



senedi

South African National Energy
Development Institute



STRATEGIC PLAN

2020-2025



ACCOUNTING AUTHORITY'S STATEMENT

With our Annual Performance Plan and Strategic Report (FYI 2020 – 2025), we have endeavoured to align our strategy with the perpetually changing and challenging global environment. Advancements in information technology and increased environmental sensitivity are some of the worldwide movements impacting on today's socio-political and economic trajectory.

It is within this context that we have taken serious consideration as to how South Africa's environment – characterised by economic challenges, rising unemployment and income inequality – impact SANEDI's mandate of delivering energy efficiency and energy research and development.

To this end, and this is outlined in more detail in the Strategic Plan and Annual Performance Plan, SANEDI has adapted three themes that will strengthen and drive our mandate forward. The themes are: climate change and decarbonisation; service delivery within the municipal environment; and information knowledge and technological convergence.

SANEDI has repositioned its focus around these three themes which we believe will play to our existing strengths and expertise in the areas of sustainable energy, renewable energy technologies and smart grids, enabling us to evolve and harness the changing global and local environment.

I invite all our stakeholders to support our newly aligned strategy driven by these three all-important themes. We look forward to an era of energy efficiency and advancements that will solidify the country's growth, benefiting all South Africans.



Mr Nkululeko Buthelezi
Interim Chairperson
SANEDI

CHIEF EXECUTIVE OFFICER'S STATEMENT

The rise of the knowledge-based economy has resulted in the changes in the patterns and level of energy consumption, which subsequently led to shifts in types of fuels and energy technologies available to us. The energy sector is the backbone of the South African economy and SANEDI plays a key role in enabling the country's socio-economic advancement.

SANEDI, an agency of the Department of Mineral Resources and Energy (DMRE), is mandated to direct, monitor and conduct energy research and development, promote applied energy research and technology innovation, as well as undertake measures to promote the uptake of green energy and energy efficiency throughout the economy. Its mission is to use applied and energy research and resource efficiency to develop innovative, integrated solutions that will catalyse growth and prosperity to meet its vision of sustainable living for growth and prosperity in Africa.

SANEDI's focus is mainly on developing innovative, integrated clean energy and resource efficient solutions that aim to catalyse growth and prosperity. As technologies develop and mature, opportunities for innovative energy solutions that can make a meaningful contribution are becoming increasingly relevant to improved energy access and lowering the country's carbon footprint. SANEDI's Working for Energy, Smart Grids, Energy Efficiency, Cleaner Fossil Fuel and Renewable Energy programmes all contribute to energy development and innovation in this area.

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 learnings 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.

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 a number of national and provincial departments to understand possible mitigation actions that would lead to a more efficient and swift deployment of renewable energy in the country.

The Working for Energy programme has focused on developing and demonstrating energy solutions suitable for rural and low income urban and peri urban communities. SANEDI has installed 80 biogas digesters in Gauteng, Limpopo, Eastern Cape and the North West Province. Demonstrated use of clean energy and energy efficiency technologies serve to refine a blueprint that can be applied to communities country wide.

SANEDI, in collaboration with the DMRE, developed and piloted the concept of smart grids in South Africa. The programme in the main focused on Technology as an Enabler for Change in the municipal environment. Municipalities are currently under huge financial pressure largely as a result of poor revenue collection and incorrect tariff designs. The Enhanced Revenue Management projects, piloted in 10 municipalities, was designed to assist municipalities to collect the electricity revenues. For projects that were properly designed and implemented, results have shown that technology can be used to improved revenue collection while also improving the effectiveness and efficiency of the municipalities thereby returning them to sustainability. Lessons learnt from this collaboration have highlighted the role of smart grids and the importance of advanced metering infrastructure (AMI) in solving the Eskom debt crisis.

SANEDI's co-ordination and implementation of the energy efficiency tax incentives (Section 12L and 12I), have produced phenomenal results, both in terms of energy savings and reduction in greenhouse gas

CHIEF EXECUTIVE OFFICER'S STATEMENT [CONTINUED]

emissions; in excess of 19 TWh have been saved and the emission of 18 730 Mega-tonnes of CO₂ has been avoided. Based on the success of this activity over the last five years, National Treasury has decided to extend the Section 12L incentive from January 2020 to January 2022. This also saw the development of various (secure) on-line tools and databases for the processing of these applications, which over the last years have resulted in the establishment of a significant repository of energy efficiency 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 ten countries globally to win an award of \$100 000 in 2019, for accelerated implementation of the initiative in South Africa. The results of this 'boost' award will see SANEDI in the running for the final global prize of \$1 million at the end of 2020.

The Pilot Carbon Dioxide Storage Pilot Project (PCSP) made a major financial gain with the signing of a World Bank grant of \$23 million. It also saw the application of new techniques, not previously available, to analyse existing geological data in the KZN Basin, the outcome of which was the identification of two prospective injection sites. Current work is directed to the characterisation of those two sites. As part of the monitoring programme, the carbon dioxide surface monitoring protocols were developed through field trials at Bongwana natural gas releases; these included atmospheric, soil and water concentrations.

A survey of industry regarding the implementation requirements of the carbon capture and storage (CCS) technology revealed greatest concerns pertained to cost and regulation. Regarding the impact of the carbon tax on carbon capture and storage, it has been shown that the tax at introduction would be insufficient by itself to finance CCS. An appraisal of fossil fuel and renewable energy hybrid systems indicated feasibility. An analysis and appraisal of global carbon capture and utilisation technologies indicated possible commercial application in South Africa. Following these new avenues, a draft update of carbon capture, utilisation and storage in South Africa roadmap has been compiled.

Our local and international co-operation and collaboration has grown stronger and over the period; SANEDI through the Austrian government-supported SOLTRAIN programme has benefited a number of solar thermal initiatives for commercial and industrial applications and building skills to support the growing industry. REEEP, supported by UNIDO, established the energy agriculture platform and has also successfully completed two demonstration initiatives in the !Kheis and Nelson Mandela Bay Metros. These were to improve energy and water efficiencies in municipal water and wastewater infrastructure. Besides saving energy, the solutions also helped the municipalities save water, improve water quality, improve service delivery and realise cost savings.

The Wind Atlas for South Africa (WASA) Programme has completed the countrywide wind mapping and launched the WASA Book. WASA maintains the national wind database. We also identified, through a SAWEP (the UNDP-funded programme) review study on the small-scale wind development sector, scope to enhance growth in this sector and focusing on training and capacity building, as we grow the wind sector SANEDI's Cleaner Mobility programme, with support from UNIDO, has been actively engaging with the Department of Transport 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 and charging batteries using solar PV with good success.

Although we have had great success in attracting funding from external partners, there has been a significant decline in third-party funds available for renewable technologies as a result of policy changes by some international governments and donors who are beginning to focus on countries less developed than

CHIEF EXECUTIVE OFFICER'S STATEMENT [CONTINUED]

South Africa. This decline poses a tremendous threat to SANEDI's funding given its already constrained budget. We are also aware that the challenges faced by the fiscus has led to a general decline in research and development funding. Therefore, we shall be exploring various funding sources.

SANEDI, with the support of the Board, undertook an organisational review process to re-focus its strategic mandate to optimise its impact. To this end, proposed focal areas have been made with proposed concomitant structures. These recommendations will be implemented in this planning period. As an organisation in transition, we shall continue to consolidate our gains and ensure that the envisaged improvements will find expression in sustainability and relevance and also support the organisation's critical role in responding to the strategic outcome areas identified by Government.

In the upcoming strategic framework period, SANEDI's activities are within the framework of the NDP, the seven priorities derived for electoral mandate and the President's State of the Nation Address and other DMRE priorities. Energy research and development of technologies have a role to play towards the sustainability of cities and thus contribute towards economic growth. The outcome of SANEDI's endeavours will demonstrate how smart cities can impact different sectors, leveraging several drivers to improve city living standards and economies. This speaks to the possible interventions SANEDI can have at the municipal and country level.

SANEDI will roll out new 5000 cool surfaces to households in selected municipalities to validate the inexpensive way of improving ambient air quality in buildings, especially the low-income housing, develop the cool surfaces industry and thereby creating jobs in the clean energy space. This project is enabled by the prize of \$100 000 SANEDI won in the Global Coll Roofs Challenge in 2019.

Following the successful implementation of the commercial solar water heating at the Regional Works Unit military base in Limpopo, through our collaboration with Department of Defence, SANEDI and SOLTRAIN will continue to demonstrate the energy saving option for the state institutions in converting conventional water and thermal heating systems and to renewable energy services, thereby reducing the operational cost of running such facilities.

Energy derived from various forms of municipal and industrial wastes is an avenue that SANEDI will be supporting, helping municipalities mitigate greenhouse gas emissions, minimise waste to landfills and diversify energy sources. These interventions will reduce the amount of energy required by municipalities to run waste management plants. Additionally, SANEDI will support SALGA/COGTA with the development and institutionalisation of the Smart Grid Programme as an approach to enable municipal revenue management, introduction of renewable energy and effective service delivery.

Based on the success of the earlier Wind Programme, SANEDI will continue to enable the development of the wind energy in South Africa through mapping and creation of demonstration of small wind projects for complementary energy applications, through the WASA 3 and SAWEP Programmes.

Through the 12L and 12I programmes, SANEDI will continue to support the industry to reduce their energy and carbon intensity through verifiable deployment of renewable energy and energy efficiency initiatives.

Carbon capture utilisation and storage is a low-carbon technology that can facilitate a just transition from fossil fuels to a renewable and nuclear future. SANEDI is currently working with other entities to pilot a carbon dioxide geological storage project as a 'proof of concept' for South Africa as well as to build local capacity. SANEDI is also investigating technologies for the utilisation of carbon dioxide as a feedstock to produce saleable products – a process that can use renewable energy. This technology can overcome one of the problems associated with renewable energy, namely storage.

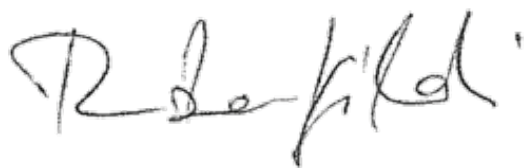
CHIEF EXECUTIVE OFFICER'S STATEMENT [CONTINUED]

Through demonstrated clean energy initiatives, SANEDI will support the SETAs and Incubators to enable the development of Skilled SMME in the clean energy sector.

In conclusion, I am pleased to present this Strategic Plan, which was drafted with inputs from the Board and some stakeholders, 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 reforming national policy. 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.

I would like to take this opportunity to thank the Department of Mineral Resources and Energy and the SANEDI Board for their ongoing support and strategic direction as well as guidance. Last but not least, a special thanks to the entire SANEDI team for their passion, hard work and their continued commitment to the success of the organisation. I am certain that they are ready and inspired to meet the delivery challenges of the next five years.



Dr Thembakazi Mali
Interim Chief Executive Officer
SANEDI

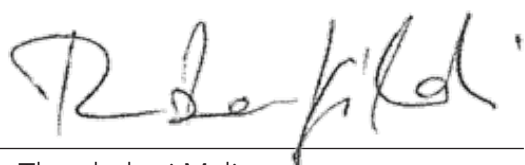
OFFICIAL SIGN-OFF

It is hereby certified that this Strategic Plan:

1. Was developed by the management of the SANEDI under the guidance of the Board
2. Considers all the relevant policies, legislation and other mandates for which the SANEDI is responsible.
3. Accurately reflects the impact, outcomes and outputs which the SANEDI will endeavour to achieve over the period 2020-2025.



Lethabo Manamela
Chief Financial Officer
Date: 31 January 2020



Dr Thembakazi Mali
Interim Chief Executive Officer
Date: 31 January 2020



Nkululeko Buthelezi
Interim Chairperson of the Board
Date: 31 January 2020

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LIST OF ACRONYMS

Acronym	Description
4IR	Fourth Industrial Revolution
BARC	Board Audit and Risk Committee
BRICS	Brazil, Russia, India, China and South Africa
CCUS	Carbon Capture Utilisation and Storage
CEO	Chief Executive Officer
CO ₂	Carbon Dioxide
DoE	Department of Energy
Dx	Distribution
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortisation
EE	Energy Efficiency
EV	Electric Vehicles
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GMO	Genetically Modified Organisms
ICT	Information Communications and Technology
IoT	Internet of Things
IPAP	Industrial Policy Action Plan
KPI	Key Performance Indicator
kWh	Kilowatt Hour
LCOE	Levelised Cost of Electricity
M&E	Monitoring and Evaluation
MTEF	Medium Term Expenditure Framework
MTSF	Medium Term Strategic Framework
MW	Megawatt
NDP	National Development Plan
NEA	National Energy Act
NSDF	National Spatial Development Plan
OECD	Organisation for Economic Co-operation and Development
OEM	Original Equipment Manufacturer
PM	Particulate Matter
R&D	Research and Development
REMC _o	Remuneration Committee
SA	South Africa
SANEDI	South African National Energy Development Institute
SCM	Supply Chain Management
SDBIP	Service Delivery and Budget Implementation Plan
SEP	Stakeholder Engagement Plan
SOE	State Owned Entity
SOLTRAIN	Southern African Solar Thermal Training & Demonstration Initiative
SWOT	Strengths Weaknesses Opportunities and Threats
Tx	Transmission

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.^[1] It is in this environment – both with significant opportunities and threats – that SANEDI must discharge its mandate of delivering energy efficiency and energy research and development.

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. These themes include:

- **Climate Change and Decarbonisation.** South Africa has a requirement to comply with certain international targets so that we have the licence to operate on a global scale. 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.** Municipalities are cumulatively owed R184.7bn (consumer debt), while municipalities owe Eskom and the Water Boards in excess of R100bn¹ (as of end FY17). In addition, there are significant challenges faced by the municipalities to maintain their distribution networks, resulting in additional losses while delivering on universal access objectives and integrating new distributed technologies. Through smart grids, electric mobility, revenue and asset management and energy efficiency 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.

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.
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.

SANEDI's expertise and demonstrated experience in the areas of energy efficiency, renewable energy technologies and smart grids 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.

