



# IPCC Inventory Software

## Demonstration using IPCC Software for CRT Reporting

Training on Preparation and Submissions of National Inventory Reports under the ETF of the Paris Agreement

IPCC TFI TSU  
Bogota, 25 July 2024

**ipcc**  
INTERGOVERNMENTAL PANEL ON climate change



# The IPCC Inventory Software

## Complete



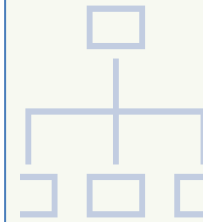
**All IPCC methods** (*all Tiers*)  
and all IPCC approaches



**All sectors and categories of the  
National GHG Inventory**




**Automatically implements  
AR5 GWP100 values**  
(and allows any other user-specific metric  
to be applied)



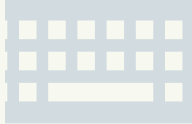
**Cross-cutting elements**  
(*Uncertainty Analysis*  
*Key Category Analysis*)

# The IPCC Inventory Software

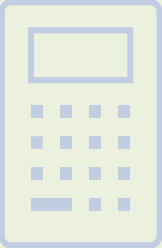
## Easy to Use



Prepare an inventory using IPCC default methods with minimal efforts



All IPCC defaults at your fingertips



**Avoids methodological and calculation errors**



**Data Managers facilitate data entry**  
*(Fuels, Solid Waste, F-gases, Livestock, Land Representation, Land Use)*



**Have NGHGI estimates ready for Paris Agreement reporting**

# The IPCC Inventory Software

## Pivotal for National GHG Inventory (NGHGI) Preparation

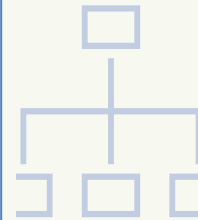


### Adaptable to national circumstances

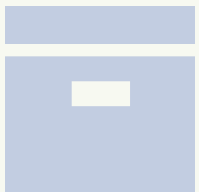
- Allows subnational level of reporting
- Use multiple tiers across inventory, even within a category
- Apply your own country-specific values wherever available



**Organizing framework for data collection among national entities**



**Multiple experts in your country can work on different categories/sectors simultaneously**



**Establishes a single archive, in-country, to help you build for the future**



**Confidence that your inventory is consistent with the 2006 IPCC Guidelines & UNFCCC requirements**

# Available resources

- ✓ **The 2006 IPCC Guidelines for National GHG Inventories**
  - The *Software* is a tremendous tool to prepare a GHG inventory, *although does not replace knowledge of the 2006 IPCC Guidelines.*
- ✓ **The *Software* Users' Guidebooks**
  - Integrated guides for the IPCC Guidelines & the *Software* :
    - Guides currently available for
      - General Software User Manual
      - Energy Sector
      - Livestock Categories 3.A.
      - Land Representation
      - UNFCCC Interoperability – CRT Export Quick Start Guide
    - Other sector-based Guidebooks under development
- ✓ **IPCC TFI TSU Support @ [ipcc-software@iges.or.jp](mailto:ipcc-software@iges.or.jp)**



Available at: <https://www.ipcc-ngqip.iges.or.jp/software/index.html>

# IPCC Inventory Software & Paris Agreement Reporting

## International reporting requirements

- ✓ Countries to submit a biennial transparency report (BTR), including a national GHG inventory, and its common reporting tables (CRTs).
- ✓ Reporting must follow the Modalities, Procedures and Guidelines (MPGs) (decision 18/CMA.1), and so be based on the [2006 IPCC Guidelines](#).

## IPCC Inventory Software as a Tool

- ✓ Decision 5/CMA.3 mandates the UNFCCC to develop reporting tools, including for CRTs for GHG inventory.
- ✓ Decision 5/CMA.3 requests the UNFCCC secretariat to facilitate **interoperability** between the reporting tool and the IPCC Inventory Software and invites the IPCC to cooperate.

# Use NGHGI from *Software* for Paris Agreement Reporting

## IPCC Inventory Software

### 1. Prepare GHG Inventory in IPCC Software

- ✓ Estimate GHG emissions consistent with IPCC Guidelines
  - ✓ Reduce errors
- ✓ Supports national institutional arrangements



### 2. Review Visualized CRTs

- ✓ Review results; if necessary, go back to calculation worksheets
  - ✓ Finalize notation keys for reporting
- ✓ Incorporate information needed for reporting in the CRT



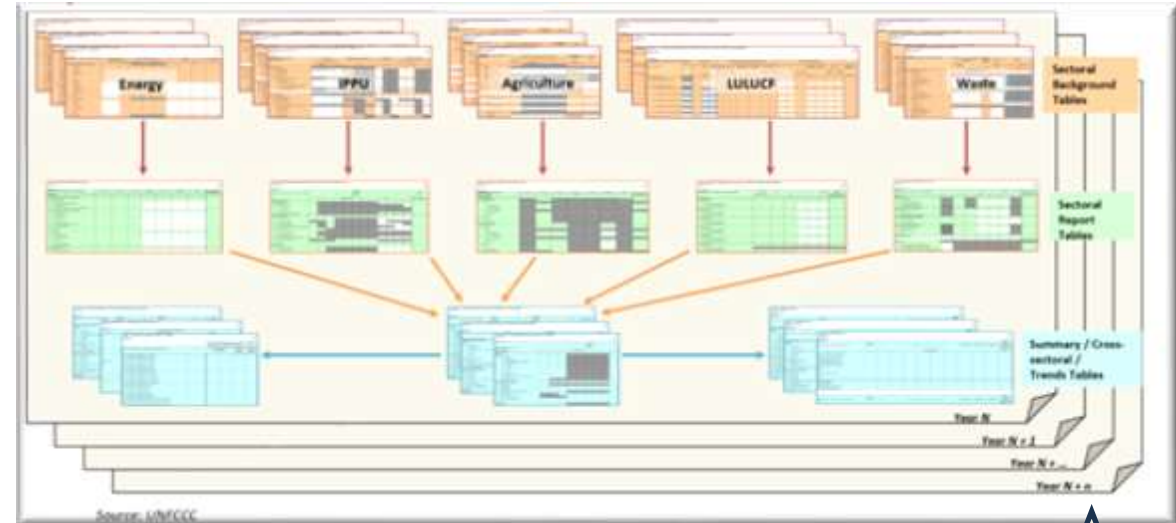
### 3. Produce JSON file

- ✓ Save file on your computer



- ### 4. Upload file to UNFCCC ETF Reporting Tool

## UNFCCC ETF Reporting Tool



Complete, Easy to Use, Fundamental  
IPCC Inventory Software used to complete 60  
tables of the CRT for each year of the time series!



