



IPCC Inventory Software

IPCC TFI Side-event
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ipcc

INTERGOVERNMENTAL PANEL ON climate change



IPCC Inventory Software- Presentation Outline

➤ Part 1:-

- ✓ Introduction/Overview
- ✓ Key functions/features of IPCC Inventory Software

➤ Part 2:-

- ✓ Updates on implementation of Tier 2 methods in IPCC inventory Software



Part 1: IPCC Inventory Software – Key Functions/Features

Introduction

The IPCC Inventory Software implements the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. It can also be used for reporting under the 1996 IPCC Guidelines

- ✓ it allows countries to utilise the improvements in the methodologies and default values since 1996

The IPCC launched the IPCC Inventory Software in 2012

The latest officially published version is available from:

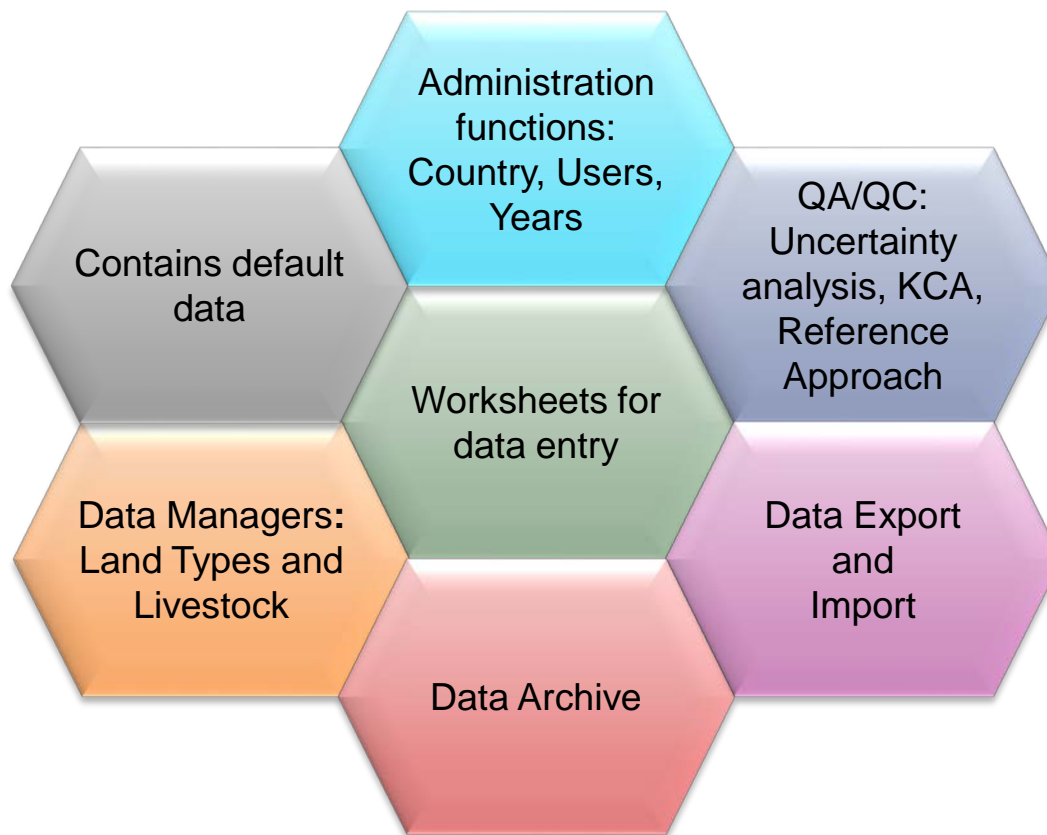
<http://www.ipcc-nggip.iges.or.jp/software/index.html>

