

PRODUCTIVE USE OF ENERGY IN SUB-SAHARAN AFRICA TOOLKIT

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List of Abbreviations

ALFA	A Light for Africa	
AMES-M	Access to modern energy services – Mozambique	
AMP	Africa Minigrids Program	
ANERSOL	National Solar Energy Agency	
ANPER	National Agency for Rural Electrification	
BASE	Basel Agency for Sustainable Energy	
BECIS	Berkely Energy Commercial Industrial Solutions	
BESS	Battery Energy Storage Systems	
CaaS -	Cooling as a Service	
CCGT	Combined Cycle Gas Turbine	
CEC	Civic Energy Communities	
DESCO	Distribued Energy Service Companies	
DOWA	Deep Ocean Water Application	
DRE-	Decentralized Rural Electrification	
ECOWAS	Economic Communicity of West African Statse	
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency	
EREDPC	Ethiopian Rural Energy Development and Promotion Centre	
EREP	ECOWAS Energy Efficiency Policy	
ESERA	Eswatini Energy Regulatory Authority	
FOB	Freight on Board	

GCCI	Gambia Chamber of Commerce and Industry	
GEF	Global Environment Facility	
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit	
GMD	Gambian Dalasi	
GTZ	German Technical Cooperation	
HVAC	Heating Ventilation and Air Conditioning	
IRENA	International Renewable Energy Agency	
LCDP	Least Cost Development Plan	
LNG	Liquiefied Natural Gas	
MARENA	Mauritius Renewable Energy Agency	
MEGA	Mulanje Energy Generation Agency	
MNRE	Ministry of Natural Resources and Energy	
MRC	Mauritius Research Council	
MSME	Micro, Small, and Medium-sized firms	
Mwh-	Megawatts hour	
NAMREP	Namibian Renewable Energy Program	
NEP-	National Energy Policy	
NEPIS	National Energy Policy Implementation Strategy	
NES	National Electrification Scheme	
NIGELEC	Niger Electricity Company	
OGEMP	Off grid Energisation Master Plan	
PACD	Programme for Accelerated Community Development	
PEDS	Strategic Plan for Sustainable Development	

PNER	National Rural Electrification Program	
PONADER	National Renewable Energy Development Policy	
PUE	Productive Use of Energy	
PV	Photovoltaics	
RE	Renewable Energy	
REF	Rural Electrification Fund's	
RUWDEC	Rural Women Development Center	
SDC	Swiss Agency for Development and Cooperation	
SDG	Sustainable Development Goal	
SENEL	National News Service	
SMEs	Small, Medium Enterprises	
SNEP	Strategic National Energy Plan	
SSA	Sub Saharan Africa	
SSPU	Standalone Solar for Productive Use	
SWAC	Sea Water Air Conditioning	
UEF	Universal Energy Facility	
UNDP	United Nations Devlopment Programme	
UNICEF	United Nations International Children Emergency Fund	
UNIDO -	United Nations Industrial Development Organisation	
USAID	United Staes Agency for International Development	
USDAF	United States African Development Foundation	
ZER	Rural Electrification Zones (Zones d'Electrification Rurale)	

1. Introduction to Productive Use of Energy (PUE)

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Supported by several studies of the World Bank and independent researchers, energy is regarded as the cornerstone of modern civilization. The United Nations also rightly recognise energy as being integral to achieving several Sustainable Development Goals, such as job creation, economic development, security concerns, and the full empowerment of women. Consequently, the United Nations in its Sustainable Development Goal 7 (SDG7), clamours for "affordable, reliable, sustainable and modern energy for all" by 2030. Additionally, while pursuing the clamour for access to energy, it is important to minimize the environmental impact of energy use by using energy productively and efficiently. Nonetheless, research has shown that while energy does have the potential to spur rural and national development, the relationship between energy and development is not causal. A socio-economic study of electrification and development in India discussed the complexities involved in making electricity work for development, highlighting that the outcomes of massive development and economic benefits to developing countries as a result of rural electrification does not always materialize. This has led to the drift towards the term productive use of energy as opposed to mere electrification. The concept of productive use of energy symbolizes the simultaneous development of energy resources for electrification alongside additional interventions or efforts needed to ensure that the end goal of economic development or industrialization is achieved.

This toolkit advances the understanding of productive use of energy and explores its practical application in countries across Sub-Saharan Africa (SSA). The toolkit commences by exploring the various definitions of PUE and proceeds to consider the traditional and modern views of PUE. The toolkit further explores the benefits and challenges associated with PUE, and the recognised models for implementing PUE. It further explores some of the models that are in application across SSA countries and

the policies and legislations that support PUE in each country. The toolkit concludes by providing recommendations for the advancement of PUE in the region.

1.1 Definition of Productive Use of Energy

While there is no universally acceptable definition of productive use of energy, several attempts have been made at providing a universally recognised definition for PUE. According to Kamal Kapadia in a consultation paper for the World Bank, "productive use of energy involves the utilization of energy – both electric, and nonelectric energy in the forms of heat, or mechanical energy - for activities that enhance income and welfare. These activities are typically in agriculture, rural enterprise, health, and education. Examples of such activities are pumping water for agriculture, agro-processing, lighting, information and communications, and vaccine refrigeration". Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) defines productive use of energy as "agricultural, commercial and industrial activities, powered by renewable energy sources, which generate income. It has also been defined as the use of mainly renewable sources of energy to generate goods and services which directly or indirectly produces income or value. These activities increase productivity, enhance diversity, and create economic value. From the host of definition, it is apparent that productive use of energy is defined by reference to the long term or immediate impact that it has on rural and by extension national economic development. Rural development could be powered by increased education rate; which in the long term could pioneer innovation or increased income, as such, the deployment of energy resources to homes/families/schools, which enable students study and gain education is a productive use of energy. Similarly, the deployment of energy resources in a manner that allows for easier processes in industries, increased productivity, or income or in a manner that creates new business opportunities for rural dwellers or better advances already existing business ventures is considered a productive use of energy.

1.2 The Traditional & Modern view of Productive Uses of Energy

Traditional definitions of "productive use" presuppose that it excludes technologies designed primarily for household, community (health and education), or consumptive use. Rather, it includes technologies used in agricultural, commercial, and industrial activities that directly produce goods or provide services. The utilization of energy in rural areas is typically viewed through the bifurcated lens of residential and productive uses. Residential energy uses are expected to positively impact the quality of life or improve rural living standards. On the other hand, the productive use of energy in rural areas is expected to result in increased rural productivity, greater economic growth, and a rise in rural employment, which would not only raise incomes but also reduce the migration of the rural poor to urban areas. Furthermore, under the productive use, the focus was primarily on the agricultural sector, where electricity was employed to provide motive power for agriculturebased industries to power farm machineries such as water pumps, fodder choppers, threshers, grinders, and dryers. The intended implication was the modernization of agricultural production.

However, this traditional view of the productive use of electricity is now changing, with the focus expanding outside the agricultural sphere. There are several reasons for this. First, studies have shown that lighting for rural nonfarm businesses has positive implications of improving productivity and increasing income for rural people. Secondly, growing evidence establishes a causal link between access to electricity and improvement in education levels. Also, due to the relationship between lifetime earnings and education, the use of energy that positively impacts education can be considered productive. Finally, access to modern energy can also lead to improvements in health care. Optimal utilization of clean energy translates to less dependence on fossil fuel energy sources and thus avoiding the attendant air pollution and consequent health implications. It also equips healthcare facilities in rural areas to cater to basic and emergency services due to the essentiality of electricity for most emergency care activities such as lighting, laboratory tests, and X-rays. This change in the way PUE is classified is what this toolkit refers to as the modern view of PUE.

2. Benefits of Productive Use of Energy

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2.1.1 Increased Rural Productivity

Established and upcoming local businesses can benefit from increased operating hours, mechanization, product preservation, higher productivity, improved working conditions, communication, and education with access to clean and dependable electricity. This is done in a way that is both socially and environmentally sustainable. Productive use of energy, therefore, benefits local businesses, residents, and the environment.

2.1.2 Greater Economic Growth

Productive use of energy enables local communities to deepen their reach and go beyond conventional economic activities, which helps diversify the local economy. Agro-processing, electronics charging stations, general stores, restaurants, repair shops, salon/barber shops, internet service providers, and telecom tower stations are a few examples of the diverse types of entrepreneurial activities.

Additionally, productive use of energy entails the creation of both direct and indirect local jobs at various levels of qualification as a result of the installation, operation, and maintenance of renewable energy equipment. Also, access to electricity positively leads to the creation and expansion of businesses. The businesses and occupations so established or maintained provide income, thus increasing the community's purchasing power. The improved ability of the consumer to pay for energy services and invest in dependable, high-quality goods will generate a positive knock-on effect.

2.1.3 Rise in Rural Employment/Reduced Migration to Urban areas

Energy is recognised as a catalyst for economic growth and the enhancement of livelihoods. Therefore, increased access to sustainable energy is expected to help prevent some of the structural causes of irregular migration. By addressing access to energy as an indirect driver of migration, the immediate drivers of migration, which are economic and environmental in nature, such as (rural) poverty, food insecurity, a lack of economic opportunities, unemployment, and inadequate healthcare and educational services, could be adequately managed..

Furthermore, access to sustainable energy can mitigate environmental drivers of migration, including environmental degradation caused by the inadequate management of natural resources, poorly planned urban development, climate variation, or natural disasters.

2.1.4 Use of Farm Machinery

The income of rural farms can profit greatly from electric-powered farm machinery. Farm equipment such as water pumps, fodder choppers, threshers, grinders, and dryers boost cropping intensities, increase average yields per acre, are more reliable, increase cost efficiency and productivity, reduce labour time required, increase cultivable areas, and result in higher crop growth.

