical Equipment
2.G.1.c	Disposal of Electrical Equipment
2.G.2	SF6 and PFCs from Other Product Uses
2.G.2.a	Military Applications
2.G.2.b	Accelerators
2.G.2.c	Other (please specify)
<b>IPCC Code</b>	<b>IPCC Name</b>
2.G.3	N2O from Product Uses
2.G.3.a	Medical Applications
2.G.3.b	Propellant for pressure and aerosol products
2.G.3.c	Other (Please specify)
2.G.4	Other (Please specify)
2.H	Other
2.H.1	Pulp and Paper Industry
2.H.2	Food and Beverages Industry
2.H.3	Other (please specify)
3	Agriculture, Forestry, and Other Land Use
3.A	Livestock
3.A.1	Enteric Fermentation
3.A.1.a	Cattle
3.A.1.a.i	Dairy Cows
3.A.1.a.ii	Other Cattle
3.A.1.b	Buffalo
3.A.1.c	Sheep
3.A.1.d	Goats
3.A.1.e	Camels
3.A.1.f	Horses
3.A.1.g	Mules and Asses
3.A.1.h	Swine
3.A.1.j	Other (please specify)
3.A.2	Manure Management
3.A.2.a	Cattle
3.A.2.a.i	Dairy cows
3.A.2.a.ii	Other cattle
3.A.2.b	Buffalo
3.A.2.c	Sheep
3.A.2.d	Goats
3.A.2.e	Camels
3.A.2.f	Horses
3.A.2.g	Mules and Asses
3.A.2.h	Swine
3.A.2.i	Poultry
3.A.2.j	Other (please specify)
3.B	Land
3.B.1	Forest land
3.B.1.a	Forest land Remaining Forest land
3.B.1.b	Land Converted to Forest land
3.B.1.b.i	Cropland converted to Forest Land
3.B.1.b.ii	Grassland converted to Forest Land

3.B.1.b.iii	Wetlands converted to Forest Land
3.B.1.b.iv	Settlements converted to Forest Land
3.B.1.b.v	Other Land converted to Forest Land
3.B.2	Cropland
3.B.2.a	Cropland Remaining Cropland
3.B.2.b	Land Converted to Cropland
3.B.2.b.i	Forest Land converted to Cropland
3.B.2.b.ii	Grassland converted to Cropland
3.B.2.b.iii	Wetlands converted to Cropland
<b>IPCC Code</b>	<b>IPCC Name</b>
3.B.2.b.iv	Settlements converted to Cropland
3.B.2.b.v	Other Land converted to Cropland
3.B.3	Grassland
3.B.3.a	Grassland Remaining Grassland
3.B.3.b	Land Converted to Grassland
3.B.3.b.i	Forest Land converted to Grassland
3.B.3.b.ii	Cropland converted to Grassland
3.B.3.b.iii	Wetlands converted to Grassland
3.B.3.b.iv	Settlements converted to Grassland
3.B.3.b.v	Other Land converted to Grassland
3.B.4	Wetlands
3.B.4.a	Wetlands Remaining Wetlands
3.B.4.a.i	Peatlands remaining peatlands
3.B.4.a.ii	Flooded land remaining flooded land
3.B.4.b	Land Converted to Wetlands
3.B.4.b.i	Land converted for peat extraction
3.B.4.b.ii	Land converted to flooded land
3.B.4.b.iii	Land converted to other wetlands
3.B.5	Settlements
3.B.5.a	Settlements Remaining Settlements
3.B.5.b	Land Converted to Settlements
3.B.5.b.i	Forest Land converted to Settlements
3.B.5.b.ii	Cropland converted to Settlements
3.B.5.b.iii	Grassland converted to Settlements
3.B.5.b.iv	Wetlands converted to Settlements
3.B.5.b.v	Other Land converted to Settlements
3.B.6	Other Land
3.B.6.a	Other land Remaining Other land
3.B.6.b	Land Converted to Other land
3.B.6.b.i	Forest Land converted to Other Land
3.B.6.b.ii	Cropland converted to Other Land
3.B.6.b.iii	Grassland converted to Other Land
3.B.6.b.iv	Wetlands converted to Other Land
3.B.6.b.v	Settlements converted to Other Land
3.C	Aggregate sources and non-CO2 emissions sources on land
3.C.1	Emissions from biomass burning
3.C.1.a	Biomass burning in forest lands
3.C.1.b	Biomass burning in croplands
3.C.1.c	Biomass burning in grasslands
3.C.1.d	Biomass burning in all other land
3.C.2	Liming
3.C.3	Urea application

