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1. EXECUTIVE SUMMARY

This Strategic Plan de nes the strategic purpose of SANEDI and sets out a compelling vision of the direc on in which the Ins tute intends to progress. It assists in establishing the priori es, iden es the long-term goals and iden es the best approach to achieve these goals.

SANEDI's mandate is derived from the authority and obliga ons set out in various government policies, legisla on and cons tu onal requirements. These include, but are not limited to, the South African Cons tu on, the Na onal Energy Act, Ministerial Direc ves, the White Paper on Energy Policy, the Na onal Development Plan and the Industrial Policy Ac on Plan (IPAP).

Sustainable energy supply is a cri cal component in economic growth and development. However, the challenge of providing access to clean, reliable and a ordable energy in support of socio-economic developmental needs, and addressing major environmental challenges including climate change, has proven to be problema c interna onally. It is generally recognised that, in order to meet the intensifying climate challenge; the global (carbon intensive) energy system must undergo a fundamental transforma on.

Many developed and fast-developing countries have already commenced with the transi on to a low-carbon economy as a compe ve and development priority, understanding that this will require far-reaching changes in technology, nance, policy and societal behaviour. Amidst the electricity crisis, South Africa nds itself at a cri cal juncture faced with urgent and important energy related decisions that will have a signi cant impact on its future. Two key building blocks of sustainable energy solu ons, and a low carbon economy, relate to energy innova on and energy conserva on, which also describe the essence of SANEDI's composi on and focus.

SANEDI has a cri cal role to play in ensuring that South Africa will have the necessary informa on and planning support (regarding, amongst others, emerging technologies, innova ve prac ces, alternate energy solu ons, advanced infrastructure, energy data) to plan for a sustainable and secure energy future that will also sa sfy the country's economic, social and environmental needs.

SANEDI has to in uence/facilitate an immediate and cri cal change in the country's energy culture towards more considered and sustainable energy prac ces.

Within the overall Government planning context, SANEDI will primarily contribute to three of the na onal priority outcomes, referred to as the 'Change Agenda'. SANEDI will be the principal partner of the Department of Energy (DOE), in its e ort to a ain the energy policy objec ves with par cular focus on those that relate to (1) achieving macro-economically e cient produc on and ra onal use of energy, (2) s mula on of renewable energy sources and of innova ve energy technologies and processes, and (3) related job crea on and green industry development aligned with IPAP.

Through thorough analysis, three speci c Strategic Outcome Orientated Goals have been iden ed for SANEDI. Three priority programmes have been iden ed for the ve years from 2013/14-2017/18 towards the three goals. Each of the three programmes will in one way or the other contribute to the reduc on of the carbon intensityoftheeconomybyeitherredu1cingtheenergyintensityorthecarbonintensityofenergysupply,orboth, as expressed in the following equa on :

Various strategic objec ves in turn support the programmes. Each strategic objec ve has been structured to be measurable against a de ned baseline to ensure progress tracking and mely correc ve ac ons.

1 World Resources Ins tute (WRI), December 2005.

STRATEGIC OUTCOMES	PROGRAMMES	STRATEGIC OBJECTIVES (short titles)
All/Crosscutting	1. Corporate governance and Administra on	• Corporate, execu ve, nancial, informa on, supply chain management, governance and compliance support to the Institute • Strong collabora ve approach and strategic international collaboration
Enable well informed and high confidence energy planning, decision-making and support policy* development Support accelerated transformation to a less energy and carbon intensive economy	2. Applied energy research and development including subprogrammes for: • Cleaner Fossil Fuels • Carbon Capture and Storage • Renewable Energy • Smart Grids • Working for Energy • Data and Knowledge Management • Green Transport	• Knowledge crea on in support of policy direc on i.e. viable cleaner energy options • Knowledge crea on in the energy mobility and green transport sector in support of policy direc on • Intelligent energy systems infrastructure • Demonstrate cleaner energy technology opportuni es and solu ons • Due custodianship of knowledge and data developed within SANEDI
Foster a culture of energy e ciency and more ra onal energy use	3. Energy efficiency programme	• Support the Income Tax Amendment Act sec on 12I and 12L rela ng to the tax rebate for energy e ciency improvements • Management of the EEDSM Hub and oversight of the Hub to a CORD • Provide Industry support and capacity building • Provide a Na onal Champion coordina ng service for all energy e ciency awareness and promo on ini a ves • Establish a Na onal Measurement and Veri ca on centre

* Please note that in this and all references to policy development, SANEDI's role is an enabling or support role. Decisions regarding policy se ng do not reside with SANEDI and this plan does not intend to suggest that.

Each programme and goal has been selected based on its alignment with the SANEDI focus areas described in the Business case, the outcomes that relate to the Minister of Energy's commitments (Key Performance Indicators) and the Department of Energy priority programmes as de ned in their amended- Strategic Plan.

The primary linkages between these programmes and commitments:

SANEDI Programme	Departmental Programmes		Minster's KPIs (Government Outcomes, 27 May 2011)	
	Programme 2: Energy Planning and Policy[2]	Programme 5: Clean Energy[3]	OUTCOME 6[4]	OUTCOME 10[5]
Programme 1: Corporate Governance and administra on				
Programme 2: Applied Energy Research	✓	✓	✓	✓
Programme 3: Energy Efficiency Programme		✓		✓

2 DoE Programme 2 Energy Planning and Policy: Evidence-based planning, policy se ng and investment decisions in the energy sector and improved energy regula on and compe on.

3 OE Programme 5: Clean Energy: Development and implementa on of clean and renewable energy and energy e ciency ini a ves.

4 An ffcient, competitive and responsive economic infrastructure.

5 Environmental assets and natural resources that are well protected and continually enhanced.

MOTIVATION FOR PUBLISHING A STRATEGIC PLAN FOR 2016/17 – 2020/21 PLAN

The Strategic Plan articulates SANEDI's Vision, Mission, Core Values and Strategic Outcome Orientated Goals; and also describes the three programmes that have been defined to support SANEDI's mandate as energy development institute and for considerably enhanced service delivery over the planning horizon.

The Framework for Strategic Plans and Annual Performance Plans determines that a Strategic Plan should cover a period of at least five years, ideally from the first planning cycle following an election, linked to the identified outcomes of Government. All government departments and entities were expected to compile a strategic plan for the period 2016/17 - 2020/21. SANEDI had been through an intensive strategic planning session in October/November 2015 which was used to set priorities for the coming year so that employees and stakeholders are working towards common goals.

The Strategic Plan reflects a narrowing of the focus from a broad pipeline of activities to a select few flagship initiatives that can demonstrate relevance, performance and governance on behalf of the national Government.

FOREWORD

The next five years will be pivotal for SANEDI as it seeks to provide essential energy research, development, demonstration and deployment support especially if one considers the Eskom's inability to keep the "lights burning." This is SANEDI's opportunity to position itself as a pillar of support and important partner to government, to leverage existing activities and opportunities and to create new avenues that will address the evolving needs of the South African energy community. This Strategic Plan is intended to provide SANEDI with a solid foundation for moving forward.

During the period of this plan, SANEDI will focus its attention on the following goals:

- By 2030, ensure universal access to affordable, reliable and modern energy services
- By 2030, increase substantially the share of renewable energy in the global energy mix
- By 2030, double the global rate of improvement in energy efficiency
- By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
- By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support

Implementation of the plan and the delivery of a coherent energy development service to government and industry will require that SANEDI continue to develop and explore ways to partner with other agencies and organisations, both public and private.

The current plan emerges from a thorough process of discussion and review within SANEDI, but also reflects initial discussions with key stakeholders and inputs and direction taken from the national Department of Energy (DOE). Their wisdom, advice, and judgment, together with documented national policy direction, serve as the basis for this strategic endeavor. SANEDI endeavors to pursue these discussions before finalising the plan to ensure that SANEDI delivers a valuable contribution to the DOE and the South African government and public.

I wish to emphasize that the Strategic Plan is a statement of intent, the first step in a long and creative endeavor to develop and grow the contribution of SANEDI.

I encourage stakeholders and role players to embrace this plan, but also to engage with SANEDI to continue to refine and evolve SANEDI's contribution to be responsive to the most pressing energy challenges and priorities.

As executive authority, I commit SANEDI to executing the plan and delivering the goals and objectives described, subject to the availability of funding.

MS RN MLONZI
Chairperson of the SANEDI Board
Executive Authority

OFFICIAL SIGN-OFF

It is hereby certified that this Strategic Plan:

Was developed by the management of SANEDI under the guidance of the Department of Energy. Takes into account all the relevant policies, legislation and other mandates for which SANEDI is responsible. Accurately reflects the strategic outcome oriented goals and objectives which SANEDI will endeavor to achieve over the period 2016/17 – 2020/21.

Ms Lethabo Manamela Signature: .....
Chief Financial Officer

Ms Deshnee Govender Signature: .....
Head Official responsible for Planning

Mr Kadri Nassiep Signature: .....
Accounting Officer

Approved by

MS RN MLONZI Signature: .....
Chairperson of the SANEDI Board
Executive Authority

1. EXECUTIVE SUMMARY

This Strategic Plan defines the strategic purpose of SANEDI and sets out a compelling vision of the direction in which the Institute intends to progress. It assists in establishing the priorities, identifies the long-term goals and identifies the best approach to achieve these goals.

SANEDI's mandate is derived from the authority and obligations set out in various government policies, legislation and constitutional requirements. These include, but are not limited to, the South African Constitution, the National Energy Act, Ministerial Directives, and the White Paper on Energy Policy, the National Development Plan and the Industrial Policy Action Plan (IPAP).

Sustainable energy supply is a critical component in economic growth and development. However, the challenge of providing access to clean, reliable and affordable energy in support of socio-economic developmental needs, and addressing major environmental challenges including climate change, has proven to be problematic internationally. It is generally recognised that, in order to meet the intensifying climate challenge; the global (carbon intensive) energy system must undergo a fundamental transformation.

Many developed and fast-developing countries have already commenced with the transition to a low-carbon economy as a competitive and development priority, understanding that this will require far-reaching changes in technology, finance, policy and societal behaviour. South Africa has many lessons to be learnt from China who is the world's leading producer of renewable energy and also leads the world in clean energy investment. From once being a high emitter of greenhouse gases seeing that it was a fossil based economy, a transition is being made towards a low carbon economy.

Two key building blocks of sustainable energy solutions, and a low carbon economy, relate to energy innovation and energy conservation, which also describe the essence of SANEDI's composition and focus.

SANEDI has a critical role to play in ensuring that South Africa will have the necessary information and planning support (regarding, amongst others, emerging technologies, innovative practices, alternate energy solutions, advanced infrastructure, energy data) to plan for a sustainable and secure energy future that will also satisfy the country's economic, social and environmental needs.

SANEDI has to influence/facilitate an immediate and critical change in the country's energy culture towards more considered and sustainable energy practices.

Within the overall Government planning context, SANEDI will primarily contribute to three of the national priority outcomes, referred to as the 'Change Agenda'. SANEDI will be the principal partner of the Department of Energy (DOE), in its effort to attain the energy policy objectives with particular focus on those that relate to (1) achieving macro-economically efficient production and rational use of energy, (2) stimulation of renewable energy sources and of innovative energy technologies and processes, and (3) related job creation and green industry development aligned with IPAP.

Through thorough analysis, three specific Strategic Outcome Orientated Goals have been identified for SANEDI. Three priority programmes have been identified for the five years from 2016/17-2020/21 towards the three goals. Each of the three programmes will in one way or the other contribute to the reduction of the carbon intensity of the economy by either reducing the energy intensity or the carbon intensity of energy supply, or both, as expressed in the following equation[1]:

1 World Resources Ins tute (WRI), December 2005.

Various strategic objectives in turn support the programmes. Each strategic objective has been structured to be measurable against a defined baseline to ensure progress tracking and timely corrective actions.

STRATEGIC OUTCOMES	PROGRAMMES	STRATEGIC OBJECTIVES (short titles)
All/Crosscutting	1. Corporate governance and Administra on	• Corporate, executive, financial, information, supply chain management, governance and compliance support to the Institute • Strong collaborative approach and strategic international collaboration
An accelerated transformation to a lower carbon economy , in support of international commitments made by SA under UNFCC and in response to growing threat of climate change	2. Research Development, Demonstration and Deployment Sub-programmes : • Clean Energy Technology Development • Human Development Capital Development Programme • Cleaner Mobility Programme • Renewable Energy • Cleaner Fossil Fuels • Data Repository and Management • Smartgrids • Working for Energy	Transform the energy market in SA to achieve the following : • Establish local industries that localize technology manufacture • Develop a supporting skills base for manufacturing, installation. O&M, decommissioning, etc • Reduce barriers to entry of new participants in energy market e.g. SANAS –accredited M&V practitioners , resource maps, CCS storage atlas, etc • Bridge the " Technology Valley of Death" funding and skills shortfall • Support the development, demonstration and development of a business case for " first of breed" low carbon technologies • Develop framework for commercialization of new technologies supporting decarbonisation • Support R&D capacity at national research centres • Supply the information gap that exists in Government to facilitate policy development, planning, revenue collection
A data repository key energy data and modelling capability that can be used by government to ensure sustainability of energy supply , inform and educate consumers, promote the uptake of technologies supporting decarbonisation		
Reduced dependency on grid based electricity, water and other resources		Reduce environmental impact associated with : • Exploration, production, transport, conversion, storage of energy • Moving consumers from A to B • Construction and building envelope • Mining of other materials and metals
Viable municipalities who understand their consumers' needs better and are able to offer a modern, affordable and diverse service offering to its market		
Stronger community participation and awareness of need to adopt modern, affordable and sustainable energy options		
An enabling environment that is created for new entrants to markets		
Increased implementation of energy efficiency, thereby enhancing overall productivity of the country	3. Energy efficiency programme	• Promotion of EE programme • Tax Incentive Programme, housing 12I and 12L activity • Human Capital Development Programme, housing the EE • Centre • Provide a National Champion coordinating service for all energy efficiency awareness and promotion initiatives • Establish a National Measurement and Verification centre

* Please note that in this and all references to policy development, SANEDI's role is an enabling or support role. Decisions regarding policy setting do not reside with SANEDI and this plan does not intend to suggest that.

Each programme and goal has been selected based on its alignment with the SANEDI focus areas described in the Business case, the outcomes that relate to the Minister of Energy's commitments (Key Performance Indicators) and the Department of Energy priority programmes as defined in their amended- Strategic Plan.

Due to the significant contribution of the energy sector towards South Africa's high carbon emissions, SANEDI Programmes and sub – programmes were also considered in terms of the positive contribution it would make in reducing carbon intensity and advancing clean energy. SANEDI's priority programmes therefore directly support the mitigation plans and approaches identified in the National Climate Change Response White Paper published October 2011.

The priority mitigation options, as identified in Section 6.3 of the Climate Change Response Plan, were defined as:

Option 1: Shifting to lower carbon generation options;

Option 2: Significant upscaling of energy efficiency applications;

Option 3: Promoting transport related interventions;

Option 4: Carbon capture and storage in the synthetics fuels industry;

Option 5: Mitigating non-energy emissions in agriculture and land use; and

Option 6: Transitioning society and economy to more sustainable consumption and production patterns.

SANEDI plays a leading role in three of the identified near-term priority flagship programmes as defined in Section 8 of the White Paper:

8.1 The Climate Change Response Public Works Flagship sub- programme Working for Energy.

8.4 The Energy Efficiency and Energy Demand Side Management Flagship Programme: SANEDI energy efficiency.

8.7 The Carbon Capture and Sequestration Flagship – sub- programme: Cleaner Fossil Fuels which includes Carbon Capture and Storage

Delivery of the full scope will require a significant investment, but will also offer significant short and long-term economic, environmental and social benefits resulting from a transition to a low-carbon, less energy intensive economy.

SANEDI's allocation for operational expenditure which is linked to Programme 1 for the 2016/17 financial year is R 55,807million.

Details of the cost breakdown per annum are included as Appendix D to this plan.

SANEDI is committed to delivering the goals and objectives described in this plan, subject to the availability of funding.

