

Sustainable Energy for All  
Technical Assistance Program (S-TAP)  
for Burundi

**Summary Report**

May 2019



## PREFACE

This report presents the summary of key findings and recommendations of the ESMAP-funded Sustainable Energy for All Technical Assistance Program (S-TAP). The aim of the program was to support the Government of Burundi with advice and capacity to design, implement and support universal access strategies and associated investments.

From 2013 to 2018, S-TAP for Burundi has supported analytical studies, facilitated knowledge exchange of international best-practices and provided support aimed at informing policy discourse and direction. The S-TAP model has also facilitated the showcase of the Bank's value proposition to develop the capacity of Burundi to engage with the private sector to achieve its energy sector goals and priorities in alignment with those of SE4ALL.

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## ACRONYMS

ESMAP	Energy Sector Management Assistance Program
GoB	Government of Burundi
ESMAP	Energy Sector Management Assistance Program
IDA	International Development Association
LV	Low Voltage
MFD	Maximizing Finance for Development
S-TAP	Sustainable Energy for All Technical Assistance Program
SE4ALL	Sustainable Energy for All
WBG	World Bank Group
UN	United Nations
SSA	Sub-Saharan Africa
EAPP	East African Power Pool

## **1. OVERVIEW OF S-TAP AND ENERGY SITUATION IN BURUNDI**

### **Sustainability Energy for All Technical Assistance Program**

Sustainable Energy for All (SE4ALL) is a global coalition of governments, private sector, civil society and international organizations with a primary goal of ensuring universal access to affordable, reliable, sustainable and modern energy for all by 2030 as consolidated in the SDG-7. SE4ALL was launched in 2011 and co-chaired by the UN and WBG. The program has three distinct but intertwined objectives of (i) universal access to energy, including electricity and modern cooking fuels, (ii) doubling the share of renewables in the global energy mix, and (iii) doubling the rate of improvement of energy efficiency.

Since 2012, the Energy Sector Management Assistance Program (ESMAP) has supported the delivery of the SE4ALL objectives through its SE4ALL Technical Assistance Program (S-TAP). The objective of S-TAP is to assist beneficiary-countries in establishing the planning, institutional and policy frameworks to facilitate the SE4ALL objectives. The first part of the two-phased program had eight beneficiary-countries which included five SSA countries; i.e., Burundi, Mozambique, Liberia, Guinea and Senegal.

In June 2013, Burundi received \$1.8 million grant from SE4All to develop the SE4all Technical Assistance Program for Burundi, articulated around six key components: (i) Enable opportunities for private-sector investment in electricity services; (ii) Develop a least-cost grid network expansion plan, (iii) Prepare Feasibility Study for Network Extension. (iv) Assess Household Fuels, (v) Evaluate Lighting for bottom of the pyramid, and (vi) Build Capacity and Share Knowledge.

### **Burundi Energy Sector Context**

*Background.* In 2012, Burundi was the fifth poorest country in the world with a GDP per capita of about US\$164. It had the lowest electricity access rate in the world at about 2% and correspondingly lowest consumption per capita levels at 23 kWh/year. Based on the structure of the demand in 2012, the weighted tariff was US\$ 0.11/kWh. Overall system losses were high at 40 percent. Electricity production was mainly through hydropower generation (84 percent) with diesel generators supplying the remainder. Production capacity included 35 MW nationally plus 3.5 MW (from Ruzizi I) purchased from the *Société Nationale d'Électricité* (SNEL), the national power utility in the Democratic Republic of Congo (DRC), and 12 MW (from Ruzizi II) purchased from the regional production company *Société Internationale d'Électricité des Pays des Grandes Lacs* (SINELAC). The total available maximum electricity production capacity was therefore 50.5 MW. REGIDESO operated 94 percent of the nationally installed generation capacity. ABER, which was established just prior in 2011, operated seven mini-plants with a capacity of 1.52 MW and religious organizations operated plants with a total capacity of 0.29 MW, none of which connected to the national grid.

