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Report No: PAD2630

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A  
PROPOSED GRANT

IN THE AMOUNT OF SDR 72.4 MILLION  
(US\$100 MILLION EQUIVALENT)

TO THE  
REPUBLIC OF BURUNDI

FOR A  
SOLAR ENERGY IN LOCAL COMMUNITIES PROJECT

February 6, 2020

Energy and Extractives Global Practice  
Africa Region

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## CURRENCY EQUIVALENTS

Exchange Rate Effective December 31, 2019

Currency Unit = Burundi Francs (FBu)

FBu 1,879 = US\$1

SDR 0.71531782 = US\$1

FISCAL YEAR

July 1 - June 30

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## ABBREVIATIONS AND ACRONYMS

ABER	<i>Agence Burundaise d'Electrification Rurale</i> (Burundian Agency for Rural Electrification)
AfDB	African Development Bank
AREEN	<i>L'Autorité de Régulation des Secteurs de l'Eau Potable et de l'Energie</i> (Burundian National Authority for Regulating the Electricity and Water Sector)
AWPB	Annual Work Plan and Budget
BBN	<i>Bureau Burundais de Normalisation et Contrôle de la Qualité</i> (Burundi Bureau of Norms and Quality Control)
CAPEX	Capital Expenditures
CCF	Clean Cooking Fund
CDS	<i>Centre de Santé</i> (Health Center)
CEC	Clean and Efficient Cookstove
CERC	Contingent Emergency Response Component
CPF	Country Partnership Framework
CPLO	Community and Participation Liaison Officer
DA	Designated Account
DFID	United Kingdom Department for International Development
DGE	<i>Direction Générale de l'Energie</i> (General Director for Energy)
EIB	European Investment Bank
EIRR	Economic Internal Rate of Return
ELECTRIFI	Electrification Financing Initiative
ENABEL	<i>Agence Belge de Développement</i> (Belgian Cooperation Agency)
EPC	Engineering, Procurement and Construction
ERR	Economic Rate of Return
ESA	Environmental and Social Assessment
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESMAP	Energy Sector Management Assistance Program
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
EU	European Union
FBu	Burundi Francs
FHC	Free Health Care
FM	Financial Management
FOREX	Foreign Exchange
GBV	Gender-based Violence
GDP	Gross Domestic Product
GHG	Green-house Gas
GIS	Geographic Information Systems
GIZ	<i>Deutsche Gesellschaft für Internationale Zusammenarbeit</i> (German Agency for International Cooperation)
GNI	Gross National Income
GoB	Government of Burundi

GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IFC	International Finance Corporation
IFR	Interim Financial Report
IPF	Investment Project Financing
IPPF	Indigenous Peoples Planning Framework
ISO	International Organization for Standardization
IVA	Independent Verification Agency
KfW	<i>Kreditanstalt für Wiederaufbau</i> (German State-owned Development Bank)
KIRA	IDA-funded Health Systems Support Project
LMCP	Last Mile Connectivity Program
M&E	Monitoring and Evaluation
M&R	Maintenance and Replacement
MEESRS	<i>Ministère de l'Éducation, de l'Enseignement Supérieur et de la Recherche Scientifique</i> (Ministry of Education, Higher Education and Scientific Research)
MFD	Maximizing Finance for Development
MFI	Microfinance Institute
MINHEM	<i>Ministère de l'Hydraulique, de l'Énergie et des Mines</i> (Ministry of Hydraulics, Energy and Mines)
MTF	Multi-tier Framework
NES	National Electrification Strategy
NGO	Non-governmental Organization
NPV	Net Present Value
O&M	Operation and Maintenance
OPEX	Operating Expenditures
PAADESCO	<i>Projet d'Appui à l'Amélioration des Apprentissages en Début de Scolarité</i> (Early Grade Learning Project)
PBF	Performance-based Funding
PCU	Project Coordination Unit
PDLE	<i>Projet de Développement Local pour l'Emploi</i> (Local Development for Employment Project)
PDO	Project Development Objective
PFM	Public Financial Management
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PND	<i>Plan National de Développement</i> (National Development Plan)
PPP	Public-private Partnership
PPSD	Project Procurement Strategy for Development
PV	Photovoltaic
RAF	<i>Responsable Administratif et Financier</i> (Financial Management Specialist)
RAP	Resettlement Action Plan
RBF	Results-based Financing
REGIDESO	<i>La Régie de Production et de Distribution de l'Eau et de l'Électricité</i> (Water and Electricity Production and Distribution Board)
RISE	Regulatory Indicators for Sustainable Energy
SDG	Sustainable Development Goals

SDR	Special Drawing Rights
SHS	Solar Home Systems
SMEs	Small and Medium Enterprises
STEM	Science, Technology, Engineering and Mathematics
TA	Technical Assistance
ToR	Terms of Reference
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAT	Value-added Tax
WADB	West African Development Bank
WFP	World Food Program



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**The World Bank**

Solar Energy in Local Communities (P164435)

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DATASHEET

**BASIC INFORMATION**

Country(ies)	Project Name	
Burundi	Solar Energy in Local Communities	
Project ID	Financing Instrument	Environmental and Social Risk Classification
P164435	Investment Project Financing	Substantial

**Financing & Implementation Modalities**

<input type="checkbox"/> Multiphase Programmatic Approach (MPA)	<input checked="" type="checkbox"/> Contingent Emergency Response Component (CERC)
<input type="checkbox"/> Series of Projects (SOP)	<input checked="" type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Disbursement-linked Indicators (DLIs)	<input type="checkbox"/> Small State(s)
<input type="checkbox"/> Financial Intermediaries (FI)	<input type="checkbox"/> Fragile within a non-fragile Country
<input type="checkbox"/> Project-Based Guarantee	<input type="checkbox"/> Conflict
<input type="checkbox"/> Deferred Drawdown	<input type="checkbox"/> Responding to Natural or Man-made Disaster
<input type="checkbox"/> Alternate Procurement Arrangements (APA)	

Expected Approval Date	Expected Closing Date
28-Feb-2020	01-Mar-2026

Bank/IFC Collaboration
No

**Proposed Development Objective(s)**

The objective of the Project is to expand access to energy services for households, enterprises, schools and health centers in rural areas of Burundi.





**Components**

Component Name	Cost (US\$, millions)
Energy Services for Schools and Health Service Centers	27.00
Energy Services for Rural Communities	37.00
Energy Services for Households	17.00
Technical Assistance, Capacity Building and Project Implementation Support	19.00
Contingent Emergency Response	0.00

**Organizations**

Borrower: Republic of Burundi

Implementing Agency: Ministère de l'Hydraulique, de l'Energie et des Mines (MINHEM)

**PROJECT FINANCING DATA (US\$, Millions)**

**SUMMARY**

<b>Total Project Cost</b>	102.00
<b>Total Financing</b>	102.00
<b>of which IBRD/IDA</b>	100.00
<b>Financing Gap</b>	0.00

**DETAILS**

**World Bank Group Financing**

International Development Association (IDA)	100.00
IDA Grant	100.00

**Non-World Bank Group Financing**

Counterpart Funding	2.00
Borrower/Recipient	2.00



**IDA Resources (in US\$, Millions)**

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
<b>Burundi</b>	0.00	100.00	0.00	100.00
National PBA	0.00	100.00	0.00	100.00
<b>Total</b>	<b>0.00</b>	<b>100.00</b>	<b>0.00</b>	<b>100.00</b>

**Expected Disbursements (in US\$, Millions)**

WB Fiscal Year	2020	2021	2022	2023	2024	2025	2026
<b>Annual</b>	0.78	11.35	19.08	23.20	21.16	16.59	7.85
<b>Cumulative</b>	0.78	12.13	31.20	54.41	75.56	92.15	100.00

**INSTITUTIONAL DATA**

**Practice Area (Lead)**

Energy & Extractives

**Contributing Practice Areas**

Education, Health, Nutrition & Population

**Climate Change and Disaster Screening**

This operation has been screened for short and long-term climate change and disaster risks

**SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)**

Risk Category	Rating
1. Political and Governance	● High
2. Macroeconomic	● High
3. Sector Strategies and Policies	● Substantial
4. Technical Design of Project or Program	● Moderate
5. Institutional Capacity for Implementation and Sustainability	● High
6. Fiduciary	● Substantial
7. Environment and Social	● Substantial



8. Stakeholders	● Substantial
9. Other	● High
10. Overall	● High

## COMPLIANCE

### Policy

Does the project depart from the CPF in content or in other significant respects?

Yes  No

Does the project require any waivers of Bank policies?

Yes  No

### Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Relevant
Cultural Heritage	Relevant
Financial Intermediaries	Not Currently Relevant



**NOTE:** For further information regarding the World Bank’s due diligence assessment of the Project’s potential environmental and social risks and impacts, please refer to the Project’s Appraisal Environmental and Social Review Summary (ESRS).

**Legal Covenants**

Sections and Description

The Recipient, through the MINHEM shall, no later than four (4) months after the effective date, recruit and thereafter maintain throughout project implementation, a project coordinator, a procurement specialist, financial management specialist, environmental specialist and social specialist; energy, health and education technical specialists; gender specialist, two accountants, and a monitoring and evaluation specialist; all with qualifications, experience and terms of reference satisfactory to the Association.

Sections and Description

The Recipient shall, no later than four (4) months after the Effective Date, cause the ABER to hire and/or designate and thereafter maintain throughout Project implementation key staff, including, a Project Manager, a procurement specialist, financial management specialist, an environmental specialist and a social specialist; all with qualifications, experience and terms of reference satisfactory to the Association.

Sections and Description

The Recipient shall, no later than three (3) months after the Effective Date, establish, and thereafter maintain throughout Project implementation, with terms of reference, mandate, composition and resources satisfactory to the Association, a steering committee chaired by the permanent secretary of MINHEM and a deputy chair who is a high level representative in the MoF; and composed of representatives from ABER, AREEN, REGIDESO, and Recipient’s ministries of health, education as well as consumers representatives, as further detailed in the Project Implementation Manual (“Steering Committee”).

Sections and Description

The Recipient through MINHEM shall, no later than three (3) months after the Effective Date, establish and thereafter maintain a technical committee, in charge of providing support to the PCU throughout Project implementation, and which shall include experienced and technical specialists from project stakeholders, including the Recipient’s ministries of health and education, under terms and conditions satisfactory to the Association.

Sections and Description

The Recipient through MINHEM shall, no later than six (6) months after the Effective Date, hire an independent audit firm to audit the Project’s financial statements, with terms of reference satisfactory to the Association.

**Conditions**

Type

Description

Effectiveness

The Recipient has prepared and thereafter adopted a project implementation manual, in form and substance acceptable to the Association.



Type Disbursement	Description Disbursements under Category (2) will not be made unless and until the Recipient enters into an Implementation Agreement with ABER, with terms and conditions acceptable to the Association, to carry out Part 2 of the Project.
Type Disbursement	Description Disbursements under Category (4) will not be made unless and until the Recipient: (i) hires a Subgrant Administrator with terms of reference and mandate, acceptable to the Association; and (ii) develops and adopts, through the Subgrant Administrator, a Subgrant Operational Manual, satisfactory to the Association.

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## I. STRATEGIC CONTEXT

### A. Country Context

1. **Burundi is a small, landlocked country in eastern Central Africa with a total land area of 27,834 km<sup>2</sup> and approximately 11.1 million inhabitants, making it the second most densely populated country in the continental Sub-Saharan Africa.** With its extremely low urbanization level (12 percent), Burundi has the most densely populated rural areas in the world. The high population growth rates (expected to double by 2040) and high population density (470 people per square kilometer) generate pressure on land and natural resources.<sup>1</sup> Burundi's population is also young, about 58 percent of the population is below 19 years. Economic growth is largely dependent on agriculture, accounting for about 32 percent of the gross domestic product (GDP) and 90 percent of livelihoods. This dependence can lead to extreme vulnerability to climatic and external shocks. Although agriculture is the backbone of the economy, many Burundians face hunger, malnutrition, and stunted development<sup>2</sup>. In 2018, almost the entire Burundian population (95.3 percent) lived below the poverty line of US\$3.20 per capita per day.

2. **Burundi is facing considerable development challenges.** Despite strong efforts and improvement in key health and education indicators, Burundi ranks 185 out of 189 countries on the 2018 Statistical Update of the Human Development Index. After more than 10 years of civil disturbances, almost three years of economic embargo, and a four-year post-war emergency period, Burundi has one of the lowest per capita gross national incomes (GNIs) in the world (US\$280 in 2016). Despite having a formal legal system that ensures gender equality, women and girls face significant obstacles when accumulating economic assets, including human capital, and register lower education, including illiteracy, and health outcomes. Women are significantly disadvantaged in monetizing their economic assets and obtaining relevant returns, particularly in the labor market where, especially in rural areas, women are confined to lower forms of jobs.

3. **The Government of Burundi (GoB) is committed to supporting the economic and social development of the country, as outlined in the “National Development Plan 2018 - 2027” (*Plan National de Développement, PND*), where energy deficit is outlined as one of the main constraints to economic growth.** The GoB identified three strategic objectives, the first of which is to ensure “sustainable and inclusive growth for economic resilience and sustainable development”. Under this objective, the second strategic pillar focuses on appropriate infrastructure to support energy production and promotes alternative sources of energy. At the heart of the PND is a focus on rural areas, where more than 9 million people live, and for which the Government wishes to allocate 60 percent of all resources of the plan over the next 10 years.

### B. Sectoral and Institutional Context

4. **Governed by the Electricity Law of 2015, the electricity sector in Burundi is largely vertically integrated** with a single, fully publicly owned utility *La Régie de Production et de Distribution de l'Eau et de l'Électricité* (Water and Electricity Production and Distribution Board, REGIDESO), that manages all levels of the electricity supply chain: generation, transmission and distribution. The sector currently operates under a single-buyer model, with independent power producers that inject supply to the main utility. Rural electricity service provision by isolated networks is managed by *Agence Burundaise d'Électrification Rurale* (Burundian Agency for Rural Electrification, ABER), which owns and operates

<sup>1</sup> Food and Agriculture Organization and World Bank population estimates. <https://data.worldbank.org/indicator/EN.POP.DNST>.

<sup>2</sup> 56 percent of children under five stunted, one of the highest rates of chronic undernutrition worldwide.

the infrastructure. While the Electricity Law requires further augmentation (for example, there is currently no specific legal framework for the development of renewable energy), the Government has made recent improvements and the law now presents a broad public-private partnership (PPP) framework and allows for various electricity production regimes,<sup>3</sup> competition in generation, and light-handed regulation for small power projects.

