



Interoperability between the UNFCCC Reporting Tool and the IPCC Inventory Software

IPCC TFI TSU

SB 58

June 2023

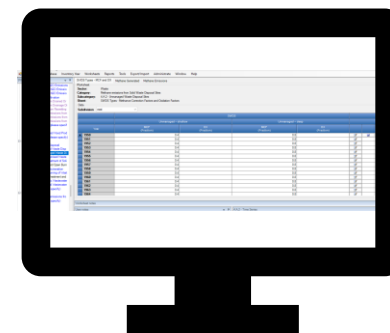
ipcc

INTERGOVERNMENTAL PANEL ON climate change



Outline

- ✓ Background
- ✓ What is interoperability and why is it important?
- ✓ UNFCCC and IPCC cooperation to achieve interoperability
- ✓ What can users expect to see in IPCC Inventory Software supporting interoperability?
- ✓ The road ahead



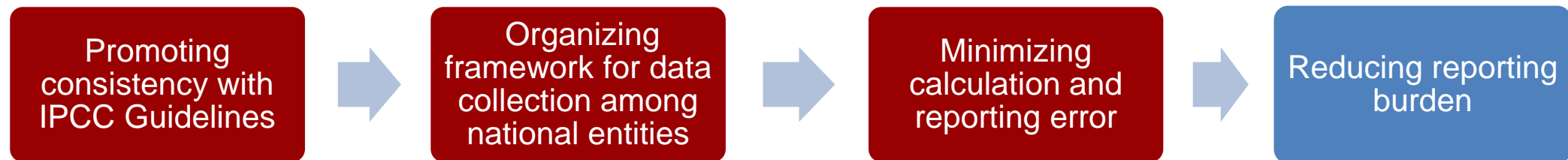
Background

- ✓ Beginning 31 December 2024, countries submit a **biennial transparency report (BTR)** consisting of a narrative document and reporting tables/ formats.
- ✓ Reporting must follow the **Modalities, Procedures and Guidelines (MPGs)** (decision 18/CMA.1).
- ✓ **Decision 5/CMA.3** mandates the UNFCCC to develop reporting tools for the electronic reporting of the tables and formats, specifically:
 - ✓ Common reporting tables (CRT) for GHG inventory (Annex I);
 - ✓ Common tabular formats (CTF) for tracking progress made in implementing/achieving NDCs (Annex 2);
 - ✓ CTF for financial, technology development and transfer and capacity-building support (Annex 3)
- ✓ Decision 5/CMA.3 requests the UNFCCC secretariat **to facilitate interoperability** between the reporting tools and the IPCC Inventory Software and invites the IPCC to participate in this effort.

Interoperability: What it is and why it is important?

Interoperability: “The ability of computer systems or software to exchange and make use of information” -Oxford Dictionary

- ✓ In practice, the goal is to enable a country to use the IPCC Inventory Software to estimate its GHG emissions and removals in accordance with the 2006 IPCC Guidelines and generate a file that could be received and read by the UNFCCC reporting tool for CRT to facilitate the country’s reporting to the Paris Agreement.
- ✓ Thereby, IPCC Inventory Software becomes a central component of a Party’s institutional arrangements to facilitate meeting UNFCCC national reporting obligations.



UNFCCC and IPCC cooperation to achieve interoperability

Step 1: Mapping between IPCC Inventory Software and CRT

1 User enters underlying data (e.g. AD and EF) into IPCC Inventory Software

Subdivision	Fuel	Consumption Unit	Consumption (Mass Volume or Energy Unit)	Conversion Factor (TJ/Unit) (NCV)	Total consumption (TJ)
Unspecified	Peat	Gg	1	9.76	9.76
Total					9.76

2 IPCC Inventory Software calculates emissions

Subdivision	Fuel	Total consumption (TJ)	CO ₂ Emissions (Gg CO ₂)	CH ₄ Emissions (Gg CH ₄)	N ₂ O Emissions (Gg N ₂ O)
Unspecified	Peat	9.76	1.03456	0.00001	0.00001
Total					

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY
Fuel combustion activities - sectoral approach
(Sheet 1 of 4)