2.2 Challenges of Productive Use of Energy 2.2.1 Access to Finance

A barrier that is evident is the fact that the majority of PUE technology that can lead to greater economic activity is quite expensive for the targeted end-users. Between several hundred and several thousand dollars are spent on solar pumps and irrigation, mills, cooling technology, and even various power tools and appliances used in the services industry. A sizable fraction of the target audience will require financial services in order to purchase PUE equipment, because they lack the funds upfront. Low bank accessibility to rural areas, hefty credit rates, conditions and collateral requirements all work against acceptance of PUE Both end users and suppliers find it difficult to buy equipment because of high bank interest rates. Although numerous PUE firms are creating product finance options for end users, given the risks associated with doing business, it is still challenging for suppliers to find capital at a reasonable rate.

2.2.2 Capacity Building

The potential users' lack of technical expertise and knowledge is one of the key limiting constraints. Absence of offering technical capacity-building for productive use of energy activities along with business and management training has reduced the adoption or advancement thereof.

2.2.3 Policy And Regulatory Framework

A number of case studies involving 16 regions across Europe and North America revealed that renewable energy (RE) represents an opportunity for stimulating economic growth in hostcommunities, it also requires a complex and flexible policy framework and a long-term strategy. Many policy and regulatory frameworks in developing countries are still insufficient in terms of limited provisions to encourage PUE and other renewable energy technologies, while some countries do not have any framework whatsoever to provide for PUE.

3. Models for Implementing Productive Use of Energy



3. Models for Implementing Productive Use of Energy

3.1 Offering PUE as a Service

This service provider model is best suited for rural end-users who have a preference for renting equipment, than buying it themselves. It is particularly common in emerging economies with prominent agriculture base. Here, mini-grid operators/companies are able to offer services under the energy as a service model. Examples of this service provider model include, Cooling as a Service (CaaS). CaaS allow retailers to rent spaces to store their produce close to the markets. Operators of CaaS own and operate walk-in solar-powered fridges and rent the space to traders who can extend the shelf life of their products through the utilisation of the cooling system. The CaaS initiative was launched by Basel Agency for Sustainable Energy (BASE) in 2018 to address the rising demand for energy and to curb the release of toxic gases into the atmosphere. This initiative has since accelerated the uptake of clean and energy efficient cooling technologies around the world in a way that targets sustainable business growth and mitigates the impact of cooling on the climate. The service provider or financier owns and maintains the cooling equipment, and pays the utility bills, incentivizing the installation of the most energy efficient equipment. To achieve scale, a sale-leaseback model with banks can unlock more financing necessary to meet growing cooling demand. CaaS supports dual benefits projects across mitigation and adaptation reducing emissions through cleaner cooling technology deployed and addressing underlying climate risks associated with increased heat.

3.2 Making Credit available to End-Users

Considering that the end-users involved in PUE are rural dwellers with a relatively low income profile, the upfront cost of purchasing productive use equipment is not readily available. The cost of financing the equipment and the energy required to power the equipment can be exhorbitant for these class of people. Financing institutions on the other hand may find financing such venture in these areas as being too risky for a business decision. As such, making credit lines available to end users is one business model that has been developed to aid PUE in rural areas. Some of the methods available under this model include;

3.2.1 Dedicated Credit Lines

Here, financial donors support financial institutions to develop dedicated credit lines with financial contributions which are channelled towards a predetermined productive use or renewable energy technology/equipment. The conditions for repayment should not be generic, it must factor in the nature and profile of the technology and circumstances of the target group (rural dwellers and their income level/ability to pay).

3.2.2 Technical Support for Financing Institutions

Actors could provide technical support to financial institutions which is geared at enhancing the understanding of novel and unfarmilair renewable or productive use of energy technologies. This understanding can enable financial institutions venture into providing/creating dedicated credit options for productive use of energy equipment financing.

3.2.3 Result Based Financing (RBF)

Results-based financing is an umbrella term referring to any program or intervention that provides rewards to individuals or institutions after agreed-upon results are achieved and verified. This model has been applied for companies involved in the importation and installation of solar powered water pumps. Such organisations receive up to 40% subsidy of the Freight on Board (FOB) price of the system or are allowed to pay 2/3 of the subsidy after import and the remaining 1/3 is paid after one year of installation according to set criteria.

3.2.4 Subsidies/Grants

The final model under this sub-heading is the provision of grants or subsidies. Although this option should not be an option of preference for reasons of sustainability, when linked with the energy efficiency rating of a device, it can facilitate a speady uptake of targeted technologies and provide the much needed finance required to invest in quality productive use of energy equipment.

1.3 Supplying Appliances & Hardwares

This PUE business model has emerged to fill the market gap that occurs in rural areas, when villages attain access to electricity, but does not extend to the tools, appliances, machines and electronics urban electricity customers can obtain from hardware shops, electronics suppliers or larger supermarket and department store chains. The PUE model of supplying appliances and hardwares involves the supply of hardware by distributed energy service companies as a means of stimulating the demand for the power that they produce, whileencouraginge economic activities, to close the demand deficit gap, by encouraging the deployment and use of appliances in rural areas. This business model also provides a solution to financing as a challenge to the implementation of

PUE. This model is likely to stimulate electrification, while generating profit for the end-users, which has a greater potential to stimulate better repayment rates and a stronger local economy.

As such, some mini-grid companies or distributed energy service companies (DESCOs) are now supplying hardware in their communities of operation, to stimulate demand for power supplied and encourage economic activity that creates impact from electrification. Hardware suppliers are also providing a smart and simple solution to many of the challenges around financing, promoting and disseminating PUE resources. Given that these suppliers frequently and more recently cource for business in places without access to electricity, consumers/end usershistorically had limited access to supplier product offerings. While the ability to reach end-users at scale is a huge advantage, there is a significant risk in this model for companies in terms of the volume of transactions required for viable operations; which necessitates large investments and most likely a significant proportion of debt. With private actors in the rural hardware supply business:

- A natural market for hardware can develop, whereby demand from end-users dictates the type of PUE products suppliers carry, rather than non-profit actors experimenting with hardware;
- The distributor (hardware supplier) can focus solely on this function and thus supply hardware to numerous villages, beyond the scope of a rural electrification project or mini-grid;
- A lender, promoter or investor deals with one partner in the financial transaction, with this partner being far more credit-worthy than the hundreds or thousands of farmers, cooperatives or MFIs involved in previous PUE promotion models;
- The kind of scale, collateral and business model DESCOs can demonstrate to financiers is more likely (than other models) to receive guarantees (e.g. First Loss Portfolio Guarantee, whereby a third party compensates lenders if the borrower defaults), grants, debt etc., especially as enduser credit ratings and off-take data can be collected by DESCOs



4. Case Study of Productive Use of Energy across Sub-Saharan Africa

This section will consider the various PUE enablers across different Sub Saharan African countries; showing a blend of the traditional use of PUE, where powered appliances are used for commerce and agricultural purpose; and a modern angle of PUE, which involves producers and investors providing services that emanate from PUE activities. This will portray the level of initiatives adopted by SSA countries, as it relatesto PUE activities.

s/n	COUNTRY	PUE Business Enablers
1	Angola	Not available as of the period of publication
2	Benin	Not available as of the period of publication
3	Botswana	Rural Education Less than 20% of the rural population in Benin has access to electricity. Schools frequently lack electricity as a result. It is challenging to study without lighting when it becomes dark early; or without a fan, when it is really hot due to lack of electricity. In order to improve the learning environment and educational quality, Aide et Action is now designing a project to electrify 120 public primary schools in Benin owing to sun power. But in a broader sense, it also covers the construction of latrines and water stations, in addition to teacher preparation programs and community school management capacity enhancements. The ALFA – A Light for Africa project, through which Aide et Actionhas been able to electrify 33 schools in West Africa since 2017, serves as the foundation for this endeavor. 18,000 pupils in six target communes will be affected by the three-year programme, which will also engage 840 instructors and educational supervisors.

s/n	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
4	Burkina Faso	Rural Health Facilities Electrification with Renewables: Enhancing Healthcare Delivery in Burkina Faso- There are 2330 healthcare facilities in the nation, 1800 of which are primary care centers that primarily serve rural areas. Similar to comparable situations in underdeveloped nations, these communities must travel further and pay more to get access to quality medical treatment. As a result, an efficient strategy for implementing an energy-healthcare program has been developed. It builds on existing infrastructure and strengthens it to better integrate energy efficiency, decentralized renewable energy sources, and healthcare delivery in Burkina Faso. This will guarantee their long-term viability and functionality. Based on assessments for the various levels of healthcare and service supply, the decentralized renewable energy solution uses customized design templates and includes effective electrical and medical appliances. Furthermore, in order to assist communities, cost estimates for these designs have been produced with nearby renewable energy businesses.
5	Burundi	Rural Education and Health Facilities Burundi - Solar Energy in Local Communities Project: The project will provide funding for the design, installation, upkeep, and replacement of institutional Civic Energy Communities (CEC)s and Solar photovoltaics (PV)system components in non-electric schools and healthcare facilities located in rural areas. Once all targeted institutions have been outfitted, the component will improve the standard of health and educational services provided to rural populations, with an estimated 6,300,000 beneficiaries annually. For around 400 elementary schools that offer free lunch to children but do not yet have institutional stoves, this project will provide funding for their installation and upkeep. Additionally, it will cover the cost of solar system installation and upkeep, while putting the benefits of giving these same schools access to inexpensive solar systems to the test. A total of 400 health centers will benefit from this project by having solar PV systems installed and maintained, and by having their primary parts replaced. A variety of services, including (a) illumination in maternity unit, main buildings, and residences; (b) refrigeration; and (c) operation of medical and office equipment including microscopes, electric sterilizers, computers, and photocopiers are anticipated to be powered by the solar PV systems.
6	Cape Verde	Not available as of the period of publication

s/n	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
7	Cameroon	Women Empowerment "Solar Mamas" Training Program Brings Solar Power to Rural Communities in Cameroon: The Rural Women Development Center (RUWDEC) has established a program wherein women are trained to undertakethe maintenance of solar panels and other equipment - even those without a background in engineering - in an effort to promote the economic development of women and facilitate a setting for social change in Africa. The program intends to supply rural Anglophone Cameroonian communities with solar energy. These "Solar Mamas" solar engineers enroll in a six- month training course at Barefoot College in India. The program offers primarily illiterate rural women a visual learning curriculum to provide them with the knowledge and abilities necessary to construct, install, and maintain solar panels and supply their communities with a green source of electricity. In an effort to empower rural women socially and economically, the RUWDEC offers budgeting and accounting education for women in addition to the technical skills required for the installation and maintenance of solar panels.
8	Central African Republic	Not available as of the period of publication
9	Democratic Republic of Congo	Rural Education and Women Empowerment Only 11% of girls in Batha province complete their basic education, a number that is much lower than the national average. Schools now have electricity thanks to a UNICEF project supported by the Swiss Agency for Development and Cooperation (SDC). Five schools in Batha were outfitted with solar panels as part of the program's initial phases, allowing for the operation of classroom fans and streetlights. Rechargeable solar lamps were subsequently distributed to 1,400 females. The purpose of giving females rechargeable solar lamps is to lower the costs associated with their education in a setting where the education of boys is privileged to the disadvantage of girls. This will encourage parents to keep their daughters in school. In fact, the light models available on the local market are not long-lasting and demand frequent battery purchases, which is not always an option for parents who are frequently on a tight budget. More than 2,696 students may now complete their schoolwork and review for tests after dark, courtesy of the streetlamps that were installed in the schoolyards. Since the learners are no longer constrained by darkness, the lighting provided by the solar panels helps to improve their chances of success.

