



SADC INDUSTRIAL ENERGY EFFICIENCY PROGRAM (SIEEP)



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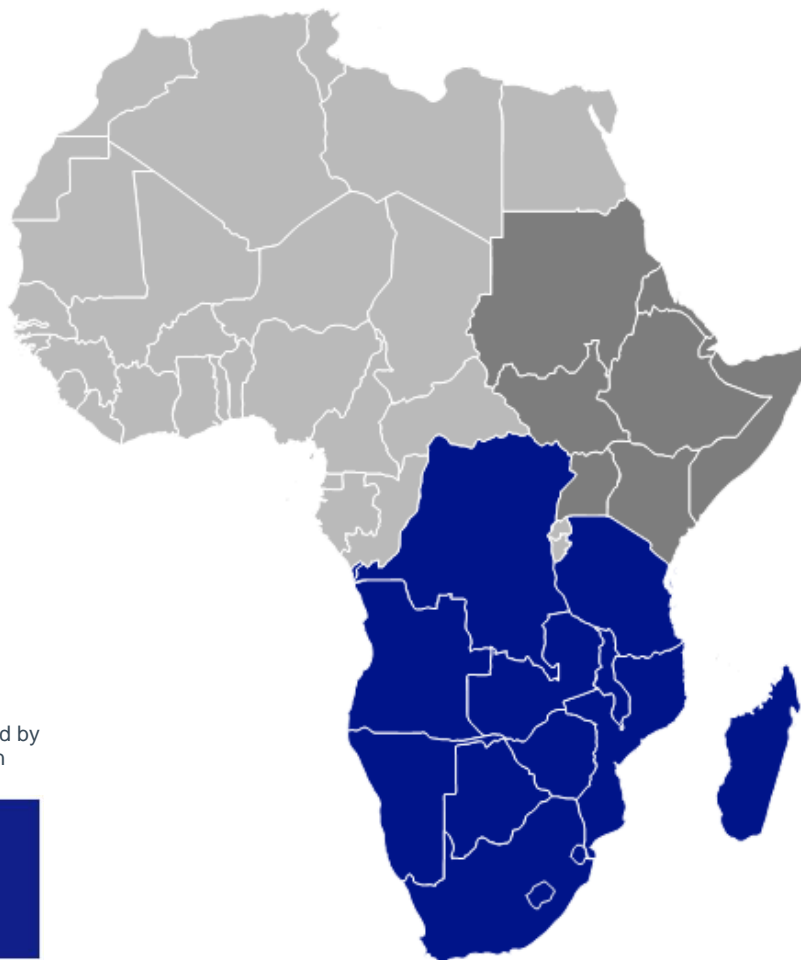
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Final Report – 20 September 2018



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SADC FOREWORD

Energy is a key driver to the development of any modern economy. Energy security and adequate access to modern sources of energy result in improved economic development and poverty alleviation, which are the pillars of the SADC Agenda stipulated in the SADC Treaty and the Regional Indicative Strategic Development Plan (RISDP – 2003 and 2015). The RISDP is a comprehensive 15-year strategic roadmap, which provides the strategic direction for achieving SADC's long-term social and economic goals. The inadequate supply of energy is a major infrastructure barrier for the industrialisation agenda of SADC as highlighted by the SADC Industrialisation Strategy and Road Map (2015 – 2063). The adverse effect of that is the rising cost of energy supply, which is affecting the operation and competitiveness of industries in the region hence the urgent need for intervention. The manufacturing sector, which is key to the growth of the region including the small and medium scale industries are the most affected.

Energy Efficiency (EE), through reducing energy demand, consumption and use can enhance industrial sector's competitiveness for its goods and services. SADC is pleased that the region through the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE), with the support of the European Union's Technical Assistance Facility (EU TAF) has developed a regional SADC Industrial Energy Efficiency Programme (SIEEP) specifically addressing the manufacturing sector of the industry. The SIEEP has developed key interventions to assist the SADC Industrialisation Agenda by supporting the industrial sector to utilise energy efficiently and in a cost effective manner. There is need for Member States to adopt EE technologies and services to reduce the cost of production in industry and minimise greenhouse gas (GHG) emissions that contribute to climate change and local air pollution. It is encouraging to note that some Member States such as Mauritius and South Africa, have made great strides in promoting EE in industry through a combination of governmental interventions such as enabling policies, regulation and tax incentives that have stimulated private sector led initiatives to be adopted. The rest of the Member States can emulate such practical examples.

The SADC Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP), approved by the Ministers responsible for Energy in 2017, is important in enabling a coherent commitment towards the development of renewable energy (RE) and EE technologies and services. I am glad that the SIEEP will contribute to the operationalization of REEESAP by supporting, amongst other, the setting of minimum energy performance standards for EE equipment, establishment of energy audits and energy management systems, and accreditation of EE service providers at regional level. The implementation of SIEEP over 5 years from 2019 to 2023 is structured through six (6) inter-related pillars, namely:

1. Formulation of comprehensive policy, regulatory and institutional frameworks;
2. Capacity building and skills development;
3. Demonstration/pilot programmes/projects and awareness raising;
4. Financing interventions for EE/RE Initiatives;
5. Application of EE/RE in industries; and
6. Domestication of EE/RE technologies in the SADC region.

Although, SACREEE will coordinate the implementation of SIEEP, these efforts will be supported by the SADC Secretariat and its other subsidiarity agencies including the Regional Electricity Regulators Association of Southern Africa (RERA) for regulatory frameworks, SADC Cooperation in Standardization (SADCSTAN) for standards, SADC Accreditation Services (SADCAS) for accreditation and the Southern African Power Pool (SAPP) for integrated demand management. The SADC Member States including their industrial firms, utilities, regulators and associations will implement country level Actions defined in SIEEP considering their priorities. The MS will also mobilize the necessary resources for implementing their priority Actions. SACREEE will assist with collective mobilization of financial resources for some of such priority Actions particularly where the impact is regional.

With the objective to contribute to the competitiveness of the industrial sector of SADC Member States by building their capacity to adopt and utilise energy efficiency technologies and practices, I, therefore call upon our International Cooperating Partners (ICPs) to come on board and support the implementation of SIEEP through both financial and technical assistance.

Dr. Stergomena Lawrence Tax
SADC Executive Secretary

FOREWORD

About 1 billion people are without access to electricity in the world. It is against this backdrop that the EU has decided to take a leading role to promote sustainable energy throughout the world in line with European Consensus on Development and the 2030 Agenda for Sustainable Development. Under the 2014-2020 financial perspective, EUR 3.7 billion have been allocated to sustainable energy cooperation for development to contribute to the three EU objectives by 2020 of providing access to energy to about 40 million people, increasing renewable energy generation by about 6.5 gigawatt and contribute to fighting climate change, by saving about 15 million tons of CO₂e/year. 2.7 billion of the mentioned EUR 3.7 has been allocated to sub-Saharan Africa (where the situation is particularly alarming with 610 million people – about 60% of the population – lacking access to electricity) with the goal to provide energy access to about 30 million people, add 5 gigawatt of renewable energy generation, and to save about 11 million tons of CO₂e /year by 2020. Energy cooperation with Africa is growing increasingly stronger. On 12 September, the European Commission's President Jean-Claude Juncker proposed a new Alliance for Sustainable Investment and Jobs between Europe and Africa that would help create up to 10 million jobs in Africa in the next 5 years. Sustainable energy is one of the key components in the Alliance.

Improving governance and reforms of the energy sectors is one of three central methods in EU energy cooperation¹. To address this, the EU launched a Technical Assistance Facility (TAF) in 2013 focusing on improving regulatory frameworks, spurring reform and enabling investments in renewable energy and energy efficiency in partner countries.

In this publication, you will read about a concrete example on how the EU through the TAF promotes energy efficiency in the Southern Africa Development Community (SADC) area to support sustainable industrialisation in the region.

The SADC Industrial Energy Efficiency Programme – SIEEP – is the result of long-term cooperation between the EU Technical Assistance Facility and the SADC Centre for Renewable Energy & Energy Efficiency (SACREEE) as well as numerous consultations with various stakeholders. The SIEEP will operationalise the SADC Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP), adopted in 2017, by identifying interventions to promote an enabling environment for energy efficiency in the region's policy, regulatory, institutional and financial frameworks, coupled with demonstration projects, awareness raising, and actions towards domestication of EE technologies - all within a timeframe of 5 years, from 2019 to 2023.

The EU will remain at the side of the SADC Member States, SADC Secretariat and Industry, and the SACREEE in their continued efforts towards mainstreaming energy efficient technologies and practices, and in support to the region's sustainable development.



*Felice Zaccheo,
Head of Unit Sustainable Energy and Climate Change
DG International Cooperation and Development
European Commission*

¹ Together with promoting political ownership and partnerships for implementation and boosting investment through innovative financial instruments.

SACREEE FOREWORD

Energy efficiency has not received much attention in the SADC region and has largely been considered an issue for the electric power utilities to relieve stress on their constrained supply infrastructure. The adoption of energy efficiency benefits the whole economy by not only improving security of supply but also by reducing utility costs of the consumer and making them competitive. The SADC Industrial Energy Efficiency Program (SIEEP) is one of SACREEE's flagship programmes designed to contribute towards accelerating the implementation of the regional block's Regional Infrastructure Development Master Plan (RIDMP). The programme fulfils SACREEE's mandate to contribute to increased access to modern energy services, and improved energy security across the SADC Region through the promotion of market based adoption of renewable energy and energy efficient technologies and energy services in the Member States.

The SIEEP is developed to complement the implementation of the SADC Industrialisation Strategy and Roadmap (2015-2063), which identifies lack adequate energy in the region as a barrier to the realisation of its objective of increasing competitiveness at the firm/industry, country and regional level. The SIEEP therefore promotes the adoption of energy efficient technologies to reduce the cost of production, making industries competitive and minimise greenhouse gas (GHG) emissions that contribute to climate change.

I, therefore, call upon both the policy makers and private sector to embrace energy efficiency as a way to make our products and services competitive at global stage. I am confident that the developed action plan spanning for a period of five years will be embraced by the Member States in developing comprehensive enabling policies, regulatory, legislative and institutional frameworks. I am hopeful that the industrial sector will adopt SIEEP which is specifically addressing the manufacturing sector.

My sincere gratitude goes to the European Union who funded the development of SIEEP through their Technical Assistance Facility (TAF) for Sustainable Energy Initiative – Eastern and Southern Africa. Finally, the development of SIEEP would not have been possible without the support of the SADC Member States, SADC Secretariat and Industry.

Kudakwashe (Kuda) Ndhlukula
Executive Director

Acknowledgements

The SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) would like to express its gratitude to all stakeholders that contributed to the successful completion of the SADC Industrial Energy Efficiency Programme (SIEEP).

In particular SACREEE would like to thank SADC Member States, various International Cooperating Partners (ICPs) and other key stakeholders (Private Sector, Development Banks and other financial institutions, Civil Society Organisations, Academia and Research/Training Institutions), for supporting the development of the SIEEP from the Scoping stage to validation of the final SIEEP Report through their participation in stakeholder consultations, workshops and through report reviews. In particular, Mozambique, Zimbabwe and Namibia hosted validation workshops for the Scoping Report, the Final SIEEP Reports as well as a validation conference, respectively.

SACREEE is grateful for the financial support provided by the EU Technical Assistance Facility (TAF) for Sustainable Energy for All (SE4ALL) for East and Southern Africa to develop the SIEEP and the guidance from European Union Delegation (EUD) Botswana and Directorate-General for International Cooperation and Development (DEVCO) during the execution of the project. Southern African Power Pool (SAPP), the Climate Technology Centre Network (CTCN), the Austrian Development Agency and the United Nations Industrial Development Organisation (UNIDO) are singled out for co-organizing and co-financing with EU TAF, the workshops and conference that validated this version of the SADC Industry Energy Efficiency Programme.

SACREEE also extends its appreciation to the EU TAF team of the consortium led by Atkins that led the development of the SIEEP comprising of Peter P Zhou (team leader, Jose Mestre and Rémy NAUDE (energy efficiency experts), Sarah Charles and Chrisanthi Katsarou (logistics and communication experts) with Dimitris Papastefanakis as the EU TAF Key expert of this project.

The process of developing the SIEEP was through collaboration efforts of the SACREEE Team, in particular the Kudakwashe Ndhlukula, Karin Reiss, Henry Shongwe, Readlay Makaliki and Asteria Markus.

The development of SIEEP was further guided by the **SADC Secretariat's** Directorate of Infrastructure and the Directorate of Industrial Development and Trade (IDT).

About SACREEE

The SACREEE is a subsidiary agency of SADC that was established by the region Ministers responsible for Energy in 2015 to contribute towards increased access to modern energy services and improved energy security across the SADC Region through the promotion of market based uptake of renewable energy (RE) and energy efficient (EE) technologies and energy services. The SACREEE Secretariat is based in Windhoek, Namibia.

The establishment of SACREEE is supported by the Austrian Development Agency and UNIDO.

The mandate of SACREEE, that is in line with up-scaling of industrial Energy Efficiency, includes:

- To support the achievements of the sustainable development objectives of SADC Member States by promoting the use of RE&EE technologies and energy services.
- To support the Region's sustainable development objectives through: resource mobilisation, policy, quality assurance, capacity building and knowledge management, communication, promoting investments in RE&EE projects and programmes.

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Acronyms and Abbreviations

AFD	Agence Française de Développement (French Development Agency)
DFI	Development Financing Institutions
EE	Energy Efficiency
EnMS	Energy Management System
ESCOs	Energy Service Companies
GHG	Greenhouse Gas Emissions
ICP	International Cooperating Partners
kV	kilovolt
kVA	kiloVolt-Ampere
kW	kilowatt
kWh	kilowatt-hour
M&V	Measurement and Verification
MD	Maximum Demand
MEPS	Minimum Energy Performance Standards
MoU	Memorandum of Understanding
MS	Member States
NCPC	National Cleaner Production Centre
NDC	Nationally Determined Contributions
PF	Power factor
PFC	Power Factor Correction
PPA	Power Purchase Agreement
R&D	Research and Development
RE	Renewable Energy
REEESAP	Renewable Energy and Energy Efficiency Strategy and Action Plan
REFIT	Renewable Energy Feed In Tariff
RERA	Regional Electricity Regulators Association
RPC	Reactive Power Compensation
RTC	Research Technology Centre
SA	South Africa
SACREEE	SADC Centre for Renewable Energy and Energy Efficiency
SADC	Southern African Development Community
SADCAS	SADC Accreditation Services
SADCSTAN	SADC Cooperation in Standards
SAPP	Southern African Power Pool
SANEDI	South African National Energy Development Institute
SE4ALL	Sustainable Energy for All
SIEEP	SADC Industrial Energy Efficiency Programme
SME	Small and Medium Enterprises
T&D	Transmission and Distribution
TA	Technical Assistance
UNIDO	United Nations Industrial Development Organization
VAT	Value Added Tax

Executive Summary

The Southern African Development Community (SADC) Industrial Energy Efficiency Programme (SIEEP) is a flagship project of the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) and has been developed following a Scoping and Assessment Study of the SADC Industrial Energy Efficiency Programme (SIEEP- Phase 1- ES0085).

The SADC Industrialisation Strategy and Roadmap (2015-2063) identifies energy as a major barrier as well as a key enabler for industrial competitiveness of the region. One of the cost-effective ways to overcome these barriers is for industries to use energy efficiently. SIEEP, as a driver of the SADC Industrialization Strategy and Roadmap, will seek to gain and spur public and private sector support for energy efficiency (EE) and renewable energy (RE) adoption in relation to specific objectives of the Industrialization Strategy and Roadmap. The Strategy and Roadmap emphasize on the promotion of the use of alternative sources of energy, particularly renewables and adoption of energy efficient technologies to reduce the cost of production and minimize greenhouse gas emissions.

The SIEEP will also contribute to the operationalization of SADC Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP2) by supporting, amongst other, the setting of minimum energy performance standards for EE equipment, establishment of energy audits and energy management systems, and accreditation of EE service providers.

Energy Efficiency (EE) is important to SADC Member States (MS) as they face substantial energy related challenges that include low energy access, power constraints due to inadequate and ageing infrastructure, and inadequate funding for additional energy capacity infrastructure development amongst, other factors.

The SIEEP is focused on objectives and actions that will provide an enabling environment (policy, regulatory, institutional, financial frameworks), projects that will demonstrate energy savings and the co-benefits of reduced costs of doing business, greenhouse gases (GHG) emissions, job creation and contribution to industrialization in the SADC region.

The key stakeholders from SADC agencies and MS have made inputs to the development of the SIEEP as part of the SIEEP Phase 1 Study. Major gaps identified limiting adoption of EE and renewable energy (RE) activities in industry³ are:

- Lack of comprehensive, clear and harmonized policies, strategies and targets for EE/RE adoption in the majority of the SADC MS
- Weak or absence of regulatory framework such as energy management regulations, performance standards for equipment and services; and poor tariff regimes
- Lack of incentives for uptake of EE/RE
- Lack of dedicated and coordinated institutional frameworks to promote and support uptake of EE/RE across sectors and for public and private sector interactions
- Limited capacity for energy audits, energy management and Measurement and Verification (M&V)
- Poor information and unavailable or scattered data to guide design and development of EE/RE projects for the industrial sector
- Lack of functioning projects to show-case the potential that exists in the adoption of EE/RE in the industrial sector
- Inaccessibility of financing particularly for EE and small RE projects by SME enterprises
- Little experience with application of RE in industries
- Poor information on availability and accessibility of EE/RE technologies in the region and how to scaled-up technology accessibility in the SADC region

Resulting from this finding, the SIEEP programme activities have been grouped into six pillars and related objectives namely:

1. Formulation of comprehensive EE policy, regulatory and institutional frameworks
2. Capacity building and skills development
3. Demonstration projects and awareness raising
4. Financing interventions for EE/RE Initiatives
5. Application of RE in industries

² Developed in 2016 and adopted by SADC MS in 2017

³ Note that these gaps may be generally common but will also differ by the MS

6. Domestication of EE/RE technologies in the SADC region.

For each Pillar, the programme presents the rationale for the objectives formulated under each Pillar and makes an objective analysis stipulating what and how is to be done when and expected results.

The SIEEP has been framed for 5 years from 2019 to 2023 presenting the actions that will be undertaken under each objective during that period.

The initial recommended key action to be executed by SACREEE in the SIEEP will be to mobilize resources that will be required to carry out the rest of the SIEEP activities followed by building capacity among various stakeholders that include policy makers, associations, project developers and expertise in industries and banks.

Policy, regulatory and institutional reforms can be done right from the start of SIEEP timeframe engaging MS to address gaps in these frameworks since they can be implemented using the fiscal budgets⁴. There are also pieces of regulations in different pillars that can be combined to be implemented by MS right from the start e.g. energy management regulations and greenhouse gas emission reporting systems.

Studies, assessments, energy audits also come early to midway in the 5-year timeframe of SIEEP so as to inform decisions largely on demonstration projects.

Actions such as project pipelines, technology lists and pricing, financing for feasibility and project implementation in the case of demonstration projects, reporting (unless where reporting is annual) and information systems tend to come at end of the 5-year timeframe.

This sequencing of actions is captured in the Action Plan.

The estimated budget for implementation of SIEEP is about US\$ 12 million⁵ over the 5 year period including contingency. The bulk of the budget is allocated to pillar on Financing Interventions followed by demonstration projects then capacity building, and policy/regulatory and institutional building. It also includes a budget dedicated to the implementation of the communication plan. This budget constitutes resources that can be mobilized by SACREEE to implement the activities of SIEEP, but does not include projects financing or formation of a Regional Financing Facility as these can only be decided as part of SIEEP implementation. Seed funding is however included to facilitate establishment of the actual Regional Financing Facility. In the case of project financing, development of an Investment Guide is proposed as part of creation of project pipelines, to enable estimation of the financing gap. The financing gap for such projects will be determined as part of the SIEEP Implementation. The estimated SACREEE budget for its role in coordinating and facilitating implementation of SIEEP is estimated to be an additional US\$1.7 million over the 5 year period⁶.

Institutional Framework

Overall coordination is anchored on SACREEE including mobilization of stakeholders and resources. In that regard, SACREEE will need to be resourced to implement the SIEEP in form of technical staff and a budget for the coordination and facilitation role. Two full-time experts (technical and financial) supported by short term experts as required are proposed to support SACREEE for engagement with stakeholders (e.g. MS, other SADC agencies, Industries and their associations), resource mobilization (approaching donors and other International Financing Institutions), recruitment of required experts/service providers, reviewing outputs, organizing workshops, tracking progress and reporting. Expertise to cater for communication function is added in SACREEE.

SACREEE will be complemented by the SADC and its other agencies e.g. the Regional Electricity Regulators Association of Southern Africa (RERA) for regulatory frameworks, SADC Cooperation in Standardization (SADCSTAN) for standards, SADC Accreditation Services (SADCAS) for accreditation and Southern African Power Pool (SAPP) for on-grid projects. The SADC Secretariat's Directorates of Infrastructure & Services, and that of Trade & Industry, Finance & Investment will support with coordination and alignment of SIEEP's implementation with regional developmental objectives.

⁴ Collective mobilization of resources by SACREEE for the same purpose will augment MS' efforts in that regard.

⁵ If every MS has to establish an entity similar to the NCPC of South Africa, then another US\$7 to 8 million will be required to establish and resource the centres in 14 MS for 5 years apart from South Africa that already has. An additional US\$0.5 million in the budget is to cater for support that UNIDO can provide in guiding the formation of such NCPCs and nurturing them for 5 years.

⁶ Detailed budget is in Appendix C

The SADC MS including their industrial firms, utilities, regulators and associations will implement country level Actions defined in SIEEP considering their priorities. The MS will also mobilize the necessary resources for implementing their priority Actions. SACREEE will assist with collective mobilization of financial resources for some of such priority Actions particularly where more MS can benefit from. The objective of *creation of new and additional Financing Options and Seed Funding* is also aimed at supporting MS activities.

International Cooperating Partners (ICPs) are the expected major source of financing of the SIEEP particularly in form of grant financing for technical assistance. Other ICPs will provide debt in some instances complemented by regional and national financing institutions.

The projects are finally undertaken in industries starting with energy audits, creating energy management policies and managers, and auditing the energy savings and hence costs achieved through EE and RE projects.

Funding Mechanism

The bulk of the financing requirements at the SADC level is expected to be provided by donor funding in form of grants to support most of the technical assistance. Implementation of demonstration projects can be a combination of debt and co-financing by industries themselves. Blended grant and loan is another possibility for implementation of demonstration projects.

Development Financing Institutions (DFI) will take central roles as potential providers of concessionary loans and can leverage resources from private investors and climate funds as well.

The energy service companies (ESCO) concept is widely accepted⁷ as a means to conduct total solutions of energy audits, installation of equipment, and management and maintenance leading to energy and cost savings. As part of the total solution, ESCOs would source own financing thereby facilitating implementation of EE/RE measures hence creation of an ESCO Fund as a Special Purpose Vehicle can benefit ESCO service providers in implementation of SIEEP. The main expected beneficiaries for ESCO operations are the Small and Medium Enterprises that cannot afford to finance such measures from their own balance sheets.

At country level, apart from government budgets and tax incentives, another important source of financing are the national commercial and development banks although these institutions will require capacity building to enable them to assess the risks and business opportunities associated with EE/RE projects.

Some development banks⁸ in the MS have started mobilizing pension and insurance funds⁹ to support project development and implementation, largely as debt. Sources of pension and insurance funds stipulate to the banks what projects they want to support and the return they require as they are not familiar to lend directly to the project developers.

Creation of diaspora bonds is another source that needs to be explored for support of EE/RE projects and programmes and the source has not been tapped.

Industries when well-motivated are seen as co-financiers of the EE/RE activities that will be conducted in their premises. They can be engaged to contribute to their energy audits, creation of own energy managers and pay for M&V in addition to contributing to demonstration projects and, further on, roll out of implementation of EE/RE projects.

Monitoring and Evaluation

A Monitoring and Evaluation (M&E) framework has been developed that tracks whether objectives under each pillar have been met considering the actions to be implemented. The M&E framework provides overview indicators for each pillar as provided in Table 0.1 below.

Table 1-1 Overview of the indicators per pillar

⁷ South Africa has deployed ESCOs in their EE programmes under SANEDI

⁸ e.g. Infrastructure Development Bank of Zimbabwe.

In that particular case, pension funds and insurance companies (whether private or public) are required by law to set aside a certain percentage of the book value of the receivable member contribution to investment in bonds/assets with a prescribed asset status. The funds raised from these instruments are usually meant to fund national government and public enterprises projects.

⁹ Both public and private pensions and insurance sources apply in MS where that is practised.

Pillar	Overview Indicators ¹⁰
Policy, regulatory and institutional framework	Created and adopted policy/regulatory and institutional reforms for EE/RE in each Member State (MS)
Capacity building and skills development	Number of trained and skilled, accredited and registered practitioners for energy audits, energy managers and M&V per MS Mapped EE/RE potential in the industry sector
	Updated Energy Information and data generated by industries in each MS
Regional and national demonstration projects	Demonstration projects executed and related estimated/achieved energy and cost savings, and financing requirements for each project
	Knowledge dissemination systems for EE/RE created and functioning in each MS and or at SADC level
Financing interventions for EE/RE initiatives	Existing US\$ resources earmarked for EE/RE investments in each MS
	Created financing mechanisms and estimated US\$ that can be created.
Application of RE in industry	Policy reforms formulated and RE projects implemented in Industry compared to start of SIEEP Implementation period
Domestication of EE/RE technologies	Technology list and sources, pricing and co-benefits reported (e.g. estimated number of Jobs that can be created)
Communication Plan	Information, communication and visibility materials shared on SIEEP

¹⁰ To be monitored and measured by SACREEE during and at end of Programme Implementation (2023)

1. INTRODUCTION

1.1. Project Background and Context

1.1.1. Project Background

Energy efficiency (EE) is a topical issue globally and has particularly become important to SADC Member States as they face substantial energy related challenges that include low energy access, power constraints due to inadequate and ageing infrastructure, and inadequate funding for additional energy capacity infrastructure development amongst many other factors.

