NATURAL CAPITAL 6

Physical Energy Flow Accounts for South Africa, 2015 to 2021

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NATURAL CAPITAL 6

Physical Energy Flow Accounts for South Africa, 2015 to 2021

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Deputy Director-General: Economic Statistics

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Preface

Natural Capital Accounting (NCA) is a growing field of work globally, in which South Africa is an acknowledged leader. NCA includes accounting for environmental assets such as land, water, minerals and energy, as well as ecosystem assets and ecosystem services. guided by an international standard, the System of Environmental-Economic Accounting (SEEA). This report is part of Statistics South Africa's (Stats SA) *Natural Capital* series and presents the Physical Energy Flow Accounts (PEFA) for South Africa from 2015 to 2021.

Stats SA is proud to have been involved in the development of the SEEA through, among others, its role in the United Nations Statistical Commission (UNSC), the UN Committee of Experts on Environmental Economic Accounting (UNCEAA) and SEEA-related technical committees. Stats SA, as a custodian and coordinator of national statistics, has embraced working in partnership with other organs of state to produce the statistics needed to make decisions for sustainable national development, including through NCA. Stats SA has partnered with relevant organs of state to develop natural capital accounts, covering environmental resources and ecosystems since the early 2000s.

Stats SA has remained steadfast in applying the SEEA in the development of natural capital accounts for South Africa for over two decades. Using the best available data in South Africa and applying robust, globally endorsed methodologies, NCA can help public and private sector actors to understand more about the interactions between the economy, society and the environment. The information from NCA can be used to monitor and report on progress towards achieving the goals of the National Development Plan (NDP) and the global Sustainable Development Goals (SDGs).

The reliable supply of energy is vital for the growth of South Africa's economy as well as the well-being of its people. Ensuring energy security, now and into the future, requires standardised energy statistics. The first Energy Account for South Africa was released by Stats SA in 2005 (Stats SA, 2005). This report is published as a discussion document in the *Natural Capital* series. The purpose of a discussion document is to present experimental accounts that are not official statistics but to also invite comments on these accounts. The statistics that come from the PEFA for South Africa, 2015 to 2021 add to the richness of evidence available to decision-and policy-makers. It further contributes to the implementation of South Africa's National NCA Strategy, that Stats SA published in June 2021.

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March 2025

Acknowledgement

Statistics South Africa (Stats SA) is acknowledged as the technical lead for the compilation of the Physical Energy Flow Accounts (PEFA) for South Africa for the reference period 2015 to 2021. This report was written through the collaborative effort of Robert Parry (Stats SA) and Riaan Grobler (Stats SA).

The following institutions are acknowledged for data provided: the Department of Mineral Resources and Energy (DMRE) for the South African energy balances data from 2015 to 2021; and the Stats SA Structural Industry Statistics (SIS) chief directorate for the industry energy use data from the various large sample surveys (LSSs).

Members of the Technical Working Group (TWG) for the compilation of the air emissions accounts (AEA) and energy accounts for South Africa – including representatives from the Department of Forestry, Fisheries and the Environment (DFFE), the DMRE, the Department of Planning, Monitoring and Evaluation (DPME), Eskom, National Treasury (NT), the South African Reserve Bank (SARB) and Stats SA – are acknowledged for providing valuable feedback and input that influenced additional analysis and contextual information that have been included in this report.

The Statistics Department of the International Monetary Fund (IMF), with support from the Switzerland State Secretariat for Economic Affairs (SECO) through the two-year “Environmental and Climate Change Statistics Capacity Development Program”, is acknowledged for the technical support, technical guidance and the training opportunities provided for compilation of the PEFA for South Africa, 2015 to 2021.

The photograph on the front cover showing the wind turbine and electricity pylons in a field was obtained from Unsplash (https://unsplash.com).

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Abbreviations

AEA	Air Emission Accounts
ANCA	Advancing Natural Capital Accounting
BESA	Experimental Biodiversity Economy Satellite Accounts
BoP	Balance of Payments
°C	Degrees Celsius
CO	Carbon Monoxide
COVID-19	Coronavirus disease 2019
CWRR	Centre for Water Resources Research
DBSA	Development Bank of Southern Africa
DGI-3	Data Gaps Initiative 3
DFFE	Department of Forestry, Fisheries and the Environment
DMRE	Department of Mineral Resources and Energy
DPME	Department of Planning, Monitoring and Evaluation
DWS	Department of Water and Sanitation
EEA	Environmental Economic Accounts
Eurostat	European Statistical Office
FSB	Financial Stability Board
FMCBGs	Finance Ministers and Central Bank Governors
G20	Group of Twenty
GDP	Gross Domestic Product
GEF	Global Environment Facility
H_2	Hydrogen
IAG	Inter-Agency Group on Economic and Financial Statistics
IEA	International Energy Agency
IIP	Indicative Implementation Plan
IMF	International Monetary Fund
IRES	International Recommendations for Energy Statistics
ISIC	International Standard Industrial Classification of All Economic Activities
JET	Just Energy Transition
J	Joule
LPG	Liquefied petroleum gases
LSS	Large Sample Survey
NCA	Natural Capital Accounting
NCAVES	NCA and Valuation of Ecosystem Services
NDP	National Development Plan
NGOs	Non-government organisations
NIST	National Institute of Standards and Technology
NSDS	National Strategy for Development of Statistics
NSO	National Statistical Office
NT	National Treasury

PEFA	Physical Energy Flow Accounts
PetroSA	The Petroleum Oil and Gas Corporation of South Africa
PJ	Petajoule
PV	Photovoltaic
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SANBI	South African National Biodiversity Institute
SANEDI	South African National Energy Development Institute
SARB	South African Reserve Bank
SAWS	South African Weather Service
SBP	Special Boiling Point
SBS	Structural Business Statistics
SC	Statistical Commission
SDGs	Sustainable Development Goals
SECO	Switzerland State Secretariat for Economic Affairs
SEEA	System of Environmental-Economic Accounting
SEEA CF	System of Environmental-Economic Accounting Central Framework
SEEA EA	System of Environmental-Economic Accounting Ecosystem Accounting
SEEA-Energy	System of Environmental-Economic Accounting Energy
SIC	Standard Industrial Classification of All Economic Activities
SIEC	Standard International Energy Product Classification
SI	International System of Units
SNA	System of National Accounts
Stats SA	Statistics South Africa
SUTs	Supply and Use Tables
SWSAs	Strategic Water Source Areas
TJ	Terajoule
TWG	Technical Working Group
UN	United Nations
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNSD	United Nations Statistics Division
UNSC	United Nations Statistical Commission
UNSIAP	United Nations Statistical Institute for Asia and the Pacific
WB	World Bank
WRC	Water Research Commission
WWF	World Wildlife Federation

Chapter 1: Introduction

This discussion document presents South Africa's Physical Energy Flow Accounts (PEFA) for the period 2015 to 2021. It contributes to the implementation of South Africa's National Natural Capital Accounting (NCA) Strategy, which was published by Statistics South Africa (Stats SA) in June 2021.

1.1 What is Natural Capital Accounting?

NCA refers to the use of an accounting framework to provide a systematic way to measure and report on stocks and flows of natural capital, analogous to accounts for other forms of capital. It is a broad term that includes accounting for individual environmental assets or resources, both biotic and abiotic (such as water, minerals, energy, timber and fish), as well as accounting for ecosystem assets and ecosystem services. NCA provides a common framework for measuring and tracking the contribution of ecosystems and natural resources to social and economic goals over time, such as water security, food security and job creation, and provides a wealth of information that can improve planning and decision-making related to the management of natural resources.

Using an accounting framework provides well-accepted and globally consistent information on the nature of humanity's connection to the environment, and how this is changing over time. Regular production of natural capital accounts can therefore provide standardised statistical information (comparable between countries, or between administrative units within a country, and over time) for tracking and reporting on progress towards sustainable development, including goals and targets set out in policies, frameworks and plans at international, continental, national, provincial or local levels. NCA can provide information to inform economic policy and decision-making for sustainable development.

To this end, the System of Environmental-Economic Accounting (SEEA) has been developed by the United Nations (UN) to organise and present statistics on the environment and its relationship with the economy. It is a statistical system that brings together economic and environmental information into a common framework. SEEA contains an internationally agreed set of standard concepts, definitions, classifications, accounting rules and tables to produce internationally comparable statistics and indicators for policy-making, analysis and research. SEEA Central Framework (CF)[1] describes methods to account for changes in land cover, pollution and waste, as well as to account for stocks and use of natural resources (water, minerals, energy, timber, fish, soil) (UN, 2014). To complement this, SEEA Ecosystem Accounting (EA)[2] describes methods to account for ecosystems and their services, using a spatial approach (UN, 2021). SEEA also provides specific guidance related to energy accounting, with which the accounts presented in this report are aligned.

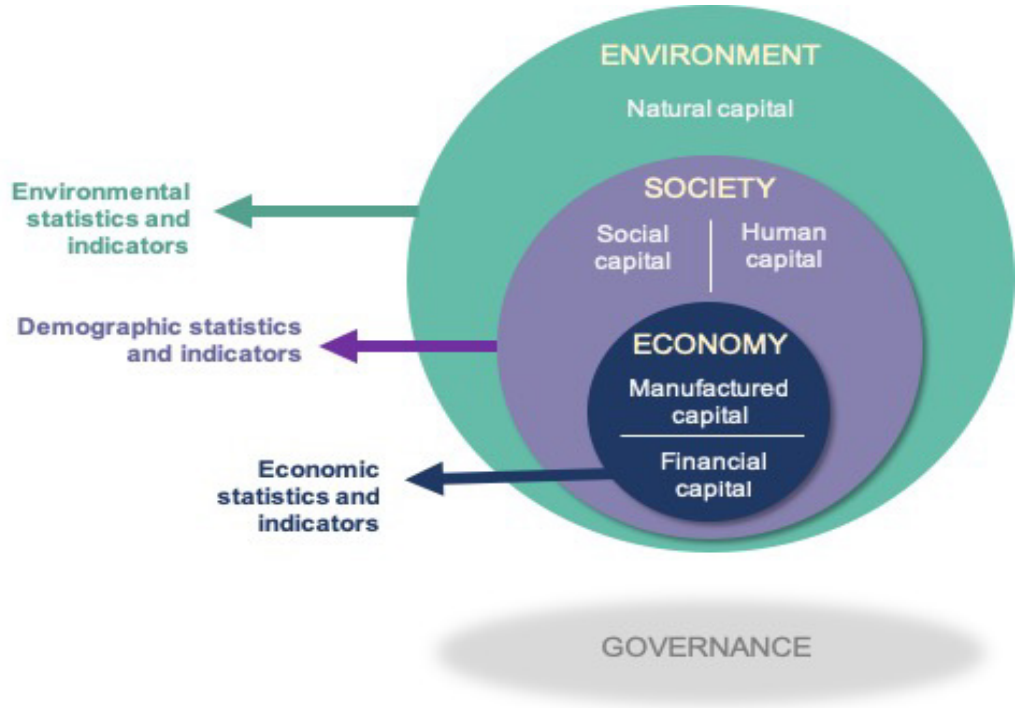
The SEEA-Energy is a subsystem of the SEEA CF and is entirely consistent with the SEEA CF (UN, 2019). SEEA-Energy (UN, 2019) is a multi-purpose conceptual framework for organising energy-related statistics. It supports analysis of the role of energy within the economy, the state of energy inputs and various

[1] SEEA Central Framework is available at https://seea.un.org/content/seea-central-framework.
[2] SEEA Ecosystem Accounting is available at https://seea.un.org/ecosystem-accounting.

energy-related transactions of environmental interest. The aim of SEEA-Energy is to serve as a bridge between the statistical and energy communities (UN, 2019). The compilation of the PEFA for South Africa, which are presented in this document, is fully aligned to the SEEA-Energy.

NCA provides a wealth of information that can improve planning and decision-making related to the management of natural resources and sustainable development. NCA aims to better capture in statistics the relationship between the environment, society and the economy, presented as a set of nested dependencies in Figure 1. This illustrates that our society and the economy we create are wholly dependent on the environment – the planet we live on and rely on for food, clean water, fresh air, fertile soil and other natural resources.

Figure 1 – The relationship between the environment, society and the economy in a sustainable future



Source: South African National Biodiversity Institute, Natural Capital Accounting & Valuation of Ecosystem Services Project 2018.

South Africa has been actively engaged in the implementation of the SEEA, following the SEEA CF and – more – recently making pioneering strides in adopting the SEEA EA. Stats SA has been producing natural capital accounts in line with the SEEA for many years, generating accounts for water, energy, fisheries and minerals since 2000 (available from the Stats SA website: www.statssa.gov.za). As the national statistical office (NSO), Stats SA is a vital enabler of NCA with a mandate to promote official statistics in policy development, policy monitoring, evaluation and decision-making. Stats SA plays a crucial role in elevating official statistics across state organs and civil society, providing a framework for the National Strategy for Development of Statistics (NSDS). Additionally, Stats SA coordinates South Africa's reporting on Sustainable Development Goals (SDGs) and maintains a small unit that produces environmental-economic accounts.

Since 2014, several donor-funded projects have supported South Africa piloting experimental ecosystem accounts and contributing to the finalisation and subsequent implementation of the SEEA-Energy. Stats SA has partnered with the South African National Biodiversity Institute (SANBI) to compile ecosystem accounts, in collaboration with the Department of Forestry, Fisheries and the Environment (DFFE), the Department of Water and Sanitation (DWS) and other national and provincial stakeholders. These projects included implementing a country pilot project on ecosystem accounts as part of a global initiative called Advancing Natural Capital Accounting (ANCA)[3] (2014–2015), and the NCA and Valuation of Ecosystem Services (NCAVES) Project[4] that began in 2017 and was completed in 2021. In 2018, SANBI began the implementation of another project – the Ecological Infrastructure for Water Security (EI4WS) Project[5] – that includes an outcome on developing natural capital accounts to enable policy, planning and decision-making in favour of ecological infrastructure. The Water Research Commission (WRC) has also funded research projects related to water accounts, including a project on National Water Accounts (in partnership with Stats SA) and two projects on the development of a methodology for compiling catchment-level water resource accounts (in partnership with the Centre for Water Resources Research [CWRR] at the University of KwaZulu-Natal). More recently, from 2023 the Statistics Department of the International Monetary Fund (IMF), with support from the Switzerland State Secretariat for Economic Affairs (SECO), launched the "Environmental and Climate Change Statistics Capacity Development Program" which assisted selected countries, including South Africa, to design and implement programmes for developing timely and internationally comparable statistics to assist in formulating policies to address the environmental, financial, economic, and social implications of climate change.

In 2021, supported through the NCAVES Project, Stats SA became one of the first countries to release a *National NCA Strategy: A ten-year strategy for advancing NCA in South Africa* (Stats SA 2021). Historically, South Africa's natural capital accounts had been produced on an ad hoc basis, linked to donor-funded projects. Recognising the need for an integrated and more holistic approach, the National NCA Strategy aims to strengthen the statistical and institutional mechanisms, systems and production processes and focus efforts of Stats SA and other institutions on consistently and regularly producing priority natural capital accounts, aligning with South Africa's development objectives. The National NCA Strategy fosters coordination, standardised statistics, relevant indicators, and collaboration among institutions over a ten-year period with a five-year review, emphasising national-level accounts.

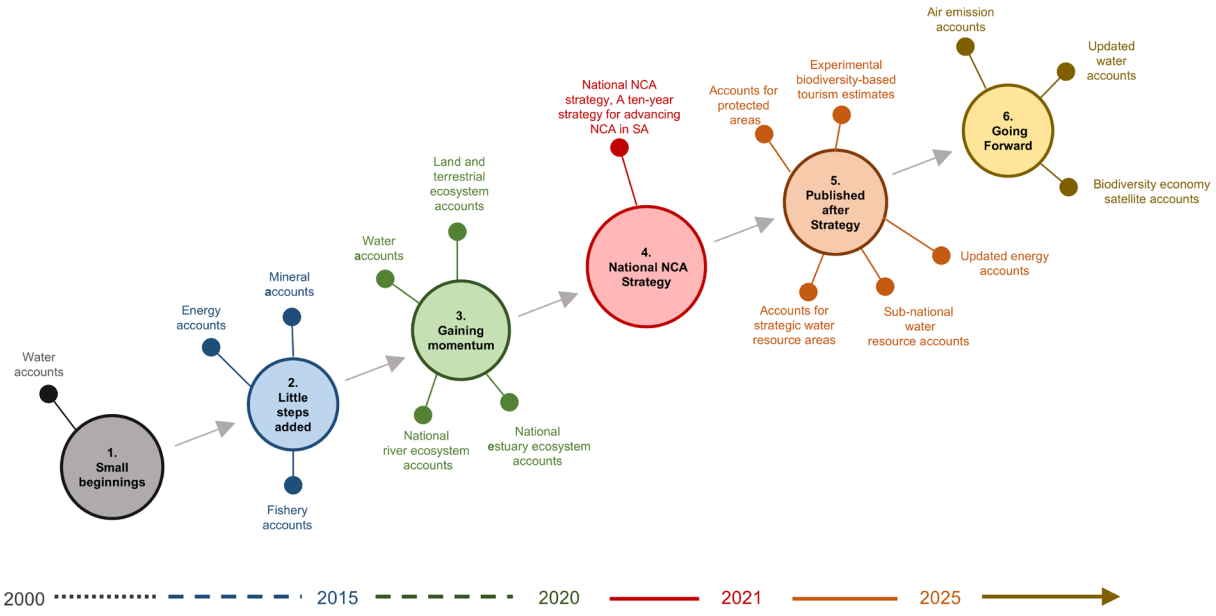
[3] In the ANCA Project, South Africa was one of seven pilot countries. The project was led by the UNSD in partnership with UN Environment and the Convention on Biodiversity, with funding from the Government of Norway. In this project, Stats SA and SANBI worked in partnership with the CSIR, Ezemvelo KZN Wildlife, DWS and DEA (now DFFE).

[4] The NCAVES Project is a global project in which South Africa is one of five participating partner countries (Brazil, China, India, Mexico and South Africa). It is funded by the EU and led globally by the United Nations Statistics Division (UNSD) and United Nations Environment Programme (UNEP). The following institutions are represented on the Project Reference Group: The Delegation of the European Union (EU) to South Africa, UNSD, UN Environment, and the Department of Forestry, Fisheries and the Environment (DFFE).

[5] The EI4WS Project is a seven-year project (2018–2025) and is funded by the Global Environment Facility (GEF), implemented by the Development Bank of Southern Africa (DBSA), and executed by SANBI in partnership with others, including DWS, World Wildlife Federation (WWF) and Stats SA. The accounts developed in the EI4WS Project include the Accounts for Strategic Water Source Areas (SWSAs), 1990 to 2020 (Stats SA 2023), Sub-national Water Resource Accounts, 2015 to 2021 (Stats SA 2024), and experimental ecosystem accounts of water-related ecological infrastructure assets.

In line with the National NCA Strategy, Stats SA is working in partnership with other entities to further the development of priority national natural capital accounts. Accounts under development using largely existing capacity include the development of South Africa's first Experimental Biodiversity Economy Satellite Accounts (BESA), first Air Emission Accounts (AEA) as well as the PEFA for South Africa, 2015 to 2021 (which are presented in this discussion document). Figure 2 provides a high-level overview of the natural capital accounts produced in South Africa from 2000 to present.

Figure 2 – A snapshot of Natural Capital Accounts in South Africa since 2000



Source: Statistics South Africa and the South African National Biodiversity Institute, 2025.

1.2 Why Physical Energy Flow Accounts?

Stats SA has a long history with the development and publication of energy accounts. The first discussion document, *Energy Accounts for South Africa, 1995–2001* (Stats SA, 2005) was published by Stats SA in 2005 with further energy accounts published in 2009 and in 2012.[6] From 2014 to 2017 the energy accounts were included as a chapter in the Environmental Economic Accounts (EEA) compendium,[7] which also included mineral and fisheries accounts, and indicators for said accounts (refer to Figure 3).

[6] Energy Accounts for South Africa: 2002–2009. Discussion document D0405.1.1. https://www.statssa.gov.za/?page_id=1854&PPN=D04051.1.

[7] Environmental Economic Accounts Compendium. Report No. 04-05-20. https://www.statssa.gov.za/?page_id=1854&PPN=Report-04-05-20.

Figure 3 – Learning curve of energy accounts at Statistics South Africa

Source: Statistics South Africa.

The Indicative Implementation Plan (IIP) of the National NCA Strategy is structured per goal and strategic objective, and includes a table specifying per output the indicative activities towards arriving at those outputs and information important to implementation (Stats SA, 2021):

- **Funding scenario**: The NCA strategy has been developed so that it can be implemented under two different funding scenarios:
  - **Low-road activities**: can be undertaken with existing human and financial resources.
  - **High-road activities**: are only possible with additional resources.
- **Key role players**: include both lead and support role players.
- **Timeframes**: in the case of low-road activities these may be known, in the case of high-road activities these might be estimated or unknown.
- **Resources**: refer to human or financial resources. There may be existing resources that are known, or resources required may be estimated, i.e. can provide an estimation of the budget required.

Goal 3 '*An integrated suite of natural capital accounts is produced based on best-available methods*' has a high-road activity for the indicative implementation output *3.1.2 'Accounts related to energy'*, specifically for output *3.1.2.1 'Regularly produce national energy supply and use tables*' (refer to Table 1).

Table 1 – National Natural Capital Accounting Strategy – Output 3.1.2: Accounts related to energy

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, South African National Energy Development Institute (SANEDI), relevant Non-government organisations (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		

Source: Statistics South Africa, National Natural Capital Accounting Strategy, A ten-year strategy for advancing Natural Capital Accounting in South Africa. Report No. 04-01-00, 2021.

In October 2022, the Group of Twenty (G20) Finance Ministers and Central Bank Governors (FMCBGs) welcomed the work plan on the G20 IMF Data Gaps Initiative 3 (DGI-3) and asked the IMF, the Financial Stability Board (FSB) and the Inter-Agency Group on Economic and Financial Statistics (IAG) to begin work on filling the identified 14 data gaps that impede the ability to develop economic and financial policy to address climate change, financial innovation, and inclusive growth.

The main objective of the G20 IMF DGI-3 is to address the critical data gaps that exist in the face of the climate crisis, increasing economic polarisation, and large-scale digital transformation. Its 14 recommendations are clustered around four statistical areas: (i) climate change; (ii) household distributional information; (iii) fintech and financial inclusion; and (iv) access to private sources of data and administrative data, and data sharing.

Under the G20 IMF DGI-3 statistical theme of climate change, there are seven recommendations:

- Recommendation III.1: Greenhouse Gas Emission Accounts and National Carbon Footprints.
- **Recommendation III.2: Energy Accounts.**
- Recommendation III.3: Carbon Footprint of Foreign Direct Investment.
- Recommendation III.4: Climate Finance (Green Debt and Equity Security Financing).
- Recommendation III.5: Forward Looking Physical and Transition Risk Indicators.
- Recommendation III.6: Government Climate Impacting Subsidies.
- Recommendation III.7: Climate Change Mitigation and Adaptation Current and Capital Expenditures.

The G20 IMF DGI-3 Recommendation 2 focuses on the compilation of energy accounts. With energy accounts as a recommendation of the G20 IMF DGI-3, it was decided that Stats SA would start the process of developing the PEFA for South Africa towards the eventual publication of the results as a discussion document in the Stats SA Natural Capital series, along with the supplementary PEFA Excel workbook for the web, even though in the National NCA Strategy IIP, the compilation of national energy supply and use tables (SUTs) is a high-road activity and dependent on Stats SA first receiving additional human and financial resources.

Meanwhile, the Statistics Department of the IMF with support from SECO launched the "Environmental and Climate Change Statistics Capacity Development Program" in 2023. As a first step, a consultation mission by the Statistics Department of the IMF, with support from SECO, was conducted in South Africa. This took place from 17 to 21 July 2023 in Pretoria and was hosted by Stats SA. The IMF mission team consulted with various stakeholders in the country (e.g. the NSO, Ministries of Finance, Environment and Planning, the Central Bank, and other relevant organisations like the United Nations Development Programme [UNDP] and technical agencies) and conducted detailed discussions for agreeing on and finalising an assessment report that will help in deciding the scope of the programme, in consultation with the concerned national agencies.