s/n	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
10	Congo (Brazaville)/Repu blic of Congo	Not available as of the period of publication
11	Comoros	Not available as of the period of publication
12	Cote d'Ivoire	Rural Health Facilities 46 health structures to be solarised in the Kwilu province. The National News Service (SENEL), an organization under the Ministry of Rural Development in the Democratic Republic of the Congo (DRC), has chosen 46 health facilities to benefit from modest autonomous solar power plants in the province of Kwilu. In each of the Kwilu territories, eight medical facilities and one hospital were chosen in accordance with the SENEL distribution. As part of a \$1.37 million electrification project, they will profit from green electricity generated by photovoltaic arrays.
13	Chad	Women Empowerment The Electrification Financing Initiative (EDFI ElectriFI) is investing EUR 1.5 million in Fin'ELLE, a division of the financial conglomerate Cofina, as subordinated debt. In Ivory Coast, this financial facility will assist in breaking down obstacles for women entrepreneurs in the sustainable energy sector. Fin'ELLE is a microfinance organization with roots in the Ivory Coast with the long-term goals of contributing to the financial and social emancipation of women and adding value to their business. This Cofina Group subsidiary offers Ivorian women who engage in the renewable energy sector the chance to profit from its assistance. Fin'ELLE invests in other industries critical to empowering women in addition to funding women's business ventures in the renewable energy industry. To strengthen support for micro, small, and medium-sized firms (MSME) and women active in the cassava value chain in Côte d'Ivoire, the microfinance institution inked a loan agreement for EUR 5 million with the Netherlands Development Finance Company (FMO).

s/n	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
14	Djibouti	Rural Education Tostan and Barefoot College have helped to fund the education of women from the African nation of Djibouti. The women receive instruction at the Barefoot College on how to install, maintain, and repair solar panels and how to train others to do the same, reinforcing and broadening the program's impact. In each participating community, management committees are established to coordinate the collection of funds from each household in exchange for solar energy. With the help of these modest contributions, ownership of the individual solar panels is established, enabling the community to take control of its own development.
15	Eritrea	Not available as of the period of publication
16	Eswatini	 Africa Minigrids Program – Solar Installation The Acting Minister for Natural Resources and Energy, Hon. Jabulani Mabuza, in 2022 launched the Africa Minigrids Program (AMP) which will enable about 500 Eswatini indigenesto access clean and affordable energy. Half of the beneficiaries from two rural communities – Bulimeni in the Shiselweni Region and Mvundla in the Manzini Region – are women. To improve energy access to remote rural communities, the Global Environment Facility (GEF) has allocated a USD 863,242 (E15,5 Million) grant to Eswatini under the AMP. Eswatini is one of the 21 African countries implementing the AMP through GEF support. UNDP Eswatini is leading the implementation of the Program in partnership with Rocky Mountain Institute, the African Development Bank, the Ministry of Natural Resources and Energy (MNRE), Eswatini Energy Regulatory Authority (ESERA), and EEC. ESERA, working with different stakeholders including civil society organizations and the communities, is responsible for the daily activities of implementing the AMP. In the first phase, the four-year Program will build upon the already developed 35-kW Solar PV system which currently supplies power to 21 homes and two churches at Mvundla, by integrating a productive use of energy (PEU) component on the demand side. In its second phase, the AMP will develop an energy hub at Bulimeni for community-based small businesses like grocery shops and salons.

s/N	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
16		Although technology advances and downward cost trends have markedly improved the business case for mini-grids in many countries, they are not yet competitive with fossil fuel-based alternatives. Therefore, one of the key highlights of the AMP is that it seeks to serve as a springboard for mini grid development in Eswatini by strengthening the country's data and knowledge resources and developing 'proof of concept' business models which will be the basis for future planning. This will encourage the private sector to participate in Eswatini's renewable energy space. This Program is expected to demonstrate how mini grids can support both residential and institutional productive energy needs such as milling, irrigation, and light-manufacturing.
17	Ethiopia	Supply of Appliances & Hardware- Installation of photovoltaic powered machine in rural areas An example of supply of appliances and hardware in Ethiopia is the Solar Powered Processing of Tomatoes by Tigray Agricultural Marketing Promotion Agency and the Sustainable Land Management Program in Ethiopia. Agro processing depends on availability of electrical power, and this is a critical issue. For this project, solar photovoltaic systems were installed for processing tomatoes, which generated income for the nation.
18	Equatorial Guinea	Subsidy and reduction of electricity cost for productive use of energy The electricity bills in Equatorial Guinea were reduced for households and SMEs in 2020. Overall, these immediate
		energy-related responses provide needed support to vulnerable households, SMEs and energy access companies alike.
19	Gabon	Not available as of the period of publication

s/n	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
20	Gambia	 Solar Installation The Gambia Chamber of Commerce and Industry (GCCI), in partnership with the GEF/UNIDO 4 project, has given a new lease of life to the promotion of renewable energy at its Private Sector and Renewable EnergyForum held at the Ocean Bay Red Croc Hotel in Cape Point, Bakau. Launched in The Gambia by the Energy Ministry some two years ago, (2012-2014) being implemented in The Gambia by the United Nations Industrial Development Organisation (UNIDO) is a sub-regional exercise being funded from the Global Environment Fund (GEF). This project is deemed especially important as The Gambia, like many other countries in the sub-region, will continue to face enormous problems if an outlet is not found to free the country from depending on excessive use of biomass and imported fossil fuels for energy generation. It is very essential that such a project is being promoted by the private sector umbrella body in the country, since almost all of The Gambia's modern energy service requirements are met from imported fossil-based energy sources. This is not only affecting the country's foreign exchange reserves, thus making the country vulnerable to fluctuations in world oil prices, but also results in the emission of greenhouse gases. On the other hand, the project is expected to generate multiple benefits to different players and stakeholders within the country at the global environment level. For these and other pertinent reasons, barriers to renewable energy development, which include legal and regulatory framework and limited institutional and technical capacity, must be addressed in earnest for the good of the nation and its economy.
21	Guinea	Electrification Guinea's National Rural Electrification Program (PNER) which was created in 2015 can be characterized as an integrated electrification plan that includes a combination of strategic regulatory approaches. One of such approach is the division of the Guinean territory into Rural Electrification Zones (Zones d'Electrification Rurale, ZER). In order to facilitate the implementation of public-private partnerships (PPP) between AGER and private operators, seven ZER have been created (based on the corresponding existing administrative division: Boké, Faranah, Kankan, Kindia, Labé, Mamou, Nzérékoré). Out of these seven zones, Boké and Faranah have already been selected to implement the first Priority Rural Electrification Projects (Projets d'Electrification Rurale Prioritaires, PPER); an international call for tenders will select two private operators for each ZER.

s/N	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
22	Guinea- Bissau	Not available as of the period of publication
23	Ghana	 Rural Electrification The National Electrification Scheme (NES) was to be accompanied by an aggressive Productive Uses of Energy (PUE) programme, but the much anticipated economic activity that was expected to have resulted from electrification is yet to be realized. The nation's efforts under the PUE component of the NES since 1989 can be summarised as follows: Organization of public forums on productive uses of electricity in newly electrified communities; Socio-economic study on productive uses of electricity in some districts; Assessment of the feasibility of the implementation of productive use of electricity initiatives in the districts; and Development of a strategy for implementing a pilot project(s) to demonstrate the practicality and sustainability of productive uses of electricity.
		According to some researchers only 50–60% of households with electricity in electrified communities are actually connected to the grid and most of these customers consume less than 50 kWh per month (Ministry of Energy, 2011). The low consumption rates are indicative of the fact that the use of electricity in these communities is predominantly for domestic lighting purposes only. It appears that the PUE programme component of the NES that was to have actively facilitated the generation of economic activity in the respective communities was not adequately pursued. The further inference is that there is little direct contribution from electrification to economic activity in communities that have benefited from the Scheme. There has been a number of small to medium scale attempts by a number of non-government institutions. Most of these initiatives were intended as pilot or demonstration projects and required policy leverage for wider public and private sector buy-in for expanded impact and long-term sustainability. These projects were however, entirely outside the public sector, so even the successful ones had very limited impact due to the absence of the necessary Government support to mainstream the ideas and concepts. The long-term sustainability of projects on productive uses of energy