[1] National Treasury, *Towards an Economic Strategy for SA, 2019*
1 StatsSA, *four facts about municipal debt, 2016/17 FY, Published June 26 2018*

EXECUTIVE SUMMARY [CONTINUED]

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 smart grids 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

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 state is highlighted in the image below and was considered as a key feature in the development of the Strategy.

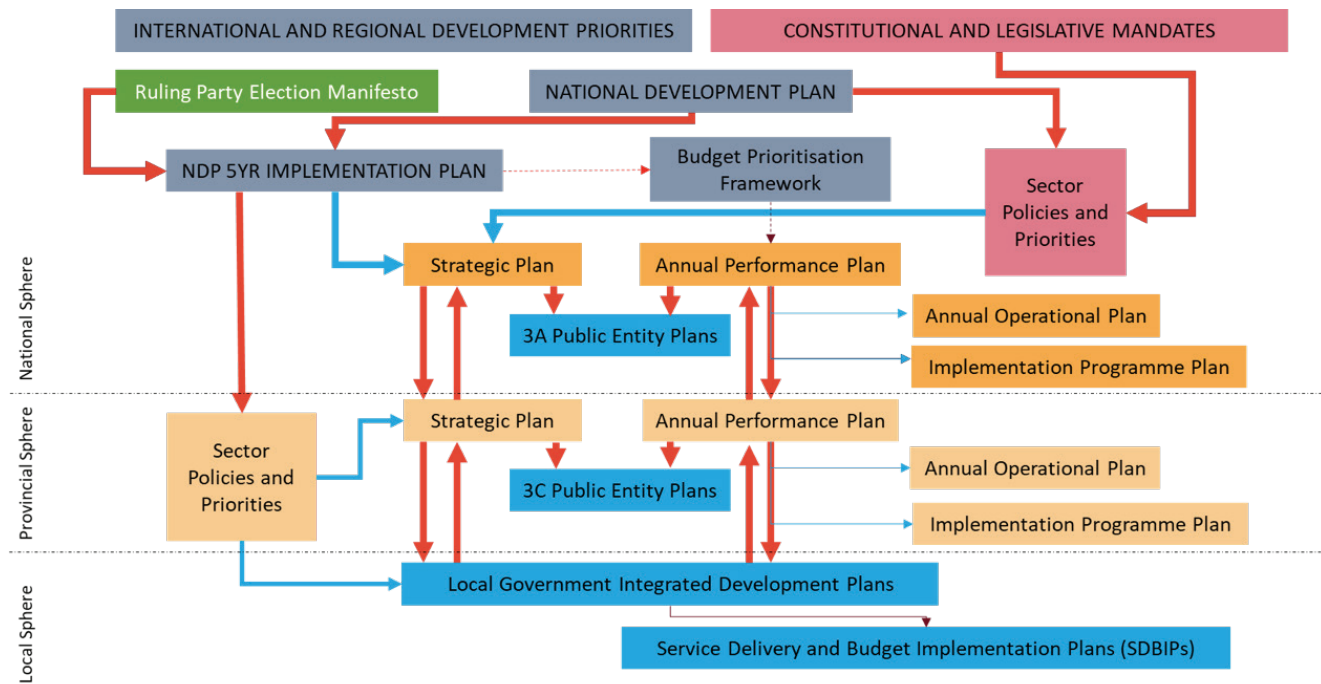


Figure 1: Context for Strategic Alignment

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 energy efficiency in the field of energy (other than nuclear energy) – thereby improving the overall energy landscape within the country.

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

- 1) Chapter 2, The Bill of Rights, where:
 - a. Everyone has the right to an environment that is not harmful to their health or well-being. Thus we must:
 - i. prevent pollution and ecological degradation;
 - ii. promote conservation; and
 - iii. 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 concerning municipalities and the issue of local government matters related to:
 - a. 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.

OUR MANDATE [CONTINUED]

2. LEGISLATIVE AND POLICY MANDATES

As a Schedule 3A State-Owned entity, 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:

	Values	Operating Principles
SANEDI's Legislative Mandate	<ul style="list-style-type: none"> • Undertake energy efficiency measures as directed by the Minister • Increase energy efficiency throughout the economy • Increase the gross domestic product per unit of energy consumed • Optimise the utilisation of finite energy resources 	<ul style="list-style-type: none"> • Direct, monitor, conduct, and implement energy research and technology in all fields of energy, other than nuclear energy • Promote energy research and technology innovation • Provide for: <ul style="list-style-type: none"> - Training and development in the field of energy research and technology development - Establishment and expansion of industries in the field of energy - Commercialisation of energy technologies resulting from energy research and development 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 research, development and innovation • Undertake any other energy technology development related activity as directed by the Minister, with concurrence of the Minister of Science and Technology • Promote relevant energy research through co-operation with any entity, institution or person equipped with the relevant 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 • Advise the Minister and the Minister of Science and Technology on research in the field of energy technology

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)

OUR MANDATE [CONTINUED]

- 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

3. 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 the 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
- iii. Pillar 3: Capable State

With the following themes cutting across all three pillars:

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

Furthermore, the seven key priorities for the government were considered and are:

- 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
- vii. A better Africa and World

As energy is central to socioeconomic development and the growth of a country – SANEDI has a defined and clear role to assist in the achievement of the national priorities.

4. RELEVANT COURT RULINGS

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



PART B: OUR STRATEGIC FOCUS

OUR STRATEGIC FOCUS

5. VISION

Sustainable energy for growth and prosperity in Africa

6. 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

7. 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

8. SITUATIONAL ANALYSIS

SANEDI has adopted the Revised Framework for Strategic Plans and Annual Performance plans 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 document.

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 on 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, as highlighted on the next page.

OUR STRATEGIC FOCUS [CONTINUED]

Strengths	Weaknesses
<ul style="list-style-type: none"> Leveraging fiscal funding through partnerships for much larger reach and impact Sound governance structures supported by robust systems and processes (clean audits) Technical expertise at top and middle management level Demonstration capacity (energy solution deployment at pilot level) Continued refinement of applied research prototype Established national and international partnerships Unique position in the energy R&D value chain in South Africa 	<ul style="list-style-type: none"> Large share of operational budget from project funding, offering limited job security, career development, does not easily attract and retain employees. Lack of clarity in SANEDI's role and strategic direction Ineffectual stakeholder relationships Broad mandate not aligned to available resources Perceived lack of visibility An internal structure that enables compliance at the cost of performance Translating research and development concepts into funded projects
Opportunities	Threats
<ul style="list-style-type: none"> Socio-economic growth and sustainability requires innovative clean energy solutions Increasing interest in the renewable energy and energy efficient sectors Need for a just transition to sustainable energy paradigm Alternative revenue generation through consulting and advisory Untapped opportunities across the R&D value chain Partnerships within key players across the value chain Interfacing government and the private sector Alignment with National Treasury priorities to harness government funding 	<ul style="list-style-type: none"> Inadequate value proposition Competition with the sector from other research entities and project partners that are funded Funder processes create challenges in accessing "green climate" funding Duplication of efforts with other institutions Reduced interest from foreign investors/donors Political alignment and support Lack of technical skills pipeline Processes that are associated with green climate funding making access difficult

Figure 3: SANEDI SWOT Analysis

8.1. External Environment Analysis

Socio-environmental issues currently dominate the global discourse. The effect of climate change is evident across the world, forcing political, economic and technological shifts. Global consensus, international accords and treaties, national policies and incentives spurred by a more demanding populace has created a snowball effect that has dramatically altered the energy landscape over the past 10 – 15 years. This shift has seen a movement away from fossil fuels and coal towards more renewable technologies, as well as gas.

Amid such transition, several megatrends present 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.

8.1.1. Global Macro Trends

Socio-environmental issues currently dominate the global discourse. The effect of climate change: "Mega Trends are transformative, global forces that define the future world with their far-reaching impacts on businesses, societies, economies, cultures, and personal lives." *Frost and Sullivan (2016)*. Several global trends are influencing the way markets to operate and thereby impacting global dynamics themselves. Technology and the impact of technology is driving much of these trends, while environmental and energy-related concerns, as well as socio-economic and geo-political factors, pose uncertainty.

However, a key theme that underpins all the trends, and which is therefore one of the mega trends, is the increasing convergence between industries and sectors through technology and its integrative power. Figure 4 shows a selection of trends and their impact. Note, these are global trends, which finds varying degrees of relevance within the South African context.

OUR STRATEGIC FOCUS [CONTINUED]

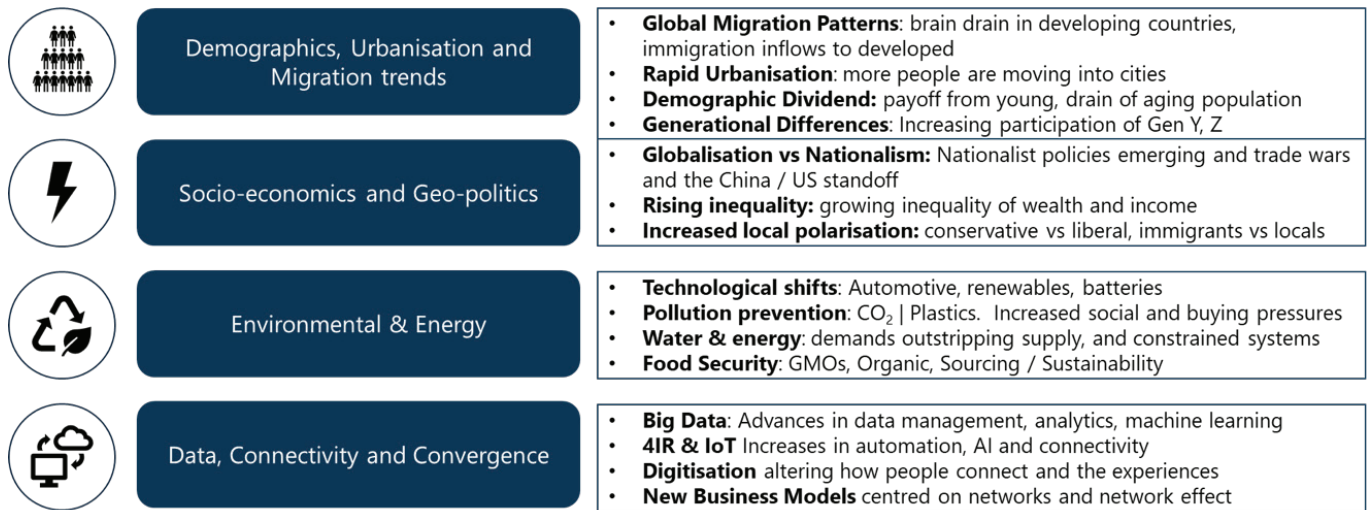


Figure 4: Global Mega Trends

8.1.1.1. Global urbanisation

Frost and Sullivan (2019) rated urbanisation as one mega trend that will have the highest degree of impact on the worldwide economy. With cities contributing about 80% towards a country's GDP, the rapid increase in urban population will impact the outlook of energy demand. About 55% of the world population currently lives in cities, with the number set to reach 68% in 2050. According to Deloitte (2017), cities account for more than 70% of global greenhouse gas emissions and use two-thirds of the world's energy. This calls for special focus on the transformation of cities to sustainable environments that can cater to their growing population. SANEDI is suitably positioned to make a valuable contribution towards defining the South African cities of the future in line with energy demand and energy efficiency. Figure 5 shows that South Africa will have about 80% of its people living in urban areas by 2050, a number above both the global and African averages. This further amplifies the urgent need for South Africa to put particular focus on the sustainability of its cities and urban areas, in light of the transformation in the energy sector.

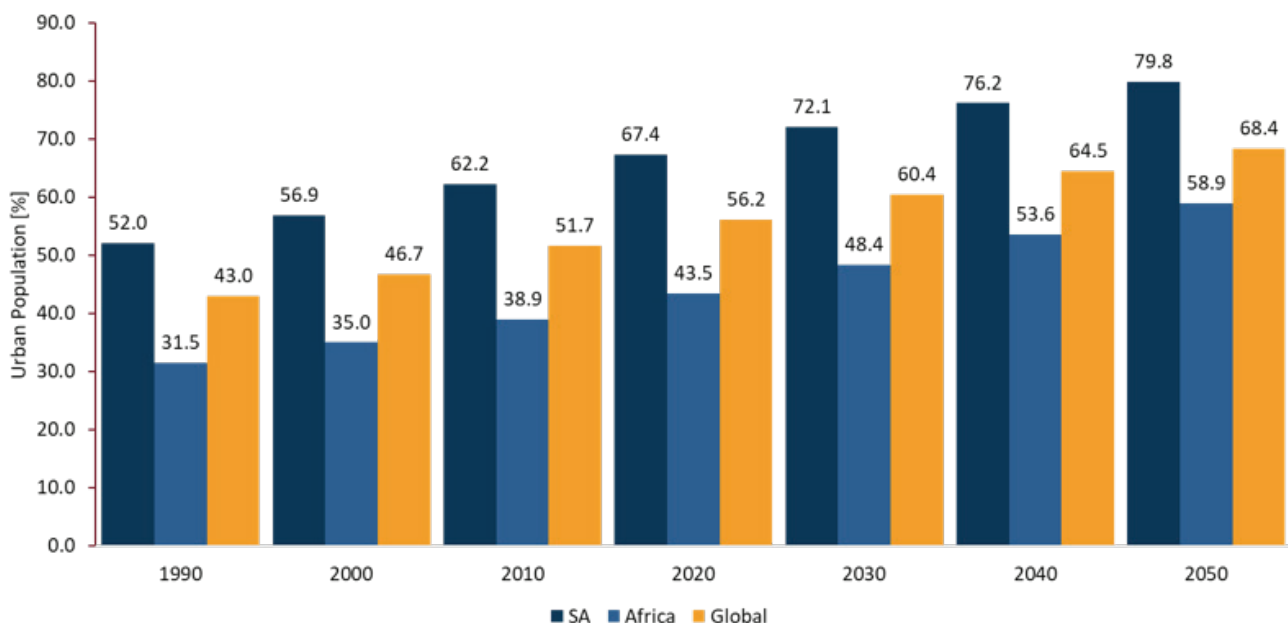


Figure 5: Global Urban Population Historical Trend and Forecast

OUR STRATEGIC FOCUS [CONTINUED]

8.1.1.2. 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 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.