The assessment helped develop a workplan for the activities under the programme – including training and technical assistance – in line with the country priorities expressed by the national agencies. South Africa is a G20 country, hence it was recommended that the programme could be utilised to support Stats SA in achieving some of the recommendation targets for the DGI-3, including energy accounts in respect to Recommendation 2.

A joint IMF and United Nations Statistical Institute for Asia and the Pacific (UNSIAP) Course on the Compilation of Energy and Air Emission Accounts was held in Chiba, Japan, from 5 to 15 February 2024. The course covered various aspects related to the accounts, including:

- Concepts, classifications and methods used for the compilation of energy accounts and AEA.
- Type of indicators that can be developed using these accounts to inform policies aimed to mitigate and/or adapt to climate change.
- Development of user-oriented dissemination formats for energy accounts and AEA and the resulting indicators.

Following this joint IMF-UNSIAP training, a technical assistance mission was conducted by the Statistics Department of the IMF, with support from SECO, to support the G20 countries in the compilation of PEFA and AEA, and to develop a work plan for the activities needed to ensure the achievement of the G20 DGI-3 Recommendations 1 and 2. The technical assistance mission by the Statistics Department of the IMF, supported by SECO, for South Africa took place from 10 to 14 June 2024 in Pretoria and was hosted by Stats SA. The objective of the mission was to support Stats SA and other relevant official agencies in the compilation of PEFA and AEA.

The IMF SECO mission team mainly worked with the team of officials from Stats SA, the DFFE and the Department of Mineral Resources and Energy (DMRE) who are directly involved in the compilation of energy accounts and AEA. The mission team also consulted with a broader group of delegates, including the Department of Planning, Monitoring and Evaluation (DPME), Eskom, National Treasury (NT), the South African Reserve Bank (SARB), Sasol, the South African Weather Service (SAWS) and various other divisions within Stats SA to get the necessary data sets required for the compilation of the PEFA and AEA and conducted detailed discussions for agreeing on a work plan.

A virtual technical assistance mission was conducted by the Statistics Department of the IMF, with support from SECO, with Stats SA from 13 to 17 February 2025. The mission provided support to Stats SA's EEA directorate in finalising the PEFA for South Africa, 2015 to 2021, following the framework outlined by the SEEA-Energy.

1.3 Scope of the South African Physical Energy Flow Accounts

The PEFA for South Africa, are presented in physical terms, more specifically in Petajoule (PJ). These accounts are compiled according to the SEEA-Energy, making use of the South African energy balances, as compiled and published by the DMRE, along with additional data sets. The time series for the PEFA covers the period 2015 to 2021 as it is fully dependent on the availability of energy balances data from the DMRE.

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. It provides a logical and interconnected framework for all measurements used in science, industry, and commerce. (UN, 2017).

The measurement units of energy used in this document, that are based on this system, are joules (J) and its multiples, the terajoule (TJ) and the PJ. Table 2 provides a quick reference for understanding the relationship between the various units of energy measurement, specifically focusing on the J and its multiples, the TJ and PJ.[8]

- **J:** 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 (NIST, 2019).
- **TJ:** Equal to 10^{12} J suitable for large-scale energy discussions, such as city-wide energy consumption. Key: 10^{12} = 1 000 000 000 000 (one trillion).
- **PJ:** Equal to 10^{15} J commonly employed in national energy balances and large energy systems. Key: 10^{15} = 1 000 000 000 000 000 (one quadrillion).

[8] The South African PEFA is presented in PJ, while the South African energy balances compiled by the DMRE are published in TJ.

Table 2 – Hierarchy of units of energy measurement

Unit	Symbol	Number of Joules (J)	Conversion formula
Joule	J	1	1 J=1 J
Terajoule	TJ	10^{12} J	1 TJ=10^{12} J
Petajoule	PJ	10^{15} J	1 PJ=10^{15} J

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

The purpose of the PEFA is to enable consistent monitoring of energy supply and use by physical flow type and industry within the territory of reference.[9] The PEFA, based on a statistical accounting framework, records the flows of energy (in PJ) from the environment to the economy (natural inputs), within the economy (products), and from the economy back to the environment (residuals) (Eurostat, 2025). These flows include energy extraction, transformation, distribution, and consumption across different sectors. The PEFA helps in understanding how energy contributes to economic activities and the environmental impacts associated with energy use (UN, 2019).

The energy products that are covered by the PEFA are coal, peat and peat products, oil shale/oil sands, natural gas, oil, biofuels, waste, electricity, heat and nuclear fuels, and other fuels.[10] Chapter 2 of this document provides a more detailed discussion on the methodological foundation for the compilation of the PEFA, as well as the differences between PEFA and energy balances.

Some of the key indicators that can be calculated from the PEFA are given in Table 3.

Table 3 – Key indicators drawn from the Physical Energy Flow Accounts

Sector	Subsector	Indicator
Energy	Energy consumption	Industry energy consumption
		Percentage of total energy consumption
Energy	Energy intensity	Amount of energy used per unit of gross domestic product (GDP)
Energy	Energy efficiency	The ratio of energy input to useful output in energy transformation processes
Energy	Carbon emissions	Carbon footprint of energy use

Source: Statistics South Africa.

1.4 Overview of energy supply and use in South Africa from 2015 to 2021

South Africa has a diverse energy resource environment, heavily influenced by its geological endowment and historical development. The country's energy mix is characterised by a strong reliance on coal, with growing contributions from renewable sources (DMRE, 2024a). For the period 2015 to 2021, South Africa had already begun diversifying its energy mix to also include renewable energy sources such as solar,

[9] According to the United Nations Statistics Division (UNSD), the territory of reference is defined as the geographic territory administered by a government within which persons, goods, and capital circulate freely.
[10] The energy products listed here are described in more detail in Chapter 2 and the Glossary.

wind and hydropower. This was also spurred on by the need for households and businesses to find more reliable energy sources due to the energy supply challenges experienced in the country since 2007.

South Africa has significant potential for solar and wind energy, particularly in regions like the Northern Cape and the Eastern Cape. Government initiatives, like the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), have played a critical role in promoting the growth of renewable energy projects, since the first submission of a bid for renewable energy projects was completed in December 2020 (DMRE, 2024b).

South Africa is in a period of energy transition, balancing its historical reliance on coal with the need to modernise its energy system, improve reliability, and meet climate commitments. According to Eskom, the Just Energy Transition (JET) is about moving towards a lower carbon, greener future while enabling the creation of new job opportunities for those displaced by the replacement of coal by these cleaner technologies (Eskom, 2021). The Presidency of South Africa published the "*Just Energy Transition Implementation Plan, 2023–2027"* in 2023 which serves as a strategic roadmap for South Africa to advance toward its decarbonisation goals while ensuring equitable outcomes for those impacted by the energy transition. It aims to foster inclusive economic growth, enhance energy security, and generate employment, aligning with the nation's socio-economic development trajectory, priorities, and financial capabilities (Presidency, 2023). At the request of the South African government, the World Bank (WB) approved the Eskom JET Project, which is a $497 million project that supports Eskom (the public energy utility) to decommission the 56-year-old Komati coal-fired power plant, to transform the site for renewable energy generation and battery storage, and to develop opportunities to benefit workers and local communities (World Bank Group, 2023).

1.4.1 Energy Supply in South Africa

South Africa's energy supply mix, as in 2021 (DMRE, 2024a), was predominantly made up of coal (consisting of 82,0% of the country's total primary energy supply [electricity] through Eskom's coal-fired power plants), followed by crude oil (9,0% of the total primary energy supply) and nuclear (4,0% of the total primary energy supply). Natural gas contributed 3,0% to the total primary energy supply in 2021, with renewables and electricity each only contributing 1,0% to the total primary energy supply in 2021. For 2021, South Africa's local production of electricity amounted to 92,0% of the total electricity supply, while the country's imports and exports of electricity amounted to 3,0% and 5,0%, respectively (DMRE, 2024a).

Electricity generation (supply) in South Africa faced major disruptions between 2015 and 2021, largely due to infrastructure constraints and maintenance issues in Eskom's aging coal-fired fleet. This led to widespread load shedding. The initial load shedding event in October 2007 signalled the onset of a nationwide electricity supply crisis that has endured for more than a decade. Load shedding involves the intentional interruption of electricity supply to certain areas to protect the power grid and prevent a nationwide blackout (Nova Economics, 2020). It is typically a last resort when other measures to balance electricity demand and supply have been exhausted. The primary purpose of load shedding is to lower electricity consumption, maintain grid stability, and avert a complete system failure (Nova Economics, 2020).

The ongoing load shedding crisis led to increased investments in renewable energy for both industry and households. Solar power – especially at the household level – saw significant uptake, with many individuals and businesses adopting photovoltaic (PV) systems to mitigate load shedding impacts (DMRE, 2024b). Wind energy projects also expanded, particularly in the Western Cape and the Eastern Cape, supported by government policies and funding from the REIPPPP (DMRE, 2024b).

Coal has traditionally been South Africa's primary energy source, supplying around 82,0% of the country's electricity through Eskom's coal-fired power plants in 2021 (DMRE, 2024a). Coal mining in South Africa is primarily concentrated in the Highveld region of Mpumalanga, with approximately 60,0% of the country's coal reserves found in eMalahleni and its surrounding areas (Africa Mining IQ, 2024). Notable coal projects in South Africa include the surface mining operations at the Mafube Colliery and the New Largo Project (Africa Mining IQ, 2024). In 2021, South Africa exported approximately 19,0% of its coal while it imported just 1,0%. Domestic production contributed 80,0% to the total coal primary supply (DMRE, 2024a).

South Africa's reliance on imported crude oil has steadily increased, as the country has limited known oil reserves. From 2015 to 2021, however, fluctuations in global oil prices and infrastructure constraints affected the country's ability to maintain a stable oil supply. The supply constraints were also further hampered by three crude oil refineries in South Africa that were non-operational during 2020 and 2021 (DMRE, 2024a). The Petroleum Oil and Gas Corporation of South Africa's (PetroSA) Mossel Bay refinery ceased operations in December 2020 due to a lack of feedstock and the Engen Petroleum refinery experienced a major fire on 4 December 2020 that caused extensive damage (DMRE, 2024a). Astron Energy was also not operational and only restarted their refinery in May 2023.[11] In 2021 South Africa continued to import almost 100,0% of its crude oil requirements, with most of the oil imported from Nigeria (43,0%), closely followed by Saudi Arabia (39,0%), Ghana (8,0%), Angola (6,0%), the United States of America (3,0%) and the United Arab Emirates (1,0%) (DMRE, 2024a).

Natural gas contributed a very small portion to South Africa's energy mix from 2015 to 2021. In 2021, natural gas made up 3,0% of the total primary energy supply in South Africa, Sasol Gas imports all of South Africa's natural gas via an 865 km pipeline from Mozambique's Temane and Pande gas fields and supplies industrial and commercial customers (DMRE, 2024a).

1.4.2 Energy Use in South Africa

For South Africa's energy use mix by sectors in the economy, according to DMRE, the top 3 energy consumers were the 'industry sector' (consuming 44,0% of the total energy supply available during 2021) and the 'transport sector' and 'residential sector' (each consuming 19,0% of the total energy supply available during 2021) (DMRE, 2024a).

[11] U.S. Energy Information Administration (EIA) https://www.eia.gov/international/content/analysis/countries_long/South_Africa/.

The coronavirus disease 2019 (COVID-19) pandemic had a pronounced effect on the energy demand (use) in South Africa during 2020 and 2021. During the lockdown period in 2020, electricity consumption in South Africa dropped significantly. In April 2020, total electricity consumption decreased by 23,3% compared with April 2019 (Stats SA, 2020).

South Africa's 'industrial sector' has predominantly had the highest energy use amongst all sectors over the period 2015 to 2021. Energy use in the 'industrial sector' for 2021 was dominated by the mining and quarrying industry (18,0%) and the iron and steel industry (16,0%) (DMRE, 2024a). According to the DMRE, coal (49,0%) and electricity (33,0%) were the most consumed sources of energy in the industrial sector for the year 2021. Total energy consumption in the mining and quarrying industry in 2021, consisted mainly of electricity (51,0%), followed by coal (27,0%) and oil products (22,0%) (DMRE, 2024a).

South Africa's 'transport sector' still relies mostly on liquid fuels, like gasoline and diesel. The 'transport sector' is gradually changing due to the increasing popularity of electric vehicles which in turn is leading to an increase in the need for electricity, from 1,0% in 2015 to 2,0% in 2021 (DMRE, 2024a). According to the DMRE (DMRE, 2024a), the successful integration of electricity into the transportation sector relies on the establishment of robust charging infrastructure, the production of energy-efficient electric vehicles, and the adoption of supportive legislation. Energy demand for oil products in the transport sector dropped slightly from 99,0% in 2015 to 98,0% in 2021.

In South Africa, the residential sector dropped from being the second-largest to the third-largest energy consumer in the economy between 2015 and 2021. The 'residential sector' constituted 27,0% of total energy consumption (demand) in the country in 2015 and this decreased to 19,0% in 2021. For 2021, the 'residential sector' energy consumption consisted predominantly of biofuels and waste (70,0%), followed by electricity (25,0%) and coal (5,0%) (DMRE, 2024a).

1.5 Structure of the discussion document

The discussion document is structured in four chapters as follows:

- Chapter 1: Introduction (this chapter) – introduces NCA, and the progress of NCA in South Africa, followed by the rationale behind compiling the PEFA for South Africa. It also provides a brief overview of both energy supply and use in South Africa for the period 2015 to 2021.

- Chapter 2: Methodological foundation for PEFA – provides an overview of the internationally agreed methodology followed for compiling the PEFA for South Africa. This chapter also includes discussions of data sources and specific datasets utilised in compiling South Africa's PEFA.

- Chapter 3: Key findings – presents the results of the PEFA for South Africa for the years 2015 to 2021. A supplementary PEFA Excel workbook, containing Excel sheets that can be downloaded from the Stats SA website (https://www.statssa.gov.za), accompanies the discussion document.

- Chapter 4: The future development of the PEFA for South Africa – makes recommendations for future work on the PEFA for South Africa.

Chapter 2: Methodological foundation for Physical Energy Flow Accounts

This chapter unpacks the SEEA-Energy, which is the internationally agreed methodological document for energy accounts in the framework of the SEEA CF that was endorsed by the United Nations Statistical Commission (UNSC) in March 2016. The SEEA-Energy was also the methodology that was followed for compiling the PEFA for South Africa, 2015 to 2021.

PEFA are a key component of the SEEA CF and are elaborated on in more detail in the SEEA-Energy. These accounts provide a comprehensive framework for recording and analysing energy flows from the environment to the economy, within an economy and between the economy and the environment.

2.1 What are Physical Energy Flow Accounts?

The UN (2019) explains that the SEEA-Energy is a multipurpose conceptual framework for organising energy-related statistical information. The SEEA-Energy is a statistical framework consisting of a comprehensive set of tables and accounts for energy-related information. The concepts, definitions and classifications facilitate the organisation of that information in support of policy analysis and research (UN, 2019). It supports analysis of both the role of energy within the economy and the relationship between energy-related activities and the environment. PEFA are part of the SEEA CF and provide structured presentations of physical energy flows from the environment into the economy, physical flows within the economy and physical energy flows back to the environment. They follow the movement of energy within the economy, covering the supply and use of energy products by industries and households, and ultimately, the flow of energy back into the environment as energy residuals. They are measured in physical units (e.g., J) and are designed to be consistent with the SEEA CF and SEEA-Energy in terms of concepts, definitions, and classifications (UN, 2019).

The PEFA tracks all stages of physical energy flow including (UN, 2019):

- **Extraction/Production**: Energy sources such as coal, oil, gas, and renewables (solar, wind) extracted or produced within the national boundaries.
- **Imports/Exports**: Energy products entering or leaving the economy.
- **Transformation:** The conversion of primary energy into secondary energy forms (e.g., crude oil to refined petroleum, or coal to electricity).
- **Final consumption**: Energy use by households, industries, governments, and other sectors.

The basic structure of PEFA includes (UN, 2019):

- ***Physical energy SUTs***: These are the core components of PEFA, illustrating:
    - **Energy supply**: The total energy available from domestic production, imports, and stock changes.
    - **Energy use**: The final consumption of energy by industries, households, and for exports.

- ***Energy conversion and losses**:*
    - PEFA captures how energy is converted from primary to secondary energy forms and quantifies energy losses during production and transformation.
- ***Industry and sector breakdown**:*
    - The accounts detail how different economic sectors and industries (e.g., manufacturing, transportation, agriculture) use energy, helping to identify high-energy-consuming industries.

2.1.1 Physical supply and use tables for energy

The physical SUTs for energy are two separate tables, which share the same headings and layout. The supply and use concept is based on the fundamental economic identity that the supply of products must equal the use of products for a calendar year.

The supply and use identity is applicable within the physical supply and use table for energy. Therefore, as illustrated below, 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 (UN, 2019):

Total supply of energy products = domestic output + imports
is equal to
Total use of energy products = intermediate consumption + household consumption
+ changes in inventories + exports.

The equality between supply and use also applies to the total supply and use of natural inputs and the total supply and use of residuals.

PEFA, which are a specialised subset of the physical flow accounts presented in the SEEA CF, may initially be compiled using original mass and volume measures like tons, litres, and cubic meters, or energy-specific units such as standard cubic meters (m^3). However, it is recommended that these accounts ultimately use J as the common energy unit, as this allows for the measurement of energy from natural inputs and energy products based on their calorific energy content (UN, 2019).

The International Recommendations for Energy Statistics (IRES) (UN, 2017) elaborates that calorific energy content refers to the amount of energy released as heat when a specific quantity of a fuel or substance is completely combusted under standardised conditions. It is typically expressed in units such J or PJ, per unit of mass, volume, or amount (e.g. per kilogram, litre, or mole). This value is a key metric for evaluating the energy efficiency and potential of various fuels or energy sources (UN, 2017).

The South African PEFA is compiled and presented in PJ, while the South African energy balances compiled by DMRE are published in TJ. Table 4 and Table 5 presents a basic physical SUT for energy as presented in the SEEA-Energy.

Table 4 – Basic format of a physical supply table for energy (Petajoule)

Supply table						
	Industry	**Households**	**Accumulation**	**Rest of the world**	**Environment**	**Total**
Energy from natural Inputs					A. Energy inputs from the environment	Total supply of energy from natural inputs
Energy products	C. Output			D. Imports		Total supply of energy products
Energy residuals	I. Energy residuals generated by industry	J. Energy residuals generated by household consumption	K. Energy residuals from accumulation	L. Energy residuals received from the rest of the world	M. Energy residuals recovered from the environment	Total supply of energy residuals

Source: United Nations, System of Environmental-Economic Accounting for Energy, 2019.

Note: Dark grey cells are always null by definition.

Table 5 – Basic format of a physical use table for energy (Petajoule)

Use table						
	Industry	**Households**	**Accumulation**	**Rest of the world**	**Environment**	**Total**
Energy from natural Inputs	B. Extraction of energy from natural inputs					Total use of energy from natural inputs
Energy products	E. Intermediate consumption	F. Household consumption	G. Change in inventories	H. Exports		Total use of energy products
Energy residuals	N. Collection and treatment of energy residuals		O. Accumulation of energy residuals	P. Energy residuals sent to the rest of the world	Q. Energy residuals flows direct to environment	Total use of energy residuals

Source: United Nations, System of Environmental-Economic Accounting for Energy, 2019.

Note: Dark grey cells are always null by definition.

Table 6 and Table 7 present the format of comprehensive physical SUTs for energy from the SEEA-Energy, which was used for the PEFA for South Africa for the time-series 2015 to 2021.

Table 6 – Comprehensive format of a physical supply table for energy (Petajoule)

PHYSICAL ENERGY SUPPLY TABLE (unit: PJ)	Production (incl. household own account) and generation of residuals								Accumulation	Flows from the rest of the World (Imports)	Flows from the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	Total Industry					
SIC	*A*	*B*	*C*	*D*	*H*	*Other*		HH	Acc	RoW	Env	
1 Energy from natural inputs:												
Natural resource inputs											–	–
Inputs of energy from renewable sources											–	–
Other natural inputs											–	–
2 Energy products:												
Production of energy products by SIEC class:												
Coal	–	–	–	–	–	–	–			–		–
Peat and peat products	–	–	–	–	–	–	–			–		–
Oil shale / oil sands	–	–	–	–	–	–	–			–		–
Natural gas	–	–	–	–	–	–	–			–		–
Oil and oil products	–	–	–	–	–	–	–			–		–
Biofuels	–	–	–	–	–	–	–			–		–
Waste	–	–	–	–	–	–	–			–		–
Electricity	–	–	–	–	–	–	–			–		–
Heat	–	–	–	–	–	–	–			–		–
Nuclear fuels and other fuels	–	–	–	–	–	–	–			–		–
3 Energy residuals:												
Energy residuals from end-use	–	–	–	–	–	–	–	–				–
Energy residuals from losses	–	–	–	–	–	–	–	–				–
4 Other residual flows:												
Residuals from end-use for non-energy purposes	–	–	–	–	–	–	–	–				–
Energy from solid waste									–			–
5 TOTAL SUPPLY	–	–	–	–	–	–	–	–	–	–	–	–

Source: United Nations, System of Environmental-Economic Accounting for Energy, 2019.

Table 7 – Comprehensive format of a physical use table for energy (Petajoule)

PHYSICAL ENERGY USE TABLE (unit: PJ)	Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	Total Industry					
SIC	A	B	C	D	H	Other		HH	Acc	RoW	Env	
1 Energy from natural inputs:												
Natural resource inputs	–	–	–	–	–	–	–					–
Inputs of energy from renewable sources	–	–	–	–	–	–	–					–
Other natural inputs	–	–	–	–	–	–	–					–
2 Energy products:												
Transformation of energy products by SIEC class:												
Coal	–	–	–	–	–	–	–					–
Peat and peat products	–	–	–	–	–	–	–					–
Oil shale / oil sands	–	–	–	–	–	–	–					–
Natural gas	–	–	–	–	–	–	–					–
Oil and oil products	–	–	–	–	–	–	–					–
Biofuels	–	–	–	–	–	–	–					–
Waste	–	–	–	–	–	–	–					–
Electricity	–	–	–	–	–	–	–					–
Heat	–	–	–	–	–	–	–					–
Nuclear fuels and other fuels	–	–	–	–	–	–	–					–
End-use of energy products by SIEC class:												
Coal	–	–	–	–	–	–	–	–	–	–		–
Peat and peat products	–	–	–	–	–	–	–	–	–	–		–
Oil shale / oil sands	–	–	–	–	–	–	–	–	–	–		–
Natural gas	–	–	–	–	–	–	–	–	–	–		–
Oil and oil products	–	–	–	–	–	–	–	–	–	–		–
Biofuels	–	–	–	–	–	–	–	–	–	–		–
Waste	–	–	–	–	–	–	–	–	–	–		–
Electricity	–	–	–	–	–	–	–	–	–	–		–
Heat	–	–	–	–	–	–	–	–	–	–		–
Nuclear fuels and other fuels	–	–	–	–	–	–	–	–	–	–		–
End-use of energy products for non-energy purposes	–	–	–	–	–	–	–	–	–	–	–	–
3 Energy residuals:												
Energy residuals from end-use											–	–
Energy residuals from losses											–	–
4 Other residual flows:												
Residuals from end-use for non-energy purposes									–			–
Energy from solid waste	–	–	–	–	–	–	–					–
5 TOTAL USE	–	–	–	–	–	–	–	–	–	–	–	–

Source: United Nations, System of Environmental-Economic Accounting for Energy, 2019.

