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GN SEC Global Network Regional Sustainable Energy Centres

First Draft Discussion Paper (unedited)

Regional Cooperation to Accelerate the Uptake of Common and Inclusive Sustainable Energy and Climate Technology Markets in Developing Countries

Prepared for the High-Level Conference: "Regional Cooperation to Accelerate Sustainable Energy Innovation and Entrepreneurship in Developing Countries", 3rd October 2018, Vienna, Austria, www.se4allnetwork.org

The paper will be finalized with the received comments and contributions during and shortly after the conference. Please send your comments to info@se4allnetwork.org.

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Abbreviations

AfDB	African Development Bank
CAF	Common Assessment Framework
CARICOM	Caribbean Community
EAC	East African Community
ECOWAS	Economic Community of West African States
EE	Energy Efficiency
GN-SEC	Global Network of Sustainable Energy Centres
IRENA	International Renewable Energy Agency
PV	Solar Photovoltaic
RE	Renewable Energy
REC	Regional Economic Community
REN 21	Renewable Energy Policy Network for 21st Century
SADC	South African Development Community
SDG	Sustainable Development Goals
SECT	Sustainable Energy and Climate Technologies
SPC	South Pacific Community
UNIDO	United Nations Industrial Development Organization
WB	World Bank

Table of content:

1. Executive Summary

The Executive Summary will be included once all received comments are incorporated.

2. Introduction

The following discussion paper is a contribution to the High-Level Conference on Sustainable Energy and Development: "Regional Cooperation to Accelerate Sustainable Energy Innovation and Entrepreneurship in Developing Countries", scheduled to take place on 3rd October 2018 in Vienna, Austria. The conference is being organised in the framework of the Austrian Presidency of the Council of the European Union by the Austrian Ministry for Europe, Integration and Foreign Affairs (MFA), the United Nations Industrial Development Organization (UNIDO) and the Austrian Development Agency (ADA).

The Conference takes place under the umbrella of the Global Network of Regional Sustainable Energy Centres (GN-SEC) and in conjunction with the Informal Meeting of the EU Directors General for Development Cooperation. The conference is also an interesting showcase how the *European Union and European Integration* has inspired developing countries to enhance regional cooperation in the sustainable energy and climate sector. The conference is being organised as a concrete follow-up to the EU Council Conclusion on Energy and Development, adopted on 22 May 2018. In the conclusions the Council stresses:

„the necessity to strengthen regional and regional cooperation and capacities in the sustainable energy and climate sector. The Council moreover supports efforts towards increasing the cost-effectiveness of the energy sector that are conducive to regional integration, trade and investment such as Regional Sustainable Energy Centres anchored in the regional economic communities."

The Conference aims to accelerate global efforts to strengthen regional cooperation and integration as a catalyst for scaling up renewable energy and energy efficiency investment, innovation and entrepreneurship in developing countries. Regional cooperation can address some of the barriers for sustainable energy and climate technology (SECT) markets more effectively and at lower costs than isolated national efforts, create the urgently needed economies of scale and enable more equal progress and spill-over effects between countries.

The Conference will therefore present case studies and lessons learned from the EU, EAC, ECOWAS, SADC, CARICOM, SPC, SICA and the Arab States, and highlight partnership opportunities with the Global Network of Regional Sustainable Energy Centres (GN-SEC). The potential contribution of regional cooperation to accelerate the implementation of the "Green People´s Energy for Africa Initiative" through enhanced entrepreneurship, civil society engagement and domestic financing will also be discussed.

Finally, the Conference will highlight the catalytic role of regional programmes and organizations in implementing global efforts and objectives like the Sustainable Development Goals (SDGs), particularly SDG-7, SDG-9 and SDG-13, as well as the Paris Climate Agreement. The Conference will bring together senior officials from EU Member States, selected key players from regional and international organisations, development banks, utilities and regulatory bodies, the private sector and academia with the objective to:

- Present an overview of the current status of regional political and technical sustainable energy cooperation/integration in different parts of the world;

- Create mutual understandings on the benefits and opportunities of a strong regional cooperation in clean energy development;
- Exchange of case studies, best practices, failures and lessons learned from processes, programs and projects in various sub-regions;
- Concrete recommendations to strengthen sub-regional cooperation as a tool to promote SDG-7, SDG-9 and SDG-13;
- Create partnerships on concrete programs/topics to be rolled out on sub-regional level as follow-up.

2.1 Objectives

The paper aims to contribute to a better understanding of the benefits, opportunities, costs and associated risks of Regional SECT cooperation/integration processes. This will be done through the establishment of an assessment framework capturing the status and quality of various Regional SECT cooperation/integration processes in different regions.

The report also rich of practical „regional innovation stories", case studies, best practices, failures and lessons learned from various regions. Based on the findings and the assessment framework, the report draws conclusions and provides recommendations for future priority functions and intervention areas of the Global Network of Regional Sustainable Energy Centres (GN-SEC). The recommendations will become part of the implementation strategy of the GN-SEC platform.

The discussion paper and the recommendations will be finalised based on the received comments and contributions during and shortly after the conference. It is intended to publish it as technical paper as part of a series of GN-SEC publications.

2.2 The UNIDO GN-SEC Approach[1]

2.2.1 The SDG-9 dimension of SDG-7 and SDG-13

With the Sustainable Development Goals (SDGs), the global community has committed to work towards a new global business model that allows producing more of the goods and services required by a growing world population, while using fewer resources and producing less waste and pollution. There is a trend towards circular economy policy concepts against the background of the increasing scarcity and price volatility of raw materials, including fossil fuels, as well as the need to internalize the costs of environmental externalities, such as air, soil and water pollution and climate change caused by global greenhouse gas emissions.

The deployment of sustainable energy and low-carbon climate technologies (SECTs) is considered as an effective tool to tackle economic/industrial productivity and competitiveness, energy security, energy access/affordability and negative externalities of conventional energy systems (e.g. GHG emissions, local pollution) simultaneously and in an integrated way. In this context, also developing countries have introduced far-reaching targets for scaling-up SECT markets (e.g. NDCs) throughout the next decades. Most of these efforts are closely aligned with economic, industrial and environmental policies targeting increased competitiveness, productivity, inclusiveness, sustainability and resilience to climate change impacts.

Despite growing investments in SECTs over the past decade, markets have not reached economies of scale particularly in least developed countries (LDCs) and small island developing states (SIDS). Key economic and industrial sectors face challenges when it comes to availability and use of SECT quality products and services (e.g. manufacturing, construction, agriculture, food-processing, tourism, transport, waste management, desalination, water and sanitation). The increased supply and use of renewable energy and energy efficiency products and services remains hindered by a broad range of barriers and shortcomings related to policy and regulation, fiscal and non-fiscal incentives, technical limitations, economics, finance, capacity, quality infrastructure, R&D and innovation frameworks, knowledge and awareness.

Moreover, in a number of developing countries the inability of the domestic private sector to supply sustainable energy quality products and services under competitive prices has become a bottleneck for the uptake of SECT markets. The domestic manufacturing and servicing sector remains weakly developed and the growing demand remains underserved by international suppliers and supply chains due to high market entry costs and risks. Moreover, policies and technology transfer programs tend to focus on creating demand for SECT products and services and tend to ignore supplier-oriented actions focused on strengthening domestic innovation systems, productive industrial capacities and entrepreneurship. SECTs are often not considered systematically as a priority in industrialisation strategies.

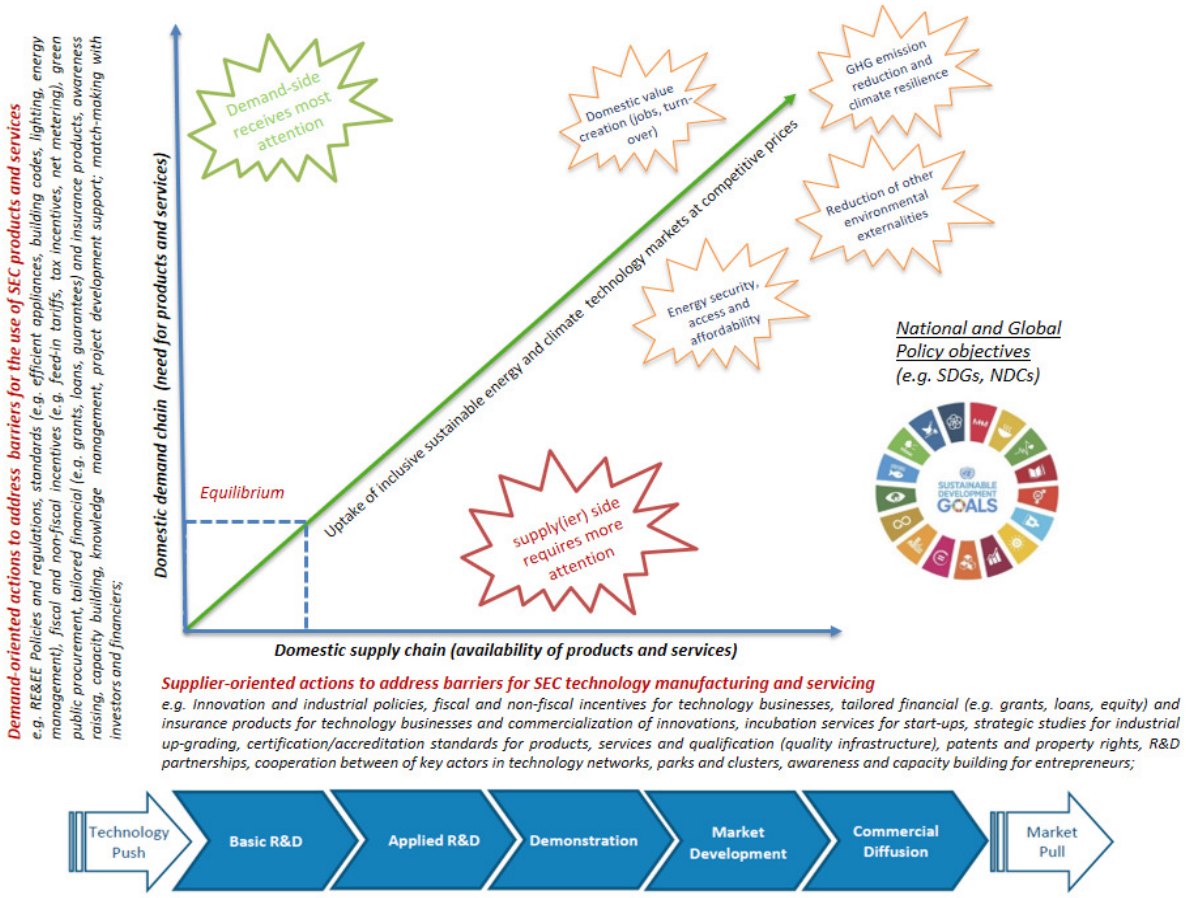
The absence of an equilibrium between demand and supply leads in some countries to high and hindering prices for SECT products and services. Such trends raise also concerns regarding the inclusiveness of technology transfer processes. This offers opportunities, but also bears the risk that the local value and job creation effects of such investments remain low and are not sustained in the long-run. Particularly in LDCs and SIDS even basic equipment and services (e.g. consulting, energy auditing, installation, maintenance) continue to be imported.

The absence of domestic suppliers and service providers questions the long-term sustainability of already undertaken renewable energy investments in various developing countries (e.g. lessons learned from mini-grids and public solar lighting projects in Sub-Sahara Africa). The lack of domestic R&D and entrepreneurship hinders the commercialisation of SECT solutions adapted to the realities of LDCs and SIDS. Therefore, public interventions and finance is

[1] Provided by Martin Lugmayr, UNIDO

required to work towards a balanced demand and supply-side approach when it comes to the promotion of SECT markets.

Figure 1: UNIDO theory of change: The uptake of inclusive SECT markets in developing countries requires equal emphasis on demand- and supply(ier)-side actions



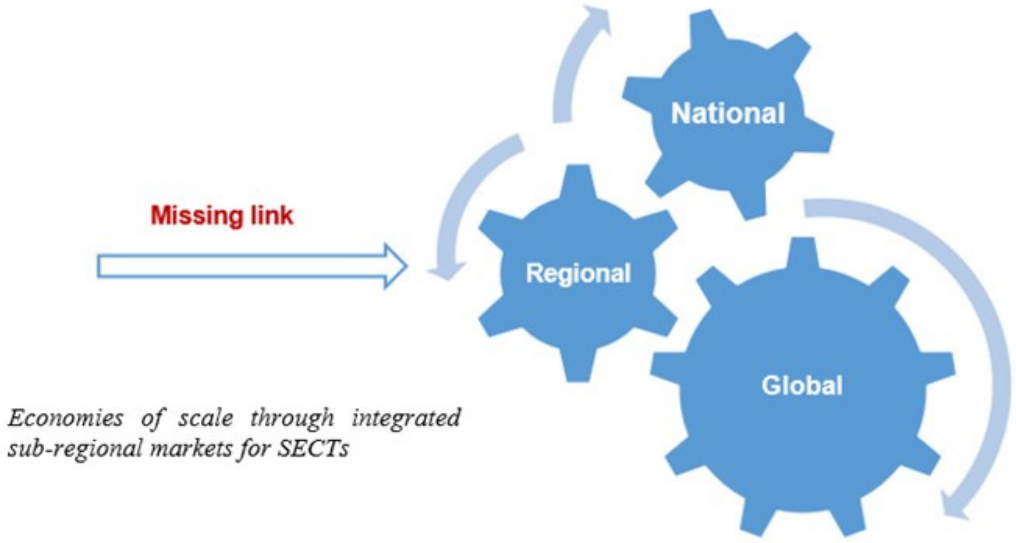
2.2.2 Regional cooperation as the missing link in the sustainable energy and climate transformation

By looking at the moderate growth rates of Sustainable Energy and Climate Technology (SECT) markets in many developing countries, it becomes obvious that SDG-7, SDG-9 and SDG-13 cannot be attained by 2030 in business-as-usual scenarios. There is need for economies of scale and speed. Formal, informal, centralised and decentralized multi-stakeholder partnerships - leveraging flexible networks and resources between a broad range of like-minded partners in developing and developed countries – can become important accelerators.

Regional partnerships, cooperation and integration between countries, private sector civil society can be an effective tool to address some of the existing demand and supply barriers for SECT market development. Integrated markets, which follow joint standards and a common framework, are an important prerequisite for the reduction of investment risks in and foster trade with SECTs products and services. However, for several reasons, the Regional level is ignored and remains a missing link in the international sustainable energy and climate cooperation. It is not used systematically as a (cost-)effective tool to promote equal progress, coordination and economies of scales.

Regionally, the energy transformation tends to remain uncoordinated between countries and common barriers and opportunities are not addressed jointly for the benefit of all. Duplication, fragmentation and lack of agenda-setting by the region lead often to inefficient use of international funding and opportunity costs. Simultaneously, global climate agreements and funding instruments face implementation challenges due to the limited national absorption capacities and the absence of Regional arrangements.

Figure 2: Regional cooperation as the missing link in the international energy and climate transformation



In many parts of the developing world, the institutional capacities to coordinate and promote Regional sustainable energy cooperation and integration are weakly developed. The traditional regional organisations/communities and their energy institutions (e.g. regional utility organisations and regulators) are dealing with wider energy and/or interconnection issues and focus often more on traditional energy sources (e.g. gas, coal, large hydro). In most cases, regional organisations lack of resources and capacities to overlook and monitor complex political and technical sustainable energy policy and implementation processes.

2.2.3 The Global Network of Regional Sustainable Energy Centres (GN-SEC)

To make Regional sustainable energy and climate cooperation/integration a priority, UNIDO launched the Global Network of Regional Sustainable Energy Centres (GN-SEC) Programme. Under a common framework, UNIDO assists regional organisations in the creation and operation of sustainable energy centres. The GN-SEC is an innovative south-south and triangular multi-stakeholder partnership to accelerate the energy and climate transformation in developing countries. The gradually expanding partnership comprises a sub-network of centres for the African and the Arab region (in cooperation with the EAC, SADC, ECOWAS, and the Arab League) and a sub-network for Small Island Developing States (in cooperation with SIDS DOCK, CARICOM, and SPC). Currently, the network is expanding to Central America, Central Asia and the Himalaya-Hindukush region. Further information is available at: www.se4allnetwork.org.

2.2.4 The GN-SEC Platform

The GN-SEC is currently becoming a formalized global platform to advocate for SDG-7, SDG-9 and SDG-13 and joint interests in international policy processes. The platform is hosted by UNIDO in Vienna, Austria. It provides also a "virtual" maker-space for south-south cooperation

activities and joint project proposals. For example, SIDS share similar challenges and opportunities when it comes to electric mobility and storage solutions. LDCs in Sub Sahara Africa share a common interest in renewable energy (hybrid) mini-grid development for rural electrification and productive uses. The platform provides also an interesting forum to exchange experiences and lessons learned on methodologies related to Regional cooperation and institution building.

Functions of the GN-SEC Platform:

- Raising the profile and visibility of the network on global level;
- Advocating for SDG-7, SDG-9 and SDG-13;
- South-south cooperation on common issues and solutions (e.g. SIDS, LDCs)
- Advocating for more inclusive SECT technology transfer processes;
- Joint policy inputs for international energy and climate processes;
- Effective communication, public relations and cooperate identity;
- Lessons learned and joint learning on technical and institutional aspects;
- Joint quality assurance and monitoring of results;
- Provision of global services and promote joint products;
- Promote Joint programs and projects;
- Joint fund raising;
- Strategic partnerships with int. organizations, industry, civil society, investors and foundations;

2.2.5 The mission of the GN-SEC network

The regional sustainable energy centres aim to accelerate the energy and climate transformation by creating economies of scales, equal progress and spill-over effects between countries. In partnership with Member States and other sub-regional players (e.g. power pools, utility organisations, regulatory authorities, regional banks), the centres work towards the creation of integrated and inclusive regional markets for SECT products and services. This is being done by setting common targets, policies, standards and incentives, as well as the de-risking of investments through the provision of reliable data, analytics, bundling of projects and convening power. Each of the centres has its own priorities depending on the demands of member states.

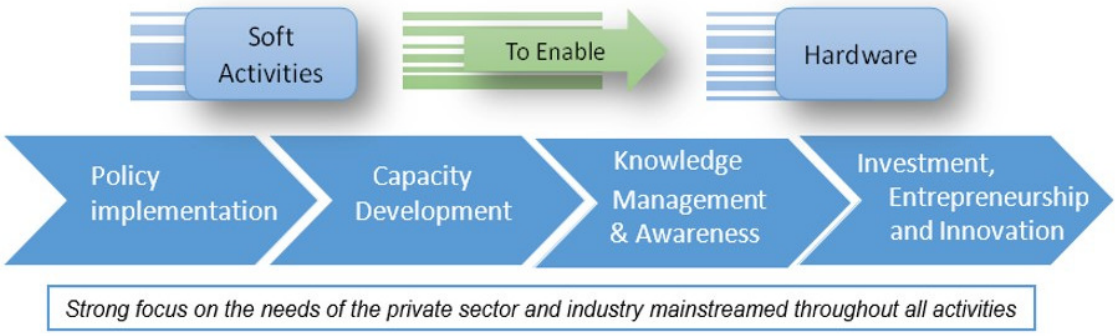
Functions of the GN-SEC Centres (selection):

- Enhance technical implementation/coordination capacities of RECs
- Advocate for SDG-7, SDG-9 and SDG-13 on regional and national level
- Strengthen domestic ownership, agenda-setting, donor harmonization and sustainability of project-based approaches
- Create high-level awareness and complement RECs, regional financial institutions and regional utility organizations/power pools
- Address the „missing link" between international energy and climate commitments and execution on national level
- Accelerate national efforts and equal progress in countries
- Address common barriers more (cost) effective through regional exchange, approaches and methodologies
- Economies of scale through the creation of sub-regional markets
- "Hubs" for knowledge and fusion of internal and external partnerships
- Leveraging funding for priority activities from a range of partners

Some of the barriers for the development of SECT markets can be addressed more effectively and at lower cost at sub-regional level. The GN-SEC centres play an important role in setting domestic priorities, contribute to donor harmonisation and coordination, as well as ensuring the sustainability and availability of results and deliverables after project closure. The centres provide regional organisations with the urgently needed technical capacities to coordinate and monitor the implementation of sub-regional energy and climate policies/regulations on national level. Moreover, the GN-SEC centres serve as knowledge resource facility, and provide advice to Member States on how best to manage the transition towards sustainable energy.

Through cross-border approaches and methodologies, the centres complement and accelerate national efforts in the areas of policy and regulation, capacity development, knowledge and data management, awareness raising, as well as the promotion of investment, innovation and entrepreneurship. The centres serve as a hub for all kind of domestic and international partnerships. They are important advocates for SDG-7, SDG-9 and SDG-13 in national, regional and international policy and decision-making processes. They can complement regional banks when it comes to the addressing of "soft" issues hindering the de-risking and long-term sustainability of investments (e.g. policy, standards, laws, qualification, certification). These issues have usually too high transaction costs for banks and/or lead to unfavourable financing terms (e.g. interest rates).

Figure 3: Complement and accelerate national efforts to address demand and supply barriers for SECTs markets



The GN-SEC centres aim at an equilibrium between market demand for and supply of SECT products and services. They put particular emphasis on actions directed to increase the domestic value creation of investments in SECTs. In this context, the centres focus on sub-regional actions to strengthen the productive (manufacturing, assembling, servicing) and innovation capacities of domestic businesses and entrepreneurs (e.g. fiscal and non-fiscal incentives, incubation, acceleration, R&D, quality infrastructure and standards, qualification, IPs, cluster building).

2.2.6 The GN-SEC principles

GN-SEC means "living empowerment". The centres are advocates for a "New Deal" giving particularly LDCs and SIDS a stronger voice in shaping climate and technology transfer processes. The official mandate given by Ministers and Head of States, the intergovernmental character (based on int. agreements) and the close link to the RECs and national Ministries (through national focal points) give the centres high-level legitimacy. Currently, over ninety Minsters of Energy and/or Heads of State adopted the creation of such centres.

From the very beginning, the centres are in the ownership and under the leadership of the respective regional organization and its Member States. The centres are well embedded in the regional decision-making structure and report usually to the RECs and their Member States. The centres employ domestic staff and seconded international experts. The centres are designed as hubs for all kind of domestic and international partnerships. Building on country leadership within existing regional cooperation entities, the network puts the key principles of aid and development effectiveness (as defined in the Accra, Paris and Busan Declarations) into practice: It respects country ownership of development priorities coupled with results-oriented partnerships, transparency and shared responsibility.

GN-SEC principles:

- Programmatic approach (individual centers are part of a wider program);
- Demand-driven (based on requests by the regions);
- „No blueprints" and tailored design to the individual needs and culture of the sub-region;
- Ownership and leadership by the regional organization and their Member States;
- Hosted by an existing domestic institution or a Member State;
- High level of legitimacy and intergovernmental character (approved by Ministers and/or Heads of States);
- Well embedded in sub-regional decision-making and policy processes;
- Well-connected to national Ministries and policies through a network of national focal institutions;
- Work complementary to the existing sub-regional institutions (e.g. RECs, utility organizations, regulatory authorities, associations);
- Use of domestic processes and systems (e.g. procurement, recruitment, financing and accounting);
- Financial sustainability through domestic contributions, international partnerships, fee-for-services and participation in call for proposals;
- „Small is beautiful" and „form follows function" - centers expand based on mobilized resources;
- Institutional "check and balances" through governance bodies (e.g. Executive Board, Technical Committee);
- Timely-limited UNIDO support for institution building, technical program development and mentoring of the political process;

Under the umbrella of the GN-SEC platform, UNIDO provides technical services for the establishment and operation of these centres throughout the preparatory and first operational phase. UNIDO acts also as facilitator and neutral moderator of the complex political process and dialogue between the Member States and the RECs. The RECs and their Member States are the owner of the progress and decide on the pace. It is envisaged that after the first operational phase the centres have reached self-sufficiency and UNIDO is becoming a technical partner like many others.

The GN-SEC model builds on already ongoing integration processes in the respective regions, lessons learned with the creation of similar technology centres (e.g. solar, hydro, hydrogen, biotechnology, Global Network of Resource Efficient and Cleaner Production Centres) and general integration theories and tools (e.g. European Integration).