3.C.4	Direct N2O Emissions from managed soils
3.C.5	Indirect N2O Emissions from managed soils
3.C.6	Indirect N2O Emissions from manure management
3.C.7	Rice cultivations
3.C.8	Other (please specify)
3.D	Other
3.D.1	Harvested Wood Products
3.D.2	Other (please specify)
4	Waste
IPCC Code	IPCC Name
4.A	Solid Waste Disposal
4.A.1	Managed Waste Disposal Sites
4.A.2	Unmanaged Waste Disposal Sites
4.A.3	Uncategorised Waste Disposal Sites
4.B	Biological Treatment of Solid Waste
4.C	Incineration and Open Burning of Waste
4.C.1	Waste Incineration
4.C.2	Open Burning of Waste
4.D	Wastewater Treatment and Discharge
4.D.1	Domestic Wastewater Treatment and Discharge
4.D.2	Industrial Wastewater Treatment and Discharge
4.E	Other (please specify)
5	Other
5.A	Indirect N2O emissions from the atmospheric deposition of nitrogen in NOx and NH3
5.B	Other (please specify)

**Table B-4 Fuel 2006 Categories**

Fuel Name
LIQUID -> Crude Oil
LIQUID -> Orimulsion
LIQUID -> Natural Gas Liquids (NGLs)
LIQUID -> GASOLINE -> Motor Gasoline
LIQUID -> GASOLINE -> Aviation Gasoline
LIQUID -> GASOLINE -> Jet Gasoline
LIQUID -> Jet Kerosene
LIQUID -> Other Kerosene
LIQUID -> Shale Oil
LIQUID -> Gas Oil
LIQUID -> Diesel Oil
LIQUID -> Residual Fuel Oil
LIQUID -> Liquefied Petroleum Gases
LIQUID -> Ethane
LIQUID -> Naphtha
LIQUID -> Bitumen
LIQUID -> Lubricants
LIQUID -> Petroleum Coke
LIQUID -> Refinery Feedstocks

LIQUID -> OTHER OIL -> Refinery Gas
LIQUID -> OTHER OIL -> Waxes
LIQUID -> OTHER OIL -> White Spirit & SBP
LIQUID -> OTHER OIL -> Other Petroleum Products
SOLID -> Anthracite
SOLID -> Coking Coal
SOLID -> Other Bituminous Coal
SOLID -> Sub-Bituminous Coal
SOLID -> Lignite
SOLID -> Oil Shale and Tar Sands
<b>Fuel Name</b>
SOLID -> Brown Coal Briquettes
SOLID -> Patent Fuel
SOLID -> COKE -> Coke Oven Coke and Lignite Coke
SOLID -> COKE -> Gas Coke
SOLID -> Coal Tar
SOLID -> DERIVED GASES -> Gas Works Gas
SOLID -> DERIVED GASES -> Coke Oven Gas
SOLID -> DERIVED GASES -> Blast Furnace Gas
SOLID -> DERIVED GASES -> Oxygen Steel Furnace Gas
SOLID -> Undifferentiated Coal
GAS -> Natural Gas
OTHER FOSSIL FUELS -> Municipal Wastes (non-biomass fraction)
OTHER FOSSIL FUELS -> Industrial Wastes
OTHER FOSSIL FUELS -> Waste Oils
PEAT -> Peat
BIOMASS -> SOLID BIOFUELS -> Wood/Wood Waste
BIOMASS -> SOLID BIOFUELS -> Sulphite Lyes (Black Liquor)
BIOMASS -> SOLID BIOFUELS -> Other Primary Solid Biomass
BIOMASS -> SOLID BIOFUELS -> Charcoal
BIOMASS -> LIQUID BIOFUELS -> Biogasoline
BIOMASS -> LIQUID BIOFUELS -> Biodiesels
BIOMASS -> LIQUID BIOFUELS -> Bio-Alcohol
BIOMASS -> LIQUID BIOFUELS -> Sewage Sludge
BIOMASS -> LIQUID BIOFUELS -> Other Liquid Biofuels
BIOMASS -> GAS BIOMASS -> Landfill Gas
BIOMASS -> GAS BIOMASS -> Sludge Gas
BIOMASS -> GAS BIOMASS -> Other Biogas
BIOMASS -> OTHER NON-FOSSIL FUELS -> Municipal Wastes (biomass fraction)
OTHER FUELS -> Fuel mixtures (fossil and biomass)
OTHER FUELS -> Hydrogen

## Appendix C: List of Gases

The primary goal of the EFDB is to become a recognised library of well-documented emission factors and other parameters to estimate emissions of direct greenhouse gases such as CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs and SF<sub>6</sub>. However, information on indirect greenhouse gases (SO<sub>2</sub>, NO<sub>x</sub>, NMVOCs, CO) can be also contained in the EFDB. Further, the EFDB may be expanded in the future so that it also accommodates information on other gases.