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 has 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 4IR, as highlighted in our national priorities.

A smart city uses information and communications technology (ICT) to enhance its liveability, workability and sustainability. In simplest terms, there are three parts to that job: collecting, communicating and 'crunching'. First, a smart city collects information about itself through sensors, other devices and existing systems. Next, it communicates that data using wired or wireless networks. Third, it 'crunches' (analyses) that data to understand what's happening now and what's likely to happen next.²

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. This concept is further articulated in Section 8.1.3 below.

8.1.1.3. 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. According to the BP Energy Outlook (2018), demand will continue to grow, with global energy consumption set to increase by approximately 30% by 2040. Africa's energy consumption remains small relative to its size: in 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.

² Smart Cities, India Readiness Guide, 2016, Smart Cities Council

OUR STRATEGIC FOCUS [CONTINUED]

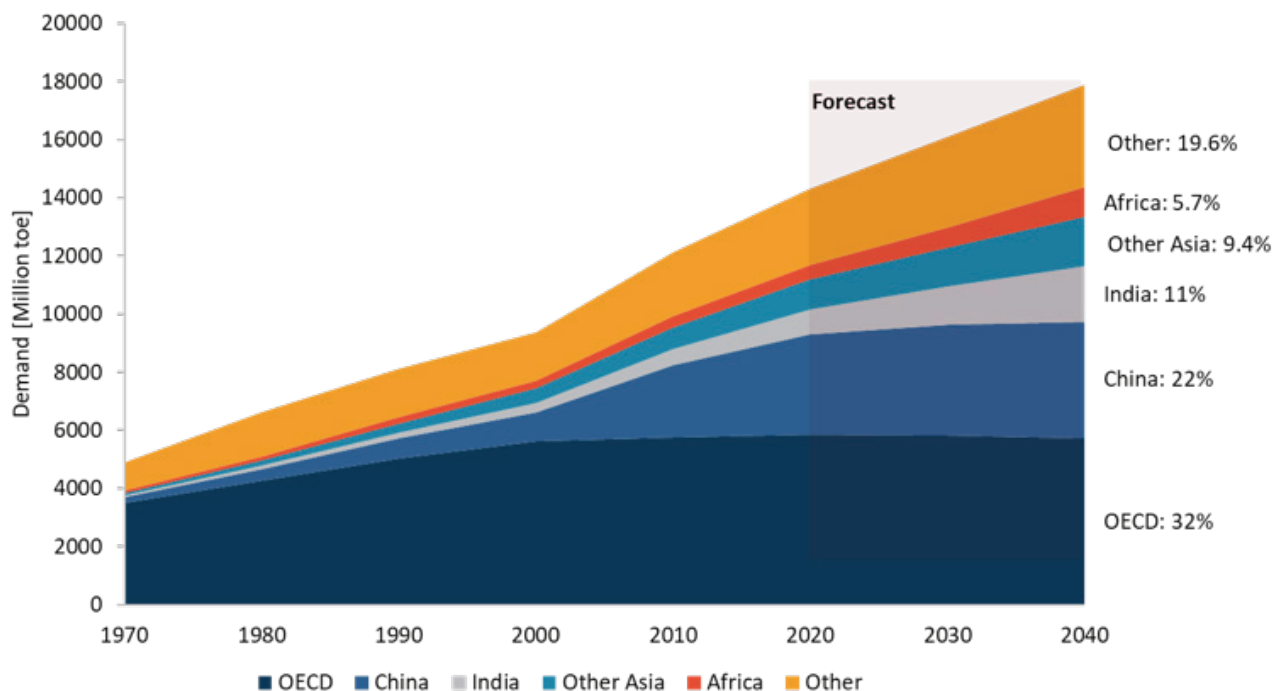


Figure 6: Global Energy Demand by Region³

Global energy consumption appears to be well-spread between the different sectors. Figure 7 shows that energy consumption by residential buildings and transport jointly contribute about half (51.3%) of energy consumption. This projection is directly linked to the growing urban population, which increases the energy demand and use in cities within these sectors.

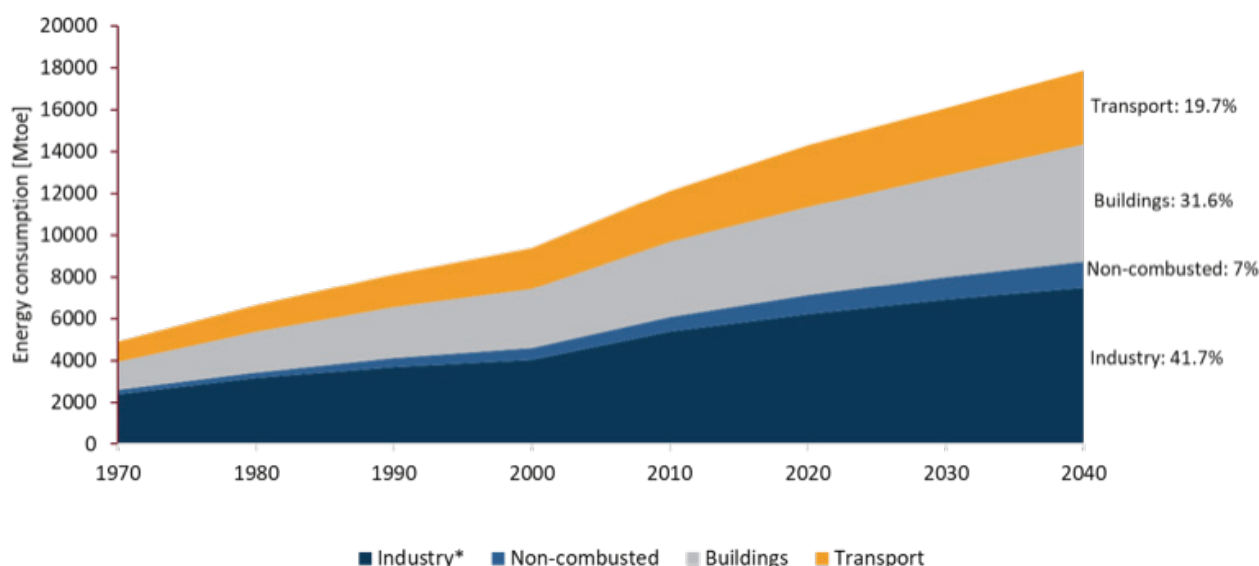


Figure 7: Energy Consumption by Sector

OUR STRATEGIC FOCUS [CONTINUED]

The figure 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. These outcomes are energy-intensive and provide an impetus to drive towards energy efficiency.

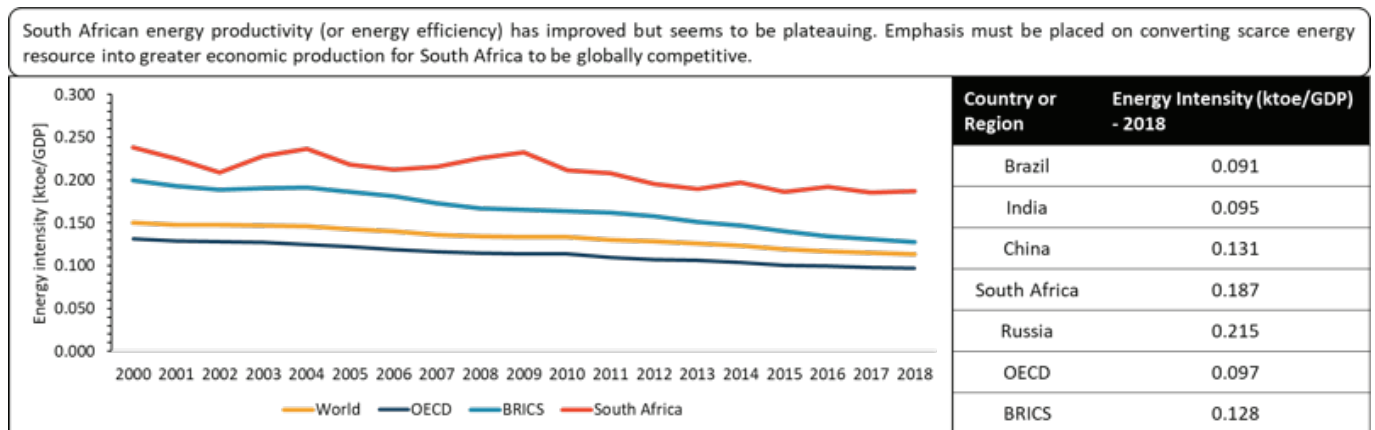


Figure 8: Global and Regional Energy Intensity⁵

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

Country or Region	Carbon Intensity (ktCO ₂ /GDP) - 2018
Brazil	0.132
India	0.232
China	0.393
South Africa	0.574
Russia	0.471
OECD	0.217
BRICS	0.345

Table 2: 2018 Carbon Intensity

8.1.1.4. 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 renewable energy 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 REIPP 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.

⁴ Energy intensity is defined as the amount of energy required in kilotons of oil equivalents to produce 1 unit of GDP

⁵ Enerdata Energy Statistical Yearbook 2019

OUR STRATEGIC FOCUS [CONTINUED]

Drivers for RE Market Uptake

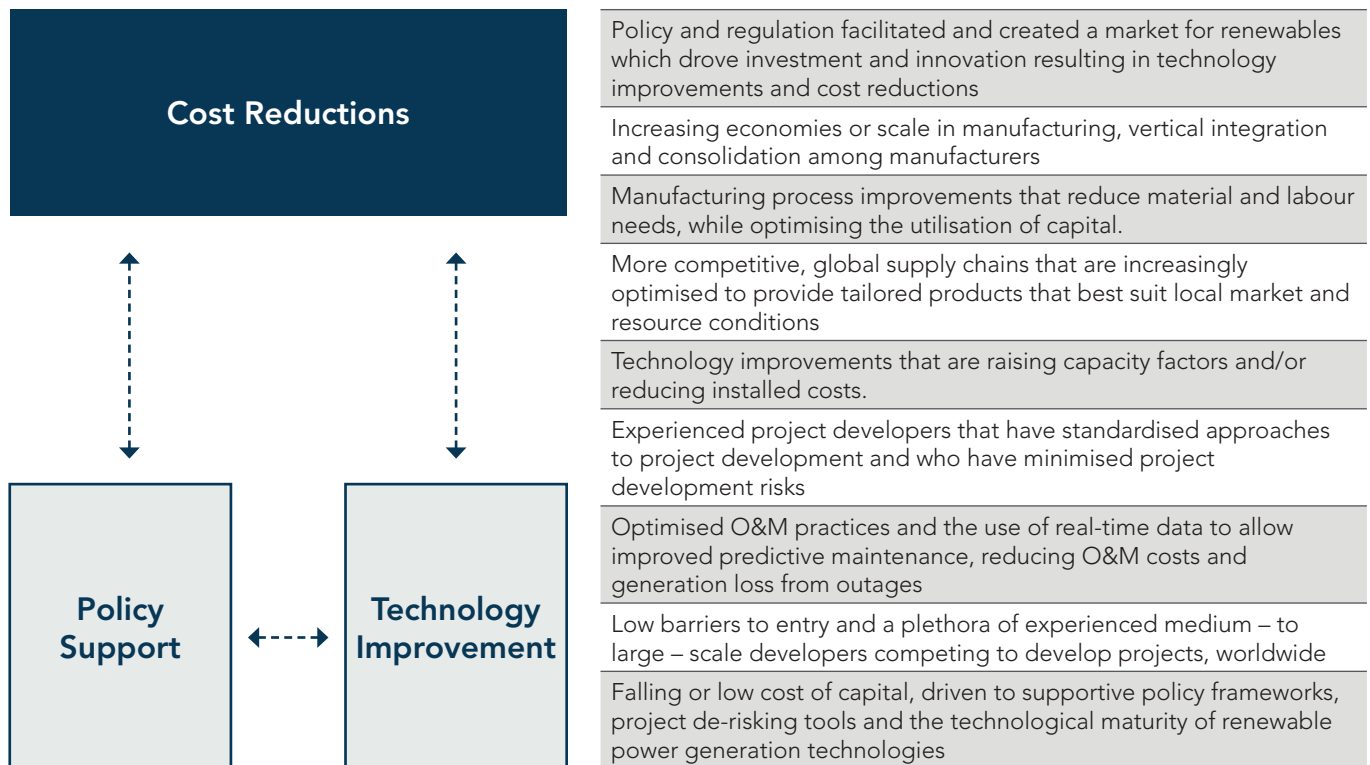
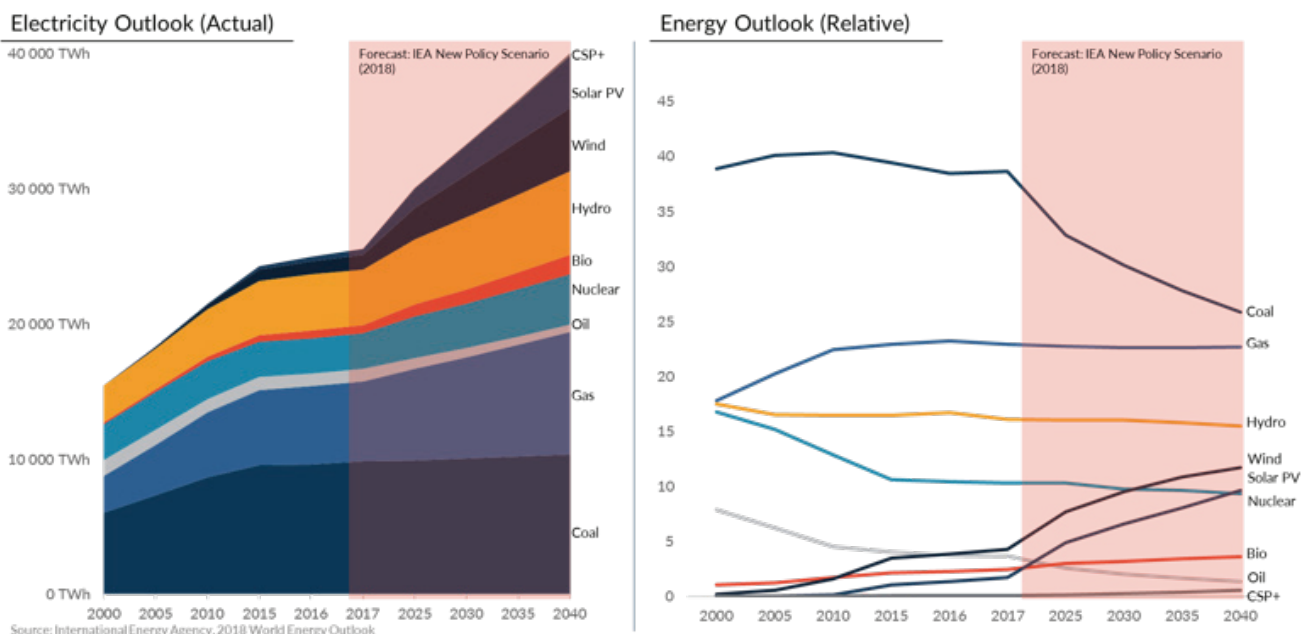


Figure 9: Drivers for Uptake

It must be clear, that policy plays a crucial role in driving technological improvements which facilitates cost reductions and drives 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



OUR STRATEGIC FOCUS [CONTINUED]

The figure below shows the level of improvement in the Levelised Cost of Electricity (LCOE) for renewables; in particular: Photovoltaics, Concentrated Solar Power and Wind (both offshore and onshore). This has enhanced the feasibility of renewable energy projects and promulgated the increased market share of renewable energy globally. Key challenges around renewables are intermittent and unreliable production schedules for baseload requirements. Energy storage solutions for renewables raise the LCOE for renewables significantly in comparison to fossil fuel alternatives – providing areas of opportunity from a technology development perspective.