Energy efficiency offers the most cost-effective way of investment to rapidly generate additional capacity to meet any increasing energy demand and can also meet other global objectives such as climate change mitigation.

In relation to the industrial sector, the energy share calculated for the SIEEP Phase 1 was nearly 25% of production costs averaged for all the SADC MS hence reduction in energy consumption will make industries more cost-competitive.

SADC countries have been implementing a variety of EE programmes but these have not been guided by a comprehensive strategy. This is particularly evident in the industrial sector where EE initiatives are limited.

Previous efforts largely focused on demand-side management (DSM) measures to curtail impact of power shortage that SADC countries have been experiencing mainly in the period from 2007 to 2012. These measures were thus largely utility driven focusing mainly on the domestic sector with limited involvement of other sectors and private sector participation. Participation of industries was mostly limited to demand market response and tax incentives for verified energy savings e.g. in South Africa. The country also promoted some participation of the private sector through financial incentives to energy service companies (ESCOs). Lately, the DSM initiatives are falling behind as the power availability situation is improving in the region due partly to declining energy demand, coupled with financial constraints to support certain DSM activities

When considering EE and RE deployment, the industrial sector has thus been the least active compared to the residential and commercial sectors in most SADC member states (MS). The business community has also not appreciated the full potential of EE on energy and cost savings. This is the case mostly with the Small and Medium sized industries that lack adequate resources - (financial and human) and know-how to implement EE in their premises. The focus on the industrial sector is now critical as the region is implementing the SADC Industrialization Strategy and Roadmap (2015-2063) to spur development and growth in the MS. Energy efficiency and application of RE in industries is considered to be an important instrument to make industrialization competitive by reducing costs of production and help alleviate the power deficit. Coupling the SIEEP to the SADC Industrialization Strategy and Roadmap (2015-2063) will be relevant gaining both public and private support for EE/RE adoption in the region. The strategy recommends MS to:

- Increase public investment in energy provision both for in-country use and export to regional partners through the Southern African Power Pool (SAPP).
- Focus on the reliability, efficiency and cost effectiveness of energy supply.
- **Promote the involvement of independent power providers to ease the burden on government investment spending.**
- **Promote the use of alternative sources of energy, particularly renewables.**
- **Adopt energy efficient technologies to reduce the cost of production and minimize greenhouse gas emissions.**
- Focus on developing low cost energy supplies rather than focusing on national self-sufficiency.
- Accelerate hydro-power network connectivity and new generation and transmission projects including regional joint-ventures. The Inga Dam project should be seen as a priority for SADC MS.

The SIEEP includes the potential of domestication, innovation, production and hence availing of appropriate and affordable EE/RE technologies in the region thus also contributing to the industrialization agenda of SADC.

The SIEEP will contribute to previous efforts to establish the role of EE/RE to improve access to clean energy and spur economic growth in the SADC industrial sector. In particular, the SIEEP will be a contribution to the implementation of the recently adopted SADC Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP) of 2016. In relation to SIEEP, REEESAP stipulates setting of minimum energy performance standards for EE equipment, establishment of energy audits and energy management systems, and accreditation of EE service providers.

The SIEEP will thus be contributing to the operationalization and implementation of both the SADC Industrialization Strategy and the REEESAP.

The SIEEP aims to create synergies with other EE programmes that the region and Member States are implementing with own or partner resources such as the programmes conducted in the other SADC countries e.g. South Africa, Mauritius, Zambia and Tanzania.

With the support of the EU TAF for SE4ALL (East and Southern Africa), SACREEE has conducted a scoping and assessment of the EE situation and opportunities in the SADC Member States to inform the design and development of the SIEEP.

The SACREEE was established by the SADC ministers responsible for Energy in 2015 as a subsidiary agency of SADC Secretariat, with the assistance of the Austrian Development Agency (ADA) and the United Nations Industrial Development Organization (UNIDO). It was mandated to contribute to: increased access to modern energy services; and improved energy security across the SADC Region through the promotion of market based adoption of RE and EE technologies and energy services in the SADC Member States.

1.1.2. Context

The SADC Industrial Energy Efficiency Programme (SIEEP) is a flagship project of SACREEE and is a follow-up of the Scoping and Assessment Study of the SADC Industrial Energy Efficiency Programme (SIEEP- Phase 1- ES0085). The SIEEP Phase 2 (ES0128¹¹) is thus being developed under the auspices of SACREEE as the beneficiary of the EuropeAid assistance.

The development of the SIEEP has been endorsed by the SADC Member States and other regional organizations as useful to guide SACREEE execute its mandate to contribute to increased access to modern energy services and improved energy security across the SADC Region through the promotion of market based uptake of RE and EE technologies and energy services.

The SIEEP is considered by SADC stakeholders to be important in the implementation of the SADC industrialization efforts through the Industrialization Strategy and Road map (2015-2063). The SIEEP – Phase 1 Study focused on the manufacturing sector and found out that some industries have been underperforming due to, among other factors, shortage of adequate energy supply and high costs resulting from inefficient use of energy.

The SIEEP – Phase 1 Study revealed that these manufacturing industries e.g. food and beverages, agro-processing and those based on natural resources such as forestry can benefit from SIEEP to attract both public and private sector participation.

The SIEEP is thus expected to address the identified energy related challenges. The SIEEP –Phase 1 Study came up with focal areas or pillars for the SIEEP namely:

- Formulation of comprehensive policy, regulatory and institutional frameworks;
- Capacity building and skills development;
- Demonstration/pilot programmes/projects and awareness raising;
- Financing interventions for EE/RE Initiatives;
- Application of EE/RE in industries.

These focal areas/pillars were endorsed by the SADC MS leading to the formulation of the objectives and recommended actions to be implemented through SIEEP.

In addition to these Pillars, a Communication Plan is added as a necessary component of the SIEEP implementation.

¹¹ Here in referred to as SIEEP onwards

1.2. SIEEP Objectives

1.2.1. Overall Objective

The **general objective** of the SADC Industrial Energy Efficiency Programme (SIEEP) is to enhance the competitiveness of the industrial sectors of SADC Member States through building their capacity to adopt, invest and utilize energy efficient and renewable energy technologies and practices.

1.2.2. Specific objective¹²

The specific objectives of the SIEEP are to:

- Develop a roadmap of objectives and actions to address the barriers, gaps and opportunities related to deployment of EE/RE in the industrial sector of the SADC MS.
- Derive a budget for implementation of SIEEP.
- Define the responsibilities among stakeholders and sources of financing to implement SIEEP.
- Develop M&E framework for tracking SIEEP Implementation.

¹² These are objectives associated with the Terms of Reference of the assignment.

2. APPROACH AND METHODOLOGY

2.1. Approach

2.1.1. Conceptual Framework for SIEEP, Guiding Principles and Strategic Objectives

The conceptual framework in Figure 2.1 summarizes the components of the SIEEP and the development process that was adopted. The Formulation of the SIEEP is guided by principles and strategic objectives to ensure alignment with SADC and Global initiatives and goals.

The Guiding Principles are that SIEEP:

- Is aligned with other SADC instruments and hence is geared towards satisfying the SADC goals of regional integration, economic growth and poverty eradication.
- Builds on what has already been stipulated in the relevant SADC policies and strategies e.g. REEESAP (2016/17) and SADC Industrialization Strategy and Roadmap (2015-2063)
- Adopts the same vision as in the REEESAP of “ensuring sufficient, reliable, least cost, sustainable, clean modern energy services for SADC by 2030’
- Builds on achievements already made by other SADC and national initiatives targeting EE and RE in the industrial sector
- Aims to enhance an enabling environment and capacity to implement EE/RE initiatives in the industrial sector tapping on existing institutional, human and technological competencies
- Aims to demonstrate the potential that exists for EE/RE for the industrial sector
- Aims to align with existing financing opportunities and attract any new sources of financing including private sector participation.
- Aims to promote manufacturing of EE/RE technologies in the region

The Strategic objectives are summarized in the Figure 2.1 and aim that SIEEP will:

- Enhance cost competitiveness of the industrial sector by cutting energy costs through deployment of self RE supply and energy efficiency measures
- Achieve sustainable production and consumption of energy in the industrial sector
- Ensure energy security of supply to the industrial sector avoiding disruption of production processes
- Introduce use of clean energy sources, technologies and practices that will reduce energy losses and hence greenhouse gas emissions of the sector.
- Promote cross sectoral planning particularly the energy, industrial and climate sectors in MS of the SADC region
- Build capacity to adopt, invest and utilize EE/RE technologies and practices.
- Attract private sector participation in EE/RE projects for the industrial sector
- Facilitate entry of project developers and financiers into the EE and RE market.

The Scope of SIEEP in relation to EE/RE measures focusses on adoption of EE measures, application of RE in the industrial sector for both electricity generation and thermal applications (heating and cooling), availing and sustaining supply of EE/RE technologies in the region.

The identified challenges and opportunities that were translated into strategic interventions are also presented in Figure 2.1 and include:

- Lack of adequate enabling environment in form of policies, strategies, action plans, targets, regulations and standards,
- Lack of cost reflective tariffs, energy consumption data and reporting for planning and mapping of EE opportunities
- Limited capacity for energy audits, energy management and Measurement and Verification, which are key skills required to implement EE projects in all sectors including in the industrial sector
- Low awareness of EE and Energy Conservation opportunities in the industrial sector in the absence of demonstration projects that can show-case potential energy and cost savings
- Low accessibility to soft financing to map and implement EE/RE projects in the industrial sector
- Untested and non- conducive regulatory framework for application of EE/RE in the industrial sector
- Lack of knowledge on the efforts being made in the domestication of EE/RE technologies and how that can translate into potential for E/E industries in the region.

The challenges in successful adoption of EE in the industrial sector have been translated into the 6 strategic intervention pillars, identified namely:

1. Policy, regulatory and institutional framework
2. Capacity building and skills development
3. Demonstration projects and awareness raising
4. Financing initiatives
5. EE/RE applications in industry

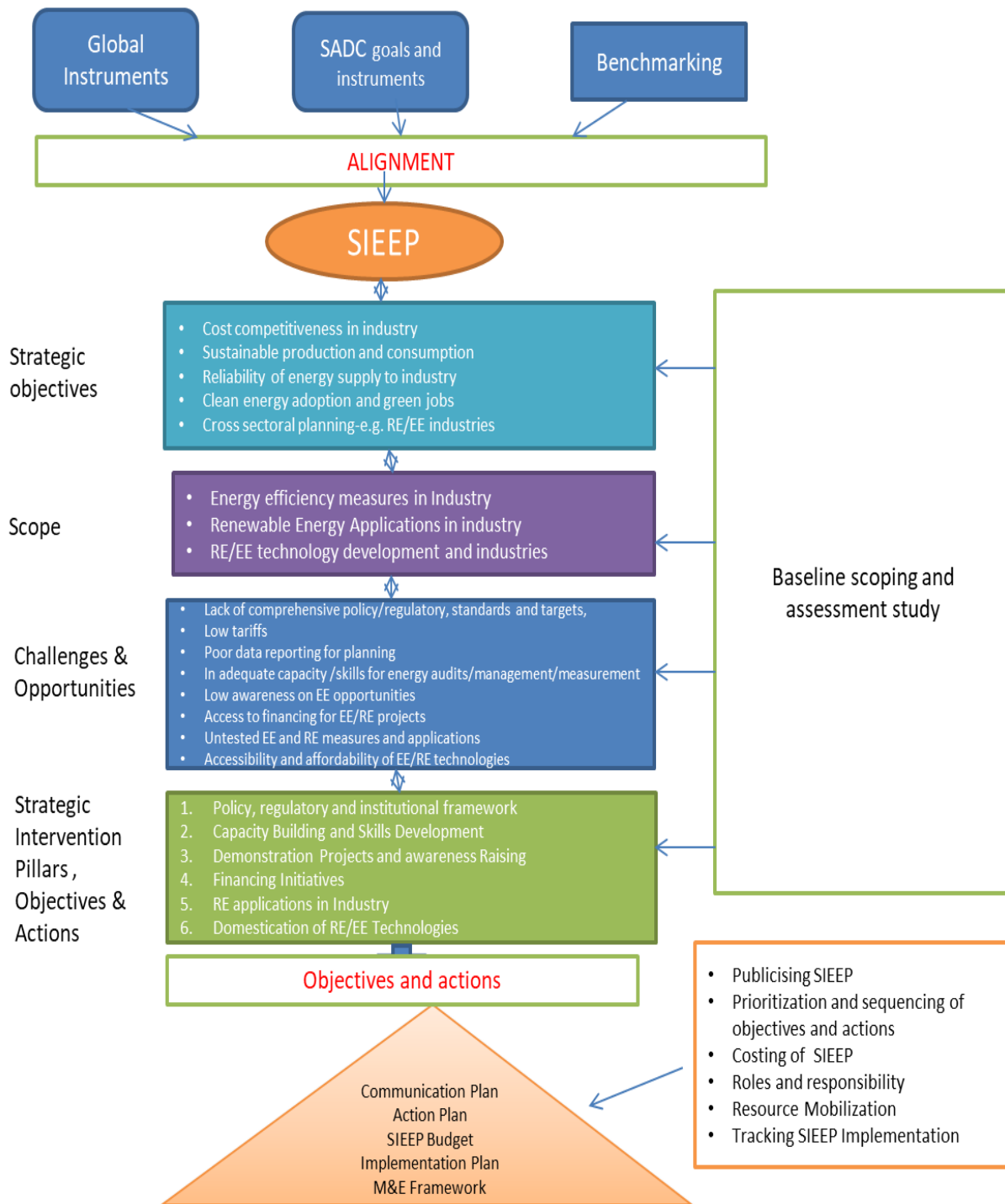
Domestication of EE/RE technologies

From these intervention pillars, specific objectives and actions are framed for implementation to meet the intervention objectives.

A communication plan is provided to create visibility and establish roles for SIEEP and its implementation.

The objectives and the related actions are prioritized and sequenced for implementation over a 5-year period from 2019 to 2023. The pillars are costed from their actions and objectives leading to an estimated budget required to implement the whole SIEEP.

Figure 2-1 Conceptual Framework for development of SIEEP



2.1.2. SIEEP Structure and Content

The structure and content of SIEEP closely follow the conceptual Framework presented in figure 2.1.

Further on, the SIEEP report presents the methodology adopted, a comprehensive baseline assessment of EE/RE application in the industrial sectors.

The main content of the SIEEP is the programme sections comprising the project templates formulated under each Pillar and objectives. These are formulated to guide implementation of the actions under each objective.

The next important chapters relate to the Communication Plan, Action Plan for 2019 to 2023 and the related budget within those 5 years.

The Implementation framework consists of the roles and responsibilities to drive implementation of SIEEP, mobilization of resources and the type of resources to tap into, and tracking of SIEEP implementation through M&E. An M&E framework has been included to guide tracking of such implementation.

2.2. Methodology

The development of the SIEEP has largely been based on the findings of the SIEEP –Phase 1 Study which in turn was based on literature review that considered a desk study of the EE/RE activities already taking place in the fifteen (15) SADC MS. This was coupled by a review of EE/RE activities in other global regions including those of Africa. The major component of the scoping exercise was stakeholder consultations in the MS. Ten of the 15 MS were visited for consultations and the rest were assessed through a questionnaire survey.

The SIEEP –Phase 1 Study focused on assessing current status on deployment of EE and RE in industries, considering policy, regulatory and institutional environment; capacity and skills to implement EE/RE programmes; past, on-going and planned EE/RE programmes. This assessment enabled identification of gaps and barriers that were transformed into objectives and actions to be implemented through the SIEEP.

Alignment with other SADC instruments and Global goals and objectives was observed in the SIEEP –Phase 1 study, and are thus not repeated in this SIEEP report. In particular, the SIEEP –Phase 1 study considered the relevant SADC development agenda and policy framework on the promotion of industrialization and energy efficiency/renewable energy (EE/RE) mainly as espoused in the SADC Industrialization Strategy and Road Map 2015-2063 and the Renewable Energy and Energy Efficiency Strategy and Action Plan of 2016

All SADC MS reviewed the SIEEP –Phase 1 Study Report individually and collectively at an organized workshop. The Stakeholders at the workshop validated the report and provided their own comments and suggestions on the design of this SIEEP. The Pillars, objectives and actions that have been adopted for the SIEEP have been informed by the version of the SIEEP –Phase 1 Report approved by the MS. The Technical inputs of the MS and those from the workshop were captured in the Final Scoping Report and hence have been assimilated in this SIEEP report.

The development of the SIEEP has gone through an iterative review process with SACREEE and the MS as part of an approval process. SACREEE had the opportunity to review the report before sharing with the MS. SACREEE national focal points¹³ were targeted for the review and were to engage with other relevant country stakeholders in the review process of SIEEP.

Another level of analysis was costing of the SIEEP based on both secondary data and experiences in SADC MS and expert judgement. The costing adopted a bottom up approach starting with actions building up to objectives and then to all the pillars.

In developing this SIEEP, the target period of 5 years stretching from 2019 to 2023 inclusive was adopted and hence the Action Plan and budget are for that same timeframe.

¹³ mainly Ministries/Departments of Energy

3. FINDINGS OF BASELINE AND SCOPING ASSESSMENT

The key findings and opportunities identified in the baseline study are summarized as issues to be addressed in Table 3-1 below in accordance with the created pillars.

Table 3-1 Summary of the key findings and opportunities identified during the first phase

Identified Pillars	Issues to be addressed
Policy, Regulatory and Institutional Frameworks	<p>Policy and Regulatory Framework</p> <ul style="list-style-type: none"> • Lack of comprehensive and dedicated policy frameworks and strategies for EE/RE in most SADC Member States • Lack of targets in EE/RE policy frameworks including for Sustainable Energy For All (SE4ALL) and Nationally Determined Contributions (NDCs) • Lack of adoption of equipment/appliance standards especially Minimum Energy Performance Standards (MEPS), • Lack of regulations and incentives (such as grants and subsidies) for industries to undertake energy audits • Lack of cost-reflective tariffs (subsidized for large industries in some cases) • No net-metering to excite self-generation in industry • No mandatory or voluntary reporting framework for EE/RE data and targets <p>Institutional frameworks and coordination</p> <ul style="list-style-type: none"> • Limited dedicated institutions to drive EE/RE in the MS • Lack of cross-sectoral approach to addressing EE/RE with other sector departments hence executing similar initiatives in parallel • Poor overall coordination of EE/RE activities in MS • Limited Public Private Partnerships (PPP) for EE/RE projects • Limited private sector participation • Low participation of industrial associations and academia in EE/RE initiatives
Capacity Building and Skills Development	<p>Capacity and skills</p> <ul style="list-style-type: none"> • Low capacity for energy audits, Energy Management Systems (EnMS) and Measurement and Verification (M&V) in most SADC MS • Limited expertise in energy audits of specialized energy systems and opportunities for enhancement of such skills • Limited EE capacity building programmes that can create and enhance needed skills base • Limited fully qualified local ESCOs in most SADC MS hence energy audits are being conducted by some energy consulting companies that do not have ESCO status • Accreditation and roster of EE experts do not exist in most SADC MS although some countries such as SA have the accreditation capacity • Technical capacity of financial institutions is limited to assess the EE/RE projects for investment. <p>Mapping of EE Opportunities in Industry</p> <ul style="list-style-type: none"> • No comprehensive mapping of EE opportunities has been done in industries of most SADC MS • No baseline studies and no resources are allocated by industries and/or governments for mapping EE opportunities in the industrial sector <p>Improvement on end use energy consumption in industry and energy balances</p> <ul style="list-style-type: none"> • Limited efforts and resources for improvement on data for end use energy consumption in the industrial sector and for creation of reliable energy balances • Poor data sets to define baseline energy use baseline and track energy efficiency

	<p>improvements in the industrial sector</p> <ul style="list-style-type: none"> • No data reporting mechanisms or regulation in place for EE activities in most SADC MS
Regional /National Demonstration and Pilot Projects and awareness creation	<ul style="list-style-type: none"> • Low understanding of benefits of EE by policy makers and industrial sector players due to lack of successful projects to show case. • Low realization of EE and Energy Conservation opportunities in the industrial sector and hence low participation of industries in EE/RE projects. • Low engagement of the industrial sector staff by management on EE/RE initiatives • Lack of awareness raising programmes being conducted on the potential and usefulness of EE in the industrial sector
Financing frameworks	<ul style="list-style-type: none"> • Financing organizations have limited exposure to in EE initiatives and have low interest and capacity to conduct due-diligence on EE projects for funding • There is need for soft financing and incentives to promote energy management and implementation of EE measures. • Limited financing packages such as credit lines are not easily accessible and inadequate while tax rebates have only benefited large industries in the past and in only a few MS. • Small RE projects are affected by lack of financial support and large transaction costs • ESCO model none existent outside South Africa¹⁴ and ESCO services offered by large international companies are not affordable to Small and Medium Enterprises (SMEs) in the SADC MS.
Adoption of RE use in industry to offset costs and fossil fuel use	<ul style="list-style-type: none"> • RE self-generation is limited by lack of cost reflective tariffs and net-metering • RE self-generation has not been embraced as cost effective and a source of reliable energy supply particularly for small and medium industries • RE self-generation and RE supply currently can only be driven by multinationals that can afford the investments but low tariffs are still a hindrance. • RE for heating and cooling in the industrial sector has not been fully exploited • Limited policy guidance to encourage use of RE to achieve reduction in greenhouse gas emissions in the industrial sector
Domestication of EE/RE technologies in the region	<ul style="list-style-type: none"> • EE/RE technologies not readily available in the market, moreover, they can be costly hence delaying implementation of measures • Level of EE/RE domestication in form of R&D, local manufacture, local adaptation and maintenance, skills for installation and maintenance is not well developed • Comparative advantage of producing EE/RE regionally has not been fully explored • Assessment of which EE/RE technologies can be up-scaled in SADC region has not yet been conducted

The Objectives and actions/measures for each Pillar have been formulated from these issues.

¹⁴ The ESCOs operating in South Africa are conglomerates from headquarters outside the country

4. PROGRAMME PILLARS, OBJECTIVES AND ACTIONS

The Objectives and Actions have been developed for the SIEEP Pillars below:

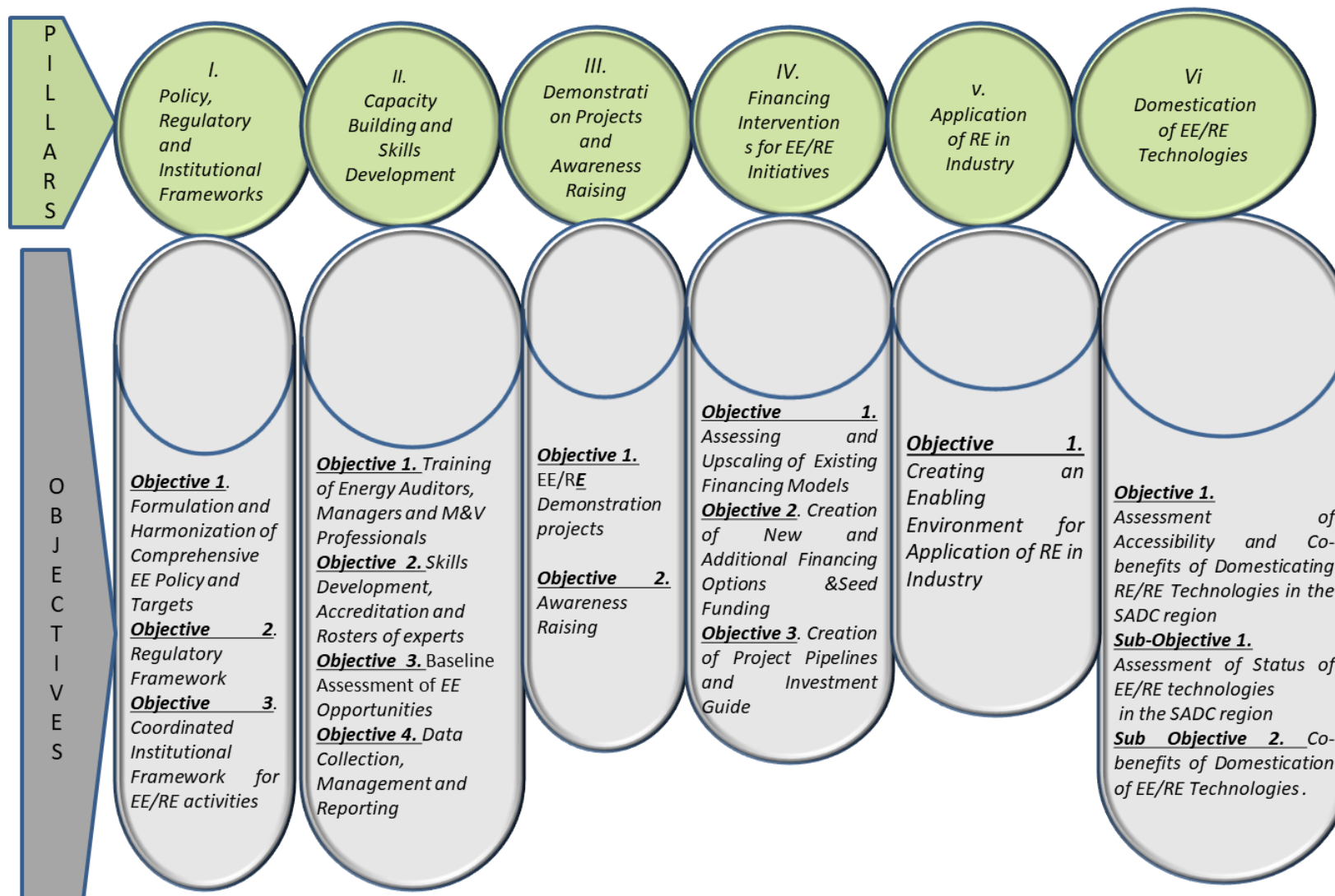
1. Policy, regulatory and institutional frameworks
2. Capacity building and skills development
3. Demonstration projects and awareness raising
4. Financing interventions for EE/RE initiatives
5. Application of RE in industries
6. Domestication of EE/RE technologies.

