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South African National Energy
Development Institute (SOCI) Ltd.



SANEDI

Annual Performance Plan

2021/22

ENERGY INNOVATION FOR LIFE

The Act provides in detail for SANEDI's Mandate



The National Energy Act, 2008 (Act No. 34 of 2008), Section 7 (2) gave effect to SANEDI's existence and provides for its primary mandate and specific responsibilities.



The Act provides for SANEDI to direct, monitor and conduct **energy research and development**, promote energy research and technology **innovation** as well as undertake measures to promote **energy efficiency** throughout the economy.

The Act provides in detail for SANEDI's Mandate



Energy Research and Technology development

Direct,
monitor,
Conduct,
Implement
and promote

Establish
research
Collaborations

Capacity
building,
commercialisa
tion , industry
development
and Growth

Register/
Utilise
patents and
intellectual
property

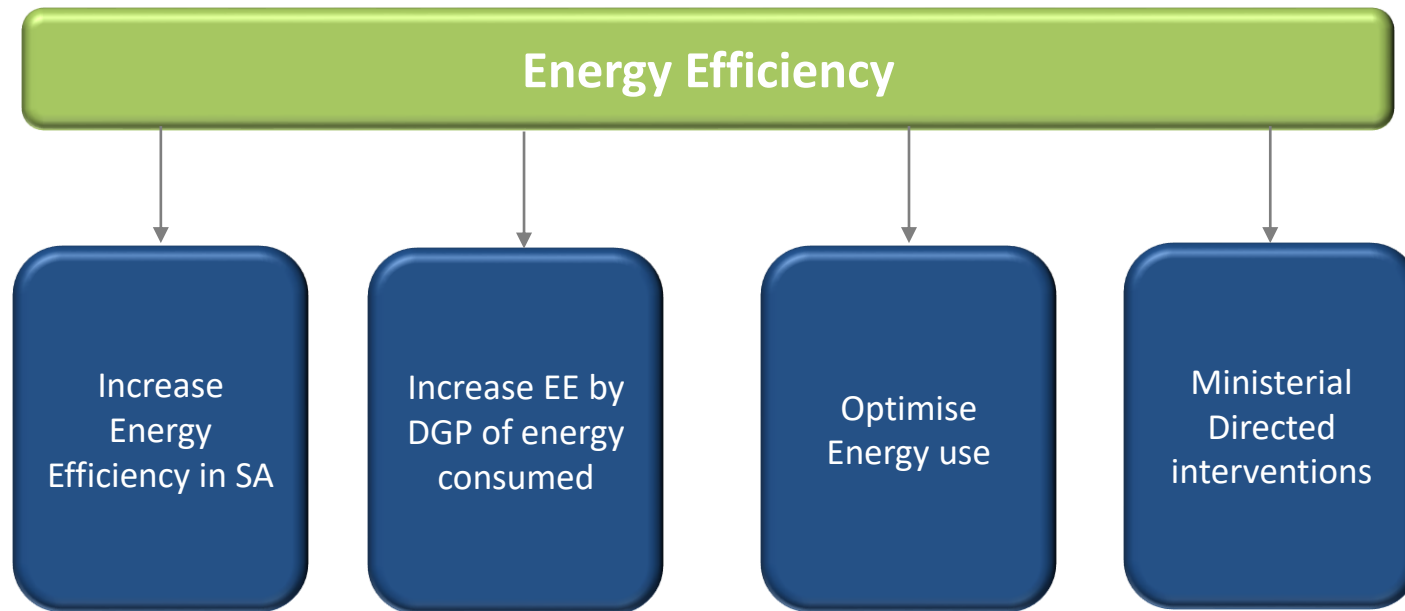
Grant funding
and research
aid

Ministerial
directed
research and
Advice to
Minister of
DST(DSI)

The National Energy Act, 2008 (Act No. 34 of 2008), Section 7 (2) gave effect to SANEDI's existence and provides for its primary mandate and specific responsibilities.