Table C-1 below shows the list of gases currently contained in the EFDB gas table.

Table C-1 List of Gases

Gas Name	Gas Abbreviation
SULPHUR DIOXIDE (SO <sub>2</sub> +SO <sub>3</sub> )	SO <sub>2</sub>
NITROGEN OXIDES (NO+NO <sub>2</sub> )	NO <sub>x</sub>
NON METHANE VOLATILE ORGANIC COMPOUNDS	NMVOC
METHANE	CH <sub>4</sub>
CARBON MONOXIDE	CO
CARBON DIOXIDE	CO <sub>2</sub>
NITROUS OXIDE	N <sub>2</sub> O
AMMONIA	NH <sub>3</sub>
PARTICULATE MATTER/DUST	TSP
Particulate matter particles < 2,5um	PM <sub>2.5</sub>
Particulate matter particles < 10um	PM <sub>10</sub>
NF <sub>3</sub>	NF <sub>3</sub>
CH <sub>2</sub> Br <sub>2</sub>	CH <sub>2</sub> Br <sub>2</sub>
CH <sub>3</sub> CCl <sub>3</sub>	CH <sub>3</sub> CCl <sub>3</sub>
CHCl <sub>3</sub>	CHCl <sub>3</sub>
CH <sub>3</sub> Cl	CH <sub>3</sub> Cl
CH <sub>2</sub> Cl <sub>2</sub>	CH <sub>2</sub> Cl <sub>2</sub>
CH <sub>3</sub> OCH <sub>3</sub>	CH <sub>3</sub> OCH <sub>3</sub>
(CF <sub>3</sub> ) <sub>2</sub> CFOCH <sub>3</sub>	(CF <sub>3</sub> ) <sub>2</sub> CFOCH <sub>3</sub>
(CF <sub>3</sub> )CH <sub>2</sub> OH	(CF <sub>3</sub> )CH <sub>2</sub> OH
CF <sub>3</sub> CF <sub>2</sub> CH <sub>2</sub> OH	CF <sub>3</sub> CF <sub>2</sub> CH <sub>2</sub> OH
(CF <sub>3</sub> ) <sub>2</sub> CHOH	(CF <sub>3</sub> ) <sub>2</sub> CHOH
HFE-125	CF <sub>3</sub> OCHF <sub>2</sub>
HFE-134	CHF <sub>2</sub> OCHF <sub>2</sub>
HFE-143a	CH <sub>3</sub> OCHF <sub>3</sub>
HCFE-235da2	CF <sub>3</sub> CHClOCHF <sub>2</sub>
HFE-245cb2	CF <sub>3</sub> CF <sub>2</sub> OCH <sub>3</sub>
HFE-245fa2	CF <sub>3</sub> CH <sub>2</sub> OCHF <sub>2</sub>
HFE-254cb2	CHF <sub>2</sub> CF <sub>2</sub> OCH <sub>3</sub>
HFE-347mcc3	CF <sub>3</sub> CF <sub>2</sub> CF <sub>2</sub> OCH <sub>3</sub>
HFE-356pcf3	CHF <sub>2</sub> CF <sub>2</sub> CH <sub>2</sub> OCHF <sub>2</sub>
HFE-374pc2	CHF <sub>2</sub> CF <sub>2</sub> OCH <sub>2</sub> CH <sub>3</sub>
HFE-7100	C <sub>4</sub> F <sub>9</sub> OCH <sub>3</sub>
HFE-7200	C <sub>4</sub> F <sub>9</sub> OC <sub>2</sub> H <sub>5</sub>
H-Galden 1040x	CHF <sub>2</sub> OCF <sub>2</sub> OC <sub>2</sub> F <sub>4</sub> OCHF <sub>2</sub>
HG-10	CHF <sub>2</sub> OCF <sub>2</sub> OCHF <sub>2</sub>

