IPCC Inventory Software

IPCC TFI Side-event

UN Climate Change Conference

Katowice, Poland

7 December 2018

Sekai Ngarize, IPCC TFI TSU

ipcc

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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

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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

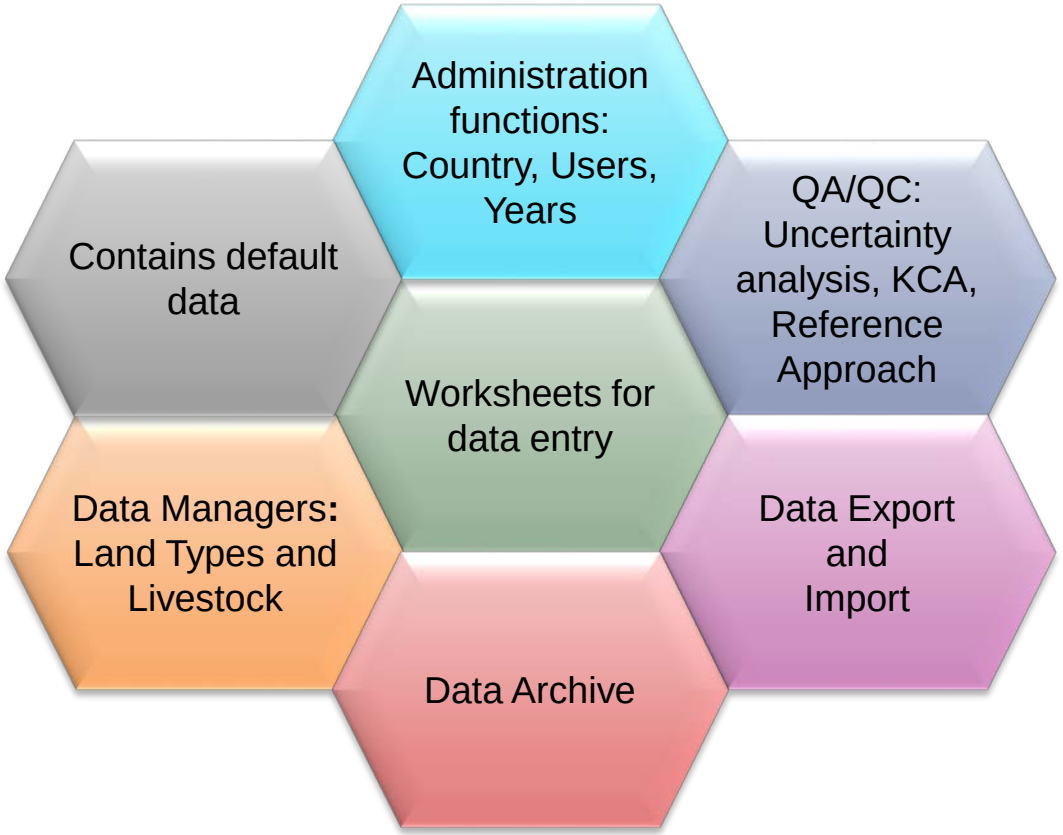
The latest officially published version is available from:
http://www.ipcc-nggip.iges.or.jp/software/index.html

