sanedi

South African National Energy Development Institute

# 2022 - 2023
# ANNUAL PERFORMANCE PLAN

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# 1. ABOUT SANEDI

The South African National Energy Development Institute (SANEDI) was established in 2011 under the National Energy Act, 2008 (Act No. 34 of 2008) (NEA). The Act provides for SANEDI to direct, monitor and conduct energy research and development, promote energy research and technology innovation as well as undertake measures to promote energy efficiency throughout the economy.

SANEDI's energy development agenda is a key part of our country's energy journey and its portfolio of initiatives is closely attuned to technology advancements, declining technology costs and continued innovation in the energy sector. These can enable South Africa to take full advantage of our energy resources and the associated infrastructure development as a vehicle for economic growth, industrialisation, employment creation, and sustainable development.

SANEDI is committed to fulfilling the objectives of South Africa regarding energy security and universal access. The entity is fully behind the Integrated Resource Plan (IRP) 2010–2030 that considers the energy security as well as energy demand-supply balance. We are equally concerned that most of the communities who lack access to energy are in the rural areas where "energy poverty" is more prevalent. Whereas, the provision of universal access to energy requires scaling up of capital investment, the country is likely to experience budget constraints because of COVID-19. In the context of the post-COVID-19 recovery, SANEDI will strengthen its obligation to energy transformation pathways in line with its mandate.

SANEDI considers itself a key part of the National System for Innovation (NSI), as defined by the Draft White Paper on Science, Technology and Innovation, published under the custodianship of the Department of Science and Technology (DST now DSI) on 10 September 2018. This White Paper builds on the previous version adopted in 2006 and sets out the medium to long term policy direction for Government to ensure a growing role for Science, Technology, and Innovation in a prosperous and inclusive society in which the potential of all South Africans is realised. SANEDI will continue its commitment to the policy statements in this White Paper, and the decadal plans that will follow detailing implementation of the policy. Additionally, as an innovation body, SANEDI will continue its long-standing collaboration with the Department of Science & Innovation (DSI), Department of Mineral Resources & Energy (DMRE) and other actors within the innovation value chain to see to it that there is a realisation of our National objectives.

# 2. ACCOUNTING AUTHORITY STATEMENT

**Mr Sicelo Xulu**
BOARD CHAIRPERSON: SANEDI

As the world continues to grapple with the negative effects of the COVID-19 pandemic, we find ourselves also not having been spared as a country. In the first quarter of 2021, South Africa reported record highest levels of unemployment at 32,6%, which is a record high for the country ever since the launch of the Quarterly Labour Force Survey (QLFS) in 2008 and this according to Statistics South Africa (Stats SA).

With significant fiscal constraints and mounting challenges, the country needs to innovatively respond to the challenge at hand which will require a significant balancing act.

The energy sectors also faces several challenges, with the availability of the grid and consistent, uninterrupted energy supply being top of the agenda. The capacity constraints that Eskom continues to experience, are having a negative impact on the economic recovery plans and will continue to do so until we find sustainable solutions to the challenge at hand. The Eskom municipal debt continues to be an issue that requires much attention, and solutions on how these debts can be repaid have implications for municipalities and the overall service delivery environment.

In the wake of the pandemic, Government put forward a COVID-19 recovery package of R500 billion. with infrastructure projects being front and centre of planned recovery interventions. Information Technology (IT) has become increasingly crucial, that as we invest in this infrastructure going forward, we make use of this opportunity to build back better, stronger and ensure that we build sustainably.

In our Strategic Plan (SP) 2020/25, we adopted three themes that would underpin the work that SANEDI will focus on. These themes are:

- Climate Change and Decarbonisation,
- Service Delivery within the Municipal Environment, and
- Information Knowledge and Technological Convergence.

We believe that the focus around these three themes, which play to our existing strengths and expertise in the areas of Sustainable Energy, Renewable Energy Technologies (RET), and Smart Grids (SG), continues to be the appropriate focus enabling us to evolve and harness the changing global and local environment.

At the beginning of the Medium-Term Strategic Framework (MTSF) period and as described in our Strategic Plan (SP) 2020/25, SANEDI was dealing with a global context shaped by several megatrends including climate change, urbanisation, demographic shifts, Fourth Industrial Revolution (4IR) and growing inequalities. Programmes of action were shaped taking these trends, local context, and National Priorities into account. SANEDI, as mentioned in our SP 2020/25, has previously adopted three themes that would strengthen and drive our mandate. The themes are Climate Change and Decarbonisation, Service Delivery within the Municipal Environment, and Information Knowledge and Technological Convergence. SANEDI believes that the repositioning of its focus around these three themes which play to our existing strengths and expertise in the areas of Sustainable Energy, Renewable Energy Technologies and Smart Grids continues to be the appropriate focus enabling us to evolve and harness the changing global and local environment.

SANEDI understands that it is uniquely positioned and is required to carefully balance the short-term needs of the country as far as energy solutions are concerned, while considering where the country wants to be in decades to come, and therefore develop energy solutions and technologies ahead of time.

Our SP 2020/25 and this Annual Performance Plan (APP) aim to maintain this careful balance of focus. SANEDI is building even closer collaboration and alignment with the DMRE to ensure that the key priorities of the Department, in line with National Priorities, are delivered effectively. SANEDI is a key part of the country's innovation system and can contribute to the elevation of innovation in the country by increasing its alignment with the White Paper on Innovation. This will achieve several aims, namely aiding economic recovery, creating jobs focussed on the youth, women and People Living with Disablities (PwDs). As the recently appointed Board on 9 December 2021 by Cabinet, we are pleased to join the organisation.

**MR SICELO XULU**
**BOARD CHAIRPERSON: SANEDI**

# 3. CHIEF EXECUTIVE OFFICER'S STATEMENT

SANEDI has attained some remarkable successes in the mandate of delivering Energy Efficiency (EE) and Energy Research and Development (ERD), and more remains to be done to deliver the ultimate impact of enabling decarbonisation and a just transition from a Fossil Fuel-based economy, to a cleaner energy economy for sustainable development. This APP details our refined approach that build on past successes as we partner with the rest of South Africa to build back better.

## ENERGY EFFICIENCY

During the 2020/21 financial year, Government made some pronouncements which present many opportunities for energy plans. The Independent Power Producers Procurement Programme (IPPPP) was officially launched during the COVID-19 pandemic by the Minister of Mineral Resources and Energy. The Minister also gazetted the Energy Performance Certificate (EPC) Regulations for classes of buildings in both the public and private sector on 8 December 2020, with SANEDI mandated to develop, host, and maintain the National Energy Performance Building Register (NEPBR). The National Regulator for Compulsory Specifications (NRCS) was developed and gazetted in March 2021 by the Minister of Trade, Industry and Competition. The NRCS informs new performance and safety lighting regulations for general service Lamps. In August 2021, the Minister of Public Works and Infrastructure issued the draft National Infrastructure Plan (NIP) 2050. The NIP 2050 entails the conditions required to ensure that the energy sector delivers on SA's 2050 vision. To this end, the trends shaping the energy transition remain in place and appear resilient to the COVID-19 crisis. SANEDI remains committed to forging ahead with plans to develop the energy sector. In this regard, we are establishing new partnerships and strengthening existing ones with various role players in our efforts to advance the energy sector.

## BRIDGING THE INNOVATION CHASM

For the upcoming financial year, we intend to scale the impact of innovation activities, especially those emanating from public funding, through an increased focus on and increased support activities towards commercialisation of South African energy related innovative solutions.

**Ms Lethabo Manamela CA (SA)**
Interim Chief Executive Officer SANEDI

Creating an avenue that supports the advancement of innovative technologies and innovative solutions has the potential to unlock new industries, job creation opportunities, and can support Government efforts in eradicating social ills creating opportunities for the youth, women and PwDs in line with National Priorities as well as the strategic intentions of the White Paper on Innovation (WPI). In pursuit of this intent, strategic partnerships and collaboration with key Stakeholders will be of utmost importance. Therefore, SANEDI will aim to lead and drive collaboration in the energy sector locally and internationally.

In the last strategic framework period, SANEDI 's focus was to provide an optimal energy research development and deployment environment, and co-operating with persons, associations and institutions undertaking related energy programmes locally and internationally, to ensure that international learning's and 'best practices' are shared and, where relevant, adopted and applied in South Africa. Co-operation and membership of international bodies has led to significant financial support for such endeavours in South Africa. We will continue with these as part of our being a global citizen and links to a better world and better Africa.

SANEDI's Smart Grids (SG's), EE, Cleaner Fossil Fuel and Renewable Energy (RE) programmes all contribute to energy development and innovation in this area.

Considerable thought, through reflection and in consultation with key Stakeholders in the sector, has gone into shaping the approaches adopted in this financial year without deviating from SANEDI's mandate and strengthening delivery in a challenging environment.

Successful collaboration between SANEDI and industry has allowed us to drive several research, development, and pilot projects, that will contribute to the National energy objectives. In this regard, SANEDI has facilitated and supported several National and Provincial Departments to understand possible mitigation actions that would lead to more efficient and swift deployment of RE in the country.

## FINANCIAL CONSTRAINTS

SANEDI expects and is aware of the budget reprioritisation measures being put in place by National Treasury (NT) over the next few years that will impact the operations of the organisation. SANEDI therefore, through this APP, is making the necessary adjustments in its approach to its programmes and projects to respond to the new realities without diluting the impact that it aims to make.

## SMART GRIDS

**Our Smart Grid programme would realize Smart Cities in South Africa and assist in solving the municipality energy debt crisis through relevant technology and data that solve both energy measurement concerns and shortfalls in financial management capacity**


SANEDI, in collaboration with the DMRE, developed and piloted the concept of SG's in South Africa. The programme mainly focused on "Technology as an Enabler for Change" in the municipal environment. Municipalities are currently under huge financial pressure, largely because of poor revenue collection and incorrect tariff designs. The Enhanced Revenue Management project, piloted in nine municipalities, was designed to assist municipalities in collecting the electricity revenues. For projects that were properly designed and implemented, results have shown that technology can be used to improve revenue collection while also enhancing the effectiveness and efficiency of the municipalities, thereby returning them to sustainability. Lessons learnt from this collaboration have highlighted the role of SG's and the importance of Advanced Metering Infrastructure (AMI) in solving the Eskom debt crisis.

Additionally, SANEDI, through the South African Smart Grids Initiative (SASGI), supports the South African Local Government Association (SALGA) and the Department of Cooperative Governance and Traditional Affairs (COGTA) with the development and institutionalisation of the SG programme as an approach to enable municipal revenue management, the introduction of RE and effective service delivery. Through SG's projects, we have designed research projects that aim to enable: -

- Implementation of a communication system that supports municipal revenue management, and
- A solid asset management policy, strategy, framework and governance structure will guide municipalities on how to manage their electricity distribution assets.

## ENERGY EFFICIENCY

**Through Renewable Energy, we will continue to undertake Cool Roof Surface and Biogas projects to demonstrate GHG emissions mitigation potential in support of national commitments. The market and the industry will be promoted; and technology that is fit for purpose will be tested.**


SANEDI's co-ordination and implementation of the EE tax incentives (Section 12L and 12I), has produced phenomenal results, both in terms of energy savings and reduction in Greenhouse Gas Emissions (GGE). Through the 12L and 12I programmes, SANEDI will continue to support the industry to reduce their energy and carbon intensity through the verifiable deployment of RE and EE initiatives. Over 19 TWh have been saved, and the emission of 18 730 Mega-tonnes of Carbon Dioxide ($CO_2$) has been avoided. Based on the success of this activity over the last five years, National Treasury (NT) has decided to extend the Section 12L incentive from January 2020 to January 2022. This also saw the development of various (secure) online tools and databases for the processing of these applications, which over the last few years, has resulted in the establishment of a significant repository of EE data, for use in modelling impacts of these interventions.

Furthermore, the Cool Surfaces programme, which initially started out as a small activity within the international Clean Energy Ministerial series of activities, has gained traction in South Africa with impressive results achieved in a Northern Cape pilot programme managed by SANEDI. This has resulted in SANEDI being chosen as one of 10 countries globally to win an award of USD100 000 in 2019, for accelerated implementation of the initiative in South Africa.

SANEDI will continue to roll out Cool Surfaces on roof surface area in households and selected buildings

in selected municipalities, as an inexpensive way of improving ambient air quality in buildings, especially low-income housing, develop the Cool Surfaces industry and thereby creating jobs in the clean energy space.

Every company and building owner has a role to play in South Africa's drive to curb carbon emissions. Climate change is a threat and EE measures must be adopted. Absa Bank has been a pioneer in this regard, being the first bank to achieve compliance with the country's new building energy performance regulations. Over the 2022/23 financial year, we will continue to partner with more Stakeholders to confront the climate change battle. Our new strategic vision towards a more sustainable and efficient energy sector, is primed to equip and support South Africa's economic transformation, growth, and social development. The EE initiated projects are aiming to: -

- Support businesses with tax incentives to promote and instil, a culture of cleaner production and energy efficiency in all sectors of the economy through participating applicants from which the projects are derived.
- Achieving the national carbon emissions reduction targets.
- Maintaining a repository of EE data, readily available to the key Stakeholder (DMRE) for policy formulation and evidence-based decision making.

## RENEWABLE ENERGY

**Through Renewable Energy, we will continue to undertake Cool Roof Surface and Biogas projects to demonstrate GHG emissions mitigation potential in support of national commitments. The market and the industry will be promoted; and technology that is fit for purpose will be tested.**

Our Renewable Energy (RE) Programme entails facilitating renewable energy technology pilot and demonstration, as well as research and coordination, collaboration and dissemination of national and international renewable energy knowledge, contributing towards a sustainable low carbon energy future. Initiatives that are being carried out by the Renewables programme include:

- **Pilot and demonstration of Renewable Energy Technologies that are fit for purpose in SA**
  - The renewables program coordinates multiple projects designed to prove that RE can offer a reliable, sustainable, secure, energy solution designed to fit the needs of the consumer/ user who is employing this intervention. These technologies include the harnessing of solar energy in the form of heat and light, biogas, energy storage, energy innovation towards sustainable energy supply and security.
- **Sector and policy support studies**
  - Sector and policy support studies are produced to promote technology development and uptake, industry expansion and boost national economy, using knowledge gained from pilot and demonstration projects, skills development and training, awareness and understanding as well as scientific data proving energy savings, Greenhouse Gas (GHG) emissions savings, and technology performance towards creating business cases around viable investment in RE.
- **The SOLTRAIN project**
  - A Southern African Development Community (SADC) regional programme, that has been in existence since 2009, focusses on capacity building and demonstration of solar thermal energy systems in the SADC region, and is funded by the Austrian Development Agency (ADA). Through the programme, Solar Thermal Roadmaps have been developed for all partner countries, and capacity building and training programmes have been implemented. The Solar Thermal Training and Demonstration Initiative (SOLTRAIN) project aims to tackle thermal needs at domestic and commercial sector levels and create opportunities through catalysing growth of the SWH sector. (https://soltrain.org)
- **The WASA project**
  - The main objective of the Wind Atlas for South Africa (WASA) project is to develop, verify and employ numerical wind atlas methods and to develop capacity to enable large scale exploitation of wind energy in South Africa. This includes dedicated wind resource assessment and siting tools for planning purposes that can be used for feasibility studies in support of projects. The atlas is freely available to all interested parties having live wind resource data at http://www.wasaproject.info/index.html .

- **PlasWen Pyrolysis Concept**
  - With plasma gasification, an electric arc heats a gas stream (air or nitrogen), at extremely high temperatures typically 5000$^0$C, and supplies energy to the process. Due to the temperature ash, metals and glass in the waste stream are melted, organic components volatilised, and complex molecules dissociated. Organic materials, containing mostly chemically bound carbon, hydrogen, and oxygen, are decomposed into syngas which can produce electricity.

## CLEANER MOBILITY

**The Cleaner Mobility Programme will continue to investigate and demonstrate alternative ways of mobility that will lead to the improvement of the environmental, social and economic conditions**

SANEDI's Cleaner Mobility programme, with support from United Nations Industrial Development Organization (UNIDO), has been actively engaging with the Department of Transport (DoT) as well as various cities to explore and introduce cleaner mobility options. SANEDI has been instrumental in doing applied research and demonstration regarding the use of Electric Vehicles (EV's) and charging batteries using solar PV with good success. Going forward, the Cleaner Mobility sub-programme will continue solving key challenges including energy security, EE in transportation, urban air pollution, traffic congestions, local industry development and climate change.

Although we have had great success in attracting funding from external partners, there has been a significant decline in third-party funds available towards renewable technologies because of policy changes by some international Governments and donors, who are beginning to focus on countries less developed than South Africa. This significant decline poses a tremendous threat to funding requirements of SANEDI, given its already constrained budget. We are also aware that the fiscal challenges faced by the fiscus have led to a general decline in Research and Development (R&D) funding. Therefore, we shall be exploring various funding sources to supplement or compensate for the shortfall in funding. Research projects to be undertaken through Cleaner Mobility would: -

- Serve as a tool for guiding decision-making process for municipalities and public decision makers,
- Identify, contrast, and recommend appropriate policies and support instrument for the South African EV market, and
- Contribute to knowledge dissemination and awareness on technology developments.

## DATA AND KNOWLEDGE MANAGEMENT

**The Data and Knowledge Management programme will provide a mechanism for energy modelling and planning in support of the alignment of national and local government energy data objectives. The Data and Knowledge Management programme completed projects that supported residential energy assumption, pulp & paper and automotive sectors.**

SANEDI plans to be a data repository for energy data in South Africa, and is in the process of establishing a data centre that will house reliable, accurate and up-to-date energy datasets that will be made available to Stakeholders. SANEDI at present is responsible for maintaining the following datasets that are annually maintained and available at no cost to Stakeholders: WASA database, Energy Services Company (ESCo) register, 12L Tax Incentives database, Big EE database, Transport database and Residential database. For the Medium Term Strategic Framework (MTSF) period, SANEDI will continue to maintain the above datasets, and create and maintain these to the following datasets: Commercial database, Industrial database, Agricultural database, Standards & Labelling database and Public Infrastructure database (Public Buildings & Wastewater Treatment Plants).

## THE ENERGY SECRETARIAT

SANEDI is proud to have been awarded the privilege by the DSI to host on its behalf, the DSI Energy Secretariat. The Secretariat is an administrative office which carries out the substantive and administrative work as directed by the Chief Director Hydrogen Energy. The objective of establishing the Energy Secretariat is to support the successful commercialisation, and up scaling of knowledge outputs from the broader energy Research and Development Initiatives (RDI) portfolio and ensuring systemic impact in the National System of Innovation (NSI). The SANEDI-DSI collaboration is Initially a 3-year programme with an estimated budget of R150 million per annum. SANEDI made readiness preparations towards the end of the last financial year, and this year will see the Secretariat tackling substantive work towards its objectives .

## SCALING, COMMERCIALISATION AND PARTNERSHIPS

SANEDI will focus more on self-sustainability of projects by supplementing our funding with funding by strategic partners. We will focus on facilitating the transformation of our research output into wider scale adoption and roll out, by supporting the entrepreneurial spirit of youth, women and PwDs. This effort will be supported by deeper partnerships and strategic relationships. Commercialisation of innovation will be a key area for SANEDI. The means to facilitate more commercialisation of energy solutions will be explored in this financial year. Strategic partnerships with DSI, National Youth Development Agency (NYDA), CEF Group of Companies formerly known as Central Energy Fund (CEF), Department Trade, Industry and Competition (the dtic), SETAs, and other organisations will be deepened, and the resulting impact would include increased adoption of our innovative solutions and job creation, as well as the stimulation of youth entrepreneurship in the energy sector.

In conclusion, I am pleased to present this APP, which was drafted with inputs from the Board, DMRE and key Stakeholders in the sector, noting that the achievement of these planned outcomes, will rely heavily on the organisation's ability to engage its Stakeholders towards resource mobilisation and continued relevance through the execution of relevant projects. The planned activities will not only position the organisation within the sector, but will be invaluable in National Policy formulation reform in a post COVID-19 era. This can only be achieved through committed strategic partnerships and collaboration. Therefore, I would like to express our gratitude to all our local and international Stakeholders, and we are looking forward to more years of fruitful collaboration and cooperation.

**Ms Lethabo Manamela CA (SA)**
**Interim Chief Executive Officer SANEDI**

# 4. OFFICIAL SIGN-OFF

It is hereby certified that this Annual Performance Plan:

Was developed by the Management of the SANEDI under the guidance of the Board.

Takes into account all the relevant policies, legislation and other mandates for which the SANEDI is responsible.

Accurately reflects the Impact, Outcomes and Outputs which the SANEDI will endeavour to achieve over the period 2022-2023.

**Mr Mthetheleli Baqwa**
**Corporate Planner**

**Ms Lorraine Ramaotsoa CA(SA)**
**Acting Chief Financial Officer**

**Ms Lethabo Manamela CA(SA)**
**Interim Chief Executive Officer**

**Mr Sicelo Xulu**
**SANEDI Board Chairperson**

# 5. LIST OF ACRONYMS

| ACRONYM | DESCRIPTION |
|---|---|
| **4IR** | 4th Industrial Revolution |
| **ADA** | Austrian Development Agency |
| **ADB** | African Development Bank |
| **AG** | Auditor-General |
| **AGSA** | Auditor-General of South Africa |
| **AMI** | Advanced Metering Infrastructure |
| **APP** | Annual Performance Plan |
| **ADA** | Austrian Development Agency |
| **AV** | Autonomous Vehicles |
| **BARC** | Board Audit and Risk Committee |
| **BRICS** | Brazil, Russia, India, China and South Africa |
| **$CO_2$** | Carbon Dioxide |
| **CCSA** | Committee for the Coordination of Statistical Activities |
| **CCUS** | Carbon Capture Utilisation and Storage |
| **CEF** | Central Energy Fund |
| **CEO** | Chief Executive Officer |
| **CFO** | Chief Financial Officer |
| CSEP | Corporate Stakeholder Engagement Plan |
| **CM** | Cleaner Mobility |
| **COGTA** | Department of Cooperative Governance and Traditional Affairs |
| **CSIR** | Council for Scientific and Industrial Research |
| **DBSA** | Development Bank of Southern Africa |
| **DMRE** | Department of Mineral Resources and Energy |
| **DoE** | Department of Energy |
| **DoD** | Department of Defense |
| **DoT** | Department of Transport |
| **DSI** | Department of Science and Technology |
| **DTU** | Danish University of Technology |
| **Dx** | Distribution |
| **EBITDA** | Earnings Before Interest, Taxes, Depreciation and Amortisation |
| **EC** | European Commission |
| **EE** | Energy Efficiency |
| **EEDSM** | Energy Efficiency and Demand Side Management |
| **EEP** | Employment Equity Plan |
| **EEPBIP** | Energy Efficiency in Public Buildings and Infrastructure Programme |
| **EPC** | Energy Performance Certificate |
| **EMS** | Energy Management Systems |
| **EnMS** | Energy Management Systems |
| **ERD** | Energy Research and Development |
| **ESO** | Energy Systems Optimisations |
| **ESCo** | Energy Services Company |

| ACRONYM | DESCRIPTION |
|---|---|
| **EU** | European Union |
| **EV** | Electric Vehicles |
| **FFC** | Funding and Finance Committee |
| **GDA** | German Development Agency |
| **GDP** | Gross Domestic Product |
| **GEF** | Global Environment Facility |
| **GHG** | Greenhouse Gas |
| **GGE** | Greenhouse Gas Emissions |
| **GMO** | Genetically Modified Organisms |
| **HDI** | Human Development Index |
| **HFCT** | Hydrogen and Fuel Cell Technologies |
| **HR** | Human Resources |
| **ICT** | Information Communications and Technology |
| **IEA** | International Energy Agency |
| **IPPPP** | Independent Power Producers Procurement Programme |
| **IRP** | Integrated Resource Plan |
| **IT** | Information Technology |
| **IoT** | Internet of Things |
| **JET** | Just Energy Transition |
| **IPAP** | Industrial Policy Action Plan |
| **IRP** | Integrated Resource Plan |
| **KPA** | Key Performance Area |
| **KPI** | Key Performance Indicator |
| **kWh** | Kilowatt hour |
| **LCOE** | Levelised Cost of Electricity |
| **M&E** | Monitoring and Evaluation |
| **MEL** | Monitoring, Evaluation, Learning |
| **MEPS** | Minimum Energy Performance Standards |
| **MoA** | Memorandum of Agreement |
| **MoU** | Memorandum of Understanding |
| **MTEF** | Medium Term Expenditure Framework |
| **MTSF** | Medium Term Strategic Framework |
| **MW** | Megawatt |
| **NBEPR** | National Building Energy Performance Register |
| **NBR** | National Buildings Register |
| **NCPC** | National Cleaner Production Centre |
| **NDA** | Non-Disclosure Agreement |
| **NDC** | Nationally Determined Contributions |
| **NDP** | National Development Plan |
| **NEA** | National Energy Act |
| **NECSA** | South African Nuclear Energy Corporation |
| **NEPBR** | National Energy Performance Building Register |
| **NERSA** | National Energy Regulator of South Africa |
| **NES** | National Energy Strategy |

| ACRONYM | DESCRIPTION |
|---|---|
| **NGO** | Non-Governmental Organization |
| **NIP** | National Infrastructure Plan |
| **NRCS** | National Regulator for Compulsory Specifications |
| **NRF** | National Research Foundation |
| **NSDF** | National Spatial Development Plan |
| **NSI** | National System for Innovation |
| **NT** | National Treasury |
| **NYDA** | National Youth Development Agency |
| **OECD** | Organisation for Economic Co-operation and Development |
| **OEM** | Original Equipment Manufacturer |
| **PC** | Projects Committee |
| **PGM** | Platinum Group Metal |
| **PM** | Particulate Matter |
| **PMO** | Project Management Office |
| **PtH** | Power to Heat |
| **PV** | Photovoltaic's |
| **PwD's** | People Living with Disabilities |
| **QLFS** | Quarterly Labour Force Survey |
| **R&D** | Research and Development |
| **R&I** | Research and Innovation |
| **RC** | Remuneration Committee |
| **RDI** | Research and Development Initiatives |
| **RE** | Renewable Energy |
| **REC** | Residential Energy Consumption |
| **RECORD** | Renewable Energy Centre for Research and Development |
| **REIPPP** | Renewable Energy Independent Power Producer Programme |
| **REMCo** | Remuneration Committee |
| **RET** | Renewable Energy Technologies |
| **RSE** | Renewable Sustainable Energy |
| **S&L** | Standards & Labelling |
| **SA** | South Africa |
| **SADC** | Southern African Development Community |
| **SAIEE** | South African Industrial Energy Efficiency |
| **SALGA** | South African Local Government Association |
| **SANAS** | South African National Accreditation System |
| **SANEA** | South African National Energy Association |
| **SANEDI** | South African National Energy Development Institute |
| **SARETEC** | South African Renewable Energy Technology Centre |
| **SARS** | South African Revenue Service |
| **SASGI** | South African Smart Grids Initiative |
| **SAWS** | South African Weather Service |
| **SCM** | Supply Chain Management |
| **SDA** | Swiss Development Agency |
| **SDBIP** | Service Delivery and Budget Implementation Plan |

| ACRONYM | DESCRIPTION |
|---|---|
| **SEP** | Stakeholder Engagement Plan |
| **SETA's** | Sector Education and Training Authority |
| **SG** | Smart Grids |
| **SJEC** | Social Justice & Ethics Committee |
| **SoE** | State-Owned Entity |
| **SOLTRAIN** | Solar Thermal Training and Demonstration Initiative |
| **SSEG** | Small-scale Embedded Generation |
| **SP** | Strategic Plan |
| **StatsSA** | Statistics South Africa |
| **SWOT** | Strengths Weaknesses Opportunities and Threats |
| **TES** | Thermal Energy Storage |
| **the dtic** | Department Trade, Industry and Competition |
| **TOC** | Theory of Change |
| **TUT** | Tshwane University of Technology |
| **TVET** | Technical Vocational Education and Training |
| **Tx** | Transmission |
| **UI** | User Interfaces |
| **UNFCCC** | United Nations Framework Convention for Climate Change |
| **UNIDO** | United Nations Industrial Development Organization |
| **UoT** | University of Technology |
| **UP** | University Pretoria |
| **WASA** | Wind Atlas for South Africa |
| **WHR** | Waste Heat Recovery |
| **WPI** | White Paper on Innovation |
| **WSP** | Workplace Skills Plan |

# 6. LIST OF FIGURES AND TABLES



# 7. EXECUTIVE SUMMARY

SANEDI's strategy draws from the contextual environment within which it sees itself, including primarily a global shift, driven by (1) Information and technological advancements towards convergence and sector coupling, (2) Changing demographic patterns and increases in urbanisation and (3) Increased environmental sensitivity and awareness driving socio-political and economic discourse.