2. VISION

To be the leading clean energy solutions provider for a low carbon South Africa

3. MISSION

Accelerating the implementation of energy research and development, improving energy efficiency and increasing the uptake of renewable energy to the benefit of SA

4. VALUES

Innovation	Refers to new ideas, new ways of doing things or even a new application technology. An example of workplace innovation is the introduction of new procedures in the company, the introduction of different processes to improve work methods or the introduction of new technologies on the technical arena.
Accountability	Means being answerable for an action. Each staff member must take responsibility for their role and be accountable for their actions.
Transparency	It means frankness, openness, straightforwardness, brazenness, boldness. In the workplace, straight communications should be encouraged eg: leadership being transparent in the workplace has many benefits like problem- solving, healthy working relationships, trust and ultimately improved performance. Performance is always compromised when there is no transparency.
Batho Pele	Is a service delivery flagship for Government and means "People First" – putting people first before considering your own needs. The 8 principles are: consultation, service standards, access, courtesy, information, openness and transparency, redress and value for money.
Integrity /Honesty	Is the quality of being honest and sincere and having strong moral principles – thinking and doing what is right at all times. Honesty expresses self-respect and respect for others. Honesty lives with openness and reliability. Where there is dishonesty, there is no respect for oneself nor others. Dishonesty seeks shade and concealment.

5. LEGISLATIVE AND OTHER MANDATES

SANEDI's mandate is derived from the authority and obligations set out in the following policies, legislation and constitutional requirements:

5.1 CONSTITUTIONAL MANDATES

The South African Constitution (Act 108 of 1996), states that the people of South Africa have the right to an environment that is not detrimental to human health, and impose duty on the state to promulgate legislation and to implement policies that ensure this right is upheld. The environmental vision of the South African Government has however departed from a conservationist approach and committed itself to sustainable development with equal emphasis on social and economic development and environmental sustainability with this principle of sustainable development being adopted into the South African Constitution[2]. Section 24 states the following:

"and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

The Constitution therefore allows for national policy to be developed and implemented by the state to protect these rights and to secure ecologically sustainable development. This is interpreted as aiming to ensure that national (including energy) resources are adequately utilised and hence that the production and distribution of energy resources are done sustainably.

SANEDI's implied mandate in terms of the Constitution is to support policy development, planning and implementation of sustainable development policy objectives in the energy sector in its role as agency to Government and specifically the Department of Energy.

5.2 LEGISLATIVE MANDATES

The following act gave effect to SANEDI's existence and provides for its primary mandate and specific responsibilities:

Legislative Mandate	Description of the focus of the act	Stated or derived SANEDI mandate
National Energy Act, 2008 (Act No. 34 of 2008), Section 7 (2)	To ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements, international commitments and obligations and interactions amongst economic sectors; to establish institutions to be responsible for promotion of efficient generation and consumption of energy, energy modelling and planning, increased generation and consumption of renewable energies, energy research, contingency energy supply, holding of strategic energy minerals, adequate investment in, appropriate upkeep of and equitable access to energy infrastructure; to provide measures for the furnishing of certain data and information regarding energy demand, supply and generation; and to provide for matters connected therewith.	Provides for SANEDI to direct, monitor and conduct energy research and development as well as undertake measures to promote energy efficiency throughout the economy. Chapter 4 focuses on the establishment of SANEDI. The institute is intended to: • Promote energy efficiency in the economy; • Increase the GDP per unit of energy consumed; • Ensure energy resources used in optimal manner; • Promote energy research and technology innovation; • Increase players in the energy field; and • Facilitate effective management of energy demand and its conservation.

2 Section 24 of the Bill of Rights of the South African Constitution (Act 108 of 1996).

5.3 POLICY MANDATES

Key responsibilities of SANEDI as provided for in policies:

Legislative Mandate	Description of the focus of the act	Stated or derived SANEDI mandate
White Paper on Energy Policy, 1998	This White Paper has been written so as to clarify Government policy regarding the supply and consumption of energy for the next decade. The policy strengthens existing energy systems in certain areas, calls for the development of underdeveloped systems and demonstrates a resolve to bring about extensive change in a number of areas. It addresses international trade and co-operation, capacity building, and the collection of adequate information. The document is comprehensive, addressing all elements of the energy sector as practically as it can.	The White Paper highlights the importance of research funding and alludes to the intended function of SANEDI by highlighting the need for integrated research and a coordinated strategy: The White Paper states that Government will consider the development of a system to prioritise national research funding into the three main research categories in order to address the medium to long-term research needs in the energy sector. This will consist of an integrated, multi-year, national, needs-driven, energy research strategy, developed from time to time by an experienced team of experts appointed by the Minister. This strategy will identify medium and long-term priority programmes and themes.
National Energy Efficiency Strategy of the RSA, 2008	The vision of the strategy is to contribute to affordable energy for all, and to minimise the effects of energy usage on health & the environment. It is implemented through sector programmes. This Strategy allows for the immediate implementation of low-cost and no-cost interventions, as well as those higher-cost measures with short payback periods. These will be followed by medium-term and longer-term investment opportunities in energy efficiency. The Strategy acknowledges that there exists significant potential for energy efficiency improvements across all sectors of our national economy.	The South African National Energy Research Institute will be funded to carry out a dedicated programme of research and development for energy efficiency. The Strategy will support appropriate research and the possible adaptation of internationally available technologies and processes. Renewable Energy; Clean Fuels Programme, Energy Audits, Energy Management - The National Energy Research Institute will be funded to carry out a dedicated R&D programme for energy efficiency.
Energy Security Master Plan for Liquid Fuels, 2007	In the short term the master plan focuses on developing supply chain solutions to South Africa's fuel supply challenges, management of liquid fuels demand and energy response tactics. The log-term approach is broader and begins to integrate supply, demand, macroeconomics, geopolitics and climate change. It further seeks to allow for the making of well-informed choices with respect of energy supply, energy carriers, demand sector strategies, as well as energy transformation approaches, cognisant of the need to minimize negative impacts on the environment and the economy.	Amongst others, the master plan recommends that energy efficiency should be strongly promoted and calls for a review of present programmes in operation. The master plan also highlights the importance of having access to relevant and adequate data for due analysis and to inform modelling, scenario planning and decision-making. "impossible to develop adequate energy plans without appropriate data acquisition and modelling tools".

Legislative Mandate	Description of the focus of the act	Stated or derived SANEDI mandate
Energy Security Master Plan, 2007	The Master Plan is premised on achieving certain goals that have been set for the electricity sector. Due to the uncertainty over the planning horizon, some assumptions are made regarding demand projections and the economic outlook. After consideration of the Energy White Paper and the regulatory policy framework, the current electricity generation, transmission and distribution sectors are appraised, in terms of the challenges confronting these sectors.	Focused research and development will enable meeting technical performance and capacity expansion objectives. Electricity/energy-based technology development and innovation is imperative to productivity and growth of the country.
Integrated Resource Plan for Energy, 2010	Cabinet promulgated the Policy-Adjusted IRP in May 2010. It is a major step towards building local industry clusters and assists in fulfilling South Africa's commitments to mitigating climate change as expressed at the Copenhagen climate change summit. The Policy-Adjusted IRP includes the same amount of coal and nuclear new builds as the RBS, while reflecting recent developments with respect to prices for renewables. In addition to all existing and committed power plants (including 10 GW committed coal), the plan includes 9,6 GW of nuclear; 6,3 GW of coal; 17,8 GW of renewables; and 8,9 GW of other generation sources.	Section 7 of the policy adapted IRP 2010 identifies a Research Agenda for the subsequent IRP process that correlates closely with SANEDI's current and planned research activities. SANEDI is expected, as energy development institute, to support this list of research needs: • Distributed generation, smart grids and off-grid generation • Harnessing South Africa's coal resource • Decommissioning and waste management Technology options: • Small hydro; • Regional hydro options (specifically Inga Biomass (including municipal solid waste and bagasse); • Storage; and • Energy efficiency demand side management. • Vision for 2050 • Uncertainty & Risk factors
DST 10 Year Innovation Plan	The plan identifies the grand challenge areas as: • The Farmer to Pharma value chain to strengthen the bio-economy. • Space science and technology. • Energy security- the race is on for safe, clean, affordable and reliable energy supply, and South Africa must meet its medium-term energy supply requirements while innovating for the long term in clean coal technologies, nuclear energy, renewable energy and the promise of the "hydrogen economy". • Global-change science with a focus on climate change • Human and social dynamics.	The plan recommends, from an R&D perspective, to position SANEDI, Eskom, Sasol and various CEF subsidiaries to work together to advance clean coal technologies.

Legislative Mandate	Description of the focus of the act	Stated or derived SANEDI mandate
Measurement and Verification Guideline for Energy Efficiency Certificates (DRAFT)	The SA Government intends to introduce tax incentives for companies that can prove energy efficiency savings. One of the primary requirements for companies to benefit from this tax incentive is that they need to make use of independent and registered Measurement and Verification (M&V) professionals that are certified by the Council of Measurement and Verification Professionals of South Africa (CMVPSA).	This Measurement and Verification Guideline for Energy Efficiency Certificates aim to provide background with regards to the M&V requirements surrounding the energy efficiency tax incentive scheme. It also provides a high-level M&V approach that should be followed by registered M&V professionals to issue the required supporting documentation that will be used by SANEDI to issue Energy Efficiency Certificates.
Industrial Policy Action Plan (IPAP) 2010/11 – 2012/13, published Feb 2010	IPAP2, as it has become known, builds on the National Industrial Policy Framework (NIPF) and the 2007/08 IPAP. It represents a significant step forward in scaling up our efforts to promote long term industrialisation and industrial diversification beyond our current reliance on traditional commodities and non-tradable services. Its purpose is to expand production in value-added sectors with high employment and growth multipliers that compete in export markets as well as compete in the domestic market against imports. In so doing, the action plan also places emphasis on more labour absorbing production and services sectors, the increased participation of historically disadvantaged people and regions in our economy and will facilitate, in the medium term, South Africa's contribution to industrial development in the African region. IPAP2 also identified green and energy saving industries as one of a few qualitatively new areas of focus of industrial policy.	Section 13.3 of the plan makes specific reference to the green industries that offer economic opportunity and requires priority attention. Those highlighted below are best aligned with SANEDI's current and planned activities: • SWH; • Wind; • Photovoltaic power; • Concentrated Solar Thermal power; • Industrial Energy Efficiency; • Water efficiency; • Waste Management; • Biomass and waste management; and • Energy-efficient vehicles. Similarly, several of the Key Action Programmes (listed as items 13.3.1 – 13.3.11) identified in the IPAP correspond with SANEDI's focus areas and requires SANEDI's support of the plan. 13.3.1 Roll-out of national solar-water-heating programme – manufacturing and installation capacity. 13.3.2 Solar and Wind Energy. 13.3.3 Development of an industrial energy-efficiency programme. 13.3.4 Strengthen water-efficiency standards. 13.3.5 Demonstrate viability of Concentrated Solar Thermal (CST) power as a major renewable energy generation source. 13.3.6 Biomass Energy. 13.3.7 Clean and Multi-Energy Stoves. 13.3.8 Water- and Energy-Efficient Appliances 13.3.9 Efficient Motors, Variable-Speed Drives, Energy Metering and Control and Electricity Storage (Batteries and Fuel Cells). 13.3.10 Waste and Waste Water Treatment. 13.3.11 Green Industries special focus: The South African Renewables Initiative (SARi).

Legislative Mandate	Description of the focus of the act	Stated or derived SANEDI mandate
Carbon Capture and Storage Road Map	The Carbon Capture and Storage Road Map outlines the research and development of carbon capture and storage in South Africa from its initial potential stage to commercial operation. The Road Map addresses five stages, the current phase being a Pilot Carbon Dioxide Storage project. The following two stages comprise a full scale integrated demonstration project leading to commercial roll-out.	During May, 2012, the Cabinet endorsed the South African Carbon Capture and Storage Road map.
Climate Change Response White Paper	Eight flagship programmes of the Climate Change Response White Paper of the Department of environmental Affairs 1) Public Works 2) Water Conservation and Demand 3) Renewable Energy flagship 4) Energy Efficiency and Energy Demand Management 5) Waste Management 6) Carbon capture and sequestration 7) Adaptation Research	SANEDI's activities covers 50% of the eight flagship programmes

6. SITUATIONAL ANALYSIS

Global factors affecting energy market in SA

- Volatility in oil price and uncertainty in medium-term trend
  - Affects Sasol business sustainability
  - Delay in establishment of shale gas market
  - Delay in rapid roll-out of Plug in Hybrid Electric Vehicle (PHEV) technology
- International accord on emission reduction
  - Paris Agreement under United Nations Framework Convention on Climate Change(UNFCCC) (December 2015) creates a platform for emission reduction projects
  - Intended National determined Contributions (INDCs) are voluntary in terms of implementation but mandatory in terms of submission
  - Growing pressure on rapidly emerging economies to embrace binding targets
- Growing Renewable Energy Market
  - Some renewable technologies have reached grid parity with grid-based fossil fueled power generation
  - SA remains a favoured destination for RE technologies due to climate, market conditions, demand and local content / support
  - import quality and quantity of renewable energy products and value-added services entering SA market has led to a growth in the market
- International investor confidence in SA economy
  - Decline in credit rating (Moody's, Standard & Poor) for both Eskom and sovereign credit-worthiness
  - Weaker exchange rate promotes exports but raises PPI and CPI/X – detrimental net impact on economy as balance of payments influenced more by oil imports than mineral / metal commodity sales
- International targets for Energy Access
  - Sustainable Development Goal 7 of SE4ALL (UN)
- Local factors affecting energy market in SA
  - Policy signals to market
    - REIPPP Programme linked to well-publicised IRP plan
    - IEP2, NDP largely ignored at present – IRP 2010 requires revision
    - Energy White Paper, RE White Paper, EE Strategy require updating
    - Climate Change Response Strategy will guide response measures to climate change
    - Nuclear Build will compete with additional cleaner fossil fuel-based power generation
  - State of economy and projected trends
    - Slower growth with possible stagflation over 5-year horizon
    - Growing unemployment with reduced investment in large infrastructure projects and local manufacturing,
    - Decline in municipal and utility revenue – lower sales due to growing trend in customers switching to own production and consumption, poor revenue collection, poor metering and asset management
    - Lower consumption due to ailing economy and high electricity tariffs

- Energy Access in SA
  - About 86% of SA has grid-based electricity – remaining 14% are targets for off-grid and distributed generation

6.1 PERFORMANCE ENVIRONMENT

A PESTLE[3] analysis framework was used as a basis for a comprehensive environmental analysis for SANEDI. A brief overview of the most pertinent considerations is highlighted here to contextualise the SANEDI Strategic plan.

Dimension	Public benefits of research and technology innovation	
Techno-economic	Improvement of industrial competitiveness	National economic growth
	Reduction of the energy intensity of the national economy	SME development (e.g. ESCO, Certification entities, component manufacturing)
	Technological and service exports	Economic efficiency
Environmental	Optimal use of renewable resources	Biodiversity
	Climate change	Sustainable development
	Air quality	
Social	Access to energy	Reduce cost to consumers
	Employment creation	Empower consumers
	Equity issues related to energy	
Strategic	System reliability, loss reduction, quality of energy	Security of energy supply
	Regional development	Improve the technological services balance of trade
	Domestic technology capacity building	Create industrial base for energy technology
	Diversification of energy mix	

6.2 ORGANISATIONAL ENVIRONMENT

SANEDI is an implementation agency of Government, specifically the Department of Energy, created for the sole purpose of assisting the State to achieve its strategic objectives as set out in the National Energy Act, 2008 (No. 34 of 2008), i.e.:

- Ensure uninterrupted supply of energy to the Republic;
- Promote diversity of supply of energy and its sources;
- Facilitate effective management of energy demand and its conservation;
- Promote energy research;

3 Political, Economic, Socio-cultural, Technology, Legislative, Environmental.

- Promote appropriate standards and specifications for the equipment, systems and processes used for producing, supplying and consuming energy;
- Ensure collection of data and information relating to supply, transportation and demand;
- Provide for optimal supply, transformation, transportation, storage and demand energy that are planned, organised and implemented in accordance with a balanced consideration of security of supply, economics, consumer protection and a sustainable development;
- Provide for certain safety, health and environment matters that pertain to energy;
- Facilitate energy access for improvement of quality of life of the people the Republic;
- Commercialise energy-related technologies;
- Ensure effective planning of energy supply, transportation and consumption; and
- Contribute to sustainable development of the South African economy.

