



Developing the first Greenhouse Gas emission Accounts for South Africa

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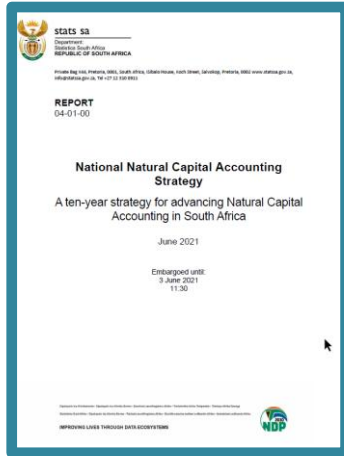


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GHG Emissions Accounts for South Africa – Why?

Implementation of South Africa's National NCA Strategy



Output	High-level indicative activities	Funding scenario	Key role players	Timeframe	Resources
3.1.3. Accounts related to carbon and greenhouse gas emissions	3.1.3.1 Compile and publish the biennial South African Greenhouse Gas (GHG) Emission Report and GHG inventory for submission under the UNFCCC	Low road	DFFE	Biennially	Existing climate change monitoring and evaluation team
	3.1.3.2 Produce spatially explicit accounts of carbon and greenhouse gas emissions (including feasibility study of what type of accounts and resolution most relevant to carbon taxes, carbon trading)	Low road	DFFE, National Treasury, Stats SA, DMRE		Existing climate change monitoring and evaluation and carbon tax teams
	3.1.3.3 Regularly produce selected accounts of carbon and greenhouse gas emissions	High road	DFFE, Stats SA, relevant NGOs, potentially SAWS, Dept of Health		

IMF G20 Data Gaps Initiative 3 – Theme: Climate Change – Recommendation 1



(i) Climate Change Theme

Rec 1: GHG Emission Accounts and national carbon footprints.

Rec 2: Energy Accounts.

Rec 3: Carbon footprint of FDI.

Rec 4: Climate finance.

Rec 5: Forward looking physical and transition risk indicators.

Rec 6: Government climate impacting subsidies.

Rec 7: Climate change mitigation and adaptation current and capital expenditures.



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Status of DGI data gaps – July 2026

Annex 1. Summary Status of DGI-3 Data Gaps across G20 and Non-G20 FSB Member Economies—as of July 2026

The progress reporting dashboard was first featured in the 2023 DGI-3 Progress Report. It allows users to track the economies' progress in implementing the DGI-3 targets, acknowledging accomplishments, and serving as a benchmark for the following years.

Status of DGI-3 Data Gaps

	ARG	AUS	BRA	CAN	CHN	FRA	DEU	IND	IDN	ITA	JPN	KOR	MEX	RUS	SAU	ZAF	TUR	GBR	USA	EU	HKG	NLD	SGP	ESP	CHE
Recommendation 1	1	1	1	2	2	1	1	2	2	1	2	2	2	1		2	1	1		1	2	1	n/a	1	1
Recommendation 2	1	1	2	2	1	1	1	2	2	1	1		2		2	1	1	2	1	1	2	1	2	1	1
Recommendation 3	2	2	1	2	2	2	2		2	1	1	2	2	2				1	1	2	2		2	1	
Recommendation 4	sc		sc	sc	sc	sc	sc		sc	sc	sc	sc	sc	sc	sc	sc	sc	sc		sc	sc		sc	sc	sc
Recommendation 5	2	2	2		2	2	1		2	2	2	2	2	2		2	2			2	2	2		2	1
Recommendation 6	2	1	1		2	1	2		1	2	2		2	2		1	2			1	2	2		1	
Recommendation 7	2	1			2	2			2	2	2		2			2	2			1	2	2		1	
Recommendation 8	1			2		1	2	2	2	1	2	1	1	2	2	2	2	2	1	1		1		2	
Recommendation 9				2		1	1	2	2	1	2	2	2	2	2	2	2	2	1	1		1		1	2
Recommendation 10	1	1	1	2	2	2		1	2	2		2	1	n/a	2	2	n/a	2		2	1		2	1	
Recommendation 11	2		1	2	2	2		2	2	2		2	2	2		2	2		2	2	2	2	2	2	2
Recommendation 12	1		2	2	2			1	2	2	2	2	1	n/a	2	2	2		2	2	n/a		2	2	

LEGEND

Data gap closed

Data gap is being addressed

Data gap is not material for the economy

Data gap is not an immediate priority area for the national authorities, given available resources

1 - Target

2 - Second-best Target

sc - Self-commitments by economies

n/a - Not Applicable – the economy selected "data gap is not material for the economy"

The details about the Target (1) and Second-best Target (2) for each Recommendation are available [here](#).