Within this global context, the South African environment is characterised by an unsustainable economic trajectory, with stagnating economic growth, rising unemployment and income inequality. It is in this environment, both with significant opportunities and threats, that SANEDI must discharge its mandate of delivering EE and ERD.

From an operational perspective, fiscal pressure has resulted in a constrained budget requiring a reprioritisation of resources to create a lasting and sustainable impact. In the analysis of the broader environment directly impacting SANEDI, three key themes emerged, underpinning the strategy that SANEDI has adopted.

SANEDI has thus repositioned itself to focus on three key thematic areas, with an Integrated and focused approach. This includes:

1. Service delivery through the Smart Cities programmes, particularly as it relates to transport, energy, revenue and asset management,

2. Decarbonisation through technological programmes, compliance monitoring and awareness campaigns, and

3. Information and knowledge management to increase the national dataset on energy-related information, thereby facilitating improvements in public sector policy-making and private sector investment decisions.

Furthermore, our EE is focussed at promoting energy savings campaigns and support industries with local efforts towards sustainable energy consumption in buildings.

**These themes include:**

## CLIMATE CHANGE AND DECARBONISATION

South Africa has a requirement to comply with specific international targets so that we have the licence to operate on a global scale. Failure to mitigate climate change would affect investor confidence and access to global energy funds. We will continue to demonstrate RE technologies that strengthen efforts to combat climate change. With South Africa's high carbon intensity, energy is intrinsically linked to climate change, requiring accelerated adoption of clean energy and mitigation solutions towards meeting national and international commitments.

## SERVICE DELIVERY WITHIN THE MUNICIPAL ENVIRONMENT

There are significant challenges faced by municipalities to maintain their distribution networks, resulting in additional losses while delivering on universal access objectives and integrating new distributed technologies. Through SG's, electric mobility, revenue and asset management and EE initiatives, significant opportunities exist within the municipal environment to drive service delivery, enhance performance and create lasting impact.

## INFORMATION, KNOWLEDGE AND TECHNOLOGICAL CONVERGENCE

Information is being generated at a rapid rate, where centralised sources of information (sensory and other) can be utilised to derive real insights that can influence decision-making, thereby contributing towards the socio-economic development of the country. Through our Data & Knowledge Management projects, we remain committed to enable an environment for evidencebased planning that support decision-making through accurate and timely information that is obtainable from datasets and data analytics.

SANEDI's expertise and demonstrated experience in the areas of EE, Renewable Energy Technologies and SG's uniquely positions it to support local Government and the broader public sector in the journey towards greater resource efficiency, service delivery and the national aspiration for Smart Cities.

SANEDI is acutely aware that focus on programmes that create maximum impact is required, preventing dilution of effort and resources. The Smart City Programme (with a focus on SG's and distributed generation, mobility, revenue enhancement and asset management and further detailed as it pertains to SANEDI in section 8.1.3 of the document) is a crucial driver of the strategy, as it provides the most significant potential area of opportunity, based on the current state of municipalities and the future trend towards increased urbanisation.

However, it must be noted, though priority is placed on this programme, SANEDI has national and international commitments that it must adhere to, requiring resource allocation towards decarbonisation programmes (including the development of appropriate technologies) and related compliance-driven initiatives.

Finally, a relevant operational structure, underpinned by Integrated and accessible information sources, is a necessary enabler in realising and maximising the value of SANEDI to the local, national and international environment.

# PART A:
# OUR MANDATE

# 8. PART A: OUR MANDATE

In order to drive optimal resource allocation through the various layers of State, consistency in strategic and budgetary planning is required. The relationship between the mandate, policy priorities and entities of the State is highlighted in the image below and was considered as a critical feature in the development of the Strategy.

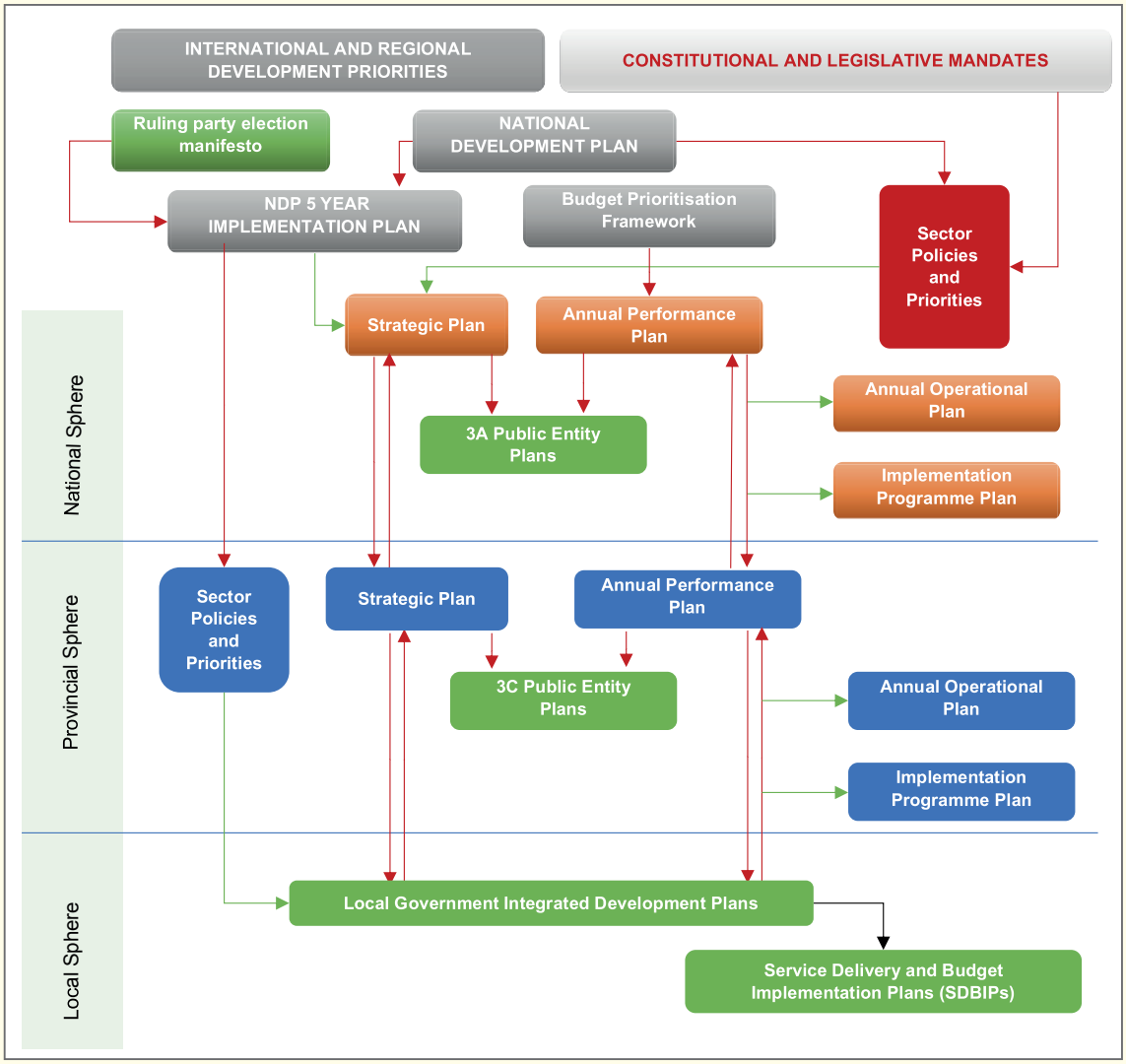



***Figure 1: Context for Strategic Alignment***

*Source : Department of Planning, Monitoring and Evaluation*

## 8.1 CONSTITUTIONAL MANDATE

SANEDI, as an entity of the State, derives its mandate from the Constitution of the Republic of South Africa, 1996 (Act 108 of 1996) and relevant Legislative and Policy Frameworks. SANEDI has a functional responsibility towards the technological development and EE in the field of energy (other than nuclear energy) – thereby improving the overall energy landscape within the country.

The strategy developed by SANEDI seeks to ensure alignment with two critical components of the Constitution, namely:

1. Chapter 2, The Bill of Rights, where: Everyone has the right:
   i. To prevent pollution and ecological degradation,
   ii. To promote conservation, and
   iii. To secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.
2. Schedule 4, The Functional Areas of Concurrent National and Provincial Legislative, specifically with respect to municipalities and the issue of Local Government matters related to:
   i. Electricity (and gas reticulation).

SANEDI has a clear role to play, contributing towards an environment that is sustainably utilised for the socio-economic development of the country, as well as municipal development for the distribution of electricity (and potentially other energy sources) to the residents of the country.

## 8.2 LEGISLATIVE AND POLICY MANDATES

As a Schedule 3A State-owned Entity (SoE), SANEDI's authority is derived from Section 7(2) of the National Energy Act, 2008 (Act No. 34 of 2008) (NEA). Section 7(2) of the NEA gives effect to SANEDI's powers and functions and provides for its responsibilities as stated below:

**SANEDI's Legislative Mandate**

**Energy Research and Development**

- **Direct, monitor, conduct and implement** energy research and technology development in all fields of energy, other than nuclear energy, and
- **Promote energy research** and technology innovation.
- **Provide for**:
  - Training and development in the field of energy research and technology development,
  - Establishment and expansion of industries in the field of energy, and
  - The commercialisation of energy technologies resulting from ERD programmes.
- **Register patents** and intellectual property in its name resulting from its activities,
- **Issue licences** to other persons for the use of its patents and intellectual property,
- **Publish information** concerning its objects and functions,
- **Establish facilities** for the collection and dissemination of information in connection with RDI,
- Undertake any other energy **technology development** related activity as directed by the Minister, with the concurrence of the Minister of Science and Technology,
- Promote relevant energy research through **cooperation with any entity, institution or person** equipped with the appropriate skills and expertise within and outside the Republic,
- **Make grants to educational and scientific institutions** in aid of research by their staff or for the establishment of facilities for such research,
- Promote **the training of research workers** by granting bursaries or grants-in-aid for research,
- Undertake **the investigations or research** that the Minister, after consultation with the Minister of Science and Technology, may assign to it, and
- **Advise the Minister** and the Minister of Science and Technology on research in the field of energy technology.

**Energy Efficiency**

- Undertake EE measures as directed by the Minister, and
- Increase EE throughout the economy.
- Increase the Gross Domestic Product v (GDP) per unit of energy consumed, and
- Optimise the utilisation of finite energy resources.

**Figure 2: Primary Legislative Mandate**

SANEDI's operational mandate is also influenced by the following Legislation and Policies:

- Electricity Regulation Act, 2006 (Act No. 4 of 2006), as amended,
- White Paper on Energy Policy, 1998,
- Petroleum Products Act, 1977 (Act No. 120 of 1977), as amended,
- Central Energy Fund Act, 1977 (Act No. 38 of 1977), as amended,
- Petroleum Pipelines Act, 2003 (Act No. 60 of 2003),
- Petroleum Pipelines Levies Act, 2004 (Act No. 28 of 2004),
- Gas Act, 2001 (Act No. 48 of 2001),
- Gas Regulator Levies Act, 2002 (Act No. 75 of 2002),
- National Energy Regulator Act, 2004 (Act No. 40 of 2004),
- Abolition of the National Energy Council Act, 1991 (Act 95 of 1991),
- The National Environmental Management Act, 1999 (Act No. 107 of 1999),
- The Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002),
- South African Revenue Service Act, 1997 (Act 34 of 1997),
- National Development Plan Vision 2030,
- Medium-Term Strategic Framework,
- National Energy Efficiency Strategy of the RSA, 2008,
- Energy Security Master Plan for Liquid Fuels, 2007,
- Energy Security Master Plan, 2007,
- Integrated Resource Plan for Energy, 2010,
- Department of Science and Technology 10 Year Innovation Plan,
- Measurement and Verification Guideline for Energy Efficiency Certificates (DRAFT),
- Industrial Policy Action Plan (IPAP) 2010/11 – 2012/13, published Feb 2010,
- Carbon Capture and Storage Road Map,
- Climate Change Response White Paper,
- Draft White Paper on Science, Technology and Innovation, and
- Intellectual Property Law

## INSTITUTIONAL POLICIES AND STRATEGIES OVER THE FIVE-YEAR PLANNING PERIOD

As highlighted, the National Planning Framework must align with the National Development Plan (NDP) policy priorities, as well as the Executive focus of the National Government, including the seven key priorities of Government.

In driving towards strategic alignment, the five-year NDP implementation plan was considered, with a focus on the three pillars that describe the strategic priorities of the National Government for the following five years, namely:

i. Pillar 1: Inclusive Economic Growth,
ii. Pillar 2: Capabilities of South Africans, and
iii. Pillar 3: Capable State.

With the following themes cutting across all three pillars:

i. Youth empowerment,
ii. Gender equity,
iii. 4th Industrial Revolution (4IR),
iv. Environmental sustainability (climate change), and
v. National Spatial Development Plan (NSDF).

Furthermore, the seven key priorities for Government were considered and are as follows:

i. Economic transformation and job creation,
ii. Education, skills and health,
iii. Consolidating the social wage through reliable and quality basic services,
iv. Spatial integration, human settlements and Local Government,
v. Social cohesion and safe communities,
vi. A capable, ethical and developmental State, and
vii. A better Africa and World.

As energy is central to socio-economic development and the growth of a country, SANEDI has a defined and clear role in assisting in the achievement of the National Priorities.

## RELEVANT COURT RULINGS

There were no court rulings that impacted SANEDI's strategic context.

# PART B:
# OUR STRATEGIC FOCUS

# 9. PART B: OUR STRATEGIC FOCUS

## 9.1 VISION

Sustainable energy for growth and prosperity in Africa.

## 9.2 MISSION

Using applied and energy research and resource efficiency to develop innovative, integrated solutions that will catalyse growth and prosperity for all in South Africa.

## 9.3 VALUES

**Table 1: Organisational Values**

| VALUES | OPERATING PRINCIPLES |
|---|---|
| Innovative | creative / proactive / taking charge / initiative / adaptive / entrepreneurial |
| Integrity | honest / ethical / accountable / transparent / responsible / trustworthy / respectful |
| Scientific evidence driven | analytical / rational / objective / factual / attentive |
| Development oriented | educative / continuous learning / transformative |
| Consultative | collaborative / participative / teamwork / engaging |
| Productive | punctual / cost conscious / disciplined / compliant |
| Responsive | courteous / friendly / client need driven / client focused |
| Caring | compassionate / empathy / emotionally intelligent |

# 10. SITUATIONAL ANALYSIS

SANEDI has adopted the Revised Framework for Strategic Plans (SP) and Annual Performance Plans (APP) in the strategic term of 2020-2025. The revised framework shifts strategy development from the previous convention of 'goals' and 'objectives' to a more measurable impact and outcomes-based approach that creates more explicit M&E linkages. This new framework is reflected in this APP.

In formulating the strategy, a macro trend analysis, as well as an internal analysis, was conducted to provide a relevant and comprehensive contextual analysis to frame both the options, but also the preferred path for which SANEDI will focus its resources. This was completed through both a document review, as well as through facilitated discussions with key Stakeholders. A key feature is a focus on creating value in the economy while creating a better life for all. A summary of this is provided in the SWOT analysis.

| STRENGTHS | |
|---|---|
| • Leveraging fiscal funding through partnerships for much larger reach and impact,<br>• Sound governance structures supported by robust systems and processes (clean audits),<br>• Mandated energy advisory arm to Government, | • Demonstration capacity (energy mission deployment at pilot level),<br>• Established national and international partnerships across the energy value chain,<br>• Translating R&D concepts into funded projects, and<br>• Interfacing Government and the private sector. |
| **WEAKNESSES** | |
| • Employee uncertainty (work contracts being linked to project funding, COVID-19, etc.),<br>• Perceived lack of visibility,<br>• Reducing corporate memory (technical expertise), | • An internal structure that enables compliance at the cost of performance, and<br>• Inadequate competitive advantage/value proposition. |
| **OPPORTUNITIES** | |
| • Industry sector development, socio-economic growth and sustainability requires clean energy solutions,<br>• Increasing integration between Renewable Energy (RE) and Energy Efficient (EE) sectors,<br>• Government need for Just Energy Transition (JET),<br>• Growth in the sizeable renewable energy sector,<br>• Positive energy policy shifts, | • Alternative revenue generation (including consulting and advisory services, match funding),<br>• Branding opportunities (in-kind services),<br>• Untapped opportunities across the R&D value chain,<br>• Alignment with National Treasury (NT) priorities to harness government funding, and<br>• Successful demonstration and commercialisation<br>• energy solutions. |
| **THREATS** | |
| • Impact of COVID-19 and recovery duration,<br>• Competition within the sector from other well-funded research entities,<br>• Limited funding for research, development and innovation initiatives, | • Reduced interest from foreign investors/donors,<br>• Inadequate technical skills pipeline in the sector (emerging technologies), and<br>• Strain on public sector budget. |

***Figure 3: SANEDI SWOT Analysis***

There is some progress made in responding to SWOT analysis, and in particular weaknesses and opportunities. Some contracts of the employees have been made permanent as from December 2021. During 2021/22, salary adjustments have been done to close salary gaps with the intention to retain employees. Organizational review has addressed some of the challenges and will continue to do so, as the structure is determined by the strategy and the projects allocated to SANEDI. Succession plan to be put in place as a priority initiative. Improved Stakeholder Engagement Strategy was approved in order to address lack of visibility. During November 2021, the Board approved a new organisational structure. Measures were put in place to confront COVID-19 challenges that

were threatening service delivery. Employees were allowed to work from home and alternative service delivery ways were put in place to deliver projects. For instance, where the organisation had committed to deliver training, online training was put in place to avoid physical contact. With the onset of the pandemic, it remains increasingly crucial that we ensure that our delivery model on projects is suitable for COVID-19 restrictions.

## EXTERNAL ENVIRONMENT ANALYSIS

### COVID- 19

Socio-environmental issues currently dominate the global discourse and in particular COVID-19 remains a threat on how we conduct business and roll out energy projects. During 2020/21, we have experienced COVID-19 related challenges in our projects such as restrictions on capacity building places. Nevertheless, we have adapted to digital platforms in conducting capacity building projects. With the onset of the pandemic, it remains increasingly crucial that we ensure that our delivery model on projects is suitable for COVID-19 restrictions.

Amid such transition, several megatrends are presenting further uncertainty to the energy sector, impacting both supply and demand. Urbanisation, with expected accelerated growth in urban populations over the next 30 years, will shift (and increase) energy demand and consumption, especially in developing countries. This calls for a particular focus to be placed on redesigning the city of the future, to cater for such increased energy demands while aligning with global drives towards reduced carbon emissions and cleaner energy sources.

**KEY GLOBAL IMPACTS OF THE PANDEMIC**

1. $CO_2$ emissions declined 6 % in 2020 largely attributable to reduced activity in aviation and transport. As countries undertake recovery efforts, many are including green and sustainable targets in their planning.

2. Global foreign direct investment is now projected to fall by as much as 40 % in 2020,

3. Global manufacturing output fell by 20 % in April 2020, compared to the same period of the previous year, accelerating an already declining trend,

4. A substantial increase in poverty among COVID-19 victims is estimated to have been 119-124 million, a substantial increase from earlier estimates.

5. Globally, the first quarter of 2020 saw a loss of the equivalent to 155 million full-time jobs, a number that increased to 400 million in the second quarter, with lower- and middle-income countries hardest hit,

6. Simulations suggest a steep and unprecedented decline in the Human Development Index (HDI), undermining six years of progress,

7. As recipients of 43 percent of global remittance inflows, the developing economies of Asia and the Pacific are especially vulnerable to the global economic stall and its impact on the transfer of remittances by migrant workers,

8. To mitigate the impact of the pandemic in Africa, the African Development Bank (ADB) has invested USD 10.2 billion to establish a Crisis Response Facility,

9. Data from 31 countries over the period 2014 to 2019, show that about 1 in 5 people reported having experienced discrimination on at least one of the grounds prohibited by International Human Rights Law, highlighting the need for COVID-19 responses to ensure that the pandemic does not exacerbate existing forms of discrimination.

10. Even before the pandemic, women did three times more unpaid domestic and care work than men since the pandemic. However, data from rapid gender assessment surveys indicate that women in some regions are shouldering the extra burden of an increased workload, particularly in terms of childcare and household chores.