**Table 1: Key Parameters of the Burundi Electricity Sector**

Parameter	Value
Electricity access rates	9 percent (62 percent urban and 1.8 percent rural)
Number of electricity customers	100,000
System peak demand (MW)	87.4
Installed generation capacity (MW)	86 (88 percent hydro; 12 percent diesel)
Annual generation (GWh)	306
Imported generation (GWh)	91
Average electricity tariff (US\$/kWh)	20
System losses (%)	32

Note: a. Data provided by REGIDESO, 2019

5. **The key institutional sector stakeholders** are the following:

- a) **Le Ministère de l'Hydraulique, de l'Énergie et des Mines (Ministry of Hydraulics, Energy and Mines, MINHEM)**, is responsible for developing and implementing the energy sector policies, administering sector planning, and supervising state electricity and mining state enterprises.
- b) **ABER** is an agency responsible for the development and implementation of rural electrification programs and projects. It owns and manages mini-grids (from hydro, solar and wind energy), and other forms of energy (such as biogas). ABER was founded in 2011 by the Presidential decree N100/318 and operates under the responsibility of MINHEM. ABER currently operates five mini-grids, some of which have been operating since 1984, and provides electricity to a total of 600 customers.
- c) **REGIDESO** is a state-owned national electricity and water production and distribution company created in 1962 on the independence of the country.
- d) **L'Autorité de Régulation des secteurs de l'Eau Potable et de l'Énergie (Burundian National Authority for Regulating the Electricity and Water Sector, AREEN)** is the regulatory agency for the electricity and water sector in Burundi (established in 2014 and reorganized in 2018). AREEN's principal mission is to ensure the transparent and profitable development of Burundi's water and electricity sector; control, regulate and monitor related activities to enforce the execution of contractual provisions, regulations, and specifications by sector operators; and implement, monitor and enforce rates in accordance with the set pricing principles.

<sup>3</sup> Electricity Law of 2015 provides for various production regimes and supply for auto-consumption, including (a) public concessions for hydro plants; (b) projects operating on public lands which require contracts with the state or parastatal entity; (c) projects greater than 500 kW on private land that require authorization from the Ministry of Energy; and (d) power projects less than 500 kW that must simply be declared.



*The energy sector in Burundi faces various challenges.*

6. **First, access to electricity remains extremely limited, particularly in rural areas.** Most access estimates put overall access to electricity below 10 percent of the population,<sup>4</sup> much lower than the regional average of 44 percent.<sup>5</sup> REGIDESO serves only about 100,000 customers, mainly in the capital (64 percent of overall client base). While 72.5 percent of the population living in Bujumbura and 42.6 percent of the population living in other urban centers have access to electricity, the proportion falls to 1.8 percent of the population in rural areas, which is a significant constraint to economic, social and human capital development in a country where most of the population lives in those areas.<sup>6</sup> Burundi's average per capita consumption of electricity, at 23 kWh per year, is among the lowest in Sub-Saharan Africa where the regional average is 480 kWh per year.<sup>7,8</sup>

7. **Second, renewable energy potential lies largely unharnessed.** The average solar insolation in Burundi is similar to that of Southern Europe with around 4 – 5 kWh per m<sup>2</sup> per day in the eastern part of the country and 3.3 – 4.0 kWh per m<sup>2</sup> per day at high altitudes in the western part of the country. As for wind energy, there are few sites suitable for wind power generation in Burundi, but some locations such as the shores of Lake Tanganyika (wind speed is 4 to 5 m/s) could prove to have favorable conditions for the exploitation of such energy. To-date, no feasibility studies on wind power have been carried out in Burundi. There are also several available sources of waste biomass and agricultural residue in different forms in Burundi, which may be harvested and transformed into energy sources, although a resource assessment is needed to evaluate competing uses.

8. **Third, insufficient energy supply is undermining economic growth opportunities.** A 2014 World Bank Enterprise Survey, the latest so far, found that 22 percent of Burundian firms identified poor electricity access and reliability as major barriers to investment, compared to an average 15 percent across Sub-Saharan Africa.<sup>9</sup> Outages are frequent due to various reasons: insufficient supply related to lack of investment in new generation capacity along with inadequate maintenance of the existing plants, excessive reliance on hydropower (affecting supply during droughts), and high technical and commercial losses and operational failures. The imbalance between supply and demand in Burundi resulted in rolling blackouts in 2015 and 2016 and service interruptions.<sup>10</sup> The situation will not improve in the short term, as demand is expected to continue to grow<sup>11</sup> while new generations projects in the pipeline will not come online before 2021, if not later.

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<sup>4</sup> Reliable data on energy access are not available and consequently, access estimates differ. The 2017 Burundi Rapid Household Survey (*Enquête sur les Conditions de Vie des Ménages Burundais*, ECVMB 2017) reports that 7.5 percent of the population has access to electricity. Tracking SDG7: The Energy Progress Report 2018 estimated that nationwide access stands at 9 percent.

<sup>5</sup> <https://trackingsdg7.esmap.org/results>

<sup>6</sup> World Bank, June 2018. Subjective Poverty and Recent Changes in Living Conditions: Findings from the Rapid Household Survey (2017).

<sup>7</sup> World Bank, June 2016. Implementation Completion and Results Report on a Global Environment Facility Grant to the Republic of Burundi.

<sup>8</sup> World Development Indicators. 2016. Electric power consumption (kWh per capita).

<https://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC>

<sup>9</sup> Enterprise Surveys (<http://www.enterprisesurveys.org>). World Bank, Burundi 2014.

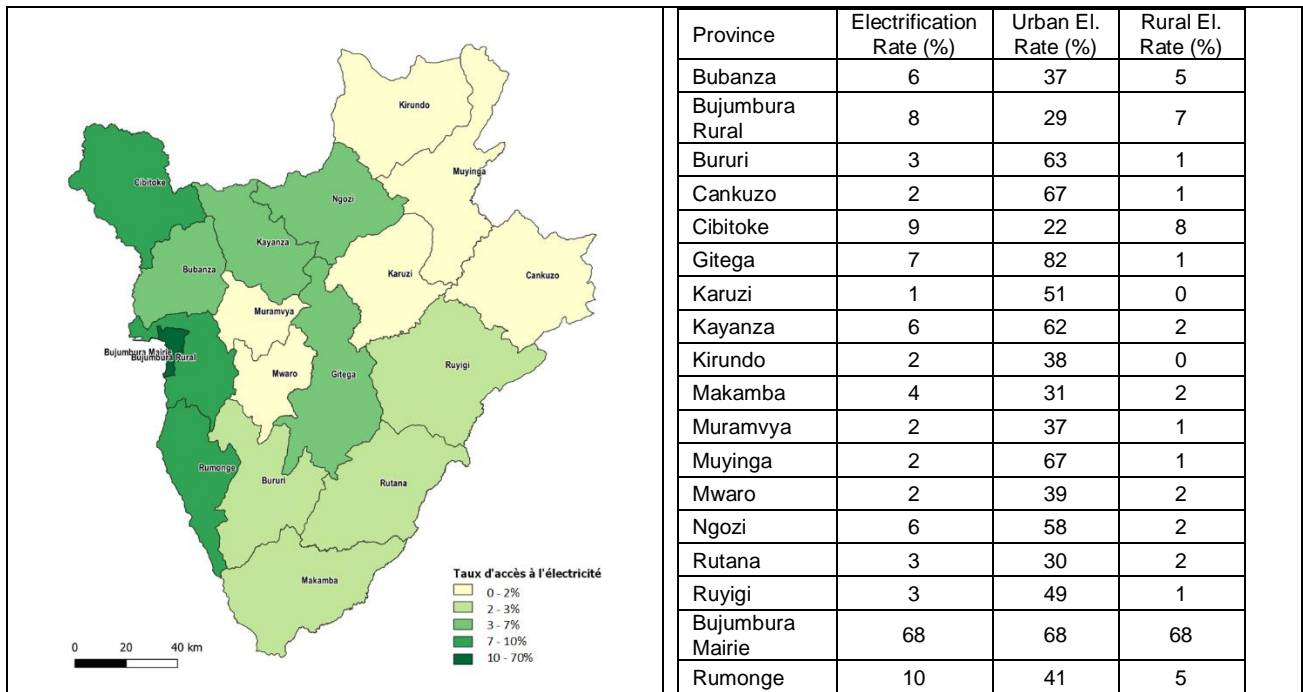
<sup>10</sup> Tractebel. (2018). *Plan Directeur de Production et de Transport de l'Energie Électrique au Burundi. Rapport final - Tome 2: Volume 1 Prévission de la demande*. Page 21.

<sup>11</sup> Peak demand is expected to grow to 89 MW in 2020 and 249 MW in 2030.





Figure 1. Electricity Access by Province in Burundi



Source: Demographic and Health Survey, 2013.

9. **Fourth, the dependence on wooded biomass is overwhelming with significant implications for deforestation and environment.** Biomass represents 95 percent of primary energy consumption, while electricity only accounts for 1.3 percent and oil 2.5 percent. An estimated 98 percent of the population<sup>12</sup>, in urban and rural areas uses wood or wood-fuel as the main source for heating and cooking. Cooking happens indoor for 92 percent of the population (96 percent for rural and 60 percent for urban). These poor cooking solutions (primarily with wood and residues) combined with the high density and demographic growth exert a high pressure on the woodstock. It is estimated that the fraction of non-renewable biomass is at 79 percent, meaning that only one-fifth of the wood used in a year is regrown that year. This situation results in (a) significant natural capital depletion, estimated at 29 percent of GDP per capita in 2010 and largely due to a net depletion of forests,<sup>13</sup> and (b) dire health costs for families (especially women and the youngest members of families) due to respiratory illness related to indoor air pollution and the physical strain of an ever-expanding radius of wood collection.

*Off-grid service delivery mechanisms are essential to the GoB vision of 30 percent electricity access by 2030*

10. **Alternative service delivery mechanisms are needed to provide services to customers in off-grid areas, either as temporary solutions until the arrival of the grid or as a permanent solution.** According to preliminary geospatial mapping analysis and estimates of electricity demand, at least one third of the power capacity required to meet electricity demand in 2030 must come from mini-grids, another third would be grid-connected, and the remaining electricity demand would be met through standalone solar systems.

<sup>12</sup> ESDB-III : Troisième Enquête Démographique et de Santé au Burundi 2016 – 2017.

<sup>13</sup> World Bank 2016. Burundi Poverty Assessment, page 153 - 154.

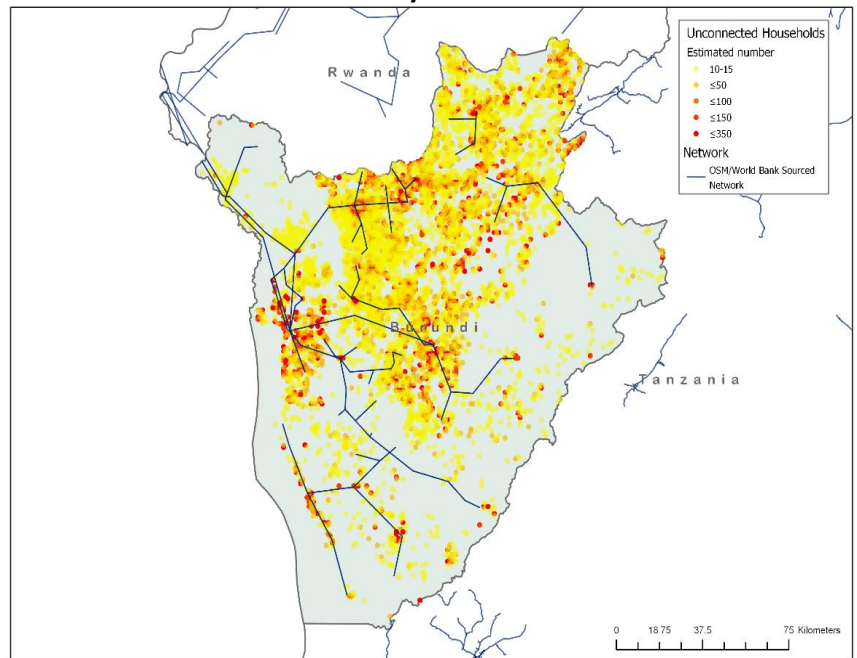


11. **Reliance on grid alone is prohibitively expensive.** The recently finalized power sector masterplan estimated investment needs of EUR 661 million in the next five years to reach the Government's goal of 30 percent of electricity access in the country by 2030. To-date, the Government has not been able to mobilize funds and development partners are unwilling to commit funds to grid extension. Given the limited financing available and the weak financial performance of REGIDESO, the Government's initial priority to densify the existing network in urban and peri urban centers has broadened to include decentralized supply solutions, namely mini-grids and standalone systems.

12. **Energy access is recognized as a vital enabler of human capital development, particularly Sustainable Development Goals (SDGs) 3 and 4.** Two notable programs in Burundi are (a) the school feeding programme, implemented by *Direction Nationale des Cantines Scolaires* through the World Food Programme (WFP), that provides lunches to pupils in the 20 percent of schools with the highest incidence of malnutrition and (b) national Free Health Care (FHC) for pregnant women and children under five years that provides beneficiaries with access to all services available at public and contracted private facilities (health centers and hospitals). Providing energy access to clinics, schools, small and medium enterprises (SMEs), and households will improve the provision of basic services, thereby improving welfare, catalyzing growth, and dramatically changing livelihoods in rural areas. For many students served by *Cantine Scolaires*, the food they receive in school is the only meal for the day; offering lunch also incentivizes families to ensure their children actually attend school, resulting in improved school attendance and enhanced education outcomes. Today in Burundi, energy services often remain unavailable or unreliable in the majority of schools and health centers. While national, regional and district hospitals are typically electrified, although quality of supply may be an issue in some districts, only 30 percent of the 943 health centers are electrified.<sup>14</sup> Education facilities show even lower electricity rates. Only 5 percent of the 4,000 primary schools (*écoles fondamentales*), 36 percent of the 980 secondary schools (*écoles post fondamentales pédagogique générales*), and 67 percent of the technical secondary schools (*post fondamentales techniques*) have functional electrical installations (solar photovoltaic [PV] or REGIDESCO).<sup>15</sup>

13. **Donors' support in the sector has long focused on expanding generation capacity<sup>16</sup>, but there is increased**

Figure 2. Existing Grid Infrastructure and Households without electricity in Burundi



Source: World Bank analysis, 2019.

<sup>14</sup> Data kindly provided by ENABEL. Health centers receive electricity either through a grid-connection to REGIDESCO (11 percent) or from a stand-alone solar PV system (19 percent).

<sup>15</sup> Diagnostic report for public schools, School Infrastructure Directorate, Ministry of Education, 2018

<sup>16</sup> Donors (World Bank, EU, the African Development Bank [AfDB] and the European Investment Bank [EIB]) are currently financing the ongoing Jiji and Mulembwe Hydropower (P133610) and the Rusumo Falls projects (World Bank, EU and AfDB). The World Bank has focused TA support to bringing the energy sector into a sustainable position through (a) preparation of a generation, transmission and distribution masterplan for the energy sector, along with AfDB (completed); (b) Public-Private Infrastructure Advisory Facility support to AREEN and the



**interest in supporting off-grid access expansion.** The European Union (EU) has financed solar mini-grids for the communities of Gitega, Bubanza and Makamba; it will soon select proposals for the provision of energy services to rural communities ('resilience project') and is also contemplating a US\$11 million investment from Electrification Financing Initiative (ELECTRIFI) to support private investments in off-grid access. EnDev is also exploring investments in solar products for small services, agriculture activities, and clean cooking products, while the Belgian cooperation agency (*Agence Belge de Développement*, ENABEL) financed solar systems and establishment of maintenance training centers for solar equipment in health centers. The United Nations Children's Fund (UNICEF) provided self-standing solar fridges to around 750 health centers that offer vaccination services and is planning to install solar systems in health centers in 2020. As for cooking needs, the National School Canteens Program<sup>17</sup> provides a free lunch program to more than 800 primary schools in areas with high risk of food insecurity, with almost half of these schools equipped with clean and efficient cookstoves (CECs) for cooking the meals for 500 to 800 pupils at a time.