2.3 Structure of Report, Methodology and Limitations

The report is structured into 4 Chapters (excluding the introduction). Chapter 2 presents a list of barriers that impact SECT and the rationale for developing the Common Assessment Framework (CAF). Chapter 3 introduces the CAF which is used to collate and present data & information on the 5 RECs listed under Table 1 above. Chapter 4 provides an analysis of the

common challenges and opportunities by comparing the data across the 5 RECs. Finally, the Chapter 5 provides a list of recommendations and a list of indicative actions that can be undertaken by the GN-SEC centres. While the report is intended to be read as a linear document, the sub-sections within every chapter are all 'individually connected' as shown in figure below:

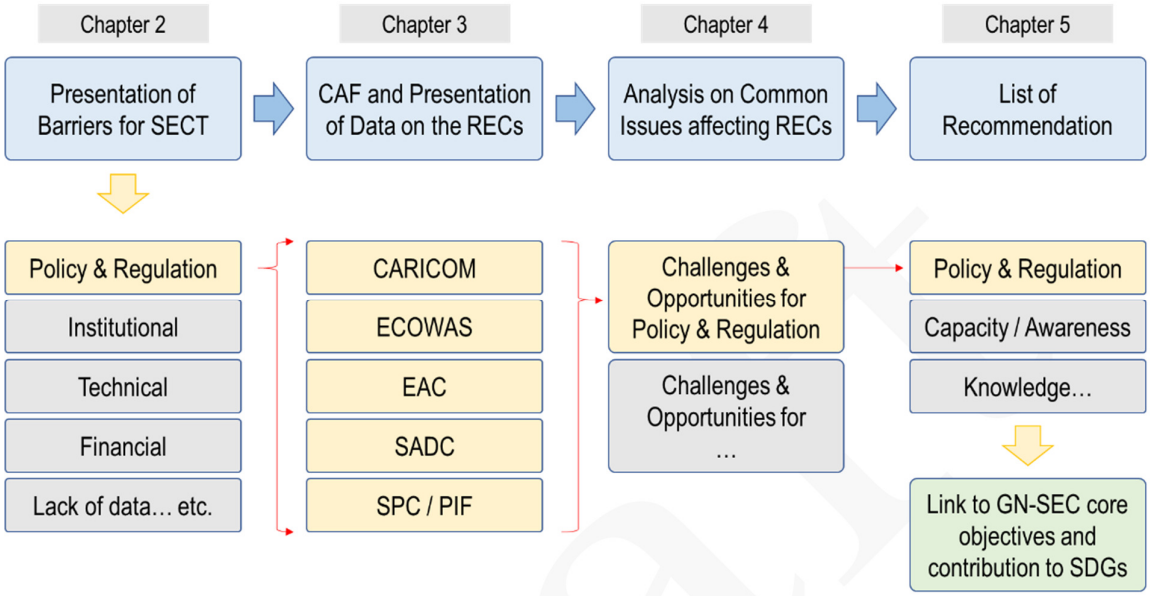


Figure 4: Logical approach to the contents in the Report

The following report is **focusing on regions and RECs which are in the scope of the African, Caribbean and Pacific (ACP) group of the European Union**. This includes the following RECs and GN-SEC centres in Sub Sahara Africa and Small Island Developing States (SIDS):

Table 1: RECs and GN-SEC centres considered under this report

GN-SEC Network Organization Member	REC that constitute Regional Cooperation in Context of this Report
1. ECOWAS Centre for Renewable Energy & Energy Efficiency (ECREEE)	**West Africa:** The Economic Community of West African States (ECOWAS)
2. East African Centre for Renewable Energy & Energy Efficiency (EACREEE)	**East Africa:** The East African Community (EAC)
3. SADC Centre for Renewable Energy & Energy Efficiency (SACREEE)	**Southern Africa:** The Southern African Development Community (SADC)
4. Pacific Centre for Renewable Energy & Energy Efficiency (PCREEE)	**Pacific Islands:** The South Pacific Community (SPC)
5. Caribbean Centre for Renewable Energy & Energy Efficiency (CCREEE)	**Caribbean Islands:** The Caribbean Community (CARICOM)

2.4 Setting the Context

2.4.1 Definitions and terminologies

The deployment of **sustainable energy and low-carbon climate technologies (SECTs)** is considered as an effective tool to tackle economic/industrial productivity and competitiveness, energy security, energy access/affordability and negative externalities of conventional energy systems (e.g. GHG emissions, local pollution) simultaneously and in an integrated way. In this report the definition is limited to renewable energy and energy efficiency products and services. However, in a wider understanding it would include also other environmental and climate (adaptation) technologies. The definition of sustainable energy includes all kind of renewable energy and energy efficiency solutions and end uses across sectors. This includes for example solar (PV and thermal), wind (on-shore and off-shore), hydro (large, medium and small), bioenergy (biogas, sustainable biofuel, efficient cookstoves), renewable hydrogen, geothermal, wave and tidal energy sources. For example, energy efficiency includes both energy savings through improvements made to lifestyles and energy efficiency measures (e.g. appliances, lighting, buildings, heat/power generation and distribution, energy management, cooking).

The term **Regional Cooperation/Integration** can be viewed through multiple lenses and the definition expanded to include economic communities, single and common markets, customs and monetary unions, and regional development banks. In the context of this report, the focus of Regional cooperation will be on the energy dimension of the Regional Economic Communities/Organisations (RECs) and their regional utility organisations, regulators, as well as regional banks involved in energy transactions. This includes also the GN-SEC centres which are official agencies of the RECs and their member states. In a wider definition this includes also cross-border cooperation of the sustainable energy industry (e.g. associations) or civil society (e.g. universities, NGOs).

2.4.2 Regional cooperation in the energy and climate sector – why it matters

The RECs and Regional entities (such as regulatory authorities and utilities, financial institutions and development banks, power pools, specialized centres, private sector associations and civil society organizations) to various degrees of success have demonstrated their contribution in promoting economic integration and assisting with implementation of a regional agenda. Comprising of a group of member states or countries linked together by geographical, historical, political and/or economic ties, the role of RECs and Regional organizations can be positioned in between a spectrum comprising of actions undertaken by respective national governments on one hand and a much wider global cooperation on the other. More importantly, in supporting growth among its member states (e.g. through trade, infrastructure, energy etc.) RECs and Regional entities have successfully demonstrated their ability in promoting peace and stability in their regions.

The most advanced example for regional cooperation/integration is the European Union. The EU is in certain economic and political areas very advanced in terms of supranational (in the sense of giving a large amount of power to an authority) and intergovernmental cooperation. A major step forward was the creation of the single European market and currency since the early 90s. Over the last two decades, the cooperation has also spilled-over into the environmental and sustainable energy sector. Today, important directives on renewable energy, energy efficiency, climate change and circular economy are important drivers of harmonisation and cooperation. This trend has also inspired other regions to intensify the cooperation on regional level (e.g. ECOWAS).

Also in the developing world, the concept of regional cooperation is not new, and the term "REC" first saw widespread use with the signing of the Abuja Treaty in 1991 that helped establish the African Economic Community and its eight Regional bodies or Regional Economic Communities (REC) as their key 'building blocks' who act as the implementing arm of the African Union (OSAA, 1991). The history of 'RECs' (though not the term) however goes back further, with the Caribbean Community (CARICOM) coming into existence in 1973 and the history of the South Pacific Community (SPC) going back even further with the signing of the Canberra Agreement right after World War II (UK, 1951).

Thus, the concept of regional economic integration or 'Regional cooperation' – the term used in this report, has a long history in virtually all parts of the world. In the context of this assignment, the RECs form the basis for selecting the geographic regions for defining Regional cooperation, particularly since also provide a basis for establishing GN-SEC and is therefore considered appropriate for further data collection and analysis.

The key element for exploring the role of Regional cooperation in the context of SECT is the homogeneity of the challenges and thus by extension the potential opportunities within the Regions. It is also based on an understanding that some challenges and opportunities can be addressed more effectively and faster jointly rather than in a fragmented way. Particularly, the creation of regional markets with common standards can be an important driver for the uptake market demand and supply of SECT products and services.

The Global Network of Regional Sustainable Energy Centres (GN-SEC) follows this logic. The GN-SEC centres are being set-up within the RECs to accelerate the energy and climate transformation by creating economies of scales, economic progress and spill-over effects between countries. In partnership with Member States and other Regional players (e.g. power pools, utility organisations, regulatory authorities, regional banks), the centres work towards the creation of integrated Regional markets for SECT products and services by setting targets, policies, standards and incentives, as well as de-risking of investments through the provision of reliable data, analytics, bundling of projects and convening power.

The GN-SEC centres aim at creating economies of scale through the creation of integrated and inclusive markets for SECT products and services. Particular emphasis is on actions directed to increase the domestic value creation of investments in SECTs. In this context, the centres focus on Regional actions to strengthen the productive (manufacturing, assembling, servicing) and innovation capacities of domestic businesses and entrepreneurs (e.g. fiscal and non-fiscal incentives, incubation, acceleration, R&D, quality infrastructure and standards, qualification, IPs, cluster building). Additionally, well established mechanisms for promoting demand side through target setting, financial and non-financial incentives for generating demand such as access to finance, capacity building, awareness creation are also supported.

The focus therefore is on stimulating the private sector participation while contributing to the issues of access to clean energy and the associated outcomes related to the economic impacts of job creation, income generation, macro-economic growth due to increased revenues from taxation, the social impacts of gender empowerment, healthier lives, social wellbeing of families and communities, and the environmental impacts of lower emissions, reduced impact on our water and land resources, etc. These in turn contribute to national priorities and international frameworks as shown in Figure below.

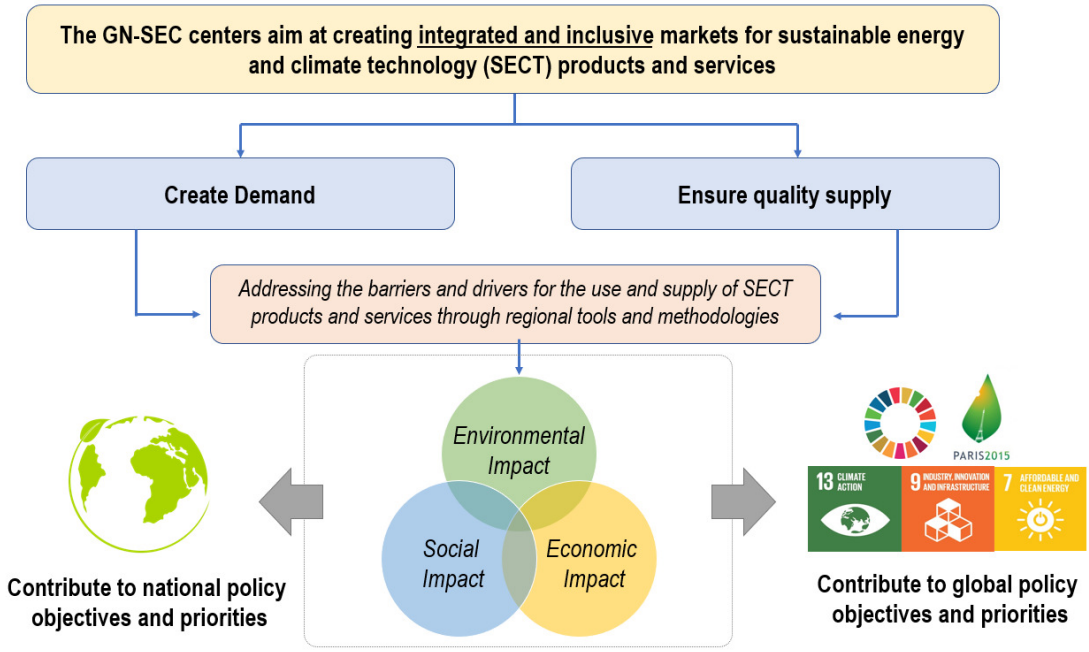


Figure 5: Activities promoted by GN-SEC contributes to national and global policy objectives and priorities

The GN-SEC agenda for supporting Regions is therefore not insular but an integral part of national and global agendas. While each region has their set of common characteristics, strengths and limitations – the RECs are bound by a set of common purpose(s), a defined framework condition (e.g. through a treaty signed by the member states) for strengthening engagement between the member states and the extended international community, while contributing to the general goodwill and prosperity of the region. To better understand the context wherein Regional cooperation can be effective for promoting SECT, this chapter looks at first, recognizing a list of barriers that limit the growth of SECT and sets a basis for developing a common assessment framework for data collection and further analysis.

2.5 Barriers and drivers for SECT market development

Despite growing investments over the past decade, SECTs markets have not reached economies of scale particularly in least developed countries (LDCs) and small island developing states (SIDS). Despite the setting of ambitious sustainable energy and climate policy goals, the concrete implementation remains slow. In the energy sector, the deployment of renewable energy and energy efficiency solutions remains hindered by a broad range of barriers and shortcomings related to policy and regulation, fiscal and non-fiscal incentives, technical limitations, economics, finance, capacity, quality infrastructure, R&D and innovation frameworks, knowledge and awareness. Overcoming barriers and strengthening drivers is central to any endeavour and the same remains true for the promotion of SECTs – both renewable energy and energy efficiency.

A barrier can be defined as an obstacle which prevents an initiative such as policy instrument or a company seeking to enter a market from being developed or implemented or limits the way in which it can be implemented. Removal or lowering of barriers will result in increased market competition due to a greater number of private sector actors investing in the SECT supply chain which in turn will reflect not only the real technology and service needs of the market but also a realistic market price based on the economic principles of supply and demand. Current energy service providers such as government utility-based monopolies or an

immature market characterized by a few local players or a dependency on imports will be replaced by a greater variety of products and services and provide consumers competitively priced SECT that can be chosen freely from a broad range of suppliers. Consumer choice will drive in maintaining the balance between supply and demand. Thus the barriers for the creation of a vibrant SECT market will need to be addressed, both from the demand and supply(ier) side equally.

In the context of this report, we use the following barriers of Policy and Regulation, Institutional, technical, Financial and the Lack of Data, Knowledge, Awareness etc. - as listed by GN-SEC as the starting point for further analysis, with a focus on identifying 'enablers' - elements that can potentially help overcome barriers, for private sector participation.

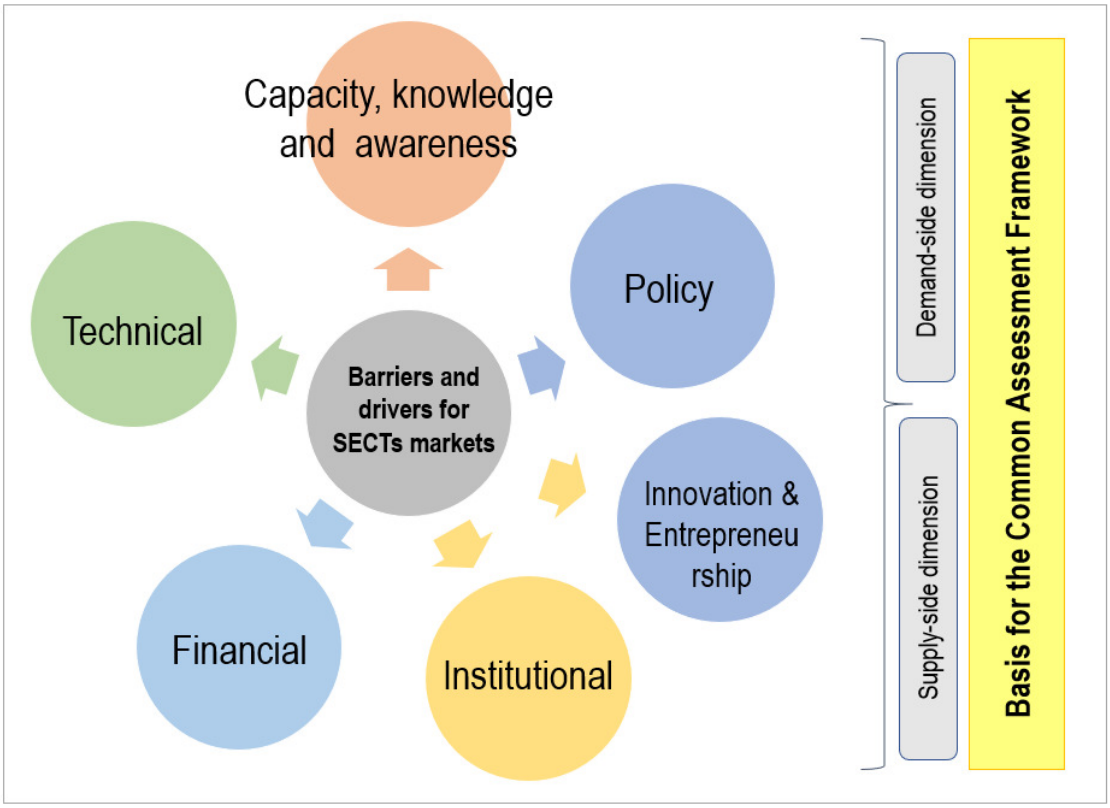


Figure 6: Overview on the considered SECT barriers and drivers (UNIDO GN-SEC, 2015)

2.5.1 Policy and Regulatory Barriers:

Note: The term 'Policy and Regulations' used in this document is intended as a comprehensive phrase that encompasses national, sectoral, regional level policies, regulations, laws, standards, certification schemes, incentives (e.g. financial and non-financial instruments) and other frameworks for implementation both on supply side and demand side of SECT.

Lack of policies and regulations can be an important roadblock for the adoption and scaling up of any new opportunity by the private sector. Well defined policies for SECT supported by implementation strategies provides a clear indication of the government priorities and when backed by incentives a stable and predictable environment for investments. To be inclusive, sustainable energy policies and fiscal and non-fiscal incentives need to consider the demand and supplier-side equally.

The uptake of demand for and supply of sustainable energy products and services in key economic sectors requires coherent policy and regulatory frameworks. Most developing countries have adopted ambitious renewable energy and energy efficiency targets but lack behind with the concrete implementation. The latter requires major amendments in laws, standards and regulations. In some countries, the continuation of fossil fuel subsidies, non-cost recovery tariff policies and the absence of standard procedures for IPPs and PPPs, are a major bottleneck for on-grid renewable energy generation. The absence of regulatory frameworks for rural electrification (e.g. concessions, tariffs) prevents the private-sector to invest in renewable energy powered (hybrid) mini-grid systems.

Weak renewable energy standards and the import of low-quality products have led to declining consumer trust in some regions (e.g. solar thermal systems, public solar PV lighting, PV stand-alone systems). The lack of coherent standards for buildings, appliances, lighting, power generation and distribution hinder the development of energy efficiency technology markets. Therefore, the following round table will discuss how regional policies, standards and incentives can accelerate national efforts towards sustainable energy futures.

In the context of Regional cooperation, the enabler to overcome this barrier is, for example the existence of a regional policies and targets for renewable energy and energy efficiency that the member countries are willing to commit and achieve within a given timeframe. The absence of such a regional policy for SECT provides a starting point for the GN-SEC centres who can engage with member countries to identify a top-down or bottom up strategy wherein they work with the respective national governments to either develop or strengthen national policies prior to consolidating this into a regional policy or alternatively work on setting up a regional policy in consultation with member countries which can then be taken up the respective national governments to propose respective targets, strategies on how they can be met. These regional 'policy and regulations' must be able to tackle the supply side (e.g. industrial policies that encourage the development of a local SECT industry) and the demand side (e.g. accreditation standards, certification of products, eco-labels etc.)

Innovation Story: EU's 2030 Energy Strategy:

EU's 2030 Energy Strategy defines 3 quantitative targets for 'climate and energy' that the EU aspires to achieve for the period between 2020 to 2030. This includes a 40% cut in greenhouse gas emissions (compared to 1990 levels), at least a 27% share of renewable energy consumption and at least a 27% energy savings compared to business as usual scenarios.

Essentially these targets provide a minimum level of ambition that the EU is willing to undertake over a set, i.e. 10-year timeframe.

To further strengthen the implementation of this strategy, the European Commission has proposed a reformed EU emissions trading scheme (ETS), defined a set of new indicators for the competitiveness and security of the energy system, such as price differences with major trading partners, diversification of supply, and interconnection capacity between EU countries and initial ideas for a new governance system based on national plans for competitive, secure, and SECT.

These plans will follow a common EU approach and ensure stronger investor certainty, transparency, enhanced policy coherence and improved coordination across the EU. In short, the EU has provided a strong basis for the growth of SECT along with 'systems' to help achieve them.

Source: (EU Law: C&E, 2014).

Innovation Story: ECOWAS Renewable Energy and Energy Efficiency Policy Process:

As a reaction to the oil crisis in 2008, the ECOWAS Head of State and Government took the decision to establish ECREEE in partnership with UNIDO and the Governments of Austria and Spain in 2010 in Cape Verde, Praia. In the view of regional integration, this was an important policy decision to integrate sustainable energy into the community policies. Before, the energy cooperation mainly focused on grid-interconnection through the WAPP (mainly driven by fossil fuels and large hydro) and rural energy access (not particularly focused on renewable energy and energy efficiency).

Based on the leadership of some ECOWAS countries, the centre in partnership with UNIDO and the European Union commenced the development of a regional policy framework for renewable energy, energy efficiency and energy access in line with SDG-7. The overall objective was to put a regional framework to ensure equal and harmonised progress in all fifteen ECOWAS countries and set priorities for the international development partners.

In July 2013, the Authority of ECOWAS Heads of State and Government adopted two path-breaking policies - the ECOWAS Renewable Energy Policy (EREP), which aims to increase the share of renewable energy in the region's overall electricity mix to 35% in 2020 and 48% in 2030; and the ECOWAS Energy Efficiency Policy (EEEP), which aims to implement measures that free 2000 MW of power generation capacity and in the long term, more than double the annual improvement in energy efficiency, so as to attain levels comparable to those of world leaders. Simultaneously, the SE4ALL Action Agendas were developed as umbrella document including also a pathway towards universal access to energy services.

The policies include a broad range of RE&EE measures to be implemented at regional and national levels and represent the ECOWAS contribution to the achievement of SDG-7. ECREEE is currently assisting the ECOWAS Member States to develop a coherent and aligned roadmap process. ECREEE has developed a regional framework for the development, implementation and monitoring of National Renewable Energy Action Plans (NREAPs), National Energy Efficiency Action Plans (NEEAPSs), and SE4ALL Action Agendas in the fifteen ECOWAS countries. ECREEE assisted the individual countries in the development and approval of the documents.

Based on the documents, also the development of investment prospectuses (IPs) was launched in partnership with banks and investors. The IPs include concrete priority investment projects which will lead to the set goals. Laudable progress has been achieved and nearly all ECOWAS countries have finalised the development of the policies. For example, with assistance of UNIDO and ECREEE, Guinea Bissau has developed an IP with a volume of more than USD 600 million. Some of the project are currently already under development or implementation. It is envisaged that Guinea Bissau reaches 50% renewable energy penetration in the electricity grid by 2030.

Source: (ECREEE-Policy, 2018)

2.5.2 Institutional Barriers:

Meaningful targets and timeframes can be made redundant unless backed by a robust set of institutions that support the process of the implementation. Given the impact energy has on socio-economic lives of the people, the implementation process involves stakeholders across the value chain. Institutions bridge the gap between demand and supply by regulating and

facilitating aspects of the entire value chain. And the lack of mandate, capacity and corruption within these institutions can considerably weaken the implementation.

The enabler to overcome institutional barriers is the existence of robust institutions with well-defined roles and responsibilities and staffed with trained people and equipped to be able to deliver the expected services. As this can comprise of several types of stakeholder groups and institutions, for example on the supply side deal with institutions that can support with permits, approvals, securing finance and providing start-up grants to initialize new ventures while on the demand side can comprise of service providers such as energy auditors who can provide the necessary technical information, gaps and recommendations to sectors such as buildings or industries on implementing energy efficiency measures. Given the complexity and the broad spectrum, the types of institutions reviewed in this report is limited to 3 types – namely technical institutions (e.g. regional energy regulatory authority or utility), financial institutions (e.g. a regional development bank) and private sector partnership (e.g. industry association). However, for the sake of consistency, the regional development banks are listed under the category for Financial Enablers and hence the CAF lists only 2 broad types of institutional categories.

For example, the strengthening of the capacities of the RECs to coordinate and promote Regional sustainable energy cooperation and integration was one of the main motivations to establish the GN-SEC centres. The traditional regional organisations/communities and their energy institutions (e.g. regional utility organisations and regulators) are dealing with wider energy and/or interconnection issues and focus often more on traditional energy sources (e.g. gas, coal, large hydro). In most cases, regional organisations lack of resources and capacities to overlook and monitor complex political and technical sustainable energy policy and implementation processes.

Innovation Story: ESCAP – SECT Cooperation in Asia Pacific

The efforts for strengthening regional cooperation for SECT is not a unique approach and indeed the UN's ESCAP addresses a similar challenge of Regional cooperation on SECT in the Asia and Pacific by recommending the creation of a "new architecture for regional energy governance".

ESCAP's flagship document 'Regional Cooperation for SECT in Asia and the Pacific' recognizes that given the specific circumstances among the member states, there is no single pathway to achieve the transition towards sustainable energy although policy options exist however, "each country must calibrate their own response". Regional institutional cooperation can help mobilize capacities, knowledge, technology and investment and support the cause for establishing a regional market for SECT.

In emphasizing the importance for regional energy governance, the document notes several steps that can be facilitated between institutions, namely:

- Developing regional energy system transition pathways that are consistent with SDG 7;
- Strengthening policy to align energy system transition and regional connectivity agendas, and promoting power grid connectivity;
- Developing an Asia-Pacific energy charter that lays out a regional legislative framework to provide private and institutional investor confidence in the long-term commitment of governments;
- Promoting public-private dialogues to encourage innovative financing and investment partnerships, and attracting private investment in SECT;

- Strengthening government capacity to establish policies, strategies, and programmes to encourage the energy transition and promote regional cooperation.

Source: (UN-ESCAP, 2017).

2.5.3 Technical Barriers:

There are manifold technical barriers when it comes to the application of RE&EE technologies in a specific context (e.g. intermittency of some RE technologies, river flow fluctuations, space limitations, road access, storage challenges of e-mobility). The lack of appropriate SECT technologies, supporting infrastructure and relevant know-how (e.g. technical specifications, operation and maintenance guidance) can limit the adoption of SECT technologies as they increase the initial investment costs (e.g. due to a reliance on imported technology), costs associated with setting up the energy value chain (e.g. setting up transmission and distribution infrastructure or market channels) and a lower reliability of technology which can translate to lower confidence of customers.