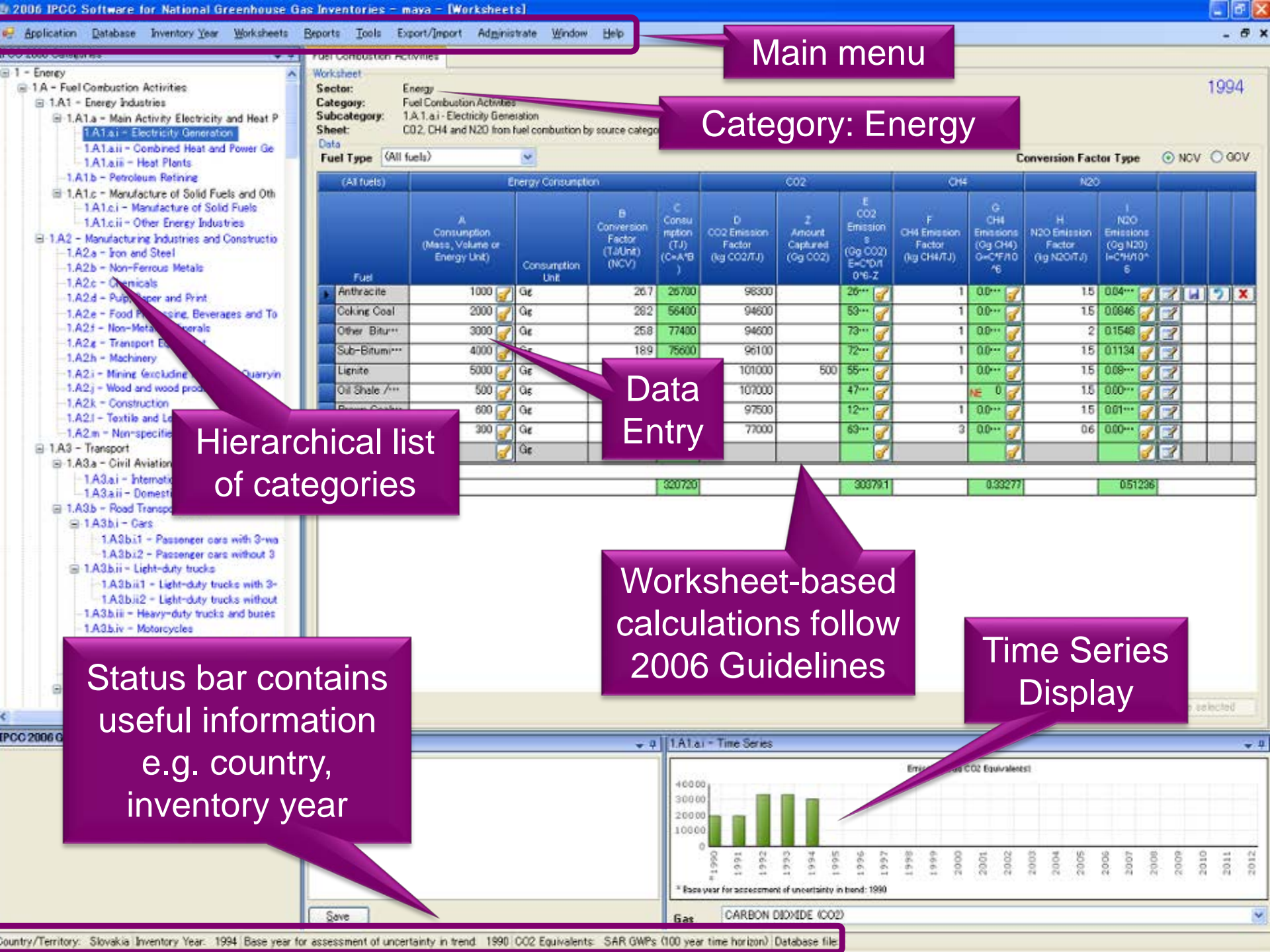
IPCC Inventory Software - Key features

The IPCC Inventory Software can assist inventory compilers in using the IPCC Guidelines

- Stand alone software with modest hardware requirements
- Data entry in worksheets following the 2006 IPCC Guidelines for ease-of-use
- It can be used for the whole inventory or just individual categories
- Allows different parts of the inventory to be developed simultaneously
- Can be used when reporting 1996 or 2006 Guidelines
- Provides default data from the 2006 IPCC Guidelines but gives users the flexibility to use their own country-specific information
- Tools includes Uncertainty and Key Category Analysis
- Aids QA/QC
- Outputs in non-Annex I National Communications format
- FREE!