### C. Relevance to Higher Level Objectives

14. **The proposed project situates energy as a catalyst for human capital development** in rural areas with solar systems for health care centers and schools. PV systems and CECs present key opportunities for energy access in public facilities located in remote areas and often characterized by poor surrounding infrastructure and low energy demand. The need remains for the improved provision of basic energy services at health and education facilities.

15. **The proposed project is closely aligned with the SDGs and the World Bank's twin goals.** By providing financing for expanding electricity and clean cooking access in Burundi, one of the poorest and least-electrified countries in the world, the project represents a critical intervention for achieving SDG7 of ensuring access to affordable, reliable, sustainable, and modern energy for all. By improving households' livelihoods in rural areas including women, which are home to a disproportionate share of Burundi's poorest and most vulnerable, the supported intervention contributes to the World Bank's twin goals of eliminating extreme poverty and boosting shared prosperity.

16. **The proposed project directly enables GoB's strategy to support economic and human capital development as identified in the World Bank Group's FY2019 - 2023 Country Partnership Framework (CPF) for Burundi.**<sup>18</sup> The project is fully aligned with the first objective of the PND to ensure "sustainable and inclusive growth for economic resilience and sustainable development", under the second pillar that seeks to promote alternative sources of energy. It contributes to Specific Objective 2.2 of improvement of the biomass use to safeguard environment that the energy sector has been tasked with under the national plan for development PND 2018 - 2027. The project is also fully consistent with the World Bank Group's FY2019 -2023 CPF for Burundi. The CPF has two focus areas: first, improving human capital and promoting social inclusions, and second, strengthening foundations for economic and social resilience. In support of the second focus, the World Bank Group identified the following objective related to the power sector: Increasing access to energy for poor families (Objective 2.2). Furthermore, the CPF recognizes that making gains in the energy sector is critical for growth and livelihoods, and particularly for improving services and opportunities in rural areas. The CPF has set targets to increase electricity generation capacity from 86 MW to 105 MW and increase the number of community social centers provided with access to electricity through off-grid systems from 0 to 1,080 schools and 150 clinics in 2023. The proposed project

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*Ministère de l'Hydraulique, de l'Énergie et des Mines* (Ministry of Hydraulic, Energy and Mines, MINHEM) in the development of a complete, functioning regulatory framework for renewable energy procurement (ongoing); and (c) preparation of a financial recovery plan for REGIDESO using support from the Energy Sector Management Assistance Program (ESMAP).

<sup>17</sup> Co-financed and led by the Ministry of Education and managed by the WFP.

<sup>18</sup> Burundi CPF. Report No. 122878-BI.



would contribute to achieving both targets by (a) increasing renewable energy generation capacity in the country, through the development of mini-grids; and (b) scaling up off-grid renewable energy solutions in rural areas.

17. **The proposed project, by creating the enabling environment for private sector participation in off-grid service delivery in a fragile context, is consistent with Maximizing Finance for Development (MFD) agenda and has the potential for tremendous impact.** As the first off-grid access project in Burundi, the proposed project would support the establishment of an enabling framework to create the conditions for private sector to play a key role in the off-grid energy sector as it does in the rest of the region. In parallel, it would pilot grant mechanisms to de-risk private sector participation in rural energy service provision in a fragile context, for the accelerated dissemination of modern energy products and construction of energy infrastructure, namely mini-grids and PV systems. Under the right conditions, private sector participation would be a game changer, unlocking the tremendous potential to significantly scale up off-grid energy service provision in Burundi and, within the duration of the project, provide as many people with access to electricity as have ever been connected to the central grid by REGIDESO almost doubling the access rate in the country.

## II. PROJECT DESCRIPTION

### A. Project Development Objective

#### PDO Statement

18. The Project Development Objective (PDO) is to expand access to energy services for households, enterprises, schools and health centers in rural areas of Burundi.

#### PDO Level Indicators

19. The PDO level indicators are as follows (section VI presents the complete Results Framework):

- People provided with new or improved electricity service (Core Results Indicator, Number)
- Health centers and schools provided with new or improved electricity services (Number)
- Households provided with clean and efficient cookstoves (Number)
- Schools provided with clean and efficient cookstoves (Number)

### B. Project Components

20. **The proposed Solar Energy in Local Communities Project (SOLEIL), also known as NYAKIRIZA by local Burundians, is designed to provide energy services to promote human capital development, enhance productivity of rural enterprises, and reach poor and vulnerable populations, including women.**

21. **The proposed project harnesses solar power to deliver energy services and simultaneously diversifies the energy mix in a country currently dominated by hydropower,** thereby strengthening energy security and contributing to a decrease in CO<sub>2</sub> emissions (by using solar power to replace use of kerosene or reduce use of gensets). The proposed project will leverage the recent advances in the solar market to expand access in Burundi; advances include: (a) dramatic technology innovations that have led to equally dramatic cost reductions in renewable energy (particularly solar PV) and energy storage technologies, significantly reducing the costs of serving remote customers through mini-grids; (b) recent innovations in today's standalone solar systems resulting in more service for less money, more product offerings meeting quality standards (owing to the impressive efforts of Lighting Africa), and new business models such as pay-as-you-go that lower the upfront barrier of acquiring the systems; and (c) parallel technology innovation in smart grids and smart



metering technologies that created a space for new business models that (i) significantly reduce operation and maintenance (O&M) costs; (ii) provide opportunities for smart energy efficiency measures and improved balancing of demand and supply; and (iii) have additional positive impacts on service quality for end users.<sup>19</sup>

22. **The project would leverage ongoing programs in education and health to deliver energy services to such facilities.** Public energy programs have been financed by a few development partners over the past couple of years that led to a total of approximately 120 electrified health centers and up to 50 electrified schools, and approximately 400 primary schools were provided with CECs. The Government's performance-based fund (PBF) mechanism supporting health centers throughout the country will be used to guarantee viability of energy systems in those facilities beyond project life, while the project will build on the National Canteen Program to provide CECs to those schools in the program.

23. **Project design is underpinned by comprehensive, data-driven analytics.** With ESMAP support, Burundi is developing a least-cost geospatial plan, off-grid market assessment, public facilities needs inventory, an energy access survey and a clean cooking assessment. These studies are informing project preparation and will strengthen implementation; they will also contribute to the preparation of the Government's off-grid strategy. The results of these studies can help strengthen governance and transparency; and establish a future basis for replication by constituting a useful set of data that can be used by other donors and the private sector to support off-grid interventions.

24. **The proposed project benefits a varied group of consumers by creating opportunities to improve the provision of community services, generate income and enhance productivity in rural areas, and improve consumer welfare.** Health and education facilities, households (including the poor and vulnerable and those headed by women), agriculture farms, and SMEs will receive enhanced access to energy services. The project will deploy PV-based mini-grids, utilizing recent trends in PV technology and business models that leverage private sector strengths and efficiencies in constructing, operating and maintaining these mini-grids. A geospatial analysis funded by ESMAP has already identified approximately 150 potential mini-grids for locations that are not expected to be connected to the national grid in the short term and mid-term, with the potential to provide electricity to 90,000 customers and at the same time creating economic opportunities and supporting electrification of public facilities in those communities. The project will also deploy standalone solar systems and CECs for the improvement in welfare. The market for stand-alone solar systems in Burundi is estimated to be around 2 million households.<sup>20</sup>

#### **Component 1: Energy Services for Schools and Health Service Centers (IDA US\$27 million equivalent)**

25. Under this component, the project will finance the design, installation, maintenance, and replacement of solar PV system components and institutional CECs in unelectrified schools and health facilities located in remote areas. The component will enhance the quality of health and education services to the rural parts of the population, with an estimated 6,300,000 beneficiaries annually once all targeted institutions have been equipped.

26. MINHEM will be responsible for the implementation of this component, in particular: (a) developing standards for the provision of energy service solutions; (b) managing the procurement process for the supply and installation of systems through the Project Coordination Unit (PCU); (c) providing and supervising solar system maintenance and parts replacement during the life of the project while preparing mechanisms to sustain it post project; (d) independently

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<sup>19</sup> Not accounting for the tier of service provided, SOLEIL has the potential to deliver electricity access to households using off-grid solar technology at lower costs (approximately US\$1,075 per household) than what is required by grid extension (approx. US\$1,075 per household), which is roughly 40 percent more expensive.

<sup>20</sup> Based on the following assumptions: 88 percent of population living in rural areas; 1.8 percent electrification rate; 4.8 people per household.



verifying service provision to these community facilities; and (e) developing and preparing training for maintenance technicians as well as curricula to create a future local workforce and ensure women technicians in the solar sector (as part of technical assistance [TA] offered under Component 4).

27. To ensure the sustainable provision of energy services, the component places major emphasis on maintenance and replacement (M&R) of equipment. Using project funds, MINHEM will provide overall supervision of maintenance and specifically (a) provide regular payments for M&R to the schools and health centers; (b) provide basic stock of equipment for maintenance and initial stock for replacement at the maintenance centers; and (c) train and contribute technicians to district maintenance centers. The technicians will provide preventive maintenance as needed and curative maintenance for all systems. Through further TA under Component 4, the project would also help establish a sustainable mechanism for financing maintenance capacity beyond the project duration, such as through a budgetary line to be established by the ministry or through the operationalization of the rural electrification fund.

28. Energy service provision for health facilities and schools requires cross-sectoral, multi-stakeholder collaboration that will be key to long-term success. The MINHEM has established and will continue to lead a close collaboration with the Ministries of Education and Health. Government representatives from health and education are already members of the Project Focal Group, established during project preparation and to be converted into the Project Technical Committee during implementation. During implementation, representatives and experts from health and education will also be an essential part of the Steering Committee and the PCU.

***Sub-component 1.1: Energy Services for Schools (IDA US\$9 million)***

29. This sub-component will finance the installation and maintenance of institutional stoves for roughly 400 primary schools that provide free lunch to students but have not yet received institutional stoves. It will also finance the installation and maintenance of solar systems, testing at scale the beneficial effects of providing basic solar systems to the same schools. This sub-component will target primary schools (*Ecoles fondamentales*) that benefit from the *Programme National des Cantines Scolaires* and are located in vulnerable and remote rural areas in the country.

30. The institutional stoves will be built in a separate self-enclosed room and are expected to provide efficient cooking and, depending on the fuel used, reduce fuel consumption by 40 to 60 percent against the traditional three stone stove baseline. It is expected that solar systems would provide basic electrical services (targeted lighting, telephone charging, possible use of television, and so on.), and, in select schools that are central in academic networking ('reseautage'), the systems would support additional tasks such as photocopying and audiovisual activities. The sizing of systems will be further informed by the ongoing ESMAP-funded Needs Assessment, which should be finalized in April 2020.

31. This subcomponent will also finance (a) technical assistance to enhance access to alternative fuel sources, such as briquettes, for schools in areas of severe wood scarcity; (b) the development and piloting of related energy services to the nearby communities, including solar libraries to enable students to borrow individual solar systems to work in evening hours and improve academic success; and (c) a similar 'borrow a new stove and try it at home' initiative targeting parents of school children. These efforts will raise consumer awareness of the benefits of solar products in the schools' broader community, complementing the consumer awareness program rolled out under Component 4, and are especially important for the development of a market for such solutions in rural areas as envisaged under Component 3.

32. MINHEM, through the PCU, will competitively select the private sector to supply and install solar systems. For the CEC installation in schools, given that it differs from MINHEM's focus on the delivery of solar systems, the PCU will contract under output agreement a United Nations (UN) agency, which is already providing food and stoves for the Government



under the *Programme National des Cantines Scolaires*. The agency will also be contracted to provide capacity building for the PCU to ensure that future activities will eventually be managed and fully implemented by the PCU, in close collaboration with the Education Ministry.

33. MINHEM will support the maintenance of stoves and solar systems through provision of maintenance grants (regular payments for M&R) to the schools. MINHEM will also supervise the maintenance of solar equipment and deploy technicians to be collocated in district maintenance centers. Technicians will provide both preventive and curative maintenance for systems installed in schools.

34. Final selection of schools and the prioritization for the rollout of activities will be facilitated by the PCU in coordination with the Project Technical Committee, and the Steering Committee based on transparent criteria described in the Project Implementation Manual (PIM) and agreed upon before activity rollout.

***Sub-component 1.2: Energy Services for Health Centers (IDA US\$18 million)***

35. This subcomponent will finance for roughly 400 health centers (a) the supply and installation of solar PV systems and (b) the maintenance and initial parts replacement of these systems. It will focus on public health centers (*Centre de Santé*, CDS), of which less than one-third (of the more than 1,000) are currently being electrified in the country.

36. It is expected that the solar PV systems will provide electricity for a range of services, including (a) lighting in maternity ward, main buildings and residences; (b) refrigeration; and (c) operation of medical and office equipment such as microscopes, electric sterilizers, computers and photocopiers. However, the exact sizing and prioritization of uses of the solar PV system will be established collaboratively between MINHEM and the sectoral ministry and informed by the outcome of the ongoing ESMAP-funded Needs Assessment, which should be finalized in April 2020.

37. MINHEM, in collaboration with the Ministry of Health, will competitively select the private sector to supply and install solar systems. MINHEM will also support the maintenance of the solar PV systems through provision of maintenance grants (regular payments for M&R) to the health centers and deploying of MINHEM technicians to district maintenance centers. Technicians will provide overall maintenance supervision and deliver curative maintenance and spare parts replacement.

38. As part of TA provided under Component 4, MINHEM will explore the opportunity to leverage the Government PBF<sup>21</sup> as an alternative mechanism to deliver the maintenance grants to health centers, especially beyond the life of the project. A key activity will be to define and integrate into the PBF technical standards and maintenance requirements for solar systems.

39. Health centers served by this subcomponent must be public and a part of the existing PBF program; final selection of CDS and the prioritization for the rollout of activities will be facilitated by the PCU in coordination with the Project Technical Committee and the Steering Committee based on transparent criteria described in the PIM and agreed upon

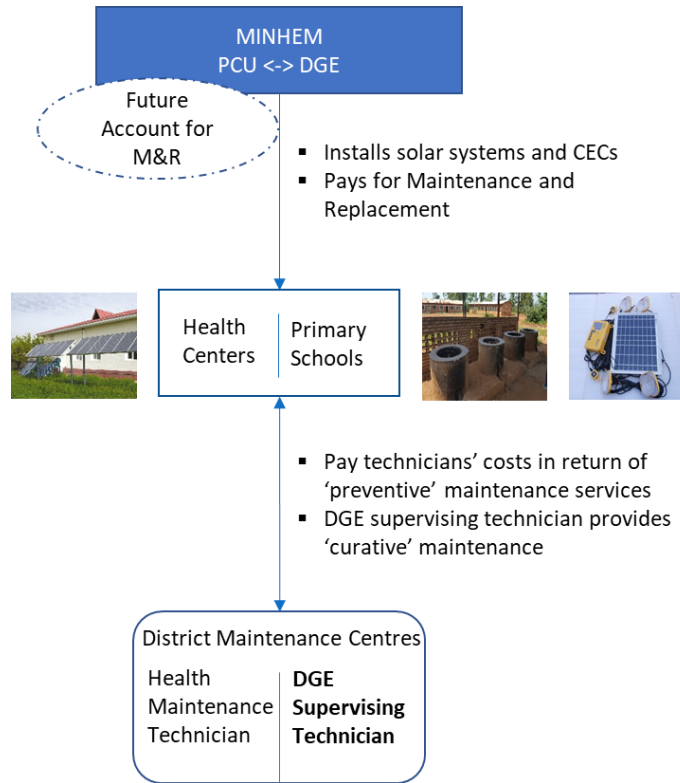
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<sup>21</sup> Created in 2010, the PBF supports provision of health care services in 701 health centers and 57 hospitals over the country. Under the PBF, facilities are paid based on their performance of delivering basic health care services to pregnant women and children under the age of five years. Other design elements of the PBF include regular and complete remote monitoring and evaluation (M&E), strong verification of the accuracy of the reported levels of services, a three-tier audit process, a database, and annual budgeting and maintenance plans ([www.fbpsanteburundi.bi/](http://www.fbpsanteburundi.bi/)). The combined program is financed by different actors, but the largest contributors are (i) the GoB, offering 51 percent through its national budget; (ii) the EU, through ENABEL and German State-owned Development Bank (*Kreditanstalt für Wiederaufbau*, KfW); and (iii) IDA, through an ongoing World Bank-funded Health System Support project (KIRA, US\$50 million grant, P156012).



before activity rollout.<sup>22</sup>

*Figure 3. Component 1 Implementation Arrangements*



Source: World Bank.