The status of each recommendation (by economy) reflects the economy's (and task team lead's) assessment of their progress as reported in the DGI Secretariat's Annual progress reporting Survey.

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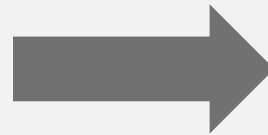


Air Emission Accounts – what are we measuring?

Air Emission Accounts measure flows *to the environment*

Emissions

flows of pollutants to the air



Air emission
statistics and
accounts



***NOT* air quality**

Concentrations of pollutants
in the air



Statistics on air
quality



Air Emission Accounts - Characteristics

- Record all emissions related to economic activity
- Emissions are recorded consistent with national accounts' principles and classifications
- Production activities classified by ISIC – SIC for South Africa.
- Emissions from transport activities should be allocated by industries and households
- Residence principle
 - ▶ *Exclude* emissions released within the national territory by non-residents
 - ▶ *Include* emissions abroad of resident economic units.
 - ◆ Example: Emissions from air transport: Emissions of a flight of Ryanair from Frankfurt to New York is recorded in the Irish accounts because Ryanair is resident in Ireland.



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Boundary – what is in and what is out?

Include emissions generated by economic activity

- All emissions from transformation and end use of energy including from combustion of biomass (e.g. wood fuel)
 - Emissions from incineration of waste
 - Flaring and venting of natural gas
 - Methane emissions from livestock (enteric fermentation)
 - Emissions from chemical processes, evaporation of solvents, etc.
 - Emissions from manure collected and spread on agricultural land (dissipative use)
 - Emissions from soil disturbances through e.g. cultivation, construction and land clearance
 - Emissions from landfills
 - Leakages from accumulations
- Emissions from durable goods like refrigerators should be recorded as they occur and attributed to the owner of the goods

Exclude emissions *in* the environment

- Transboundary flows of air emissions
- Capture of gases by the environment, e.g. capture in forests and soil
- Emissions from unintended forest and grassland fires
- Secondary emissions resulting from processes in the atmosphere

Flows within the economy may be recorded in a separate table

- Substances captured for use in other production processes
 - Carbon capture and storage
 - Methane captured to generate biogas

Differences between GHG inventories and Air Emission Accounts

GHG Inventory (IPCC)	Air Emissions Accounts (SEEA CF)
Territorial principle	Residence principle
Process-based allocation of emissions	Allocation of emissions to economic activities
Breakdown by sectors: energy, industrial processes; solvent and other product use; agriculture; land use, land-use change and forestry (LULUCF); waste; other)	Breakdown by industries (ISIC) and households
Functional allocation of transport emissions within the energy sector	Allocation of transport emissions to industries and households



GHG Emission Accounts:

- Time series of the first GHG Emission Accounts for South Africa: **2010 to 2022.**
- Stats SA EEA Directorate aim: **To release first GHG Emission Accounts for South Africa in the 2026/2027 financial year – November 2026.**

IMF SECO missions (technical assistance) – DGI 3 (with focus on Rec 1 and Rec 2)

July 2023



IMF-SECO

Transformative Statistics Agenda

Environment and Climate Change Statistics Capacity Development Program

Consultation Mission

July 17-21, 2023

June 2024



IMF-SECO Technical Assistance Mission:

Mission Details	Transformative Statistics Agenda: Environment and Climate Change Statistics Capacity Development Program
Purpose	To initiate the compilation of Air Emissions Accounts and review the work being done on the compilation of Energy Accounts
Venue	Statistics South Africa, <u>ISibalo House</u> , I Koch Street, <u>Salvokop</u> , Pretoria, South Africa
Date	June 10 -14, 2024