There were three ongoing IDA-financed projects in the country including (i) a \$15 million Emergency Recovery Project to expand and rehabilitate existing electricity assets and to procure fuel for plants; (ii) a \$50M Multi-Sectoral Water and Electricity Infrastructure Project to rehabilitate the networks and purchase fuel, lubricants and spare parts for existing thermal plants for three years as well as conduct pre-feasibility and feasibility studies of small-sized hydropower plants and demand-side management, (iii) a \$2 million Energy Efficiency Project grant through GEF for capacity building, supply of Compact Fluorescent Lights (CFLs) and utility energy audit and capacity strengthening.

There were also other development partners engaged in SE4ALL-related activities in Burundi including the African Development Bank (AfDB), the European Union (EU), the French development Agency, the United

Nations Development Program (UNDP), and the GIZ (German International Cooperation) with a summary of their activities in Annex 1.

*Challenges.* In 2012, the country entered into an electricity crisis, which is still ongoing, due to (i) increasing power demand resulting from returning refugees and the development of new factories and industries in Bujumbura, (ii) an increasingly dilapidated network system, following 13 years of civil war (1993 to 2005) (iii) the overdependence on hydro resources (95%), which increased the system's vulnerability to hydrological conditions, and (iv) the weak financial position of REGIDESO. In order to address the crisis, the Government decided to enact some interesting reforms in the energy sector. They resulted in improvements in the business environment with, at the end of 2015, the creation of a regulatory institution. However, perceptions of high sovereign political risks remained and served as a major disincentive to the private sector.

*Political crisis in 2015.* A political and civil war broke out in April 2015, which seriously affected the progress made in the years prior. It caused a shortage in funding for infrastructure projects in the country—both from public and private sources. The crisis seriously delayed the implementation of the SE4all activities. It was further exacerbated by a near total collapse of external aid in 2016 as major donors, including the European Union (EU), withdrew funding in response to the constitutional crisis. Similarly, foreign direct investment (FDI) inflows have remained near zero in 2016 and 2017 (from US\$ 82 million in 2014).

*The electricity sector today in Burundi.* The electricity sector continues to face the same issues as in 2012. Electricity access remains extremely low, at less than 5% in the whole country (a consumer survey to be launched shortly should help assess more accurately the access gap). Existing electricity assets remain in a poor state: according to REGIDESO, 60% of the grid requires rehabilitation or upgrading to meet interconnection standards of the East African Power Pool (EAPP). Generation plants are also highly inefficient with low load factor and high technical losses. Nevertheless, the country possesses significant opportunities for renewable energy development especially in hydropower. Based on a hydropower atlas developed with funding from the Belgian Cooperation, Burundi has about 1,700MW of hydropower resources of which approximately 300 MW is economically exploitable.

## **2. SUMMARY OF S-TAP – ACTIVITIES IN BURUNDI**

Since 2013, Burundi has received \$857,490 of S-TAP grant resources aimed at enhancing the capacity of government to engage with the private sector and facilitating donor-financing for accelerating access to electricity and clean household fuels.

The S-TAP- facility has enabled the WBG ability to provide the Government of Burundi (GoB) with the analysis, recommendations and tools to define its priorities.

The first three activities - Private-sector investment in electricity services, Least-cost grid network expansion plan, Feasibility Study for Network Extension - were implemented with an implementation rating of moderately satisfactory, satisfactory and moderately satisfactory, respectively. The remaining three activities - Household Fuels, Lighting for bottom of the pyramid, and Capacity Building and Knowledge Sharing - were cancelled as there was no clear demand nor follow-up from the Government, leading to a reduction in the original \$1.8 million grant amount by \$1 million. Details of objectives and outcomes for each activity are summarized in table 1 below.

