



Physical Energy Flow Accounts for South Africa, 2022

National NCA Forum 2026
14 September 2026

Robert Parry
Deputy Director: Environmental
Economic Accounts



stats sa

Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA

IMPROVING LIVES THROUGH DATA ECOSYSTEMS



Background



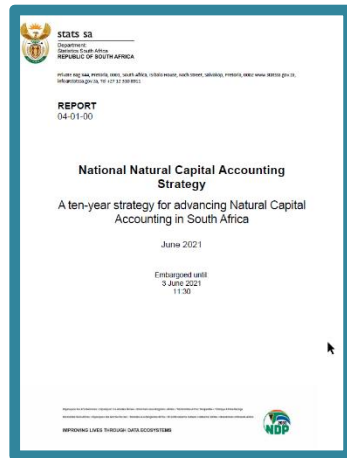
stats sa
Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA

IMPROVING LIVES THROUGH DATA ECOSYSTEMS



Energy 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
3.1.2. Accounts related to energy	3.1.2.1 Regularly produce national energy supply and use tables	High road	Stats SA, DMRE, Eskom, SANEDI, relevant NGOs		
	3.1.2.2 Explore production of energy supply and use tables at finer spatial resolutions, e.g. district municipality level	High road	Stats SA, DMRE, local and district municipalities		

IMF G20 Data Gaps Initiative 3 – Theme: Climate Change – Recommendation 2:



(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.



stats sa
Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA

IMPROVING LIVES THROUGH DATA ECOSYSTEMS



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

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

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</u> House, 1 Koch Street, <u>Salvokop</u> , Pretoria, South Africa
Date	June 10 -14, 2024

IMF SECO Mission team mainly working with the team of officers in Stats SA, DFFE and the DEE directly involved in the compilation of Energy and Air Emissions Accounts. The mission team also consulted with other agencies/directorates of Stats SA

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

The IMF SECO 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

October 2025



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, <u>ISibalo</u> House, 1 Koch Street, <u>Salvokop</u> , Pretoria, South Africa
Date	October 6 -10, 2025