3 AD, EFs and some parameters entered into cells of CRT

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA		IMPLIED EMISSION FACTORS			EMISSIONS		
	Consumption (TJ)	NCV/GCV ⁽¹⁾	CO ₂ ⁽²⁾ (t/TJ)	CH ₄ ⁽³⁾ (kg/TJ)	N ₂ O ⁽⁴⁾	CO ₂ ⁽⁵⁾	CH ₄ ⁽⁶⁾ (kt)	N ₂ O
Biomass ⁽¹⁰⁾								
<i>Drop-down list</i>								
1.A.1.a.i. Electricity generation								
Liquid fuels								
Solid fuels								
Gaseous fuels ⁽¹¹⁾								
Other fossil fuels ⁽¹²⁾								
Peat ⁽¹³⁾								
Biomass ⁽¹⁴⁾								

✓ For all categories, tiers and gases, map where they should appear in the UNFCCC CRT

✓ In some cases, this has required updates to the IPCC Inventory Software (e.g. 2019 Refinement, additional gases)

✓ Coordination with UNFCCC to ensure correct mapping

UNFCCC and IPCC cooperation to achieve interoperability

- Step 2: Cell-by-cell mapping between IPCC Inventory Software and CRT, implementing visualization of CRT in IPCC Inventory Software

✓ For Sectoral / Background CRT, AD and emissions map from IPCC Inventory Software to CRT; IEF and summary tables calculated in CRT

✓ Additional explanatory information can be added in IPCC Inventory Software (e.g. documentation boxes, user/ Party comments, method/EF information, notation key explanations, including confidentiality)

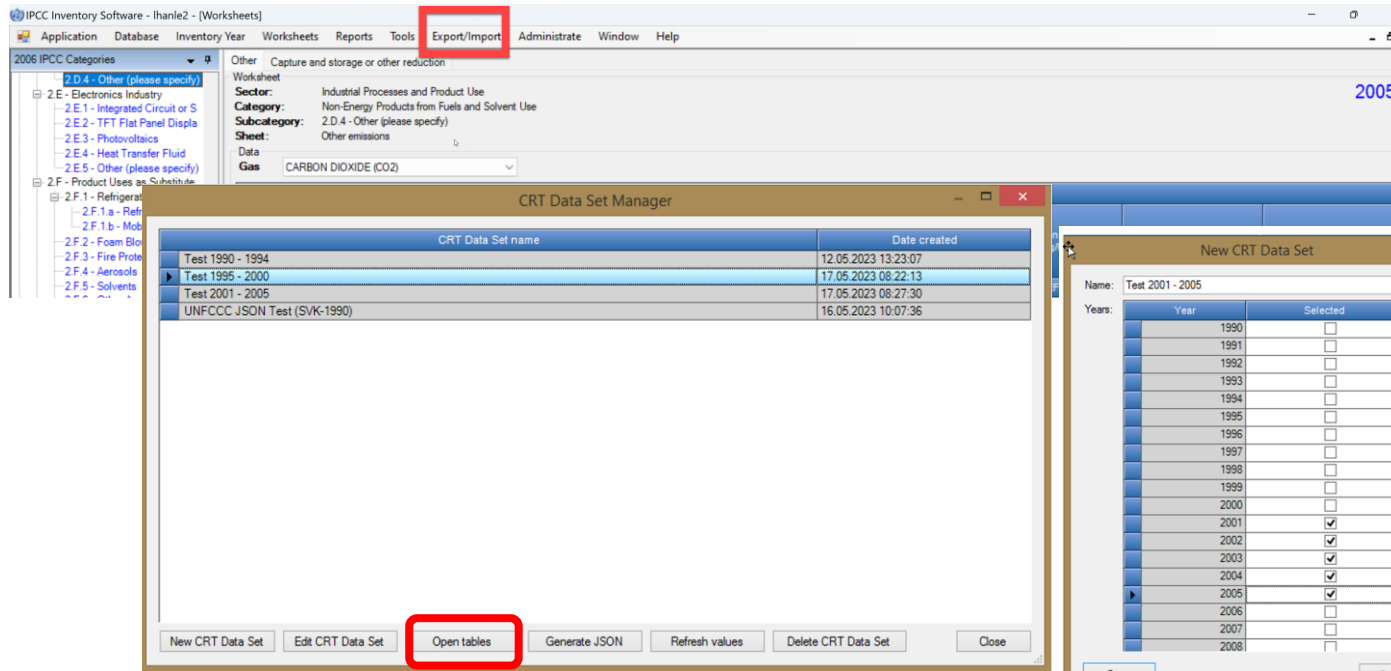
TABLE I.A(a) SECTORAL BACKGROUND DATA FOR ENERGY			General Instructions for Column H				General Instructions for Column J				General Instructions for Column L			
AGGREGATE ACTIVITY DATA			IMPLIED EMISSION FACTORS				EMISSIONS							
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Commodity	NCV/GCV ¹⁾	CO ₂ ²⁾	CH ₄ ²⁾	N ₂ O ²⁾	CO ₂ ³⁾	CH ₄ ³⁾	N ₂ O ³⁾	CO ₂ ⁴⁾	CH ₄ ⁴⁾	N ₂ O ⁴⁾	CO ₂ ⁵⁾	CH ₄ ⁵⁾	N ₂ O ⁵⁾
1.A.1 Manufacturing industries and construction	Liquid fuels	1.1.1.1.1.1.1.1												
	Solid fuels	1.1.1.1.1.1.1.1												
	Other fossil fuels ¹⁾	1.1.1.1.1.1.1.1												
	Peat ¹⁾	1.1.1.1.1.1.1.1												
	Biomass ²⁾	1.1.1.1.1.1.1.1												
	Liquid fuels	1.1.1.1.1.1.1.1												
	Solid fuels	1.1.1.1.1.1.1.1												
	Other fossil fuels ¹⁾	1.1.1.1.1.1.1.1												
	Peat ¹⁾	1.1.1.1.1.1.1.1												
	Biomass ²⁾	1.1.1.1.1.1.1.1												
	Liquid fuels	1.1.1.1.1.1.1.1												
	Solid fuels	1.1.1.1.1.1.1.1												
	Other fossil fuels ¹⁾	1.1.1.1.1.1.1.1												
	Peat ¹⁾	1.1.1.1.1.1.1.1												
	Biomass ²⁾	1.1.1.1.1.1.1.1												

