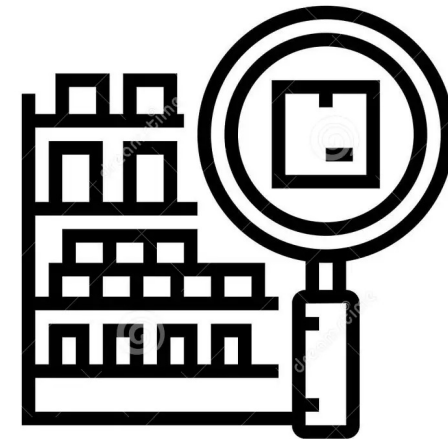




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# Training on 2006 IPCC Guidelines for preparing National GHG Inventory: Energy and Waste Sector

Introduction to the tools and software  
available for facilitating reporting



**Present By:**

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*Organized by the Capacity Building Initiative for  
Transparency  
Global Support Programme (CBIT-GSP)*

**ipcc**  
INTERGOVERNMENTAL PANEL ON climate change



# National GHG Inventory can be prepared by using

## IPCC Inventory Software

- 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 utilize the improvements in the methodologies and default values since 1996
- The IPCC launched the IPCC Inventory Software in 2012
- Supported by the UNFCCC secretariat and the Technical Support Unit of the IPCC Task Force on National Greenhouse Gas Inventories.
- The latest officially published version is available from: <http://www.ipcc-nggip.iges.or.jp/software/index.html>

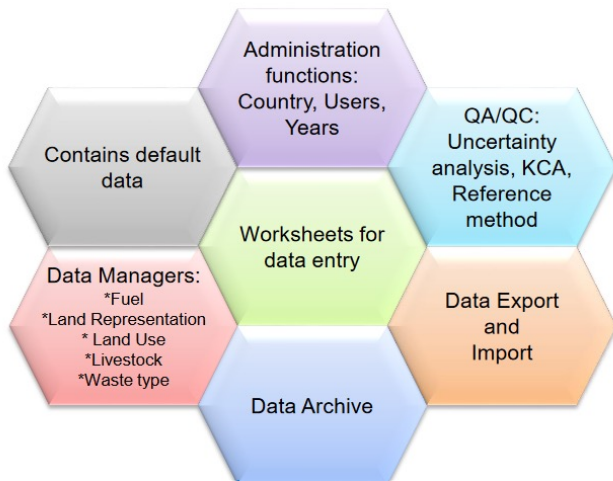
# IPCC Software

## 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
- Includes uncertainty and key category analysis
- Aids QA/QC
- Outputs in non-annex I national communications format
- **Free!**

# IPCC Inventory Software

## Architecture



The screenshot displays the software interface for the year 2006. The left pane shows a tree view of IPCC categories, with "1.B.1.a.i.1 - Mining" selected. The right pane shows the "Worksheet" for "Coal production from underground mines" for the year 2020. The worksheet includes a table for data entry:

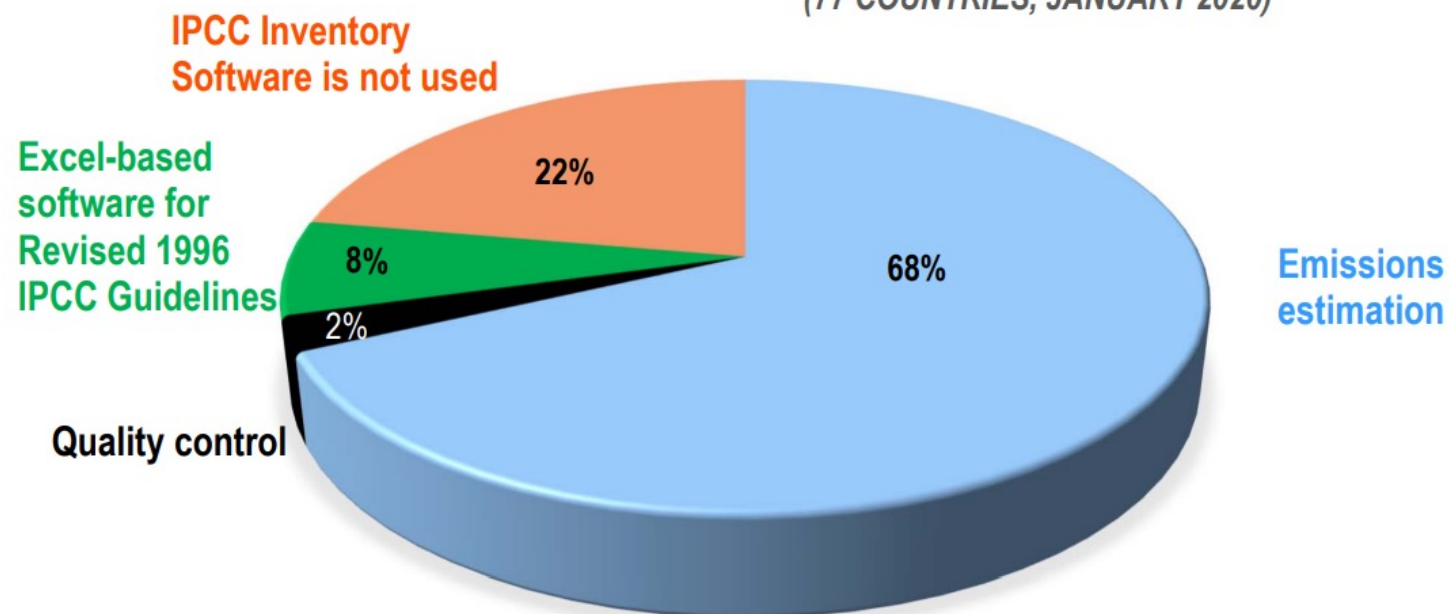
Equation 4.1.3			
Subdivision	Amount of Coal Produced (tonne)		
S	CP		
Total		0	

The interface also includes a menu bar (Application, Database, Inventory Year, Administrate, Worksheets, Tools, Export/Import, Reports, Window, Help) and a status bar with "Time Series data entry...".

# Use of the IPCC Software by Developing Countries



STATISTICS IS BASED ON QUESTIONNAIRES  
AND OTHER INFORMATION  
(77 COUNTRIES, JANUARY 2020)



# New Features of IPCC Inventory Software



IPCC Inventory Software was first released in 2012. Initially, it was designed to be a simple tool implementing only Tier 1 methods according to the 2006 IPCC Guidelines

The latest version, 2.901, has been released on February 14, 2024

- ✓ All Methodological Tiers and approaches according to the 2006 IPCC Guidelines,
- ✓ Calculation of Indirect CO<sub>2</sub> and N<sub>2</sub>O emissions according to the 2006 IPCC Guidelines and its 2019 Refinement
- ✓ Interoperability functionality with the UNFCCC CRT Reporting tool (Energy Sector, Waste sector, Agriculture categories)

## More Features of IPCC Inventory Software

- Allows for each source/sink to use either a **single methodological Tier or a mix of Tiers**
- Allows, in each equation, to **input user-specific values for EFs and parameters**
- Allows different categories/sectors to be developed simultaneously
- Implements **AR5 GWP<sub>100</sub>** values (and allows any other user-specific metric to be applied)
- Stores the **entire set of information of National GHG Inventory within a single database**

# Interface of the IPCC Tool



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**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**

Fuel	Energy Consumption		CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O	
	A Consumption (Mass, Volume or Energy Unit)	B Conversion Factor (TJ/Unit) (NCV)	C Consumption (TJ) (CVA/B)	D CO <sub>2</sub> Emission Factor (kg CO <sub>2</sub> /TJ)	E Amount Captured (Gg CO <sub>2</sub> )	F CO <sub>2</sub> Emission Factor (Gg CO <sub>2</sub> /TJ)	G CH <sub>4</sub> Emission Factor (kg CH <sub>4</sub> /TJ)	H N <sub>2</sub> O Emission Factor (kg N <sub>2</sub> O/TJ)
Anthracite	1000	Ge	267	26700	96300	26***	1	0.0***
Coking Coal	2000	Ge	262	56400	94600	53***	1	0.0***
Other Bitum*	3000	Ge	258	77400	94600	79***	1	0.0***
Sub-Bitumi**	4000	Ge	189	75600	96100	72***	1	0.0***
Lignite	5000	Ge	110	55000	101000	55***	1	0.0***
Wood	500	Ge	47	107000	107000	47***	1	0.0***
Construction	600	Ge	12	97500	97500	12***	1	0.0***
Textile	300	Ge	7	70000	70000	69***	3	0.0***
			320720			303791		0.39277
								0.51296