The energy products that are covered by the SEEA-Energy (refer to Table 6 and Table 7) are listed and defined below (UN, 2019).[12] [13]

- **Coal** is a solid fossil fuel consisting of carbonised vegetal matter. Coal products can be derived directly or indirectly from the various classes of coal by carbonisation or pyrolysis processes, by the aggregation of finely divided coal or by chemical reactions with oxidising agents, including water.
- **Peat and peat products** are composed of a solid formed through the partial decomposition of dead vegetation under conditions of high humidity and limited air access (initial stage of coalification) and any products derived from it.
- **Oil shale/oil sands** constitute a sedimentary rock that contains organic matter in the form of kerogen. Kerogen is a waxy, hydrocarbon-rich material that is regarded as a precursor of petroleum.
- **Natural gas** is a mixture of gaseous hydrocarbons (primarily methane but, generally, also ethane, propane and higher hydrocarbons in much smaller amounts) and some non-combustible gases such as nitrogen and carbon dioxide.
- **Oil and oil products** are made up of liquid hydrocarbons of fossil fuel origin comprising (a) crude oil, (b) liquids extracted from natural gas, (c) fully or partly processed products derived from the refining of crude oil, and (d) hydrocarbons and organic chemicals of vegetal or animal origin that are functionally similar to liquid hydrocarbons of fossil fuel origin.
- **Biofuels** are derived directly or indirectly from biomass (fuels produced from animal fats, by-products and residues that obtain their calorific value indirectly from the plants consumed by those animals).
- **Waste** is made up of materials voluntarily discarded by their owner. In cases where the owner of the waste receives payment for passing on the waste to another party, the waste is considered a product. In cases where no payment is received by the discarding unit, the waste is considered a residual.
- **Electricity** is the transfer of energy through those physical phenomena involving electric charges and their effects when at rest and in motion.
- **Heat** is the energy obtained from the translational, rotational and vibrational motion of the constituents of matter, as well as from changes in its physical state.
- **Nuclear fuels and other fuels not elsewhere classified** include uranium, plutonium and derived products that can be used in nuclear reactors as a source of electricity and/or heat.

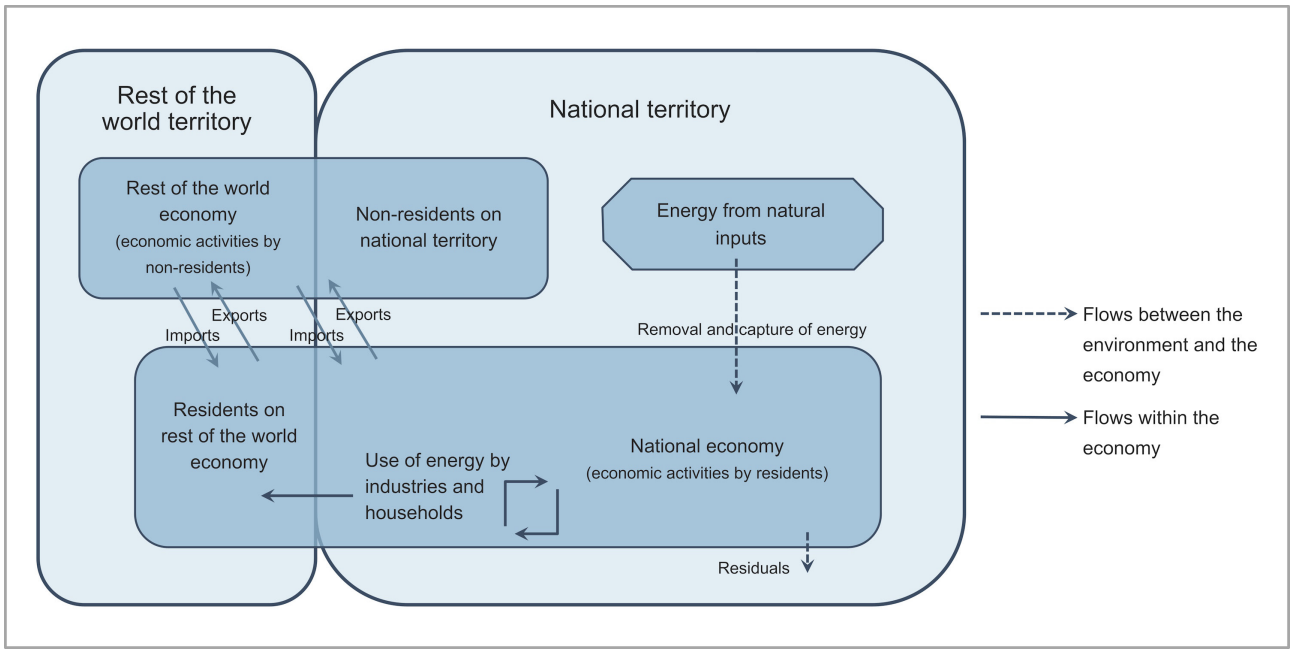
Figure 4 presents a visual representation of the stages of physical energy flows. The main flows are inclusive of (UN, 2019):

- ***Natural inputs***
    - Energy resources in the environment that can be extracted (e.g. crude oil and coal) or harnessed and or captured (i.e. renewables like sunlight).

[12] For a more detailed breakdown of the energy products that are relevant to South Africa, please refer to the Glossary section in this discussion document.
[13] For South Africa, the following energy products have zero values: peat and peat products; oil shale/oil sands; heat and waste.

- ***Energy products***
  - Energy products that are mainly used as a source of energy (for example coal in South Africa).
  - Include fuels produced or generated by an economic unit, electricity that is generated by an economic unit and heat that is generated and sold to third parties by an economic unit.
  - Some energy products may be used for non-energy purposes.
- ***Energy residuals***
  - Flows of energy that are discarded, discharged or emitted by industries and households.

Figure 4 – Visual representation of the stages of the physical flow of energy



Source: United Nations, System of Environmental-Economic Accounting for Energy, 2019.

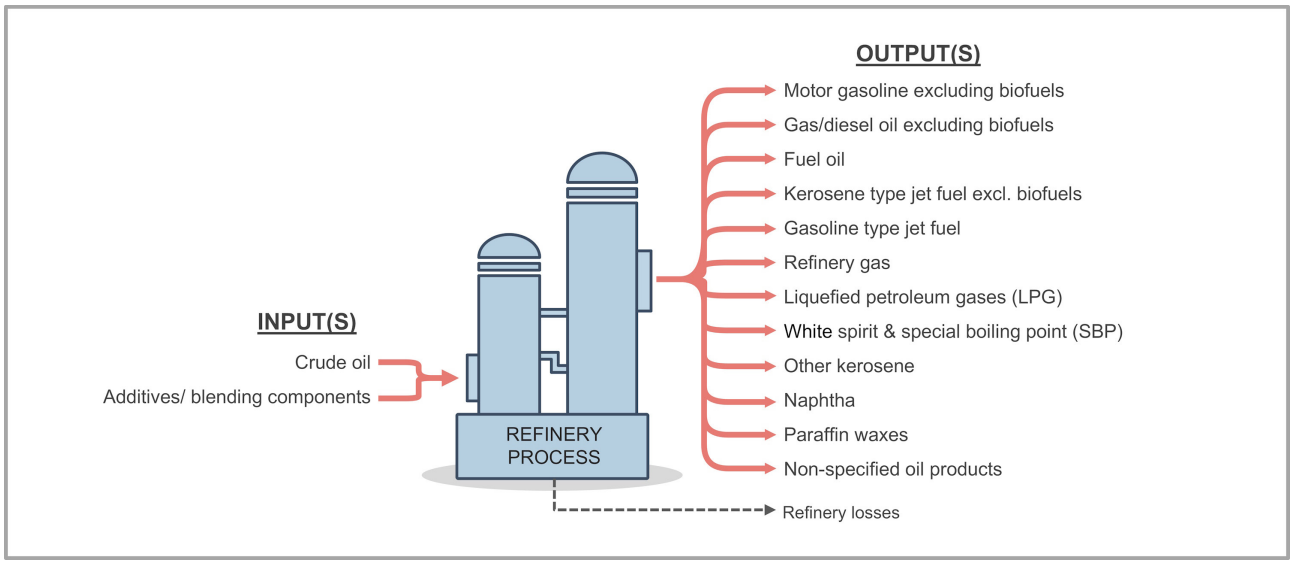
To explain in more detail the stages of energy flow as represented in Figure 4, we will further explore some of the flows of selected energy products.

Crude oil

Crude oil (energy from natural inputs) is used as an input into the refinery process (manufacturing industry) to produce various energy product outputs which are then used within the national economy. Figure 5 provides a visual representation of the refinery process for crude oil.

A refinery processes crude oil by separating it into various fractions, converting these fractions into usable products, and blending them to create the final finished products. These refined products include the fuels and chemicals used in daily life. Within the refinery, outputs from certain processes may be reintroduced into the same process, transferred to different processes or stages, or blended with other outputs to form finished products. Oil products that are produced and utilised for energy purposes must be accounted for as part of production (DMRE, 2023).

Figure 5 – Overview of the crude oil refinery process

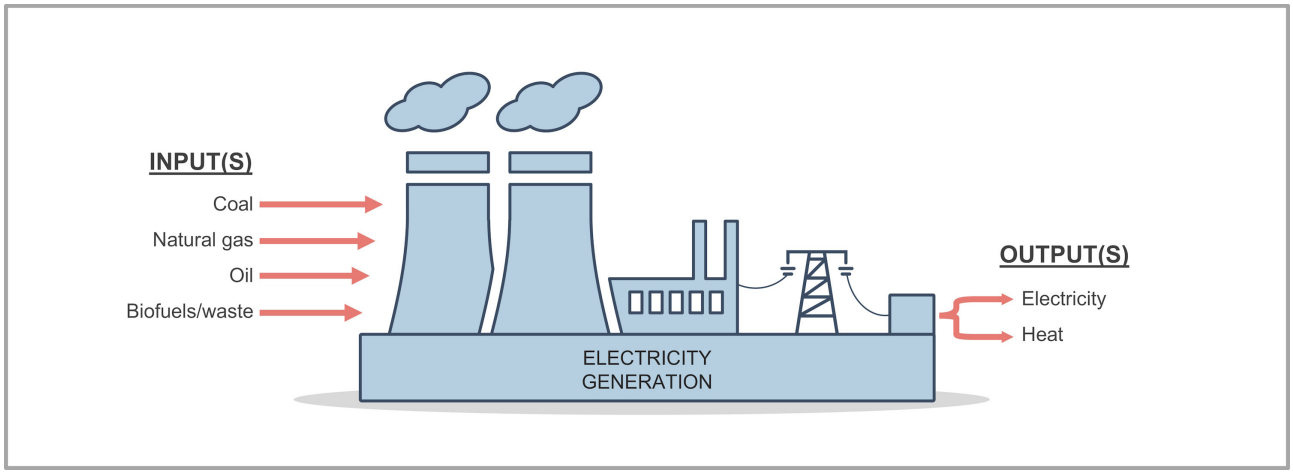


Source: Statistics South Africa.

Electricity and heat

Primary electricity is generated from natural resources like hydro, wind and solar power, while primary heat comes from geothermal and solar thermal energy. In contrast, secondary electricity and heat are produced by burning combustible fuels, including coal, natural gas, oil, biofuels and waste (DMRE, 2023). Figure 6 provides a visual representation of the secondary electricity and heat generation process.

Figure 6 – Overview of the secondary electricity and heat generation process



Source: Statistics South Africa.

The PEFA covers all these flows that have been discussed and listed in Section 2.1 of this discussion document.

2.2 Scope of the Physical Energy Flow Accounts

The SEEA-Energy (UN, 2019) explains that the PEFA covers all energy products, including fossil fuels (coal, oil, and gas), renewable energy (solar, wind, hydropower) and electricity (refer to the detailed descriptions in Section 2.1.1). The scope of PEFA can be used for both territorial (related to energy flows within the national boundaries) and residential (related to the activities of residents, whether within the country or abroad) principles. The primary distinctions between energy balances and energy accounts lie in the scope of activities considered and the method of classification (UN, 2019). Energy accounts apply the residence principle to decide whether a particular energy flow should be included (e.g., as imports) and whether it qualifies as part of energy use.

The SEEA-Energy (UN, 2019) elaborates that, in general, the accounts are compiled within the framework of a national economy, as defined by the System of National Accounts (SNA), and the SEEA CF. Geographically, the economy is delineated by the country's economic territory, which typically corresponds closely to its recognised national boundaries (UN, 2019). The economic units of interest include enterprises, households, and governments that have a centre of interest within this economic territory, based on the residence principle. The economy encompasses the production, consumption, and accumulation activities carried out by these economic units within the economic territory. It is important to note that transactions related to international bunkering and international transport are recorded based on the residence of the transport equipment operator (UN, 2019).

The environment, which provides energy resources and absorbs emissions, is also defined by these territorial boundaries. Therefore, all energy derived from natural inputs and the environment within a country's economic territory (including its exclusive economic zone) falls within the scope of the SEEA-Energy framework (UN, 2019).

It is important to pay special attention to the bunkering of fuel, particularly in relation to ships and aircraft. In some cases, specific agreements may be made in which a unit residing in one country stores fuel in another country while maintaining ownership of the fuel (UN, 2019).

For example, the SEEA-Energy follows the principles of the SNA and the Balance of Payments (BoP) and International Investment Position Manual regarding the physical location of fuel or energy that is not the primary consideration: the focus must be on the ownership of the fuel. Thus, according to the SEEA-Energy (UN, 2019), if country A establishes a bunker in country B and transports fuel to country B in order to refuel a ship that it operates, then the fuel is considered to have remained in the ownership of country A, and no export of fuel to country B is recorded.

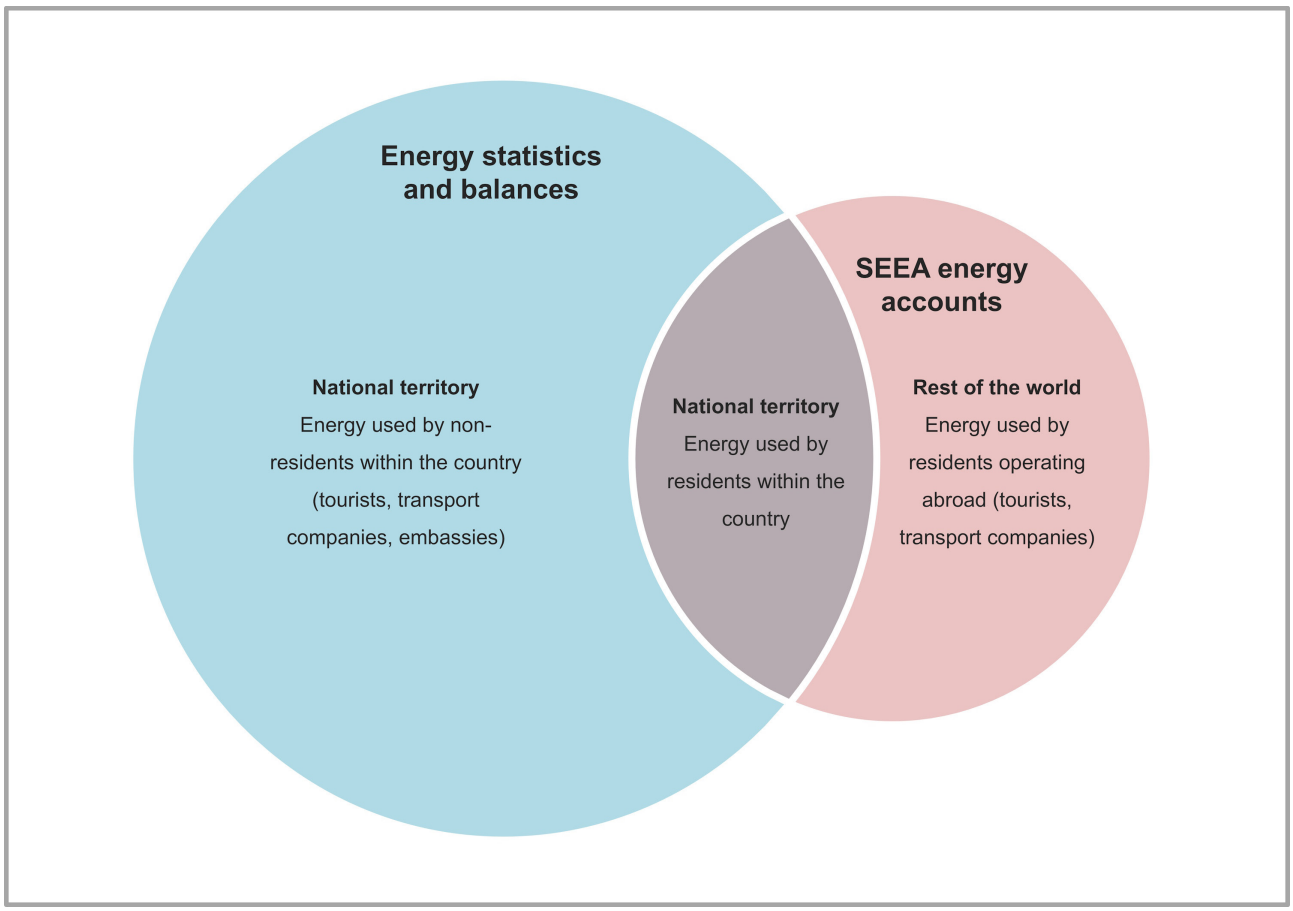
Figure 7 shows how energy use is recorded based on the territory and residence principles (UN, 2019). Energy statistics and balances focus on operations within a country's borders, as shown in blue circles. This includes:

- Energy used by residents within the country.
- Energy used by non-residents within the country, such as foreign transport equipment.

In contrast, energy accounts aim to capture resident activities, regardless of location, as depicted in the pink circle. Energy accounts cover:

- Energy products sold to residents, whether used domestically or abroad.
- Energy products from foreign bunkers (inventory stores) used by resident-operated transport equipment.

Figure 7 – Residence versus territory principle for System of Environmental-Economic Accounting Energy, energy statistics and balances



Source: United Nations, System of Environmental-Economic Accounting for Energy, 2019.

2.3 What is the relationship between energy statistics, energy balances and energy accounts?

The SEEA-Energy (UN, 2019) highlights that energy statistics, energy accounts and energy balances all present information on energy supply and use.

Energy statistics are compiled by collecting data on the production, imports, exports, and domestic use of energy products, often through targeted surveys and utilising business and foreign trade statistics. Energy balances reorganise this data to focus on and consolidate the supply and use components while emphasising the transformation of energy within the economy. Similarly – energy accounts, which align with national accounts classifications and definitions, reorganise and expand the scope of energy statistics. Although both

energy balances and energy accounts adhere to the principle that energy supply equals energy use, they define "total supply" and "total use" differently to address their specific objectives (UN, 2019).

The key distinctions between energy balances and energy accounts lie in the activities they encompass, how these activities are classified and the different methodological frameworks guiding their compilation. For example, the energy balances are compiled and consistent with the IRES (IRES, 2017). Energy accounts apply the residence principle to determine whether a specific energy flow, such as imports, should be included and whether it constitutes part of energy use. In contrast, energy balances are defined by the territory principle, which also typically forms the basis for basic energy statistics.

Along with the above-mentioned differences, Table 8 lists other main differences between energy balances and energy accounts.

Table 8 – Differences between energy balances and accounts

Energy balances	Energy accounts
Physical terms	Physical and monetary terms
Format designed to allow for re-arrangement of industries' energy use according to purpose (for example: transport, auto-producers, heat for sale)	Uses the same format as the national accounts SUTs
Focus on energy sector, including description of technologies	Energy sector described by International Standard Industrial Classification of All Economic Activities (ISIC), no special focus on technologies
All transport in one separate sector	Own account transport included in industries' activities
Territory principle	Residence principle
Statistical differences	No statistical differences

Source: United Nations, System of Environmental-Economic Accounting for Energy, 2019.

2.4 Other types of energy accounts

Besides the PEFA accounts that have already been discussed, the SEEA-Energy (UN, 2019) provides for other types of energy-related accounts that include monetary energy accounts and energy asset accounts.

Monetary energy accounts measure energy-related economic activities in monetary terms, including the costs, revenues, and economic value of energy production and consumption. The main purpose of these accounts is to track the financial transactions associated with energy resources, such as the costs of production, the market value of energy goods and services, and energy subsidies or taxes (UN, 2019).

Energy asset accounts record the stocks and changes in energy resources over time, both in physical and monetary terms. They cover resources like coal, oil, natural gas, and renewable energy sources. The main purpose is to provide information about the availability and depletion of energy resources, tracking how reserves change due to extraction, discoveries, or technological advancements (UN, 2019).

2.5 Classifications used for the compilation of the physical energy flow accounts

For the compilation of the PEFA, it is important to make use of consistent classifications for the main economic units and products (UN, 2019). The SEEA-Energy classifies industries using the ISIC. South Africa makes use of the Standard Industrial Classification of All Economic Activities (SIC). The SIC 5th edition is based upon the ISIC (third revision which appeared in 1990) with suitable adaptations for local conditions (Stats SA, 1993). Both the ISIC and the SIC were designed for the classification of establishments according to kind of economic activity, and provide a standardised framework for the collection, tabulation, analysis and presentation of statistical data on establishments. Energy products are classified using the Standard International Energy Product Classification (SIEC), which organises internationally agreed-upon energy product definitions into a hierarchical system, highlighting their relationships and offering a coding framework for data collection and processing (UN, 2019).

2.6 Uses of energy accounts

Energy accounts developed using the concepts and methods outlined in the SEEA-Energy, can be employed in various ways to effectively present and summarise collected data, highlighting connections between different variables. Integrating energy accounts with other data sources can significantly enhance the insights available to policymakers, researchers, and other users (UN, 2019). Below are some examples as provided in the SEEA-Energy (UN, 2019):

- **SDGs can be informed by the SEEA-Energy**. The main SDG's that can be informed by SEEA-Energy is for Goal 7 (Ensure access to affordable, reliable, sustainable and modern energy for all).
- **With the development of energy SUTs**, one can gain a good understanding of the supply and use of energy which is necessary for the improved management of energy natural resource inputs and future planning. Energy SUTs can provide information on the overall supply and use of energy in the country/region, the degree of energy self-sufficiency, the use of energy and the expenditure by industry and household.
- **The energy sector plays a crucial role in the broader economy**, as it provides essential inputs that all other sectors rely on for their production processes. Monetary data collected though the monetary energy accounts can be utilised as a tool to gain an understanding of the energy sector's role within the economy. Some indicators as listed in the SEEA-Energy are output and value added from the energy sector, operating surplus of energy-related industries and the role of depletion and energy-related taxes and resource rent, energy and foreign trade, wealth and lastly economy-wide energy decoupling.
- **An important application of the PEFA is for the calculation of air emissions**. The SEEA-Energy describes how the accounts for energy-related emissions can be developed.

2.7 Data sources that were used for the compilation of the physical energy flow accounts for South Africa, 2015 to 2021

The main data sources that were used in the compilation of the PEFA for South Africa for 2015 to 2021 are briefly discussed below. These include the DMRE for the South African energy balances data set from 2015 to 2021 and Stats SA's large sample survey (LSS) data.

The IRES defines energy balances as an "accounting framework for the compilation and reconciliation of data on all energy products entering, exiting and used within the national territory of a given country during a reference period" (IRES, 2018).

The IRES provides guidance on the scope and general principle of energy balances compilation. The scope of energy balances is determined by the territory, product and flow boundaries (IRES, 2018). The scope of energy balances does not include passive energy, energy resources and reserves, extraction of any materials not covered in primary energy production and finally peat, waste and biomass used for non-energy purposes (IRES, 2018).

The IRES highlights that an energy balance is organised as a matrix that illustrates the relationship between energy products (displayed in columns) and energy flows (displayed in rows) (IRES, 2018). The specific arrangement of an energy balance is influenced by a country's energy production and consumption patterns, as well as the level of detail required. However, to maintain international comparability and consistency, it is advisable to follow certain standardised approaches (IRES, 2018).

2.7.1 The national energy balances

The main input data for the compilation of the PEFA for South Africa are the South African energy balances, that are compiled and published by DMRE. The energy balances provide a detailed overview of the country's energy supply, energy transformation, and energy consumption (use). These balances are key to understanding the flow of energy within South Africa's economy and are structured to give insights into the production, imports, exports, transformation, and end-use of various energy forms.

The DMRE follows the IRES prescribed methodologies for managing energy statistics as well as the compilation of energy balances for South Africa. The South African energy balances are compiled by the DMRE from various data sources for the different energy products (coal, petroleum/oil, natural gas, electricity etc.). The data are collected by the DMRE via questionnaires that are sent to relevant industry or government organisations involved in the relevant industries related to the various products.