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# A Deeper Dive...entering Energy Sector data in the Software

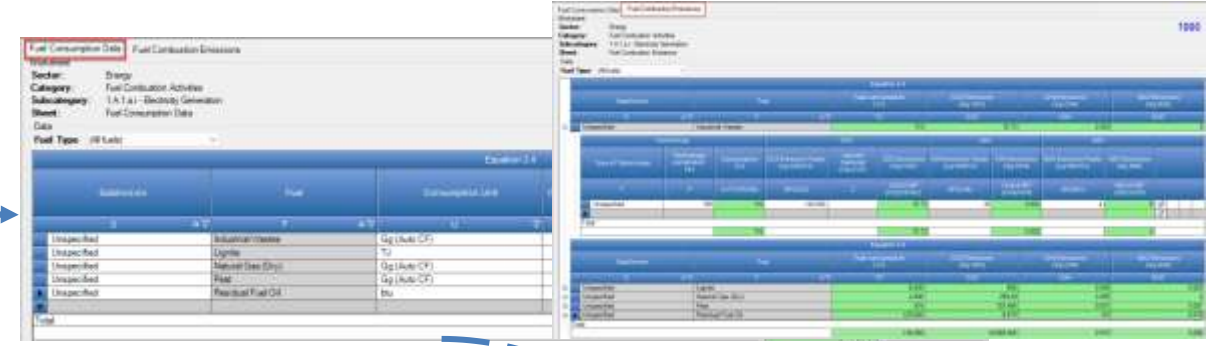
Using national data or readily available international data sets

...and filling in relevant data for each category in the two worksheets below

Sector										
Activity	Total GHG emissions	CO2	CH4	N2O	Other GHG	CO2e	CO2	CH4	N2O	Other GHG
Electricity production	10000	10000	0	0	0	10000	10000	0	0	0
Manufacturing and construction	2000	2000	0	0	0	2000	2000	0	0	0
Transport	5000	5000	0	0	0	5000	5000	0	0	0
International aviation and shipping	1000	1000	0	0	0	1000	1000	0	0	0
Land use, land-use change, and forestry	1000	0	0	0	0	1000	0	0	0	0
Buildings	1000	1000	0	0	0	1000	1000	0	0	0
Other	1000	1000	0	0	0	1000	1000	0	0	0
<b>Total</b>	<b>20000</b>	<b>20000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20000</b>	<b>20000</b>	<b>0</b>	<b>0</b>	<b>0</b>

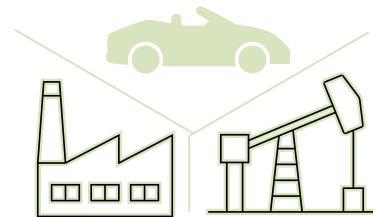
  

Subsector										
Activity	Total GHG emissions	CO2	CH4	N2O	Other GHG	CO2e	CO2	CH4	N2O	Other GHG
Electricity production	10000	10000	0	0	0	10000	10000	0	0	0
Manufacturing and construction	2000	2000	0	0	0	2000	2000	0	0	0
Transport	5000	5000	0	0	0	5000	5000	0	0	0
International aviation and shipping	1000	1000	0	0	0	1000	1000	0	0	0
Land use, land-use change, and forestry	1000	0	0	0	0	1000	0	0	0	0
Buildings	1000	1000	0	0	0	1000	1000	0	0	0
Other	1000	1000	0	0	0	1000	1000	0	0	0
<b>Total</b>	<b>20000</b>	<b>20000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20000</b>	<b>20000</b>	<b>0</b>	<b>0</b>	<b>0</b>



...for most countries captures majority of emissions:

- fuel combustion responsible for ~70% of total emissions, excl. LULUCF
- Same worksheets allow countries to report Tier 2/3 methods for stationary combustion (~55% of total national emissions, excl LULUCF)



Source: 2021 Energy Balances  
[\(https://unstats.un.org/unsd/energystats/pubs/balance/\)](https://unstats.un.org/unsd/energystats/pubs/balance/)



# Live Demonstration

- ✓ Additional slides available in full presentation to document major steps demonstrated.
- ✓ Refer to the Energy Sector User's Guidebook for detailed, step-by-step instruction for data entry for the Energy sector.
- ✓ Please support by using it and reporting any findings or questions to: [ipcc-software@iges.or.jp](mailto:ipcc-software@iges.or.jp).