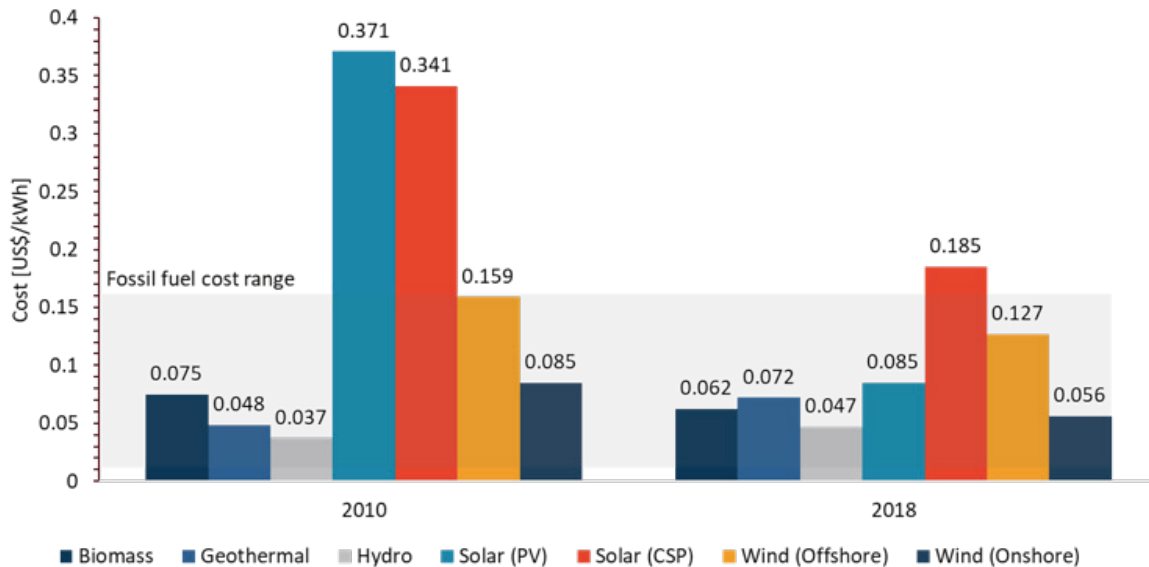


Figure 11: Improving Renewable Energy Costs⁶

8.1.1.5. 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 carbon dioxide into the atmosphere that leads to global climate change.

To address climate change, the United Nations Framework Convention for Climate Change (UNFCCC) was established. South Africa is a Party to the UNFCCC and also a Party to the Kyoto Protocol that established CO₂ emission reduction targets.

The South African President stated at the Copenhagen Conference of Parties of the UNFCCC that South Africa would increase its CO₂ emissions until the mid-2020s, plateau for 10 years and then decrease in real terms from the mid-2030s. Consequently, mitigating CO₂ emissions has become a crucial factor in national energy strategy. The modalities of achieving such mitigations include:

- Carbon Capture Utilisation and Storage
- Renewable energies
- Energy Efficiency Measures
- Nuclear Energy (not a SANEDI mandate)

The first three are being addressed by SANEDI.

⁶ IRENA Renewable Energy Costs 2018

OUR STRATEGIC FOCUS [CONTINUED]

Consumer patterns continue drive market demand. Consumer behaviour trends are shifting as younger 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 and so forth.

Tesla Inc. is a brand which initiated the trend towards electrical vehicles (EVs). Tesla lead US car sales in the second quarter of 2019 within the small and midsize luxury car market⁷. The development and growth of the company has signaled 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 traveled between charges while reducing the cost per unit energy storage. EV adoption requires effective 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
- Sustainability

The figure below indicates the growing demand and production of EVs by Tesla Inc. 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.

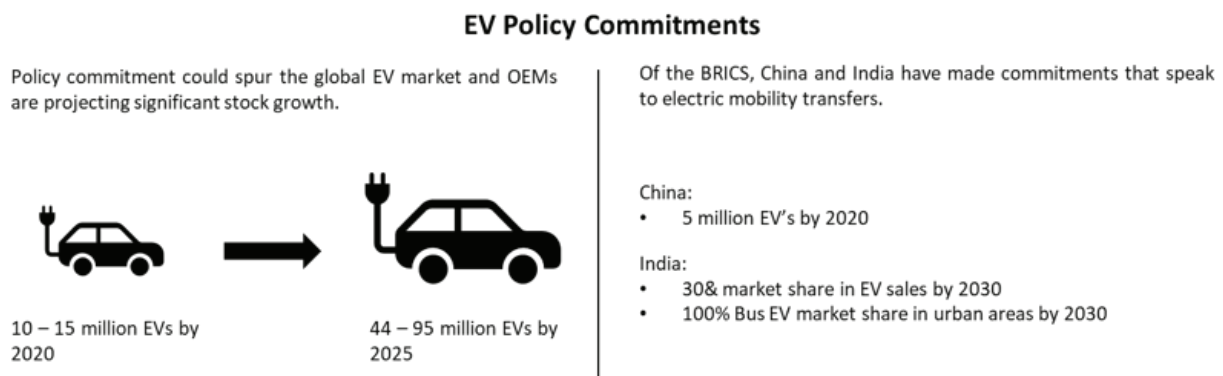
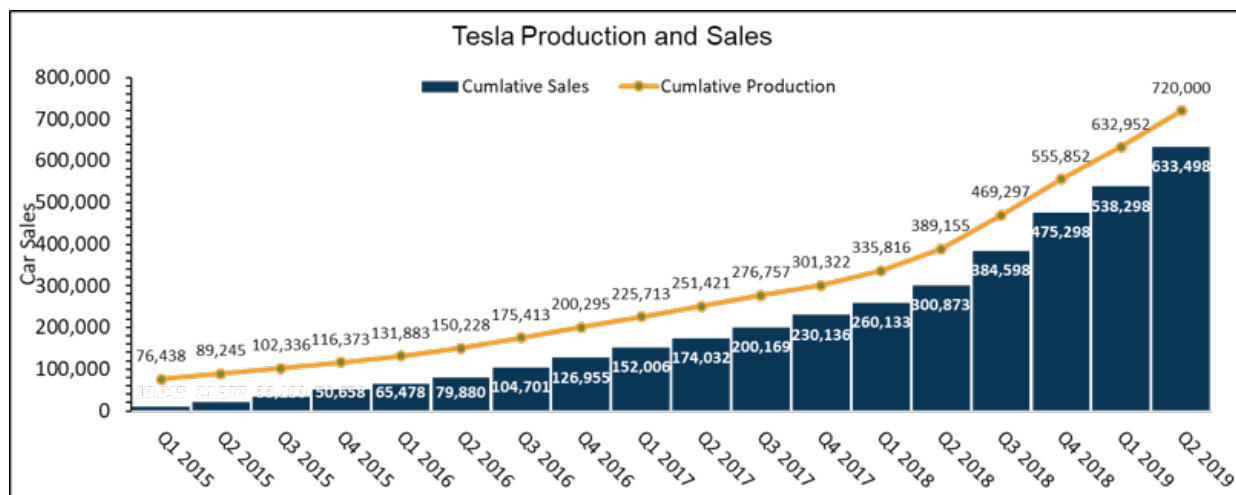


Figure 12: Global EV Market Potential

OUR STRATEGIC FOCUS [CONTINUED]

8.1.2. The SA Economy

8.1.2.1. Macro-economic Issues

The strategy comes at a time where South African sovereign debt must maintain high return levels to attract foreign investment due to lower credit ratings. Two out the three prominent international rating agencies have rated our sovereign debt at below investment grade, namely Fitch and Standard & Poor. The figure below indicates the slowing of GDP growth and the stagnation of GDP per capita.

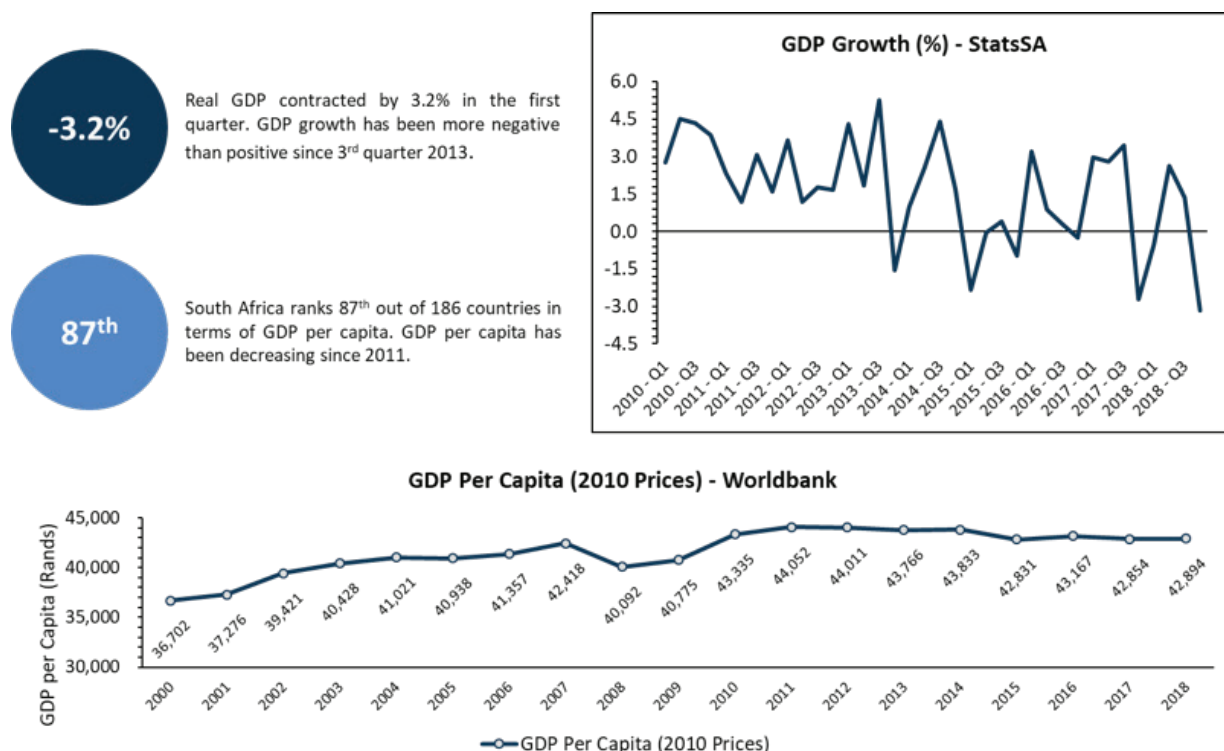


Figure 13: GDP statistics⁸

Unemployment continues to grow, currently at 29% by the official count. Youth unemployment sits at 56%, a rate that is among the highest in the world. Moreover, in 2014, South Africa had the highest level of inequality among 74 countries according to World Bank Gini Index estimates.

Economic transformation in terms of B-BBEE and poverty alleviation is enabled by strong and consistent economic growth. Thus, economic growth is a high priority outcome that has achieved consistent focus in terms of the NDP although performance has been lacking due to various local and international factors.

The debt-to-GDP ratio of the country has grown significantly over the past decade as underperforming SOEs have placed an increasing burden on the fiscus. Eskom is a significant SOE both in terms of scope and financials within the South African economy. It supplies 95% of South Africa's electricity with 92% of the electricity being generated from coal. Eskom's 2019 integrated report indicated an organisation with a significantly leveraged financial position leading to interest expenses that are higher than EBITDA resulting in Eskom's highest reported net loss in its history. Added to that is the fact that 41% of Eskom's sales are to municipalities who currently have a combined arrears of R19 billion. The grave situation with the SOE has promulgated the appointment of a Chief Restructuring Officer who must, among other priorities, transition Eskom into separate entities that focus on Generation, Transmission, and Distribution respectively. This will have significant impact on, not only the structure of Eskom, but the local energy landscape as well.

⁸ World Bank Data, 2019

OUR STRATEGIC FOCUS [CONTINUED]

8.1.2.2. 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 debts to Eskom with no improvement. This is certainly a large factor in the extent of Eskom's R440Bn debt that itself provides a key risk to our current sovereign debt issue. Table 3 shows the extent of the municipal debt. Moreover, only 18 out of 257 municipalities in South Africa received clean audits.