s/n	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
23		could be facilitated by greater involvement of the private sector. However, private sector buy-in of the projects has been weak due to uncertainty on the economic viability of the projects. Technical support on the preparation of comprehensive business plans on proposed projects would encourage the private sector to take up some of the projects.
24	Kenya	Installation of Productive Technologies The Power Africa Off-Grid Project provided access to companies in the agriculture sector for the procurement of productive technologies in 2020.
25	Liberia	 Productive Technologies Scale-up of off grid technologies for productive use to boost productivity and economic growth in the Liberian market. In Liberia, roughly 17% of the urban population and 2% of the rural population have access to electricity. Liberia is working to attain 70% electrification of capital city and 35% of rural areas by 2030 Agriculture is the primary livelihood for more than 60% of Liberia's population. However, overall agricultural productivity is low, making the country vulnerable to global food price volatility. The Power Africa Off-grid Project (the Project), a USAID-funded project aimed at increasing off-grid electricity access throughout Sub-Saharan Africa has two main components: Technical assistance and Targeted grants. The project goals include: 1. 6 million off-grid household connections 2. Increased private financing available for the off-grid sector 3. Improved enabling environment for off-grid market growth
26	Lesotho	Not available as of the period of publication
27	Madagascar	Not available as of the period of publication

s/N	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
28	Malawi	Delivering cleaner, more reliable services to rural communities in Malawi Mulanje is a rural district in Malawi, where many everyday
		community services are provided manually or – if available – with support from polluting fossil fuel generators. Since 2016, social enterprise Mulanje Energy Generation Agency (MEGA) has been supplying communities with affordable and more reliableelectricity through a micro-hydropowered mini-grid. The mini-grid supports maize mills, carpentry, welding and workshops, and a bakery. It allows these businesses to provide more consistent services while also lowering their operating costs – which can improve affordability for communities and strengthen livelihoods In Mulanje, mini-grids can be an economically viable means of providing electricity for productive uses, thanks to its high population density. Meanwhile revenue from electricity sales contributes to the cost of operation and maintenance. Strengthening resilience to climate shocks and stresses. For more remote, less well populated areas, the cost of mini-grid infrastructure can be prohibitive. In these communities, equipment that uses solar to operate independently of larger energy infrastructure offers more viable solutions. Standalone solar irrigation is gaining particular traction as a productive use of electricity, and is both a climate mitigation solution (as it replaces diesel pumps) and a result of the climate crisis.
29	Mali	Productive Technologies
		Investment of funds in Productive technologies for businesses. Over 40 enterprises were funded in the agriculture and health sectors towards integrated renewable energy by Power Africa USDAF in 2022.

s/N	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
30	Mauritius	Leading technologies for PUE
		In Mautirius, several technologies are being deployed to promote PUE including:
		Photovoltaic cells and technology
		Solar energy technology for solar water heaters
		Waste-to-energy plant for burning solid waste
		Pumping of cold sea water for air conditioning
		Wind turbines
		Liquefied Natural Gas (LNG) projects
		Green building design services and equipment
		Energy efficiency projects and energy audits
		Electric vehicles
		SolarTechnology
		Much of Mauritius receives almost year-round, intensive sunlight that makes solar photovoltaic (PV) energy an attractive energy option, with a potential average annual solar radiation value of some 6 kWh/m2/day. To achieve the target of 60 percent renewable energy by 2030, Mauritius has commissioned six more solar farms. From the last tendered Solar PV projects in 2016, all of them have now been connected to the CEB Grid, with a total capacity of 66.15MWp. The total installed capacity of large-scale utility PV was estimated at 87.2MWp as of April 2021.
		As of mid-2020, the total capacity committed for solar stood at 125.5 MWdc, of which 105 Mwdc is owned by the private sector. The government's Home Solar Project, which includes the installation of 10,000 roof-top solar panels, was inaugurated in 2018. A loan of \$10 million from the Abu Dhabi Fund for Development and the International Renewable Energy Agency (IRENA) is being used to implement this project. In the 2021 budget speech, the finance minister announced a concessionary loan of 2 percent to enable households to purchase solar kits for domestic use. A public investment of Rs 650 million (\$16 million) is planned for the installation of solar panels on government buildings, including hospitals and educational institutions, and for the provision of solar water heaters to 2,000 households. As part of the buget speech in 2021, a grant of 50 percent up to a
		maximum of Rs 400,000 (\$10,000) was planned to I be provided

COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
	on the purchase and installation of solar powered cold rooms by registered planters cultivating on a minimum of one hectare of land.
	In 2021, the CEB requested proposals for the purchase of electrical energy from utility scale solar voltaic farms.
	The government also announced measures for promoting the uptake of electric vehicles, namely by allowing owners of electric vehicles to install a PV system not exceeding 10kW to charge their vehicles and export any surplus to the grid, and to encourage private investment in charging infrastructure points across the island.
	Waste-to-Energy
	Mauritius produces about 500,000 tons of solid waste per year and its only landfill site is nearly full. Accordingly, in 2016 CEB issued a Request for Proposals for a 24 MW waste-to-energy project. The Mauritius Research Council also conducted research into waste-to-energy projects, including one on the use of arundo donax biomass for energy production. In his 2018 budget speech, the prime minister announced plans for a 20- plus MW waste-to-energy project. A bid invitation was launched in 2018 but the tendering process for the project was unsuccessful. The project was announced once again in the 2019-2020 budget speech. However, the CEB informed Post in April 2021 that the waste to energy project was under review due to changes in supply and demand forecasts. In the 2021 budget speech, the finance minister announced the setting up of a National Biomass Framework and a remuneration of Rs 3.50 (0.08 USD) per kWH to planters and producers using bagasse to produce electricity. The Public Sector Investment Programme 2021/2022 has also earmarked funds for the commissioning of a study on electricity production from pig manure.
	Wind and Wave Energy
	The CEB has signed two Energy Supply and Purchase Agreements with two foreign firms for wind farm projects in 2015. The first project for 9 MW was completed in 2016 by French company Quadran in joint venture with a local partner. The second project of 29 MW, involving Indian firm Suzlon in joint venture with a local partner stalled amid legal problems and allegations of fraud. Preliminary research carried out by the Mauritius Research Council (MRC) shows potential for the development of offshore wind farms, in addition to wave energy, in the waters of Mauritius and Rodrigues.

s/n	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
30		Energy Efficiency/Green Building
		As part of a general move away from fossil fuel-generated energy, opportunities exist for energy efficiency, audit, management, and advisory projects targeting large energy consumers. The Building Control Act 2011 provides opportunities for consultancy services in designing "green" buildings and supplying related equipment and materials. Energy efficiency is now one of the main criteria in the design of public buildings and in rental of private buildings. According to MARENA, there are currently no building integrated photovoltaics in Mauritius.
		The Green Building Council Mauritius was set up in 2009 by a group of professionals to promote green building and it is a member of World Green Building Council.
		Battery Storage
		In 2018, two grid-scale Battery Energy Storage Systems (BESS) of 2MW were installed, enabling high-capacity storage of renewable energy. In the 2019-2020 budget speech, the prime minister announced that Mauritius will launch tenders for an additional 14MW in battery storage systems to stabilize the network. This was announced again in the 2020-2021 budget speech. In the 2021-2022 budget speech, the finance minister announced that funds would be committed to raise the absorption capacity of intermittent renewable energy though increased battery capacity to 40 MW from the current 4 MW.
		Deep Ocean Water Application (DOWA) Project
		Deep Ocean Water Application (DOWA) projects are often known in the United States as "O-tech" or Sea Water Air Conditioning (SWAC). Local company Sotravic, through its subsidiary Urban Cooling Ltd, is developing a project to pump cold sea water from a deep ocean current into downtown Port Louis for air conditioning.
		An Offtake Agreement between Urban Cooling and the Government of Mauritius is currently under negotiations as of January 2023. In addition to air conditioning, Sotravic is considering the next phase of the project, which could involve using cold ocean water for bottling, aquaculture, seaweed cultivation, thalassotherapy, pharmaceutical, and cosmetic products.

s/N	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
30		Liquefied Natural Gas (LNG)
		In 2017, the Ministry of Energy issued an international call for proposals for consultancy services for a feasibility study for liquefied natural gas. In 2018, the Central Electricity Board launched a tender for the design, supply, installation, testing, and commissioning of a combined cycle gas turbine (CCGT) power plant. The project stalled due to financing issues. The governments of Mauritius and Madagascar have reportedly held high-level discussions in 2019 to discuss cooperation regarding the supply of LNG. In the 2019 budget speech, the prime minister announced the setting up of a regional value chain for LNG and partial financing for the CCGT project. In early 2021, PricewaterhouseCoopers India finished the first phase of a feasibility study to assess the potential of Mauritius as an LNG hub for the region.
		Partnering with Mauritian Firms in Africa
		Several Mauritian firms are currently involved in or investigating renewable energy projects, particularly hydropower and PV solar farms, in Kenya, Rwanda, Burundi, Madagascar, and Ghana. U.S. firms could partner with Mauritian companies to implement energy projects on mainland Africa with the support of Power Africa. Launched in 2013, Power Africa is a market-driven, U.S. Government-led public-private partnership created to double access to electricity in sub-Saharan Africa. It offers private sector entities the tools and resources needed to do business in Africa's power sector. In 2016, the Electrify Africa Act institutionalized Power Africa.
31	Mauritania	Not available as of the period of publication
32	Mozambique	Access to Electricity – Solar
		Access to modern energy services – Mozambique (AMES-M)" is one component under the umbrella of the Dutch-German energy partnership Energising Development (EnDev) implemented by the German Technical Cooperation (GTZ). The objective is providing five million people in developing countries with sustainable access to modern energy, i. e. reliable grid electricity, improved cooking stoves, solar panels, generators or – to a limited extent – car batteries. AMES-M comprises the following components: (i) Electricity grid densification; (ii) Pico Hydro; and (iii) small solar photovoltaic (PV) systems. The present baseline survey has been conducted for both the grid densifi cation component and the Pico Hydro project