Country/Territory: Slovakia Inventory Year: 1994 Base year for assessment of uncertainty in trend: 1990 CO<sub>2</sub> 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.A4b - Residential
- 1.A4c - Agriculture/Forestry/Fishing/Fish F
- 1.A4c.i - Stationary
- 1.A4c.ii - Off-road Vehicles and Other
- 1.A4c.iii - Fishing (mobile combustion)
- 1.A5 - Non-Specified
- 1.A5a - Stationary
- 1.A5b - Mobile
- 1.A5b.i - Mobile (system component)
- 1.A5b.ii - Mobile (water-borne compone
- 1.A5b.iii - Mobile (Other)
- 1.A5c - Multilateral Operations
- 1.B - Fugitive emissions from fuels
- 1.B1 - Solid Fuels
- 1.B1a - Coal mining and handling
- 1.B1a.i - Underground mines
- 1.B1a.i.1 - Mining
- 1.B1a.i.2 - Post-mining seam gas emi
- 1.B1a.i.3 - Abandoned underground
- 1.B1a.i.4 - Flaring of drained methan
- 1.B1a.ii - Surface mines
- 1.B1a.ii.1 - Mining
- 1.B1a.ii.2 - Post-mining seam gas em
- 1.B1b - Uncontrolled combustion and burnin
- 1.B1c - Solid fuel transformation
- 1.B2 - Oil and Natural Gas
- 1.B2a - Oil
- 1.B2a.i - Venting
- 1.B2a.ii - Flaring
- 1.B2a.iii - All Other
- 1.B2a.iii.1 - Exploration
- 1.B2a.iii.2 - Production and Operatin
- 1.B2a.iii.3 - Transport
- 1.B2a.iii.4 - Refining
- 1.B2a.iii.5 - Distribution of oil produ
- 1.B2a.iii.6 - Other
- 1.B2b - Natural Gas
- 1.B2b.i - Venting
- 1.B2b.ii - Flaring
- 1.B2b.iii - All Other
- 1.B2b.iii.1 - Exploration
- 1.B2b.iii.2 - Production
- 1.B2b.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 emissions  
Data

1994

Industry Segment	Subcategory	Activity	Unit	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)
Oil Production	Conventional Oil	1000	10 <sup>6</sup> Sm <sup>3</sup>	95E-05	0.095	0.00072	0.72	0.05	50
	Default Weighted Total	500	10 <sup>6</sup> Sm <sup>3</sup>	0.0078	0.9	0.0087	4.36	0.05	25
	Heavy Oil / Cold Bitumen	600	10 <sup>6</sup> Sm <sup>3</sup>	0.0053	0.32	0.00005	0	0.00005	0
	Thermal Oil Production	400	10 <sup>6</sup> Sm <sup>3</sup>	0.00022	0.088	0.00025	1.4	0.00025	12
Oil Transport	Loading of Off-shore Production on Tanker Ships	300	10 <sup>6</sup> Sm <sup>3</sup>	0.005	1.5	0.00002	0.0002	0.00002	0.06
Total					5.763				

Notation Keys Available

Uncertainties

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

Time Series Data Entry

IPCC 2006 Guidelines

Worksheet remarks

1.B2.a.i - Time Series

Emissions (Gg CO2 equivalent)

1994

Country/Territory: Slovakia Inventory Year: 1994 Base year for assessment of uncertainty in trend: 1990 CO2 Equivalent

# Reports



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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*

# Non-Annex I Reporting Table



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- **The IPCC Inventory Software follows the format of Tables in Annex to Decision 17/CP.8 (*Guidelines for the preparation of National Communications from Parties not included in Annex I to the Convention*)**
  
- **Main Menu**
  - **Export/Import**
  - **NAI Reporting Tables**

# Non-Annex I Reporting Table



IPCC Inventory Software - maya - [NAI Reporting Tables]