What can users expect for version with interoperability?



Step 1. User calculates annual/ time series of GHG Inventory in IPCC Inventory Software

- ✓ Interface will look the same as current version, with some updated categories/ gases to facilitate interoperability.



Step 2. Access CRT interface in the Main Menu of IPCC Inventory Software

- Create / name the CRT data set to be generated
- Select the year(s) for export to CRT
- Feed worksheet data into CRT
visualized in IPCC Inventory Software

Note: Some images may be updated as we continue to finalize interoperability, taking into account comments received.

What can users expect for version with interoperability?

Step 3. Review visualized CRTs

CRT Tables - Test 1990 - 1994

Sector: Energy Year: 1990 Refresh values

Table1 | Table1.A(a)s1 | Table1.A(a)s2 | Table1.A(a)s3 | Table1.A(a)s4 | Table1.A(b) | Table1.A(c) | Table1.A(d) | Table1.B.1 | Table1.B.2 | Table1.C | Table1.D

TABLE 1.D. SECTORAL BACKGROUND DATA FOR ENERGY
International aviation and international navigation (international bunkers) and multilateral operations

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA	IMPLIED EMISSION FACTORS			EMISSIONS		
		Consumption (TJ)	CO2 (t/TJ)	CH4 (kg/TJ)	N2O (g/TJ)	CO2 (kt)	CH4 (kt)
1.D.1.a. International aviation (aviation bunkers)	660,700				39,209.101542	0.320022	
Jet kerosene	456,000				32,603.995547	0.2205	
Aviation gasoline	94,200				6,594.01804	0.047092	
Biomass	110,500				11.087955	0.052429	
1.D.1.b. International navigation (marine bunkers)	279,305.5				13,885.63975	1.206939	
Residual fuel oil	NO				FX	NO	
Gas/diesel oil	102,705.5				7,534.23975	0.718939	
Gasoline	88,600				NE	NE	
Other liquid fuels (please specify)	21,000				1,694	0.105	
Other liquid fuels [IPCC Software 1.A.3.d.i]	21,000				1,694	0.105	
Gaseous fuels (1)	24,000				1,346.4	0.168	
Biomass	NO				NO	NO	
Other fossil fuels (please specify) (2)	43,000				3,311	0.215	
Other fossil fuels [IPCC Software 1.A.3.d.i]	43,000				3,311	0.215	
1.D.2. Multilateral operations (3)	299,900				15,403.292165	1.5505	
Additional information							
Fuel consumption	Domestic distribution (%) (a)	International distribution (%) (a)					
Aviation							
Marine							

Legend

(1) Including LNG for international navigation.