s/N	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
33	Namibia	 Implementation of Solar PV The implementation of the Namibian Renewable Energy Program (NAMREP) also offers opportunities for rural electrification. NAMREP was launched in 2004 to address the key barriers experienced in the dissemination of RETs in Namibia. Under NAMREP there were achievements for solar water heaters, solar cookers and solar PV for pumping . However one of the most important programme is the Off grid Energisation Master Plan (OGEMP) which aims at providing energy access from renewable energy and energy efficient appliances to those who do not have access to energy services from the grid over a period of 20 years A two pronged approach is adopted: energy shop approach: commercialisation of renewable energy technologies and efficient appliances
		access to credit through a revolving fund: given the solar and wind potential and the declining world prices, there are good prospects for a significant penetration of on grid and off grid RES.
34	Niger	Green Mini-Grids in Rural Areas and other Programs The Government of Niger has declared its intention to support the productive use of electricity through the "Haské" programme in 2022, by promoting access to electricity for businesses through the deployment of green mini-grids in rural areas. Currently only 5% of rural households and small businesses are reported to have access to electricity according to Power Africa. A major component of the "Haské" programme is the deployment of clean cooking kits in households. The programme will be implemented by Niger Electricity Company (NIGELEC), the National Agency for Rural Electrification (ANPER), the National Solar Energy Agency (ANERSOL) and the Direction de la promotion des énergies de cuisson (Directorate for the promotion of cooking energy) of the Nigerien Ministry of Energy and Renewable Energies. The programme is supported by the World Bank. The government of Niger also plans to build new mini-grids and add solar systems to existing mini-thermal power plants in rural areas. The project will provide electricity to households, public utilities and promote the productive use of electricity. The other major component of the "Haské" programme is the deployment of clean cooking kits in households.

s/N	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
35	Nigeria	Implementation of PUE Models Several models of Productive Use of Energy have been implemented in Nigeria til date some of these models include Cooling as a Service (CaaS) through a partnership with ColdHubs is a business model currently in operation in Nigeria. The Universal Energy Facility (UEF) has also initiated a Standalone Solar for Productive Use (SSPU) Programme in August of 2022 which is designed to scale up electricity access to households and small and medium enterprises (SMEs). Furthermore, a mobility company, Metro Africa Xpress Inc. (MAX), leased electric two- wheelers to certified local drivers at the Rubitec Solar-operated minigrid in Gbamu Gbamu, Ogun State. Drivers were able to use the vehicles to travel between hubs within a 20-kilometer (km) radius, consuming about one kilowatt-hour of minigrid electricity per daily rental
36	Rwanda	PUE deployment OffGridBox (OGB), a technology company founded in 2016 selected Rwanda as the most suitable country to test its Productive Use of Energy equipment, a containerized infrastructure solution which is shipped with technology assets inside that, when installed, are capable of (a) generating, storing, and distributing photovoltaic (PV) electricity, (b) purifying local water, and (c) providing local data and connectivity services through cellular networks.
37	Sao Tome and Principe	Not available as of the period of publication
38	Senegal	PUE consumer financing A number of solar companies have partnered with microfinance institutions to offer consumer financing in 2019. Bonergie offers solar pumps, solar cold storage and solar fruit dryers. It has done more than 200 solar pump installations. Most of its sales are on credit.

s/N	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
39	Nigeria	PUE Model To meet the efficient cooling demand, BECIS provides Cooling- As-A-Service (CaaS) solution to high quality commercial and industrial consumers in the country. Under CaaS model BECIS designs, installs, commissions, and operates entire HVAC system as per the consumer's requirement. BECIS has the technical capability and financial strength to execute both electrical and thermal (waste heat) cooling projects. Thermal cooling projects are suitable in cases where waste heat from process steam, gas engines and turbines etc. is available. Entire design, engineering, installation, commissioning, operation, and maintenance of HVAC systems is taken up by BECIS, while consumer simply pays a fixed rate on per tons of Refrigeration (TRh) delivered. The delivered TRh is measured at by BTU meter installed at the site.
40	Sierra Leone	PUE for Agriculture Productive Use of Energy have been implemented in the Agricultural sector of Sierra Leone to cover productive activities including rice milling and processing; palm oil production; cassava processing; refrigeration for cold fish storage.
41	South Africa	PUE Business Models Several South African clean energy organisations have incorporated Productive Use of Energy into their business model. Some of such models include the Cooling as a Service (CaaS) business model. Organisations such as Energy Partners provide refrigeration services, either as a turnkey (cash) and outsourced utility solutions to refrigeration clients in the industrial and commercial sectors by identifying and developing sustainable refrigeration projects which are designed according to world- class engineering standards.
42	Somalia	Not available as of the period of publication
43	South Sudan	Not available as of the period of publication
44	Sudan	Not available as of the period of publication

s/N	COUNTRY	LEGISLATIONS/REGULATIONS/POLICIES
44	Togo	PUE Models Solar Kiosk - Between 2011 and 2016, Solar without Borders installed 150 'basic' solar kiosks in Togo. Solar kiosks are constructions equipped with solar panels which are centrally located in villages without electricity supply. Local residents can rent a rechargeable lamp and charge it using solar power. Other devices, such as mobile phones, can be charged for a small fee. Each solar kiosk is run by a self-employed local operator trained by Solar without Borders. The kiosk operator can make a decent living out of this, which is an incentive for local entrepreneurship.
45	Tanzania	PUE Models Cooling as a Service (CaaS) - JUMEME Tanzania buys fish from local community and subsequently freezes it, enabling the fish to be transported and sold to a city market with strong demand.
46	Uganda	Hardware Supplier Business Model EnerGrow in Uganda is acting as a commercial hardware supplier to newly electrified village communities in partnership with mini- grid operators and the national utility, to ensure that businesses are able to buy tools, appliances, refrigerators and other machinery.
47	Zambia	PUE Business Models Ndkay Zambia provides cooling systems for IT environments and surgical rooms, and commercial and domestic air conditioning, humidification and chilled water production. Ndkay Zambia supplies air conditioning units that use the environmentally-friendly, United Nations approved R410 refrigerant. This company is a sole distributor of Stulz IT Cooling Solutions and Tecnair Surgical Room Air Conditioners. Ndkay Zambia specialises in air conditioning and IT cooling systems, and the installation and maintenance of domestic and business premises. The company also offers property maintenance and a wide variety of solar solutions.
48	Zimbabwe	Not available as of the period of publication

5. Policies and Legislations that promote Productive Use of Energy across SSA

5. Policies and Legislations that promote Productive Use of Energy across SSA

One way of promoting PUE is the creation of an environment that makes PUE and its models attractive to both public and private investors, participants and stakeholders, via legal and regulatory instruments. This section will consider the extant policies and legislations in SSA countries that aid the promotion of PUE.

s/N	COUNTRY	Policies/Legislation/Projects/Programs
1	Angola	 National Program for Rural Electrification of Rural Areas 2015 The Rural Electrification program's objective is part of the Long- term vision "Angola 2025" to achieve a rural electrification rate of 60%. Installation of solar generation systems is the program's main method because of Angola's high irradiation levels. In Angola, rural electrification is foreseen under three implementation models: 1. Rural electrification through grid extension 2. Electrification through isolated systems 3. Electrification through individual systems Rural electrification increases the opportunities for wealth creation, develops private initiative and generates employment for men and women in the rural environment.
2	Benin	National Renewable Energy Development Policy (PONADER) 2020-2030 This was adopted to provide new guidelines for the implementation of actions contributing to the implementation of the vision of "renewable energy as a priority source of optimal sustainable satisfaction and national energy needs by 2030." In 2014, the President of the Republic of Benin, accompanied by the Minister of Energy, launched the electrification project of sixty- seven (67) new communities within the city of Abomey-Calabi. This project was geared towards improving the population's access to energy, especially those in remote areas, and led to the electrification of over 1300 rural communities.

s/N	COUNTRY	Policies/Legislation/Projects/Programs
3	Botswana	Botswana Energy Master Plan (1996, reviewed 2003) The Plan outlines various goals for rural electrification including the efficient use of solar energy, off-grid solutions, and grid extensions. It also removes investment barriers and creates appropriate institutional framework.
		Biomass Energy Strategy 2009 The Strategy was developed under the Ministry and is supported by the German Development Corporation (GIZ). It outlines biomass energy demand, woody and non-woody biomass supply, potential interventions, and a comprehensive strategy for the utilization of biomass energy resources.
		National Energy Policy 2021 The National Energy Policy (NEP) is intended to guide the management and development of Botswana's energy sector, especially the penetration of new and renewable energy sources into the country's energy mix, in order to attain energy self- sufficiency and increased security of supply. The NEP is expected to create a conducive environment that will not only facilitate investment in the energy sector but also add value to export revenues, facilitate production in other sectors of the economy and create employment within the energy sector. It also sets a foundation that will steer the utilization of locally available energy resources optimally and efficiently to ensure that Botswana attains a sustainable and low carbon economic development.
4	Burkina Faso	Energy Sector Policy 2014-2025 The Energy Sector Policy serves as the energy policy for the electricity sector of Burkina Faso, defining the energy targets of the energy sector in the State to be achieved by 2025. The policy aims to provide sustainable energy access for all via various energy resources, the increased use of renewable energy resources in the energy mix, and the development of technologies used to supply energy to households in Burkina Faso. Yeleen Rural Electrification Project in Burkina Faso 2018 The Green Climate Fund is financing the Yeleen Rural Electrification Project in Burkina Faso. Yeleen Rural Electrification Project in Burkina Faso project aims to project and the development of the State Sta
		create a shirt towards low-emissions electricity access by using a