**Table 1: Summary of Activities supported by S-TAP**

	<b>Activity</b>	<b>Objective</b>	<b>Planned Output</b>	<b>Actual Output</b>	<b>Implementation Rating (<i>Status</i>)</b>	<b>Remarks</b>
1	Enable Opportunities for private-sector investment in electricity services	Create an enabling environment for private-sector solutions and facilitate proactive outreach to potential investors.	Development of institutional, legal and regulatory frameworks for PPPs, Workshop and Capacity-building for government stakeholders in PPPs	PPP documents were elaborated and validated. Key government stakeholders were trained	Moderately Satisfactory ( <b>Completed</b> )	Financed and implemented by IFC
2	Investment prospectus (Least-cost grid network expansion planning)	To take stock of the country's electricity access situation and financing gaps and develop a plan for sector-financing	Investment Prospectus	Least cost grid network plan (Masterplan) with investment prospectus completed and validated by the Government	Satisfactory ( <b>Completed</b> )	Delay in implementation after 2015 contract signing due to political and social instability during the presidential elections. World Bank financed the distribution component of the plan, with AfDB financing the generation and transmission plan
3	Pre-feasibility study for network extension	To develop preliminary designs of sub-projects identified in the investment prospectus and scope out proposed options	Pre-Feasibility reports	Terms of Reference completed	Moderately Satisfactory ( <b>Completed</b> )	A detailed study for network densification in Bujumbura and for 28 communal capitals is ongoing under Jiji Mulembwe Project's component
4	Household fuels	To understand existing and potential clean cooking technologies and determine institutional arrangements and market	Technology assessment and market survey, design public support mechanisms to	None	Unsatisfactory ( <b>Cancelled</b> )	At the time the study was launched, the GoB decided to focus on more pressing sector concerns. However, a study on

		mechanisms to promote them	facilitate market activity			clean cooking will be carried out under ESMAP ACCES activity.
5	Lighting for bottom of the pyramid	Market scoping and intelligence gathering to stimulate off-grid solutions	Market scoping and intelligence work for off-grid lighting, policy assessments and recommendations to stimulate the off-grid lighting market in Burundi	None	Unsatisfactory <i>(Cancelled)</i>	At the time the initiative was introduced, the GoB decided to focus on more pressing sector concerns. This is now being reconsidered in a new off-grid access project in 2019.
6	Capacity building and knowledge sharing	Assessment of existing capacity and establishment of a data gathering and management systems to fulfill the requirements of the global tracking framework	Updated Capacity Assessment, study tour to similarly-sized country	None	Unsatisfactory <i>(Cancelled)</i>	Training and workshops have been organized in 2019 (ESMAP funding).

### **3. IMPACT OF S-TAP BURUNDI AND WAY FORWARD**

#### **3.1. Achievements and impact of activities**

The main output from the S-TAP is the integrated least cost power sector masterplan, an instrumental tool for integrated access expansion planning. The plan has allowed the Government to identify priority grid infrastructure investments needed to reinforce and extend the existing network, thereby expanding electricity access to various parts of Burundi. In addition, it is a key input for off-grid access expansion planning, and various data from the master plan - such as digitized grid network data, material and service costs - feed directly into the current geospatial mapping exercise for off-grid access, as it lays out areas where it is most cost effective to provide service via the main grid but also implies those areas where alternate and potential transitionary off-grid solutions must be devised to provide access in the near to medium-term. Below is an overview of the key results.

##### ***(1) Opportunities for private-sector investment in electricity services***

This component supported the GoB in creating the enabling environment for private-sector investments and solutions in the electricity sector. This activity aimed to mitigate against key risks that would inhibit private-sector interest in the sector and facilitate a proactive outreach to potential investors in line with the Bank's Maximising Finance for Development (MFD) approach. It was initially conceived as part of the S-TAP package but was then developed by the International Finance Corporation (IFC). It helped the Government validate and elaborate existing provisions for PPPs and strengthen the capacity of key government officials in PPP delivery and management through training. The activity informed the preparation of the Electricity Law ("Loi portant sur la réorganisation du secteur de l'électricité au Burundi"), promulgated on April 23, 2015, which introduced PPPs in generation. The law allows for the operation, by a third party, of generation, transmission and distribution assets.

As a follow-up, the Bank requested and obtained (in July 2018) a grant from the Public Private Infrastructure Advisory Facility (PPIAF) to support the newly established regulatory agency (AREEN) and the Ministry of Energy and Mines in preparing a complete, functioning regulatory framework for renewable energy auctions to enable private sector investment in generation infrastructure, in particular in solar. The study is being procured and is expected to be completed in 2019. It would provide the needed framework for PPP development in the country's power sector.