Software Functions





- IPCC 2006 Categories
- 1.A4b - Residential
 - 1.A4c - Agriculture/Forestry/Fishing/Fish F
 - 1.A4.c.i - Stationary
 - 1.A4.c.ii - Off-road Vehicles and Other
 - 1.A4.c.iii - Fishing (mobile combustion)
 - 1.A5 - Non-Specified
 - 1.A5a - Stationary
 - 1.A5b - Mobile
 - 1.A5.b.i - Mobile (aviation component)
 - 1.A5.b.ii - Mobile (water-borne component)
 - 1.A5.b.iii - Mobile (Other)
 - 1.A5c - Multilateral Operations
 - 1.B - Fugitive emissions from fuels
 - 1.B1 - Solid Fuels
 - 1.B1.a - Coal mining and handling
 - 1.B1.a.i - Underground mines
 - 1.B1.a.i.1 - Mining
 - 1.B1.a.i.2 - Post-mining seam gas emi
 - 1.B1.a.i.3 - Abandoned underground
 - 1.B1.a.i.4 - Flaring of drained methan
 - 1.B1.a.ii - Surface mines
 - 1.B1.a.ii.1 - Mining
 - 1.B1.a.ii.2 - Post-mining seam gas em
 - 1.B1.b - Uncontrolled combustion and burnin
 - 1.B1.c - Solid fuel transformation
 - 1.B2 - Oil and Natural Gas
 - 1.B2.a - Oil
 - 1.B2.a.i - Venting
 - 1.B2.a.ii - Flaring
 - 1.B2.a.iii - All Other
 - 1.B2.a.iii.1 - Exploration
 - 1.B2.a.iii.2 - Production and Operadin
 - 1.B2.a.iii.3 - Transport
 - 1.B2.a.iii.4 - Refining
 - 1.B2.a.iii.5 - Distribution of oil produc
 - 1.B2.a.iii.6 - Other
 - 1.B2.b - Natural Gas
 - 1.B2.b.i - Venting
 - 1.B2.b.ii - Flaring
 - 1.B2.b.iii - All Other
 - 1.B2.b.iii.1 - Exploration
 - 1.B2.b.iii.2 - Production
 - 1.B2.b.iii.3 - Processing

Oil and Natural Gas

Sector: Energy
 Category: Fugitive Emissions from Fuels - Oil and Natural Gas
 Subcategory: 1.B.2.a.i - Venting
 Sheet: CO2, CH4 and N2O from fugitive em

1994

Industry Segment	Subcategory	Activity	Emission Factor (Gg CO2/Unit for AD)	CO2 Emissions (Gg CO2)	CH4		N2O		
					Emission Factor (Gg CH4/Unit for AD)	CH4 Emissions (Gg CH4)	Emission Factor (Gg N2O/Unit for AD)	N2O Emissions (Gg N2O)	
				C=A*B	E=A*D	G=A*F			
Oil Production	Conventional Oil	1000	10 ⁻⁶ Sm ³	95E-05	0.095	0.00072	0.72	0.05	50
	Default Weighted Total	500	10 ⁻⁶ Sm ³	0.0018	0.9	0.0087	4.35	0.05	25
	Heavy Oil / Cold Bitumen	600	10 ⁻⁶ Sm ³	0.0053	3.18		0		0
	Thermal Oil Production	400	10 ⁻⁶ Sm ³	0.00022	0.088	0.0035	1.4	0.03	12
Oil Transport	Loading of Off-shore Production on Tanker Ships	300	10 ⁻⁶ Sm ³	0.005	1.5		0.09	0.0002	0.06
Total					5.763				

Notation Keys Available

Defaults Available: can be over-written with country specific data

Uncertainties

Time Series Data Entry

IPCC 2006 Guidelines

See Table 4.2.7 'Guidance on obtaining the activity data values required for use in Tier 1 approach to estimate fugitive emissions from oil and gas operations' in Chapter 4, Volume 2 of the 2006 IPCC Guidelines

Worksheet remarks

1.B.2.a.i - Time Series

Year	Emissions (CO2 Equivalent)
1997	
1998	
1999	
2000	
2001	
2002	
2003	
2004	
2005	
2006	
2007	
2008	
2009	
2010	
2011	
2012	