Municipality	Debt in Rands
Free State	7 317 486 321
Mpumalanga	5 192 724 347
Gauteng	1 425 648 553
North West	424 464 273
Limpopo	402 093 606

Table 3: Top 5 Municipal Debt to Eskom 2018

According to StatsSA Financial Census of Municipalities for the year ended 30 June 2018, electricity sales made up 26.9% of municipal revenues and electricity purchases made up 21.4% of municipal operating expenditure. Consumer debt to municipalities sits at R165.5Bn overall.⁹ More than two-thirds of this debt is considered 'realistically uncollectable' by National Treasury as it has been owed for longer than 90 days.[2]

A key cause of the rising debt levels is poor financial management, lack of financial and technical skills and corruption.

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 financial management capacity. For example, smart grids allow for real-time energy consumption data that can alert households and municipalities to high consumption levels, while financial planning and 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 felt.

8.1.3. The Smart City Concept

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 a new one, it is a natural evolution of advancements made through the fields of information technology. As more sensory information (i.e. user interface solutions) become connected to a centralised information store (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.

9 Consolidated s71-Q4, 1 August 2019, National Treasury

OUR STRATEGIC FOCUS [CONTINUED]

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. This can be described by the image below.

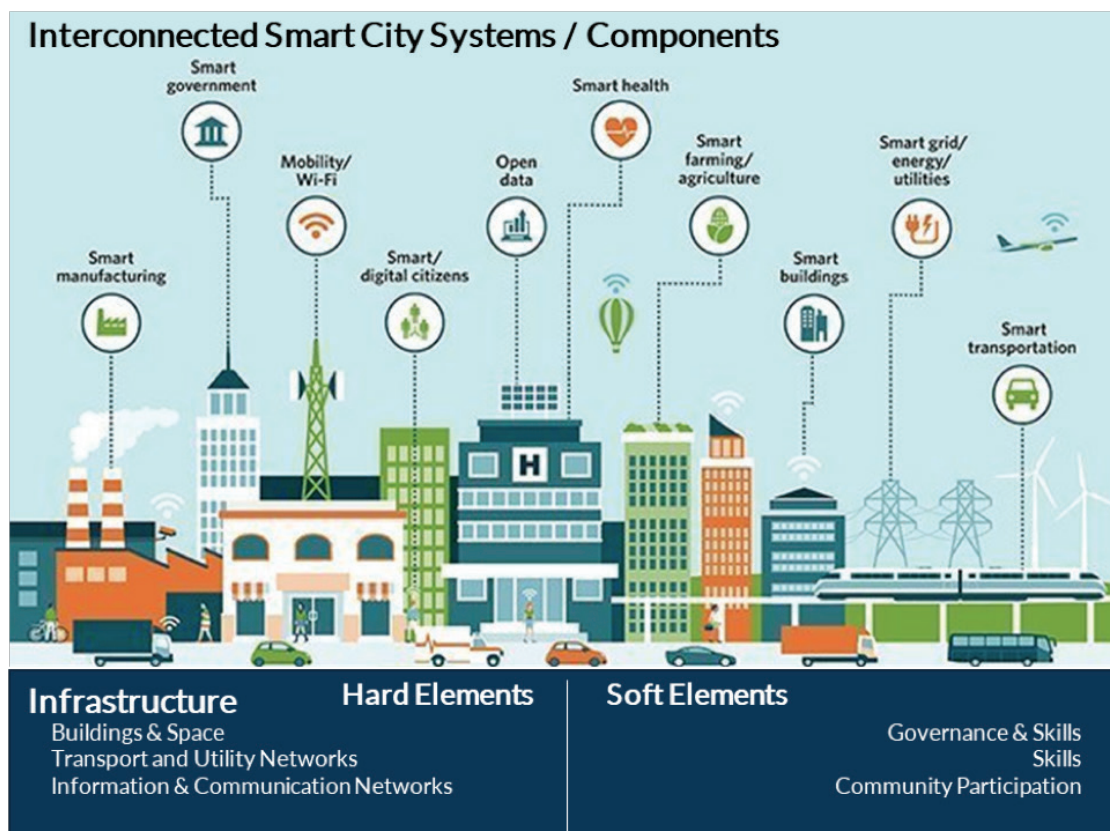


Figure 14: Dimensions of a Smart City

Smart grids, within which SANEDI has significant experience, is a component (a key, underlying component) of what would constitute a smart cities.

Furthermore, as seen by the rising global population in cities earlier, cities play a key part in energy demand and consumption. Energy research and development of technologies have a role to play towards the sustainability of cities and thus contribute towards economic growth. Figure 15 provides a framework on how smart cities can impact different sectors.

OUR STRATEGIC FOCUS [CONTINUED]

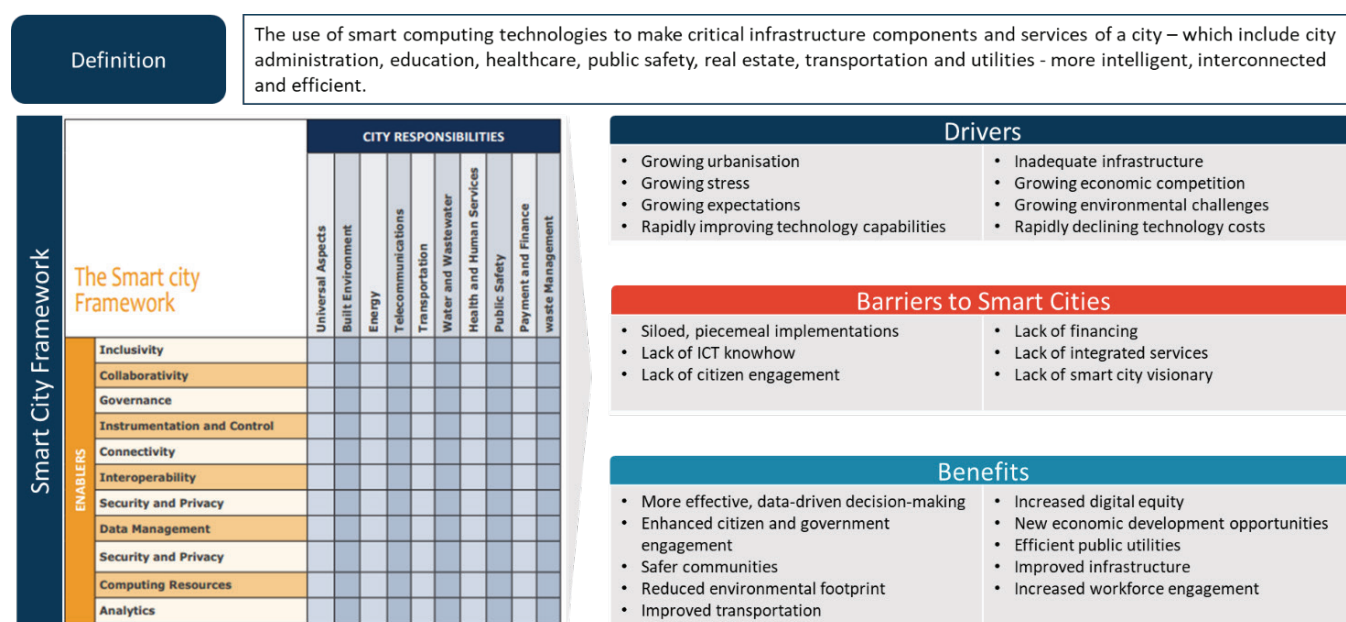


Figure 15: Framework for Understanding Smart Cities¹⁰

Within the energy sector, with a rising need for energy access, increasing utilisation of renewables and a greater 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:

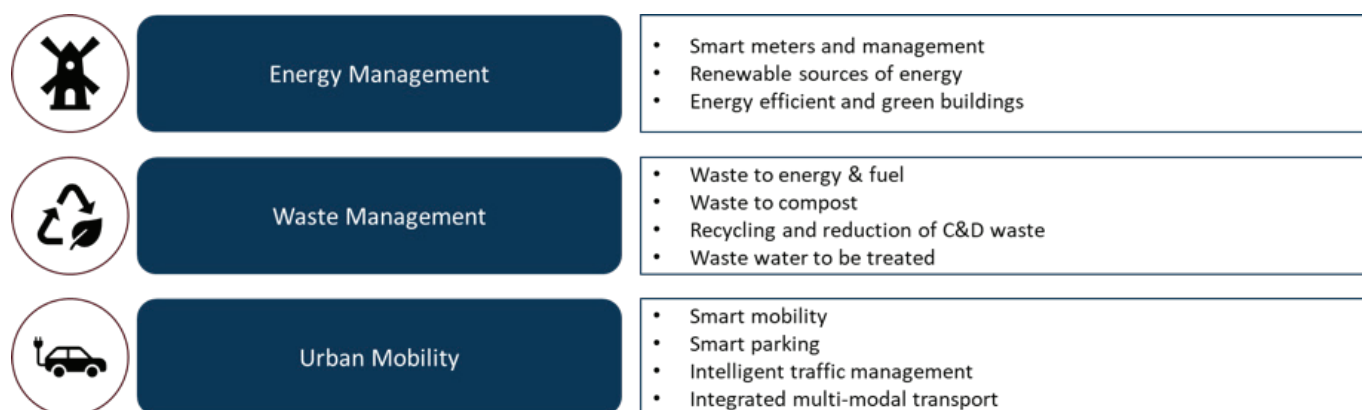


Figure 16: Key Considerations From a Municipal Support Perspective

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

8.2. 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 (No. 34 of 2008), with a focus on energy efficiency, energy research, development and innovation.

OUR STRATEGIC FOCUS [CONTINUED]

8.2.1. Operating Model (People, Process, Technology)

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

Staff morale at SANEDI has been low, affecting performance and effectiveness. This must be addressed by creating a performance enabling culture, strengthening the organisational structure, and clearly defining roles and responsibilities while integrating silo-d work teams. In addition, capacity building must be a constant consideration.

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

8.2.2. Organisational Structure

The organogram includes the SANEDI board directly overseeing the Board Committees: Board Audit and Risk, Remuneration, Projects, Funding and Finance, and, Social Justice and Ethics. The SANEDI CEO reports to the Board, and oversees the 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.

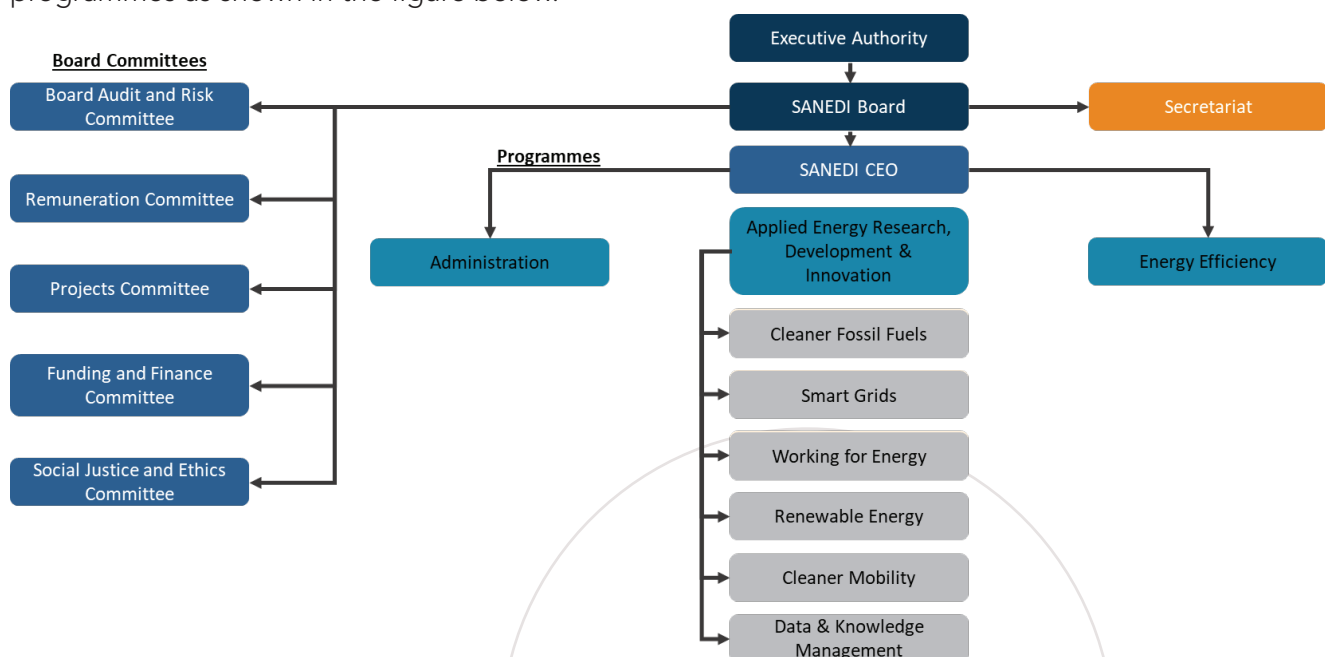


Figure 17: SANEDI Organogram¹¹

SANEDI has undergone an organisational restructuring and benchmarking exercise to ensure efficient utilisation resources in delivering the mandate. Implementation of the new organisational structure will likely occur during the strategic cycle presented.

Due to the broad mandate, and limited funds available, resource effectiveness and efficiency by focusing on real value creation is key to the long-term sustainability of SANEDI.

11 SANEDI Approved APP, 2018/2019

OUR STRATEGIC FOCUS [CONTINUED]

8.2.3. Funding and Resource Allocation

From a funding perspective, 65% of SANEDI's budgeted income has been from donor-funded projects – ensuring appropriate selection and delivery of projects becomes an underlying strategic enabler. However, levels of funding have been falling as South Africa is perceived as an 'emerged economy' by international donors. SANEDI is still on an establishment grant and the funding has not ramped up as mapped out in the founding business case; this has had an impact on the capacity of the organisation to deliver. National Treasury has, however, agreed to increase the base line allocation by an additional amount of R7 million with an annual inflationary increase of 6% year on year in response to cost pressures particularly related to Programme 2: Applied Energy, and Programme 3: Energy Efficiency. Programme 2 has historically been allocated approximately 70% of the overall funding because of its volume of sub-programmes.