However, to understand the potential technical challenges it is important to first understand the list of technologies that can be implemented in more than 1 country within a REC and thus can be leveraged through Regional cooperation. Hence the enabler for overcoming technical barriers is to identify a list of common or SECT technologies that have a scope to be implemented across a region. Identifying a select group of SECT can provide a basis for additional initiatives and actions at a regional level such as a regional R&D or innovation facility for promoting a relevant group of technologies within a region.

To ensure that the data source is homogeneous – the analysis is done by reviewing the mitigation actions submitted by member states in a region as part of their submission for NDC (Nationally Determined Contribution) along with other publicly available information such as the **REN 21 Status Reports** and Baseline Assessments for the respective regions. The rationale for reviewing NDC targets is the stated 'ambitions' for energy (and other sectors) in the NDCs are voluntary based on their financial capacities (self-financed and targets achievable with international support) and hence is reflective of the national development priorities for the energy sector. And by identifying a limited number of technologies the GN-SEC can focus its efforts and resources more efficiently while contributing to issues around economies of scale and scope as addressing technical barriers can be highly complex and resource intensive (e.g. grid connectivity). By comparing the information collected from the **NDC Platform** (a World Bank supported resource database that provides quick facts, interactive maps and NDC commitments on specific sectors and sub-sectors and associated costs) with the available reports, it is possible to verify stated national ambitions and the priority technologies with studies undertaken by independent organizations and identify potential mismatch if any.

Innovation Story: Scale and Scope for Clean Cookstove Technology

According to a SE4All publication, the potential market size for clean cookstoves to be promoted through the 'Global Alliance for Clean Cookstoves' is **100 million households** by 2020. This will be implemented through a combination of formal commitments of USD 413 million and pledges of more than USD 250 million for in-country programs and policy implementation. (SE4All-GACC, 2015). The Alliance is a public-private partnership hosted by the UN Foundation that operates through a network of country and regional organizations through the principle of shared experiences and resources. Similar to rationale for Regional cooperation through GN-SEC, the Alliance benefits from the similarities in challenges and opportunities across regions – namely issues of environment, health, humanitarian,

livelihoods, women and gender that affect cookstove users in sub-Saharan Africa, Asia and Latin America.

One of the technical barriers that the Alliance has supported to overcome is by supporting the development of a 'Clean Cooking Catalogue' which is a global database of information on cookstoves, fuels, fuel products, and other technical data such as performance, specifications, emissions, efficiency and safety based on laboratory and field-testing. Through the catalogue, the Alliance is championing the adoption of international cookstove standards, which in turn not only supports the monitoring and evaluation of project activities through standardization but directly enables the creation of a private sector led international market for clean cookstoves that is harmonious across the regions.

Source: (Global Alliance for Clean Cookstoves, 2018)

2.5.4 Financial Barriers:

Experts estimate that up to US$300 billion by 2020, and up to US$500 billion by 2030, may be required annually in developing countries to address climate change mitigation alone. As private sector investment flows within and into developing countries are steadily increasing, the public sector has a unique opportunity to ensure that these flows are directed to meet critical climate change investment needs. However, so far access to tailored public finance and private sector investment has been a major bottleneck for the uptake of renewable energy and energy efficiency markets in many developing countries.

Only a small fraction of the global renewable energy investment is flowing into LDCs, particularly in Sub Sahara Africa. Various risks and barriers are hindering private sector investments. Tailored financial and insurance products are often not available or not affordable (e.g. high interest rates) in the domestic market. There are hardly instruments incentivising small-scale renewable energy projects, decentralised renewable energy systems (stand alone, mini-grids) as well as energy efficiency solutions (incl. efficient cooking solutions).

Public financing has so far not really found a coherent answer on the needs of these emerging areas.[2] International climate funds and multilateral financial organisations are required to strengthen national commercial banks and national institutions to provide tailored financial products and services for the various needs of sustainable energy products and businesses (e.g. grants, equity, loans, guarantees, insurance). Therefore, the lack of finance and appropriate financial mechanisms / instruments is well-understood and particularly important in the context of developing economies and climate actions.

The low rate of adoption of SECT technologies compared to conventional energy sources means a significant need for initial capital, that needs to be further supported by incentives, subsidies, lower transaction costs and other financial instruments. There is also the challenge of availability of finance by end-users to access SECT related goods and services. Recognizing the several strategies, scope and scale present for regional organizations in overcoming financial barriers – from risk reduction strategies, to creating regional financial products and services that benefit the sector, to promoting regional fiscal and monetary integration, there is a need for the assessment framework to limit the data collection process to issues that are of greater relevance to the role of the private sector. The focus is therefore on analysing the impact of 3 financial 'enablers' as below:

- **Regional Development Bank:**
- **Regional Financial Facility:**

[2] UNIDO

Finance for developing the supply and demand side can take the form of either public finance and private finance. While the later consists of investments by the private sector and institutional investors such as pension funds, the former can comprise of various types of financing mechanisms including official development assistance (ODA), foreign direct investment (FDI), direct budgetary support (DBS), other official flows (OOF), as well as conditional and unconditional funding. These sources of international (or donor provided) finance can be channelized through regional development banks or similar financial facilities.

In the context of implementing SECT in developing countries, this form of regional financing particularly from international sources or international development assistance in addition to fiscal incentives, and other financial incentives provided by the respective member states will play a key enabling role from covering early-stage project risk to getting new markets to maturity.

- **Independent Power Producers (IPPs), Public-Private Partnerships (PPP) and other regional models / mechanisms for promoting private sector participation:**

  IPPs are typically privately held facilities, businesses, cooperatives on non-energy industries that generate power with the mandate to supply (excess) electricity into the grid. PPPs as the name suggests comprises of the participation of a public and a private entity that combine their respective resources and capabilities to implement energy and infrastructure projects. Other mechanisms and models used globally to implement grid connected, but also decentralized and stand-alone SECT projects include initiatives such as the Global Alliance for Clean Cookstoves or programs such as Lighting Africa which create a collective push for small and medium sized enterprises to invest into new markets and technologies. The key market enabler in all these models is that they introduce private sector investment as a driver to promote SECT.

Innovation Story: Regional calls of the Private Financing Advisory Network (PFAN)

In partnership with ECREEE, the Private Financing Advisory Network (PFAN) has organised several regional calls for proposals and investment forums. PFAN identifies promising clean energy projects at an early stage and provides mentoring for development of a business plan, investment pitch, and growth strategy, significantly enhancing the prospect of financial closure. PFAN is hosted by UNIDO. Around 480 clean energy projects have been inducted into the PFAN Project Development Pipeline. These projects employ technologies including biogas, biomass, waste to energy, clean transport, wind, solar, small hydro and energy efficiency solutions. Thus far, 101 projects have achieved financial closure with over US$ 1.24 billion of investment raised. Combined, these projects have the potential to mitigate over 3.3 million tons of CO2e emissions per year and provide over 802 MW of clean generation capacity.

Innovation Story: Regional Trends in Public and Private Sector Finance

The IRENA in its publication titled 'Global Landscape of Renewable Energy Finance' notes that investments into renewables has grown at a higher rate as compared to conventional energy sources. While investments have been highly responsive to policy changes the private investors overwhelmingly favour investments into their respective domestic renewable energy projects (over 90% in 2013-2015), whereas public investment is more balanced between in-country and international financing. This clearly points to the limited

risk-taking appetite by the international private sector, particularly when investing in new and emerging markets.

The report notes that Western Europe and the Latin America-Caribbean regions were the two largest destinations for public renewable energy finance. While west Europe accounted for USD 14 billion, or 36% of public finance in the sector, Latin America-Caribbean accounted for USD 9 billion (22%) in 2013-2015. This points to national governments allocating significant public resources to establish regulatory instruments and fiscal incentives for stimulating investments into the domestic renewable energy markets.

In terms of financial instruments, the publication notes that by end of 2016, 147 countries had renewable energy support policies in place. While feed-in tariffs and premiums continue to be implemented, falling costs and grid integration issues have driven an increase in the use of auction mechanisms in awarding projects. And as policies drive many renewable energy investment decisions, investment trends vary greatly by geography. However, globally the past years has been a high share of investments on onshore wind and solar PV. The East Asia Pacific region which includes China led the trend in renewable energy investments followed by Western Europe and OECD America. Sub-Saharan Africa accounted for less than 5% of the total global investments. While most development banks and finance institutions favoured loans, USD 793 million worth of risk mitigation instruments in Asia and USD 552 million in Africa were extended, primarily to assist in establishing renewables in countries with a limited track record for such projects.

Source: (IRENA-Global Landscape, 2018)

2.5.5 Lack of Qualification, Innovation, Entrepreneurship, Knowledge and Awareness

The ECREEE in its website notes that non-availability of reliable and updated energy information creates a major constraint for investors and project developers in the SECT sector in the ECOWAS region. Data can take the form of relevant statistics, existing policies, laws, stakeholders, prices, generation costs, resources, investments and potential project sites – many of which are either unavailable or up-to-date. This can be perceived as a significant threat by private sector investors and one reason for favouring investments in the domestic renewable energy industry as noted in Box 4 above. Like financial barriers, this category of barriers is broad and there are enablers which can be highly effective if tackled at Regional level as it calls for sharing of resources, information and cooperation among member states.

Often there is no certification and accreditation framework for sustainable energy qualification, products and services in place. There is lack of training courses and educational programs at all levels focusing on RE and EE (e.g. higher education, vocational training). Policy makers on federal and municipality level, utility, regulator, consultants, project developers, businesses and industry, banks and civil society need to be trained on RE and EE solutions addressing all aspects: technical and technological, financial and economic, environmental and social benefits. Qualification is needed on the consumer (demand) as well as on the level of suppliers (supply).

Moreover, the sustainability of the energy transformation in developing countries requires inclusiveness in terms of local added value, turn-over and jobs. Inclusiveness requires the ability of the domestic private sector to supply quality products and services and to participate in the value chains of expanding renewable energy and energy efficiency technology markets.[3] However, in a number of countries, particularly in LDCs and SIDS, domestic businesses and

[3] UNIDO

start-ups continue to face a broad range of barriers. Existing energy policies and technology transfer programs tend to focus on creating demand for sustainable energy products and services rather than creating domestic supply. In a number of LDCs and SIDS even basic equipment and services continue to be imported. Sustainable energy technologies are often not considered as a particular priority in industrialisation strategies. Therefore, the question how regional cooperation can strengthen domestic energy innovation systems, industrial capacities and entrepreneurship in developing countries is an important one.

Moreover, due to weak R&D infrastructure and spending, the link between innovation and entrepreneurship is often weak. Both are grounded in the application of scientific research. Science and technology are a major catalyst for the creation of innovative products and services. Innovation and entrepreneurial activities need the right mix of: education and training, research and development, applied science and technology, as well as financing. More focus on actions to strengthen the productive (manufacturing, assembling, servicing) and innovation capacities of domestic entrepreneurs (e.g. fiscal and non-fiscal incentives, incubation, acceleration, R&D, quality infrastructure and standards, qualification, IPs, cluster building) is needed.[4]

While acknowledging that the selected enablers are not comprehensive and can be open to further discussion, this barrier looks at presenting 3 types of enablers that member states have been employed or exists and have a potential to make an impact and can be implemented at a regional level as further elaborated below. The objective of the assessment is to identify platforms that have been employed regionally (e.g. Energy Summits for awareness creation), infrastructure that may already exist (Regional Information Portals of Power Pools for sharing of data and knowledge) or institutions that provide an opportunity for building human resource and capacity (e.g. University Courses).

In addition to the selected enablers, other regional enablers for awareness creation can take the form of the use of TV, radio, print, social and other forms multi-media in addition to road shows, exhibitions or targeted information events and seminars to specific end-users. Information database can take various forms such as public database (e.g. websites, libraries, R&D Labs, Innovation Centres or Agencies that specialize in industrial development or trade), circulated information (e.g. from regular emailers to comprehensive reports developed by specialized agencies made available for a price) or conveyed through specialized events such as the energy summits and conferences. Building human resource and capacity can be through academic programs, vocational training programs, certification courses and other forms of training and new forms of knowledge sharing exercise (e.g. 'MOOCs' or Massive Open Online Courses, webinars, use of info-graphics, social media etc.)

- **Regional Energy Summit**

  The introduction of (new) SECT related goods and services will require governments to 'hear', cooperate and support the private sector and one such platform that has been successfully employed is through regional energy summits or conferences which brings together all relevant stakeholders to engage with each other, raise issues of mutual concern and provide a single voice to facilitate collective decision making.

- **Public Information Database and System:**

  The availability of a public database and information system such as a website that provides information on solar radiation, wind data, population, energy demand and other relevant information can be an important source of market intelligence for the private sector in developing a business case for investment. The assessment calls for identifying whether there exists a 'regional' website that makes available OR can be enhanced to make available relevant energy related information.

- **Human Resource:**

[4] UNIDO

Capacity development and training for enhancing the human resource available is cross sectoral and applicable to all barriers.

The focus of this assessment is to identify whether there exists a university within the region that provides Masters or PhD level courses in relevant areas of SECT and does not discount the role of other programs such as vocational training or certification courses. The rationale is that the existence of university programmes within a region can have a "multiplier effect" on the local economy. (Universities UK, 2014). They help create a talent pool of technically qualified people, "white-coloured" jobs and knowledgeable managers who in turn can support the growth of R&D, innovation, facilitate "training of trainers" and local know-how thus reducing the dependency on international experts over time.

Innovation Story: Sustainable Energy Forum for East Africa, 19 to 21 March 2018 in Kigali

The first Sustainable Energy Forum for East Africa concluded, with the over 300 participants adopting a Call for Action urging governments of the EAC Partner States, Development Partners, Private Sector, Financial Institutions and all relevant stakeholders to each play an active role in ensuring that energy needs of citizens in the region are effectively addressed.

The Forum was organized by the East African Centre for Renewable Energy and Energy Efficiency (EACREEE) in collaboration with the United Nations Industrial Development Organization (UNIDO), the EAC Secretariat, the Austrian Development Agency (ADA), Sustainable Energy for All (SEforALL), and the Ministry of Infrastructure of the Republic of Rwanda (MININFRA), and is hosted by the government of Rwanda.

The participants called upon governments of the EAC partner states to strengthen individual and collective national commitments toward addressing the special energy and climate resilience needs of the East African region in the context of the Sustainable Development Goals and the Paris Agreement on Climate Change.

The Call for Action also urged the EAC Partner States, in consultation with private and civil society organizations, to develop and implement a coherent regional renewable energy, energy efficiency and energy access policies, including integrated regional and national energy access strategies, which are aligned to the Sustainable Development Goals and the Paris Agreement.

The participants have further called upon the EAC Partner States to put in place an enabling environment to enhance public private partnerships for investments in grid extension, decentralized and distributed generation systems to increase rural electrification, energy efficiency and sustainable and inclusive industrialization.

The Forum has also called upon financing institutions to develop flexible and innovative financing mechanisms to support renewable energy and energy efficiency investments and services, in particular for decentralized energy options; urged Development Partners to support capacity building of local financial institutions on assessing renewable energy business plans and project risks, and sensitizing potential investors/entrepreneurs on conducting feasibility studies and preparation of bankable project documents.

As a way of addressing gender gaps, the Forum has called upon EAC Partner States and Development Partners to support gender-inclusive programmes specifically those aimed at empowering women, youth and the disadvantaged in sustainable energy entrepreneurship, productive uses of energy and strengthening their involvement in sustainable energy development leadership and workforce.

The Forum has also recognized the great potentials of geothermal energy resources in the EAC region and called upon EAC Partner States to develop programmes to enhance capacity for exploitation of these resources.

2.6 Common Assessment Framework (CAF)

This chapter has presented the 5 barriers that can impact SECT and a list of potential enablers that can be tackled at Regional level for enhancing the role of the private sector "by creating and integrated and inclusive regional market of SECT products and services through a balance demand and supply-oriented approach". The barriers therefore provide a starting point for developing the CAF and focuses on information that are relevant to the overall goals and objectives of establishing the GN-SEC centres. This approach does have its drawbacks as it focusses on a limited number of enablers but allows to define activities that can be tackled more effectively at Regional level. For a more comprehensive barrier analysis, the readers are pointed to refer to existing project documents for the respective RECs, baseline assessment reports, 3rd party reports such as the Status Reports by REN 21, many of which are used as a source material in the next chapter.

3. Data Collection

By looking at the moderate growth rates of Sustainable Energy and Climate Technology (SECT) markets in many developing countries, it becomes obvious that SDG-7, SDG-9 and SDG-13 cannot be attained by 2030 in business-as-usual scenarios.[5] The climate crisis and issues such as migration due to lack of opportunities have highlighted the importance of SECT in development. Without a well-functioning energy system, countries lose out on economic gains that provides a basis for a peaceful society.

A robust energy system prioritized around SECT on the other hand, can boost a country's economic growth due to lower dependency on fossil fuel imports, foster social development and protect vulnerable groups, as well as the environment. Renewable energy and energy efficiency are, apart from other low-carbon options, an effective tool to address energy poverty and affordability, energy security and reliability, as well as negative environmental externalities (GHG emissions, local pollution) simultaneously and in an integrated way. Recognizing this the UN initiated SDG-7 with the aim of achieving 3 goals by 2030, namely: Ensuring universal access to modern energy services; Doubling the global rate of improvement in energy efficiency; and Doubling the share of renewable energy in the global mix.

This chapter focusses on presenting the past and on-going initiatives in the 5 RECs specifically related to promoting SECT. To ensure that the data collection is not a complex process to collate and present existing information in the public domain, the Common Assessment Framework has been developed with the principle of identifying a limited number of enablers that can be pursued through Regional cooperation. The CAF is therefore not intended to act as a comprehensive management tool or model and neither does it aim to provide a comparative 'scoring' between the RECs or aim to create any new data.

[5] UNIDO

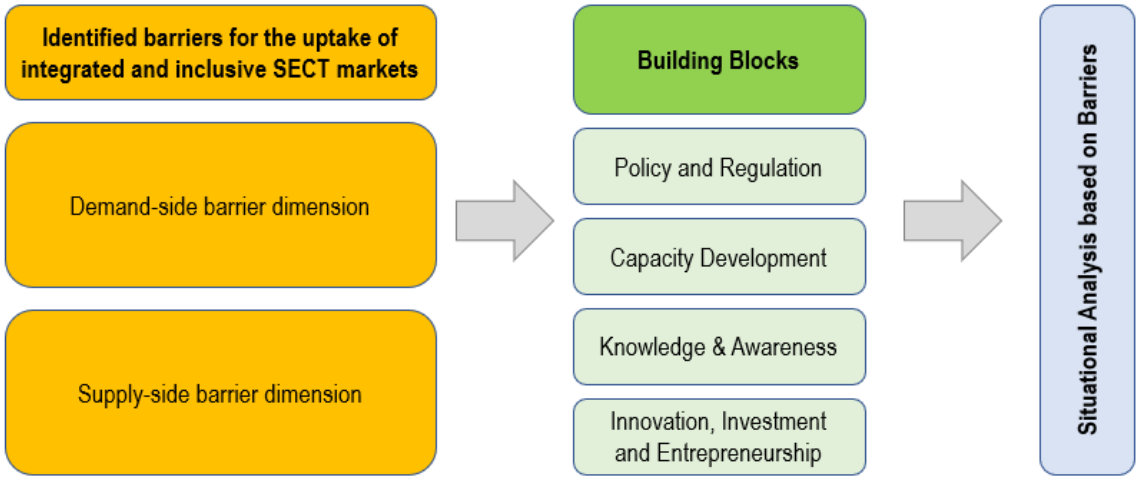


Figure 7: Logical flow for developing the CAF

3.1 The Common Assessment Framework

The main reference for developing the CAF is the approach taken by ESMAP in developing the Regulatory Indicators for Sustainable Energy (RISE). The RISE looks through 3 pillars – namely Energy Access, Energy Efficiency and Renewable Energy and is comprehensive in terms of defining indicators and sub-indicators under each pillar which are then scored between 0-100.

The CAF takes a simpler approach by first defining a hypothesis that points to the existence of an equilibrium in the market between demand and supply. The data collection then focuses on identifying to what extent is this equilibrium met, and if not provides a list of challenges and opportunities for the GN-SEC to intervene and enable.

- **Socio-Economic Indicators:**

  The CAF provides basic information such as population, GDP and links to the key reginal institutions and GN-SEC centre that provides an overview of the REC

- **Enabler to Policy and Regulatory Barriers:**

  The RECs have the appropriate enabling environment in terms of a common regional policy, and legal and regulatory framework including regional targets and timelines that provides the private sector a level of credibility to invest in and pursue opportunities in renewable energy and energy efficiency initiatives.

- **Enablers to Institutional Barriers:**

  There exist within the RECs a set of Regional institutions, namely technical, financial and a business association that can support the activities of private sector and the member states achieve the policy goals, targets and timeframes for RE and EE. (Note: the institutions do not consider the parent Regional entity e.g. ECOWAS or the GN-SEC centre e.g. ECREEE)

- **Enablers to Technical Barriers:**

  There is a list of SECT technologies that is relevant across the RECs (e.g. 2 or more member states) and thus supports pursuing a regional market strategy. The technologies are relevant to both RE and EE and in line with national priorities with the possibility of contributing to broader global goals.

- **Enablers to Financial Barriers:**

  The RECs have a well-established and functional environment such as Regional Development Banks, Financial Facilities and incentive structures / models (e.g. Feed-in tariffs, IPPs, PPPs, etc.) that promote private sector participation for promoting SECT.

- **Enablers for Capacity, Innovation and Entrepreneurship, Knowledge and Awareness:**

  There are existing initiatives within the REC which points to experience with programmatic marketing and awareness creation, infrastructure that supports sharing of data and information, and required academic courses / institutions that ensures a pipeline of qualified and trained people for the private sector.

1. Socio-Economic Indicators of RECs
List a set of key socio-economic indicators for the REC ***Key Enablers:*** *1.1. List of member countries* *1.2. GDP* *1.3. Population* *1.4. Information on GN-SEC Centre: Entity, Status and Website*
2. Policy and Regulatory Enablers
Does the REC have a Regional policy / roadmap or similar document with well-defined targets and timeframes for SECT? ***Key Enablers:*** *2.1. Key Regional Policy / Target for Renewable Energy / Implementation Framework* *2.2. Key Regional Policy / Target for Energy Efficiency / Implementation Framework* *2.3. Other Regional Policies and Regulations (e.g. Standards / Incentives etc.)* *2.4. Treaty of the REC and linkage to SECT*

Such a policy could be either set collectively for either renewable energy and/or energy efficiency (e.g. 20% of all electricity should be produced from renewable sources) OR for specific technologies (e.g. 100 MW from Solar PV).

If a suitable policy is identified, is there a linkage or alignment with respective national energy policies, targets and timelines. If no policy exists, then the focus for Regional cooperation is to create a level of certainty for the private sector by establishing a common goal. This includes also targets for decentralized renewable energy solutions. It is expected that in Sub Sahara Africa more than 50% of the investments driving universal access by 2030 will go in stand-alone systems and (hybrid) mini-grids.

3. Institutional Enablers

Is there a group of institutions operating with a regional mandate to support the implementation of Regional policies for SECT?

Key Enablers:

3.1. Regional Technical Entity (e.g. Energy Authority, Utility, Power Pool, GN-SEC centre etc.)

3.2.

3.3. Regional Private Sector Association (e.g. Chamber of Commerce)

While there can be several types of regional institutions, the 3 listed above are the most common types of institutions that can facilitate the initial engagement process for GN-SEC, particularly in relation to overcoming technical and financial barriers, and act as a focal point for outreach with the private sector.

4. Technical Enablers

Identify a list of SECT technologies that is applicable across the REC (at least 2 or more countries) that can contribute to the regional policy goals and also to the national priorities. Identifying a list of RE/EE technologies can provide a basis for additional actions and initiatives (e.g. regional innovation or R&D facilities)

Key Enablers:

4.1. List of Renewable Energy technologies

4.2. List of Energy Efficiency technologies

The analysis is focused on identifying a regional list of SECT based on targets set out by the respective national governments and verified through studies undertaken by independent / international organizations.

5. Financial Enablers

Discuss the scenario with regards to the following enablers:

Key Enablers:

5.1. Regional Development Bank

5.2. Regional Financing Facility

5.3. Other Regional Implementation Models / Financial Incentives for promoting private sector investment in SECT

Given the complexities, this section is intended to be an open discussion aimed at giving a sufficiently broad understanding of issues related to regional financial facility – which brings in the perspective of international finance and the role of regional development banks and models such as IPPs, PPPs which bring in the perspective on private sector investments for SECT projects.

6. Enablers for Qualification, Innovation and Entrepreneurship, Knowledge and Awareness:

Present a short narrative of relevant examples existing either regional or national level on the 3 enablers listed below.

Key Enablers:

6.1. Regional energy conference or similar.

6.2. Regional Public Information Database (e.g. website)

6.3. University offering relevant post-graduate programs

The examples provide a point for departure for subsequent support that can be provided. For example, populating an existing website with relevant information or strengthening curriculum across various educational institutions.

3.2 CARICOM

1. Socio-Economic Indicators of RECs

1.1. List of member countries: (15)

Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and Grenadines, Suriname, Trinidad and Tobago.