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

NAI Reporting Table 1

Greenhouse gas source and sink categories	Net CO2 (Gg)	CH4 (Gg)	N2O (Gg)	CO Gg	NOx (Gg)	NMVOCs (Gg)	SOx (Gg)
<b>Total National Emissions and Removals</b>	55610.001	4680.209	15.494	1.249	0.000	0.000	0.000
<b>1 - Energy</b>	306.136	505.375	2.268	0.000	0.000	0.000	0.000
<b>1A - Fuel Combustion Activities</b>	44029.577	12.634	2.268	0.000	0.000	0.000	0.000
1A1 - Manufacturing Industries and Construction	98.655	0.379	0.326	0.000	0.000	0.000	0.000
1A2 - Residential	37.813	1.246	0.166	0.000	0.000	0.000	0.000
1A3 - International Aviation and Shipping	11.010	11.010	1.777	0.000	0.000	0.000	0.000
1A4 - Other Sectors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1A5 - Other	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>1B - Fugitive Emissions from Fuels</b>	6556.559	492.740	0.000	0.000	0.000	0.000	0.000
1B1 - Solid Fuels	6500.004	480.009	0.000	0.000	0.000	0.000	0.000
1B2 - Oil and Natural Gas	56.555	12.731	0.000	0.000	0.000	0.000	0.000
<b>2 - Industrial Processes</b>	1298.264	0.522	1.416	0.000	0.000	0.000	0.000
2A - Mineral Products	8.935	0.000	0.000	0.000	0.000	0.000	0.000
2B - Chemical Industry	78.678	0.508	1.416	0.000	0.000	0.000	0.000
2C - Metal Production	241.461	0.014	0.000	0.000	0.000	0.000	0.000
2D - Other Production	0.000	0.000		0.000	0.000	0.000	0.000
2E - Production of Halocarbons and Sulphur Hexafluoride				0.000	0.000	0.000	0.000
2F - Consumption of Halocarbons and Sulphur Hexafluoride	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2G - Other (please specify)	969.191	0.000	0.000	0.000	0.000	0.000	0.000
<b>3 - Solvent and Other Product Use</b>	0.000	0.000	9.201	0.000	0.000	0.000	0.000
<b>4 - Agriculture</b>		0.216	0.000	1.249	0.000	0.000	0.000
4A - Enteric Fermentation		0.134		0.000	0.000	0.000	0.000
4B - Manure Management		0.037	0.000	0.000	0.000	0.000	0.000
4C - Rice Cultivation		0.000		0.000	0.000	0.000	0.000
4D - Agricultural Soils			0.000	0.000	0.000	0.000	0.000
4E - Prescribed Burning of Savannas		0.000	0.000	0.000	0.000	0.000	0.000

Number of decimal places: 3  Zero padding

Export to Excel

Documentation box

Save

Country/Territory: Slovakia | Inventory Year: 1991 | Base year for assessment of uncertainty in trend: 1990 | CO2 Equivalents: SAR GWPs (100 year time horizon)

Reference: UNFCCC CGE Training material

# Tools



- **Uncertainty analysis**
- **Key category analysis**

**When all values are entered in the worksheet for each sector, these analysis can be performed by following steps:**

## **Main Menu**

→ **Export/Import**

→ **Uncertainty Analysis**

**or Key Category Analysis**

✓ ***click “Refresh” button***

# Tools



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**Click Tools – Uncertainty Analysis**

Year	Methane generated									Methane recovery (Gg)	Methane Emissions (Gg)
	Food (Gg)	Garden (Gg)	Paper (Gg)	Wood (Gg)	Textile (Gg)	Nappies (Gg)	Sludge (Gg)	Industrial (Gg)	Total (Gg)		
1950	0	0	0	0	0	0	0	0	0	0	0
1951	0.56846	0.02109	0.73922	0.13806	0.09562	0.01265	0.13753	7.81853	9.53118	0	9.53118
1952	1.10382	0.04115	1.44946	0.27339	0.1875	0.02469	0.26836	15.25575	18.60412	0	18.60412
1953	1.608	0.06023	2.13185	0.40604	0.27577	0.03614	0.3928	22.33025	27.24109	0	27.24109
1954	2.08282	0.07838	2.78748	0.53607	0.36058	0.04703	0.51118	29.05973	35.46326	0	35.46326
1955	2.52998	0.09565	3.4174	0.66352	0.44207	0.05739	0.62378	35.461	43.29079	0	43.29079
1956	2.95111	0.11207	4.02263	0.78844	0.52036	0.06724	0.73089	41.55008	50.74282	0	50.74282
1957	3.34771	0.12769	4.60412	0.91089	0.59558	0.07662	0.83278	47.34219	57.83759	0	57.83759
1958	3.73139	0.14255	5.18991	1.03009	0.66705	0.08559	0.93007	50.95109	64.5004	0	64.5004

