



Art 6, National Greenhouse Gas Inventories and the IPCC Inventory Software: a consistent implementation

UNFCCC COP29, Baku 2024

IPCC TFI-TSU

NDC Reporting and Accounting Rules

- ✓ Article 4, para. 14 of Paris Agreement: *"In the context of their NDC, when recognizing and implementing mitigation actions with respect to anthropogenic emissions and removals, Parties should take into account, as appropriate, existing methods and guidance under the Convention, in the light of the provisions of paragraph 13 of this Article."*
- ✓ Annex II, decision 4/CMA.1: *accounting for the NDC, Parties estimate anthropogenic emissions and removals in accordance with methodologies and common metrics assessed by the IPCC*
- ✓ Article 13, para. 7 of Paris Agreement: *"Each Party shall regularly provide...A **national inventory** report of anthropogenic emissions by sources and removals by sinks of GHGs, prepared using good practice methodologies accepted by the **Intergovernmental Panel on Climate Change (IPCC)** and agreed upon by the Conference of the Parties serving as the meeting of the Parties to this Agreement;"*

ART6 Reporting and Accounting Rules

- ✓ Annex, decision 2/CMA.3: *Art 6.2 ITMOs Measured in t CO₂ eq in accordance with the methodologies and metrics assessed by the IPCC*
- ✓ Annex, decision 3/CMA.3: *A6.4ERs Measured in t CO₂ eq in accordance with the methodologies and metrics assessed by the IPCC*

Key messages

- ✓ Parties shall use the *2006 IPCC Guidelines for National GHG inventories* to produce their GHG Inventory for the BTR
- ✓ **The IPCC Inventory Software (*Software*)** is the tool for preparing a GHG inventory consistently with the *2006 IPCC Guidelines*
- ✓ It is interoperable with the UNFCCC ETF Reporting Tool, so serving as the cornerstone of country's institutional arrangements for National GHG Inventory (NGHGI) development
- ✓ It allows to estimate, and track in the NGHGI, GHG emissions/removals at sub-national/action/project level (*subdivisions*); thus, allowing tracking progress in **NDC's mitigation actions** implementation
 - Further, by compiling 2 alternative databases, -i.e. with actual AD & EF vs projected AD & EF- and comparing their GHG estimates, the *Software* provides for a tool to assess expected impact of policies and measures/project activities

Counting for mitigation actions results

- ✓ Example, with very dummy data, on how to **report within a National GHG inventory**:
 - **Art6.2 activities** that can originate **ITMO units**
 - **Art6.4 activities** that can originate **A6.4ER units**
 - **Other NDC's mitigation actions**

Counting for mitigation actions results

Electricity Generation – Activity Data

Fuel Consumption Data | Fuel Combustion Emissions

Worksheet

Sector: Energy 2015

Category: Fuel Combustion Activities

Subcategory: 1.A.1.a.i - Electricity Generation

Sheet: Fuel Consumption Data

Data

Fuel Type: (All fuels)

Equation 2.1, 2.2, 2.3, 2.4, 2.5

Subdivision	Fuel	Consumption Unit	Consumption (Mass, Volume or Energy Unit)	Conversion Factor (TJ/Unit) (NCV)	Total consumption (TJ)				
S	F	U	C	CF	TC = C * CF				
▶ Art 6.2 phasing out coal	Lignite	Gg (Auto CF)	1000000	11.9	11900000				
▶ Art 6.4 upgrading to CHP	Natural Gas (Dry)	Gg (Auto CF)	1000000	48	48000000				
▶ NDC Carbon Capture	Other Petroleum Products	Gg (Auto CF)	1000000	40.2	40200000				
*									
Total					100100000				

2015 - Base Year

Counting for mitigation actions results

Electricity Generation – Emissions

Fuel Consumption Data | Fuel Combustion Emissions

Worksheet

Sector: Energy 2015

Category: Fuel Combustion Activities

Subcategory: 1.A.1.a.i - Electricity Generation

Sheet: Fuel Combustion Emissions

Data

Fuel Type: (All fuels)