SANEDI will furthermore support the local renewable energy and Energy Efficiency and Demand Side Management (EEDSM) industries in South Africa in accordance with the Industrial Production Action Policy (IPAP) and, indirectly, also the climate change and mitigation, social and economic development and environmental sustainability priorities of the country.

As indicated earlier two key building blocks of sustainable energy solutions relate to energy innovation and energy conservation/efficiency. This is reflected in the high level organisational structure (Figure 1).

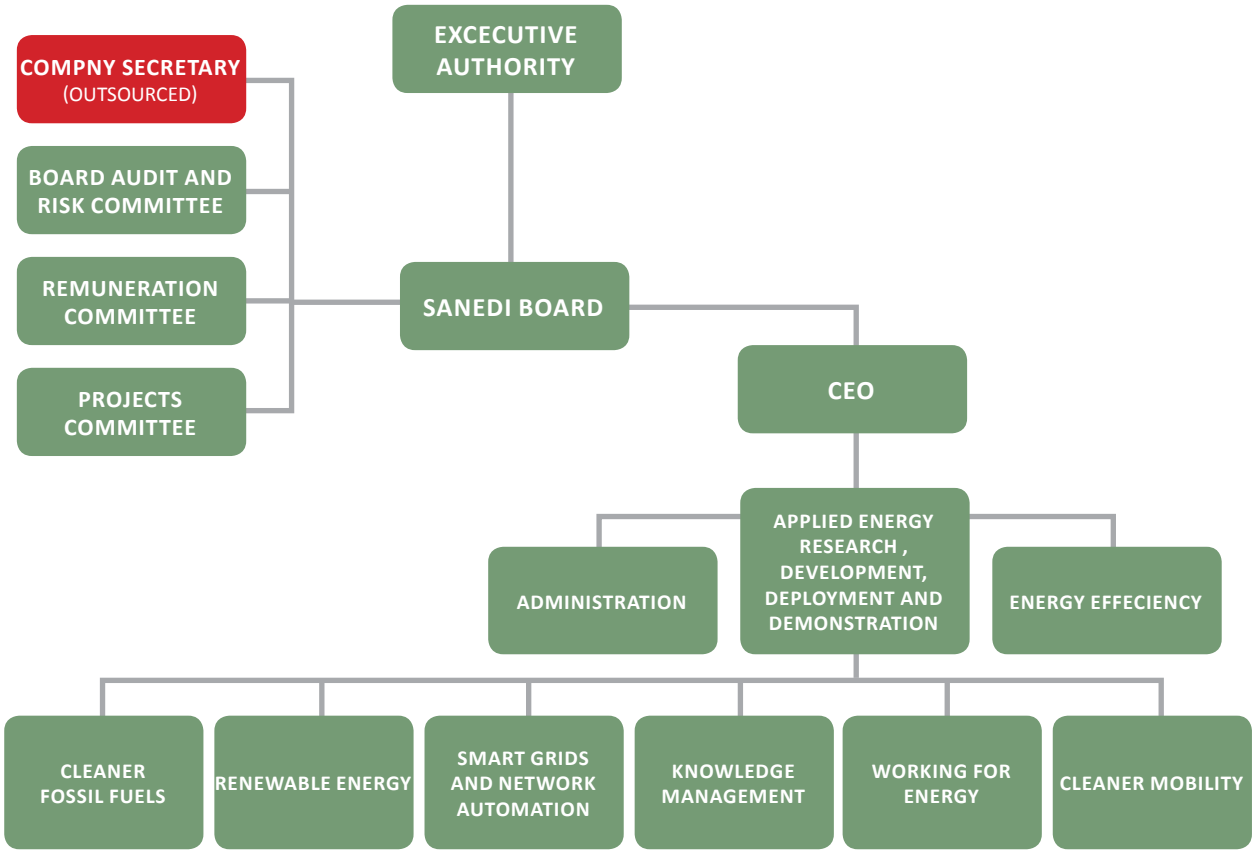

Figure 1: SANEDI Organisational structure

In South Africa's existing research and innovation context, SANEDI's focus will be primarily on energy research, development, demonstration and deployment. Select activities of SANEDI Energy Efficiency Programme and the Working for Energy sub-programme will also promote technology deployment, i.e. market entry and penetration, of new clean energy and energy efficiency solutions.

SANEDI's operating structure is based on the matrix management model. Effectively this structure establishes a pool of people who can be utilised across the different functional areas to optimise the limited capacity and the available skills set and to allow for greater development opportunities. The complete view of all relevant areas and the matrix management model as it applies to SANEDI is attached as Appendix B.

SANEDI acknowledges that the structure introduces a higher level of internal complexity and additional management challenges, but these are considered manageable with the small permanent staff complement. As the number of employees increase, this model may be reconsidered and adjusted to suit the changing environment.

The operational model that SANEDI has chosen also relies on the establishment of CORDs. These centres, either located within SANEDI or externally, will rely on human capital to provide for key services. It is the objective of SANEDI to leverage additional funds, from sources such as donors, DFIs, NRF, SETAs, etc to enhance the capacity available to these CORDs. Many of the postgraduate students graduating today have little prospect of finding employment at the university itself. This is simply due to the numbers of students that graduate and the ever-present budget constraints that limit employment opportunities at these institutions. SANEDI, through its CORDs intends deploying some of the postgraduate students that are currently funded by SANEDI in the tertiary institution itself. In so doing, the student will continue to add to the body of knowledge and also be a research resource for SANEDI. The payment of remuneration that is more in line with market norms, will also serve to aid in staff retention.

6.3 DESCRIPTION OF THE STRATEGIC PLANNING PROCESS

A three day strategic planning session was held by SANEDI during October 2015. The first day which was scheduled on 19 October 2015 was intended for existing Board members to provide leadership and guidance to the strategic planning of the entity. The second session was held a week later on 26 October 2015 where the key priorities and programmes were discussed with senior management and middle management. The last session was held on 23 November 2015 with all staff to give an overview of the shortfall in the budget allocation for the new financial year and the programmes that would be funded by means of donor funding.

7. STRATEGIC OUTCOME ORIENTED GOALS OF THE INSTITUTION

As described by the Department of Energy's, Strategic Plan, the Department will primarily contribute to three of the fourteen national priority outcomes referred to as the 'Change Agenda', namely 'Decent employment through inclusive growth' (Outcome 4), 'An efficient, competitive and responsive economic infrastructure network' (Outcome 6) and 'Environmental assets that are protected and continually enhanced' (Outcome 10). The Department however, expects to also contribute, albeit to a lesser extent, to the remaining nine Outcomes.

As the only state-owned, energy development agency in South Africa, SANEDI is the principal partner of Government through the Department of Energy in its effort to attain the energy policy objectives with particular focus on those that relate to achieving macro-economically efficient production and a rational use of energy, and stimulation of renewable energy sources and of innovative energy technologies and processes.

SANEDI's focus and activities therefore will directly contribute to the stated energy-related Outcomes, but as a result of identified capacity building, skills development and training initiatives and the research focus, will also contribute significantly to Outcome 5: 'A skilled and capable workforce to support an inclusive growth path.'

SANEDI's five specific Strategic Outcome Orientated Goals have been identified for realising SANEDI's stated vision and defined as summarised below and described in subsequent paragraphs:

- By 2030, ensure universal access to affordable, reliable and modern energy services
- By 2030, increase substantially the share of renewable energy in the global energy mix
- By 2030, double the global rate of improvement in energy efficiency
- By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
- By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support.

In order to accomplish the strategic orientated goals, it is essential for SANEDI to play the role of a catalyst, facilitator and implementer. Its role in relation to the various forms of intervention is depicted below :

Figure 2: SANEDI's role in relation to various forms of intervention

Strategic Outcome Oriented Goal 1	**Ensure universal access to affordable, reliable and modern energy**
Goal statement	By 2030, SANEDI will aim to ensure that there is universal access to affordable, reliable and modern energy services by making a contribution through energy research, development, demonstration and deployment.

* Please note that SANEDI's role is to develop and collate the necessary information that can be used by government for planning and decision-making.

SANEDI contributes to the achievement of this strategic outcome by:

- Providing an optimal energy research environment.
- Directing and conducting energy research, development and innovation on priority energy-related technologies and solutions
- Co-operating with persons, associations and institutions undertaking related energy programmes in other countries, to ensure that international learnings and 'best practices' are shared and, where relevant, adopted and applied in South Africa.
- Creating local and international partnership to leverage funding, research facilities and share knowledge to accelerate technology development and innovation in the respective thematic areas.
- Reduce technology cost and risk and facilitate learning (learning by doing, learning by using and learning by interacting) on strategically chosen technologies.

The South African Government has made several international commitments[4] to cap and reduce its absolute carbon emission levels.

Achieving these commitments are important because of the environmental implications, but also because of the possible economic consequences associated with non-compliance. Concerns exist over trade barriers based on emission intensity of imports, further supporting the need for South Africa to manage its emissions and energy intensive economy.

South Africa's energy sector is closely linked to South Africa's climate change commitments. The recently promulgated Integrated Resource Plan (IRP) 2010 has effectively accepted 'ownership' for 50% of the emissions reduction targets defined by the Long-term Mitigation Scenarios (LTMS). This however implies that a further 50% of the targeted emission reductions must be forthcoming from other industries and economic activities.

In terms of these required emission reductions and South Africa's goals for energy security and sustainability it will be critical for South Africa's current energy and carbon intensive economic structure/focus to be diversified and a transition to be made to a low carbon economy.

4 Notably African National Congress' 2007 Polokwane Resolution on Climate Change, 2008 Cabinet Vision, Strategic Direction and Framework for Climate Policy and the International Pledge under the Copenhagen Accord.

Strategic Outcome Oriented Goal 2	**Increase substantially the share of renewable energy in the global energy mix**
Goal statement	By 2030, SANEDI will increased substantially the share of renewable energy in the global energy mix through actively stimulating 'green' energy industry development, capacity building, skills development and job creation in response to the immediate concern of job scarcity and also support economic development and the critical transformation of the South African economic structure/activities to less energy and carbon intensive activities during the transition period identified by national commitments. (new growth path, climate change commitments).

The required economic shift may have short-term implications associated with the transition, but is ultimately expected to result in a competitive economy, with increased investment (avoided trade barriers linked to high carbon intensity), create new enterprises and open up new job opportunities.

SANEDI will directly support the economic transition by:

- Accelerating, where relevant, applied research projects getting to market, ultimately resulting in commercial rollout.
- Stimulate a market demand (pull) for innovative, clean energy technologies through, amongst others, awareness, education, demonstration and communicated successes and also by facilitation of the tax incentives.
- Facilitating, coordinating and enabling industry capacity building and skills development efforts.
- Supporting the local renewable energy and Energy Efficiency and Demand Side Management (EEDSM) industries in South Africa in accordance with the Industrial Production Action Policy (IPAP).

Improving resource efficiency is among the top priorities in today's world, as Governments, businesses and civil society are increasingly concerned about natural resource use, environmental impacts, material prices and supply security.

Strategic Outcome Oriented Goal 3	**Double the global rate of improvement in energy efficiency**
Goal statement	Actively influence consumer consciousness and behaviour to improve the energy-efficiency of existing economic activity and energy consumption by 10% during the short-term (period of supply constraints) and to contribute to achieving an energy resource efficient (described by energy intensity levels on par with international benchmarks) society in the medium to long term (2020).

Pending clarity on the way forward for industry and SANEDI's role in the energy efficiency environment, SANEDI will expedite a culture change inter alia by:

- Supporting industry with measurement and verification measures in order to qualify for tax incentives linked to energy efficiency;
- Provide a consolidated national, independent measurement and verification service for all energy efficiency;
- Establish a national awareness;
- Support industry with information and technical assistance to promote considered and rational use of energy; and supporting the energy efficiency hub.

Strategic Outcome Oriented Goal 4	**Enhance international cooperation to facilitate access to clean energy research and technology**
Goal statement	By 2030, international cooperation will be enhanced to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil fuel technology and promote investment in energy infrastructure and clean energy technology.

SANEDI will be forge and foster relationships with international partners to promote investment in energy infrastructure projects including clean energy projects and promote information sharing with regards to energy research and development across the globe.

Strategic Outcome Oriented Goal 5	**Expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all**
Goal statement	Expand infrastructure and upgrade technology by 2030 for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries , small island developing states and land locked developing counties in accordance with their respective programmes of support

The sub – programmes in Programme 2 will contribute to expanding infrastructure and upgrading technology for the supply of modern and sustainable energy services for all in developing countries. The research, development, demonstration and deployment of energy will make a contribution to the development of Africa as a continent.

These objectives will directly dictate the focus of all the defined SANEDI programmes.

The department's 5-year strategic plan furthermore acknowledges the close interconnection between energy and climate change and the significant responsibility that the Department of Energy, and the energy sector as a whole, carry in terms of the national climate change and environmental sustainability objectives. As such, several of the defined departmental programmes, its technological and energy focus and current and planned policy instruments align directly with these objectives.

SANEDI's programmes aim to make a meaningful contribution to, and support the department and sector's mitigation activities. A significant focus of SANEDI's energy development imperative will therefore be on technological opportunities in energy efficiency, renewable energy and carbon capture and storage while also investigating possible mitigation means and measures of relevance to the energy industry. In this respect, SANEDI's programmes also correlate well with the National Climate Change Response White Paper, published in October 2011.

The priority mitigation options, as identified in Section 6.3 of the Climate Change Response Plan, were defined as:

Option 1: Shifting to lower carbon generation options;

Option 2: Significant upscaling of energy efficiency applications;

Option 3: Promoting transport related interventions;

Option 4: Carbon capture and storage in the synthetics fuels industry;

Option 5: Mitigating non-energy emissions in agriculture and land use; and

Option 6: Transitioning society and economy to more sustainable consumption and production patterns.

The correlations between the SANEDI programmes and these priority mitigation actions can be shown as:

Table 3: Programme linkages to the National Climate Change Response White Paper, October 2011

SANEDI Programme	Priority Mitigation Options (identified and listed in section 6.3 of the Climate Change Response Plan)					
	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Programme 2 : Energy Research, Development, Demonstration and Deployment	×	×	×	×	×	×
Programme 3 : Energy Efficiency	×	×				×

× indicates that the option is directly supported by the SANEDI Strategic Plan

×* indicates that the option is indirectly supported by the SANEDI Strategic Plan

SANEDI furthermore plays a leading role in three of the identified near-term priority flagship programmes as defined in Section 8 of the White Paper:

8.1 The Climate Change Response Public Works Flagship sub-programme: Working for Energy.

8.4 The Energy Efficiency and Energy Demand Side Management Flagship Programme: SANEDI energy efficiency.

8.7 The Carbon Capture and Sequestration Flagship sub-programme: SANEDI's Cleaner Fossil Fuels which includes Carbon Capture and Storage.