The energy balances for South Africa consist of products at a more disaggregated level and these products are aggregated into the product groups listed in the PEFA (refer to Table 7 and Table 8). The energy balances for South Africa, compiled by the DMRE, have the following product groupings.[14]

[14] For a more detailed breakdown of the energy products that are relevant to South Africa, please refer to the Glossary section in this discussion document.

- **Coal, peat, oil shale and oil sands**
    - Anthracite, coking coal, other bituminous coal, sub-bituminous coal, lignite, patent fuel, coke oven coke, gas coke, coal tar, brown coal briquettes, gas works gas, coke oven gas, blast furnace gas, other recovered gases, electricity/heat output from non-specified manufactured gases, peat, peat products and oil shale and oil sands.
- **Crude oil, natural gas liquids, feedstock**
    - Crude oil, natural gas liquids, refined feedstock, additives/blending components and other hydro-carbons.
- **Oil and oil products**
    - Refinery gas, ethane, liquefied petroleum gases (LPG), motor gasoline excl. biofuels, aviation gasoline, gasoline type jet fuel, kerosene type jet fuel excl. biofuels, other kerosene, gas/diesel oil excluding biofuels, fuel oil, naphtha, white spirit and special boiling point (SBP), lubricants, bitumen, paraffin waxes, petroleum coke and non-specified oil products.
- **Natural gas**
    - Natural gas.
- **Biofuels and waste**
    - Industrial waste, municipal waste (renewable), municipal waste (non-renewable), primary solid biofuels, biogases, biogasoline, bio jet kerosene, biodiesels, other liquid biofuels, non-specified primary biofuels/ waste and charcoal.
- **Electricity and heat**
    - Nuclear, hydro, geothermal, solar PV, solar thermal, tide/ wave/ ocean, wind, heat pumps, electric boilers, heat from chemical sources, other sources, electricity, heat and heat output from non-specified combustible fuels.

2.7.2 Statistics South Africa: large sample surveys

Structural Business Statistics (SBS) enables a detailed analysis of enterprise and employment structures, of the economic performance of enterprises and legal units as well as regional distribution of local units. SBS is an important basis for national accounts, other business statistics and decision making within politics and the economy. Additionally, SBS provides essential basis data for calculating different economic indicators.

LSSs are periodic surveys that provide estimates in respect of a specific economic industry of interest for a financial year and for the following data items:

- industrial classification;
- employment;
- trading income;
- expenditure;

- profit or loss;
- inventories;
- capital expenditure on new assets;
- services rendered;
- purchases; and
- client base.

The statistical unit for the collection of information for the LSS is an enterprise. An enterprise is a legal unit (or a combination of legal units) that includes and directly controls all functions necessary to carry out its activities (UN, 2009). Each enterprise is classified to an industry that reflects its predominant activity. The 1993 edition of the SIC, Fifth Edition, Report No. 09-90-02 is used to classify the statistical units in the LSS. The SIC is based on the ISIC with suitable adaptations for local conditions.

Results of the LSSs are used within Stats SA for benchmarking national accounts (e.g. the GDP) and compiling SUTs. These statistics are also used by the government to develop and monitor policies and plans to grow the economy and create jobs. The private sector uses the data to analyse comparative business and industry performance.

Table 9 provides an overview of the Stats SA LSSs that were used in the compilation of the PEFA for South Africa, 2015 to 2021 to further disaggregate the SIEC energy products ‘coal’, ‘natural gas’ and ‘oil and oil products’ for the ‘end-use of energy products by SIEC class’ in the PEFA use tables.

Table 9 – Statistics South Africa large sample surveys

Large sample survey	Conducted in the past	Latest publication[15]	Frequency	Coverage
Agricultural survey (Report P1101)	Yes	December 2024 (reference period – 2023)	Annually	9 286 enterprises sampled
Forestry, logging and related services survey (Report 12-00-00)	Yes	March 2022 (reference period – 2020)	Every 3 to 5 years	300 enterprises sampled
Ocean (marine) fisheries and related services industry (Report 13-00-00)	Yes	March 2022 (reference period – 2020)	Every 3 to 5 years	424 enterprises sampled
Mining Industry (Report 20-01-02)	Yes	June 2024 (reference period – 2022)	Every 3 to 5 years	2 004 enterprises sampled
Manufacturing industry: Production (Report 30-02-04)	Yes	July 2023 (reference period – 2021)	Every 3 to 5 years	11 413 enterprises sampled
Electricity, gas and water supply industry (Report 41-01-02)	Yes	November 2022 (reference period – 2021)	Every 3 to 5 years	442 enterprises sampled
Construction industry (Report 50-02-01)	Yes	June 2022 (reference period – 2020)	Every 3 to 5 years	3 191 enterprises sampled
Wholesale trade industry (Report 61-01-01)	Yes	September 2024 (reference period – 2022)	Every 3 to 5 years	3 018 enterprises sampled
Retail trade industry (Report 62-01-02)	Yes	September 2024 (reference period – 2022)	Every 3 to 5 years	3 091 enterprises sampled
Motor trade Industry (Report 63-01-02)	Yes	September 2024 (reference period – 2022)	Every 3 to 5 years	2 510 enterprises sampled
Accommodation industry (Report 64-11-01)	Yes	June 2024 (reference period – 2022)	Every 3 to 5 years	3 778 enterprises sampled
Food and beverages industry (Report 64-20-01)	Yes	June 2024 (reference period – 2022)	Every 3 to 5 years	1 014 enterprises sampled
Transport and storage industry (Report 71-02-01)	Yes	September 2021 (reference period – 2019)	Every 3 to 5 years	3 063 enterprises sampled
Post and telecommunications industry (Report 75-01-01)	Yes	June 2024 (reference period – 2022)	Every 3 to 5 years	786 enterprises sampled
Real estate, activities auxiliary to financial intermediation and business services industry (Report 80-04-02)	Yes	June 2022 (reference period – 2020)	Every 3 to 5 years	6 499 enterprises sampled
Personal services industry (Report 90-01-01)	Yes	September 2020 (reference period – 2018)	Every 3 to 5 years	3 000 enterprises sampled

Source: Statistics South Africa.

[15] As at February 2025.

The industries published in the PEFA for South Africa, 2015 to 2021 are:

- Agriculture, forestry and fisheries – SIC 1.
- Mining and quarrying – SIC 2.
- Manufacturing – SIC 3.
- Electricity, gas, steam and air conditioning supply – SIC 41.
- Transportation and storage – SIC 71 – SIC 74.
- Other industries – see page 30 for more details.

Both physical and monetary data from the LSS related to industry (SIC industry) energy end use (for example coal, diesel, petrol and gas), and as an input for the production of non-energy products was used to further disaggregate the SIEC energy products ‘coal’, ‘natural gas’ and ‘oil and oil products’ for the ‘end-use of energy products by SIEC class’ in the PEFA use tables into the following industry groupings, with the relevant SIC codes listed in brackets:

Agriculture, forestry and fisheries:

- Agriculture, hunting and related services (SIC 11).
- Forestry, logging and related services (SIC 12).
- Fisheries, operation of fish hatcheries and fish farms (SIC 13).

Mining and quarrying:

- Mining of coal and lignite (SIC 21).
- Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying (SIC 22).
- Mining of gold and uranium ore (SIC 23).
- Mining of metal ores, except gold and uranium (SIC 24).
- Other mining and quarrying (SIC 25).

Manufacturing:

- Manufacture of food products, beverages and tobacco products (SIC 30).
- Manufacture of textiles, clothing and leather goods (SIC 31).
- Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials; manufacture of paper and paper products; publishing, printing and reproduction of recorded media (SIC 32).

- Manufacture of coke, refined petroleum products and nuclear fuel; manufacture of chemicals and chemical products; manufacture of rubber and plastic products (SIC 33).
- Manufacture of other non-metallic mineral products (SIC 34).
- Manufacture of basic metals, fabricated metal products, machinery and equipment and of office, accounting and computing machinery (SIC 35).
- Manufacture of electrical machinery and apparatus, n.e.c. (SIC 36).
- Manufacture of radio, television and communication equipment and apparatus and of medical, precision and optical instruments, watches and clocks (SIC 37).
- Manufacture of transport equipment (SIC 38).
- Manufacture of furniture; manufacturing n.e.c.; recycling (SIC 39).

Electricity, gas, steam and air conditioning supply:

- Production, collection and distribution of electricity (SIC 411).
- Manufacture of gas; distribution of gaseous fuels through mains (SIC 412).

Transportation and storage:

- Railway transport (SIC 711).
- Other land transport (SIC 712).
- Air transport (SIC 73).

Other industries:

- Collection, purification and distribution of water (SIC 42).
- Site preparation (SIC 501).
- Building of complete constructions or parts thereof; civil engineering (SIC 502).
- Building installation (SIC 503).
- Building completion (SIC 504).
- Renting of construction or demolition equipment with operators (SIC 505).
- Wholesale and commission trade, except of motor vehicles and motor cycles (SIC 61).
- Retail trade, except of motor vehicles and motor cycles; repair of personal and household goods (SIC 62).
- Sale, maintenance and repair of motor vehicles and motor cycles; retail trade in automotive fuel (SIC 63).
- Hotels and restaurants (SIC 64).

- National postal activities (SIC 7511).
- Telecommunication (SIC 752).
- Building and industrial plant cleaning activities (SIC 8893).
- Packaging activities (SIC 8895).
- Health and social work (SIC 93).
- Other community, social and personal service activities (SIC 94).
- Other service activities (SIC 99).

For a more detailed breakdown of ‘end-use of energy products by SIEC class’ in the PEFA use tables, refer to the PEFA Excel workbook for the web table “*Detailed physical end use of selected energy products*”, South Africa, 2015 to 2021 (sheet “*8. End Use, 2015 to 2021*”).

Chapter 3: Key Findings

Chapter 3 presents the PEFA SUTs for South Africa from 2015 to 2021, as well as some of the high-level results from the PEFA SUTs for South Africa for that period. The analysis of the PEFA for South Africa provides an overview of the energy supply and use in the country from 2015 to 2021. A good understanding of the supply and use of energy is necessary for the improved management of energy natural resource inputs as well as for future planning (UN, 2019). The supplementary PEFA Excel workbook for the web contains detailed PEFA SUTs from 2015 to 2021 and is available on the Stats SA website (https://www.statssa.gov.za).

3.1 Physical Energy Flow Accounts for South Africa

Table 10 to Table 23 present the PEFA SUTs for South Africa from 2015 to 2021. The ‘statistical difference’ in the DMRE energy balances refers to the difference between the energy supply and energy use of an energy commodity. This difference arises because the figures on supply and use come from different sources. Pending this review by the DMRE, for the present set of PEFAs in this discussion document, the statistical difference in the DMRE energy balances has been assigned to ‘accumulation’ in the PEFA use tables.

Table 10 – Physical energy supply table, 2015 (Petajoule)

PHYSICAL ENERGY SUPPLY TABLE (unit: PJ)	Production (incl. household own account) and generation of residuals								Accumulation	Flows from the rest of the World (Imports)	Flows from the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs											7 111,7	**7 111,7**
Inputs of energy from renewable sources											58,9	**58,9**
Other natural inputs											0,0	**0,0**
2 Energy products:												
Production of energy products by SIEC class:												
Coal	0,0	5 963,6	37,5	22,1	0,0	0,0	**6 023,2**			23,9		**6 047,0**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Natural gas	0,0	0,7	0,0	0,0	0,0	0,0	**0,7**			117,1		**117,8**
Oil and oil products	0,0	176,4	949,7	0,0	0,0	0,0	**1 126,1**			976,8		**2 102,9**
Biofuels	651,3	0,0	0,0	0,0	0,0	0,0	**651,3**			0,0		**651,3**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Electricity	0,0	0,0	0,0	918,1	0,0	0,0	**918,1**			47,0		**965,2**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Nuclear fuels and other fuels	0,0	163,5	0,0	0,0	0,0	0,0	**163,5**			0,0		**163,5**
3 Energy residuals:												
Energy residuals from end-use	62,4	163,0	1 333,5	157,2	426,7	198,0	**2 340,9**	702,9				**3 043,7**
Energy residuals from losses	0,0	0,0	426,9	1 623,1	0,0	0,0	**2 049,9**	0,0				**2 049,9**
4 Other residual flows:												
Residuals from end-use for non-energy purposes	0,0	0,0	18,9	0,0	7,0	23,5	**49,5**	0,0				**49,5**
Energy from solid waste									147,3			**147,3**
5 TOTAL SUPPLY	**713,7**	**6 467,1**	**2 766,5**	**2 720,5**	**433,7**	**221,5**	**13 323,1**	**702,9**	**147,3**	**1 164,8**	**7 170,7**	**22 508,7**

Source: Statistics South Africa.

Physical Energy Flow Accounts for South Africa, 2015 to 2021, Discussion Document D0401.6 (March 2025)

Table 11 – Physical energy use table, 2015 (Petajoule)

PHYSICAL ENERGY USE TABLE (unit: PJ)	Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs	651,3	6 304,1	156,3	0,0	0,0	0,0	**7 111,7**					**7 111,7**
Inputs of energy from renewable sources	0,0	0,0	34,6	24,3	0,0	0,0	**58,9**					**58,9**
Other natural inputs	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
2 Energy products:												
Transformation of energy products by SIEC class:												
Coal	0,0	0,0	79,0	2 470,3	0,0	0,0	**2 549,3**					**2 549,3**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Oil shale / oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Natural gas	0,0	0,0	94,1	0,0	0,0	0,0	**94,1**					**94,1**
Oil and oil products	0,0	0,0	975,9	28,9	0,0	0,0	**1 004,7**					**1 004,7**
Biofuels	0,0	0,0	221,6	4,3	0,0	0,0	**225,9**					**225,9**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Electricity	0,0	0,0	0,0	19,7	0,0	0,0	**19,7**					**19,7**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Nuclear fuels and other fuels	0,0	0,0	0,0	125,2	0,0	0,0	**125,2**					**125,2**

Source: Statistics South Africa.

Table 11 – Physical energy use table, 2015 (Petajoule) (concluded)

PHYSICAL ENERGY USE TABLE (unit: PJ)		Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
		Industries (by SIC)							Households				
		Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	Total Industry					
	SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
	End-use of energy products by SIEC class:												
	Coal	1,4	32,4	408,1	1,1	0,4	11,0	**454,4**	11,1	927,1	2 105,2		**3 497,8**
	Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Natural gas	0,0	0,0	69,5	15,1	0,0	1,1	**85,7**	0,2	-62,9	0,7		**23,7**
	Oil and oil products	40,9	8,6	23,3	0,0	413,9	81,5	**568,3**	201,6	169,5	109,1		**1 048,6**
	Biofuels	0,0	0,0	81,1	0,0	0,0	0,0	**81,1**	344,4	0,0	0,0		**425,5**
	Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Electricity	20,1	122,0	456,8	31,6	12,4	104,4	**747,3**	145,6	0,0	52,6		**945,5**
	Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Nuclear fuels and other fuels	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	38,3	0,0		**38,3**
	End-use of energy products for non-energy purposes	0,0	0,0	18,9	0,0	7,0	23,5	**49,5**	0,0	0,0	0,0	0,0	**49,5**
3	**Energy residuals:**												
	Energy residuals from end-use											3 043,7	**3 043,7**
	Energy residuals from losses											2 049,9	**2 049,9**
4	**Other residual flows:**												
	Residuals from end-use for non-energy purposes									49,5			**49,5**
	Energy from solid waste	0,0	0,0	147,3	0,0	0,0	0,0	**147,3**					**147,3**
5	**TOTAL USE**	**713,7**	**6 467,1**	**2 766,5**	**2 720,5**	**433,7**	**221,5**	**13 323,1**	**702,9**	**1 121,4**	**2 267,6**	**5 093,7**	**22 508,7**

Source: Statistics South Africa.

Table 12 – Physical energy supply table, 2016 (Petajoule)

PHYSICAL ENERGY SUPPLY TABLE (unit: PJ)	Production (incl. household own account) and generation of residuals								Accumulation	Flows from the rest of the World (Imports)	Flows from the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs											7 011,0	**7 011,0**
Inputs of energy from renewable sources											36,9	**36,9**
Other natural inputs											0,0	**0,0**
2 Energy products:												
Production of energy products by SIEC class:												
Coal	0,0	5 965,0	35,9	21,0	0,0	0,0	**6 021,9**			17,8		**6 039,8**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Natural gas	0,0	0,7	0,0	0,0	0,0	0,0	**0,7**			131,1		**131,8**
Oil and oil products	0,0	0,0	858,9	0,0	0,0	0,0	**858,9**			1 063,8		**1 922,7**
Biofuels	651,1	0,0	0,0	0,0	0,0	0,0	**651,1**			0,0		**651,1**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Electricity	0,0	0,0	0,0	940,7	0,0	0,0	**940,7**			38,0		**978,7**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Nuclear fuels and other fuels	0,0	221,8	0,0	0,0	0,0	0,0	**221,8**			0,0		**221,8**
3 Energy residuals:												
Energy residuals from end-use	63,8	162,6	1 365,3	83,7	422,0	226,6	**2 324,0**	733,1				**3 057,1**
Energy residuals from losses	0,0	0,0	438,7	1 761,0	0,0	0,0	**2 199,7**	0,0				**2 199,7**
4 Other residual flows:												
Residuals from end-use for non-energy purposes	0,0	0,0	19,6	0,0	8,1	24,3	**52,0**	0,0				**52,0**
Energy from solid waste									175,4			**175,4**
5 TOTAL SUPPLY	**714,9**	**6 350,1**	**2 718,5**	**2 806,5**	**430,1**	**250,9**	**13 270,9**	**733,1**	**175,4**	**1 250,8**	**7 047,9**	**22 478,1**

Source: Statistics South Africa.

Physical Energy Flow Accounts for South Africa, 2015 to 2021, Discussion Document D0401.6 (March 2025)

Table 13 – Physical energy use table, 2016 (Petajoule)

PHYSICAL ENERGY USE TABLE (unit: PJ)	Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs	651,1	6 187,5	172,4	0,0	0,0	0,0	**7 011,0**					**7 011,0**
Inputs of energy from renewable sources	0,0	0,0	3,1	33,8	0,0	0,0	**36,9**					**36,9**
Other natural inputs	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
2 Energy products:												
Transformation of energy products by SIEC class:												
Coal	0,0	0,0	115,0	2 494,8	0,0	0,0	**2 609,8**					**2 609,8**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Natural gas	0,0	0,0	124,2	0,0	0,0	0,0	**124,2**					**124,2**
Oil and oil products	0,0	0,0	870,2	28,9	0,0	0,0	**899,1**					**899,1**
Biofuels	0,0	0,0	221,5	4,3	0,0	0,0	**225,8**					**225,8**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Electricity	0,0	0,0	0,0	27,0	0,0	0,0	**27,0**					**27,0**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Nuclear fuels and other fuels	0,0	0,0	0,0	173,6	0,0	0,0	**173,6**					**173,6**

Source: Statistics South Africa.

Table 13 – Physical energy use table, 2016 (Petajoule) (concluded)

PHYSICAL ENERGY USE TABLE (unit: PJ)		Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
		Industries (by SIC)							Households				
		Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	Total Industry					
	SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
	End-use of energy products by SIEC class:												
	Coal	0,8	32,7	425,1	1,2	0,4	9,4	**469,6**	9,5	1 067,4	1 883,6		**3 430,0**
	Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Natural gas	0,0	0,0	83,4	10,4	0,0	0,2	**94,0**	0,2	-87,2	0,6		**7,6**
	Oil and oil products	42,2	8,2	30,1	0,0	410,4	83,2	**574,0**	204,4	73,1	120,1		**971,6**
	Biofuels	0,0	0,0	81,1	0,0	0,0	0,0	**81,1**	344,2	0,0	0,0		**425,3**
	Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Electricity	20,8	121,8	397,6	32,4	11,2	133,8	**717,4**	174,7	0,0	59,6		**951,7**
	Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Nuclear fuels and other fuels	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	48,2	0,0		**48,2**
	End-use of energy products for non-energy purposes	0,0	0,0	19,6	0,0	8,1	24,3	**52,0**	0,0	0,0	0,0	0,0	**52,0**
3	**Energy residuals:**												
	Energy residuals from end-use											3 057,1	**3 057,1**
	Energy residuals from losses											2 199,7	**2 199,7**
4	**Other residual flows:**												
	Residuals from end-use for non-energy purposes									52,0			**52,0**
	Energy from solid waste	0,0	0,0	175,4	0,0	0,0	0,0	**175,4**					**175,4**
5	**TOTAL USE**	**714,9**	**6 350,1**	**2 718,5**	**2 806,5**	**430,1**	**250,9**	**13 270,9**	**733,1**	**1 153,5**	**2 063,8**	**5 256,8**	**22 478,1**

Source: Statistics South Africa.

Table 14 – Physical energy supply table, 2017 (Petajoule)

PHYSICAL ENERGY SUPPLY TABLE (unit: PJ)		Production (incl. household own account) and generation of residuals								Accumulation	Flows from the rest of the World (Imports)	Flows from the environment	TOTAL
		Industries (by SIC)							Households				
		Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
	SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1	**Energy from natural inputs:**												
	Natural resource inputs											7 064,9	**7 064,9**
	Inputs of energy from renewable sources											44,3	**44,3**
	Other natural inputs											0,0	**0,0**
2	**Energy products:**												
	Production of energy products by SIEC class:												
	Coal	0,0	5 971,9	36,8	19,4	0,0	0,0	**6 028,1**			33,1		**6 061,2**
	Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
	Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
	Natural gas	0,0	0,7	0,0	0,0	0,0	0,0	**0,7**			111,7		**112,4**
	Oil and oil products	0,0	12,6	874,1	0,0	0,0	0,0	**886,7**			1 098,5		**1 985,3**
	Biofuels	654,7	0,0	0,0	0,0	0,0	0,0	**654,7**			0,0		**654,7**
	Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
	Electricity	0,0	0,0	0,0	955,9	0,0	0,0	**955,9**			38,0		**993,9**
	Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
	Nuclear fuels and other fuels	0,0	219,5	0,0	0,0	0,0	0,0	**219,5**			0,0		**219,5**
3	**Energy residuals:**												
	Energy residuals from end-use	64,4	159,2	1 394,9	83,7	445,4	236,2	**2 383,8**	745,0				**3 128,8**
	Energy residuals from losses	0,0	5,5	307,0	1 714,2	0,0	0,0	**2 026,7**	0,0				**2 026,7**
4	**Other residual flows:**												
	Residuals from end-use for non-energy purposes	0,0	0,0	20,1	0,0	8,6	24,1	**52,8**	0,0				**52,8**
	Energy from solid waste									175,4			**175,4**
5	**TOTAL SUPPLY**	**719,1**	**6 369,3**	**2 632,9**	**2 773,2**	**454,0**	**260,3**	**13 208,8**	**745,0**	**175,4**	**1 281,3**	**7 109,2**	**22 519,9**

Source: Statistics South Africa.

Physical Energy Flow Accounts for South Africa, 2015 to 2021, Discussion Document D0401.6 (March 2025)

Table 15 – Physical energy use table, 2017 (Petajoule)

PHYSICAL ENERGY USE TABLE (unit: PJ)	Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs	654,7	6 204,6	205,6	0,0	0,0	0,0	**7 064,9**					**7 064,9**
Inputs of energy from renewable sources	0,0	0,0	0,0	44,3	0,0	0,0	**44,3**					**44,3**
Other natural inputs	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
2 Energy products:												
Transformation of energy products by SIEC class:												
Coal	0,0	0,0	73,6	2 473,3	0,0	0,0	**2 546,9**					**2 546,9**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Natural gas	0,0	0,0	79,5	0,0	0,0	0,0	**79,5**					**79,5**
Oil and oil products	0,0	0,0	813,0	1,0	0,0	0,0	**814,0**					**814,0**
Biofuels	0,0	0,0	221,6	4,3	0,0	0,0	**225,9**					**225,9**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Electricity	0,0	0,0	0,0	35,3	0,0	0,0	**35,3**					**35,3**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Nuclear fuels and other fuels	0,0	0,0	0,0	171,7	0,0	0,0	**171,7**					**171,7**

Source: Statistics South Africa.