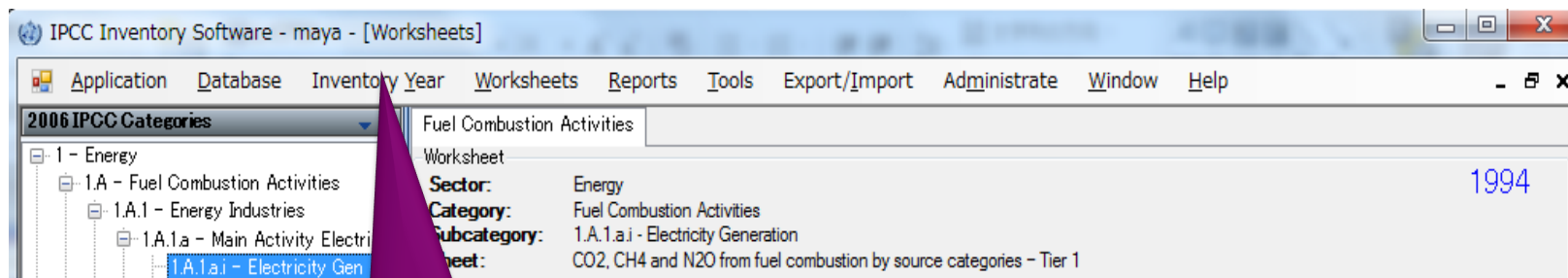
**Click “Refresh Data” to perform analysis**

Reference: UNFCCC CGE Training material

# Other basic operations - Year

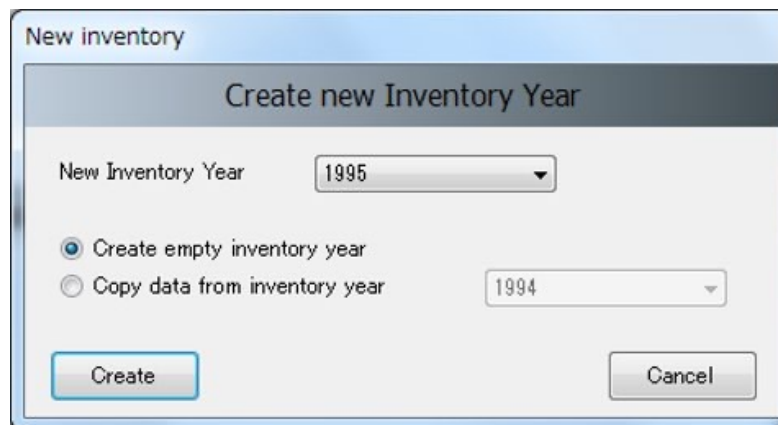


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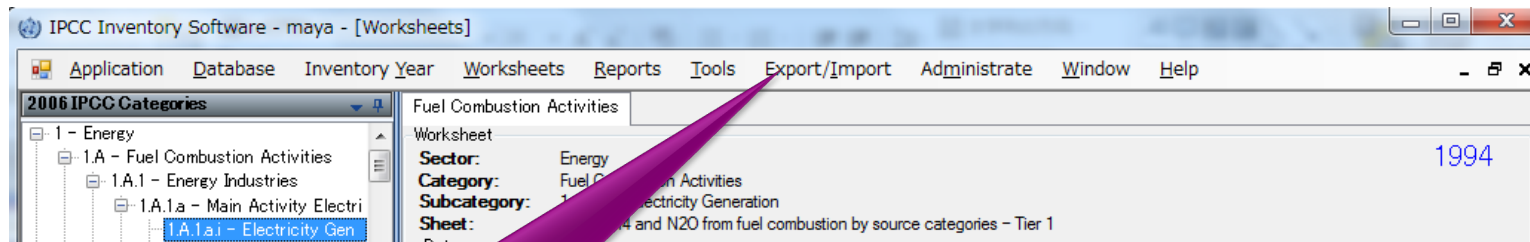
## Inventory Year