With the exception of Guyana and Suriname located on the northern tip of the South American continent, CARICOM comprises primarily of Small Island Developing States (SIDS) and all the 15-member states are classified as LDCs. The region in characterised by small economies dependent on agriculture and tourism sectors, significant dependence on imported fossil fuels and vulnerability to global oil price volatility and face similar challenges in terms of climate impacts – particularly in the form of cyclones and flooding of the coastal zones and low-lying areas.

1.2. GDP: USD 77.74 Billion

Largest economies Trinidad and Tobago (USD 22 billion), Jamaica (USD 14.4 Billion) and Bahamas (USD 12.1 Billion). Smallest economy: Dominica (USD 563 Million)

1.3. Population: 18.3 Million

Largest country by population – Haiti (11 million) and smallest – St. Kittis and Nevis (55,400)

1.4. Information on GN-SEC Centre:

GN-SEC Centre: CCREEE - Bridgetown, Barbados - https://ccreee.org/

Status: Operational since Oct 2015

CARICOM Secretariat: Georgetown, Guyana - https://caricom.org/

2. Policy and Regulatory Enablers

2.1. Regional Policy / Target for Renewable Energy:

Key Policies include the CARICOM Energy Policy (2013) and the **Caribbean Sustainable Energy Roadmap and Strategy (C-SREMS)** published in 2015 covers both RE and EE.

The C-SREMS provides the regional strategy for SECT and notes that "extremely strong potential for utilizing domestic renewable resources" exists across the region with technical assessments indicating opportunities related to energy efficiency improvements and renewable sources geothermal, hydropower, modern biomass, solar, and wind. Current grid and storage infrastructure, however, is generally insufficient to support such developments on a large scale. Harnessing the sustainable energy potential will require several key technical assessment gaps to be filled and will depend on "long-term vision, the effectiveness of existing policy and

regulatory structures, and the surrounding governance and administrative framework." (CARICOM-C-SREMS, 2015)

Target for RE: Share of Renewables of total generation capacity (%): 20% (2017), 28% (2022) and 47% (2027)

2.2. Regional Policy / Target for Energy Efficiency:

Target for EE: 33% reduction in energy intensity is proposed across the region between 2012 to 2027

2.3. Other Regional Policies & Regulations

CARICOM's Renewable Energy and Energy Efficiency (REETA) Project intends to collaborate with the CARICOM Regional Organization for Standards and Quality (CROSSQ) for developing a Draft Energy Codes for Building as well the Minimum Energy Performance Standards (MEPS) for public buildings in the region. CARICOM has promoted several similar programs through the CARICOM Energy Program on Energy Building Code, Appliance Standard and Labelling Coordination.

2.4. Treaty of REC and linkage to SECT:

CARICOM was founded on the **Treaty of Chaguaramas** and was revised in 2001 to include the CARICOM Single Market and Economy (CSME). The key objectives of the treaty are stated in Article 6 of the treaty – all of which can contribute to or will benefit from promoting Regional cooperation on sustainable energy and private sector participation.

Some of the relevant sections of the treaty include: Improved standards of living and work, Employment, Expansion of trade and International competitiveness of the private sector, Increased productivity, and Enhanced functional co-operation, including (i) more efficient operation of common services and activities for the benefit of its peoples; (ii) accelerated promotion of greater understanding among its peoples and the advancement of their social, cultural and technological development; (iii) intensified activities in areas such as health, education, transportation, telecommunications. (CARICOM-Treaty, 2001)

3. Institutional Enablers

3.1. Regional Technical Entity:

The **Caribbean Electric Utility Services Corporation** (CARILEC) is an association of electric services, dealers, manufactures and other stakeholders operating in the electricity industry in the Caribbean region.

CARICOM Regional Organisation for Standards and Quality is responsible for promoting standardization in the region. As the region comprises primarily of small islands and hence limits physical connectivity of electricity grid, there is no designated Power Pool.

The CARICOM Energy Unit and the Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE) are the main drivers of the C-SERMS implementation process. Whereas the CARICOM Energy Unit will

concentrate more on the overall coordination of energy issues, the centre is supposed to act as technical implementation in partnership with other regional and national thematic hubs and National Focal Institutions.

3.2. Regional Private Sector Association:

Caribbean Association of Industry and Commerce (CAIC) that represents the Caribbean private sector at a variety of regional and international meetings on economic, social and environmental policy.

Caribbean Hotel and Tourism Association (CHTA) represents the actors from the tourism sector which is a key contributor to the region's economy and energy consumer.

4. Technical Enablers

The C-SERMS notes that the CARICOM states exhibit a heavy reliance on imported fossil fuels, particularly diesel and heavy fuel oil for power generation and transport. The power systems are characterised by a monopoly control over transmission and distribution and regional grid connectivity is unexplored challenges associated with isolated grids, insufficient infrastructure, and investment cost. The cost of electricity rates in the Caribbean are high and this is further exaggerated due to poor infrastructure, technical losses and low quality of service in general. However, the uptake of renewable energies requires in many islands further innovation on the side of storage solutions.

4.1. List of Renewable Energy technologies applicable across the REC

The NDC assessment indicates a potential for small capacity solar PV plants (e.g. Grenada – 10MW, Haiti – 30 MW), geothermal (e.g. Dominica, St. Kittis and Nevis is planning for 35 MW) and small capacity wind. This is further supported by the analysis provided in the C-SREMS which indicates a potential of 2525 MW of solar, 6,280 MW of geothermal and 2,153 MW of wind. The potential for hydro is listed at 9,750 MW but this is primarily due to a potential of 7,000 MW in Gyuana alone. The tourism sector has in the past promoted the use of solar water heaters and a potential exists of expending this program across the CARICOM states. (CARICOM-C-SREMS, 2015).

4.2. List of Energy Efficiency technologies applicable across the REC

Energy efficiency targets do not find a significant prominence in the NDC assessments although there are indications for setting up labeling schemes for appliances and buildings (e.g. St. Vincent and the Grenadines), distribution of energy efficient lighting (e.g. Haiti has set a target of 1 million) and reducing emissions in buildings through retrofitting and building codes (e.g. Grenada). This is also supplemented by the C-SERMS which calls for developing policies on building codes. Additionally, there is a potential for improving the power systems to minimize losses.

5. Financial Enablers

5.1. Regional Development Bank:

The **Caribbean Development Bank** (CDB) is regional development bank however has a limited mandate and capacity for proving finance on

sustainable energy with the **Inter-American Development Bank (IDB)** being the key institution in Latin America and the Caribbean.

5.2. Regional Financial Facility:

The Caribbean Development Bank and the UK's Department for International Development (DFID) have partnered for the implementation of the UK Caribbean Infrastructure Programme (UKCIF) aimed at improving and creating new infrastructure in nine Caribbean countries.

The DFID will provide up to UK Pound 300 million of grant financing from January 2016 to March 2020 to establish a UK Caribbean Infrastructure Partnership Fund with the Caribbean Development Bank. The projects are expected to provide a minimum of 12% economic return on investments and information on contributions by national governments / private sector in unavailable. For the sake of comparison, the commercial bank prime lending rate stood at 16.6% (Dec 2017) for Jamaica.

Source: (CDB-UKCIF, 2016)

In 2017, the Chairman of the World's Small Island Developing States, Grenada's Prime Minister Dr. Keith Mitchell, insisted that Caribbean countries need "urgent access to financing" if they are to achieve SDGs. (Grenada Government-News, 2017). This statement is partly reflective of the limited availability of public finance for large infrastructure projects and coupled by the fact that the public financial system in the Caribbean "is not yet fully mature" presents a significant challenge for governments to play an active role for promoting SECT in the CARICOM. (WB-GoD, 2016)

Similarly, the Caribbean Development Bank with support from the World Bank and the Inter-American Development Bank, has established a USD 1.2 million Regional PPP Support Facility. A PPP roadmap developed by the Public-Private Infrastructure Advisory Facility for the Caribbean identifies a list of 33 projects PPP projects in various stages of development of which only 4 projects relate to the energy sector – one related to geothermal and the other 3 related to other renewable energy technologies. No initiatives for EE were identified.

Source: (CARICOM-PPP Facility, 2015) and (PPIAF-Caribbean, 2014)

5.3. Other Regional Models and Financial Incentives for promoting Private Sector Participation

The following section requires further research.

6. Enablers for Capacity, Data, Knowledge and Awareness:

6.1. Regional Energy Conference

The Caribbean Regional Energy Forum (CREF) hosted by CARICOM, the Caribbean Development Bank (CDB), the Inter-American Development Bank (IDB), the Organization of American States (OAS), the U.S. Departments of State and Energy, The World Bank, and the Government of Canada is the premier regional event that brings together "investors, developers, utilities, bankers, regulators, suppliers, and regulators and policy-makers" for exchange of information on SECT. Past events have been held in the

Caribbean with the more recent events being organized in Florida which signals the intent of the region to be closer to the investor community.

Source: (CREF, 2018)

6.2. Regional Public Information Database

The **Caribbean Energy Information System (CEIS),** is the Energy Information arm of the Caribbean set up to provide a regional energy information service to support planning and decision making. However, the system is not functioning very well. Therefore, it was decided to establish a new and more comprehensive system in the scope of the GN-SEC and other international data portals under the C-SERMS. The system will be managed by CCREEE.

6.3. University offering relevant post-graduate programs

The University of Technology in Jamaica offers a multidisciplinary Master of Science Degree in Sustainable Energy and Climate Change and the University of West Indies offering a M.Sc. in Renewable Energy Management at their Cave Hill Campus in Barbados. However, there is a lot of need to strengthen also vocational training.

3.3 ECOWAS

1. Socio-Economic Indicators of RECs

1.1. List of member countries: (15)

Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo

ECOWAS is a group of 15-member countries primarily located in West Africa. 11 of the member states excluding Nigeria, Cabo Verde, Côte d'Ivoire, and Ghana are LDCs with Cabo Verde being the only SIDS. The regional economic "super power" is Nigeria, home to 20 of the 25 largest businesses in West Africa and the region accounts for 70% of the world's cocoa production and is known for its mineral resources. However, the region is characterised by high levels of poverty, weak infrastructure and a predominantly agrarian and rural economy. The West African states are particularly susceptible to climate impacts that will impact agriculture, water resources, human health, ecosystems, livestock and fisheries.

1.2. GDP: USD 550 Billion

Largest economies Nigeria (USD 375 billion), Ghana (USD 47.3 Billion) and Côte d'Ivoire (USD 40.4 Billion). Smallest economy: The Gambia (USD 1.1 Billion)

1.3. Population: 367 Million

Largest country by population – Nigeria (190 million) and smallest – Cape Verde (546,000)

1.4. Information on GN-SEC Centre:

GN-SEC Centre: ECREEE - Praia, Cape Verde - http://www.ecreee.org/
Status: Operational since July 2010
ECOWAS Secretariat: Abuja, Nigeria - http://www.ecowas.int/

2. Policy and Regulatory Enablers

The creation of ECREEE was a major policy decision to include SECT more strongly in the Community mandate. The ECOWAS Heads of State adopted 2 "path-breaking" policies for Renewable Energy and Energy Efficiency respectively. To implement the regional RE and EE policies and the SE4ALL Initiative in West Africa, ECREEE has developed a regional framework for the development, implementation and monitoring of National Renewable Energy Action Plans (NREAPs), National Energy Efficiency Action Plans (NEEAPSs), and SE4ALL Action Agendas. Moreover, Investment Plans were developed.

2.1. Regional Policy / Target for Renewable Energy:

Regional Policy: **ECOWAS Renewable Energy Policy (EREP)**

Target: The share of renewable energy in the region's overall electricity 10% in 2020 and 19% in 2030. Including large hydro, the share is targeted at 35% in 2020 and 48% in 2030.

Around 25% of the rural ECOWAS population will be served by mini-grids and stand-alone systems by 2030.

2.2. Regional Policy / Target for Energy Efficiency:

Regional Policy: **ECOWAS Energy Efficiency Policy (EEEP)**

Target: Implement EE measures to free up to 2,000 MW of power generation capacity by 2020.

Phase out incandescent lamps by 2020.

Reduce average losses from electricity distribution from the current levels (15-40%) to 10% by 2020.

2.3. Other Policies and Regulations

The ECOWAS currently has an ECOWAS Energy Protocol which provides a legal framework to promote long-term co-operation in the energy field, based on complementariness and mutual benefits, with a view to achieving increased investment in the energy sector, and increased energy trade in the West Africa region. The Protocol lays the policy foundation for action on energy, including improved energy efficiency.

2.4. Treaty of REC and linkage to SECT:

As alignment of policies and actions are the key objectives of ECOWAS in promoting sustainable energy, there is a high level of alignment with the stated objectives of the ECOWAS treaty, particularly on 'Harmonization and

co-ordination of national policies and the promotion of integration programmes, projects and activities, Harmonization and co-ordination of policies for the protection of the environment, Establishment of joint production enterprises, Establishment of a common market and the Establishment of an economic union through adoption of common policies in the economic, financial, social and cultural sectors, and creation of a monetary union.'

In addition the treaty also calls for an enhanced role for the private sector through promotion of joint ventures by private sector enterprises and other economic operators, through the adoption of a regional agreement on cross border investments, adoption of measures for the integration of the private sectors, particularly the creation of an enabling environment to promote SMEs, establishment of an enabling legal environment, harmonisation of national investment codes leading to the adoption of a single Community investment code and the harmonization of standards and measures. From a sustainable development perspective investing in the energy sector will contribute to strengthening of relations and the promotion of the flow of information particularly among rural populations, women and youth organizations and socio-professional organizations such as associations of the media, business men and women, workers, and trade unions. (UNECA-ECOWAS, 2018)

3. Institutional Enablers

3.1. Regional Technical Entity:

The **ECOWAS Regional Electricity Authority (ERERA)** and the **West African Power Pool (WAPP)** are the 2 relevant regional institutions for the energy sector.

ERERA is the energy regulator of regional cross-border trade of electricity and cross border electricity interconnections in West Africa while WAPP comprising of 14 of the 15 member states focuses on the integration of regional power system integration and the realization of a regional electricity market.

UNIDO has in the past supported a **West Africa Quality Programme** with the support of EU to implement a quality policy for ECOWAS and in 2017 the region adopted the ECOWAS Standard Harmonisation Procedures.

The **ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)** was decided in 2008 and got operational in 2010. The centre is the main driver for RE&EE in West Africa.

3.2. Regional Private Sector Association:

The **Federation of West Africa Chambers of Commerce** (FEWACCI) is a regional entity representing the respective national chambers of commerce. The entity is active in supporting capacity building and awareness raising programs among its member organizations and has a stated objective for promoting transnational companies that can operate across the various countries in West Africa.

FEWACCI is credited to have initiated the **ECOBANK Transnational** which is one of the largest private sector banks in the region and can be expected to play a role in facilitating private sector finance.

4. Technical Enablers

The REN 21 notes that the energy infrastructure in the ECOWAS region is characterised by various factors including poor reliability of the power systems, limited infrastructure, dependence on imported fuels and heavy reliance on fossil fuels, hydro and traditional biomass. The national electricity rates vary greatly from less than 10% in Niger to almost universal access in Cabo Verde. More than 85% of the population rely on traditional biomass and solid fuels for cooking.

4.1. List of Renewable Energy technologies applicable across the REC

The NDC assessment indicates a significant potential for off-grid and grid connected solar PV (e.g. Nigeria 13 GW of PV), biomass/biofuels (e.g. Guinea and Niger has indicated ambitions for the use of biogas while Sierra Leone has indicated its willingness to develop biofuels from rice husk, sugarcane, corn etc.) and hydro (e.g. Senegal 200 GWh by 2025 and Niger has set an ambition of 130 MW). In addition to renewables, Nigeria and Ghana have also indicated their willingness to explore gas as an alternative source of fuel given the availability of gas in these 2 countries. This is supported by the information in the REN 21 report which notes that hydro is the only renewable source that deployed on a commercial scale in many states with only 19% of the actual potential exploited. There has been a growing interest for solar PV, particularly on small MW capacity off-grid projects.

4.2. List of Energy Efficiency technologies applicable across the REC

Energy efficiency actions primarily focus on 3 types of activities – the promotion of the use of efficient cookstoves, distribution of LED lamps and energy efficiency improvements in buildings and this supported by the information provided in REN 21 although the document also notes that technical and non-technical losses is a significant barrier to the sector.

5. Financial Enablers

5.1. Regional Development Bank:

The **ECOWAS Bank for Investment and Development** (EBID) works 2 funding windows, to promote private sector activities and to fund the development of public sector. The bank also operates the African Bio-fuels and Renewable Energies Company (ABREC) which focuses on investments in sustainable energy technologies. Additionally, the AfDB (African Development Bank) plays an important role in all of Africa.

The **African Development Bank** is an important intra-regional provider and runs important facilities, increasingly also for decentralised renewable energy systems. One example is Sustainable Energy Fund for Africa (SEFA).

5.2. Regional Financing Facility:

The New Partnership for Africa's Development Infrastructure Project Preparation Facility (NEPAD-IPPF) hosted by the African Development Bank is a multilateral donor supported Special Fund supported by Canada, Germany, the United Kingdom (UK), Denmark, Norway and Spain as well as the United States Agency for International Development (USAID) for co-financing projects including energy and infrastructure.

NEPAD-IPPF has committed nearly US$100 million for preparing bankable infrastructure projects while unlocking USD 7.8 Billion in investments according to the website. The partnership is a recognized partner for RECs and signed a MOU with the PPDU in 2017 to "bring more resources to project preparation in West Africa given the growing demand for project preparation in energy including renewable energy,". As part of this partnership, the 2 agencies also organized a workshop on 'ECOWAS Technical Meeting on PPP Structuring and Guarantee Mechanisms for the Financing of ECOWAS Priority Infrastructure Projects'.

Source: (AfDB-NEPAD, 2017)

Akinwumi Adesina the president of the African development bank was quoted to have said that "Africa must focus more on industrialisation to boost economic development" noting that the industrial value addition declined in Nigeria by 41% between 2012 and 2018. The AfDB aims to invest USD 35 Billion over the next 10 years to help the continent industrialize and taking note that this can be harmful to the environment the President also noted that the bank would "triple its climate financing to 40% of its work by 2020". (PFI-News, 2018).

The ECOWAS Project Preparation and Development Unit (PPDU) established in 2011 is a Specialised Agency under ECOWAS mandated to prepare regional bankable infrastructure projects in line with the objectives of regional integration and economic development. The main functions of the PPDU are to:

- Prepare and develop regional integration infrastructure projects in ECOWAS Member States;
- Manage a dedicated infrastructure fund for preparation of the projects;
- Promote PPP in investment financing and project management in ECOWAS

5.3. Other Regional Models and Financial Incentives for promoting Private Sector Participation

One example is the Private Financing Advisory Network (PFAN). Another example is the Regional Off-Grid Electrification Project (ROGEP).

6. Lack of Capacity, Data, Knowledge and Awareness:

6.1. Regional Energy Conference:

One of the more 'high-profile' regional programs that focus on raising awareness around SECT and the energy market is the **annual 'West Africa Power Summit'** which was launched in 2016 and has been held annually since then. Though organized by a private sector entity, the event has the support of the ECOWAS and participation by a broad range of stakeholders including Ministries of Power and Energy, State Power providers, proponents of PPP, Independent Power Producers and solution providers. The forum engages at a B2B level on issues related to investments for sustainable energy power initiatives.

Source: (WAFPOWER, 2018)

Additionally, the ECOWAS Sustainable Energy Forum is another key event that aims to promote exchange of ideas and cooperation to support the acceleration of sustainable solutions to the region's energy situation. The forum will provide a platform to improve the current policy and regulatory landscape hindering the required investment into the region's energy sector. The forum will also facilitate networking and partnerships between ECOWAS policy makers, regional and international private sector players and financial institutions.

6.2. Regional Public Information Database

The key institute that promotes data and information exchange in ECOWAS is the ECREEE managed ECOWAS Observatory for Renewable Energy and Energy Efficiency (ECOWREX). The main objectives of ECOWREX is to provide targeted, timely and statistical information and data about the energy sector (especially in the field of RE and EE) in the ECOWAS Region. This includes RE&EE policies and regulatory frameworks, potentials, stakeholders, policies, events, lessons learned and investment projects, and the use geospatial technology to visualize and overlay the energy resource with the existing infrastructure and other human activities.

EU is currently supporting the development of a **Western African Power Pool Information and Coordination Centre** (WAPP ICC) to manage power system related information in the ECOWAS countries. The WAPP ICC will serve as the central monitoring and electricity trading hub and provide ECOWAS the means to coordinate data exchange, and support the operation of an interconnected Power System. The ICC Project involves the construction of the ICC building in Calavi (Republic of Benin)

Source: (EU-WAPP_ICC, 2018)

6.3. University offering relevant post-graduate programs

KNUST in Ghana, 2IE in Burkina Faso and Cape Verde are examples with Master programs. The largest universities in West Africa are predominantly located in Nigeria with the University of Lagos having a dedicated 'Private Sector & Sustainable Development Research Group' that focusses on issues related to entrepreneurship development, institutional environment and the role of finance sector among others. The University also has dedicated 'Innovation Hubs' with the Centre for Environment Human Resources Development and the Centre for Biodiversity, Conservation & Ecosystem Management focussing on issues related environment and climate change.

3.4 EAC

1. Socio-Economic Indicators of RECs

1.1. List of member countries: (6)

Burundi, Kenya, Rwanda, South Sudan, Uganda and Tanzania.
(Note: Tanzania is also a member of SADC)

The countries can be broadly categorized into smaller economies of Burundi, Rwanda and South Sudan and the relatively larger economies of Uganda, Tanzania and Kenya with the latter being the only country not classified as an LDC. The region's geography is dominated by the 'Great Rift Valley' a geographic formation that is home to rich biodiversity, Lake Victoria - the world's 2nd largest fresh water lake, Mount Kilimanjaro, Africa's highest peak and is known source for geothermal energy.

Like the rest of sub-Saharan Africa, the population is dependent on agriculture, informal and predominantly rural economy although the region has a vibrant (wildlife) tourism sector, trade due to the twin ports of Mombasa and Dar-e-Salaam and a vibrant industrial sector in Kenya. As most poor people in the region depend on rain-fed agriculture and pastoralism, the recurring drought has led to repeated crop failures, poor harvests and significant livestock losses and has trapped many families in a complex mix of hunger, poverty and perennial humanitarian crisis.

1.2. GDP: USD 169 Billion

Largest economies Kenya (USD 75 Billion) and Tanzania (USD 57 billion). Smallest economies: South Sudan (USD 3.05 Billion) and Burundi (USD 3.47 Billion)

1.3. Population: 185 Million

Largest country by population – Tanzania (57 million) and smallest – Burundi (10.8 million)

1.4. Information on GN-SEC Centre:

GN-SEC Centre: EACREEE - https://www.eacreee.org/
Status: Operational since June 2016
EAC Secretariat: Arusha, Tanzania - https://www.eac.int/

2. Policy and Regulatory Enablers

The 'Baseline Report on RE and EE Markets in EAC' prepared with the support of UNIDO in 2013 notes that the EAC countries have made reasonable progress in creating national environments for SECT although this has not necessarily translated into real investments nor the creation of a vibrant energy market. There is a real need to boost small and medium sized grid connected RE plants, decentralized RE solutions for rural households, as well as energy efficiency improvements. Based on the national plans, the region has the potential to add 5,000 MW in renewable

energy capacity with hydro power accounting for almost 3,000 MW of the planned capacity addition.

2.1. Regional Policy / Target for Renewable Energy:

Regional Policy: **No regional policy and targets exist for RE**

2.2. Regional Policy / Target for Energy Efficiency:

Regional Policy: **No regional policy and targets exist for EE**

2.3. Other Regional Policies and Incentives

The East African Power Pool promoted the development of an East African Power Master Plan with the intention of implementing it by 2020. In parallel to the Master Plan was an interconnection code which would govern the design and operation of electricity interconnections in the region.

2.4. Treaty of REC and linkage to SECT:

The Treaty Establishing EAC (1999) stipulates the following principles to enhance policy harmonization and integration in the EAC region, of which the ones relevant in the context of sustainable energy and private sector development include the attainment of sustainable growth and development of the partner States by promotion of a more balanced and harmonious development of the partner States, strengthening and consolidation of cooperation in agreed fields that would lead to equitable economic development within the partner States and which would in turn, raise the standard of living and improve the quality of life of their populations.

The region will also seek to promote sustainable utilization of the natural resources and taking of measures that would effectively protect the natural environment of the partner States and facilitate strengthening and consolidation of political, economic, social, cultural and traditional ties and associations between the peoples of the member States to promote a people-centred mutual development of these ties and associations. In doing so it will mainstream gender in all its endeavours and the enhancement of the role of women in cultural, social, political, economic and technological development, promote peace, security, and stability within, and good neighbourliness among the partner States and enhance and strengthen partnerships with the private sector and civil society to achieve sustainable socioeconomic and political development. (UNECA-EAC, 2018)

3. Institutional Enablers

3.1. Regional Technical Entity:

The 2 regional agencies involved with the energy sector are the **East African Power Pool** (EAPP) comprising thirteen utilities, and seven national energy/electricity regulators – that extend beyond the EAC countries and with the objective of developing energy resources in the region and to ease the access to electricity power supply to all people of

the countries in the Eastern Africa Region through the regional power interconnections and

Energy Regulators Association of East Africa (EREA)which is the association of the respective national energy regulators with the mandate to pool expertise in regulatory matters relating to the energy sector, including but not limited to facilitating the development of good policy proposals and legislation on energy regulation.