##### ***(2) Least-cost grid network expansion planning***

The component took stock of the country's electricity access situation and identified the financing gaps for the sector. The actual outcome was a production, transmission and distribution masterplan (integrated power sector masterplan), prepared by the firm Tractebel. The distribution masterplan was financed by S-TAP Burundi while the production and transmission plans were financed by the African Development Bank. The integrated masterplan was validated by the Government in June 2018.

Under the study, demand forecasting was carried out with the main objective of increasing the electricity access rate from 5.5% in 2016 to 30% in 2030. The updated demand forecast accounts for this increase in

electricity access as well as reflects changes in population and GDP, showing an increase in peak electricity demand from 54 MW in 2016 to 249 MW in 2030, reaching a peak of 406 MW in 2040.

a. Production Master Plan

The main recommendation of the production master plan is to diversify the energy mix, which is now largely dominated by the hydroelectric sector. Indeed, the various studies carried out have demonstrated the limits of power systems relying on a single source of fossil or hydro-electricity, in particular due to the drift of fuel costs, the risks of supply failures, the risk of a dry year and increased losses on the transmission grid. Thus, the strengthening of production capacities targets the hydroelectric sector, the thermal sector and the renewable sector.

**Table 1: 2017-2040 production capacity [Tractebel]**

	<b>2017 (MW)</b>	<b>2020 (MW)</b>	<b>2025 (MW)</b>	<b>2030 (MW)</b>	<b>2040 (MW)</b>
<b>Existing Thermal</b>	14	14	14	4	4
<b>Existing Hydro</b>	48	48	48	48	44
<b>Thermal Projects</b>	20	20	40	120	244
<b>Hydro Projects</b>	0	111	175	175	194
<b>Solar Projects</b>	0	19	19	19	204
<b>Biomass Projects</b>	0	0	0	35	65
<b>TOTAL</b>	82	212	296	401	755

The Production Master Plan recommends the installation of 204 MW of solar photovoltaic by 2040. This capacity would represent 27% of the total installed capacity in the Burundian production fleet in 2040. Concerning the interconnection of the Burundian electrical system with neighboring countries, the Rusumo Falls (80MW) and Ruzizi III (49MW) units are expected to be commissioned by the year 2022 and contribute to the 194MW of hydro to be developed by 2040. These shared power plants are located in Tanzania and Congo, and power is imported via 220 kV lines to the consumption centers of Burundi.

The evolution of the energy mix by 2040, is expected to be such that 58% of the energy would be produced by the hydroelectric units, 20% by the biomass units, 13% by the solar units and 9% by the thermal units. The investment required to realize this Production Master Plan through 2040 totals EUR 1717.7 million.

b. Transmission Master Plan

The transmission network will gradually evolve towards a system that meets the requirements of modern transmission and distribution networks, resulting in a distinction between transmission and distribution functions. The transmission network will then bring power from production centers to demand centers. It will meet strict reliability requirements and will therefore mesh. It will be used for transporting power over long distances and for interconnections with neighboring systems. For these reasons, the transmission network will be operated in THT (Very High Voltage > 100,000 V) and the 30kV network will perform the distribution function radially.

The creation of a higher voltage transmission network reduces energy losses associated with the transmission of electricity. In addition, it has been demonstrated that losses can be reduced by replacing

small section conductors and it is recommended that this section be no longer used in the future when new lines are created or when renewing existing lines.

Dynamic analyses have highlighted the benefit of interconnections with neighboring systems. Indeed, the connection of the Burundian system with other systems improves its stability by increasing the inertia of the interconnected system. These interconnections are planned within the framework of the EAPP and NELSAP in particular.

The overall investment plan for Burundi's production and transport projects for the 2017-2040 study period is presented in the following Table 3. The total amount of investments for this period amounts to EUR 2016 million (3528 billion FBU), with roughly 85.2% required for generation and 14.8% for transmission.