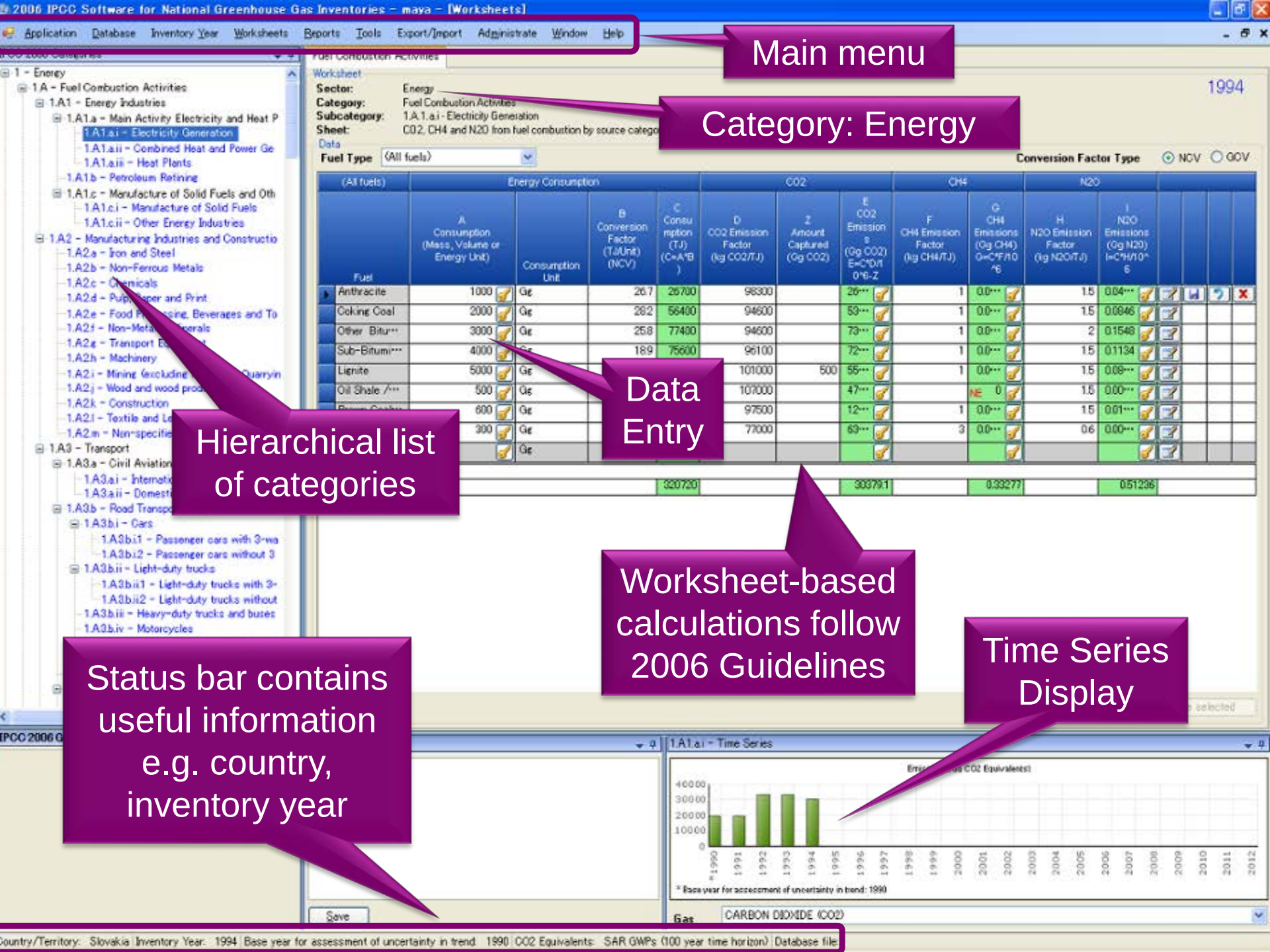
IPCC Inventory Software - Key features

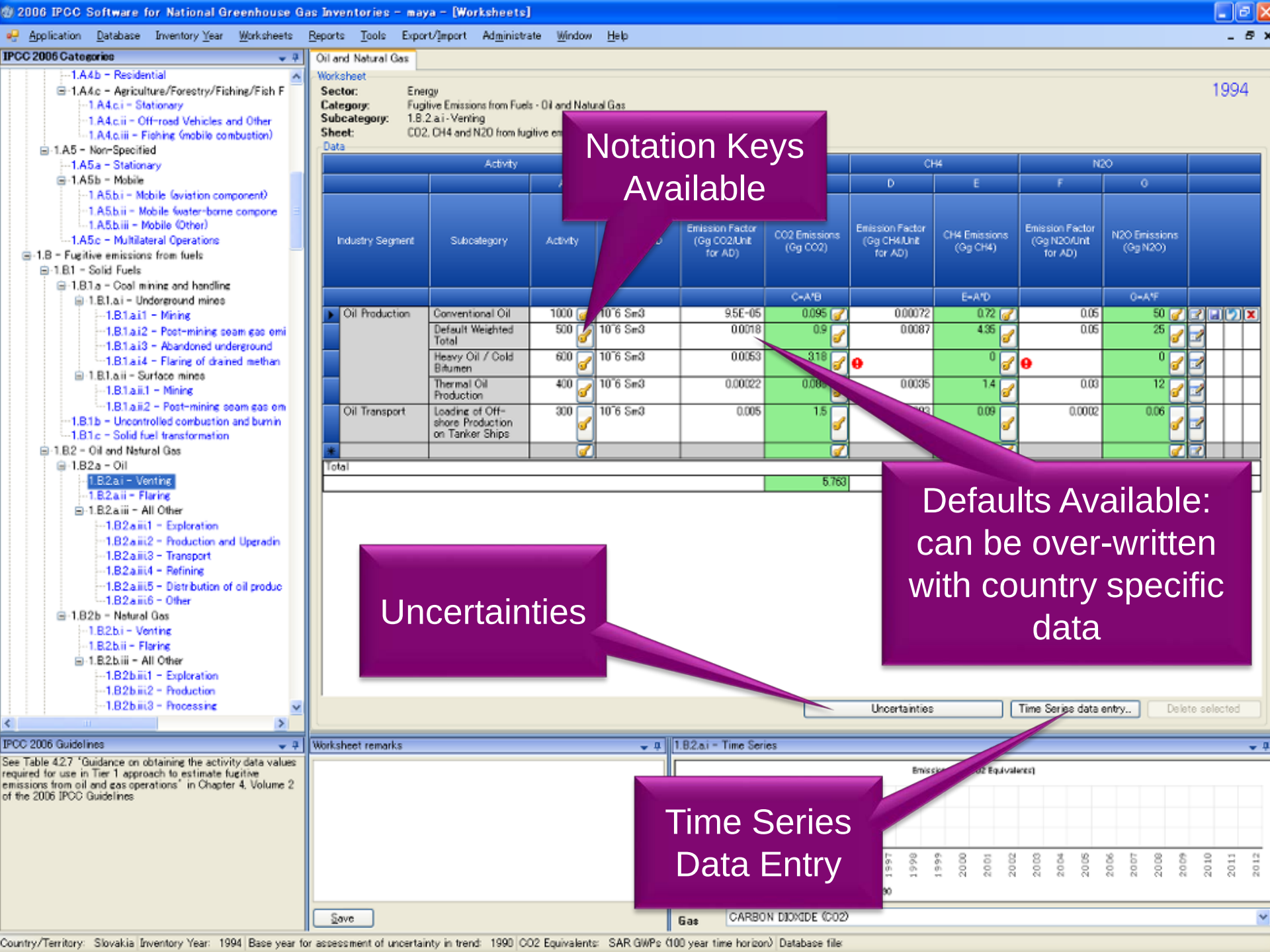
The IPCC Inventory Software can assist inventory compilers in using the IPCC Guidelines

- 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!