Table 15 – Physical energy use table, 2017 (Petajoule) (concluded)

PHYSICAL ENERGY USE TABLE (unit: PJ)		Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
		Industries (by SIC)							Households				
		Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
	SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
	End-use of energy products by SIEC class:												
	Coal	2,0	34,3	457,7	1,1	0,0	16,5	**511,6**	16,6	1 029,5	1 956,6		**3 514,3**
	Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Natural gas	0,0	0,0	75,8	10,3	0,0	1,2	**87,3**	0,2	-55,1	0,4		**32,9**
	Oil and oil products	41,9	8,7	25,2	0,0	433,3	84,6	**593,7**	208,7	197,2	118,9		**1 118,4**
	Biofuels	0,0	0,0	81,1	0,0	0,0	0,0	**81,1**	344,8	2,9	0,0		**428,8**
	Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Electricity	20,6	121,8	404,3	31,8	12,0	133,9	**724,3**	174,7	0,0	59,6		**958,6**
	Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Nuclear fuels and other fuels	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	47,7	0,0		**47,7**
	End-use of energy products for non-energy purposes	0,0	0,0	20,1	0,0	8,6	24,1	**52,8**	0,0	0,0	0,0	0,0	**52,8**
3	**Energy residuals:**												
	Energy residuals from end-use											3 128,8	**3 128,8**
	Energy residuals from losses											2 026,7	**2 026,7**
4	**Other residual flows:**												
	Residuals from end-use for non-energy purposes									52,8			**52,8**
	Energy from solid waste	0,0	0,0	175,4	0,0	0,0	0,0	**175,4**					**175,4**
5	**TOTAL USE**	**719,1**	**6 369,3**	**2 632,9**	**2 773,2**	**454,0**	**260,3**	**13 208,8**	**745,0**	**1 275,1**	**2 135,5**	**5 155,5**	**22 519,9**

Source: Statistics South Africa.

Table 16 – Physical energy supply table, 2018 (Petajoule)

PHYSICAL ENERGY SUPPLY TABLE (unit: PJ)	Production (incl. household own account) and generation of residuals								Accumulation	Flows from the rest of the World (Imports)	Flows from the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and Quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs											7 072,6	**7 072,6**
Inputs of energy from renewable sources											46,3	**46,3**
Other natural inputs											0,0	**0,0**
2 Energy products:												
Production of energy products by SIEC class:												
Coal	0,0	6 020,9	37,0	19,6	0,0	0,0	**6 077,4**			35,8		**6 113,2**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Natural gas	0,0	0,7	0,0	0,0	0,0	0,0	**0,7**			142,7		**143,3**
Oil and oil products	0,0	16,5	1 015,7	0,0	0,0	0,0	**1 032,2**			1 291,1		**2 323,2**
Biofuels	653,4	0,0	0,0	0,0	0,0	0,0	**653,4**			0,0		**653,4**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Electricity	0,0	0,0	0,0	861,7	0,0	0,0	**861,7**			27,0		**888,7**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Nuclear fuels and other fuels	0,0	198,1	0,0	0,0	0,0	0,0	**198,1**			0,0		**198,1**
3 Energy residuals:												
Energy residuals from end-use	65,3	174,0	1 154,6	18,3	442,2	237,9	**2 092,3**	749,7				**2 842,1**
Energy residuals from losses	0,0	0,0	647,5	1 751,5	0,0	0,0	**2 399,0**	0,0				**2 399,0**
4 Other residual flows:												
Residuals from end-use for non-energy purposes	0,0	0,0	20,5	0,0	8,2	23,8	**52,5**	0,0				**52,5**
Energy from solid waste									184,3			**184,3**
5 TOTAL SUPPLY	**718,7**	**6 410,1**	**2 875,2**	**2 651,1**	**450,4**	**261,7**	**13 367,3**	**749,7**	**184,3**	**1 496,5**	**7 118,8**	**22 916,7**

Source: Statistics South Africa.

Physical Energy Flow Accounts for South Africa, 2015 to 2021, Discussion Document D0401.6 (March 2025)

Table 17 – Physical energy use table, 2018 (Petajoule)

PHYSICAL ENERGY USE TABLE (unit: PJ)	Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs	653,4	6 236,1	183,0	0,0	0,0	0,0	**7 072,6**					**7 072,6**
Inputs of energy from renewable sources	0,0	0,0	0,0	46,3	0,0	0,0	**46,3**					**46,3**
Other natural inputs	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
2 Energy products:												
Transformation of energy products by SIEC class:												
Coal	0,0	0,0	68,7	2 358,8	0,0	0,0	**2 427,4**					**2 427,4**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Natural gas	0,0	0,0	55,5	0,0	0,0	0,0	**55,5**					**55,5**
Oil and oil products	0,0	0,0	1 184,4	0,8	0,0	0,0	**1 185,2**					**1 185,2**
Biofuels	0,0	0,0	221,5	4,3	0,0	0,0	**225,8**					**225,8**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Electricity	0,0	0,0	0,0	38,2	0,0	0,0	**38,2**					**38,2**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Nuclear fuels and other fuels	0,0	0,0	0,0	155,1	0,0	0,0	**155,1**					**155,1**

Source: Statistics South Africa.

Table 17 – Physical energy use table, 2018 (Petajoule) (concluded)

PHYSICAL ENERGY USE TABLE (unit: PJ)		Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
		Industries (by SIC)							Households				
		Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	Total Industry					
	SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
	End-use of energy products by SIEC class:												
	Coal	0,7	57,2	461,1	1,1	0,0	17,2	**537,3**	18,2	1 161,6	1 968,7		**3 685,8**
	Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Natural gas	0,0	0,0	76,5	13,9	0,0	1,2	**91,6**	0,2	-4,3	0,3		**87,8**
	Oil and oil products	43,3	13,4	16,0	0,0	430,7	85,5	**588,9**	212,4	161,3	122,9		**1 085,5**
	Biofuels	0,0	0,0	81,2	0,0	0,0	0,0	**81,2**	344,2	2,2	0,0		**427,6**
	Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Electricity	21,3	103,4	322,4	32,7	11,5	134,0	**625,3**	174,7	0,0	50,5		**850,5**
	Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Nuclear fuels and other fuels	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	43,1	0,0		**43,1**
	End-use of energy products for non-energy purposes	0,0	0,0	20,5	0,0	8,2	23,8	**52,5**	0,0	0,0	0,0	0,0	**52,5**
3	**Energy residuals:**												
	Energy residuals from end-use											2 842,1	**2 842,1**
	Energy residuals from losses											2 399,0	**2 399,0**
4	**Other residual flows:**												
	Residuals from end-use for non-energy purposes									52,5			**52,5**
	Energy from solid waste	0,0	0,0	184,3	0,0	0,0	0,0	**184,3**					**184,3**
5	**TOTAL USE**	**718,7**	**6 410,1**	**2 875,2**	**2 651,1**	**450,4**	**261,7**	**13 367,3**	**749,7**	**1 416,3**	**2 142,3**	**5 241,0**	**22 916,7**

Source: Statistics South Africa.

Table 18 – Physical energy supply table, 2019 (Petajoule)

PHYSICAL ENERGY SUPPLY TABLE (unit: PJ)		Production (incl. household own account) and generation of residuals								Accumulation	Flows from the rest of the World (Imports)	Flows from the environment	TOTAL
		Industries (by SIC)							Households				
		Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
	SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1	**Energy from natural inputs:**												
	Natural resource inputs											7 092,4	**7 092,4**
	Inputs of energy from renewable sources											46,7	**46,7**
	Other natural inputs											0,0	**0,0**
2	**Energy products:**												
	Production of energy products by SIEC class:												
	Coal	0,0	6 020,9	33,1	19,6	0,0	0,0	**6 073,6**			35,8		**6 109,4**
	Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
	Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
	Natural gas	0,0	0,7	0,0	0,0	0,0	0,0	**0,7**			117,4		**118,1**
	Oil and oil products	0,0	16,8	848,4	0,0	0,0	0,0	**865,2**			1 293,3		**2 158,4**
	Biofuels	652,3	0,0	0,0	0,0	0,0	0,0	**652,3**			0,0		**652,3**
	Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
	Electricity	0,0	0,0	0,0	860,4	0,0	0,0	**860,4**			27,0		**887,3**
	Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
	Nuclear fuels and other fuels	0,0	198,1	0,0	0,0	0,0	0,0	**198,1**			0,0		**198,1**
3	**Energy residuals:**												
	Energy residuals from end-use	66,1	175,7	1 380,3	20,6	450,8	239,0	**2 332,6**	755,4				**3 088,0**
	Energy residuals from losses	0,0	0,0	287,2	1 764,2	0,0	0,0	**2 051,3**	0,0				**2 051,3**
4	**Other residual flows:**												
	Residuals from end-use for non-energy purposes	0,0	0,0	15,7	0,0	10,8	25,7	**52,3**	0,0				**52,3**
	Energy from solid waste									203,6			**203,6**
5	**TOTAL SUPPLY**	**718,4**	**6 412,2**	**2 564,7**	**2 664,8**	**461,6**	**264,7**	**13 086,4**	**755,4**	**203,6**	**1 473,4**	**7 139,0**	**22 657,9**

Source: Statistics South Africa.

Physical Energy Flow Accounts for South Africa, 2015 to 2021, Discussion Document D0401.6 (March 2025)

Table 19 – Physical energy use table, 2019 (Petajoule)

PHYSICAL ENERGY USE TABLE (unit: PJ)	Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs	652,3	6 236,5	203,6	0,0	0,0	0,0	**7 092,4**					**7 092,4**
Inputs of energy from renewable sources	0,0	0,0	0,0	46,7	0,0	0,0	**46,7**					**46,7**
Other natural inputs	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
2 Energy products:												
Transformation of energy products by SIEC class:												
Coal	0,0	0,0	64,7	2 358,8	0,0	0,0	**2 423,4**					**2 423,4**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Natural gas	0,0	0,0	52,2	0,0	0,0	0,0	**52,2**					**52,2**
Oil and oil products	0,0	0,0	830,2	14,9	0,0	0,0	**845,1**					**845,1**
Biofuels	0,0	0,0	221,5	4,3	0,0	0,0	**225,8**					**225,8**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Electricity	0,0	0,0	0,0	36,9	0,0	0,0	**36,9**					**36,9**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Nuclear fuels and other fuels	0,0	0,0	0,0	155,1	0,0	0,0	**155,1**					**155,1**

Source: Statistics South Africa.

Table 19 – Physical energy use table, 2019 (Petajoule) (concluded)

PHYSICAL ENERGY USE TABLE (unit: PJ)		Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
		Industries (by SIC)							Households				
		Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	Total Industry					
	SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
	End-use of energy products by SIEC class:												
	Coal	0,7	58,1	480,5	1,1	0,0	17,2	**557,5**	18,2	1 141,6	1 968,7		**3 686,0**
	Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Natural gas	0,0	0,0	69,6	13,9	0,0	1,1	**84,6**	0,2	-19,3	0,4		**65,8**
	Oil and oil products	43,9	14,2	20,4	0,0	439,3	86,7	**604,5**	218,1	313,5	125,0		**1 261,0**
	Biofuels	0,0	0,0	81,2	0,0	0,0	0,0	**81,2**	344,2	1,1	0,0		**426,5**
	Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Electricity	21,6	103,4	321,5	33,3	11,5	134,0	**625,4**	174,7	0,0	50,5		**850,5**
	Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Nuclear fuels and other fuels	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	43,1	0,0		**43,1**
	End-use of energy products for non-energy purposes	0,0	0,0	15,7	0,0	10,8	25,7	**52,3**	0,0	0,0	0,0	0,0	**52,3**
3	**Energy residuals:**												
	Energy residuals from end-use											3 088,0	**3 088,0**
	Energy residuals from losses											2 051,3	**2 051,3**
4	**Other residual flows:**												
	Residuals from end-use for non-energy purposes									52,3			**52,3**
	Energy from solid waste	0,0	0,0	203,6	0,0	0,0	0,0	**203,6**					**203,6**
5	**TOTAL USE**	**718,4**	**6 412,2**	**2 564,7**	**2 664,8**	**461,6**	**264,7**	**13 086,4**	**755,4**	**1 532,1**	**2 144,5**	**5 139,4**	**22 657,9**

Source: Statistics South Africa.

Table 20 – Physical energy supply table, 2020 (Petajoule)

PHYSICAL ENERGY SUPPLY TABLE (unit: PJ)	Production (incl. household own account) and generation of residuals								Accumulation	Flows from the rest of the World (Imports)	Flows from the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs											6 880,7	**6 880,7**
Inputs of energy from renewable sources											62,4	**62,4**
Other natural inputs											0,0	**0,0**
2 Energy products:												
Production of energy products by SIEC class:												
Coal	0,0	5 876,1	33,8	18,6	0,0	0,0	**5 928,6**			40,3		**5 968,8**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Natural gas	0,0	0,7	0,0	0,0	0,0	0,0	**0,7**			136,4		**137,1**
Oil and oil products	0,0	0,0	603,1	0,0	0,0	0,0	**603,1**			1 270,5		**1 873,6**
Biofuels	652,1	0,0	0,0	0,0	0,0	0,0	**652,1**			0,0		**652,1**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Electricity	0,0	0,0	0,0	913,8	0,0	0,0	**913,8**			27,0		**940,8**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Nuclear fuels and other fuels	0,0	169,5	0,0	0,0	0,0	0,0	**169,5**			0,0		**169,5**
3 Energy residuals:												
Energy residuals from end-use	63,2	158,5	1 315,4	21,0	429,9	236,2	**2 224,2**	786,0				**3 010,2**
Energy residuals from losses	0,0	0,0	289,7	1 861,4	0,0	0,0	**2 151,1**	0,0				**2 151,1**
4 Other residual flows:												
Residuals from end-use for non-energy purposes	0,0	0,0	9,9	0,0	6,8	18,5	**35,2**	0,0				**35,2**
Energy from solid waste									182,3			**182,3**
5 TOTAL SUPPLY	**715,3**	**6 204,8**	**2 251,9**	**2 814,9**	**436,7**	**254,7**	**12 678,3**	**786,0**	**182,3**	**1 474,2**	**6 943,1**	**22 063,9**

Source: Statistics South Africa.

Physical Energy Flow Accounts for South Africa, 2015 to 2021, Discussion Document D0401.6 (March 2025)

Table 21 – Physical energy use table, 2020 (Petajoule)

PHYSICAL ENERGY USE TABLE (unit: PJ)	Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs	652,1	6 046,3	182,3	0,0	0,0	0,0	**6 880,7**					**6 880,7**
Inputs of energy from renewable sources	0,0	0,0	0,0	62,4	0,0	0,0	**62,4**					**62,4**
Other natural inputs	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
2 Energy products:												
Transformation of energy products by SIEC class:												
Coal	0,0	0,0	56,3	2 494,1	0,0	0,0	**2 550,5**					**2 550,5**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Natural gas	0,0	0,0	59,8	0,0	0,0	0,0	**59,8**					**59,8**
Oil and oil products	0,0	0,0	589,0	22,9	0,0	0,0	**611,9**					**611,9**
Biofuels	0,0	0,0	221,5	4,3	0,0	0,0	**225,8**					**225,8**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Electricity	0,0	0,0	0,0	50,0	0,0	0,0	**50,0**					**50,0**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Nuclear fuels and other fuels	0,0	0,0	0,0	132,7	0,0	0,0	**132,7**					**132,7**

Source: Statistics South Africa.

Table 21 – Physical energy use table, 2020 (Petajoule) (concluded)

PHYSICAL ENERGY USE TABLE (unit: PJ)		Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
		Industries (by SIC)							Households				
		Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
	SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
	End-use of energy products by SIEC class:												
	Coal	0,5	49,7	476,6	1,0	0,0	20,1	**548,0**	21,2	1 171,1	1 678,1		**3 418,4**
	Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Natural gas	0,0	0,0	66,8	13,4	0,0	1,1	**81,2**	0,2	-4,6	0,4		**77,3**
	Oil and oil products	42,0	12,3	16,7	0,0	420,7	81,5	**573,3**	183,2	358,6	111,3		**1 226,5**
	Biofuels	0,0	0,0	81,2	0,0	0,0	0,0	**81,2**	344,2	0,8	0,0		**426,3**
	Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Electricity	20,6	96,5	309,5	34,0	9,2	133,5	**603,3**	237,1	0,0	50,5		**890,8**
	Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Nuclear fuels and other fuels	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	36,9	0,0		**36,9**
	End-use of energy products for non-energy purposes	0,0	0,0	9,9	0,0	6,8	18,5	**35,2**	0,0	0,0	0,0	0,0	**35,2**
3	**Energy residuals:**												
	Energy residuals from end-use											3 010,2	**3 010,2**
	Energy residuals from losses											2 151,1	**2 151,1**
4	**Other residual flows:**												
	Residuals from end-use for non-energy purposes									35,2			**35,2**
	Energy from solid waste	0,0	0,0	182,3	0,0	0,0	0,0	**182,3**					**182,3**
5	**TOTAL USE**	**715,3**	**6 204,8**	**2 251,9**	**2 814,9**	**436,7**	**254,7**	**12 678,3**	**786,0**	**1 598,0**	**1 840,3**	**5 161,3**	**22 063,9**

Source: Statistics South Africa.

Table 22 – Physical energy supply table, 2021 (Petajoule)

PHYSICAL ENERGY SUPPLY TABLE (unit: PJ)	Production (incl. household own account) and generation of residuals								Accumulation	Flows from the rest of the World (Imports)	Flows from the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs											6 545,1	**6 545,1**
Inputs of energy from renewable sources											91,6	**91,6**
Other natural inputs											0,0	**0,0**
2 Energy products:												
Production of energy products by SIEC class:												
Coal	0,0	5 532,3	67,1	20,6	0,0	0,0	**5 620,0**			57,9		**5 677,9**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Natural gas	0,0	0,7	0,0	0,0	0,0	0,0	**0,7**			144,2		**144,8**
Oil and oil products	0,0	0,0	477,5	0,0	0,0	0,0	**477,5**			901,4		**1 378,8**
Biofuels	652,3	0,0	0,0	0,0	0,0	0,0	**652,3**			0,0		**652,3**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Electricity	0,0	0,0	0,0	888,5	0,0	0,0	**888,5**			27,0		**915,6**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**			0,0		**0,0**
Nuclear fuels and other fuels	0,0	177,6	0,0	0,0	0,0	0,0	**177,6**			0,0		**177,6**
3 Energy residuals:												
Energy residuals from end-use	69,9	198,9	1 483,0	19,3	441,5	239,8	**2 452,4**	730,2				**3 182,6**
Energy residuals from losses	0,0	0,0	199,3	1 792,2	0,0	0,0	**1 991,5**	0,0				**1 991,5**
4 Other residual flows:												
Residuals from end-use for non-energy purposes	0,0	0,0	10,3	0,0	10,0	17,7	**38,0**	0,0				**38,0**
Energy from solid waste									182,3			**182,3**
5 TOTAL SUPPLY	**722,2**	**5 909,4**	**2 237,2**	**2 720,6**	**451,4**	**257,5**	**12 298,4**	**730,2**	**182,3**	**1 130,5**	**6 636,6**	**20 978,0**

Source: Statistics South Africa.

Physical Energy Flow Accounts for South Africa, 2015 to 2021, Discussion Document D0401.6 (March 2025)

Table 23 – Physical energy use table, 2021 (Petajoule)

PHYSICAL ENERGY USE TABLE (unit: PJ)	Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
	Industries (by SIC)							Households				
	Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
1 Energy from natural inputs:												
Natural resource inputs	652,3	5 710,5	182,3	0,0	0,0	0,0	**6 545,1**					**6 545,1**
Inputs of energy from renewable sources	0,0	0,0	13,8	77,7	0,0	0,0	**91,6**					**91,6**
Other natural inputs	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
2 Energy products:												
Transformation of energy products by SIEC class:												
Coal	0,0	0,0	104,3	2 380,5	0,0	0,0	**2 484,8**					**2 484,8**
Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Natural gas	0,0	0,0	61,9	0,0	0,0	0,0	**61,9**					**61,9**
Oil and oil products	0,0	0,0	342,3	9,7	0,0	0,0	**352,1**					**352,1**
Biofuels	0,0	0,0	221,5	4,3	0,0	0,0	**225,8**					**225,8**
Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Electricity	0,0	0,0	0,0	62,4	0,0	0,0	**62,4**					**62,4**
Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**					**0,0**
Nuclear fuels and other fuels	0,0	0,0	0,0	139,0	0,0	0,0	**139,0**					**139,0**

Source: Statistics South Africa.

Table 23 – Physical energy use table, 2021 (Petajoule) (concluded)

PHYSICAL ENERGY USE TABLE (unit: PJ)		Intermediate consumption, use of energy resources, receipt of energy losses							Final Consumption	Accumulation	Flows to the rest of the World (Exports)	Flows to the environment	TOTAL
		Industries (by SIC)							Households				
		Agriculture, forestry and fisheries	Mining and quarrying	Manufacturing	Electricity, gas, steam and air conditioning supply	Transportation and storage	Other industries	**Total Industry**					
	SIC	*1*	*2*	*3*	*4*	*7*	*Other*		*HH*	*Acc*	*RoW*	*Env*	
	End-use of energy products by SIEC class:												
	Coal	0,2	77,4	586,3	0,9	0,0	21,5	**686,3**	22,3	1 186,1	1 298,4		**3 193,1**
	Peat and peat products	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Oil shale/oil sands	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Natural gas	0,0	0,0	69,8	12,3	0,0	0,2	**82,4**	0,2	0,0	0,4		**83,0**
	Oil and oil products	48,1	19,7	23,5	0,0	433,3	82,7	**607,3**	204,5	94,9	82,1		**988,7**
	Biofuels	0,0	0,0	82,2	0,0	0,0	0,0	**82,2**	344,3	0,0	0,0		**426,5**
	Waste	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Electricity	21,6	101,8	356,5	33,8	8,2	135,4	**657,3**	159,0	0,0	36,8		**853,2**
	Heat	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	0,0	0,0		**0,0**
	Nuclear fuels and other fuels	0,0	0,0	0,0	0,0	0,0	0,0	**0,0**	0,0	38,6	0,0		**38,6**
	End-use of energy products for non-energy purposes	0,0	0,0	10,3	0,0	10,0	17,7	**38,0**	0,0	0,0	0,0	0,0	**38,0**
3	**Energy residuals:**												
	Energy residuals from end-use											3 182,6	**3 182,6**
	Energy residuals from losses											1 991,5	**1 991,5**
4	**Other residual flows:**												
	Residuals from end-use for non-energy purposes									38,0			**38,0**
	Energy from solid waste	0,0	0,0	182,3	0,0	0,0	0,0	182,3					**182,3**
5	**TOTAL USE**	**722,2**	**5 909,4**	**2 237,2**	**2 720,6**	**451,4**	**257,5**	**12 298,4**	**730,2**	**1 357,6**	**1 417,8**	**5 174,1**	**20 978,0**

Source: Statistics South Africa.

3.2 The supply of energy in South Africa

This section will highlight some of the main findings from the PEFA supply tables for the period 2015 to 2021.

Table 24 and Table 25 show the supply of energy from natural inputs in South Africa from 2015 to 2021. The supplier of these flows (natural inputs) is the environment, and natural inputs comprise the flow of energy that results from its removal and capture from the environment by resident economic units. Energy is extracted from the environment either to be used by the economic unit that undertakes the extraction (own use extraction) or to be supplied to other economic units for further processing or direct use (UN, 2019).

Table 24 – Energy from natural inputs, 2015–2021 (Petajoule)

	2015	2016	2017	2018	2019	2020	2021
	Petajoule						
Natural resource inputs	7 111,7	7 011,0	7 064,9	7 072,6	7 092,4	6 880,7	6 545,1
Inputs of energy from renewable sources	58,9	36,9	44,3	46,3	46,7	62,4	91,6
Total: Energy from natural inputs	**7 170,7**	**7 047,9**	**7 109,2**	**7 118,8**	**7 139,0**	**6 943,1**	**6 636,6**

Individual figures may not add up to stated totals due to rounding.
Source: Statistics South Africa.