The IMF SECO 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, 2022



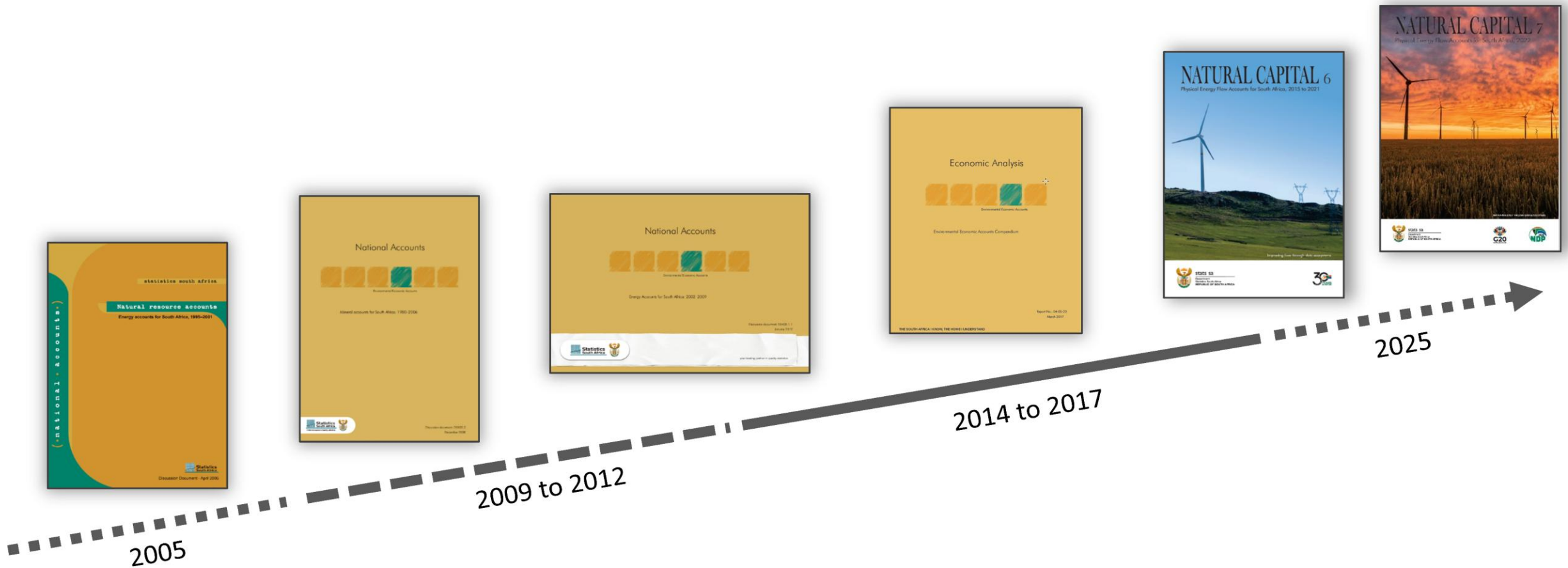
stats sa

Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA

IMPROVING LIVES THROUGH DATA ECOSYSTEMS



Energy Accounts: Learning curve

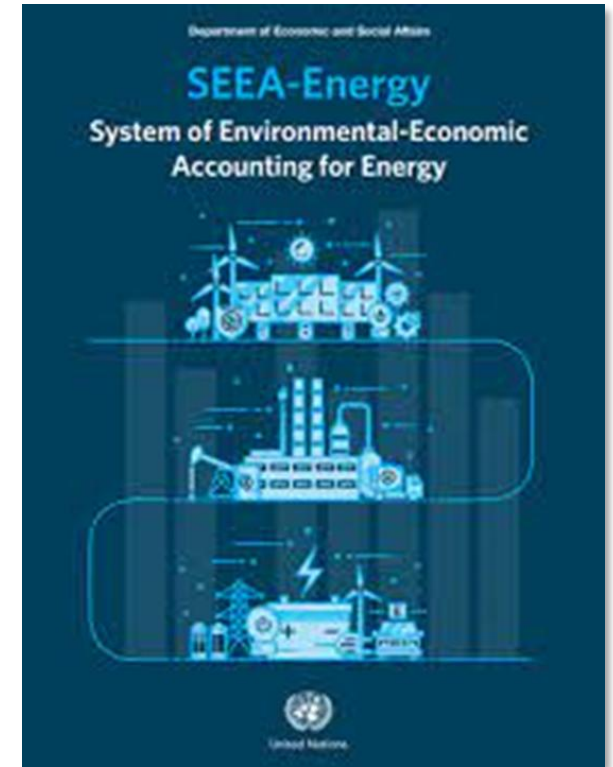


stats sa
Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA

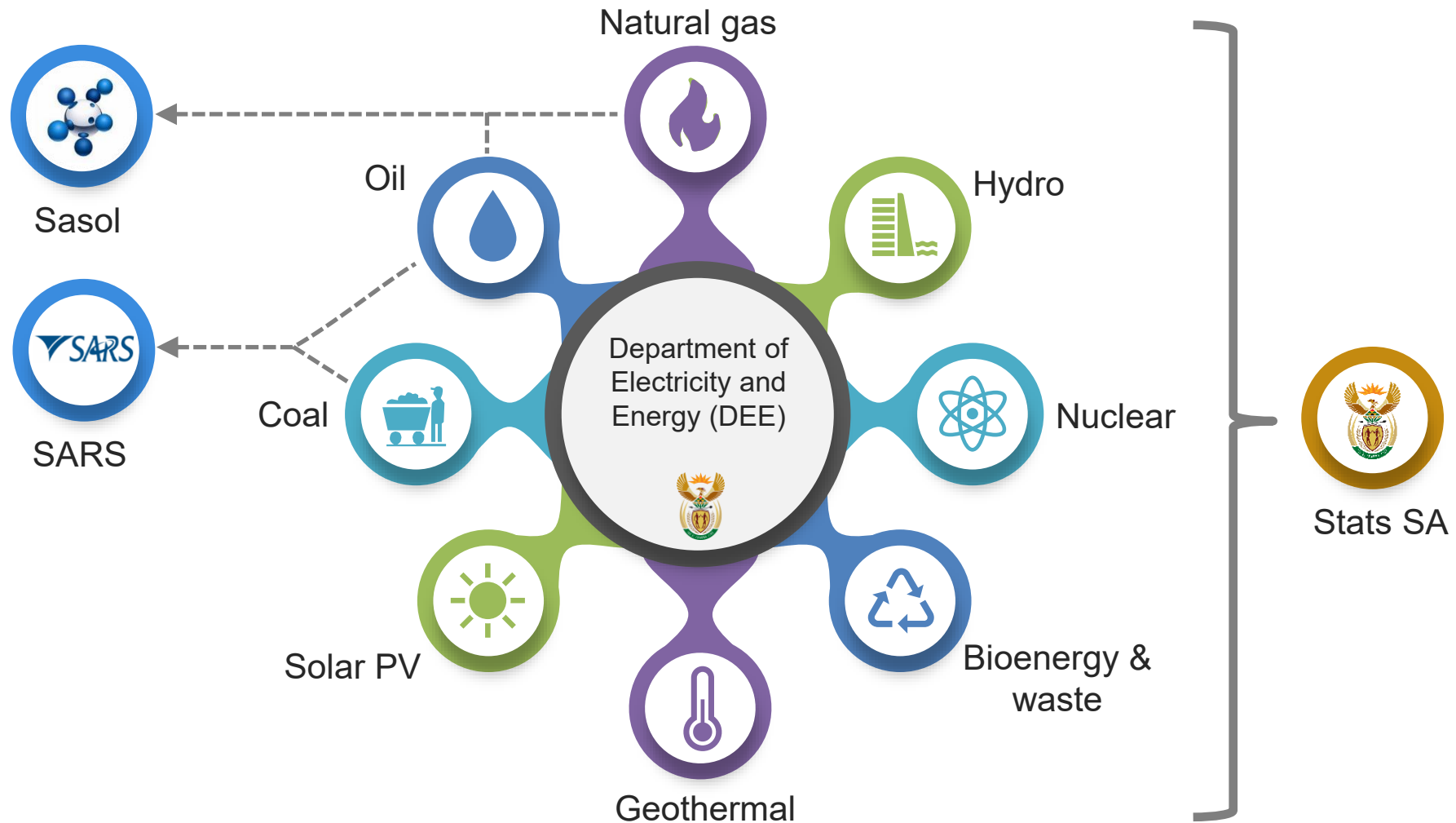
IMPROVING LIVES THROUGH DATA ECOSYSTEMS



- **SEEA Energy** is a separate SEEA-publication with more details on how data on energy should be organised in the accounts.
 - **Flow accounts**
 - **Asset accounts**
 - **Physical accounts**
 - common physical unit: typically Joules
 - **Monetary accounts**
 - Rand, \$, euros, etc.



Data sources for Energy Balances



Physical Energy Flow Accounts for South Africa 2015 to 2022 unpacked



stats sa
Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA

IMPROVING LIVES THROUGH DATA ECOSYSTEMS



Scope of the PEFA for South Africa

- The PEFA for South Africa, are presented in physical terms, more specifically in Petajoule (PJ).
- The measurement units of energy used based upon the International System of Units (SI), derived from the French "Système International d'Unités," is the modern metric system of measurement established through international agreement.
- The measurement units of energy used in the PEFA for South Africa, that are based on this system, are joules (J) and its multiples, the terajoule (TJ) and the PJ.
- J is the base unit of energy in the SI, defined as the energy transferred when one newton of force is applied over a distance of one meter.
- PJ: Equal to 10^{15} J, commonly employed in national EBs and large energy systems. Key: $10^{15} = 1,000,000,000,000,000$ (quadrillion).

Table 2 – Hierarchy of units of energy measurement

Unit	Symbol	Number of Joules (J)	Conversion Formula
Joule	J	1	1J=1J
<u>Terajoule</u>	TJ	10^{12} J	1TJ= 10^{12} J
<u>Petajoule</u>	PJ	10^{15} J	1PJ= 10^{15} J

Source: National Institute of Standards and Technology, Special Publication 330, The International System of Units, 2019



stats sa

Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA

IMPROVING LIVES THROUGH DATA ECOSYSTEMS



What is the PEFA for South Africa

The PEFA tracks all stages of physical energy flow in South Africa, including:

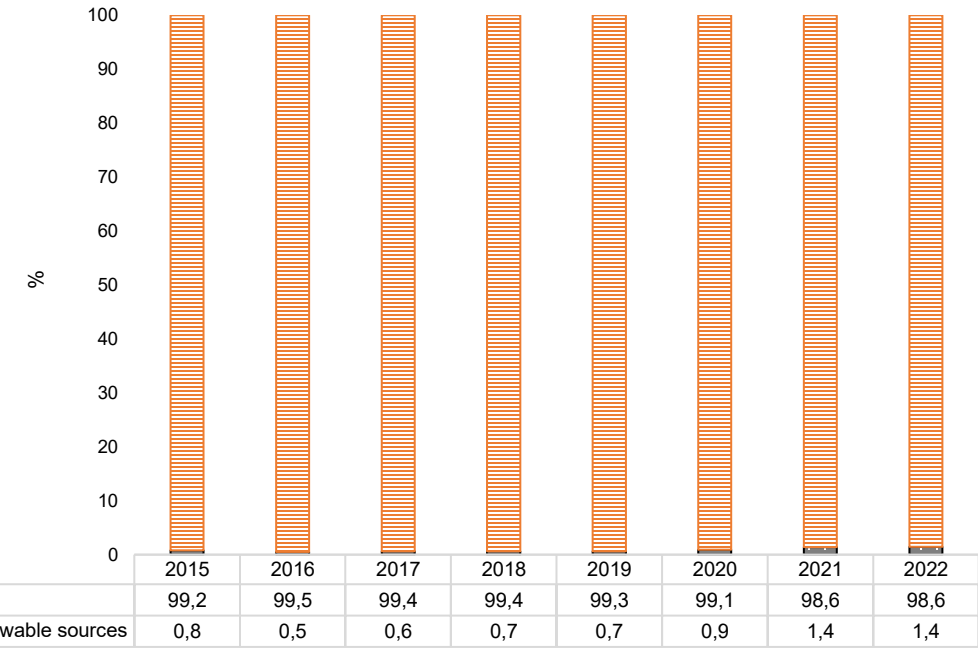
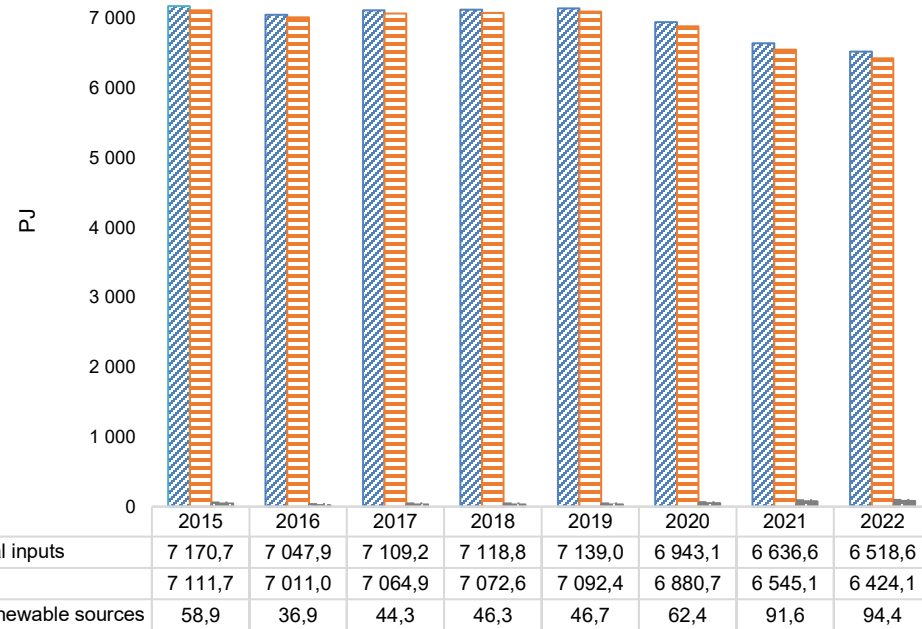
1. **Extraction/Production:** Energy sources such as coal, oil, gas, and renewables (solar, wind) extracted or produced within the national boundaries.
 2. **Imports/Exports:** Energy products entering or leaving the economy.
 3. **Transformation:** The conversion of primary energy into secondary energy forms (e.g., crude oil to refined petroleum, or coal to electricity).
 4. **Final Consumption:** Energy use by households, industries, governments, and other sectors.
- SEEA – Energy is a multipurpose conceptual framework for organising energy-related statistical information.
 - PEFA provides structured presentations of physical energy flows from the environment into the economy, physical flows within the economy and physical energy flow back to the environment.
 - For each energy product measured in physical units (for example coal in PJ), the total supply of the energy product (domestic production plus imports) must equal the total use (demand), which includes consumption (both intermediate and final), changes in inventories, and exports:

Total supply of energy products = domestic output + imports

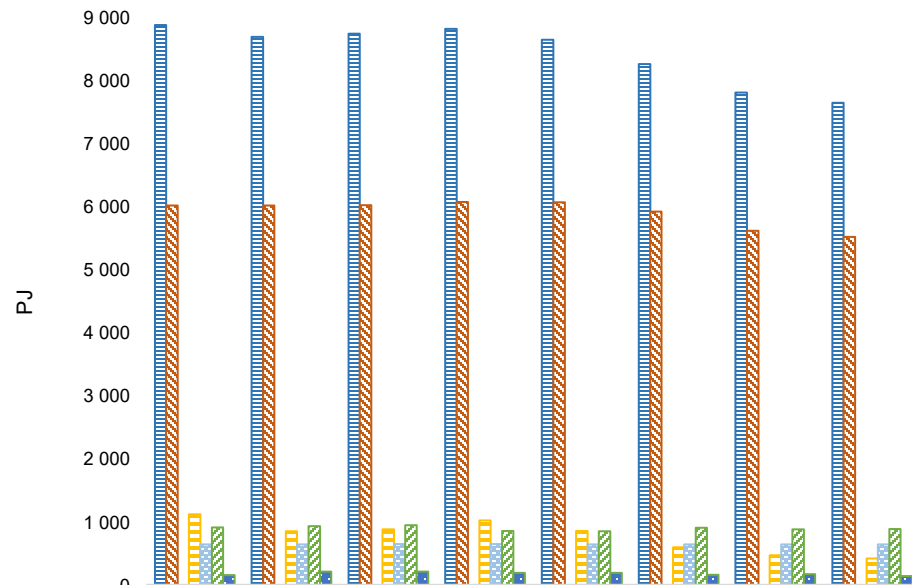
is equal to

Total use of energy products = intermediate consumption + household consumption
+ changes in inventories + exports.

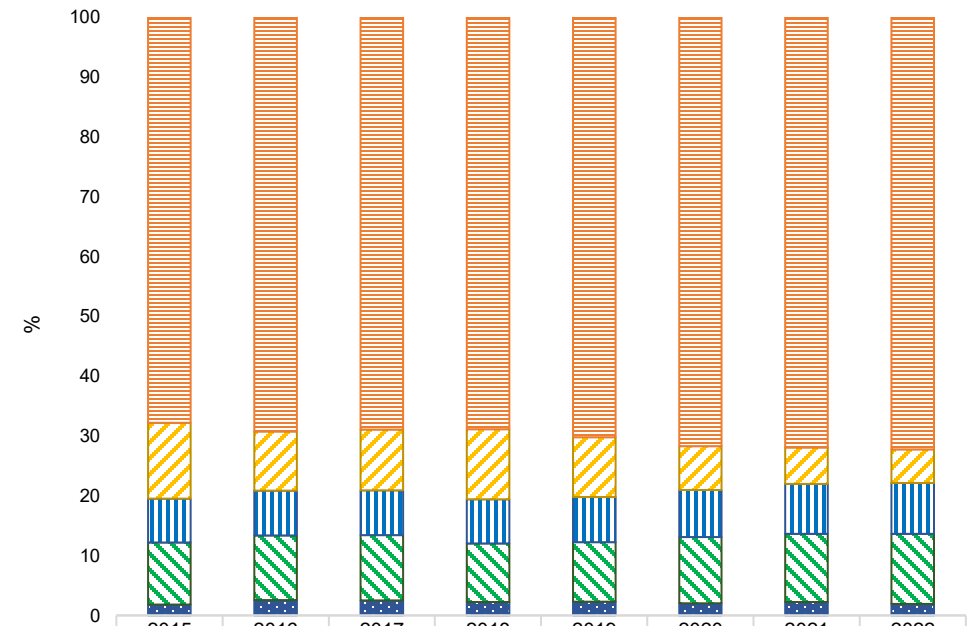
Energy from natural inputs, 2015–2022 (Petajoule)



Domestic supply of energy products, 2015–2022 (Petajoule)



	2015	2016	2017	2018	2019	2020	2021	2022
Total domestic supply of energy products	8 882,9	8 695,2	8 745,6	8 823,5	8 650,2	8 267,8	7 816,5	7 650,1
Coal	6 023,2	6 021,9	6 028,1	6 077,4	6 073,6	5 928,6	5 620,0	5 526,4
Natural gas	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
Oil and oil products	1 126,1	858,9	886,7	1 032,2	865,2	603,1	477,5	427,5
Biofuels	651,3	651,1	654,7	653,4	652,3	652,1	652,3	652,3
Electricity	918,1	940,7	955,9	861,7	860,4	913,8	888,5	895,7
Nuclear fuels and other fuels	163,5	221,8	219,5	198,1	198,1	169,5	177,6	147,7