**Download and use:**

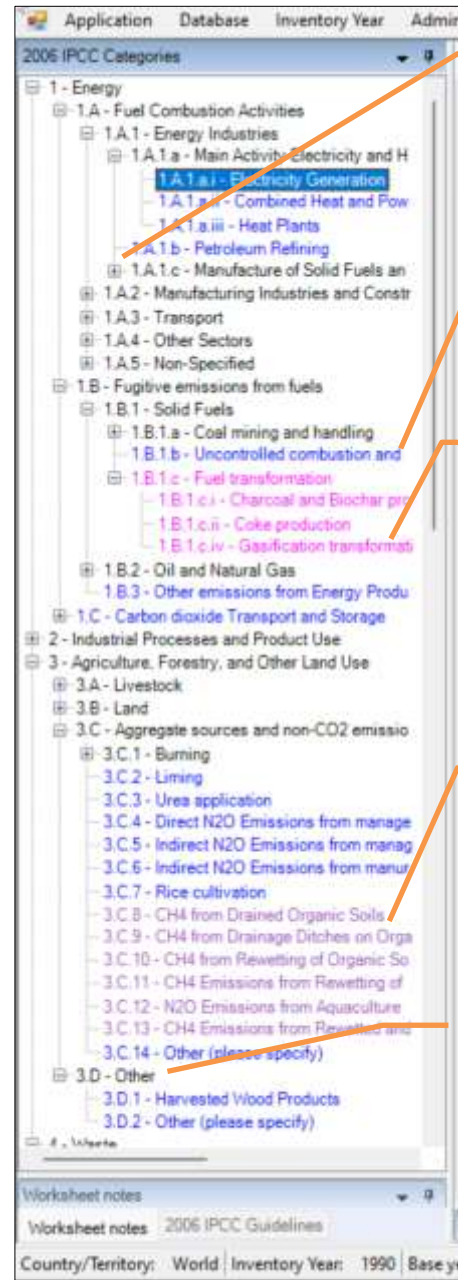
<https://www.ipcc-nggip.iges.or.jp/software/index.html>


- ✓ The *IPCC Inventory Software* comes with two alternative installation packages: 32bit vs 64bit

# 2006 IPCC Categories Navigation Window (tree)

This window contains the full 2006 IPCC Guidelines Category tree structure. The navigation tree is useful to select the category to work with, by clicking on it. The worksheets relevant to the selected IPCC Category will be displayed in the main working area on the right.

Worksheets are available for all IPCC categories that are highlighted in blue, magenta and lilac.



Press  to open a subcategory

**Blue** highlighted categories are from the 2006 IPCC Guidelines

**Magenta** highlighted categories are from the 2019 Refinement

**Lilac** highlighted categories are from the Wetlands Supplement

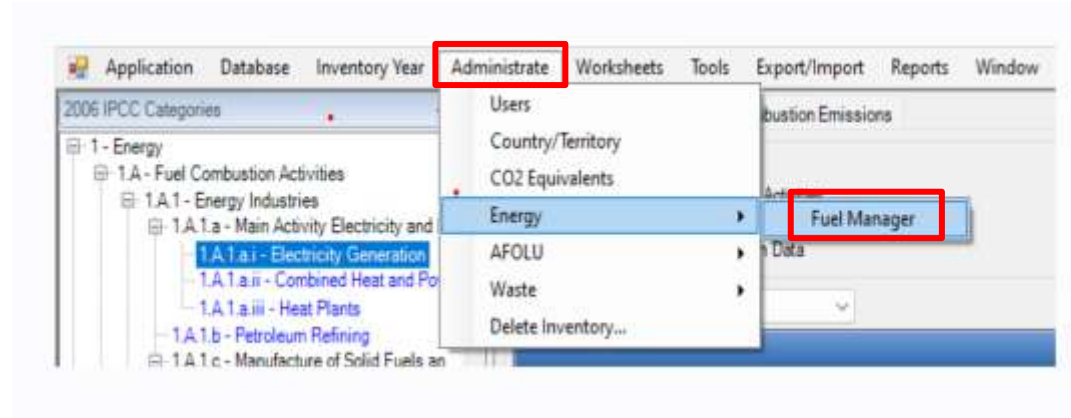
Clicking on the **Black** "Sector/ Sub-sector" level shows the CO<sub>2</sub>e time series graph of the "Sector/ Sub-sector".




# Step A: Set-up Fuel Manager

The **Fuel Manager** contains the following for each fuel:  
 -- name, carbon content and calorific value.

- Access **Fuel Manager** from main menu or any category level worksheet before you start a GHG Inventory, can modify **Fuel Manager** later.



 If you change parameters, data in worksheets automatically linked from the **Fuel Manager** are updated.

- Select **NCV (Net Calorific Value)** or **GCV (Gross Calorific Value)** as the Conversion Factor Type.

Note that:

- For each IPCC default fuel, when NCV is selected, the Calorific Value and Carbon Content are pre-filled with IPCC default values, may overwrite with user-specific values.
- For GCV, no IPCC default values are available, requires data to be entered by the user.

 A screenshot of the 'Fuel Manager' dialog box. At the top, 'Conversion Factor Type' has radio buttons for 'NCV' (selected) and 'GCV'. Below is a table with columns: Fuel Type, Fuel Name, Primary Fuel, Net Calorific Value (C2/Gg), and Carbon content (NCV) (kg C/Gg). The table lists various fuels under 'Liquid Fuels' and 'Solid Fuels'.
 