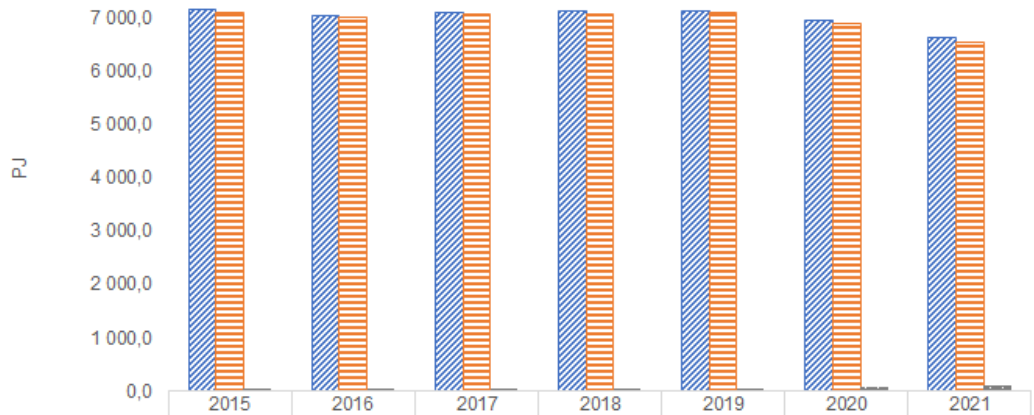
Table 25 – Energy from natural inputs, 2015–2021 (percentage)

	2015	2016	2017	2018	2019	2020	2021
	%						
Natural resource inputs	99,2	99,5	99,4	99,4	99,3	99,1	98,6
Inputs of energy from renewable sources	0,8	0,5	0,6	0,7	0,7	0,9	1,4
Total: Energy from natural inputs	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

Individual figures may not add up to stated totals due to rounding.
Source: Statistics South Africa.

'Natural resource inputs' for the supply of energy in South Africa decreased from 7 111,7 PJ in 2015 to 6 545,1 PJ in 2021, and 'inputs of energy from renewable sources' increased from 58,9 PJ in 2015 to 91,6 PJ in 2021. Figure 8 and Figure 9 show that the majority of South Africa's energy from natural inputs between 2015 and 2021 was from 'natural resource inputs', slightly decreasing between 2015 (99,2% of all natural inputs) and 2021 (98,6% of all natural inputs).

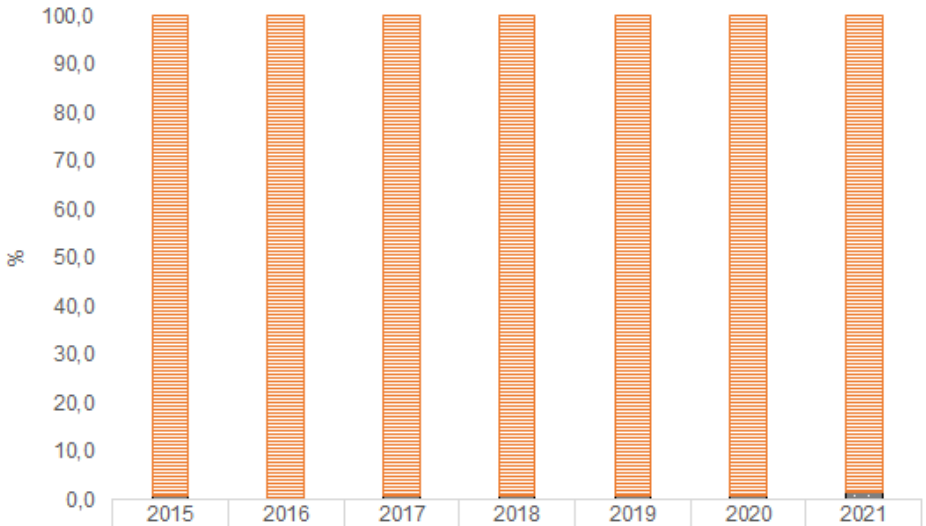
Figure 8 – Energy from natural inputs, 2015–2021 (Petajoule)



	2015	2016	2017	2018	2019	2020	2021
Total energy from natural inputs	7 170,7	7 047,9	7 109,2	7 118,8	7 139,0	6 943,1	6 636,6
Natural resource inputs	7 111,7	7 011,0	7 064,9	7 072,6	7 092,4	6 880,7	6 545,1
Inputs of energy from renewable sources	58,9	36,9	44,3	46,3	46,7	62,4	91,6

Source: Statistics South Africa.

Figure 9 – Energy from natural inputs, 2015–2021 (percentage)



	2015	2016	2017	2018	2019	2020	2021
Natural resource inputs	99,2	99,5	99,4	99,4	99,3	99,1	98,6
Inputs of energy from renewable sources	0,8	0,5	0,6	0,7	0,7	0,9	1,4

Source: Statistics South Africa.

Table 26 and Table 27 show the domestic supply of energy products in South Africa from 2015 to 2021. These are the energy products that were produced by various industries within the South Africa economy for this period and that are then used by businesses for intermediate consumption (either for direct use or as an input into a transformation process directed towards producing other energy on non-energy products), or by households as part of final consumption or that can be exported to the rest of the world (UN, 2019).

Table 26 – Domestic supply of energy products, 2015–2021 (Petajoule)

	2015	2016	2017	2018	2019	2020	2021
	Petajoule						
Coal	6 023,2	6 021,9	6 028,1	6 077,4	6 073,6	5 928,6	5 620,0
Natural gas	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
Biofuels	651,3	651,1	654,7	653,4	652,3	652,1	652,3
Electricity	918,1	940,7	955,9	861,7	860,4	913,8	888,5
Nuclear fuels and other fuels	163,5	221,8	219,5	198,1	198,1	169,5	177,6
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**

Individual figures may not add up to stated totals due to rounding.
Source: Statistics South Africa.

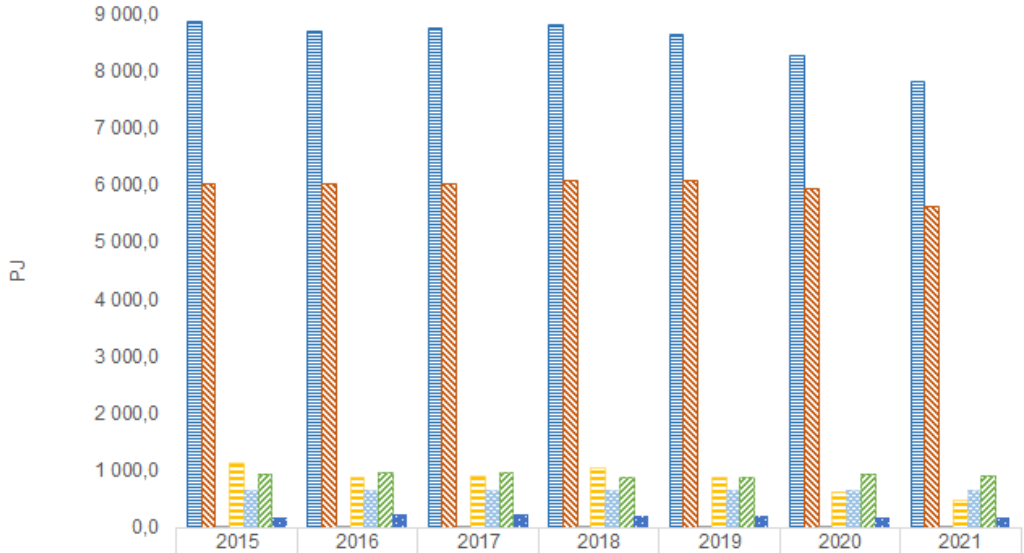
Table 27 – Domestic supply of energy products, 2015–2021 (percentage)

	2015	2016	2017	2018	2019	2020	2021
	%						
Coal	67,8	69,3	68,9	68,9	70,2	71,7	71,9
Natural gas	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
Biofuels	7,3	7,5	7,5	7,4	7,5	7,9	8,3
Electricity	10,3	10,8	10,9	9,8	9,9	11,1	11,4
Nuclear fuels and other fuels	1,8	2,6	2,5	2,2	2,3	2,1	2,3
Total: Domestic supply of energy products	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

Individual figures may not add up to stated totals due to rounding.
Source: Statistics South Africa.

Figure 10 and Figure 11 show that ‘coal’ was still the most dominant domestically produced energy product for South Africa from 2015 to 2021, even though it decreased between 2015 (6 023,2 PJ) and 2021 (5 620,0 PJ). ‘Coal’ contributed 71,9% of the total domestic supply of energy products in South Africa in 2021. From 2015 to 2019, either ‘oil and oil products’ or ‘electricity’ was the second and third largest energy products domestically supplied in South Africa. For 2020 and 2021, ‘biofuels’ was the third largest domestically supplied energy product in South Africa, after ‘electricity’. ‘Oil and oil products’ showed a declining trend between 2019 and 2021 due to supply constraints from domestic crude oil refineries. ‘Electricity’ also showed a declining trend over the period 2015 to 2021, due to Eskom supply constraints.

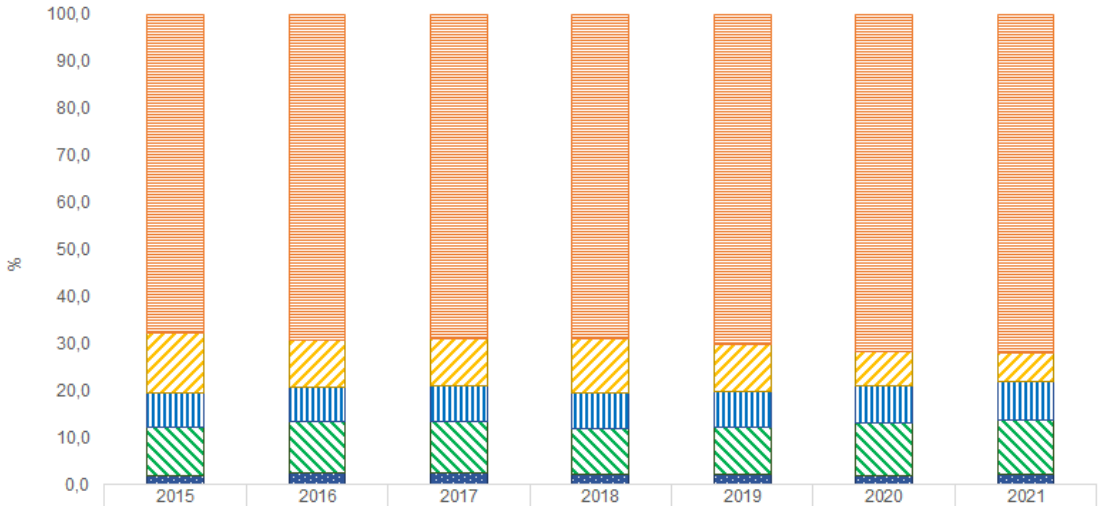
Figure 10 – Domestic supply of energy products, 2015–2021 (Petajoule)



	2015	2016	2017	2018	2019	2020	2021
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
Coal	6 023,2	6 021,9	6 028,1	6 077,4	6 073,6	5 928,6	5 620,0
Natural gas	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
Biofuels	651,3	651,1	654,7	653,4	652,3	652,1	652,3
Electricity	918,1	940,7	955,9	861,7	860,4	913,8	888,5
Nuclear fuels and other fuels	163,5	221,8	219,5	198,1	198,1	169,5	177,6

Source: Statistics South Africa.

Figure 11 – Domestic supply of energy products, 2015–2021 (percentage)



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

Source: Statistics South Africa.

Table 28 and Table 29 show the imports of energy products in South Africa from 2015 to 2021.

Table 28 – Imports of energy products, 2015–2021 (Petajoule)

	2015	2016	2017	2018	2019	2020	2021
	Petajoule						
Coal	23,9	17,8	33,1	35,8	35,8	40,3	57,9
Natural gas	117,1	131,1	111,7	142,7	117,4	136,4	144,2
Oil and oil products	976,8	1 063,8	1 098,5	1 291,1	1 293,3	1 270,5	901,4
Electricity	47,0	38,0	38,0	27,0	27,0	27,0	27,0
Total: Imports of energy products	**1 164,8**	**1 250,8**	**1 281,3**	**1 496,5**	**1 473,3**	**1 474,1**	**1 130,5**

Individual figures may not add up to stated totals due to rounding.
Source: Statistics South Africa.

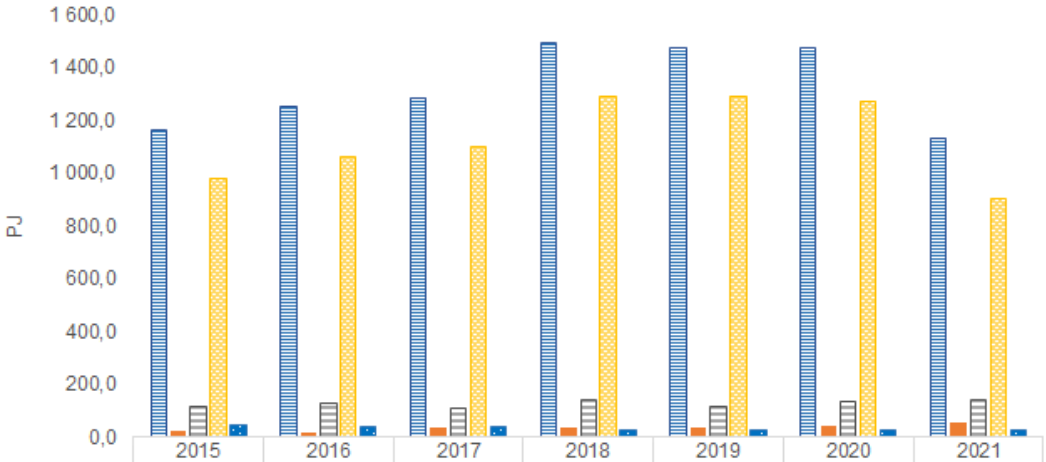
Table 29 – Imports of energy products, 2015–2021 (percentage)

	2015	2016	2017	2018	2019	2020	2021
	%						
Coal	2,0	1,4	2,6	2,4	2,4	2,7	5,1
Natural gas	10,1	10,5	8,7	9,5	8,0	9,3	12,8
Oil and oil products	83,9	85,0	85,7	86,3	87,8	86,2	79,7
Electricity	4,0	3,0	3,0	1,8	1,8	1,8	2,4
Total: Imports of energy products	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

Individual figures may not add up to stated totals due to rounding.
Source: Statistics South Africa.

Figure 12 and Figure 13 show that South Africa mainly imported the energy product ‘oil and oil products’ from 2015 to 2021, followed by ‘natural gas’. South Africa’s imports of ‘oil and oil products’ and ‘natural gas’ are described in more detail in Section 1.4.1 of Chapter 1 in this document. ‘Oil and oil products’ constituted 79,7% of all energy products imported to South Africa in 2021, followed by ‘natural gas’ (12,8%).

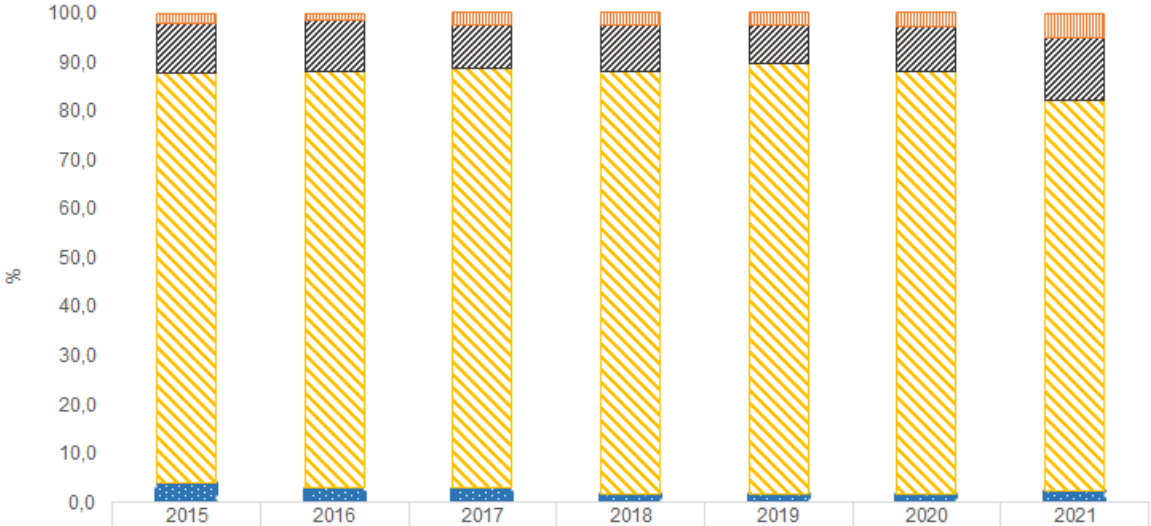
Figure 12 – Imports of energy products, 2015–2021 (Petajoule)



	2015	2016	2017	2018	2019	2020	2021
Total imports of energy products	1 164,8	1 250,8	1 281,3	1 496,5	1 473,4	1 474,1	1 130,5
Coal	23,9	17,8	33,1	35,8	35,8	40,3	57,9
Natural gas	117,1	131,1	111,7	142,7	117,4	136,4	144,2
Oil and oil products	976,8	1 063,8	1 098,5	1 291,1	1 293,3	1 270,5	901,4
Electricity	47,0	38,0	38,0	27,0	27,0	27,0	27,0

Source: Statistics South Africa.

Figure 13 – Imports of energy products, 2015–2021 (percentage)



	2015	2016	2017	2018	2019	2020	2021
Coal	2,0	1,4	2,6	2,4	2,4	2,7	5,1
Natural gas	10,1	10,5	8,7	9,5	8,0	9,3	12,8
Oil and oil products	83,9	85,0	85,7	86,3	87,8	86,2	79,7
Electricity	4,0	3,0	3,0	1,8	1,8	1,8	2,4

Source: Statistics South Africa.

3.3 The use of energy in South Africa

This section will highlight some of the main findings from the PEFA use tables for the period 2015 to 2021.

Table 30 and Table 31 show the industrial end-use of energy, by energy products, in South Africa from 2015 to 2021. Energy products that were supplied (produced) by various industries within the South African economy are used by other industries for intermediate consumption and industrial end-use of energy. Industrial end-use of energy focusses on all the energy products directly used (final use) as part of the production process.

Table 30 – Industrial end-use of energy, by energy product, 2015–2021 (Petajoule)

	2015	2016	2017	2018	2019	2020	2021
	Petajoule						
Coal*	454,4	469,6	511,6	537,3	557,5	548,0	686,3
Natural gas	85,7	94,0	87,3	91,6	84,6	81,2	82,4
Oil and oil products*	568,3	574,0	593,7	588,9	604,5	573,3	607,3
Biofuels	81,1	81,1	81,1	81,2	81,2	81,2	82,2
Electricity	747,3	717,4	724,3	625,3	625,4	603,3	657,3
Total: End-use of energy products by all industries	**1 936,9**	**1 936,2**	**1 998,0**	**1 924,4**	**1 953,1**	**1 887,0**	**2 115,4**

Individual figures may not add up to stated totals due to rounding.

* Note: The industrial end-use of energy, by energy product, for the 'manufacturing' industry and the 'electricity, gas, steam and air conditioning supply' industry excludes energy used for the transformation of energy products.

Source: Statistics South Africa.

Table 31 – Industrial end-use of energy, by energy product, 2015–2021 (percentage)

	2015	2016	2017	2018	2019	2020	2021
	%						
Coal*	23,5	24,3	25,6	27,9	28,5	29,0	32,4
Natural gas	4,4	4,9	4,4	4,8	4,3	4,3	3,9
Oil and oil products*	29,3	29,6	29,7	30,6	30,9	30,4	28,7
Biofuels	4,2	4,2	4,1	4,2	4,2	4,3	3,9
Electricity	38,6	37,1	36,3	32,5	32,0	32,0	31,1
Total: End-use of energy products by all industries	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

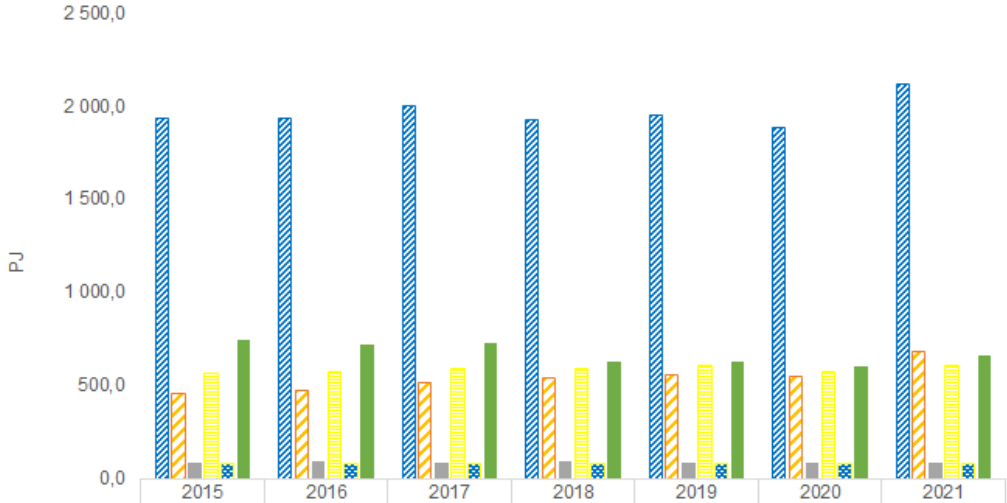
Individual figures may not add up to stated totals due to rounding.

* Note: The industrial end-use of energy, by energy product, for the 'manufacturing' industry and the 'electricity, gas, steam and air conditioning supply' industry excludes energy used for the transformation of energy products.

Source: Statistics South Africa.

Figure 14 and Figure 15 show that, for all industries in South Africa, the energy product 'electricity' was still the largest energy product directly used as part of the production process (and to produce goods and services that are not energy products) between 2015 and 2020, followed by 'oil and oil products' and 'coal'. The industrial end-use of the energy product 'electricity' showed a declining trend from 2015 (747,3 PJ) to 2021 (657,3 PJ), and this was related to the Eskom supply constraints during this period. 'Oil and oil products' and 'coal' showed an increasing trend from 2015 to 2021.

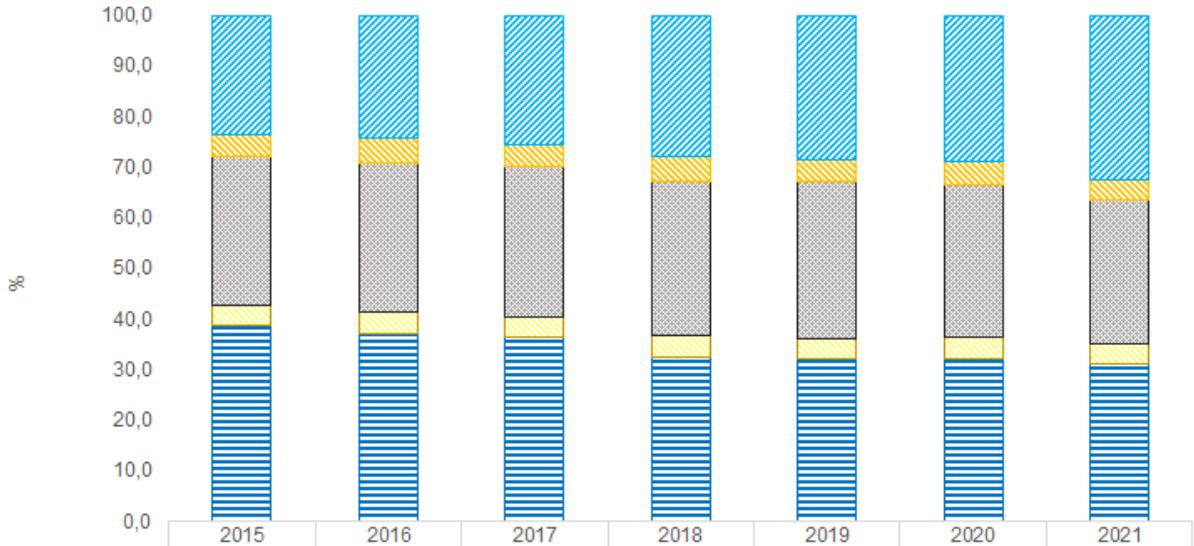
Figure 14 – Industrial end-use of energy, by energy product, 2015–2021 (Petajoule)



	2015	2016	2017	2018	2019	2020	2021
End-use of energy products by industries	1 936,9	1 936,2	1 998,0	1 924,4	1 953,1	1 887,0	2 115,4
Coal	454,4	469,6	511,6	537,3	557,5	548,0	686,3
Natural gas	85,7	94,0	87,3	91,6	84,6	81,2	82,4
Oil and oil products	568,3	574,0	593,7	588,9	604,5	573,3	607,3
Biofuels	81,1	81,1	81,1	81,2	81,2	81,2	82,2
Electricity	747,3	717,4	724,3	625,3	625,4	603,3	657,3

Source: Statistics South Africa.