*Source: How COVID-19 is changing the world: a statistical perspective Volume II, The Committee for the Coordination of Statistical Activities (CCSA), https://unstats.un.org/unsd/ccsa/*

## GLOBAL ENERGY MACRO TRENDS AND STRATEGIC IMPLICATIONS

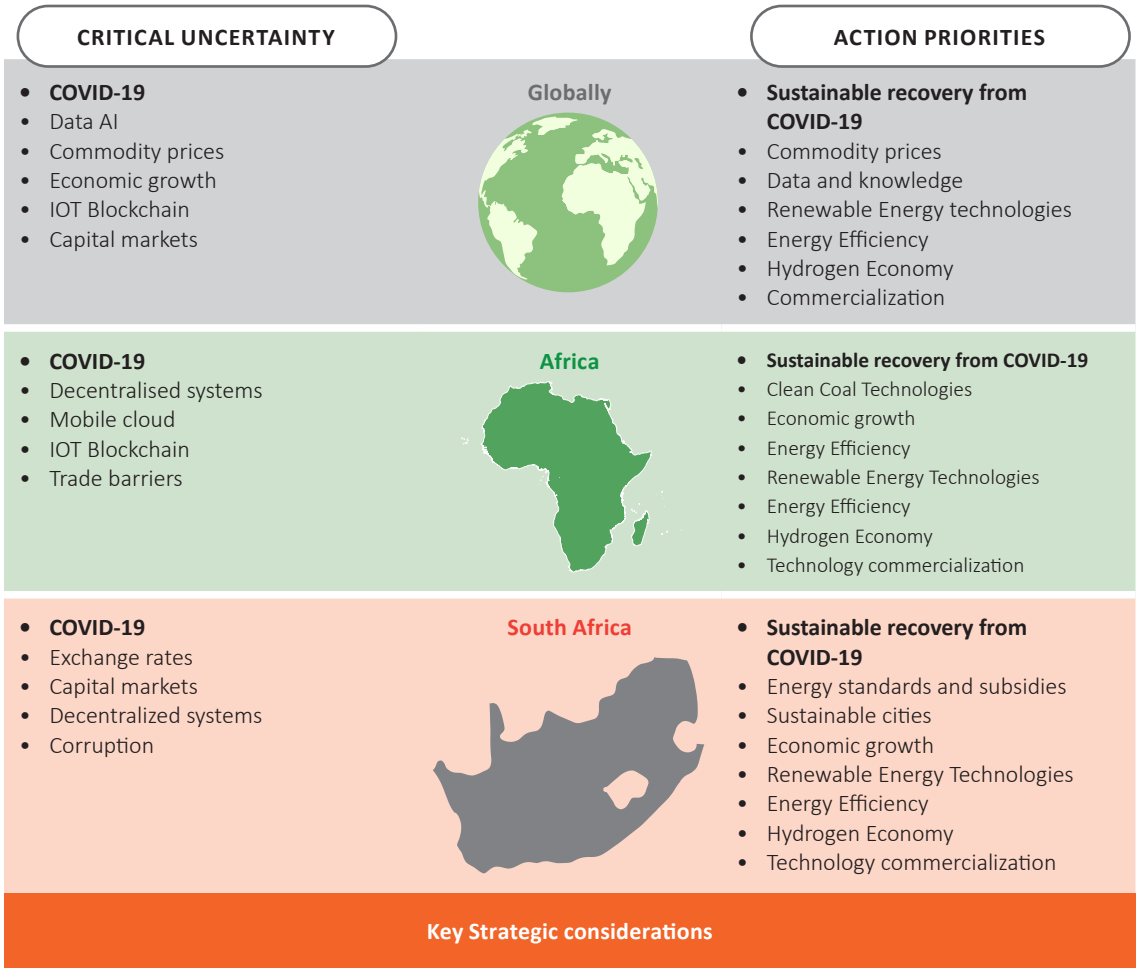



**Figure 15: Critical contextual elements for SANEDI**
*Source: World Energy Outlook 2020.*

According to the BP Energy Outlook (2021), the global energy system is likely to undergo a vital restructuring for the purpose of decarbonisation, which will create challenges and opportunities for the industry. A recent report released by MarketLine in 2020 revealed that South Africa accounts for 0.2% of the global renewable energy market value, whereas wind is the largest segment of the RE accounting for 51.8% of the market's total volume. Whereas there is a need for rapid decarbonisation, the South African energy sector is still dominated by coal and is ranked among the lowest energy costs in the world. South African National Energy Association (SANEA) expressed in its 2020/21 energy risk report that "financing any coal-based projects is becoming increasingly difficult and many countries, including some of South Africa's biggest trading partners, are tightening their requirements". The available global finance is for decarbonising the energy system and make countries resilient to climate change effects. This implies that the global energy context is dominated by technologies that aim to support decarbonisation. SANEDI is also pursuing international energy donor funding, and this means we should strengthen our RE projects and compete globally in order to overcome resource constraints. SANEDI is committed to decarbonisation and Hydrogen as amongst strategic imperatives to support global and national outcomes on GHG emissions mitigation.

- **Decarbonisation**

SANEDI supports decarbonisation and our strategic priority on decarbonisation is behind Energy Transition and GHG emissions. In December 2020, the Department of Mineral Resources and Energy (DMRE) passed into law the 'Regulations for the Mandatory Display and Submission of Energy Performance Certificates (EPC) for buildings. SANEDI mandated to develop, host and maintain the National Energy Performance Building Register (NEPBR).

The Minister of Finance in the 2022 budget vote speech made some announcements regarding Carbon Tax. The Carbon Tax rate increased from R134 to R144. Phase 1 extended to 2025. Carbon budget allowance to be removed in 2023 and R640 penalty if budget is exceeded. Carbon offset allowance increase by 5% in 2026. S12L extended to 2025 (3-year extension). The S11D is extended to Dec 2023. There will be no increase in general fuel levy and RAF. SANEDI's strategic imperative on Carbon Tax through EE is to support GHG emissions mitigation potential in support of national commitments. SANEDI will continue its involvement Carbon Tax through Section 12L Energy Efficiency tax incentives, the Energy Performance Certificates (EPCs) for buildings.

- **Hydrogen Economy**

Hydrogen is a global fuel source of the future and Governments worldwide are forging ahead with goals for the important role to play in delivering against broader decarbonisation strategies. In South Africa, Cabinet approved the Hydrogen Society Roadmap in 2007. Hydrogen economy will contribute towards the creation of new jobs and the monetization of the platinum industry, enabling substantive economic growth. At present, South Africa is exploring ways to develop a national hydrogen economy, and to date, a new feasibility study was concluded in October 2021 aimed to outline the full potential of establishing a hydrogen valley in the country. A collaboration between South Africa's Department of Science and Innovation (DSI), Anglo American, SANEDI, Engie, and Bambili Energy, will sustain hydrogen valley during the 2022/23 financial year and beyond. As part of its strategic priority on the hydrogen economy, SANEDI will continue to forge true strategic partnerships.

South Africa is an associate member of the International Energy Agency (IEA) who recently released a report detailing a way forward for countries looking to achieve net-zero emissions by 2050. SANEDI is contributing towards the Just Energy Transition (JET) framework, which is crucial for the country's move towards cleaner energy practices.

In addition, as the drive towards increased energy access, lower energy costs, as well as cleaner sources of energy (i.e. lower $CO_2$), is a global imperative, Within the SA context, SANEDI has a mandated role to play in this regard. SANEDI's strategic role would include managing compliance-related activities and technology development around decarbonisation. As highlighted, South Africa is still heavily reliant on Fossil Fuels for its energy requirements, and our international license to operate depends on reducing our absolute and relative carbon emissions.

Finally, as SANEDI deals with information (through research and programmatic interventions), an operational environment that leverages this information to create usable insights, data and analysis to influence policymakers and investors is a necessary and relevant requirement, specifically as we transition into a more information-centric environment.

## CONVERGENCE AND SMART CITIES

Energy has a direct or indirect impact on almost every aspect of modern life, driving economic growth and prosperity. Technology, however drives convergence. Increases in sensory information available in Integrated data sources accessible around the world, have consequentially changed how decisions are being made, how businesses operate, and how data has influenced strategic and operational considerations. These issues are encapsulated in the drive towards the Fourth Industrial Revolution (4IR), as highlighted in our National Priorities.

This issue is perhaps most relevant within the SANEDI context, in the Smart City concept (further expanded in Section 8.1.3 below). Smart Technologies have matured to the point that cities of all sizes can tap into enormous computing power, driven by the integration of information and collaborative partnerships.

A Smart City uses Information and Communications Technology (ICT) to enhance its liveability, workability and sustainability. In simplest terms, there are three parts to this process: collecting, communicating and 'crunching'. Firstly, a Smart City collects information about itself through sensors, other devices and existing systems. Next, it communicates that data using wired or wireless networks. Thirdly, it 'crunches' (analyses) that data to understand what's happening now and what's likely to happen next.[2]

The Situational Analysis has highlighted those budgetary constraints, and require a more focused approach by SANEDI in delivering its mandate. Through the demonstration and roll-out of the Smart Cities programme, highlighted in Section 8.1.3 above, SANEDI has a significant opportunity to drive service delivery improvements across the municipalities. This would improve asset management, reduce electricity losses, improve revenue collection (and reduce consumer debt to municipalities), while lowering transport/fuel costs and contributing towards decarbonisation efforts (by improving EE). It requires a coordinated effort between various Stakeholders across National, Provincial and Local Government and includes technical, programme management and capacity building support, to ensure a solution relevant to the South African context is adopted.

As highlighted in the section above, growing urbanisation will further strain, already strained cities and regions, requiring solutions that are predictive and enhance resource utilisation. Smart Cities, through rapidly evolving technology, offer a future that uses less to achieve more. For 2022/23, we are committed to undertake research on Enterprise service business requirements for Smart Grid applications, Development of an Asset Management Policy, Strategy and Governance Framework for Municipalities, and cost of supply study. These would enable piloting of Smart Grid systems Smart Cities.

## RISING ENERGY DEMAND AND CONSUMPTION

With the overall increase in global population, along with increasing urbanisation and economic growth, global energy demands are set to increase over the next 30 years. While there is a flattening demand in countries which currently have 100% access to electricity, South Africa and other developing countries are set to contribute towards the increasing global energy demand. Global energy demand continues to grow, at least for a period, driven by increasing prosperity and living standards in the emerging world. Africa's energy consumption remains small relative to its size. By 2040, Africa will account for almost a quarter of the world's population, but only 6% of energy demand, providing for significant upside potential. This number could be even higher if African countries continue to develop greater manufacturing capabilities.

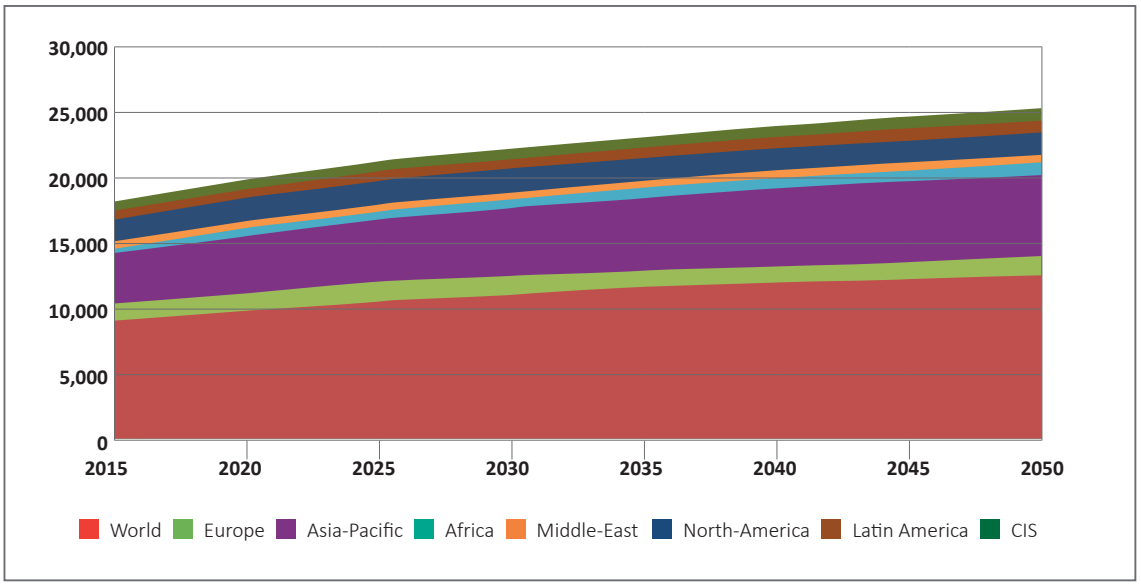



***Figure 6: Global Energy Demand by Region***
***Source: Energy Outlook 2050.***

Global energy consumption appears to be well-spread between the different sectors. Figure 6 shows that energy consumption by residential buildings and transport, jointly contribute about half (51.3%) of the energy consumption. This projection is directly linked to the growing urban population, which increases the energy demand and use in cities within these sectors.

The Rapid Transition Scenario (Rapid) posts a series of policy measures, led by a significant increase in carbon prices and supported by more-targeted sector specific measures, which cause carbon emissions from energy use to fall by around 70% by 2050. This fall in emissions is in line with scenarios which are consistent with limiting the rise in global temperatures by 2100 to well below 2-degrees Celsius above pre-industrial levels.

The Net Zero Scenario (Net Zero) assumes that the policy measures embodied in Rapid are both added to and reinforced by significant shifts in societal behaviour and preferences, which further accelerate the reduction in carbon emissions. In a range of scenarios consistent with limiting temperature rises to 1.5 degrees Celsius, global carbon emissions from energy use will fall by over 95% by 2050.

The Business-as-usual Scenario (BAU) assumes that Government policies, technologies and social preferences continue to evolve in a manner and speed seen over the recent past*. A continuation of that progress, albeit relatively slow, means carbon emissions will peak in the mid-2020s. Despite this peaking, little headway is made in terms of reducing carbon emissions from energy use, with emissions in 2050 less than 10% below 2018 levels.

Figure 8 below indicates energy intensity4 both globally and regionally (OECD and BRICS) as well as for South Africa. South African energy productivity has improved since the year 2000 by 21%, but is behind both the global average and the BRICS average and seems to be plateauing. This poses a risk to the nation's competitiveness, particularly as a developing country with forecasted trends in terms of urbanisation, suggesting an increased requirement for energy to sustain the economy. National Policy points to more significant investments in mining, manufacturing and ICT, as levers for future economic growth combined with an improved quality of life for all citizens. Theses outcomes are energy-intensive and provide an impetus to drive towards EE.

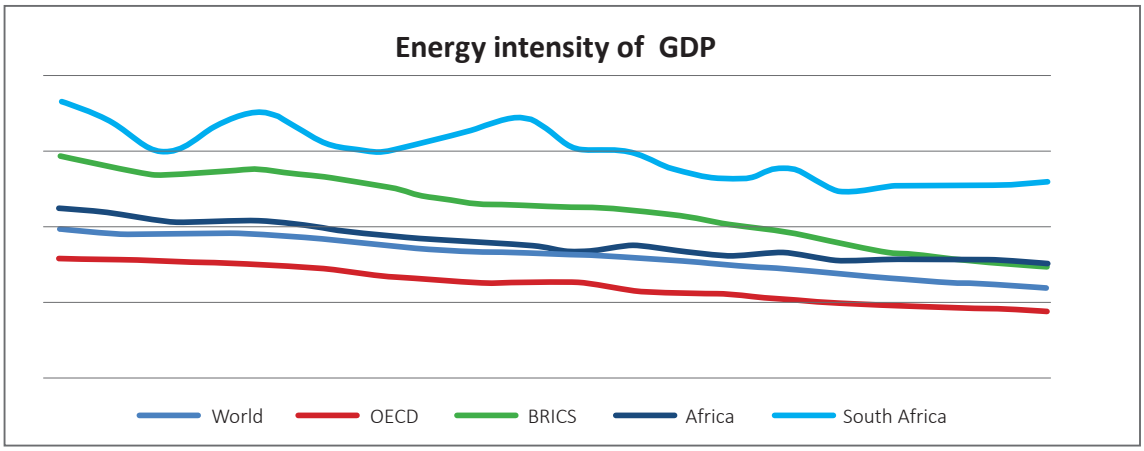



***Figure 8: Global and Regional Energy Intensity*** [1] [2]

Coupled with our carbon intensity, this highlights the relative improvements required to compete globally.

***Table 2: 2020 Carbon Intensity***

| COUNTRY OR REGION | CARBON INTENSITY ($KtCO_2$/GDP) - 2020 |
|---|---|
| OECD | 0.093 |
| BRICS | 0.124 |
| Russia | 0.210 |
| Brazil | 0.089 |
| China | 0.128 |
| India | 0.089 |
| South Africa | 0.180 |

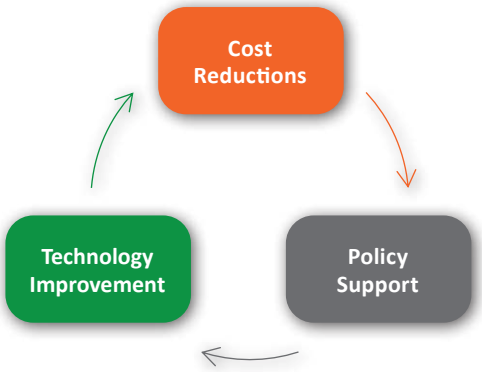
1 Energy Intensity is defined as the amount of energy required in kilotons of oil equivalents to produce 1 unit of GDP

2 Enerdata Energy Statistical Yearbook 2020

## INCREASING PENETRATION OF RENEWABLES

Several global environmental and economic considerations (primarily climate change) are driving the shifts in the energy landscape, towards decarbonisation (away from coal), towards RE and natural gas. The past few years have seen a decline in the use of coal as a source of electricity, with the rise of renewable sources supplemented by gas to support renewables in providing consistent and predictable capacity.

South Africa is progressing in this transition with the implementation of the Renewable Energy Independent Power Producer Programme (REIPPP) process, which was widely heralded globally as a success, and has created an environment within which renewables can succeed within the local context. However, SA remains one of the top five producers of coal globally.




| Drivers for Renewable Energy Market uptake |
|---|
| Policy and regulation facilitated and created a market for renewables, which drove investment and innovation resulting in technology improvements and cost reductions. |
| Increasing economies of scale in manufacturing, vertical integration, and consolidation among manufacturers. |
| Manufacturing process improvements that reduce material and labour needs, while optimising the utilisation of capital. |
| More competitive, global supply chains that are increasingly optimised to provide tailored products that best suit local market and resource conditions. |
| Technology improvements that are raising capacity factors and /or reducing installed costs. |
| Experienced project developers that have standardised approaches to project development, and who have minimised project development risks. |
| Optimised O&M practices and the use of real-time data to allow improved predictive maintenance, reducing O&M costs and generation loss from outages. |
| Low barriers to entry and a plethora of experienced medium-to-large-scale developers competing to develop projects. |
| Falling cost of capital, driven by supportive policy frameworks, de-risking tools and the technological maturity of renewable power generation technologies. |

***Figure 9: Drivers for Uptake***

It must be clearly noted that, policy plays a crucial role in driving technological improvements which facilitates cost reductions and drives towards economically sustainable solutions. In this regard globally, due to the technological advancements in processing, renewables are already economically competitive with Fossil Fuels (refer Figure 11) – indicating new generation capacity will be renewables driven, as highlighted below.

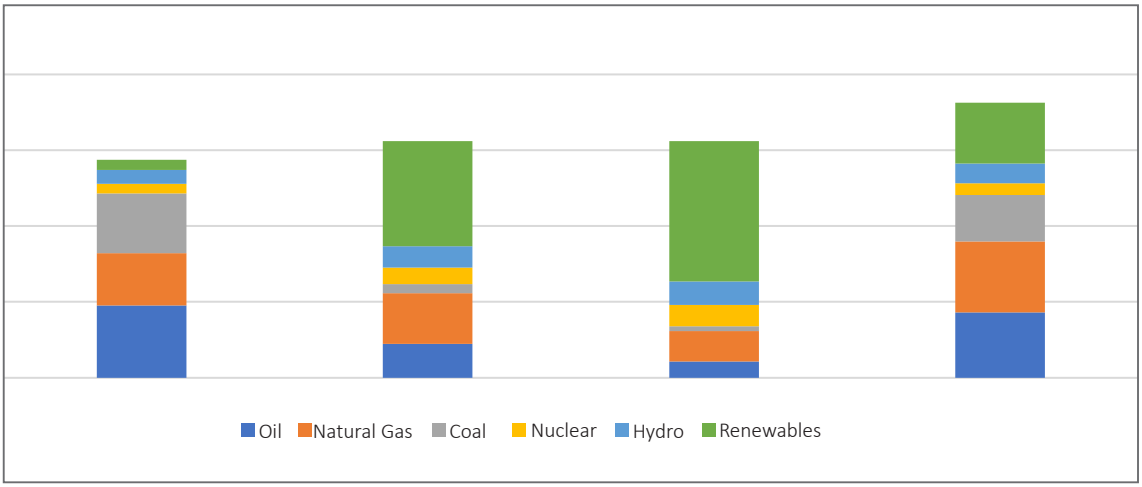



***Figure 10: Electricity and Energy Outlook***

According to the BP Energy Outlook (2021), the global energy system is likely to undergo a vital restructuring for the purpose of decarbonisation. Whereas there is a need for rapid global decarbonisation, the South African energy sector is still dominated by coal and is ranked among the lowest energy costs in the world. SANEA expressed in its 2020/21 Energy Risk Report that financing any coal-based projects is becoming increasingly difficult. The available global finance is for decarbonising the energy system and make countries resilient to climate change effects. This implies that the global energy context is dominated by technologies that aim to support decarbonisation.

Therefore, SANEDI in pursuing international energy donor funding, should strengthen on RE projects and compete globally to overcome resource constraints.

## ENVIRONMENTAL SUSTAINABILITY

Along with economic and social considerations, over the past few decades, the environment has risen to prominence in energy matters. Over the preceding centuries, humankind's rapid development has been enabled by the utilisation of Fossil Fuels, first coal and then oil. The use of these high energy density carriers has also facilitated the rapid growth in global population. Unfortunately, the expanding use of Fossil Fuels has likewise increased the emissions of $CO_2$ into the atmosphere that leads to global climate change. The Cleaner Mobility at SANEDI support the Clean Municipal Fleet, Improved Public and Private Transport System.

To address climate change, the United Nations Framework Convention for Climate Change (UNFCCC) was established. South Africa is a party to the UNFCCC and a party to the Kyoto Protocol that established $CO_2$ emission reduction targets.

The South African President stated at the Copenhagen Conference of Parties of the UNFCCC, that South Africa would increase its $CO_2$ emissions until the mid-2020s plateau for ten years, and then decrease in real terms from the mid-2030s. Consequently, mitigating $CO_2$ emissions has become a crucial factor in the National Energy Strategy (NES). The modalities of achieving such mitigations include:

- Carbon Capture, Utilisation and Storage,
- Renewable Energies,
- Energy Efficiency Measures, and
- Nuclear Energy (not a SANEDI mandate) the first three of which are being addressed by SANEDI.

Consumer patterns continue to drive market demand. As consumer behaviour trends are shift, young consumers are more inclined towards products and services that are socially responsible, encompassing issues like climate change. In many respects, consumer demand has shifted the discourse in mobility from purely Fossil Fuel, towards Electric Vehicles (EVs) and so forth.

Tesla Inc. is a brand which initiated the trend towards EVs. Tesla leads US car sales in the 2nd quarter of 2019 within the small and midsize luxury car market.

The development and growth of the company have signalled opportunities in the EV market, which global participants are beginning to exploit. EVs have an influence on lowering GHG emissions within densely populated areas.

Technological improvements in energy storage are increasing the distances travelled between charges, while reducing the cost per unit energy storage. EV adoption requires significant investment in electrical charging infrastructure that provides a network to consumers. Thus, based on Tesla's success, SANEDI's policy implementation would require a focus on the following aspects:

- Affordability,
- Availability,
- Convenience, and
- Sustainability.

Original Equipment Manufacturers (OEMs) predict that policy implementation around EV penetration, could increase EV stock by six-fold globally with China significantly leading the demand. Two BRICS countries (India and China) have currently indicated clear policy targets in this direction of EV migration.

## THE SA ECONOMY

### MACRO-ECONOMIC ISSUES

According to StatSA, South Africa's Gross Domestic Product (GDP) increased by 1,2% in the second quarter of 2021. Electricity generation (production) increased by 2,0% year-on-year in August 2021. Electricity distribution (consumption) increased by 2,2% year-on-year in August 2021. With regard to the rising electricity consumption, SANEDI will continue to engage on Standards & Labelling (S&L). Through the S&L project, SANEDI notifies customers to look at the Energy Efficiency Labels when purchasing electrical products. The S&L Programme aims to educate consumers through the prominent display of informative and easy-to-understand labels on appliances, so that they can easily make informed decisions. S&L provide consumers with accurate and comparable information on the appliance's EE performance. We will continue assessing the impact of EE appliances on the electrical energy consumption of the residential sector in South Africa, while looking at possible future scenarios for the residential sector in the country.

Whereas there is a need for rapid global decarbonization, the South African energy sector is still dominated by coal and is ranked among the lowest energy costs in the world. SANEA expressed in its 2020/21 energy risk report that financing any coal-based projects is becoming increasingly difficult. South Africa is highly depended on coal for its base load and energy security. SANEDI remains committed to just energy transition that speaks to the national development interests of our nation. The 12L tax incentive initiative is aimed at reducing companies' carbon footprint and assisting in reducing the demand for SA's scarce energy resources.

#### *8.1.3.2. SERVICE DELIVERY WITHIN THE MUNICIPAL ENVIRONMENT*

South Africa's municipalities rely on electricity sales through Eskom for revenue, however, it is evident that many municipalities struggle to pay their Eskom debts of R53,3 billion to Eskom in 2021. A Smart City model would assist in solving the municipality energy debt crisis through relevant technology and data, that solve both energy measurement concerns, and shortfalls in a financial management capacity. For example, Smart Grids allow for real-time energy consumption data that can alert households and municipalities to high consumption levels, during financial planning & management. ICT systems that assist in financial management, automated payment and/or pre-paid systems can reduce corruption and fraud and drive revenue enhancement within municipalities. In this regard, Smart Cities, as highlighted in the section below, can provide tangible benefits in enhancing municipal revenue, while reducing costs, thereby reducing the debt burden currently experienced. SANEDI's Smart Grid programme is earmarked to pilot Smart Grid systems piloted for Smart Cities. The involvement of SANEDI in developing an Asset Management Policy, Strategy, and Governance Framework for Municipalities will provide municipalities with a solid asset management policy and guide them on how to manage their electricity distribution assets.