HG-01	CHF <sub>2</sub> OCHF <sub>2</sub> CF <sub>2</sub> OCHF <sub>2</sub>
Gas Name	Gas Abbreviation
SF <sub>5</sub> CF <sub>3</sub>	SF <sub>5</sub> CF <sub>3</sub>
c-C <sub>3</sub> F <sub>6</sub>	c-C <sub>3</sub> F <sub>6</sub>
HFE-227ea	CF <sub>3</sub> CHFOCF <sub>3</sub>
HFE-236ea2	CF <sub>3</sub> CHFOCHF <sub>2</sub>
HFE-236fa	CF <sub>3</sub> CH <sub>2</sub> OCHF <sub>3</sub>
HFE-245fa1	CHF <sub>2</sub> CH <sub>2</sub> OCHF <sub>3</sub>
HFE-263fb2	CF <sub>3</sub> CH <sub>2</sub> OCH <sub>3</sub>
HFE-329mcc2	CF <sub>3</sub> CF <sub>2</sub> OCHF <sub>2</sub> CHF <sub>2</sub>
HFE-338mcf2	CF <sub>3</sub> CF <sub>2</sub> OCH <sub>2</sub> CF <sub>3</sub>
HFE-347mcf2	CF <sub>3</sub> CF <sub>2</sub> OCH <sub>2</sub> CHF <sub>2</sub>
HFE-356mec3	CF <sub>3</sub> CHF <sub>2</sub> OCH <sub>3</sub>
HFE-356pcc3	CHF <sub>2</sub> CF <sub>2</sub> CF <sub>2</sub> OCH <sub>3</sub>
HFE-356pcf2	CHF <sub>2</sub> CF <sub>2</sub> OCH <sub>2</sub> CHF <sub>2</sub>
HFE-365mcf3	CF <sub>3</sub> CF <sub>2</sub> CH <sub>2</sub> OCH <sub>3</sub>
(CF <sub>3</sub> ) <sub>2</sub> CHOCHF <sub>2</sub>	(CF <sub>3</sub> ) <sub>2</sub> CHOCHF <sub>2</sub>
(CF <sub>3</sub> ) <sub>2</sub> CHOCH <sub>3</sub>	(CF <sub>3</sub> ) <sub>2</sub> CHOCH <sub>3</sub>
-(CF <sub>2</sub> ) <sub>4</sub> CH(OH)-	-(CF <sub>2</sub> ) <sub>4</sub> CH(OH)-
HFC-23	HFC-23
HFC-32	HFC-32
HFC-41	HFC-41
HFC-43-10mee	HFC-43-10m
HFC-125	HFC-125
HFC-134	HFC-134
HFC-134a	HFC-134a
HFC-152a	HFC-152a
HFC-143	HFC-143
HFC-143a	HFC-143a
HFC-227ea	HFC-227ea
HFC-236fa	HFC-236fa
HFC-245ca	HFC-245ca
CF <sub>4</sub>	CF <sub>4</sub>
C <sub>2</sub> F <sub>6</sub>	C <sub>2</sub> F <sub>6</sub>
C <sub>3</sub> F <sub>8</sub>	C <sub>3</sub> F <sub>8</sub>
C <sub>4</sub> F <sub>10</sub>	C <sub>4</sub> F <sub>10</sub>
c-C <sub>4</sub> F <sub>8</sub>	c-C <sub>4</sub> F <sub>8</sub>
C <sub>5</sub> F <sub>12</sub>	C <sub>5</sub> F <sub>12</sub>
C <sub>6</sub> F <sub>14</sub>	C <sub>6</sub> F <sub>14</sub>
SF <sub>6</sub>	SF <sub>6</sub>
CF <sub>3</sub> I	CF <sub>3</sub> I
DIOXINS AND FURANS	DIOX
POLYCYCLIC AROMATIC HYDROCARBONS	PAH

## Appendix D: Basic Information on Units

### Prefixes and multiplication factors

Multiplication Factor	Abbreviation	Prefix	Symbol
1 000 000 000 000 000	$10^{15}$	peta	P
1 000 000 000 000	$10^{12}$	tera	T
1 000 000 000	$10^9$	giga	G
1 000 000	$10^6$	mega	M
1 000	$10^3$	kilo	k
100	$10^2$	hecto	h
10	$10^1$	deca	da
0.1	$10^{-1}$	deci	d
0.01	$10^{-2}$	centi	c
0.001	$10^{-3}$	milli	m
0.000 001	$10^{-6}$	micro	$\mu$

### Units and abbreviations

cubic metre	$m^3$
hectare	ha
gram	g
tonne	t
joule	J
degree Celsius	$^{\circ}C$
calorie	cal
year	yr
capita	cap
gallon	gal
dry matter	dm

## Standard equivalents

1 tonne of oil equivalent (toe)	$1 \times 10^{10}$ calories
$10^3$ toe	41.868 TJ
1 short ton	0.9072 tonne
1 tonne	1.1023 short tons
1 tonne	1 megagram
1 kilotonne	1 gigagram
1 megatonne	1 teragram
1 gigatonne	1 petagram
1 kilogram	2.2046 lbs
1 hectare	$10^4$ m <sup>2</sup>
1 calorie <sub>IT</sub>	4.1868 Joules
1 atmosphere	101.325 kPa