For each Pillar, the programme presents the rationale for the objectives formulated under each Pillar and makes an objective analysis indicating:

- The response required to meet each objective
- The target groups that will benefit from the response and or contribute to realization of the objective
- Actions/Activities to be carried out
- Expected output, outcome and impact in the Industry EE/RE subsector
- Service providers that can be considered for executing the activities
- Time frame when the activities can be carried out within the SIEEP timeframe,
- Risks associated with achieving the objective and how they will be managed
- Estimated level of effort for executing the activities to inform budgeting
- Synergies with other on-going initiatives for maximum traction (where applicable).

The information for each objective is structured using the same templates for ease of reading and for accessing specific information. This presentation enables presentation of actions in a SMART (**S**pecific, **M**easurable, **A**chievable, **R**ealistic and **T**ime bound) way. The templates adopted can assist in the formulation of concept notes and drawing Terms of Reference when seeking funding and service providers.

Figure 4-1 Summarized Programme Pillars and Objectives



4.1. Policy, Regulatory and institutional Frameworks

4.1.1. Objective 1 – Formulation and Harmonization of Comprehensive EE Policy and Targets

Rationale

On the policy framework, there is clear evidence that not all MS have dedicated policies and strategies to address EE particularly for the industrial sector. EE is, occasionally, included as part of broader energy or renewable energy policies but without specific targets. Out of the 15 MS, some have either an EE or a RE policy but not strategies or action plans. Others may have strategies or acts or/and regulations but no policies and no action plans. The countries active in EE, such as South Africa and Mauritius, have an EE Strategy¹⁵ and EE Act respectively but no policies or action plans. Those that have recently started developing their EE policy frameworks do not have strategies or targets, particularly for the industrial sector. Only 3 SADC MS were found during scoping stage to have targets for EE for the industrial sector, namely Mozambique, Tanzania and South Africa. These targets may also not have been supported by reliably assessed energy saving opportunities in the sector in those countries.

The EU experience is also worth highlighting with legal binding directives setting targets to be met by the European Union and its Member States. As a region, the EU has committed to the targets of 20% EE improvements by 2020 and 30% for 2030 (when compared to the projected use of energy in 2020 and 2030). Measures to be adopted are stipulated in the Directives but Member States can take more stringent measures above the legal binding ones. The MS measures are formulated in the National Energy Efficiency Action Plans (NEEAP) that each EU member state submits to the EU. For SADC to create such targets, similar policy mandate for MS to develop NEEAPs with targets will be required.

Although about half of the SADC MS have developed their SE4All Action Agendas, the targets mentioned/set in those reports have not been backed by reliable and realistic data, and largely were based on various past studies/surveys conducted at different times. Similarly, INDC/NDCs have set targets that are more political than realistic. More reliable targets can better be derived through submission of energy consumption data by the industries themselves after performing baseline assessments. South Africa and Zimbabwe for example have been developing regulatory frameworks for reporting data on company energy consumption for industries, company plans for energy efficiency and their targets. Through such MS data, regional targets can be set.

The response under this objective presents actions/activities that will create adequate policy/strategy framework and targets for EE in industry in the SADC MS.

¹⁵ And introducing energy management plans and EE tracking targets

Pillar Objective analysis

Response	Development of a comprehensive EE policy ¹⁶ framework with targets for the industrial sector.
Target group	SACREEE for coordination and mobilization of resources Ministries of Energy- for policy formulation and target setting Industries- for mapping own EE opportunities to set targets
Actions/Activities	SACREEE to <ul style="list-style-type: none"> • Mobilize resources and technical assistance for MS to establish and strengthen policy framework and harmonization in SADC, based on REEESAP or other applicable Guidelines and set targets supported by EE baseline studies • Engage MS to use own fiscal budgets and any additional support to formulate policy/strategy based on agreed templates. • Support harmonization of the policy framework and calculation of targets for the region • Recruit technical experts to assist MS and SACREEE in coordination of policy formulation activities and facilitation of stakeholders • Engage industries to lead baseline studies and provide required data and inputs for evidence- based policy and targets formulation
Output	Formulated and or revised MS policies/strategies with targets set Data reporting regulations developed and implemented Industry/company energy management plans and targets in place SADC EE targets calculated from MS targets
Outcome	Policy signal to attract EE investments Industrial participation in EE activities Operationalization of EE programs in the region
Impact	Increased investments in EE activities in industry Increased realization of energy and cost saving in the industrial sector at MS and the regional level
Service providers	Technical experts to support formulation/revision of policy frameworks
Timeframe	2019-2020 with possible on-going upgrades after that period
Risk/constraints	Lack of political motivation to allocate resources for reforming policy framework and set targets Industries not having interest and capacity to collect own data, report, make plans and targets
Risk management	Coordinated support through SACREEE to support policy formulation and revision initiatives in all the MS. Support data collection in industries through demonstration
Estimated level of effort for budgeting	Cost of technical experts to support relevant Ministries and selected industries of each MS to collect data for target setting
Synergy with other interventions	REEESAP Action Guidelines 2016 Other Applicable Guidelines in the MS

¹⁶ "policy" here includes strategies and Action plans.

4.1.2. Objective 2 – Regulatory Framework

Rationale

In addition to creating policies/strategies/action plans that stipulate targets, MS need to articulate a regulatory framework that will promote EE in the industrial sector. Key regulatory elements that have been identified are technical standards for EE equipment and services, cost reflective tariffs and for companies to undertake energy audits and formulate their own EE management plans and report on meeting their targets. Other ancillary regulations such as incentives e.g. tax rebates, are required to excite uptake of EE and RE actions. On voluntary basis, industries need to be incentivized to adopt energy management standards such as ISO 50001¹⁷.

Although awareness for the benefits resulting from the application and enforcement of Minimum Energy Performance Standards (MEPS) already exists, this type of market mechanisms has been mostly applied to domestic and lighting appliances. As examples, South Africa has MEPS for household electrical appliances but the second phase of the MEPS will include motors applicable to industries as well. Zimbabwe has adopted MEPS for lighting. MEPS can be a useful tool when choosing new appliances and equipment to finally achieve efficient plant processes and systems.

Most governments have not allowed utilities (or the energy regulator) to set cost reflective tariffs. Industries do not pay the true cost of electricity for generation, transmission and distribution as a number of MS practice cross-sector subsidization and or have set lower tariffs for the industries¹⁸. Hence there is a reduced incentive for industries to invest in EE and RE self-generation.

The industrial energy management regulations and plans can be an important regulatory instrument to ensure energy consumption reporting and contribute to the data required for developing comprehensive targets. Regulatory bodies will then need to stipulate whether such energy audits and reporting should be mandatory or voluntary.

There should also be a regulatory framework to govern operations of the service providers and their accreditation which will be the responsibility of the Standard Bodies in the SADC MS.

Pillar Objective analysis

Response	Formulation and harmonization of regulatory framework for EE/RE adoption
Target group	<p>SADCSTAN to coordinate and harmonize regional standards</p> <p>MS standards bodies to formulate applicable and harmonized national standards</p> <p>MS Ministries of Energy, power utilities and energy regulators- for setting cost reflective tariffs</p> <p>Energy Regulators and Ministries of Energy - for setting energy management regulations</p> <p>Industrial Associations to mobilize their members</p>
Actions/Activities	<p>SACREEE to engage</p> <ul style="list-style-type: none"> • MS Standards bodies and SADCSTAN to develop harmonized standards, translate into SADC official languages, enforce and track implementation. • SADCSTAN to establish regional technical committees (TCs) of Standard Bodies to develop and adopt technical standards. • SADCSTAN, SADCAS and Standard Bodies accredited to certify for ISO 50001 and similar standards. • SADCAS and SADCSTAN working with MS Standards Bodies to develop and track implementation of accreditation rules for service providers and the M&V protocol • RERA and MS Energy regulators to mobilize resources for supporting adoption of

¹⁷ Currently not adopted by many industries

¹⁸ To persuade them to continue operations and sustain employment.

	<p>cost reflective tariffs by all MS following the SADC target of 2019/2020</p> <ul style="list-style-type: none"> • Relevant ministries and regulators¹⁹ to develop energy management regulations stipulating mandatory or voluntary reporting on EE activities in industry & enforcing mandatory energy management plans with targets set by large industries ²⁰
Output	<p>MEPS for equipment/technologies and practices established Energy Management Systems and regulations established and in operation Cost reflective tariffs in place in each MS by 2020 Accreditation rules for service providers and M&V protocol in place</p>
Outcome	<p>Harmonization of MEPS Adoption of Certification EnMS standards by industries Attractive tariff regime for investment in EE initiatives in SADC MS Regulated reporting of EE performance by industries</p>
Impact	<p>Strong regulatory framework for promotion of EE in industries of SADC MS</p>
Service provider	<p>Ministries of Energy, energy regulators and power utilities using their own budgets Technical and legal experts to support and facilitate target groups in formulation of the regulatory frameworks</p>
Timeframe	<p>2019-2021 as the regulatory framework is required early in the stage of SIEPP as an enabler for EE activities and projects.</p>
Risk/constraints	<p>Creating MEPS at same pace across the MS Cost reflective tariffs have been postponed since 2013 by SADC MS and target may not be met</p>
Risk management	<p>Support creation of both MEPS and cost reflective tariffs through SACREEE support at the same time in all the MS.</p>
Estimated level of effort for budgeting	<p>Expert support for MEPS and EnMS development, adoption certification at SADC level and MS level Support the establishment of technical Committees Ensuring cost of service studies conducted in each MS, where it hasn't been done and draw agreed parameters for determining cost reflective tariffs</p>
Synergy with other interventions	<p>The SAPP initiative funded by CTCN/UNEP. SACREEE EE Lighting and Appliances project is a Sida funded project to be implemented in both SADC and East African Community Cost of Service Studies in various MS</p>

4.1.3. Objective 3 – Coordinated Institutional Framework for EE/RE Activities

Rationale

Some MS (e.g. Mauritius, Namibia, South Africa and Zimbabwe) can be considered so far to have dedicated EE/RE institutions in SADC countries. Mauritius has an EE Management Office created through an EE Act. Namibia has the Namibia Energy Institute with a centre dedicated for RE and EE, amongst other energy centres, while Zimbabwe has a fully-fledged Department for RE and Energy Conservation. South Africa's Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) office caters for RE projects while South Africa National Energy Development Institute (SANEDI) has harnessed initiatives also involving EE activities. Otherwise the common set up involves desk officers in charge of EE and RE resident within the mainstream Departments of Energy.

Being a cross-sectorial issue, EE/RE should be part of the plans and programmes of different ministries such as energy, industry and agriculture, climate. However, these institutions have often a limited dialogue among themselves and limited technical capacity, which affects the identification of potential common opportunities and the coordination of EE activities. There is tendency to have parallel resource mobilization for similar EE/RE activities by different Departments such as for energy, environment/climate change, industry, science

¹⁹ Including dedicated EE regulatory offices where they exist such as Mauritius

²⁰ Large industries will be defined by energy intensiveness of the operations.

and technology in an uncoordinated manner. All MS mentioned the need for coordination among public institutions and also strengthening public –private sector partnerships.

Coordinated institutional framework has been realized where EE programmes have made an impact in form of demonstrated government commitment and private sector involvement. A few countries such as Mauritius and South Africa have achieved a significant level of success in the promotion of EE through a combination of governmental incentives (policies, regulations and tax incentives) and private sector led initiatives (networks, business associations and green credit lines). However, this level of cooperation between the government and the private sector is lacking in most MS.

. Forging public sector, private sector and development agency partnerships is needed even to the extent of co-sharing resource and technical support for EE activities. Cooperation of public and private sector is important to ensure that regulations developed also involve private sector participation so both public and private sectors have ownership.

Critically to be included in the development and implementation of EE activities in the industrial sector are the chambers of industries and business associations that can mobilize their members to participate in EE programmes and share best practices. This type of organizations seems to be the most promising partner through whom EE activities can be implemented basing on the experiences of South Africa, Tanzania and Mauritius. There is also interest among associations in all the other countries visited to support their members to embark on EE initiatives. Some associations have started some initiatives albeit small to create interest among their members to take up EE measures e.g. Zambia and Zimbabwe.

Research and technology centres, some in universities, are an important player that can test EE/RE technologies and installations at cheaper costs than international ESCOs and can be deployed to undertake technology innovation and localization. These organizations are however not engaged by governments in most of the SADC MS as partners in meeting EE objectives. Universities can also form an anchor for sustainable capacity building of energy auditors, managers and for providing M&V services.

Institutions that drive EE programmes such as National Cleaner Production Centre (NCPC) of South Africa have created capacity, markets and confidence of industries to participate in EE programmes. The NCPC of SA was started by the Department of Trade and Industry of South Africa with technical support from UNIDO and has harnessed participation of both public and private entities in its Industrial EE programme. Consideration can be made to create such focal organizations in the MS to promote EE/RE initiatives in the industrial sector.

The articulated response for this objective and programme details are given below:

Pillar Objective analysis

Response	Coordinated participation of public, private sector stakeholders entities, academia/research institutes in implementation of EE/RE initiatives in the industrial sector
Target group	Ministries of Energy- EE/RE Departments/offices if any Industrial manufacturing associations Research and Technology Centres e.g. energy research centres, universities
Actions/Activities	SACREEE to engage: <ul style="list-style-type: none"> • MS to create dedicated EE/RE Offices or Departments where they do not exist to take leadership in the MS • MS EE/RE Departments/Offices to lead creation of cross sectoral platforms to ensure optimization of resources for implementation e.g. energy and climate • MS EE/RE Departments/Offices to collaborate with public and private /industrial associations to create platforms to support implementation of EE/RE initiatives in the industrial sector with regular sharing of information and experiences e.g. through planned meetings/workshops • MS EE/RE Departments/offices with Ministries of Industries to seek support to create and involve dedicated centres such as National Clean Production Centres for a more

	<p>focused coordination on EE in industries.</p> <ul style="list-style-type: none"> MS EE/RE Departments/Offices to mobilize through expression of interest their energy research centres to provide facilities for equipment/technology innovation, quality testing/calibration; capacity building and M&V services.
Output	<p>Coordinated platform for sharing of information and experiences on EE initiatives at both public and private sector levels</p> <p>Research, technology and testing facilities that support EE initiatives in the MS</p> <p>Dedicated capacity building institutions and service providers for EE initiatives (energy audits, EnMS, M&V)</p>
Outcome	<p>Coordinated public-public; and public-private partnership on EE initiatives for the industrial sector</p> <p>Established support for technology innovation, testing, training, measurement and verification for EE activities/programmes</p>
Impact	Effective implementation of EE initiatives in the industrial sector
Service provider	Government and Private sector representatives supported by expert coordination and facilitation of meeting events
Timeframe	2019-2020. Creation of dedicated EE entities may take up to 2020 but platforms can start in the first year of SIEPP.
Risk/constraints	<p>Finding champions in both Government and Private sector to lead the coordination</p> <p>Getting the research centres/universities to deliver timeously on expression of interest, building necessary capacity and services when engaged.</p>
Risk management	<p>Working with SACREEE National Focal Institutions and key industrial association in each MS and create market and business opportunities for the stakeholders</p> <p>Agree on MoUs with various partners at start of SIEPP including centres of excellence.</p>
Estimated level of effort for budgeting	<p>Expert support:</p> <p>Mobilization of stakeholders and organizing meetings</p> <p>Development of MoUs with each stakeholder grouping.</p> <p>To formulate, agree and test appropriate platforms for interchanges and exchanges of information.</p>
Synergy with other interventions	<p>NCPC activities in South Africa; EEMO of Mauritius</p> <p>Regular seminar briefings on EE practiced in certain SADC MS e.g. Mauritius, Zimbabwe</p> <p>Public and private Stakeholder engagements in MS</p>

4.2. CAPACITY BUILDING AND SKILLS DEVELOPMENT

4.2.1. Objective 1 – Training of Energy Auditors, Managers and M&V Professionals

Rationale

It is evident that in countries that have not been involved in comprehensive EE programmes, capacity in form of energy auditors, energy managers and Measurement and Verification (M&V) professionals is minimal. The majority of energy auditors in most SADC countries have only the skills to conduct general energy audits and often lack the requisite measurement instruments for the audits.

There are also efforts being made to build capacity in some countries e.g. Zimbabwe and Zambia through organized training conducted by the Energy Training Foundation (ETF) of South Africa. The ETF provides some tailor-made courses for energy audits, energy managers and M&V professional courses.

A reasonable approach would be to reduce cost of training by starting with training of trainers for each MS who will in turn conduct further training at cheaper rate in their own MS.

The South African Renewable Energy Technology Centre (SARETEC), which was formed by the South Africa government, is designing a long-term energy audit training programme targeting industry practitioners. The cost of this training is expected to be much cheaper than what is charged by current short-term energy audit training service providers.

Pillar Objective analysis

Response	Ensure adequate human and institutional capacity for energy audits, EnMS adoption and certification, M&V in the Region and MS.
Target group	Energy Service Companies(ESCOs) Energy managers in industries Measurement and Verification professionals e.g. in Universities and other training providers MS Training Authority/Centres ²¹ Regulatory institutions, Power Producers (Independent and public) Power Utilities.
Actions/Activities	SACREEE to mobilize resources and identify experts/service providers for Training SACREEE to organize training of trainers in energy auditing, energy management, M&V from each MS to have adequate capacity to train own experts at reasonable cost. MS EE/RE Departments/Offices to collaborate with relevant training authorities/centres and organize training of energy auditors, EnMS managers and M&V professionals in MS by trainers annually
Output	Trainers for energy audits, energy managers and M&V Pool of trained energy auditors, energy managers, M&V experts
Outcome	Capacity for development and implementation of EE initiatives
Impact	Enhanced EE initiatives in the industrial sector
Service provider	Training service providers such as the Energy Training Foundation of South Africa and Academic Energy Efficiency and DSM (EEDSM) Hubs in South Africa. South African Renewable Energy Technology Centre Other regional and national expert training providers International technical assistance experts where needed for specialized training
Timeframe	Last quarter of 2019 for training of trainers after SACREEE mobilizes funding for training On-going annually for MS trainings by trained trainers
Risk/constraints	Selection of suitable candidates and staff turnover at Industries and trained service companies Industries not buying into energy efficiency capacity building hence not sending technical staff for training Possible trainees may not be interested in trainings if they do not see clearly the job opportunities that this capacity building could bring to them
Risk management	Criteria for selection of candidates developed and agreed by SACREEE and MS EE/RE Departments and Industrial Association representatives. Selection of trainees also to be evaluated by hired training experts. Awareness raising in the industrial sector on the need for training and development of in-house capacity for basic energy management Ongoing annual training fills gap created by staff turnover. Creation of EE Market through mandatory energy audits
Estimated level of effort for budgeting	Training of Trainers expert costs Training workshops including trainees and trainers workshop accommodation travel and subsistence

²¹ In MS where such authorities/Centres are active in the energy sector training.

	Professional fees for trainers during annual trainings
Synergy with other interventions	MS and utility initiatives training practitioners through national EE programmes and other training providers.

4.2.2. Objective 2 – Skills Development, Accreditation and Rosters of Experts

After training of EE practitioners is done, the level of exposure still needs to be enhanced to match expectations and gain confidence of the local industries. Opportunities for further enhancement of the capacity can be achieved working with experienced experts in some MS or recruited internationally. Freshly trained experts can thus take advantage of such arrangements to work alongside experienced experts in specialized areas of energy audits.

Expertise for driving adoption, certification of EnMS and M&V being limited would largely depend on international ESCOs but that would obviously entail expensive services that medium enterprises would not afford. It is therefore important to train and strengthen the capacity of SADC energy auditors in that regard to a level that they can assume similar ESCO level.

The region can benefit from such strengthened expertise and the requisite institutional framework and programmes to build such capacity can be adopted in each SADC MS and or at regional level.

It is apparent that creation of both expertise and markets can best be created around EE programmes. Creation of a market for EE among industries will in turn create opportunities for the created expertise/service providers to offer services in form of energy audits, support adoption and certification of EnMS such as ISO 50001 and M&V.

Apart from capacity building of skills for energy audits, EnMS, M&V, industries will require training to implement EE measures, including specific preparatory energy studies, selection of service providers, knowledge of available services, equipment types and suppliers, and access to finance. It is important then to have a roster of such well-trained and accredited experts to facilitate their identification by industries. Financial institutions will also need capacity building for assessing both EE projects for funding.

Response	Enhanced skills, accreditation and roster of experts, creation of market for energy auditors, energy managers, M&V professionals and skilled banking institutions
Target group	Trained EE experts/energy service companies Industries' energy managers Universities/ Research Institutes Banking institutions
Actions/Activities	<p>SACREEE to engage/lead</p> <ul style="list-style-type: none"> • MS EE/RE Departments/Offices and service providers to identify and attach trained experts to EE programmes and industries under guidance of experienced experts • MS EE/RE Departments/Offices to develop/revise regulations for mandatory energy audits every 3 years hence also creating markets for energy auditors • SADC to undertake Capacity building of SADCAS, SADCSTAN and MS standards/accreditation bodies to be certified so that they conduct certification for EnMS such as ISO 50001 and accreditation of energy auditors, energy managers and M&V Professionals • MS and industrial associations to mobilize certain industries to participate as pilot sites to enhance skills and create markets for experts/service providers; and interest for industries to implement EE measures making their production cost competitive. • SADCAS to undertake accreditation of experts, create and update roster of accredited energy auditors, energy managers, M&V professionals • Development of tailor- made training courses and seminars for Banking institutions on how to assess EE/RE projects and structuring of financing products for uptake of EE/RE

Output	Skilled practitioners and on-line database of accredited experts. Mandatory energy audits SADC and MS Standard Bodies accredited for certification role Trained staff of selected Banks to assess EE projects for financing
Outcome	Availability of experienced and accredited expertise and established market for EE activities in the industrial sector of MS. Bank participation in financing service providers/ESCOs and EE projects
Impact	Increased interest in EE activities in the MS by service providers, industries and banking institutions.
Service provider	Experienced experts working with locally trained experts, SADC agencies and selected development and commercial banking institutions.
Timeframe	2019-On-going for attachment training, accreditation and roster updates,
Risk/constraints	Getting opportunities for trained experts to work with experienced experts for all the types of practitioners. Bank interest to learn about financing opportunities in EE projects
Risk management	Seek regional opportunities to deploy newly trained experts in other MS e.g. SA. SACREEE to coordinate that. Awareness raising at banks of the opportunity for enhancing capacity to assess EE projects through SIEPP.
Estimated level of effort for budgeting	Cost is for the experienced experts working under SIEPP on training trained experts, designing pilot projects, preparation of training seminar materials and presentations to bankers. Experts supporting capacities of the regional and MS bodies, for accreditation
Synergy with other interventions	On-going national EE programmes e.g. SA, Mauritius, Zambia

4.2.3. Objective 3 – Baseline Assessment of EE Opportunities

Rationale

In order to have an overview of the opportunities that exist in the industrial sector of the SADC MS, it is crucial to carry out industry sector-wide baseline studies and this will require both resources and technical know-how.

Some form of grant financing is required at start of SIEPP to raise the interest of industries to participate in such baseline studies. Such mapping can also inform where EE activities should be concentrated in terms of measures that can achieve both energy savings and cost savings for the industries themselves and meeting sector-wide targets that will have been stipulated in the EE/RE policy/strategies. Sector wide opportunities at MS level can also be extended to define SADC level achievable targets.

Industries can be supported to undertake such baseline studies through technical support of experienced experts (e.g. accredited experts and ESCOs) and grant resources can be used to create a market for EE by exposing the opportunities and stipulated regulations.

Beyond the trial period financed through grant, the SADC MS will need to stipulate and enforce their energy management regulations so that industries undertake their data collection, develop energy management plans and report to custodians of such data in the MS at their own cost and hiring accredited experts.