Fuel Type	Fuel Name	Primary Fuel	Net Calorific Value (C2/Gg)	Carbon content (NCV) (kg C/Gg)
Liquid Fuels	Aviation Gasoline	<input type="checkbox"/>	44.3	19.1
	Bitumen	<input type="checkbox"/>	40.2	.20
	Crude Oil	<input checked="" type="checkbox"/>	42.3	20
	Ethane	<input type="checkbox"/>	46.4	16.8
	Gas/Diesel Oil	<input type="checkbox"/>	43	20.2
	Jet Gasoline	<input type="checkbox"/>	44.3	19.1
	Jet Kerosene	<input type="checkbox"/>	44.1	19.5
	Liquefied Petroleum Gases	<input type="checkbox"/>	47.3	17.2
	Lubricants	<input type="checkbox"/>	40.2	.20
	Motor Gasoline	<input type="checkbox"/>	44.3	18.9
	Naptha	<input type="checkbox"/>	44.5	20
	Natural Gas Liquids	<input checked="" type="checkbox"/>	44.2	17.5
	Orimulsion	<input checked="" type="checkbox"/>	27.5	21
	Other Kerosene	<input type="checkbox"/>	43.8	19.6
	Other Petroleum Products	<input type="checkbox"/>	40.2	.20
	Paraffin Waxes	<input type="checkbox"/>	40.2	.20
	Petroleum Coke	<input type="checkbox"/>	32.5	26.6
	Refinery Feedstocks	<input type="checkbox"/>	43	.20
	Refinery Gas	<input type="checkbox"/>	43.5	15.7
	Residual Fuel Oil	<input type="checkbox"/>	40.4	21.1
Stale Oil	<input type="checkbox"/>	38.1	.20	
White Spirit and SBP	<input type="checkbox"/>	40.2	.20	
Solid Fuels	Anthracite	<input checked="" type="checkbox"/>	26.7	26.8
	Blast Furnace Gas	<input type="checkbox"/>	2.47	70.8
	Brown Coal Briquettes	<input type="checkbox"/>	20.7	26.6
	Coal Tar	<input type="checkbox"/>	28	.22

Type and Name of default fuels cannot be changed and default fuels cannot be deleted.  
 Selected Conversion Factor Type is automatically applied in all the relevant worksheets across all the Inventory Years.  
 Any user-specific biomass-derived fuel, e.g. dung, not covered in the definitions in table 1.1 (Vol.2, Chapter 1 of the 2006 IPCC Guidelines) shall be classified as "biomass-other", these fuels are all considered "waste derived".  
 Any user-specific fossil fuel not covered in the definitions in table 1.1 (Vol.2, Chapter 1 of the 2006 IPCC Guidelines) shall be classified as "Other fossil fuels", these fuels are all considered "waste derived".

# Step A: Set-up Fuel Manager

For each new (user-specific) fuel entry the following steps apply:

1. Click on the **asterisk** in the bottom-most row to add the user-specific fuel.
2. Select **fuel type** from the drop-down menu.
3. Enter specific **fuel name**.
4. Indicate (checkbox) if a **primary fuel** or not.
5. Enter its **calorific value** in TJ/Gg, (either NCV or GCV according to the selection made for entire Fuel Manager).
6. Enter **carbon content** in kg C/GJ.
7. **Save**

[To single out user-defined fuels only, the corresponding box on the window's top border shall be marked].

Fuel Type	Fuel Name	Primary Fuel	Net Calorific Value (TJ/Gg)	Carbon content (kg C/GJ)
	Gas Works Gas	<input type="checkbox"/>	38.7	12.1
	Lignite	<input checked="" type="checkbox"/>	11.9	27.6
	Oil Shale / Tar Sands	<input checked="" type="checkbox"/>	8.9	29.1
	Other Bituminous Coal	<input checked="" type="checkbox"/>	25.8	25.8
	Oxygen Steel Furnace Gas	<input type="checkbox"/>	7.06	49.6
	Patent Fuel	<input type="checkbox"/>	20.7	26.6
	Sub-bituminous Coal	<input checked="" type="checkbox"/>	18.9	26.2
Gaseous Fuels	Natural Gas (Dry)	<input checked="" type="checkbox"/>	48	15.3
Other Fossil Fuels	Industrial Wastes	<input checked="" type="checkbox"/>	11	39
	Municipal Wastes (nonbiomass fraction)	<input checked="" type="checkbox"/>	10	25
	Waste Oils	<input checked="" type="checkbox"/>	40.2	20
Peat	Peat	<input checked="" type="checkbox"/>	9.76	28.9
Biomass - solid	Charcoal	<input type="checkbox"/>	39.9	30.5
	Other Primary Solid Biomass	<input type="checkbox"/>	11.6	27.3
	Wood/Wood Waste	<input checked="" type="checkbox"/>	15.6	30.5
Biomass - liquid	Biodiesels	<input type="checkbox"/>	27	19.3
	Biogasoline	<input type="checkbox"/>	27	19.3
Biomass - liquid	Hydropower	<input checked="" type="checkbox"/>		
Biomass - liquid	Other Liquid Biofuels	<input type="checkbox"/>	27.4	21.7
Biomass - liquid	Solar Power	<input checked="" type="checkbox"/>	0	0
Biomass - liquid	Sulphite Lyes (Black Liquor)	<input type="checkbox"/>	11.8	26
Biomass - gas	Lamell Gas	<input type="checkbox"/>	50.4	14.9
	Other Biogas	<input type="checkbox"/>	50.4	14.9
	Sludge Gas	<input type="checkbox"/>	50.4	14.9
Biomass - other	Municipal Wastes (biomass fraction)	<input type="checkbox"/>	11.6	27.3
Solid Fuels	Northern Coal Mine	<input checked="" type="checkbox"/>	20	27.3

1 2 3 4 5 6 7

Type and Name of default fuels cannot be changed and default fuels cannot be deleted.  
Selected Conversion Factor Type is automatically applied in all the relevant worksheets across all the Inventory Years.  
Any user-specific biomass-derived fuel, e.g. sludge, not covered in the definitions in table 1.1 (Vol 2, Chapter 1 of the 2006 IPCC Guidelines) shall be classified as "biomass-other"; these fuels are all considered "waste derived".  
Any user-specific fossil fuel not covered in the definitions in table 1.1 (Vol 2, Chapter 1 of the 2006 IPCC Guidelines) shall be classified as "Other fossil fuels"; these fuels are all considered "waste derived".

Save Undo Close

# Step B: Fuel Consumption Data

Then, compile worksheet **Fuel Consumption Data** either with a single row of data for the entire category or with subnational aggregations.