- Create New year
- Select year



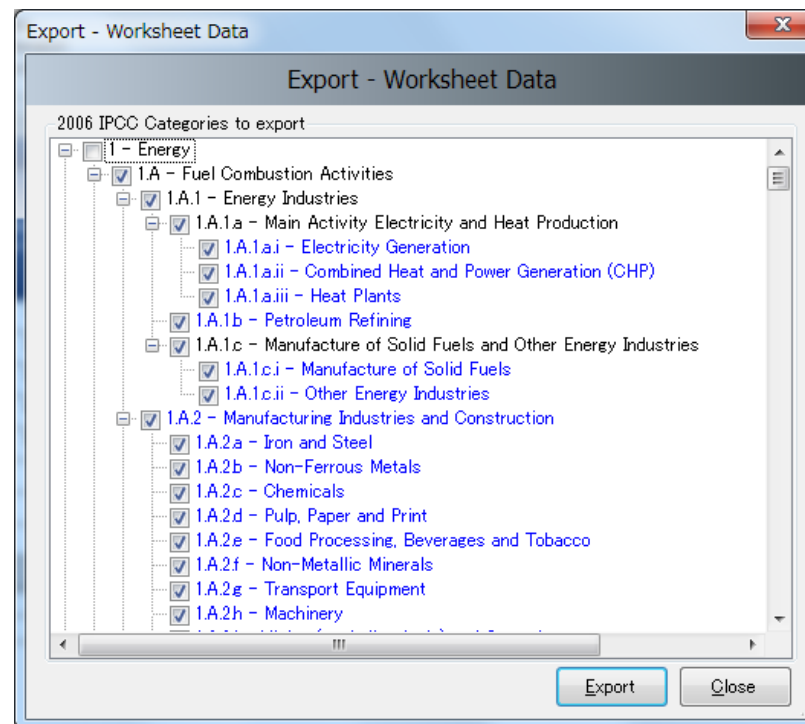
Reference: UNFCCC CGE Training material

# Other basic operations - Export



Export/Import worksheet data as XML file format.

In this example, Worksheet data for category 1A for year 1994 will be exported.