Programme 2 : Applied Energy Research and Innovation

The Act provides in detail for SANEDI's Mandate



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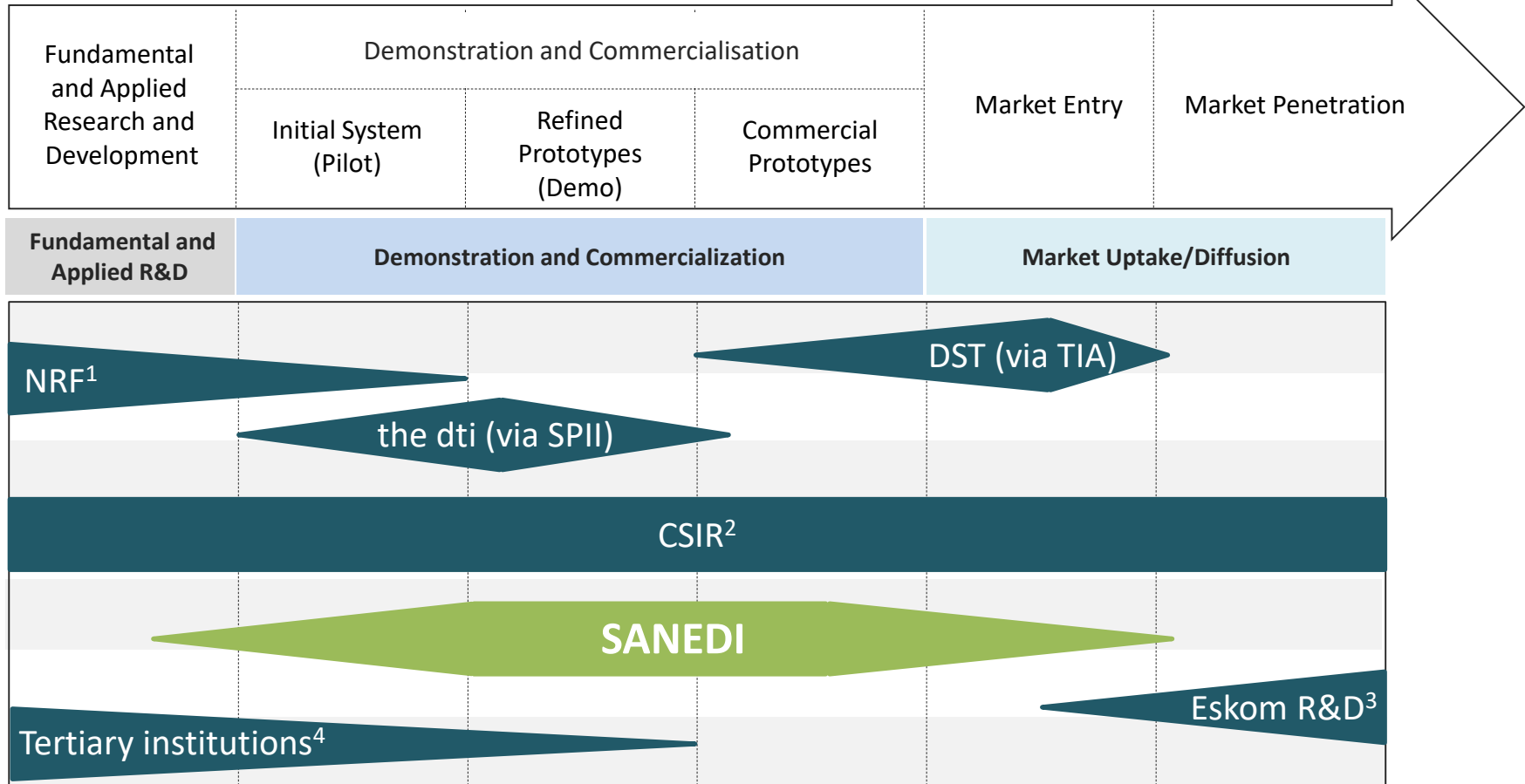
Programme 3 : Energy Efficiency

Within the available budget, SANEDI's efforts had to be focused for greatest impact (role players)



Focus has been informed by other role players in the energy research and development space

Innovation Value Chain, Stages



Note 1. Including THRIP; Note 2. Focused on making private sector businesses more efficient. Note 3. Focus shifted to operational efficiency and innovation to address operational challenges; Note 4. Tertiary institutions such as the ERC, UP Energy Hub, etc. are funded from a combination of funds from the Department of Higher Education, DST, Industry, etc.



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Strategic Plan 2020-2025

ENERGY INNOVATION FOR LIFE

Mission, visions, Impact statement and Outcomes



SANEDI's strategic direction cascades well from the vision through to the programme level.