Save

Gas CARBON DIOXIDE (CO2)

Inventory Years

The screenshot displays the IPCC Inventory Software interface. The main window shows a worksheet for 'CH4 Emissions from Enteric fermentation' for the year 2010. The 'Sector' is 'Agriculture, Forestry and Other Land Use', the 'Category' is 'Livestock/Enteric Fermentation', and the 'Subcategory' is '3.A.1.a.i - Dairy Cows'. The 'Sheet' is '1 of 1'. The 'Gas' is 'METHANE (CH4)'. A 'New inventory' dialog box is open, allowing the user to create a new inventory year for 2011. The dialog box has two options: 'Create empty inventory year' (selected) and 'Copy data from inventory year' (with a dropdown set to 2010). A 'Create' button and a 'Cancel' button are visible. In the background, a table shows 'CH4 Emissions (Gg CH4/yr)' for 2010 with a value of 3094. The formula for CH4 is $CH4 = N(T) * EF(T) * 10^{-6}$. A 'Worksheet remarks' pane is also visible at the bottom.

Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help

2006 IPCC Categories

- 2.G.3.a - Medical Applications
- 2.G.3.b - Propellant for pressure 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 - Cattle
 - 3.A.1.a - Dairy cows
 - 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.i - 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

2010

Worksheet

Sector: Agriculture, Forestry and Other Land Use

Category: Livestock/Enteric Fermentation

Subcategory: 3.A.1.a.i - Dairy Cows

Sheet: 1 of 1

Data

Gas: METHANE (CH4)

CH4

CH4 Emissions (Gg CH4/yr)

$CH4 = N(T) * EF(T) * 10^{-6}$

68	3094
	3094

Inventory Year

- Create new year
- Select year

New inventory

Create new Inventory Year

New Inventory Year: 2011

Create empty inventory year

Copy data from inventory year: 2010

Create Cancel

IPCC Inventory Software

Inventory Year

Choose the inventory year from the drop-down box below and press OK or press "Create new" to create new Inventory year.

1990

OK Create new...

Worksheet remarks

Save

Gas: METHANE (CH4)

Reports

Report	Level	Contents
Summary	1.A.1	Emissions
Short summary	1.A	Emissions
Sectoral	1.A.1.a.ii (most disaggregated level)	Emissions
Background	1.A.1.a.ii (most disaggregated level)	Activity data Emissions

Note: All reports can be exported as MS Excel file

Reports

Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help

2006 IPCC Categories

- 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 Rem...
 - 3.B.1.b - Land Converted to Agriculture
 - 3.B.1.bi - Cropland con...
 - 3.B.1.bii - Grassland co...
 - 3.B.1.biii - Wetlands co...
 - 3.B.1.biv - Settlements

CH4 Emissions from

Worksheet: CH4 Emissions from

Sector: Livestock/Enteric F...

Category: 3.A.1.a.i - Dairy Co...

Subcategory: 1 of 1

Sheet: 1 of 1

Data

Gas: METHANE (CH4)

Export/Import

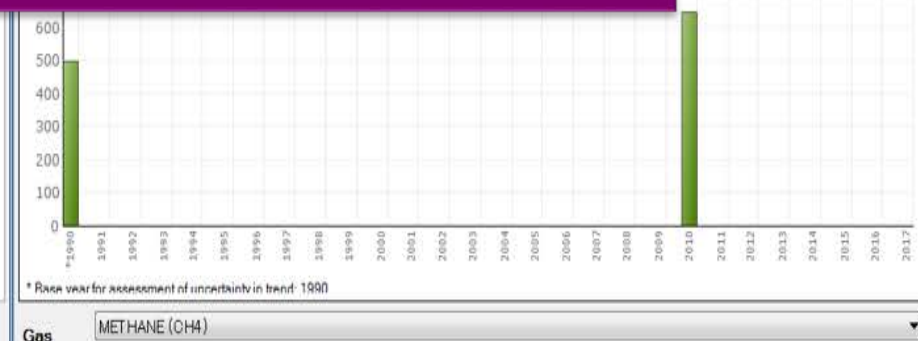
- Export
 - Worksheet Data
 - CO2 Equivalents
 - F-Gases Data
 - NAI Reporting Tables
- Import

T	N(T)	EF(T)	CH4
Species/Livestock C...	Number of Animals (head)	Emission Factor (kg CH4/(head yr))	CH4 Emissions (Gg CH4/yr)
			$CH_4 = N(T) * EF(T) * 10^{-6}$
Dairy cow_A	455000	68	3094
Total			3094

Time Series data entry...