Pillar Objective analysis

Response	Development and establishment of a comprehensive mapping of EE opportunities in industries leading to development of company EE policies, plans and reporting
Target group	Industries as implementers MS Energy Regulators and RERA defining management and reporting regulations

	Experienced experts/Energy Services Companies(ESCOs) to support EE mapping
Actions/Activities	<p>SACREEE to:</p> <ul style="list-style-type: none"> • Mobilize resources for defining EE opportunities in selected industries as pilot baseline studies. • Mobilize and coordinate process of mapping of EE opportunities in the industries. • Identify, mobilize and provide Technical support for pilot EE mapping in selected industries <p>MS Regulators (energy and/or EE offices²²) with support of RERA formulate harmonized energy management and reporting regulations on EE baseline, target setting, data management and performance reporting.</p>
Output	<p>Methodology for EE baseline mapping established for roll out to other industries</p> <p>Potential and target EE savings in selected industries</p> <p>Harmonized EE management and reporting regulations established</p> <p>Reporting System for industries' EE performance</p>
Outcome	<p>Capacity for EE Mapping in industries</p> <p>Extrapolated potential of EE savings to MS industrial sectors</p>
Impact	MS Sector wide and SADC EE target and National EE Action Plans to meet targets
Service provider	Accredited Experts/ESCOs for EE mapping with attached experts trained in the SIEPP Energy Regulators working with RERA for energy management regulations
Timeframe	2019-2021 for pilot technical support but will be on-going by industries themselves when they acquire capacity
Risk/constraints	<p>Private sector mobilization to participate in baseline studies</p> <p>Getting resources for the baseline pilot projects</p>
Risk management	<p>Work with select industries that are already involved in some EE mapping e.g. in Mauritius</p> <p>Work with industrial associations for coordination and reaching a wider audience of their members</p> <p>Request industries to co-finance and have MoUs with industries and their associations on the undertaking</p>
Estimated level of effort for budgeting	<p>Technical support for experienced experts to train industries' personnel and junior experts on EE baseline mapping</p> <p>Development of the energy management regulations- Convening of MS regulators and RERA on formulation of the energy management regulations (workshop/group meeting and expert guidance/facilitation)</p>
Synergy with other interventions	On-going national and industrial EE programmes e.g. Mauritius SUNREF III that has already been involved in EE mapping.

4.2.4. Objective 4 – Data Collection, Management and Reporting

Rationale

It is currently not easy to get information on the share of energy consumption in industries for most countries as their energy balances are outdated and are not supported by updated reliable data. There is also indication that previously reported EE improvements²³ were not supported by good data.

The effort being introduced by some MS to require mandatory reporting from large industries should lead to better data collection and management systems. Such data collection systems are important for all countries to track baseline energy consumption and impact of the EE initiatives implemented in the industries. This is the required starting point in order that measured EE improvements will also be reliable going into the future. This will require strengthening the capacity of the Departments of Energy (DoEs) on data management and

²² Where they exist e.g. Mauritius

²³ e.g. for SA previous EE strategy.

reporting on energy use, and the industrial sector training to collect, manage and assess their own potential for benefits from EE measures. Such data will be useful to track baseline, energy and cost savings and greenhouse gas (GHG) emissions reductions at Industries' and MS level. The data will also be used by other global data systems such as SE4ALL Global Tracking Framework and reporting on NDCs.

The energy management regulations will be useful to stipulate mandatory requirements for providing such data most preferably annually.

Pillar Objective analysis

Response	Systems of providing reliable end use energy consumption in the industrial sector and for the MS energy balances.
Target group	<ul style="list-style-type: none"> Ministries/Departments of Energy, energy utilities and regulators-as official custodian of energy data National Statistics Agencies/Central Statistical Offices (CSOs)- as custodians of national data Industries- responsible for data collection management and reporting.
Actions/Activities	<p>SACREEE to:</p> <ul style="list-style-type: none"> Mobilize resources for technical support to MS to initially update their Industrial energy sector statistics and energy balances and how to maintain the system of reliable data collection, processing, management and reporting; Engage Ministries/Departments of Energy to regulate industries to collect and process end use consumption, energy savings and cost savings Collaborate with National Statistics Agencies/CSOs in data collection, processing and management Engage MS EE/RE Departments/Offices to create and manage EE target monitoring information systems to enable data capture, manipulation and reporting
Output	<p>Updated energy database for MS on industrial sector</p> <p>Capacitated Ministries of Energy (MoE/DoE) and industries to collect energy consumption data in industrial sector</p> <p>EE target monitoring information systems</p>
Outcome	Reliable energy consumption data and regular reporting systems for industrial sector
Impact	Reliably informed policy on the industrial sector energy planning
Service provider	<p>Energy service companies/trained experts/ESCOs for initial update of MS databases</p> <p>Company energy managers for regular collection, processing, management and reporting</p>
Timeframe	<p>2020-2021 Period of technical support to update MS energy statistics and databases</p> <p>On-going for industry data collection, management and reporting by target groups.</p>
Risk/constraints	<p>MS are at various levels of data and information quality hence causing delays in updating of all MS energy statistics</p> <p>Poor cooperation of Industries during pilot phase before regulations are developed and enforced.</p> <p>Data qualities may not be uniform and can be poor</p> <p>Poor enforcement of energy management regulations</p>
Risk management	<p>SACREEE to mobilize adequate resources for updating period</p> <p>MS to make awareness on energy management regulations and enforce penalties</p> <p>There should be quality auditing facilities established by Ministries of Energy for data supplied by industries</p>
Estimated level of effort	Technical support services to guide data surveys and analysis; and updates of

for budgeting	energy statistics and databases at start of SIEPP Equipment and systems for data management and analysis
Synergy with other interventions	Some MS e.g. Botswana have benefited from EU TAF ES0123 to undertake similar surveys for the whole energy sector.

4.3. Demonstration Projects and Awareness Raising

4.3.1. Objective 1 – EE/RE Demonstration Projects

Rationale

A number of EE measures would be of use to industries and some of these measures are being implemented but to a limited extent in some of the SADC MS. Typical interesting measures include power factor correction, co-generation, steam system sizing and optimization, cooling and refrigeration efficiency improvements, retrofitting of variable speed drives and solar thermal applications in the industrial sector.

The national electricity companies are already involved with some Demand Side Management Programmes and are exploring how to enforce power factor correction among their maximum demand customers e.g. in Zambia where power factors below the target correction of 0.92 will attract penalties. Such involvement of power utilities in DSM activities will allow larger penetration of such an EE measure and hence accelerating creation of a market for EE practices and technologies.

During the shortage of power in the region from 2007, some large industries started their own power generation using either fossil fuels/diesel, biomass and solar PV responding to the unreliable supply of utility power and to ensure that some industrial processes requiring continuous operations could be sustained.

On RE, some biomass industries (e.g. sugar and forestry residues) have embarked on co-generation using biomass replacing coal and deploying efficient boilers.

Solar PV is finding application for both electricity generation, either as roof-top systems or back up plants offsetting diesel gen-sets. Technologically, use of solar PV for electricity generation is proven but will require support measures such as net-metering and feed-in-tariffs to allow industries to sell excess power to the grid. What requires further assessment is application of solar thermal for heating and cooling services in industry. Some thermal applications have been tested in the commercial and residential sectors (e.g. under SOLTRAIN²⁴). SOLTRAIN initiatives in the region are limited in the industrial sector. However some initiatives in South Africa are being directed at the industrial sector as well and more future initiatives supported by donors are earmarked to continue in the country. Such creation of market for solar thermal applications in the industrial sector of SA will present opportunities for replication in the rest of SADC MS.

Steam sizing and optimization, cooling and refrigeration efficiency and variable speed drive applications have been applied in some industries typically food and beverage since all these systems are applicable.

Industries can be supported to adopt these types of EE/RE measures across the region but will require public resources to carry out demonstration of technologies and the corresponding energy and cost savings. Experience shows that, even in countries with a high awareness for EE such as Mauritius and South Africa, grant financing and fiscal incentives are required to implement such demonstration projects and hence create the market for EE/RE activities.

Such selected regional demonstration projects will offer an opportunity for regionally trained experts to work with specialized experts in these selected technologies and hence allow skills transfer to local junior experts.

Experiences from the demonstration projects will be show-cased to increase the awareness on the technologies and create a bigger market for such technologies and practices in the region.

Pillar Objective analysis

²⁴ Southern African Solar Thermal Training & Demonstration Initiative is a regional initiative on capacity building & demonstration of solar thermal systems in the SADC region

The analysis for this objective has been divided into a number of responses depending on the technologies presented above.

The responses presented related to this objective are:

- Response 1: Power Factor Correction
- Response 2: Co-generation
- Response 3: Steam Sizing; Cooling, Refrigeration and Variable Speed Drives
- Response 4: Solar thermal applications in industries substituting diesel

Response 1: Power Factor Correction

The electricity sector in the SADC region has been hampered by a lack of adequate supply capacities in combination with high technical transmission and distribution (T&D) energy losses. Technical T&D losses are reported to be above 20% of total national generation, for some countries. Part of these technical losses can be addressed by improving power factor through installation of Reactive Power Compensation (RPC) equipment at the utility and customer transmission/distribution lines' interface. This will result in reduced maximum energy demand for the customers and substantial reduction of energy losses in the utility power transmission and distribution system. Power factor correction thus bears a large potential to reduce energy losses and hence greenhouse gas (GHG) emissions. RPC is an EE intervention that can be implemented in any industry and has a large potential for replication in all SADC countries.

The technology has been for a long time recognized as a potential energy saving and GHG mitigation option but little or no implementation has been adopted and yet significant benefits can be realized by both utility and maximum demand customers.

Below are the actions that will be implemented to demonstrate power factor correction in industry.

Response 1	Piloting Power Factor Correction in selected industries
Target group	<p>Selected Maximum Demand Customers as registered by Utilities in the pilot MS</p> <p>Power Utilities for coordinating response in the MS</p> <p>Electricity / energy regulators that set the tariffs and technical standards (and regulatory framework for PFC)</p> <p>Industrial Associations to mobilize their members to participate in the pilot project</p> <p>RPC equipment suppliers</p> <p>Service providers e.g. in form of accredited/experienced experts and ESCOs that can advise based on energy audits, source & install the RPC equipment; monitor performance and report on energy and cost savings for the pilot industries.</p>
Actions/Activities	<p>Grant mobilization by SACREEE for undertaking demonstration projects in 3 participating countries e.g. those that have done preliminary PFC assessment and/or implemented PFC measures before.</p> <p>SACREEE, working with:</p> <ul style="list-style-type: none"> • MS will guide selection of MS that are most suitable to host the demonstration projects based on the above criteria and interest of the MS industries. • Utilities and Industrial associations in selected pilot MS will identify relevant industries at different levels of tariff/kV connection (e.g. 0.4kV, 11kV, 33kV, 66/88kV, 132kV) as sites of pilot projects in participating countries. Low power factor will also be a critical criterion for selecting the participating industries guided by availability of data and preliminary assessment of potential energy savings in the MS. • Utilities and Industrial Associations engage selected Industries/electricity consumers to sign MOUs for the demonstration project including for co-financing by the consumers on basis of potential cost savings. • Accredited experts/ESCOs (invited through Expression of Interest) to carry out the activities below with technical support from specialized experts (if needed) and coordinated by the utilities and associations. The experts will: <ul style="list-style-type: none"> - conduct energy audits at selected industries; - identify type of installation of the RPC equipment (central; group or individual

	<p>compensation)</p> <ul style="list-style-type: none"> - identify RPC equipment required (model, quality, sizing); - install the RPC equipment; - measure and analyse of energy savings, kVA reductions, maximum demand payment savings (at start and after RPC installation) - Report results.
Output	<p>Improvement in power factor correction using the RPC installed at selected industries. Demonstrated energy savings and GHG reductions Reduced MD payments (cost savings) by customer and rate on Investment Investment costs required for RPC equipment and extrapolation in the MS</p>
Outcome	<p>Propagation of PFC projects by other industries and non-participating countries Improved utility technical loss performance in participating countries</p>
Impact	<p>Utility policy and regulatory measures introduced for PFC Financing mechanism for RPC availed RPC supply establishments start up in the SADC MS ESCO market created for RPC Adoption of PFC to meet Nationally Determined Contribution (NDCs) report- targets Potentially limit future planned generation investments in MS countries</p>
Service provider	<p>SACREEE coordinates the actions with possible external assistance in collaboration with SAPP and RERA Accredited experts and ESCOs with adequate Technical RPC expertise</p>
Timeframe	<p>2020 energy audits and installations of RPC 2021-2023 monitoring RPC performance and reporting annually</p>
Risk/constraints	<p>Low awareness of technology hence consumer resistance to participate Technology accessibility including quality, high transaction costs (Import/VAT, transportation costs) Low skills for local energy service companies for credible installations Securing financing for the demonstration projects in 3 countries (mainly equipment purchase)</p>
Risk management	<p>Target industries with EE champions that may already be exploring PFC as an energy saving option Check several suppliers of RPC equipment especially from the countries that can support with Export Commodity Agencies Technical assistance should backstop locals to guarantee performance of the demonstration project to succeed Persuade selected industrial consumers to co-finance projects.</p>
Estimated level of effort for budgeting	<p>Technical assistance to trained experts/energy consulting companies Cost of energy audits and system sizing and sourcing RPC equipment (purchase or leased) installation + other transaction costs such as transportation, VAT/duty Measurement of RPC performance Reporting workshops where results are shared.</p>
Synergy with other interventions	<p>Reduction of technical losses through Reactive Power Compensation conducted by GFA Consulting Group and UNFCCC with Germany Support in Mozambique, Uganda, Zambia and Zimbabwe (2017-2018). National PFC penalty/regulatory regimes e.g. Zambia, South Africa, and Zimbabwe.</p>

Response 2: Co-generation

Response 2	Biomass based electricity co-generation demonstration in the industrial sector
Target group	Industries dealing with biomass and waste such as sugar, paper/pulp, livestock based, Industrial associations, Equipment providers ESCOs/ accredited/experienced experts, Financing institutions
Actions/Activities	SACREEE to coordinate: <ul style="list-style-type: none"> • Mobilization of grant and local resources to support development of demonstration/pilot projects • MS to Identify and communicate interest of industries with co-generation potential e.g. sugar and wood/pulp that can benefit from the pilot programmes. • Engagement of Industrial Associations and selected industries and their associations to commit to participate in co-generation demonstration projects. • Recruitment (through EOI) ESCOs/Accredited/experienced energy experts to design and develop demonstration projects for electricity self- generation from biomass waste and for heating and cooling systems (including a component related to the sustainable management of biomass resources if applicable) to pre-feasibility/feasibility stage depending on data availability and resources available. • Recruitment of a transaction advisor/ finance and investment expert to structure co-financing with selected industries and engage banking sector to fund projects supported by blending grant and debt funding
Output	Energy audit results, potential energy, costs and GHG savings Pre-feasibility/feasibility studies for developed demonstration/pilot projects Funding for projects available either for feasibility stage or implementation. Co-generation technology identified
Outcome	Self-generation through co-generation well established in the industrial sector Creation of conducive environment for private investors to invest and develop biomass and co-generation energy sources
Impact	Co-generation policy and regulatory measures in place Active participation of private investors in biomass based co-generation projects
Service provider	SACREEE coordinates the actions working with MS, industries and energy experts and transaction advisors/ finance and investment expert
Timeframe	2020-2021 project design assuming grant financing available already 2022-2023 securing funding for projects
Risk/constraints	Financial support without PPA and or net-metering and feed-in tariff may be difficult to secure by industries
Risk management	Developing net-metering and feed-in tariff at same time. Designing projects also for self-catering power demand so that projects are not only looking at selling power.
Estimated level of effort for budgeting	Energy experts and transaction advisor costs for project design and development and transaction advisory
Synergy with other interventions	Learn from co-generation projects in MS on sugar (e.g. Illovo in Swaziland, Mauritius), pulp/paper industries (e.g. SAPPI in SA)

Response 3: Steam Sizing; Cooling, Refrigeration and Variable Speed Drives

Response 3	Demonstration of Steam Sizing, Cooling, Refrigeration and Variable Speed Drives
Target group	Selected Industries Industrial associations, Equipment providers and Energy experts/ESCOs/ transaction advisors/ finance and investment expert
Actions/Activities	SACREEE to: <ul style="list-style-type: none"> • Mobilize grant resources for undertaking demonstration projects • Engage MS together with Industrial associations to identify relevant industries that have interest to participate in the Steam sizing, Cooling, Refrigeration and Variable Speed Drives demonstration project and together with SACREEE shortlist the ones to participate. • Recruit energy experts and transaction advisors that will identify technology and financing sources and options to be tested. • Undertake energy audits and show energy and cost saving potential teaming up specialized experts and locally trained experts to enhance skills of newly trained experts in SIEEP. • Assist in structuring blending of grant, debt and co-financing for implementation of the projects by industries
Output	Energy audit results, potential energy, costs and GHG savings Designed and developed demonstration projects to feasibility or implementation Required financial resources and potential sources of financing.
Outcome	Potential energy savings of steam sizing, cooling & refrigeration efficiency and VSD in selected industries
Impact	Application of the EE measures and their potential energy savings in MS and SADC region industrial sector
Service provider	Energy experts/ESCOs Transaction advisor/ finance and investment expert
Timeframe	2019-2020 mobilization of stakeholders, grants and local resources 2021-2023 energy audits, designs, project developments and securing funding
Risk/constraints	Co-financing may be a restrictive condition to industries Finding suitable industries to conduct all 3 measures as one demonstration project
Risk management	Advance agreement and MoUs with selected industries considering co-financing Limiting co-financing to include in-kind services. Select industries that can offer opportunities to demonstrate all 3 measures to avoid excessive transaction costs.
Estimated level of effort for budgeting	Energy audits Design and development of projects Financing structuring
Synergy with other interventions	National and donor funded EE programmes e.g. Mauritius (Agence Française de Développement (French Development Agency - AFD), Zambia (EU); South Africa (UNIDO)

Response 4: Solar thermal applications in industries substituting diesel

Response 4	Solar energy for thermal applications in industries
Target group	Industries Industrial associations, Plant designers/ESCO Financing institutions
Actions/Activities	SACREEE to: <ul style="list-style-type: none"> • Mobilize grant resources for undertaking demonstration/pilot projects • Engage MS together with Industrial associations to identify relevant industries that can demonstrate solar thermal demand (heating and cooling). • Recruit energy experts and financing experts to: <ul style="list-style-type: none"> - Assess industry heating and cooling energy demand in the selected plants (e.g. 3 industries in the region). - carry out system design, costing and related return on investment - structure blending of grant, debt and co-financing by industries
Output	Energy audit results showing potential energy, cost and GHG reduction potential in the selected industries Plant size and end-use opportunities in the selected industries Designed demonstration plants to-prefeasibility Investment requirements and rate of return Required financial resources and potential sources of financing.
Outcome	Solar thermal application opportunities in industries
Impact	Application of the solar thermal measures in industries as sources of energy and GHG mitigation measures
Service provider	ESCOs/skilled energy experts Transaction advisor/finance and investment expert
Timeframe	2019-2020 mobilization of stakeholders and grant resources 2021-2023 plant design and project development, and funding options
Risk/constraints	Tariff structure limiting interest to migrate to solar thermal e.g. from electricity water heating Net-metering or feed-in tariff constraints
Risk management	Pillar 2- should succeed in 2019/2020 as planned for SADC; Planned net metering study (Pillar 5) complete to support this demonstration project by 2021
Estimated level of effort for budgeting	Costs of experts for demand and system design of projects; and identification of financing options
Synergy with other interventions	SOLTRAIN projects in some SADC MS and Solar Thermal Projects for SA. Refer to Pillar 5

4.3.2. Objective 2 – Awareness Raising

Rationale

Awareness raising will play an important role in convincing various players to be engaged in EE initiatives. Policy makers should be informed to create credible policies, strategies and incentives that will induce the market to adopt EE/RE activities in the industrial sector.

Financiers require awareness to realize business opportunities in EE programmes. They are still basing their due diligence for financing projects on the balance sheet and need to open up to innovative financing for EE projects.

Some industries that have implemented EE measures now see energy saving gains to be similar to selling products and such view is needed to encourage more participation in EE initiatives. Those that have implemented some energy saving measures have come to appreciate the realized cost savings and have included EE in their KPIs. The category of those who have benefited from EE can be a source of inspiration as they show-case their experiences to other industries particularly the SMEs that have not yet implemented such measures.

Awareness raising is needed at senior/shareholder level that can lead the development of EnMS policies and approve resources for implementation of agreed EE/RE measures and actions. So far there is a general lack of awareness on the benefits of Energy Management Systems such as EnMS ISO 50001. Awareness raising and technical support are required for the development of EnMS to increase the uptake of this type of system in the industries.

Show-casing the benefits of EE through the above demonstration projects can be a convincing form of awareness raising when shared by those industries or countries that have achieved good results. This can be facilitated through sharing of EE experiences and best practices among the industries through the existing private sector associations. In a number of MS, these associations and energy utilities also require training to enhance their advisory role to their members and organizations.

Pillar Objective analysis

Response	Awareness raising targeted at policy makers, industries and financiers, to appreciate the benefits of EE/RE measures.
Target group	Policy makers Management and shareholders in Industries Industrial associations Banking institutions
Actions/Activities	SACREEE supports, through grant financing, engagement of MS and recruited energy experts to: <ul style="list-style-type: none"> • Create information system of good practice on industry energy & cost savings and GHG reductions e.g. from above demonstration projects and other best practice EE programmes. • Create MS national platforms for sharing information among stakeholders e.g. breakfast meetings, workshops, seminars. • Engage industrial associations to lobby corporate management of their members to embrace energy management systems such as ISO 50001. • Deploy experts to undertake 1 to 1 follow-ups with banks on funding opportunities for EE projects
Output	Awareness information for show-casing accessible Scheduled stakeholder workshops/seminars and meetings Targeted captains of industry and financing institutions
Outcome	Industrial and financing institutions awareness on EE raised leading to their active participation and resource allocation to EE programmes
Impact	Increased EE activities in the industrial sector and avoided energy losses, costs and GHGs
Service provider	Energy and finance/investment experts Standards bodies, energy utilities and energy regulators participation Media involvement and publicity
Timeframe	2019-On-going Annual meetings to share information
Risk/constraints	Coordination to mobilize service providers and get audience of beneficiaries
Risk management	Work through industry associations to show case good practice and experiences with their members Use Association media platforms to undertake the promotion

Estimated level of effort for budgeting	Preparation of materials for showcasing by experts Cost of meetings and follow-up seminars Information system development
Synergy with other interventions	On-going national programmes e.g. Mauritius monthly meetings championed by Business Mauritius

4.4. Financing Interventions for EE/RE Initiatives

Rationale

There are various needs for accessing financing for EE/RE programmes. Although various forms of subsidy are required by both medium and large industries, medium- size enterprises are most affected as they find it difficult to borrow from banks based on their balance sheets. They also have weak capacity to present bankable projects that banks can finance. Their projects also tend to be small and hence would not attract financing due to high transaction costs.

Technical assistance and financial schemes have been provided by development agencies in form of credit lines such as SUNREFs of AFD of France. Such forms of financing are still important to excite the financial market to explore funding opportunities for EE projects in the industrial sector.

In the case of incentives such as tax rebates practiced in South Africa, medium enterprises have not benefited as costs related to investments, measurement and verification of energy savings did not justify the effort, so a different structure of such rebates may be required is needed to cater for the medium enterprises. Financing in medium enterprises is also needed for the rest of the EE value chain from EE baseline definitions, energy audits and adoption of EnMS in addition to M&V.

Some development financing Institutions (DFIs) and commercial banks are supporting RE projects, but there is no clarity on how they can finance EE initiatives as evaluation for funding for such EE projects is different for RE projects. Currently commercial and DFIs currently have limited technical know-how to assess EE projects or do not have financial products that can be applied to the specific conditions of EE measures (e.g. unable to repossess assets in case of default and lack of definitive revenue streams). Mobilization of the financial sector to provide financial support to EE in addition to the effort already being done for RE projects is required. It is interesting that some commercial banks and DFIs such as the African Development Bank (AfDB) have started exploring EE project financing.

Some of the financing institutions need capacity and awareness to understand the opportunities related to financing of EE projects. Project pipelines would facilitate creation of financing for such projects since financing institutions can base their decisions on the type of projects that require financing when creating financing for EE projects.

Self-generation RE projects of low capacity (less than 5MW) are not easily amenable to funding as they incur large transaction costs; hence special financing packages for such projects are required.

The ESCO model is another opportunity that can be used to finance EE initiatives at cheaper interest rates but currently the ESCO market is limited and lacks innovative financing. The existing local energy consulting companies are small to play the ESCO role. The large international ESCOs that can afford the required cash flow, have strong balance sheets and can provide total solutions will be too costly for small and medium size enterprises (SMEs). The smaller energy companies that can provide services at a cheaper rate will thus require access to financing to support such SMEs.

Pillar Objective analysis

4.4.1. Objective 1 – Assessing and Upscaling of Existing Financing Models

Several financing mechanisms that exist in the region will be beneficial to support EE/RE projects in the industrial sector. However they should be adapted to support SME project developers. A detailed diagnosis of such mechanisms is thus required to streamline recommendations that could be made to improve on existing financial systems.