Overall, this suggests that there may some financial constraints due to income in-flows. SANEDI shows a trend that when funding is reduced, project spend is reduced disproportionately which impacts effective project delivery. The organisation must respond to this by improving efficiency and productivity. Expenditure is expected to increase from 2017/18 by an average of 4%. This is due to a combination of increasing staff costs and expenditure on goods and services. Staff costs are projected to increase by 6-7% per annum over the MTEF period in line with inflation. At present, employee costs are currently 32% of total revenue which is a major risk for an R&D organisation. Expenditure on goods and services administration strategic objectives has historically increased by 6% year-on-year and is expected to increase annually by between 5.5-6% in future periods.

SANEDI programmes are largely securely funded but there may need to be increased focus on funding shortfalls in the medium term. Cleaner mobility and working or energy programmes, in particular, are underfunded. Additional funding needs to be sourced – or they be removed from the portfolio – while reprioritising resources to higher value creation or higher impact programmes.

8.3. Strategic Implications

The following elements were highlighted as being important considerations for SANEDI.

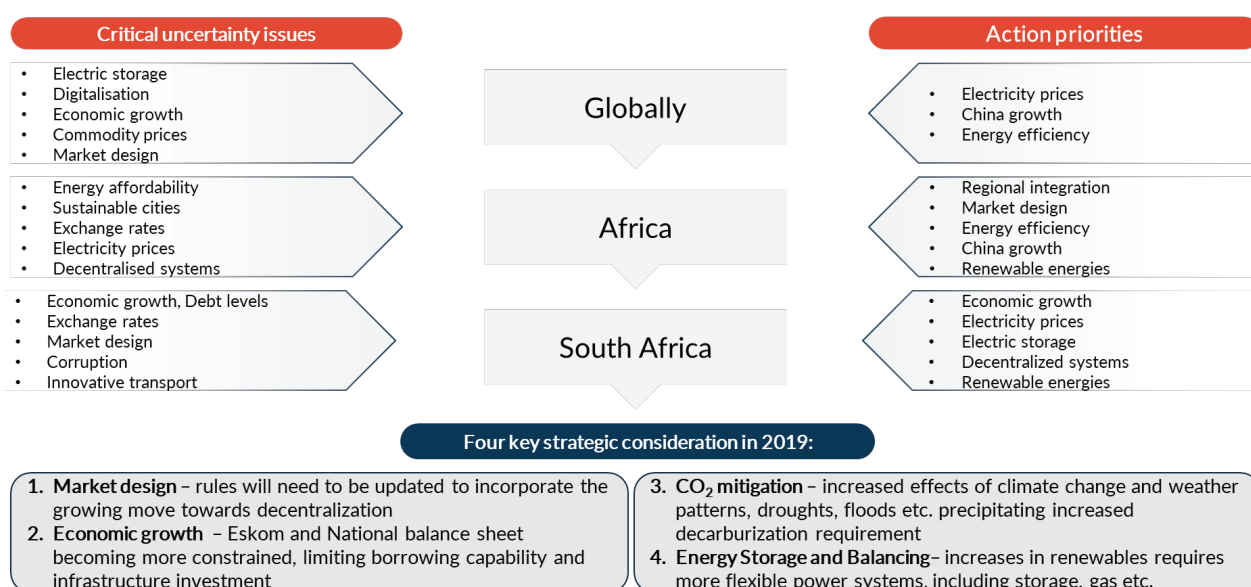


Figure 18: Critical Contextual Elements for SANEDI¹²

OUR STRATEGIC FOCUS [CONTINUED]

The situational analysis has highlighted that budgetary constraints require a more focused approach by SANEDI in delivering its mandate. The significant opportunity for SANEDI to drive service delivery improvements across the municipalities through the demonstration and roll-out of the smart cities programme as highlighted in Section 8.1.3 above. 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 energy efficiency). This requires a co-ordinated effort between various stakeholders across National, Provincial and Local Government and include technical, programme management and capacity building support to ensure a solution relevant to the South African context is adopted.

In addition, as the drive towards increased energy access, lower energy costs as well as cleaner sources of energy (i.e. lower CO₂) is a global imperative; SANEDI has a mandated role to play in the development of this within the SA context. SANEDI's strategic role would include managing compliance related activities and technology development around decarbonisation. As highlighted, SA is still heavily reliant on fossil fuels for its energy requirements, and our international licence 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 policy makers and investors is a necessary and relevant requirement – specifically as we transition into a more information-centric environment.



PART C: MEASURING OUR PERFORMANCE

MEASURING OUR PERFORMANCE

9. INSTITUTIONAL PERFORMANCE INFORMATION

9.1. Measuring the Impact

No.	Statement
1.	Enabling decarbonisation and a just transition from a fossil fuel-based economy to a cleaner energy economy for sustainable development

9.2. Measuring Outcomes

Impact No.	Outcome	Outcome Indicator	Baseline	Five Year Target
1.	Smart Grid systems Piloted for Smart cities ¹³	Number of Smart Grid systems Pilots for smart cities.	0 smart grid technologies Pilot for Smart cities.	3 Smart systems Pilot projects
2.	Demonstrated GHG emissions potential in support of national commitments	Amount of GHG emission reduction potential directly related to SANEDI initiatives ¹⁴	0 GHG emissions potential	>4.3 MToe CO ₂ reduction potential [CO ₂ equivalent] ¹⁵
3.	An awareness of the technologies to be used in the transition process (for an increasingly aware society on energy transition solutions)	Results from perception studies conducted.	0% {No prior perception studies conducted}	Evidenced-based awareness of technologies to be used in the transition process.
4.	Evidence-based planning, resource allocation and decision making enabled by accurate and timely information, datasets and data analytics	A centralised and maintained data repository available to stakeholders	Fragmented, outdated and disaggregated data repository on renewable energy and cleaner fossil fuels)	A centralised and up to date data repository on Renewable and Cleaner Fossil fuels available to stakeholders
5	Internal Operational effectiveness and efficiency	Percentage performance targets achieved	84% entity wide target achieved	>84% performance achieved
6	Energy transition expertise and competence building enabled	Energy transition capacity needs tracked, analysed and solutions assessed	10 competency building solutions assessed	>10 expertise and competency building solutions assessed
7	A capacitated, effective and efficient operational environment (within which SANEDI will discharge its mandate) – internal compliance	Restructured operational environment that meets delivery and legal requirements	New operating model approved ¹⁷	100% implementation of new operating model ¹⁸

¹³ Visibility and control, CO₂ mitigation, energy diversity, interconnection

¹⁴ Supporting programmes to drive GHG reduction in line with national aspirations,

¹⁵ Target across CCUS, EE, smart cities, other

¹⁶ Data sets, data records

¹⁷ Pending Board approval expected by latest November 2019 (scheduled for Board meeting, 27 August 2019)

¹⁸ Compliant in all areas of finance, HR

9.3. Programme 2

During October 2019 Cabinet approved the 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. It also highlights opportunities which, if realised, could have a positive impact on infrastructure planning and development going towards meeting the 2030 NDP goals.

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 have developments make global access to energy through renewable and off-grid technologies such as solar PV, bioenergy and wind through micro grids 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 makes it imperative for the country to start aggressively investing into 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 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 adoption of new technologies.

For the (2020-2025) Medium Term Strategic Framework (MTSF) period, SANEDI will be mainly focusing on provision of information, develop and maintain datasets and implement pilots 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 security of energy supply through a number of targeted initiatives.

- Pilot studies to test the viability of new technologies.

Cleaner Fossil Fuels Sub-Programme

Specific focus will be given to clean coal technologies, gasification and carbon capture, utilisation and storage. For the MTSF period the end goal will be to have proof of concept for geological storage of carbon dioxide in South Africa while at the same time we explore and quantify opportunities for capture and utilisation. This project will be undertaken in collaboration with the World Bank, which has made funding available towards the pilot storage project, the Council for Geoscience of South Africa (CGS) which will provide support in the form of technical skills and access to geological data and the Department of Science and Innovation (DSI) on the utilisation aspects and carbon dioxide.

MEASURING OUR PERFORMANCE [CONTINUED]

The carbon capture and storage project is crucial, particularly because of the potential it has for South Africa, which predominately generates power from coal. The proof of concept for CCS will demonstrate the ability for SA to store carbon dioxide in a deep geological formation thus contributing towards the reduction of GHG emissions, prolonging the use of coal in power generation. It is estimated that if the technology can be successfully piloted, GHG emissions of tens of millions of tonnes can be saved from being emitted into the atmosphere. Additional funding will however be required if the project is to succeed.

A pilot also will investigate prospects for utilisation of the captured carbon dioxide for economic purposes such as synthetic fuels, fertilisers, ethanol and other chemical products. The use of renewable energies in such production will further mitigate GHG emissions. Should the pilot prove to be viable, this can unlock new industries, create job opportunities, prolong to lives of coal mining thus saving jobs that stand to be lost should the cleaner coal electricity generation options not be available.

Energy Access Sub-Programme

The Energy Access 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.

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 case for appropriate stakeholders such as Department of Co-operative Government and Traditional Affairs (COGTA), municipalities, business etc 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 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 pilots will be running a greater number of people will be trained. Training will focus on mainly the youth and women in an effort to create opportunities for these groups and fight poverty and unemployment.

In an effort 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 be included as part of curriculum at TVET colleges involved in the construction industry.

Wind Energy

The WASA project is a pilot demonstration project which had built 18 WASA masts across five provinces. 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 5 different provinces in South Africa to enable the continuous assessment of wind potential in South Africa. The project is currently on its third phase and is being undertaken in partnership with the South African Weather Services, CSIR, UCT and the Danish University of Technology.

Wind has been identified as an option for electricity generation that will cost the least. It is expected to contribute 1600MW of electricity by 2030. With this in mind, SANEDI will continue its partnership with 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, specifically small wind turbines, for commercialisation and mass roll-out. The new policy of Government allowing own generation by

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business and municipalities creates opportunity to create sustainable businesses and jobs in the wind energy space.

Bio Energy (Food and Water Nexus and the Circular Economy)

The Working for Energy Sub-Programme predominantly focuses on energy access to rural and low-income community projects providing training, jobs and demonstration of a packages of RE technologies in those communities. Predominant technologies piloted under the WFE are solar thermal, energy efficiency, cool surfaces, biomass and waste-to-energy and energy-water-environment-food nexus initiatives in various rural and low-income communities. The objective thereof being to provide evidence-based policy proposals to the Department of Mineral Resources and Energy on benefits of clean energy as part of the green economy.

Working in low income and rural areas poses several non-technical challenges such as a need for extensive stakeholder management, belief and cultural systems, change management, technology apprehension, illiteracy, 'freebies-grant mindset' and lack of technical support systems.

Experience has shown that in South Africa, establishing new technologies projects without adequate local technical support bases is a recipe for failure. Therefore, a systems approach is necessary to deal with numerous needs shortcomings in order to provide a basket of basic services (water, food, thermal energy, cooling energy, access to communications, electricity, waste management, transportation, appliances and other basic resources) to make the interventions meaningful.

In partnership with a few universities, the Working for Energy Programme is undertaking a number of impact assessments studies on the previous projects it has built over the years with a view to determine the consumer benefit from the clean energy technologies.

It is expected that over the financial year that the programme will be running, several beneficiaries will be trained, and work opportunities created as part of its contribution towards the Expanded Public Works Programme (EPWP) under the DMRE. Specific focus will be placed on the empowerment of youths and women. It is expected that during that period job opportunities contributing in excess of 5000 manhours from various projects will be created. In addition, the programme will develop and train a number of community-based organisations to support the projects initiated various communities post the projects close out.

In order to be effective, the WfE energy programme also focuses on the issue of the energy-water-food nexus in a circular economy framework. A centre of excellence is currently being established in the Tompie Seleka College of Agriculture, where a bio-energy infrastructure will be installed to demonstrate the use of production of biofuels, use of solar energy, bio waste to energy for cooking purposes in partnership with the Biofuels Business Incubator (BBI). In addition, the programme will be operationalising the mobile biodiesel plant, to demonstrate the waste cooking oil conversion to biodiesel for agricultural and other applications, with concomitant job creation.

It the 2020-2024 MTSF, the work done under the WfE sub-programme will be transitioned into the Energy Access Portfolio. SANEDI will still focus on exploring, piloting and demonstration the potential of biomass in line with IRP to enable the country to explore the potential that this holds for co-generation plants, to deliver electricity through distributed generation and for biofuels. Demonstration of projects in this regard will also focus on possibility on municipal waste being utilised for power generation with the prospect of improving revenue of municipalities.

SANEDI is currently working with NECSA and has signed agreements with Stellenbosch University for a Waste to Energy Pilot project to evaluate the potential for biowaste and provide verifiable data and a facility for possible scaling of waste to energy across municipalities.

MEASURING OUR PERFORMANCE [CONTINUED]

Through our partnership with the Department of Defence, SANEDI will be piloting renewable energy technologies at identified military bases following the success of the pilots at the Limpopo Base where SANEDI successfully piloted solar water heating and biogas cooking technologies as well as the cool surfaces technology. As part of the pilot, SANEDI has in partnership with SOLTRAIN provided training to military officials on solar thermal installations and maintenance. This partnership between the Department of Defence, SANEDI and SOLTRAIN will continue into the new MTSF cycle providing technical advice, technical support and training to the Department of Defence.

PV and Energy Storage

In partnership with various stakeholders, SANEDI will explore opportunities of PV and battery storage as distributed and off-grid options for ensuring energy security and access in South Africa.

Just transition

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

SANEDI has been involved through a number of partnerships in upskilling 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. Understanding as well that the transition to new technologies creates an opportunity for dialogue and engagement with stakeholders in order to bring about an understanding of the transition 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 and buy in and adoption of new technologies by communities in general, opportunities for new industries and jobs are harnessed and there is commercialisation of these technologies.

SANEDI will furthermore explore and map through modelling of scenarios, opportunities for consolidating environmental rehabilitation initiatives with power generation opportunities. Exploring the potential for reusing sites from retired power plants and re-using these as sites for renewable energy power plants/parks. Feasibility studies, will, as far as funding allows, be conducted.