Vision	Mission	Impact Statement	Outcomes	Programme
Sustainable living for growth and prosperity in Africa	Using applied energy research and resource efficiency to develop innovative, integrated solutions that will catalyse growth and prosperity	<i>Enabling decarbonisation and a just transition from a fossil fuel-based economy to an efficient cleaner energy economy for sustainable development.</i>	Smart Grid systems Piloted for Smart cities	Programme 2& 3
			Demonstrated GHG emissions mitigation potential in support of national commitments	
			An awareness of the technologies to be used in the transition process (for an increasingly aware society on energy transition solutions)	
			Evidence based planning, resource allocation and decision making enabled by accurate and timely information, datasets and data analytics	
			Energy transition expertise and competence building enabled	
			Internal Operational effectiveness and efficiency	Administration
			A capacitated, effective and efficient operational environment (within which SANEDI will discharge its mandate) – internal compliance	


Executive Summary




- 🌱 The strategic plan that we have developed has **three themes**:
- Climate Change and Decarbonisation,
 - Service Delivery within the Municipal Environment, and
 - Information, Knowledge and Technological Convergence.
- 🌱 Three themes, which **play to our existing strengths and expertise** in the areas of *sustainable energy, Renewable Energy Technologies, and Smart Grids*, continues to be the **appropriate focus enabling** us to harness the changing global and local environment.

Executive Summary



 SANEDI is committed in fulfilling the objectives of South Africa with respect to:

- **energy security and universal access.**

 The entity is fully behind the **Integrated Resource Plan (IRP) 2019** that considers the energy security as well as energy demand-supply balance.

DEPARTMENT OF MINERAL RESOURCES AND ENERGY

GOVERNMENT NOTICE

NOTICE _____ OF 2019

INTEGRATED RESOURCE PLAN 2019

I, **SAMSON GWEDE MANTASHE, MP**, Minister of Mineral Resources and Energy, hereby in terms of section 35 (4) of the Electricity Regulation Act, 2006 (Act No. 4 of 2006) read with item 4 of the Electricity Regulations on New Generation, 2011, publish the Integrated Resource Plan for implementation.

A copy of the Integrated Resource Plan 2019 is attached hereto.


A handwritten signature in black ink, appearing to read 'S. Gwede Mantashe', is written over a horizontal line.

Mr Samson Gwede Mantashe, MP
Minister of Mineral Resources and Energy

Date: 17/10/2019

Executive Summary



 SANEDI remains a key part of the National System for Innovation (NSI), as defined by the **White Paper on Science, Technology and Innovation** published under the custodianship of the Department of Science and Innovation (DSI).



Mission, visions, Impact statement and Outcomes



SANEDI's strategic direction cascades well from the vision through to the programme level.

Vision	Outcomes	Programme
Sustainable living for growth and prosperity in Africa	Smart Grid systems Piloted for Smart cities	Programme 2& 3
	Demonstrated GHG emissions mitigation potential in support of national commitments	
	An awareness of the technologies to be used in the transition process (for an increasingly aware society on energy transition solutions)	
	Evidence based planning, resource allocation and decision making enabled by accurate and timely information, datasets and data analytics	
	Energy transition expertise and competence building enabled	
	Internal Operational effectiveness and efficiency	Administration
	A capacitated, effective and efficient operational environment (within which SANEDI will discharge its mandate) – internal compliance	

Outcomes, Targets and National Priorities



National Priorities

Priority 1: A capable, ethical and developmental state

Priority 2: Economic transformation and job creation

Priority 3 : Education, skills and health

Priority 5: Spatial integration, human settlements and local government

Priority 7 : A better Africa and the World



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Annual Performance Plan

ENERGY INNOVATION FOR LIFE

Programmes



Programme 1: Administration

- Enabling internal control environment to execute our mandate.

Programme 2: 'Applied Energy research , development and innovation

- Undertaking/Support energy research , development and innovation
- Capacity building/Skills development initiatives
- Policy support initiatives
- DE -risking investment
- Market development/uptake for Energy

Programme 3: Energy Efficiency

- Energy efficiency intervention for a resource efficient economy and
- Maximising GDP per KWh produced/utilised

Programmes: Administration



Programme 1: Administration



- Enabling internal control environment to execute our mandate.