Then, for each subdivision in Column |S| data are entered row by row as follows:

1. Column |F|: select each fuel used from the drop-down menu (one row for each fuel)  
 (Note that fuels shown in the dropdown are those listed in the Fuel Manager. User can filter fuels shown in the “Fuel Type” bar at the top)

2. Column |U|: enter unit of fuel consumption data (e.g. Gg, TJ, m<sup>3</sup>). To enter a user-specific unit (e.g. m<sup>3</sup>) select Gg (Manual CF) from the dropdown menu and overwrite Gg with the user-specific unit.

3. Column |C|: enter corresponding amount of fuel consumed.

4. Column |CF|: enter conversion factor to convert the consumption unit to an energy unit (TJ). Note that where Gg of fuel are entered, the NCV/GCV is automatically sourced from the Fuel Manager; while if the consumption unit is TJ the Software compiles the conversion factor with the value 1. Where other units are applied (e.g. m<sup>3</sup>) the user shall enter the relevant conversion factor here.

The screenshot shows a spreadsheet titled "Fuel Consumption Data" with the following data:

Subdivision	Fuel	Consumption Unit	Consumption (Mass, Volume or Energy UHC)	Conversion Factor (1/GCV) (NCV)	Total consumption (TJ)
S	F	U	C	CF	T <sub>C</sub> = C * CF
Northern	Municipal Waste (nonbiomass fraction)	TJ	4,000	1	4,000
Power City 1	Charcoal	TJ	200	1	200
Power City 1	Liquefied Petroleum Gases	TJ	2,900	1	2,900
Unspecified	Anthracite	TJ	40,000	1	40,000
Unspecified	Gas/Diesel Oil	TJ	1,000	1	1,000
Unspecified	Natural Gas (Dry)	TJ	10,000	1	10,000
Unspecified	Peat	TJ	3,500	1	3,500
Total					61,500

Annotations in the image: 1 points to the Fuel column, 2 points to the Consumption Unit column, 3 points to the Consumption column, and 4 points to the Conversion Factor column.

# Step C: Fuel Consumption Emissions

Then, the **Fuel Combustion Emissions** worksheet is pre-filled by the *Software* with rows corresponding to the number of subdivision/fuel combinations entered in worksheet **Fuel Consumption Data**.

1. For each row, users click the symbol “田” on the left of the row to open a drop-down table where EF values are to be compiled.

2. Drop-down table can be filled: either with a single row of data, this is the case for IPCC default method; or with several rows, one row for each technology type, this is the case for IPCC Tier 3 method.

3. Again the “Fuel Type” bar available to enter data for each fuel one by one.

The screenshot shows the 'Fuel Combustion Emissions' worksheet for the year 2022. The main table is titled 'Equation 2.4' and has columns for Fuel, Total consumption (TJ), CO2 Emissions (Gg CO2), CH4 Emissions (Gg CH4), and N2O Emissions (Gg N2O). A 'Fuel Type' dropdown menu is open, showing options like 'All fuels', 'Liquid Fuels', 'Solid Fuels', etc. A red box highlights the 'Fuel Type' dropdown menu (1). Below the main table is a 'Technology' table with columns for Type of Technology, Technology penetration (%), Consumption (TJ), CO2 Emission Factor (kg CO2/TJ), Amount Captured (Gg CO2), CO2 Emissions (Gg CO2), CH4 Emission Factor (kg CH4/TJ), CH4 Emissions (Gg CH4), N2O Emission Factor (kg N2O/TJ), and N2O Emissions (Gg N2O). A red box highlights the 'Technology' table (2). A red circle with the number 3 is placed over the 'Category' field in the top right corner of the worksheet.

Fuel	Total consumption (TJ)	CO2 Emissions (Gg CO2)	CH4 Emissions (Gg CH4)	N2O Emissions (Gg N2O)
Municipal Wastes (nonbiomass fraction)	4,000	0	0	0
Charcoal	200	17.4	0.02	0.0004
Liquefied Petroleum Gases	2,900	177.99	0.00145	0.000029
Anthracite	40,000	3,922	0.76	0.096
Gas/Diesel Oil	1,000	80	0.003	0.0006
Natural Gas (Dry)	10,000	558	0.01	0.001
Peat	3,500	366	0.0035	0.00525

Type of Technology	Technology penetration (%)	Consumption (TJ)	CO2 Emission Factor (kg CO2/TJ)	Amount Captured (Gg CO2)	CO2 Emissions (Gg CO2)	CH4 Emission Factor (kg CH4/TJ)	CH4 Emissions (Gg CH4)	N2O Emission Factor (kg N2O/TJ)	N2O Emissions (Gg N2O)
T	P	C=TC*(P/100)	EF(CO2)	Z	CO2=C*EF (CO2)/10^6-Z	EF(CH4)	CH4=C*EF (CH4)/10^6	EF(N2O)	N2O=C*EF (N2O)/10^6
Technology 3	100	3,500	106,000	5	366	1	0.0035	1.5	0.00525

# Step C: Fuel Consumption Emissions - EFs

Compile each row as follows:

1. **Column [T]:** enter technology type. Where the IPCC default method is applied, the notation “unspecified” is selected.
2. **Column [P]:** enter technology penetration rate (%) associated with each technology type. The technology penetration rate apportions the total fuel consumed in the subdivision among technology types. Where the IPCC default method is applied, the value 100 is automatically entered by the *Software*. (For each fuel in each subdivision, summing up technology penetration rates shall = 100%)

3. **Column [EF(CO<sub>2</sub>)]:** select from the drop-down menu the IPCC default value or, for user-specific fuels entered in the **Fuel Manager**, the value calculated by the *Software* as the carbon content multiplied by 44/12; otherwise enter the technology-type-specific value, in kg of CO<sub>2</sub> per TJ.

4. **Column [EF(CH<sub>4</sub>)]** and **Column [EF(N<sub>2</sub>O)]:** select from the drop-down menu the IPCC default value or enter the technology-type-specific value, in kg of CH<sub>4</sub> per TJ or kg of N<sub>2</sub>O per TJ, respectively.