(2) Include information in the documentation box on which fuels are included and provide a reference to the section in the NID where further information is provided.

(3) Parties may choose whether to report or not report AD and IEFs for multilateral operations, consistently with the principle of confidentiality stated in the MFGs (chapter II). In any case, Parties should report the emissions from multilateral operations, where available, under memo items in the summary tables and in the sectoral report table for energy.

Documentation box

Parties should provide a detailed description of the fuel combustion subsector, including international aviation and international navigation, in the relevant section of chapter 3 ("Energy" (CRT subsector 1.A)) of the NID. Use this documentation box to provide references to relevant sections of the NID, if any additional information is required.

1.D.1

1.D.2

Save

IPCC Inventory Software notes

Orange cells above that contain no information (i.e. are blank) will be calculated automatically by the UNFCCC reporting tool. No action by the user is required.

Note that in CRT Reporting, it is not necessary to enter data for some fuel types used as international bunkers. The IPCC Inventory software may include additional fuels for bunkers not included here.

Please report in the "Documentation Box" the other liquid fuels included in the estimates reported in

Identify explanations needed (e.g. "NE" / documentation boxes)

Checks done for all tables / all years

Review Values

Guidance available (CRT footnotes, and IPCC Inventory Software)

What can users expect for version with interoperability?

Step 4. Finalize information for export to CRT

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY
Fuel combustion activities - sectoral approach (Sheet 2 of 4)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA		IMPLIED EMISSION FACTORS			EMISSIONS			AMOUNT CAPTURED	Information to Summary 3 CRT					
	Consumption	NCV/GCV	CO2	CH4	N2O	CO2	CH4	N2O	CO2	CO2		CH4		N2O	
	(TJ)		(t/TJ)	(kg/TJ)	(kg/TJ)	(kt)	(kt)	(kt)	(kt)	Method	EF	Method	EF	Method	EF
1.A.2 Manufacturing industries and construction	573,340					58,298.779	28,741.785	4,739.078	-3,883.895						
Liquid fuels						15,420.599	19,617.865	1,835.238	-1,278.995						
Solid fuels						35,465.82	0.9345	0.6141	-1,087.5						
Gaseous fuels (6)						5,080.8	0.552	0.5808	-300						
Other fossil fuels (7)						1,397	1.3	1.24	-200						
Peat (8)						934.56	0.01952	0.01464	-100						
Biomass (3)						6,268	6.3179	0.4543	-917.4						
1.A.2.a Iron and steel						9,304.97	6,667.12	0.24401	-1,550						
Liquid fuels						3,036	0.1326	0.02652	-500						
Solid fuels						2,224.61	0.267	0.04005	-400						
Gaseous fuels (6)						2,392.8	0.048	0.0048	-300						
Other fossil fuels (7)						717	0.3	0.04	-200						
Peat (8)						934.56	0.01952	0.01464	-100						
Biomass (3)						3,254	5.9	0.118	-50						
1.A.2.b Non-ferrous metals						NE, NO	NE, NO	NE, NO	NE, NO						
Liquid fuels						NE	NE	NE	NE						

Click on relevant cell(s)

ACTIVITY DATA

Consumption

(TJ)

660,700

Edit

Notation Key

Refresh value

Method and EF info.

CRT Variable Detail

Summary | Description | Party comment | User comment | Official comment | FX

MFG Feasibility Provision:

Description of the application of flexibility:

Clarification of capacity constraint:

Timeframe for improvement:

Progress made in addressing areas of improvement:

Notation Key

Save Cancel

CRT Variable Detail

Summary | Description | Party comment | User comment | Official comment

Variable description|

Edit

CRT Variable Detail

Method | Description | Party comment | User comment | Official comment

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Selected	Notation	Remark
<input checked="" type="checkbox"/>	T1	IPCC Tier 1 methodological approach
<input checked="" type="checkbox"/>	T2	IPCC Tier 2 methodological approach
<input checked="" type="checkbox"/>	T3	IPCC Tier 3 methodological approach
<input type="checkbox"/>	CR	CORINAIR
<input type="checkbox"/>	CS	Country-Specific
<input type="checkbox"/>	M	Model
<input type="checkbox"/>	RA	IPCC Reference Approach
<input type="checkbox"/>	OTH	Other

What can users expect for version with interoperability?