Figure 15 – Industrial end-use of energy, by energy product, 2015–2021 (percentage)



	2015	2016	2017	2018	2019	2020	2021
Coal	23,5	24,3	25,6	27,9	28,5	29,0	32,4
Natural gas	4,4	4,9	4,4	4,8	4,3	4,3	3,9
Oil and oil products	29,3	29,6	29,7	30,6	30,9	30,4	28,7
Biofuels	4,2	4,2	4,1	4,2	4,2	4,3	3,9
Electricity	38,6	37,1	36,3	32,5	32,0	32,0	31,1

Source: Statistics South Africa.

Table 32 and Table 33 show the end-use of energy products by industry in South Africa from 2015 to 2021. For a more detailed description of the classification of industries, please see Section 2.7.2 in Chapter 2 of this document. It is important to note that for the end-use of energy products by industry, for the industry 'electricity, gas, steam and air conditioning supply', this does not include the use of coal by Eskom to generate electricity, which is separately recorded in the PEFA use table under 'transformation of energy products by SIEC class' (which records the transformation of energy products into other energy products).

Table 32 – End-use of energy products by industry, 2015–2021 (Petajoule)

	2015	2016	2017	2018	2019	2020	2021
	Petajoule						
Agriculture, forestry and fisheries	62,4	63,8	64,4	65,3	66,1	63,2	69,9
Mining and quarrying	163,0	162,6	164,7	174,0	175,7	158,5	198,9
Manufacturing*	1 038,9	1 017,2	1 044,1	957,3	973,1	950,8	1 118,4
Electricity, gas, steam and air conditioning supply*	47,9	44,0	43,2	47,7	48,3	48,5	47,0
Transportation and storage	426,7	422,0	445,4	442,2	450,8	429,9	441,5
Other industries	198,0	226,6	236,2	237,9	239,0	236,2	239,8
Total: End-use of energy products by industry	**1 936,9**	**1 936,2**	**1 998,0**	**1 924,4**	**1 953,1**	**1 887,0**	**2 115,4**

Individual figures may not add up to stated totals due to rounding.

* Note: The end-use of energy products for the 'manufacturing' industry and the 'electricity, gas, steam and air conditioning supply' industry excludes energy used for the transformation of energy products.

Source: Statistics South Africa.

Table 33 – End-use of energy products by industry, 2015–2021 (percentage)

	2015	2016	2017	2018	2019	2020	2021
	%						
Agriculture, forestry and fisheries	3,2	3,3	3,2	3,4	3,4	3,3	3,3
Mining and quarrying	8,4	8,4	8,2	9,0	9,0	8,4	9,4
Manufacturing*	53,6	52,5	52,3	49,7	49,8	50,4	52,9
Electricity, gas, steam and air conditioning supply*	2,5	2,3	2,2	2,5	2,5	2,6	2,2
Transportation and storage	22,0	21,8	22,3	23,0	23,1	22,8	20,9
Other industries	10,2	11,7	11,8	12,4	12,2	12,5	11,3
Total: End-use of energy products by industry	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

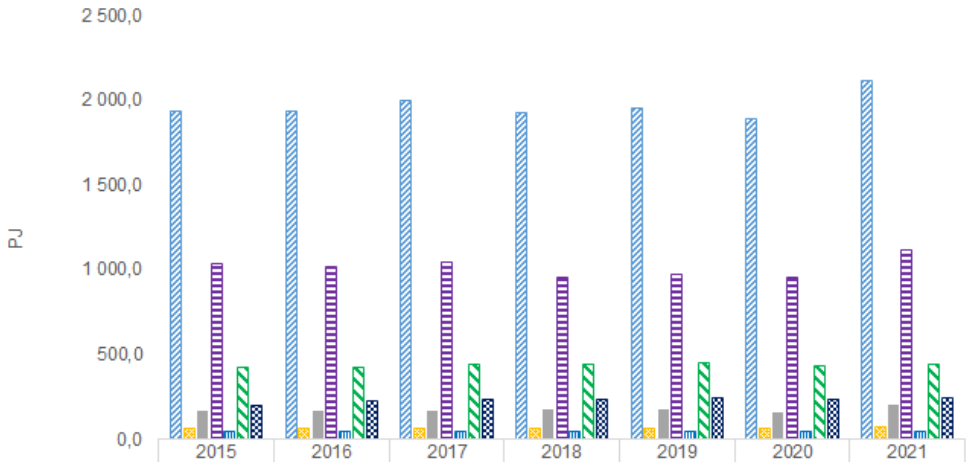
Individual figures may not add up to stated totals due to rounding.

* Note: The end-use of energy products for the 'manufacturing' industry and the 'electricity, gas, steam and air conditioning supply' industry excludes energy used for the transformation of energy products.

Source: Statistics South Africa.

Figure 16 and Figure 17 show that the 'manufacturing' industry was the largest end user of all energy products, to produce goods and services that are not energy products, from 2015 (53,6% of all end-use of energy products by industry) to 2021 (52,9% of all end-use of energy products by industry). The second largest end user of energy products was the 'transportation and storage' industry from 2015 (22,0% of all end-use of energy products by industry) to 2021 (20,9% of all end-use of energy products by industry).

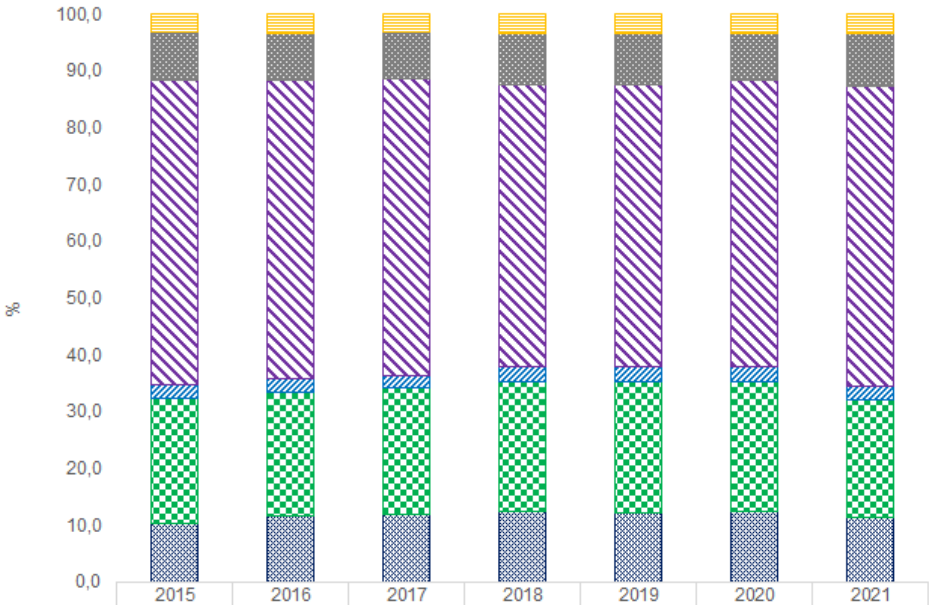
Figure 16 – End-use of energy products by industry, 2015–2021 (Petajoule)



	2015	2016	2017	2018	2019	2020	2021
End-use of energy products by industry	1 936,9	1 936,2	1 998,0	1 924,4	1 953,1	1 887,0	2 115,4
Agriculture, forestry and fisheries	62,4	63,8	64,4	65,3	66,1	63,2	69,9
Mining and quarrying	163,0	162,6	164,7	174,0	175,7	158,5	198,9
Manufacturing	1 038,9	1 017,2	1 044,1	957,3	973,1	950,8	1 118,4
Electricity, gas, steam and air conditioning supply	47,9	44,0	43,2	47,7	48,3	48,5	47,0
Transportation and storage	426,7	422,0	445,4	442,2	450,8	429,9	441,5
Other industries	198,0	226,6	236,2	237,9	239,0	236,2	239,8

Source: Statistics South Africa.

Figure 17 – End-use of energy products by industry, 2015–2021 (percentage)



	2015	2016	2017	2018	2019	2020	2021
Agriculture, forestry and fisheries	3,2	3,3	3,2	3,4	3,4	3,3	3,3
Mining and quarrying	8,4	8,4	8,2	9,0	9,0	8,4	9,4
Manufacturing	53,6	52,5	52,3	49,7	49,8	50,4	52,9
Electricity, gas, steam and air conditioning supply	2,5	2,3	2,2	2,5	2,5	2,6	2,2
Transportation and storage	22,0	21,8	22,3	23,0	23,1	22,8	20,9
Other industries	10,2	11,7	11,8	12,4	12,2	12,5	11,3

Source: Statistics South Africa.

Table 34 and Table 35 show the end-use of energy products by households in South Africa from 2015 to 2021. Household consumption entails the consumption by households of energy products purchased or otherwise obtained from energy suppliers (UN, 2019). There were imputations made for energy end-use on household transport, and some of the fuel consumption captured by the DMRE energy balances in the 'transportation and storage' industry was moved to the household sector to attribute fuel end-usage associated with private vehicles owned by households. The source of these imputations was the statistical release (P0100) "Income and Expenditure of Households, 2022/2023" that was released by Stats SA in January 2025.

Table 34 – End-use of energy products by households, 2015–2021 (Petajoule)

	2015	2016	2017	2018	2019	2020	2021
	Petajoule						
Coal	11,1	9,5	16,6	18,2	18,2	21,2	22,3
Natural gas	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
Biofuels	344,4	344,2	344,8	344,2	344,2	344,2	344,3
Electricity	145,6	174,7	174,7	174,7	174,7	237,1	159,0
Total: End-use of energy products by households	**702,9**	**733,1**	**745,0**	**749,7**	**755,4**	**786,0**	**730,2**

Individual figures may not add up to stated totals due to rounding.
Source: Statistics South Africa.

Table 35 – End-use of energy products by households, 2015–2021 (percentage)

	2015	2016	2017	2018	2019	2020	2021
	%						
Coal	1,6	1,3	2,2	2,4	2,4	2,7	3,1
Natural gas	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
Biofuels	49,0	47,0	46,3	45,9	45,6	43,8	47,1
Electricity	20,7	23,8	23,4	23,3	23,1	30,2	21,8
Total: End-use of energy products by households	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

Individual figures may not add up to stated totals due to rounding.
Source: Statistics South Africa.

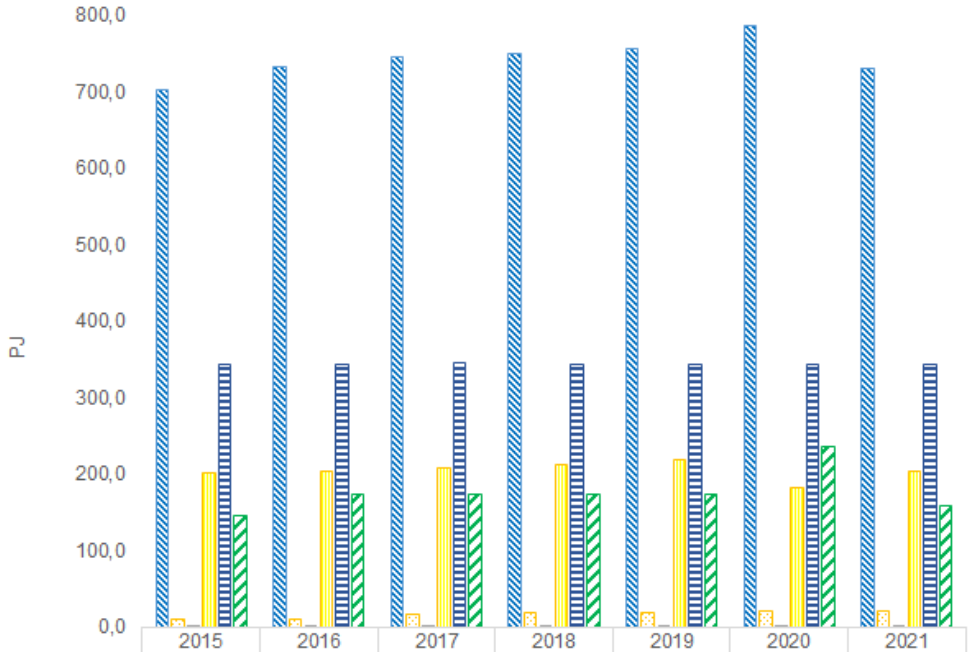
Figure 18 and Figure 19 show that the main energy product used by households for their own end-use from 2015 to 2021, was 'biofuels', followed by 'oil and oil products' and 'electricity'. Solid biofuels are derived from non-fossil, organic materials, including plant biomass, animal waste, and municipal waste, which can be used to produce energy for heating, cooking, or electricity generation.[16] The latest General Household Survey, statistical release P0318,[17] released by Stats SA in May 2024, indicated that the use of wood and coal as a main source of energy for cooking in 2023 was particularly noticeable in the following provinces of South Africa:

- Limpopo (31,4% of the total main sources of energy used for cooking by the households in the province);

[16] https://www.sciencedirect.com/science/article/abs/pii/B9780128192429000178.
[17] https://www.statssa.gov.za/?page_id=1854&PPN=P0318&SCH=73897.

- Mpumalanga (20,3%);
- Eastern Cape (9,2%);
- KwaZulu-Natal (8,4%); and
- North West (7,8%).

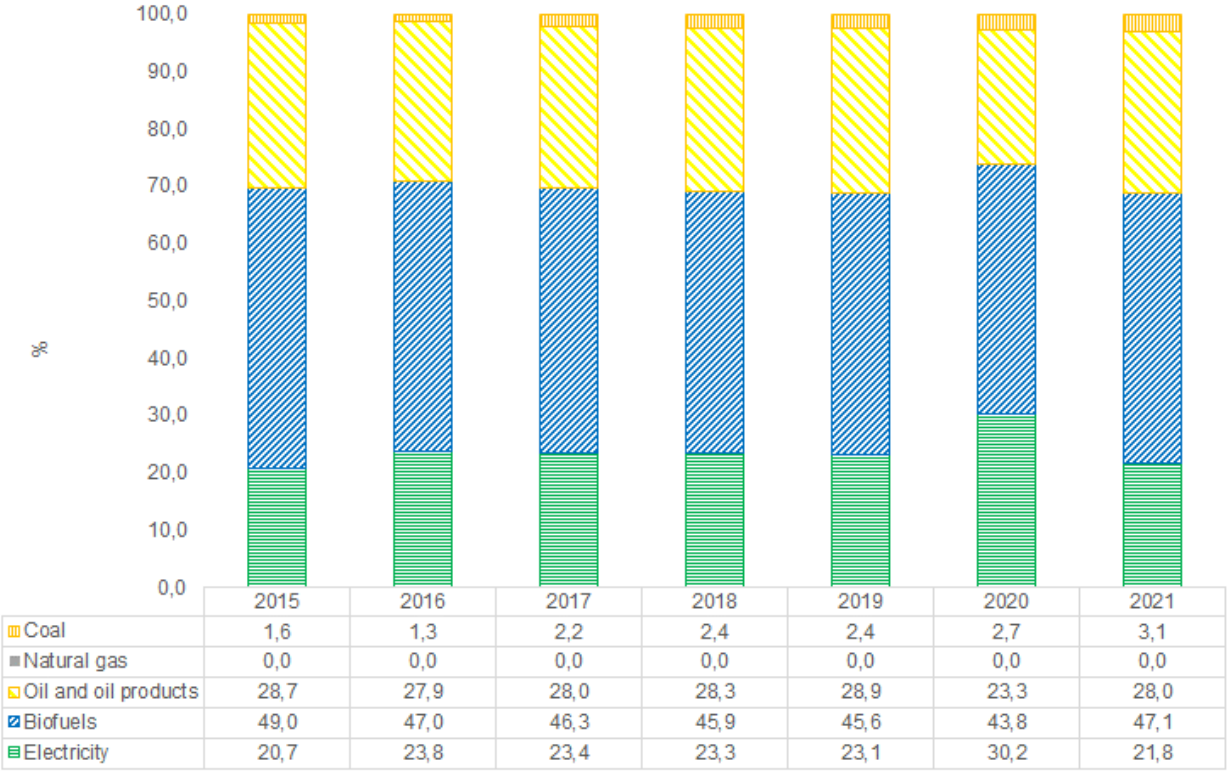
Figure 18 – End use of energy products by households, 2015–2021 (Petajoule)



	2015	2016	2017	2018	2019	2020	2021
End-use of energy products by households	702,9	733,1	745,0	749,7	755,4	786,0	730,2
Coal	11,1	9,5	16,6	18,2	18,2	21,2	22,3
Natural gas	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
Biofuels	344,4	344,2	344,8	344,2	344,2	344,2	344,3
Electricity	145,6	174,7	174,7	174,7	174,7	237,1	159,0

Source: Statistics South Africa.

Figure 19 – End use of energy products by households, 2015–2021 (percentage)



	2015	2016	2017	2018	2019	2020	2021
Coal	1,6	1,3	2,2	2,4	2,4	2,7	3,1
Natural gas	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
Biofuels	49,0	47,0	46,3	45,9	45,6	43,8	47,1
Electricity	20,7	23,8	23,4	23,3	23,1	30,2	21,8

Source: Statistics South Africa.

Table 36 and Table 37 show the exports of energy products from South Africa from 2015 to 2021.

Table 36 – Exports of energy products, 2015–2021 (Petajoule)

	2015	2016	2017	2018	2019	2020	2021
	Petajoule						
Coal	2 105,2	1 883,6	1 956,6	1 968,7	1 968,7	1 678,1	1 298,4
Natural gas	0,7	0,6	0,4	0,3	0,4	0,4	0,4
Oil and oil products	109,1	120,1	118,9	122,9	125,0	111,3	82,1
Electricity	52,6	59,6	59,6	50,5	50,5	50,5	36,8
Total: Exports of energy products	**2 267,6**	**2 063,8**	**2 135,5**	**2 142,3**	**2 144,5**	**1 840,3**	**1 417,8**

Individual figures may not add up to stated totals due to rounding.
Source: Statistics South Africa.

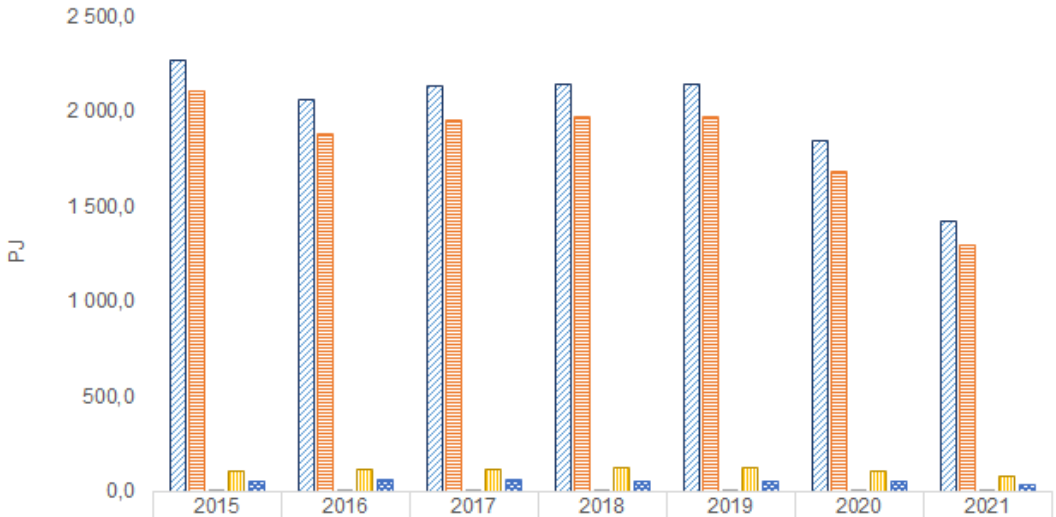
Table 37 – Exports of energy products, 2015–2021 (percentage)

	2015	2016	2017	2018	2019	2020	2021
	%						
Coal	92,8	91,3	91,6	91,9	91,8	91,2	91,6
Natural gas	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Oil and oil products	4,8	5,8	5,6	5,7	5,8	6,1	5,8
Electricity	2,3	2,9	2,8	2,4	2,4	2,7	2,6
Total: Exports of energy products	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

Individual figures may not add up to stated totals due to rounding.
Source: Statistics South Africa.

Figure 20 and Figure 21 show that South Africa mainly exported the energy product ‘coal’ to the rest of the world from 2015 (92,8% of total exports of energy products) to 2021 (91,6% of total exports of energy products).

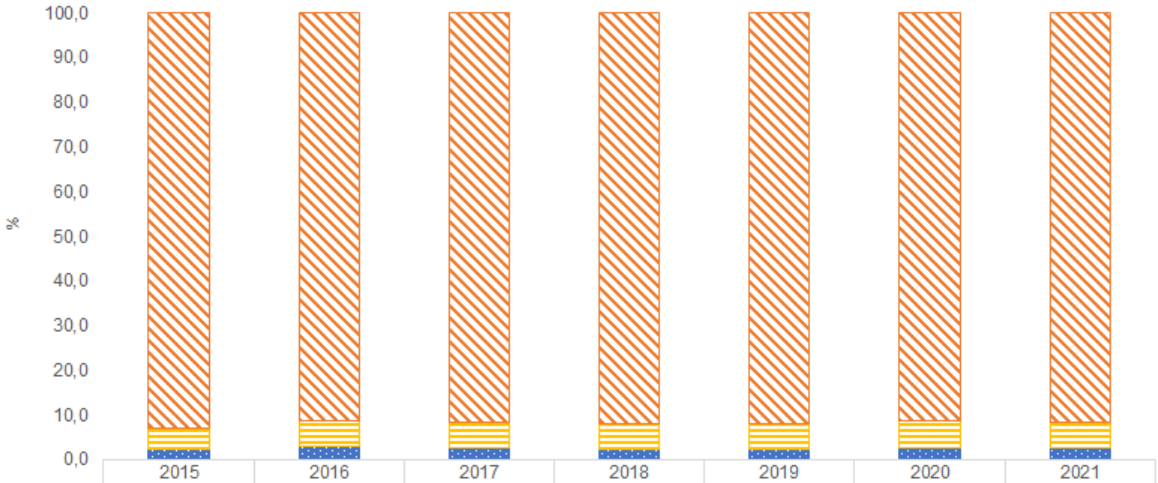
Figure 20 – Exports of energy products, 2015–2021 (Petajoule)



	2015	2016	2017	2018	2019	2020	2021
Total exports of energy products	2 267,6	2 063,8	2 135,5	2 142,3	2 144,5	1 840,3	1 417,8
Coal	2 105,2	1 883,6	1 956,6	1 968,7	1 968,7	1 678,1	1 298,4
Natural gas	0,7	0,6	0,4	0,3	0,4	0,4	0,4
Oil and oil products	109,1	120,1	118,9	122,9	125,0	111,3	82,1
Electricity	52,6	59,6	59,6	50,5	50,5	50,5	36,8

Source: Statistics South Africa.

Figure 21 – Exports of energy products, 2015–2021 (percentage)



	2015	2016	2017	2018	2019	2020	2021
Coal	92,8	91,3	91,6	91,9	91,8	91,2	91,6
Natural gas	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Oil and oil products	4,8	5,8	5,6	5,7	5,8	6,1	5,8
Electricity	2,3	2,9	2,8	2,4	2,4	2,7	2,6

Source: Statistics South Africa.

3.4 The energy intensities for selected industries in South Africa

Table 38 shows the energy intensities for selected industries in South Africa from 2015 to 2021. Increased efficiency in energy use and decreased energy use can contribute to sustainable development. Energy intensity is defined as the ratio of energy used for a given industry to the value added in constant prices by that industry (UN, 2019). Decreasing energy intensities indicate a tendency over time to use energy more efficiently.