2006 IPCC Guidelines

Can export to non-Annex I (NAI) reporting tables. The format of the NAI reporting tables follows the Tables 1 and 2 in Annex to Decision 17/CP.8 of the UNFCCC (Guidelines for the preparation of National Communications from Parties not included in Annex I to the Convention)



Tools

Click Tools –
Uncertainty Analysis

Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help

2006 IPCC Categories

- 4.A – Solid Waste Disposal
 - 4.A.1 – Managed Waste Disposal Sites
 - 4.A.2 – Unmanaged Waste Disposal Sites
 - 4.A.3 – Uncategorized Waste Disposal Site
- 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
 - 4.D.2 – Industrial Wastewater Treatment a
- 4.E – Other (please specify)
- 5 – Other

Parameters Methane C... Worksheet

Sector: Waste
Category: Metha...
Subcategory: 4.A - Solid Waste Disposal
Sheet: Results

Data

Methane generated											
Year	Food	Garden	Paper	Wood	Textile	Nappies	Sludge	Industrial	Total	Methane recovery	Methane Emissions
	A	B	C	D	E	F	G	H	I	J	$M = (I-J) * (1 - OX)$
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
1950	0	0	0	0	0	0	0	0	0	0	0
1951	0.58016	0.00100	0.20000	0.10006	0.00000	0.01000	0.10000	0.10000	2.01853	9.53118	0
1952	0.55575	0.00100	0.20000	0.10006	0.00000	0.01000	0.10000	0.10000	18.60412	0	18.60412
1953	3.025	0.00100	0.20000	0.10006	0.00000	0.01000	0.10000	0.10000	27.24109	0	27.24109
1954	35.973	0.00100	0.20000	0.10006	0.00000	0.01000	0.10000	0.10000	35.46326	0	35.46326
1955	43.461	0.00100	0.20000	0.10006	0.00000	0.01000	0.10000	0.10000	43.29079	0	43.29079
1956	50.008	0.00100	0.20000	0.10006	0.00000	0.01000	0.10000	0.10000	50.74282	0	50.74282
1957	57.4219	0.00100	0.20000	0.10006	0.00000	0.01000	0.10000	0.10000	57.83759	0	57.83759
1958	64.5094	0.00100	0.20000	0.10006	0.00000	0.01000	0.10000	0.10000	64.5094	0	64.5094

Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help

Uncertainty Analysis – Approach 1 (Table 3.2)

Base year for assessment of uncertainty in trend: 1990 Year T: 1994

2006 IPCC Categories	Gas	Base Year emissions or removals (Gg CO2 equivalent)	Year T emissions or removals (Gg CO2 equivalent)	Activity Data Uncertainty (%)
4.A – Solid Waste Disposal				
	CH4	3598.6	3705.4	3.0
4.B – Biological Treatment of Solid Waste				
	CH4	81.8	0.0	0.0
	N2O	39.5	0.0	0.0
4.C – Incineration and Open Burning of Waste				
4.C.1 – Waste Incineration	CO2	1419.2	5501.4	4.0
	CH4	11.7	1.9	4.0
	N2O	0.0	480.1	4.0
4.C.2 – Open Burning of Waste	CO2	69.2	2203.1	4.0
	CH4	0.0	4.2	4.0
	N2O	1.0	34.1	4.0
4.D – Wastewater Treatment and Discharge				
4.D.1 – Domestic Wastewater Treatment and Discharge	CH4	5.0	0.1	5.0
	N2O	0.2	0.1	3.0

Number of decimal places: 1 Zero padding

Refresh Data Export to Excel

Click “Refresh Data” to perform analysis

NE (CH4) Emissions (Gg CO2 Equivalents)