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s/N	COUNTRY	Policies/Legislation/Projects/Programs
4		public sector intervention to provide an enabling environment for the private sector, which will operate solar mini-grids. The project will see to the installation of 100 mini-grids in Burkina Faso using result-based payments to private sector operators and improving the regulatory framework to mobilise private sector capital in renewable energy-based rural electrification investments. Micro- finance institutions will be encouraged to provide loans to productive users in the areas where solar mini-grids will be installed. One of the project's key outcomes is to deliver access to more than 900 000 people in rural areas through solar energy.
5	Burundi	Decentralized Rural Electrification Strategy 2017
		The DRE Strategy intends to address energy issues at all scales, from the household to public sector, and optimize the social impact of decentralized renewable energy. Bringing the advantages of current energy technology to rural children and families and fostering the sustainable transfer of new knowledge and methods to institutional, commercial, and community level organizations are two important goals of the plan.
6	Cape	National Energy Policy, 2008
	Verde	Cape Verde's energy policy is tailored towards the realization of the Socio-Economic Transformation Agenda of Cape Verde. The policy stipulates the different challenges facing the energy sector, the vision and objectives of the energy sector, and the mechanisms to be employed by the State in achieving these objectives. The policy focuses on achieving a future for the energy sector in which there is little to no dependence on fossil fuels for energy production.
		Electric Sector Master Plan 2018-2040
		The Electricity Sector Master Plan 2018–2040 serves as a structural document for the development of the electrical system in Cape Verde. The Master Plan covers the following topics – electricity consumption, investments, infrastructural reinforcements, electricity network management, environmental and social impact assessment, etc. The Master Plan also establishes targets for the power sector, which include the realization of 30% of electricity production from renewable energy resources by 2025 and more than 50% of electricity production from renewable energy efficiency, maintaining the focus on wind energy and starting an ambitious program for the development of solar energy.

s/N	COUNTRY	Policies/ Legislation/ Projects/ Programs
6		Strategic Plan for Sustainable Development (PEDS) 2017-2021
		The PEDS provides directives towards implementing certain sustainable development-oriented programmes which would help provide a green and better future for all Cape Verdeans. The Plan comprises the state government taking advantage of Cape Verde's great potential in renewable energy resources, especially in wind and solar energy, to reduce the cost of electricity and water, and achieve increased energy security and competitiveness in the power sector.
		National Action Plan for Renewable Energies (2015-2020/2030)
		The National Action Plan was promulgated as part of the implementation of the ECOWAS Energy Efficiency Policy (EREP) by the Government of Cape Verde. The Plan seeks to promote the provision of sustainable and competitively available energy for households in Cape Verde, the development of innovation in the energy sector, development of the private sector in the energy sector, creation of service delivery skills at regional and international level, reduction in greenhouse gas emissions, and the creation of a green energy sector for Cape Verde.
7	Cameroon	No existing Framework available os of the period of publication
8	Central African Republic	No existing Framework available os of the period of publication
9	Democratic	Energising Development International Programme 2022
	Republic of Congo (DRC)	This programme has the objective of developing the local renewable energy market through the promotion of the utilisation of efficient electric appliances within small and micro-enterprises.
10	Congo	Energising Development International Programme 2022
	(Brazaville) /Republic of Congo	This programme has the objective of developing the local renewable energy market through the promotion of the utilisation of efficient electric appliances within small and micro-enterprises.
11	Comoros	No existing Framework available os of the period of publication

s/n	COUNTRY	Policies/Legislation/Projects/Programs
12	Cote d'Ivoire	Energy Master Plan 2013–2030 The plan, which was introduced in 2014, guides the production and transmission of electricity in the country, and lays down a roadmap for the rehabilitation of distribution infrastructure and the improvement of rural electrification across the nation.
		Electricity Code 2014 The code was set to terminate CIE's monopoly on transmission, distribution and marketing of electricity. It also created new regulatory provisions for renewable energy producers, and established regulations to penalise electricity theft.
13	Chad	No existing Framework available os of the period of publication
14	Djibouti	 Law no 88/AN/15/7th The law regulating the activities of independent electricity producers, has been adopted with a view to: Reducing the costs of electricity; Favouring the production of electricity from renewable energy sources; Ensuring a production that is adequate as regards volume, frequency and quality; Ensuring the energy independence of the country.
15	Eritrea	Energy Policy 2019 The Energy Policy aims to increase the use of renewables in its energy mix so as to reduce dependency on fossil fuels and lower greenhouse gas emissions.

s/n	COUNTRY	Policies/Legislation/Projects/Programs
16	Eswatini	 National Energy Policy Implementation Strategy (NEPIS) The Strategy was developed to address energy issues as they relate to all national development activities. The Strategy advocates for an enabling environment for the diversification of energy access and cost reductions, for large and small users. Amongst other things it calls for: i) the development of renewable energy action plans and targets; ii) establishment of fiscal incentives to promote renewables; iii) establishment of activities for renewable energy demonstrations; v) establishment of priority energy sector standards; anddevelopment of a long-term biomass programme.
17	Ethiopia	Ethiopian Rural Energy Development and Promotion Centre (EREDPC) The EREDPC was created to conduct studies of the nation's energy resources, gather and analyze data, design rural energy policies, conduct technology research and development, and promote suitable energy technologies in rural areas. The Rural Electrification Fund's (REF) executive branch is housed at the Centre. Renewable energy sources like solar and wind are mentioned by the Center as viable options for rural electrification.
18	Equatorial Guinea	No existing Framework available os of the period of publication
19	Gabon	No existing Framework available os of the period of publication

s/N	COUNTRY	Policies/Legislation/Projects/Programs
20	Gambia	Energy Policy 2005
		The Energy policy of 2005 sets the objectives for the government of the energy sector and also aims for the deployment of renewable energy resources in the electricity sector. It provides a roadmap for the electricity sector in the country.
		Energy Policy 2014–2018
		The Gambian Energy Policy of 2014-2018 seeks to ensure an efficient, affordable, and environmentally sound energy supply in the country. It promotes infrastructural development to enhance and secure power distribution and supply, especially to underserved rural communities.
		Electricity Sector Roadmap 2017
		The major significance of the Energy Sector Roadmap is the establishment of a Least Cost Development Plan (LCDP) for the promotion of energy access in the country. The Roadmap reviews investment in electricity transmission and distribution and it makes institutional changes that are necessary to attract independent power producers to the sector. In the area of electricity generation, the Roadmap aims to close the generation gap and expand energy access to all regions of the country.
		Renewable Energy Act 2013
		The Renewable Energy Act promotes the use of renewable energy resources to achieve better electricity productivity thereby reducing the utilization of fossil fuels, greenhouse gas emissions and the demand burden on the NAWEC. The Act established the Renewable Energy Fund and provides incentives for renewable energy facilities and rules for Feed-In-Tariff.
		In November 2022, the government of Gambia committed 28 Million Gambian Dalasi (GMD) (\$499 800) for its flagship Programme for Accelerated Community Development (PACD). In furtherance of Gambia's National Development Plan (2018-2022), the PACD aims to improve rural populations' access to essential social services by establishing socio-economic infrastructure. Current electricity access rates in the Gambia stand at 62.3%, with 31.6% in rural areas and 60.3% in urban regions. Ramping up electrification rates in the rural areas of Gambia is thus a welcome development. Since the PACD project began in 2021, 69 new electricity poles have been established in the North Bank Region. 3,824 persons and 478 households had access to power in the area as of September 2022. Ten (10) settlements in the Lower Nuimi, Upper Nuimi, and Jokadu districts of the North Bank Region have received electricity as part of the PACD electrical component. 96 SMEs and 32 public utilities have also benefited

s/n	COUNTRY	Policies/ Legislation/ Projects/ Programs
21	Ghana	Strategic National Energy Plan (SNEP) 2006
		The SNEP took a comprehensive look at the available energy resources of the country and how to tap them economically and in a timely fashion to ensure secure and adequate energy supply for sustainable economic growth.
		The Energy for Poverty Reduction Action Plan (EPRAP) 2006: The broad objectives of the Plan of Action proposed in EPRAP are as follows:
		1. Facilitate the provision of reliable electricity to support and enhance the delivery of essential social services such as education, health care, and potable water, and the deployment of ICTs in rural areas.
		2. Facilitate the provision and use of modern energy services (in the form of mechanical and/or electrical power) at the community level for all rural communities for productive applications.
		3. Facilitate the provision and use of affordable modern cooking fuels and devices to at least 50% of households currently using traditional biomass for cooking.
		Renewable Energy Act, 2011
		The Renewable Energy Act of 2011 was promulgated as the threshold provision for the augmentation of renewable energy use in the energy mix. The Act stipulates regulations on the utilization of renewable energy resources in electricity production. It provides for a Renewable Energy Fund, which would help in the promotion and execution of renewable energy development projects.
		In 2020, the Deputy Minister of Energy launched a rural electrification project across the Northern, North East, and Savannah regions.
		The project, funded by the Government of Ghana, is estimated at \$50 million and will connect several communities to the national grid and benefit about 16,000 households.

s/n	COUNTRY	Policies/Legislation/Projects/Programs
23	Guinea- Bissau	National Energy Policy, 1995 The National Energy Policy of Guinea Bissau serves as the legal instrument governing energy supply activities within the State. The policy focuses on the increased use of renewable energy in the state's energy mix, and the growth of energy access for all and sundry within Guinea Bissau. Law N°. 2013-21 The legislative and legal framework of the sector also includes the Project of Law N°. 2013-21 on the renewable energy sector, which, upon approved, will set a regulatory framework for the development of renewable energy
24	Kenya	 Draft Energy (Solar Photovoltaic Systems) Regulations 2020 The regulations require solar technicians to be certified. It proposes transitioning from the old certifications of class Technicians (T) 1-3 to new categories Solar PV Workers (SPW) 1-4. One feature of the shift is to amend the maximum permitted system size for T1 and T2. It governs the off-grid solar and mini-grid sectors, including electric appliances and equipment. They enforce quality and minimum energy performance standards and design solar systems. National Mechanisation Bill and General Regulations 2021 The policy promotes the use of equipment to intensify production, enhance value addition, reduce costs and reduce drudgery. It does not explicitly mention how the equipment should be powered, though there is acknowledgement that the government has the responsibility of promoting the use of renewable energy sources. The Bill provides for the establishment of Agricultural Mechanisation Board.
25	Liberia	Rural Energy Strategy and Master Plan (RESMP), 2016 The Master Plan was promulgated by the Rural and Renewable Energy Agency in 2016 to be implemented over a 14-year period, ending in 2030. The RESMP aims to set clear targets, to identify least- cost projects and technologies, to propose substantial investments for funding and implementation, with appropriate institutional framework and capacity to increase energy access and renewable energy deployment to the country's rural areas and population – i.e., all areas and population outside of greater Monrovia.