**Component 2: Energy Services for Rural Communities (IDA US\$37 million equivalent)**

40. This component will fund the deployment of several mini-grids using business models that leverage the private sector in areas where electricity supply through mini-grids represents the least-cost option from a country perspective, as underpinned by geospatial and socioeconomic analyses. Mini-grids contribute to leveraging productive activities (especially agriculture/artisanal production and so on) in areas that will not be reached by the grid in the medium to long term, offering a viable opportunity for income generation and economic development. This component seeks to kick-start the development of a private sector-led mini-grid market in Burundi, and more specifically (a) demonstrate viable business models for service delivery; (b) improve availability of mini-grid market information, thereby attracting private sector participants; (c) offer technical support for due diligence and project implementation; and (d) as part of Component 4, create customer awareness about different tiers of service offered by mini-grids. The proposed approach leverages the skills of the private sector, while ensuring that the goals of expanding access to reliable and affordable service are guaranteed, under the leadership of the Government.

41. Through the project, the Government aims to extend access to a significant number of Burundian households, which requires the development and operation of mini-grids on a much larger scale than today. Up to 45 mini-grid sites

<sup>22</sup> Preliminary criteria include (a) CDS that provide the best quality health services under the PBF (grading under PBF); (b) CDS who can contribute to capital expenditures (CAPEX); (c) CDS is with a district hospital that has or is planned to be equipped with a district maintenance workshop and staffing; and (d) CDS with no plan to be connected to the grid or mini-grid in the next five to 10 years.





will be selected by MINHEM, General Director for Energy (*Direction Generale de l'Energie*, DGE) and ABER from a long-list of approximately 150 potential sites (identified in an ESMAP-funded study based on geographic information system [GIS analysis]<sup>23</sup>) based on transparent selection criteria. Care will be taken to select sites throughout the country with significant potential for economic development, income-generating activities, and job creation. More specifically, the selection of sites<sup>24</sup> to be financed under the project will be based on criteria such as the following:

- a. **Distance to the grid.** Sites that are located at least 5 km from the existing electricity supply network to reduce the risk of unscheduled grid extension activities interfering in the mini-grid project development process;
- b. **Public facilities.** Sites with health and education facilities will be targeted to ensure maximum positive impact and spill over to the community, including beyond the immediate area served by the grid. The maximum distance of the power station to health centers and schools must be 1 km;
- c. **Number of connections.** Sites that provide a sufficient number of high potential electricity customers (commercial users, medium to high income households) to create a critical mass of electricity consumption required for economically viable operation. The minimum number of potential customers per site is 150;
- d. **Productive uses.** Sites that provide potential to unlock productive and commercial activities through access to electricity and additional investments, and presence of economic activity at the village level (for example, provision shops, refrigeration centres, bars/restaurants, mills and agro-processing).

42. The mini-grids will service all households, schools and health facilities in the specified service area. Commercial customers (SMEs) and other anchor loads (such as agricultural post-harvesting centers) will be encouraged to connect as well. Based on preliminary analysis, it is expected that roughly 31,000 customers - including households, SMEs, schools, and health facilities will benefit from mini-grids developed within this component.

43. The mini-grid sites will be supplied through solar hybrid systems, that is, solar generation with battery<sup>25</sup> storage and diesel backup. The mini-grids will be built to standards specified by AREEN (Burundi's grid code standard to allow for integration to the main grid in the future is forthcoming and under preparation). Prepaid metering and smart meter systems will be required to mitigate revenue collection risk and enhance the bankability of the mini-grid subprojects.

44. While the number of customers at potential sites ranges from 150 to 4,500, the average number of customers per site is 650. Based on available data for existing projects in East Africa and findings from the recent ESMAP report 'Mini-Grids for Half a Billion People', preliminary Homer simulations were prepared to estimate system sizes and the costs for mini-grids. It is expected that the average capital cost for a solar hybrid mini-grid system is approximately US\$2,200 per kWp and the cost per customer is US\$1,200. Therefore, the average cost for a 430 kW hybrid mini-grid system (350 kWp solar PV plus 80 kVA diesel genset) to power a site of 650 customers is estimated at US\$780,000. This is comparable to mini-grid costs in the East-African Region (namely the Democratic Republic of Congo, Kenya, Uganda and Tanzania) which range from US\$2,100 to US\$2,700 per kW.<sup>26</sup>

45. The operational model to be applied considers the prevailing conditions in Burundi, international best practices

<sup>23</sup> This ESMAP-funded GIS study aggregates high-density populations to accurately locate villages and settlements of populations beyond the scope of the national grid network. It also aggregated various datasets, geotagged all building structures in the country, and categorized buildings to provide insight on activities near potential mini-grid sites of interest. Potential sites range in size from 150 to 4,600 customers.

<sup>24</sup> Site selection criteria were defined by the GoB, through the focal group, during project preparation and will be included in the PIM.

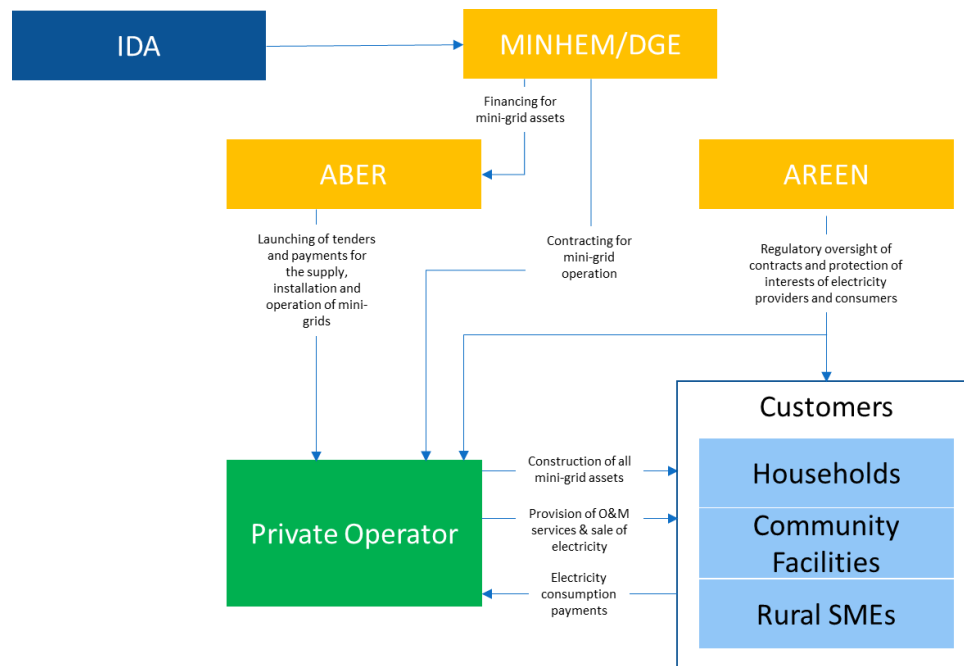
<sup>25</sup> This approach is consistent with World Bank's recent initiative to promote battery storage.

<sup>26</sup> ESMAP. 2019. *Mini Grids for Half a Billion People : Market Outlook and Handbook for Decision Makers*. ESMAP Technical Report;014/19. World Bank, Washington, DC. <https://openknowledge.worldbank.org/handle/10986/31926>



(in Nigeria, Senegal and Tanzania) and the choice expressed by the Government. Through the project, the Government aims to extend access to a significant number of Burundian households, which requires the development and operation of mini-grids on a much larger scale than today. The proposed approach leverages the skills of the private sector, while ensuring that the goals of expanding access to reliable and affordable service are guaranteed, under the control of the Government. The private sector has experience in client-based management, seeking cost optimization to ensure profit, for which customer satisfaction is paramount, and access to diversified sources of funds. In line with the Law on the Reorganization of the Electricity Sector in Burundi, the project will apply PPPs for the implementation of the mini-grids.

Figure 4. Flow of Funds and Institutional Responsibilities for Component 2



Source: World Bank.

46. Under the proposed approach, the private sector will develop mini-grids to deliver electricity services on a build-own-operate basis. Through a competitive procurement process, a minimum subsidy tender, ABER will award to a single bidder the responsibility of the supply, installation, and O&M of all mini-grid components (generation and distribution network) in a single lot.<sup>27</sup> The selected mini-grid operators, using SOLEIL funds, will construct/install the generation facilities, distribution network and service connections; subsequently the operator will operate and maintain those assets over a renewable 10 - 15-year period, providing O&M and retail services to its customers.

47. The sites will be divided into three lots (geographically contiguous areas)<sup>28</sup> to encourage economies of scale in procurement and efficiency in O&M. By increasing the deal size, this project aims to attract international private developers to enter the mini-grid market in Burundi and collaborate closely with local companies. The lots will be tendered successively so that learning from the first tender can be incorporated into subsequent tenders. For each lot, bidders will

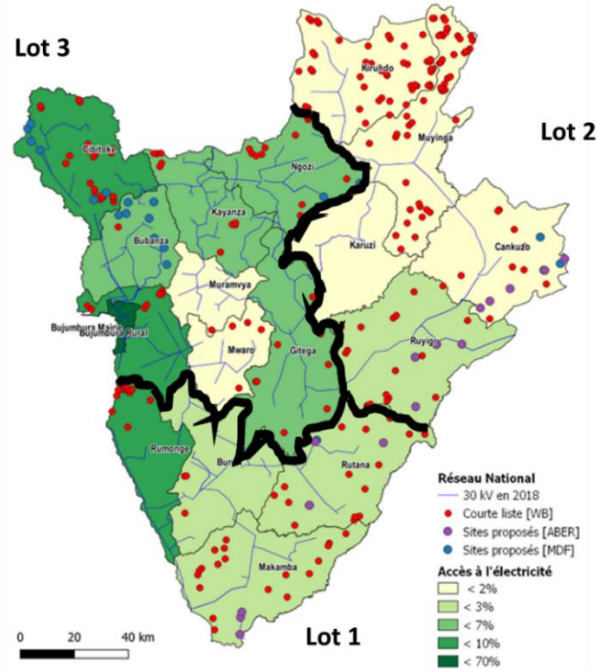
<sup>27</sup> For the awarded bidder, a single contract may be established or two separate contracts, one for supply and construction, the other for operation and maintenance.

<sup>28</sup> The 17 provinces will be divided into 3 lots of roughly equal size. The size depends on the comparable number of connections and the economic attractiveness.



compete to demand the lowest amount of subsidy to build, own and operate a portfolio of mini grids. This enables private investment where viable and the potential to develop even more than 45 mini-grids<sup>29</sup>. For areas that private developers consider too risky, the MINHEM is considering fully public-financed approaches, with private sector participation in constructing and operating the mini-grids under Engineering, Procurement and Construction (EPC) and O&M contracts. This could be incorporated as a separate tender under this component depending on the uptake of the initial tender and private sector interest to enter these areas; this will be assessed during the first year of the project.<sup>30</sup>

**Figure 5. Potential Mini-grid Sites and Potential Creation of Lots for Mini-grid Tenders**



Source: World Bank.

48. ABER will manage land acquisition of sites until finalization of tendering process and, with the support of a transaction adviser, will prepare the mini-grid contracts for each lot and conduct the tendering process. MINHEM will review results and sign the contracts with the operators. ABER will supervise all components of the contracts. AREEN will be responsible for issuing licenses to the operators, setting tariffs based on annual revenue requirements, and, once construction is complete and technical standards are verified, monitoring quality of service provided by the mini-grids.

49. This component will be complemented by extensive TA under Component 4 to (a) confirm the sites through further feasibility studies and techno-economic analysis; (b) promote productive and efficient use of energy by users; (c) provide technical, legal, and procurement support to effectively design the bidding documents and supervise the construction of the mini-grid assets; (d) increase capacity of local mini-grid developers; and (e) strengthen legal and

<sup>29</sup> If mini-grid assets are fully funded through the project, up to 45 mini-grid sites can be developed. If private investment is realized, more than 45 sites may be developed.

<sup>30</sup> In the unlikely event that there is no interest at all in participating in the mini-grid tender even as EPC and O&M contractors, a stronger focus would be placed on extending ABER's current mandate from rural electrification facilitator (as currently envisaged) to mini-grid implementation and operation authority. This would require extremely high efforts for capacity development activities, shifting significant resources of the project from mini-grid equipment financing to TA for ABER. As a result, a smaller number of mini-grid would be implemented compared to the current private sector-based approach.



regulatory framework for mini-grid deployment in Burundi, which is critical for the long-term sustainability of the project and other mini-grid projects.

**Box 1. Private Sector Involvement in Mini-grid Deployment Models in the Region**

Similar mini-grid deployment models have attracted the interest of the private sector and proven successful in similar countries in the region. Sierra Leone and Togo in West Africa show comparable conditions to Burundi in terms of total population (Sierra Leone 6.3 million and Togo 8.2 million, compared to Burundi 11.8 million), population without electricity (Sierra Leone 6 million, Togo 5 million, compared to Burundi 10 million), population below poverty line (Sierra Leone 64.6 percent, Togo 70.2 percent, compared to Burundi 64.6 percent) and GDP (Sierra Leone US\$3.61 billion and Togo US\$4.76 billion, compared to Burundi US\$3.39 billion) as well as other aspects, such as limited capacities of the public sector.<sup>31</sup>

In Sierra Leone, the United Kingdom Department for International Development (DFID) has provided approximately US\$40 million for the implementation of a country wide mini-grid project covering the development of specific mini-grid regulations, comprehensive TA to the public and private sectors, and the implementation of 90+ solar hybrid mini-grids between 2016 and 2021. The business model for the operation of the mini-grids is based on a PPP including significant co-investment from the private sector. Initially, DFID questioned the likelihood of sufficient private sector interest in co-investment and long-term operation of mini-grids in Sierra Leone. During the international bidding process a large number of international mini-grid companies and local enterprises showed strong interest, and at the end of the process three experienced mini-grid companies signed long-term PPP agreements with the Government, committing large amounts of private capital as co-financing for the 90+ mini-grids. Today, roughly 50 percent of the sites are already in operation.