February 2025



IMF-SECO Technical Assistance Engagement:

Mission Details	Transformative Statistics Agenda: Environment and Climate Change Statistics Capacity Development Program
Purpose	To review and assess the work already done on the compilation of Physical Energy Flow Accounts for South Africa, 2015 to 2021
Venue	MS Teams
Date	February 11 -13, 2025

In-country IMF SECO mission conducted to finalize an assessment report that would help in deciding the scope of the program, in consultation with the concerned national agencies

In-country IMF SECO Mission team mainly **working** with the team of officers in Stats SA, DFFE and the DMRE **directly involved** in the compilation of Energy and Air Emissions Accounts. The mission team also consulted with other agencies/divisions of the National Statistics Office (NSO)

Virtual IMF SECO mission team mainly **worked** with the team of officers in Stats SA (Environmental Economic Accounts (EEA Directorate) **directly involved** in the compilation and the release of the Physical Energy Flow Accounts for South Africa, 2015 to 2021

IMF SECO missions (technical assistance) – DGI 3 (with focus on Rec 1 and Rec 2)

October 2025



STATISTICS

IMF-SECO Technical Assistance Mission:

Mission Details	Transformative Statistics Agenda: Environment and Climate Change Statistics Capacity Development Program
Purpose	To review and assess the work already done on the compilation of Physical Energy Flow Accounts for South Africa, 2022 and the development of the first Air Emission Accounts for South Africa
Venue	Statistics South Africa, ISibalo House, 1 Koch Street, Salvokop, Pretoria, South Africa
Date	October 6 -10, 2025

In-country IMF SECO mission conducted to review and assess the work already done on the compilation of Physical Energy Flow Accounts for South Africa, 2022 and the development of the first Air Emission Accounts for South Africa

September
2026



STATISTICS

IMF-SECO Technical Assistance Mission:

Mission Details	Transformative Statistics Agenda: Environment and Climate Change Statistics Capacity Development Program
Purpose	To review and assess the work already done on the compilation of the first Greenhouse Gas emission accounts for South Africa
Venue	Statistics South Africa, ISibalo House, 1 Koch Street, Salvokop, Pretoria, South Africa
Date	September 28-30, 2026 and October 1 -2, 2026

In-country IMF SECO mission to be conducted to review and assess the work already done on the compilation of the first Greenhouse Gas emission accounts for South Africa

- Next, and last, IMF TA mission is scheduled for 28 September 2025 to 2 October 2026 and will be hosted by Stats SA.
- Logistical arrangements for the hosting has started already.