### SMART GRIDS SUB-PROGRAMME

The establishment of a Smart City is not a one-stop process, it is a journey. SANEDI has been participating in this journey in various forms over the past five years. Moving away from hyperbole and terminology, the concept of Smart Cities is not new , it is a natural evolution of advancements made through the fields of Information Technology (IT). As more sensory information (i.e., transmitters, sensors) become connected to centralised information stores (i.e., databases), through communication networks (i.e. telecommunications), that information can be presented through User Interfaces (UI) solutions, while predictive tools can be utilised on data sets to drive optimal resource utilisation. The benefit to this is both potentially increasing revenue, and decreasing costs associated with service delivery (i.e. water, refuse, transport, electricity) within municipalities. Without connected sensors feeding information to centralised databases, Smart Cities become impossible.

As centralised information could include electricity/ energy-related information, as well as public health, public transport, water, emergency services and so forth, it becomes a cross-cutting opportunity, however, as highlighted it is centred on having Integrated information in central data stores.

Smart Grids, within which SANEDI has significant experience, is a component (a key, underlying component) of what would constitute a Smart City. Furthermore, as seen by the rising global population in cities earlier, cities play a crucial part in energy demand and consumption. Energy Research and Development (ERD) of technologies have a role to play towards the sustainability of cities, and thus contribute towards economic growth.

Within the energy sector, with a rising need for energy access, increasing utilisation of renewables and a more significant requirement for access to the grid for distributed generation, Smart Grids are necessary for the transition, and to manage the complexity that comes with this. Areas for SANEDI to participate and lead (including programme management) includes the following.

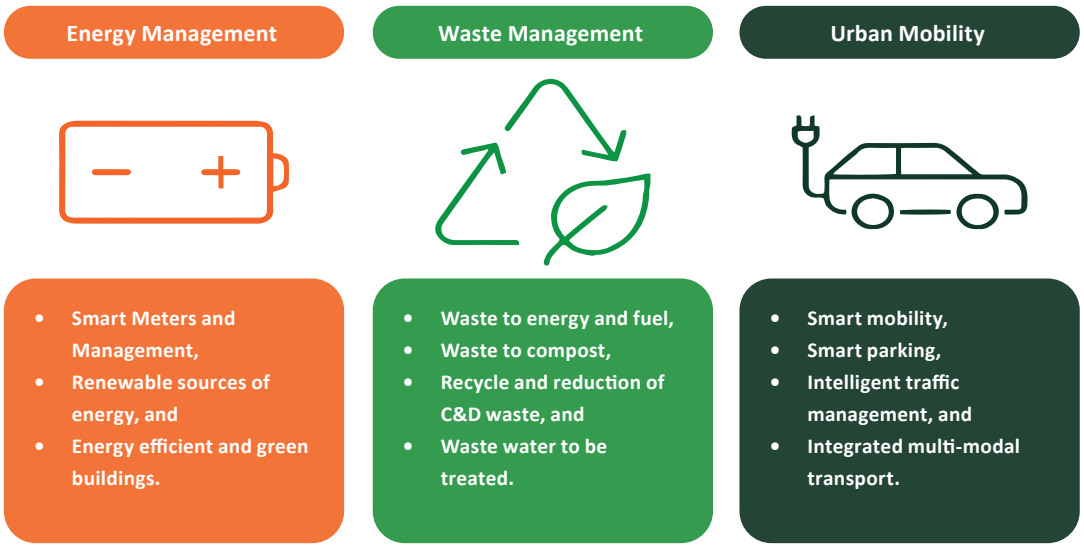



***Figure 13: Key considerations from a municipal support perspective***

Intervention in cities will require SANEDI to work together with municipalities, which currently do not have the skills to facilitate this transition.

In order to meet the objective of doubling the share of RE in the global energy mix by 2030, the amount of electricity produced from renewable sources will need to increase significantly. Fortunately, there is growing evidence in many countries that high levels of RE penetration in the grid are technically and economically feasible, particularly as solar and wind technologies increasingly reach grid parity in economic terms. However, continuous and expanded growth of the share of renewables in centralised and decentralised grids requires an effective new approach to grid management, making full use of "Smart Grids" and "Smart Grid Technologies". Existing grid systems already incorporate elements of smart functionality, but this is mostly used to balance supply and demand. Smart Grids incorporate information and communications technology into every aspect of electricity generation, delivery and consumption in order to minimise environmental impact, enhance markets, improve reliability and service, and reduce costs and improve efficiency (EPRI 2013).

These technologies can be implemented at every level, from generation technologies to consumer appliances. As a result, Smart Grids can play a crucial role in the transition to a sustainable energy future in several ways, by facilitating smooth integration of high shares of variable renewables, supporting the decentralised production of power, creating new business models through enhanced information flows, consumer engagement and improved system control, and providing flexibility on the demand side.

Technology such as Smart Grids can enable the use of renewables, but there are risks associated with the lack of experience with the technologies, uncertainties in costs and benefits, and non-technical issues such as privacy and change management that make it difficult to decide which strategies will make best use of the technologies. One logical path forward is to introduce "smartness"

into electricity systems incrementally. Today's mostly one-way electricity systems have little or no information flowing from consumers to the utility. At the other end of the spectrum, is a fully integrated system that includes several types of distributed resources, advanced pricing and other Smart Grid-related technologies. Note however, that there is a wide range of possibilities between these two extremes. Pilot or demonstration projects that try out Smart Grid technologies can provide insight into how these technologies perform in a specific system but more importantly, how it can be used to solve current industry-related problems. They can also ease concerns about how the technologies affect reliability, how consumers react, and what it means to open the electricity system to new actors and new technologies. Choosing which Smart Grid technologies to use is a system-specific decision, requiring a detailed look at the current state of an electric system as well as projections of its possible future states. When grid upgrades are required, whether to accommodate RE, or for other reasons, it is typically much more cost-effective to include Smart Grid technologies than to use only conventional technology. It is, of course, essential to choose specific Smart Grid technologies wisely.

Although each electricity system differs depending on the mix of energy sources and geographical demand profiles, we consider three different levels of renewables penetration in electricity systems. The three levels are defined in terms of the grid modifications necessary to accommodate non-dispatchable renewables, rather than in terms of absolute percentage. Low levels of renewables, with capacity penetration not exceeding 15% (on any section of the grid), are generally feasible without any Smart Grid technologies. At medium levels of renewables penetration, typically between 15% and 30%, Smart Grid technologies will become increasingly important. Capacity penetration levels above 30% are considered high for renewables and usually require the use of Smart Grid technologies to ensure reliable grid operation (Kroposki, 2011).

## INTERNAL ENVIRONMENT ANALYSIS

SANEDI is an implementation agency of Government, specifically the Department of Mineral Resources and Energy (DMRE, previously Department of Energy (DoE)), established under the National Energy Act, 2008 (Act No. 34 of 2008) (NEA), with a focus on EE, Energy Research, Development and Innovation. We have commitments on Skills Development through our programs on Renewable Energy, Cleaner Mobility, Smart Grids. These include training and development on EE technologies and related datasets, Clean Mobility Technology systems with a purpose to enable energy transition expertise and competence building.

## OPERATING MODEL (PEOPLE, PROCESS, TECHNOLOGY)

SANEDI's operating model compromises three components that speak to People, Process, and Technology, which determines the organisation's capacity to action its business processes, thereby achieving its Strategy. Robust and well-defined business processes create a well-functioning organisation.

Significant effort has been placed on process standardisation, driving towards well-defined business principles. Clear lines of accountability must be established to re-enforce current systems and procedures. Change Management becomes a key component in terms of embedding the change the organisation is undertaking.

In the past financial year, a number of key milestones were achieved in an effort to ensure that the organisation is well resourced in implementing the recommendation from the 2018/19 organisational review which also shaped the strategy for 2020-25 period:

- Implementation of the organisational review and section 189 without any litigation,
- Implemented a new operational structure for the organisation with a remuneration system that is aligned to the market,
- Significantly improved visibility and influence of the organisation through the development, adoption and implementation of the Stakeholder engagement plan,
- Secured project funding more than the MTSF allocation on a multi-year basis ensuring sustainability, and
- Governance structures are being restored with the appointment of the Board, effective 11 January 2021 with processes to appoint a Chief Executive Officer(CEO) underway.

We continue to engage with key Stakeholders to ensure that SANEDI's activities are aligned with those of key Stakeholders, and in turn, will have the desired impact.

# 11. ORGANISATIONAL STRUCTURE

The organogram includes the SANEDI Board directly overseeing the Board Committees: Board Audit and Risk Committee (BARC), Remuneration Committee (RC), Projects Committee (PC), Funding and Finance Committee (FFC), and Social Justice and Ethics Committee (SJEC). The SANEDI CEO reports to the Board and oversees three programmes: Administration, Applied Energy Research, Development and Innovation, and Energy Efficiency. Within those programmes are several sub-programmes as shown in the figure below.

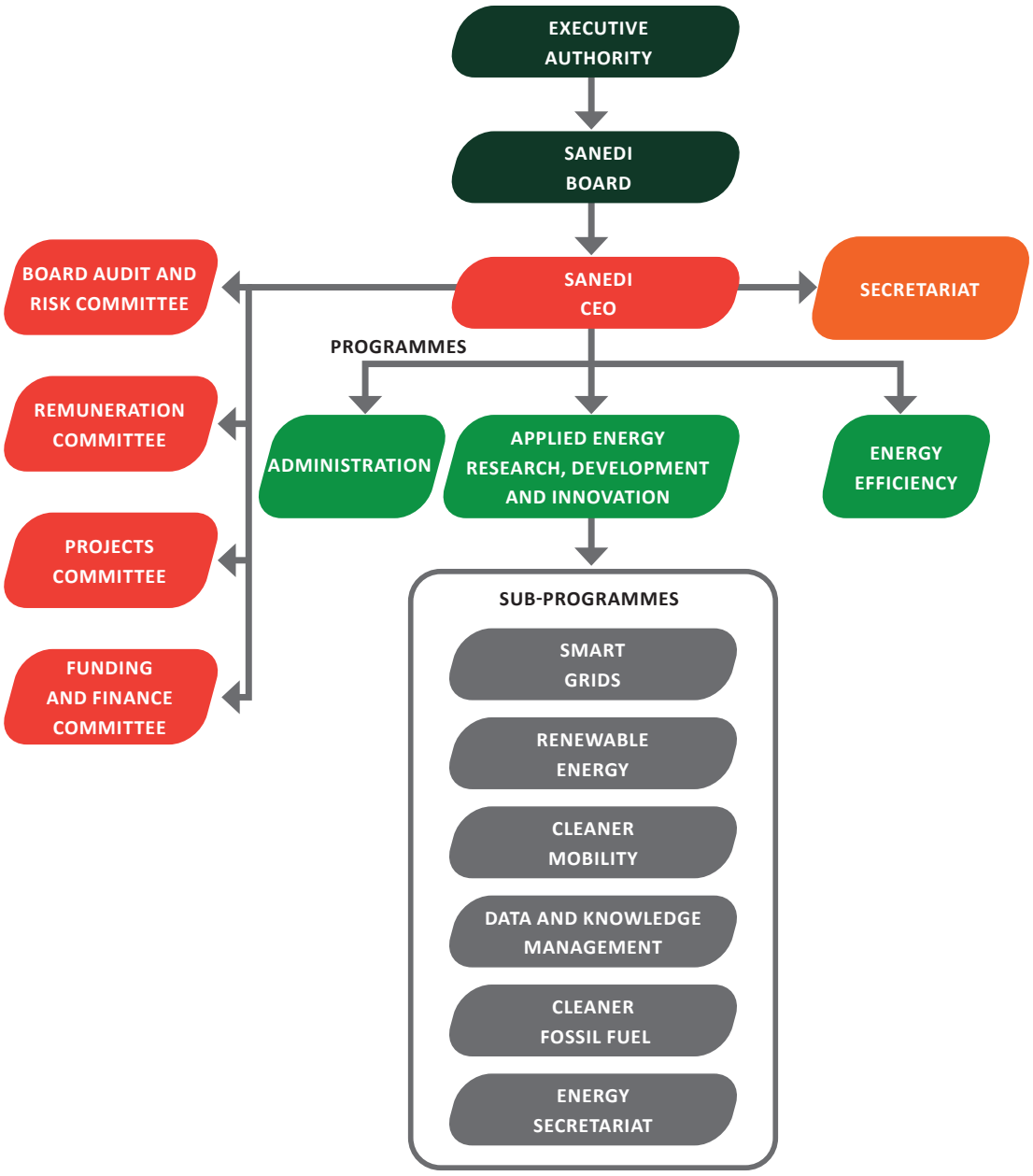



***Figure 14: SANEDI Organogram***

SANEDI has undergone an organisational restructuring and benchmarking exercise to ensure the efficient utilisation of resources in delivering its mandate. Implementation of the new organisational structure will likely occur during the strategic cycle presented. Due to the broad mandate, and with limited funds available, resource effectiveness and efficiency by focusing on real value creation is key to the long-term sustainability of SANEDI.

# 12. FUNDING AND RESOURCE ALLOCATION

SANEDI derives its revenue through transfers from the department and limited donor funding. From a funding perspective, historically about 5% to 7% of SANEDI's actual income has been from donor-funded projects, thus ensuring appropriate selection and delivery of projects becomes an underlying strategic enabler. However, funding levels have declined in recent years. Revenue is expected to be at R125million and declined over the Medium-Term Expenditure Framework (MTEF) period to approximately R91million.

Programme 2 has historically been allocated approximately 70% of the overall funding because of its volume of sub-programmes. In 2022/23 we are expecting the Management Fee from the DSI, resulting in the additional funding. Budgeted donor funding is expected to be 30% of revenue for 2022/23 due to mainly the Energy Secretariat Management Fee and other donor fees secured. This is expected to be below 5% onwards in the subsequent years as most projects are funder over a period of 2 to 3 years and new funds can only be secured for the next phase once the current phase is completed. Interest is expected to grow in line with the prevailing repo and prime rates. Programme 2 has been allocated approximately 70% of the overall funding because of its volume of sub-programmes. Cost containment measures will continue to be implemented to contain expenditure especially in Programme 1 relating to operational expenditure, which constitutes less than 20% of the total budget.

Expenditure is expected to be in-line with actuals from 2020/21 and increase by an average of 4% in line with inflation. This is due to a combination of rising staff costs and a reduction of 5% of spending on goods and services. SANEDI shows a trend that when funding is reduced, project spend is reduced disproportionately. Staff costs are projected to increase by 4% per annum over the MTEF period in line with inflation. At present, employee costs are currently 40% of total revenue. SANEDI, in-line with the NT measures on spending, could potentially see the employee costs being plugged in the future in line with inflation. Expenditure on goods and services administration strategic objectives has historically increased by 6% year-on-year, and is expected to increase annually by between 4% to 6% in future periods.

The lack of adequate funding remains a risk that faces the organisation, and can materially impact on the organisation's ability to fully implement is mandate. In response to the risks that are posed by the inadequate funding, SANEDI plans to leverage the available climate funds in order to augment the funding of the organisation. Partnerships and funding agreements have been reached with key Stakeholders for funding of initiatives that are included in this contract with the Stakeholders, and engagements continue to leverage the available funding.

Management will continue with the implementation of the recommendations of the organisational review conducted in 2018/19, which also proposed measures that would need to be undertaken to improve funding for SANEDI programmes. As part of the plan, SANEDI continues with its plans of leveraging on commercialisation opportunities when funding technology innovation projects, and in deriving a financial benefit from the technologies that it will support in their development.

# 13. PLANNING TOOLS

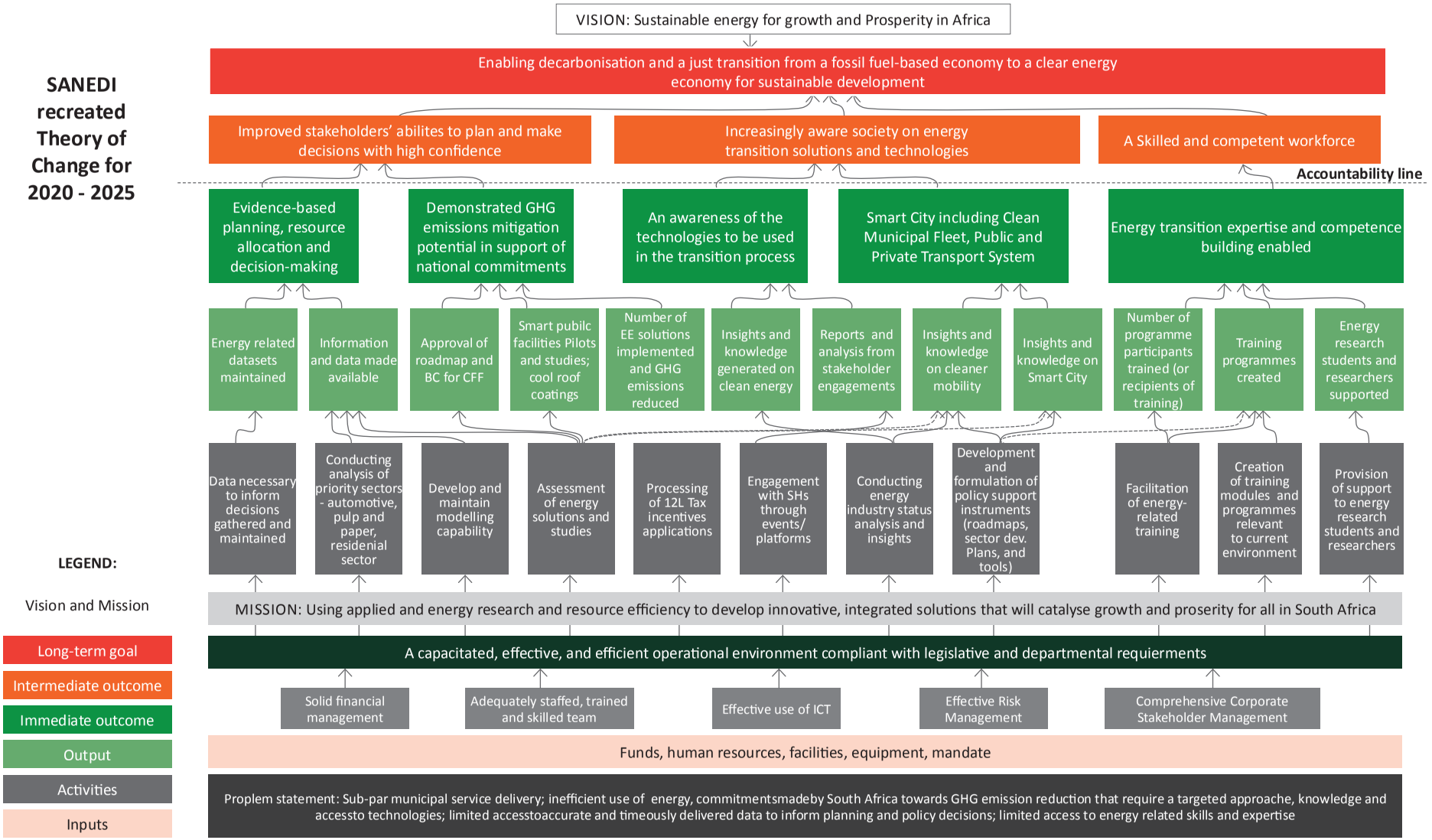
## 13.1 THEORY OF CHANGE

SANEDI's Theory of Change (TOC) allows mapping the change that SANEDI is pursuing and illustrates how the activities of the organisation are envisaged to contribute to the change. By institutionalising TOC, SANEDI will be able to monitor and track its contributions to the energy sector and the country, considering the pursued outcomes and impacts. By conducting regular implementation evaluations and making use of the recreated TOC, it will also be able to identify the areas of success and challenges, which will assist the organisation in informing and refining future planning and efforts, so SANEDI's contribution can be increasingly targeted and effective.

SANEDI's TOC is in line with SANEDI's Strategic Plan (SP) for the period between 2020 and 2025. It reflects vision, mission and objectives for the 2020/25 period to make sure that the assessment of the organisation's performance is fair and is done in light of the activities that are pursued during the analysis period. The mandate of the organisation is expected to remain the same in the foreseeable future, and demand the organisation to deliver EE and Energy Research and Development (ERD). However, the ever-changing technology landscape, the macro-economic challenges, and the resource constraints have forced the organisation to prioritise the needs for the 2020/25 period. As outlined in the SP 2020/25, the organisation re-positioned itself to focus on three areas of delivery: -

- Service delivery through the Smart Cities programmes, particularly as it relates to transport, energy, revenue and asset management,
- Decarbonisation through technological programmes, compliance monitoring and awareness campaigns, and
- Information and knowledge management to increase the national dataset on energy-related information, thereby facilitating improvements in public sector policy making and private sector investment decisions.

## SANEDI recreated Theory of Change for 2020 - 2025



# PART C:
# MEASURING OUR PERFORMANCE

# 14. PART C: MEASURING OUR PERFORMANCE

## 14.1 PROGRAMME ONE: ADMINISTRATION

The following is a list of programmes and associated sub-programmes conducted by SANEDI.

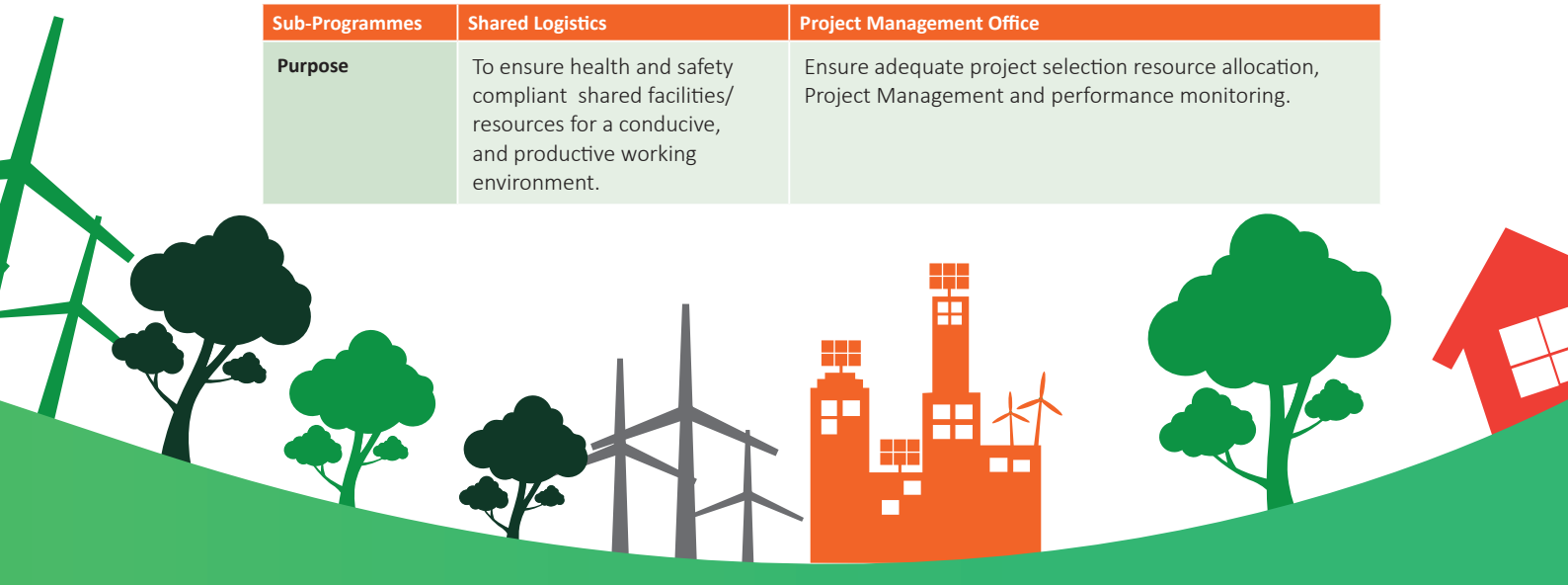
| PROGRAMME 1 | ADMINISTRATION |
|---|---|
| **Purpose** | The purpose of Programme 1 is to create an effectual delivery environment for SANEDI that is fully compliant with all statutory requirements. |

| Sub-Programmes | Human Resources | Information and Communications Technology |
|---|---|---|
| **Purpose** | Managing employee related processes and affairs, as well as administration of employee benefits in an efficient manner to ensure that SANEDI has a adequately capacitated, motivated staff complement. | Support efficient operations and ensuring data processing, integrity and availability. |

| Sub-Programmes | Corporate Services | Financial Management |
|---|---|---|
| **Purpose** | Facilitate transparency and compliance from a Legislative and Governance perspective. Incorporating all lines of business and support activities relating to the Board and Board Committees. | Delivery of business and support activities relating to the effectual financial management, financial reporting and auditing practices. |

| Sub-Programmes | Supply Chain Management | Corporate Communications |
|---|---|---|
| **Purpose** | To ensure efficient and effective Supply Chain Management (SCM) processes, that are compliant procurement regulations. | To ensure effective communications with all Stakeholders through robust Stakeholder engagement, client satisfaction surveys, public awareness campaigns in collaboration with the DMRE and media intelligence support services |

| Sub-Programmes | Shared Logistics | Project Management Office |
|---|---|---|
| **Purpose** | To ensure health and safety compliant shared facilities/ resources for a conducive, and productive working environment. | Ensure adequate project selection resource allocation, Project Management and performance monitoring. |



### 14.1.1 FINANCE

SANEDI has consistently managed to obtain an unqualified audit opinion from the Auditor-General of South Africa ( AGSA) indicative of a sound control environment that exists within the organisation. For the year under review, increased focus will be made on improving reporting for decision making, and maintenance of a sound control environment, to ensure that we retain an unqualified audit from the Auditor – General (AG).