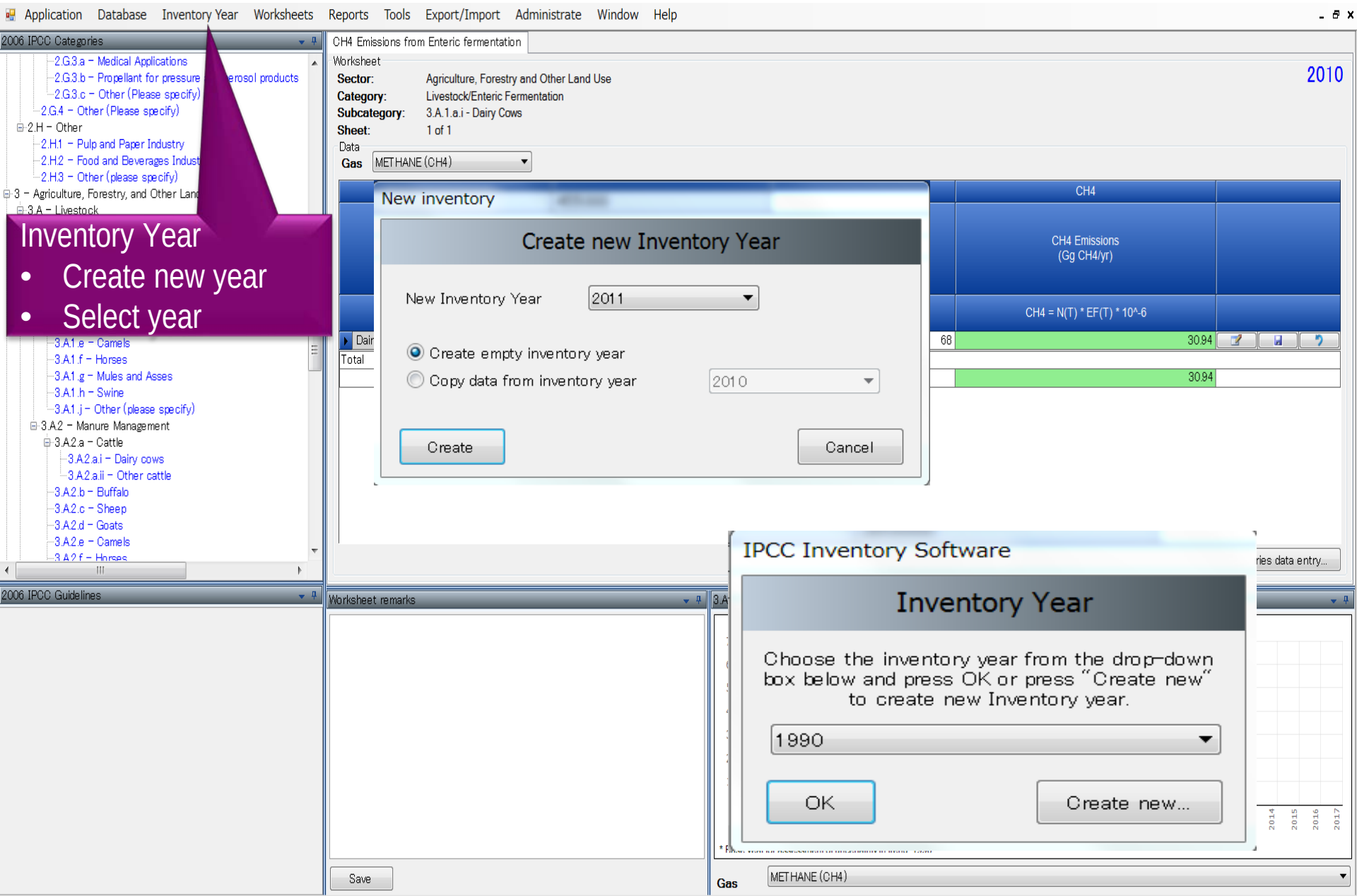
Software Functions




2006 IPCC Software for National Greenhouse Gas Inventories - maya - [Worksheets]
Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help
Main menu
Category: Energy
Hierarchical list of categories
Data Entry
Worksheet-based calculations follow 2006 Guidelines
Time Series Display
Status bar contains useful information e.g. country, inventory year
1 - Energy
1A - Fuel Combustion Activities
1.A1 - Energy Industries
1.A1.a - Main Activity Electricity and Heat P
1.A1.a.i - Electricity Generation
1.A1.a.ii - Combined Heat and Power Ge
1.A1.a.iii - Heat Plants
1.A1.b - Petroleum Refining
1.A1.c - Manufacture of Solid Fuels and Oth
1.A1.c.i - Manufacture of Solid Fuels
1.A1.c.ii - Other Energy Industries
1.A2 - Manufacturing Industries and Constructio
1.A2.a - Iron and Steel
1.A2.b - Non-Ferrous Metals
1.A2.c - Chemicals
1.A2.d - Pulp, Paper and Print
1.A2.e - Food Processing, Beverages and To
1.A2.f - Non-Metallic Minerals
1.A2.g - Transport Equipment
1.A2.h - Machinery
1.A2.i - Mining (excluding Quarrying
1.A2.j - Wood and wood products
1.A2.k - Construction
1.A2.l - Textile and Leather
1.A2.m - Non-specified
1.A3 - Transport
1.A3.a - Civil Aviation
1.A3.a.i - International
1.A3.a.ii - Domestic
1.A3.b - Road Transport
1.A3.b.i - Cars
1.A3.b.i.1 - Passenger cars with 3-wa
1.A3.b.i.2 - Passenger cars without 3
1.A3.b.ii - Light-duty trucks
1.A3.b.ii.1 - Light-duty trucks with 3-
1.A3.b.ii.2 - Light-duty trucks without
1.A3.b.iii - Heavy-duty trucks and buses
1.A3.b.iv - Motorcycles
Worksheet
Sector: Energy
Category: Fuel Combustion Activities
Subcategory: 1.A.1.a.i - Electricity Generation
Sheet: CO2, CH4 and N2O from fuel combustion by source catego
1994
Data
Fuel Type (All fuels)
Conversion Factor Type NCV GCV
(All fuels) Energy Consumption CO2 CH4 N2O
Fuel
A Consumption (Mass, Volume or Energy Unit)
Consumption Unit
B Conversion Factor (TJ/Unit) (NCV)
C Consumption (TJ) (C=A*B)
D CO2 Emission Factor (kg CO2/TJ)
Z Amount Captured (Gg CO2)
E CO2 Emissions (Gg CO2) E=C*D/10^6-Z
F CH4 Emission Factor (kg CH4/TJ)
G CH4 Emissions (Gg CH4) G=C*F/10^6
H N2O Emission Factor (kg N2O/TJ)
I N2O Emissions (Gg N2O) I=C*H/10^6
Anthracite 1000 Gg 26.7 26700 98300 26··· 1 0.0··· 1.5 0.04···
Coking Coal 2000 Gg 28.2 56400 94600 53··· 1 0.0··· 1.5 0.0846
Other Bitu··· 3000 Gg 25.8 77400 94600 73··· 1 0.0··· 2 0.1548