Step 4. Finalize information for export to CRT

IPCC Inventory Software - gregus - [CRT Tables - Test 1990]

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

Sector: Energy Year: 1990 Refresh values

Table1 Table1.A(a)s1 Table1.A(a)s2 Table1.A(a)s3 Table1.A(a)s4 Table1.A(b) Table1.A(c) Table1.A(d) Table1.B.1 Table1.B.2 Table1.C Table1.D

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY

Fuel combustion activities - sectoral approach (Sheet 1 of 4)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA			IMPLIED EMISSION FACTORS			EMISSIONS			AMOUNT CAPTURED	Information to Summary 3 CRT					
	Consumption	NCV/GCV		CO2	CH4	N2O	CO2	CH4	N2O	CO2	CO2		CH4		N2O	
	(TJ)			(tTJ)	(kgTJ)	(kgTJ)	(kt)	(kt)	(kt)	(kt)	Method	EF	Method	EF	Method	EF
Biomass (3)	95,950						1,711.6	NE, NO	NE, NO	-200						
1.A.1.a. Public electricity and heat production (9)	736,660						47,640,246.9	0.641994	0.528984	-500						
Liquid fuels	64,823						1,547,278.4	0.061869	0.012374	NE, NO						
Solid fuels	492,887						39,336,668.5	0.403125	0.492461	-300						
Gaseous fuels (6)	48,000						2,692.8	0.048	0.0048	NE, NO						
Other fossil fuels (7)	64,500						4,063.5	0.129	0.01935	NE, NO						
Peat (8)	NO						NO	NO	NO	NO						
Biomass (3)	66,450						1,711.6	NE, NO	NE, NO	-200						
1.A.1.a.i. Electricity generation	692,460						47,640,246.9	0.641994	0.528984	-500						
Liquid fuels	20,623	NCV					1,547,278.4	0.061869	0.012374	NE						
Solid fuels	492,887	NCV					39,336,668.5	0.403125	0.492461	-300						
Gaseous fuels (6)	48,000	NCV					2,692.8	0.048	0.0048	NE						
Other fossil fuels (7)	64,500	NCV					4,063.5	0.129	0.01935	NE						
Peat (8)	NO	NCV					NO	NO	NO	NO						
Biomass (3)	66,450	NCV					1,711.6	NE	NE	-200						
1.A.1.a.ii. Combined heat and power generation	44,200						NE, NO	NE, NO	NE, NO	NE, NO						
Liquid fuels	44,200	NCV					NE	NE	NE	NE						
Solid fuels	NO	NCV					NO	NO	NO	NO						
Gaseous fuels (6)	NO	NCV					NO	NO	NO	NO						
Other fossil fuels (7)	NO	NCV					NO	NO	NO	NO						
Peat (8)	NO	NCV					NO	NO	NO	NO						
Biomass (3)	NO	NCV					NO	NO	NO	NO						
1.A.1.a.iii. Heat plants	NO						NO	NO	NO	NO						
Liquid fuels	NO	NCV					NO	NO	NO	NO						
Solid fuels	NO	NCV					NO	NO	NO	NO						
Gaseous fuels (6)	NO	NCV					NO	NO	NO	NO						
Other fossil fuels (7)	NO	NCV					NO	NO	NO	NO						
Peat (8)	NO	NCV					NO	NO	NO	NO						
Biomass (3)	NO	NCV					NO	NO	NO	NO						
1.A.1.b. Petroleum refining	48,958						3,394,593.6	0.146874	0.029375	NE, NO						
Liquid fuels	48,958	NCV					3,394,593.6	0.146874	0.029375	NE						
Solid fuels	NO	NCV					NO	NO	NO	NO						
Gaseous fuels (6)	NO	NCV					NO	NO	NO	NO						

Country/Territory: Slovakia | Inventory Year: 1990 | Base year for assessment of uncertainty in trend: 1990 | CO2 Equivalents: | Vmaker - Free Webcam and Screen Recorder is sharing your screen. | Stop sharing | Hide

IPCC Inventory Software notes

Legend

Note: Minimum level of aggregation is needed to protect confidential business and military information, where it would identify particular entity's/entities' confidential data.

Note: A Party may collapse rows below 1.A.1.b and 1.A.1.c up to the 1.A.1.b and 1.A.1.c level when: all the data must be aggregated to protect confidential business and military information; and this data can be used to identify particular entity(ies). The rows will be expanded for display purposes. An explanation of why this has been applied will be provided in the documentation box.