Data Knowledge Management

SANEDI plans to be a data repository for energy data in South Africa. SANEDI 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. These are annually maintained and available at no cost to stakeholders:

- WASA database
- ESCO register
- 12L Tax incentives database
- Big EE database
- Transport database
- Residential database

For the MTSF period, SANEDI will continue to maintain the above datasets and create and maintain to these the following datasets:

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- Commercial database
- Industrial database
- Agricultural database
- Standards and labelling database
- Public infrastructure database (public buildings & wastewater treatment plants)

Cleaner Mobility Sub-Programme

Top of the agenda for the country with respect to reduction of Green House Gas emissions and also ensuring reliable transportation, Under the MTSF the Government plans to focus on making improvements to the rail infrastructure to divert traffic from roads to rail systems. An opportunity, therefore, exists to invest in energy efficient technologies and to incorporate renewable energy sources as part of this infrastructure improvement project.

SANEDI plans to investigate the feasibility of incorporation of renewables within the SA rail networks as a way of reducing the carbon footprint from rail transportation, reduction of electricity costs and ensuring that stations are energy efficient. Subject to available funds, a business case in co-operation with the relevant department and utility will then be created for the incorporation of such in the future and made available to possible stakeholders.

In collaboration with the Department of Transport, COGTA and municipalities, SANEDI will be exploring funding opportunities to green municipal fleets. SANEDI will, working with COGTA and the Department of Transport be guided by the district model in prioritising areas for demonstration pilots.

Smart Grids Sub-Programme

Since 1994, municipalities have faced service delivery challenges which are attributed to poor financial management, inadequate human and institutional capacity, overstretched infrastructure and generally weak governance systems. The service delivery challenges persist despite government channelling increasing resources (transfers) to the local government sphere. The increased resources going into the local sphere have not translated into commensurate service delivery improvements in most municipalities. Therefore, injecting more resources is a necessary intervention but may not be enough to solve all the challenges facing the sector.

The efficiency and effectiveness with which resources are used in this sphere are critical for optimal service delivery. Poor service delivery characterises many municipalities, producing outcomes such as the frequent and sometimes violent protests by residents clamouring for better services. Local government is at the coalface of service delivery, and any failure in the sector is fundamental, not only in shaping public opinion about the entire government system but also, more importantly, has the potential to undermine the overall socio-economic development of the country. Since 1994, the South African government has instituted several public sector reforms to enhance the performance of municipalities. The list includes policy and legislative changes (e.g. Municipal Finance Management Act (MFMA) of 2003), benchmarking exercises, monitoring and evaluation (M&E) systems, capacity-building initiatives, annual municipal audits, performance-based budgeting, performance appraisal schemes and performance-based contracts. However, despite all these initiatives, the performance gaps in the local government sphere remain a cause for concern. Performance gaps manifest in the high incidence of weak audit reports, under-spending/overspending, poorly maintained infrastructure, large and growing consumer debt problems, billing challenges and the non-payment of creditors. Therefore, it is necessary to rethink the traditional support programmes and focus on addressing root causes so that municipalities can deliver on their service delivery mandate in an effective, efficient and sustainable manner.

Local government is constitutionally mandated to provide basic services to communities within a three-sphere decentralised system of governance. Schedules 4B and 5B of the Constitution of South

MEASURING OUR PERFORMANCE [CONTINUED]

Africa (Act No. 106 of 1996) assign an array of service delivery responsibilities to the country's 257 municipalities. The most essential of these is the provision of water, sanitation and electricity services. In addition to their service delivery mandate, municipalities continue to invest significantly in social and economic infrastructure in the country. Urban municipalities play a central role in local economic development through their planning and managing of the urban built environment. In contrast, rural municipalities continue to roll out basic social infrastructure to eradicate the massive service backlogs in these areas.

Municipalities are empowered with an array of revenue instruments that equip them to deliver on their mandates. The legal framework provides for municipalities to generate their revenues, which include levying a property tax, user fees, surcharges on services and a wide range of other local taxes. However, municipalities will continue to rely on their allocations from the national fiscus as they are unable to maximise the revenue generation potential of their existing revenue sources. National government supplements municipal own revenue with intergovernmental transfers, in the form of unconditional and conditional grants.

The development of innovative strategies and technological advancements are needed to change the status quo in the quality of electricity, to deliver a stable and secure electricity output. The effective deployment of smart grids in the Electricity Supply Industry (ESI) is recognised as a critical business enabler. The implementation of an appropriate technology contributes amongst others to improved customer service, improved business efficiency and business sustainability. Thus, the positive outcomes that are observed from the deployment of smart grids provide an effective solution to address some of the challenges that municipalities and utilities are faced with. The investment into smart grids takes a value inclusive approach to test solutions that transition a utility into becoming more efficient and competent in managing their systems and processes.

Energy access and distributed generation are not possible without smart technologies being incorporated. Smart cities and a post-apartheid future city will also not be attainable without ensuring that there is a smart grid that takes advantage of technological advancements in the Information Technology space, the internet of things, big data and use of smart devices to manage the electricity grids. Real-time availability of data becomes crucial in a Smart Grid for responsive electricity to supply and demand.

SANEDI has, in the past MTSF period, been working on Smart Grid Pilots demonstration, focusing on Assets management and Revenue enhancement Pilot in 7 municipalities. As a result of the success of these Pilots, SANEDI is providing support to COGTA and the National Treasury for a larger scale pilot which is expected to form a basis for implantation of smart grids across municipalities in South Africa.

9.4. Programme 3

SANEDI's co-ordination and implementation of the Energy Efficiency Tax incentives (Section 12L and 12I), have produced phenomenal results, both in terms of energy savings and reduction in Green House Gas Emissions with more than 19 TWh saved and 18 730 mega-tonnes of CO₂ avoided, as of 31 December 2019. Based on the success of this activity over the last five years, National Treasury has decided to extend the Section 12L incentive from January 2020 to January 2023 and this activity will form a core basis for the initial phase of this five-year strategy.

The initial phase of the implementation of the tax incentives resulted in the development of various (secure) online tools and databases for the processing of these applications, which over the last years, has resulted in the establishment of a significant repository of energy efficiency data. A focus for the next five years includes the use of this data in modelling various energy, environment and economic impacts of these interventions on the participating customers and the national fiscus.

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Furthermore, the cool surfaces programme which initially started 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 \$100 000 in 2019, for accelerated implementation of the initiative in South Africa. The results of this 'boost' award will see SANEDI in the running for the final global prize of \$1 million at the end of 2020 and it is anticipated that the further national roll-out of this technology by SANEDI will result in significant positive socio-economic benefits for low-income houses in the country.

The termination of Eskom's Integrated Demand Management funding for energy efficiency left a huge vacuum in the market for service providers (Energy Service Companies (ESCOs)), who are instrumental in realizing energy savings on the ground. SANEDI, with the support of GIZ, has managed to partially resurrect this market, with the development of training programmes and a national register of ESCOs, that provide potential customers with a resource on where to find suitably qualified energy efficiency practitioners to assist in solving their energy problems/high energy bills. This activity will be continued and expanded over the next five years, creating a favourable and sustainable market for the implementation of energy efficiency across the various programmes introduced by both the public and private sectors.

The success of the French Development Agency's (AFD), green credit facility saw them introduce a second phase of this funding opportunity in 2016, known as SUNREF 2 (Sustainable Use of Natural Resources Fund). SANEDI hosted the Technical Assistance Facility (TAF) for the participating financial institutions and customers in the first phase of this clean energy funding initiative and based on the success thereof, was duly appointed to provide the TAF for SUNREF 2 for an extended period of one year, (2020). The objective is for SANEDI to provide the same level of technical assistance to financial institutions and potential customer, post this funding period by the AFD.

Furthermore, SANEDI (Energy Efficiency) will be involved as a partner with the Department of Mineral Resources and Energy (DMRE), the Department of Public Works and Infrastructure (DPWI) and the Department of Co-operative Governance and Traditional Affairs (Cogta), in the implementation of two, three-year European Union(EU)-funded projects in the public sector, focusing primarily on data collection and modelling energy performance:-

1. To improve energy and environmental performance of government buildings, through an accelerated integration of renewable energy and energy efficient technologies.
2. To achieve a net-zero energy of South African Wastewater Treatment Plants (WWTPs), through the deployment of integrated biogas cogeneration/Combined Heat and Power (CHP) and energy efficient technologies.

Lastly, SANEDI (Energy Efficiency), will be responsible for the Measurement and Evaluation (M&E) function of a five-year (Vertical) Nationally Appropriate Mitigation Action (V-NAMA) funded programme, titled 'Energy Efficiency in Public Buildings and Infrastructure Programme (EEPBiP)', involving various government departments, (nationally, provincially and at a local government level). The SANEDI M & E component of this programme has a grant budget of €700 000.00 and the project is due to officially commence during 2020.

9.5. Explanation of Planned Performance over the Five-Year Planning Period

In developing its strategy, SANEDI must 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 Department of Mineral Resources and Energy priorities.

MEASURING OUR PERFORMANCE [CONTINUED]

Outcome	Link to NDP	Link to MTSF	Link to DMRE Priorities
Smart Grid systems piloted for smart cities¹⁹	<p>Chapter 4: Economic infrastructure</p> <p>At least 20000 MW of this additional generated capacity should come from renewable sources</p> <p>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</p> <p>The concept of smart cities is based on cleaner and more efficient energy technologies, offering cleaner and more efficient buildings and transportation</p>	<p>Priority 5: Spatial integration, human settlements and local government</p> <p>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</p> <p>Priority 2: Economic transformation and job creation</p> <p>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</p> <p>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</p>	<p>Policy, planning and clean energy</p> <p>Smart cities aim to utilise cleaner and more efficient energy system which are less detrimental to the environment.</p>
A skilled and competent workforce	<p>Chapter 5: Environmental sustainability and resilience - zero-emission building standards by 2030</p> <p>The drive towards zero emissions starts with identifying and reducing current sources of GHG emissions in our energy systems</p>	<p>Priority 7: A better Africa and the world</p> <p>In reducing GHG emissions, South Africa would be aligning itself with goals towards the mitigation of climate change. Hence, contributing towards a better world.</p> <p>This will entail developing strategic policy and regulatory frameworks and programmes to promote a low carbon economy</p>	<p>Policy, planning and clean energy</p> <p>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</p> <p>The DMRE also aims to diversify the country's energy sources and reducing GHG emissions.</p>

MEASURING OUR PERFORMANCE [CONTINUED]

Outcome	Link to NDP	Link to MTSF	Link to DMRE Priorities
Reduction of GHG emissions in line with national commitments	Chapter 4: Economic infrastructure – the foundation of social and economic development 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. (ii) Environmentally sustainable through efforts to reduce pollution and mitigate the effects of climate change	Priority 2: Economic transformation and job creation Promote a just transition to an environmentally sustainable economy. High impact environmental sustainability research, evidence gathering, and systematic review commissioned Priority 7: A better Africa and the world The transition towards an environmentally sustainable economy	Policy, planning and clean energy The DMRE aims to foresee the implementation of energy policy interventions, mapping out future power generation technologies. Top of their priorities is diversifying energy sources and reducing GHG emissions
Create an awareness for the technologies to be used in the transition process	Chapter 9: Improving education, training and innovation Expand science, technology and innovation outputs by increasing research and development spending by government and through encouraging industry to do so	Priority 2: Economic transformation and job creation Awareness creation to enable investments for inclusive growth, industrialization, localization, exports and as well as innovation Priority 2: Education, skills and health Address the challenge of poverty across society through providing expertise and create economic opportunities, especially for vulnerable groups. An awareness of clean technologies opens an opportunity for South Africans to acquire new skills.	Policy, planning and clean energy The Energy Policy and Planning Programme is tasked with the responsibility of ensuring evidence-based planning, policy setting and investment decisions in the energy sector to improve energy security through supply and demand-side options and increase competition through regulation
Create an awareness for the technologies to be used in the transition process	Chapter 13: Building a capable and developmental state Clear governance structures and stable leadership enable state-owned enterprises (SOEs) to achieve their developmental potential	Priority 1: Economic transformation and job creation Awareness creation to enable investments for inclusive growth, industrialisation, localisation, exports and as well as innovation	

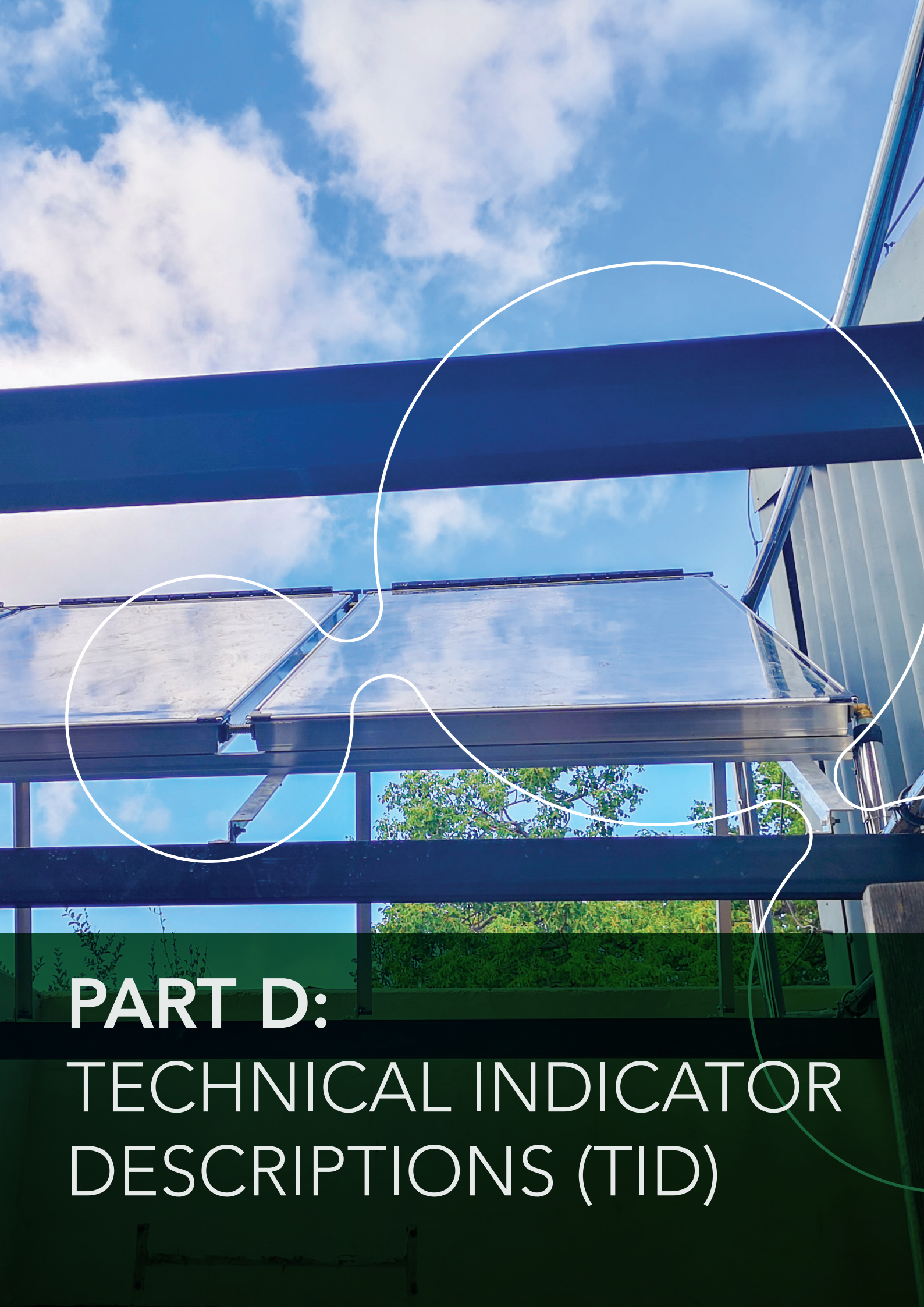
MEASURING OUR PERFORMANCE [CONTINUED]