- 🇳🇬 Clean administration
- 🇳🇬 Unqualified audits
- 🇳🇬 Effective and efficient Internal controls
- 🇳🇬 Fit for purpose organisational design
- 🇳🇬 Competent and adequately skilled workforce
- 🇳🇬 IT systems
- 🇳🇬 Effective stakeholder engagement
- 🇳🇬 Effective risk management

Programmes: Administration



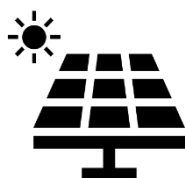
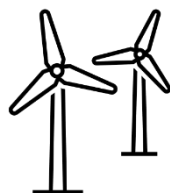
No	Indicator	Actual 2020/21	Target 2021/22
1.	Percentage critical business risk factors managed as per Risk Management Plan.	>90%	>90%
2.	Percentage implementation of Corporate Stakeholder Engagement Plan (CESP).	55%	85%
3.	Percentage implementation of Corporate ICT Plan.	80%	80%
4.	Unqualified audit achieved.	Unqualified audit report	Unqualified audit report
5.	Percentage of personnel trained as per Workplace Skills Plan (WSP).	80%	80%
6.	Vacancy rate of funded positions.	<5%	<5%
7.	Percentage deviation from employment equity targets.	<5%	<5%

Programmes: Applied Energy Research










Programme 2:

'Applied Energy research , development and innovation



- Undertaking/Support energy research , development and innovation
- Capacity building initiatives
- Policy support initiatives

-  Cleaner Fossil Fuels
-  Renewable Energy
-  Smart Grids
-  Data and knowledge Management
-  **Working for Energy(Retired)**
-  Cleaner Mobility
-  **Energy Secretariat (DSI funded-New)**

SANEDI's activities contribute across the entire energy landscape, to all of society



Cleaner Fossil Fuels

Carbon capture and storage
Carbon utilisation
Clean coal technologies
Hybrid systems



Smart Grids

Municipal / ESI sustainability
Integration of distributed and variable generation sources
Support for advanced appliances / electric vehicles



Cleaner Mobility

Electric vehicles
Clean fuels (NLG, CNG, etc.)
Public transport systems
Pedestrian / cycling enabled



Data and knowledge management

National energy data repository
Energy modelling skills and capacity
Analysis and modelling
Decision and planning support tools



Renewable Energy

Solar power
Wind energy
Waste to energy
Wave and ocean current
Storage
Skills development



Energy Secretariat

Administration/Project a manager of Energy RDI



Energy Efficiency

Improved resource efficiency
Technical assistance facility
Industry development
Tax incentives



Programmes: Applied Energy Research



Consolidated programme 2

No	Indicator	Actual 2020/21	Target 2021/22
1.	Number of energy solutions assessed (advisory notes, feasibility reports, complete study reports, case studies, technology roadmaps and operational demonstration facilities).	14	15
2.	Number of energy-related knowledge sharing events / platforms engaged in (own hosted, attended, knowledge presented, supported).	7	5
3.	Number of recipients of energy-related training facilitated .	120	40
4.	Number of annual Energy industry status reports (insights, trends, international and national collaboration decisions, interfacing and forums).	1	1

Programmes: Applied Energy Research



Consolidated programmed 2

No	Indicator	Actual 2020/21	Target 2021/22
5.	Minimum number of energy-related datasets maintained per annum.	1	1
6.	Number of policy support instruments (industry roadmaps, sector development plans and industry support tools, etc).	3	3
9.	Number of energy-related research students / contracted researchers supported (e.g. bursaries, non-bursaries, contract opportunities, infrastructure support, etc).	1	1

Programmes: Applied Energy Research



Consolidated programme 2

No	Indicator	Actual 2020/21	Target 2021/22
8.	Fully functional Data and Knowledge Management (DKM) facility in-house within SANEDI.	n.a	1
9.	Number of national energy programmes for which data is available / captured.	n.a	1



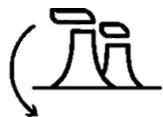
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Programme 2: Sub-programmes

Programmes: Applied Energy Research



Cleaner Fossil Fuels

- *Investigate/pilot the clean coal technologies that will ensure that we do not sterilise existing coal fleet*
- Support **Coal to X programme** under the energy Secretariat funded by the DSI
- Exploring opportunities for Hydrogen as part of the Hydrogen Economy is SA
- Research for other Clean Coal interventions in partnership with universities and other partners working in the area of clean coal.