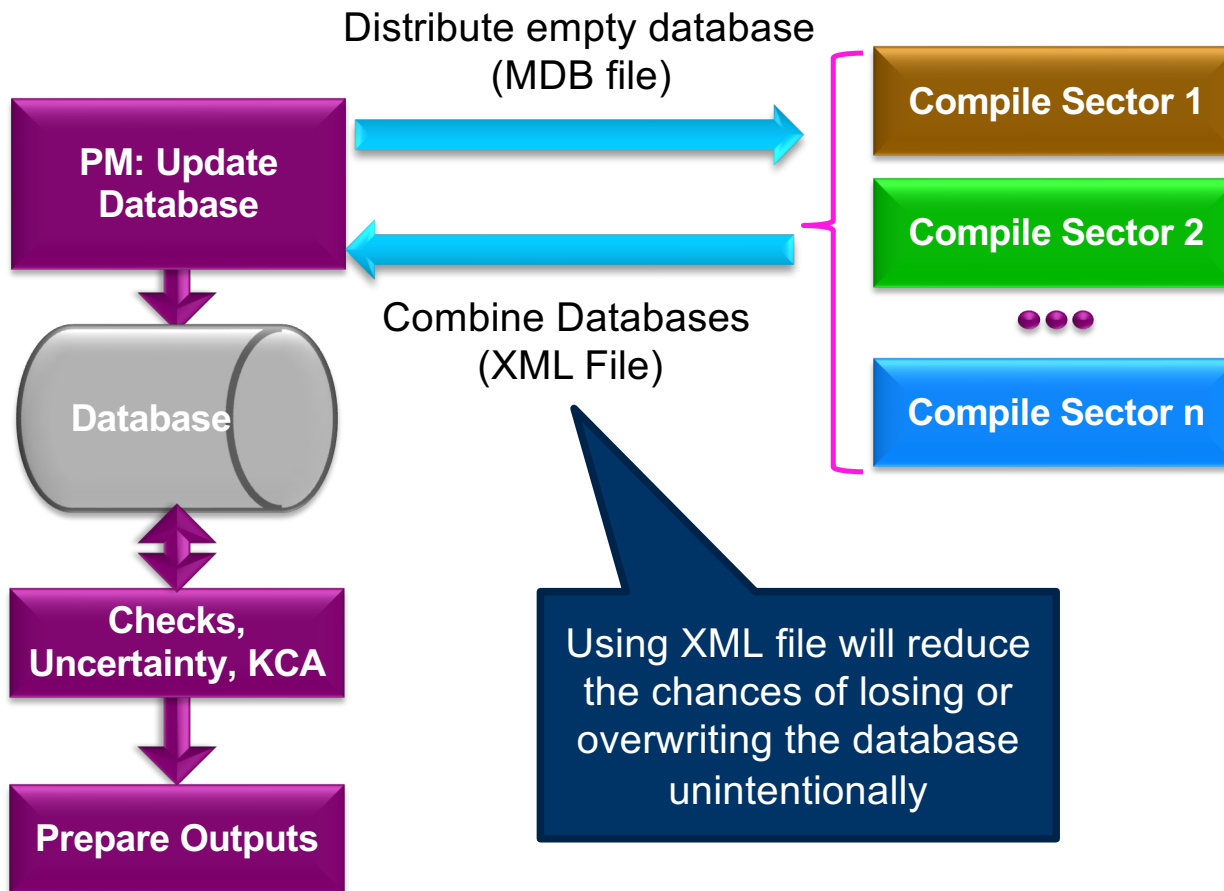
# Multiple Users



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## Project manager

## Sectoral Experts(s)



Reference: UNFCCC CGE Training material

# Support



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- **The TSU is supporting the IPCC Inventory Software:**

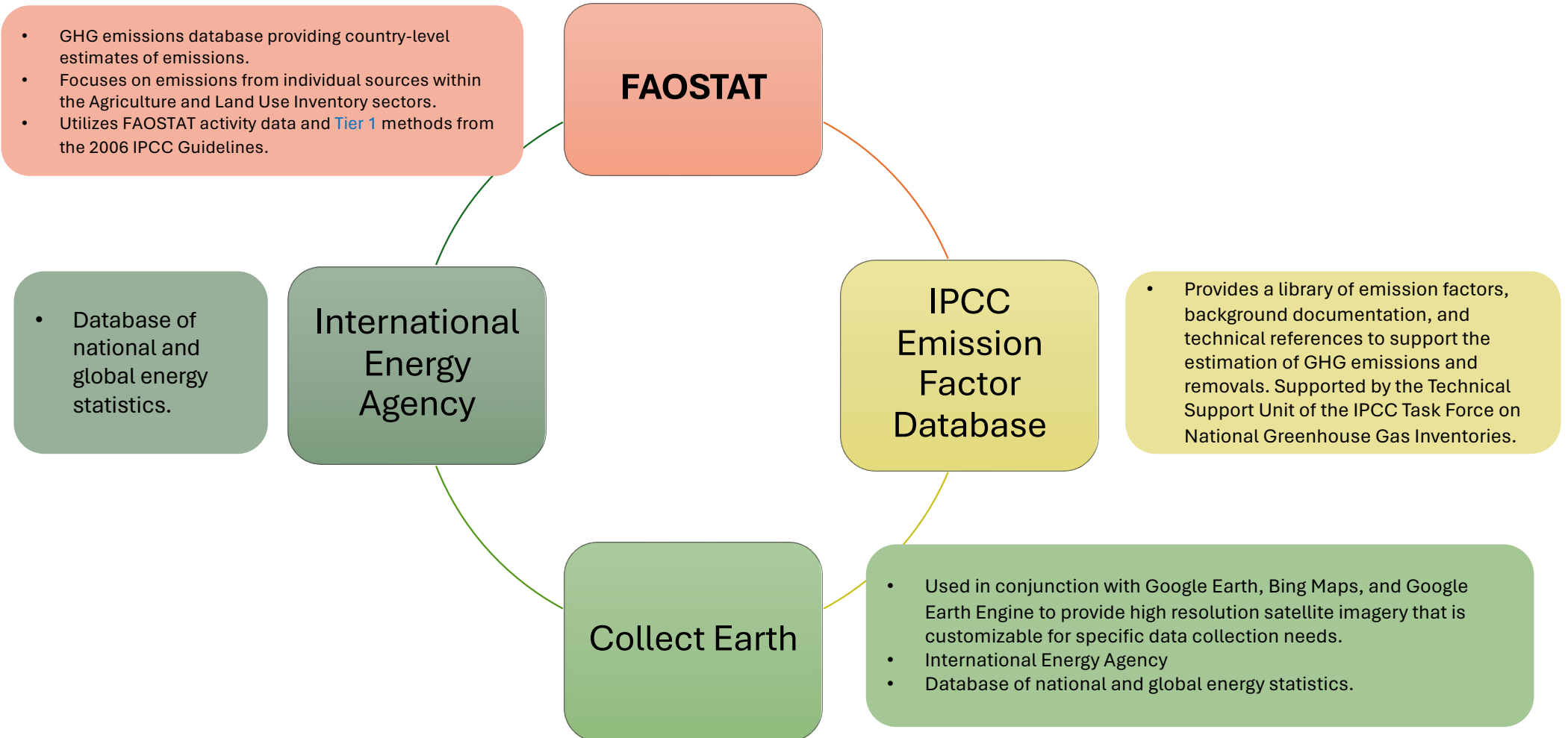
- Help Desk E-mail: [ipcc-software@iges.or.jp](mailto:ipcc-software@iges.or.jp)
- Web Forum: <https://discussions.zoho.com/ipccinventorysoftware/>