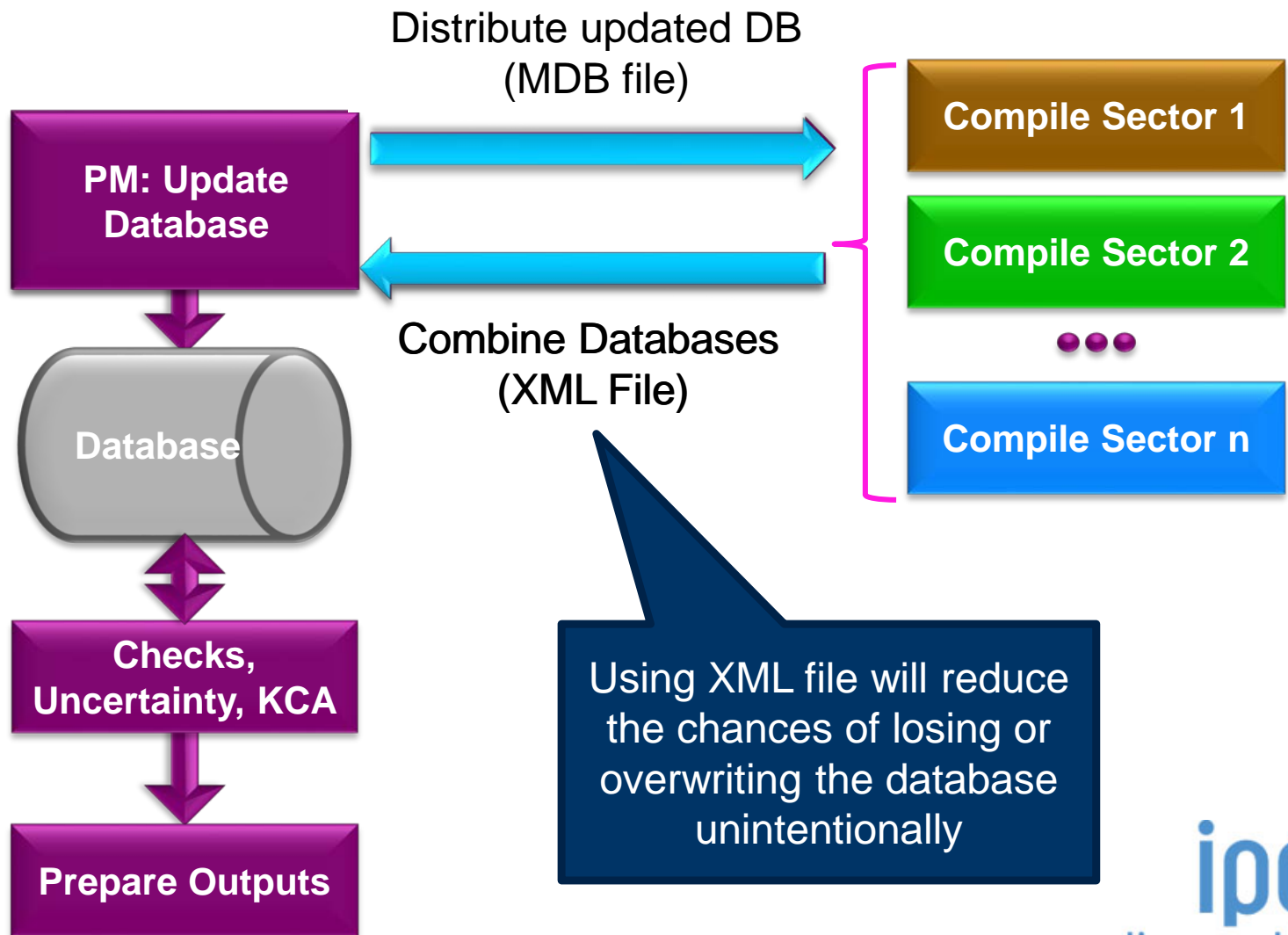
Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
Emissions

in trend: 1990

Multiple Users

Project manager

Sectoral Experts(s)



Support

- The TSU is supporting the IPCC Inventory Software:
 - Help Desk E-mail: ipcc-software@iges.or.jp
 - Web Forum: <https://discussions.zoho.com/ipccinventorysoftware/>
✓ *please, read the User Manual*
- TSU will maintain the IPCC Inventory Software and is planning to implement the following:
 - Tier 2 methods
 - Wetlands Supplement