As indicated under the Situational analysis, the SANEDI's portfolio of activities is aligned with, and directly supports 6 of the 17 SIPs:

SIP 6: Integrated Municipal Infrastructure Project;

SIP 7: Integrated Urban Space and Public Transport Programme;

SIP 8: Green Energy in support of the South African economy;

SIP 9: Electricity Generation to support socio-economic development;

SIP 10: Electricity Transmission and Distribution for all;

SIP 15: Expanding access to communication technology; and

SIP 17: Regional Integration for African cooperation and development

With consideration of SANEDI's organisational arrangements, the respective sub – programmes correspond with the defined programmes as follows:

Table 4: SANEDI's sub- programmes correlation with SANEDI defined programmes

SANEDI Programme	Cleaner Fossil Fuels	Renewable Energy	Smart Grids and Network Automation (Smartgrids)	Cleaner Mobility
Programme 1: Corporate Governance and Administration	-	-	-	-
Programme 2: Energy Research, Development, Demonstration and Deployment	×	×	×	×
Programme 3: Energy Efficiency	-	-	×	×

8. CRITICAL SUCCESS FACTORS

8.1 FUNDING

Availability of funding is a critical enabler of the fulfillment of the SANEDI mandate scope and therefore effective and optimal utilisation of available funding and active development of alternate funding sources are immediate priorities to support delivery requirements. A second priority is securing a longer-term view on scheduled/committed funding to enable capacity building, ramping up of activities with longer durations and the ability to offer career opportunities that will attract more high calibre talent (also a critical success factor).

8.2 SKILLS AND CAPACITY

Having access to appropriate skills and human capital is critical to SANEDI's successful contribution to energy development in South Africa. Insufficient delivery capacity to coordinate and implement the comprehensive portfolio of programmes may hamper the delivery of the SANEDI outcomes. Being able to recruit and maintain suitable talent in sufficient numbers will be a critical success factor (tied closely to available funding).

8.3 EXECUTION CAPACITY

A critical and immediate priority for SANEDI will be to strengthen the necessary execution capacity i.e. organisational structures, operating models and processes that can support and coordinate the rapidly expanding, diverse portfolio of SANEDI activities.

8.4 POLICY ENVIRONMENT AND GOVERNANCE STRUCTURES

As policy direction will serve as the primary guideline to focus SANEDI's research and efforts, an unambiguous policy environment is critical to ensure ongoing alignment with national priorities. A conducive policy environment, such as specific provisions under an Energy Technology Innovation Policy as example, will further serve to optimise the benefits to the energy sector and national economy and environment.

This section describes SANEDI's three priority programmes for the five years from 2016/17 – 2020/21 to achieve the set goals described in the preceding section.

9. PROGRAMME 1: CORPORATE GOVERNANCE AND ADMINISTRATION

Energy development encompasses a broad spectrum of matters resulting in the diverse span of activities that reside with SANEDI. Given the varying industry structures, levels of involvement and type of activity it also means diversity in the structures and approaches of the corresponding focus areas. The size, complexity and operations of each focus area differ, and so flexibility must be allowed in the structures adopted to optimise individual performance. But, this should be achieved without compromising on accountability. Well-defined and enforced corporate governance provides a structure that works for the benefit of everyone concerned by ensuring that SANEDI as an organisation adheres to accepted ethical standards and best practices as well as to formal laws.

Corporate governance requirements are of particular interest for SANEDI as a state owned enterprise and a significant proportion of effort is dedicated to ensuring compliance. Particular attention will be required during the initial transitional period to operationalise SANEDI in its new format. Programme 1 therefore focuses on:

- Establishing sound relationships between SANEDI's management, Board, its shareholder: the Department of Energy.
- Establishing a platform for accountability, sound governance, control and administration in compliance with all legal and regulatory requirements.
- Managing the administration of funds and ensuring economic efficiency.
- Managing and establishing adequate and efficient infrastructure and business support.

A. Compliance with existing legislation, regulations, practice notes and guidelines

The enabling legislation that established SANEDI, namely the National Energy Act of 2008, made provision for the transfer of all assets (including personnel) and liabilities from SANERI to the new entity which is SANEDI.

The Public Management Act, (Act 29 of 1999) is key to the operations of the entity as it regulates financial management in national governments and provincial governments to ensure that revenue, expenditure, assets and liabilities are managed effectively and efficiently and to provide for the responsibilities of persons entrusted with financial management.

There are other important legislation, regulations, practice notes and guidelines that are also impact on the operations of the entity which include the following but are not limited to these only:

National Treasury Regulations, practice notes and guidelines relating to finance and procurement;

Framework for Managing Performance;

Framework for Strategic Plans and Annual Performance Plans; and

King Code for Corporate Governance.

9.1 STRATEGIC OBJECTIVES

The following strategic objectives have been defined to ensure due corporate governance and administration of SANEDI's operations and process of transformation.

Providing executive support to the DoE and the Minister of Energy is a primary focus for SANEDI. Responsibility for this function resides with the highest level of the organisation including the CEO, CFO and the Manager: Corporate Support and Office of CEO.

All matters across the organisation should be conducted in a way that provides assurance of competence and integrity to the SANEDI shareholder and stakeholders. The second focus for this programme is therefore on corporate support that encompasses a broad range of activities ranging from resource management, administration and communication to governance services. Three strategic objectives have been defined to ensure corporate support meet the organisational requirements:

Strategic Objective 1.11	**Compliance with Department of Energy's compliance calendar in respect of strategic plans, annual performance plans , annual reports and quarterly reports**
Objective statement	Ensure compliance with the Department of Energy's compliance calendar in respect of strategic plans, annual performance plans , annual reports and quarterly reports for state entities reporting to the Department
Baseline	90% Compliance

Strategic Objective 1.2	**Effective financial processes and systems and procedures for Finance /Supply Chain Management**
Objective statement	Ensure that 97% of all creditors are paid within 30 days after relevant documents are received
Baseline	97% of all creditors paid within 30 days after all relevant documents are received

Strategic Objective 1.3	**Highly motivated team of employees who are managed according to best practice thereby contributing optimally to the achievement of organizational goals**
Objective statement	SANEDI needs to have its own HR policies and procedures
Baseline	5 basic HR policies to be developed

Strategic Objective 1.4	**Corporate and Programme Marketing and Communications**
Objective statement	Provide corporate and programme marketing and communication services that will adequately support the promotion and knowledge sharing SANEDI activities both internally and externally. Ensure that the stakeholder engagement plan is place and is being implemented
Baseline	Draft corporate and programme marketing and communication plan Draft stakeholder engagement plan

Besides optimisation of research investments, a strong co-operative approach and strategic international collaboration will also contribute to the optimal use of other scarce resources such as expertise and facilities. SANEDI already facilitates several established partnerships, bi-lateral or multi-lateral agreements (e.g. IEA and REEEP) and regional multi-technology frameworks (e.g. European Union (EU) Framework Programme). But, this service to the energy sector can be significantly enhanced with the development of a national strategy for collaboration and broadening of coordinated research, joint projects, information exchange, modelling databases and capacity building.

As with technology adaptation, international co-operation also presents an invaluable opportunity for learning and capacity and skills development from sharing facilities and expertise.

SANEDI, and South Africa, already benefits significantly from generous support from international organisations and partnerships. Supporting and facilitating these interfaces and building on these into the future is becoming increasingly important. The fifth objective is therefore to establish and implement a comprehensive and practical strategy for effective international and national collaboration.

The strategy should furthermore set clear measures of success and criteria for evaluation, both at a strategic level and to guide the structuring of co-operation and partnerships.

The administration in support of the established interfaces and partnerships will be supported by SANEDI's corporate governance and administration function. These support services will be positioned as a centralised function available across the organisation and optimally utilising the available resources.

9.2 RISK MANAGEMENT

The six key risks that may affect realisation of the stated strategic objectives of the applied research programme:

Risk	Risk Description and Proposed Mitigation
Insufficient funds to support its objectives	Insufficient funds to support its objectives. The controls put in place are stakeholder management, variable costing model, prioritizing programmes and objectives, ensure plans and strategies are aligned to government's priorities and leverage additional funding.
Company exposure to project risk.	The risk that projects may not be successful and delivered within time, cost and quality. The controls are adequate cash flow forecasting and contractual commitment, project management framework in place PMBOK and train staff in project management.
Inability to recruit and retain key skills.	The inability to recruit and retain the key skills to deliver on its mandate. The controls are having an internship programme, variable costing model and mentorship programme.
Loss of institutional information/ memory	Risk that institutional memory may be lost. The controls put in place are having a knowledge management being implemented, a document management system to be put in place, identify and document possible IP opportunities and a project gated management system to be put in place.
Mandate sustainability	Sustainability of the organisation is at risk. It is therefore imperative that SANEDI have a Marketing and Communication strategy and have continuous stakeholder management.
Inadequate Business Continuity	There is the risk of inadequate business continuity which will impact on all three programmes. A Disaster recovery Plan/Business Continuity as well as succession planning needs to be put in place.

10.PROGRAMME 2: ENERGY RESEARCH, DEVELOPMENT, DEMONSTRATION AND DEPLOYMENT

During the coming decades, it is projected that there will be major changes in energy systems throughout the world as efforts are made to meet the growing demand for affordable energy and reconcile energy demand with the need to effectively address climate change. South Africa is faced with finding suitable solutions to supply a rapidly growing population with energy and to support essential economic development in ways that are economically, environmentally and socially acceptable.

Fostering research and development in the energy sector will undoubtedly be an important step towards developing suitable solutions for our country.

The purpose of the energy research, development, demonstration and deployment programme is effectively knowledge creation (Note knowledge creation includes: technology adaption through localisation, learning, technology cost reduction and technology risk reduction secondary issues relate to beneficiation of raw materials, job creation and creation of secondary support industries) that can support and inform energy-related planning and decision-making by all stakeholders. The energy research, development, demonstration and deployment programme is therefore primarily focused on developing a portfolio of confirmed viable (cost effective and low risk) and sustainable energy solutions- aligned with Government goals of energy security, energy sector transformation and diversification, economic development and environmental protection- that can confidently be incorporated into national plans and policy processes. This programme contributes directly to SANEDI's Strategic Outcome Goals.

With consideration to limited resources, SANEDI Energy Research, Development, Demonstration and Deployment programme has been structured to correspond with four priority sub- programmes for energy research, development, demonstration and deployment as informed by national policy direction:

Table 5: Direct SANEDI Research, Development, Demonstration and Deployment thematic area correlation with national policy direction

SANEDI Research, Development, Demonstration and Deployment Sub – programmes	IRP 2010	IEP2	LTMS 2008	RE White Paper, 2003	DST 10 Year plan	NEES 2008	Energy Policy, 1998
Cleaner Fossil Fuels including Carbon Capture and Storage and Shale gas	✖		✖		✖	✖	
Renewable Energy	✖	✖		✖	✖		✖
Smart Grids and Network Automation (SASGI)	✖		✖			✖	✖
Working for Energy			✖	✖	✖	✖	✖

The relevance of the listed legislative and policy instruments to SANEDI are detailed in Appendix B to this plan, but the brief overview below emphasises the significance of energy research as identified in a few of the relevant publications and/or the motivation for the selection of the four priority thematic areas.

Table 6: Research priorities dictated by Policy

Policy	Description of relevance
Integrated Resource Plan (IRP) 2010	The IRP 2010 identified a specific research agenda for the next IRP that included distributed generation, smart grids, off-grid generation, harnessing of South Africa's coal resource as well as technology options that relate to energy efficiency demand side management, biomass and energy storage. These agenda items correspond directly with the priority research areas within SANEDI.
Long-Term Mitigation Scenarios (LTMS), 2008	The LTMS strongly emphasises, technology development along-side investment and policy interventions as key to an appropriate response strategy. The LTMS indicates the need for wider deployment of existing climate-friendly technology together with commercialisation of emerging technologies and spending at scale on research and development of new technology.
White Paper on Renewable Energy, 2003	The white paper calls for the promotion of appropriate research and development and local manufacturing to strengthen renewable energy technology and optimise its implementation. It further more emphasises the importance of monitoring ongoing research and development programmes and identifying additional investigations and demonstration projects that would assist in the development and optimisation of renewable energy systems. Specifically research and development of cost effective energy storage systems utilising renewable energy are to be encouraged.
DST 10 year innovation plan	The 10-year innovation plan identifies both energy security and climate change as grand challenge areas. The plan most notably states: "the race is on for safe, clean, affordable and reliable energy supply, and South Africa must meet its medium-term energy supply requirements while innovating for the long term in clean coal technologies, nuclear energy, renewable energy and the promise of the "hydrogen economy"." These identified priorities correspond closely with the advanced fossil fuels, biomass, clean energy solutions and green transport research areas.
National Energy Efficiency Strategy, 2008 (revision 1)	The vision of the strategy is to contribute to affordable energy for all, and to minimise the effects of energy usage on health & the environment. Besides energy efficiency, it also includes reference to renewable energy and the clean fuels programme. The strategy identifies SANEDI Applied Research (previously SANERI) to carry out a dedicated R&D programme in support of national energy efficiency targets.
White Paper on Energy Policy, 1998	Identifies the need for an integrated, multi-year, national, needs-driven, energy research strategy.
Energy Security Master Plan for Electricity, 2007	The Master Plan identifies focused research and development as a key enabler for meeting technical performance and capacity expansion objectives and states that electricity/energy-based technology development and innovation is imperative to productivity and growth of the country.

Policy	Description of relevance
Climate Change Response White Paper	Eight flagship programmes – the Climate Change Response White Paper of the Department of the Environmental Affairs 1) Public Works 2) Water Conservation and Demand 3) Renewable Energy Flagship 4) Energy Efficiency and Energy Demand Management 5) Waste Management 6) Carbon capture and sequestration 7) Adaptation Research

A second focus of the energy research, development, demonstration and deployment programme is on establishing and maintaining strategic partnerships and cooperative arrangements in the energy sphere with other research institutions and Government agencies both in South Africa and abroad to promote energy research, demonstration and implementation of technologies.

In view of the global nature of the challenges at hand and global developmental and climate change commitments, international organisations have significant interest in energy developments within developing countries. For this reason, international knowledge sharing and assistance, both financial and advisory, is readily on offer.

But collaboration also extends to national partnerships and sharing of responsibilities between the private and public sector.

Research cooperation/collaboration has been restructured as an intrinsic part of each of the thematic areas. Every area within SANEDI will therefore be focused on creating local and international partnerships to leverage funding, research facilities and share knowledge to accelerate technology development and innovation in the respective thematic areas.

To optimise collaboration and all available resources, a Centre of Research and Development (CORD) structure has been selected. This interface with industry and stakeholders will provide capability for common ground research in an industry partnership arrangement. It is expected that most research activities (programmes and initiatives) will be transitioned into the CORDs within the next two years. The likely exception will be ring-fenced programmes, which are those programmes 100% externally funded, but overseen by SANEDI.

Initially, research will be undertaken in partnership with universities under the auspices of the Centres of Research and Development. However, in areas where no capacity exists at universities, SANEDI will establish and undertake in-house research.

A further important aspect of the Research, Development, Demonstration and Deployment Programme is to provide due custodianship of all knowledge developed and collated within SANEDI's sphere of activities. Credible and consistent data is critical for all decision making and planning amongst all stakeholders.

10.1 STRATEGIC OBJECTIVES

Unless proven to be cost-competitive, safe and effective, the adoption of innovative, cleaner energy technologies and systems will either be limited or driven by policy. Research, development, demonstration and deployment is thus needed to reduce costs, risks and learning curves associated with uncertainty and to encourage adoption.

Significant opportunity exists for adaptation of internationally available technology. In this context, applied research would focus on appropriate technology transfer and localisation for South African conditions and application. A critical aspect of effectively absorbing 'foreign' technology and developing local technological capacity is learning and development of local scientific and technological knowledge. An appropriately structured applied energy programme presents an invaluable opportunity for learning by doing, using and interacting with the technologies of interest, and ultimately job creation in the green energy sector.