Fuel Consumption Data: Fuel Combustion Emissions  
Worksheet: Energy  
Sector: Fuel Combustion Activities  
Category: 1.A.1.a) - Electricity Generation  
Subcategory: Fuel Combustion Emissions  
Sheet: Fuel Combustion Emissions  
Data  
Fuel Type: (All fuels)

2022

Subdivision	Fuel	Total consumption (TJ)	CO <sub>2</sub> Emissions (Gg CO <sub>2</sub> )	CH <sub>4</sub> Emissions (Gg CH <sub>4</sub> )	N <sub>2</sub> O Emissions (Gg N <sub>2</sub> O)
Northern	Municipal Wastes (nonbiomass fraction)	4,000	0	0	0
Power City 1	Charcoal	200	17.4	0.02	0.0004
Power City 1	Liquefied Petroleum Gases	2,900	177.99	0.00145	0.000029

Type of Technology	Technology penetration (%)	Consumption (TJ)	CO <sub>2</sub> Emission Factor (kg CO <sub>2</sub> /TJ)	Amount Captured (Gg CO <sub>2</sub> )	CO <sub>2</sub> Emissions (Gg CO <sub>2</sub> )	CH <sub>4</sub> Emission Factor (kg CH <sub>4</sub> /TJ)	CH <sub>4</sub> Emissions (Gg CH <sub>4</sub> )	N <sub>2</sub> O Emission Factor (kg N <sub>2</sub> O/TJ)	N <sub>2</sub> O Emissions (Gg N <sub>2</sub> O)
T	P	C=TC*(P/100)	EF(CO <sub>2</sub> )	Z	CO <sub>2</sub> =C*EF (CO <sub>2</sub> )/10 <sup>6</sup> -Z	EF(CH <sub>4</sub> )	CH <sub>4</sub> =C*EF (CH <sub>4</sub> )/10 <sup>6</sup>	EF(N <sub>2</sub> O)	N <sub>2</sub> O=C*EF (N <sub>2</sub> O)/10 <sup>6</sup>
Technology 4	100	2,900	61.100	5	177.99	0.5	0.00145	0.01	0.000029
Total		2,900			177.99		0.00145		0.000029

# Step D: Fuel Combustion Emissions- Results

1. To estimate the total CO<sub>2</sub> emitted into the atmosphere, the amount of CO<sub>2</sub> captured instead of emitted into the atmosphere is to be entered in Gg CO<sub>2</sub> in **Column |Z|** of worksheet **Fuel Combustion Emissions**.
2. Then, for each GHG, emissions from each source are calculated by the *Software*, in mass unit (Gg). Total emissions from each source of stationary combustion is the sum of all emissions from combustion of all fuels listed in all subdivisions.

Fuel Consumption Data: Fuel Combustion Emissions

Worksheet: Energy 2022

Sector: Fuel Combustion Activities

Category: 1.A.1.a) - Electricity Generation

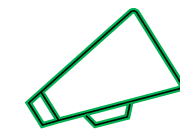
Subcategory: Fuel Combustion Emissions

Sheet: Fuel Combustion Emissions

Data

Fuel Type: (All fuels)

Subdivision		Fuel	Total consumption (TJ)	CO <sub>2</sub> Emissions (Gg CO <sub>2</sub> )	CH <sub>4</sub> Emissions (Gg CH <sub>4</sub> )	N <sub>2</sub> O Emissions (Gg N <sub>2</sub> O)			
Σ	Δ	F	TC	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O			
Northern		Municipal Wastes (nonbiomass fraction)	4,000	383.48	0.132	0.0176			
Technology		CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O			
Type of Technology	Technology penetration (%)	Consumption (TJ)	CO <sub>2</sub> Emission Factor (kg CO <sub>2</sub> /TJ)	Amount Captured (Gg CO <sub>2</sub> )	CO <sub>2</sub> Emissions (Gg CO <sub>2</sub> )	CH <sub>4</sub> Emission Factor (kg CH <sub>4</sub> /TJ)	CH <sub>4</sub> Emissions (Gg CH <sub>4</sub> )	N <sub>2</sub> O Emission Factor (kg N <sub>2</sub> O/TJ)	N <sub>2</sub> O Emissions (Gg N <sub>2</sub> O)
T	P	C=TC*P/100	EF(CO <sub>2</sub> )	Z	CO <sub>2</sub> -CEF (CO <sub>2</sub> )/10 <sup>6</sup> -Z	EF(CH <sub>4</sub> )	CH <sub>4</sub> -CEF (CH <sub>4</sub> )/10 <sup>6</sup>	EF(N <sub>2</sub> O)	N <sub>2</sub> O-CEF (N <sub>2</sub> O)/10 <sup>6</sup>
Technology 1	60	2,400	91,700	10	210.08	30	0.072	4	0.0096
Technology 2	50	2,000	91,700	10	173.4	30	0.05	4	0.008
Total		4,400			383.48		0.132		0.0176



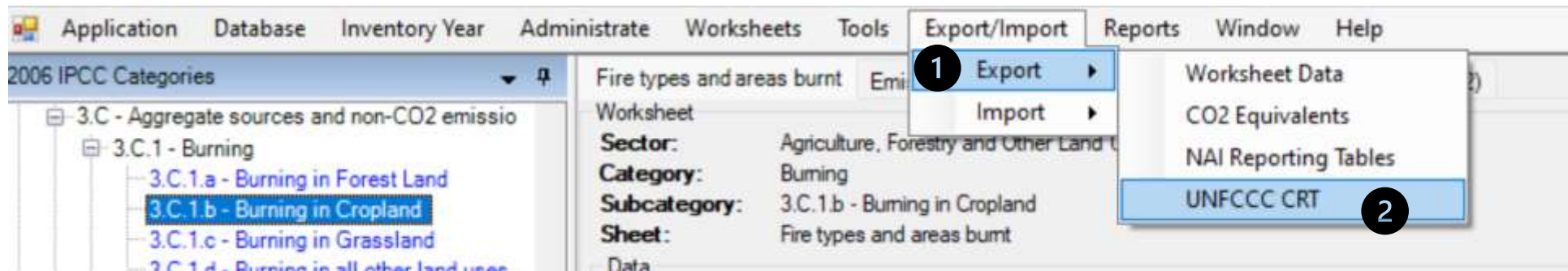
Do you notice the error in the image?