Sub-Bitumi··· 4000 Gg 18.9 75600 96100 72··· 1 0.0··· 1.5 0.1134
Lignite 5000 Gg 101000 500 55··· 1 0.0··· 1.5 0.09···
Oil Shale /··· 500 Gg 107000 47··· NE 0 1.5 0.00···
600 Gg 97500 12··· 1 0.0··· 1.5 0.01···
300 Gg 77000 63··· 3 0.0··· 0.6 0.00···
Gg
320720 303791 0.33277 0.51236
Save
1.A1.a.i - Time Series
Emissions (Gg CO2 Equivalents)
40000
30000
20000
10000
0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012
* Base year for assessment of uncertainty in trend: 1990
Gas CARBON DIOXIDE (CO2)
Country/Territory: Slovakia Inventory Year: 1994 Base year for assessment of uncertainty in trend: 1990 CO2 Equivalents: SAR GWPs (100 year time horizon) Database file:


2006 IPCC Software for National Greenhouse Gas Inventories – maya – [Worksheets]
Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help
IPCC 2006 Categories
1.A.4.b – Residential
1.A.4.c – Agriculture/Forestry/Fishing/Fish F
1.A.4.c.i – Stationary
1.A.4.c.ii – Off-road Vehicles and Other
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 compone
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 emi
1.B.1.a.i.3 – Abandoned underground
1.B.1.a.i.4 – Flaring of drained methan
1.B.1.a.ii – Surface mines
1.B.1.a.ii.1 – Mining
1.B.1.a.ii.2 – Post-mining seam gas em
1.B.1.b – Uncontrolled combustion and burnin
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 Upgradin
1.B.2.a.iii.3 – Transport
1.B.2.a.iii.4 – Refining
1.B.2.a.iii.5 – Distribution of oil produc
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
Oil and Natural Gas
Worksheet
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
Data
Activity
CH4
N2O
Industry Segment
Subcategory
Activity
Emission Factor (Gg CO2/Unit for AD)
CO2 Emissions (Gg CO2)
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 Sm3
9.5E-05
0.095
0.00072
0.72
0.05
50
Default Weighted Total
500
10^6 Sm3
0.0018
0.9
0.0087
4.35
0.05
25
Heavy Oil / Cold Bitumen
600
10^6 Sm3
0.0053
3.18
0
0
Thermal Oil Production
400
10^6 Sm3
0.00022
0.0035
1.4
0.03
12
Oil Transport
Loading of Off-shore Production on Tanker Ships
300
10^6 Sm3
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
Uncertainties
Time Series data entry...
Delete selected
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
Save
Gas
CARBON DIOXIDE (CO2)
Country/Territory: Slovakia
Inventory Year: 1994
Base year for assessment of uncertainty in trend: 1990
CO2 Equivalents: SAR GWPs (100 year time horizon)
Database file