Note: All footnotes for this table are given at the end of the table (sheet 4).

Note: For the coverage of fuel categories, refer to the 2006 IPCC Guidelines (vol. 2, chap. 1.4.1.1, p.1.11). If some derived gases (e.g. gas works, gas, coke oven gas, blast furnace gas) are considered, Parties should provide information on the allocation of these derived gases under the above fuel categories (liquid, solid, gaseous, biomass and other fuels) in the NID.

Debug

Method [22, 10] 0a3649cb-7fd2-46c8-a9c6-7ad0f26d6c85

* To implement the second note, users can mark values mapped in this CRT with the notation key "C". Note that Totals calculated in orange cells won't change because of the input of "C".

* Orange cells above that contain no information (i.e. are blank) will be calculated automatically by the UNFCCC reporting tool. No action by the user is required.

* In "1.A.1.c.i - Manufacture of solid fuels - Solid fuels - Consumption" cell, activity data from worksheet "Fuel consumption Data" of the relevant category in the IPCC Inventory Software are mapped, as are some process inputs from coke production in category 2.C.1. Users that estimate GHG emissions from coke production in iron and steel should ensure the energy content (TJ) of all process inputs from category 2.C.1 are included. If necessary, the user should revise the activity data to include the total fuel consumed for the category, including the energy content of all process inputs to coke production in iron and steel.

What can users expect for version with interoperability?

Step 4. Finalize information for export to CRT – treatment of confidential information

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY
Fuel combustion activities - sectoral approach (Sheet 2 of 4)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA			IMPLIED EMISSION FACTORS			EMISSIONS			AMOUNT CAPTURED	Information to Summary 3 CRT					
	Consumption	NOV/GCV		CO2	CH4	N2O	CO2	CH4	N2O	CO2	CO2		CH4		N2O	
	(TJ)			(t/TJ)	(kg/TJ)	(kg/TJ)	(kt)	(kt)	(kt)	(kt)	Method	EF	Method	EF	Method	EF
1.A.2 Manufacturing industries and construction	573,340						58,298.779	28,741.785	4,739.078	-3,883.895						
Liquid fuels	291,880						15,420.599	19,617.865	1,835.238	-1,278.995						
Solid fuels	80,100						35,465.82	0.9345	0.6141	-1,087.5						
Gaseous fuels (6)	96,000						5,080.8	0.552	0.5808	-300						
Other fossil fuels (7)	10,000						1,397	1.3	1.24	-200						
Peat (8)	9,760						934.56	0.01952	0.01464	-100						
Biomass (3)	85,600						8,288	8,317.9	0.4543	-917.4						
1.A.2 a. Iron and steel																
Liquid fuels																
Solid fuels																
Gaseous fuels (6)																
Other fossil fuels (7)																
Peat (8)																
Biomass (3)																
1.A.2 b. Non-ferrous metals																
Liquid fuels																