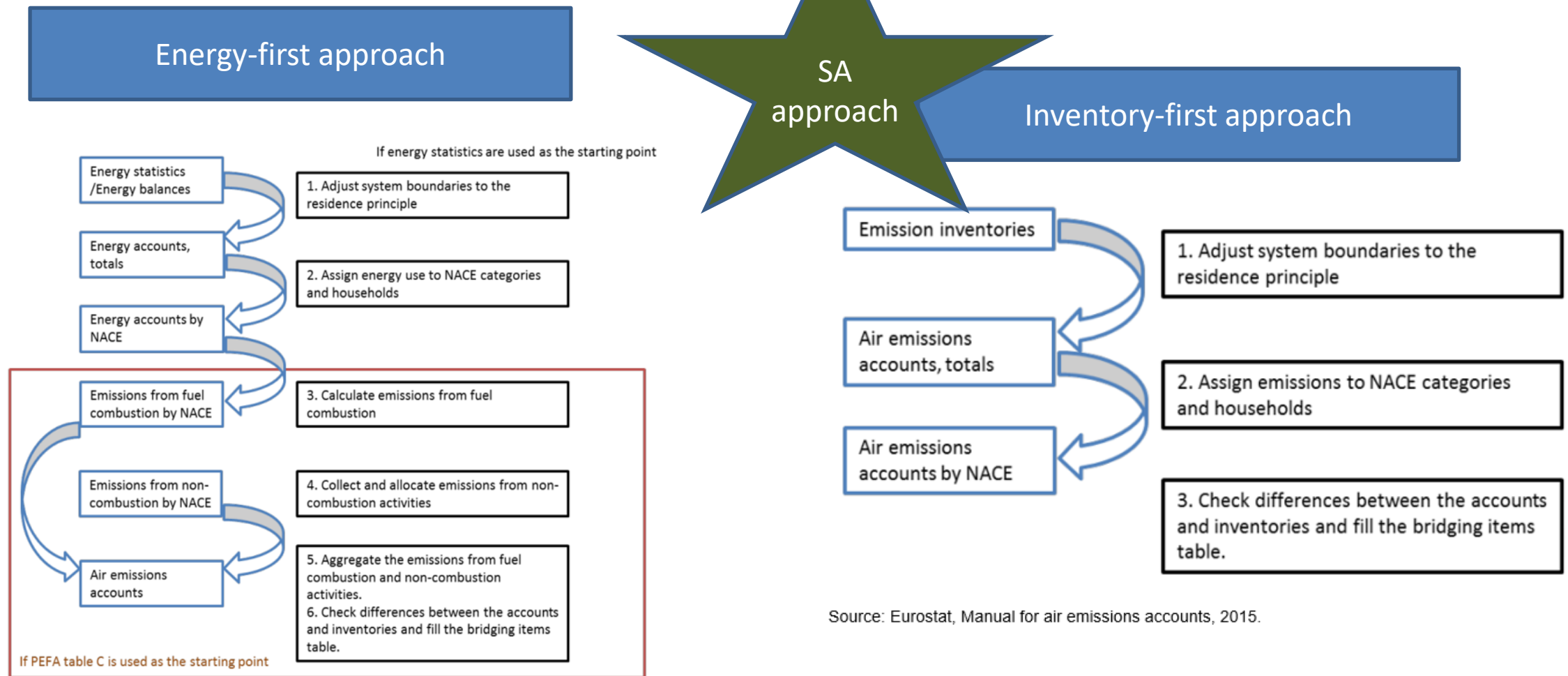
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The two approaches to compile Air Emission Accounts



Source: Eurostat, Manual for air emissions accounts, 2015.

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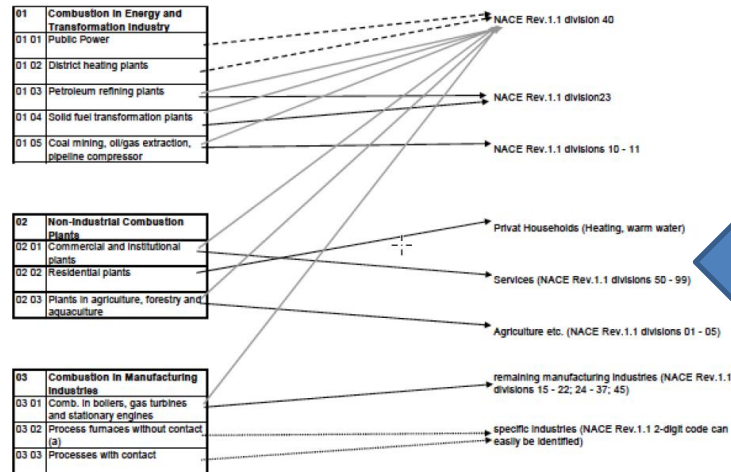
DFFE Development of the first GHG Emission Accounts for South Africa compilation system

- DFFE work in progress:

"Inventory first" approach

Emission inventory

Emission accounts



Companies that report for GHG inventory and their emissions – 2010 to 2022

Table 3.7
Air emissions account (tonnes)

Air emissions account (tonnes)

Supply table for air emissions

Who releases them?

Where do they go?