Response	Analysis of the existing EE financing mechanisms to match financing needs of Industries
Target group	MS Ministries of Finance responsible for tax rebates and incentives coordinated at SADC level Ministries responsible for energy and climate policies National and regional financial entities already supporting EE/RE projects e.g. Commercial and Development Banks Donor community active in financing EE/RE in the region Industrial associations to mobilize own members to provide feedback on the difficulties faced to secure financing for EE/RE
Actions/Activities	SACREEE recruit finance and investment experts to: <ul style="list-style-type: none"> Review existing credit lines and incentives and how to access the funds and adapt to finance EE projects and small RE projects. The assessment of these mechanisms can be carried out in MS where mechanisms are being deployed. Explore the establishment of a regional financing facility for EE and small RE projects to be managed by a bank. Explore impact of reduced transaction costs in form of import duty and VAT and how they will impact on Return on Investment for EE/RE projects Analyse creation of an ESCO fund that local energy service providers can tap into to support uptake of EE projects Analyse other existing Banks and DFI support to EE and RE projects Estimate existing and potential support from green and climate funds to EE/RE projects and how much is/can be targeted at the industrial sector. Investigate scope presented by pension and insurance funds, diaspora bonds and other unconventional sources for financing EE/RE in industry and other sectors
Output	Study Reports on: <ul style="list-style-type: none"> Critical analysis of the existing financing mechanisms Design of a regional EE financing facility Effect of various tax incentives to EE/RE investments ESCO financing structure and how it can be funded Current DFI and Bank support relevant for EE/RE projects Green and Climate Funds (existing & potential) for EE/RE projects Role of pension and insurance funds currently and in future for EE/RE in the industrial sector and diaspora bonds
Outcome	Gaps for improved financing options for EE and RE projects
Impact	Increased funding for uptake of EE and RE technologies in SADC MS
Service provider	Finance and investment experts and other service providers recruited and supervised by SACREEE
Timeframe	2019-2020 for all the assessment studies above
Risk/constraints	Getting adequate information for the required analysis from financing institutions and relevant public entities
Risk management	Early engagement with the relevant financing institutions and the MS with SADC/SACREEE support
Estimated level of effort for budgeting	Cost of studies of existing financing options and gaps to address Cost of designing an EE financing facility
Synergy with other interventions	Some examples are: SUNREF initiatives in some SADC MS in Mauritius, South Africa, Namibia, Mozambique Tax rebates in South Africa NAMA Facility Funding Support in South Africa GCF initiatives in MS e.g. Zambia Infrastructure Development Bank of Zimbabwe- pension/insurance funding for RE

4.4.2. Objective 2 – Creation of New and Additional Financing Options and Seed Funding

Response	Availing forms of financing for EE projects covering EE baseline studies, energy audits, adopting EnMS and related certification, paying for M&V, project development, project implementation
Target group	MS Ministries of Finance responsible for tax rebates and other incentives Ministries responsible for energy and climate policies National, regional and International entities in charge of financing EE/RE e.g. Commercial and Development Banks- for financing packages Donor community for grant financing Industries
Actions/Activities	SACREEE to: <ul style="list-style-type: none"> • Mobilize grant funding for EE baseline mapping, energy management, energy audits and M&V and blending financing of projects • Lobby creation of specific packages by Banks and DFIs for medium enterprises at reasonable cost of capital. • Lobby MS to create specialized tax rebates for medium enterprises • Set a Seed Funding to support creation of a Regional EE Financing Facility • Coordinate collaboration of donors /DFIs/Export Credit Agencies and commercial banks to establish a regional EE financing facility that will allow access to financing by industries and ESCOs at reasonable interest rates compared to what commercial banks charge. • Collaborate with MS Climate Ministries and accredited Green Climate Fund (GCF) Banks in the region in the mobilization of Green/climate funds for EE/RE in the industrial sector basing on NDC targets and assessments
Output	Subsidized funding for EE baseline mapping, energy audits, energy management and M&V and project implementation Financing packages for small scale EE/RE projects Simplified tax rebates for medium enterprises Seed Funding & EE Financing facility design and creation Potential green/climate funds for EE/RE
Outcome	Additional dedicated sources of financing for EE/RE uptake
Impact	Increased financing for EE and RE projects in the SADC region
Service provider	Technical Assistance Experts to advise on modalities of introduction of new/additional financing options under SACREEE Technical supporting agencies and accredited GCF banks
Timeframe	2019-2021 Mobilizing grant funding, stakeholders and lobbying stage 2022-Creation of funding facility and onwards further assessment and mobilization of financing sources
Risk/constraints	Willingness of governments (tax rebates) and DFI (moving to financing facility) to change the current financing status
Risk management	Demonstrated benefits of such amendments through analysis needed.
Estimated level of effort for budgeting	TA for awareness and technical support to banks/ DFIs and governments
Synergy with other interventions	Tax Rebates for large industries in SA SADC Infrastructure Development Fund GCF readiness and Project Financing in a number of MS

4.4.3. Objective 3 – Creation of Project Pipelines and Investment Guide

Response	Development of EE/RE Project Pipelines and Investment Guide
Target group	Ministries of Energy and Utilities Industries ESCOs/Energy experts Financing Institutions
Actions/Activities	SACREEE to: <ul style="list-style-type: none"> Recruit energy, finance and investment experts to capacitate SMEs and local corporate enterprises to develop bankable EE and self-generation RE projects. Coordinate with MS and industrial associations to identify SME industries that have potential project ideas/pre-feasibility stage projects Select industries to be supported by energy experts to create project pipelines for EE and RE to be presented to financing institutions. Develop an Investment Guide defining project pipelines of MS and the related financing gap. Support SME industries through finance and investment experts to mobilize resources and technical support to access financing for pre-feasibility and feasibility studies and implementation of the project pipeline.
Output	Trained/skilled medium enterprises for project pre-feasibility/feasibility studies Pool of EE/RE projects for the industrial sector Investment Guide covering all MS Financing gap for pre-feasibility/feasibility studies and projects Implementation
Outcome	Investment opportunities and financing for EE/RE in industries
Impact	Increased EE/RE project implementation in the industrial sector
Service provider	Energy and finance experts to SMEs to develop projects
Timeframe	2020 coaching by energy experts 2020-on-going for developing project pipelines by SMEs
Risk/constraints	Mobilizing medium enterprises for skills building Mobilizing adequate grant funding for pre-feasibility/feasibility studies
Risk management	Start with medium enterprises with energy managers in place and/or practising EE in-house. Present funding opportunities during seminars with Banks (Pillar 3)
Estimated level of effort for budgeting	Training of project developers by experts Mobilization of resources for pre-feasibility and feasibility of projects.
Synergy with other interventions	Pillar 3 Other Project development initiatives such as in NDCs

4.5. Application of RE in Industry

Rationale

The scope for the use of RE in industries to ensure security of supply in addition to reducing costs of production and use of fossil based fuels will depend on a conducive regulatory framework. Industries will employ self-generation either to sustain their operations or reduce energy costs. In the latter, cost reflective tariffs are usually required to make the investment worthwhile. In MS where tariffs are subsidized, return on investment for installation of RE plants would not encourage investments.

There is currently lack of regulatory frameworks allowing for self-generation of energy in some MS. The majority of MS do not allow companies to generate energy for auto-consumption with RE or even fossil fuels. Net-metering is hardly practiced in all SADC MS except for some trial activities in South African Municipalities and Namibia although a number of other MS are also working on introduction of net-metering

e.g. in Zimbabwe, Zambia. In Mauritius industries are allowed to generate to meet own demand apart from IPP contracts with sugar producers that already sell to the utility.

Due to the tariffs that are not cost –reflective, industries are therefore constrained to reduce their energy bills (e.g. electricity and heat) by investing in RE. A conducive enabling environment is then required to attract application of RE by industries.

Pillar Objective analysis

4.5.1. Objective 1 – Creating an Enabling Environment for Application of RE in Industries

Response	Creating a conducive regulatory framework for RE self-generation in industries
Target group	Ministry of Energy in MS Power utilities Energy Regulators in MS and RERA Industries and associations
Actions/Activities	SACREEE to: <ul style="list-style-type: none"> • Coordinate, through RERA and MS energy regulators, setting of cost reflective tariffs for industries in the MS to make RE self-generation a worthwhile investment. • Engage consultants to conduct study that will inform introduction of net-metering regulatory framework in the MS so industries can sell excess power to the grid. • Mobilize grant resources and support demonstration projects for solar thermal applications - heating and cooling and bio-energy in industries as part of sub-Objective under “Demonstration/pilot projects and programmes” (Pillar 3). • Coordinate through SADC and MS Ministries of Environment, the introduction of mandatory measurement and reporting of greenhouse gas emissions reduction from RE application in industries.
Output	Cost reflective tariffs Net-metering guidelines Designed solar thermal and bio-energy projects for the industrial sector (Pillar 3) Guidelines on regulation of greenhouse emission targets and reporting
Outcome	Conducive tariffs and net-metering structures in the MS Increased Self-generation capacity in industries Regulated greenhouse gas emissions system
Impact	Policy and regulatory reforms for self-generation and clean energy use in industries
Service provider	Technical experts to produce net metering guidelines and facilitation of stakeholders on tariff setting and GHG related framework
Timeframe	2019-2020 resource mobilization and studies 2021-2023 demonstration project support
Risk/constraints	Cost reflective tariffs may take time to achieve as MS have already taken a long time from 2013 to date to set such tariffs collectively Resistance by utilities/bulk suppliers to net-metering as they will lose some of their revenue
Risk management	Allow negotiated cost reflective tariffs as in sugar industries if SADC deadline is not met Engaging utilities and bulk suppliers in designing net metering, REFIT, etc. showing cost benefit analysis to the MS.
Estimated level of effort for budgeting	Technical support to: <ul style="list-style-type: none"> • Develop cost-reflective tariffs, • Conduct net-metering study,

	<ul style="list-style-type: none"> Develop guidelines/regulations for GHG reduction and reporting
Synergy with other interventions	Cost reflective tariffs initiative by SADC for 2019/2020 Net-metering initiatives in the various MS- Zambia, Zimbabwe, Mauritius, SA, Namibia. Pillar 3

4.6. Domestication of EE/RE Technologies

4.6.1. Objective 1 Assessment of Accessibility and Co-benefits of Domesticating EE/RE Technologies in the SADC region

4.6.1.1. Rationale

EE/RE equipment is mostly imported to the SADC region which leads to higher costs and to equipment that may not be of consistent standards to the local industrial needs. There is also no technology innovation of significance in the region.

There are some efforts to domesticate EE/RE technologies ranging from basic R&D to localization and incubation of technologies being done by some research and technology centres, including universities.

There is consideration for national level production of technologies e.g. for LEDs in a number of MS as the market exists for DSM programmes. There has also been infrastructure in the region for production of efficient lighting e.g. CFLs in Lesotho that can be revived to ensure easy access of technologies in the region. The LED initiative can benefit from the Directive by SADC Ministers responsible for Energy to phase inefficient incandescent lights by end of 2019 as well as the Energy Efficient Lighting and Appliances initiative that SACREEE is involved together with SAPP. SADC Secretariat is also currently conducting an Energy Foresight Study with the objective to help the region have a holistic view to improve the chances of success of the industrialization strategy through RE value chains.

However, there are technologies that would not be competitive to produce in the SADC region such as solar PV panels when competing with production systems in China and India. In that regard, strategic sourcing of such technologies is required. For instance, some SADC countries can enjoy duty free imports from EU countries under Economic Partnerships Agreements making it possible to bring EE/RE technologies at competitive landing costs either as components for assembly and for adaptation. Export Credit Agencies in such countries can facilitate accessibility to such technologies at reduced costs.

What is needed is clarity in terms of how the region can upscale availability, accessibility and affordability of EE/RE technologies to realize better impact on energy and cost savings. An assessment is therefore required to see what useful initiatives are already being done to avail EE/RE technologies in the region and what can be done to upscale and coordinate the various efforts that are being done in the region. Industries should also be made aware of the EE/RE technologies that they can use, their functionality and how and where to access them.

Pillar Objective analysis

4.6.1.2. Sub Objective 1 – Assessment of Status of EE/RE Technologies in the SADC region

Response	Undertake an assessment of EE/RE technology situation in the SADC MS
Target group	Ministries of Energy Power Utilities Research and Technology Institutions Industries
Actions/Activities	SACREEE to <ul style="list-style-type: none"> Mobilize resources for assessment study on status of R&D, Innovation, adaptation,

	<p>manufacture, supply of EE/RE technologies in the SADC MS.</p> <ul style="list-style-type: none"> Recruit experts or Research Centres to undertake an assessment exercise on domestication of EE/RE efforts already being made and develop EE/RE technology lists and database.
Output	EE/RE Technology status report in the SADC region Database of technology list for various systems in industries
Outcome	Opportunities for up-scaling EE/RE technology availability
Impact	Policy reforms and resource allocation to domestication of EE/RE technologies
Service provider	Technical experts and Research Centres/Universities
Timeframe	2019-2020 Grant resource mobilization and assessment study
Risk/constraints	Only large activities e.g. in South Africa will be mapped considering the size of the region and that other MS have small operations of this nature.
Risk management	MS Research Centres can assist to provide information about what is happening in their own MS
Estimated level of effort for budgeting	Costs of experts for the assessment study and developing the technology database
Synergy with other interventions	National EE Programmes Technology List e.g. Private Sector Energy Efficiency Programme - South Africa

4.6.1.3. Sub-Objective 2 – Co-benefits of Domestication of EE/RE Technologies

Response	Assessing co-benefits of domestication of EE/RE technologies in the SADC MS
Target group	Ministries of Energy/Departments of EE/RE Research and Technology Organizations/Universities Industries
Actions/Activities	<p>SACREEE to:</p> <ul style="list-style-type: none"> Coordinate with other relevant SADC agencies on creation of a competitive pricing of EE/RE technologies taking into consideration harmonized tax policies to facilitate trade of EE/RE across the SADC region and to ensure adherence to SADC quality standards Coordinate adoption of the UNIDO Cleantech model as a platform for identifying local technologies for adoption. Recruit experts to conduct country assessments of RE value chains, skills, infrastructure capacity and policy framework that will be required and co-benefits (job creation, GHG reduction, industrialization, etc.) that will accrue to the MS.
Output	EE/RE technology price list Assessment report on co-benefits
Outcome	Co-benefits and value of domestication of EE/RE Technologies
Impact	Policy reforms on EE/RE industrialization and contribution to economy
Service provider	Experts on commodity pricing and trade Experts on co-benefits assessment and costing
Timeframe	2020 Assessment study On-going defining price lists and developing technology database & updates
Risk/constraints	Not easy to make such assessment and create pricing that all MS can use.
Risk management	Engagement of relevant SADC bodies on Science Technology and Innovation as well as those dealing with Customs and Excise matters
Estimated level of effort for budgeting	Technical expertise required for the study and database of technologies
Synergy with other interventions	Climate change co-benefits assessment in MS

5. COMMUNICATION PLAN, ACTION PLAN AND BUDGET

5.1. Communication Plan

This Communication Plan is required to guide SACREEE to communicate with the various stakeholders on the SIEEP and its implementation.

The purpose of a communication plan in the context of the proposed activities is two-fold:

- To ensure that the SIEEP's visibility is increased and its results and key milestones are disseminated to relevant institutions, the donor community and potential investors;
- To raise awareness and increase ownership of activities and objectives among key stakeholders for maximum effectiveness and sustainability of actions.

Main instruments for visibility of the SIEEP and dissemination of its results and key milestones:

- The report itself: hard copies distributed to the key stakeholders in SADC MS and potential investors and funders;
- The Knowledge Management System envisaged at start of SIEEP implementation can be a repository of key information on the SIEEP implementation Action Plan to allow accessing by enquiring parties within and outside the SADC;
- The monthly SE4All Newsletter: this can be a potential dissemination platform for key milestones reached, depending on approval from designated content selection authorities;
- SACREEE and SADC websites can potentially be used as a platform for SIEEP news-sharing;
- Social media: SADC has an active Twitter account "@SADC news" which can be engaged as a platform for SIEEP news-sharing and redirecting to relevant websites for sharing relevant project coverage (articles for example) and promotion of events;
- Mail-outs: Based on a contact list of key stakeholders, announcement of events, key milestones reached and study results can be disseminated to key stakeholders;
- Workshops & meetings: The stakeholder workshops and Energy Ministers Meetings will be the first point of sensitizing key stakeholders like MS, SADC Agencies and International Cooperating Partners (ICPs) about the implementation Plan of SIEEP.

Key Messages:

Beyond sharing the study results among key stakeholders in government and other organisations, there is a need to reach out to the public and private sector communities.

The key messages on SIEEP relate to:

- Awareness-raising on energy efficiency in industries and the benefits;
- Potential support that will accrue through SIEEP implementation to the public and private stakeholders;
- Synergies that will be realized by implementing EE/RE in industries in other sectors such as climate change and industrial competitiveness, and co-benefits such as job creation possibilities.

Target audience:

SACREEE with support of the SADC MS (represented by the Ministries/Departments of Energy responsible for EE/RE) will be mainly responsible for the communication of messages and reaching out to the target audiences:

- Other SADC Agencies (e.g. RERA, SADCAS, SADCSTAN, SAPP);
- Other Public entities (e.g. other relevant energy departments, regulators and utilities);
- Research centres and universities;
- Expert groups/service providers/ESCOs;
- Donors/development agencies;
- financing institutions/banks;
- Industries, associations and their members.

Approach to industries will be best through their associations but also directly for the industries that are already proactive to implement EE initiatives.

For an effective implementation of the communication plan and achievement of its objectives, SACREEE and SADC MS will need to agree to commit to the communication component as one of their priorities and view it as an integrated aspect of the activities, rather than a stand-alone element to be addressed separately. Communication can serve the iterative nature of project implementation well and be a useful tool as well as a way of increasing visibility.

The recommended objectives and actions for this communication plan are as follows:

Communication objective 1: Strengthening of SACREEE's communication on SIEEP

Communication actions

- Set up internal - SACREEE information and knowledge sharing mechanisms.
- Strengthen SACREEE's communication function to ensure its effective leadership in the execution of SIEEP.
- Strengthen linkages between SACREEE and governmental institutions, ICPs, market actors, industrial associations of the SADC member states.

Communication objective 2: Build and maintain partnerships with key Governmental - Industrial – Market stakeholders

Communication actions

- Reach out to key partners such as governmental decision makers, financial institutions, industrial associations and private sector.
- Emphasize messages to the effect that every industry - energy consumer is a stakeholder in clean energy and energy efficiency.
- SACREEE to explore synergies with other lead institutions in specific events.

Communication objective 3: Improve the understanding and perception of the industrial community on SIEEP

Communication actions

- Increase media attention to the work of SACREEE on SIEEP at regional and national level.
- SACREEE's participation in industrial community activities and programmes.
- SACREEE to monitor and keep abreast of developments in order not to miss opportunities.

Communication objective 4: Improve awareness and understanding on energy efficiency benefits for each industry

Communication actions

- Intensify the promotion of energy efficiency through a combination of mass media, multimedia and new media channels.
- Set an advocate for industrial energy efficiency issues for mainstreaming in all MS programmes/ ministries/institutions/associations.
- Disseminate the final SIEEP report widely.

5.2. SIEEP Action Plan

SACREEE will be in the forefront of implementation of the SIEEP through coordination, engaging other stakeholders, mobilizing the resources required, recruiting service providers and supervising and monitoring implementation. SACREEE will liaise with its SADC counterpart agencies where other such agencies have mandate to implement the SADC agenda e.g. SAPP for regional utility mobilization, RERA for regional energy regulators mobilization and SADCSTAN for mobilizing MS Standards Bodies and SADCAS for accreditation of service providers.

SACREEE will also importantly engage with MS where the implementation takes place and will be assisted by the MS to reach out to relevant industrial associations and their members.

The Action Plan has been designed recognizing SACREEE's role in implementation of all the stipulated actions of SIEEP. SACREEE will therefore need to be resourced to execute this function. Two experts (one technical and another financial) are envisaged with additional support from short term experts when required. The technical expert will deal with all technical issues including recruitment of technical experts to execute the actions. The financial expert will mobilize resources for all actions and also projects and will recruit transaction advisors. A communication expert will also be recruited to implement the communication plan with the support of a design expert (mobilised part-time). Other service providers/experts may be required for short term assignments such as workshop organization, reviewing experts' reports. A budget has been set aside for SACREEE coordination, facilitation and related administration costs.

The Action Plan indicates **What** actions are to be implemented, **Who** will be involved in implementation of the Actions, and **When** they will be implemented.

The Action Plan has been presented following the identified actions under each pillar. There is realization of overlap of events in different pillars that can be implemented at the same time.

The initial Actions will be to mobilize resources either as grant-financing and MS contributions for required events and technical support then followed by building capacity among various stakeholders that include experts, industries, banks and project developers.

Although policy, regulatory and institutional reforms may require technical assistance in some instances, these Actions can be carried out right from the start engaging with MS to implement the required reforms using their fiscal budgets. There are also pieces of regulations in different pillars that can be combined to be implemented by MS right from the start e.g. energy management and greenhouse gas reporting regulations.

Studies, assessments, energy audits also come early to midway in the 5-year timeframe of SIEEP so as to inform decisions going forward e.g. on demonstration projects.

End results such as project pipelines, technology lists and pricing, financial close for some demonstration projects, reporting (unless where reporting is annual) and information systems tend to come at end of the 5-year timeframe.

It is also important to separate actions that are events and those that are processes. Even in the case of processes intensity of involvement may differ as indicated in Table 5-1 Training of stakeholders and specific engagements with stakeholders have been represented as workshops/meetings, sometimes followed by intermittent follow ups.

The general sequencing of implementation of Actions under each pillar is depicted in Table 5-1. An elaborated Action Plan by each pillar, objective and action is presented in Appendix A.

Table 5-1 Action Plan for the SIEEP25

Pillars	Actions	Leading Organization	2018	2019	2020	2021	2022	2023
Pillar1& 5	Cost reflective Tariffs- energy sector and Industrial sector (to meet target of 2019/2020)	RERA/MS Regulators coordinated by SADC	■	■				
All Pillars	Mobilization of Resources for policy/regulations, capacity building, EE skills programmes, demonstration projects, Studies	SACREEE and Member States		■	■			
Pillar 1	Policy/regulatory Reforms including Energy and GHG Management Regulations and Reporting	Member States coordinated by SACREEE		■	■			
Pillar 1	Institutions and creation of NCPCs/dedicated EE Centres	SACREEE identifies Technical Assistance Agency, funds and supervises		■	■	■	■	
Pillar 2	Training of Experts (Energy Auditors, Energy Manager, M&V Professionals)- Trainers in 2020 and Annual training of other experts	SACREEE coordinates and supervise			■	■	■	■
Pillar 2	Skills Building through EE Programmes	SACREEE coordinating MS and industries				■	■	■
Pillar 2	EE Mapping and Data updates	MS and industries supervised by SACREEE			■	■	■	■
Pillar 2 and 4	Training of Bankers (Annual Seminars)	Recruited experts- recruited and coordinated by SACREEE			■	■	■	■
Pillar 2	Capacitate SADC Agencies- SADCSTAN, SADCAS	SADC with SACREEE inputs			■			
Pillar 3	Demonstration Projects	SACREEE coordinates MS and Industries			■	■	■	
Pillar 3	Securing Demonstration Financing	SACREEE leads with support of experts				■	■	
Pillar 3	Awareness Raising	SACREEE and MS		■	■	■	■	■
Pillar 3	Knowledge Information System at start then annual Reporting	SACREEE and MS-funded through SACREEE		■	■	■	■	■
Pillar 4 & 5	Studies on existing financing options for EE/RE and Gaps and Net Metering	SACREEE recruits and supervise experts		■				
Pillar 4	Setting Seed Funding for creating financing options and a Regional EE Financing Facility; Creation of new and additional financing options	SACREEE recruits and supervise experts			■	■	■	
Pillar 4	Creation of Project pipelines and Investment Guide	Funded through SACREEE working with recruited experts and industries				■	■	■
Pillar 4	Mobilize Financing for Project pipelines	SACREEE coordinates Industries					■	■
Pillar 4	Net Metering Studies for RE application in industries	SACREEE recruits and supervise experts			■	■		
Pillar 6	Studies on assessment of Domestication of EE/RE technologies	SACREEE recruits and supervise experts			■	■		
Pillar 6	Study on co-benefits of domestication of EE/RE Technologies	SACREEE recruits and supervise experts			■	■		
Pillar 7	Communication Plan Actions	SACREEE Communication Expert		■	■	■	■	■

²⁵ Purple concerted effort; Yellow lighter/intermittent effort

5.3. SIEEP Implementation Budget

In drawing this draft budget, the focus has been on support systems and facilitation required to create and excite the EE/RE Market in the SADC region.

The main sources of funding for SIEEP implementation is mainly donor/grant funding to fund technical support for policy/regulatory reforms, capacity building, undertaking studies and energy audits, establishing knowledge management systems and databases, project designs and development and securing funding for the developed demonstration projects. This is the sort of money that SACREEE will mobilize and control in terms of managing disbursements.

Apart from Power factor Correction which is considered to require small amounts for procurement of equipment (~US\$ 300000²⁶), mobilization of resources for the other demonstration projects for equipment and installations will be the responsibility of the industries themselves. Hence for the rest of the demonstration projects, SIEEP will only design and develop the projects and advise industries how to secure funding for their projects.

Creation of funding packages will only entail engaging with financing institutions to create their appetite to fund EE projects. Creation of a regional fund is a next step that will require donor/development agency engaging with commercial/development banks to create the fund in credible MS and Banking institutions. Creation of such a regional fund is preceded by a comprehensive market survey to know how much should be in the fund. Even Funding mechanisms such as SUNREF have gone through that mapping process. The budget hence does not stipulate the amount for the regional fund as there is no basis to do so without the market survey but has included US\$0.75 million as seed funding to support creation of the actual Regional Financing Facility

An Investment Guide will be helpful to determine projects implementation budget as the projects in the guide will have specific stage of development and financing gap. Under such an arrangement SACREEE can approach financiers to assist project developers to secure funding. The Investment Guide will be developed as part of the Creation of Project Pipelines (Pillar 4, Objective 3).

The following considerations have been made in formulating the budget.

- That most of the policy/regulatory and institutional frameworks will be covered by the MS with minimal technical assistance²⁷ except for institutional support that may be required to set up dedicated EE institutions/programmes in the MS. The example of National Clean Production Centres offers some lessons that can be adopted in the driving of EE as part of Clean Production in industries. UNIDO having established some NCPCs could be consulted to share that experience and deliver the Technical Assistance when required. Alternatively the NCPC of South Africa that has now acquired experience in that area can be consulted to share the same experience.
- That equipment for demonstration projects will be bought by the responsible industries except for Power Factor Correction that will be met from the determined budget.
- The budget for SIEEP implementation will be in form of technical assistance to support policy/legal/regulatory reforms, building capacity, designing and developing demonstration projects and project pipelines, transaction advisory when mobilizing project financing and conducting assessment studies
- Where all MS are involved, expert support and facilitation will be required in form of regional workshop formats. The costing here included workshop costs for groups of participants from more than one SADC MS and the expert costs. In this regard, the expert support and facilitation comprises man-days of preparation and involvement in the workshops.
- The assumption is that in the first year, resource mobilization will be the preoccupation of SACREEE and MS can already carry on with policy/regulatory reforms using their resources with expert support provided through SACREEE effort.