No	Indicator	Actual 2020/21	Target 2021/22
1.	Number of energy solutions assessed (advisory notes, feasibility reports, complete study reports, case studies, technology roadmaps and operational demonstration facilities).	No targets – transferred to CGS	1

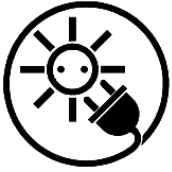
Programmes: Applied Energy Research



Renewable Energy

- Pilot Renewable energy technologies in various applications :
 - **Wind Energy** – Continue with activities under the WASA 3 project as part of the SAWEP programme (DMRE, DSI, CSIR, DTU, UCT, UNDP, SANEDI), project co-ordinator for the SAWEP programme. DMRE Exploring WASA 4.
 - **Solar Thermal**
 - SOLTRAIN – **Capacity building and technology installations**
 - Solar Thermal Lab in partnership with the CSIR
 - **Solar PV** – Partnership with DoD, Pilot sites for RE technologies and capacity building initiatives.(includes EE interventions)
 - **Bioenergy(Waste)** – In partnership with NECSA , mobile Plaswen Waste to energy plant.
 - **Bio-oil/diesel** – In partnership BBI and GDARD- **Capacity building and creating employment opportunities** in the sector.
 - Support for the SARCHI chair of Waste (Participation Active participation) in research that will contribute towards **Waste to Energy Roadmap (with other partners)**

Programmes: Applied Energy Research



Renewable Energy

- Awareness creation and engagement of stakeholders on RE technologies to obtain buy in.
- Capacity building initiatives in partnership with the **EWSETAs and TVET** colleges with specific focus on empowerment youth and women.
- Publications and insights on development in the Energy sector.

Programmes: Applied Energy Research



Smart Grids

- Integration of information systems into municipal power supply infrastructure to introduce efficiencies in power supply, billing , collection and asset management.
- SANEDI, through the South African Smart Grids Initiative (**SASGI**), supports the South African Local Government Association (SALGA) and the Department of Cooperative Governance and Traditional Affairs (COGTA) with the **development and institutionalization of the Smart Grid programme** as an approach to enable municipal revenue management, the introduction of RE and effective service delivery.
- Technical Support to the National Treasury on the work for the IMTT
- Enabling connection of renewables into the grid, better grid management and improvement in reliability of energy supply
- Evaluating impact of renewables of municipal revenues and infrastructure

Programmes: Applied Energy Research



Data knowledge Management

- Creation of a **data repository** , SANEDI is creating a data centre for energy data in South Africa
- Data resources currently being maintained by SANEDI:
 - **Wind Atlas of South Africa**
 - **Section 12L and 12I Energy Efficiency Tax Incentive Data-bases**
 - **Building Energy Performance Certificate Register**
 - **A National Energy Service Company (ESCO) Register**
 - **BIG EE database**
- Data collection , analysis and publications to inform energy decision (Sector reports, research reports, annual industry insights etc.
- Database of information that will inform work and progress around Just transition initiatives
- Investigations underway for database for Hydrogen developments locally and tracking thereof



Data knowledge Management

- New databases :
 - Commercial database,
 - Industrial database,
 - Agricultural database,
 - Standards & Labelling
 - database and Public Infrastructure database (Public Buildings & Wastewater Treatment Plants).

Programmes: Applied Energy Research



Energy Secretariat

- SANEDI has been appointed by the DSI to run the DSI Energy Secretariat on its behalf.
- The Secretariat is an administrative office/project management which carries out the substantive and administrative work as directed by DSI.
- The objective of establishing the Energy Secretariat is to:
 - **support the successful commercialisation, and upscaling of knowledge outputs** from the broader DSI energy RDI portfolio and ensuring systemic impact in the NSI.
- The SANEDI-DSI collaboration is Initially a 3 year programme with an estimated budget of **R150 million per annum**.
- UK-PACT has approved skills share support for the establishment of the Secretariat.

Programmes: Applied Energy Research ...