Equation 2.1, 2.2, 2.3, 2.4, 2.5										
Subdivision		Fuel		Total consumption (TJ)	CO2 Emissions (Gg CO2)		CH4 Emissions (Gg CH4)		N2O Emissions (Gg N2O)	
S	Δ ▾	F	Δ ▾	TC	CO2		CH4		N2O	
Art 6.2 phasing out coal		Lignite		11900000	1168151.6		11.9		17.85	
Technology			CO2				CH4		N2O	
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
XYZ	100	11900000	Calculated	98164	0	1168151.6	1	11.9	1.5	17.85
*										
Total		11900000				1168151.6		11.9		17.85
Equation 2.1, 2.2, 2.3, 2.4, 2.5										
Subdivision		Fuel		Total consumption (TJ)	CO2 Emissions (Gg CO2)		CH4 Emissions (Gg CH4)		N2O Emissions (Gg N2O)	
S	Δ ▾	F	Δ ▾	TC	CO2		CH4		N2O	
Art 6.4 upgrading to CHP		Natural Gas (Dry)		48000000	2692800		48		4.8	
NDC Carbon Capture		Other Petroleum Products		40200000	2946660		120.6		24.12	
Total				100100000	6807611.6		180.5		46.77	

2015 - Base Year

Counting for mitigation actions results

Electricity Generation – Activity Data

Fuel Consumption Data | Fuel Combustion Emissions

Worksheet

Sector: Energy 2018

Category: Fuel Combustion Activities

Subcategory: 1.A.1.a.i - Electricity Generation

Sheet: Fuel Consumption Data

Data

Fuel Type (All fuels) ▾

Equation 2.1, 2.2, 2.3, 2.4, 2.5

Subdivision	Fuel	Consumption Unit	Consumption (Mass, Volume or Energy Unit)	Conversion Factor (TJ/Unit) (NCV)	Total consumption (TJ)				
S	F	U	C	CF	TC = C * CF				
Art 6.2 phasing out coal	Lignite	Gg (Auto CF)	812250	11.9	9665775				
Art 6.4 upgrading to CHP	Natural Gas (Dry)	Gg (Auto CF)	912673	48	43808304				
NDC Carbon Capture	Other Petroleum Products	Gg (Auto CF)	970299	40.2	39006019.8				
Wind Farm	wind	TJ	1000000	1	1000000				
Total						93480098.8			

2018 – Wind Farm

Counting for mitigation actions results

Electricity Generation – Timeseries Data Entry

Fuel Consumption Data | Fuel Combustion Emissions

Worksheet

Sector: Energy
Category: Fuel Combustion Activities
Subcategory: 1.A.1.a.i - Electricity Generation
Sheet: Fuel Consumption Data

Data
Fuel Type: (All fuels)

Time Series Data Entry

1.A.1.a.i - Electricity Generation

Sector: Energy
Category: Fuel Combustion Activities
Category code: 1.A.1.a.i - Electricity Generation
Sheet: Fuel Consumption Data

Parameter: Consumption (Mass, Volume or Energy Unit)

Subdivision	Fuel	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Art 6.2 phasing out coal	Lignite	10000...										
Art 6.4 upgrading to CHP	Natural Gas (Dry)	10000...										
NDC Carbon Capture	Other Petroleum Products	10000...										
Wind Farm	wind											

Total consumption (TJ)

TC = C + CF

11900000				
48000000				
40200000				
100100000				

2015

Fuel Manager... Time Series data entry...