The programme objective is therefore to focus public funded research, development, demonstration and deployment on reducing technology risk, reducing technology cost and increasing societal value by increasing the deployment of clean technology options, quantified as follows:

Strategic Objective 2.1	**Technical Report addressing the implications and recommendations for the exploitation of shale gas in SA**
Objective statement	Determination of the potential for Shale Gas in the energy economy of South Africa
Baseline	Completed reports on : • CO2 as extraction agent • CO2 reduction potential • Matching supply and demand • Completed external reports: • Water requirements and waste water Geography and surface aspects

Strategic Objective 2.2	**Proof of concept and capacity building for carbon dioxide storage in SA**
Objective statement	The determination of the potential and appropriateness of geological storage of carbon dioxide in South Africa – Pilot CO2 Storage Project (PCSP)
Baseline	• Atlas and further analysis thereof • Preliminary design of the PCSP • Documentation of stakeholder concerns • International profile for PCSP to leverage capacity building and funding • Commitment of funding from MTEF and the World Bank

Strategic Objective 2.3	**Determination of a business case for the commercialisation of carbon capture and storage**
Objective statement	Oversight of the implementation of the National Carbon Capture and Storage Road Map and associated capacity building – South African Centre for Carbon Capture and Storage (SACCCS)
Baseline	• National CCS Road map endorsed by Cabinet • CCS designated as one of the flagship programmes for mitigation of greenhouse gas emissions • Integral part of the NDP • Establishment of a bursary programme • Support projects of the CCS • Biennial capacity building conferences

Strategic Objective 2.4	**Increased deployment of renewable energy**
Objective statement	To provide a centre that coordinates and promotes RE research, development and demonstration in SA through collaboration and funding
Baseline	• RECORD is operational • Collaborative funding with GIZ, Eskom and UNOPS

Strategic Objective 2.5	Increased renewable energy and energy efficiency awareness
Objective statement	Provide technical and management support through tendering, contracting, payment and reporting to the Danish RE EE programme's DoE and ESKOM components
Baseline	• Projects in place • Project procurement plan

Strategic Objective 2.6	Raised SA's renewable energy R&D profile through international collaboration and capacity building
Objective statement	Foster international collaboration • To globalize expertise and leverage research funding • To gain knowledge
Baseline	• Several IEA implementation agreement memberships • Hosting the Southern Africa secretariat of REEEP • Participate in EU Horizon 2020

Strategic Objective 2.7	Increased wind energy integration and deployment in SA
Objective statement	Develop maps, database , tools and guidelines for effective wind siting and decision making for the national wind programme
Baseline	Wind atlas and database

Strategic Objective 2.8	To research essential aspects of Clean Energy relating to the provision clean energy solutions to rural and low income communities
Objective statement	Undertake various Research Studies to advance sustainable access and use of clean energy solutions by rural and low income communities
Baseline	Two (2) Research Projects

Strategic Objective 2.9	To Implement Clean Energy technologies and services to low income communities
Objective statement	Undertake selected clean energy projects to demonstrate the use of various renewable energy applications in low income rural and urban communities for possible national roll out.as alternative mode of energy provision in various applications
Baseline	Eighty (80) beneficiary establishments (schools, ECDC, Primary Schools, High Schools, community facilities, productive facilities)

Strategic Objective 2.10	On the Job Training
Objective statement	To Enhance the Capability of selected Practitioners to Implement Clean Energy Solutions
Baseline	Three (3) on the job Biogas Digester Training Programmes implemented

The identified Research and Development portfolios (sub-programmes) relating to Renewable Energy, Carbon Capture and Storage[5], Clean Coal Technology and Clean Oil and Gas have the potential to contribute significantly to reducing the carbon intensity of the country's energy mix. Renewable energy typically has Life-Cycle Assessment (LCA) emission factors that are below 30 g CO2/MJ and Carbon Capture and Storage reportedly has the potential to reduce emissions from fossil fuel-based energy sources by 60%. Performance indicators for each of the sub-programmes towards the stated objective are currently being developed.

Although much of SANEDI's applied research and development in the energy sector is focused on the energy mix around electricity, a large potential gain can be realised within public sector fleet and public transport.

5 60%+ reduction in CO2 emissions.

One of the sub programmes housed within Programme 2 is the development of technologies for the use of alternate fuels to be used in government fleet and public transport. The benefits of such technology innovation will see a large cost benefit to fleet operating costs as well as the GHG immersions reduction, and if developed at scale, then an entirely new job creation stream will ensue.

One of the major hindrances and prolonged challenges in this sector, has been the diversified approach and lack of coordinated activities across line departments and their respective agencies. It is thus proposed that over the next MTEF period, SANEDI will develop a strong coordination, facilitation and macro strategic responsibility for this thematic area and support both the DOE and DOT to plan effective implementation strategies to create momentum and positive traction for this sector.

Advanced, responsive and 'intelligent' energy systems infrastructure has been identified as a key addition to the applied research programme. The transition to a Smart Grid will be critical for the successful implementation and management of a diversified, low carbon energy mix that incorporates intermittent supply from renewable energy sources, distributed generation and energy storage. An intelligent energy delivery system is further essential to support new innovations (products and services), new infrastructure requirements (e.g. electric vehicles), the growing digital economy, improved energy management and effective and efficient energy usage.

Strategic Objective 2.11	**Electricity supply industry capacity building through workshops, knowledge sharing, international and local collaboration**
Objective statement	To Manage Industry participation and contributions in SA through local and international collaboration for the development of Smart Grid Policy recommendations and industry capacity building
Baseline	Draft Smart Grid Vision document

Strategic Objective 2.12	**EU donor funded Smart Grid Programme Demonstration projects with How to Guides, business case and policy recommendations for the following areas** • **Enhanced revenue management** • **Advanced asset management** • **Active network management** • **FBE/IBT/TOU tariff demonstrated using AMI**
Objective statement	To use technology as an enabler of change in the municipal environment in following areas • Enhanced revenue management • Advanced asset management • Active network management Free Basic Electricity /Inclining Block Tariff Demonstration
Baseline	• Regulation 773, Renewable strategy, Climate change strategy, NDP, IRP 2010, PICC, IEP2012, NEES, Presidential State of Nation address 2014. • ADAM and the AG reports

Smart Grids have the potential to contribute to and enable reduced peak demand, improved operational and system efficiency, higher grid reliability and resilience, lower carbon emissions and higher economic productivity from integration of more distributed and renewable generation. As such, an intelligent energy systems infrastructure is a vital enabler of a low carbon economy.

SANEDI's role with respect to developing a Smart Grid vision and accelerating the deployment thereof in South Africa requires consideration. Industry activities are currently fragmented across 174 municipal distributors and Eskom and driven by legal obligations and market imperatives. As an independent Energy Development Institute, SANEDI is well positioned to play a lead role, providing macro structure and direction to a comprehensive, coordinated national initiative. Through the guidance of the South African Smart Grid Initiative (SASGI), an early electricity industry grouping chaired by the DoE, SANEDI will direct the technological standards, policy and pilot implementation programme.

A final objective is then to ensure that all of the information under SANEDI's control is adequately consolidated and managed and available to support reporting, planning and industry development needs.

Strategic Objective 2.13	**Trained energy modellers to undertake energy modelling research**
Objective statement	To capacitate CESAR with the necessary resources (people and tools) to be able to undertake Energy Modelling Research
Baseline	Ongoing on the job training with ERC

Strategic Objective 2.14	• **Policy recommendations based on research projects conducted** • **Energy modelling database**
Objective statement	To Provide energy policy guidance through energy modelling research
Baseline	• Transport Study Phase 1 • ERC modelling database

10.2 RESOURCE CONSIDERATIONS

The table below shows the number of projects, maximum number of staff, the budget required to fulfil its mandate and the budget allocated. The table highlights the resources required for the realisation of this programme and the related strategic objectives:

Research, Development, Demonstration and Deployment Programme	**Number of Projects**	**SANEDI team members**	**External or Donor contributions received / committed**	**Budget Required (2016/17 – 2020/21)**	**Budget allocated (2016/17– 2020/21)**
Cleaner Fossil Fuels (SACCCS)				219 700	219 700
Smart Grids and Network Automation (Phase 2 of Smartgrids)				500 m	500 000 *
Working for Energy				100m	-
Renewable Energy				7535m**	-
Data Repository and Management (CESAR)				4227m	-
Cleaner Mobility				1m	-
Cleaner Fossil Fuels (Shale Gas)				***-	-

* allocated to ISGAN EXCO membership and participation – R500m is for 2nd phase of the smart meters

** Funding request submitted to NT – undergoing moderation process

***- Ends 16/17

10.3 RISK MANAGEMENT

The six key risks that may affect the achievement of the stated strategic objectives of the energy research, development, demonstration and deployment programme:

Risk	Risk Description and Proposed Mitigation
Insufficient funds to support its objectives	Insufficient funds to support its objectives. The controls put in place are stakeholder management, variable costing model, prioritising programmes and objectives, ensure plans and strategies are aligned to government priorities and leverage additional funding.
Company exposure to project risk.	The risk that projects may not be successful and delivered within time, cost and quality. The controls are adequate cash flow forecasting and contractual commitment, project management framework in place PMBOK and train staff in project management.
Inability to recruit and retain key skills.	The inability to recruit and retain the key skills to deliver on its mandate. The controls are having an internship programme, variable costing model and mentorship programme.
Loss of institutional information/ memory	Risk that institutional memory may be lost. The controls put in place are having a knowledge management being implemented, a document management system to be put in place, identify and document possible IP opportunities and a project gated management system to be put in place.
Mandate sustainability	Sustainability of the organisation is at risk. It is therefore imperative that SANEDI have a Marketing and Communication strategy and have continuous stakeholder management.
Inadequate Business Continuity	There is the risk of inadequate business continuity which will impact on all three programmes. A Disaster recovery Plan/Business Continuity as well as succession planning needs to be put in place.

11.PROGRAMME 3: ENERGY EFFICIENCY

Low electricity prices have historically been a key inhibitor for energy efficiency and contributed to a wasteful energy culture in South Africa. Unfortunately, these energy habits threaten the sustainability of the environment, natural resources and our planet for future generations. It also means that South Africa's energy productivity is comparatively low. Resource saving and greater utilisation efficiency is therefore of utmost importance.

Globally communities will have to prioritise the conservation of energy, water, materials and land, the comprehensive utilisation of resources and the development of a recycling economy, establishing energy-efficient modes of production, consumption and of urban and rural construction. Energy is intrinsically linked to and interweaved into this list.

The purpose of SANEDI's Energy Efficiency programme is to accelerate a move towards a resource and particularly, an energy (including gas, liquid fuels, electricity and water) efficient society. The National Energy Efficiency Strategy creates the primary context and direction for energy efficiency in South Africa. This strategy is currently under review (presented to Cabinet on 7 November 2012 and gazetted on 29 November 2012 for public comment[6]) and indications are that SANEDI's role will be expected to align with and support the revised strategy and industry structure once approved.

Preliminary indications suggest that SANEDI will be required to focus on industry support, capacity building, and services related to measurement, verification and assurance with respect to energy efficiency nationally. But, currently no clarity is available regarding the exact scope. Initiatives for the immediate future will therefore focus on critical activities and the continuation of established services.

This programme contributes to SANEDI's Strategic Outcome Goal 3: Foster a culture of greater efficiency and more rational use of energy.

11.1 STRATEGIC OBJECTIVES

It is anticipated that SANEDI will play a pivotal role with respect to measurement, verification and assurance of energy efficiency interventions in the country, going forward. Consolidating and hosting credible and standardised impact and performance data at a central point will be of immense value to all stakeholders interested in energy efficiency.

Although this service is considered an intrinsic part of SANEDI Energy Efficiency's intended role as Government energy efficiency agency in South Africa, the details of the role and objectives are still uncertain. SANEDI however, proposes the development of a single, national data repository for Energy Efficiency, including top-down (sectoral) and bottom-up (customer level, including the existing tax incentive data), for access by all local and international interested-and-affected parties.

In line with this expected role, SANEDI is currently providing an assurance and support function for the implementation of the Income Tax Amendment Act, (Sections 12I and 12L). Adequately supporting the DTI with verification of the proposed energy efficiency measures and consolidating the total resulting energy efficiency impacts are therefore listed as a specific objective:

6 Statement on Cabinet meeting of 7 November 2012, available from http://www.gcis.gov.za/content/newsroom/media-releases/cabstatements/7Nov2012 November 2012. The draft strategy was gazetted on 29 November 2012 as document 1000 of 2012. Opportunity for comments close on 30 January 2013.

Strategic Objective 3.1	**Provide assurance to SARS on energy savings claims, in line with published regulations, and perform a reporting function to key stakeholders (DoE, National Treasury, SARS (through National Treasury), and DTI) by :** • **issuing Energy Efficiency tax certificates for approved and compliant applications and copying them to the Revenue**
Objective statement	Provide an energy efficiency support function for the certification of energy savings for tax reduction claims and monitoring impacts and benefits
Baseline	Section 12 I: A review (conducted for the 2011/12 implementation year), of the evaluation process and service provided, confirmed that SANEDI successfully supported the first year of implementation of Section 12I tax incentive and a second review has been conducted in 2015/ 2016. Section 12 L: In terms of Clause 3 of the Regulations promulgated to support Section 12L of the Income Tax Act, 1962, on the Allowance for Energy Efficiency Savings, SANEDI is specifically mandated with the role of implementing these incentives on behalf of the South African Revenue Service (SARS) and National Treasury. This Regulation remains in force until 1 January 2020 and in order to effectively implement this activity, SANEDI is required in terms of 3(1

Delivery of this function will contribute significantly to developing a credible, national dataset and hence integration with Programme 3 will be important.

A second critical activity relates to the continuation of the Energy Efficiency Hub, an existing commitment that rolled over from SANERI and to which SANEDI is contractually bound. There is no budget for this programme under the current allocation and R 3 million per annum for the 3-year budget cycle (2014/15 to 2016/17 has been secured from the Department of Science and Technology (DST) and is the only funding source expected for Energy Efficiency.

The specific objectives of the EEDSM Hub are threefold: first to build human resource capacity; second to deepen knowledge; and third, to stimulate innovation and enterprise in the field of Energy Efficiency and Demand Side Management. However, the vision is to grow the hub into a fully-fledged national Energy Efficiency Centre of Research and Development (EECORD), when the current contract for the management of the EEDSM Hub expires. Some steps have already been taken by the current EEDSM Hub at the University of Pretoria to introduce elements of a CORD through interventions such as the construction of additional research laboratories, (including a Solid State Lighting (SSL) facility to support South Africa's contribution to the BRICS-SSL Working Group), introducing a broad range of training programmes, support to industry on testing and development and cutting edge research programmes.

Realising this vision to migrate the HUB into a CORD will however require a revised budget. For now, SANEDI remains committed to supporting the EEDSM Hub in its current format and funds received from DST during the next financial year will be used to enhance outputs of the Hub and leverage additional funds to accelerate the migration into a fully-fledged CORD.

But, given the current funding environment, only commitments under the current funding arrangement are reflected. The performance and outcomes of this function will therefore also be tracked and reported on, as follows:-

Both an Interim (half-year) Annual Report, that accurately represents:

a. The state of affairs of the programme, which shall include a full analysis and report that clearly and accurately presents the activities of the programme and the outcome of the implementation of the Programme
b. The programme performance against pre-determined objectives and Key Performance Indicators;
c. An internally audited expenditure report for the period concerned; and
d. Report on progress on the previous six months activities and deliverables.

Strategic Objective 3.2	**To support and provide capability building through designed programmes in the area of energy efficiency**
Objective statement	Continue the Energy Efficiency Hub initiative to strengthen energy related research, human capacity development, and market transformation and enterprise development initiatives that will be tracked against a comprehensive existing set of KPIs.
Baseline	Comprehensive set of KPIs with baseline performance for 2014/2015, as follows: Number of journal publications: 8; Number of conference papers: 15; Number of registered students: 50; Number of Graduates: 10; Number of modules/short courses offered: 45; Number of externally funded projects: 30; Female student ratio: 18%; PDI ratio: 45%.

The third function that will continue is the provision of industry support services within the context of available resources:

Strategic Objective 3.3	To fulfil the role of a national energy efficiency champion through collaborative activities with industry partners aimed at the promotion of new technologies thereby increasing the uptake of energy efficient technologies
Objective statement	Support industry stakeholders and the DoE, towards achieving improved energy efficiency in collaboration with local and international partners, by various initiatives
Baseline	Initial contracted data collection for bigEE database has been completed and published on the website. The current number of SANAS-accredited bodies is six (6) and this is insufficient to meet the growing demand for the Energy Efficiency tax incentives. SANEDI has conducted the initial feasibility of this activity in South Africa, through limited pilot activities and engagement with potential suppliers of the required products and the USA – DoE.