Implementation of Tier 2 Methodology for the IPCC Inventory Software

Tier 2 Implementation

- TFI-TSU has adopted a phased approach in implementing tier 2 work:
- Work on Tier 2 methods in the 2006 IPCC Guidelines for most categories under Energy , IPPU and Waste Sectors has been completed and are implemented in version 2.54
- Details on Tier 2 coverage maybe found at:

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

Categories (non-AFOLU) with adjustments or with new worksheets to perform Tier 2 estimates

For the other categories no new Tier 2 worksheets are included, either because the Tier 1 worksheets are already suitable for Tier 2 (Energy) or because it was not possible to include them since significant elaboration is required (just a few, Iron and Steel, Ferroalloys, Petrochemicals, Aluminium-CO2).

#	Category	Gas							
		CO2	CH4	N2O	HFCs	PFCs	SF6	NF3	Other
	1 - Energy								
	1.A - Fuel Combustion Activities								
	1.A.3 - Transport								
	1.A.3.a - Civil Aviation								
1	1.A.3.a.i - International Aviation (International bunkers)	x	x	x					
2	1.A.3.a.ii - Domestic Aviation	x	x	x					
	2 - Industrial Processes and Product Use								
	2.A - Mineral Industry								
3	2.A.1 - Cement production	x							
4	2.A.2 - Lime production	x							
	2.B - Chemical Industry								
5	2.B.2 - Nitric Acid Production			x					
6	2.B.3 - Adipic Acid Production			x					
7	2.B.4 - Caprolactam, Glyoxal/Glyoxylic Acid Production			x					
8	2.B.6 - Titanium Dioxide Production	x							
	2.B.9 - Fluorochemical Production								
9	2.B.9.a - By-product emissions				x	x	x		x
	2.C - Metal Industry								
10	2.C.3 - Aluminium production	x				x			
11	2.C.4 - Magnesium production	x					x		
	2.D - Non-Energy Products from Fuels and Solvent Use								
12	2.D.1 - Lubricant Use	x							
13	2.D.2 - Paraffin Wax Use	x							
	2.E - Electronics Industry								
14	2.E.1 - Integrated Circuit or Semiconductor				x	x	x	x	x
15	2.E.2 - TFT Flat Panel Display				x	x	x	x	x
16	2.E.3 - Photovoltaics				x	x	x	x	x
17	2.E.4 - Heat Transfer Fluid					x			
	2.G - Other Product Manufacture and Use								
18	2.G.1.c - Disposal of Electrical Equipment					x	x		
	2.G.2 - SF6 and PFCs from Other Product Uses								
19	2.G.2.a - Military Applications						x		
20	2.G.2.b - Accelerators						x		
	4 - Waste								
	4.C - Incineration and Open Burning of Waste								
21	4.C.1 - Waste Incineration	x	x	x					
22	4.C.2 - Open Burning of Waste	x	x	x					
	4.D - Wastewater Treatment and Discharge								
23	4.D.1 - Domestic Wastewater Treatment and Discharge		x						
24	4.D.2 - Industrial Wastewater Treatment and Discharge		x						

Tier 1/ Tier 2

IPCC Inventory Software - shermanau - [Worksheets]

Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help

2006 IPCC Categories

- 2.A.4.b - Other Uses of S
- 2.A.4.c - Non Metallurgic
- 2.A.4.d - Other (please s
- 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 Productio
 - 2.B.4 - Caprolactam, Glyoxal
 - 2.B.5 - Carbide Production
 - 2.B.6 - Titanium Dioxide Pro
 - 2.B.7 - Soda Ash Production
 - 2.B.8 - Petrochemical and C
 - 2.B.8.a - Methanol
 - 2.B.8.b - Ethylene
 - 2.B.8.c - Ethylene Dichl
 - 2.B.8.d - Ethylene Oxide
 - 2.B.8.e - Acrylonitrile
 - 2.B.8.f - Carbon Black
 - 2.B.9 - Fluorochemical Prod
 - 2.B.9.a - By-product emis
 - 2.B.9.b - Fugitive Emissio
 - 2.B.10 - Other (Please specif
- 2.C - Metal Industry
 - 2.C.1 - Iron and Steel Produ
 - 2.C.2 - Ferroalloys Productio
 - 2.C.3 - Aluminium productio
 - 2.C.4 - Magnesium productio
 - 2.C.5 - Lead Production
 - 2.C.6 - Zinc Production
 - 2.C.7 - Other (please specify
- 2.D - Non-Energy Products from
 - 2.D.1 - Lubricant Use