The EAC also operates a 'Quality Infrastructure in the East African Community' which aims to create a set of industry standards for various goods and services such as handling of seafood, alcohol, food grains etc.

The **East African Centre for Renewable Energy and Energy Efficiency (EACREEE)**, based in Kampala, has the official mandate of EAC to promote RE&EE.

3.2. Regional Private Sector Association:

The **East African Business Council** is the apex body of business associations of the Private Sector and also runs the East African Private Sector Standards Platform which works in cooperation with the East African Standards Committee to develop regional standards on industrial goods to promote trade between the member states.

The other agencies are **East African Chamber of Commerce, Industry and Agriculture** that promotes cross border trade and **Eastern Africa Association** headquartered in London that works in attracting investments into the region.

There are also some **very active national renewable energy associations** in some countries which have formed a **regional umbrella association**.

4. Technical Enablers

The EAC is characterised by a dependence on the use of traditional biomass that is comparable to ECOWAS (approx. 85%), petroleum products – primarily by the industrial sector to provide back-up power for industrial activity and low electrification rates with South Sudan at 1% being among the lowest in entire sub-Saharan Africa. The REN 21 report notes that the power grid in EAC is among the "worst in Africa" with a heavy reliance on hydro power (65%) although electricity contributes a very small percentage of the region's energy balance. The power sector is adversely affected by poor transmission and distribution systems, outages during periods of peak demand and the depletion of hydropower storage during the dry season.

4.1. List of Renewable Energy technologies applicable across the REC

The NDC assessment indicates a potential for geothermal (significant opportunity in Kenya) apart from hydro (e.g. Burundi plans to increase its electrification rate by 35% by the construction of 3 hydro plants) and solar PV (e.g. Rwanda targets the installation of 100 mini-grids). This information is supplemented by the REN 21 report which indicates a hydro potential of 13.4 GW, an estimated 15.4 GW of geothermal energy in the Rift Valley and

solar radiations of 4-6.5 kWh/sqm/day making it among the highest in the world. The region also has a potential of 1.3GW of wind energy.

4.2. List of Energy Efficiency technologies applicable across the REC

Like ECOWAS the region has a significant demand for efficient cookstoves. The countries have also indicated their preference to promote industrial energy efficiency in the tea and coffee industry a key economic sector (e.g. Rwanda) along with energy efficiency in hospitals and schools (e.g. Uganda). Energy intensity is also expected to decrease through the promotion of bio digesters and the use of energy efficient lighting according to REN21 report.

5. Financial Enablers

5.1. Regional Development Bank:

The **East African Development Bank** is the regional development bank with Climate Change and Infrastructure being two of the many focus areas. With an asset base of USD 400 million, the development bank typically acts as a co-financer for projects with larger development banks such as the AfDB and other financial institutions. This is in to the African Development Bank which is also active in East Africa.

5.2. Regional Financing Facility:

The Energy and Environment Partnership covering Southern and East Africa (EEP Africa) is a multi-donor fund providing early stage grant and catalytic financing to innovative clean energy projects, technologies and business models. Since 2010, EEP Africa has focused on fast tracking access to clean energy, according to the EEP website by channelling more than EUR 57 million to 200+ projects. In January 2018, EEP Africa transitioned into a multi-donor trust fund managed by the Nordic Development Fund (NDF).

Another program in the region is the Aid for Trade (AfT) which is one of the large donor supported programmes that focuses on establishing supply-side and trade-related infrastructure in developing countries to enhance their trade performance. Funded by a consortium of partners including the World Bank, the EU, AfDB the emphasis is on supporting SDG 8. One of the beneficiaries of the AfT is Rwanda where development partners have focussed on developing energy and transport infrastructure. To monitor performance of AfT, Rwanda has put in place a system of result-based management to evaluate benefits from AfT and to promote accountability through various levels of government.

Source: (Rwanda News, 2017)

5.3. Other Regional Models and Financial Incentives for promoting Private Sector Participation

To be completed during a later stage.

6. Enabler for Capacity, Data, Knowledge and Awareness:

6.1. Regional Energy Summit

Two pan-Africa industry associations, namely the 'Alliance for Rural Electrification' and the 'Voice of the Off-Grid Solar Energy Industry' have partnered with a UK based even organizer and UK Aid to organize the 'Africa Energy Forum – Off the Grid' and the 'East Africa Energy Infrastructure Summit'. The website indicates that the events in the past have the support of the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS); the British High Commission in Tanzania; USAID Tanzania and the Department for International Development (DFID).

Source: (Energy_Net, 2018)

6.2. Regional Public Information Database

The East Africa Power Pool has an energy database that has restricted access. No further information is available.

Source: (EAPP_Database, 2018)

6.3. University offering relevant post-graduate programs

There are several Master's level courses being offered by regions universities such as the M.S. in Energy management by University of Nairobi, M.Sc. in Renewable Energy by Makerere University in Uganda and MSc. Energy Technology at the Jomo Kenyatta University of Agriculture and Technology.

3.5 SADC

1. Socio-Economic Indicators of RECs

1.1. List of member countries: (15)

Angola, Botswana, the Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe

The countries of SADC have significant variety in terms of economy and geo-political standing, comprising of South Africa – the continent's 2nd largest economy, the 2nd largest country in Africa by size – DRC known for its rich mineral resources and yet remains among the poorest nations of the world, the oil rich state of Angola, the three island nations of Madagascar, Mauritius and Seychelles of which the former is the 4th largest island of the world and the latter being the smallest country in Africa, the landlocked states of Botswana and Lesotho with the former ranked among the least corrupt countries of the world.

Mining is an industry of strategic importance in Southern Africa and according to the official SADC website, roughly half of the world's vanadium, platinum, and diamonds originate in the region, along with 36% of gold and 20% of cobalt. The oil industry of Angola. wildlife tourism and an economy dependent on small agricultural land holders characterize the regional economy although South Africa has relatively diversified industrial base and is an integral part of the 'BRICS' economy and considered among the five major emerging national economies. In Southern Africa, climate change is likely to affect nearly every aspect of human well-being, from

agricultural productivity and energy use to flood control, municipal and industrial water supply to wildlife management, since the region is characterised by highly spatial and temporally variable rainfall and, in some cases, scarce water resources.

1.2. GDP: USD 689 Billion

Largest economies South Africa (USD 349 Billion), Angola (USD 124 Billion) and Tanzania (USD 57 billion). Smallest economy: Seychelles (USD 1.5 Billion)

1.1. Population: 342 Million

Largest country by population – Democratic Republic of Congo (81 million) and smallest – Seychelles (95,800)

1.2. Information on GN-SEC Centre:

GN-SEC Centre: SACREEE Windhoek, Namibia - https://www.sadc.int/

Status: Operational since Oct 2015

SADC Secretariat: Gaborone, Botsawana - https://www.eac.int/

2. Policy and Regulatory Enablers

The key document available in public domain is the 'SADC RE and EE Status Report' developed by SAADC with the support of UNIDO and REN 21. It notes that in the energy sector, SADC has focused on two areas: improving access to modern energy services for off-grid populations, and increasing the security and stability of energy supplies generally. To achieve its goals, SADC has developed a series of guiding documents, including the **SADC Energy Protocol**, the Regional Indicative Strategic Development Plan (RISDP) and the Regional Infrastructure Development Master Plan (RIDMP). A Regional Energy Access Strategic Action Plan (REASAP) was approved in 2011, setting broad goals for improving access to modern forms of energy as well as specific policy mechanisms to achieve increased access.

2.1. Regional Policy / Target for Renewable Energy:

The Regional Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP), which spans the period 2016-2030, aims to provide a framework for SADC member states to develop renewable energy strategies, leading to the greater uptake of RE resources as well as mobilization of financial resources in the sector.

This will be achieved by a variety of measures, including establishing renewable energy agencies in all 15 SADC member states that will have specific mandate for off-grid systems, as well as developing and adopting guidelines to meet the SADC target of cost-reflective tariffs by 2019 while ensuring that the poor are not prejudiced.

Other proposed measures include raising awareness on the value and benefits of renewable energy and introducing sustainable energy issues in school curricula and tertiary education.

The **REN 21 Status Report** on SADC quotes that SADC has indicated a capacity addition of 24,062 MW of which 70% is expected from renewables.

2.2. Regional Policy / Target for Energy Efficiency:

2.3. See REEESAP above. **Other Energy Policies and Regulations:**

The REEESAP is expected to promote technological innovation in the sector that will ensure that the region uses less energy to provide the same service. This will be achieved through various measures including the use of remote electric geyser switches, water sensor dispatching equipment and time-controlled shower units for institutions, as well as banning the use of incandescent light bulbs, electric geysers, boilers and other inefficient water heating and lighting equipment.

Switching from traditional light bulbs to compact florescent lamps and commercial lighting, as well as the uptake of solar water heaters have been effective in most SADC countries as they have significantly reduced energy use. The use of compact florescent lamps can save up to 80 percent of the electricity consumption compared to incandescent bulbs while the other energy conservation device being promoted are solar water heaters.

2.4. Treaty of REC and linkage to SECT:

The objectives of SADC, as stated in the SADC Treaty are to: Achieve development and economic growth, alleviate poverty, enhance the standard and quality of life of the people of Southern Africa and support the socially disadvantaged through Regional Integration; Evolve common political values, systems and institutions; Promote and defend peace and security; Promote self-sustaining development on the basis of collective self-reliance, and the inter-dependence of member States; Achieve complementarity between national and regional strategies and programs; Promote and maximize productive employment and utilization of resources of the region; Achieve sustainable utilization of natural resources and effective protection of the environment; and Strengthen and consolidate the long-standing historical, social and cultural affinities and links among the people of the Region.

While energy does not find a specific mention in the treaty objectives, the elements of sustainable development and economic growth which are the resultant outcomes from promoting SECT is the bedrock of the treaty. Hence any actions towards promoting SECT will directly contribute to the objectives of SADC.

3. Institutional Enablers

3.1. Regional Technical Entity:

The **Regional Association of Energy Regulators for Eastern and Southern Africa** (RAERESA), **Regional Electricity Regulators Association of Southern Africa** (RERA) and the **Southern Africa Power Pool** (SAPP) are the key regional counterparts. SADC established the RERA to harmonise the region's regulatory policies on energy and its subsectors while RAERESA is an entity with a similar mandate under the wider COMESA group of countries. Established in 1995, the members of SAPP

have created a common power grid between their countries and a common market for electricity in the SADC region.

SADC also operates a **Standardisation, Quality Assurance, Accreditation, and Metrology Programme** to oversee standardisation of policies and procedures for ensuring quality and safety of trade in the region.

The **SADC Centre for Renewable Energy and Energy Efficiency (SACREEE)** is operating in Namibia and has the main mandate for renewable energy and energy efficiency.

3.2. Regional Private Sector Association:

The **Association of SADC Chambers of Commerce and Industry** (ASCCI) and **the SADC Business Forum** are the two regional entities that coordinate the activities of the respective national associations for the private sector.

4. Technical Enablers

The SADC website notes that 75% of the regions electricity comes from coal and the region has significant coal reserves despite this the region faces significant challenges related to energy shortage, partly due to lack of funding and aggravated by low tariffs, poor project preparation, issues with Power Purchase Agreements, and absent regulatory frameworks. The REN 21 supplements the issue around finance noting that the region expects investments between USD 114 to USD 233 Billion between 2012-2027 to keep up with the demand. Like its neighbours in west and east Africa, the SADC is characterized by low electrification rates and a weak infrastructure.

4.1. List of Renewable Energy technologies applicable across the REC

The NDC assessment indicates a potential for hydro (e.g. Malawi – 800MW), solar PV (e.g. Lesotho – 40MW) and solar water hears (e.g. Seychelles, South Africa, Zimbabwe and Malawi). The REN 21 supplements this information by noting a 4,800 MW hydro power project has reached financial closure in the DRC of which South Africa has already agreed to off-take 2,500 MW and there is also a proposed dam in the Mozambique. The REN 21 also notes that IRENA has estimated the wind energy potential of the SADC region to be approximately 800 TWh per year.

4.2. List of Energy Efficiency technologies applicable across the REC

The Southern African countries have indicated targets for demand side energy efficiency (e.g. Namibia and Seychelles) and promoting the use of clean cookstoves. The REN 21 report notes that 13 of the SADC member states have instituted a CFL replacement program and a wide variety of energy efficiency activities exists ranging from programmes to time-of-use tariffs, solar water heating, demand market participation, standards and labelling, hot water load control, awareness programmes, and energy audits in the industrial and building sectors.

5. Financial Enablers

5.1. Regional Development Bank:

The **Development Bank of Southern Africa (DBSA)** is a development finance institution wholly owned by the Government of South Africa that seeks to "accelerate sustainable socio-economic development and improve the quality of life of the people of SADC". This is in addition to role of the AfDB (African Development Bank) which is a much wider mandate.

5.2. Regional Financial Facility:

The SADC has a Protocol of Finance and Investments advocates its member states to avoid increasing their public debt-to-GDP ratio and encourages the governments to monitor this ratio as an indicator for the region's 'Macroeconomic Convergence' - a regional macroeconomic framework that supports for similar policies on Inflation, Public Debts, and Current Accounts.

The SADC has a subsidiary institution, the SADC-DFRC (Development Finance Resource Centre) that was set up in 2013 to act as a centre of excellence to strengthen the SADC Development Finance Institutions (DFIs) Network and to enhance the capacity of the SADC DFIs to deliver on their mandates towards the achievement of the SADC RISDP goals of economic growth, employment generation and poverty alleviation. Currently the SADC DFIs Network has 41 members from 15 SADC Countries. The Centre focuses on activities related to Capacity Development, Policy Research, PPP Support, and assistance to SMEs – making it a significant partner for SACREEE.

Source: www.sadc-dfrc.org/

Another example is the EEP managed by the Nordic Development Fund (see EAC)

Other Regional Models and Financial Incentives for promoting Private Sector Participation

To be completed at a later stage.

6. Lack of Capacity, Data, Knowledge and Awareness:

6.1. Regional Energy Conference

The SADC secretariat organized a High-Level Resource Mobilization Workshop and Energy Investors Conference in 2017 with the theme on "Resource Mobilisation for Investment in Sustainable Energy Infrastructure for an Inclusive SADC Industrialisation and for the Prosperity of the Region". The event was sponsored by the African Development Bank, Development Bank of Southern Africa, World Bank Group, European Union, China Overseas Infrastructure Development and Investment Corporation in collaboration with other strategic partners and investors with the aim of identifying investment opportunities for private companies in the energy sector and provide potential investors and other key stakeholders with up to date progress information on strategic energy projects for the region. No follow up event in 2018 was identified.

Source: (SADC-Event, 2017)

6.2. Regional Public Information Database

The Southern African Research and Documentation Centre (SARDC) is an independent regional knowledge resource kfdcentre established in 1985 to strengthen regional policy perspectives and track implementation on a range of issues in southern Africa, and works in partnership at national and regional levels. SARDC is made up of topical institutes that focus on relevant regional processes, and has a long track record of achievements, in partnership with the Southern African Development Community (SADC) and others. The Southern Africa Power Pool website provides information for entities participating in the regional power pool such as monthly market performance reports. However, the information is not exhaustive and does not cover various aspects of SECT.

6.3. University offering relevant post-graduate programs

The Centre for New Electricity Studies (CNES) is a research centre within the Department of Electrical, Electronic and Computer Engineering in the University of Pretoria. It focuses on being a premier research institute in energy management both nationally and internationally and is the only centre of excellence in energy optimization and standardization.

The Centre for Renewable and Sustainable Energy Studies (CRSES) acts as a central point of entry into Stellenbosch University for the general field of renewable energy. The courses offered include a Masters in Renewable and Sustainable Energy and a Masters in Smart Grid Technology.

3.6 SPC

1. Socio-Economic Indicators of RECs

1.1. List of member countries: (22)

American Samoa, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, New Caledonia, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Pitcairn Islands, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna.

The Pacific island nations all of which are considered as SIDS are geographically located in the Pacific Ocean but scattered over a large area which is prone to natural calamities and limited opportunities due to their small size in terms of economy, population and resources. Large sections of the population are without access to grid connected electricity and the islands are heavily reliant on imported fossil fuels. In many cases 100% of the islands power is provided by diesel generators. Recognizing these challenges, the Pacific islands have initiated and been beneficiaries of several development programs including those in field of sustainable energy one among which is the Pacific Islands Energy Policy and Strategic Action Planning.

The economies of the islands are dependent on tourism and agriculture and have been beneficiaries from various forms of support by the developed countries, particularly USA, Australia and New Zealand along with the former colonial powers of France and UK.

1.2. GDP: USD 32 Billion

Largest economies Papua New Guinea (USD 21 Billion), and Fiji (USD 5 billion). Remaining islands have GDPs ranging from tens of millions to below USD 1 billion

1.3. Population: 11 Million

Largest country by population – Papua New Guinea (8.2 Million) and Fiji (900,000).

1.4. Information on GN-SEC Centre:

GN-SEC Centre: PCREEE, Kingdom of Tonga - https://www.pcreee.org

Status: Operational since April 2017

SPC Secretariat: Noumea, New Caledonia – https://www.spc.int/

2. Policy and Regulatory Enablers

2.1. Regional Policy / Target for Renewable Energy:

The individual countries have established very ambitious national renewable energy targets. In the last meeting of the Ministers of Energy and Transport in Tonga, the Pacific Islands approved a 100% renewable energy vision for the region. However, so far, the regional framework is not very ambitious and far behind the national commitments. The existing **Framework for Action on Energy Security in the Pacific (FAESP) and the Implementation Plan for an Energy Secure Pacific (IPESP)** is very conservative and more based on fossil fuels. In the 2017 Ministers meeting it was decided to develop new regional framework for RE&EE and an implementation plan.

2.2. Regional Policy / Target for Energy Efficiency:

(See above)

2.3. Other Energy Policies and Regulations:

The Pacific Appliance Labelling and Standards Program (PALS) is designed to assist Pacific countries implement labelling and standards for energy using equipment such as refrigerators, freezers, air conditioners and lighting by adopting Australian and New Zealand standards and focusing on building capacity in the region. The Pacific Islands Sustainable Energy Industry Association has developed minimum quality standards for decentralised PV system.

2.4. Treaty of REC and linkage to SECT:

The original treaty establishing the South Pacific Commission was established in 1947 and in 2000 the agreement establishing the Pacific

Islands Forum Secretariat was laid out with Article 9 providing a list of the functions that the secretariat is to carry out which includes: Preparing studies on opportunities for regional trade including investigations for the development of free trade between countries and the political, legal and security issues that the member governments. The secretariat would also work towards "rationalisation of manufacturing and processing industries and the achievement of economies of scale in certain regional enterprises" and provide advisory, information, and coordinate actions between the government and private sector. The activities required to promote Regional cooperation for SECT, particularly through the increased role of the private sector is fully in line with the objectives of the secretariat.

https://iea.uoregon.edu/treaty-text/2000-pacificislandsforumsecretariatentxt

3. Institutional Enablers

3.1. Regional Technical Entity:

The **Pacific Community (SPC)** has the mandate coordinate the implementation of the the Framework for Action on Energy Security in the Pacific under the guidance of the Pacific Energy Oversight Group (PEOG)[6] and the Pacific Energy Advisory Group (PEAG). The **Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE)**, hosted by SPC in Tonga, assist SPC in the technical implementation of activities particularly related to the private sector. It has a strong emphasis on the supply side, promoting innovation and entrepreneurship.

The **Pacific Power Association (PPA)** is an inter-governmental agency and member of the Council of Regional Organisations in the Pacific (CROP) to promote the direct cooperation of the Pacific island power utilities in technical training, exchange of information, sharing of senior management and engineering expertise and other activities of benefit to the members.

Additionally, there is **The Secretariat of the Pacific Regional Environment Programme (SPREP)** which is the regional organisation established by the Governments and Administrations of the Pacific charged with protecting and managing the environment and natural resources of the Pacific and works on issues around environmental governance, climate change and has a staff of technically qualified people.

While no specific regional standards body exists, there are examples of local governments recognizing the importance of setting up a regional standard such as developing an industry standard for 'kava'.

3.2. Regional Private Sector Association:

The South Pacific Commission operates several agencies of which the **South Pacific Tourism Organisation** (SPTO) and the Pacific Islands Forum Fisheries Agency (FFA) represent the 2 important economic sectors and work with the relevant private sector participants.

[6] CROP Executives approved in late 2015 that the PEOG be renamed the CROP Energy Security Working Group.

There is a significant influence on the private sector from Australia and New Zealand as can be observed by the existence of the **Australia Pacific Islands Business Council** and the **NZ Pacific Business Council** which work on promoting regional trade and business cooperation.

There is a very **active Pacific Islands Sustainable Energy Industry Association**.

4. Technical Enablers

A document titled 'Towards and Energy Secure Pacific' developed by the SPC secretariat notes that 85% of the regions energy mix is dependent on imported fossil fuels with oil accounting for 76%. Traditional biomass use for cooking – although slowly declining in favour of LPG and kerosene – still accounts for the largest share of overall energy use in rural areas throughout the Pacific. Apart from the known challenges of limited power generation capacities, low electrification rates, and high cost associated with imported fuels, the regions power systems are particularly susceptible to natural hazards such as cyclones which often cause significant damage to the infrastructure.

4.1. List of Renewable Energy technologies applicable across the REC

The NDC assessment indicates that several islands have proposed a significant (greater than 50% and in many cases 100% - e.g. Vanuatu) of the energy generation will come from renewable energy sources with a large potential being met through solar PV. Fiji, Papua New Guinea, Solomon Islands and Vanuatu also have significant potential for the use of geothermal, bio-mass and small hydro resources. An IRENA report also indicates a potential for wind however there are constraints in terms of logistics and a potential for coconut oil based biofuels. (IRENA-Pacific, 2013)

4.2. List of Energy Efficiency technologies applicable across the REC

The energy efficiency initiatives are focused around reducing transmission and distribution losses and issues related to battery storage. The IRENA report also notes that use of solar water heaters, and high efficiency lamps can lead to "notable reduction in demand" while energy efficiency measures can be readily deployed for reducing the demand for diesel consumption in the existing diesel generators.

5. Financial Enablers

5.1. Regional Development Bank:

The **Pacific Islands Development Bank (PIDB)** is a regional development finance institution but the mandate for promoting financing required for SECT is uncertain although they do provide financing for businesses and promoting economic activities such as "agriculture, fisheries, manufacturing, and the service industry."

The **Asian Development Bank** has a Regional office in the region and multiple liaison offices in cooperation with the World Bank.

5.2. Regional Financing Facility:

An analysis on the status of 'Public Financial Management in the Pacific Island Countries by World Bank notes significant challenges related to institutional systems and human resource characterized by "weak systems, thin capacity, high staff churn and poorly understood processes". This leads to national budgets proposed by the respective national governments that are unsustainable due to high deficits and impacts execution of priority projects.

The Pacific island states are among the most aid dependent regions in the world with the largest donors being Australia, Japan, the EU, New Zealand and the USA. The EU has committed up to € 800 million to the Pacific region between 2014-2020 with a focus on 6 major areas: Resilience, Climate Change, Sustainability, Economic Growth, Gender Equality and Regional Integration. However, the dependency on aids and remittances made by expatriates has led to national financial systems that is unsustainable. There is a need for the Pacific states to look inwards, particularly on their own resources to ensure a supply for food and energy and building local knowledge and capacity.

The region has its own unique challenges with the development of infrastructure with the high costs partly affected due to the region's geography and the need to transport equipment to the island states and this further exaggerated by the relatively small economic sizes resulting in most countries do not have or plan to have sufficient funding towards the maintenance of completed infrastructure projects which leads to requests for "major rehabilitation".

6.4. Other Regional Models and Financial Incentives for promoting Private Sector Participation

to be filled at a later stage.

6. Lack of Capacity, Data, Knowledge and Awareness:

6.1. Regional Energy Conference

The Pacific Power Association runs an annual conference that aims to bring together all relevant stakeholders including donors and utilities. The PCREEE in cooperation with IRENA and GGGI is also organising the 3rd **Pacific Energy Investors Forum** that will showcase some of the investment opportunities for the private sector to invest in the region.

6.2. Regional Public Information Database

The **Pacific Regional Data Repository for SE4ALL** was established. The system is more gathering system for studies and document. Currently it is under discussion to upgrade the system to an ECOWREX (see ECREEE).

The **Pacific Climate Change Portal** supported by SPREP (under SPC), GIZ, Australia Aid and the University of South Pacific is the key information portal that provides information on issues related climate finance, adaptation, and regional technical advisory.

Source: https://www.pacificclimatechange.net/

The **Statistics for Development Division** (SDD) of SPC also operates a program called 'PRISM' which is an information portal and statistical

database on Population, Economic, Social statistics among others. These statistics are complimented by National Minimum Development Indicator Database, the SDG Dashboard which will track the performance against the SDGs and POP GIS which allows users to map their own data.

6.3. University offering relevant post-graduate programs

The **University** of **South Pacific** (USP) in Fiji offers relevant courses including a M.Sc. in Sustainable Development in SIDS, a M.Sc. in Environmental Science and Environmental Management.

4. Analysis

The data collection in the previous chapter is representative of the situation in the 5 RECs based on information that is publicly available including reports, project documents and other information made available by UNIDO. This chapter aims to analyse the information presented to determine the potential opportunities for intervention that form the basis for developing a set of recommendations for strengthening the mandate of GN-SEC Centres. This approach ensures that the recommendations reflect the on-ground scenario in the 5 RECs – which are representative of the situation in other Regions where it is intended to establish new centres in the future. The next sections analyses some of these common characteristics identified across the RECs based on the categories listed in the CAF.