The initial expectation was for SANEDI to play an independent and authoritative role as envisaged in the National Energy Act, 2008 and to provide full support to the Department with regards to energy efficiency in South Africa. More recent indications from the Department are that SANEDI's contribution may significantly differ from this role and the broad mandate described in the Energy Act needs to be narrowed down to specific activities. SANEDI and the DoE are currently engaging on this matter.

The objectives for Energy Efficiency are based on the current understanding of SANEDI's expected contribution within the energy efficiency landscape and may be subject to change, pending the final direction decided by the National Energy Efficiency Strategy (NEES) that is currently under review.

High frequency communication, repeat messaging through all available channels and public education is essential to achieve a change in the energy culture towards greater conservation and more rational use of energy. Education, communication and awareness activities in the country is currently fragmented, often poorly aligned in terms of optimal timing and alignment of efforts and, in the worst case, inconsistent in its messaging. The intent is for SANEDI Energy Efficiency to take a leading role in coordinating across role players, ensuring consistent, aligned, technically correct and optimal messaging that is effective and that result in optimal and measurable impacts in energy efficiency awareness levels and ultimately sustained behaviour change.

South Africa has very advanced M&V skills and capacity. These resources are however clustered within specific organisations and have historically focused on a select few electricity projects. A priority for the energy sector is therefore to consolidate fragmented data collection and M&V efforts into an independent, centralised, national centre that can ensure a standardised approach and data collection into a single consolidated view for reporting and tracking purposes that are of relevance for the country.

11.2 RESOURCE CONSIDERATIONS

The table below shows the number of projects, maximum number of staff, the budget required to fulfil its mandate and the budget allocated. The table highlights the resources required for the realisation of this programme and the related strategic objectives:

Research, Development, Demonstration and Deployment Programme	Number of Projects	SANEDI team members	External or Donor contributions received / committed	Budget Required (2016/17 – 2020/21)	Budget allocated (2016/17– 2020/21)
Support 12 I and 12 L Tax Allowance	2	2		21m	-
Energy Efficiency HUB	1	1		3 m	3 m
Industry support and capacity building	2	2		1.4m	-
National Awareness Energy Efficiency Champion	1	2		3.2m	-
National Measurement and Verification Centre	1	1		750k	-
Total	**6**	**10**			

11.3 RISK MANAGEMENT

The six key risks that may affect realisation of the stated strategic objectives of the energy efficiency programme:

Risk	Risk Description and Proposed Mitigation
Insufficient funds to support its objectives	Insufficient funds to support its objectives. The controls put in place are stakeholder management, variable costing model, prioritizing programmes and objectives, ensure plans and strategies are aligned to government priorities and leverage additional funding.
Company exposure to project risk.	The risk that projects may not be successful and delivered within time, cost and quality. The controls are adequate cash flow forecasting and contractual commitment, project management framework in place PMBOK and train staff in project management.
Inability to recruit and retain key skills.	The inability to recruit and retain the key skills to deliver on its mandate. The controls are having an internship programme, variable costing model and mentorship programme.
Loss of institutional information/ memory	Risk that institutional memory may be lost. The controls put in place are having a knowledge management being implemented, a document management system to be put in place, identify and document possible IP opportunities and a project gated management system to be put in place.
Mandate sustainability	Sustainability of the organisation is at risk. It is therefore imperative that SANEDI have a Marketing and Communication strategy and have continuous stakeholder management.
Inadequate Business Continuity	There is the risk of inadequate business continuity which will impact on all three programmes. A Disaster recovery Plan/Business Continuity as well as succession planning needs to be put in place.

12. LINKS TO THE LONG-TERM INFRASTRUCTURE AND OTHER CAPITAL PLANS

The Department of Energy is not directly responsible for energy sector infrastructure development and as such SANEDI does not link into a long-term infrastructure plan.

13.PUBLIC-PRIVATE PARTNERSHIPS AND DONOR FUNDING

SANEDI is not currently part of any formal Public Private Partnerships23 as defined by South African law. SANEDI does, however, intend pursuing the establishment of such partnerships, particularly with metropolitan councils and municipalities involvement. In such a case, a Public Private Partnership model will be explored to allow the local government institution to provide a concession to SANEDI to develop key projects in their jurisdiction. Working for Energy projects are good examples of projects involving possible Public Private Partnerships. In the case where a private management company is required to operate a facility allocated to SANEDI on a concessional basis, SANEDI intends establishing a Public Private Partnership to manage such a relationship. SANEDI will also pursue the leveraging of funds from local and international partners and donors to implement key projects. SANEDI currently manages the following strategic partnerships with private entities and global organisations:

Partnering entity	Description of partnerships	Value of partner contributions	Status	Commitment period
REEEP*	Hosting of Regional contact centre on behalf of REEEP programme.	R700 000/a	Active	Uncertain
Industry Partners for SACCCS **	Financial and other support / collaboration from Sasol, Eskom, Alstom, Anglo Coal, PetroSA, Total, Xstrata, UK, Norway and AFD, amongst others.	Under discussion	Active	Ended 2014/15
Several communities via the Working for Energy Programme	Partnerships are tailored for each project.	Varies	Active and pending	Ongoing
World Bank	Financial support for carbon capture and storage – the Pilot Storage Project	US 25m	Phase 1 active Phase 2 subject to Recipient Assessment Appraisal	2015-20

* donor funded

** mixed funding (donor and PPP)

14.APPENDIX A: TECHNICAL INDICATOR DESCRIPTIONS FOR STRATEGIC OUTCOMES

Table 7: Technical Indicator description for Strategic outcomes

Indicator Title	Identifies the title of the strategic outcome oriented goal, objective or programme performance indicator.
Short Definition	Provides a brief explanation of what the indicator is, with enough detail to give a general understanding of the indicator.
Purpose/importance	Explains what the indicator is intended to show and why it is important.
Source/collection of data	Describes where the information comes from and how it is collected.
Method of calculation	Describes clearly and specifically how the indicator is calculated.
Data limitations	Identifies any limitation with the indicator data, including factors that might be beyond the department's control.
Type of indicator	Identifies whether the indicator is measuring inputs, activities, outputs, outcomes or impact, or some other dimension of performance such as efficiency, economy or equity.
Calculation type	Identifies whether the reported performance is cumulative, or non-cumulative.
Reporting cycle	Identifies if an indicator is reported quarterly, annually or at longer time intervals.
New indicator	Identifies whether the indicator is new, has significantly changed, or continues without change from the previous year.
Desired performance	Identifies whether actual performance that is higher or lower than targeted performance is desirable.
Indicator Responsibility	Identifies who is responsible for managing and reporting the indicator.

14.1 CORPORATE GOVERNANCE AND ADMINISTRATION

Indicator Title	1.1 Timely submitted strategic plans, annual performance plans, annual reports and quarterly reports
Short Definition	Submission of strategic plan, annual performance plans, annual reports, quarterly reports as per compliance calendar
Purpose/importance	Essential service delivered to shareholder for compliance purposes
Source/collection of data	DoE compliance calendar
Method of calculation	Completed documents.
Data limitations	None anticipated.
Type of indicator	Compliance
Calculation type	Qualitative.
Reporting cycle	Quarterly
New indicator	No
Desired performance	Target Achieved
Indicator Responsibility	Accountability resides with the CEO

Indicator Title	1.2 Percentage of all creditors are paid within 30 days after relevant documents are received
Short Definition	Ensure all creditors invoices are paid within 30 days after receipt of all the required documentation.
Purpose/importance	Ensure compliance with the PFMA.
Source/collection of data	Reports from the financial systems.
Method of calculation	Track delivery against the milestone.
Data limitations	None anticipated.
Type of indicator	Compliance
Calculation type	Qualitative
Reporting cycle	Quarterly.
New indicator	No
Desired performance	90% of invoices paid within 30 days after receipt of all required documentation
Indicator Responsibility	Accountability resides with CEO of SANEDI.

Indicator Title	1.3 Human Resources Policies and Procedures.
Short Definition	SANEDI needs to have its own HR policies and procedures.
Purpose/importance	It will ensure management of staff according to best practice.
Source/collection of data	Policies and best practices.
Method of calculation	Track delivery against the milestone.
Data limitations	None.
Type of indicator	Compliance
Calculation type	Non-cumulative
Reporting cycle	Quarterly.
New indicator	New indicator – compliance
Desired performance	Achievement as per APP
Indicator Responsibility	Accountability resides with the HR Manager

Indicator Title	1.4 A stakeholder engagement plan and an implementation plan in place and implemented
Short Definition	Draft Stakeholder engagement plan in place. The plan needs to be implemented so that feedback can be obtained from stakeholders
Purpose/importance	Feedback from stakeholder engagements will help to improve the organsations image and manage the perceptions in the market.
Source/collection of data	Internal reporting against a milestones and evaluation criteria to be defined as part of the development of the plan.
Method of calculation	Finalise plan within planned timeframe (yes or no); and Track implementation and performance against milestones and targets once developed.
Data limitations	None anticipated.
Type of indicator	Governance
Calculation type	No cumulative.
Reporting cycle	Quarterly.
New indicator	Yes.
Desired performance	Draft stakeholder engagement plan
Indicator Responsibility	Accountability resides with Senior Manager : Communications

Indicator Title	1.5 At least 4 exhibitions per annum, 80% attendance of DOE events, monthly updated website and distribution of quarterly newsletters as per distribution list and channels.
Short Definition	It is important for SANEDI to make its presence known in the energy industry. Exhibitions, the attendance of DoE events, monthly updated website and the delivery of quarterly newsletter to stakeholders will assist in this initiative.
Purpose/importance	The management of stakeholder perceptions is becoming more and more important as institutions do not exist in a vacuum.
Source/collection of data	Internal reporting against the indicators.
Method of calculation	Track reporting against indicators
Data limitations	None anticipated.
Type of indicator	Governance
Calculation type	Non cumulative.
Reporting cycle	Quarterly.
New indicator	Yes.
Desired performance	All indicators achieved
Indicator Responsibility	Accountability resides with Senior Manager : Communications

14.2 ENERGY RESEARCH, DEVELOPMENT, DEMONSTRATION AND DEPLOYMENT PROGRAMME: TECHNICAL INDICATOR DESCRIPTIONS

Indicator Title	2.1 Completed Reports on:carbon dioxide as an extraction agent,CO2 reduction potential, demand and supply match, water and waste issues, risk assessment, geography and surface issues and Syntheses Report
Short Definition	The determination of the potential and appropriateness of technologies for the geological storage of carbon dioxide in South Africa carbon capture and storage
Purpose/importance	Carbon capture and storage is a national flagship programme to contribute to the mitigation of greenhouse gas emissions
Source/collection of data	Gas emission reduction targets based on the Carbon Dioxide Geological Storage Atlas released in 2010
Method of calculation	Calculations done from research reports
Data limitations	Research is done by external stakeholders
Type of indicator	Outcome
Calculation type	Cumulative.
Reporting cycle	Quarterly
New indicator	No
Desired performance	Target to be achieved
Indicator Responsibility	Accountability resides with the Senior Manager: Cleaner Fossil Fuels.

Indicator Title	2.2 Exploration , Design, Engineering, Construction and operation of a pilot carbon dioxide storage plant, determination of the commercialisation for carbon dioxide storage in SA, Protocols for the monitoring of carbon dioxide
Short Definition	The determination of the potential and appropriateness of geological storage of carbon dioxide in South Africa – Pilot CO2 Storage Project (PCSP)
Purpose/importance	New technology in SA
Source/collection of data	Reports
Method of calculation	Calculations done in terms of reports
Data limitations	Research carried out external stakeholders
Type of indicator	Outcome
Calculation type	Non-Cumulative.
Reporting cycle	Quarterly
New indicator	No
Desired performance	Target to be Achieved
Indicator Responsibility	Accountability resides with the Senior Manager: Cleaner Fossil Fuels

Indicator Title	2.3 Bursary and non-bursary support report on the number of students and their research topics and publications, CCS stakeholder engagement Reports on concerns raised and R&D Project Reports.
Short Definition	For this new technology to be a success, the buy- in from the affected stakeholders is necessary and it is important for capacity development in this area to take place
Purpose/importance	New technology in SA
Source/collection of data	Reports
Method of calculation	Calculations done in terms of reports
Data limitations	Research carried out external stakeholders
Type of indicator	Outcome
Calculation type	Non-Cumulative.
Reporting cycle	Quarterly
New indicator	No
Desired performance	Target to be Achieved
Indicator Responsibility	Accountability resides with the Senior Manager: Cleaner Fossil Fuels

Indicator Title	2.4 Number of collaborative projects and platforms with industry, government and government entities with respect to : Policy improvement , Knowledge sharing, Advisory, Research collaboration
Short Definition	To provide a centre that coordinates and promotes RE research, development and demonstration in SA through collaboration and funding
Purpose/importance	By 2030, SANEDI wishes to increases substantially the share of renewable energy in the global energy mix
Source/collection of data	Collaboration agreements Research reports
Method of calculation	Confirmation of a formally signed off collaboration agreements Clearly defined roles and responsibilities
Data limitations	Research is carried out by external stakeholders
Type of indicator	Outputs.
Calculation type	Non-cumulative
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Target to be achieved
Indicator Responsibility	Accountability resides with the Senior Manager : Renewable Energy

Indicator Title	2.5 Number of progress and financial reports
Short Definition	Provide technical and management support through tendering, contracting, payment and reporting to the Danish RE EE programme's DoE and ESKOM components
Purpose/importance	The indicator is intended to show the contribution of the subprogrammes towards innovation and to promote demonstration initiatives with regards to renewable energy
Source/collection of data	Progress reports Financial reports
Method of calculation	Progress and financial reports
Data limitations	Results are expected from external stakeholders
Type of indicator	Impact
Calculation type	Cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	More clean energy capacity and generated energy collaboration agreementsover the period is desirable.
Indicator Responsibility	Accountability for this indicator resides with the Senior Manager: Renewable Energy

Indicator Title	2.6 Database and resource map to be developed
Short Definition	Develop maps, database , tools and guidelines for effective wind siting and decision making for the national wind programme
Purpose/importance	By 2030, SANEDI wishes to increases substantially the share of renewable energy in the global energy mix
Source/collection of data	Internal database
Method of calculation	Database and map to be developed
Data limitations	None
Type of indicator	Outputs
Calculation type	Cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Target to be achieved
Indicator Responsibility	Accountability for reporting on this indicator resides with the Senior Manager : Renewable Energy

Indicator Title	2.7 Number of IEA implementation agreement memberships and number of joint projects under Southern Africa secretariat of REEEP
Short Definition	International collaboration needs to be fostered to globalize expertise and leverage research funding and to share and gain knowledge through the renewable energy community
Purpose/importance	By 2030, SANEDI wishes to ensure universal access to affordable, reliable and modern energy services
Source/collection of data	Internal database
Method of calculation	Number of research projects in place
Data limitations	None
Type of indicator	Outputs
Calculation type	Cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Target to be achieved
Indicator Responsibility	Accountability for reporting on this indicator resides with the Senior Manager : Working for Energy

Indicator Title	2.8. Number of projects to implement clean energy technologies and services to low income communities
Short Definition	Undertake selected clean energy projects to demonstrate the use of various renewable energy applications in low income rural and urban communities for possible national roll out as alternative mode of energy provision in various applications
Purpose/importance	By 2030, SANEDI wishes to ensure universal access to affordable, reliable and modern energy services
Source/collection of data	Internal database
Method of calculation	Number of implementation projects in place
Data limitations	None
Type of indicator	Outputs
Calculation type	Cumulative.
Reporting cycle	Annually.
New indicator	No.
Desired performance	Target to be achieved
Indicator Responsibility	Accountability for reporting on this indicator resides with the Senior Manager : Working for Energy