Use table for air emissions

Pollutants	Industries—by ISIC					Households			Emissions from landfill	Total supply of emissions	Flows to the environment	
	Agriculture ISIC A	Mining ISIC B	Manufacturing ISIC C	Transport ISIC H	Other	Transport	Heating	Other			Emissions released to the environment	Total use of emissions
Type of substance												
Carbon dioxide	10 610.3	2 602.2	41 434.4	27 957.0	82 402.4	18 920.5	17 542.2	1 949.1	701.6	204 119.6	204 119.6	204 119.6
Methane	492.0	34.1	15.8	0.8	21.9	2.4	15.5	1.7	222.0	806.3	806.3	806.3
Dinitrogen oxide	23.7		3.5	0.8	2.6	1.0	0.2	0.1	0.1	32.0	32.0	32.0
Nitrous oxides	69.4	6.0	37.9	259.5	89.0	38.0	12.1	1.3	0.3	513.6	513.6	513.6
Hydrofluorocarbons			0.3		0.4					0.7	0.7	0.7
Perfluorocarbons												
Sulphur hexafluoride												
Carbon monoxide	41.0	2.5	123.8	46.2	66.2	329.1	51.2	5.7	1.1	666.9	666.9	666.9
Non-methane volatile organic compounds	5.2	6.5	40.0	16.4	27.2	34.5	29.4	3.2	0.9	163.3	163.3	163.3
Sulphur dioxide	2.7	0.4	28.0	62.4	8.1	0.4	0.4	0.1	0.0	102.5	102.5	102.5
Ammonia	107.9		1.7	0.2	0.9	2.3	11.4	1.2	0.2	125.9	125.9	125.9
Heavy metals												
Persistent organic pollutants												
Particulates (including PM10 and dust)	7.0	0.1	8.5	9.3	4.4	6.0	2.8	0.5	0.0	38.5	38.5	38.5

System of Environmental-Economic Accounting 2012—Central Framework



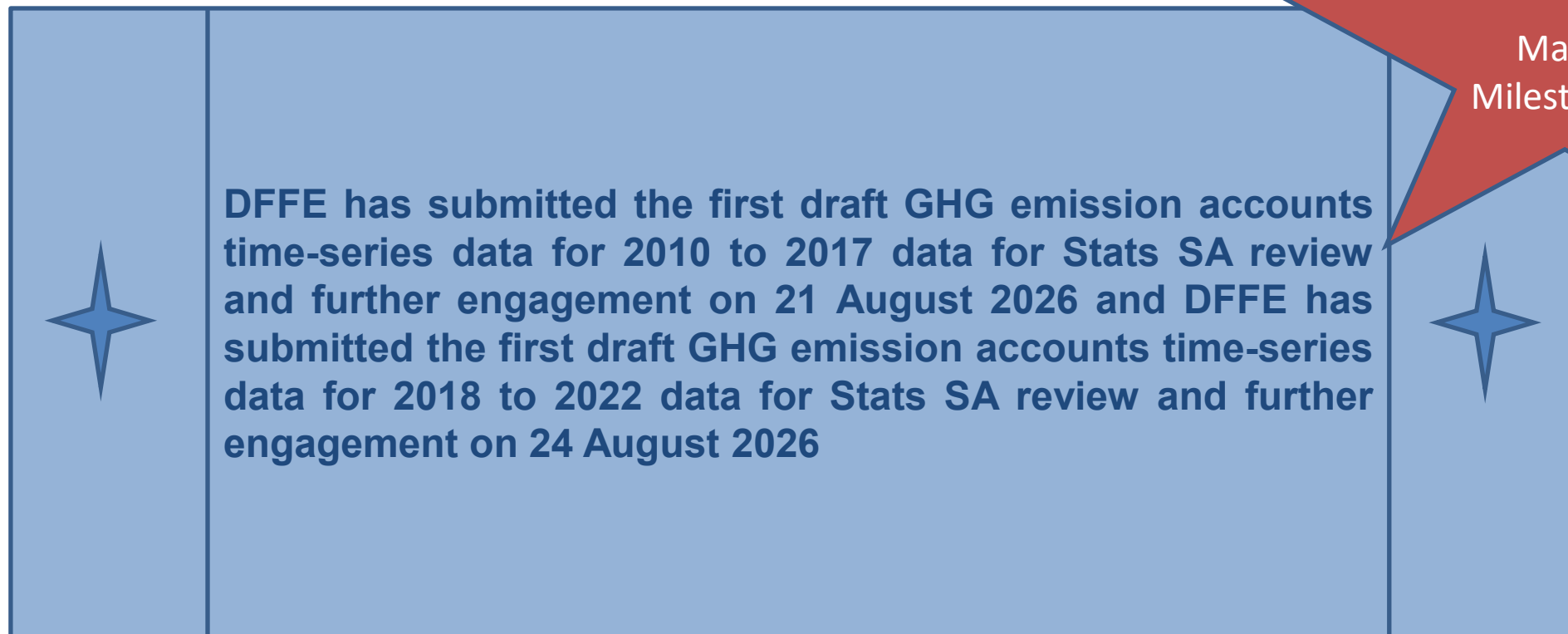
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Development of the AEA compilation system:



Stats SA development of the discussion document for the first GHG emission accounts for South Africa

Stats SA aims to release the first GHG emissions accounts as experimental statistics by November 2026 – **Discussion Document**



Work in progress during September 2026 - Development of the bridging table for GHG Emission Accounts

- Accurate estimation of the emissions from international transport activities, delineated by resident and non-resident transport companies, can strengthen policy analysis and environmental accounting.
- This process, known as the residence adjustment, differentiates between the territorial-based measurements traditionally used in the Energy Balances compiled by the DMRE and GHG inventories compiled by the DFFE, and the activities of these transport entities irrespective of their geographical operations.
- The distinction is particularly relevant for the air and maritime transport sectors characterized by their international nature and significant fuel consumption.

Generic bridge table	
Total air emissions according to SEEA air emissions accounts	
Less national residents abroad	
land transport	
water transport and fishing vessels	
air transport	
plus non-residents on the territory	
land transport	
water transport (inland) and fishing vessels	
air transport (inland)	
plus other adjustments and statistical discrepancies	
= Total air emissions, excl. LULUCF according to UNFCCC/IPCC /CLRTAP	
+ LULUCF	
= Total air emissions, incl. LULUCF according to UNFCCC/IPCC /CLRTAP	

Example: Danish CO2-emissions	
	1000 tonnes
Emissions from Danish economic activities (SEEA)	69 250
Less emissions abroad (international transport)	- 39 584
Emissions caused by Danish operated ships abroad	- 37 195
Emissions caused by Danish operated planes abroad	- 571
Emissions caused by Danish operated vehicles abroad	- 1 818
Plus other differences in emissions from transport and cross border trade	188
Emissions originating from the Danish territory (UNFCCC/UNECE)	29 854
Land use, land use change and forestry (LULUCF)	2 089
Emissions originating from the Danish territory inclusive LULUCF	31 943

Bridge tables are very important for both compilers and users



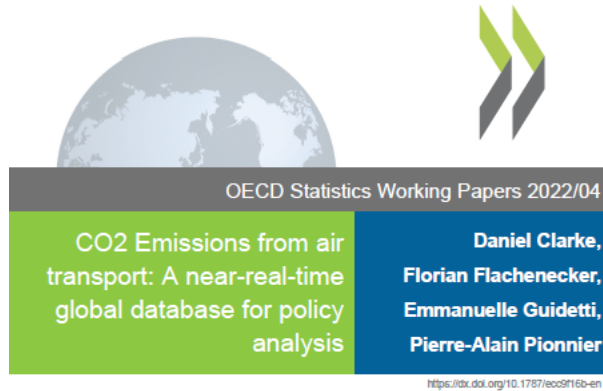
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Air Transport - Development of the bridging table for GHG Emission Accounts



- This OECD database builds on air traffic data (Automatic Dependent Surveillance-Broadcast (ADS-B)) provided by the International Civil Aviation Organisation (ICAO) and a CO₂ emission calculator provided by the European Organisation for the Safety of Air Navigation (EUROCONTROL).
- Database compiled by the ICAO - includes most of the passenger and freight flights taking place around the world.
- For each flight, this database includes information on the departure and arrival airports, the operating airline, and the type of aircraft used. More than 1 000 different aircraft types are considered in this database.
- For each airline, the database also has information on which country has delivered its Air Operator's Certificate (AOC).
- Up to 2018, the information provided by ICAO relates to scheduled flights, and from 2019 onwards, it relates to flights actually taking place, based on information from the ADS-B system.