2006 IPCC Guidelines

Tier 2

Nitric Acid Production - Tier 2

Worksheet

Sector: Industrial Processes and Product Use

Category: Chemical Industry

Subcategory: 2.B.2 - Nitric Acid Production

Sheet: 1 of 1

Data

A	B	C	D	E
Nitric acid production from technology i (tonnes)	N2O emission factor for technology type i (kg N2O/tonne nitric acid produced)	Destruction factor for abatement technology type j (Fraction)	Abatement system utilisation factor for abatement technology type j (Fraction)	N2O Emissions (Gg)
				$E = A*B*(1-C*D)/10^6$
1500	9	0.925	0.89	0.00239
Total				0.00239

1990

Uncertainties Time Series data entry... Delete selected rows...

Worksheet remarks

2.B.2 - Time Series

NITROUS OXIDE (N2O) Emissions (Gg CO2 Equivalents)

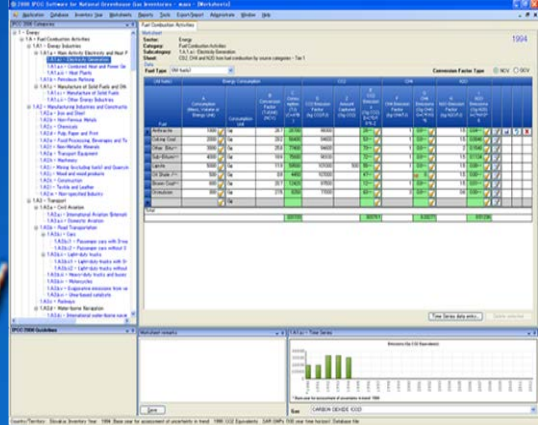
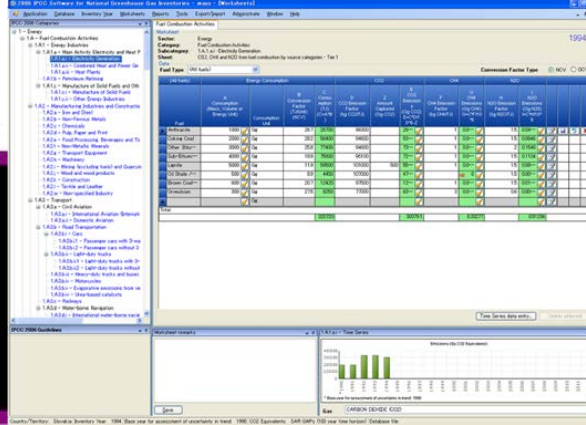
* Base year for assessment of uncertainty in trend: 1990

Gas NITROUS OXIDE (N2O)

Country/Territory: Japan Inventory Year: 1990 Base year for assessment of uncertainty in trend: 1990 CO2 Equivalents: SAR GWPs (100 year time horizon) Database file: (C:\ProgramData\IPCC2006Software\ipcc2006.mdb)

Implementation of Tier 2 methods - AFOLU Sector.

- At present (IPCC) software implements the 2006 IPCC Guidelines for National Greenhouse Gas Inventories at Tier 1 for the entire AFOLU sector.
- Development to implement tier 2 methods for the AFOLU sector is underway and includes Wetland Supplement (at Tier 1)
- Agriculture sector - Tier 2 implementation for livestock categories was completed in 2018, new version of software with Tier 2 for livestock categories is expected first quarter of 2019.
- Work on implementation of Tier 2 for LULUCF categories is due to start (December –January)
- Implementation of Wetlands Supplement, is an extension to 2006 IPCC Guidelines dealing with new methodologies for calculating and reporting emissions for inland/coastal, drained/rewetted lands under Land Use sector (at Tier 1)



Thank you for your attention!
Any questions?