The internal control environment will undergo continuous reviews with the audit action plans developed and implemented by the Internal Audit Department within a reasonable period of time to avoid material weaknesses in the control environment. AGSA audit findings will continue to be addressed within the financial year that they are raised, focusing on addressing root causes to avoid repeat findings and material findings that may have an impact on that audit outcomes of the organisation.

Finance Department working with the programmes, will continue to drive the implementation of funding plans that will ensure that the organisation's mandate is adequately funded through the leveraging of Climate funds as available. This is a continuous process which will ensure that SANEDI takes advantage of available opportunities. Cost containment measures will continue to be implemented in order for operational costs to be kept within inflationary increase. Any increases, of employee related costs will continue to be made on the basis of market related surveys, and will endeavour to be as competitive as possible in order to attract, and retain the right calibre of employees into the organisation. This being implemented in partnership with HR.

SANEDI will continue to monitor the costs associated with the use of consultants to ensure that they stay within a reasonable range, with use of consultants only when necessary, e.g., where capacity constraints exist, where skills are not readily available within the organisation, and where funding arrangements for the use of consultants require it.

### 14.1.2 HUMAN RESOURCES

To make this possible, the previously approved HR strategy that was formulated a few years ago and does not align with the current organizational strategy will have to be changed to align with the recent changes within the organization. The main focus in the 2022/23FY is to review the strategy, prioritise the Balance Score Card, Talent Management, Performance Management and start introducing an integrated people management system.

To improve reporting and monitoring, SANEDI needs to have a SMART (Specific, Measurable, attainable, realistic, and timeous) performance management system that can be improved by a Balanced Score Card whereby the Key Performance Areas (KPA) across the organisation are the same and only differ in internal processes. All Executives and Management will be measured on the same dimension in their different areas of work. The score card will also assist in aligning the KPA to the APP and organisational strategy.

In addition, HR will conduct a culture survey to gauge the impact of the country's lockdown on SANEDI's working culture. On completion of the survey, and depending on the outcomes, interventions to resolve the challenges will be sought and implemented to restore or take SANEDI's culture to a more desirable state.

### 14.1.3 INFORMATION SYSTEMS

SANEDI has made significant investment in Information Systems infrastructure which enabled the organisation to continue to operate during period of hard lockdowns. Information Technology (IT) is a crucial part of our business, and a key enabler in our ability to effectively deliver on our mandate, and maintain an effective and efficient control environment.

Several strategic IT projects are planned which should further improve efficiencies:

**Installation of a Project server solution for the organisation** – SANEDI has implemented a Project Management Office (PMO) to assist with the implementation of projects across all Departments. Currently, these projects operate using different kinds of software which includes Microsoft Excel and Microsoft Word. This method is exceptionally cumbersome and problematic, as there is no uniformity in the implementation and reporting processes. SANEDI has in the last two years, procured the services of a company to develop the Project Management processes and policies. In spite of the fact that these processes are currently in use, they are problematic due to the fact they are manual, thus prone to human error.

SANEDI, IT proposes the implementation of a Project server solution that will automate the PMO processes and allow for the central and uniform implementation of all projects within SANEDI.

**Implementation of a database solution for the organisation:** SANEDI has several internet-facing systems that a public hosting company currently hosts. The data is sensitive, and the need to host the databases internally is becoming more urgent. SANEDI has already procured some hardware, however, additional software and hardware must be procured to house these databases and ensure that the data is backed up and safely stored. Furthermore, an internet connection is required to facilitate the hosting and the safety of the data.

The current systems are required to be hosted by SANEDI on behalf of the (DMRE) as we pursue the vision of establishing a data centre at SANEDI:

- 12L database,
- GIS system,
- SEEL system ,
- Additional WASA databases,
- MDMS system, and
- Standard and Labelling System.

### 14.1.4 RISK MANAGEMENT

We continue through our Risk Management system to monitor the risks associated with the implementation of the SP and APP. Historical performance indicates that current systems are appropriate and have not resulted in the materialisation of any of the identified risks.

For the current financial year, we will focus on maintaining the status quo in relation to Risk Management, although we will conduct some reviews of our current risk management systems to identify areas for improvement. The function is also significantly under resourced and measures to ensure that there is adequate capacity with Risk Management will be pursued. The focus of Risk Management is to ensure that Business and Operational Risks are mitigated by various risk owners. The impact of Risk Management is to monitor and reduce the impact of risks that are threatening the organization, and improve on the action plans to mitigate risks.

## PROGRAMME 1 ADMINISTRATION

### OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS

| Outcome | Outputs | Output indicators | ANNUAL TARGETS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Audited performance | | | Estimated Performance | MTEF targets | | |
| | | | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 |
| **A capacitated, effective, and efficient operational environment (within which SANEDI will discharge its mandate) – internal compliancexzzzzz.** | Critical business risk factors identified, managed as per Risk Management Plan. | Percentage of business risk managed as per Risk Register. | New Indicator | >90% | >90% | >90% | >95% | >95% | >95% |
| | Implemented Corporate Stakeholder Engagement Plan (CESP). | Percentage implementation of Corporate Stakeholder Engagement Plan (CESP). | New Indicator | 75% | 55% | 85% | 90% | 95% | 95% |
| | Implementation of Corporate ICT Plan. | Percentage implementation of Corporate ICT Plan. | New Indicator | 80% | 80% | 80% | 85% | 90% | 95% |
| | Unqualified Audit Reports. | Unqualified audit achieved. | Unqualified audit report | Unqualified audit report | Unqualified audit report | Unqualified audit report | Unqualified audit report | Unqualified audit report | Clean Audit report |
| | Personnel trained as per Workplace Skills Plan (WSP). | Percentage of personnel trained as per Workplace Skills Plan (.WSP) | 80% | 80% | 80% | 80% | 90% | 95% | 100% |
| | Filled funded positions. | Vacancy rate of funded positions. | <5% | <5% | <5% | <5% | <5% | <5% | <5% |
| | Employment equity targets adhered to. | Percentage deviation from employment equity targets. | <5% | <5% | <5% | <5% | <5% | <5% | <5% |

### OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS

| Output indicators | Annual targets | Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|---|
| Percentage of business risk managed as per Risk Register | >95% | >95% | >95% | >95% | >95% |
| Percentage implementation of Corporate Stakeholder Engagement Plan (CESP). | 90% | 25% | 45% | 55% | 90% |
| Percentage implementation of Corporate ICT Plan. | 85% | 20% | 40% | 60% | 80% |
| Unqualified audit achieved. | Unqualified audit report | Unqualified audit report | Unqualified audit report | Unqualified audit report | Unqualified audit report |
| Percentage of personnel trained as per Workplace Skills Plan (WSP). | 90% | 20% | 40% | 60% | 90% |
| Vacancy rate of funded positions. | <5% | <5% | <5% | <5% | <5% |
| Percentage deviation from employment equity targets. | <5% | <5% | <5% | <5% | <5% |

## 14.2 PROGRAMME 2: APPLIED ENERGY RESEARCH, DEVELOPMENT & INNOVATION

| PROGRAMME 2 | APPLIED ENERGY RESEARCH, DEVELOPMENT & INNOVATION |
|---|---|
| **Purpose** | The purpose of Programme 2 is to facilitate knowledge creation that can support energy-related planning and decision-making, and accelerating the transformation of the energy market and landscape in the country. |

| Sub-Programmes | Cleaner Fossil Fuels |
|---|---|
| **Purpose** | Alternative low carbon energy and mitigation options to limit serious, negative and environmental impacts from conventional energy sources. |

| Sub-Programmes | Renewable Energy |
|---|---|
| **Purpose** | Support the accelerated and informed development of South Africa's clean energy portfolio and RE sector. |

| Sub-Programmes | Smart Grids |
|---|---|
| **Purpose** | Demonstrate and assess intelligent energy systems infrastructure, as an enabler for municipal sustainability. |

| Sub-Programmes | Data and Knowledge Management |
|---|---|
| **Purpose** | Collation, development and utilisation of credible, objective and high-quality data and information relating to the areas of SANEDI's responsibility. |

| Sub-Programmes | Cleaner Mobility |
|---|---|
| **Purpose** | Developing Cleaner Mobility solutions for Public transportation. |

During October 2019, Cabinet approved the Integrated Resource Plan (IRP) 2019, which recognises the challenges that South Africa faces as a country within the national and global energy landscape, and proposes solutions to address them. In the report, opportunities are also highlighted that could significantly improve infrastructure planning and development, allowing for progress towards achieving each goal of the 2030 National Development Plan (NDP).

The IRP recognises socio-economic challenges of increasing electricity tariffs, shortages of generation capacity emanating from the challenges that Eskom is faced with, as well as the over-reliance on coal as the primary source of energy. These have a significant negative impact on the economic growth of the country.

The IRP also recognises opportunities that are brought about, by emerging technological advancements and the concomitant decreasing costs of production. These developments, make global access to energy through renewable and off-grid technologies such as solar PV, bioenergy and wind through microgrids and battery storage much more possible for both rural and urban applications.

Reliance on coal for electricity or liquid fuels generation is starting to become less viable, as the banking sector moves away from financing coal-based energy generation. This constraint is making it imperative for the country to start aggressively investing in cleaner coal technologies, and ensuring that the country begins to adhere to minimum global emission standards. South Africa, as a Party to the Paris Agreement, has obligations towards reducing its Green House Gas (GHG) emissions as set out in the 2016 Nationally Determined Contributions (NDC).

As disruptive technologies are developed and applied across the world, it becomes crucial that these technologies are assessed for their potential adoption and deployment within the South African energy landscape, to ensure their appropriateness for the country in support of the advancement of the country's development goals.

Where it becomes evident that transition is required from one technology to the next, attention should also be given to issues of the impact of such a transition. In this regard, a just transition is required to minimise the adverse impacts on affected fossil energy sectors and communities who depend on them for socio-economic development. The development of concomitant policies also needs to be supported by accurate, reliable and timeous data and research information.

SANEDI's contribution then becomes crucial in supporting policy formulation, as well as piloting and demonstrating new technologies to inform policy and to support the adoption of new technologies.

For the (2020-2025) Medium Term Strategic Framework (MTSF) period, SANEDI will be mainly focusing on the provision of information, develop and maintain datasets and implement pilot and demonstrations projects that will enable, strengthen, and support the ability of Government and all sectors of the economy, to collectively ensure that there is the security of energy supply through a number of targeted initiatives.

### 14.2.1 CLEANER FOSSIL FUELS SUB-PROGRAMME

During 2012, the South African Carbon Capture Storage (CCS) Roadmap was endorsed by Cabinet. Recently, delays and the incorporation of capture, utilisation and mineralisation saw the phylogeny of a refreshed Roadmap. The Pilot CO2 Storage Project and the Pilot CO2 Capture project conflate in the integrated CCS Demonstration Project circa 2026. The consummation of the overall Carbon Capture, Utilisation and Storage (CCUS) programme is anticipated during 2030.

There are changes in Cleaner Fossil Fuel (CFF), and as from 1 September 2020 the sub-programmes under CFF were transferred to the Council for Geoscience (SGS) as per the Minister's approval. To this end, the Pilot Carbon Dioxide Storage Pilot Project (PCSP), the CCUS project, and the team have been transferred to the Council for Geosciences (CGS) for further implementation and custodianship. The transfer of CCUS to CGS is a logical step as SANEDI had been working with the SGS throughout the CCS programme. The move has resulted in extra staff being available to work on the programme. Moreover, it has resulted in two major revisions to the CCUS Programme: -

- Since the launch of the original Atlas, the CGS has undertaken further geological analyses indicating further possible geological storage sites. Consequently, the PCSP has been moved from the KZN Province to the Mpumalanga Province, closer to the source of point CO2 emissions, and
- Technologies, enhanced coal-bed methane, underground coal gasification and enhanced geothermal energy extraction, have been added to the scope of utilisation under investigation.

We believe that exploration of solutions in CFF is important, and that there is scope outside of CCUS that should be explored. Therefore, SANEDI retains the CFF sub programme and is exploring other applied energy research including clean coal pilots and biofuels. Through demonstrated clean energy initiatives, SANEDI will support the Sector Education and Training Authorities (SETAs) and Incubators, to enable the development of skilled Small, Medium Micro Enterprises (SMMEs) in the clean energy sector.

## OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS

| Outcome | Outputs | Output indicators | Annual Targets | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Audited performance | | | Estimated Performance | MTEF targets | | |
| | | | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 |
| Demonstrated GHG emissions mitigation potential in support of national commitments. | Roadmap and Business Case for Cleaner Fossil Fuels approved. | Number of energy solutions assessed (advisory notes, feasibility reports, complete study reports, case studies, technology roadmaps and operational demonstration projects/facilities). | - | - | - | 1 | 1 | 1 | 1 |

## OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS

| Output indicators | Annual targets | Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|---|
| Number of energy solutions assessed (advisory notes, feasibility reports, complete study reports, case studies, technology roadmaps and operational demonstration projects/ facilities). | 1 | - | - | - | 1 |

### 14.2.2 CLEAN ENERGY SUB-PROGRAMME (RENEWABLE ENERGY)

The Clean Energy sub-programme will focus on developing pilot and demonstrate Renewable Energy Technologies in different applications with the aim of providing research, to showcase potential, create data, develop policy recommendations, and insights for decision-makers and industry to inform potential uptake of such technologies in the commercial and industrial sectors.

#### JUST TRANSITION

As the country transitions its power generation infrastructure from fossil-based to a cleaner, environmentally sustainable energy infrastructure, there is a need to ensure that the transition happens in a manner that is equitably and socially just, focusing on local communities and people. The decommissioning of power stations that are coming to their end of life, as well as the transition of Fossil Fuels, presents a challenge of ensuring that communities and people stand to be negatively affected.

SANEDI has been involved through a number of partnerships in up skilling, and training artisans and professionals in an effort to ensure that people are capacitated, and prepared for future jobs that will be brought about by this transition. The transition to new technologies will create opportunities for dialogue and engagement with Stakeholders in order to bring about an understanding of the transition and the need thereof, and the need to understand the new technologies as we move away from the traditional methods of energy supply.

SANEDI will focus on the engagements with Stakeholders with the objective of ensuring that there is understanding, buy-in, and adoption of new technologies by communities in general, opportunities for new industries, jobs are harnessed, and there is the commercialisation of these technologies.

#### COOL SURFACES PILOT

Looking forward to the upcoming MTSF period, SANEDI will extend the scope of the Cool Surfaces project utilising funds received for the demonstration of the technology. A number of demonstration projects are planned for the MTSF period and are expected to be completed during the first two years of the MTSF. Ultimately, SANEDI intends to develop business cases for appropriate Stakeholders such as the Department of Co-operative Government and Traditional Affairs (COGTA), municipalities, and businesses for a mass roll-out of Cool Surfaces.

This innovative paint technology not only has the potential of reducing the energy demand for space cooling purposes, but also has the potential to create a new industry, local manufacturing and to create new jobs. To date, a number of people have been trained as applicators for this new paint technology, and it is expected that in the two years that pilot projects will be running, a greater number of people will be trained. Pilot projects have already demonstrated and increased skills capacity as well as creating small and micro businesses particularly within the Limpopo Province to date. As SANEDI rolls out this technology, we are expecting to see even more skills creation and small/micro businesses capacitated and empowered. This is expected to be supported through the SANEDI collaboration with the Cool Surface Associations in establishing an accreditation laboratory for South African manufactured Cool Surface products. Training will focus on mainly the youth and women, to create opportunities for these groups to alleviate poverty and unemployment.

To also formalise the training provided in this regard, SANEDI will be engaging with the SETAs to formalise the training provided under the Cool Surfaces programme, and also to assess the potential of this and be included as part of the curriculum at Technical Vocational Education and Training (TVET) colleges involved in the construction industry.

#### WIND ENERGY MAP

The WASA project is a renewable resource measurement project, for wind potential in South Africa, that has seen 18 wind measurement masts built across five Provinces. Providing reliable high-resolution data on the wind energy resource for South Africa, has the ultimate benefit of being able to level the playing field for wind energy developers, and provide a much-needed boost in RE site development. Data generated from these masts will continue to be a useful tool to inform policy decision-makers, investors, researchers, and other Stakeholders in providing reliable and accurate wind data at the five different Provinces to enable the continuous assessment of wind potential in South Africa. The project is currently in its third phase and is being undertaken in partnership with the DMRE, South African Weather Services (SAWS), Council for Scientific and Industrial Research (CSIR) and the Danish University of Technology (DTU).

From the Integrated Resource Plan (IRP), wind has been identified as one of the least costs' options for electricity generation in the country, and is expected to contribute 1600MW of electricity by 2030. With this in mind, SANEDI will continue its partnership with South African

Renewable Energy Technology Centre (SARETEC) with regards to the training of wind technicians as we support the industry, by ensuring that there will be appropriate skills available in the country. We will also pursue pilot studies, that will show the potential of locally developed wind technologies for commercialisation and mass rollout. The new policy of Government allowing their own generation by business and municipalities, creates an opportunity to create sustainable businesses and jobs in the wind energy space.

## PV AND ENERGY STORAGE PILOTS

In partnership with various Stakeholders and collaborators, SANEDI will explore opportunities for Photovoltaic's (PV) and battery storage as options for ensuring energy security in South Africa.

SANEDI will furthermore explore, map, with thorough modelling of scenarios, identify opportunities for consolidating environmental rehabilitation initiatives with power generation opportunities, and exploring the potential for repurposing sites from retired power plants as sites for RE power plants. Feasibility studies supporting this concept will, as far as funding allow, be conducted with the aim of developing viable business cases should they be a pursuable option.

Through its partnership with the Department of Defense (DoD), SANEDI is exploring the possibility of piloting fit-for-purpose micro, small and medium scale PV with battery storage for energy security to meet national priority demand within the Defence Force mandate.

## PLASWEN

SANEDI commissioned the South African Nuclear Energy Corporation (NECSA) to design, build and demonstrate a proof-of-concept waste pyrolysis machine. The unit can treat between 0,2 and 0,5 tonnes of municipal green waste per day, while able to produce between 10 and 25 kW. The unit can further treat COVID-19material waste, mixed solid waste, and tyres. It is scalable and can treat larger waste volumes and produce more electricity over time.

## SOLTRAIN

The Solar Thermal Training and Demonstration Initiative (SOLTRAIN), funded by the Austrian Development Agency (ADA) has been active within South Africa since 2009. SANEDI has collaborated with this initiative since its inception and since 2016 is the official implementation partner of this project in the country. To date, it has achieved over 600 demonstration systems, over 4000 persons trained, awareness generation, industry capacitation and boost, as well as developing business cases and roadmaps for solar thermal implementation across 6 SADC country partners. Through this project, South Africa has been able to place the largest district heating system in Saharan Africa, marking the country in the top 20 in 2019.

## SANEDI CSIR THERMAL LAB

South African industry has historically developed in an environment of low coal and electricity prices. This has resulted in a wide range of industrial processes that are inefficient and carbon intensive. Rapidly increasing energy costs, coupled with the need to reduce GHG emissions, requires industrial consumers to optimise, and in some cases redesign their thermal generation and distribution systems. WHR, PtH and TES technologies have the potential for concurrent cost savings and decarbonisation, but the development of these technologies requires innovative Research and Development (R&D) solutions for the South African market.

Initial objectives of this lab are to conduct modelling and technology development into Waste Heat Recovery (WHR), Power-to-Heat (PtH) and Thermal Energy Storage (TES) systems to support industrial competitiveness. Simulation and analysis will guide the optimisation of thermal energy systems, and in cases where off-the-shelf solutions are not readily available in the market, targeted R&D will be conducted in partnership with industry to develop novel solutions.

## SANEDI DoD PARTNERSHIP

SANEDI and the DoD are currently engaged in an energy collaboration that allows them to essentially pilot, and demonstrate technologies that are fit for purpose on DoD facilities. These technologies stretch across the EE and RE space, and are designed to be able to prove that RE technologies can be adapted to deliver according to requirements across the variety of sectors. Currently SANEDI has 17 active projects at different scales with the National Defence force, demonstrating technologies such as Cool Surfaces, Photovoltaic's, biogas, storage, energy efficient lighting, energy efficiency, energy security, water treatment using EE and RE. Included in all of these is skills development, technology proof and transfer, ultimately leading to a economic boost through industry support during project duration.

## DSI SOLAR RDI PROGRAMME

This program is designed to accelerate solar technologies in the market, create industry and skills in the sector in South Africa, and advance new and innovative technologies to pilot and potential commercial stage. The mainstream component of this project has yielded 3 primary outputs, an innovative inverter technology, waste to energy technology and a portable solar energy device that can be scaled up to container size for small and micro business use. This program is currently winding down, though further offshoots will be showcased under the Energy Secretary within SANEDI.

## INTERNATIONAL RELATIONS

SANEDI represents South Africa and the DMRE in several International fora. At least three of these are within specific technologies of the International Energy Agency (IEA) task projects, which focus on solar heating and cooling technologies, bioenergy and GHG. The renewables program also collaborates closely with the German Development Agency (GDA), the Austrian Development Agency (ADA) and the Swiss Development Agency (SDA), towards clean energy technologies and a sustainable future.

## VIABILITY AND VALIDATION INNOVATION SERVICE DELIVERY PROGRAMME (VVISDP)

The Department Science and Innovation (DSI) submitted a proposal and successfully secured European Funding. The programme management comprises a consortium from the CoGTA, DSI, TIA and SALGA. TIA appointed SANEDI to manage the Energy Management component of the VISDP. The programme is divided into four work streams and six projects. Viable Energy Management technologies will be demonstrated at select municipalities whose submitted proposals were approved. These municipalities include City of Cape Town,; Drakenstein, City of Mbombela, and Rustenburg. SANEDI will earn an 8% Management Fee from the overall Energy Management sub-program budget of an estimated R50m.

## OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS: RENEWABLE ENERGY

| OUTCOMES | Outputs | Output indicators | Annual Targets | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Audited performance | | | Estimated Performance | MTEF targets | | |
| | | | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 |
| Demonstrated GHG emissions mitigation potential in support of national commitments. | Smart public facilities Pilots and studies (Renewable Energy SANEDI driven initiative contributing towards GHG reduction). Information and data made available for policy development. | Number of energy solutions assessed (advisory notes, feasibility reports, complete study reports, case studies, technology roadmaps and operational demonstration projects/facilities). | 3 | 1 | 6 | 4 | 4 | 2 | 4 |
| Data and awareness of the technologies to be used in the transition process (for an increasingly aware society on energy transition solutions). | Reports and analysis from stakeholder engagements. | Number of energy-related knowledge sharing events / platforms engaged in (own hosted, attended, knowledge presented, supported). | 1 | 3 | 6 | 4 | 4 | 4 | 4 |
| | Clean energy technologies training in the sector (including municipalities, training programmes with trained, skilled participants). | Number of recipients of energy-related training facilitated. | 107 | 85 | 120 | 120 | 120 | 120 | 122 |
| | Research publications reflecting clean energy insights. | Number of annual Energy industry status reports (insights, trends, international and national collaboration decisions, interfacing and forums). | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Accessible and high-quality data: maintain energy-related datasets. | Minimum number of energy-related datasets maintained per annum. | 2 | 3 | 3 | 2 | 2 | 1 | 1 |

| OUTCOMES | Outputs | Output indicators | Annual Targets | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Audited performance | | | Estimated Performance | MTEF targets | | |
| | | | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 |
| Energy transition expertise and competence building enabled. | Training modules and programmes relevant to the current environment. | Number of policy support instruments (industry roadmaps, sector development plans and industry support tools, etc). | - | - | 1 | 1 | 1 | 1 | 1 |
| | Energy Research students and researchers supported. | Number of energy-related research students / contracted researchers supported (eg. bursaries, non-bursaries, contract opportunities, infrastructure support, etc). | 1 | 1 | 1 | 1 | - | - | - |

**Targets in the above tables are outlined according to known funding available and committed to these outputs, however this does not negate overachieving these targets once more projects are confirmed. There are some expected out puts that could be delivered from projects waiting for the new financial year to confirm funding and thus be able to add into expected/ projected outputs. These projects are linked into collaborative agreements where mutual resources are pooled in order to achieve outcomes/demonstrations, several such collaborative memoranda of agreements overarch collaborations with project partners and separate project agreements are pending the new financial year.*

*** Output indicators are defined concisely in the table above for ease and conciseness in target measuring, however please refer to the annual report for complex breakdowns of the intricate and detailed deliverables leading to answering SANEDI's mandate towards job and skills creation, business support/development, technology demonstration, business case development, return on investment understanding, economic and industrial advancement, national and international collaboration, policy information, as well as knowledge and networking exchange.*

## OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS: RENEWABLE ENERGY

| Output indicators | Annual targets | Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|---|
| Number of energy solutions assessed (advisory notes, feasibility reports, complete study reports, case studies, technology roadmaps and operational demonstration projects/facilities). | 4 | - | - | 1 | 3 |
| Number of energy-related knowledge sharing events / platforms engaged in (own hosted, attended, knowledge presented, supported). | 4 | 1 | 1 | - | 2 |
| Number of recipients of energy-related training facilitated. | 120 | 20 | 20 | 40 | 40 |
| Number of annual Energy industry status reports (insights, trends, international and national collaboration decisions, interfacing and forums). | 1 | - | - | - | 1 |
| Minimum number of energy-related datasets maintained per annum. | 2 | - | - | | 2 |
| Number of policy support instruments (industry roadmaps, sector development plans and industry support tools, etc). | 1 | - | - | - | 1 |

### 14.2.3 THE ENERGY SECRETARIAT SUB-PROGRAMME

The DSI commissioned the National Research Foundation (NRF) to conduct a review of the Renewable Sustainable Energy (RSE) Hub and Spokes programme. Recommendations proposed the establishment of an Energy Secretariat. The DSI contracted SANEDI to establish an Energy Secretariat in the 2019-20FY. The Secretariat would promote the 10-Year Innovation Plan and leverage the Energy Grand Challenge. The Grand Challenge stimulates and advances a knowledge-based economy and advances increased knowledge generation and exploitation, human capital development, knowledge infrastructure, and enablers to addressing the "innovation chasm." These efforts will seamlessly address the energy trilemma which encompasses energy access, environmental sustainability, and energy security.