0.00603 C NE

Edit

Notation Key

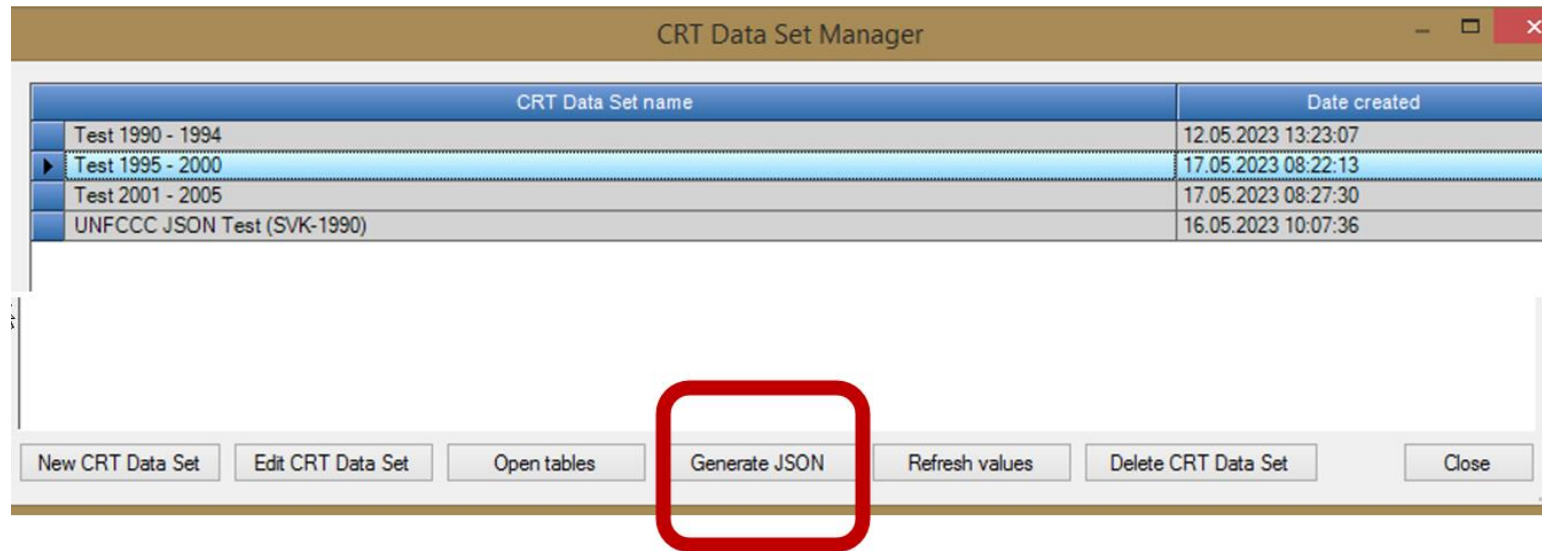
Refresh value

C

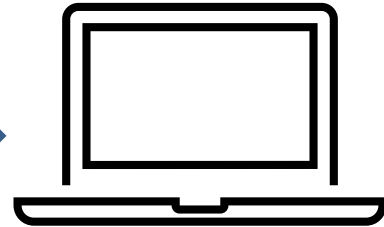
- ✓ In cells containing values, the only notation key is C (Confidential) allowing a user to mark that CRT Variable as “Confidential”. A “C” flag is added as a suffix to the numeric value. While the value in the confidential cell is still visible in the software it will not be exported to CRT
- ✓ If issues are identified during the finalization phase, user may toggle to IPCC Inventory Software worksheets, and address issue. Selecting “Refresh value” will update view in CRT visualization tables

What can users expect for version with interoperability?

Step 5. Generate JSON file for export to CRT



→
JSON file importable
by UNFCCC
electronic reporting
tool



Step 6. User proceeds to conduct any QC checks in UNFCCC electronic reporting tool

IPCC Inventory Software: CRT Export Quick Start Guide

○ First Iteration

IPCC Inventory Software

**UNFCCC Interoperability –
CRT Export Quick Start Guide**

Contents

Introduction	3
CRT Data Set management	3
What is CRT Data Set	3
CRT Data Set management screen	3
New CRT Data Set	4
Edit CRT Data Set	5
Open tables.....	6
Generate JSON.....	6
Refresh values.....	7
Delete CRT Data Set.....	8
CRT Tables	9
CRT Table actions	10
Single-cell actions	10
Multi-cell actions	13
Editable cells	15
CRT Table Documentation Box.....	16

This Guide was prepared by the Technical Support Unit (TSU) of the IPCC Task Force on National Greenhouse Gas Inventories (TFI) to help users of the IPCC Inventory Software. It has not been subject to formal IPCC review procedures.

- Description of functionalities in IPCC Inventory Software to prepare data for generation of JSON file for use by UNFCCC electronic reporting tool.

The Road Ahead

- ✓ Multiple releases between now and COP28, and beyond to June 2024, are expected.
- ✓ The best way for Parties to prepare for reporting under the ETF, is to start today.
- ✓ Learn more about IPCC Inventory Software and download the latest version:
<https://www.ipcc-nggip.iges.or.jp/software/index.html>
- ✓ Please continue to support us through testing and reporting your findings to ipcc-software@iges.or.jp

In the 7th IPCC assessment cycle (from end of July 2023) the plan may be subject to changes, depending on consideration by the IPCC and the new Bureau of the Task Force on National Greenhouse Gas Inventories

June
2023

Release version 2.861 of IPCC Inventory Software (test functions of interoperability)

Multiple updated releases of IPCC Inventory Software

June
2024

Final version of CRT: interoperable with IPCC Inventory Software

ipcc

INTERGOVERNMENTAL PANEL ON climate change



Thank you

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