Inventory Years

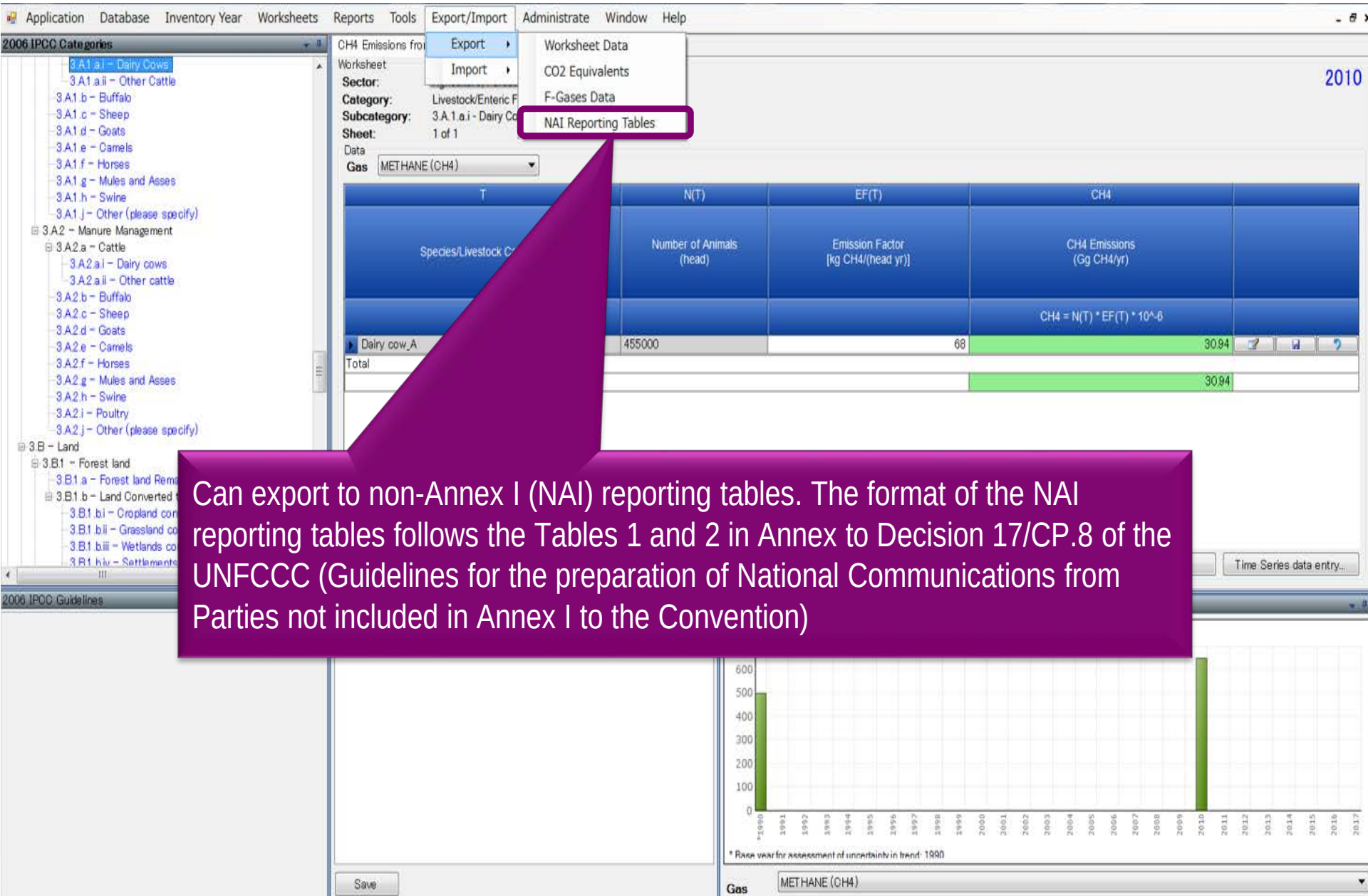


Reports

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

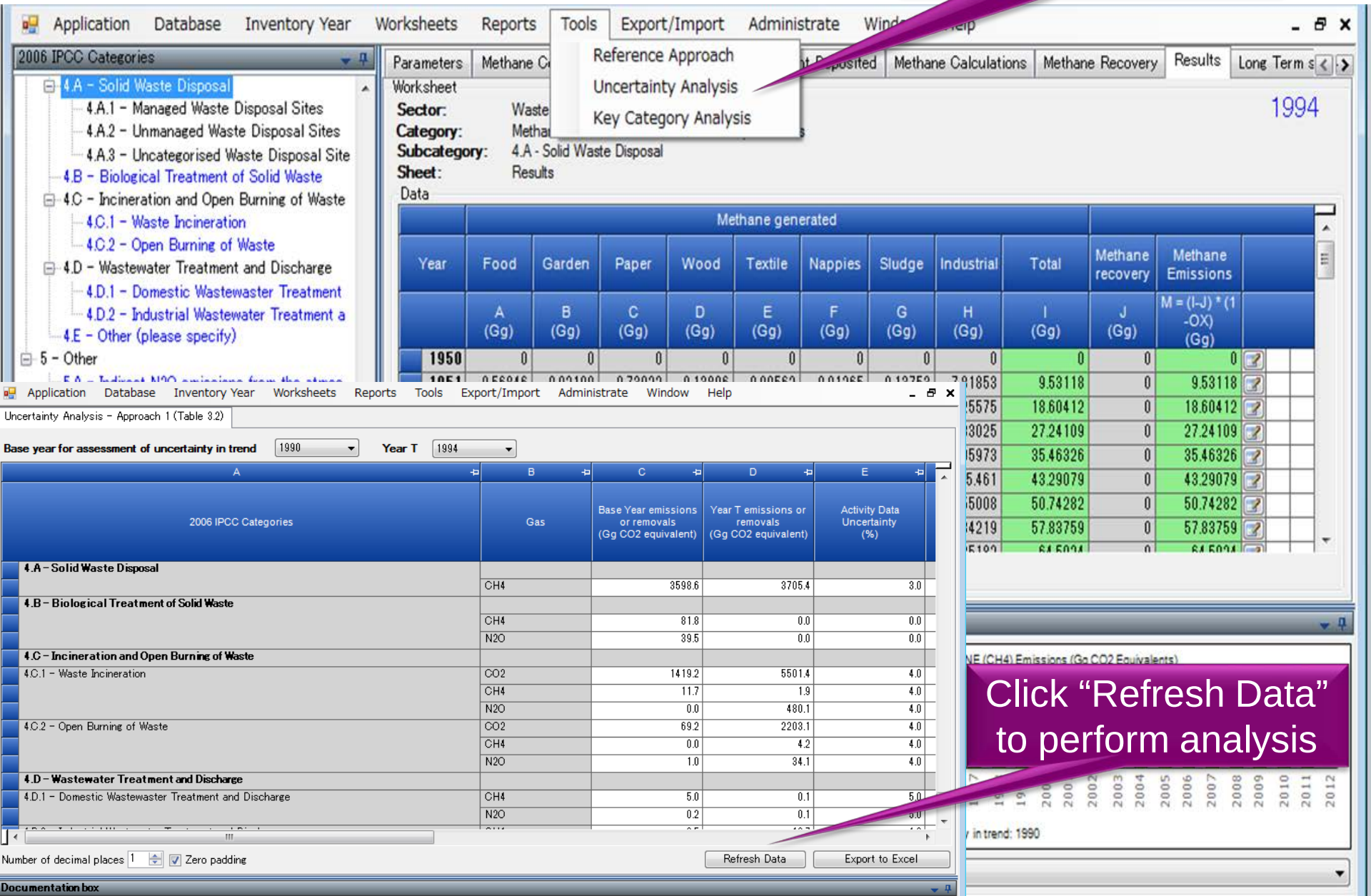
Note: *All reports can be exported as MS Excel file*