The *Software* has alerted you that the technology penetration rates are greater than 100%.



# Access CRT Interface in Software

1. Navigate to Main Menu and select “Export/Import”
2. Select “Export” and “UNFCCC CRT”

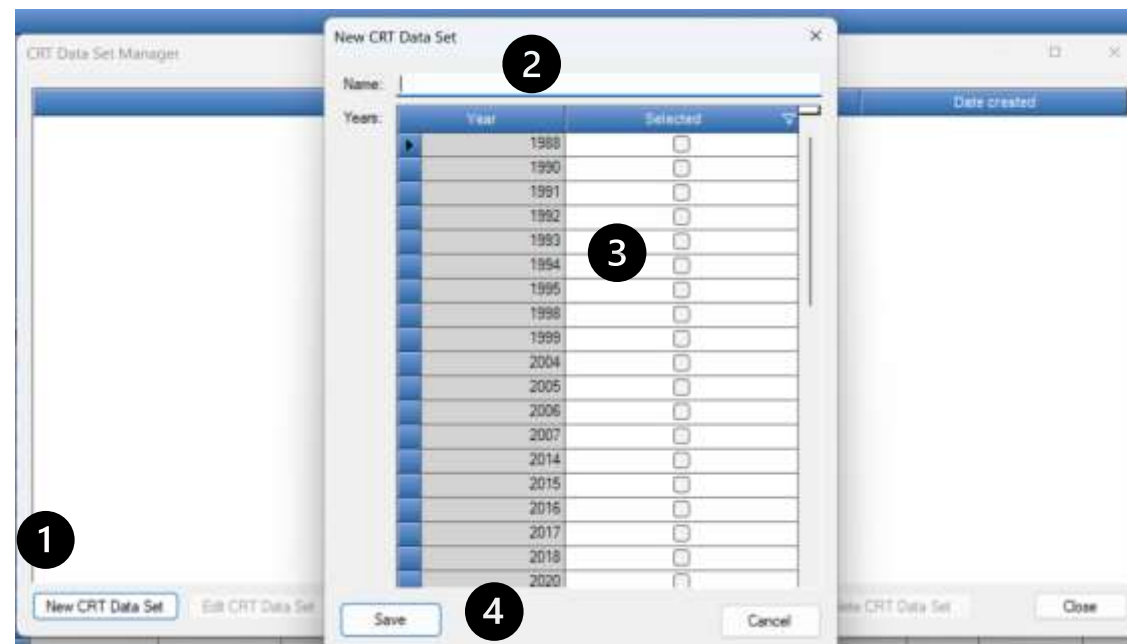


- This opens the **CRT Data Set Manager** interface



# Create New CRT Data Set

1. **Select New CRT Data Set:** This action button opens a screen where properties of the new CRT Data Set are specified, managed and exported to JSON independently.
2. **Name** – Enter name of new CRT Data Set
3. **Years** – Select years to include in your data set
4. **Save** – Select Save
5. A new data set is created



## NOTES:

- The list of years for selection will include only those years that you have created in the *Software*
- You may save in the JSON a subset of years you have in your CRT data set



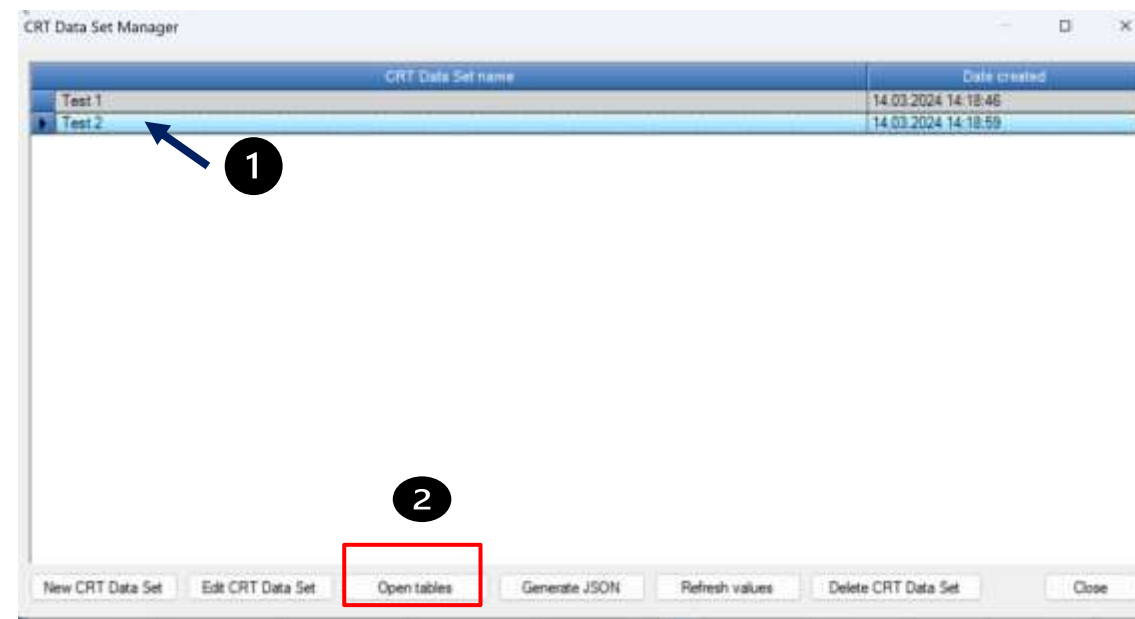
# Open CRTs

- **Open Tables** is an interface that visualizes the CRT and allows you to review, manage and finalize the data for the CRT across sectors and years for your selected CRT Data Set

1. Highlight the **CRT Data Set** you want to review

2. Select **Open Tables**

- This action button opens a screen containing CRT for the currently selected CRT Data Set.
- This screen will open in a mode that allows you to switch between the visualized CRT and other *Software* screens (e.g. Worksheets). Only one visualized CRT for one CRT Data Set can be open at a time.