**Table 3: 2017-2040 Production and Transmission Plan [Tractebel]**

Période	Types d'Investissement	Coûts d'Investissement (M€)	Investissement Total (M€)
2017 – 2020	Projets décidés du réseau de transport	192.731 M€	796.5 M€
	Mise en service des unités de production	599.727 M€	
	Renforcements du réseau de transport	3.992 M€	
2020 – 2025	Mise en service des unités de production	279.727 M€	297.6 M€
	Renforcements du réseau de transport	17.911 M€	
2025 – 2030	Mise en service des unités de production	149.963 M€	204.0 M€
	Renforcements du réseau de transport	54.075 M€	
2030 – 2040	Mise en service des unités de production	688.318 M€	718.0 M€
	Renforcements du réseau de transport	29.655 M€	
2017 – 2040	<b>TOTAL</b>		2016.1 M€

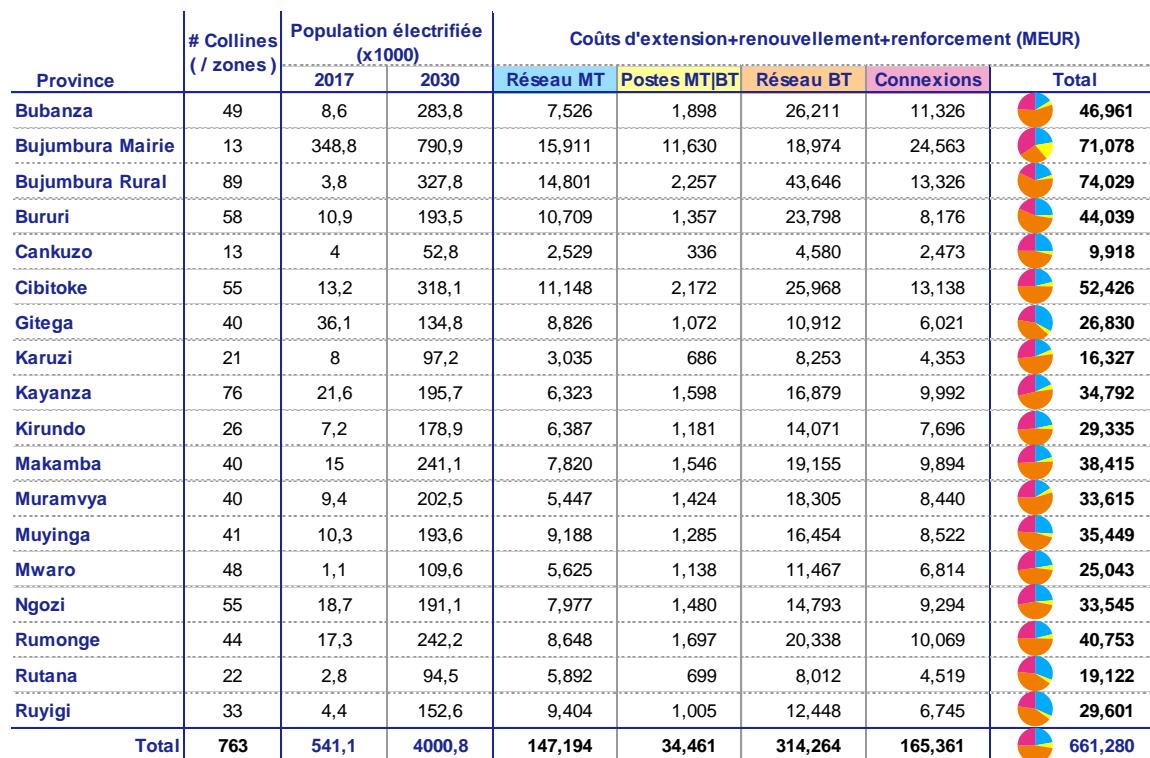
#### c. Distribution Master Plan

The Distribution Master Plan was financed by the S-TAP Burundi. To achieve the overall objective of 30% access by 2030, the plan divides investments between the capital city and the rest of the country and

recommends (i) densifying and electrifying 750<sup>1</sup> hills outside the capital city over the period and (ii) densifying the grid in the capital, which covers an additional 13 hills. The total cost of the distribution program amounts to EUR 661 million for the connection of 3.5 million Burundians.