In Togo, the International Finance Corporation (IFC) supported the Government in developing the National Electrification Strategy (NES), based upon which an international bidding process is currently being established. With a loan from the West African Development Bank (WADB) of approximately US\$35 million, possibly in combination with a performance-based grant from the AfDB, more than 100 villages shall receive electricity through solar mini-grids between 2020 and 2023. The operation of the mini-grids, and potentially some co-investment, is foreseen to be provided by private mini-grid companies. Following a recent call for expression of interest, 35 companies submitted expressions of interest.

Based on these experiences, it is expected that the SOLEIL project will interest international mini-grid companies in similar ways (which was confirmed recently during initial discussions with representatives of the private mini-grid sector in Africa), provided that the project, in close collaboration with the GoB, succeeds in creating an enabling environment (development of regulatory framework and provision of comprehensive TA package) that meets the expectations of the private sector.

**Component 3: Energy Services for Households (IDA US\$17 million equivalent)**

50. This component will finance a grant fund for the distribution of standalone solar products to roughly 65,000 households and CECs to roughly 300,000 households. This component aims to improve household access to modern energy and will (a) address constraints to accelerating growth of the isolated solar and CEC markets; (b) leverage mechanisms put in place to mitigate the lack of access to foreign currency hindering private sector growth and access to finance for households and businesses; (c) improve affordability of solar products and cooking services; and (d) encourage productive use of electricity. The activity will target consumers nationwide, with the potential to reach each demographic in the country. Stove-related activities under this component will be complemented and further enhanced through additional (parallel) access to budget from the newly created ESMAP Clean Cooking Fund (CCF).<sup>32</sup>

<sup>31</sup> <https://www.cia.gov/library/publications/resources/the-world-factbook/>.

<sup>32</sup> The World Bank's US\$500 million (CCF) announced at the September 2019 Climate Summit Energy Transition Track in New York will help accelerate progress toward universal access to clean cooking by 2030 with initial contributions pledged by Denmark, Norway and the United Kingdom also their support under the ESMAP. The CCF will provide financial and technical support, primarily through results-based funding grants, to help countries incentivize the private sector to deliver modern cooking services.



51. In small, nascent, and risky markets such as Burundi, well designed grant mechanisms can play a catalytic role by de-risking the entry of experienced clean energy companies into the Burundian market; supporting the growth of young, local businesses, cooperatives, or non-governmental organizations (NGOs) who are not yet ready to take on debt or investment, and encouraging businesses in related sectors (such as telecoms, microfinance institutions (MFIs), and agribusinesses) to pilot new business models. By taking the early risk and proving the market, the project will help attract additional finance to address the working capital and foreign exchange (FOREX) needs of the private sector. In addition to providing grants for the private sector, TA under Component 4 will establish the bases for the creation of a market for solar systems and CECs. Such support from SOLEIL will ensure companies are ripe to leverage options for commercial financing in the region emerging in parallel, such as the Regional Infrastructure Financing Facility, which would be supported through an IDA-financed project under preparation (P171967).

52. Distribution of standalone solar products and CECs will be encouraged by providing to the private sector (including NGOs, cooperatives, etc.) a variety of grant mechanisms that stimulate and accelerate the growth of clean energy market. This includes the following:

- a. Subgrants for start-up companies with viable, scalable, and sustainable business models to initiate their operations in Burundi and pilot new approaches.
- b. Subgrants for early stage growth of clean energy businesses. These grants will be partially results-based and disbursed based on pre-determined business plan milestones.
- c. Results-based financing (RBF) grants for quality verified solar and cookstove products to support the penetration of high-quality products in the Burundian market and build customer confidence in these products. These grants will be provided against verified sales/installations of quality-certified products.

53. The component will target all areas of the country but will prioritize awarding grants to companies operating in (a) areas where other project components are implemented, such as those surrounding the public institutions identified in Component 1 or the mini-grids of Component 2, to maximize the impacts across components; or (b) areas where other World Bank projects are being implemented, such as the Burundi Integrated Community Development Project (P169315).

54. The component will also target the awarding of start-up grants to foster enhanced female entrepreneurship through the allocation of 20 percent earmarked funding. SDG7 ensuring access to affordable, reliable, sustainable and modern energy for all is tremendously important as energy deficiency is one of the principal barriers to human capital development, particularly for women and children. Generally, women and girls do most of the cooking and, therefore, are disproportionately affected by household air pollution caused by the inefficient burning of solid biomass cooking fuels. They are also often required to spend a significant amount of time and effort collecting the traditionally used biomass fuels, a physically draining task that can take 20 or more hours per week and can expose women and girls to risk of sexual harassment and sexual violence when seeking fuel in unsafe and isolated areas. These trends are even more severe for poor and vulnerable households. On the other hand, households with even basic electricity may benefit from longer hours of productivity in the home and more study hours for children. Households using CECs have been shown in some contexts to save significant amounts of time and use less fuel than those using traditional stoves. In one study, women who saved time reported spending more time to increase involvement in social and family activities, including spending time with children. However, modern energy solutions are, for various reasons, often not accessible to the poorest segments of the population.

55. The component will consider helping poor or vulnerable households acquire solar lanterns or home systems/kits and CECs by offering the private sector differentiated levels of RBF grants based on affordability analysis. To that end, under Component 4, SOLEIL will also tailor campaigns and training to vulnerable groups (in particular women, but this

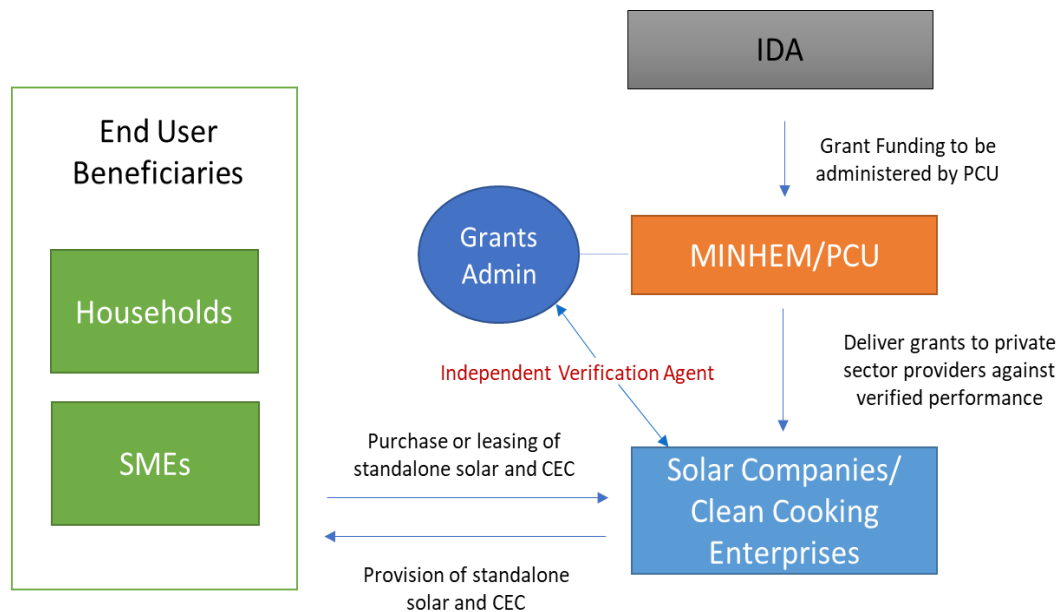


could include other groups identified as vulnerable) to raise community awareness on clean energy products and the subsidies program.

56. It should be noted that, while the grant mechanisms are shared between solar and CECs, these are different technologies, serving different needs, triggering different consumer preferences and behaviors. Therefore, the calls for proposals, processing, requirements, grant levels, and target audiences will be differentiated between solar and CECs. Similarly, the mechanisms to determine RBF technical eligibility, incentive levels, and payment schedules will be defined separately, just as it will be for the consumer awareness and behavior campaigns. It is expected that the CEC activities will begin with locally produced lower tier stoves, angling later for higher tier stoves likely to be imported. A specific effort will be made to seek and support players interested in carrying both solar and CEC equipment as complementary products that can address the needs of a household at different times.

57. To complement this component and as part of technical assistance under Component 4, the project will also finance the services of a firm with a proven track record as an independent verification agency (IVA). The IVA will be tasked with ensuring that solar and CEC distributors meet their obligations to customers. Component 3 will be complemented by extensive TA under Component 4 that aims to (a) address the lack of local experts to fill management and key technical positions; (b) address the limited awareness among both the public and policy makers of the importance of quality in solar products and CECs; (c) educate local banks and MFIs on the sector and potential for investment; and (d) facilitate regulatory improvements that would stimulate and support market growth, such as reducing the value-added tax (VAT) charges for solar or imported stove products. The World Bank will continue exchanges with the EU, German Agency for International Cooperation (*Deutsche Gesellschaft für Internationale Zusammenarbeit, GIZ*), *Stichting Nederlandse Vrijwilligers* Development Organization, UN organizations, and other players engaged in the household energy sector to ensure that TA supported in this activity is complementary to their respective interventions.

Figure 6. Component 3 Implementation Arrangements



Source: World Bank.



**Component 4: Technical Assistance, Capacity Building and Project Implementation Support (IDA US\$19 million equivalent)**

58. Given the tender and early stage of energy service provision using solar and clean cooking technologies, considerable TA and capacity development is needed. This component will assist public and private sector stakeholders - Ministry of Energy, ABER, AREEN, REGIDESO, Ministries of Health and Education as partnering entities, off-grid companies, MFIs and so on in building technical expertise and operational capacity, and devise enabling policies and regulatory frameworks to expand off-grid access. It will provide a broad range of technical and financial support in access planning, market development, implementation support, and capacity-building activities.

***Sub-component 4.1: Access Strategy and Planning (IDA US\$1.5 million)***

59. This subcomponent will strengthen the capacity of the sector stakeholders for comprehensive sector planning for universal energy access. In particular, this subcomponent will finance the preparation of an NES and a National Electrification Plan, along with tools, training, and the development of a geospatial platform to inform future investment decisions in grid extension and the localized promotion of mini-grids and stand-alone solar systems to advance electrification in Burundi, and will also support the establishment of a National Electricity Access Planning and Program Coordination Unit within MINHEM, whose mandate will be to provide effective centralized coordination and oversight in terms of policy development, strategic planning, and project design and implementation. The subcomponent will also finance tools and consulting support to establish a nationwide energy database and planning platform and build capacity in the coordination unit for planning and hosting and updating of a geospatial platform. The NES should define the institutional, technical and, financial pillars guiding the achievement of universal energy access in Burundi, and specifically recommend mechanisms for the Planning and Program Coordination Unit to ensure the sustainable maintenance of off-grid solar equipment in the country. Options for the financing of maintenance, such as the establishment of a budgetary line at MINHEM or the operationalization of the rural electrification fund created under the Electricity Law, will be assessed.

***Sub-component 4.2: Market Development Support (IDA US\$4.5 million)***

60. This subcomponent will support a suite of activities to strengthen the market for off-grid energy solutions, including the following:

- a. **Developing local capacity for installing and maintaining solar systems and CECs**, including the development of curricula and provision of training for local technicians and users as well as strengthening and establishing district maintenance centers. The training program will build on the experience of ENABEL as well as the ongoing Burundi Youth Skills and Employability Project (P164416), which provides vocational training on solar to both male and female youth. The program will focus on ensuring women technicians are trained as part of the future energy workforce. This subcomponent will also provide TA to help establish a sustainable mechanism for financing maintenance capacity beyond project duration.
- b. **Strengthening the enabling environment for off-grid energy service provision.** According to 2018 Regulatory Indicators for Sustainable Energy (RISE), Burundi scored 38 out of 100 (with 100 being the best) in the area of electricity access.
  - On mini-grids, the RISE score was 47 out of 100, indicating progress but also the need to strengthen the existing regulatory framework. Therefore, the project will specifically fund TA to clarify what will occur when the interconnected grid reaches a mini-grid, establish quality standards for mini-grids, and recommend how Burundi can strengthen the financial incentives for private operators. Given the



prominence of ABER's role in mini-grid deployment, the project will also support the preparation of its business plan.

- On stand-alone systems, the RISE score was 33 out of 100. The project will support the establishment of minimum products standards and quality assurance for stand-alone solar and CECs, and similarly identify options to strengthen financial incentives for private operators.

c. **Empowering and educating sector players**, namely;

- Development of marketing campaigns to promote quality-verified products;
- Education of commercial banks, MFIs and other financing entities on investment opportunities in the solar sector; and
- Organization of matchmaking events between local solar companies and quality-verified solar manufacturers.

***Sub-component 4.3: Consumer Awareness and Citizen Engagement, Women's Employment and Female Entrepreneurship (IDA US\$4.0 million)***

61. Consumer awareness and citizens engagement activities will be carried out in close coordination with off-grid solar and cooking distributors to ensure that sensitization occurs only in regions where high-quality products are available in the market. Sensitization activities will include both above and below the line marketing activities, road shows, and matchmaking events that help both private companies and consumers understand the value of clean energy products and how to distinguish quality. These campaigns will leverage international best practices balanced with the specific needs of the Burundian market.

62. Through the gender action plan (being prepared with ESMAP funding), this activity will consider women as specific targets and seek collaboration with saving groups that are committed to improve financial inclusion, particularly in rural areas (see annex 6). Specifically, this subcomponent will do the following:

- a. Provide TA support focused on ensuring that the policy commitments on gender equality in the energy sector are strengthened and included in all key government policy and institutional documents.
- b. Establish formal interventions to foster and showcase female talent in the sector through for example leadership training and targeted mentorship programs.
- c. Establish a full scholarship program for women studying Science, Technology, Engineering and Mathematics (STEM) related degrees for 40 female candidates supported by the DGE for applicants who wish to join the energy work force after graduation.
- d. Map the preferences of the women's segment at the household and enterprise level (micro enterprise or farming and so on) to see what off-grid products they prefer and associated affordability constraints.

***Sub-component 4.4: Project Coordination, Implementation Support, Capacity Building and Sector Studies (IDA US\$9 million)***

63. This subcomponent will strengthen the capacity of the sector stakeholders for coordination, project management, and implementation. Activities will include the hiring of a dedicated project coordinator and additional fiduciary and environmental and social (E&S) support staff at the PCU, fiduciary and E&S consultants at ABER, and an experienced grants administrator to manage the grant program, and related capacity-building and training activities for all key staff in the PCU and ABER to support implementation of the project. The capacity building will among other things address mitigating



and managing social risks related to the labor influx (sexual exploitation, gender-based violence [GBV], and human trafficking).

64. To facilitate project implementation, this subcomponent will also fund (a) the preparation of feasibility studies and techno-economic analysis for deployment of mini-grids and expansion of access to solar systems and CECs; (b) transaction advisory services to effectively design the bidding documents for mini-grids; (c) supervision of the construction of the energy assets; and (d) independent verification of results under components 1 and 3.

#### **Component 5: Contingent Emergency Response Component (IDA US\$0 million)**

65. A Contingent Emergency Response Component (CERC) with zero allocation may be used to partially cover emergency response through implementation of key activities by the appropriate agencies to respond to the emergency. The CERC could also be used to channel additional funds should they become available as a result of an eligible emergency. For the Burundi energy sector, emergency conditions may arise subsequent to droughts, flooding, or energy import shortage.