Reports


Application
Database
Inventory Year
Worksheets
Reports
Tools
Export/Import
Administrate
Window
Help
Export
Import
Worksheet Data
CO2 Equivalents
F-Gases Data
NAI Reporting Tables
2006 IPCC Categories
2010
Sector:
Category:
Subcategory:
Sheet:
1 of 1
Gas
METHANE (CH4)
Number of Animals (head)
Emission Factor [kg CH4/(head yr)]
CH4 Emissions (Gg CH4/yr)
CH4 = N(T) * EF(T) * 10^-6
Dairy cow_A
455000
68
30.94
Total
30.94
Time Series data entry...
2006 IPCC Guidelines
Save
Gas
METHANE (CH4)
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)

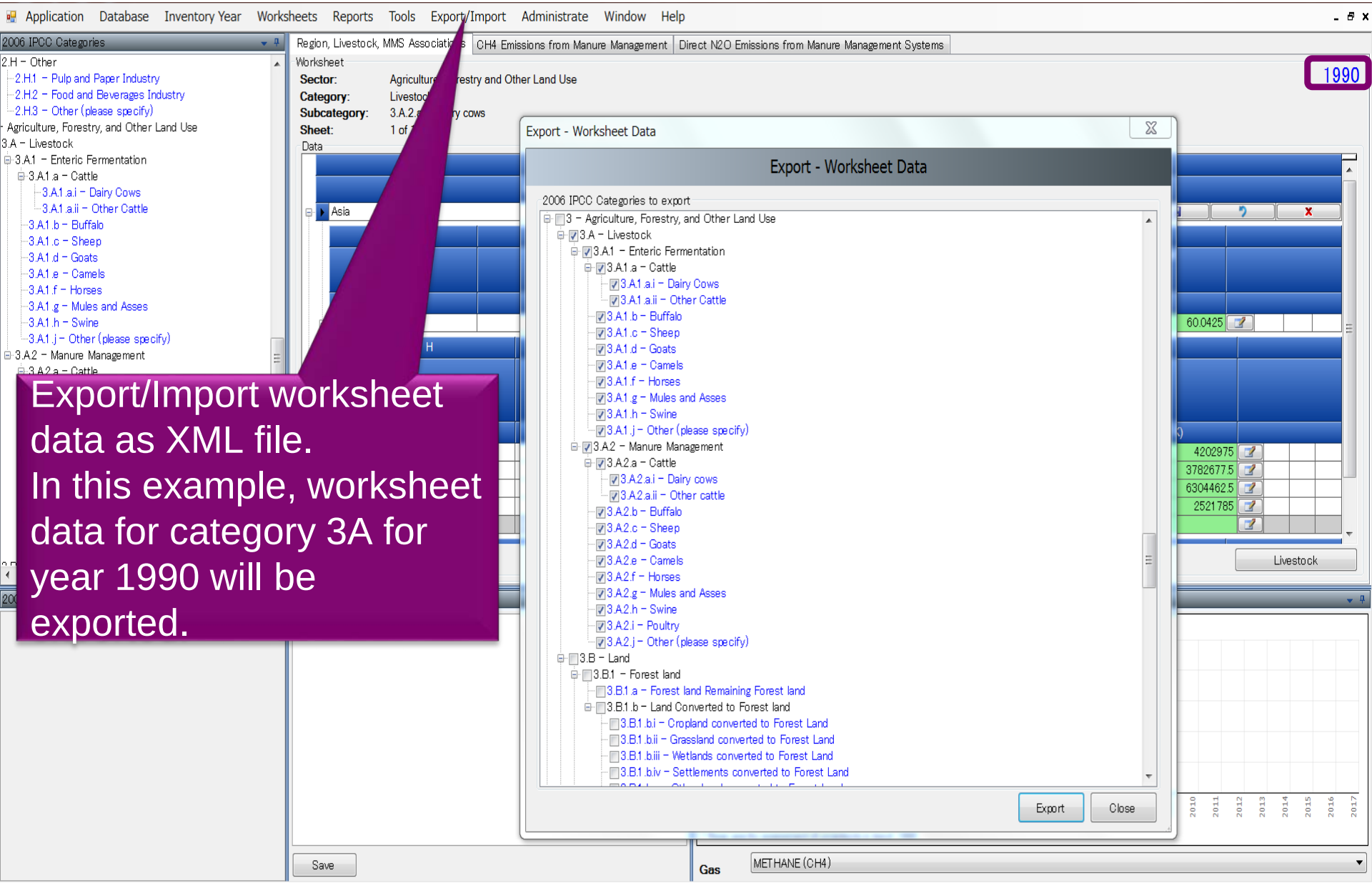
Tools

Click Tools – Uncertainty Analysis



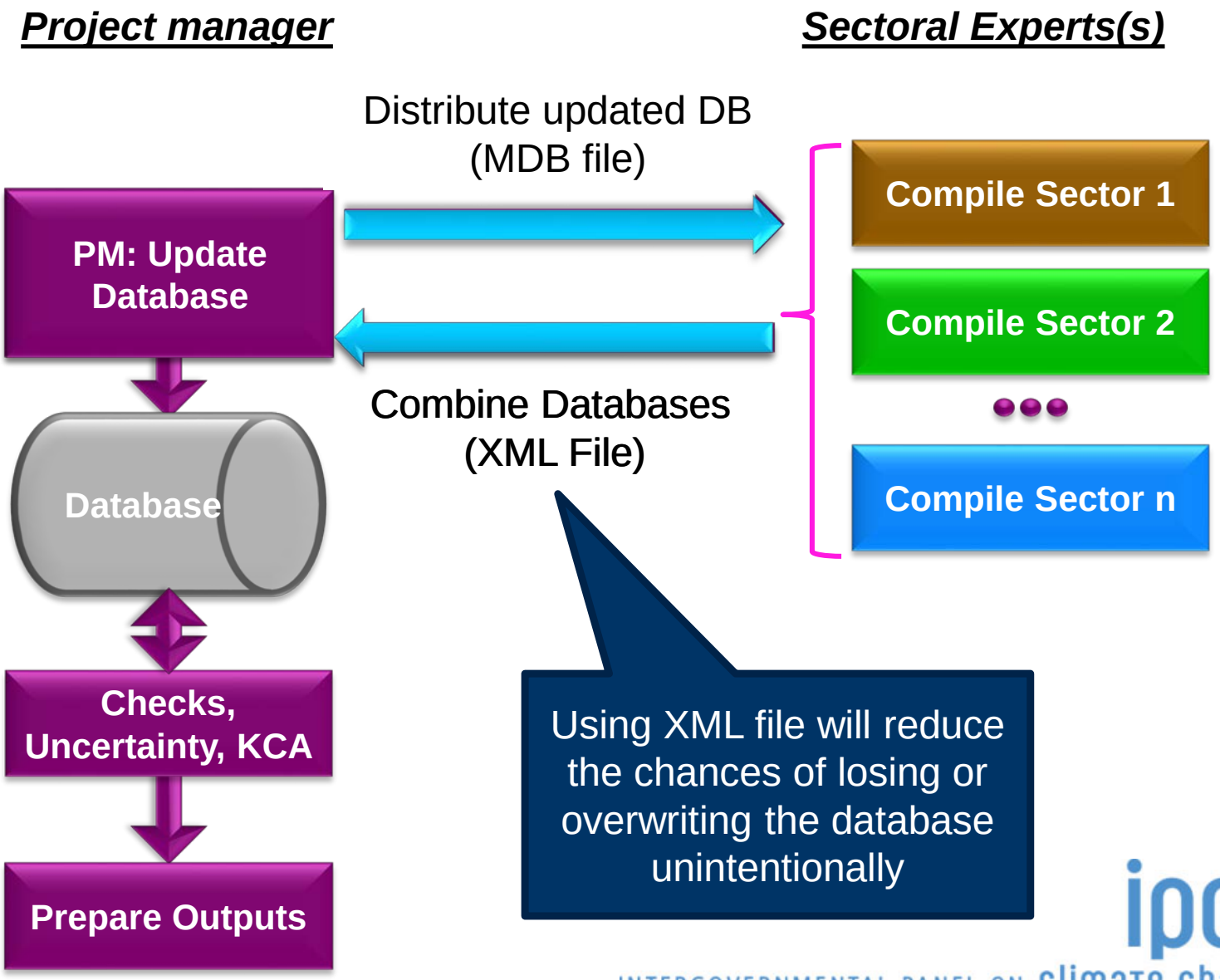
Click “Refresh Data” to perform analysis

Data Export and Import



Export/Import worksheet data as XML file.
In this example, worksheet data for category 3A for year 1990 will be exported.

Multiple Users



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

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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:

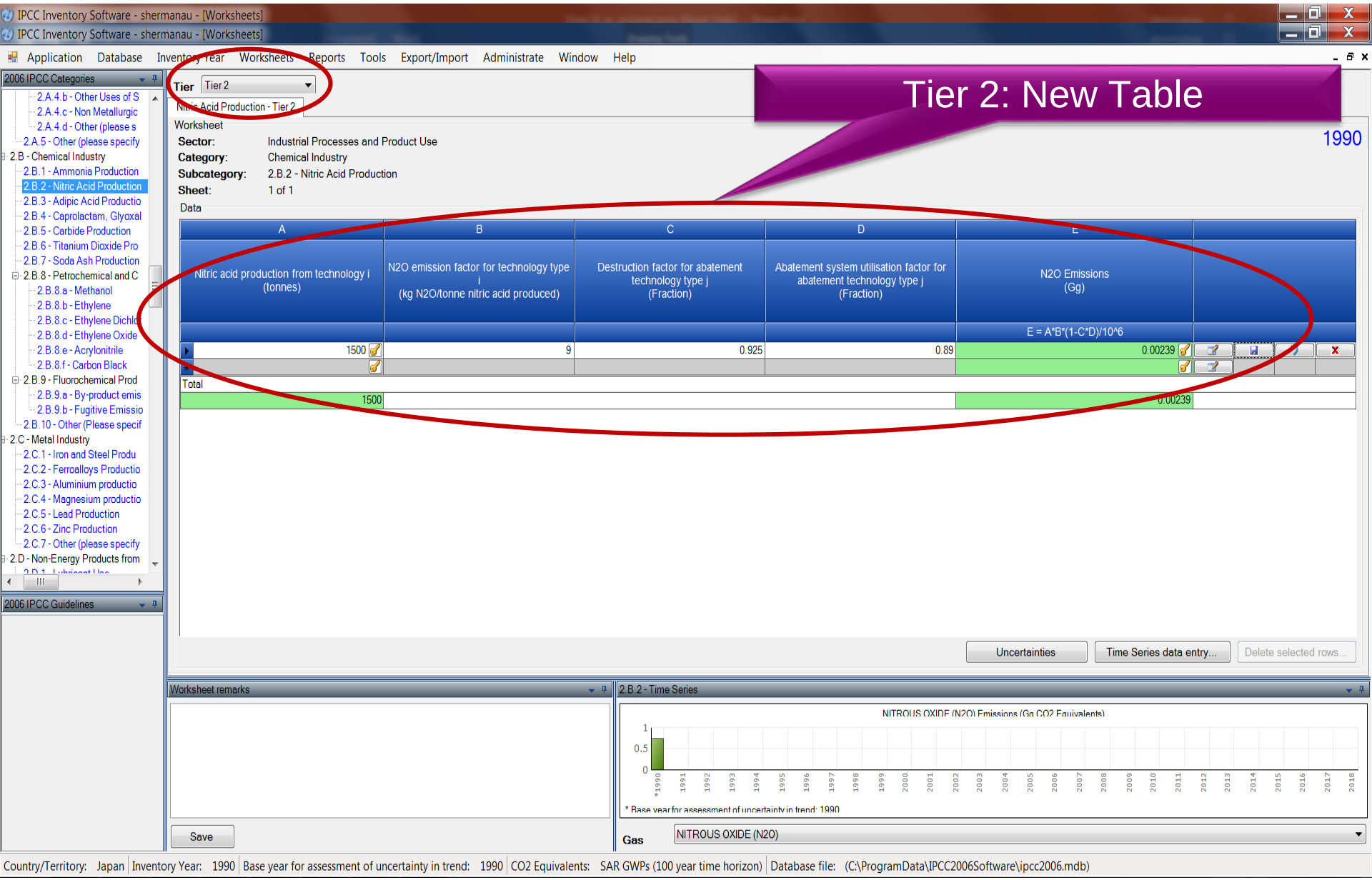
http://www.ipcc-nggip.iges.or.jp/software/index.html

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							
	1 - Energy 1.A - Fuel Combustion Activities 1.A.3 - Transport 1.A.3.a - Civil Aviation	CO2	CH4	N2O	HFCs	PFCs	SF6	NF3	Other
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

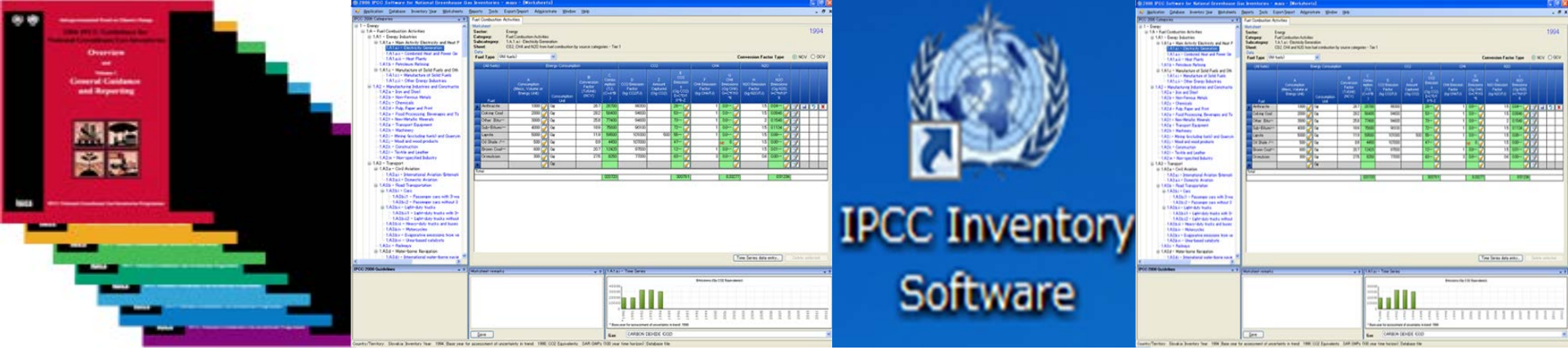

IPCC Inventory Software - shermanau - [Worksheets]
Application Database Inventory Year Worksheets Reports Tools Export/Import Administrate Window Help
Tier 2
Tier 2: New Table
Nitric Acid Production - Tier 2
Worksheet
Sector: Industrial Processes and Product Use
Category: Chemical Industry
Subcategory: 2.B.2 - Nitric Acid Production
Sheet: 1 of 1
1990
Data
A
Nitric acid production from technology i (tonnes)
B
N2O emission factor for technology type i (kg N2O/tonne nitric acid produced)
C
Destruction factor for abatement technology type j (Fraction)
D
Abatement system utilisation factor for abatement technology type j (Fraction)
E
N2O Emissions (Gg)
E = A*B*(1-C*D)/10^6
1500
9
0.925
0.89
0.00239
Total
1500
0.00239
Uncertainties
Time Series data entry...
Delete selected rows...
Worksheet remarks
Save
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)
2006 IPCC Categories
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.9 - Fluorochemical Prod
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
2006 IPCC Guidelines
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?

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