In addition to production needs of 25 MW during the dry season and a transmission program that will include creation of four new 220-kV interconnections with neighboring countries, programmed improvements should also support the 30kV distribution network, which currently has a combined role in both transmission and distribution of electricity in the interior of the country.

**Table 4: Summary of Distribution Master Plan per Province 2018 - 2030**



The Distribution Master plan identified priority projects for the first 5 year-period through 2022. The priority projects include densification of Bujumbura for EUR 28 million, electrification of 271 hills in the countryside for EUR 206 million, and strengthening the current MV network for EUR 19 million:

#### *Densification of Bujumbura:*

- Network expansion is prioritized, requiring the procurement and installation of the following: 34 km of MV conductors, 465 km of LV conductors, 43 new MV / LV transformer stations and 32 thousand connections.
- For the rehabilitation of the existing network, the following is needed: 43 km of MV conductors, 126 km of LV conductors, 55 MV / LV transformer substations and 13 thousand connections.

<sup>1</sup> 523 new hills should be electrified and 227 hills that are already partially electrified would be densified between 2018 – 2030.

- Overall, required investment in: MV network totals EUR 31.5 million, substations totals EUR 9.9 million, LV network totals EUR 106 million, and grid connections totals EUR 58.8 million.

*Electrification of the Countryside:*

- Priority is given to the electrification of the 28 chief towns that are not yet connected, for a cost of EUR39 million.
- Until 2022, the plan also recommends increasing the rate of electrification in all the hills that already have partial access to electricity, for a cost of EUR149 million.
- The MV network should also be extended to 16 hills for a budget of EUR 18 million.

*Strengthening of MV Network:*

- The distribution network reinforcements needed by 2022 include the replacement of 76 km of 35 and 95 mm<sup>2</sup> conductors by conductors of 240 mm<sup>2</sup> section, and the replacement of 465 km of 35 mm<sup>2</sup> section by conductors in 95 mm<sup>2</sup> for a total cost of EUR 18.7 million.

Three sources of financing for the Distribution Master Plan were identified and include public development aid, financial institutions or other private investors, and initiatives to promote rural electrification. However, the Plan also recommends strengthening of the institutional and legal framework for distribution and commercialization in rural areas covered by the interconnected network, in order to attract the needed external investment. This investment is critical as it is currently expected by the GoB that REGIDESO will only be able to connect two chief towns to the grid by 2020.

### **(3) Pre-feasibility study for network extension**

The component was aimed at preparing preliminary designs of sub-projects identified in the overall least-cost grid network expansion planning exercise, to inform the optimal electrification schemes and scope for further network extension. Terms of Reference were completed but actual activities were delayed due to political unrest which followed the last exercise. \$800,000 USD have been set aside under the IDA-financed Jiji Mulembwe project to finance the feasibility studies.

#### **3.1. Ensuring the sustainability of S-TAP impact**

External funding is critical to implement the Masterplan. However, no funds have been mobilized towards the identified projects due to a significant decrease in donor aid to Burundi following the 2015 crisis, as well as concerns regarding the capacity of REGIDESO to carry out such projects and ensure their sustainability. Preparation of pre-feasibility studies for the projects, strengthening of planning capacity and sector governance, and improvement in the performance of the utility will be key for the Government to secure funding for the Masterplan in the near to medium term.

#### ***Improving the performance of REGIDESO***

Moving forward, there should be efforts to enhance governance and improve REGIDESO's operational and financial performance as this is a critical requisite for effective private-sector participation. Such efforts are being carried out under the Jiji Mulembwe project, focusing on the implementation of a performance improvement plan (PIP) for REGIDESO, and the preparation of a performance contract between REGIDESO and the Government of Burundi. The PIP would include a Management Information System, Enterprise

Resource Management, a Revenue Protection Program and emergency investments for short term operational improvements.

### ***Strengthening capacity for grid expansion planning***

The masterplan for production, transmission and distribution was approved by the GoB in June 2018. However, no follow up activities have been carried out since. In parallel to the preparation of feasibility studies for select investments (see above), there should be efforts to support generation and transmission capacity planning. Experience in other countries has proven that strong country ownership is critical for the continuous updating of the existing plans, for them to remain relevant and for the sector to adequately plan its future expansion. Strengthening sector planning will be key for the overall improvement of utility operational performance.