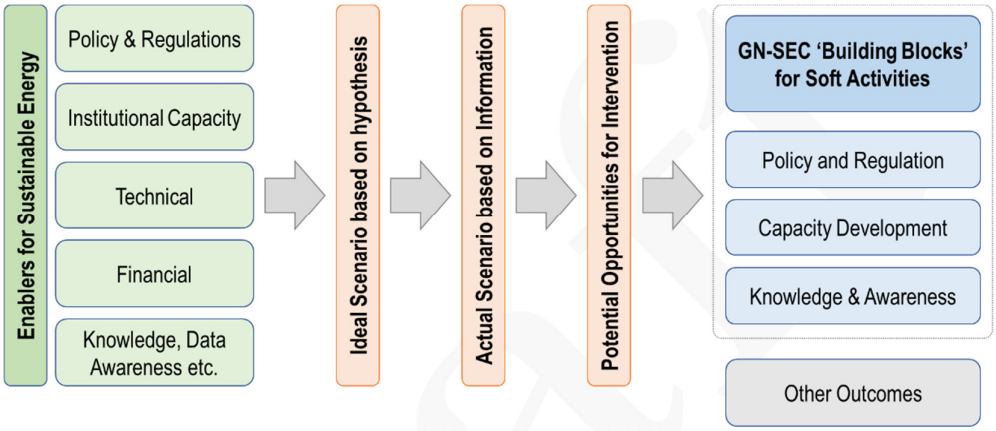


Figure 8: The intended analytical approach

4.1 Socio-Economic Indicators and the Case for Common Market

The analysed RECs represent two groups of nations or member states as classified by the World Bank – namely low income or least developed countries (LDCs), and small island nation states (SIDS) many of those in the latter category are also classified as LDCs. According to the World Bank, there are several socio-economic indicators that are used to analyse a country's economic status and it is generally accepted that lower is the value of these indicators, the less developed or lower income, the country is. One such statistic is the GDP which provides a measure of the monetary value of the goods and services that a country produces in a given year. Typically, GDP comprises of 3 economic sectors – agriculture, manufacturing and services and most REC are characterized by agrarian economies with a significant dependency on service sector such as tourism (e.g. Caribbean and the Pacific Islands) or mining (e.g. sub-Saharan Africa). This economic shortcoming points to little diversification among the industrial sector complemented by a difficult policy environment. In the context of Regional cooperation this can be viewed as an opportunity for promoting the role of private sector through collaborations, partnerships and shared knowledge, not only within the member states in a region but also between the Regions.

As the focus of activities being promoted by the GN-SEC is to facilitate the participation of private sector in making SECT products and services available it gives rise the market dynamics of creating demand and ensuring supply. Regions provide an opportunity for creating demand by providing a market size that is considered 'reasonable' by the private sector ensuring that goods and services are made available at a price that reflects the market competitiveness. One way of comparing the potential market size is to compare the GDPs of the RECs in addition to the GDP of the more developed energy markets as shown below:

REC / Country	GDP (in USD Billion)	Population (Million)	Per Capita (USD)
CARICOM	77.7	18.3	4,258
ECOWAS	550	367	1,498
EAC	169	185	913
SADC	689	342	2,014
SPC	32	11	2,909
US	19,390	325	59,501
EU	17,280	512	33,713
China	12,237	1,390	8,804
India	2,597	1,339	1,940
African Union	2,151	1,211	1,776

Source: https://countryeconomy.com/countries/groups

Recognizing the economic opportunities of a single market, each of the RECs have initiated actions towards the creation of a 'Common Market' and these are in various stages of development or implementation with international support. The European Commission for example had asked its member states to double the funding for ECOWAS to adopt a common external tariff, an essential step for the creation of a common market. (The Economist-ECOWAS, 2013).

Currently, in most regions there is no real common market for SECTs based on joint standards and a common framework. In the context of power generation and transmission, an example highlighting the existence of a common market in the RECs is the Power Pools – particularly in sub-Saharan Africa where the geography allows for physical connectivity of grid infrastructure. Another example are gas pipelines (e.g. West Africa). However, power pools are mainly focused on traditional energy sources and technologies (e.g. gas, coal, diesel, large hydro). Many of the Master Plans do not take RE&EE sufficiently under consideration.

Commercial opportunities exist across the entire range of goods and services from small off-grid solar lanterns for small families to large motors or pumps using variable speed drives that can significantly reduce the energy demand in the industrial or commercial sector. Similar opportunities exist in the EE sector. But as can be observed by the delayed process in setting up a single market coupled by the extensive stakeholder process, specialized advisory needed, the GN-SEC centres given their proximity to the governments are ideally placed in driving towards the creation of a common market.

Innovation Story: Off Grid Solar Lighting Market in Africa

A research report by a private market research firm notes that the market size for off-grid solar lighting market in Africa is expected to be worth USD 1.4 billion by 2024 and is expected to grow at an average of 16% annually. The report indicates that there will be an increased demand for solar lanterns and solar home lighting systems as people make the transition from kerosene lamps and candles towards "portable, affordable and clean" source of energy as a transition phase while the continent drives towards grid integration. The demand will be primarily driven by economic consideration, namely the oscillating kerosene prices but will also arise from another technological development – the increasing customer base for mobile phones. (Global Market Insights, 2015). Technological developments like

mobile phone chargers as an added feature to solar lanterns has already seen a significant demand for such products as seen by the 115 such products listed in the World Bank supported website 'Lighting Africa'. (WB-Lighting Africa, 2018)

4.2 Regional and National Policy Linkages

Creation of a Common Market will require an appropriate enabling environment that supports both demand and supply side. The analysis below looks at the existing regional and national policy environment which will support a Regional market for SECT:

REC	Description on Regional Policy / Targets for RE and EE
CARICOM	The Implementation Plan for the Caribbean Regional Framework for Achieving Development Resilient to Climate Change is a key implementation strategy document that identifies and prioritises activities under each strategic element and goal area of the CARICOM's 'Regional Framework for Achieving Development Resilient to Climate Change' which defines the region's strategic approach for coping with climate change. The Framework and the Implementation Plan collectively work to allocate responsibilities and outline functional co-operation between regional and national agencies, develop an investment programme, and proposed a governance regime and a monitoring and evaluation system. The CARICOM – Sustainable Energy Roadmap and Strategy (C-SERMS) is a key planning mechanism and communication tool used to establish a link between priorities and renewable energy policy goals of CARICOM Member States. The key document currently available is the Baseline Report and Assessment exists which provides an overview of the regional energy situation; recommends regional sustainable energy targets for renewable power capacity and energy efficiency in the short (2017), medium (2022), and long (2027) terms and pathways to achieve the set targets. The baseline report further notes that "all 15 CARICOM member states now have national energy strategies in some stage of development or implementation", however it also notes that the while several member states have set ambitious targets for RE, they "lack concrete mechanisms to achieve their goals". And only half of the member states have set energy efficiency targets in their national strategies. Source: (CARICOM-C-SREMS, 2015) A group comprised of nine CARICOM member states have established a "regional project team (RPT)" with a mandate to develop regional energy efficiency building codes. Apart from providing recommendations to the work undertaken by private consultants in developing the minimum energy performance standard (MEPS) for public and commercial buildings in CARICOM member states, the team will also review the International Energy Conservation Code (IECC) in an effort to adapt it, where necessary, and present for

	acceptance and adoption by member states as a regional energy efficiency building code.
ECOWAS	ECOWAS has 2 well defined regional policies and targets for both renewables and energy efficiency in the form of EREP and EEEP and is based on past successes of establishing the WAPP which itself builds on the lessons learnt in establishing the Southern African Power Pool. The ECREEE is also the oldest of the 5 GN-SEC centres reviewed and has considerable experience of working in the region. The REN 21 status report analysing the sustainable energy sector notes a top down approach where the regional policy has set out the targets for the national governments. At national level, the member states have "already begun incorporating sustainable energy development into their policymaking process and are strengthening their commitments by developing National Renewable Energy Action Plans (NREAPs)". And as of 2014 13 Member States had adopted some form of renewable energy support policy, 13 Member States had a renewable energy target in place, and all 15 Member States had at least one policy or one target at the national level, promoting renewable energy technology developments. The progress on energy efficiency however has been slow and at present there is only Ghana and Nigeria which has developed Minimum Energy Performance Standards for CFLs and air-conditioning while additional standards are being developed in a handful of other member states. Source: (REN21-ECOWAS, 2015)
EAC	The EAC does not have a common energy policy although the regional integration process has been progressive based on the 4 pillars of Customs Union, Common Market, Monetary Union and Political Federation and the alignment with other regional particularly SADC (Tanzania) and COMESA. The creation of EACREEE was an important step forward. The REN 21 regional status report notes that while the countries (except for Burundi) appear to have national policies and instruments (particularly the FiT) in place for renewable energy, the focus is on the electricity sector with relatively less attention being paid onto other sectors such as cooking and energy efficiency. Source: (REN21-EAC, 2016)
SADC	The Regional Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP), is a key regional policy aimed at enabling SADC member states to develop renewable energy strategies, leading to the greater uptake of RE resources as well as mobilization of financial resources in the sector. The development of national policies appears to be skewed with South Africa being the most progressive with implementing a comprehensive Energy Efficiency and Demand Side Management programme with the local utility Eskom. The REN 21 status report for SADC notes while all member countries have introduced specific policies to encourage development of RE, "some types of policies are not being implemented or found in only one or two" and some member states have set general targets which do not necessarily require the use of renewables.

	Source: (REN 21-SADC, 2015)
SPC	SPC has currently no regional renewable energy and energy efficiency policy. The Minister recently adopted a 100% renewable energy target. The existing regional energy framework is very conservative and much behind the RE commitments of countries. The Ministers requested SPC to Develop a RE&EE policy and implementation plan.

Innovation Story: Gender Mainstreaming in Energy Access (ECOW-GEN)

The ECOWAS Programme on Gender Mainstreaming in Energy Access (ECOW-GEN) is a flagship programme of the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) addressing barriers to the equal participation of women and men in expanding energy access in West Africa. ECOW-GEN was established with initial GEF-UNIDO support against the background that women's potential, in the ECOWAS region, as producers and suppliers of energy services is underutilized and that empowering women and men to make significant contributions to the implementation of the regional policies on renewable energy and energy efficiency is necessary for the achievement of SDG-7 in West Africa.

Thus, to ensure that women, as much as men, contribute to, and benefit from, clean energy development ECOW-GEN implements activities directed at strengthening women economically by improving energy access for income generating activities and, more importantly, empowering women as active actors in the sustainable energy sector. Launched in 2013, the programme started its pilot phase working on the four Members States of the Mano River Union (MRU) – Cote d'Ivoire, Guinea, Liberia and Sierra Leone. Over the course of the pilot phase of the programme:

- More than 70 energy experts from the Member States were trained on mainstreaming gender in energy policies, programs, and projects.
- 250 participants, comprising of Gender and Energy Ministers, women groups and associations, civil society organizations, parliamentarians, etc. from the MRU, trained on developing Gender Action Plans.
- A Framework Action Plan on 'Women's Economic Empowerment through Energy Access in the Mano River Union (MRU) Sub-region was developed with, and adopted by, the MRU Gender and Energy Ministers.
- Under the ECOWAS Women's Business Fund, clean energy demonstration projects in Ghana and Senegal are being supported through grants. It is expected that these projects would lead to 1000 women street vendors having access to improved liquefied petroleum gas (LPG) stoves in Ghana and the installation of 13 clean and improved modern furnaces for fish smoking in a rural fishing community in Senegal.
- ECOW-GEN is pioneering the first regional gender-sensitive and gender-responsive energy policy, to address all forms of gender inequalities pertaining to energy development and consumption in West Africa.
- With successful completion of the pilot phase, activities, envisaged to have even more far-reaching impacts, have been planned for over a 5 – year period starting from 2015 – 2019. These activities will be implemented through the ECOW-GEN high-impacts initiatives and would address barriers related to awareness and capacity, financial, technical, policy and regulation.

The Opportunity for GN-SEC:

Based on the above analysis, it can be concluded that while there are regional policies in many of the RECs – which supports the case for a regional approach, it does not necessarily translate into the existence of the entire palate of regional policies, regulations, certifications, standards, incentives structures – that are collectively needed to ensure the implementation of the regional polices and targets. Within the regions the member states with comparatively better economies and human resource such as Kenya and Uganda in EAC, Nigeria in ECOWAS, South Africa in SADC have well developed national and sectoral energy policies and strategies, but this is an exception rather than a rule. Most member states will need support at national and sectoral level to enable SECT and this gives rise for the GN-SEC centres to engage at 2 levels:

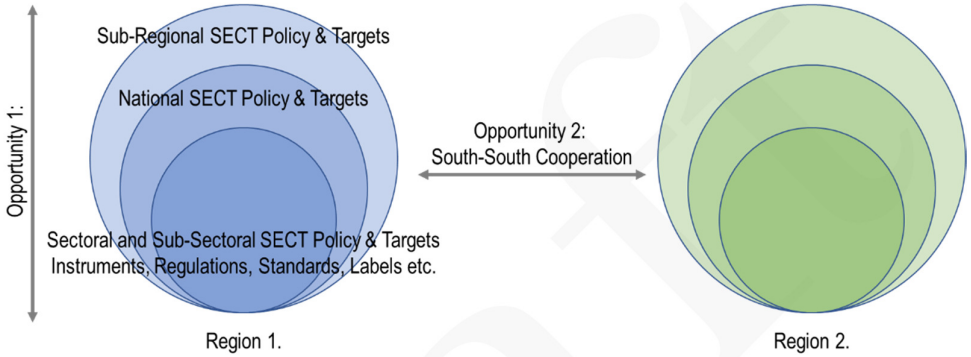


Figure 9: Potential interventions by GN-SEC on Policy and Regulation

- **Intra-Regional Policy and Regulations:** The first opportunity for a GN-SEC centre is to facilitate the development of a policy enabled environment including standards, incentives, certifications, regulations, laws, implementation plans etc. along with targets and timeframes. These can be either a top-down approach (wherein the regional policy is developed first) or a bottom-up approach (where the national policies and priorities take precedence and forms the basis for developing regional policies). The next step in case of a top down approach will be to translate these regional policies into national and sectoral targets, and the development of appropriate instruments, regulations, standards, labels, certification programs etc. that can collectively contribute to the achievement of the set targets – and thus to the national and regional objectives. In case of a bottom-up approach, the GN-SEC can coordinate the efforts of the respective national governments by providing standardized frameworks to allow the creation of homogeneous policies, regulations, standards, incentives etc. which can then be consolidated to create a regional framework.

- **South-South Cooperation (or Inter-Regional Cooperation on Policy and Regulations):** As the essential framework conditions are expected to remain the same across the regions, there is a significant scope for shared learnings and knowledge and transferring the experience gained from developing and implementing regional, national and sectoral polices, programs and instruments to the other Regions, by existing and future GN-SEC centres.

Innovation Story: Case Study – Arab Renewable Energy Framework (AREF)

Arab states, recognizing the importance of planning long-term targets for renewable energy deployment has issued the Arab Renewable Energy Strategy 2030 as a policy support to target planning. To assist the realization of this strategy, RCREEE (the regional GN-SEC centre) and German Development Cooperation (GIZ) GmbH support the Energy Department at the League of Arab States in the development of the Arab Renewable Energy Framework

(AREF). AREF provides guidance to member states with developing their short to medium term National Renewable Energy Action Plans (NREAPs) according to a template prepared for this purpose.

AREF works as the foundation for both national and regional activities of renewable energy. AREF and NREAP template work as a regional framework for countries to develop their NREAPs, which in turn is the baseline for annual progress reports. RCREEE developed the NREAP template and is also responsible for monitoring NREAPs progress and template adoption, as well as for disseminating periodic reports to LAS. RCREEE helps Arab states in the adoption process by conducting regional and local workshops and providing technical assistance. The template is approved by the Arab Ministerial Council for Electricity (AMCE) and circulated among Arab states for adoption.

The AREF document is prepared to introduce a Pan-Arab collaborative framework that enhances energy production from renewable sources. AREF contains guiding recommendations to achieve national renewable energy targets determined by member states of the Arab League. These targets include renewable energy share in total electricity production mix. AREF also sets rules for reporting, knowledge exchange, and joint-project suggestions in collaboration with other countries or bodies. The AREF initiative develops a consolidated annual report of achievements and progress by Arab states in this field.

4.3 Institutional Capacity

Successful implementation of the policies will occur at the respective regional and / or national level and will depend on the capacity, commitment and support of the relevant governmental agencies, financial institutions, and the private sector apart from other stakeholders. Three key types of institutions are analysed to determine the nature and type of collaborations that GN-SEC centres can undertake. The analysis does not consider the existing human resource capacities within these institutions as that calls for a more comprehensive assessment and it is generally understood that further capacity development will be needed. The selection of these 3 types of institutions does not discount the importance or the role of other institutions or potential partners for the GN-SEC:

Type	Status of the Institutional Capacity
Technical Institutions	The current set of regional technical institutions focus primarily on electricity generation and distribution either in the form of Power Pools (e.g. WAPP, EAPP, SAPP), Electricity Regulators or Association representing the service providers (e.g. PPA in Fiji and CARILEC in the CARICOM). Most of the utility organisations and their mater plans are conservative. The Master Plans in Africa often do not consider renewable energy (apart from large hydro) and energy efficiency very well. The GN-SEC centres therefore fill a very important gap. The RECs have undertaken initial steps towards standardization of industrial goods and services although the current capacities within the institutions and activities seem limited. Beyond the efforts of the power pools, and with the exception of ECOWAS and the efforts of ECREEE no regional standards for SECT and initiatives such as Lighting Africa for solar lanterns and Global Alliance for Clean Cookstoves for clean cookstoves have recognized this gap and partially fulfilled this by setting up their own standards. It can be concluded that considerable institutional gap exists within the RECs particularly around the wider technical issues that impact SECT and this will require the RECs to widen the scope of institutional

	networks to include Universities and Academia but more importantly look for external partners. As a single focal point dealing with both renewable energy and energy efficiency within the REC, the respective GN-SEC centres are ideally placed to take a lead in such collaborations and partnerships.
Financial Institutions	Access to private capital by the Regions is currently unreliable, limited and costly and lending from the regional banks and financial institutions will continue to play an important role in the region's progress towards a market driven model for SECT. The analysis reveals that while all RECs have a dedicated 'Regional' development bank however their mandates and capacities to support extensive programmes for SECT is currently limited. As the GN-SEC centres are expected to support respect member states in identifying financial instruments and mechanisms to meet the respective sectoral, national and regional targets, the limitations of the Regional banks will need to be considered. The GN-SEC network can provide a single voice when dealing with the larger regional development banks (e.g. IDB in CARICOM, AfDB in ECOWAS, EAC and SADC, and ADB in SPC) and other financial institutions. The centres can also complement bank operations by providing technical services for enabling activities and pre- and post-investment support.
Private Sector Associations	While the ability of the respective industry associations within the RECs to engage with the governments and significantly influence decision making is not known, all the RECs have regional private sector associations that aim to address issues around regional market integration, and support the local private sector. In addition to private sector led initiatives, certain regions also have industry associations established with the support of development partners such as the Sustainable Energy Industry Association of the Pacific Islands. **Case Study – FICCI, India and Solar Task Force:** Globally, private sector and trade associations have been highly influential in driving change. Consider the case of Federation of Indian Chambers of Commerce and Industry (FICCI) which is an association of businesses in India. The FICCI is highly influential in policy matters, encouraging dialogue between the industry and the government apart from the traditional role of initiating trade fairs, exhibitions and acting as the focal point for international investors seeking information. In 2013, FICC established a solar task force with the objective of making recommendations to the government in making the renewable energy as an independent sector and separate it from the general power sector in developing the national budget. This enabled the government to make a distinction in the debt funding required for developing the power infrastructure distinct from the loans extended for renewable energy companies. This in turn allowed the banks and financial institutions to not compare renewable energy projects with conventional sources judge the risks based on its own merits.

The Opportunity for GN-SEC:

The analysis indicates that while institutions exist in the Regions their current mandates are limited and the decision-making structure is further aggravated due to insufficient information and know-how due to lack of precedence. This in turn points out to a need to build human resource capacities within the institutions, creating awareness and allowing the institutions to drive the transformation process in partnership with the respective national governments. This gives rise to 2 opportunities for the GN-SEC with the aim of 'closing the loop'. The first opportunity is to assist with building institutional capacities and once they reach the required level of competence, the GN-SEC can act as partners and collaborators to support with the implementation.

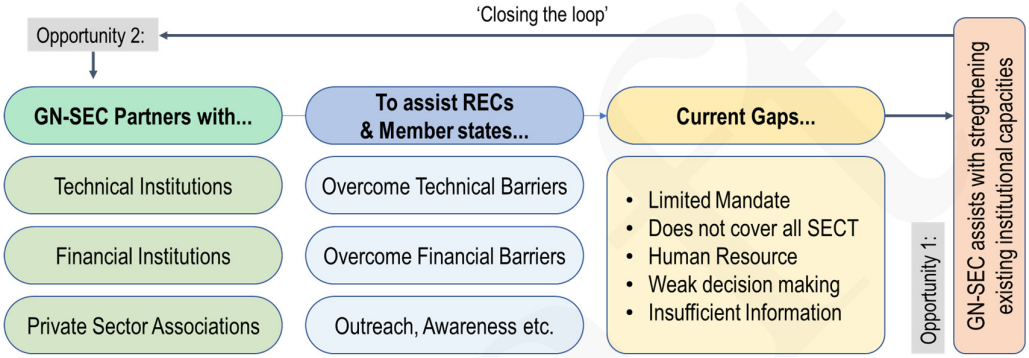


Figure 10: GN-SEC can assist with closing the loop on Institutional Capacity

4.4 Scope of Technologies and Sectors

In identifying the potential opportunities for renewable and energy efficiency by reviewing the NDCs and publicly available literature such as the REN 21 reports and data from IRENA, there exist significant synergies for cooperation among the member states and also for South-South cooperation. Grid connected and off-grid solar PV is the renewable energy technology of choice given the abundance of solar radiation across the RECs while solar thermal energy in the form of solar water heaters are found to be particularly important in the tourism driven sectors in the Pacific Islands and the Caribbean along with a demand in Southern African states given their relatively mild winters. While the potential for wind exists, there are several challenges particularly related to logistics and transportation as most of the turbine technology will need to be imported from Europe or Asia. The potential for geothermal exists in pockets particularly in East Africa and its exploitation limited due to the high investment costs which is a challenge in the island states and their small economies. The potential for hydro like solar PV is plentiful and is often the only commercially tested technology among the renewables in various member states. While large hydro power plants can provide base load, there are opportunities for small hydro power which will need to be locally analysed and data made available for the private sector. The use of traditional biomass particularly for cooking makes up the single largest source of primary energy in most parts of the developing world and there are initiatives around the world around ensuring sustainable supply of biomass (e.g. green charcoal, forestry management, efficient kilns etc.). Biofuel technology is relatively more sophisticated as it requires industrial scale processing which may be beyond the capacities of the several LDCs.

On energy efficiency, the two most common strategies are the use of the clean cookstoves and promoting the use of energy efficient lights (e.g. LEDS). Given the energy consumption in buildings, targeting energy efficiency measures through policy measures such as codes, standards, incentives, certifications and labels are a proven strategy. This can be further

expanded to include electrical appliances such as air-conditioning, refrigerators, water pumps and other high energy consuming devices. Finally, given the weak infrastructure of the power sector which is common across the regions and the resulting losses from the transmission and distribution, points to a demand for energy efficiency initiatives that minimize losses and reducing the overall demand for electricity. The objective here would be ensuring that losses are reduced to less than 10% which is the internationally acknowledged benchmark. The table 2 below summarizes the relevant technologies across the regions as identified through the analysis of the NDC and other supporting literature.

Table 2: List of relevant SECT by RECs according to NDC (still to be finalised)

Technology	**CARICOM**	**ECOWAS**	**EAC**	**SADC**	**SPC**
RE - Solar PV (grid-connected and decentralised)					
RE - Solar thermal for water heating systems					
RE - Wind					
RE - Geothermal					
RE – Large Hydro					
RE – Small Hydro					
RE - Biomass / Biofuels					
Fuel Switch – From Carbon Intensive fuels to Gas					
EE - Cookstoves					
EE – LED lamps					
EE - Buildings					
EE – Demand Side/Grid					

Innovation Story: Case Study – Use of Labels in Promoting Energy Efficient Appliances

The EU Technical Assistance Facility - East and South Africa in close cooperation with the African Union Commission (Department of Infrastructure and Energy) is implementing activities around 6 strategic objectives aimed at harmonizing the electricity regulatory framework for the electricity market in Africa. One of the strategic objectives is to 'Establish norms, standards and frameworks for energy efficiency'. There are quick wins to be gained with specific EE actions. Through the adoption of standards and recommendations, tangible results in saved energy can be observed in the short-term. The effects of EE standards and labels in the market place together enhance the efficiency of products sold in the market, by ensuring a sustainable "market transformation" process towards increased sales of energy efficient products. The project is being implemented in close cooperation with the African Union, RCREEE, ECREEEE, EACREEE and SACREEE.