66. The CERC mechanism will be further defined in a CERC Operational Manual attached to the PIM, which will include triggers and conditions for the use of funds. This manual will clearly outline the triggers, eligible expenditures, and procedures for tapping into the CERC. Should the CERC be triggered, all expenditures will be made in accordance with paragraph 11 of the Investment Project Financing Policy and will be reviewed and accepted by the World Bank before any disbursement is made. In accordance with paragraphs 11 and 12 of the Investment Project Financing Policy, this component would provide immediate, rapidly disbursing support to finance goods (positive list agreed with the Government), works, and services needed for response, mitigation, and recovery and reconstruction. Operating costs that are eligible for financing would include the incremental expenses incurred for early recovery efforts arising from the impact of a major crisis.

#### **Project Costs**

67. The breakdown of project costs and financing by component is given in table 2 below. In addition, it is expected that the GoB will cover the costs of preparing and implementing<sup>33</sup> all required safeguards instruments during project implementation. These costs are estimated to be US\$2 million.

**Table 2. SOLEIL Costs Per Component (in US\$, millions)**

<b>Project Components</b>	<b>Total IDA Financing</b>
<b>Component 1: Energy Services for Schools and Health Service Centers</b>	<b>27.0</b>
<i>Subcomponent 1.1: Energy Services for Schools</i>	<i>9.0</i>
<i>Subcomponent 1.2: Energy Services for Health Centers</i>	<i>18.0</i>
<b>Component 2: Energy Services for Rural Communities</b>	<b>37.0</b>
<b>Component 3: Energy Services for Households</b>	<b>17.0</b>
<b>Component 4: Technical Assistance, Capacity Building and Project Implementation Support</b>	<b>19.0</b>
<i>Subcomponent 4.1: Access Strategy and Planning</i>	<i>1.5</i>
<i>Subcomponent 4.2: Market Development Support</i>	<i>4.5</i>

<sup>33</sup> This includes costs of compensation and resettlement assistance, implementation supervision, monitoring, training, consultations, disclosures, communication, and grievance redress mechanism (GRM) operating costs for each subproject.



Project Components	Total IDA Financing
<i>Subcomponent 4.3: Consumer Awareness and Citizen Engagement, Women’s Employment and Female Entrepreneurship</i>	4.0
<i>Subcomponent 4.4: Project Coordination, Implementation Support, Capacity Building and Sector Studies</i>	9.0
<b>Component 5: Contingent Emergency Response Component</b>	<b>0.0</b>
	<b>100.0</b>

68. Potential additional grant financing in the amount of US\$2.7 million from Japan’s Policy and Human Resource Development (PHRD) Fund is under consideration and, if approved, would likely support the deployment of additional mini-grids under Component 2.

**C. Project Beneficiaries**

69. The **project’s main beneficiaries are households, SMEs, schools and health centers that currently have extremely limited access to affordable and reliable energy sources and will gain access through the project.** In particular, direct project beneficiaries include 91,500 households, 4,320 small business, 535 schools and 445 health centers gaining access to electricity through mini-grids or standalone solar systems, as well as those 400 schools and 300,000 households gaining access to CECs. Project activities will enhance the quality of health and education services delivered in rural parts of the country, with an estimated 6,300,000 beneficiaries annually once all targeted institutions have been equipped.

70. Women play a significant and dominant role within household energy use. Generally, women and girls do most of the cooking and, therefore, are disproportionately affected by household air pollution caused by the inefficient burning of solid biomass cooking fuels. They are also often required to spend a significant amount of time and effort collecting the traditionally used biomass fuels, a physically draining task that can take 20 or more hours per week and can expose women and girls to risk of sexual harassment and sexual violence when seeking fuel in unsafe and isolated areas. The project aims to provide CECs to 300,000 households and will therefore have remarkable impacts on households’ health and well-being and will substantially free women and girls’ time from firewood and charcoal collection. According to the WFP in Burundi, largely 96 percent of energy requirements are met through traditional biomass of which 70 percent is the usage of wood fuel, with substantial impacts on girls’ education and safety.

71. In addition, improved energy access for health facilities plays a significant role in the lives of women and children as, according to United Nations Foundation and Sustainable Energy for All,<sup>34</sup> it supports core operations, including Medical Services and Lighting, Disease Treatment and Prevention, Maternal Care and Obstetrics Services. The project would electrify 445 clinics in rural areas.

**Youth**

72. To develop an effective education system, in accordance with national needs and international standards, it is important to increase resources, equipment, and additional basic service provision (electricity, water and food) channeled to the schools to deliver quality education. The project would provide electricity and CECs to 535 schools in the country with the following potential impacts:

- i. Better lighting in public spaces such as schools will also increase safety and security for students especially young

<sup>34</sup> United Nations Foundation and SEforALL, 2019. Lasting Impact, Sustainable Off-Grid Solar Delivery Models to Power Health and Education.



girls and will improve girls' access to education and more broadly improve potential for youth employment.

- ii. Currently, youths of 15 - 24 make up 18 percent of the Burundian population of about 11 million and account for the majority of entrants into the labor market. As stated in the National Youth Policy 2016 - 2026, rural youth barely have any productive land to cultivate, while only a small number of urban youths have access to employment. Therefore, education will help youth transition to non-agricultural jobs.

#### ***Vulnerable and Indigenous Populations***

73. Special attention will be paid to poor and vulnerable households through the promotion of solar kits and CECs to households of all demographics and in all areas of the country, including for example the poorest households or those households in and around refugee camps. The indigenous Twa (the Batwa) - 1 percent of the Burundian population will also benefit from energy access with better education outcomes and increased economic opportunities, occasion for cultural rituals and ceremonies, and household needs. Special provisions will be added and consulted upon to favor the Batwa's access to the project benefits.

#### ***Rural Communities***

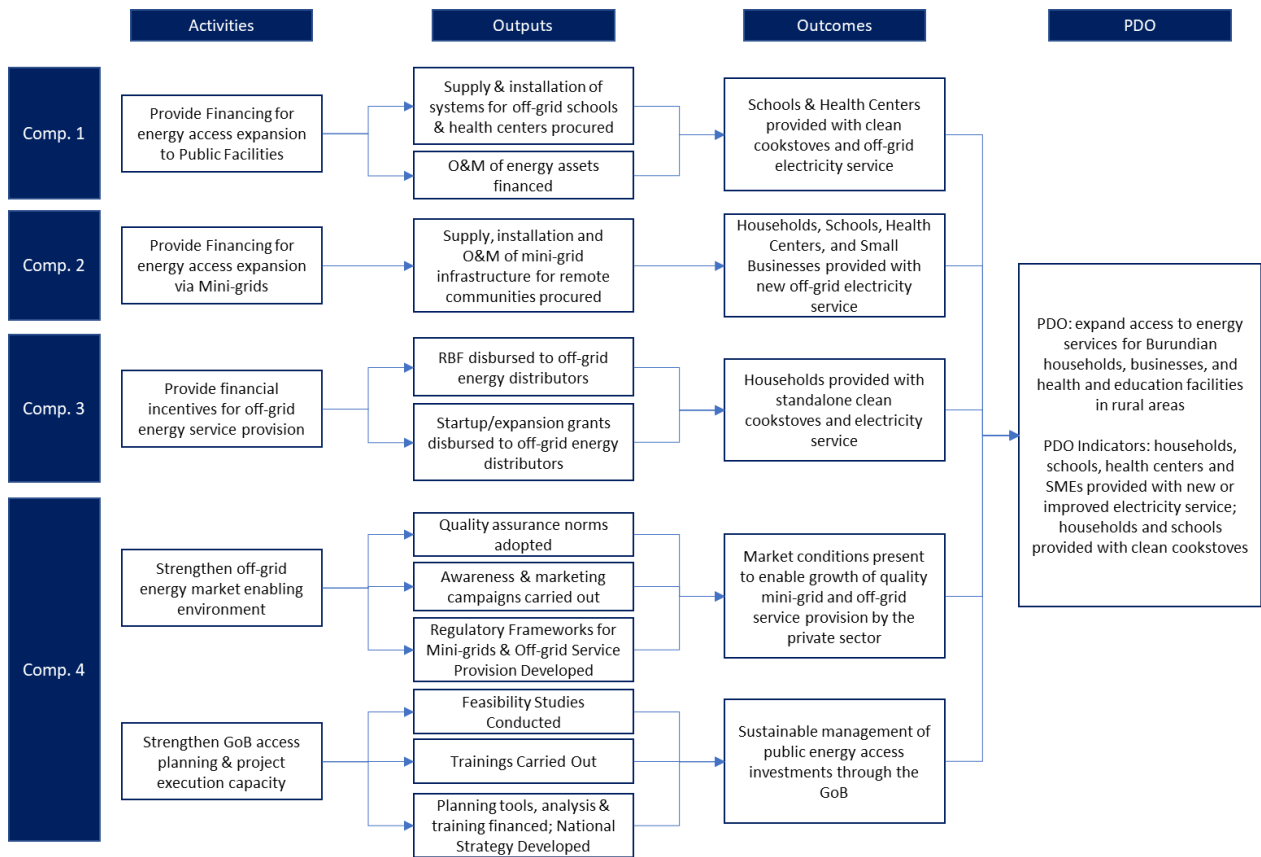
74. Up to 45 mini-grids will be developed by the project, providing electricity access to roughly 31,000 customers, including households, SMEs, schools and health facilities in remote areas of the country. Here, the development of income-generating activities, particularly in the agriculture and livestock sector (coffee drying, milk storage, and so on), will be accelerated.

#### **D. Results Chain**

75. The theory of change underpinning the proposed project is presented in figure 7 below. The project aims to increase access to new or improved energy services to households, SMEs, schools and health centers through a range of market-building interventions as well as the competitive tendering of mini-grids and component-based solar systems. In parallel, support to key Government agencies will strengthen project execution and lay a foundation for sustainable future access planning beyond the life of the project.



**Figure 7. Theory of Change and Results Chain**



**E. Rationale for World Bank Involvement and Role of Partners**

76. **The World Bank’s main value added in electrification lies in helping set up comprehensive, coordinated, and well-planned programs and provide anchor financing to accelerate implementation.** Funding needs to achieve universal access far exceed the financial resources of international finance institutions and bilateral donors. The World Bank’s focus is therefore on setting up scalable electrification programs (or ‘platforms’) to synergize public funding from various sources and attract large volumes of private sector financing. Recently, with support from the World Bank, the Government of Rwanda prepared the Rwanda Electricity Access Scale-up and Sector Wide Approach (SWAp) Development Project (P111567) that helped scale up access from 6 percent in 2009 to 43 percent in 2018. A GIS-based spatial network plan was developed to optimize expansion in the country through 2020. Kenya has also been remarkably successful in its electrification efforts: the country’s electricity access rates increased from 23 percent in 2009 to more than 50 percent in 2016. With the support of the World Bank, the Government of Kenya designed and adopted the Last Mile Connectivity Program (LMCP) as the primary grid densification vehicle to speed up access in grid-connected areas, which has the potential of reaching about 70–80 percent of consumers. The LMCP has assembled close to US\$700 million in donor resources and has helped connect more than 1 million consumers per year in the past five years.

77. Recent developments in the off-grid solar sector, if supported adequately through quality control and targeted



financial interventions by the World Bank, represent an unparalleled opportunity for Burundi to reach out to a large part of the country bereft of modern energy services. The project would build on World Bank experience in leveraging private sector to develop off-grid markets, such as in Ethiopia and Nigeria, thereby optimizing strengths of public and private stakeholders as well as the use of public resources. The project also builds on activities and mechanisms already in place in other sectors and supported by the World Bank (safety nets, health, and education, primarily) to maximize its impact on human capital development.

78. The World Bank involvement will (a) ensure that the project design and/or any proposed policy reforms will reflect principles of sustainability; (b) support best practices in market and demand assessments for off-grid technologies; (c) support best practice analytics such as geospatial planning to improve the off-grid electrification plan; (d) enable leveraging of additional financing from other donors and private sector, eventually; (e) support on competitive tendering and procurement for mini-grid developers and renewable energy technology providers to ensure value for money during project implementation; and (f) draw on global experiences in mini-grid installations and operation/management as well as designing credit lines to support the design of a robust off-grid electrification program.

79. **The proposed project will be implemented in coordination with other donors engaged in the energy access sector**, and will draw from their experiences, as there is increased donors' interest in supporting off-grid access expansion. Most of the current donors' funding supports grid-connected generation projects (Jiji & Mulembwe and Rusumo Falls projects). However, there is renewed interest in off-grid access. The EU launched a call for proposals for the provision of energy services in rural communities. It is also contemplating a US\$11million investment from ELECTRIFI to support private investments in off-grid access (household systems and mini grids). EnDev is also exploring investments in solar products for small services and agriculture activities and clean cooking products. Annex 5 gives more details on donor activity supporting access expansion. The World Bank will seek parallel financing from development partners to scale up the program as opportunities arise.

## F. Lessons Learned and Reflected in the Project Design

80. Lessons from experience with energy access projects in Sub-Saharan Africa have informed the design of this project. Project design and preparation also build on lessons learned from the preparation of SOLEIL, other actors in the sector and the ongoing country dialogue.

81. **Geospatial least-cost plans have become best practice in electrification planning.** After the successful experiences of Kenya, Rwanda, Myanmar, and Nigeria, the use of geospatial planning for grid and off-grid access rollout has been expanded at the African continent level with the Geospatial Electrification Planning in the Africa Region Project (P165617). Geospatial plans constitute a data-driven approach to planning for the efficient and effective deployment of limited resources, particularly aimed at supporting countries with high access deficits. Spatial modelling delivers a least-cost plan identifying the optimal grid or off-grid technology tailored to local circumstances and appropriate in its technical feasibility and economic viability, while integrating social and economic planning objectives. At the same time, geospatial plans allow for identifying communities that may require pre-electrification solutions in the short to medium term while waiting for higher service standard connections. Key to ensuring the effectiveness, sustainability, and dynamism over time of the geospatial approach is the establishment of GIS monitoring capacity within the country to track progress and facilitate updates of the least-cost plans.

82. **Mini-grids should be deployed where they are the least-cost electrification method.** Mini-grids are mostly suited



for rural towns/larger villages that (a) are relatively remote and therefore unlikely to be served by the national grid; (b) are relatively densely populated; (c) have expected loads that justify the mini-grid investments as opposed to deploying individual household systems; and (d) are actively involved in the processing and trading of natural resources available locally (for example, fishing, beef, tomatoes, banana, cassava, avocado oil, palm oil) so that the provision of electricity unlocks local economic potential. This usually requires a certain size (for example, 100 households plus) and sufficient existing or potential business and institutional loads. Mini-grid potential should ideally be mapped through a least-cost electrification plan and its viability confirmed through detailed feasibility studies. Although mini-grids are typically applied in remote locations, sometimes they can be used as a temporary solution (pre-electrification) in areas where the grid may eventually arrive. In that case, the mini-grids should apply technical standards that would allow future interconnection with the main grid.