The role of the Secretariat is to commercialise and upscale knowledge outputs from the RDI portfolio. The outputs will systematically ensure impact in the National System of Innovation (NSI). The Secretariat will monitor and evaluate implementation of the Energy Science, Technology, and Innovation Plan. Monitor implementation of innovative, alternative, and emerging technology policies influencing the energy landscape. Coordinate and monitor the training of TVET and University of Technology (UoT) graduates. Deploy scalable technologies with public and private sector, as well as academia. Align deployments with the Presidential District Development Model. The Science and Innovation flagship programmes are summarised here.

The **Coal CO2-X programme** demonstrates $CO_2$ captured from the flue gas emitted from coal-fired power stations, along with green hydrogen produced from RE sources by way of the electrolysis of water, to green, clean burning 0% sulphur diesel. This is a RE carrier for local demand and developing global renewables trade. The programme seeks to reduce $CO_2$ emissions, while honouring our national obligations under the Paris Agreement.

The **Energy Storage programme** advances energy storage technology research. Lithium-ion battery development supports stationary and mobile applications. Lithium, nickel, and cobalt minerals can be supplied by neighbouring countries. Research focal areas include value-added precursor materials like lithium manganese oxide and lithium nickel manganese cobalt. Universities and science councils undertake computational modelling, precursor material development, cell manufacturing, and battery testing research. The research programme consortium comprises Universities and Science Councils alike.

The **Hydrogen South Africa (HySA) programme** originated from the National Hydrogen and Fuel Cell Technologies (HFCT) RDI strategy approved by cabinet in May 2007. The programme consortium comprises local Universities and Science Councils researching the beneficiation of Platinum Group Metal (PGM) resources. The research contributes actively towards energy security and RE. It further supports Government's ambition to supply green hydrogen into Africa. It also exploits component manufacture throughout the HFCT value chain.

The **RSE Hub and Spokes programme** advances research and technology innovation in the RE landscape, postgraduate skills development, and increases the knowledge base. It stimulates new science, technology, and innovation industries supporting Government policies and plans. The hub and spokes model involves administrative support at the hub, while computational modelling, photovoltaic, solar thermal, and wind technology research and demonstrations are undertaken by the hubs.

SANEDI on boarded a new DSI programme, the VVISDP. DSI applied and secured European Union (EU) funding. Strategic programme management is undertaken by a consortium comprising CoGTA, DSI, TIA and SALGA. TIA recently appointed SANEDI to implement the energy management component of the programme. The City of Cape Town, Drakenstein, City of Mbombela, and Rustenburg submitted successful proposals that were approved.

The Energy Secretariat have not compiled Key Performance Indicators (KPIs) and targets in the 2022-23FY APP. Work currently underway by the UK-Pact are investigating a model for improved operational efficiency and Governance. A Theory of Change -Monitoring, Evaluation, Learning (MEL) framework also forms part of the project outputs. The UK PACT project outputs will enable SANEDI to formulate appropriate and relevant KPIs and targets in support of the 2022-23FY APP.

**LEAP-RE**

The LEAP-RE is a 5-year program co-funded by the European Commission (EC) under Horizon 2020. It aims to develop long-term partnerships between Europe and Africa on Research and Innovation (R&I) in Renewable Energy (RE). The consortia comprise 83 partners from European and African countries. The overall budget is €32m, including €15m from the EC. There are three pillars, Pillar 1 is a joint call for RE research proposals, Pillar 2 focuses on the management of R&I and capacity building projects and Pillar 3 fosters long-term RE

partnerships between African and European countries. SANEDI has secured R5m from the DSI, and expects an additional R15m, to implement projects approved by Leap-Re International.

### 14.2.4 SMART GRIDS SUB-PROGRAMME

Electricity service delivery within the municipal environment has been a challenge over the years. Municipal electricity distribution departments struggle to maintain their networks, and provide the required level of service to their customer base. This has resulted in additional revenue losses and also the difficulty of introducing new technologies and customers migrating to alternative energy sources, ''small-scale-renewables technologies". Through the deployment of smart distribution networks, also referred to as advanced metering infrastructure, revenue and asset management initiatives can be driven as a sustainable business model that guarantees visibility and control of local networks.

SANEDI Smart Grids sub-programme focuses on the introduction of smart distribution networks to support the deployment of distributed generation; revenue enhancement; asset management and the deployment of various smart grid technologies. Smart grids are a driver for positive change and therefore, strategic roadmaps that guide the industry "distribution segment" aligned to the strategic objectives of the Department of Mineral resources and Energy's (DMRE) Electricity Directorate and SANEDI's Applied Research and Innovation mandate are required to guide municipal electricity distribution asset management interventions, industry insights and case studies that emanate from piloting smart grid technologies using system thinking.

Previous advanced metering infrastructure projects supported by the DMRE's Electricity Directorate for policy making decisions, have successfully piloted these concepts, carefully considering the risk of the age and state of distribution assets. Now after lessons learnt from doing and not just conceptualising, a better understanding of how to deploy advanced metering infrastructure to address sustainability is now championed by the National Treasury (NT) in collaboration with other national entities through projects that aim to generate blueprints for success.

These projects will further support case studies and research publications that allow other municipal electricity distribution departments and industry stakeholders to replicate successes and avoid similar pitfalls during their implementation of advance metering infrastructural projects. The aim of improving the knowledge base, constituting of public officials and technical experts is crucial to driving better service delivery, thereby, guaranteeing sustainable municipal electricity distribution departments.

In the last financial year, SANEDI, in collaboration with municipalities, developed the Smart Grid Roadmap. The Roadmap serves as a guideline to municipalities in their Smart Grid journey, and allows SANEDI to use Smart Grid technologies as an enabler to solving pressing municipal related problems. In this financial year, SANEDI will support NT and COGTA in the "Smart and financially sustainable Municipality" pilot and demonstration project. Several research projects are also proposed in collaboration with the University of Pretoria (UP).

For 2022/23, the Smart Grids will deliver activities that aim pilot Smart Grid systems for cities. These include Enterprise service business requirements for Smart Grid applications and The Development of an Asset Management Policy, Strategy and Governance Framework for Municipalities.

## OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS: SMART GRIDS

| Outcome | Outputs | Output indicators | Annual Targets | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Audited performance | | | Estimated Performance | MTEF targets | | |
| | | | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 |
| Smart Grids Pilots | Energy solutions assessed evidenced by reports | Number of energy solutions assessed (as confirmed by (i) advisory notes, (ii) feasibility reports, (iii) complete study reports, (iv) case studies, (v) technology roadmaps, and (vi) operational demonstration facilities). | 4 | 1 | 4 | 4 | 2 | 1 | 2 |
| | | Annual energy industry insight (trends) publication reflecting insights from extensive international and national collaboration, interfacing and forums. | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Number of industry roadmaps, sector development plans and industry support tools developed to promote energy related market/industry development. | - | - | - | 1 | 1 | 1 | 1 |

** We have reduced our smart grids pilots over the years because the concept have be proven in past pilot demonstrations. Municipal electricity distribution departments have the evidence that supports smart grids work and enables business sustainability. The new approach is to direct our focus around solving existing problems rather than piloting concepts, hence, the reduction in targets. Such applied projects must be limited and targeted at addressing the most burning issues for participating municipal distribution departments.*

## OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS

| Output indicators | Annual targets | Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|---|
| Number of energy solutions assessed (as confirmed by (i) advisory notes, (ii) feasibility reports, (iii) complete study reports, (iv) case studies, (v) technology roadmaps, and (vi) operational demonstration facilities). | 2 | - | - | 1 | 1 |
| Annual energy industry insight (trends) publication reflecting insights from extensive international and national collaboration, interfacing and forums. | 1 | - | - | - | 1 |
| Number of industry roadmaps, sector development plans and industry support tools developed to promote energy-related market/industry development. | 1 | - | - | - | 1 |

### 14.2.5 DATA AND KNOWLEDGE MANAGEMENT SUB- PROGRAMME

Working in collaboration with the Energy Efficiency Directorate of the Department of Mineral Resources and Energy (DMRE) to fulfil the energy efficiency sectorial targets as stated within the National Energy Efficiency Strategy (post NEES 2015), the Data and Knowledge Management sub-programme focuses on utilising energy data for evidence-based planning to support energy efficiency as the first fuel to South Africa's drive for electricity consumption demand-side management through scaling up the use of energy efficiency intervention technologies and the development of building standards to drive the adoption of such technologies.

The development of sector reports that focus on the adoption of Energy Management Systems (EMS) in addition to ISO standards within the Pulp and Paper and automotive industrial sub-sectors are driven by SANEDI and the Energy Efficiency Directorate. These sector reports are supported by working with the IEA, United Nations Industrial Development Organization (UNIDO), the Department of Trade Industry and Competition (the dtic) and the National Cleaner Production Centre (NCPC) to support the transition process to a less energy intense economy.

Furthermore, strengthening the technical capacity for public officials and creating opportunities for skills development within the energy sectors addressing inclusive growth, is driven by SANEDI and the Energy Efficiency Directorate's General Budget Support Programme. This programme is expected to reach fruition in 2023. Over a hundred public officials are targeted in extensive training through a collaboration with the University of Pretoria. The training areas cover EE in its broad term, it also addresses EE interventions within wastewater treatment plants and certain classifications of buildings for public or commercial use, based upon the recently issued mandatory Energy Performance Certificates (EPC) by the DMRE.

For the 2022/23 APP, SANEDI will undertake research that would realise Evidence-based planning, resource allocation and decision-making enabled by accurate and timely information, datasets, and data analytics.

## OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS: DATA AND KNOWLEDGE MANAGEMENT

| Outcome | Outputs | Output indicators | ANNUAL TARGETS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Audited performance | | | Estimated Performance | MTEF TARGETS | | |
| | | | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 |
| Evidence-based planning, resource allocation and decision-making enabled by accurate and timely information, datasets and data analytics. | Detailed analytical reports containing data and insights of priority subsectors | Number of Sector Reports produced | New indicator | New indicator | New indicator | 3 | 3 | 2 | 2 |
| An awareness of the technologies to be used in the transition process (for an increasingly aware society on energy transition solutions). | Research publications reflecting clean energy insights. | Number of annual Energy industry status reports (insights, trends, international and national collaboration decisions, interfacing and forums). | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Energy transition expertise and competence building enabled. | Energy Data Research support and development | Number of energy data analytics related research students / contracted researchers supported (e.g., bursaries, non-bursaries, contract opportunities, infrastructure support, etc). | - | - | 0 | 1 | 5 | 5 | 5 |
| | Training provided to recipients | Number of recipients of energy data related training facilitated. | New indicator | New indicator | New indicator | 10 | 20 | 10 | 10 |

## OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS

| Output indicators | Annual Targets | Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|---|
| Number of sector Reports produced | 3 | - | 1 | - | 2 |
| Number of annual Energy industry status reports (insights, trends, international and national collaboration decisions, interfacing and forums). | 1 | - | - | - | 1 |
| Number of recipients of energy data related training facilitated. | 20 | - | - | 20 | |
| Number of energy data analytics related research students / contracted researchers supported (e.g., bursaries, non-bursaries, contract opportunities, infrastructure support, etc). | 5 | - | - | 5 | - |

### 14.2.6 CLEANER MOBILITY SUB-PROGRAMME

By 2050, about 70% of the world's population will live, commute and work in urban areas[3]. Between now and then, cities and suburbs will undergo significant transformations to create sustainable living conditions for their residents. Mobility and energy are the twin pillars of these transformations, and both will require radical adaptation to meet demographic and economic growth without increasing congestion and pollution. Cities will require mobility and energy solutions that are sustainable, affordable, secure, and inclusive, and integrated with customer-centric infrastructure and services. Thus, the convergence of energy and mobility is critical.

These are exciting times in which new technologies allow people to rethink the way they live more sustainably and efficiently. Smart Mobility, Smart Water, Smart Grid, and Smart Integration. These are the foundations of tomorrow's cities, which are being realised today.

Mobility is going to change rapidly in the coming years as EVs proliferate, ride-sharing continues to grow, and eventually Autonomous Vehicles (AV) enter urban fleets. This is especially true in cities where new forms of mobility are concentrated and where investment in supporting infrastructure needs to accommodate this growth. These changes coincide with the evolution towards a cleaner, more decentralized, and digitalized energy systems and services, and increasing electrification.

The Cleaner Mobility Program within SANEDI in collaboration with the Development Bank of Southern Africa (DBSA) and key Stakeholders will conduct a study to assess the feasibility of rolling out electric busses for public transport in the next three years. The project objective is to advance and accelerate large scale roll out of Electric Vehicles (EV's) for public transport system in major Metropolitan areas and will initially comprise two phases, namely feasibility study and demonstration. The feasibility study is funded through the Global Environment Facility (GEF) facility, whilst the demonstration phase with an estimated budget of R 1,7 billion will be funded to a large extent (83%) by Metropolitan municipalities, with GEF expected to provide 17% of project funding.

The Cleaner Mobility program has relied on collaboration with key partners in financial, technical and Government sectors to undertake large scale and high impact projects in the clean mobility sector. Such collaborations will still be critical for the program's success in the short to medium term. The program will intensify efforts to secure more partnerships, particularly in key areas such as financial and technical assistance. The partnerships with entities such as the DBSA, DOT, Municipalities and GEF, to name a few will be strengthened as part of the objective to unlock additional resources towards

3 **WEF, 2018**

infrastructure development projects, for both public transport and private use electric vehicles.

There is an opportunity to design a different future, and reap both environmental and economic benefits with a call to action around the following three principles to be acted upon: -

- **Take a multi-Stakeholder and market-specific approach**: First and foremost, a market-specific approach that considers all relevant Stakeholders should be applied to new mobility patterns with smarter and cleaner energy systems. Energy, mobility, and infrastructure enterprises, along with policymakers, regulators, and urban planners, can collectively define a new paradigm for cities. The paradigm would go beyond today's industry divisions in search of complementary municipal, regional and national policies. The investment and infrastructure to support electric mobility will vary significantly from one place to another, thus, any approach needs to be market specific. Local Stakeholders should plan for electrification while considering local characteristics, especially urban infrastructure and design, the energy system and the culture and patterns of mobility.
- **Prioritise high-use vehicles**. The focus should be on electrifying fleets, taxis, mobility-as-a-service vehicles, and public transport, which will have a greater impact as these represent a higher volume of kilometres travelled. Although personal-use vehicles will likely remain a significant portion of the vehicle stock for many years, they are on the road less than 5% of the time, representing a low volume of overall kilometres driven.
- **Deploy critical charging and refuelling infrastructure today while anticipating the transformation of mobility**. To keep pace with growing demand and to address range-anxiety issues, charging infrastructure is needed, especially along highways, at destination points, and close to public transport hubs. To minimise the risk of stranded investments, future mobility and vehicle ownership patterns should be considered, as some current charging locations (i.e. in apartment buildings, at parking meters along city streets) may not be needed in the future. The infrastructure should be deployed in combination with grid edge technologies, such as decentralised generation, storage, microgrids and Smart buildings and integrated into Smart Grids, to fully exploit the flexibility of EVs while enabling the stability of the energy system. Digitalisation would help simplify and enhance the customer experience, support efficient infrastructure deployment and management as well as enable new services associated with electric, shared, and autonomous mobility. Charging stations can become hubs for Smart City services.

## OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS: CLEANER MOBILITY

| Outcome | Outputs | Output indicators | Annual Targets | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Audited performance | | | Estimated Performance | MTEF targets | | |
| | | | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 |
| Clean Municipal Fleet, Public and Private Transport System. | Cleaner mobility: greening municipal fleet and cleaner transport massification plans. | Number of energy solutions assessed (as confirmed by (i) advisory notes, (ii) feasibility reports, (iii) complete study reports, (iv) case studies, (v) technology roadmaps, and (vi) operational demonstration facilities). | - | - | 1 | 1 | 1 | 1 | 1 |
| | | Annual energy industry insight (trends) publication reflecting insights from extensive international and national collaboration, interfacing and forums. | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | Number of industry roadmaps, sector development plans and industry support tools developed to promote energy related market/industry development. | - | - | - | 1 | 1 | 1 | 1 |
| | | Number of industry knowledge sharing events and platforms hosted to promote energy related market/ industry development. | - | - | - | 1 | 1 | 1 | 1 |
| | | Number of recipients of energy related training facilitated by SANEDI. | - | - | - | 5 | 2 | 3 | 5 |

## OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS

| Output indicators | Annual Targets | Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|---|
| Number of energy solutions assessed (as confirmed by (i) advisory notes, (ii) feasibility reports, (iii) complete study reports, (iv) case studies, (v) technology roadmaps, and (vi) operational demonstration facilities). | 1 | - | - | - | 1 |
| Annual energy industry insight (trends) publication reflecting insights from extensive international and national collaboration, interfacing and forums. | 1 | - | - | - | 1 |
| Number of industry roadmaps, sector development plans and industry support tools developed to promote energy related market/industry development. | 1 | - | - | - | 1 |
| Number of industry knowledge sharing events and platforms hosted to promote energy related market/ industry development. | 1 | - | - | - | 1 |
| Number of recipients of energy related training facilitated by SANEDI. | 2 | - | - | 2 | - |

## 14.3 PROGRAMME 3: ENERGY EFFICIENCY

| PROGRAMME 3 | ENERGY EFFICIENCY |
|---|---|
| **Purpose** | The purpose of Programme 3 is to accelerate a shift towards a resource and particularly, an energy (including gas, liquid fuels, electricity, and water) efficient society. |

Since 2008, South Africa has been experiencing intermittent bouts of load shedding across the country, largely brought about by the demand for energy exceeding the available supply from Eskom at various points in time. Notwithstanding, this serious challenge to the country's economic development, South Africa remains within the top 15 countries with the highest Greenhouse Gas Emissions(GHG) per capita, as a result of the country's dependence on coal for power generation.

To address these two serious national challenges, the EE division at SANEDI plans on undertaking a range of solutions-based activities, which are guided by various Legislative commitments, guidance from the Shareholder, the Department of Mineral Resources and Energy(DMRE) and defined in a formal Memorandum of Understanding (MoU) between SANEDI and the Department, as well as activities identified through SANEDI's own research and strategic planning.

Amongst the key activities planned for the 2022/23 financial year and which are included in this Annual Performance Plan (APP), are highlighted as follows: -

The administration of the Section 12L Energy Efficiency tax incentives on behalf of the DMRE, National Treasury and the South African Revenue Services(SARS), where registered companies can claim a rebate for every unit of energy saved. Although still very significant in the size of rebates claimed (and associated GHG savings), we are expecting a slight decline in the number of applications received, because of companies shifting their focus from EE interventions more towards the installation of Small-scale Embedded Generation(SSEG) technologies, due to the recent increase in licensing threshold to 100MW by the DMRE and The National Energy Regulator of South Africa (NERSA).

Within the activities around SMART public facilities, SANEDI will be hosting and maintaining the National Building Energy Performance Register (NBEPR), as mandated by the Energy Performance Certificate (EPC) Regulations promulgated by the DMRE Minister on 8 December 2019, as well as facilitating the market through several sub-initiatives, such as the re-skilling of 20 unemployed electricians to be able to enter this market and conduct EPC-assessments in commercial buildings. SANEDI is also co-funding the collection of data, analysis of results and the issuing of 20 EPCs in public facilities across all three tiers of Government. SANEDI have also been earmarked to provide a fully funded Monitoring and Evaluation (M & E) facility for an international (V-NAMA) funded 'Energy Efficiency in Public Buildings and Infrastructure Programme (EEPBIP)', also covering facilities in all 3 tiers of Government, as well as State-owned Entities (SoE's).

Furthermore, through the Energy Efficiency Standards and Labelling programme that SANEDI are administering on behalf of the DMRE, it is anticipated that at least one additional technology will be added to the current basket of 12 domestic appliances for which mandatory Minimum Energy Performance Standards (MEPS) already exist. SANEDI is working very closely with multiple public and private sector Stakeholders in this activity, which includes the DTIC, DMRE, SABS, NRCS, manufacturers, retailers, end-users of these technologies, as well as international partners and donor funders.

However, all successful EE programmes worldwide, are reliant on the existence of a robust Energy Service Company (ESCo) market, i.e. companies that focus on and specialize in EE audits and the implementation and financing of EE interventions. In this area, we will be finalizing two extensive World Bank funded studies in the coming financial year, one titled: 'Sustainable Energy Efficiency Sectoral Financing Mechanisms' and an 'ESCo Market Development Strategy for South Africa'. Both these SANEDI-initiated reports are expected to provide a clear strategy to accelerate the uptake of EE in South Africa, whilst potentially creating a platform for significant job creation opportunities for women, youth, and PwDs. This will also increase the number of requisite skills to assist in activities relating to the envisaged Just Energy Transition (JET) in South Africa in the coming years.

Digitalization has been identified by the International Energy Agency (IEA) as one of the key enablers towards a low carbon and EE world and SANEDI has embraced this by securing funding for the Tshwane University of Technology (TUT) to conduct the first-ever Digitalization Impact Assessment for EE in South Africa, due for completion in the 2022/23 financial year, and in support of this on a practical level, SANEDI is administering and maintaining

datasets that can underpin a transition towards a Digital Energy Efficiency industry in South Africa.

SANEDI will furthermore continue to support the establishment of a Cool Roof industry in South Africa, through a transition from pilot and demonstration projects (to increase the number of square meters coated), towards an increase in local economic development by supporting local manufacturing of the coatings, job creation through skills development, and capacity building and product quality control through the development of local product standards and testing facilities.

Lastly, the Section 12L Energy Efficiency tax incentives, the Energy Performance Certificates (EPCs) for buildings and even phase 2 of the Carbon Tax, all require the Inspection Bodies involved in these activities to be accredited by the South African National Accreditation System (SANAS). In leading by example and because of our key role in the successful implementation of the first two legislated activities, SANEDI has initiated a formal process to become SANAS-accredited in these two disciplines within the 2022/23 financial year. The initial aim is to assist the DMRE with the assessment of internal projects such as the Energy Efficiency and Demand Side Management (EEDSM) projects within municipalities and some Government building EPC projects, but this accreditation could assist in potential revenue generation activities by participating in these markets at a future stage.

Over 2022/23 financial year, we will continue to partner with more Stakeholders to confront the climate change battle. Our new strategic vision towards a more sustainable and efficient energy sector is primed to equip and support South Africa's economic transformation, growth, and social development. The EE initiated projects are aiming to:-

- Support businesses with tax incentives to promote and instil a culture of cleaner production and EE in all sectors of the economy through participating applicants from which the projects are derived,
- Achieving the national carbon emissions reduction targets, and
- Maintaining a repository of EE data, readily available to the key Stakeholder (DMRE) for policy formulation and evidence-based decision making.