	2015	2016	2017	2018	2019	2020	2021	2022
Coal	67,8	69,3	68,9	68,9	70,2	71,7	71,9	72,2
Natural gas	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Oil and oil products	12,7	9,9	10,1	11,7	10,0	7,3	6,1	5,6
Biofuels	7,3	7,5	7,5	7,4	7,5	7,9	8,3	8,5
Electricity	10,3	10,8	10,9	9,8	9,9	11,1	11,4	11,7
Nuclear fuels and other fuels	1,8	2,6	2,5	2,2	2,3	2,1	2,3	1,9



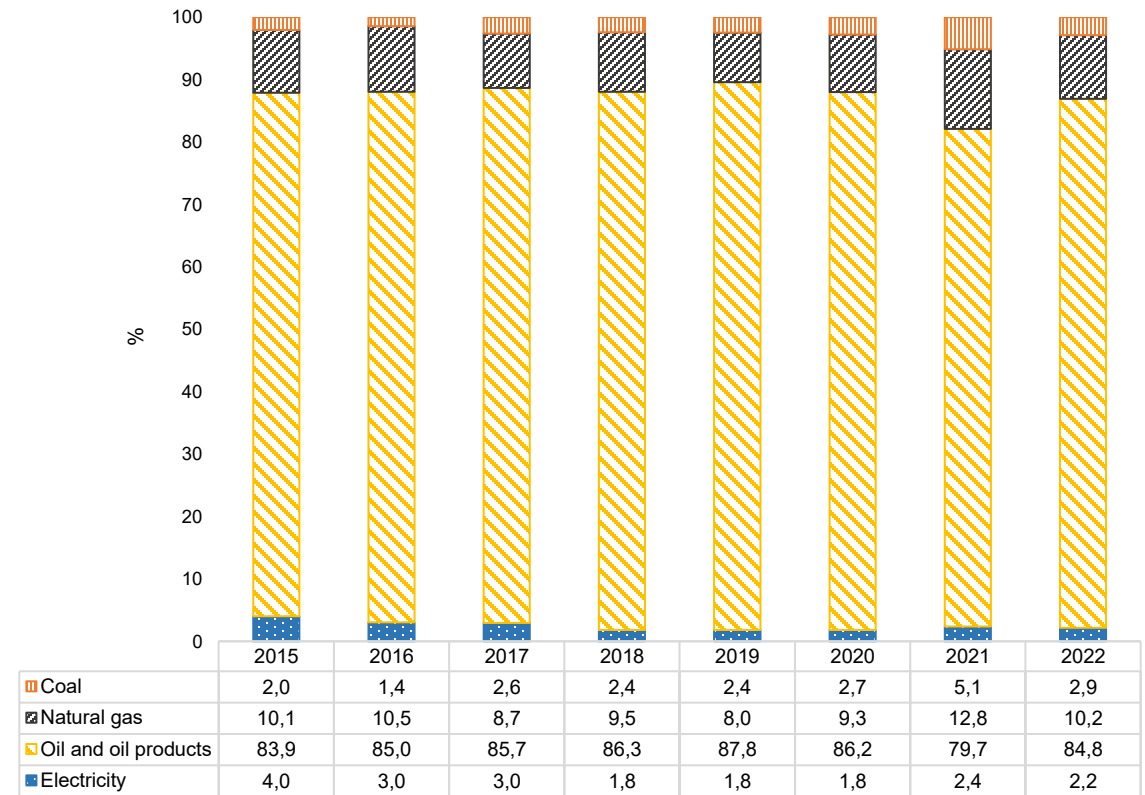
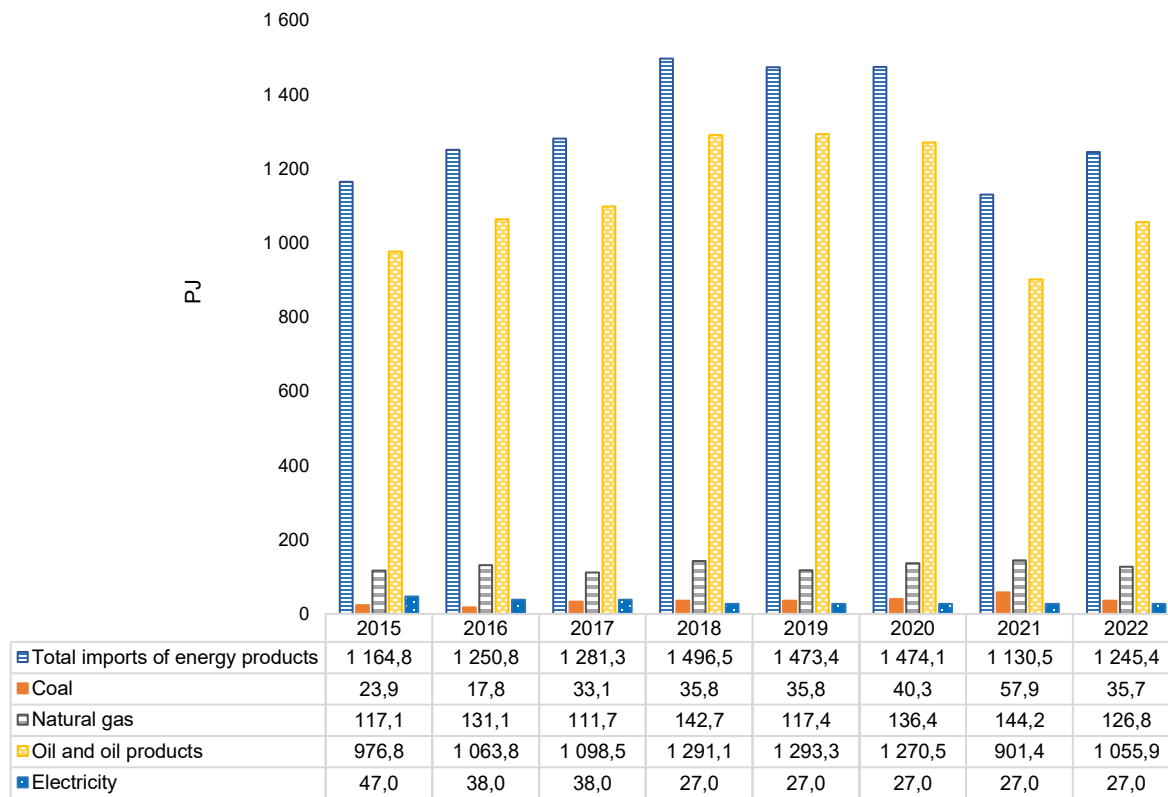
stats sa

Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA

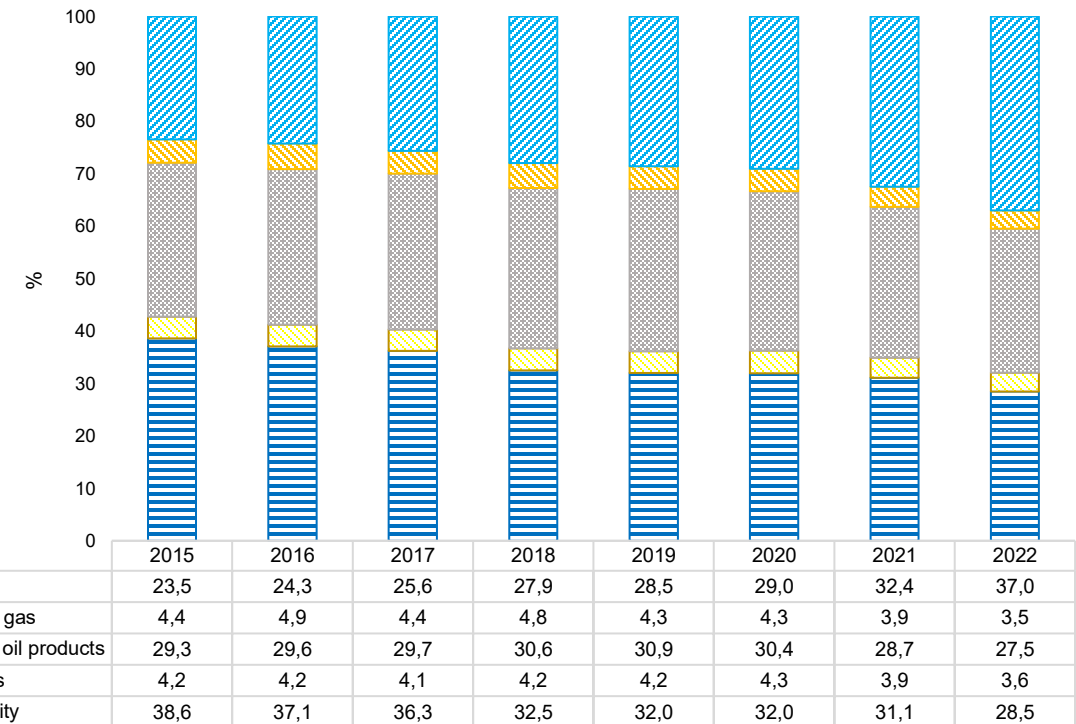
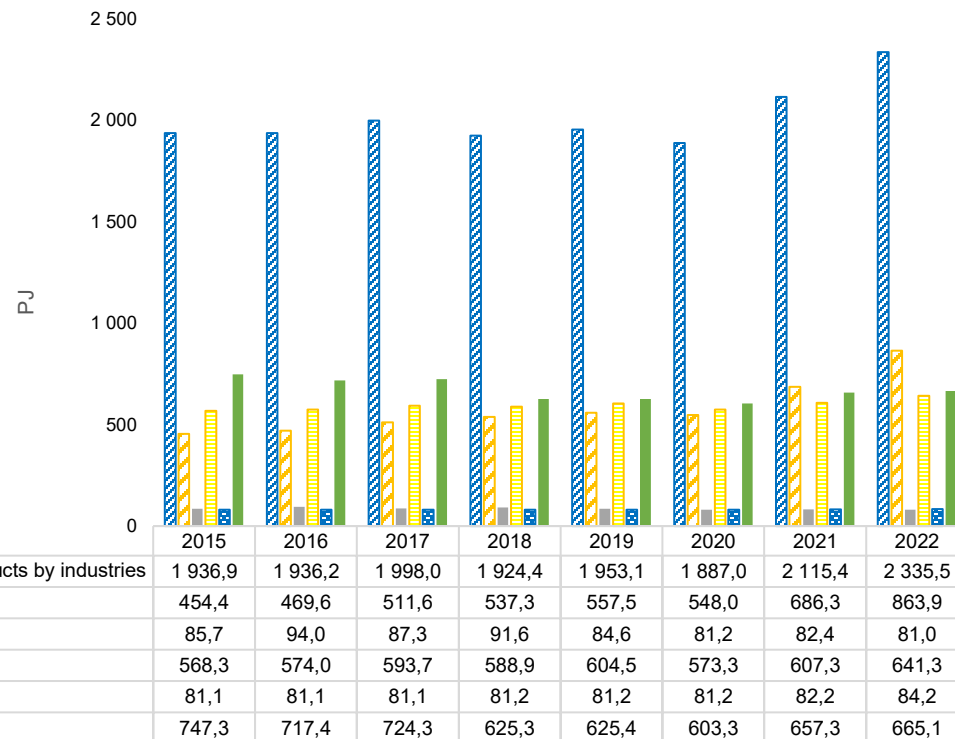
IMPROVING LIVES THROUGH DATA ECOSYSTEMS



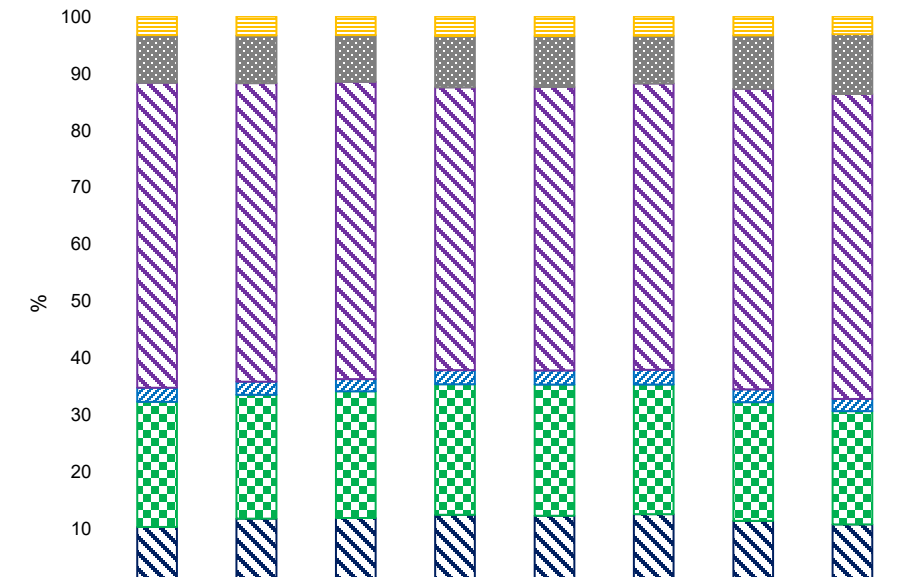
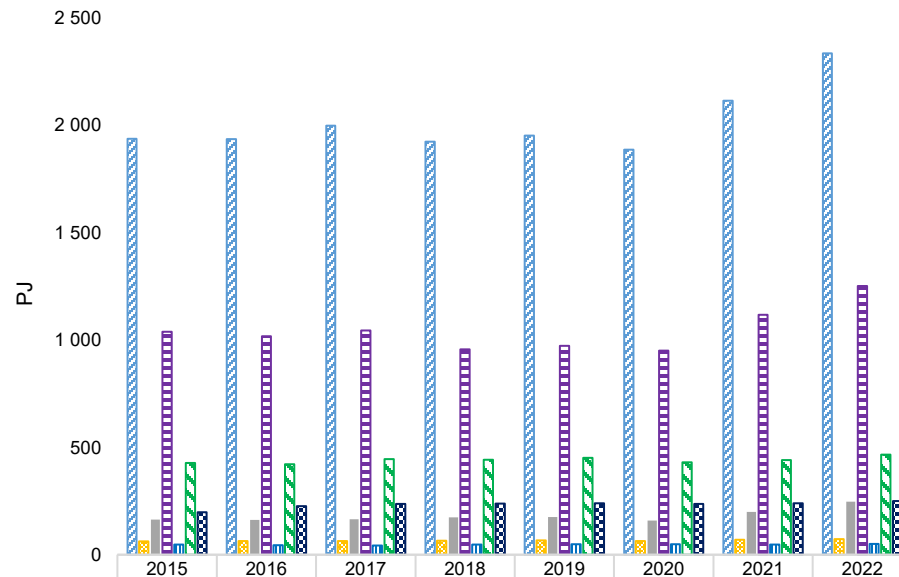
Imports of energy products, 2015–2022