s/n	COUNTRY	Policies/Legislation/Projects/Programs
26	Lesotho	Lesotho Energy Policy 2015-2025 This framework policy sets out the strategic direction of the country's energy sector developments. It is aligned to the development of environmentally cleaner renewable energy and increasing its share in the country's energy mix. One of the methods to boost the pace of electrification in the nation is suggested to be the use of renewable energies. The Renewable Energy Feed-In-Tariffs (REFIT) scheme will be created in order to entice investment in the industry.
27	Madagascar	Decentralised Rural Electrification Program To achieve the Millennium Development Goals and the "Sustainable Energy for All" Programme, the Government of Madagascar has taken the initiative to implement the Decentralised Rural Electrification Program to improve the rate of access to electricity in rural areas by prioritizing the deployment of renewable resources.
28	Malawi	National Energy Policy 2018 The overall goal of the Energy policy is to provide guiding framework for increased access to affordable, sustainable and efficient energy for all sectors and every person in Malawi
29	Mali	 Reference Framework for the Development of Rural Electrification (CdR-ER), 2003 The CdR-ER was prepared by the Government of Mali (GoM) in 2003 to provide principles and guidelines directing the implementation of rural electrification programs by AMADER. The CdR-ER notably provides three approaches for the granting of concessions or authorizations to private entities by the State – The Top-down approach where AMADER solicited bids through a competitive process; The selection of private operators following a call for Expression of Interest, and Bottom-up approach, which involved spontaneous project proposals under the PCASER programme. The Bottom-up approach has been the primary approach used by AMADER since 2005 in its rural electrification programs.

s/n	COUNTRY	Policies/Legislation/Projects/Programs
29		National Energy Policy, 2006 The National Energy Policy was established to ensure the sustainable development of the country's energy sector, and to provide adequate energy access, thus augmenting the proper execution of socio-economic activities. The Energy policy also seeks to meet energy needs in quality, quantity, and cost; ensure the protection of persons, property, and environment against the risks of inappropriate energy services; strengthen the capacities of policy, management, monitoring, and control of the energy sector; and strengthen the benefits of international cooperation in the field of energy.
		National Action Plan for Renewable Energies, 2006 The National Action Plan for Renewable Energies serves as a framework for the developed use of renewable energy resources in the energy mix. The Plan looks towards the installation of 1.42 GW worth of renewable energy by 2030.
		 The World Bank is currently is currently running a Rural Electrification Hybrid System 2014-2023. So far A) 295,000 people have been provided with access to electricity under the project by household connections - other renewable energy - off grid B) 36 Hybrid mini-grid systems installed C) 476 persons have been trained under the project D) 8,284 number of solar home systems have been installed E) 9, 072 additional connection to mini-grids have been connected.

s/n	COUNTRY	Policies/ Legislation/ Projects/ Programs
30	Mauritius	Mauritius Renewable Energy Agency Act 2015 (No. 11 of 2015) The Mauritius Renewable Energy Agency (MARENA) was established in January 2016 to promote the adoption and use of renewable energy with a view to achieving sustainable development goals and increasing the share of renewable energy in the national energy mix, in line with the Government's vision (Mauritius envisages to increase the share of renewable energy to 35% of the energy mix by 2025 and maintain it at this target by 2030).
		In this context, MARENA is working to increase capacity through increased dialogue with regional and global peer organizations in the following fields: Finding alternatives to LPG as the primary energy source for cooking; Managing production and grid penetration of renewable energies; Developing regulations and standards for the renewable energy sector. The main goals are to: (a) encourage the use of renewable energy in order to achieve sustainable development goals; (b) provide advice on potential applications for liquified natural gas; (c) foster an environment that will foster the development of renewable energy; (d) increase the proportion of renewable energy in the country's energy mix; and (e) exchange knowledge and experience on research and technology related to renewable energy.
31	Mauritania	Mauritania Poverty Reduction Strategy Paper (PRSP) 2006- 2010 The PRSP notably calls out renewable energy sources and contains 15% by 2015, 20% by 2020, and 35% by 2030 targets for renewable generation. It acknowledges the role renewable energy plays in securing the nation's energy supply, reducing its reliance on foreign oil, stabilizing power generation costs, and enhancing access to energy in off-grid areas.
32	Mozambique	National Electrification Strategy, 2018-2030 states the importance of prioritising grid expansion to areas with high potential demand for industries, irrigation schemes and commercial farming, among others. In a similar manner, it suggests that productive areas should be the focus for the deployment of mini-grids to guarantee responsiveness to irrigation and agricultural demands.

s/n	COUNTRY	Policies/ Legislation/ Projects/ Programs
33	Namibia	National Renewable Energy Policy 2017 The National Renewable Energy Policy aims for at least 70% coverage by 2020 and nearly universal coverage by 2030, with one of its main goals being to use renewable energy to speed up the expansion of energy access and guarantee adequate and affordable energy services to the vast majority of Namibians.
34	Niger	Draft Energy Policy Letter, 2010 This policy letter contributes to poverty reduction by providing sustainable access to modern energy services by the various socio-economic groups. Its main pillars focus on energy security, energy access, environment protection and capacity development. It is envisaged to ensure energy access to all at reasonable prices, allowing energy services companies to maintain and develop the provision of energy services, and contribute to the country's social cohesiveness.
35	Nigeria	The National Energy Policy, 2003 The National Energy Policy developed by the ECN establishes the framework required for developing the energy sector for the effective contribution of the sector to the national economy. The policy also primarily considers the effect of fossil fuels on environmental degradation and thus emphasizes the utilization of renewable energy resources. It looks towards attaining a sustainable energy future for Nigeria, with the overall objective of achieving a clean energy-based sector. The Policy and related policies do not have the force of law and only serve as a framework for developing and implementing the primary legislation in the sector. National Renewable Energy and Energy Efficiency Policy (NREEEP), 2015 The NREEEP was approved by the Federal Executive Council in 2015 as a framework for addressing the challenges Nigerians faced regarding inclusive access to modern and clean energy resources, improved energy security, and climate objectives. The policy recognizes the national significance of renewable energy-generated electricity and thus provides for developing, operating, maintaining, and upgrading new and existing renewable energy electricity generation activities. The policy also guides the power sector on renewable energy utilization and supply, pricing, efficiency and conservation, research, development, etc.

s/N	COUNTRY	Policies/Legislation/Projects/Programs
35		 Nigeria has carried out numerous rural electrification projects through the Rural Electrification Agency. So far: A) 26, 815 electricity connections have been achieved through Mini-Grids B) 2,693 households headed by women have been connected to Mini-Grids C) 5,085kW of PV capacity of renewable energy has been installed D) 1,143,968 million homes have been connected to electricity through SHS E) 5,106 MSMEs have been connected through SHS F) 34, 441 kW total PV capacity of solar home systems as at 2023. Nigeria Energy Transition Plan 2022: The Nigerian government plans for Solar Home Systems (SHS) to be provided for areas with low density (e.g. villages with less than 20 individuals), while Minigrids are planned for larger communities.
36	Rwanda	 Energy Access Roll-out Program in Rwanda, 2009 – effective in extending electricity lines and increasing the national electrification rate. National Energy Policy was adopted in 2004 and aims at ensuring better use of the energy resources, while promoting socio-economic development and protecting the environment. Rural Electrification Strategy, 2016. The Ministry of Infrastructure has developed a strategy which targets 22% of households gaining access to a Tier-1 energy service and 48% of households gaining access to on-grid or at least Tier 2 energy service by 2017-2018.
37	Sao Tome and Principe	No existing Legal Framework available os of the period of publication

s/n	COUNTRY	Policies/ Legislation/ Projects/ Programs
38	Senegal	Energy Sector Development Policy Letter, 2012
		This is the primary policy for the energy sector, which was first established in 1997 but was later reviewed in 2002, 2008, and 2012. The policy majorly recognizes the significance of renewable energy for the sustenance of the energy sector. In its 2008 version, the policy contained provisions that recognizes renewable energy in the energy sector and served as the foundation for the promulgation of the Renewable Energy Law of 2010. Some of the objectives stated in the policy include consolidating energy security and increasing energy access for all; developing an energy mix combining thermal generation, bioenergy, and renewables; encouraging independent production and institutional reform; and the increase of competitiveness in the power sector.
		Renewable Energy Law, 2010
		The Renewable energy law serves as a guideline towards the increased utilization of renewable energy in the energy mix. The law also provides directives on concessions with the State, private participation, investment, and energy security, and sets out goals for the power sector regarding renewable energy utilization.
39	Seychelles	No existing Framework available os of the period of publication
40	Sierra Leone	Energy Policy of Sierra Leone 2018
		This policy was launched in 2018 and it outlines the status of renewable energy deployment in the country including specified objectives, projections and expected improvements in the energy sector. National Renewable Energy Policy of Sierra Leone (NREP) 2018: This policy clarifies the Energy Policy of Sierra Leone and extends it to include goals, policies, and measures for solar and other forms of renewable energy. Finance Act 2016 The Finance Act which enacted in 2016 guarantees duty
		waivers for imported solar products that fulfill International Energy Commission Standards.