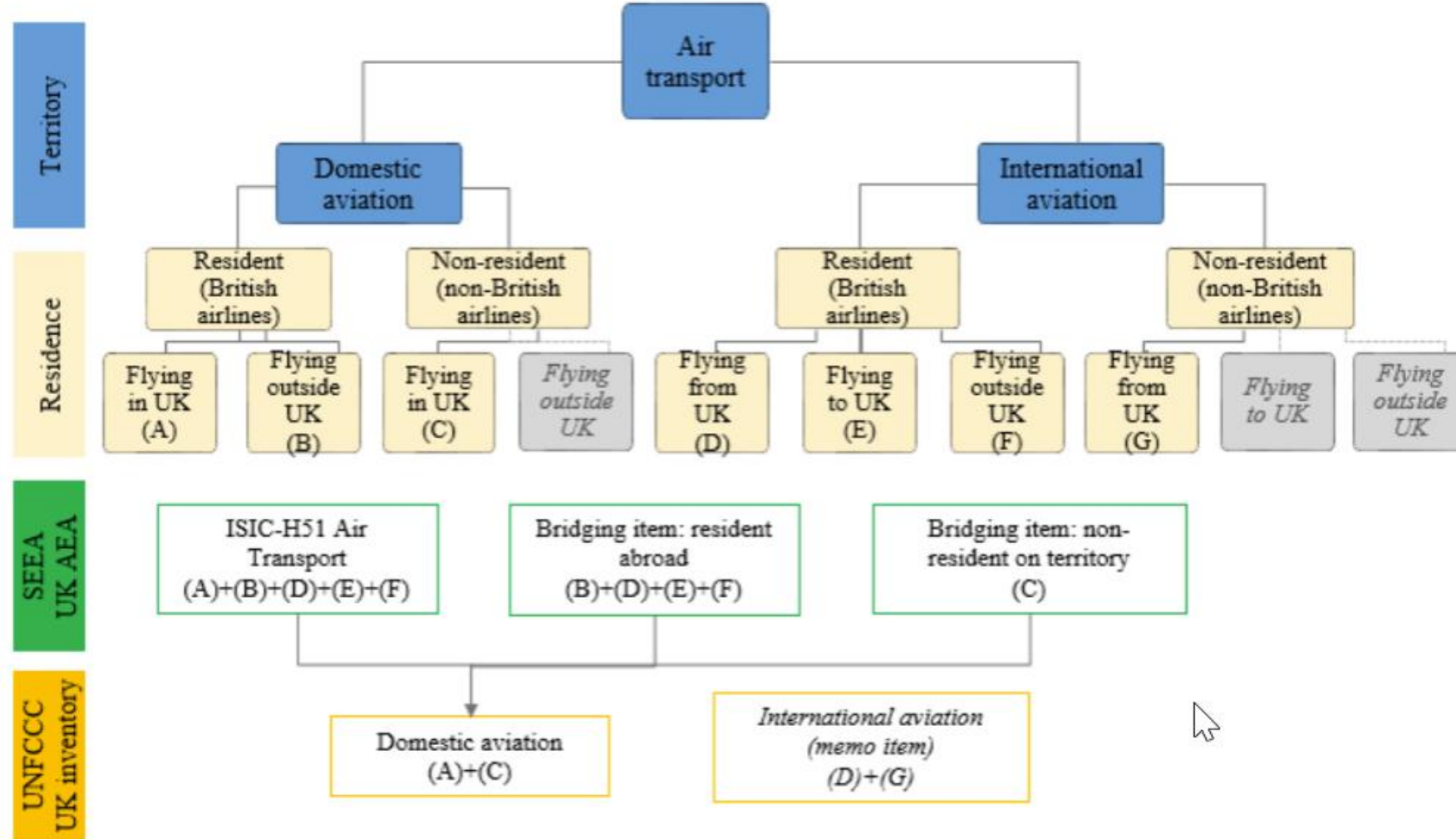
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Air Transport - Development of the bridging table for GHG Emission Accounts