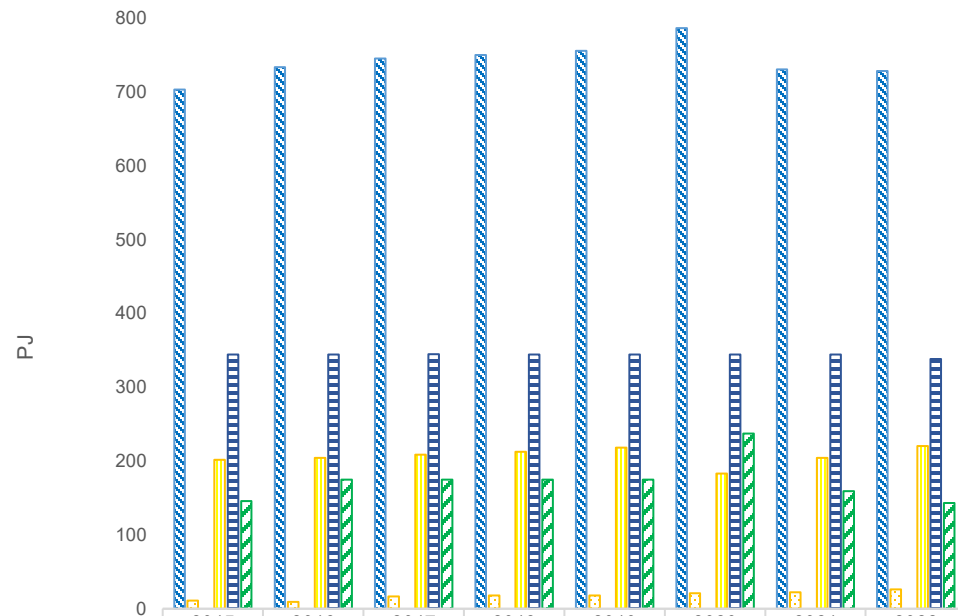
Industrial end-use of energy by energy product, 2015–2022



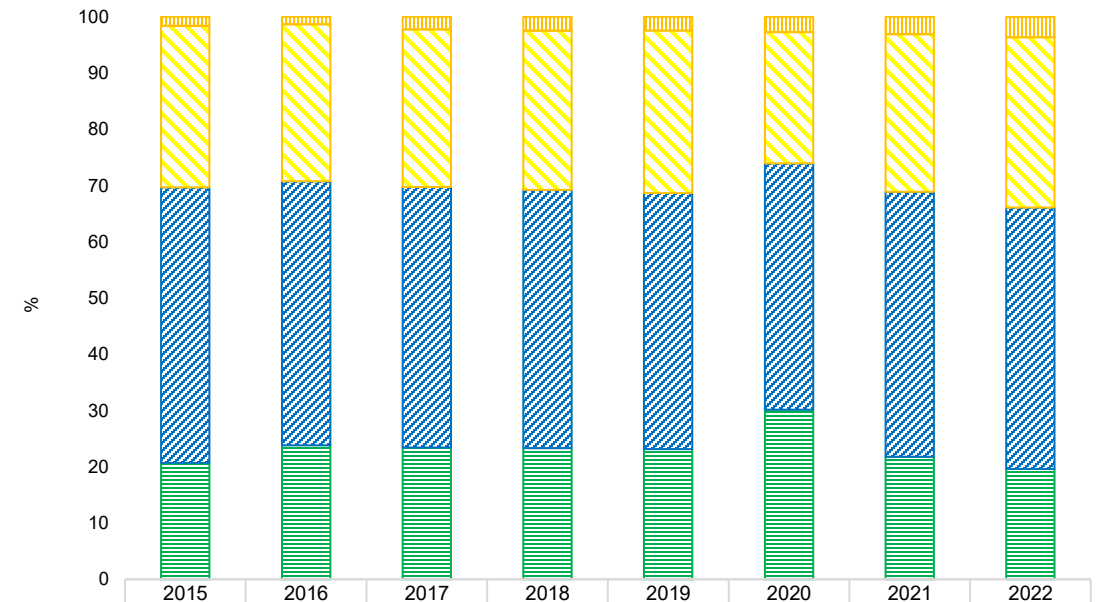
End-use of energy products by industry, 2015–2022



End-use of energy products by households, 2015–2022

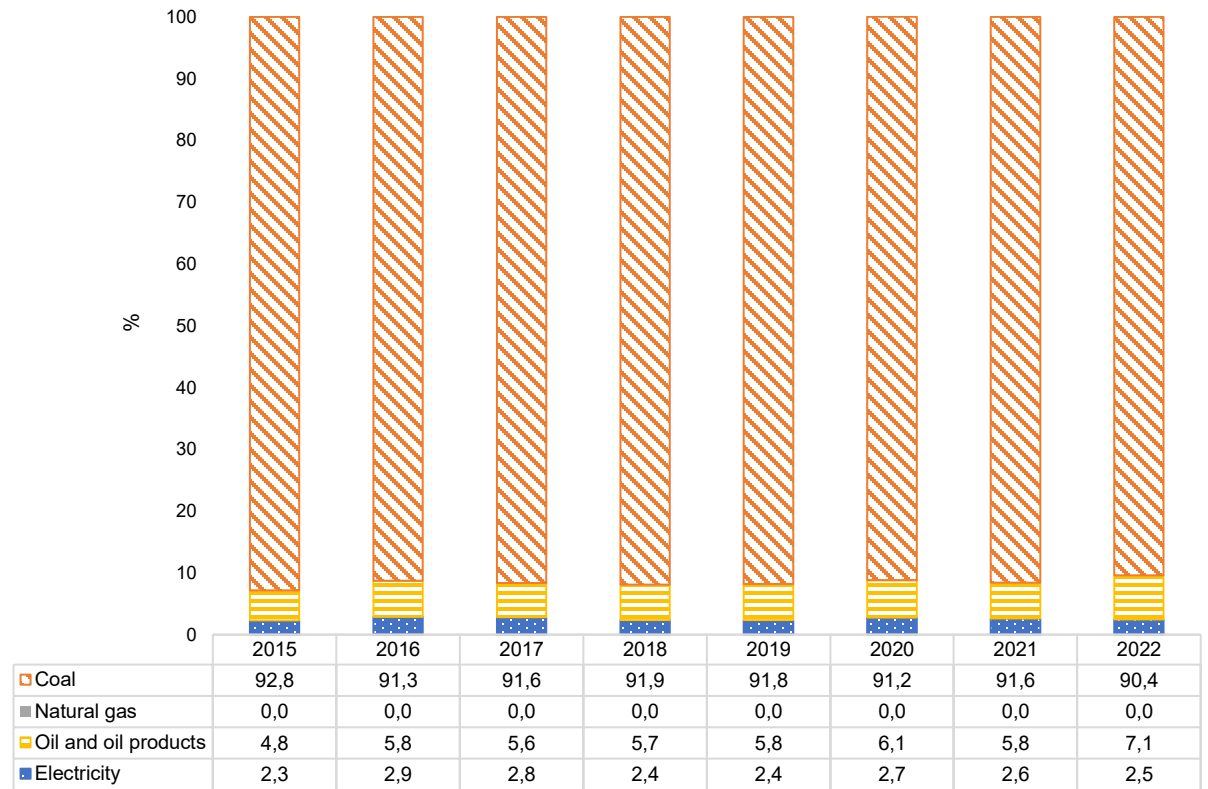
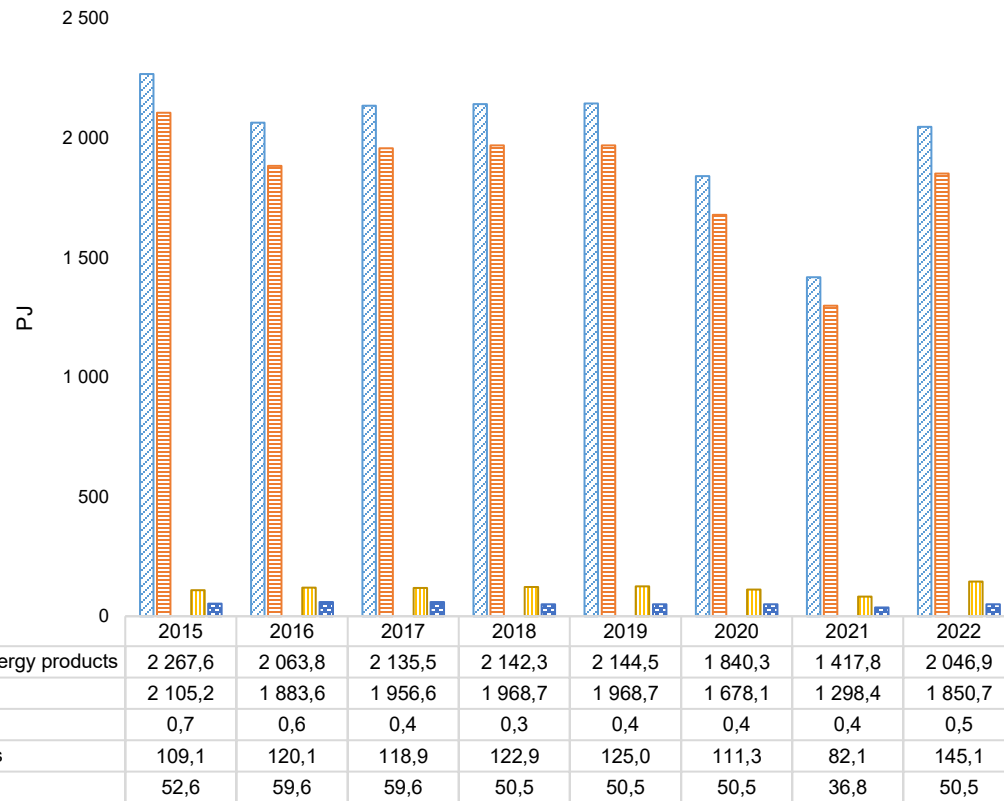