Recall, to access this screen navigate to the **Main Menu** and select **Export/Import / Export / UNFCCC CRT**

# Open CRTs - Functionalities

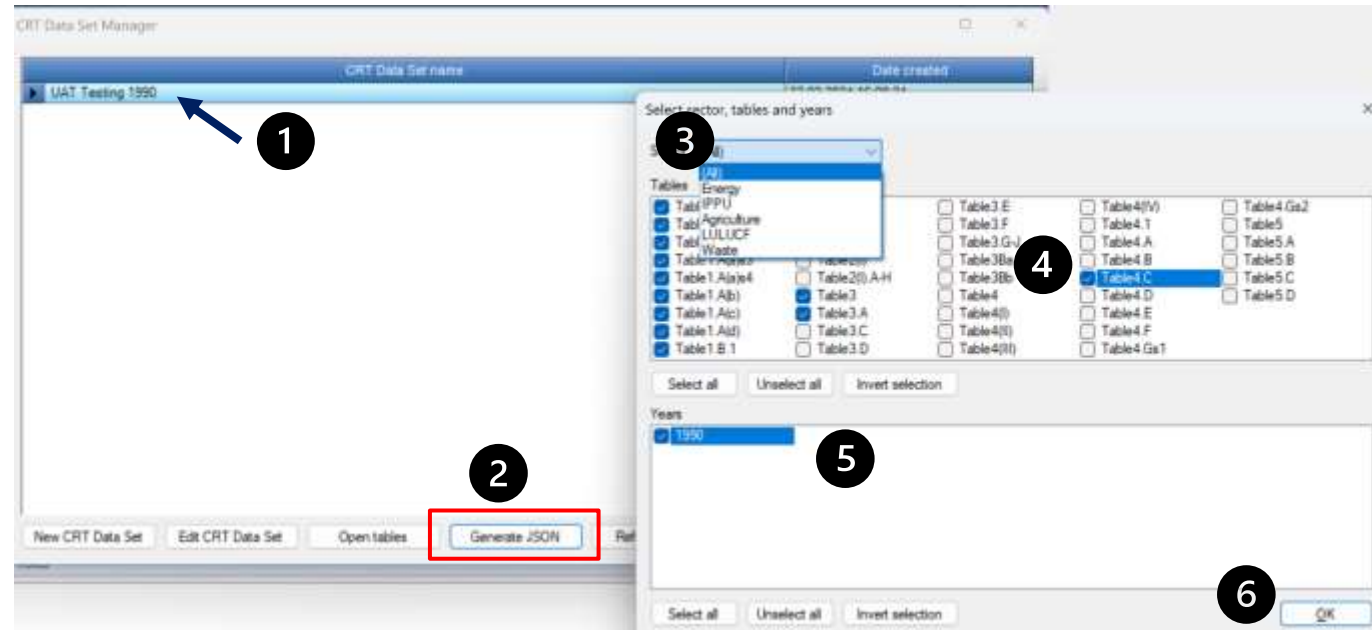
- In Open Tables, you can separately visualize each table for each sector and each year and provide additional information that will be needed for your submission in the UNFCCC ETF Reporting Tool.
- In the visualized CRT, you may:
  - **Review** your data, including data aggregations
  - **Change notation keys**
  - **Provide explanations for use of the notation keys “IE” (included elsewhere) and “NE” (not estimated)** for CRT table 9
  - Provide information on the **method and EFs used**, for Summary 3 of the CRT
  - Designate information as confidential (notation key “C”)
  - Draft **“Official” comments**
  - Provide information for **documentation boxes**
  - Review **CRT footnotes**
  - Review **IPCC Inventory Software Notes**

The screenshot displays the 'Sectoral Background Data for Energy' table. The table is organized into several columns: Emissions (Gt CO<sub>2</sub>e), Intensity (kg CO<sub>2</sub>e/\$), and various energy sources (Coal, Gas, Oil, Nuclear, etc.). The 'Notation' column contains keys such as 'IE' (included elsewhere) and 'NE' (not estimated). The table is presented in a grid format with alternating row colors. Below the table, there are several sections for 'Official comments' and 'Documentation boxes'.

# Generate JSON

- Selecting this button allows you to generate a JSON file for export and subsequent upload to the UNFCCC ETF Reporting Tool.
- All tables of the CRT that belong to the selected CRT Data Set and settings selected below, will be serialized into the JSON file for selected years.

1. **Highlight** the **CRT Data Set** for which you want to generate a JSON file.
2. **Select Generate JSON**
3. **Select Sector(s)** you would like to include in the JSON file. You may include one, multiple, or all sectors
4. **Select specific table(s) of the CRT** you would like to include in the JSON file.
5. **Select the Year(s)** you want to include in the JSON file. You may, but do not have to, include all years that are in your CRT Data Set.
6. **Select “OK”**



## Notes:



Recall, to access this screen navigate to the **Main Menu** and select **Export/Import / Export / UNFCCC CRT**

- At the time of drafting, the F gas tables of the IPPU sector are not yet available for export in JSON format.

# Generate JSON

Save the JSON file to your computer. This is the file you can then upload to the ETF Reporting Tool