Specifically, the following activities could be supported:

- Training, advice and TA on data aggregation and updating
  - Review of current data management
  - Preparation of recommendations for data management
- Training on generation and transmission capacity expansion planning
  - Review of current planning practices
  - Training on current planning methodologies + overview of planning tools available
  - Preparation of input data files and execution of Least Cost Development Plan (LCDP)
- Training on access planning
  - Introduction to Geospatial Information System (GIS) planning for electricity access
  - Overview of tools for GIS planning and data management approaches

The Bank and other DPs could meet to identify sources of funding to provide such support. Once the feasibility studies are completed, funding should also be mobilized to help the Government finance investments outlined under the plans.

### ***Planning for off-grid expansion***

Under its National Development Plan (*Plan National de Développement*, PND), the GoB has outlined as a priority the development of rural areas. However, while the grid Master Plan has been completed, there is currently no plan for off-grid/rural electricity access expansion. One of the studies mentioned above, training on access planning, would involve planning for both on and off-grid expansion. The Bank is launching several technical assistance activities to help the Government of Burundi establish off-grid expansion planning capacity, under ESMAP-funded activities: *Burundi Off-grid Electrification Options Project*, *Regional Multi-Tier Framework (MTF) surveys in Africa*, and the *Geospatial Electrification Planning in the Africa Region*.

An assessment of off-grid options will be carried out, to inform a rural plan focusing on the following aspects: (i) strategic objectives and targets, in line with the Burundi National Development Plan, alongside strategic pillars to define; (ii) institutional and regulatory framework; (iii) implementation roadmap; (iv) investment/financing prospectus, and (v) M&E framework. As part of the activity, building on results from MTF and geospatial mapping, a database for the energy sector would be established, providing capacity building to the Ministry of Energy and the Rural Electrification Agency on data aggregation and updating, with the creation of a GIS unit.

### Annex 1: Donor Interventions in Burundi Power Sector

Name	Installed Power Capacity/Intervention	Financing	Expected Commissioning
<i>Grid</i>			
Hydro-Electric Plant Mpanda	10.4 MW	Burundian Government	2021
Hydro-Electric Plant Kabu 16	20 MW	Credit from the Indian Government	2021
Hydro-Electric Plant Jiji-Mulembwe	49 MW	World Bank, AfDB, UE, EIB	2024
Hydro-Electric Plant Rusumo falls (Burundi-Rwanda-Tanzania, 80 MW)	26.6 MW (Burundi Part)	World Bank, AfDB	2021
Hydro-Electric Plant Kagu 006	8 MW	PPP Swedenergy	2023
Solar PV Project	7.5 MW	PPP Gigawatt Global	2019
Importation from Ethiopia	200 MW	Burundian Government: MoU signed.	2020
Thermal power Plant	30 MW	PPP Interpetrol	2017
Peat Power Project	15 MW	PPP with BUCECO	2020
Hydro-Electric Plant Ruzizi III	49 MW (Burundi Part)	World Bank, AfDB, EIB, UE	2024
Hydro-Electric Plant RUZIBAZI	15 MW	Grant from Chinese Government	2022
<i>Off-grid</i>			
Support to energy transition ASAE II	Payment of fuel for thermal plant in Bujumbura	European Union	Ongoing
Resilience project	Energy services for small communities	European Union	Selection process ongoing
Electrifi	Supporting private sector for off-grid energy	European Union	To be launched end 2019
Social Services Electrification	PV electrification of 30 schools and 20 clinics	European Union	Completed in 2017
Institutional support program to health sector	PV electrification of 30 health centers in 2018; 10 additional expected for 2020	ENABEL	November 2014 – October 2020
Support to Vocational and Technical Training centers	PV electrification of 13 vocational training centers from June 2015 to June 2020	ENABEL	December 2019
SESMA	Solar electrification of communities of Gitega, Bubanza and Makamba	European Union (with TTA)	May 2019