	2015	2016	2017	2018	2019	2020	2021	2022
End-use of energy products by households	702,9	733,1	745,0	749,7	755,4	786,0	730,2	727,8
Coal	11,1	9,5	16,6	18,2	18,2	21,2	22,3	26,2
Natural gas	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
Oil and oil products	201,6	204,4	208,7	212,4	218,1	183,2	204,5	220,2
Biofuels	344,4	344,2	344,8	344,2	344,2	344,2	344,3	338,3
Electricity	145,6	174,7	174,7	174,7	174,7	237,1	159,0	143,0



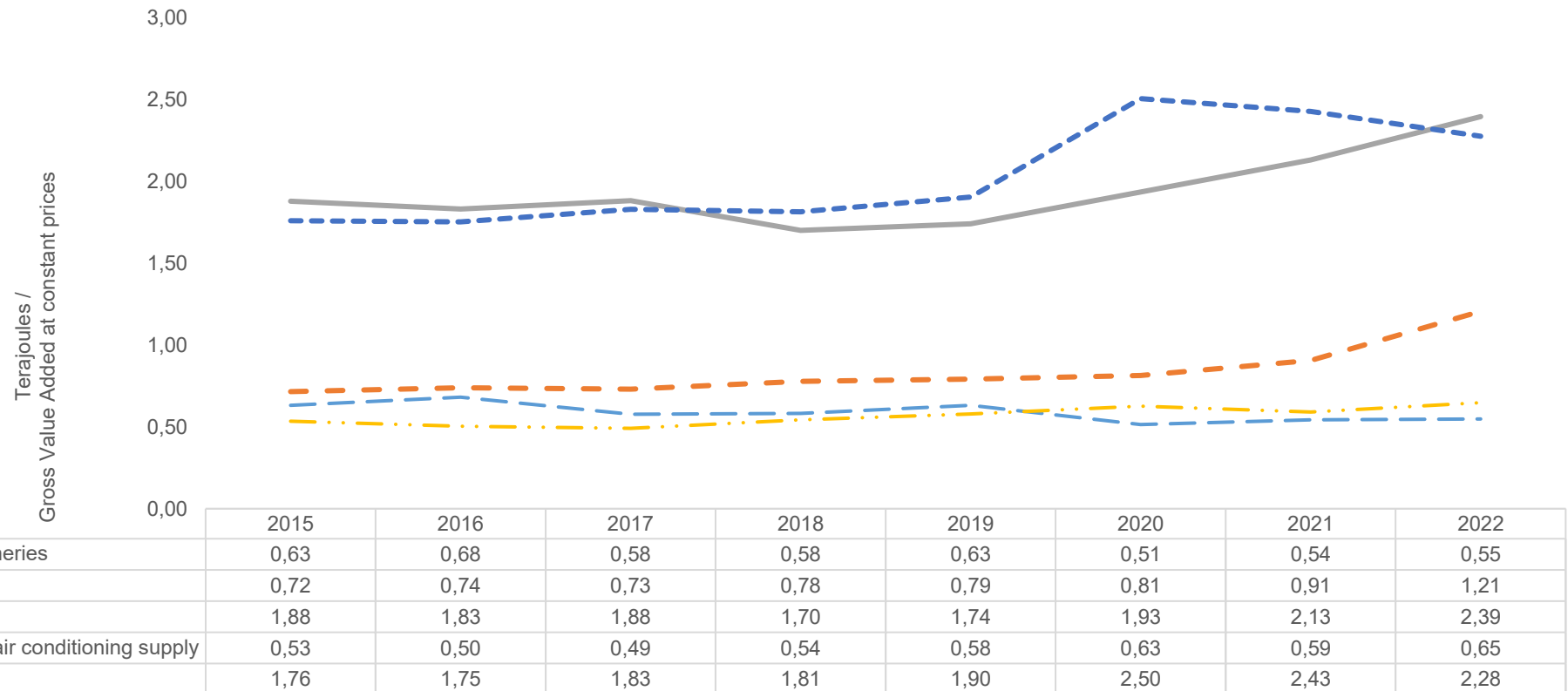
	2015	2016	2017	2018	2019	2020	2021	2022
Coal	1,6	1,3	2,2	2,4	2,4	2,7	3,1	3,6
Natural gas	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Oil and oil products	28,7	27,9	28,0	28,3	28,9	23,3	28,0	30,3
Biofuels	49,0	47,0	46,3	45,9	45,6	43,8	47,1	46,5
Electricity	20,7	23,8	23,4	23,3	23,1	30,2	21,8	19,6