This case study looks at the idea of setting up an energy labelling system in Africa. Energy rating labels provide consumers with information on EE of a product. EE labels are informative labels which are affixed to appliances to provide guidance to consumers at the time of purchase. The information provided by the labels usually cover energy consumption of the product and EE. The labels can thus be used by consumers to make comparison and assessments on energy costs for ongoing use and environmental impact.

There are two main types of labels – comparison labels and endorsement labels. Comparison labels allow consumers to compare the energy consumption of similar products and take into account, lifetime running cost into their purchasing decision. Endorsement labels, provide a 'seal of approval' to inform prospective purchasers that the product is highly energy efficient for its class. The energy labels can be either mandatory or voluntary. The current set of activities aim at developing the following outputs:

- Developing Guidelines for implementing energy efficiency label schemes in Africa with a focus on the appropriate legal and regulatory framework.
- Investigating, identifying and recommending the types of Minimum Energy Performance Standards and energy labels that can be adopted
- Developing a roadmap in one pilot country in every GN-SEC Centre and make recommendations how to ensure implementation of the proposed energy labels at national levels.

The Opportunity for GN-SEC:

The case study above indicates that the RECs need to be supported in developing their own labelling system as an integral part of creating a regional market for SECT. Certain regions such as ECOWAS have made progress in this regard, but this represents an exception. The regions will require establishing laboratories and other test facilities along with high profile marketing and awareness creation. In combination with the findings of the technology assessment, the opportunity for GN-SEC is to establish an equivalent of 'centres of excellence' or 'knowledge hub' in partnership with national and international institutions. While the efforts of Lighting Africa and Global Alliance is recognized in promoting off-grid solar powered lighting solutions and efficient cookstoves respectively, the knowledge hub can focus on overlapping issues such as improving grid efficiency, energy efficiency in buildings, switching to LEDs among others.

4.5 Access to Finance:

In economics, the concept of market equilibrium is the price point at which the market operates. Supply is created by the private sector led SECT technology providers while demand is created by end-users (individuals, communities, organizations, cities etc.) who benefit from

the use of energy. However, for a market to function it is just not sufficient that supply and demand exist, there must also be a willingness and capability of the market to 'trade it'. The end-users must have the financial capacity to pay for the goods or services while the private sector will need to find (long-term) financing for developing and making the goods and services available to the end-users. This exchange makes the market highly complex and calls for a more comprehensive discussion on market instruments, incentives and institutions. As the issue of finance is relevant to all stakeholder groups, the opportunity for the GN-SEC centres can be identified by analysing the potential expectations of the various stakeholder groups – including the demand, supply side and providers of finance. It must be further noted that each of the stakeholder can either be a recipient of finance (e.g. the end-users), or a provider of finance (e.g. banks) or both (e.g. private sector investors who invest their own money but also access loans from banks) as highlighted by the table below:

Financial Capacity	Recipient of Finance	Provider of Finance	Expectation of the Stakeholder	Role of GN-SEC centres
Individual, End-Users Communities & Groups	X		Access to SECT Goods & Services	Raise Awareness on Financial Instruments aimed at Improving Affordability
Private Sector / Project Developers	X	X	Profit / Rate of Return against Investment	Coordination & Awareness to Strengthen the Business Case for Investments
Commercial Banks / Institutional Investors		X	Loan Pay-Back (Minimal Risk)	Facilitate Risk Reduction strategies through Demonstration, Awareness, Guarantees etc
Development Banks / International Donors		X	Verifiable Outcomes and Pay-back (loans)	Coordination at Programmatic level. including Monitoring & Reporting
National Government / Implementing Agencies	X	X	Allocation of resources & Verifiable Outcomes	Advisory & Coordination with Developing and Implementing Financial Instruments

Based on the expectations of each of the stakeholder groups, the GN-SEC centres can either take a lead or support the stakeholder groups towards building a market equilibrium:

- Demand Side (Individuals, End User Communities, Organizations, Groups etc.): This is a group that represents the beneficiaries of SECT and to access RE and EE technologies needs finance. The GN-SEC centres can play a specific role in designing financial instruments (e.g. feed-in tariffs) or financial products (micro-loans) and raising awareness among these stakeholders with the overall objective of improving affordability of the SECT.

- Supply Side (Private Sector / Business Entities, Project Developers etc.): This is a group that typically represents the Small-Medium Enterprises (and potentially a few larger ones) that will offer a wide range of products and services and are primarily driven by the motive of making a reasonable rate of return on their investments – on the equity contributions made and on the loans secured from banks and other investor groups. Their driver for investment is in their ability to undertake the commercial risk and the GN-SEC centres can contribute to reducing this risk by a series of supporting activities that allow strengthening the business case for investments, supporting capacity development particularly in the areas related to financing and ensuring that there is sufficient awareness around the regional and national policies, programs, incentives and other forms of financial support.

- Commercial banks / Institutional Investors and Development Banks / International Donors: While both these groups represent providers of finance and expect the financing / loans extended to be paid back, the distinction lies in the expanded

interest of the latter group (comprising of development banks, bilateral and other multilateral donors). Hence, while the former group needs assurances in the form of reduced risks through project demonstration, or government guarantees, and improved decision-making ability (e.g. to screen projects, allocate funds, distribution of loans etc.) the latter group need assurance that the objectives of the program / project activity for which finance is being extended are met successfully. The GN-SEC Centres can thus focus on building investor confidence in addition to focussing on coordination and tracking of performance particularly for development banks and international donors.

- National Governments and Implementing Agencies (e.g. Rural Energy Agency): The respective member states represent the main partners for the regional initiatives undertaken by the GN-SEC and the types of cooperation between the GN/SEC centres and the government counterparts work at various levels that can be broadly classified in the form of advisory (e.g. to develop financial instruments), coordination (e.g. on awareness creation and working with regional financial institutions, donors etc.), capacity development and implementation (e.g. supporting the development of business case, project demonstration and other risk reduction strategies).

In conclusion, it can be observed that while the type of technologies (e.g. grid connected, decentralized, EE schemes, etc.), stakeholders (e.g. individuals, communities, organizations) and modalities of financing (e.g. equity, micro-loans, soft loans, donor support etc.) can vary significantly the role of the GN-SEC centres from a regional perspective can be broadly understood to take the form of advisory, strengthening institutional capacity, awareness creation and capacity development and training – activities fully in line with the mandates of the GN-SEC, although these will need to be tailored to specific circumstances and needs.

Innovation Story: PPP Units in Sub-Saharan Africa

A review of the PPP undertaken by the RECs indicates that the experience has been mixed although all regions have been using the PPP approach to develop infrastructure projects. A review of the private sector participation in the electricity sector indicates a reasonable number of PPP projects in sub-Saharan Africa and the Caribbean are in various stages of negotiation and development. The total investment commitments in sub-Saharan Africa for the electricity sector amounts to USD 32.84 Billion (for 191 projects classified as 'active') although this figure drops dramatically to USD 110 million (representing 16 projects) when analysing for the number of projects for which the PPP process has been 'concluded'. (WB-PPI, 2018) - Data Visualization filters applied 'active' or 'concluded', 'PPP', 'Sub-Saharan Africa', 'Electricity'.)

This notes that while many PPP projects have operated successfully in delivering quality energy and infrastructure facilities others have faced challenges. The complexities around developing and implementing the PPP process has meant long delays and as can be observed has resulted in questionable value or unexpected costs to governments or consumers. Many member states have implemented PPP projects without any overarching PPP policy frameworks and as listed below, only the more advanced economies among the member states have dedicated governmental agencies such as a 'PPP Unit' that can oversee the implementation of the PPP process.

A PPP Unit is typically a governmental organization, parked under a relevant ministry that is set-up with the intent of supporting the national government to carry out functions related to policy guidance, technical support and capacity building, promotion of PPP and guiding investments. The PPP Unit can ensure a proper regulatory framework along with necessary tools, best practice, knowledge is available for the private sector along with necessary competencies required to ensure that the PPP is the 'best value for money' solution for all parties involved while aligning the PPP with national budget process. The 'Public-Private-Partnership Legal Resource Centre' an exhaustive World bank supported

database for PPP notes the existence of PPP Unit in the following countries. (Note: this list may not be exhaustive and does not reflect that no information was available for CARICOM and SPC regions)

- Ghana: PPP Advisory Unit
- Kenya: PPP Unit
- Malawi: Public Private Partnership Commission
- Mauritius: PPP Unit
- Namibia: PPP Unit
- Nigeria: Foundation for PPP Association
- Senegal: APIX
- South Africa: PPP Unit
- Uganda: PPP Unit (Ministry of Finance, Planning and Economic Development)

Source: (WB-PPP Units, 2018)

4.6 Knowledge, Qualification, Innovation, Entrepreneurship and Awareness:

The scope of activities and types of efforts covered under this category is vast and an attempt is made to get an impression of the existing regional capacities by reviewing 3 enablers – namely the existence of regional conferences and seminars as platform for exchange of ideas, information and opinions, the availability of web based regional information portals that allow the latest and most up-to-date data and information on energy sector available to the wider community and the scope for capacity building through university level programs. It is acknowledged that the 3 enablers do not provide a full assessment of the existing scenario, for e.g. unavailability of university led academic degree courses is not reflective of the short-term certificate or specialized training programs conducted by specialized institutions or the opportunities that exist for R&D and innovation. But the choice of enablers does serve two purposes – they provide an opportunity for the GN-SEC to quickly scale-up the efforts through targeted actions (e.g. the absence of an information portal can be supported by GN-SEC Centres by setting up a regional information hub which is fully in line with its role as a technical agency) and more importantly provide a direction for wider collaboration and partnerships as these activities will need to be done in cooperation with 3rd party actors.

Regional Conferences:

There is a growing awareness within all 5 RECs on the importance of renewable energy technologies and the role it is expected to play in the future energy mix and this is observed by the increasing number of public events and conferences being organized within these each of these regions, particularly in the recent years. The conferences focus on bringing together the private sector (supply side) and government and regional representatives – with the role of the latter two focussed on giving legitimacy to the entire process. Where these conferences are found lacking is that the focus lies on attracting private sector investment in renewable energy projects which results in the opportunities on energy efficiency measures taking a back seat and secondly, is the weak representation by the demand side (e.g. rural communities).

As most energy conferences are organized and managed by private sector event management organizations, they offer a professional platform for exchange of ideas, information and awareness particularly in attracting international investors. This is also observed by dedicated event websites, the location settings of the conference (usually in premier hotels or conference

sites) and the attendance fees being charged from attendees. At present there seems to be little or no consideration to include end beneficiaries such as local community leaders or the participation of civil societies and NGOs in the dialogue. The regional energy conferences, clearly provide an opportunity for the GN-SEC Centres to act as a facilitator, outreach and raising awareness of its own activities and the support they can provide to potential investors. More importantly, the GN-SEC centres can provide a higher level of legitimacy to private event management organizations as observed by the role of PCREEE in the Pacific Investors Forum thus helping drive the agenda which can be aligned to the regional objectives for SECT.

Information Portals:

Like the regional conferences above, there currently exists some form of regional information portal in the RECs with the possibility of building onto them for wider dissemination of information and knowledge. The RECs of sub-Saharan Africa have dedicated websites for Power Pools provide electricity related information as part of its core activities while the two SIDS based RECs have a more comprehensive energy and climate related information portals. While the former provides limited information, that all RECs have some provision for making energy related data and information publicly available and the opportunity for the GN-SEC is to ensure that the websites are populated with the appropriate information, particularly market intelligence and information required by the private sector to build business cases and investment plans. The ECOWREX portal of ECOWAS is a comprehensive website that is closest to what a regional information portal can contain. The opportunity for GN-SEC centres is to cooperate with partners such as IRENA, REN 21, NREL, World and Regional Development Banks along with other international organizations such as UNIDO to establish a comprehensive website that acts as a one-stop-shop for all relevant information for end-user groups (e.g. financing for purchase of energy efficiency equipment by industries or solar water heaters by hotels or information regarding the energy labelling) and the private sector (e.g. latest government policies, programs, incentives, training and certification programs etc.) in addition to being an important source of information for international organizations (e.g. provide live tracking of the performance of various programs such as distribution of cookstoves or comparing the feed-in tariff rates for hydro / PV power plants) and national governments (e.g. measuring performance against the SDGs).

Capacity Development and Academic Programs:

The issue of capacity development and training is all encompassing and needs to be tackled across multiple levels. Consider the case of lack of policies and regulations – the opportunity for GN-SEC Centres from the capacity building perspective can focus on raising awareness and equipping the key decision makers such as government ministers with the right information that can facilitate decision making process, while training staff within the ministries on specific issues such as designing framework contracts for IPPs. The lack of human resource is not limited to government institutions and is extended to private sector, service providers and on the demand side with organizations such as the hotel industry or industry association to identify potential opportunities for implementing SECT. Similarly, there are other opportunity for the GN-SEC centres to support through targeted capacity building measures based on the specific challenges and opportunities for stimulating the market environment for supply and demand side of SECT including the role of the government and other institutions and one such opportunity is the role of universities which is further elaborated subsequently:

The RECs have at least 1 University that provides relevant high-level educational program (Masters level) but there is clearly a significant opportunity to build additional courses, programs, partnerships and collaborations between institutions especially among the economically weaker member states. Additional information is needed to determine the status of vocational training, certification programs and other non-University or short-term education or training programs to determine the role of the GN-SEC centres however the advantage of having a high-level education program is that supports building local intellectual capital by

allowing a large pool of talented and bright young people to be trained over an extended period of time and equipping them with the necessary academic perspective and skills required to not only support the implementation activities but also build additional capacities such as the vocational or short term certification training programs, partnerships with other institutions for promoting innovation and R&D and forms of capacity building.

5. Recommendations

In line with the previous findings, the following recommendations for the GN-SEC centres are made.

5.1 The 3-Point Hub Strategy:

The inherent strength of Regional cooperation lies in the phrase itself and consists of 2 elements – the concept of a 'region' and the spirit of 'cooperation'. A region provides the "strength in numbers" (as noted by the GDP values in Chapter 4) and the rationale for pursuing a strategy based on a Common Market for SECT products and services while cooperation ensures that every member state within a region stands to benefit from the "shared opportunities" that arises. Creating a regional Common Market for SECT that supports an equilibrium between demand and supply requires cooperation between the member states of an REC which in turn requires commitment and reciprocity.

As observed by the ongoing climate negotiation process, cooperation is established through a process involving consultation, consensus building and concluded through a formal written agreement between the stakeholder groups. Consultation ensures that all parties are heard, and their opinions acknowledged. Consensus building is a negotiation and contains an element of risk wherein some parties stand to lose out, in the interest of a greater good. Once an agreement is reached and signed off by respective entities, it often signals the start of a process, a level of commitment and requires additional support to ensure its implementation.

The first such supporting element is the 'enabling policy environment'. The implementation process that follows is a demanding and complex task that requires coordination of all defined actions to support the overall objective of sustainable development. As the environmental and social impacts are already covered through the implementation of SECT in the form of lower emissions and improved quality of life, there is a need to support the economic impact which by stimulating private sector participation. And this brings into focus 2 additional elements for supporting 'development of technology and markets' and assisting with 'awareness creation and partnerships. These 3 elements provide the basis for developing a 3-Point (Hub) Strategy that collectively forms the Common Framework for a Common Market.

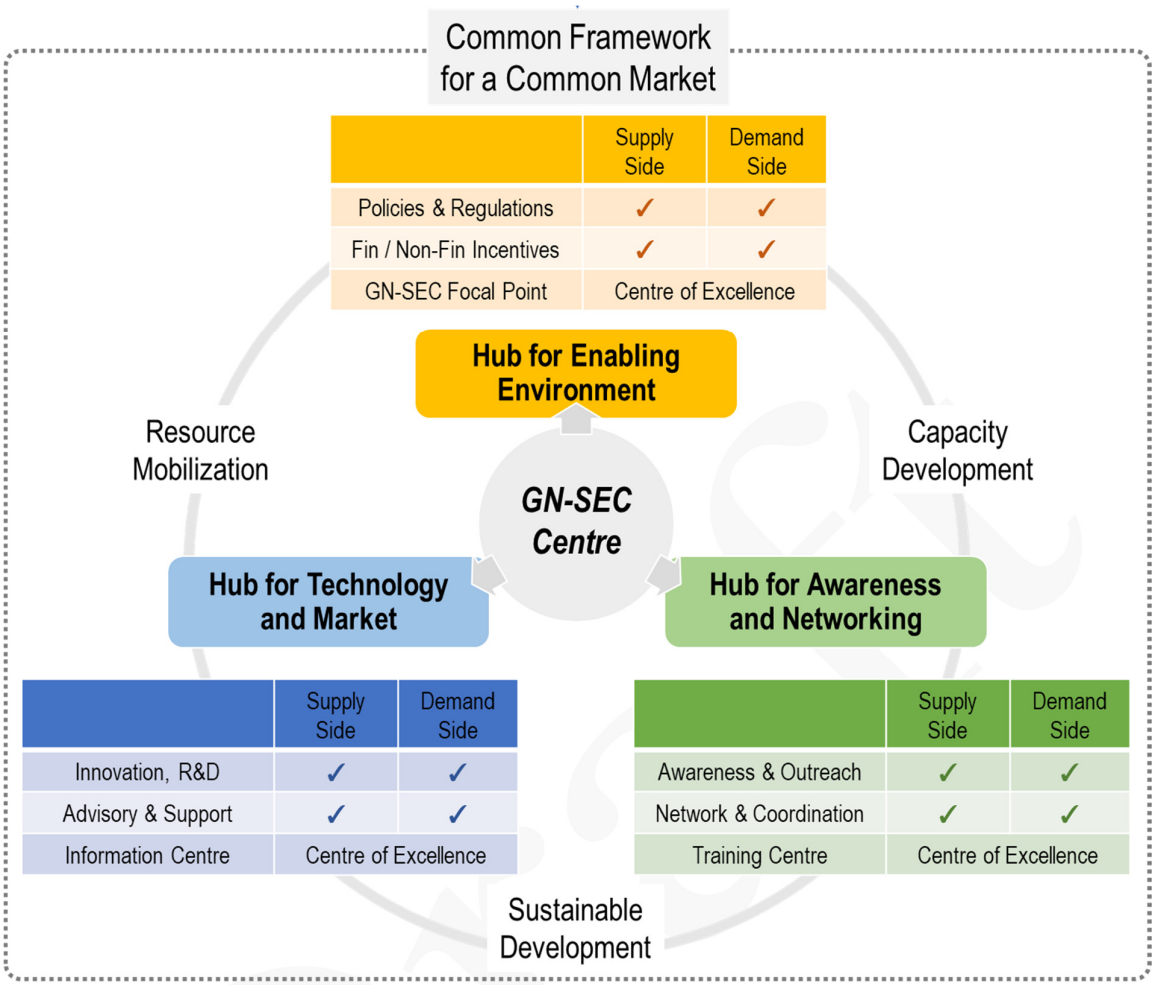


Figure 11: Schematic Overview of a '3-Point Hub' Strategy for the GN-SEC Centre

Without losing sight of the core objectives and mandates of the GN-SEC, the proposed strategy facilitates the 'soft measures' required to enable 'hardware' through the creation of 3 'Hubs' (or Teams) within each GN-SEC Centre, each focusing on a set of core activities that supports both supply and demand side of the SECT value chain. Each Hub will also contain a 'Centre of Excellence' which will build on the activities of the respective hub to provide additional value added services which will collectively contribute to overall capacity development, resource mobilization and contributions to specific SDGs.

5.1.1 The Hub for Enabling Environment:

This hub intends to enable the 'policy and regulation' challenges and opportunities identified in the RECs and this will happen across various levels:

- **Supporting Regional, National and Sectoral / Sub-Sectoral Policies / Standards:** Current thinking behind transforming the energy markets is driven by policies that tilts the balance towards demand side (e.g. targets for RE) and the GN-SEC centre will aim to 'correct this balance' by strengthening the entire the value chain.

Type	Supply Side	Demand Side

Policy	Assisting member states with designing and implementing policies that supports increased investments that facilitate industrialization, innovation and entrepreneurship. Examples of such policies can focus on encouraging SMEs to invest in the SECT value chain and could (initially) focus on leveraging existing industries such as circuit board designing and printing or encourage trade activities such as welding and electrical engineering with the aim of producing solar home lighting systems, energy efficient electrical appliances, solar water heaters etc. Another example of such policies could focus on creating a start-up culture such as the 'Start-up India' initiative of the Government of India which focuses on a range of policies, initiatives and financing aimed at 'Simplification and Handholding', 'Funding Support and Incentives' and 'Industry-Academia Partnership and Incubation'. For more information refer: https://www.startupindia.gov.in/	Supporting the creation of a regional policy along with energy related targets and timeframes, will signal a clear mandate for the creation of a regional 'Common Market' for SECT and the potential market size or demand that needs to be met. And by assisting member countries to align (either through a top-down approach or a bottom up approach) regional targets with national targets, it will signal the intention of the respective national governments to support specific SECT through sectoral policies, financial and non-financial incentives. Sectoral/sub-sectoral target setting can be developed through a comprehensive stakeholder engagement process which can be facilitated by the GN-SEC. By sharing best practices and learnings between member states and through South-South cooperation, the GN-SEC can support improved decision making and this will be applicable for both supply and demand side.

Innovation Story: Efficient Lighting and Appliances in Southern and Eastern Africa (EELA)

The project refers to 'Efficient Lighting and Appliances in Southern and Eastern Africa (EELA). It is implemented by UNIDO and SACREEE with support of SIDA.

Therefore, increased efficiency in the use of electricity is central to achieving the regions' energy security and sustainable development objectives. Promoting market-based adoption of energy efficient lighting and appliances will, among others, result in the efficient use of electricity through adopting best available and appropriate technologies to provide quality lighting services to consumers, as well as extending access to modern lighting services and appliances to municipalities, institutions, households, public places, and industries in both on- and off-grid areas. As such, the EELA project seeks to transform the market for energy efficient lighting and appliances in the East African Community and the Southern African Development Community. More specifically, the project aims to create market and institutional conditions to enable a transformation of the sector to stimulate increased diffusion of energy efficient lighting products and appliances across all sectors.

The EELA-PREP is envisaged to run for at least 6 months and seeks to finalize and validate various aspects of the main EELA project and will be implemented by the UNIDO. EACREEE

based in Kampala, Uganda and SACREEE based in Windhoek, Namibia will be execution partners. The Swedish Energy Agency, the Swedish Standards Institute, and CLASP will provide specific services during the EELA-PREP project.

- **Supporting Financial and Non-Financial Incentives:** Incentives are crucial to encourage any implementation process and the table below captures a range of financial and non-financial incentives that can be facilitated by the GN-SEC:

Type	Supply Side	Demand Side
Financial	Start-up Funds, Investment Grants / Loans, Corporate Tax exemptions, Credit schemes (e.g. income tax credits, export credits etc.), Insurance Products (e.g. Government insurance at preferential rates)	Feed-in tariffs, Grants and Soft Loans, Micro-finance for purchase of equipment, tax depreciation, rebates, savings program, refinancing, buy back schemes etc.
Non-Financial	Setting up a one-stop shop for permitting, licensing, land purchase, water and energy connections, temporary or permanent exemptions from applicable standards, clauses for stabilization guaranteeing against amendments of favourable terms, preferential government contracts etc.	Simplified import export procedures, energy audits, labelling, certifications, support with advisory, tools, installation guides, project demonstrations, special schemes (e.g. first service free), etc.

GN-SEC Focal Point – A Centre of Excellence:

As this hub will be main counterpart dealing with governments and their regional counterparts including development banks, international donors, it is recommended that the hub contain a 'GN-SEC focal point' (e.g. a senior technocrat and supporting team) that can facilitate the high-level dialogue with their regional and national counterparts, supporting the decision-making process by making available relevant information, securing finance, showcasing best practices and setting the agenda for the GN-SEC centre based on the evolving needs of the member states. The GN-SEC focal point is also ideally placed to track and report performance *(Note: the monitoring, reporting and verification of data will be undertaken by the Information Centre – see below)* against the established targets and inform member states about their progress against international frameworks such as the SDGs or commitments to the Paris Agreement. The figure below provides an overview of the activities to be supported by the Hub and the Focal Point.