Indicator Title	2.9 the number of research studies undertaken to advance sustainable access and use of clean energy solutions by rural and low income communities r of projects to implement clean energy technologies and services to low income communities
Short Definition	Undertake various Research Studies to advance sustainable access and use of clean energy solutions by rural and low income communities
Purpose/importance	By 2030, SANEDI wishes to ensure universal access to affordable, reliable and modern energy services
Source/collection of data	Internal database
Method of calculation	Number of research projects in place
Data limitations	None
Type of indicator	Outputs
Calculation type	Cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Target to be achieved
Indicator Responsibility	Accountability for reporting on this indicator resides with the Senior Manager : Working for Energy

Indicator Title	2.10 Number of " on the job' training programmes to enhance the capability of selected practitioners to implement clean energy solutions
Short Definition	Selected practitioners could enhance their skills through the "on the job training" programmes which will result in SMME development and increase in job opportunities, thereby reducing the rate of unemployment
Purpose/importance	These programmes will assist in achieving Government's social objectives
Source/collection of data	Internal database
Method of calculation	Number of programmes in place
Data limitations	None
Type of indicator	Impact
Calculation type	Cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Target to be achieved
Indicator Responsibility	Accountability for reporting on this indicator resides with the Senior Manager : Working for Energy

Indicator Title	2.11 Number of workshops held evidenced by minutes and Reports from Sessions held
Short Definition	To Manage Industry participation and collaboration towards the sustainable development of a Smart Grid in South Africa
Purpose/importance	Intelligent energy systems infrastructure is a vital enabler for a low carbon economy
Source/collection of data	Internal database
Method of calculation	Number of contracts in place with municipalities
Data limitations	None
Type of indicator	Impact
Calculation type	Cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Target to be achieved
Indicator Responsibility	Accountability for reporting on this indicator resides with the Senior Manager : Samrtgrids and Network Automation

Indicator Title	2.12 Reports on Smart Metering Code, Advanced Metering Infrastructure security guideline , Advance Metering Infrastructure guideline, Smart meter short course curriculum developed, Number of bursaries awarded, Smart Metering lab
Short Definition	To Collaborate with the University of Pretoria and address the critical Electricity Industry Challenges through research and capacity development.
Purpose/importance	Intelligent energy systems infrastructure is a vital enabler for a low carbon economy
Source/collection of data	Internal database
Method of calculation	Number of implementation guidelines in place
Data limitations	None
Type of indicator	Impact
Calculation type	Cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Target to be achieved
Indicator Responsibility	Accountability for reporting on this indicator resides with the Senior Manager : Samrtgrids and Network Automation

Indicator Title	2.13 Biannual Exco reports
Short Definition	International Smart Grid collaboration through participating in the ISGAN (International Smart Grid Action Network)
Purpose/importance	Intelligent energy systems infrastructure is a vital enabler for a low carbon economy
Source/collection of data	Internal database
Method of calculation	Reports
Data limitations	None
Type of indicator	Impact
Calculation type	Cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Target to be achieved
Indicator Responsibility	Accountability for reporting on this indicator resides with the Senior Manager : Data Repository amd Management (CESAR)

Indicator Title	2.14 The number of training programmes initiated through the CESAR initiative
Short Definition	To capacitate CESAR with the necessary resources (people and tools) to be able to undertake Energy Modelling Research
Purpose/importance	Data plays a significant role in the planning and research.
Source/collection of data	Internal database
Method of calculation	Reports
Data limitations	None
Type of indicator	Impact
Calculation type	Cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Target to be achieved
Indicator Responsibility	Accountability for reporting on this indicator resides with the Senior Manager : Data Repository amd Management (CESAR)

Indicator Title	2.15 The number of research reports finalized and energy modelling database updated
Short Definition	To provide energy policy guidance through energy modelling research.
Purpose/importance	Data plays a significant role in the planning and research.
Source/collection of data	Internal database
Method of calculation	Reports and database
Data limitations	None
Type of indicator	Impact
Calculation type	Cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Target to be achieved
Indicator Responsibility	Accountability for reporting on this indicator resides with the Senior Manager : Data Repository and Management (CESAR)

14.3 ENERGY EFFICIENCY PROGRAMME: TECHNICAL INDICATOR DESCRIPTIONS

Indicator Title	3.1 Processing of applications within 6 weeks of receipt and the number of reports submitted to key stakeholders as required by legislation
Short Definition	Provide assurance to SARS on energy savings claims, in line with published regulations, and perform a reporting function to key stakeholders (DoE, National Treasury, SARS (through National Treasury), and DTI) by : • issuing Energy Efficiency tax certificates for approved and compliant applications and copying them to the Revenue Service.
Purpose/importance	In terms of 12I and 12L of the tax legislation
Source/collection of data	Internal database
Method of calculation	Applications processed and reports compiled
Data limitations	None
Type of indicator	Measures output.
Calculation type	Non-cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Targets to be met
Indicator Responsibility	Accountability for this indicator resides with the Senior Manager Energy Efficiency.

Indicator Title	3.2 Number of energy efficiency capacity building programmes undertaken
Short Definition	To support and provide capability building through designed programmes in the area of energy efficiency
Purpose/importance	Intended to demonstrate the tertiary technical skills development and capacity building achievement that result from this specific arrangement.
Source/collection of data	Performance data will be sourced from EEDSM HUB Annual performance reporting.
Method of calculation	Tracking of annual performance against targets.
Data limitations	None foreseen.
Type of indicator	Measures outcomes.
Calculation type	Non-cumulative.
Reporting cycle	Quarterly
New indicator	No.
Desired performance	Targets to be met
Indicator Responsibility	Accountability resides with the Senior Manager: Energy Efficiency

Indicator Title	3.3 Number of projects undertaken
Short Definition	To fulfil the role of a national energy efficiency champion through collaborative activities with industry partners aimed at the promotion of new technologies thereby increasing the uptake of energy efficient technologies
Purpose/importance	Significant opportunity exists to assist in accelerating the adoption of energy efficiency in the country. . SANEDI is well positioned to provide such support.
Source/collection of data	Internal database
Method of calculation	Collaboration agreements
Data limitations	None anticipated.
Type of indicator	Measures activity towards a final output.
Calculation type	Non-cumulative.
Reporting cycle	Quarterly.
New indicator	No
Desired performance	Targets to be met
Indicator Responsibility	Accountability for reporting on this indicator resides with the Senior Manager.: Energy Efficiency

15.APPENDIX B: POLICY CONTEXT

A comprehensive list of relevant legislation and policy that shapes the context for SANEDI's activities and focus is listed below- alphabetically and not order of importance.

State of the National Address in June 2014, Budget Vote speech by the Minister of Energy , 2014	Budget Vote Speech.	We need to respond decisively to the country's energy constraints to create a conducive environment for growth. There are calls for a radical transformation of the energy sector to develop a sustainable energy mix that comprises of coal, solar, wind, hydro and gas. Works needs to be done at a technical level on all form of energy especially shale gas with regards to funding, safety, exploration and local manufacture of components. Shale gas is recognised as a game changer for the economy. We will pursue the shale gas option within the framework of our good environmental laws.
2011 National Council of Provinces (NCOP) Budget Vote speech by the Minister of Energy, Ms Dipuo Peters, MP, Old Assembly Chamber, Parliament, Cape Town	Budget Vote Speech.	Last year we committed to establishing the South African National Energy Development Institution (SANEDI), and this was duly done. SANEDI will, amongst others, be the champion for Energy Efficiency in the country, which will not only save energy but reduce the burden on households. In addition SANEDI will house South Africa's carbon Capture and Storage research and development as well as other energy research programmes. He refers to the different programmes and progress made.
Biofuels Industrial Strategy 2007	A significant change to the draft Strategy is to adopt a short term focus (5 year pilot) to achieve a 2% penetration level of biofuels in the national liquid fuel supply, or 400 million litres pa. The target has been revised down from the 4.5% target that was initially proposed in the draft Strategy document. The following crops are proposed for the production of biofuels in the country: for Bioethanol, sugar cane and sugar beet and for Biodiesel sunflower, canola and soya beans. The exclusion of other crops and plants such as maize and Jatropha is based on the food security concerns. Further research is still needed to test usability of these in the country.	R&D platform will allow for the strengthening of local capacity and also leverage on international R&D work. The DST together with relevant stakeholders within the National Systems of Innovation (NSI) will facilitate the development and coordination of this work through a biofuels R&D plan that will focus on the total value chain. The research focus areas will include the investigation of alternative feedstock, development of energy crops (i.e. drought tolerance, high yield per ha, energy efficiency etc.) and improvement of known technologies whilst further developing, supporting and piloting the second generation technologies.
DOE strategic plan	The Department's strategic plan seeks to deliver results along eight strategic objectives that include promoting energy security through reliable, clean, and affordable sources; universal access to energy sources, transformation of the energy sector, and strengthening the operations and management of the Department.	Centre for Carbon Capture and Storage under SANERI1 Clean Coal Technologies1

DST 10 year innovation plan	The grand challenge areas are: The Farmer to Pharma value chain to strengthen the bio-economy. Space science and technology. Energy security- the race is on for safe, clean, affordable and reliable energy supply, and South Africa must meet its medium-term energy supply requirements while innovating for the long term in clean coal technologies, nuclear energy, renewable energy and the promise of the "hydrogen economy". Global-change science with a focus on climate change. Human and social dynamics.	From an R&D perspective, it makes sense to position Saneri, Eskom, Sasol and various CEF subsidiaries to work together to advance clean coal technologies. For the long term, South Africa needs to strengthen the innovation chain in nuclear energy science. R&D to support conventional reactors in materials, safety, waste, reactor physics and so on must be planned and coordinated.
Energy Efficiency Policy & Strategy, DME 2004	The vision of the strategy is to contribute to affordable energy for all, and to minimise the effects of energy usage on health & the environment. It is implemented through sector programmes.	Renewable Energy; Clean Fuels Programme, Energy Audits, Energy Management - The National Energy Research Institute will be funded to carry out a dedicated R&D programme for energy efficiency.
National Energy Efficiency Strategy of the RSA	This Strategy allows for the immediate implementation of low-cost and no-cost interventions, as well as those higher-cost measures with short payback periods. These will be followed by medium-term and longer-term investment opportunities in energy efficiency. The Strategy acknowledges that there exists significant potential for energy efficiency improvements across all sectors of our national economy.	The South African National Energy Research Institute will be funded to carry out a dedicated programme of research and development for energy efficiency. The Strategy will support appropriate research and the possible adaptation of internationally available technologies and processes.
Energy Security Master Plan, DME	The Master Plan is premised on achieving certain goals that have been set for the electricity sector. Due to the uncertainty over the planning horizon, some assumptions are made regarding demand projections and the economic outlook. After consideration of the Energy White Paper and the regulatory policy framework, the current electricity generation, transmission and distribution sectors are appraised, in terms of the challenges confronting these sectors.	Focused research and development will enable meeting technical performance and capacity expansion objectives. Electricity/energy-based technology development and innovation is imperative to productivity and growth of the country.
Gauteng Integrated Energy Strategy	It aims to improve Gauteng's environment, reduce its contribution to climate change and tackle energy poverty, whilst promoting economic development.	
Green Paper on Climate Change Response Strategy	Climate change response objective of: making a fair contribution to the global effort to achieve the stabilisation of greenhouse gas concentrations in the atmosphere at a level that prevents dangerous anthropogenic interference with the climate system; and effectively adapt to and manage unavoidable and potential damaging climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity.	Carbon capture and storage (research, development and demonstration programmes).

Industrial Policy Action Plan (IPAP) 2010/11 – 2012/13, published Feb 2010		Photovoltaic power; Green industries Concentrated Solar Thermal power; Industrial Energy Efficiency; Water efficiency; Waste Management; Biomass and waste management; and Energy-efficient vehicles
Integrated Resource Plan for Energy, 2010	This Policy-Adjusted IRP is recommended for adoption by Cabinet and for subsequent promulgation as the final IRP. This proposal is a confirmation of the RBS in that it ensures security of supply. It is a major step towards building local industry clusters and assists in fulfilling South Africa's commitments to mitigating climate change as expressed at the Copenhagen climate change summit. The Policy-Adjusted IRP includes the same amount of coal and nuclear new builds as the RBS, while reflecting recent developments with respect to prices for renewables. In addition to all existing and committed power plants (including 10 GW committed coal), the plan includes 9,6 GW of nuclear; 6,3 GW of coal; 17,8 GW of renewables; and 8,9 GW of other generation sources.	Section 7- Research Agenda for Next IRP Distributed generation, smart grids and off-grid generation Harnessing South Africa's coal resource Decommissioning and waste management Technology options Small hydro; Regional hydro options (specifically Inga Biomass (including municipal solid waste and bagasse); Storage; and Energy efficiency demand side management. Vision for 2050 Uncertainty & Risk factors
Integrated Energy Plan, 2003	The Integrated Energy Plan outlines the direction and steps to be taken by South Africa to meet energy needs. The plan declares South Africa's continued reliance on coal, but also uses modeling to forecast which energy sources can be used most effectively to meet demand under four different scenarios. The plan advocates diversification of energy sources, including renewables, as well as fuel switching to improve energy efficiency.	
Long-Term Mitigation Scenarios, DEAT, October 2007	Develops scenarios to mitigate greenhouse gas emission and forms the basis of South Africa's national mitigation policy direction.	The LTMS recognizes the importance of a low carbon future and provides an indication of the effort that has to be extended into changing the energy mix and economic activity of South Africa to achieve the required reduction in carbon.
Measurement and Verification Guideline for Energy Efficiency Certificates (DRAFT)	The SA Government intends to introduce tax incentives for companies that can prove energy efficiency savings. One of the primary requirements for companies to benefit from this tax incentive is that they need to make use of independent and registered Measurement and Verification (M&V) professionals that are certified by the Council of Measurement and Verification Professionals of South Africa (CMVPSA).	This Measurement and Verification Guideline for Energy Efficiency Certificates aim to provide background with regards to the M&V requirements surrounding the energy efficiency tax incentive scheme. It also provides a high-level M&V approach that should be followed by registered M&V professionals to issue the required supporting documentation that will be used by SANEDI to issue Energy Efficiency Certificates.

National Energy Act, 2008	To ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements, international commitments and obligations and interactions amongst economic sectors; to establish institutions to be responsible for promotion of efficient generation and consumption of energy, energy modelling and planning, increased generation and consumption of renewable energies, energy research, contingency energy supply, holding of strategic energy minerals, adequate investment in, appropriate upkeep of and equitable access to energy infrastructure; to provide measures for the furnishing of certain data and information regarding energy demand, supply and generation; and to provide for matters connected therewith.	Chapter 4 focuses on the establishment of SANEDI. The institute is intended to: • Promote energy efficiency in the economy; • Increase the GDP per unit of energy consumed; • Ensure energy resources used in optimal manner; • Promote energy research and technology innovation; • Increase players in the energy field; and • Facilitate effective management of energy demand and its conservation.
National Research & Development Strategy- Aug 2002	The objective of this strategy is to address these weaknesses in a profound but practical way. In particular, the approach is to apply internationally well-tested principles and systems that are adjusted to local realities and requirements. The strategy must be able to give expression to our national goals of economic development and improvement of quality of life for all citizens.	
National Energy Research, Development and Innovation Strategy (developed by DME, DST and stakeholders)		Medium- to long-term energy-related research themes that would guide the management of SANEDI to appropriately position the company in terms of national priorities: • Energy infrastructure optimisation; • Energy efficiency and demand-side management; • The impact of energy use on the environment; • The use of energy to stimulate socio-economic development; • Cleaner fossil fuel use, including clean coal; • Renewable energy; • Alternative energy sources, including fuel cells and hydrogen; • Energy planning and modelling; and • Energy policy research.
NERSA Consultation Paper- Revision of Regulatory Rules for Energy Efficiency Demand Side Management (EEDSM) including Standard Offer Programme (SOP) June 2010	Policy to support the Energy Efficiency and Demand Side Management Program for the Electricity Sector through the Standard Offer Incentive Scheme Energy Efficiency & Demand-Side Rules incl Standard Offer Program.	No specific reference in the document.