Table 38 – Energy intensities for selected industries, 2015–2021

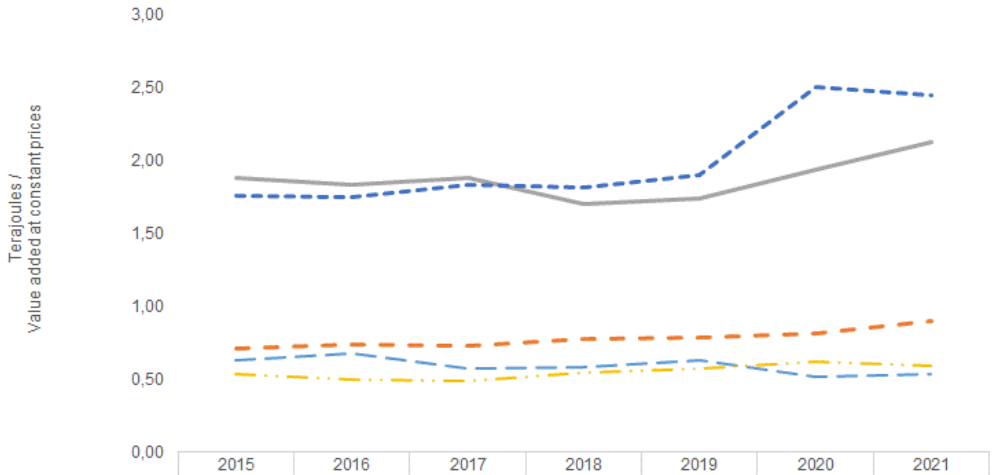
	2015	2016	2017	2018	2019	2020	2021
Agriculture, forestry and fisheries							
Value Added at constant prices (R million)	98 759,6	93 672,1	111 545,1	112 094,9	104 784,8	122 870,1	129 709,4
Energy end-use (Terajoule)	62 400,0	63 800,0	64 400,0	65 300,0	66 100,0	63 200,0	69 900,0
Energy intensity	*0,63*	*0,68*	*0,58*	*0,58*	*0,63*	*0,51*	*0,54*
Mining and quarrying							
Value Added at constant prices (R million)	227 875,0	220 141,0	225 419,7	223 613,0	222 100,1	194 984,9	220 131,3
Energy end-use (Terajoule)	163 000,0	162 600,0	164 700,0	174 000,0	175 700,0	158 500,0	198 900,0
Energy intensity	*0,72*	*0,74*	*0,73*	*0,78*	*0,79*	*0,81*	*0,90*
Manufacturing*							
Value Added at constant prices (R million)	553 392,4	555 879,7	554 832,7	563 249,7	559 321,5	491 446,6	525 484,9
Energy end-use (Terajoule)	1 038 900,0	1 017 200,0	1 044 100,0	957 300	973 100,0	950 800,0	1 118 400,0
Energy intensity	*1,88*	*1,83*	*1,88*	*1,70*	*1,74*	*1,93*	*2,13*
Electricity, gas, steam and air conditioning supply*							
Value Added at constant prices (R million)	89 628,3	87 439,9	87 955,3	87 858,3	83 579.8	77 429,1	79 439.1
Energy end-use (Terajoule)	47 900,0	44 000,0	43 200,0	47 700,0	48 300,0	48 500,0	47 000,0
Energy intensity	*0,53*	*0,50*	*0,49*	*0,54*	*0,58*	*0,63*	*0,59*
Transportation and storage							
Value Added at constant prices (R million)	242 742,2	240 909,6	243 633,0	243 894,7	236 843,0	171 664,4	180 720,1
Energy end-use (Terajoule)	426 700,0	422 000,0	445 400,0	442 200,0	450 800,0	429 900,0	441 500,0
Energy intensity	*1,76*	*1,75*	*1,83*	*1,81*	*1,90*	*2,50*	*2,44*

* Note: The energy intensity for the 'manufacturing' industry and the 'electricity, gas, steam and air conditioning supply' industry excludes energy used for the transformation of energy products.

Source: Statistics South Africa.

Figure 22 shows that the 'manufacturing' industry and the 'transportation and storage' industry had relatively higher energy intensities compared to the 'agriculture, forestry and fisheries', 'mining and quarrying' and 'electricity, gas, steam and air conditioning supply' industries. The energy intensity for the 'manufacturing' industry also noticeably increased during 2020 and 2021, indicating that these industries were using energy less efficiently over this period. The energy intensity for the 'agriculture, forestry and fisheries' industry decreased between 2015 (0,63) and 2021 (0,54), indicating that this industry made more efficient use of energy over this period.

Figure 22 – Energy intensities for selected industries, 2015–2021



	2015	2016	2017	2018	2019	2020	2021
Agriculture, forestry and fisheries	0,63	0,68	0,58	0,58	0,63	0,51	0,54
Mining and quarrying	0,72	0,74	0,73	0,78	0,79	0,81	0,90
Manufacturing	1,88	1,83	1,88	1,70	1,74	1,93	2,13
Electricity, gas, steam and air conditioning supply	0,53	0,50	0,49	0,54	0,58	0,63	0,59
Transportation and storage	1,76	1,75	1,83	1,81	1,90	2,50	2,44

Source: Statistics South Africa.

Chapter 4: The future development of the Physical Energy Flow Accounts for South Africa

Chapter 4 discusses the various directions related to future work and improvements to the PEFA for South Africa. As outlined below, these will further enhance and add richness to the work undertaken thus far.

4.1 Continuous improvement of the energy statistics and information in the country

The PEFA for South Africa is reliant on both the quality of energy statistics and information in South Africa, as well as the DMRE compiled energy balances.[18] All relevant role-players in the energy data ecosystem for South Africa must work jointly towards the continuous improvement of the energy statistics and information in South Africa, as well as the DMRE compiled energy balances, to improve the compilation of the PEFA for South Africa into the future. The improved communication and co-ordination between the role-players in the energy data ecosystem for South Africa, which was strengthened by the G20 IMF DGI-3 processes (as described in more detail in Section 1.2 of Chapter 1 in this document) in South Africa, should be further built upon and expanded going into the future.

4.2 Further investigate the compilation of the bridging table for energy

When a country implements SEEA-Energy accounts, energy statistics and energy balances typically serve as the primary data sources. In this context, the most efficient approach to compiling energy accounts is by modifying existing energy statistics and balances. In practice, this involves making necessary adjustments and additions to the data provided by these sources (UN, 2019). To illustrate the connections between key concepts and aggregates in energy accounts and the underlying energy statistics and balances, countries may opt to create bridge tables. These tables outline the necessary adjustments, including additions and subtractions, to align the data used in energy accounts with that in energy balances (UN, 2019). Stats SA will further investigate the compilation of the bridging table for energy.

4.3 Monetary flow accounts for energy-related transactions

The next step in expanding the PEFA for South Africa could be introducing monetary flow accounts for energy-related transactions. According to the SEEA-Energy, many physical energy flows are accompanied by corresponding monetary flows, representing transactions between economic units such as industries, households, and governments. For instance, household consumption of refined petroleum products can be quantified not only in PJ but also in terms of household expenditure on these products. All such transactions between economic units are documented in the SNA (UN, 2019). This would entail the investigation of available monetary data from the published South African SUTs by Stats SA, as well as other possible monetary data sources like energy surveys that collect monetary energy-related data.

[18] The ‘statistical difference’ in the DMRE energy balances refers to the difference between the energy supply and energy use of an energy commodity. This difference arises because the figures on supply and use come from different sources. An in-depth review of each of the energy commodities by the DMRE in into the future could help in determining the extent of the difference that should be attributed to either supply or use. Pending this review by the DMRE, for the present set of PEFAs in this discussion document, the statistical difference in the DMRE energy balances has been assigned to ‘accumulation’.

4.4 Asset accounts in physical and monetary terms

The assessment of mineral and energy resource quantities, along with tracking changes over time, is a key aspect of SEEA-Energy. The preparation of asset accounts in physical terms offers essential insights into the availability of mineral and energy resources. A key aspect of SEEA-Energy asset accounts is the estimation of resource depletion in physical terms (UN, 2019). This would need the investigation of available stock in physical terms of mineral and energy resources as published by the DMRE and other possible physical stock data sources like resource stock surveys. Stats SA previously developed and published mineral asset accounts, with the last account published in March 2017 as a chapter in the Environmental Economics Account Compendium report (Stats SA, 2017). Stats SA could build on the previous mineral accounts and broaden the energy-related resources that are included in the asset accounts.

4.5 Combining energy information in physical and monetary terms

With the development of both the PEFA and the monetary flow accounts (as a suggested way forward already discussed above), the next step would be to present the physical and monetary flow accounts in a combined format. A key strength of SEEA-Energy lies in its structured approach to organising information in both physical and monetary terms, ensuring consistency in scope, definitions and classifications. This is particularly evident in the development of accounts and tables that integrate physical and monetary data, providing a comprehensive framework for analysis (UN, 2019).

The PEFA for South Africa are released as a discussion document and not as official statistics. We hereby invite all interested parties to engage with the PEFA for South Africa and submit feedback to Stats SA by 30 November 2025 on any aspect of the PEFA. These submissions will be used to improve the methodology used for the PEFA, contributing to a future update and potential release as official statistics in Stats SA's Natural Capital series. Stats SA encourages organisations, stakeholders, government departments and individuals to make written submissions in either PDF or Microsoft Word format. Email submissions are preferred and should be sent to RiaanG@statssa.gov.za.

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Glossary

Anthracite	High-rank coal typically utilised for industrial and residential applications. It is characterised by having less than 10,0% volatile matter and a high carbon content, approximately 90,0% fixed carbon. Its gross calorific value is equal to or greater than 24 000 kJ/kg (5 732 kcal/kg) on an ash-free but moist basis.
Biofuels	Produced from renewable organic sources or 'feedstocks', biofuels include ethanol and biodiesel, commonly used as fuels in transportation, as well as landfill and sludge biogas captured for combustion to generate heat and/or electricity.
Biogasoline	Liquid fuels derived from biomass and used in spark-ignition internal combustion engines. Common examples are: bioethanol (including both hydrous and anhydrous ethanol); biomethanol; biobutanol; bio ETBE (ethyl-tertio-butyl-ether); and bio MTBE (methyltertio-butyl-ether). Biogasoline may be blended with petroleum gasoline or used directly in engines. The blending may take place in refineries or at or near the point of sale.
Bio jet kerosene	Liquid biofuels derived from biomass and blended with or replacing jet kerosene. Bio jet kerosene can be produced by a range of thermal processes, including gasification followed by Fischer-Tropsch synthesis, pyrolysis followed by hydrogenation, or conversion of sugar to hydrocarbons using microorganisms (e.g. yeast). A wide range of biomass feedstocks, including cellulosic materials and algal biomass, could be used in such processes.
Black coal	A sedimentary organic rock consisting of anthracite, bituminous and sub-bituminous rank coals. Black coal includes thermal black coal, which is primarily used as a solid fuel to raise steam to generate electricity, and metallurgical black coal, used to produce coke for steel making.
Briquettes	Made from brown coal through a process of crushing, drying and the addition of a binding agent, to produce a compact, high-energy fuel easily transported and commonly used for industrial and domestic heating. These have been aggregated into coal products.
Brown coal	Also known as lignite, brown coal is a low rank, brownish-black coal with a high moisture content of around 60,0%.
Butane	A gaseous hydrocarbon and the fourth member of the paraffin series (following methane, ethane and propane). If exposed to higher pressures or lower temperatures, it can be converted to liquid form and is a major component of LPG.
Coal products	Includes products made from coal such as metallurgical coke, coal tar and briquettes. Blast furnace gas and coke oven gas, previously included as coal by-products, have been excluded from the scope of this account. Benzene/toluene/xylene feedstock, previously included as a coal by-product, has been reclassified as other petroleum products.

Coking coal	Has a high carbon content and is typically used as the source of carbon and heat in steel making. It is transformed into coal coke, which then feeds into the blast furnace during steel production. In these accounts it is aggregated with thermal black coal and reported as black coal totals.
Condensate	A liquid mixture of pentanes and heavier hydrocarbons that form part of the vapour phase of natural gas in the reservoir and become liquid under standard field separation conditions.
Conversion loss	Energy lost in the transformation of a primary fuel to a derived (secondary) energy product.
Crude oil	A mixture of hydrocarbons, existing in the liquid state; both in natural underground reservoirs and at atmospheric pressure after passing through surface separating facilities.
Degree of energy self-sufficiency	Measures the dependence on energy imports to sustain current energy activity. This measure is closely connected with the pattern of extraction of energy resources presented in the energy asset tables. An energy self-sufficiency number greater than 100 indicates net exports of energy, a number less than 100 indicates net imports.
Electricity	The flow of electrical power or charge. It is a secondary energy source, meaning it is derived from the conversion of primary sources of energy such as coal, natural gas, oil, nuclear power, and renewables.
End use	The use of energy products to produce goods and services that are not energy products. These energy products may be used for intermediate consumption, for household final consumption, as a change in inventories of energy products, or for export.
Energy from natural input	Energy from natural inputs encompasses flows of energy resulting from the extraction and capture of energy from the environment by resident economic units.
Energy residuals	Energy residuals in physical terms comprise energy losses and other energy residuals. Examples of energy losses include flaring and venting of natural gas and losses during transformation in the production of primary energy products from natural inputs and in the production of secondary energy products. Energy losses during distribution may arise from the evaporation and leakages of liquid fuels, loss of heat during transport of steam, and losses during gas distribution, electricity transmission and pipeline transport. Energy residuals also include other energy residuals, particularly heat generated when end users (either households or enterprises) use energy products for energy purposes (e.g. household lighting).
Energy product	Includes forms of energy suitable for direct use (e.g. electricity and heat) and energy products that release energy while undergoing some chemical or other process (including combustion). By convention, energy products also include peat, biomass and waste when and only when they are used for energy purposes.
Environmental account	An information system and framework that links the economic activities and uses of a resource to changes in the natural resource base, therefore linking resource use with the System of National Accounts. See also SEEA.

Ethane	A naturally gaseous straight-chain hydrocarbon (C_2H_6). Ethane is obtained at gas separation plants or from the refining of crude oil. It is a valuable feedstock for petrochemical manufacture.
Exports	Goods exported (exports) represent the quantity of goods sent to other countries or for which ownership changes from residents to non-residents.
Feedstock	A feedstock is defined as "raw material supplied to a machine or processing plant". In industrial contexts, feedstocks are materials used directly in manufacturing processes and transformed into intermediate or finished products. For example, crude oil serves as a feedstock in refineries, where it is processed into various fuels and chemicals.
Final use	Use that finally consumes a product, as opposed to an intermediate use. Final use includes household final consumption; government final consumption; exports; and changes in inventories.
Fischer-Tropsch synthesis	A chemical process that converts carbon monoxide (CO) and hydrogen (H_2) into liquid hydrocarbons using a catalyst, typically iron or cobalt. It is used to produce synthetic fuels, lubricants, and other hydrocarbon-based products from feedstocks like coal, natural gas, or biomass.
Flow accounts	General term used for a framework that presents information on the physical flows of resources throughout the economy. Flow accounts published for energy include SUTs.
Fossil fuel	Any natural fuel derived from decomposed or partly decomposed organic matter.
Fuel oils	Fuel oils include petroleum-based oils used as fuel, e.g. for transport, heating oil or other petroleum-based oils. Fuel oils were previously aggregated into other refined products.
Fractions	Fractions are the components of crude oil that are separated out during the oil refining process. The process used to separate these fractions is called fractional distillation.
Gross energy	Total energy including that derived from primary as well as secondary energy sources. See also net energy.
Gross energy input	Gross energy input reflects the total energy captured from the environment, energy products that are imported, and energy from residuals within the economy.
Gross energy supply and use	Total energy, including that derived from primary as well as secondary energy sources. See also net energy.

Household final consumption expenditure	Net expenditure on goods and services by persons and expenditure of a current nature by private non-profit institutions serving households. This item excludes expenditure by unincorporated businesses and expenditure on assets by non-profit institutions (included in gross fixed capital formation). Also excluded is expenditure on maintenance of dwellings (treated as intermediate expenses of private enterprises), but personal expenditure on motor vehicles and other durable goods and the imputed rent of owner-occupied dwellings are included. The value of 'backyard' production (including food produced and consumed on farms) is included in household final consumption expenditure and the payment of wages and salaries in kind (e.g. food and lodging supplied free to employees) is counted in both household income and household final consumption expenditure.
Hydrogen	Hydrogen is a lightweight gas found in water and hydrocarbons. It is not freely available in its pure form but is transformed using other energy sources. In the past, hydrogen has been made from fossil fuels such as natural gas and coal but can also be generated from water using renewable electricity and an electrolyser. Hydrogen can be burnt directly, like natural gas. It can also be stored as a gas or liquid and used in fuel cells to generate electricity for remote communities or mining sites, and to power fuel cell vehicles including cars, trucks, buses and trains.
Hydropower	A process in which flowing water is used to spin a turbine connected to a generator.
Imports	Goods imported (imports) represent the quantity of goods received from other countries or for which ownership changes from non-residents to residents.
Intermediate use	Intermediate use consists of goods and services consumed as inputs by a process of production, excluding fixed assets whose consumption is recorded as consumption of fixed capital. The goods or services may be either transformed or used up by the production process.
Liquefied natural gas	Natural gas that has been processed and then refrigerated to the very low temperatures needed to reach the liquid state.
Liquefied petroleum gas	Consists of propane, butane and isobutane and is derived by processing the natural gas produced from either gas or oil reservoirs through a low-pressure gas separation plant.
Load shedding	Involves the intentional interruption of electricity supply to certain areas to protect the power grid and prevent a nationwide blackout. It is typically a last resort when other measures to balance electricity demand and supply have been exhausted. The primary purpose of load shedding is to lower electricity consumption, maintain grid stability, and avert a complete system failure.
Naphtha	Light or medium oils distilling between 30 degrees celsius (°C) and 210°C that do not meet the specification for motor gasoline. Different naphthas are distinguished by their density and the content of paraffins, isoparaffins, olefins, naphthenes and aromatics. The main uses for naphthas are as feedstock for high-octane gasolines and the manufacture of olefins in the petrochemical industry.
National accounts	Systematic summary of national economic activity. At a detailed level it shows a statistical picture of the performance and structure of the economy.

Natural gas	A combustible mixture of hydrocarbon gases. While natural gas is formed primarily of methane, its composition can vary widely, commonly including ethane, propane, butane and pentane.
Net domestic energy use	Measures all uses of energy by residents of a country. It is equal to the total net use of energy less exports of energy.
Net energy/Net energy supply and use	Total net energy accounts for the transformation process of a primary energy product to a secondary energy product and related conversion losses. In this way, estimates for total net energy avoid double counting the amount of converted primary energy. See also gross energy.
Oil and oil products	Made up of liquid hydrocarbons of fossil fuel origin comprising (a) crude oil, (b) liquids extracted from natural gas, (c) fully or partly processed products derived from the refining of crude oil, and (d) hydrocarbons and organic chemicals of vegetal or animal origin that are functionally similar to liquid hydrocarbons of fossil fuel origin.
Oil shale/Oil sand	A sedimentary rock that contains organic matter in the form of kerogen. Kerogen is a waxy hydrocarbon-rich material regarded as a precursor of petroleum.
Other petroleum products	Other petroleum products include petroleum coke, petroleum-based solvents and chemical feedstocks, and liquefied aromatic hydrocarbons (e.g. benzene/toluene/xylene). Other refined products referred to in the previous account have been disaggregated. Aviation turbine fuel and kerosene are now included under kerosene, aviation gasoline has been reallocated to petrol, and fuel and heating oils have been grouped as fuel oils.
Other volume changes	Other volume changes quantify changes in resources that occur between one period and another.
Output	Consists of goods and services produced within a business that become available for use outside that business, plus any goods and services produced for own final use.
Petajoule	One petajoule is 10^{15} J, or 278 giga-watt hours. The joule is the standard unit of energy in general scientific applications. One joule is the equivalent of one watt of power radiated or dissipated for one second.
Peat	A solid formed from the partial decomposition of dead vegetation under conditions of high humidity and limited air access (initial stage of coalification). It is available in two forms for use as a fuel: sod peat and milled peat.
Petrol	Refinery product made from crude oil. In this account, it includes automotive gasoline and aviation gasoline (which was previously included as other refined products).
Petroleum	Naturally occurring hydrocarbon or mixture of hydrocarbons as oil or gas, or in solution found in sedimentary rocks.
Physical energy flow accounts	PEFA are a statistical accounting framework that record the flows of energy (in TJ) from the environment to the economy (natural inputs), within the economy (products), and from the economy back to the environment (residuals).

Primary energy source	Those forms of energy obtained directly from nature. They include both non-renewable and renewable energy. Primary energy sources include firewood, coal, crude oil, natural gas, liquefied natural petroleum gases, uranium, bagasse, hydro, wind and solar energy.
Propane	A gaseous hydrocarbon and the third member of the paraffin series (following methane and ethane). If exposed to higher pressures or lower temperatures, it can be converted to liquid form and is a major component of LPG.
Refined products	A petroleum product which has been derived from processes such as catalytic cracking and fractional distillation. Refined products include: automotive gasoline and diesel, aviation gasoline and turbine fuel, kerosene and heating oil, industrial diesel and fuel oil, and others such as naphtha and petroleum coke used as fuel.
Renewable energy	Renewable energy is defined as those energy resources that are naturally replenishing. They are virtually inexhaustible in duration but may be limited in the amount of energy available at a given time. Renewable energy resources include biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action.
Resource	A concentration of naturally occurring solid, liquid, or gaseous materials in or on the earth's crust and in such form that its economic extraction is feasible now or in the future. The definition does not intend to imply that exploitation of any such material will take place in that time span, but only that its possibility might reasonably be considered.
Secondary energy source	A product that has been derived from a primary energy source. Secondary energy resources include refined petroleum products, coal by-products, coke and electricity.
Solar power	PV conversion generates electric power directly from the light of the sun in a photovoltaic (solar) cell. Solar thermal electric generators use the radiant energy from the sun to produce steam to drive turbines.
Supply-use framework	An accounting framework with the basic principle that the total supply of a product is equal to its total use.
System of Environmental-Economic Accounting	The SEEA is a framework used to develop environmental accounts by integrating environmental information into an accounting framework. The SEEA handbook provides the conceptual basis for developing a framework to describe the relationship between the natural environment and the economy. See also Environmental account.
System of National Accounts	The SNA is an international framework which can be used to develop a comprehensive, consistent and flexible set of macro-economic accounts.
Thermal black coal	Thermal black coal is primarily used in power generation to create electricity. In these accounts, it is aggregated with metallurgical black coal and reported as black coal totals.
Total domestic energy use	A measure of total resident energy use, including losses due to conversion or transformation into other energy products. Total domestic energy use is calculated from total net energy use minus exports of energy products.

Total energy use per capita	Defined as the total net energy use per capita. Energy use per capita is calculated by dividing total net energy use by estimated resident population.
Total supply	Production plus imports.
Transformative use	The transformation of energy products into other energy products, for example the conversion of thermal black coal to produce electricity, or the refining of crude oil to produce petroleum products.
Uranium	Radioactive grey heavy metallic element, used as a source of nuclear energy.
White spirit and special boiling point	White spirit and special boiling point (SBP) industrial spirits are refined distillate intermediates with a distillation in the naphtha/kerosene range. They are mainly used for non-fuel purposes and sub-divided as: (a) white spirit – an industrial spirit with a flash point above 30°C and a distillation range of 135°C to 200°C; and (b) industrial spirit (SBP) – light oils distilling between 30°C and 200°C.
Wind power	The conversion of wind energy into electricity using wind turbines.
Wood and wood waste	Includes wood and wood waste used to produce energy, usually through burning.

Previous publications in the Natural Capital Series

Statistics South Africa (Stats SA), 2020. *Natural Capital Series 1: Land and Terrestrial Ecosystem Accounts, 1990 to 2014*. Discussion document D0401.1. Produced in collaboration with the South African National Biodiversity Institute and the Department of Forestry, Fisheries and the Environment. Statistics South Africa, Pretoria.

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