Energy Secretariat

- Flagship programmes the Energy Secretariat will be responsible for:
 - Hydrogen South Africa(HySA),
 - Energy Storage RDI Initiative,
 - Renewable Energy Hub and Spokes,
 - Coal CO2 to X RDI Programme,

Programmes: Applied Energy Research



Cleaner Mobility

- Partnering with UNIDO, Uyilo, department of transport , municipalities
- Programme will focus on:
 - Electrification of Public transport (BRT/Rail – BEV/FCEV/Hybrids)
 - Feasibility study and business case
 - Pilots and demonstrations
 - Infrastructure planning (Charging and refuelling stations)
 - Greening the municipal fleet
 - Feasibility study and business case
 - Pilots and demonstrations
 - Infrastructure planning (Charging and refuelling stations)
 - Business models



**Programme
3:**
Energy
Efficiency

- Energy efficiency intervention for a resource efficient economy and
- Maximising GDP per KWh produced/utilised
- De-risking EE investment
- Market Development



Energy Efficiency

- SANEDI (EE) will be supporting the **DMRE**, (the Department of Public Works and Infrastructure (**DPWI**) and the Department of Cooperative 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 RE and energy-efficient technologies,
And
 2. To achieve **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.

Programmes: Energy Efficiency



Energy Efficiency

- SANEDI (EE), 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 (EEPBP)'
- **Continue the management of the Section 12L** Energy Efficiency Tax Incentives on behalf of SARS (extended to 31 December 2022)
- Build on **Cool Surfaces Pilot** successes with a **further 1000 000 m2** coated with cool surfaces and market development in this area. (Utilising winning from the award of USD 100 000 global competition)
- **Pioneering development work on 'Digitilisation** in the Energy Efficiency Industry' and Hydrogen fields.
- Extending the Appliance **Standards & Labelling (S & L)** programme, by including energy efficient electric motors.

Programmes: Energy Efficiency



Energy Efficiency

- SANEDI, with the support of German Agency for International Cooperation (GIZ), has managed to **partially resurrect this Energy Services market**, with the development of training programmes and a national register of ESCos,
- **Upscaling work in the Energy Service Company (ESCO), Market Development**, focusing on **women, youth & people with disabilities**.
- SANEDI hosted the Technical Assistance Facility (TAF), providing technical assistance to financial institutions and potential customer, for qualifying energy projects

Programmes: Applied Energy Research



Energy Efficiency

No	Indicator	Actual 2020/21	Target 2021/22
1.	Number of EE solutions implemented.	1	15
2.	GHG emissions reduced (tonnes CO ₂).	n/a	1.5 tonnes
3.	Number of EE solutions assessed.	n/a	1 000 000 m ² - leading to 0.5 tonnes
4.	Area coated (m ²) and GHG emissions reduced (tonnes CO ₂).	2	1
5.	Number of EE energy-related datasets maintained per annum.	4	4

Programmes: Applied Energy Research



Energy Efficiency

No	Indicator	Actual 2020/21	Target 2021/22
6.	Number of EE performance certificates issued.	1	1
7.	Functional database.	n.a	1



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Budget

ENERGY INNOVATION FOR LIFE



- SANEDI derives its revenue through transfers from the department and through donor funding.
- The MTEF allocation is utilised to leverage and generate revenue from donors to support the programmes.
- Baseline adjustments can potentially impact SANEDI's ability to secure additional revenue required when entering into donor funding agreements.
- Due to the impact of COVID-19 and the economic impact the pandemic had globally and locally, it is anticipated that donor revenue will dwindle further, also as South Africa is perceived as an emerging economy.
- Based on the above SANEDI will need to focus on narrowing down projects within the existing programmes whilst ensuring that its impact is more focused on job creation and will have to have an increased focus on sourcing alternative sources of funding.

Budget Allocation MTEF



	2021/22	2022/23	2023/24
Rand thousand	R'000	R'000	R'000
Indicative baseline	82,517	86,478	90,370
MTEF Reductions	-7,335	-5,406	-8,987
Revised Baseline	75 182	81 072	81 383

Actual vs Budget Highlights



	2016/17		2017/18		2018/19		2019/20	
R'000	Budget	Audit outcome	Budget	Audit outcome	Budget	Audit outcome	Budget	Audit outcome
Total Revenue	324 652	84 770	238 919	142 596	174 031	117 440	232 414	96 333
Goods and services	267 084	59 450	190 018	99 348	121 278	50 044	179 020	32 626
Compensation of Employees	51 961	49 637	46 512	47 084	50 233	36 404	50 735	39 214

Historical Performance



- 🌱 Expenditure for the organisation is linked to the total amount of income the entity can secure for implementation of various projects.
- 🌱 Year on year expenditure for the organisation is a direct function of the total amount of income the entity can secure for implementation of various project. As a result, significant fluctuations occur year on year.
- 🌱 Operational Expenditure is mainly made-up of compensation of employees and goods and services. This includes research and development costs.
- 🌱 Compensation of employees has historically increased by 6%-7%, this is expected to increase by 4% on average. Actual costs amounted to R39 million for the 2019/20 period.
- 🌱 The expectation in 2021 will be that this will increase to R43 million mainly because of proposed amendments to SANEDI's operating model following the organisational review.