## OUTCOMES, OUTPUTS, OUTPUT INDICATORS AND TARGETS: ENERGY EFFICIENCY

| Outcome | Outputs | Output indicators | ANNUAL TARGETS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Audited performance | | | Audited performance | AUDITED PERFORMANCE | | |
| | | | 2018/19 | 2019/20 | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 |
| Demonstrated GHG emissions mitigation potential in support of national commitments. | Processed 12L tax applications. | Number of EE solutions implemented. | 1 | 1 | 1 | 15 | 10 | 10 | 10 |
| | | GHG emissions reduced (tonnes $CO_2$). | New indicator | New indicator | New indicator | 1.5 tonnes | 1 tonne | 0 tonnes | 0 tonnes |
| | Smart public facilities (and any other SANEDI driven initiative contributing towards GHG reduction). | Number of EE solutions assessed. | 79 | 56 | 6 | 2 | 3 | 3 | 3 |
| | Minimum Energy performance standards developed. | Number of EE solutions implemented. | New indicator | New indicator | New indicator | New indicator | 1 | 1 | 1 |
| Evidence-based planning, resource allocation and decision-making enabled by accurate and timely information, datasets and data analytics. | EE data sets and information for policy decision making. | Number of EE energy-related datasets maintained per annum. | 1 | 1 | 1 | 3 | 3 | 3 | 3 |
| | ESCO Market Development Strategy. | Number of EE solutions implemented. | New indicator | New indicator | New indicator | New indicator | 1 | - | - |
| Expertise required for the energy transition. | EE capacity created through training. | Number of recipients of energy related training facilitated by SANEDI. | New indicator | New indicator | New indicator | New indicator | 20 | - | - |
| | SANAS accreditation. | SANEDI staff trained in all SANAS accreditation training requirements, including ISO 90001. | New indicator | New indicator | New indicator | New indicator | 3 | 1 | 1 |



## OUTPUT INDICATORS: ANNUAL AND QUARTERLY TARGETS

| Output indicators | Annual targets | Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|---|
| Number of EE solutions implemented. | 11 | - | 4 | 5 | 2 |
| GHG emissions reduced (tonnes $CO_2$). | 1.0 tonne | - | 0.3 tonne | 0,8 tonne, (Cumulative) | 1 tonne, (cumulative) |
| Number of EE solutions assessed. | 3 | - | - | - | 3 |
| Number of EE energy-related datasets maintained per annum. | 3 | - | - | - | 3 |
| Number of recipients of energy related training facilitated by SANEDI. | 20 | 20 | - | - | - |
| SANEDI staff trained in all SANAS accreditation training requirements, including ISO 90001 | 3 | - | 3 | - | - |

# 15. EXPLANATION OF PLANNED PERFORMANCE OVER THE MEDIUM-TERM PERIOD

In developing its strategy, SANEDI has to align with key National Priorities and DMRE focus areas. Its strategy thus seeks to add value and contribute towards specific areas of these priorities. The table below details the alignment of the strategic outcomes to the NDP, MTSF and DMRE priorities.

| OUTCOME | LINK TO NDP | LINK TO MTSF | LINK TO DMRE PRIORITIES |
|---|---|---|---|
| Smart Grid systems Piloted for Smart Cities13 | Chapter 4: Economic infrastructure At least 20 000 MW of this additional generated capacity should come from renewable sources.<br><br>The proportion of people who use public transport for regular commutes will expand significantly. By 2030, public transport will be user friendly, less environmentally damaging, cheaper and integrated or seamless. | Priority 5: Spatial integration, Human Settlements and Local Government<br><br>Smart Cities are equipped with Smart Grid systems using the Smart Cities framework to enhance municipal revenue management, energy asset management and improved demand-response. | Policy, Planning and Clean Energy<br>Smart Cities aim to utilise a cleaner and more efficient energy system with less detriment to the environment. |
| Smart Grid systems Piloted for Smart Cities13. | The concept of Smart Cities is based on cleaner and more efficient energy technologies, offering cleaner and more efficient buildings and transportation. | Priority 2: Economic transformation and job creation<br><br>The move towards Smart Cities will have an impact on the economic outlook of the country through increased access and uptake of ICT, creating new opportunities and improved competitiveness for the country.<br><br>Transport massification in the municipal environment will result in greener municipal fleet. The massification will also result in the introduction of new technologies, creating opportunities for new jobs and business opportunities and innovation in the sector. | Policy, Planning and Clean Energy<br><br>Smart Cities aim to utilise a cleaner and more efficient energy system with less detriment to the environment. |

| OUTCOME | LINK TO NDP | LINK TO MTSF | LINK TO DMRE PRIORITIES |
|---|---|---|---|
| Energy transition expertise and competence building enabled. | Chapter 5: Environmental sustainability and resilience - Zero-emission building standards by 2030<br><br>The drive towards zero emissions starts with identifying and reducing current sources of GHG emissions in our energy systems. | Priority 7: A better Africa and World<br><br>In reducing GHG emissions, South Africa would be aligning itself with goals towards the mitigation of climate change, hence contributing to a better world.<br><br>This will entail developing strategic policy and regulatory frameworks and programmes to promote a low carbon economy. | Policy, Planning and Clean Energy<br><br>Petroleum and Petroleum Products Regulation: The focus will be on strengthening the role of the regional offices in the licensing process, by improving the capabilities in the regional offices and delegating certain functions to the regional offices.<br><br>The DMRE also aims to diversify the country's energy sources and reducing GHG emissions. |
| Demonstrated GHG emissions mitigation potential in support of national commitments. | Chapter 4: Economic infrastructure – the foundation of social and economic development<br><br>Aims to promote: (i) Economic growth and development through adequate investment in energy infrastructure and the provision of quality energy services that are competitively priced, reliable and efficient, and (ii) Environmentally sustainable through efforts to reduce pollution and mitigate the effects of climate change. | Priority 2: Economic transformation and job creation<br><br>Promote a just transition to an environmentally sustainable economy. High impact environmental sustainability research, evidence gathering, and systematic review commissioned.<br><br>Priority 7: A better Africa and World<br><br>Transition towards an environmentally sustainable economy. | Policy, Planning and Clean Energy<br><br>The DMRE aims to foresee the implementation of energy policy interventions, mapping out future power generation technologies. Top of their priorities are diversifying energy sources and reducing GHG emissions. |
| | Chapter 9: Improving education, training and innovation<br><br>Expand science, technology and innovation outputs by increasing research and development spending by the government and through encouraging industry to do so. | Priority 2: Economic transformation and job creation<br><br>Awareness creation to enable investments for inclusive growth, industrialization, localization, exports, and as well as innovation.<br><br>Priority 3: Education, skills and Health<br><br>Address the challenge of poverty across society through providing skills and creating economic opportunities, especially for vulnerable groups. An awareness of clean technologies opens up an opportunity for South Africans to acquire new skills. | |

| OUTCOME | LINK TO NDP | LINK TO MTSF | LINK TO DMRE PRIORITIES |
|---|---|---|---|
| An awareness of the technologies to be used in the transition process (for an increasingly aware society on energy transition solutions). | Chapter 13: Building a capable and developmental State<br>Clear Governance structures and stable leadership enable State-Owned Enterprises (SOEs) to achieve their developmental potential. | Priority 2: Economic transformation and job creation<br><br>Awareness creation to enable investments for inclusive growth, industrialisation, localisation, exports and as well as innovation. | |
| Evidence-based planning, resource allocation and decision making enabled by accurate and timely information, datasets and data analytics. | Chapter 3: Economy and Employment<br><br>Public employment programmes should reach 1- million people by 2015 and 2-million people by 2030.<br><br>Chapter 13: Building a capable and developmental State<br><br>Staff at all levels have the authority, experience, competence and support they need to do their jobs. | Priority 3: Education, skills and Health<br><br>Expanding the high-tech industry by ensuring that the legal and regulatory framework promotes innovation, scaling up skills development for young people in new technologies, and reducing data costs.<br><br>Priority 1: A capable, ethical and developmental State<br><br>Scaling up skills development for young people, women and Government officials in new technologies. | Electrification and Energy Programme and Project Management<br><br>Through economic development initiatives, such as Education Project & Partnerships (EP&Ps), the programme will:<br>Create job possibilities through EP&Ps,<br>Create opportunities for skills development within the energy sector,<br>Re-establish electrical engineering training programmes that support the municipalities' capacity building and poverty alleviation, and<br>Develop small businesses in rural areas that support the mission of rural development. |
| A capacitated, effective and efficient operational environment (within which SANEDI will discharge its mandate) – internal compliance. | Chapter 13: Building a capable and developmental State<br><br>A public service immersed in the development agenda but insulated from undue political interference.<br><br>Clear Governance structures and stable leadership enable SOEs to achieve their developmental potential. | Priority 1: A capable, ethical and developmental State<br><br>Clean administration, accurate and reliable reporting. Strengthening Internal capacity and collaboration with other organs of State. | The Implementation of Best Management Practices<br><br>In support of Government's cost-cutting measures, outlined by the Minister of Finance in his medium-term budget policy statement in 2013, the DMRE has begun and will continue to review and implement internal policies aimed at containing operational costs. |

# 16. PROGRAMME RESOURCE CONSIDERATIONS

## 16.1 STATEMENTS OF HISTORICAL FINANCIAL PERFORMANCE AND POSITION

| Statement of financial perfomance | Budget | Audited outcome | Budget | Audited outcome | Budget | Audited outcome | Budget estimate | Approved budget | Outcome/ Budget Average % | Average growth rate (%) | Expen-diture/ total: Average (%) | Medium-term estimate | | | Average growth rate (%) | Expen-diture/ total: Average (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R thousand | | 2018/19 | | 2019/20 | | 2020/21 | | 2021/22 | | 2018/19-2021/22 | | 2022/23 | 2023/24 | 2024/25 | 2021/22- 2024/25 | |
| Revenue | | | | | | | | | | | | | | | | |
| Tax revenue | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Non-tax revenue | 6 000 | 20 341 | 6 330 | 17 391 | 6 678 | 8 571 | 1 000 | 1 000 | 236,4% | -63,4% | 11,5% | 6 369 | 6 582 | 6 777 | 89,2% | 5,2% |
| Other non-tax revenue | 6 000 | 20 341 | 6 330 | 17 391 | 6 678 | 8 571 | 1 000 | 1 000 | 236,4% | -63,4% | 11,5% | 6 369 | 6 582 | 6 777 | 89,2% | 5,2% |
| Transfers received | 168 031 | 97 099 | 226 084 | 78 942 | 222 963 | 80 471 | 90 905 | 90 905 | 49,1% | -2,2% | 88,5% | 118 812 | 84 233 | 85 038 | -2,2% | 94,8% |
| Total revenue | 174 031 | 117 440 | 232 414 | 96 333 | 229 641 | 89 042 | 91 905 | 91 905 | 54,2% | -7,8% | 100,0% | 125 181 | 90 815 | 91 815 | -0,0% | 100,0% |
| Expenses | | | | | | | | | | | | | | | – | |
| Current expenses | 174 031 | 90 066 | 232 414 | 74 639 | 229 641 | 74 052 | 91 905 | 91 905 | 45,4% | 0,7% | 86,2% | 125 181 | 90 815 | 91 815 | -0,0% | 100,0% |
| Compensation of employees | 50 233 | 36 404 | 50 735 | 38 203 | 51 625 | 36 792 | 43 139 | 43 139 | 79,0% | 5,8% | 40,2% | 45 001 | 46 881 | 49 000 | 4,3% | 47,0% |
| Goods and services | 121 278 | 50 044 | 179 020 | 32 626 | 175 211 | 34 912 | 45 792 | 45 792 | 31,3% | -2,9% | 42,6% | 76 153 | 39 728 | 38 423 | -5,7% | 49,1% |
| Depreciation | 2 520 | 3 617 | 2 659 | 3 810 | 2 805 | 2 348 | 2 974 | 2 974 | 116,3% | -6,3% | 3,4% | 4 026 | 4 207 | 4 392 | 13,9% | 4,0% |
| Transfers and subsidies | – | – | – | – | – | 90 974 | – | – | – | – | 13,8% | – | – | – | – | – |
| Total expenses | 174 031 | 90 066 | 232 414 | 74 639 | 229 641 | 165 026 | 91 905 | 91 905 | 57,9% | 0,7% | 100,0% | 125 181 | 90 815 | 91 815 | -0,0% | 100,0% |
| Surplus/ (Deficit) | – | 27 374 | – | 21 694 | – | (75 984) | – | – | | -100,0% | | – | – | – | – | |

## 16.2 GOODS AND SERVICES DETAILED BREAKDOWN

| | Budget | Audited outcome | Budget | Audited outcome | Budget | Audited outcome | Approved budget | Revised budget estimate | Revised budget estimate | Planning budget estimate |
|---|---|---|---|---|---|---|---|---|---|---|
| Rand thousand | | | | | | | | | | |
| Economic classification | - | - | - | | - | | | | | |
| Goods and services | 121 278 | 50 044 | 179 020 | 32 626 | 175 211 | 34 912 | 45 792 | 76 153 | 39 728 | 38 423 |
| Administrative fees | - | 103 | - | - | - | 465 | - | 426 | 443 | 461 |
| Advertising | - | 82 | - | 1 422 | - | 463 | - | 589 | 589 | 589 |
| Audit costs: External | - | 1 340 | - | 1 087 | - | 898 | - | 1 400 | 1 400 | 1 400 |
| Bursaries: Employees | - | 142 | - | - | - | - | - | - | - | - |
| Catering: Internal activities | - | 137 | - | 194 | - | 18 | - | 46 | 46 | 46 |
| Communication (G&S) | 787 | 2 404 | 850 | - | 879 | - | 862 | 909 | 950 | 1 000 |
| Computer services | 1 660 | 2 721 | 2 172 | 3 431 | 2 274 | 3 119 | 932 | 3 987 | 4 147 | 4 314 |
| Consultants: Business and advisory services | 4 798 | 4 607 | 15 016 | 3 889 | 16 662 | 5 778 | 8 780 | 6 439 | 6 211 | 6 485 |
| Legal services (G&S) | - | - | - | - | - | 1 085 | - | 1 100 | 1 200 | 1 300 |
| Science and technological services | 97 776 | 27 484 | 147 845 | 13 408 | 139 838 | 18 152 | 18 719 | 47 671 | 12 271 | 9 784 |
| Maintenance and repairs of other fixed structures | 886 | 879 | 1 089 | 205 | 1 135 | 451 | 666 | 150 | 156 | 162 |
| Maintenance and repairs of other machinery and equipment | | | | 763 | | | | | | |
| Agency and support/ outsourced services | 5 278 | - | 5 365 | - | 5 548 | - | 5 359 | 3 997 | 3 204 | 3 681 |
| Entertainment | - | 71 | - | - | - | - | - | - | - | - |
| Consumables: Stationery, printing and office supplies | - | - | 370 | - | - | 376 | - | 390 | 400 | 400 |
| Operating leases | 1 796 | 1 438 | 1 894 | 1 301 | 1 957 | 1 185 | 2 074 | 2 188 | 2 287 | 2 287 |
| Travel and subsistence | 4 663 | 4 082 | 5 466 | 2 610 | 4 168 | 367 | 3 556 | 2 361 | 2 091 | 2 153 |
| Training and development | 1 114 | 366 | 1 176 | 499 | 1 228 | 832 | 1 292 | 751 | 785 | 796 |
| Operating payments | 2 520 | 4 049 | (2 672) | 3 434 | 1 112 | 1 662 | 3 243 | 3 421 | 3 256 | 3 259 |
| Venues and facilities | - | 139 | 450 | 383 | 410 | 61 | 310 | 327 | 292 | 305 |

## 16.3 STATEMENTS OF ESTIMATES OF FINANCIAL PERFORMANCE AND POSITION

| Financial position | Budget | Audited outcome | Budget | Audited outcome | Budget | Audited outcome | Budget estimate | Approved budget | Outcome/ Budget Average % | Average growth rate (%) | Net change/ total: Average (%) | Medium-term estimate | | | Average growth rate (%) | Net change/ total: Average (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2018/19 | | 2019/20 | | 2020/21 | | 2021/22 | | | 2018/19-2021/22 | | 2022/23 | 2023/24 | 2024/25 | 2021/22 - 2024/25 | |
| Carrying value of assets | 6 828 | 8 523 | 8 628 | 8 954 | 9 428 | 6 764 | 9 947 | 9 947 | 98,2% | 5,3% | 4,8% | 10 494 | 10 966 | 10 966 | 3,3% | 8,0% |
| *of which:* | | | | | | | | | | | | | | | | |
| *Acquisition of assets* | (1 300) | (5 189) | (1 300) | (4 250) | (1 300) | (1 209) | (527) | (527) | 252,4% | -53,3% | -1,2% | (10 331) | (10 796) | (11 283) | 177,7% | -5,7% |
| Receivables and prepayments | 1 500 | 9 023 | 1 584 | 4 481 | 1 673 | 4 744 | 1 765 | 1 765 | 306,9% | -42,0% | 2,2% | 1 862 | 1 946 | 1 946 | 3,3% | 1,4% |
| Cash and cash equivalents | 76 440 | 229 519 | 80 721 | 249 029 | 85 241 | 260 613 | 89 929 | 89 929 | 249,5% | -26,8% | 93,0% | 364 875 | 99 145 | 99 145 | 3,3% | 90,5% |
| Derivatives financial instruments | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| **Total assets** | **84 768** | **247 065** | **90 933** | **262 464** | **96 342** | **272 121** | **101 640** | **101 640** | **236,4%** | **-25,6%** | **100,0%** | **377 231** | **112 056** | **112 057** | **3,3%** | **100,0%** |
| Accumulated surplus/(deficit) | 6 828 | 210 179 | 8 628 | 231 873 | 9 428 | 155 890 | 9 947 | 9 947 | 1 745,3% | -63,8% | 60,1% | 180 493 | 10 965 | 10 966 | 3,3% | 19,3% |
| Capital and reserves | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Capital reserve fund | 64 816 | 15 872 | 68 445 | 15 513 | 72 279 | 103 411 | 76 254 | 76 254 | 74,9% | 68,7% | 31,3% | 180 448 | 84 068 | 84 068 | 3,3% | 68,2% |
| Borrowings | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Trade and other payables | 5 000 | 12 529 | 5 280 | 4 956 | 5 576 | 7 227 | 5 882 | 5 882 | 140,7% | -22,3% | 3,9% | 6 206 | 6 485 | 6 485 | 3,3% | 4,8% |
| Provisions | 8 124 | 8 485 | 8 579 | 10 122 | 9 059 | 5 593 | 9 558 | 9 558 | 95,6% | 4,0% | 4,7% | 10 083 | 10 537 | 10 537 | 3,3% | 7,7% |
| Total equity and liabilities | 84 768 | 247 065 | 90 932 | 262 464 | 96 342 | 272 121 | 101 641 | 101 641 | 236,4% | -25,6% | 100,0% | 377 230 | 112 056 | 112 056 | 3,3% | 100,0% |

Expenditure for the organisation is linked to the total amount of income the entity can secure for implementation of various projects. As a result, significant fluctuations occur year-on-year. Over the previous medium-term period, SANEDI's actual revenue declined versus the budget, mainly due to a reduction in donor funding secured for new projects. Most projects are funded over a period of two to three years and new funds can only be secured for the next phase once the current phase is completed.

Future projections indicate, and based on our strategy, suggest that in the medium term there will be average increases in expenditure and revenues because of new projects that will be undertaken, and as the entity moves into new phases on some of the existing projects. Specifically, the following projects will have a significant impact on the expenditure estimates:

- The Smart Grids projects,
- Data knowledge Management,
- Energy Efficiency 12 L project,
- Energy Efficient Wastewater treatment,
- Energy Efficiency in Government buildings, and.
- Energy Secretariat.

Cost containment measures will continue to be implemented to contain expenditure. Administrative expenditure related to Programme 1. Governance and Administration, will be expected to increase with inflationary adjustments over the remainder of the medium term as we focus on improving control efficiencies, and automation of data management processes. Administration will account for under 20% of the total expenditure, not considering the compensation of employees. The expectation in the future years will be that compensation of employees will account for over 50% of the total budget at most, around 50% will be for goods and services, apart from the 2022/23 year as we anticipate increased expenditure from the Energy Secretariat and this stabilising subsequently to around 50%. We will also be continuing to implement the organisational review recommendations. Core mandate expenditure relating to Programmes 2 and 3, that is Applied Energy Research and Energy Efficiency, will increase especially under the Energy Secretariat programme.

## 16.4 PERSONNEL INFORMATION

| Salary level | Post status estimated for 31 March 2022 | | Number and cost1 of personnel posts filled/planned for on funded establishment | | | | | | | | | | | | | | Number | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of posts on approved establishment | Number of funded posts | Actual | | | Revised estimates | | | Medium-term expenditure estimate | | | | | | | | Average growth rate (%) | Salary level/ total: Average (%) |
| | | | 2020/21 | | | 2021/22 | | | 2022/23 | | | 2023/24 | | | 2024/25 | | | | |
| | | | Number | Cost | Unit cost | Number | Cost | Unit cost | Number | Cost | Unit cost | Number | Cost | Unit cost | Number | Cost | Unit cost | 2021/22-2024/25 | |
| Salary level | 47 | 47 | 71 | 36 792 | 518 | 47 | 43 139 | 918 | 47 | 45 001 | 957 | 47 | 46 880 | 997 | 47 | 49 000 | 1 043 | 4,3% | 100,0% |
| 1 – 6 | 12 | 12 | 25 | 2 808 | 112 | 12 | 2 843 | 237 | 12 | 2 965 | 247 | 12 | 3 080 | 257 | 12 | 3 219 | 268 | 4,2% | 25,5% |
| 7 – 10 | 14 | 14 | 22 | 10 077 | 458 | 14 | 9 814 | 701 | 14 | 10 238 | 731 | 14 | 10 608 | 758 | 14 | 11 088 | 792 | 4,2% | 29,8% |
| 11 – 12 | 8 | 8 | 10 | 6 775 | 677 | 8 | 7 869 | 984 | 8 | 8 209 | 1 026 | 8 | 8 569 | 1 071 | 8 | 8 956 | 1 119 | 4,4% | 17,0% |
| 13 – 16 | 12 | 12 | 13 | 15 312 | 1 178 | 12 | 19 963 | 1 664 | 12 | 20 825 | 1 735 | 12 | 21 739 | 1 812 | 12 | 22 721 | 1 893 | 4,4% | 25,5% |
| 17 – 22 | 1 | 1 | 1 | 1 819 | 1 819 | 1 | 2 649 | 2 649 | 1 | 2 764 | 2 764 | 1 | 2 885 | 2 885 | 1 | 3 015 | 3 015 | 4,4% | 2,1% |

## 16.5 COMPENSATION OF EMPLOYEES

Employee compensation costs have historically increased by 6%-7%, inflationary increases of around 4% are expected in future. Actual costs amounted to R37 million for the 2020/21 period, as vacancies were filled in both the administrative and technical functions of the entity to cater for new projects. The expectation in future years will be that they will increase to R49 million, mainly because of proposed amendments to SANEDI's operating model following the organisational review that was carried out in 2018.In terms of cost pressures salary account for over 50% of the baseline, SANEDI aims to attract top talent and a highly skilled workforce, the current allocation is underfunded as these resources cannot be recruited given the current base line.

### DETAILED BREAKDOWN FOR EMPLOYEE COSTS

| | Actual | Approved Budget | Revised estimates | | |
|---|---|---|---|---|---|
| | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 |
| Salary level | Cost | Cost | Cost | Cost | Cost |
| Basic | 31 041 | 31 578 | 32 925 | 34 412 | 35 984 |
| Performance bonus | 3 844 | 6 661 | 6 981 | 7 168 | 7 504 |
| Medical Aid cc | 761 | 1 400 | 1 456 | 1 514 | 1 575 |
| Provident & Pension | 1 146 | 3 500 | 3 640 | 3 786 | 3 937 |
| Total | 36 792 | 43 139 | 45 001 | 46 880 | 49 000 |

# 17. KEY RISKS

| OUTCOME | KEY RISKS | RISK MITIGATION |
|---|---|---|
| Number of Smart Grid systems Pilots for Smart Cities. | Lack of coordination between departments and teams,<br>Lack of municipal skills to drive implementation, and<br>Political will to drive change. | Driving the linkages between the current requirements of Local Government and the benefit that Smart Cities will provide (e.g. Smart Grid linkage to the Smart City), and<br>Communicating the business case for Smart Cities. |
| Energy transition expertise and competence building enabled areas of influence. | Limited support and buy-ins from stakeholders and constituents (e.g. municipalities / other Government Departments), and<br>Limited Resources to execute (knowledge, finance, and human resources). | Stakeholder engagement, demonstrable outcomes, Communication, and awareness, and<br>Partnerships and International linkages/ collaborations (knowledge- sharing). |
| Reduction of GHG emissions in line with national commitments. | Lack of funds and investment to drive GHG emission reductions programmes. | Explore alternative funding sources. |
| Create awareness for the solutions to be used in the transition process. | Funding for adequate reach and depth, and<br>Limited participation. | Creating a localised reference case. |
| Evidence-based planning, resource allocation and decision making enabled by accurate and timely information, datasets, and data analytics. | Lack of centralised information to drive evidence-based planning, and<br>Not being able to access relevant stakeholders (not getting Stakeholders to utilise our solutions). | Building ICT capability,<br>Building relationships and partnerships, and<br>Linkage to the DPME. |
| Compliance with legislative and departmental requirements – external compliance. | Inadequate resources to execute. | Explore alternative funding sources and leverage climate funds.<br>Collaborate with partners to collaboratively source funding<br>Actively Pursue funding calls for research projects<br>Pursue commercialisation opportunities where SANEDI can obtain a return on investments made |
| A capacitated, effective, and efficient operational environment (within which SANEDI will discharge its mandate) – internal compliance. | Limited funding and budget allocations.<br>Mandate of SANEDI pertaining to Governance and funding. | Reprioritise projects and re-channel funding to focus on building internal capability,<br>Explore external opportunities for funding capacity building, and<br>Motivate for potential revision of Governance aspects of Section 7 of the NEA. |

| OUTCOME | KEY RISKS | RISK MITIGATION |
|---|---|---|
| A resilient organisation in the face of COVID-19. | Interruption of the service, delivery value chain by COVID-19, including staff, delivery partners, beneficiaries being incapacitated. | Reprioritise projects and re-channel funding to focus on building internal capability,<br>Geographically reprioritise projects away from hotspots for as long as required,<br>Use partners as proxies,<br>Enforce observation of COVID-19 regulations (including PPE) on all SANEDI work and projects,<br>Develop an operational model that responds to COVID-19 (detailing how SANEDI operates and deliver projects in this new environment),<br>Have backup and redundancy solutions (addressing people and systems, MOAs, NDAs) for key functions (considering public sector / private sector service providers), and<br>Review policies and bring them up to date with all updated risks. |
| A resilient organisation in the face of COVID-19. | COVID-19-induced challenges at municipalities necessitating diversion of funds, and reassignment of staff capacity. | In the short term, work with municipalities who are ready and able to work with SANEDI (reprioritisation). |
| A resilient organisation in the face of COVID-19. | National budget cuts and policy changes in response to a prolonged COVID-19 environment. | Explore / review future capital asset investments,<br>Explore possible restructuring of capital investments made,<br>Explore opportunities for cost savings in existing contracts, and<br>Explore opportunities for converting fixed costs to variable costs as much as possible (across the organisation). |

# 18. PUBLIC-PRIVATE PARTNERSHIPS

SANEDI is not currently part of any formal public-private partnerships as defined by South African law. SANEDI does, however, intend pursuing the establishment of such partnerships, particularly with metropolitan councils and municipality involvement. In such a case, a public-private partnership model will be explored to allow the Local Government institution to provide a concession to SANEDI to develop key projects in their jurisdiction. In the case where a private management company is required to operate a facility allocated to SANEDI on a concessional basis, it intends establishing a public-private partnership to manage such a relationship.