- ✓ *please, read the User Manual*

- **TSU will maintain the IPCC Inventory Software and is planning to implement the following:**

- Tier 2 methods
  - ✓ from Version 2.54, the Software implements Tier 2 methods in the 2006 IPCC Guidelines for most categories under Energy, IPPU and Waste Sectors
  - ✓ Livestock categories are under development
- Wetlands Supplement

# Various Tools – Inventory Supporting Materials



# Various Tools

## Municipal officials in South Africa

GHG Emission Inventory Tool



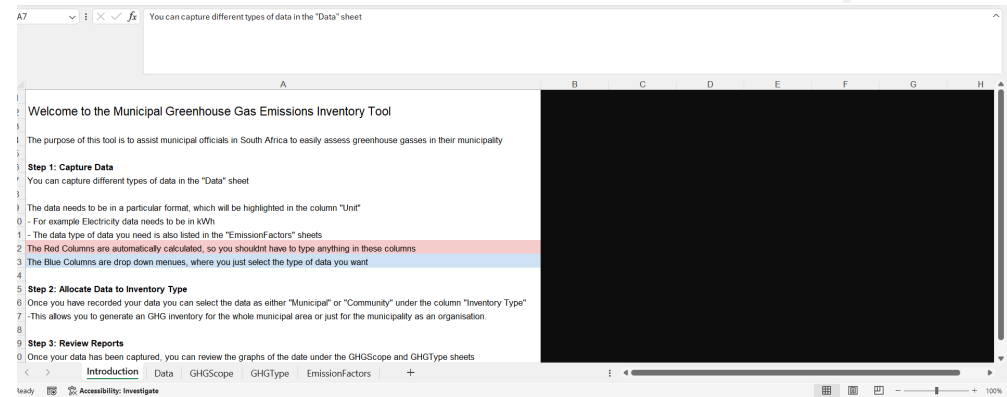
Designed for

Province or municipality



Simplified Municipal GHG Reporting Tool was provided with an Excel

<https://letsrespondtoolkit.org/resources/ghg-inventory-tool/>



# Various Tools



## City Inventory Reporting and Information System (CIRIS) - C40 Cities

Easy-to-use Excel-based tool for managing, calculating and reporting city greenhouse gas emissions inventory data.

CIRIS provides a systematic and templated way for cities to input information and use it for a variety of processes.

It is based on the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) standard, and facilitates a transparent calculation and reporting of emissions for all sectors:

- Stationary energy (buildings).
- Transportation.
- Waste.
- Industrial processes and product use (IPPU).
- Agriculture, forestry and other land use (AFOLU).

[https://www.c40knowledgehub.org/s/article/City-Inventory-Reporting-and-Information-System-CIRIS?language=en\\_US](https://www.c40knowledgehub.org/s/article/City-Inventory-Reporting-and-Information-System-CIRIS?language=en_US)





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