s/n	COUNTRY	Policies/Legislation/Projects/Programs
41	South	National Energy Efficiency Strategy Post 2015
	Africa	Post-2015 NEES aims to build on the achievements of NEES 2005, stimulating further energy efficiency improvements through a combination of fiscal and financial incentives, a robust legal and regulatory framework, and enabling measures. The strategy has been framed to complement the policies and strategies of the Department of Environment Affairs (DEA), the Department of Public Works (DPW), the Department of Science and Technology (DST), Department of Trade and Industry (DTI), Department of Transport (DoT) and the National Treasury.
		The South African Government developed and published the post- 2015 National Energy Efficiency Strategy setting a vision to "promote energy efficiency as the first fuel in driving balanced, socially inclusive and environmentally sustainable economic growth, boosting job creation and leading technological innovation across the region
		National Energy Act 2008
		The National Energy Act gives a directive for an energy plan to increase generation by diversifying energy mix and utilising renewable energy.
42	Somalia	The Somalia National Development Plan for 2020-24
		The Plan emphasizes the critical contribution that off-grid solar energy makes to giving access to energy to households in rural and remote parts of the country through solar home systems (SHS).
43	South Sudan	No existing Framework available os of the period of publication
44	Sudan	Solar Home System Project Program 2013 This is an initiative to employ off-grid solar energy applications to offer electricity in isolated rural areas, led by the ministry of water resources and electricity. The SHS Program seeks to advance socioeconomic levels and enhance the standard of living for rural households. It encourages the use of renewable energy sources and backs programs in rural regions to use energy productive in order to raise household income.

s/N	COUNTRY	Policies/ Legislation/ Projects/ Programs
45	Тодо	National Electrification Strategy, 2018
		This Stategy was adopted in 2018 as a guideline towards achieving access to environmentally friendly and competitive energy by 2030. The strategy also looks towards the achievement of specified aims such as the provision of solar home systems to about 550,000 households in rural areas as a solution for sustainable energy supply, the construction and operation of about 315 mini-grids utilizing renewable energy resources majorly, the extension of the power supply network to about 960 villages, etc.
		Renewable Energy Law, 2018
		This law was promulgated in 2018 as the general legal framework for the execution of renewable energy-based projects. It provides guidelines for safety, storage, marketing, and security for renewable energy resources.
		Project To Support The Social Component Rural Electrification ProgrammeCizo(Pravost)2019
		The African Development Bank funds and supports a social component rural electrifications programme. It is a solar electrification project aimed at rural areas as part of the national program, "CIZO." The project's overarching objective is to strengthen the resilience of approximately 500 rural communities in Togo by improving access to energy for households, community infrastructure, and small-scale farms. The project has four components:
		 (a) a social component that includes the electrification of 314 health centers and equipping 122 health centres with solar water heaters, the solar electrification of 400 drinking water supply stations, and the deployment of 600 solar irrigation pumps;
		(b) the electrification of approximately 2000 households by smart mini-grids;
		(c) the implementation of a paygo platform for the integration of payments and data collection; and
		(d) coordination, management, monitoring, and evaluation.
		Furthermore, In 2017, only 40% of the Togolese population had access to electricity, with rural areas often as low as 8%. Many disadvantaged rural households used candles, battery torches, and kerosene lamps for lighting.

s/N	COUNTRY	Policies/Legislation/Projects/Programs
45		To meet this challenge, the government created the Togolese Electrification and Renewable Energy Agency, a government body tasked with ensuring that all of Togo had access to electricity. This was to be achieved with electricity grid expansion, rural mini-grids, and solar home systems. By offering a combination of routes to energy, the Agency was able to overcome some of the regional and access changes faced by the rural population.
46	Tanzania	The Energy Policy of Tanzania 2015 T
		he Government through the Agricultural policy of Tanzania, emphasizes plans for increased output and efficiency of agricultural production at village level. This increase in production can be achieved either through an increase in the area under cultivation or through an increase in productivity per hectare. Both of these measures can be effected through an increase in both direct and embodied energy inputs into the agricultural systems.
47	Uganda	No existing Framework available os of the period of publication
48	Zambia	National Energy Policy 2008
		The objectives of the policy include- to reduce dependence on wood fuel and ensure sustainable provision of affordable, reliable modern energy services to rural and urban households as a means of raising productivity and standards of living; to increase access to affordable energy in rural areas to reduce poverty and promote economic growth; to increase the utilization of renewable energy sources (RES) by addressing the barriers to their wider dissemination, etc

s/N	COUNTRY	Policies/Legislation/Projects/Programs
49	Zimbabwe	The National Energy Policy 2012 The goal of the policy is to foster an environment where actors in the energy industry can find and develop opportunities for energy supply that support sustainable development. It calls for the sustainable use of biomass resources (e.g. wood fuel, industrial waste such as bagasse and pulp), hydropower, solar power and wind power. Adopting a long-term government-driven program for renewable energy technologies (RETs) that promotes IPPS and public-private partnerships to harness sustainable RETs; establishing creative funding mechanisms and financing opportunities for RETs, such as feed-in tariffs and micro-credit institutions; establishing RETs- sustainable capacity building programs. The National Renewable Energy Policy 2020 The Policy is the government's key document aimed at fostering the production and use of renewable sources in the grid and off-grid. It aims to raise the share of renewables in the energy mix by creating incentives from supply, to distribution and demand, in urban and rural settings.

6. Recommendations for Increasing the Utilization of PUE in SSA Countries

6. Recommendations for Increasing the Utilization of PUE in SSA Countries

• Financing Options

The availability of financing options, such as microcredits, bank loans, or subsidies, is crucial for the development and inclusion of energy-efficient technologies and operations for productive use of energy activities. This will call for the availability of credit and micro-credit to finance productive tools and equipment. In some instances, the majority of micro-grid operators in rural, isolated locations demand that their clients, both residential and commercial, pre-pay for a particular service or quantity of usage, typically one month in advance. There is also the option of lease financing where an entrepreneur can use machinery or equipment while making predetermined payments to the owner over a predetermined time. This enables business owners to profit from the equipment and, in principle, pay for the recurring payments. Also, capitalizing group lending organizations, for PUE is one broad approach that might be taken to reduce or do away with the need for collateral. This could also lead to lower interest rates and more flexible loan terms with more readily available and less expensive financing.

Capacity Building

Vocational training and information campaigns are indispensable for successful energy delivery models. Most electrification programmes fostering productive uses often apply an approach that provides a set of complementary services such as business development services and technical training to help establish these programmes. It is first necessary to train a number of locals to run and maintain the renewable energy plant, as this is a novel area to the industry and region. Second, business and management training is extremely beneficial for aspiring entrepreneurs in order to launch and operate a business.

It is however important to note that capacity-building activities require ongoing support throughout all stages of the enterprise's development rather than being a one-time event. The capacity-building needed may involve ongoing training, information and problem-solving support, and adapting products to the market needs as necessary.

Regulatory Environment

it is imperative that there be at the very basic level a level playing field for renewable energy (i.e. no subsidies for fossil fuels), and preferably an incentive program like feed-in tariffs, clear and efficient procedures to become an independent power producer and to obtain the necessary equipment and permits, official templates for power purchase agreements, etc. The establishment of an industry organization, tariff setting advice for mini-grids, support for the development of quality standards, tax regulatory advice, and training of government officials on PUE technology and benefits are all examples of activities related to the existence of an enabling environment.

Social Awareness and Acceptance

The local community support for PUE micro-grid operators presents another difficulty as the integration of PUE is alien and the benefits are not known to the indigenes. Although the benefits of PUE promotion might be clear on paper, often customers are not convinced of the benefits in relation to the high upfront costs. However, by including the community early on and launching public awareness efforts, these hazards can be partially reduced. A kick-off meeting, training on electricity usage and business problems, awareness-raising about the potential effects of productive appliances, and training on the installation and use of appliances should normally be included in the engagement process.

There can also be marketing events aimed at promoting PUE products, sales entrepreneur training, including the inclusion of women and disadvantaged groups, and the creation of toolkits on how to apply PUE in daily company practice.

Gender Equality and Inclusion

The majority of projects have included a section explicitly concentrating on gender equality and inclusion in the delivery of PUE technologies. In order to include gender equality in PUE projects, it is necessary to specifically target women-led enterprises in the adoption of PUE technology, target women and disadvantaged groups in awareness-raising campaigns, and provide financial solutions that are suited to their needs. Women are not just seen as the beneficiaries of change in energy access, but also as important movers of that change. The special barriers that women confront in accessing skills, capital, collateral, financial and technical literacy, asset ownership, product promotion, relationships along the value chain, and saving and credit services must be taken into account while designing PUE programs.

Public Investment

The upfront cost of acquiring PUE equipment are grossly unaffordable for small scale agrarian communities. There is need to make public investment accessible to projects that benefit activities across the agriculture value chain. This could be a viable way of funding PUE technologies in agrarian communities.

Subsidies

The provision of subsidies for PUE technology for agricultural activities is another means through which the financial cost of acquisition can bereduced. Subsidies can be viewed as a long-term investment policy in return for the long-term economic benefits that increased agricultural produce can generate for the nation. The availability of PUE technology subsidy could encourage the use of PUE technologies and the willingness of PUE technology dealers to extend their services to agrarian communities.

Develop Suitable Business mMdels

Policies that encourage renewable energy project developers to create affordable, viable and mutually beneficial business models for PUE should be created.

Guarantees

Governments can provide guarantees and government investment protection for developers of energy access projects. Such guarantees will in turn encourage the extension of PUE technologies to agrarian communities as they provide comfort to the energy access project developers on guaranteed returns or ability to recoup funds.

Import Duties, Taxation & VAT

Governments could equally provide tax waivers (e.g. import) on quality Renewable Energy and Energy Efficiency products to cover the extra costs of Renewable Energy.

Public Funds

Governments can make available government loans or subsidies (e.g. in the forms of concessional financing) for energy access projects; in addition to easy access to such loans for agrarian farmers for PUE technology advancement.

Research and Development (R&D) Funds

There is also the need to establish funds for research and development (R&D) for field testing (piloting) and energy product innovation. R&D would in turn enable the development of PUE technologies locally; which in turn could drastically reduce the cost of acquisition of same for the agrarian communities.

DISCLAIMER

The devised method of data representation and the mode of populating the information in this Toolkit document is not premised on and does not in any way imply the opinion of International Organizations, Ministries, Governmental Bodies and Regulatory Entities of SSA countries, relating to the legal status of the country, the territory, boundary, or delimitation of the country's frontiers.

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