Exports of Energy, 2015–2022



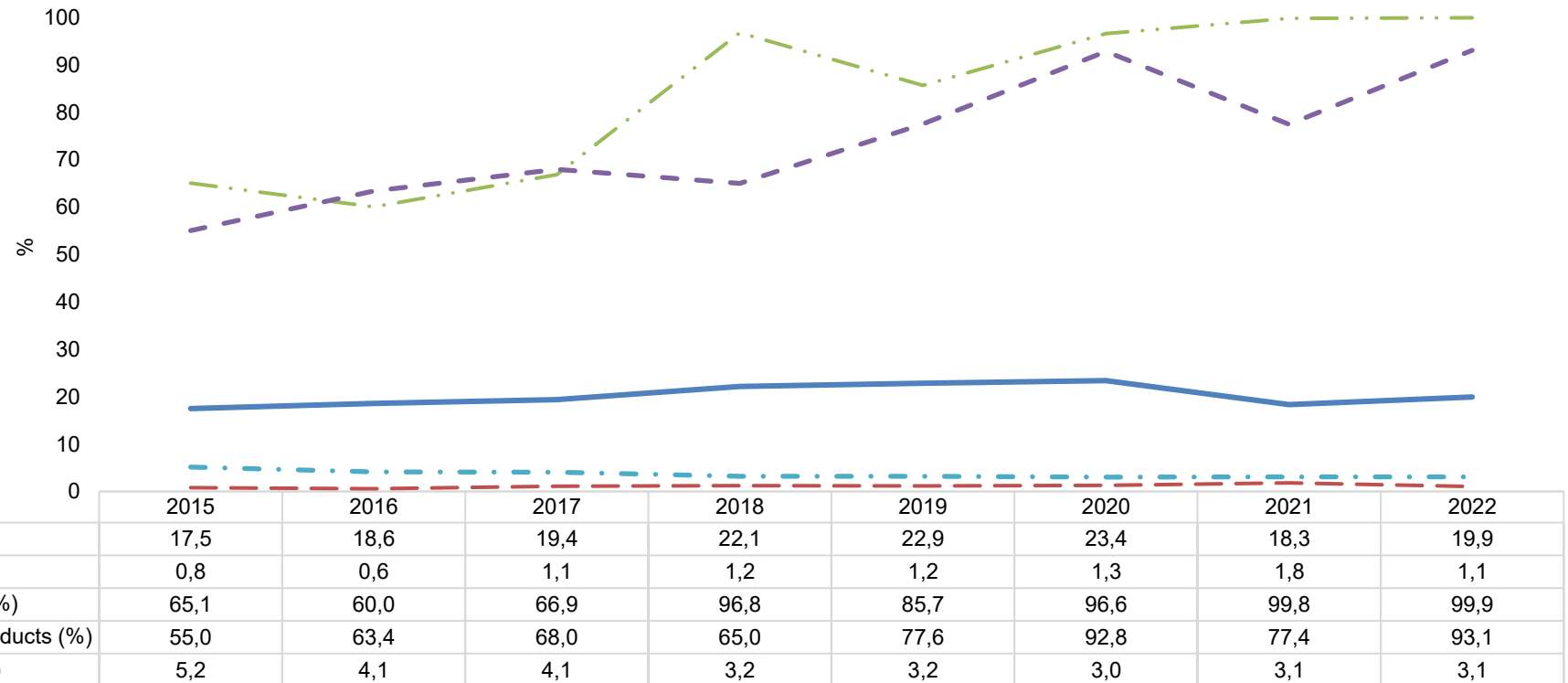
Energy intensities for selected industries in South Africa, 2015–2022

- Energy intensity is defined as the ratio of energy used for a given industry to the value added in constant prices by that industry.
- Decreasing energy intensity indicates a tendency over time to use energy more efficiently.
- Increased efficiency in energy use and decreased energy use can contribute to sustainable development.



Energy dependency ratios, 2015–2022

- A country's energy dependency ratio is the proportion of energy it imports divided by its total domestic energy consumption.
- Expressed as a percentage, it reflects how much an economy depends on other countries to meet its energy needs.
- If the energy dependency ratio decreases, then the country is said to be making the transition toward 'energy sovereignty'.



stats sa

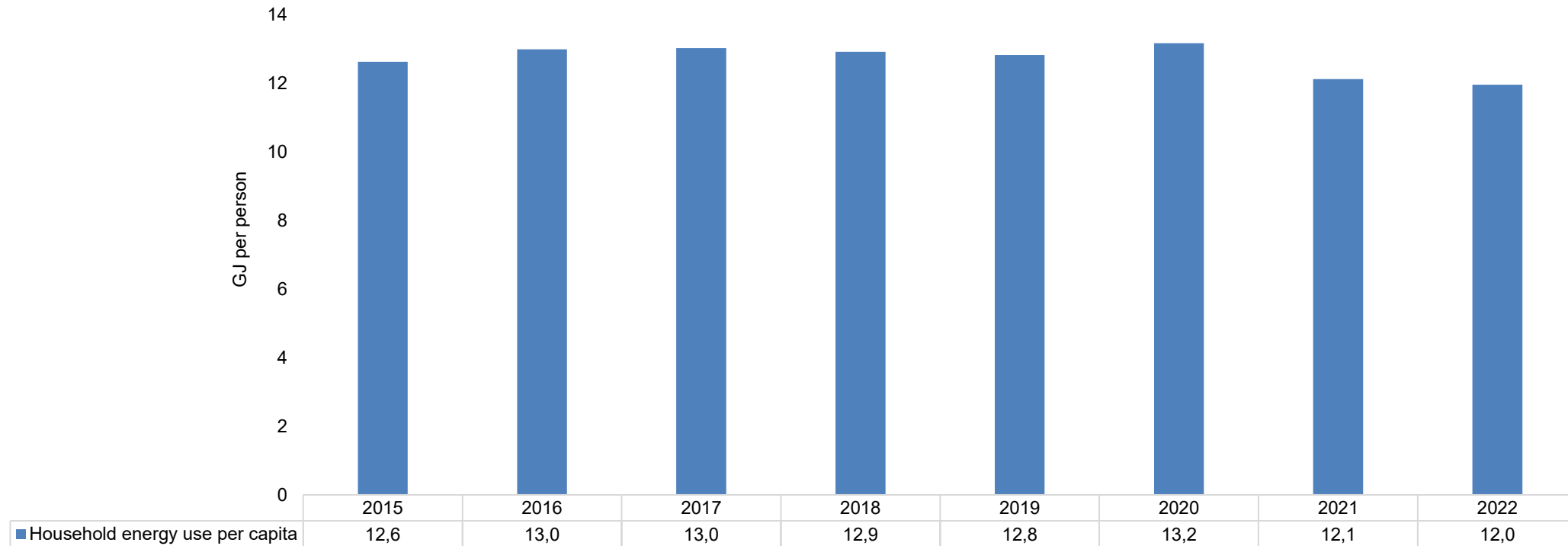
Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA

IMPROVING LIVES THROUGH DATA ECOSYSTEMS



Household energy use per capita, 2015–2022

- The household energy use per capita is the total energy use by resident households (total purposes, i.e. heating/cooling, transport, other) divided by the resident population.
- It is calculated as the consumption of energy products by households for all purposes divided by the resident population.



Natural Capital series 7, Physical Energy Flow Accounts for South Africa, 2022 (D0401.7)

Released on StatsOnline:
Date: 26 November 2025
Time: 11:00



stats sa
Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA

IMPROVING LIVES THROUGH DATA ECOSYSTEMS





Thank you



stats sa

Department:
Statistics South Africa
REPUBLIC OF SOUTH AFRICA

IMPROVING LIVES THROUGH DATA ECOSYSTEMS