Export to Excel Import from Excel Save current row

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Counting for mitigation actions results

Electricity Generation – Timeseries Data Entry

Fuel Consumption Data | Fuel Combustion Emissions

Worksheet

Sector: Energy

Category: Fuel Combustion Activities

Subcategory: 1.A.1.a.i - Electricity Generation

Sheet: Fuel Consumption Data

Data

Fuel Type (All fuels)

Time Series Data Entry

1.A.1.a.i - Electricity Generation

Sector: Energy
Category: Fuel Combustion Activities
Category code: 1.A.1.a.i - Electricity Generation
Sheet: Fuel Consumption Data

Parameter: Consumption (Mass, Volume or Energy Unit)

Subdivision	Fuel	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Art 6.2 phasing out coal	Lignite	10000...	950000	902500	812250	731025	65792...	59213...	53291...	47962...	43166...	38849...
Art 6.4 upgrading to CHP	Natural Gas (Dry)	10000...	970000	940900	912673	88529...	85873...	83297...	80798...	78374...	76023...	73742...
NDC Carbon Capture	Other Petroleum Products	10000...	990000	980100	970299	96059...	95099...	94148...	93206...	92274...	91351...	90438...
Wind Farm	wind				10000...	11000...	12100...	13310...	14641...	16105...	17715...	19487...

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Export to Excel | Import from Excel | Save current row

2015

Total consumption (TJ)				
TC = C + CF				
	11900000			
	48000000			
	40200000			
	100100000			

Time Series

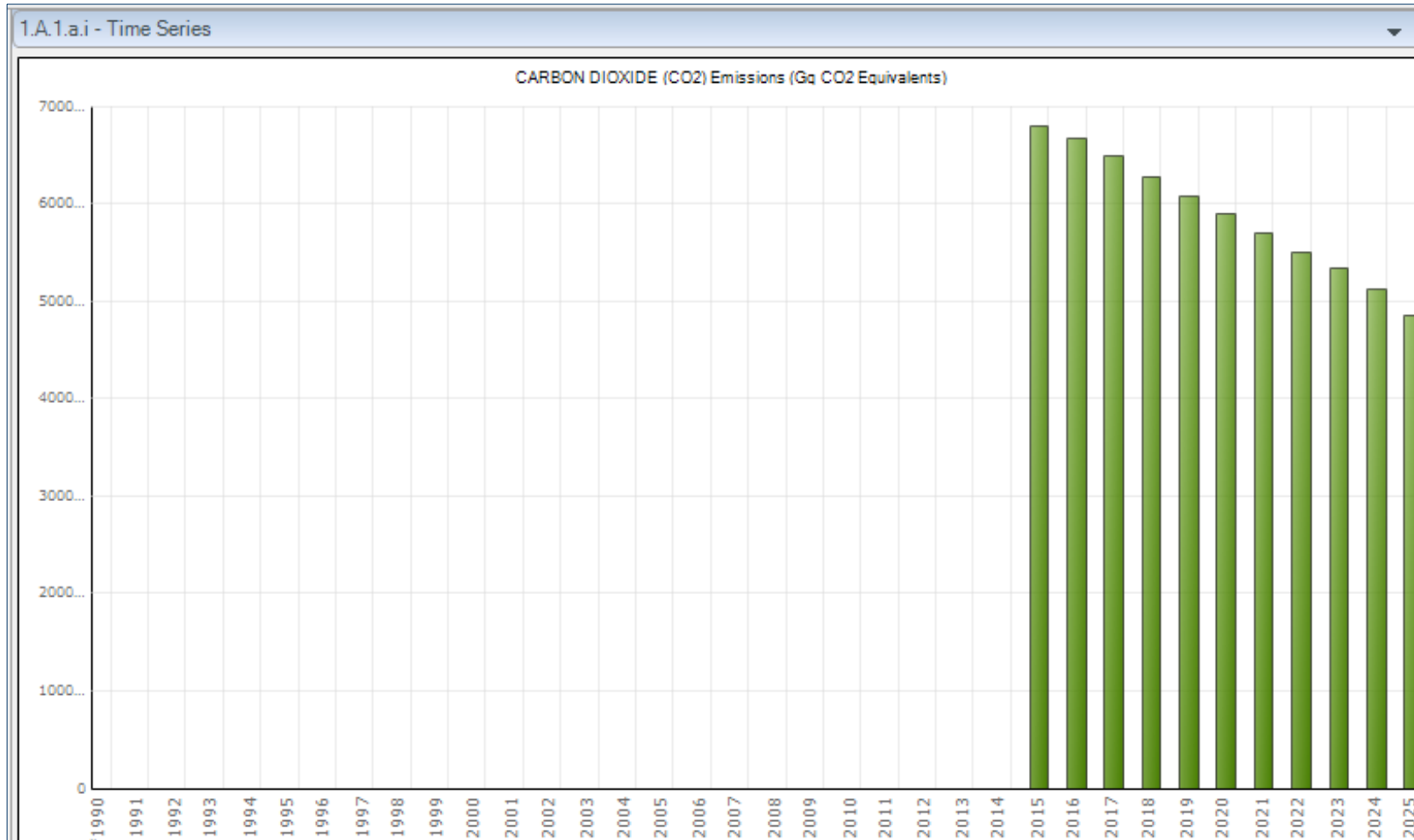
Consumption (Mass, Volume or Energy Unit)