**83. Models leveraging the private sector for mini-grid deployment and improved regulatory frameworks are increasingly enabling countries to leverage strengths from all stakeholders**, whereby the public sector supervises private sector operators to ensure the provision of quality service at the most competitive price. Innovative private sector business models have emerged, for example, those using smart prepaid meters, allowing remote monitoring, and balancing supply and demand, resulting in increased reliability at reduced operating costs. This creates an opportunity to attract more private sector financing and efficiency in operation into the mini-grid space. However, to attract the private sector, mini-grids need to be financially viable and regulatory risks need to be minimized. For example, the private sector needs to have clarity about the tariffs it is allowed to charge (and if applicable, subsidies it is entitled to), licensing regime, and the time frame during which it is entitled to operate the mini-grid and/or the rules of what happens when the main grid arrives. Private sector opportunities can be leveraged best through creating conditions for a large-scale mini-grid deployment to leverage economies of scale in both construction and operation.

#### Lessons from Off-Grid Projects

**84.** Over the past decades, the World Bank and other development partners have supported off-grid energy access projects providing access to modern energy services to more remote households, businesses, and institutions that could not be reached by conventional grid expansion. The Lighting Africa<sup>35</sup> program in particular has provided a set of early successes in supporting off-grid access. Among the most cited successful examples are projects in Sri Lanka,<sup>36</sup> Bangladesh,<sup>37</sup> Mongolia,<sup>38</sup> Bolivia,<sup>39</sup> Peru,<sup>40</sup> Argentina,<sup>41</sup> and Ethiopia. Some of the lessons learned from these projects are included in the following paragraphs.

**85. Off-grid solutions should be fully and strategically integrated into a country's electrification program and planning process.** New technologies, falling costs, and innovative business models mean that off-grid solutions provide an opportunity to reach a much wider spectrum of the population, including the poor, in a much shorter time. Geospatial

<sup>35</sup> The IFC-World Bank Lighting Africa Program catalyzes and accelerates the development of commercial markets for OGS lighting products in Sub-Saharan Africa. It is part of the World Bank Group's wider efforts toward the goal of SEforAll initiative by 2030. Lighting Africa mobilizes the private sector to build sustainable markets that provide affordable, modern solar lighting products to families that are not connected to grid electricity, most of whom are low-income rural families.

<sup>36</sup> Govindarajulu, C., Raihan Elahi, and Jayantha Nagendra. 2008. *Electricity Beyond the Grid: Innovative Programs in Bangladesh and Sri Lanka*. World Bank. ESMAP.

<sup>37</sup> Sadeque, Z., Raihan Elahi, and Dana Rysankova. *Scaling Up Access to Electricity: The Case of Bangladesh*. World Bank Livewire.

<sup>38</sup> Jayawardena, M., Salvador Rivera, and Chrisantha Ratnayake. 2012. *Capturing the Sun in the Land of the Blue Sky: Providing Portable Solar Power to Nomadic Herders in Mongolia*. World Bank.

<sup>39</sup> Reiche, K., Dana Rysankova, and Susan Goldmark. 2007. "Output-Based Aid in Bolivia: Balanced Tender Design for Sustainable Energy Access in Difficult Markets." OBA Approaches, Global Partnership on Output-Based Aid.

<sup>40</sup> <http://www.worldbank.org/en/results/2014/09/24/peru-brings-electricity-to-rural-communities>.

<sup>41</sup> World Bank. 2013. *Argentina, Renewable Energy in the Rural Market Project, Implementation Completion and Results Report*.



planning, such as that to be conducted under SOLEIL, can help optimize the deployment of off-grid intervention as a complement and/or interim solution to grid electrification.

86. **Empowering the private sector is the best approach to deliver quality off-grid access.** Projects that allowed the private sector to distribute solar PV technologies in a commercially oriented market achieved results faster and in a sustainable manner. When grant administrators are part of the design, systems should be put in place to ensure necessary sectoral and operational knowledge is acquired. If necessary, TA should be provided to the private sector to facilitate its cooperation with grant administrators. A platform should be put in place allowing for ongoing knowledge and experience sharing between participating entities in the project. The SOLEIL Project Coordinator and Grant Administrator will ensure that these efforts are effectively carried out under the project.

87. **The design of the project needs to be flexible to quickly respond to any changes and developments on the ground, especially in untested, developing off-grid markets.** The proposed project has been designed to be flexible to adapt to changes in market conditions and consumer needs. Most of the off-grid electrification programs have evolved over time with important design features changed or new features introduced midcourse. In Bangladesh, both microfinance and fee-for-service models were introduced, but the microfinance model was much more effective to reach households and the fee-for-service model was abandoned. Over time, smaller systems were also introduced to serve poorer market segments, as technology advancements reduced the cost and increased the efficiency of solar home systems (SHSs). In Ethiopia, in contrast, the original focus was to support distributors of solar lanterns, but over time, the project began moving toward supporting larger systems. In the Philippines, the dealer-based model of selling SHSs fell short of achieving the access targets set by the Government, and a fee-for-service model was adopted. The same was the case in Cambodia, where the initial pace of SHS installation was sluggish, primarily because rural households could not afford the up-front payments to the suppliers. The model was then changed to a 'hire-and-purchase model'. Under SOLEIL, the eligibility criteria are purposefully left broad and flexible to accommodate a variety of business models and new approaches.

88. **Government ownership in quality control matters.** It is crucial to establish quality assurance of product performance at the beginning of a project to establish credibility and consumer confidence. The need for quality assurance for SHSs was determined early in the Bangladesh project. Procurement of the SHSs was the responsibility of the MFIs and NGOs, which were to follow established commercial practices. Stringent quality standards were set, including a five-year warranty for batteries, and these quality standards were strongly enforced. In Mongolia, as a result of adoption of international standards for SHSs as well as robust after-sales service and warranties, the credibility of these products in the eyes of the consumers was enhanced. The impressive efforts of Lighting Africa in establishing and certifying products have been instrumental in kick-starting the East African market. At the same time, in the fast-evolving technology environment, it is important that the quality standards adapt to reflect the latest available technologies so that they do not become a barrier to introducing more efficient technologies. The task team has already begun working with the *Bureau Burundais de Normalisation et Contrôle de la Qualité* (Burundi Bureau of Norms and Quality Control, BBN) to adopt Lighting Global standards for off-grid solar systems and, most importantly, foster sector ownership among key GoB institutions.

89. **Leveraging grants to launch market development activities is a critical first step.** Grant structures have been deployed in markets such as Haiti and Nigeria, where the electrification gap was massive and low risks funds were necessary to attract experienced businesses to the market, create interest among existing, successful distribution channels, and encourage innovative business models best suited to the local context. Debt funders, especially in Nigeria, have then begun to provide funds to the new, but experienced companies entering the market and launched conversations with the local companies launching or scaling their activities with the grants program. Debt funders will



never assume the initial risk for an unproven market such as Burundi, but they will enter the market pending the ability of the grant program to attract and develop scaling clean energy business. Similarly, grants will play a catalytic role in the development of the private sector to deliver clean energy products in Burundi. At present, there are only a few small companies working in the clean energy sector, with the majority of the momentum in clean cooking, since companies have had difficulty accessing both foreign currency and debt capital to import quality verified solar products and grow their business. These companies will need patient capital such as grant funds in both hard and local currency combined with TA to help grow their business from several hundred sales per year to several hundred sales per month. Once this scale has been achieved, then commercial debt funds will be interested in these high-volume businesses. SOLEIL's grant funds and TA will be the bridge between the small, nascent market with low affordability and limited access to finance that Burundi currently is and the scaling market that requires debt capital from commercial banks and private funds that Burundi will become.

### III. IMPLEMENTATION ARRANGEMENTS

#### A. Institutional and Implementation Arrangements

90. The project will be implemented by the **MINHEM**. MINHEM will create a PCU to coordinate all project activities and will include a project coordinator, energy, health and education technical staff, two accountants as well as financial management (FM), procurement and E&S safeguards specialists, the latter with experience in World Bank fiduciary procedures and E&S requirements. The PCU will also include an M&E specialist and a Gender specialist.

91. The PCU will be responsible for overall project oversight and monitoring progress and the management and implementation of all activities under Components 1, 3, 4, and 5 and will supervise ABER to ensure effective implementation of project activities under Component 2.

- a. **Component 1.** Under Subcomponent 1.1, the PCU will obtain initial support by contracting a UN agency as a service provider (under output agreement) to assist in installing and maintaining stoves in schools. The PCU will directly manage activities related to the procurement, installation and maintenance of solar equipment for health centers and schools. MINHEM will build on existing mechanisms put into place by the Ministries of Health and Education to optimize maintenance, including by strengthening and staffing district maintenance centers and channeling support for preventive maintenance in health centers and schools through the PBF and maintenance grants, respectively.
- b. **Component 2.** MINHEM will ensure implementation of Component 2 by the rural electrification agency, ABER, by establishing an Implementation Agreement with ABER. ABER will establish a Project Implementation Unit (PIU) and will be responsible for activities related to mini-grid development. ABER will be in charge of tendering out asset procurement, installation and mini-grid operation, and will be the authority in charge of supervision of contract implementation. A manager for Component 2 activities will be hired competitively, and consultants will support dedicated staff on technical (Owner's Engineer), fiduciary and E&S aspects. A transaction adviser will be hired to facilitate the preparation of the tender documents and to establish and implement the mini-grid procurement process.
- c. **Component 3.** MINHEM through the PCU will competitively select a grant administrator to manage the allocation of all grants (start-up, expansion and RBF), including the screening and selection of grant beneficiaries under this Component. MINHEM will determine the technical criteria for companies to qualify to participate in the grants program as well as set minimum electrification requirements and quality standards





for the market. Component 3 will benefit from the experience of the PCU of *Projet de Développement Local pour l'Emploi* (Local Development for Employment Project, PDLE, P155060) for the establishment and management of the grant fund and support any initial procurements.

- d. **Component 4:** Activities under Component 4 will be executed by MINHEM through the PCU, in collaboration with relevant entities (ABER, AREEN, REGIDESO, and Ministries of Health and Education) for technical inputs.

92. The PCU will be responsible for M&E of project implementation progress and results indicators as well as progress toward achievement of the PDO. Therefore, the PCU will have a dedicated M&E officer responsible for M&E and preparing monthly and quarterly progress reports for discussion by the project coordinator and the World Bank during implementation and support missions. The PCU will also have a dedicated gender and community awareness specialist, responsible for informing the public of project objectives and progress, liaising with officials in engaging the county governments and communities, and overseeing actions focused on women's employment and productive uses of energy. The gender and community awareness specialist, also called the community and participation liaison officer (CPLO), will play a critical role in ensuring citizen engagement and accessible (including vulnerable groups) consultations at the local level for all project activities. The grant fund manager (Component 3) will be placed under the responsibility of the PCU. Staff in the PCU will be hired competitively.

93. A **Project Steering Committee**, chaired by MINHEM, and composed of high-level representatives from MINHEM, ABER, AREEN, REGIDESO, and the Ministries of Health, Education, Solidarity and Finance, as well as Consumers representatives, will meet bi-annually to oversee project implementation, review progress, approve Annual Plans and Budgets, provide policy guidance, and resolve any high-level challenges facing the project.

94. During project preparation, a focal group was created by MINHEM, which includes technical staff from the entities represented in the Steering Committee. MINHEM requested the convening of a weekly focal group meeting to monitor progress during preparation and identify any issues arising. Once the project moves to implementation, the focal group will meet monthly and be formally established as the **Technical Committee**.

## B. Results Monitoring and Evaluation Arrangements

95. The PCU will be responsible for monitoring of project implementation progress and results indicators, as well as progress toward achievement of the PDO. The collection of connection data for schools and health centers will be the responsibility of MINHEM, with inputs from Ministries of Health and Education on the provision of funds for maintenance of the systems installed at schools and health centers. The collection of connection data for mini-grid installations will be the responsibility of ABER as provided by the private mini-grid developers. The collection of connection data for the distribution of stand-alone energy systems will be the responsibility of the PCU through the grant administrator and will be verified by the IVA. MINHEM and ABER will also be responsible for the submission of sex-disaggregated data, where relevant, for presenting progress in key and intermediate indicators. Within the PCU, a dedicated M&E officer will be responsible for M&E and preparing progress reports on an annual basis for PDO indicators and on a semiannual basis for the intermediate indicators at the component level. The Results Framework section in this document specifies the results indicators for the project as a whole as well as for each of its components.

96. The PCU will monitor the results of Component 3 with the help of the grant administrator and the IVA. Regular reporting requirements for the energy companies receiving support through the grant fund will be part of the grant agreements signed between them and the grant administrator, who will aggregate these data and report on the overall progress to the PCU at MINHEM.

**Table 3. M&E by Component**

Components	Data collection	Consolidation	Validation	Transmission to the World Bank
Component 1	MINHEM, with inputs from UN agency (schools), and Ministries of Health and Education on maintenance.	PCU, on a monthly basis	IVA	Every six months
Component 2	ABER, with inputs from private providers.		n.a.	
Component 3	MINHEM, with inputs from grant administrator		IVA	
Component 4	PCU, with inputs from all entities involved in studies.		n.a.	
Component 5	To be determined based on type of assistance.		n.a.	

97. Besides the project-specific results monitoring, the World Bank is also supporting the Government to establish better data on the nationwide electrification rate which will be helpful for evaluation of the project's broader impacts on Burundi's state of electricity access. The multi-tier framework (MTF) survey which applies the multitier framework methodology for energy access and is expected to be completed by mid-2020, will provide detailed information on the energy access situation of households, including quantity and quality of services provided by all available (main and backup) sources of electricity, magnitude and frequency of energy expenditures, and willingness to pay. The baseline and the follow-up survey at the end of the project will allow for the quantification of improvements in energy service delivery in the country and could also be used for impact evaluation of development outcomes.

### C. Sustainability

98. Sustainability of investments beyond the life of the project is at the core of project design. The proposed approach focuses on procurement of adequate, high-quality products establishment of sustainable maintenance schemes (with design choices seeking to help complete a system's life cycle, which goes beyond project lifetime); and consumer awareness across the three investment components of the project. As a general rule, technical requirements for all equipment to be financed under the project will follow best practices to ensure optimized life-span.

99. Under Component 1, the project focuses on ensuring sustainable capacity within MINHEM for maintenance/replacement of equipment. To do so, the component will support MINHEM in establishing human and financial infrastructure for maintenance/replacement of equipment financed under the component. The component will initially leverage existing national mechanisms or programs that are co-financed by the Government and that have proven to be effective in the health and education sectors. In parallel, the project will place emphasis on developing local capacity for installing and maintaining solar systems and CECs, including through the provision of training for local technicians as well as strengthening and establishing district maintenance centers. In addition, the service provider identified to initially procure and install the stoves (UN agency) will be asked to build capacity in the Government to ensure maintenance can be efficiently and effectively provided during the project and even beyond the life of the project. Finally, the project will help establish within MINHEM a sustainable mechanism for financing maintenance capacity beyond the project duration, such as through a budgetary line to be established by the ministry or through the operationalization of the rural electrification fund.



100. Under Component 2, mini grid operators will be required to ensure the maintenance of equipment during the life of the contract (15 years). The project will also provide the minimum subsidy required to ensure the financial sustainability of the private operators, and hence their capacity to continue maintaining the systems. In addition, ABER will ensure that operators comply with maintenance requirements as stipulated in their contracts.

101. Under Component 3, all supported household energy solutions will be required to demonstrate adherence to Lighting Global quality standards, which require a minimum guarantee of the systems. For stoves, CECs eligible for financing will be required not only to be aligned with stove International Organization for Standardization (ISO) guidelines but will need to be carried by private distributors providing minimum after sales services guarantees to customers. In addition, all households will receive training on how to properly operate and ensure maintenance of their solar equipment and/or CEC.