# PART D:
# TECHNICAL INDICATOR DESCRIPTIONS (TID)

# 19. PART D: TECHNICAL INDICATOR DESCRIPTIONS (TID)

## 19.1 PROGRAMME 1: PERFORMANCE INDICATORS

### PROGRAMME PERFORMANCE INDICATORS - ADMINISTRATION

| | |
|---|---|
| **INDICATOR TITLE** | Percentage of business risks managed as per Risk Register |
| **SHORT DEFINITION** | This indicator tracks mitigated risks against risks identified in the risk register. |
| **SOURCE/COLLECTION OF DATA** | Risk Register with quarterly action plans reported |
| **METHOD OF CALCULATION** | Number of risks mitigated ÷ number of risks identified per risk register X 100. |
| **METHOD OF VERIFICATION** | Proof of Risk Register with quarterly action plans reported |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieving targets as set in the APP. |
| **INDICATOR RESPONSIBILITY** | Risk Owners identified through the risk register. |

| | |
|---|---|
| **INDICATOR TITLE** | Percentage implementation of Corporate Stakeholder Engagement Plan (CSEP) |
| **SHORT DEFINITION** | This indicator tracks implementation against the corporate stakeholder engagement plan. |
| **SOURCE/COLLECTION OF DATA** | Stakeholder engagement plan, Stakeholder engagement events reports. |
| **METHOD OF CALCULATION** | Number of stakeholder engagement events ÷ by number of stakeholder engagement events planned x 100. |
| **METHOD OF VERIFICATION** | Proof of stakeholder engagements reports |
| **ASSUMPTIONS** | All engagements to be recorded. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve actions as set in the APP. |
| **INDICATOR RESPONSIBILITY** | Communications manager / officer. |

| | |
|---|---|
| **INDICATOR TITLE** | Percentage implementation of Corporate ICT plan in relation to the IT Strategy |
| **SHORT DEFINITION** | This indicator tracks performance implementation of appropriate IT Governance as per the approved ICT plan and strategy. |
| **SOURCE/COLLECTION OF DATA** | ICT activities measures against ICT plan. |
| **METHOD OF CALCULATION** | Number of plans implemented ÷ total number of plans to be implemented X 100. |
| **METHOD OF VERIFICATION** | Proof of ICT activities undertaken |
| **ASSUMPTIONS** | Availability of performance information. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve targets as set in the APP. |
| **INDICATOR RESPONSIBILITY** | IT Manager |

| | |
|---|---|
| **INDICATOR TITLE** | Unqualified Audit Reports for 2022/2033 financial year. |
| **SHORT DEFINITION** | Strengthening of governance to reduce the number of audit findings and obtain clean audit |
| **SOURCE/COLLECTION OF DATA** | Auditor General report |
| **METHOD OF ASSESSMENT** | Audit opinion from external auditors. |
| **METHOD OF VERIFICATION** | Annual report with Auditor General report |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Annually. |
| **DESIRED PERFORMANCE** | Achieve audit opinion as per target set in the APP. |
| **INDICATOR RESPONSIBILITY** | Chief Financial Officer (CFO). |

| | |
|---|---|
| **INDICATOR TITLE** | Percentage of personnel trained as per Annual Training Plan. |
| **SHORT DEFINITION** | This indicator tracks development of skills and competencies against the Workplace Skills Plan. |
| **SOURCE/COLLECTION OF DATA** | HR records of staff training.<br>WSP |
| **METHOD OF CALCULATION** | The number of employees trained as per the WSP ÷ by the number of employees in the organisation X 100. |
| **METHOD OF VERIFICATION** | Training records, attendance records for physical and virtual training. |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieving targets as set in APP for the relevant period. |
| **INDICATOR RESPONSIBILITY** | Responsibility for reporting resides with the HR Manager. |

| | |
|---|---|
| **INDICATOR TITLE** | Vacancy rate of funded positions |
| **SHORT DEFINITION** | To monitor vacancy rate of funded positions. |
| **SOURCE/COLLECTION OF DATA** | Organisation structure, HR records on vacant positions |
| **METHOD OF CALCULATION** | Number of vacancies in the stipulated period ÷ number of funded positions in the organisation X 100. |
| **METHOD OF VERIFICATION** | Proof of funded positions and vacant positions |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieving targets as set in APP. |
| **INDICATOR RESPONSIBILITY** | Human Resources (HR) Manager. |

| | |
|---|---|
| **INDICATOR TITLE** | Percentage deviation from employment equity targets |
| **SHORT DEFINITION** | To track/monitor achievement against SANEDI improved employment equity plan. |
| **SOURCE/COLLECTION OF DATA** | Employment Equity reports. |
| **METHOD OF CALCULATION** | Number of Non-whites ÷ total number of employees x 100 as per the EWSETA plan |
| **METHOD OF VERIFICATION** | Employment Equity reports. |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieving targets as set in the APP. |
| **INDICATOR RESPONSIBILITY** | HR Manager. |

## 19.2 PERFORMANCE INDICATORS

### PROGRAMME PERFORMANCE INDICATORS – CLEANER FOSSIL FUELS

| | |
|---|---|
| **INDICATOR TITLE** | Number of energy solutions assessed (advisory notes, feasibility reports, complete study reports, case studies, technology roadmaps and operational demonstration projects/ facilities). |
| **SHORT DEFINITION** | Assess and/or demonstrate energy solutions for relevance in South Africa. |
| **SOURCE/COLLECTION OF DATA** | As confirmed by (i) Advisory notes, (ii) Feasibility Reports, (iii) Complete Study Reports, (iv) Case studies, (v) Technology Roadmaps, (vi) Operational demonstration facilities/ projects, pilot studies among others, (vii) Business cases, and (viii) Proof of concepts. |
| **METHOD OF CALCULATION** | Count outputs across Cleaner Fossil Fuels |
| **METHOD OF VERIFICATION** | i) Advisory notes, (ii) Feasibility Reports, (iii) Complete Study Reports, (iv) Case studies, (v) Technology Roadmaps, (vi) Operational demonstration facilities/ projects, pilot studies among others, (vii) Business cases, and (viii) Proof of concepts. |
| **ASSUMPTIONS** | Outputs not published or released to the public or intended recipients because of Government moratorium, preference or sensitivity of content. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target or more. |
| **INDICATOR RESPONSIBILITY** | Manager Cleaner Fossil Fuels. |

## PROGRAMME PERFORMANCE INDICATORS – RENEWABLE ENERGY

| | |
|---|---|
| **INDICATOR TITLE** | Number of energy solutions assessed (advisory notes, feasibility reports, complete study reports, case studies, technology roadmaps and operational demonstration projects / facilities) |
| **SHORT DEFINITION** | Assess and/or demonstrate energy solutions for relevance in South Africa. |
| **SOURCE/COLLECTION OF DATA** | As confirmed by (i) Advisory notes, (ii) Feasibility Reports, (iii) Complete Study Reports, (iv) Case studies, (v) Technology Roadmaps, (vi) Operational demonstration facilities/ projects, pilot studies among others, (vii) Business cases, and (viii) Proof of concepts. |
| **METHOD OF CALCULATION** | Count outputs collated across projects within the sub-programme. |
| **METHOD OF VERIFICATION** | i) Advisory notes, (ii) Feasibility Reports, (iii) Complete Study Reports, (iv) Case studies, (v) Technology Roadmaps, (vi) Operational demonstration facilities/ projects, pilot studies among others, (vii) Business cases, and (viii) Proof of concepts. |
| **ASSUMPTIONS** | Sufficient funding provided |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in the APP or more. |
| **INDICATOR RESPONSIBILITY** | General Manager of EE. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of energy-related knowledge sharing events / platforms engaged in (own hosted, attended, knowledge presented, supported) |
| **SHORT DEFINITION** | This indicator tracks the hosting of industry knowledge sharing events and platforms to promote energy-related market/industry development. |
| **SOURCE/COLLECTION OF DATA** | Knowledge sharing events records (registers, recordings, pictures, etc.). |
| **METHOD OF CALCULATION** | Count of knowledge sharing events hosted. |
| **METHOD OF VERIFICATION** | Knowledge sharing events records (registers, recordings, pictures, etc.). |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in the APP or better. |
| **INDICATOR RESPONSIBILITY** | General Manager of EE. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of recipients of energy related training facilitated |
| **SHORT DEFINITION** | This indicator tracks training offered or facilitated by SANEDI to recipients. |
| **SOURCE/COLLECTION OF DATA** | Training records, attendance register, training report, virtual recordings of attendance. |
| **METHOD OF CALCULATION** | Count the number of trainees. |
| **METHOD OF VERIFICATION** | Training records, attendance register, training report, virtual recordings of attendance. |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective general managers / project managers that leads sub-programmes and/or programmes. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of annual Energy industry status reports (insights, trends, international and national collaboration decisions, interfacing and forums). |
| **SHORT DEFINITION** | Annual energy sector insight (trends) publication reflecting insights from extensive international and national collaboration, interfacing and forums produced annually. |
| **SOURCE/COLLECTION OF DATA** | Published industry insight publications. |
| **METHOD OF CALCULATION** | Simple count of reports. |
| **METHOD OF VERIFICATION** | Proof of published industry insight publications |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Annual. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Manager of EE; responsibility for final publication resides with the CEO of SANEDI. |

| | |
|---|---|
| **INDICATOR TITLE** | Minimum number of energy-related datasets maintained per annum |
| **SHORT DEFINITION** | This indicator tracks maintenance (update and expand) of energy-related datasets. |
| **SOURCE/COLLECTION OF DATA** | Datasets |
| **METHOD OF CALCULATION** | Simple count of data sets. |
| **METHOD OF VERIFICATION** | Datasets |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Annual. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | General Manager EE / project managers. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of policy support instruments (industry roadmaps, sector development plans and industry support tools, etc.) |
| **SHORT DEFINITION** | This indicator tracks the development of industry roadmaps, sector development plans, and industry support tools to promote energy-related market/industry development including tools, that enable sector skills development and training for future capacity development in line with policy. |
| **SOURCE/COLLECTION OF DATA** | Industry roadmaps, sector development plans and industry development / support tools, project records. |
| **METHOD OF CALCULATION** | Count outputs across this sub-programme. |
| **METHOD OF VERIFICATION** | Proof of Industry roadmaps, sector development plans and industry development / support tools, project records. |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Annual. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Manager of EE. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of energy-related research students / contracted researchers supported (e.g. bursaries, non-bursaries, contract opportunities, infrastructure support, etc.) |
| **SHORT DEFINITION** | This indicator tracks the number of energy-related students and or contracted researchers supported. |
| **SOURCE/COLLECTION OF DATA** | Energy-related research support records, Bursary records |
| **METHOD OF CALCULATION** | Count number of energy data analytics related research.<br>Count number of post-graduate MSc supported by a SANEDI programme or bursary. |
| **METHOD OF VERIFICATION** | Proof of energy-related researchers support records or bursary records |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Annual. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Manager of EE. |

## PROGRAMME PERFORMANCE INDICATORS – SMART GRIDS

| | |
|---|---|
| **INDICATOR TITLE** | Number of energy solutions assessed (as confirmed by (i) advisory notes, (ii) feasibility reports, (iii) complete study reports, (iv) case studies, (v) technology roadmaps, and (vi) operational demonstration facilities). |
| **SHORT DEFINITION** | To track the number of energy solutions assessed for relevance to local applications. |
| **SOURCE/COLLECTION OF DATA** | (i) Advisory notes, (ii) Feasibility Reports, (iii) Complete Study Reports, (iv) Case studies, (v) Technology Roadmaps, and (vi) Operational demonstration facilities/projects or pilots that document an assessed EE solution. |
| **METHOD OF CALCULATION** | Count of EE solutions assessed. |
| **METHOD OF VERIFICATION** | Proof of (i) Advisory notes, (ii) Feasibility Reports, (iii) Complete Study Reports, (iv) Case studies, (v) Technology Roadmaps, and (vi) Operational demonstration facilities/projects or pilots that document an assessed EE solution. |
| **ASSUMPTIONS** | Outputs not published or released to the public or intended recipients because of Government moratorium, preference, or sensitivity of content. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | General Managers for EE. |

| | |
|---|---|
| **INDICATOR TITLE** | Annual energy industry insight (trends) publication reflecting insights from extensive international and national collaboration, interfacing and forums. |
| **SHORT DEFINITION** | Annual energy sector insight (trends) publication reflecting insights from extensive international and national collaboration, interfacing and forums produced annually. |
| **SOURCE/COLLECTION OF DATA** | Published industry insights publication. |
| **METHOD OF CALCULATION** | Count outputs |
| **METHOD OF VERIFICATION** | Published industry insights |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Annual. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers; responsibility for final publication resides with the CEO of SANEDI. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of industry roadmaps, sector development plans and industry support tools developed to promote energy related market/industry development. |
| **SHORT DEFINITION** | This indicator tracks the development of industry roadmaps, sector development plans, and industry support tools to promote energy-related market/industry development including tools, that enable sector skills development and training for future capacity development in line with policy. |
| **SOURCE/COLLECTION OF DATA** | Industry roadmaps, sector development plans and industry development/ support tools developed. |
| **METHOD OF CALCULATION** | Count outputs across this sub-programme. |
| **METHOD OF VERIFICATION** | Proof of Industry roadmaps, sector development plans and industry development/ support tools |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Annual. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers that lead sub-programmes. |

## PROGRAMME PERFORMANCE INDICATORS – DATA AND KNOWLEDGE MANAGEMENT

| | |
|---|---|
| **INDICATOR TITLE** | Number of Sector Reports produced |
| **SHORT DEFINITION** | This indicator tracks the production of detailed analytical reports containing data and insights for priority energy-related sectors and/or sub-sectors. |
| **SOURCE/COLLECTION OF DATA** | Industrial Energy Efficiency project records, Relevant Economic Classification study articles. |
| **METHOD OF CALCULATION** | Counting of insights identified from each of the sectors. |
| **METHOD OF VERIFICATION** | Sector reports |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers / project managers. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of annual Energy industry status reports (insights, trends, international and national collaboration decisions, interfacing and forums). |
| **SHORT DEFINITION** | This indicator tracks annual energy industry insight (trends) publication reflecting insights from extensive international and national collaboration, interfacing and forums produced annually. |
| **SOURCE/COLLECTION OF DATA** | Published industry insights |
| **METHOD OF CALCULATION** | Simple count of reports. |
| **METHOD OF VERIFICATION** | Published industry insights. |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Annually. |
| **DESIRED PERFORMANCE** | Achieve the stated target in APP. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers / project managers. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of energy data analytics related research students / contracted researchers supported (e.g. bursaries, non-bursaries, contract opportunities, infrastructure support, etc.) |
| **SHORT DEFINITION** | This indicator tracks support for full time energy data research studies through bursaries or non-bursary support. |
| **SOURCE/COLLECTION OF DATA** | Bursary records, non-bursary support records. |
| **METHOD OF CALCULATION** | Simple count of records of energy-related researchers support or bursary records |
| **METHOD OF VERIFICATION** | Proof of energy-related researchers support records or bursary records |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve the stated target in APP. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers / project managers. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of recipients of energy data related training facilitated |
| **SHORT DEFINITION** | This indicator tracks energy data-related training offered or facilitated by SANEDI to recipients. |
| **SOURCE/COLLECTION OF DATA** | Training records, attendance records for physical and virtual training. |
| **METHOD OF CALCULATION** | Counting the number of trainees. |
| **METHOD OF VERIFICATION** | Training records, attendance records for physical and virtual training. |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers / project managers. |

## PROGRAMME PERFORMANCE INDICATORS – CLEANER MOBILITY

| | |
|---|---|
| **INDICATOR TITLE** | Number of energy solutions assessed (as confirmed by (i) advisory notes, (ii) feasibility reports, (iii) complete study reports, (iv) case studies, (v) technology roadmaps, and (vi) operational demonstration facilities). |
| **SHORT DEFINITION** | Assess and/or demonstrate energy solutions for relevance in South Africa. |
| **SOURCE/COLLECTION OF DATA** | (i) Advisory notes, (ii) Feasibility Reports, (iii) Complete Study Reports, (iv) Case studies, (v) Technology Roadmaps, (vi) Operational demonstration facilities/ projects, pilot studies among others, (vii) Business cases, and (viii) Proof of concepts. |
| **METHOD OF CALCULATION** | Count outputs collated across this sub-programme. |
| **METHOD OF VERIFICATION** | (i) Advisory notes, (ii) Feasibility Reports, (iii) Complete Study Reports, (iv) Case studies, (v) Technology Roadmaps, (vi) Operational demonstration facilities/ projects, pilot studies among others, (vii) Business cases, and (viii) Proof of concepts. |
| **ASSUMPTIONS** | Outputs not published or released to the public or intended recipients because of Government moratorium, preference or sensitivity of content. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers of this sub-programme. |

| | |
|---|---|
| **INDICATOR TITLE** | Annual energy industry insight (trends) publication reflecting insights from extensive international and national collaboration, interfacing and forums. |
| **SHORT DEFINITION** | Annual energy industry insight (trends) publication reflecting insights from extensive international and national collaboration, interfacing and forums produced annually. |
| **SOURCE/COLLECTION OF DATA** | Published industry insights. |
| **METHOD OF CALCULATION** | Count outputs. |
| **METHOD OF VERIFICATION** | Published industry insights |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Annual. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers, responsibility for final publication resides with the CEO of SANEDI. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of industry roadmaps, sector development plans and industry support tools developed to promote energy related market/industry development. |
| **SHORT DEFINITION** | This indicator tracks the development of industry roadmaps, sector development plans, and industry support tools to promote energy-related market/industry development including tools, that enable sector skills development and training for future capacity development in line with policy. |
| **SOURCE/COLLECTION OF DATA** | Count of industry roadmaps, sector development plans and industry development/ support tools, developed. |
| **METHOD OF CALCULATION** | Count outputs collated across this sub-programme. |
| **METHOD OF VERIFICATION** | Proof of developed industry roadmaps, sector development plans and industry development/ support tools |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Annual. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers that lead this sub-programme. |

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|---|---|
| **INDICATOR TITLE** | Number of industry knowledge sharing events and platforms hosted to promote energy related market/industry development. |
| **SHORT DEFINITION** | This indicator tracks the hosting of industry knowledge sharing events and platforms to promote energy-related market/industry development |
| **SOURCE/COLLECTION OF DATA** | Knowledge sharing events records. (Registers, recordings, pictures, etc.). |
| **METHOD OF CALCULATION** | Count of knowledge sharing events hosted. |
| **METHOD OF VERIFICATION** | Registers, recordings, pictures of Knowledge sharing events records |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers that lead this sub-programme. |

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|---|---|
| **INDICATOR TITLE** | Number of recipients of energy related training facilitated by SANEDI. |
| **SHORT DEFINITION** | This indicator tracks the training offered or facilitated by SANEDI |
| **SOURCE/COLLECTION OF DATA** | Training records, attendance records for physical and virtual training. |
| **METHOD OF CALCULATION** | Count trainees. |
| **METHOD OF VERIFICATION** | Proof of training records, attendance records for physical and virtual training. |
| **ASSUMPTIONS** | Documented and signed attendance registers.<br>Documented attendance registers, physical and virtual |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | General Managers that leads this sub-programme and/or programmes. |

## 19.3 PROGRAMME 3: ENERGY EFFICIENCY

There are 3 similar output indicators under Energy Efficiency with different outputs, hence there are 3 similar indicator titles under this section. Table below shows different outputs with similar indicator title.

| Output | Indicator Title |
|---|---|
| Processed 12L tax applications. | Number of EE solutions implemented. |
| Minimum Energy performance standards developed | Number of EE solutions implemented. |
| ESCO Market Development Strategy | Number of EE solutions implemented. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of EE solutions implemented |
| **SHORT DEFINITION** | Assess EE solutions for relevance to local applications. |
| **SOURCE/COLLECTION OF DATA** | Section 12L projects fully approved and Tax Certificates issued. |
| **METHOD OF CALCULATION** | Count of EE solutions implemented including Section 12L projects fully approved and Tax Certificates issued. |
| **METHOD OF VERIFICATION** | Proof of approved 12L projects and issued tax certificates |
| **ASSUMPTIONS** | Outputs not published or released to the public or intended recipients because of Government moratorium, preference, or sensitivity of content. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | General Managers for EE. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of EE solutions implemented |
| **SHORT DEFINITION** | Assess EE solutions for relevance to local applications. |
| **SOURCE/COLLECTION OF DATA** | Minimum Energy performance standards developed |
| **METHOD OF CALCULATION** | Count on Minimum Energy performance standards developed |
| **METHOD OF VERIFICATION** | Energy performance standards developed |
| **ASSUMPTIONS** | Outputs not published or released to the public or intended recipients because of Government moratorium, preference, or sensitivity of content. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | General Managers for EE. |

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|---|---|
| **INDICATOR TITLE** | Number of EE solutions implemented |
| **SHORT DEFINITION** | Assess EE solutions for relevance to local applications. |
| **SOURCE/COLLECTION OF DATA** | ESCO Market Development Strategy |
| **METHOD OF CALCULATION** | Count on Minimum Energy performance standards developed |
| **METHOD OF VERIFICATION** | ESCO Market Development Strategy |
| **ASSUMPTIONS** | Outputs not published or released to the public or intended recipients because of Government moratorium, preference, or sensitivity of content. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | General Managers for EE. |

| | |
|---|---|
| **INDICATOR TITLE** | GHG emissions reduced (tonnes CO2). |
| **SHORT DEFINITION** | To track the reduction of GHG emissions as a result of Section 12L projects and Cool surface product application |
| **SOURCE/COLLECTION OF DATA** | Online data repository dedicated for Section 12L tax incentives applications and procurement documents for cool surface |
| **METHOD OF CALCULATION** | Database automatically calculates, using a standard formula and published Emission Factors -Count area coated for cool surface |
| **METHOD OF VERIFICATION** | Online data repository for Section 12L tax incentives applications and procurement documents for cool surface |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | General Managers for EE. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of energy solutions assessed |
| **SHORT DEFINITION** | To track the number of energy solutions assessed for relevance to local applications. |
| **SOURCE/COLLECTION OF DATA** | Completed Reports with Recommendations published |
| **METHOD OF CALCULATION** | Count of EE solutions assessed. |
| **METHOD OF VERIFICATION** | Publication date of reports |
| **ASSUMPTIONS** | Outputs not published or released to the public or intended recipients because of Government moratorium, preference, or sensitivity of content. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | General Manager for EE. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of energy related datasets maintained per annum |
| **SHORT DEFINITION** | This a collection of related sets of information on an excel sheet relevant to particular project/research work or topic or area. |
| **SOURCE/COLLECTION OF DATA** | Datasets developed and maintained. Databases must reflect the reported Outputs Quarterly, Annual and performance from Programme/ Project Inspection. The Database can be Manual (Excel spreadsheet) or from an automated System i.e. the 12L tax incentives online system. |
| **METHOD OF CALCULATION** | Count datasets maintained |
| **METHOD OF VERIFICATION** | Maintained data sets |
| **ASSUMPTIONS** | None. |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | General Managers / project manager that leads this sub-programme and/or programme. |

| | |
|---|---|
| **INDICATOR TITLE** | Number of recipients of energy-related training facilitated by SANEDI |
| **SHORT DEFINITION** | This indicator tracks the training offered or facilitated by SANEDI. |
| **SOURCE/COLLECTION OF DATA** | Training records, attendance records for physical and virtual training. |
| **METHOD OF CALCULATION** | Count trainees. |
| **METHOD OF VERIFICATION** | Proof of training records, attendance records for physical and virtual training |
| **ASSUMPTIONS** | Documented and signed attendance registers.<br>Documented attendance registers, physical and virtual |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers that leads this sub-programme and/or programme. |

| | |
|---|---|
| **INDICATOR TITLE** | SANEDI staff trained in all SANAS accreditation training requirements, including ISO 90001 |
| **SHORT DEFINITION** | This indicator tracks the number of SANEDI staff trained in all SANAS accreditation training requirements including ISO 90001. |
| **SOURCE/COLLECTION OF DATA** | Training records, attendance records for physical and virtual training. |
| **METHOD OF CALCULATION** | Count the number of trainees. |
| **METHOD OF VERIFICATION** | Proof of training records, attendance records for physical and virtual training |
| **REPORTING CYCLE** | Quarterly. |
| **DESIRED PERFORMANCE** | Achieve at least the stated target in APP or better. |
| **INDICATOR RESPONSIBILITY** | Respective General Managers that leads this sub-programme and/or programme. |

# NOTES:

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sanedi
South African National Energy Development Institute

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