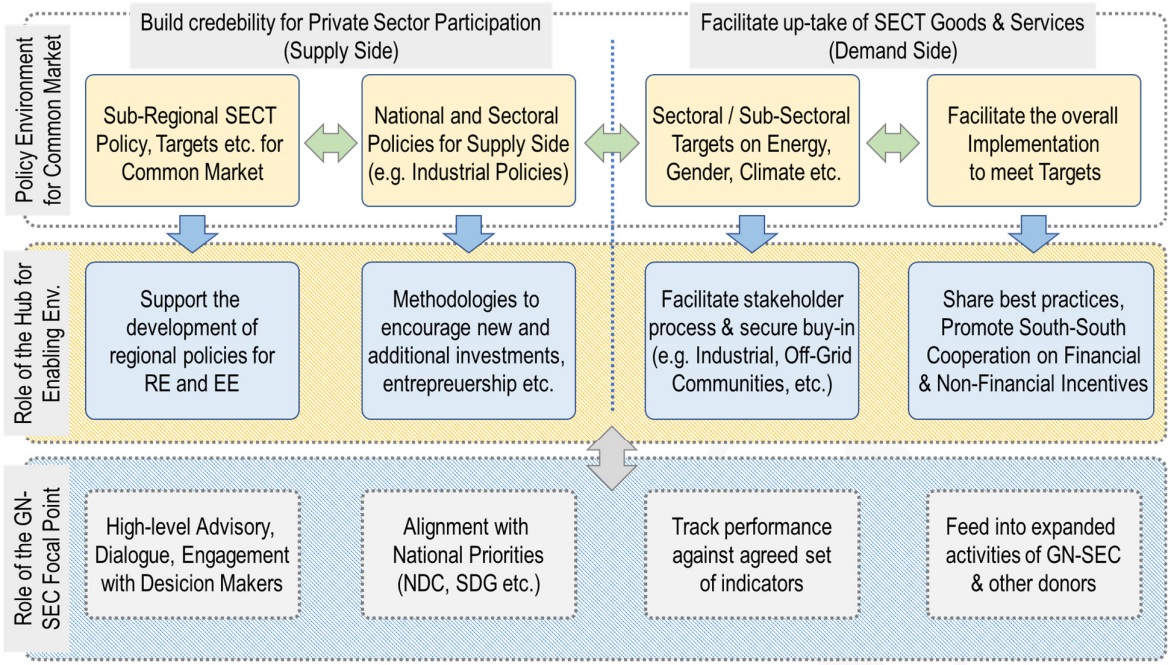


Figure 12: Overview of the activities supported by the Hub for Enabling Environment

Innovation Story: Regional Off-Grid Electrification Project (ROGEP)

The project refers to 'Regional Off-Grid Electrification Project' (ROGEP) aimed at promoting standalone solar systems in West Africa. The project is an example for a regional approach which addresses the issue of financing for small scale systems through innovative public financing instruments (e.g. guarantees) and promotes solar entrepreneurship simultaneously. The West Africa and Sahel region is characterized by having one of the world´s lowest rates of energy access. Of the 395 million inhabitants of the region, approximately 244 million have no access to electricity. In most countries, the access is limited and substantially confined to the urban areas.

Due to the strategic importance of energy in achieving sustainable development, ECREEE and EBID are implementing the proposed Regional Off-Grid Electrification Project (ROGEP), with support from the World Bank and their Lighting Africa Program. ROGEP aims to enhance electricity access in West Africa and Sahel region, through standalone solar systems (solar lanterns, solar home systems, solar water pumps, solar mills, solar sewing machines, etc.).

The project, with an estimated overall budget of USD 200 million, includes 19 countries: Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Sierra Leone, Senegal, Togo, Cameroon, CAR, Chad, and Mauritania. ROGEP is comprised by 2 major components, divided by their respective sub-components:

- Component 1 - Supporting the acceleration of the Regional Market
- Subcomponent 1 A: The Enabling Environment
- Subcomponent 1 B: Entrepreneurship Support
- Subcomponent 1 C: Risk Mitigation Facility
- Component 2 - Access to Finance

5.1.2 The Hub for Market and Technology

While the first hub focusses on creating the appropriate framework conditions for improving the overall investment climate, the 2nd hub focusses on the more pragmatic issues required to translate this into on-ground actions. And this will be done through:

- **Innovation, R&D, Patents, Intellectual Property Rights etc:** R&D (Research and Development) plays an all-important role in building a culture of innovation and is an investment in technology and future capabilities for the respective stakeholders which can be transformed into new products, and services for SECT. It helps in developing new competitive advantages which over time will lead to better and cheaper solutions. At present the culture of innovation, R&D and associated issues such as intellectual property rights, patents and collaborations between institutions and the private sector remains a weak link which will be strengthened by the GN-SEC centre.

Innovation Story: Innovation Fund - Denmark

Innovation Fund Denmark (Innovationsfonden) was established in April 2014 by bringing together research, technology development and innovation grants from the Danish Council of Strategic Research, the Danish National Advanced Technology Foundation and the Danish Council for Technology and Innovation into one new powerful foundation.

The overall aim of Innovation Fund Denmark is to support the development of knowledge and technology, including advanced technology, to strengthen research and innovative solutions that may benefit growth and employment in Denmark. This is done by investing in, and thus providing risk capital for societal partnership on innovation, thus enabling cutting-edge initiatives to achieve results that have substantial impact for the participating parties and the Danish Society.

For more information in English: https://innovationsfonden.dk/en

- **Advisory and Support:** This activity group relates to a broad range of services that can include support required for start-ups on the supply side (e.g. shared work spaces, advisory on setting up new businesses, support with permitting, licensing, and other government incentives), to undertaking detailed market survey on the demand side to determine the market potential, price points and data required by companies to develop, market and sell new products and services, to supporting with technical advisory in cooperation with international donors.

Innovation Story: Fab Labs

A Fab Lab is a global technical prototyping platform for innovation and invention, providing stimulus for local entrepreneurship. Established as an educational outreach component of MIT's Centre of Bits and Atoms, the Fab Labs are currently located in 30 countries and comprises of off-the-shelf, industrial-grade fabrication and electronics tools, wrapped in open source software and programs written by researchers at MIT's Centre for Bits & Atoms. While the focus of the activities is aimed at supporting STEM (Science, Technology, Engineering, & Mathematics) related activities, the available infrastructure such as laser cutters, milling machines, and a suite of suite of electronic components and programming tools for low-cost, high-speed microcontrollers for on-site rapid circuit prototyping

For more information: http://fabfoundation.org

Information Centre / Focal Point – A Centre of Excellence:

As the hub is expected to facilitate exchange of knowledge and information on market, technology and other relevant issues, the hub will also host an 'Information Centre' that will make the information available to all relevant stakeholders. This can take various forms such as a web portal operated in conjunction with the Power Pools (as previously noted the existing Power Pools currently operate websites that make electricity related information available) or a combination of hard (e.g. handbooks, guides, reports etc. in the form of a library) or soft data (e.g. internet based information can be categorized into 2 categories – on a free to use basis and certain data can be restricted by user defined or pay-per-use basis). The hub will also be responsible for operating the monitoring, reporting and verification system and coordinating with the other hubs in making the required information available.

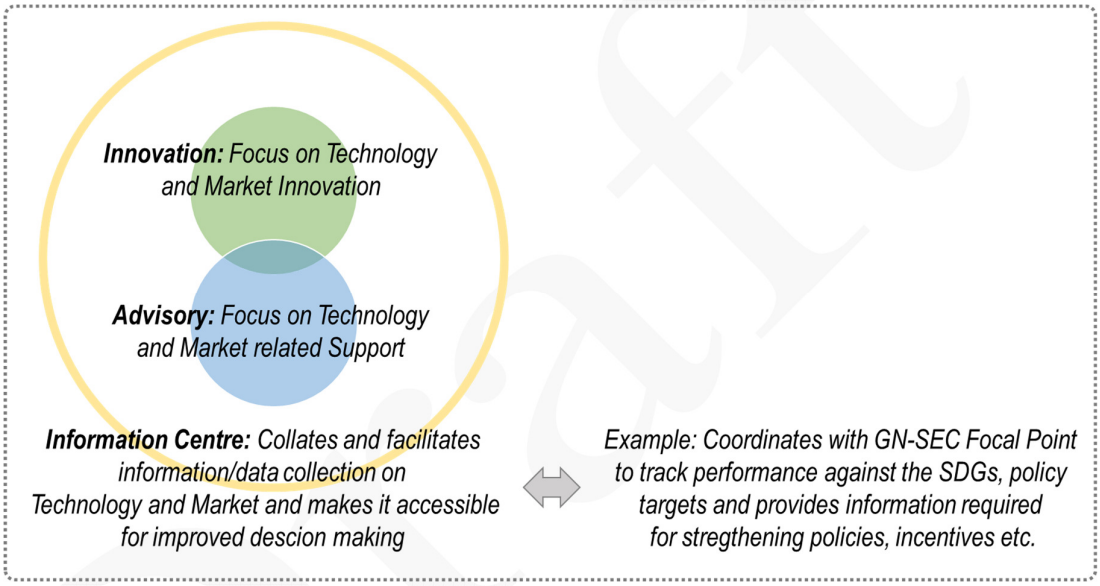


Figure 13: Overview of the activities supported by the Hub for technology and Market

Innovation Story: ECOWAS Observatory for Renewable Energy and Energy Efficiency (ECOWREX)

The project refers to the GIS based ECOWAS' ECOWREX knowledge platform that is aimed at improving existing knowledge and mitigating information barriers towards the development of the energy sector in the ECOWAS region. ECOWREX provides decision makers, project developers, investors and other stakeholders with tailored information and planning strategies. It will boost knowledge management, networking, advocacy and strengthening of capacities on renewable energy and energy efficiency. The project started with funds and technical assistance from UNIDO under the GEF Project "Promoting Coordination, Coherence and Knowledge Management under Energy Component of the Strategic Program for West Africa (SPWA)". The system was very innovative and the first comprehensive energy information system in ECOWAS. The main objectives of ECOWREX is to:

- Provide targeted, timely and statistical information on the energy resources (especially in the field of RE and EE) including RE resources, policies, projects, power plants and other relevant information about the ECOWAS Region, to support in decision making.

- Build up a network of energy experts and cooperation among key local and international players to share knowledge and experience on best practices and technical knowhow from around the world.

Considering the improvement in technology for data access and sharing, the need for data standardization and improvement in energy resources and potential mapping, ECREEE took further steps towards restructuring and improving the ECOWREX Geographic Information System (GIS). In partnership with the University of Geneva, Noveltis S.A.S, the Energy Centre of the Kwame Nkrumah University of Science and Technology (KNUST) and the Directorate of Energy, Cape Verde, ECREEE executed a project titled "ECOWREX2" with the theme "Promoting Sustainable Energy Access through the use of geospatial technologies in West Africa". The project is funded by the European Union.

ECOWREX 2 seeks to improve the ECOWREX GIS (available at: www.ecowrex.org/mapView/), by building a complete Spatial Data Infrastructure (SDI) and adding new resource maps of energy access, green power potential/power consumption, all focused on increasing investment in West Africa. The output will be fully compliant with the Open Geospatial Consortium (OGC) standards, thereby aiding data interoperability, effective data processing, sharing and knowledge transfer. The major outputs of the project includes:

- An improved web-based map framework with improved functionalities to enable easy and reliable sharing and transfer of data.
- Enhanced solar and wind maps with improved temporal and spatial resolutions necessary for planning.
- A map of ratio between power consumption and green power production potential.
- Energy access map based on the "GEAR GIS toolkit" model developed by the KNUST Energy Centre, for Ghana.

Increased knowledge and awareness on the use of geospatial technology, including data and metadata collection standards in West Africa.

5.1.3 The Hub for Network and Awareness Creation

The third hub is intended to act as the "marketing and business development unit" of the GN-SEC centre and will focus on:

- **Awareness and Outreach:** Governments and the private sector often use a range of strategies using traditional and social media in combination with direct outreach activities (e.g. roadshows, exhibitions, engaging community leaders, schools etc.) to spread awareness about new programmes and initiatives. In the context of promoting SECT, this activity will be crucial for both the supply side – in raising awareness with the private sector on incentives, policies, support mechanisms etc. and demand side – in informing individuals, communities and organizations about new technologies, solutions, standards, labels, financial support and incentives and other drivers that can ultimately increase the sales of SECT. The awareness activities can also be extended to financial institutions through demonstration projects and presenting financial case studies to improve investor confidence.
- **Network and Collaboration:** This can involve setting up partnerships, collaborations and facilitating exchange of ideas, information at various levels such as collaborating

with the existing private sector associations, setting up partnerships with research and academic institutions (e.g. vocational training, university programs etc.), engaging with banks to develop new financial products and coordinate the efforts with the GN-SEC Network and South-South cooperation, establishing technology clusters. The efforts of network and collaboration will directly complement the awareness and outreach activities as the former is targeted at specific user groups while the later can focus on institutional partnerships.

Innovation Story: Strategic platform to promote sustainable energy technology innovation, industrial development and entrepreneurship in Barbados

UNIDO in partnership with the Government of Barbados and the Caribbean Centre for Renewable Energy and Energy Efficiency (CCREEE) is implementing the Global Environment Facility (GEF) funded project, "Strategic platform to promote sustainable energy technology innovation, industrial development and entrepreneurship in Barbados". In line with the proposed alternative scenario, the project focuses on the mitigation of the barriers for the sustainable energy manufacturing and servicing industry in areas with high GHG emission and value creation potential in Barbados and the wider Caribbean. Particularly, the project will:

a. establish a public-private platform for regular policy dialogue to promote coherent demand and supplier-oriented cross-sectoral policies, regulations and incentives;
b. establish a physical sustainable energy and climate cluster hub which provides businesses with communication and networking space, start-up support (e.g. co-working and maker space, incubation services, common marketing/branding), as well as capacity building;
c. strengthen the cluster members by establishing a funding window which provides grants and concessional loans for the commercialisation innovative business ideas and industrial up-grading;
d. promote networking and joint ventures between the cluster members and entrepreneurs, investors, venture capitalists, financiers in the Caribbean, other SIDS, internationally (incl. the diaspora);
e. contribute to the creation of qualification and certification frameworks for personal, equipment and services and provide targeted training to current and future members of the cluster;

Training and Capacity Building Centre – A Centre of Excellence:

Capacity Development is an all-encompassing enabler that focuses on equipping people with skills and knowledge required to support every aspect of the implementation process. As the target group for the capacity development and training includes government agencies, public institutions, private sector and end-users – all of who will be accessed either through outreach and awareness creation programs, partnerships, collaboration – the hub will be ideally placed to host the 'Training Centre'.

The activities of the training centre can consist of a broad type of activities, some of which can be directly undertaken by the Training Centre itself as part of the GN-SEC's core activities or executed through the assistance or cooperation of 3rd parties (e.g. vocational training and certification programs can be organized in partnership with a local university of institute). This hub can make a distinction of beneficiaries either as government / public institutions, the private sector and the end-users (this can include individuals, communities and organizations). Or it can also include a more complex matrix to target individuals or groups, institutional or organizational level beneficiaries, and in supporting the creation of an enabling environment – which relates to policy and regulations. There would be a lot of emphasis on the supply side.

The figure below provides a schematic overview of the various types of engagement that the GN-SEC centres can undertake and in doing so also fulfils a crucial gap in the institutional structure of the Paris Climate Agreement. At present, the Agreement identifies the GCF as the key financial entity and CTCN as the technical arm, however no institution has yet been identified for supporting capacity development which is the regarded as the 3rd 'means of implementation' under the Agreement.

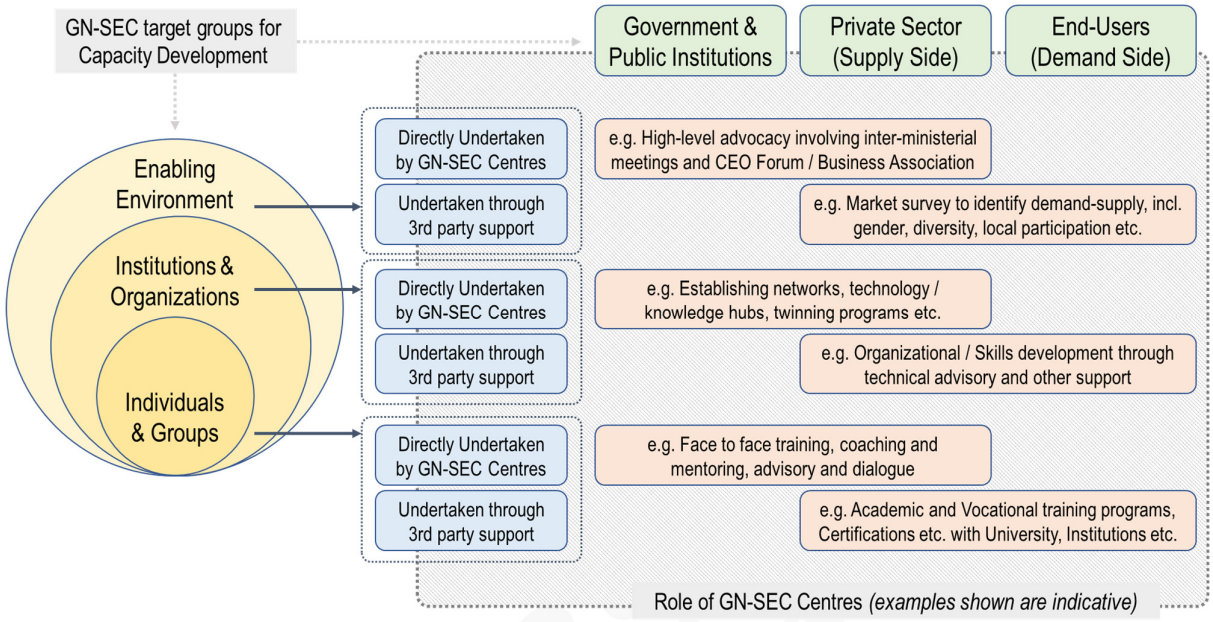


Figure 14: Role of GN-SEC Centres in promoting Training and Capacity Building

Innovation Story: PCREEE Sustainable Energy Entrepreneurship Support Facility for Pacific Island Countries and Territories

At the Third Pacific Regional Energy and Transport Ministers' Meeting (Nuku'alofa, Tonga, 26–28 April 2017), ministers applauded the launch of the Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE), a collaboration to up-scale and replicate national efforts in the areas of capacity development, knowledge management and innovation, awareness raising, as well as investment and business promotion. The centre has a strong focus on the private sector and industry while supporting targeted renewable energy and energy efficiency programs to enhance the productivity of key industries with high job leverage (e.g. agriculture, tourism, fishery, manufacturing, creative industry) and the creation of a locally sustainable energy servicing and manufacturing industry. The centre implemented the following practical examples:

- The PCREEE Sustainable Energy Entrepreneurship Support Facility was launched to support the setting up of new businesses relating to sustainable energy in the member countries of the Pacific Community. The facility is not a cash grant but a technical facility to support activities like market studies, packaging of loan proposals, technical assistance on preparing tenders and business mentoring by established sister businesses in the region. Discussions are underway in terms of partnering with the Global Green Growth Initiative's Youth Green Entrepreneurship Programme and other interested partners.
- In line with its private-sector mandate, and with support of the New Zealand Government and UNIDO, PCREEE organised a South-South capacity building and knowledge exchange program from 2 to 6 October 2017 in Suva, Fiji. Twenty private sector energy businesses from around the

Pacific region took part. Electrical contractors and renewable energy system distributors made up the majority of the participants however, the importance of energy efficiency to a broad range of business areas was evident. The revelation that energy usage can account for 60% of the operational costs for a typical hotel or motel the Pacific for example, was an eye-opener for opportunities in the tourism industry. Participants also learned how energy efficiency can help the agricultural sector. Solar drying to improve the quality of cocoa, coconuts, taro, cassava and kava; the use Bio-digesters in pig and dairy farms and; the cost benefits of solar pumps for irrigation, all made a significant impression. During the week, the importance of using high quality products and services and maintaining standards was emphasised.

5.2 Regional Cooperation in the context of SDGs

The SDGs represent a broadly defined and all-encompassing goals agreed by international stakeholders and in the context of this report can be viewed as 1 'Energy' related SDG – dealt primarily through SDG 7 that calls for "ensuring access to affordable, reliable, sustainable and modern energy for all" (along with a call to increase the share of renewables and improving energy efficiency) and 16 'non-Energy' related SDGs. Literature reviews indicate that although not yet fully understood, there is a growing understanding of the linkages between the 16 non-Energy SDGs with that of SDG 7. This discussion is important because unlike the MDGs, there is consensus among international and thus by default national stakeholders to tackle the SDGs not as individual strategies but from a more holistic perspective. This section aims to show how the proposed recommendations will contribute to specific SDGs and compliment SDG 7.

5.2.1 SDG 9: Infrastructure, inclusive and sustainable industrialization and innovation:

The recommendations focus on the supply side and the demand side with the former strengthening the case for industrialization as the key driver for development. As summarized in the Lima Declaration - Industry increases productivity, job creation and generates income, thereby contributing to poverty eradication and addressing other development goals, as well as providing opportunities for social inclusion, including gender equality, empowering women and girls and creating decent employment for the youth. As industry develops, it drives an increase of value addition and enhances the application of science, technology and innovation, therefore encouraging greater investment in skills and education, and thus providing the resources to meet broader, inclusive and sustainable development objectives. The 3 hubs have specific activities that promote industrialization (e.g. industrial policies promoted by the Hub for Enabling Environment), innovation and entrepreneurship (e.g. promoting innovation and start-up are an integral element of the Hub for Technology and Markets) and thus will collectively contribute to the SDG 9.

5.2.2 SDG 13: Climate Action

Tackling climate change poses an enormous challenge to both developed and developing countries with the energy demands in the latter group of countries expected to significantly increase as general prosperity levels rise. Generating electricity is acknowledged as one of the biggest contributors to greenhouse gas emissions worldwide and by promoting the increased uptake of RE and EE technologies the GN-SEC will drive forward the transformational change on how we produce and use energy in the future. As already noted by the respective NDC commitments, most countries plan to significantly reduce and in many cases phase out the use of electricity dependent on fossil fuels and the Regional approach promoted through GN-SEC centres can greatly enhance the abilities of the member countries achieve the set ambitions through specific actions as provided by the 3 Hubs.

5.2.3 SDG 17: Partnership for Goals

The SDG 17 is supported at several levels with the concept of setting up a GN-SEC network of centres focussed on promoting a strong commitment for 'Global Partnership' and commitment between the individual centres. The efforts of individual centres focussing on creating an enabling environment through policies, market, technology, and outreach activities. The Hubs also contribute to specific targets under SDG 17 particularly:

Finance and Resource Mobilization: Through improved environment for private sector investment facilitated through international donor finance which is expected to reduce over time as the focus on industrialization and the common market is expected to improve the economic conditions of the Regions

Information and Communication Technology: By setting up an Information Centre and making information accessible through websites and information portals, the GN-SEC Centres will seek to take advantage of and improve the cause for investing into robust ICT.

Capacity Building: The Training Centres will focus on a broad range of capacity building activities across a range of stakeholders but the efforts will not be limited to this Hub alone and will be undertaken by the GN-SEC Focal Point through high-level advisory, policy dialogue and equipping the national and regional stakeholders / institutions with knowledge, and by the Market and Technology Hub through the advisory and support activities.

Trade: The focus on industrialization will reduce the dependency on imports but the Regional approach and the push for a Common market will significantly boost trade between the member states and improve the market conditions for goods and services beyond SECT by removal of barriers and setting a precedence for other sectors.

Data Monitoring and Accountability: Tracking performance is integral to the GN-SEC activities through target setting, facilitating the implementation process and the collection of data which will enable countries to track progress against the SDGs in addition to other national and international commitments.

5.2.4 Other SDGs:

SDG 1: Access to energy is fundamental to human development and by creating an enabling environment that improves both the economic conditions (jobs, employment, trade, etc.) along with the availability of clean energy will lead to reduced poverty and reduced exposure of the world's poor to climate related risks.

SDG 2: Wastage of food is a delimiter to reducing hunger and the availability of energy allows food preservation and refrigeration which increases shelf life reduces wastage and allows food to be made accessible to a wider group of people.

SDG 3: The relationship between improved health and clean energy is well recognized particularly in the context of improved air quality for the economically weaker sections of the society by promoting the use efficient cookstoves, use of solar lanterns (replacing kerosene lanterns) and generally due to lower emissions and improved environmental conditions.

SDG 4: Access to energy directly contributes to improved conditions in schools which in turn raises the general education standards by making it easier for both teachers and students. The GN-SEC will also promote vocational training, university programs and other training and certification programs aimed at improving the skills and knowledge base of the population.

SDG 5: Access to energy services can empower women by improving their income-earning, entrepreneurial opportunities, autonomy and reducing drudgery associated with daily household tasks (e.g. collection of firewood). Participating in the supply and demand side of the energy value chain can increase the profile of women in society

SDG 6: Energy production has a strong link to water usage as promoting energy efficiency can lower the demand the water used for cooling (e.g. in thermal power plants) but inefficient management of hydro power and bioenergy can lead to increased water pressures.

SDG 8: Developing policies that promote economic growth and industrialization will lead to increased employment opportunities while the push for a Common Market will improve cross border opportunities for people leading to economic growth.

SDG 10: Energy efficiency can free up resources which in turn can be used for productive purposes that will ultimately reduce inequalities among people. Stakeholder engagement to facilitate the decision making can lead to a more participatory process where the voice of the disadvantaged sections of the society can be heard and mainstreamed into policies, incentive structures and other enablers.

SDG 11: Urban areas and the building sector remain the largest user of energy and a combination of energy efficiency standards (for buildings and appliances) and building integrated renewable energy systems (solar water heaters, BIPV) can significantly improve the quality of life of the people.

SDG 12: Deals with responsible consumption and production which is closely linked to the process of sustainable industrial development being promoted by UNIDO and specific interventions such as waste to energy technologies can help reduce waste while energy efficiency measures can focus on recycling which will reduce the total energy input.

SDG 14: Ocean based energy sources are a potential source of energy for SIDS and countries with coastlines deployment of SECT can reduce the acidification rates

SDG 15: Efficient cookstoves have the potential to reduce deforestation and this in turn can improve the biodiversity and prevent soil degradation. Promoting biofuels can be as a positive impact against land degradation.

SDG 16: The GN-SEC will support strengthening of institutional structures and promoting cooperation between the member states and this increased dependency will lead to peaceful societies and strengthen cooperation with international institutions.

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