Budget 2021/22



Medium-term estimate

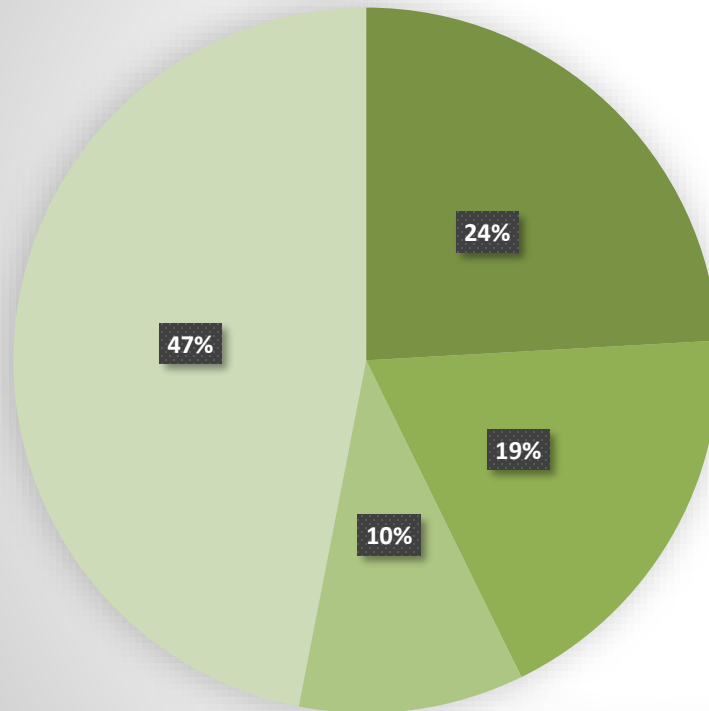
R'000

	2021/22	2022/23	2023/24
Interest, dividends and rent on land	1 000	4 672	4 882
Transfers received	90 905	81 072	81 383
Total revenue	91 905	85 744	86 265
Current expenses	91 905	85 744	86 265
Compensation of employees	43 139	45 001	46 881
Goods and services	45 792	36 717	35 178
Depreciation	2 974	4 026	4 207
Total expenses	91 905	85 744	86 265
Surplus/(Deficit)	–	–	–

Budget Expenditure



2021/22



- Programme 1: Administration
- Programme 3: Energy efficiency programme
- Programme 2: Applied Energy Research, Development & Innovation
- Compensation of Employees

Budget Summary



- The entity has a budget allocation estimated at R90million, coming from the MTEF and will also be receiving donor funding of R13.50 million through the general budget support for projects which are implemented by the department in collaboration with SANEDI towards improving the energy performance of government buildings and achieving a net-zero energy wastewater treatments plants.
- The 2021/22 budget expenditure will be spent towards the Compensation of Employees and goods and services 47% and 53% respectively.
- Expenditure is expected to reduce by more than 4% from 2019/20 due to budget reprioritisations, the transfer of Carbon Capture and Storage, and a reduction of spending on goods and services.
- Cost containment measures will continue to be implemented to contain expenditure especially in programme 1 relating to operational expenditure.
- New business development will also be our core focus as well as implementation of the Organisational review recommendations.
- Alignment to government priorities of job creation and commercialisation in order to improve cash flows.
- Core mandate expenditure relating to programme 2 and 3, that is applied Energy Research and Energy Efficiency, will see an increased focused on more self sustainable projects and reprioritisation within project that's is mainly focused on developing innovative clean energy solutions.



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Strategic risks

Key Risks



Outcome	Key Risks	Risk Mitigation
Smart city (visibility and control, CO ₂ mitigation, energy diversity, interconnection)	<ul style="list-style-type: none"> • Lack of co-ordination between departments and teams • Lack of municipal skills to drive implementation • 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-ins 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)

Key Risks



Outcome	Key Risks	Risk Mitigation
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 an 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 localized reference case

Key Risks



Outcome	Key Risks	Risk Mitigation
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 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 DPME
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 sect. 7 of the NEA