²⁶ Based on quotations for a particular industry in one of the MS of about US\$100000 per site of about 1250kVar equipment.

²⁷ Technical assistance means any technical support that can be provided by specialized experts funded under grant financing regardless of whether they are international/regional/national experts.

- Concerted effort for training and skills building will be from the second year and repeated annually.
- There are also a range of actions that will involve SACREEE, MS and Industrial associations without requiring additional budgets and hence are not included in the budget but can be covered from contingency if resources are needed.

SACREEE however will require a budget to resource its coordination and facilitation role and an estimated US\$1.7 million has been estimated to support full time and short term experts and related administration costs that SACREEE will require to support implementation of SIEPP (including the implementation of the communication plan) for the 5 year period.

The budget derived has assumed 10% contingency to cover for unforeseen costs and cost of administration by other coordinating agencies to be involved (Table 5-2).

Error! Reference source not found. shows a summary of the budget costs estimates derived per each pillar and their objectives. The detailed presentation of the budget is provided by pillar, objective and actions in the Appendices B to D with comments on the assumptions made. The budget has been closely presented in accordance with the Action Plan.

A budget estimate of about US\$12 million is derived. The largest budget line is for the financing intervention, followed by demonstration projects, capacity and skills building then development of the policy/regulatory and institutional frameworks.

All the demonstration projects have significant contributions from project designs and development, and costs will be incurred for energy audits in selected countries and the Reactive Power Compensation equipment for three industrial plants.

The budget line for policy/regulatory and Institutional framework is inflated by the technical assistance that may be required to create dedicated NCPCs/EE centres in the MS. The allocated budget estimate of the advisory role that an agency like UNIDO can give in the establishment of the NCPCs is about 50% of the total budget estimate for this Pillar.

If all MS are to establish a centre similar to an NCPC, the budget may increase by another US\$ 6-8 million to resource the centres in 14 MS for 5 years. The capacity building budget line is due to repeated training and attachments to industries during the SIEPP timeframe.

Over 50% of the estimated budget of about USD 12 million²⁸ is required in the 2nd and 3rd years of SIEPP implementation. This demands that SACREEE moves fast after approval of the SIEPP to mobilize resources.

The studies launched in the first years of the SIEPP will inform any revision require in the budget. This is particularly true for the actions that will follow the demonstration projects for instance. The funds to be mobilized for the financing intervention pillar will depend on the conclusions of the assessment of the existing financial models as well as on how SACREEE could mobilize funds from International Financing Institutions to create a green facility or EE Regional Fund.

The budget will thus be continually revised during the implementation of SIEPP as informed by new findings from earlier activities.

²⁸ Excluding the creation of NCPCs in 14 Ms apart from South Africa that has already a functioning NCPC.

Table 5-2 Summary Budget estimates for SIEEP 2019-2023

Pillars	Objectives	2019	2020	2021	2022	2023	TOTAL
POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK	Objective 1. Formulation and Harmonization of Comprehensive EE Policy and Targets	\$ -	\$ 222,000.00	\$ 252,000.00	\$ -	\$ -	\$ 474,000.00
	Objective 2. Regulatory Framework	\$ 89,500.00	\$ 104,750.00	\$ -	\$ -	\$ -	\$ 194,250.00
	Objective 3. Coordinated Institutional Framework for EE/RE Activities	\$ -	\$ 500,000.00	\$ -	\$ -	\$ -	\$ 500,000.00
	subtotal	\$ 89,500.00	\$ 826,750.00	\$ 252,000.00	\$ -	\$ -	\$ 1,168,250.00
CAPACITY BUILDING AND SKILLS DEVELOPMENT	Objective 1. Training of Energy Auditors, Managers and M&V Professionals	\$ -	\$ 202,500.00	\$ 97,500.00	\$ 97,500.00	\$ 97,500.00	\$ 495,000.00
	Objective 2: Skills Development, Accreditation and Rosters of Experts	\$ -	\$ 91,250.00	\$ 112,500.00	\$ 129,000.00	\$ 159,000.00	\$ 491,750.00
	Objective 3: Baseline Assessment of EE Opportunities	\$ -	\$ 165,000.00	\$ -	\$ -	\$ -	\$ 165,000.00
	Objective 4: Data Collection, Management and Reporting	\$ -	\$ 247,500.00	\$ 33,750.00	\$ -	\$ -	\$ 281,250.00
	subtotal	\$ -	\$ 706,250.00	\$ 243,750.00	\$ 226,500.00	\$ 256,500.00	\$ 1,433,000.00

REGIONAL AND NATIONAL DEMONSTRATION PROJECTS	Objective 1.EE/RE Demonstration projects						\$ -
	Power factor Correction	\$ -	\$ 90,000.00	\$ 367,500.00	\$ 67,500.00	\$ 67,500.00	\$ 592,500.00
	Co-generation	\$ -	\$ -	\$ 225,000.00	\$ 225,000.00	\$ 100,000.00	\$ 550,000.00
	Steam sizing, Refrigeration and VSD	\$ -	\$ -	\$ 225,000.00	\$ 225,000.00	\$ 100,000.00	\$ 550,000.00
	Solar thermal applications in industries substituting diesel	\$ -	\$ -	\$ 225,000.00	\$ 225,000.00	\$ 100,000.00	\$ 550,000.00
	Objective 2. Awareness Raising	\$ -	\$ 22,500.00	\$ 75,000.00	\$ -	\$ -	\$ 97,500.00
	subtotal	\$ -	\$ 112,500.00	\$ 1,117,500.00	\$ 742,500.00	\$ 367,500.00	\$ 2,340,000.00
FINANCING INTERVENTIONS FOR EE/RE INITIATIVES	Objective 1. Assessing and Upscaling of Existing Financing Models	\$ 164,600.00	\$ -	\$ -	\$ -	\$ -	\$ 164,600.00
	Objective 2. Creation of New and Additional Financing Options and Seed Funding	\$ -	\$ 658,500.00	\$ 658,500.00	\$ 283,500.00	\$ 283,500.00	\$ 1,884,000.00
	Objective 3 Creation of Project Pipelines and Investment Guide	\$ -	\$ -	\$ 682,083.33	\$ 682,083.33	\$ 682,083.33	\$ 2,046,250.00
	subtotal	\$ 164,600.00	\$ 658,500.00	\$ 1,340,583.33	\$ 965,583.33	\$ 965,583.33	\$ 4,094,850.00
APPLICATION OF RE IN INDUSTRY	Objective 1. Creating an Enabling Environment for Application of RE in Industries	\$ 40,000.00	\$ -	\$ 90,000.00	\$ -	\$ -	\$ 130,000.00

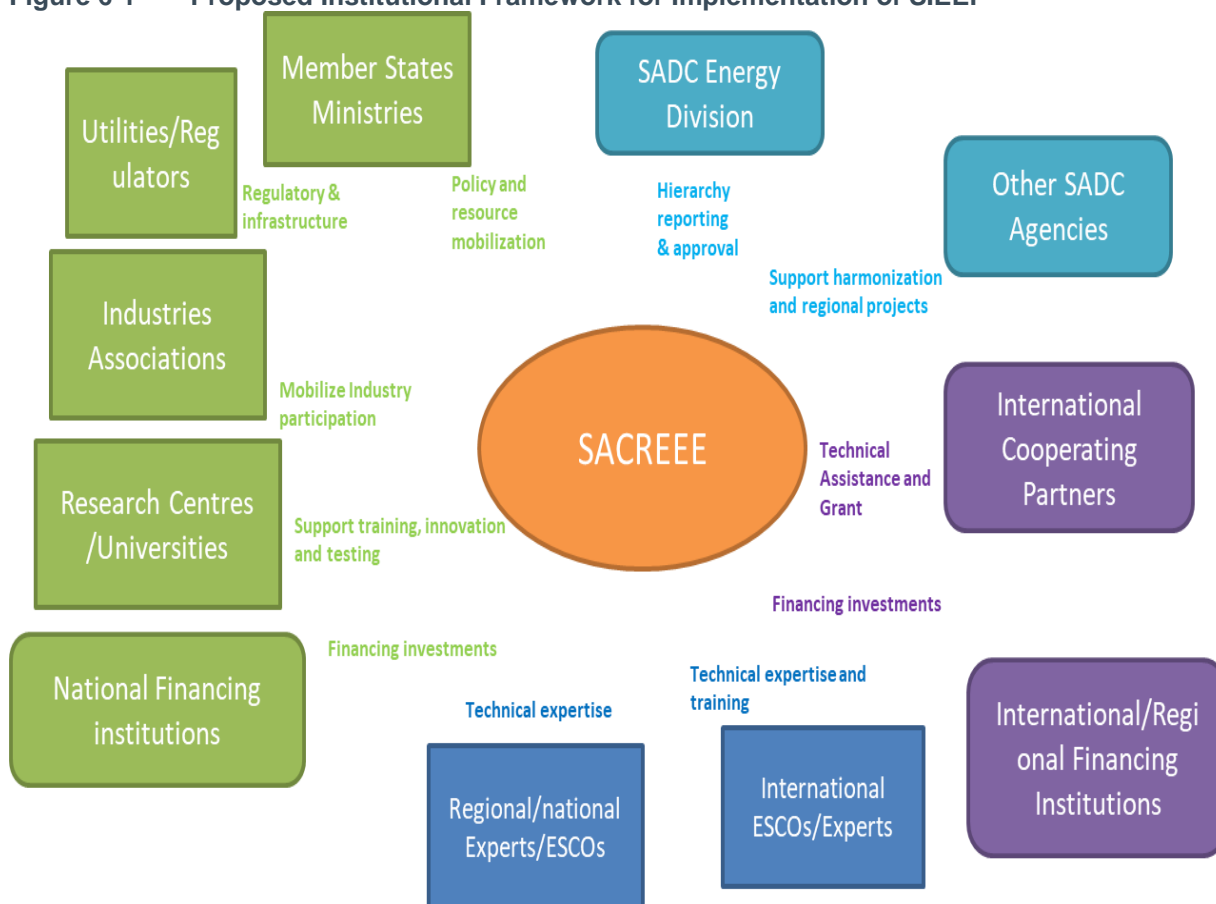
	subtotal	\$ 40,000.00	\$ -	\$ 90,000.00	\$ -	\$ -	\$ 130,000.00
DOMESTICATION OF EE/RE TECHNOLOGIES	Objective 1: Assessment of Status of EE/RE Technologies in the SADC region	\$ -	\$ 112,500.00	\$ -	\$ -	\$ -	\$ 112,500.00
	Objective 2 Co-benefits of Domestication of EE/RE Technologies	\$ -	\$ 63,750.00	\$ -	\$ 30,000.00	\$ -	\$ 93,750.00
	subtotal	\$ -	\$ 176,250.00	\$ -	\$ 30,000.00	\$ -	\$ 206,250.00
	TOTAL	\$ 294,100.00	\$ 2,480,250.00	\$ 3,043,833.33	\$ 1,964,583.33	\$ 1,589,583.33	\$ 9,372,350.00
	SACREE budget for SIEEP implementation	\$ 240,000.00	\$ 240,000.00	\$ 240,000.00	\$ 240,000.00	\$ 240,000.00	\$ 1,200,000.00
	SACREE budget for communication plan	\$ 100,040.00	\$ 100,040.00	\$ 100,040.00	\$ 100,040.00	\$ 100,040.00	\$ 500,200.00
	Contingency 10%	\$ 29,410.00	\$ 248,025.00	\$ 304,383.33	\$ 196,458.33	\$ 158,958.33	\$ 937,235.00
	Grand Total	\$ 663,550.00	\$ 3,068,315.00	\$ 3,688,256.67	\$ 2,501,081.67	\$ 2,088,581.67	\$ 12,009,785.00
		2019	2020	2021	2022	2023	TOTAL

6. IMPLEMENTATION PLAN

6.1. Institutional Framework for implementing SIEPP

This section proposes an institutional framework that will provide adequate coordination, and the necessary experiences for implementation of the SIEPP and comprise the different institutions of SADC, public (government, utilities, regulators), private (industries, research centres, financing institutions, local experts) and international organizations (international Cooperating Partners, International financing institutions and experts) as depicted in Figure 6.1..

Figure 6-1 Proposed Institutional Framework for Implementation of SIEPP



The full coordination of the implementation of SIEPP will revolve around SACREEE that has been mandated to support the achievements of the sustainable development objectives of SADC Member States by promoting the use of RE&EE technologies and energy services.

SACREEE will be working with other SADC agencies such as SADC Energy Division the highest authority in the energy sector within SADC; SAPP dealing with on-grid generation, transmission project developers including those with RE projects linked to power utilities; RERA coordinating the regional electricity regulatory frameworks working with national regulators, SADCSTAN for cooperation on standards and SADCAS for accreditation role. SACREEE in conjunction with SADC and its other agencies are responsible for policy, resource mobilization, promoting investments in RE&EE projects and programmes, monitoring and evaluation of implementation, capacity building, knowledge management and communication at regional level.

The SADC MS will be at the centre of implementation of all the majority of defined actions implemented at country level. The MS will be creating appropriate policy and regulatory reforms to promote EE/RE projects/programmes, mobilizing their resources, capacity and conducting knowledge management and communication at country level supported by their key parastatals in form of power utilities and energy

regulators. Utilities in particular will provide technical support on EE/RE technologies and setting appropriate infrastructural requirements. Energy Regulators and Standards Bodies will ensure setting up of appropriate equipment standards and energy management regulatory framework.

The technology know how, innovation and testing will fall under the jurisdiction of the academia in form of research centres and universities. The same institutions will form custodians of sustainable capacity building in specialized areas of energy auditing, energy management and M&V. For the immediate capacity building, regional and national experts in these areas can be supported through specialized experts (international, regional, national) under technical assistance framework.

National financing institutions are expected to play a role in providing financing for the identified actions under Financing Pillar following further capacity building from specialized experts on how best to evaluate RE/E projects for industries. The bulk of resource mobilization at both SADC and MS level usually comes from International Cooperating Partners/donors (ICP) and international and regional Development Financing institutions (DFIs) such as Development Bank of Southern Africa (DBSA), AfDB, World Bank, European Investment Bank (EIB). Both ICPs and DFIs provide funding in form of grants and the latter also as debt.

The projects are finally undertaken in industries starting with energy audits, creating energy management policies and managers, and auditing the energy savings and implementing RE and EE projects.

6.2. Funding Mechanisms for SIEEP

Figure 6.2 shows the various sources of financial mechanisms that can be tapped into to finance SIEEP.

The bulk of the financing requirements at the SADC level will depend on donor funding relying on grants to support most of the technical assistance including design and development (and where appropriate implementation) of demonstration projects. Technical assistance (TA) will combine supporting SADC level policies, regulations, standards, targets and to some extent extended to support MS themselves. Some MS will cover their policy and regulation formulation using their own fiscal budgets and incentives. Regional assessment studies and capacity building can also be part of the TA especially at SADC level but MS can also provide resources for the assessments and capacity building targeting their own countries using their budgets and resources of country level cooperating partners.

Development Financing Institutions (DFI) can be potential co-investors that share the risk and expertise on projects. DFIs resources can be used to leverage private sector resources. DFIs can be sources of grants for project development and can support implementation through concessionary funding in form of both debt and equity. In some instances DFIs have provided financing for credit lines similar to what AFD has provided for the SUNREF credit line. DFIs have also created special lending portfolios utilizing sovereign wealth funds and some have been involved as implementing agencies for Climate financing. Climate financing has been boosted with creation of the Green Climate Fund (GCF) that has significant funds to also fund implementation projects submitted by both public and private project developers. Other climate resources have been around supporting project development, enabling environment including investment plans and demonstration projects.

The ESCO concept is widely accepted as a means to avail expertise and financing to smaller service providers facilitating implementation of EE/RE activities by SMEs. Currently cheap financing is not readily available for ESCOs but with appropriate motivation, DFI, Climate funds (as carbon revenue) and Donor funding (as grants) could be channelled into a regional EE Financing Facility/ Fund as a Special Purpose Vehicle that will benefit industry and ESCO service providers in implementation of SIEEP. For the sake of EE/RE technology procurement from certain countries, Export Credit Agencies of the source countries can also support ESCO Fund. Such an ESCO fund can be created in commercial banks with a regional footprint (e.g. Stanbic/ Standard Bank) or regional development banks such as DBSA to support regional initiatives such as SIEEP.

At country level, apart from government budgets and tax incentives, another important source of financing are the national commercial and development banks although these require TA for them to conduct risk assessment and acquire the necessary capacity to conduct due-diligence on EE/RE projects.

Some development banks in the MS have started mobilizing pension and insurance funds to support project development and implementation, largely as debt. The pension and insurance sources stipulate to the banks what projects they want to support and the return they require but are not familiar to lend directly to the project developers. The resources are a quota these insurance and pension organizations are required to contribute for public infrastructure projects.

Creation of diaspora bonds is another source that needs to be explored for support of EE/RE projects and programmes similar to pension and insurance funds.

Industries when well motivated are seen as co-financiers of the EE/RE activities that will be conducted in their premises. They can be encouraged to contribute to their energy audits, creation of own energy managers and pay for M&V in addition to contributing to demonstration projects.

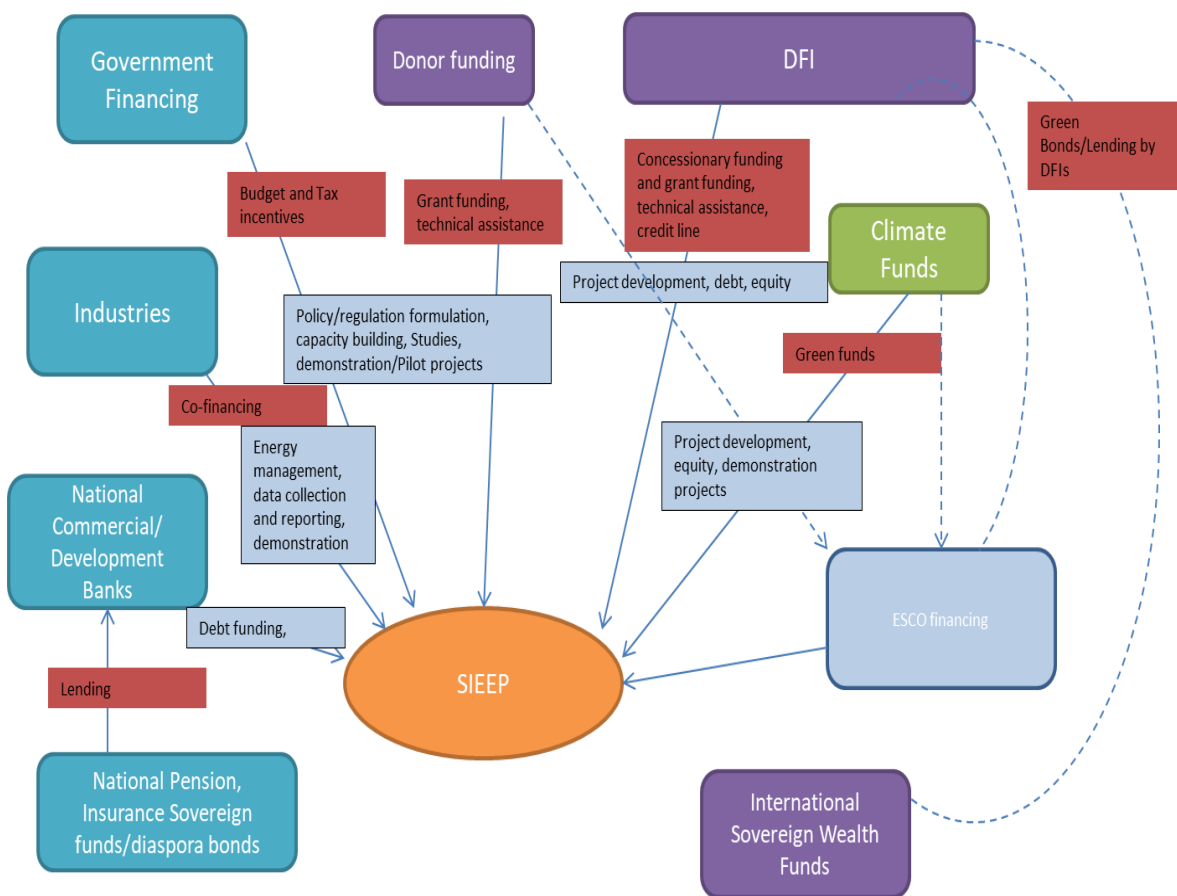
Table 6-1 summarizes possible financing under each SIEEP Pillar.

Table 6-1 Proposed Sources of Funding for the SIEEP Objectives

Pillar	Objectives	Potential source of funding
Policy, regulatory and institutional frameworks	Objective 1. Formulation and harmonization of comprehensive EE policy and targets	MS budgets with expert TA support
	Objective 2. Regulatory Framework	MS budgets with expert TA support
	Objective 3. Coordinated Institutional Framework for EE/RE activities	MS, Industries association receiving expert TA support Grant for creation of EE dedicated institutions
Capacity building and skills development	Objective 1: Training of energy auditors, managers and M&V Professionals	Grant financing from donors and DFIs
	Objective 2: Skills development, accreditation and rosters	Grant funding to prepare Roster of accredited experts and execution of EE programmes
	Objective 3: Baseline assessment of EE opportunities	Grant and Industry co-financing
	Objective 4: Data collection, management and reporting	Grant for expert support from donors and DFIs with MS and industry co-financing
Demonstration projects and awareness raising	Objective 1. EE/RE Demonstration projects	Grant, concessionary financing, debt, green funds, industry co-financing
	Objective 2. Awareness Raising	MS and SADC budgets
Financing interventions for EE/RE initiatives	Objective 1. Assessing and upscaling of existing financing models	Grant funding and MS co-financing
	Objective 2. Creation of new and additional financing options and Seed Funding	Grant for Seed and EE Fund, and expert TA support
	Objective 3 Creation of project pipelines and Investment Guide	Grant funding for expert TA support
Application of RE in the industry	Objective 1. Creating an enabling environment for application of RE in industry	MS budgets with expert TA support
Domestication of EE/RE technologies	Objective 1: Assessment of accessibility and co-benefits of domesticating EE/RE technologies in the SADC region Sub Objective 1. Assessment of status of EE/RE technologies in the SADC Region	Grant financing for expert TA support
	Sub-objective 2 Co-benefits of domestication	Grant funding for expert support and

	of EE/RE technologies	MS co-financing
Communication Plan	Objective 1: Strengthening of SACREEE's communication on SIEPP	In house expert /SACREEE budget
	Objective 2: Build and maintain partnerships with key governmental - industrial – market stakeholders	In-house expert/SACREEE Budget
	Objective 3: Improve the understanding and perception of the industrial community on SIEPP	In house expert/SACREEE budget and grant funding for outsourced expert
	Objective 4: Improve awareness and understanding on energy efficiency benefits for each industry	In house expert/SACREEE budget and grant funding for outsourced expert

Figure 6-2 Resource Mobilizations for Implementation of SIEPP



6.3. Monitoring and Evaluation Framework for SIEEP

6.3.1. M &E Objective

A Monitoring and Evaluation (M&E) framework has been developed for the set objectives and actions. This will enable the monitoring organization, SACREEE to track that objectives are being achieved. Results of the M&E will also feed back into the programme where implementation adjustments are required.

6.3.2. SIEEP Objectives and Indicators for M&E

The M&E framework presents a set of measurable and verifiable indicators that conform to the basic rules of simplicity and cost effectiveness when determining the indicators.

In terms of what needs to be monitored, the indicators presented conform to any of the four-level hierarchy namely:

- inputs (Resources and the activity itself if carried out)
- outputs (the product and service resulting from inputs)
- outcomes (results of the service of outputs)
- Impacts (on broad national objectives).

6.3.3. M&E Institutional Set-up

For an M&E system to function, it will need dedicated resources both human and budgets with support of a dedicated team of experts to guide the functioning of the system. Processes and procedures should also be agreed upon, e.g. how stakeholders are coordinated to provide data and how often reporting is done. It is anticipated that the M&E system will be based within SACREEE because of its mobilization and coordination ability in the EE/RE sector. Table 6-2 presents some indicators that will be used to track progress on implementation of SIEEP.