Outcome	Link to NDP	Link to MTSF	Link to DMRE Priorities
Evidence-based planning, resource allocation and decision making	<p>Chapter 3: Economy and employment Public employment programmes should reach 1 million by 2015 and two million people by 2030</p> <p>Chapter 13: Building a capable and developmental state Staff at all levels have the authority, experience, competence and support they need to do their jobs</p>	<p>Priority 2: Education, skills and health 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</p> <p>Priority 6: A capable, ethical and developmental state Scaling up skills development for young people, women and government officials in new technologies</p>	<p>Electrification and Energy Programme and Project Management: Through economic development initiatives, such as education projects & partnerships (EP&Ps), the programme will:</p> <ul style="list-style-type: none"> • create job possibilities through EP&Ps; • create opportunities for skills development within the energy sector; • re-establish electrical engineering training programmes that support the municipalities' capacity building and poverty alleviation; and • develop small businesses in rural areas that support the mission of rural development
Compliance with legislative and departmental requirements – external compliance	<p>Chapter 13: Building a capable and developmental state A public service immersed in the development agenda but insulated from undue political interference</p> <p>Clear governance structures and stable leadership enable state-owned enterprises (SOEs) to achieve their developmental potential</p>	<p>Priority 6: A capable, ethical and developmental state Clean administration, accurate and reliable reporting. Strengthening internal capacity and collaboration with other organs of state</p>	<p>The implementation of best management practices: 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 and eliminating wasteful and fruitless expenditure</p>

MEASURING OUR PERFORMANCE [CONTINUED]

10. KEY RISKS

Outcome	Key Risks	Risk Mitigation
Smart cities (visibility and control, CO₂ mitigation, energy diversity, interconnection)	<ul style="list-style-type: none"> • Lack of coordination between departments and teams • Lack of municipal skills to drive implementation • The Political will to drive change 	<ul style="list-style-type: none"> • 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] • Communicating the business case for smart cities
A skilled and competent workforce within the energy industry as pertains to SANEDI areas of influence	<ul style="list-style-type: none"> • Limited support and buy-in from stakeholders and constituents [e.g municipalities/other government departments] • Limited resources to execute [knowledge, finance and human resources] 	<ul style="list-style-type: none"> • Stakeholder engagement, demonstrable outcomes, Communication and awareness • Partnerships and international linkages/collaborations (knowledge sharing)
Reduction of GHG emissions in line with national commitments	<ul style="list-style-type: none"> • Lack of funds and investment to drive GHG emission reductions programs 	<ul style="list-style-type: none"> • Explore alternative funding sources
Create awareness for the solutions to be used in the transition process	<ul style="list-style-type: none"> • Funding for adequate reach and depth • Limited participation 	<ul style="list-style-type: none"> • Creating a localised reference case
Evidence-based planning, resource allocation and decision making	<ul style="list-style-type: none"> • Lack of centralized information to drive evidence-based planning • Not being able to access/ reach relevant stakeholders [not getting stakeholders to utilize our solutions] 	<ul style="list-style-type: none"> • Building ICT capability • Building relationships and partnerships • Linkage to the DRME
Compliance with legislative and departmental requirements – external compliance	<ul style="list-style-type: none"> • Inadequate resources to execute 	<ul style="list-style-type: none"> • Explore alternative funding sources
A capacitated, effective and efficient operational environment (within which SANEDI will discharge its mandate) – internal compliance	<ul style="list-style-type: none"> • Limited funding and budget allocations • Instability within leadership and governance structures • Mandate of SANEDI pertaining to governance and funding 	<ul style="list-style-type: none"> • Motivate for potential revision of governance aspects of section 7 of the NEA , the SANEDI chapter



PART D: TECHNICAL INDICATOR DESCRIPTIONS (TID)

TECHNICAL INDICATOR DESCRIPTIONS

Indicator title	Number of Smart Grid systems Pilots for smart cities
Short Definition	<p>Smart Systems</p> <p>Cities as identified and aligned to the district model and government priority areas.</p> <p>Smart Energy being defined as energy that integrates Information Technology (ICT) to optimise generation, distribution, efficient utilisations, and enhances the availability of energy supply.</p> <p>Smart transportation, for the purposes of this indicator includes all transportation modes that make use of alternative energy not from fossil-based fuels and cleaner fossil fuels and their link to technology innovation (IoT, Bigdata, data analytics etc.) to improve consumption efficiencies and reduce negative environmental impacts in transportation.</p>
Source/collection of data	Internally generated data from sources which include (i) advisory notes, (ii) feasibility reports, (iii) complete study reports, (iv) case studies, (v) technology roadmaps and (vi) operational demonstration facilities/projects, among others. (vii) Business cases (viii) proof of concepts
Method of calculation/assessment	Quantitative
Assumptions (data limitations)	None
Reporting cycle	Annually
Desired performance	Achieve at least the stated target or more
Indicator responsibility	Responsibility for reporting reside with the respective General Managers of sub-programmes

Indicator title	Amount of GHG emission reduction potential directly related to SANEDI initiative ²⁰
Short definition	<p>Total projected/modelled emissions potential that can be reduced from the atmosphere as a result of the adoption of SANEDI Piloted/tested/demonstrated initiatives</p> <p>GHG emission is defined as the emission of gasses such as water vapour (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and ozone (O₃) into the atmosphere resulting in a greenhouse gas effect</p>
Source/collection of data	Internally generated project closeout reports such as 12L reports, Data models and data analysis reports
Method of calculation/assessment	Summation of all GHG emission reduced by an initiative implemented during a 12 months cycle
Assumptions (data limitations)	GHG emissions can be reliability estimated at the project conceptualisation stage, and these can also be quantified at project closeout
Reporting cycle	Annually
Desired performance	Achieve at least the stated target or more
Indicator responsibility	Responsibility for reporting resides with the respective General Managers of sub-programmes

TECHNICAL INDICATOR DESCRIPTIONS [CONTINUED]

Indicator title	Results from perception studies conducted
Short definition	Perceptions studies are those studies that will be designed and carried out to measure the impact of the engagements with stakeholders. These will be conducted after every 2 years during the MTSF cycle
Source/collection of data	Stakeholder engagement events and activities measured against the SEP
Method of calculation/assessment	Qualitative: % implementation of the stakeholder engagement plan, including an analysis audience reached through perception studies performed twice in the MTSF period
Assumptions (data limitations)	All engagements are recorded
Reporting cycle	Annually
Desired performance	Achieve at least the stated target or more
Indicator responsibility	Responsibility for reporting resides with the respective General Managers of sub-programmes

Indicator Title	A centralised and maintained data repository available to stakeholders
Short definition	A data repository being an IT data management system that houses all of the databases developed by or on behalf of SANEDI, publications, data analysis reports, research reports, advisory notes, data models
Source/collection of data	Draw information from available data, producing analyses, results, findings and recommendations that can support and inform high-confidence energy planning, decision-making and policy development throughout the sector
Method of calculation/assessment	Collation of all initiatives that are implemented as a result of SANEDI policy advisory notes/research report recommendations
Assumptions (data limitations)	Stakeholder engagements, as well as stakeholder, buy in necessary for implementation will take place within the strategic planning period
Reporting cycle	Annually
Desired performance	Achieve at least the stated target or more
Indicator responsibility	Responsibility for reporting resides with the respective General Managers of sub-programmes

Indicator title	Internal Operational effectiveness and efficiency
Short definition	The ability of the institution to maintain good governance practices and comply with all applicable requirements from the Executive authority and National treasury
Source/collection of data	Internal audit reports, external audit reports, correspondence from the Executive Authority and National Treasury
Method of calculation/assessment	Qualitative Non-cumulative
Assumptions (data limitations)	Annually
Reporting cycle	Annually
Desired performance	Achieve at least the stated target or more
Indicator responsibility	Responsibility for reporting reside with the respective General Managers of sub-programmes

TECHNICAL INDICATOR DESCRIPTIONS [CONTINUED]

Indicator title	Energy transition capacity
Short definition	Capacitated workforce/Persons that with adequate skills to enable the implementation of the National Energy Transition Plans, as noted in the IRP. Persons being defined to include both Natural as well as juristic persons
Source/collection of data	Reports on capacity buildings initiatives, Bursary awards letters, training programmes, internship programme and attendance registers, reports on the implementation of gender mainstreaming, SCM reports
Method of calculation/assessment	Qualitative (Counts the number of persons that SANEDI has been able to impact to persons)
Assumptions (data limitations)	None
Reporting cycle	Annually
Desired performance	Achieve at least the stated target or more
Indicator responsibility	Responsibility for reporting resides with the respective General Managers of sub-programmes

Indicator title	A restructured operational environment that meets delivery and legal requirements
Short definition	A new operational model that has been predefined that is adopted and implemented to improve operational efficiency and improve delivery methods while also to strengthen governance and ability to delivery on predetermined objectives
Source/collection of data	Implementation plan progress reports
Method of calculation/assessment	Quantitative, measured % implementation against a predetermined plan.
Assumptions (data limitations)	None
Reporting cycle	Annually
Desired performance	Achieve at least the stated target or more
Indicator responsibility	Responsibility for reporting resides with the respective General Managers of sub-programmes

The background of the slide features a sunset or sunrise scene with a gradient from blue at the top to orange and yellow near the horizon, and a dark brown foreground. Two black silhouettes of wind turbines are visible. Overlaid on the image are white line art elements: a circle around the smaller turbine on the left, a larger circle around the taller turbine on the right, and a wavy line connecting the two circles. The text 'PART E: STRATEGIC ENABLERS' is written in white, bold, sans-serif capital letters in the bottom left corner.

PART E: STRATEGIC ENABLERS

STRATEGIC ENABLERS

SANEDI's intended impact statements and outcomes will be realised through several enablers, which are listed below:

11. STRATEGIC FRAMEWORK

SANEDI's strategy must be enabled by an appropriate operating model – which pivots on its knowledge and energy data management functions. SANEDI's strategic framework outlines the central role played by knowledge management in driving its functions thereby contributing towards the mitigation of CO² emissions while contributing towards service delivery and the realisation of South Africa's smart city aspirations. Central to this is its capacity to provide advisory services and leverage its knowledge management function to extract value and generate revenue. This also has the potential to drive private sector investments through increased data availability, assisting in decision-making for companies seeking opportunities in the energy space.

Within this are several key components:

Knowledge management: Knowledge management involves the standardisation and institutionalisation of knowledge developed through SANEDI's research initiatives and technological advancements in the energy space. This further includes data management and storage.

Service delivery: Service delivery speaks to the enablement of entities of state to better deliver their Constitutional requirements. An example of this speaks to municipalities and the potential for improvement through the adoption of smart city technologies that would drive improvements in service delivery.

Decarbonisation: This contributes towards CO₂ mitigation, CCUS, democratised energy production, embedded generation and movement away from coal technologies. The drive towards decarbonisation requires certain interventions in the supply side of energy. Part of such interventions includes the introduction and demonstration of renewable technologies to encourage their utilisation by the private sector and municipalities.

Policy investments: These make use of the knowledge generated to assist in policy development and refinement. The aim is for policies to be more conducive for investors to be attracted to the energy space.

Advisory services: These contribute to revenue generation, knowledge sharing and training services central to SANEDI's business model. SANEDI can also offer training services at a cost to contribute towards revenue generation.

12. ORGANISATIONAL ALIGNMENT

The developed strategy, and the strategic process, must be broadly integrated into the operational environment, to ensure organisational alignment. While fulfilling its legislative mandate, SANEDI's strategy needs to be in alignment with national priorities.

13. REALISED BENEFITS TO SANEDI

The developed strategy seeks to help SANEDI focus its efforts and resources on creating lasting impact and value to the South African socioeconomic environment, while effectively carrying out its legislative mandates.

- Policy input: Analysed data can give input to national policies, with the aim of creating a conducive

STRATEGIC ENABLERS [CONTINUED]

environment for private sector investments

- Revenue generation: Through commercializing SANEDI's advisory and training services on renewable energy technologies and insights
- Partnership: Through knowledge sharing platforms with relevant institutions
- Encouraging private sector participation: Through establishing SANEDI as a source of data and insights in the energy space, private sector company would want to approach SANEDI when making investment decisions in the energy space



senedi

South African National Energy
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