Development of the bridging table for GHG Emission Accounts

a

Air transport CO2 emissions (experimental)				
Reference area: South Africa				
Unit of measure: Tonnes				
Adjustment: Neither seasonally adjusted nor calendar adjusted				
Pollutants: Carbon dioxide				
Time period			2013	2014
Emissions	Combined unit of measure			
Air emissions accounts: air transport	Emissions, SEEA (residence principle)	A_B_D_E_F	4 140 524	4 162 707
Residents abroad	Emissions, SEEA (residence principle)	B_D_E_F	2 996 316	2 953 898
Inventories: domestic aviation	Emissions, UNFCCC inventories (territory principle)	A_C	1 468 752	1 527 911
Inventories: international aviation	Emissions, UNFCCC inventories (territory principle)	D_G	4 299 213	4 323 989
Domestic flights in reference country, operated by resident airlines of reference country	Emissions	A	1 144 208	1 208 809
Domestic flights outside of reference country, operated by resident airlines of reference country	Emissions	B	13 227	10 340
Domestic flights in reference country, operated by airlines that are non-residents in reference country	Emissions	C	324 544	319 102
International flights departing from reference country, operated by resident airlines of reference country	Emissions	D	1 408 934	1 389 867
International flights arriving in reference country, operated by resident airlines of reference country	Emissions	E	1 414 639	1 404 597
International flights outside of reference country, operated by resident airlines of reference country	Emissions	F	159 516	149 094
International flights departing from reference country, operated by airlines that are non-residents in reference country	Emissions	G	2 890 278	2 934 122



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Development of the bridging table for GHG Emission Accounts



- The OECD CO₂ emissions from maritime database and estimates of CO₂ emissions from shipping are produced using a ship-tracking dataset known as the Automatic Identification System (AIS), which was developed by International Maritime Organization (IMO) of the UN and is available on the UN Global Platform.
- The AIS is compulsory for international commercial ships with gross tonnage (GT) of 300 or more tonnes, and all passenger ships regardless of size.
- Each vessel in the global fleet is associated with a ship operator in the AIS database, with information on the company's country of residence.
- The AIS system contains static and dynamic vessel information, electronically exchanged between AIS receiving stations (onboard, ashore or satellite).
- It uses Global Positioning Systems (GPS) in conjunction with shipboard sensors and digital Very High Frequency (VHF) radio communication equipment to automatically exchange navigation information electronically.
- AIS transceivers are required for most large shipping vessels in the global fleet by the International Convention for the Safety of Life at Sea (SOLAS).



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Maritime Transport - Development of the bridging table for GHG Emission Accounts

Maritime transport CO2 emissions (experimental)								
Reference area: South Africa								
Unit of measure: Tonnes								
Adjustment: Neither seasonally adjusted nor calendar adjusted								
Pollutants: Carbon dioxide								
Source: Estimated by OECD								
Time period		2019	2020	2021	2022	2023	2024	2025
Vessel								
Combined unit of measure: Emissions, SEEA (residence principle)								
Vessel emissions: Air emissions accounts: maritime transport A_B_D_E_F								
All vessels		360 427	353 568	352 762	350 148	347 777	335 260	
Combined unit of measure: Emissions, Port of departure								
Vessel emissions: Domestic voyages A_C								
All vessels		1 117 234	1 234 599	1 294 440	2 007 838	1 449 010	1 431 833	1 144 018
All vessels except fishing		935 837	1 067 354	1 106 183	1 829 074	1 262 910	1 252 457	976 942
Combined unit of measure: Emissions, Port of departure								
Vessel emissions: International voyages D_G								
All vessels		8 443 659	8 546 333	9 513 700	9 116 151	8 421 853	8 417 935	7 944 632
All vessels except fishing		8 359 476	8 452 545	9 451 920	9 063 137	8 315 214	8 346 817	7 881 527
Combined unit of measure: Emissions								



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