Table 6-2 Proposed M&E Indicator Framework for SIEEP

Pillar	Objective	Key Indicators
Policy, regulatory and institutional frameworks	Formulation and harmonization of comprehensive EE policy and targets	MS with EE/RE Policy and targets Industries supported to develop energy management plans and targets SADC Target for EE
	Regulatory Framework	MEPS developed by technology/equipment type for industrial sector at SADC level Accreditation rules and M&V Protocol in place Status of adoption of cost reflective tariffs by SADC MS MS with Energy Management systems and Regulations
	Coordinated Institutional framework for EE/RE activities	MS with dedicated EE/RE offices Schedule of public-private meetings/workshops on EE initiatives in MS NCPC/EE centres created in other MS Research Centres/Universities offering Energy audits/managers, M&V training Research Centres/Universities with EE/RE testing facilities
Capacity Building and Skills Development	Training of energy auditors, managers and M&V Professionals	No of MS with own trained trainers for energy audits, energy managers and M&V No of Trained and practising energy auditors, energy managers, M&V professionals
	Skills Development,	Locally trained experts involved in attachment

	Accreditation and Rosters of Experts	(EE) programmes MS with mandatory energy audits Status of Accreditation of SADCAS and SADCSTAN Accredited energy auditors, energy managers and M&V Professionals No and type of industries participating in EE projects/programmes Database of accredited experts for energy audits, energy managers and M&V professionals Training modules and seminars conducted with banks and associations
	Baseline assessment of EE opportunities	Baseline studies conducted in each MS EE potential derived from baseline studies No and type of Industries with energy management plans and targets
	Data collection, management and reporting	MS with updated energy statistics and energy balances Data on energy consumption, potential savings MS with EE target monitoring systems
Demonstration Projects and Awareness Raising	EE/RE Demonstration projects	<u>Power Factor Correction</u> Mobilized amount US\$ for PFC projects MS and industries with PFC demonstration projects RPC investments made Energy loss reduction and utility PF estimated/measured.
		<u>Co-Generation</u> Mobilized grant resources No of co-generation projects designed/developed and type of industries Financing secured for co-generation and financing gap MS with co-generation policies
		<u>Steam Sizing; Cooling, Refrigeration And Variable Speed Drives</u> No of demonstration projects designed/developed Technology identification Results of potential energy savings Financing secured and Gap (US\$)
		<u>Solar Energy For Thermal Applications In Industries</u> Resources mobilized Plant sizes based on demand Return on investment Finance secured and Financing Gap(US\$)
	Awareness Raising	Knowledge management systems on EE initiatives at SADC and MS Schedule of gatherings public/private to share EE information. No of meetings etc. with captains of industries No of seminars conducted for the various banking

		institutions
Financing Interventions for EE/RE Initiatives	Assessing and upscaling of existing financing models	Types of mechanisms and current support levels Proposed tax reductions Regional EE fund structure Existing commercial bank/DFI financing for EE/RE (US\$) Amounts US\$ estimated for green/climate funds; pension/insurance, diaspora bonds for EE/RE initiatives
	Creation of new and additional financing options and Seed Funding	Grant amounts aimed for financing EE activities (US\$) List and value (US\$) of proposed packages and lending conditions Proposed tax rebate changes Green funds created (US\$)
	Creation of project pipelines and Investment Guide	No of project developers trained No and types of projects developed Secured funding sources and amounts for pre-feasibility/feasibility (US\$); and Financing Gap
Application of RE in Industries	Creating an enabling environment for application of RE in industry	Tariffs set Proposed net metering regulatory framework No and capacity of designed/developed/implemented solar thermal projects Regulations for GHG reporting
Domestication of EE/RE Technologies	Assessment of accessibility and co-benefits of domesticating EE/RE technologies in the SADC region	
	Sub objective 1: Assessment of Status of EE/RE Technologies in the SADC region	Status Report Technology database with types and stages of technology development in each MS
	Sub-objective 2: Co-benefits of domestication of EE/RE technologies	EE/RE Pricing lists Status Report on potential co-benefits
Communication Plan	Objective 1: Strengthening of SACREEE's communication on SIEEP	Established Information and knowledge sharing mechanisms. No of SIEEP communication activities led by SACREEE No of contact and established liaisons between SACREEE and governmental institutions, ICPs, market actors, industrial associations of the SADC member states.
	Objective 2: Build and maintain partnerships with key governmental - industrial – market stakeholders	No of partnerships established with key governmental decision makers, financial institutions, industrial associations and private sector.
	Objective 3: Improve the understanding and perception of the industrial	No of mass media and social media references on SACREEE on SIEEEP No of SACREEE's participations in industrial

	community on SIEEP	events, activities and programmes.
	Objective 4: Improve awareness and understanding on energy efficiency benefits for each industry	No of specific communication activities: B2B of SACREEE with industries No of promotional activities (articles, TV spots, publications, etc.) on specific energy efficiency solutions per industrial target group SIEEP data base including energy efficiency solutions per industrial sector

Appendices

Appendix A. Detailed action plan

Full involvement process	
Less involvement process	
Intermittent involvement	
Event	E
Workshop/meetings	W

Pillars	Objectives	Actions	2018				2019				2020				2021				2022				2023				Comments		
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK	Objective 1. Formulation and harmonization of comprehensive EE policy and targets	SACREE to:																								All activities run parallel			
		• mobilize resources and technical assistance for MS to establish and strengthen policy framework and harmonization in SADC basing on REEESAP or other applicable Guidelines and set targets supported by baseline studies in Objective 3																											
		• engage MS to use own fiscal budgets to formulate harmonized policy/strategy/regulations																											
		• support harmonization of the policy framework and calculation of targets for the region																											
		• Recruit Technical experts to assist MS and SACREEE in coordination of activities and facilitation of stakeholders																											
		• Engage Industries to lead baseline studies and provide required data and inputs for policy and targets formulation																											
		Objective 1. Formulation and harmonization of comprehensive EE policy and targets																											
		Objective 2. Regulatory Framework	SACREE to engage:																										
	• MS Standards bodies with SADCSTAN to develop harmonized standards, translate into SADC official languages, enforce and track implementation.																												
	• SADCSTAN to establish regional technical committees (TCs) to develop and adopt technical standards.																												
	• SADCAS and SADCSTAN working with MS Standards Bodies to develop and track implementation of accreditation rules for service providers and the M&V protocol																												
	• RERA and MS Energy regulators to mobilize resources for supporting adoption of cost reflective tariffs by all MS by SADC target of 2019/2020																												
		• Relevant ministries and regulators to develop energy management regulations stipulating mandatory or voluntary reporting on EE activities in the industrial sector & enforce mandatory energy management plans with targets by large industries																											
		Objective 2. Regulatory Framework																											
		Objective 3. Coordinated institutional framework for EE/RE activities	SACREEE to engage:																										
	• MS to create dedicated EE/RE Offices or Departments where they do not exist to take leadership in the MS																												
	• MS EE/RE Departments/Offices to lead creation of public platform of cross sectoral sectors to ensure optimization of resources for implementation e.g. energy and climate																												
	• MS EE/RE Departments/Offices to collaborate with public and private /industry associations to create platforms to support implementation of EE/RE initiatives in industry with regular information and experiences sharing. e.g. through planned meetings/workshops																												
• MS EE/RE Departments/offices with Ministries of Industry to seek support to create and involve nuclei centres similar to NCPC for a more focussed coordination on EE in industries.																													
	• MS EE/RE Departments/Offices to mobilize through expression of interest their energy research centres to provide facilities for equipment/technology innovation, quality testing/calibration; capacity building and M&V services.																												
	Objective 3. Coordinated Institutional Framework for RE/EE activities																												

Pillars	Objectives	Actions	2018				2019				2020				2021				2022				2023				Comments	
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
CAPACITY BUILDING AND SKILLS DEVELOPMENT	Objective 1: Training energy auditors, managers and M&V Practitioners	SACREEE to mobilise: • Mobilize resources and identify experts/service providers for Training																								Once off at start after resource mobilization		
		• Organize training of trainers in Energy auditing, energy management, M&V from each MS to have adequate capacity to train own experts at reasonable cost.																									Training of Trainers at start	
		• MS EE/RE Departments/Offices to organize training of energy auditors, EnMS managers and M&V experts in MS by trainers annually																										Annual training workshop
	Objective 1: Training energy auditors, managers and M&V Practitioners																											
	Objective 2: Skills Development, Accreditation and Rosters	SACREEE to engage/lead: • MS EE/RE Departments/Offices and service providers to identify and attach trained experts to EE programmes and industries under guidance of experienced experts																										After training of 1st batch
		• MS EE/RE Departments/Offices to develop/revise regulations for mandatory energy audits every 3 years so that markets are created for energy auditors																										Every 3 years
		• SADC to undertake Capacity building of SADCAS, SADCSTAN and MS standards/accreditation bodies to be certified so that they conduct certification for EnMS such as ISO 50001 and accreditation of energy auditors, energy managers and M&V Professionals																										Start with SADC bodies and continue with MS bodies
		• MS and industry associations to mobilize certain industries to participate as pilot sites to enhance skills and create market for experts/service providers; and interest for industries to implement EE measures that can make their production cost competitive.																										Concerted mobilization at start and continue
		• SADCAS to undertake Accreditation of experts and MS and Industry Associations create and update roster of accredited energy auditors, energy managers, M&V professionals																										Start with existing experts then trained
		• development of tailor- made materials and seminars for Banking institutions to appreciate opportunities in financing of EE/RE projects																										materials then yearly seminar sessions
		Objective 2: Skills Development, Accreditation and Rosters																										
	Objective 3: Baseline assessment of EE opportunities	SACREEE to: • Mobilize and coordinate process of mapping of EE opportunities in the industries.																										
		• Mobilize resources for defining EE opportunities in selected industries as pilot baseline studies.																										
		• Identify, mobilize and provide Technical support for pilot EE mapping in selected industries and system of such baseline mapping established for roll out to other industries.																										
		• MS Regulators with support of RERA formulate harmonized energy management and reporting regulations on EE baseline, target setting, data management and performance reporting.																										
	Objective 3: Baseline assessment of EE opportunities																											
	Objective 4: Data collection, management and Reporting	SACREEE to • mobilize resources for technical support to MS to initially update their Industrial energy sector statistics and energy balances and how to maintain the system of reliable data collection, processing, management and reporting;																										Updates and reporting continue
		• engage Ministries/Departments of Energy to regulate industries to collect and process end use consumption, energy savings and cost savings																										
		• collaborate with National Statistics Agencies in data collection, processing and management																										
		• Engage MS EE/RE Departments/Offices to create and manage EE target monitoring information systems to enable data capture, manipulation and reporting																										
Objective 4: Data collection, management and Reporting																												

Pillars	Objectives	Actions	2018				2019				2020				2021				2022				2023				Comments		
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
REGIONAL AND NATIONAL DEMONSTRATION PROJECTS	Objective 1. EE/RE Demonstration projects																												
	Power factor Correction	Grant mobilization by SACREEE for undertaking demonstration/pilot projects in 3 participating countries e.g. those that have done preliminary PFC assessment and/or implemented PFC measures before.																											
		SACREEE working with:																											
		• MS will guide selection of MS that are most suitable to host the demonstration projects. based on above criteria and interest of the MS industries.																											
		• Utilities with Industrial associations in selected pilot MS will identify relevant industries at different levels of tariff/kV connection (e.g. 0.4kV, 11kV, 33kV, 66/88kV, 132kV) as sites of pilot projects in participating countries. Low power factor will also be a critical criterion for selecting the participating industries guided by availability of data and preliminary assessment of potential energy savings in the MS.																											
		• Utilities/Industrial Association persuade selected Industries/electricity consumers to sign MOUs for the demonstration project including for co-financing by the consumers on basis of potential cost savings.																											
		• Accredited experts/ESCOs (invited through Expression of Interest) to will carry out the activities below with Technical support from specialized experts (if needed). and coordinated by the utilities and associations. The experts will:																											Sequential activities
		conduct energy audits at selected industries;																											
		identify RPC equipment required (model, quality, sizing);																											
		installation of the RPC equipment + ancillary;																											
		measurement and analysis of energy savings, KVA reductions, maximum demand payment savings (at start and after RPC installation) every year																											
		Reporting of Results.																											
		Power factor Correction																											
		Co-generation	SACREEE to coordinate																										
			• mobilization of grant and local resources to support development of demonstration/pilot projects																										
			• MS to identify and communicate interest of industries with cogeneration potential e.g. sugar and wood/pulp that can benefit from the pilot programmes.																										
			• Engagement of Industry Associations and selected industries and their associations to commit to participate in co-generation demonstration projects.																										
			• Recruitment (through EOI) ESCOs/Accredited Energy Experts to design and develop demonstration/pilot projects for electricity self-generation from biomass waste and for heating and cooling systems (including a component related to the sustainable management of biomass resources if applicable) to pre-feasibility/feasibility stage depending on data availability and resources available.																										
			• Recruitment of a transaction advisor/ finance and investment expert to structure co-financing with selected industries and engage banking sector to fund projects supported by blending grant and concessional loans funding																										
		Co-generation																											
	Steam sizing, Refrigeration and VSD	SACREEE to																											
		• Mobilize grant resources for undertaking demonstration/pilot projects																											
		• Engage MS together with Industry associations to identify relevant industries that have interest to participate in the Steam sizing, Refrigeration and Variable Speed Drives demonstration Project and together with SACREEE shortlist the ones to participate.																											
		• Recruit energy experts and transaction advisors that will:																											
		Identify expertise and technology required.																											
		Undertake energy audits and show energy and cost saving potential teaming up specialized experts and locally trained experts.																											
		• Structuring blending of grant and loan funding and co-financing for implementation of the projects by industries																											
	Steam sizing, Refrigeration and VSD																												
	Solar energy for electricity and thermal applications in industries Industry	SACREEE to:																											
		• Mobilize grant resources for undertaking demonstration/pilot projects																											
		• Engage MS together with Industry associations identify relevant industries that can demonstrate, solar thermal demand (heating and cooling).																											
		• Recruit energy experts and financing experts																											
		Undertake industry electricity demand; and heating and cooling energy demand in the selected plants (e.g. 3 industries in the region).																											
		System design, costing and related Return on Investment																											
		Mobilize blending of grant and loan funding for industries and co-financing for implementation by industries																											
	Solar energy for electricity and thermal applications in industries Industry																												
	Objective 2. Awareness Raising	SACREEE supports, through grant financing, engagement of MS and recruited energy experts :																										More information later	
		• creation of information system of good practice on industry energy , cost savings and GHG reductions e.g. from demonstration projects and other best practice EE programmes.																										Create and then meetings	
		• creation of MS national platforms for sharing information among stakeholders e.g. breakfast meetings, workshops, seminars.																										Workshop then follow ups	
		• Engage Industry associations to lobby corporate management of their members to embrace energy management systems such as ISO 50001.																											
		• Deploy experts to undertake 1 to 1 follow-ups with banks on funding opportunities for EE projects																										Part of seminars	
	Objective 2. Awareness Raising																												

Pillars	Objectives	Actions	2018				2019				2020				2021				2022				2023				Comments				
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
FINANCING INTERVENTIONS FOR EE/RE INITIATIVES	Objective 1. Assessing and upscaling existing financing models	SACREEE recruit finance and investment experts or conduct a specific study to :																													
		Review of existing credit lines and incentives and how they can be adapted to finance EE projects and small RE projects. These mechanisms can be limited to MS where they are being used.																													
		Explore the establishment of a regional financing facility for EE and small RE projects to be managed by a bank.																													
		Explore impact of reduced transaction costs in form of import duty and VAT and how they will impact on Return on Investment for EE/RE projects																													All activities conducted as one study
		Analyse creation of an ESCO fund that local energy service providers can tap into to support uptake of EE projects																													
		Analyse other existing Banks and DFI support to EE and RE projects																													
		Estimate potential presented by the green and climate funds to support EE/RE in the industry sector																													
		Investigate scope presented by pension and insurance funds and diaspora bonds for financing EE/RE projects in industry																													
	Objective 1. Assessing and upscaling existing financing models																														
	Objective 2. Creation of new and additional Financing Options and Seed Funding	SACREEE to :																													
		• mobilize grant funding for energy management, energy audits and M&V and blending financing of projects																													
		• Lobby creation of specific packages by Banks and DFIs for medium enterprises at reasonable cost of capital.																													
		• Lobby MS to create specialized tax rebates for medium enterprises																													
		• Set a SEED Funding to support creation of the Regional EE Financing Facility																													
		• Coordinate collaboration of donors /DFIs/Export Credit Agencies and commercial banks to establish a regional EE financing facility that will allow access to financing by industry and ESCOs at reasonable interest rates compared to what commercial banks charge.																													
		• Collaborate with MS Climate Ministries and accredited Green Climate Fund (GCF) Banks in the region in the mobilization of Green/climate funds for EE/RE in industry basing on NDC targets and assessments																													
		Objective 2. Creation of new and additional Financing Options and Seed Funding																													
	Objective 3 Creation of Project Pipelines and Investment Guide	SACREEE to:																													
		• Recruit energy, finance and investment experts to capacitate SMEs and local corporate enterprises to develop bankable EE and self-generation RE projects.																													
		• coordinate with MS and Industrial associations to identify SME industries that have potential project ideas/pre-feasibility stage projects																													
		• Select industries to be supported by energy experts to create project pipelines for EE and RE to be presented to financing institutions.																													
		• Develop an Investment Guide defining project pipelines and financing Gap.																													Workshop and follow ups
		• support SME industries through finance and investment experts to mobilize resources and technical support to access financing for pre-feasibility and feasibility studies																													
	Objective 3 Creation of Project Pipelines and Investment Guide																														

Pillars	Objectives	Actions	2018				2019				2020				2021				2022				2023				Comments		
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
APPLICATION OF RE IN INDUSTRY	Objective 1. Creating an Enabling Environment for Application of RE in Industry	SACREEE to:																											
		• Coordinate, through RERA and MS energy regulators, setting of cost reflective tariffs for industries in the MS to make RE self-generation a worthwhile investment.																											
		• Engage consultants to conduct study that will inform introduction of Net Metering regulatory framework in the MS so industries can sell excess power to the grid.																											
		• Mobilize grant resources and support demonstration projects for solar thermal applications - heating and cooling and bio-energy in industry as part of sub-Objective under "Demonstration/pilot projects and programmes" (Pillar 3).																											
		• Coordinate through SADC and National Ministries of Environment, the introduction of mandatory measurement and reporting of greenhouse gas emissions reduction from RE application in industries.																											Similar timeframe to reporting on energy consumption
	Objective 1. Creating an Enabling Environment for Application of RE in Industry																												
DOMESTICATION OF RE/EE TECHNOLOGIES	Objective 1: Assessment of Status of EE/RE Technologies in the SADC region	SACREEE to:																											
		• Mobilize resources for assessment of status of R&D, Innovation, adaptation, manufacture, supply of EE/RE technologies in the SADC MS.																											
		• Recruit experts or Research and Technology institutions to undertake an assessment exercise on domestication of EE/RE efforts already being made and develop EE/RE Technology lists and database.																											
		Objective 1: Assessment of Status of EE/RE Technologies in the SADC region																											
	Objective 2 Co-benefits of Domestication of RE/EE Technologies	SACREEE to:																											
• Coordinate with other relevant SADC agencies creation of a competitive Pricing of RE/EE Technologies taking into consideration harmonized tax policies to facilitate trade of RE/EE in the SADC region and to ensure adherence to quality standards																													
• Coordinate adoption of the UNIDO Cleantech model as a platform for identifying local technologies for adoption.																													
	• Recruit experts to conduct country assessments of RE value chains, skills, infrastructure capacity and policy framework that will be required and co-benefits (job creation, GHG reduction, industry development etc.) that will accrue to the MS.																												
	Objective 2 Co-benefits of Domestication of RE/EE Technologies																											Same time as technology assessments	

Pillars	Objectives	Actions	2018				2019				2020				2021				2022				2023				Comments		
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
OVERALL ACTIVITIES	SACREEE budget for SIEEP implementation																												
Communication plan	Objective 1: Strengthening of SACREEE's communication on SIEEP	• Set up internal - SACREEE information and knowledge sharing mechanisms.																											
		• Strengthen SACREEE's communication function to ensure its effective leadership in the execution of SIEEP.																											Activities run in parallel
		• Strengthen linkages between SACREEE and governmental institutions, market actors, industrial associations of the SADC member states.																											
	Objective 1: Strengthening of SACREEE's communication on SIEEP																												
	Objective 2: Build and maintain partnerships with key governmental - industrial - market stakeholders	• Reach out to key partners such as governmental decision makers, financial institutions, industrial associations and private sector.																											
		• Emphasize messages to the effect that every industry - energy consumer is a stakeholder in clean energy and energy efficiency.																											
		• SACREEE to explore synergies with other lead institutions in specific events.																											
	Objective 2: Build and maintain partnerships with key governmental - industrial - market stakeholders																												
	Objective 3: Improve the understanding and perception of the industrial community on SIEEP	• Increase media attention to the work of SACREEE on SIEEP at regional and national level.																											
		• SACREEE's participation in industrial community activities and programmes.																											
• SACREEE to monitor and keep abreast of developments in order not to miss opportunities.																													
Objective 3: Improve the understanding and perception of the industrial community on SIEEP																													
Objective 4: Improve awareness and understanding on energy efficiency benefits for each industry	• Intensify the promotion of energy efficiency through a combination of mass media, multimedia and new media channels.																												
	• Set an advocate for industrial energy efficiency issues for mainstreaming in all MS programmes/ ministries/institutions/associations.																											Activities run in parallel	
	• Disseminate the final SIEEP report widely.																												
Objective 4: Improve awareness and understanding on energy efficiency benefits for each industry																													

Appendix B. Detailed Costing and Budget

Pillars	Objectives	Actions	Responsibilities	2019	2020	2021	2022	2023	TOTAL	Assumptions	Comments	
POLICY, REGULATORY AND INSTITUTIONAL FRAMEWORK	Objective 1. Formulation of Comprehensive Policy and targets	1. mobilize resources and technical assistance for MS to strengthen policy framework and harmonization in SADC basing on REEESAP or other applicable Guidelines and set targets supported by baseline studies in Objective 3	SACREEE in charge		\$ 180,000.00	\$ 210,000.00			\$ 390,000.00	30,000 USD / 30-40 working-days per country to elaborate those policies	TA in first 2 years to 13 MS excluding SA and Mauritius- 6 countries in 2020 and 7 countries in 2021	
		engage MS to use own fiscus budgets to formulate harmonized policy/strategy/regulations	SACREEE in charge		\$ 12,000.00	\$ 12,000.00			\$ 24,000.00	2 w-d per month to be provided by SACREEE for all the countries (500 USD per w-d)	Estimation of SACREEE support to the MS	
		support harmonization of the policy framework and calculation of targets for the region	SACREEE in charge		\$ 12,000.00	\$ 12,000.00			\$ 24,000.00	2 w-d per month to be provided by SACREEE for all the countries (500 USD per w-d)	Estimation of SACREEE input for this task	
		Recruit Technical experts to assist MS and SACREEE in coordination of activities and facilitation of stakeholders	SACREEE in charge		\$ 6,000.00	\$ 6,000.00			\$ 12,000.00	1 w-d per month as administrative follow-up (500 USD per w-d)	Coordination task	
		Engage Industries to lead baseline studies and provide required data and inputs for policy and targets formulation	SACREEE in charge		\$ 12,000.00	\$ 12,000.00			\$ 24,000.00	2 w-d per month to ensure the follow-up (500 USD per w-d)	Coordination task	
		Objective 1. Formulation and Harmonization of Comprehensive EE Policy and Targets			\$ -	\$ 222,000.00	\$ 252,000.00	\$ -	\$ -	\$ 474,000.00		
		Objective 2. Regulatory Framework	MS Standards bodies develop harmonized standards, translate into SADC languages, enforce and track implementation.	SACREEE as coordinating body		\$ 60,000.00				\$ 60,000.00	Workshop costs for 60 participants (500 USD + 250 USD) and 20 working days of TA (at 750 USD)	TA support to develop standards. Group workshop for all MS-workshop costs for 60 and TA fees preparation and attendance/presentations
		SADCSTAN to establish regional technical committees (TCs) to develop and adopt technical standards.	SACREEE as coordinating body		\$ -					\$ -	No specific additional costs	
		SADCAS and SADCStan working with MS Standards Bodies to develop and track implementation of accreditation Rules for service providers and the M&V protocol	SACREEE as coordinating body		\$ 44,750.00					\$ 44,750.00	Workshop/training costs for 17 participants (500 USD + 250 USD) and 20 working days of TA (at 750 USD)	TA support and workshop costs to SADCAS, SADCstan and 15 MS standards bodies to develop Accrediation rules and M&V protocol-workshop format- 5 days
		RERA and MS Energy regulators to mobilize resources for supporting adoption of cost reflective tariffs by all MS by SADC target of 2019/2020	SACREEE as coordinating body	\$ 44,750.00						\$ 44,750.00	Workshop/training costs for 17 participants (500 USD + 250 USD) and 20 working days of TA (at 750 USD)	TA support to RERA and MS on formulation of cost reflective tariffs-workshop format eraly to meet SADC deadline of 2019-5 days
		Relevant ministries and regulators to develop energy management regulations stipulating mandatory or voluntary reporting on EE activities in industry & enforce mandatory energy management plans with targets by large industries	SACREEE as coordinating body	\$ 44,750.00						\$ 44,750.00	Workshop/training costs for 17 participants (500 USD + 250 USD) and 20 working days of TA (at 750 USD)	TA group support and workshop costs to MS regulators- workshop format- 5 days
		Objective 2. Regulatory Framework			\$ 89,500.00	\$ 104,750.00	\$ -	\$ -	\$ -	\$ 194,250.00		
		Objective 3. Coordinated Institutional Framework for RE/EE activities	MS to create dedicated EE/RE Offices or Departments where they do not exist to take leadership in the MS	SACREEE as coordinating body						\$ -		MS budgets
		MS EE/RE Departments/Offices to lead creation of public platform of cross sectoral sectors to ensure optimization of resources for implementation e.g. energy and climate	SACREEE as coordinating body							\$ -		meetings that can be met by MS
	MS EE/RE Departments/Offices to collaborate with public and private /industry associations to create platforms to support implementation of EE/RE initiatives in industry with regular information and experiences sharing. e.g. through planned meetings/workshops	SACREEE as coordinating body							\$ -		meetings that can be met by MS and industry associations	
	MS EE/RE Departments/offices with Ministries of Industry to seek support to create and involve nuclei centres similar to NCPC for a more focussed coordination on EE in industries.	SACREEE as coordinating body		\$ 500,000.00					\$ 500,000.00	First estimation, waiting for information on the existing NCPC costs	UNIDO TA support 1 year continued with MS budgets	
	MS EE/RE Departments/Offices to mobilize through expression of interest their energy research centres to provide facilities for equipment/technology innovation, quality testing/calibration; capacity building and M&V services.	SACREEE as coordinating body							\$ -		MS effort	
	Objective 3. Coordinated Institutional Framework for EE/RE Activities			\$ -	\$ 500,000.00	\$ -	\$ -	\$ -	\$ 500,000.00			
	subtotal			\$ 89,500.00	\$ 826,750.00	\$ 252,000.00	\$ -	\$ -	\$ 1,168,250.00			