Art 6.2 phasing out coal, Lignite

Counting for mitigation actions results

Fuel Consumption Data		Fuel Combustion Emissions								
Worksheet										
Sector:	Energy									
Category:	Fuel Combustion Activities									
Subcategory:	1.A.1.a.i - Electricity Generation									
Sheet:	Fuel Combustion Emissions									
Data										
Fuel Type	(All fuels)									
2025										
Equation 2.1, 2.2, 2.3, 2.4, 2.5										
Subdivision	Fuel	Total consumption (TJ)	CO2 Emissions (Gg CO2)	CH4 Emissions (Gg CH4)	N2O Emissions (Gg N2O)					
S	F	TC	CO2	CH4	N2O					
Art 6.2 phasing out coal	Lignite	4623110.2186	466934.13208	4.62311	6.93467					
Art 6.4 upgrading to CHP	Natural Gas (Dry)	35396358.09096	1985735.6889	35.39636	3.53964					
NDC Carbon Capture	Other Petroleum Products	36356159.41535	2408906.48515	109.06848	21.8137					
Technology		CO2		CH4		N2O				
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	
ABC	100	36356159.41535	Specified	73300	256000	2408906.48515	3	109.06848	0.6	21.8137
Total		36356159.41535				2408906.48515		109.06848		21.8137
Equation 2.1, 2.2, 2.3, 2.4, 2.5										
Subdivision	Fuel	Total consumption (TJ)	CO2 Emissions (Gg CO2)	CH4 Emissions (Gg CH4)	N2O Emissions (Gg N2O)					
S	F	TC	CO2	CH4	N2O					
Wind Farm	wind	1948717.1	0	0	0					
Technology		CO2		CH4		N2O				
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	
ABC	100	1948717.1	Specified	0	0	0	0	0	0	
Total		1948717.1				0		0		0
Total		78324344.82491				4861576.30613		149.08795		32.288

Counting for mitigation actions results



Concluding thoughts...

The IPCC Inventory Software is the resource to prepare **GHG inventories** in accordance with:

- ✓ **IPCC good practice and principles** (*Transparency, Completeness, Consistency, Accuracy, Comparability*)
- ✓ **UNFCCC reporting requirements for:**
 - **National GHG Inventories**
 - **NDCs**
 - **Art 6,2 ITMOs**
 - **A6.4ERs**

It thus ensures **consistency among NGHGs, NDCs, Art6**; so, addressing double counting and integrity in mitigation's reporting

IPCC TFI TSU is supporting the IPCC Inventory Software:

- ✓ User Manual
- ✓ Guidebook with step-by-step guidance to compile GHG estimates in all sectors/categories
- ✓ **Help Desk:** ipcc-software@iges.or.jp
- ✓ Cooperation with the UNFCCC at training workshops on GHG Inventories
- ✓ Annual IPCC meetings on feedback from software users, *including issues where support is needed, or software improvements are envisaged*

Download the IPCC Inventory Software at: <https://www.ipcc-nggip.iges.or.jp/software/index.html>

THANK YOU

FOR YOUR ATTENTION

STAY IN TOUCH

 ipcc-nggip.iges.or.jp/software/index.html

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Any further questions?

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