White paper on energy policy	This White Paper has been written so as to clarify Government policy regarding the supply and consumption of energy for the next decade. The policy strengthens existing energy systems in certain areas, calls for the development of underdeveloped systems and demonstrates a resolve to bring about extensive change in a number of areas. It addresses international trade and co-operation, capacity building, and the collection of adequate information. The document is comprehensive, addressing all elements of the energy sector as practically as it can.	Government will consider the development of a system to prioritise national research funding into the three main research categories in order to address the medium to long-term research needs in the energy sector. This will consist of an integrated, multi-year, national, needs-driven, energy research strategy, developed from time to time by an experienced team of experts appointed by the Minister. This strategy will identify medium and long-term priority programmes and themes.
White Paper on Renewable Energy Policy, Aug 2002	Formerly known as the White Paper on the Promotion of Renewable Energy and Clean Energy Development, this paper aims at informing the public and the international community of the Government's goals and objectives for the optimal use of renewable energy. Recognizing the importance of reducing the damage done to the environment by South Africa's reliance on electricity from coal and the need for diversification of energy resources, it commits the Government to a number of actions to ensure that renewable energy becomes a significant part of South Africa's energy portfolio over the next ten years. These measures include fiscal mechanisms, regulatory instruments, and standards to promote R&D and investment in renewables and educational programs to raise public awareness.	
White Paper on Renewable Energy, November 2003	The main aim of this White Paper is to create the conditions for the development and commercial implementation of renewable technologies. Government will use a phased, managed and partnership approach to renewable energy projects that are well conceived and show the potential to provide acceptable social, environmental and financial returns for all investors and stakeholders. This will lessen the strain on fiscal resources and hold greater potential for successful implementation. The focus will be on delivery. An appropriate enabling environment towards full commerciality will nurture the technologies that are proven to best meet Government's policy objectives. Through this policy document Government is venturing into an entirely new area.	Mechanisms will be investigated to extend the operational support available from the Central Energy Fund to renewable energy programmes.
Electricity Regulation Act (412006): Electricity Regulations for Compulsory norms and Standards for Reticulation Services	To establish a national regulatory framework for the electricity supply industry; to make the National Energy Regulator the custodian and enforcer of the national electricity regulatory framework; to provide for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated; and to provide for matters connected therewith.	

16.APPENDIX C: AN OVERVIEW OF THE CURRENT ENERGY RESEARCH ENVIRONMENT

16.1 ROLE OF DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST)

The DST strives toward introducing measures that put science and technology to work to make an impact on growth and development in a sustainable manner in areas that matter to all the people of South Africa. This includes focused interventions, networking and acting as a catalyst for change in terms of both productive components of our economy, making it competitive in a globally competitive liberalised environment, and in respect of the huge development backlog existing among the poorest components of our society. The goal of realising this vision is underpinned by development and resourcing strategies for the formation of science, engineering and technology, human capital, democratisation of state and society, promotion of an information society and ensuring environmental sustainability in development programmes. The department has, and should continue to provide strategic insight into technological advances likely to impact upon the programmes implemented by SANEDI in line with its policy that specialised research entities should be close to their line function departments.

In line with the strategic management model on science and technology which was approved by Cabinet which is currently being implemented by the Department of Science and Technology, cross-cutting primary research activities will fall within the mandate of the DST and will be implemented by relevant agencies under the ambit of the DST. Applied research specifically within the energy sector will be conducted by SANEDI. Current programmes within SANEDI Applied Research have been reviewed and separated in line with the model. While there has been a separation of current SANEDI Applied Research programmes, continual engagement will be required between SANEDI and the DST to ensure alignment of activities.

The representation of DST on the SANEDI Board will ensure that the DST continues to be involved and provides guidance and oversight into the strategic direction of SANEDI and that potential areas of overlap and misalignment of programmes are identified and addressed.

16.2 ROLE OF TECHNOLOGY INNOVATION AGENCY (TIA)

As an agency established by Government to stimulate innovation in the country, TIA should support the basic research requirements of SANEDI, in keeping with the Strategic Management Framework for Research as approved by Cabinet. TIA has also been given the responsibility of protecting and assisting in the commercialisation of intellectual property emanating from local inventors and developers. SANEDI will therefore need to collaborate with TIA in the commercialisation of intellectual property, relating to SANEDI focal areas.

16.3 ROLE OF NATIONAL RESEARCH FOUNDATION (NRF)

The objective of the National Research Foundation is to support and promote research through funding, human resource development and the provision of the necessary research facilities, in order to facilitate the creation of knowledge, innovation and development in all fields of the natural and social sciences, humanities and technology. In

so doing, it contributes to the improvement of the quality of life of all the people of the country. The organisation was established in 1999 in accordance with the NRF Act.

As the Government's national agency responsible for promoting and supporting basic and applied research as well as innovation, the NRF upholds excellence in its investments in knowledge, people, products and infrastructure. The NRF provides services and grants to support research and postgraduate research training, vital to the development of South Africa. It is the NRF's vision to be a key instrument in the creation of an innovative, knowledge-driven society where all citizens are empowered to contribute to a globally competitive and prosperous country. Funding from the NRF is largely directed towards academic research, developing high-level human resources, and supporting the nation's national research facilities. The NRF's task is to advance research in all fields of the humanities, social and natural sciences, engineering, and technology; including indigenous knowledge. By forging strategic partnerships locally and internationally, it extends the resources that researchers need to foster and expand South Africa's research capabilities and, ultimately, to improve the quality of life for all. Other areas of its core business are to promote research capacity development (RCD), to unlock the full creative potential of the research community and to establish equity and redress. The NRF fosters strategic partnerships and knowledge networks to make South Africa globally relevant and competitive. It provides research information and strategic advice.

It is anticipated that the NRF will support SANEDI in the funding of human capital development programmes that support SANEDI CORDs, while also providing grant funding through the Innovation Fund for projects that display evidence of intellectual property rights development.

16.4 ROLE OF UNIVERSITIES IN UNDERTAKING ENERGY RESEARCH

The energy research undertaken at the Universities played an important part in establishing and developing a vibrant energy sector research programme that served the sector in developing capable technical, scientific and engineering skills for the energy sector in South Africa. The recent transformation of tertiary education institutes has seen a rise in the number of experienced academics leaving South Africa and a subsequent depletion of technical research capability. Therefore, the level of advanced research at universities has declined and in turn had a negative impact on the research capability of the country. Moreover, the NRF's Technology and Human Resources Industry Programme (THRIP) is presently guided by a broad national research strategy which does not necessarily have a direct focus on energy. As a result focused and advanced energy research at universities that contributes to the development of the energy sector in any meaningful way has been limited.

16.5 ROLE OF ESKOM RESEARCH

The Eskom Research and Innovation Department (ERID), as part of the Resources and Strategy Division of Eskom, is responsible for the planning and implementation of the Eskom technical research programme against the annually allocated research budget. In 2006, Eskom realigned the Eskom Research programme to focus more on electricity

operations research rather than longer-term energy research, as was the case in previous years. This resulted in the closure of critical laboratories that had relevance to the broader electricity sector and a high-specialised staff attrition within Eskom research.

In summary Eskom no longer played the role of Eskom housing an energy research facility of national importance.

16.6 CSIR

An Act of Parliament constituted the CSIR in 1945 as national science council. The CSIR undertakes directed and multidisciplinary research, technological innovation as well as industrial and scientific development to improve the quality of life of the country's people.

The CSIR is committed to supporting innovation in South Africa to improve national competitiveness in the global economy. Science and technology services and solutions are provided in support of various stakeholders, and opportunities are identified where new technologies can be further developed and exploited in the private and public sectors for commercial and social benefit.

The CSIR's shareholder is the South African Parliament, held in proxy by the Minister of Science and Technology.

16.7 ROLE OF INTERNATIONAL BODIES

Membership of international bodies and co-operation with similar institutes as SANEDI brings access to international expertise that facilitates SANEDI maintaining an international compatibility. Such international reputation also facilitates the acquisition of funding (both local and international) for specific projects within SANEDI.

17.APPENDIX D: ANNUAL BUDGET BREAKDOWN

The table below indicates the allocation of the current approved baseline allocation from the Energy Vote under the Appropriation Act for the period under review:

	2014/15		2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
	Budget	Preliminary outcome	Approved budget	Budget estimate	Budget estimate	Budget estimate	Budget estimate	Budget estimate
	R'000	R'000	R'000	R'000	R'000	R'000	R'000	R'000
Administration	17,110	53,480	68,952	55,807	57,896	55,552	58,607.36	61,830.76
Energy efficiency programme	24,083	9,058	2,000	2,000	-	3,000	3,165.00	3,339.08
Energy Research, Development, Demonstration and Deployment programme:								
SACCCS/PCSP	182,762	8,442	139,213	119,650	129,850	180,000	266,000	68,000
Smart grids	-	28,826	93,800	-	-	500	527.50	556.51
Working for energy	-	2,211	20,075	-	-	3,000	3,165.00	3,339.08
Clean energy solutions	-	9,283	70,741	2,838	3,508	1,189	1,254.40	1,323.39
Centre for Energy systems Analysis and Research	-	1,234	2,000	3,000	1,227	-	3,000.00	3,165.00
Green transport	-	-	-	-	-	-	1,000.00	1,055.00
Shale gas	-	817	6,769	-	-	-	-	-
Total	**223,95**	**113,351**	**403,550**	**191,245**	**73,789**	**144,183**	**470,719.26**	**496,608.81**
Current payments	223,955	86,801	301,074	191,245	73,789	144,183	152,113.07	160,479.28
Compensation of employees	43,800	39,688	45,711	48,911	52,335	56,548	59,658.14	62,939.34
Salaries and wages	43,800	39,688	45,711	48,911	52,335	56,548	59,658.14	62,939.34
Social contributions	-	-	-	-	-	-	-	-
Goods and services	179,225	42,267	251,615	136,727	19,065	86,202	90,943.11	95,944.98
Of which 1							-	-
Agency and support/outsourced services	1,680	1,857	2,991	1,482	1,452	1,524	1,607.82	1,696.25
Communication	-	-	-	1,391	-	-	-	-
Computer services	-	-	-	-	-	-	-	-
Consultants	1,515	228	1,152	1,514	266	280	295.40	311.65
Contractors	-	-	-	-	-	-	-	-
Inventory	-	-	-	-	-	-	-	-
Lease payments	**3,762**	**3,251**	**4,726**	**5,136**	**5,434**	**5,992**	**6,321.56**	**6,669.25**
Repairs and maintenance	**531**	**342**	**172**	**158**	**32**	**34**	**35.87**	**37.84**
Research and development	**152,430**	**20,527**	**231,420**	**118,022**	**6,284**	**72,703**	**76,701.67**	**80,920.26**

Training and staff development	**300**	**498**	**450**	**800**	**516**	**136**	**143.48**	**151.37**
Travel and subsistence	**5,561**	**5,874**	**6,695**	**3,744**	**1,573**	**3,292**	**3,473.06**	**3,664.08**
Other	**13,446**	**9,690**	**4,008**	**4,480**	**3,508**	**2,243**	**2,366.37**	**2,496.52**
Depreciation	**930**	**4,846**	**3,748**	**5,607**	**2,389**	**1,433**	**1,511.82**	**1,594.96**
Transfers and subsidies	**-**	**26,550**	**87,000**	**-**	**-**	**-**	**-**	**-**
Other government units	**-**	**26,550**	**87,000**	**-**	**-**	**-**	**-**	**-**
Municipalities	**-**	**26,550**	**87,000**	**-**	**-**	**-**	**-**	**-**
Tax payment	**-**	**-**	**15,476**	**-**	**-**	**-**	**-**	**-**
Total Expenditure	**223,955**	**113,351**	**403,550**	**191,245**	**73,789**	**144,183**	**622,832.32**	**657,088.10**

ADMINISTRATIVE BUDGET

The budget allocation under this programme is aimed at enabling administrative divisions within the organization to continue to support the core divisions in the delivery and execution of the organisational mandate and the execution of the approved Strategy.

Over the 2016/17 MTEF, the administration budget linked to programme 1 will amount to R55, 807 million being a reduction of 24% from the previous period (2015/16) as a result of increased efforts to contain costs stemming from fiscal budget cuts and some of strategic positions not being filled i.e. Procurement Manager and Company Secretary . Expenditure on goods and services linked to administrative function will amount to R18, 044 million of the overall expenditure budget as we direct more efforts towards spending on applied energy research, development, demonstration and deployment as well as energy efficiency programmes..

There will be an increased focus on training and development of staff in order to ensure high calibre of staff and innovation within the organization. The training and development budget will increase by 78% from the previous financial year as SANEDI positions itself to be the leaders in energy innovation and development. Expenditure on consultants/contractors will increase by 36% as we continue with the establishment of a fully capacitated Human Resources department to ensure that the organization has a motivated and fully functional workforce.

Investments in IT infrastructure will continue during the period as the entity capacitates the Project Management Office with resources required to ensure efficiency in project design, implementation, evaluation and reporting. It is expected that an investment of R1 million will be made in improving the performance management module. This will, however, be tackled using a phased in approach.

Expenditure relating to compensation of employees will amount to R34 032 million with an estimated total staff complement of 61 employees. This is an increase of 7% in comparison to the previous year's projections for cost of living adjustments to remuneration.

Research, development, demonstration and deployment initiatives linked to programme 2 and 3 will amount to 57% of the overall expenditure budget with expenditure being spread as follows:

		Estimated Budget 2015/16 R'000	Estimated Budget 2016/17 R'000
Energy efficiency programme		2,000	2,000
Energy Research, Development, Demonstration and Deployment programme:			
Cleaner Fossil Fuels (CCS)	1	139,213	127,600
Smart Grids and Network Automation	2	93,800	-
Working for Energy	3	20,075	-
Renewable Energy	4	70,741	2,838
Data Repository and Management	5	2,000	3,000
Cleaner Mobility	6	-	-
Cleaner Fossil Fuels (Shale gas)	7	6,769	-
Total		**334,598**	**135,438**

18.APPENDIX E: SANEDI MATRIX STRUCTURE

To give effect to the strategic plan and meet the delivery objectives of the annual performance plan SANEDI has to structure itself in an effective and efficient manner so as to optimise its operations. The matrix structure (tabled below) is targeted for this purpose as it offers a dynamic structure that provides benefits specific to SANEDI's requirements, including:

- greater flexibility that allows employee movement across current functional / departmental boundaries;
- improved access to a diverse range of skills and perspectives;
- improved communication, coordination and information sharing across functional boundaries; and
- allows for broader experience and hence offers improved opportunities for professional development and career progression to employees.

In the matrix structure, the personnel and other resources that a project manager requires are not permanently assigned to the project, but are obtained from a pool controlled and monitored by a functional manager. Personnel required to perform specific functions in a particular project are detailed for the period necessary, and are then returned to the control of the functional manager for reassignment.

18.1 ADVANTAGES OF THE MATRIX STRUCTURE

The matrix arrangement attempts to retain the benefits of both structures (functional organization and project team structure). It coordinates resources in a way that applies them effectively to different projects. Staff can still retain membership on teams and their functional department colleagues.

Efficient Information Exchange

The matrix arrangement can lead to an efficient exchange of information. Departments work closely together and communicate with each other frequently to solve issues. Efficient lines of communication enhance productivity and allow for quick decision-making. The specialized information exchange allows managers to respond quickly to the needs of clients and the organization.

Increased Motivation

In an ideal situation, the matrix structure encourages a democratic leadership style. This style incorporates the input of team members before managers make decisions. The ability to contribute valuable information before decisions are made leads to employee satisfaction and increased motivation. In a matrix structure, each employee brings his expertise to the table. Managers are involved in the day-to-day operations, which allow them to make decisions through the viewpoint of employees.

18.2 DISADVANTAGES OF THE MATRIX STRUCTURE

Internal Complexity

A disadvantage of the matrix structure is that it can result in internal complexity that needs to be managed effectively. Some employees may become confused as to who their direct supervisor is. The dual or multiple authority and communication problems may cause division among employees and managers. Miscommunication and ineffective managing can result in employee dissatisfaction and low morale. Prolonged issues may cause an organization to experience high employee turnover.

NOTES