Pillars	Objectives	Actions	Responsibilities	2019	2020	2021	2022	2023	TOTAL	Assumptions	Comments
CAPACITY BUILDING AND SKILLS DEVELOPMENT	Objective 1: Training energy auditors, managers and M&V Practitioners	• Mobilize resources and identify experts/service providers for Training	SACREEE in charge		\$ 2,500.00				\$ 2,500.00	5 days to prepare the tender and recruit the experts/service providers	
		• Organize training of trainers in Energy auditing, energy management, M&V from each MS to have adequate capacity to train own experts at reasonable cost.	SACREEE in charge with external support		\$ 102,500.00				\$ 102,500.00		5 day-Group training workshop for MS selected experts- 3 per country to cover each expertise
		• MS EE/RE Departments/Offices to organize training of energy auditors, EnMS managers and M&V experts in MS by trainers annually	SACREEE as coordinating body		\$ 97,500.00	\$ 97,500.00	\$ 97,500.00	\$ 97,500.00	\$ 390,000.00		deploying trained Trainers
	Objective 1. Training of Energy Auditors, Managers and M&V Professionals			\$ -	\$ 202,500.00	\$ 97,500.00	\$ 97,500.00	\$ 97,500.00	\$ 495,000.00		
	Objective 2: Skills Development, Accreditation and Rosters	• MS EE/RE Departments/Offices and service providers to identify and attach trained experts to EE programmes and industries under guidance of experienced experts	SACREEE as coordinating body, ensure the funding of this action			\$ 112,500.00	\$ 112,500.00	\$ 112,500.00	\$ 337,500.00		annual event in group format for selected experts 3 from each MS from previous trained group at some selected industries in each MS-TA support required for 3 Int experts roving to MS
		• MS EE/RE Departments/Offices to develop/revise regulations for mandatory energy audits every 3 years so that markets are created for energy auditors	SACREEE as coordinating body, ensure the funding of this action		\$ 30,000.00			\$ 30,000.00	\$ 60,000.00		TA support for 30 days
		• SADC to undertake Capacity building of SADCAS, SADCSTAN and MS standards/accreditation bodies to be certified so that they conduct certification for EnMS such as ISO 50001 and accreditation of energy auditors, energy managers and M&V Professionals	SACREEE as coordinating body, ensure the funding of this action		\$ 44,750.00				\$ 44,750.00		TA support -workshop format
		• MS and industry associations to mobilize certain industries to participate as pilot sites to enhance skills and create market for experts/service providers; and interest for industries to implement EE measures that can make their production cost competitive.	SACREEE as coordinating body						\$ -		where attachments take place
		• SADCAS to undertake Accreditation of experts and MS and Industry Associations create and update roster of accredited energy auditors, energy managers, M&V professionals	SACREEE as coordinating body						\$ -		SADC resources
		• development of tailor- made materials and seminars for Banking institutions to appreciate opportunities in financing of EE/RE projects	SACREEE in charge		\$ 16,500.00		\$ 16,500.00	\$ 16,500.00	\$ 49,500.00		only TA support as workshops for bankers-20 days. Bankers to fund themselves
	Objective 2: Skills Development, Accreditation and Rosters of Experts			\$ -	\$ 91,250.00	\$ 112,500.00	\$ 129,000.00	\$ 159,000.00	\$ 491,750.00		
	Objective 3: Baseline assessment of EE opportunities	• Mobilize and coordinate process of mapping of EE opportunities in the industries.	SACREEE in charge						\$ -		SACREEE resources
		• Mobilize resources for defining EE opportunities in selected industries as pilot baseline studies.	SACREEE in charge						\$ -		SACREEE and MS resources
		• Identify, mobilize and provide Technical support for pilot EE mapping in selected industries and system of such baseline mapping established for roll out to other industries.	SACREEE in charge		\$ 165,000.00				\$ 165,000.00		TA to selected energy auditors-trainers from each MS
		• MS Regulators with support of RERA formulate harmonized energy management and reporting regulations on EE baseline, target setting, data management and performance reporting.	SACREEE as coordinating body						\$ -		MS own budget
	Objective 3: Baseline Assessment of EE Opportunities			\$ -	\$ 165,000.00	\$ -	\$ -	\$ -	\$ 165,000.00		
	Objective 4: Data collection, management and Reporting	• mobilize resources for technical support to MS to initially update their Industrial energy sector statistics and energy balances and how to maintain the system of reliable data collection, processing, management and reporting.	SACREEE in charge						\$ -		SACREEE effort
	• engage Ministries/Departments of Energy to regulate industries to collect and process end use consumption, energy savings and cost savings	SACREEE as coordinating body		\$ 247,500.00				\$ 247,500.00		TA support-workshop format-1 govt, 2 trainers	
	• Engage MS EE/RE Departments/Offices to create and manage EE target monitoring information systems to enable data capture, manipulation and reporting	SACREEE as coordinating body			\$ 33,750.00			\$ 33,750.00		TA for design and development of systems	
Objective 4: Data Collection, Management and Reporting			\$ -	\$ 247,500.00	\$ 33,750.00	\$ -	\$ -	\$ 281,250.00			
subtotal			\$ -	\$ 706,250.00	\$ 243,750.00	\$ 226,500.00	\$ 256,500.00	\$ 1,433,000.00			

Pillars	Objectives	Actions	Responsibilities	2019	2020	2021	2022	2023	TOTAL	Assumptions	Comments
REGIONAL AND NATIONAL DEMONSTRATION PROJECTS	Objective 1.EE/RE Demonstration projects								\$ -		
	Power factor Correction	• MS will guide selection of MS that are most suitable to host the demonstration projects. based on above criteria and interest of the MS industries.	SACREEE as coordinating body						\$ -		
		• Utilities with Industry associations in selected pilot MS will identify relevant industries at different levels of tariff/kV connection	SACREEE as coordinating body						\$ -		
		• Accredited experts/ESCOs (invited through Expression of Interest) to will carry out the activities below with Technical support from specialized experts (if needed), and coordinated by the utilities and associations. The experts will:	SACREEE as responsible for the tender process and contract follow-up						\$ -	Feedback received from one Zimbabwe company (the costs of equipment will be covered by the company unless they could benefit from a loan)	
		conduct energy audits at selected industries;			\$ 90,000.00				\$ 90,000.00		Energy audit Expert costs at 3 industriesx3 MS
		identify RPC equipment required (model, quality, sizing);							\$ -		part of energy audits
		installation of the RPC equipment + ancillary;				\$ 300,000.00			\$ 300,000.00		Cost of equipment
		measurement and analysis of energy savings, KVA reductions, maximum demand payment savings (at start and after RPC installation) every year							\$ -		M&V experts
		Reporting of Results.				\$ 67,500.00	\$ 67,500.00	\$ 67,500.00	\$ 202,500.00		Selected industries and experts report at workshop
	Power factor Correction			\$ -	\$ 90,000.00	\$ 367,500.00	\$ 67,500.00	\$ 67,500.00	\$ 592,500.00		
	Co-generation	• mobilization of grant and local resources to support development of demonstration/pilot projects	SACREEE as coordinating body						\$ -		SACREEE effort
		• MS to identify and communicate interest of industries with cogeneration potential e.g. sugar and wood/pulp that can benefit from the pilot programmes.	SACREEE as coordinating body						\$ -		SACREEE and MS effort
		• Engagement of Industry Associations and selected industries and their associations to commit to participate in co-generation demonstration projects.	SACREEE as coordinating body						\$ -		Industry associations effort
		• Recruitment (through EOI) ESCOs/Accredited Energy Experts to design and develop demonstration/pilot projects for electricity self-generation from biomass waste and for heating and cooling systems (including a component related to the sustainable management of biomass resources if applicable) to pre-feasibility/feasibility stage depending on data availability and resources available.	SACREEE as responsible for the tender process and contract follow-up			\$ 225,000.00	\$ 225,000.00		\$ 450,000.00		TA support
		• Recruitment of a transaction advisor/ finance and investment expert to structure co-financing with selected industries and engage banking sector to fund projects supported by blending grant and concessionary loans funding	SACREEE as responsible for the tender process and contract follow-up					\$ 100,000.00	\$ 100,000.00	This recruitment could be combined with the recruitment of other sub-objectives of this objective and with the recruitment of the external support received in the framework of the fourth pillar.	Transaction advisor costs
	Co-generation			\$ -	\$ -	\$ 225,000.00	\$ 225,000.00	\$ 100,000.00	\$ 550,000.00		
	Steam sizing, Refrigeration and VSD	• Mobilize grant resources for undertaking demonstration/pilot projects	SACREEE as coordinating body						\$ -		SACREEE/MS/association
		• Engage MS together with Industry associations to identify relevant industries that have interest to participate in the Steam sizing, Refrigeration and Variable Speed Drives demonstration Project and together with SACREEE shortlist the ones to participate.	SACREEE as coordinating body						\$ -		SACREEE/MS/association
		• Recruit energy experts and transaction advisors that will:	SACREEE as responsible for the tender process and contract follow-up						\$ -		
		Identify expertise and technology required.							\$ -		TA support
	Undertake energy audits and show energy and cost saving potential teaming up specialized experts and locally trained experts.				\$ 225,000.00	\$ 225,000.00		\$ 450,000.00		Energy auditor costs	
	assist in structuring blending of grant and loan funding and co-financing for implementation of the projects by industries						\$ 100,000.00	\$ 100,000.00	This recruitment could be combined with the recruitment of other sub-objectives of this objective and with the recruitment of the external support received in the framework of the fourth pillar.	Transaction advisor costs	
Steam sizing, Refrigeration and VSD			\$ -	\$ -	\$ 225,000.00	\$ 225,000.00	\$ 100,000.00	\$ 550,000.00			

Pillars	Objectives	Actions	Responsibilities	2019	2020	2021	2022	2023	TOTAL	Assumptions	Comments
REGIONAL AND NATIONAL DEMONSTRATION PROJECTS	Solar energy for electricity and thermal applications in industries Industry	• Mobilize grant resources for undertaking demonstration/pilot projects	SACREEE as coordinating body						\$ -		
		• Engage MS together with Industry associations identify relevant industries that can demonstrate, solar thermal demand (heating and cooling).	SACREEE as coordinating body						\$ -		
		• Recruit energy experts and financing experts	SACREEE as responsible for the tender process and contract follow-up								
		Undertake industry electricity demand, and heating and cooling energy demand in the selected plants (e.g. 3 industries in the region).							\$ -		
		System design, costing and related Return on Investment				\$ 225,000.00	\$ 225,000.00		\$ 450,000.00		
		Mobilize blending of grant and loan funding for industries and co-financing for implementation by industries						\$ 100,000.00	\$ 100,000.00		This recruitment could be combined with the recruitment of other sub-objectives of this objective and with the recruitment of the external support received in the framework of the fourth pillar.
	Solar thermal applications in industries substituting diesel			\$ -	\$ -	\$ 225,000.00	\$ 225,000.00	\$ 100,000.00	\$ 550,000.00		
	Objective Awareness Raising	2. • creation of information system of good practice on industry energy , cost savings and GHG reductions e.g. from demonstration projects and other best practice EE programmes.	SACREEE in charge			\$ 75,000.00			\$ 75,000.00		TA costs to design and develop, test and update system
		• creation of MS national platforms for sharing information among stakeholders e.g. breakfast meetings, workshops, seminars.	SACREEE as coordinating body						\$ -		monthly meetngs of stakeholders-30-Associations coordinated in each MS
		• Engage Industry associations to lobby corporate management of their members to embrace energy management systems such as ISO 50001.	SACREEE as coordinating body						\$ -		6 monthly meetings for Managers-associations coordinated in each MS
	• Deploy experts to undertake 1 to 1 follow-ups with banks on funding opportunities for EE projects	SACREEE in charge		\$ 22,500.00				\$ 22,500.00		TA support for seminars to bank managers (workshop format e.g. for SADC DFIs and selected commercial banks	
	Objective 2. Awareness Raising		\$ -	\$ 22,500.00	\$ 75,000.00	\$ -	\$ -	\$ 97,500.00			
	subtotal		\$ -	\$ 112,500.00	\$ 1,117,500.00	\$ 742,500.00	\$ 367,500.00	\$ 2,340,000.00			

Pillars	Objectives	Actions	Responsibilities	2019	2020	2021	2022	2023	TOTAL	Assumptions	Comments	
FINANCING INTERVENTIONS FOR EE/RE INITIATIVES	Objective 1. Assessing and upscaling existing financing models	SACREEE recruit finance and investment experts or conduct a specific study to :	SACREEE in charge	\$ 164,600.00					\$ 164,600.00	This objective could be covered by a market study and a formulation study of the mechanism.	all assessments can be done as one study	
		Review of existing credit lines and incentives and how they can be adapted to finance EE projects and small RE projects. These mechanisms can be limited to MS where they are being used.										
		Explore the establishment of a regional financing facility for EE and small RE projects to be managed by a bank.							\$ -			
		Explore impact of reduced transaction costs in form of import duty and VAT and how they will impact on Return on Investment for EE/RE projects							\$ -			
		Analyse creation of an ESCO fund that local energy service providers can tap into to support uptake of EE projects							\$ -			
		Analyse other existing Banks and DFI support to EE and RE projects							\$ -			
		Estimate potential presented by the green and climate funds to support EE/RE in the industry sector							\$ -			
		Investigate scope presented by pension and insurance funds and diaspora bonds for financing EE/RE projects in industry							\$ -			
		Objective 1. Assessing and Upscaling of Existing Financing Models			\$ 164,600.00	\$ -	\$ -	\$ -	\$ -	\$ 164,600.00		
		Objective 2. Creation of new and additional Financing Options and Seed Funding	SACREEE recruit finance and investment expert to :	SACREEE in charge		\$ 283,500.00	\$ 283,500.00	\$ 283,500.00	\$ 283,500.00	\$ 1,134,000.00	Following the study launched in objective n°1, SACREEE could recruit someone to deal with the EE/RE funding mechanisms at SACREEE and managing possible facilities established.	SACREEE/MS/Associations
		• mobilize grant funding for energy management, energy audits and M&V and blending financing of projects								\$ -		
		• Lobby creation of specific packages by Banks and DFIs for medium enterprises at reasonable cost of capital.								\$ -		
		• Lobby MS to create specialized tax rebates for medium enterprises								\$ -		
		• Coordinate collaboration of donors /DFIs/Export Credit Agencies and commercial banks to establish a regional EE financing facility that will allow access to financing by industry and ESCOs at reasonable interest rates compared to what commercial banks charge.								\$ -		
		• Collaborate with MS Climate Ministries and accredited Green Climate Fund (GCF) Banks in the region in the mobilization of Green/climate funds for EE/RE in industry basing on NDC targets and assessments								\$ -		
		A seed funding budget managed by SACREEE is also put in place to support the implementation of the first actions.			\$ 375,000.00	\$ 375,000.00			\$ 750,000.00			
	Objective 2. Creation of New and Additional Financing Options and Seed Funding			\$ -	\$ 658,500.00	\$ 658,500.00	\$ 283,500.00	\$ 283,500.00	\$ 1,884,000.00			
	Objective 3 Creation of Project Pipelines and Investment Guide	SACREEE recruit a technical assistance hosted at SACREEE and supervised by its finance and investment expert to	SACREEE in charge			\$ 682,083.33	\$ 682,083.33	\$ 682,083.33	\$ 2,046,250.00	This amount is a first estimation based on similar TA related to green loan facilities. Depending on the funds mobilised from the IFIs and banks, the TA needs could be higher. This should be defined in pillar IV, objective 1.	Regional TA to identify possible projects to be funded and reinforce the capacity. We judge that a TA is necessary to start this process. This TA will be defined to enable SACREEE to gain sufficient experience to then lead such activities in medium term.	
	Capacitate SACREEE, banks, SMEs and local corporate enterprises to develop bankable EE and self-generation RE projects.							\$ -				
	Coordinate with MS and Industry associations to identify SME industries that have potential project ideas/pre-feasibility stage projects							\$ -				
	Mobilize resources and technical support to access financing for pre-feasibility and feasibility studies by Medium enterprises							\$ -				
	Elaboration of an investment guide							\$ -				
	Objective 3 Creation of Project Pipelines and Investment Guide			\$ -	\$ -	\$ 682,083.33	\$ 682,083.33	\$ 682,083.33	\$ 2,046,250.00			
	subtotal			\$ 164,600.00	\$ 658,500.00	\$ 1,340,583.33	\$ 965,583.33	\$ 965,583.33	\$ 4,094,850.00			

Pillars	Objectives	Actions	Responsibilities	2019	2020	2021	2022	2023	TOTAL	Assumptions	Comments	
APPLICATION OF RE IN INDUSTRY	Objective 1. Creating an Enabling Environment for Application of RE in Industry	• Coordinate, through RERA and MS energy regulators, setting of cost reflective tariffs for industries in the MS to make RE self-generation a worthwhile investment.	SACREEE as coordinating body	\$ 20,000.00					\$ 20,000.00		TA support	
		• Engage consultants to conduct study that will inform introduction of Net-Metering regulatory framework in the MS so industries can sell excess power to the grid.	SACREEE in charge		\$ 90,000.00				\$ 90,000.00		TA support	
		• Mobilize grant resources and support demonstration projects for solar thermal applications - heating and cooling and bio-energy in industry as part of sub-Objective under "Demonstration/pilot projects and programmes" (Pillar 3).	SACREEE in charge						\$ -			
		• Coordinate through SADC and National Ministries of Environment, the introduction of mandatory measurement and reporting of greenhouse gas emissions reduction from RE application in industries.	SACREEE as coordinating body	\$ 20,000.00	\$ -					\$ 20,000.00		MS effort-with TA support-SADC group workshop format
	Objective 1. Creating an Enabling Environment for Application of RE in Industries			\$ 40,000.00	\$ -	\$ 90,000.00	\$ -	\$ -	\$ 130,000.00			
	Subtotal		\$ 40,000.00	\$ -	\$ 90,000.00	\$ -	\$ -	\$ 130,000.00				
DOMESTICATION OF EE/RE TECHNOLOGIES	Objective 1: Availing and upscaling of RE/EE Technologies in the SADC Region	• Mobilize resources for assessment of status of R&D, Innovation, adaptation, manufacture, supply of EE/RE technologies in the SADC MS.	SACREEE in charge						\$ -		SACREEE effort	
		• Recruit experts or Research and Technology institutions to undertake an assessment exercise on domestication of EE/RE efforts already being made and develop EE/RE Technology lists and database.	SACREEE in charge		\$ 112,500.00				\$ 112,500.00		TA for study	
	Objective 1: Assessment of Status of EE/RE Technologies in the SADC region			\$ -	\$ 112,500.00	\$ -	\$ -	\$ -	\$ 112,500.00			
	Objective 2 Co-benefits of Domestication of RE/EE Technologies	• Coordinate with other relevant SADC agencies creation of a competitive Pricing of RE/EE Technologies taking into consideration harmonized tax policies to facilitate trade of RE/EE in the SADC region and to ensure adherence to quality standards	SACREEE as coordinating body		\$ 63,750.00				\$ 63,750.00		TA working with SADC bodies and MS-group workshop	
		• Coordinate adoption of the UNIDO Cleantech model as a platform for identifying local technologies for adoption.	SACREEE in charge				\$ 30,000.00		\$ 30,000.00		UNIDO TA	
		• Recruit experts to conduct country assessments of RE value chains, skills, infrastructure capacity and policy framework that will be required and co-benefits (job creation, GHG reduction, industry development etc.) that will accrue to the MS.	SACREEE in charge						\$ -		Can be part of TA study in Objective 1	
	Objective 2 Co-benefits of Domestication of EE/RE Technologies			\$ -	\$ 63,750.00	\$ -	\$ 30,000.00	\$ -	\$ 93,750.00			
	Subtotal		\$ -	\$ 176,250.00	\$ -	\$ 30,000.00	\$ -	\$ 206,250.00				

Pillars	Objectives	Actions	Responsibilities	2019	2020	2021	2022	2023	TOTAL	Assumptions	Comments
	TOTAL			\$ 294,100.00	\$ 2,480,250.00	\$ 3,043,833.33	\$ 1,964,583.33	\$ 1,589,583.33	\$ 9,372,350.00		
	SACREEE budget for SIEPP implementation	We assume that SACREEE will need to mobilise one financial expert, one technical expert and one communication full time to implement this ambitious program		\$ 240,000.00	\$ 240,000.00	\$ 240,000.00	\$ 240,000.00	\$ 240,000.00	\$ 1,200,000.00		
	SACREEE budget for communication plan	We assume that SACREEE will need to mobilise one communication expert full time to implement this communication plan and one part-time designer (1 day per week from mid 2019 till 2013)		\$ 100,040.00	\$ 100,040.00	\$ 100,040.00	\$ 100,040.00	\$ 100,040.00	\$ 500,200.00		
	Contingency 10%			\$ 29,410.00	\$ 248,025.00	\$ 304,383.33	\$ 196,458.33	\$ 158,958.33	\$ 937,235.00		
	Grand Total			\$ 663,550.00	\$ 3,068,315.00	\$ 3,688,256.67	\$ 2,501,081.67	\$ 2,088,581.67	\$ 12,009,785.00		

Appendix C. Focus on the Pillar IV (Financing) budget

Further details on the pillar IV budget are given in the table below.

Objectives	Needs	Unit	Quantity			Rate			Total fees	Detail of incidentals	Incidentals	Total
			Financial expert / TL	EE specialist in industry		Financial expert	EE specialist					
Objective 1. Assessing and upscaling existing financing models	1 financial expert and 1 EE specialist in industry are hired to carry out this study.	Day	60	50		900 USD	750 USD		91,500.00 USD	1 trip per country + 2 trips / expert to SADC (inception and closure) 1 week per country for the field mission + 2 weeks per expert on field for inception and closure of the study 20 000 USD for the workshop	73,100.00 USD	164,600.00 USD

Objectives	Needs	Unit	Quantity			Rate			Total fees	Detail of incidentals	Incidentals	Total
			Financial specialist	Support staff		Financial specialist	Support staff					
Objective 2. Creation of new and additional Financing Options	To implement the conclusions of the study, dedicated staff will be needed at SACREE. At least one full-time specialist has to be mobilised to ensure the follow-up of actions and lobby the IFIs to mobilise funds. This person will be also mobilised for the objective 3.	Month	48	48		15,000.00 USD	3,000.00 USD		864,000.00 USD	Regular travels in the region - 1 visit per country each quarter as an average (to be amended according to SACREEE experience)	270,000.00 USD	1,134,000.00 USD
	A seed funding budget is also foreseen to prime the financing of projects. 750,000 USD is foreseen.								0.00 USD		750,000.00 USD	750,000.00 USD

Objectives	Needs		Quantity				Rate				Total fees	Detail of incidentals	Incidentals	Total
			TL	EE specialists in industry	Expert in awareness raising	Expert in capacity building	TL	EE specialists in industry	Expert in awareness raising	Expert in capacity building				
Objective 3 Creation of Project Pipelines	Once the relevant framework is in place to finance projects, support has to be provided to project developers and partners banks to see projects financed. One full-time team leader will be necessary with the ad-hoc support from ST experts. The last year, he could be half time in order that the SACREEE financial specialist takes little by little more responsibilities. One specific output is to prepare an investment guide.	Day	550	250	100	100	1,200.00 USD	1,000.00 USD	1,000.00 USD	1,000.00 USD	1,110,000.00 USD	Regular travels in the region for the team leader - 1 visit per country each quarter as an average (to be amended according to SACREEE experience) + 20 international trips to SACREEE + corresponding per diem + 100 000 USD for communication + 50 000 USD for capacity building + 300 000 USD for specific studies (feasibility studies for promising projects, audits...) + 200 000 USD for the preparation of an investment guide	936,250.00 USD	2,046,250.00 USD

Appendix D. Focus on the SACREEE budget

Details on the SACREE budget for SIEEP implementation are given in the following table.

Action	Needs	Unit	Quantity				Rate				Total fees	Detail of incidentals	Incidentals	Total
			Financial specialist	Technical specialist	Communication expert	Designer	Financial expert	EE specialist	Communication expert	Designer				
SACREE budget for SIEEP implementation	We assume that SACREEE will need to mobilise one financial expert and one technical expert full time to implement this ambitious program	Month	60	60			7,500 USD	7,000 USD			870,000.00 USD	Regular travels in the region - 1 visit per country per expert each quarter as an average (to be amended according to SACREEE experience)	330,000.00 USD	1,200,000.00 USD
SACREE budget for communication plan	We assume that SACREEE will need to mobilise one communication expert full time to implement this communication plan and one part-time designer (1 day per week from mid 2019 till 2013)	Month / days			60	234				5,000.00 USD	300.00 USD	15,000 USD per year for SACREEE's participation at a high-level conferences/exhibitions/forums with SIEEP stands + workshops / material to be issued by SACREE	130,000.00 USD	500,200.00 USD

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