102. Under Component 4, quality assurance and consumer awareness activities will support implementation and acceptance of quality standards for the systems disseminated under the project. In addition, the project will aim to systematize the training and availability of technicians to carry maintenance of solar systems, based on current programs and lessons learned. Lastly, the project will help the GoB establish market conditions enabling accelerated growth of quality mini-grid and off-grid service provision by the private sector even beyond the life of the project.

#### **IV. PROJECT APPRAISAL SUMMARY**

##### **A. Technical, Economic and Financial Analysis (if applicable)**

103. Project investments (under Components 1 through 3) use well-proven technologies and present no unusual installation, commissioning or operational challenges. As described in the risk section, the main challenge will be to ensure that sound maintenance mechanisms are in place throughout the lifecycle of the investments.

104. Under Component 1, solar systems and CECs for health centers and schools will need to meet rigorous design specifications. For solar systems, a variety of relevant International Electrotechnical Commission standards will apply for this purpose (to be detailed during implementation). This will ensure that O&M requirements are kept to a minimum, thus increasing the likelihood of system uptime over the longer term. For stoves installed in schools, no ISO norms exist yet related to large institutional stoves (each are used to cook for 200 children) but the methodology related to testing of individual stoves (required under Component 3 before distributors receive financing) will be applied to thermal efficiency, emissions, safety, and durability.

105. Under Component 2, the equipment and the technologies to be used in the construction and operation of mini-grids will meet international standards as specified by AREEN. In addition, operators will be expected to ensure the availability of determined capacity throughout the operation of the system. ABER has experience supervising and operating mini-grids in Burundi and will receive additional technical support from a transaction adviser for the preparation and execution of bidding processes. During project implementation, international consultants will be hired under Component 4 to provide support to ABER for the supervision of the implementation of key contracts. Cost estimates are based on recently completed installations in Burundi and in other similar countries under projects financed by the World Bank or by other donors and aligned with current market prices.

106. Under Component 3, all solar systems and stoves deployed directly or indirectly through the project will need to



meet minimum performance and reliability standards. For solar, the strict Lighting Global quality standards will be used to ensure that the project will contribute to raising the bar in the off-grid solar market in Burundi. There are currently only two off-grid solar distributors in the market, with no national standards established for solar systems. For CECs, the eligibility process will be aligned with guidelines from the ISO that has published ISO/TR19867 *Clean cookstoves and clean cooking solutions*<sup>42</sup> which provides guidelines for voluntary performance targets on thermal efficiency, emissions, safety, and durability of cookstoves. The project has already contacted the BBN to provide technical support in the development of internationally accepted norms for solar, and the BBN has already been an active member in ISO/TR19867 stove work. The activity is expected to spur the creation of a quality-verified market segment in the country.

107. The economic analysis uses a cost-benefit framework to determine the development impact of the project, the rationale for public-sector involvement, and the value added of the World Bank’s support. The economic returns of the project are from the avoided cost of substituting SHSs and CECs for traditional sources of lighting and cook stoves for household, institutional (health and education), and business beneficiaries. The economic returns of the project are conservative estimates as it does not account for increased level of service and local environmental and health costs associated with deforestation and dry cell disposal.

108. The analysis finds the project to be economically viable with an economic internal rate of return (EIRR) of 44 percent and a net present value (NPV) of US\$60.9 million at 6 percent discount rate. A total of 102,361 tons of CO<sub>2</sub> of emissions are avoided through the project, with the substitution of traditional sources of lighting and cooking fuel with CECs and solar products. The incorporation of greenhouse gas (GHG) emissions reduction into the analysis increases the NPV to US\$70.6 million and the EIRR to 52 percent. A sensitivity analysis was also conducted and indicates that these results remain sufficiently robust under significantly higher-cost and lower-benefit scenarios. Further details of the analysis are in annex 2.

*Table 4. Summary of Economic Analysis*

	Economic Internal Rate of Return (EIRR) (%)	NPV
Without GHG	44%	US\$60.9
With GHG	52%	US\$70.6

**B. Fiduciary**

**(i) Financial Management**

109. A PCU will be established within MINHEM to ensure the day-to-day coordination of the project’s FM activities for Components 1, 3, 4 and 5, while ABER will retain FM responsibility of project activities under Component 2.

110. The FM assessments of the proposed PCU arrangement and ABER were carried out to determine whether they have acceptable FM arrangements in place. The assessments have considered the degree to which (a) reasonable records are maintained and financial reports produced and disseminated for decision making, management, and reporting; (b) funds are available to finance the project; (c) there are reasonable controls over project funds; and (d) independent and competent audit arrangements are in place. The FM assessments were carried out in accordance with the World Bank

<sup>42</sup> ISO *Clean cookstoves and clean cooking solutions*: <https://www.iso.org/news/ref2335.html>



Directive: Financial Management Manual for World Bank Investment Project Financing (IPF) Operations, issued on February 4, 2015, and latest revision on February 10, 2017 and the World Bank Guidance Financial Management in World Bank IPF Operations, issued and effective February 24, 2015.

111. Both the MINHEM PCU and ABER PIU will be established within four months after project effectiveness and therefore lack experience in managing World Bank financed projects. In addition, the project will manage many transactions. The inherent country fiduciary risk is high; there is a lack of experience managing grant funds to develop the off-grid market; and there will be two implementing agencies and the need to coordinate with other ministries during project implementation.

112. The conclusion of the assessment is that the FM risk is High and mitigation measures have been proposed to address some of the issues and fiduciary risks identified.

- a. Experienced FM staff (FMs, accountants and internal auditor) will be recruited to coordinate the day-to-day financial activities of the project at the PCU level.
- b. ABER is planning to detach some of its staff to be dedicated to the project and long-term qualified consultants will be hired to support this team during a given period.
- c. Under Component 1:
  - i. An UN agency will be contracted by the PCU as a service provider (under an output agreement) to install and maintain CECs in schools during a defined period. The agency will also provide capacity building for the PCU to subsequently execute these activities.
  - ii. The project will leverage the existing mechanisms of the Ministries of Health and Education to ensure preventive maintenance of the equipment provided to the health centers and schools.
- d. Under Component 3, the PCU will recruit an independent consulting firm ('grant administrator') which will carry out the selection of the beneficiaries of the grants under this component.
- e. The PCU and ABER will acquire an accounting software (TOMPRO highly recommended) to maintain the project accounts and generate all the required financial reports (interim financial reports [IFRs], withdraw applications, and project financial statements).
- f. The PIM that includes FM procedures should be developed by the PCU by the project effectiveness date.
- g. An independent audit firm will be recruited for the audit of the project financial statements (shortlist and terms of references (ToRs) should be submitted for World Bank 'no-objection') no later than six months after project effectiveness.

113. Once these risk mitigation measures are implemented, the residual risk rating should be **Substantial**. An FM action plan is included in annex 3.

#### (ii) Procurement

114. **Procurement under the proposed operation will be guided by the following:** Procurement for works, goods, non-consulting, and consulting services will be carried out in accordance with the procedures specified in the 'World Bank Procurement Regulations for IPF Borrowers' dated July, 2016 and revised in November 2017 and August 2018 (Procurement Regulations); the World Bank's Anti-Corruption Guidelines: Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants (revised as of July 1, 2016); and the provisions stipulated in the Financing Agreement. All goods, works and non-consulting services will be procured in



accordance with the requirements set forth or referred to in the section VI. Approved Selection Methods: Goods, Works and Non-Consulting Services of the ‘Procurement Regulations’; the Consulting Services will be procured in accordance with the requirements set forth or referred to in Section VII. Approved Selection Methods: Consulting Services of the “Procurement Regulations,” the Project Procurement Strategy for Development (PPSD), and Procurement Plan approved by the World Bank.

115. The PPSD and the procurement plan covering the first 18 months of the project implementation were approved by the World Bank. The PPSD presents the procurement strategy for the project, including a market analysis and an assessment of risks and opportunities of procurement activities, as input to the proposed institutional arrangements, approach to market, selection methods, and evaluation options for procurement. Any updates of the Procurement plan shall be submitted for World Bank approval. The Recipient shall use the World Bank’s online procurement planning and tracking tools (Systematic Tracking of Exchange in Procurement [STEP]) to prepare, clear and update its Procurement Plans and conduct all procurement transactions.

116. When approaching the national market, the country’s own procurement procedures may be used with the requirements set forth or referred to in paragraphs 5.3 to 5.6 related to National Procurement Procedures. The requirements for national open competitive procurement are included in table 5.

**Table 5. Requirements for National Open Competitive Procurement**

<b>Requirements</b>	<b>Actions</b>
(a) Open advertising of the procurement opportunity at the national level.	No action needed
(b) The procurement is open to eligible firms from any country.	No action needed
(c) The request for bids/request for proposals document shall require that bidders/proposers submitting bids/proposals present a signed acceptance at the time of bidding to be incorporated in any resulting contracts, confirming application of, and compliance with, the World Bank’s Anti-Corruption Guidelines, including without limitation the World Bank’s right to sanction and the World Bank’s inspection and audit rights.	The form elaborated by Operations Policy and Country Services (OPCS) must be added to each contract agreement with bidders/consultants
(d) Contracts with an appropriate allocation of responsibilities, risks, and liabilities.	No action needed
(e) Publication of contract award information.	No action needed
(f) Rights for the World Bank to review procurement documentation and activities.	The requirement should be included in the Procurement Plan.
(g) An effective complaints mechanism.	The PIM must develop an effective complaints mechanism in line with World Bank Regulations.
(h) Maintenance of records of the procurement process	The PIM must spell out the practical modalities and the appropriate documentation to archive

117. **Procurement risk assessment and mitigating measures.** The PCU within MINHEM will be responsible for the coordination and management of SOLEIL. The key staff (project coordinator, FM specialist and procurement specialist) will



be hired through a competitive process. The procurement assessment conducted within MINHEM and ABER shows the following:

- a. The existing staff have limited procurement skills and insufficient experience in World Bank procurement procedures.
- b. The tender committee is not trained in the World Bank procurement procedures.
- c. The filing system in place is not acceptable.

118. According to the procurement risk assessment the procurement mitigation measures shown in table 6 are proposed. The procurement assessment for the new PCU will be conducted and updated during project implementation. The procurement team shall be trained on the Procurement Regulations for project activities.

**Table 6. Procurement Mitigation Measures**

Implementing agency	Procurement mitigation measures	By when
MINHEM	Recruitment of a Procurement Specialist	Four months after effectiveness
MINHEM	Elaborate and submit to IDA for approval a PIM with procurement section	By effectiveness
ABER	Recruitment of a Procurement Consultant	Four months after effectiveness
MINHEM and ABER	Train the Procurement Specialist, Procurement Consultant, and the tender committee in World Bank New Procurement Framework	Six months after effectiveness
MINHEM and ABER	Establish in the PCU and ABER PIU an acceptable filing system	Needs to be described in the PIM

119. **Procurement Risk Rating:** The project procurement risk before the mitigation measures is ‘High’. The risk is reduced to a residual rating of ‘Substantial’ upon considering successful implementation of the mitigation measures.

120. **Oversight and monitoring arrangements for procurement.** A PIM will be developed and submitted to the World Bank for review as a condition of effectiveness. It will define the project’s internal organization and its implementation procedures, and will include, among other things, all the relevant procedures for calling for bids, selecting consultants, and awarding contracts. The project monitoring arrangements for procurement will be analyzed and developed. Detailed procurement documentation (for example, PPSD) may be referenced as such and retained in the project files.

### C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No



#### D. Environmental and Social

121. The project aims at expanding access to sustainable energy services for health and education facilities, and households in rural areas which are not connected to the national grid. As energy is one of the drivers of human capital development, off-grid renewable energy will have largely positive impacts and will strengthen public health and education services. The project would bring access to electricity for roughly 400 schools and 400 health centers across the country. In addition, it will make available CECs and will develop productive and income-generating activities for households in rural areas.

122. The **environmental risk classifications for the project is Substantial** as activities may present adverse impacts to the environment, although their nature, magnitude and scope are not yet defined in detail. Environmental risks and impacts anticipated as a result of the construction, installation and maintenance of PV solar systems and mini-grids, include risks and impacts related to occupational health and safety, and management of end-of-life batteries. These risks and impacts are expected to be managed in accordance with the World Bank Group Environment, Health, and Safety Guidelines and the relevant requirements of Environmental and Social Standard (ESS) 1, ESS2, ESS3, ESS4, and ESS6.

123. **The social risk classification for the project is Moderate**, as the project may include small-scale involuntary land acquisition, limited exposure of GBV/SEAH risks to community members due to labor influx for infrastructure works, and inequity in identification of sub-project sites. This project has been scored as **moderate risk** according to the GBV Risk Assessment Screening Tool using available information. Country-level factors that contribute to this risk level include high prevalence of intimate partner and sexual violence, and high accepting attitudes toward GBV. Project-level factors that increase potential GBV risks include project activities planned in rural settings that are particularly poor, remote and/or in a humanitarian crisis, such as those with refugees and host communities. The project entails minor infrastructure construction, potentially spanning a broad geographic area, the installation of solar systems and CECs, and may require an influx of workers who will be near women and girls in communities, notably for work within a large number of schools and health centers. In addition, targeting vulnerable households for access to energy services, while potentially beneficial to the household members, sets up the type of unequal power differential between vulnerable women and girls and those who provide access to a valuable asset energy which can increase the risk of sexual exploitation and abuse.

124. According to the Good Practice Note for Addressing GBV in IPFs Involving Major Civil Works, all projects, regardless of risk level should ensure the following minimum recommended actions to address GBV risks: include GBV risk assessment in the project's social assessments (Environmental Social Assessment [ESA] and Environmental and Social Management Plan [ESMP]), arrange community engagement/ consultations with women, map GBV service provider, integrate GBV risk in safeguard instruments, conduct PIU capacity assessment, include GBV-sensitive approaches in GRM, define GBV requirements bid documents (including the requirement for a code of conduct for all workers), address how GBV-related costs will be paid in the contract; ensure codes of conduct are signed and understood, and ensure physical safety of work sites (such as separate facilities for women and men, and GBV-free zone signage). In addition to the above actions, projects such as this one with a moderate risk level should also ensure the following actions: develop a GBV action plan including an Accountability and Response Framework as part of the project ESMP, evaluate the contractor's GBV response proposal in the C-ESMP for ability to meet the project's GBV requirements, *consider* hiring a GBV specialist in the PIU, and *consider* hiring a GBV specialist in the supervision consultant's team. All these actions will be undertaken during project implementation.

125. **E&S assessment and management.** A project Environmental and Social Management Framework (ESMF), publicly disclosed on January 22, 2020, has been prepared for all components (all project activities) that provides guidelines for





the preparation of subproject-specific ESA instruments during the implementation phase, including subproject screening, risk categorization, deciding whether an ESMP is warranted, and ESMP review, clearance, and disclosure procedures. The project will address gaps through the implementation of an Environmental and Social Commitment Plan (ESCP) that was prepared jointly between the PCU and the World Bank and was publicly disclosed on January 24, 2020.

126. The ESMF includes procedures and processes for managing E&S risks and impacts related to implementation of the grant fund for off-grid energy. As the project shall involve multiple subprojects across the country, the PCU will regularly guide the private sector on the ESS. During the project implementation, the project will monitor their activities based on elaborated ESS's instruments, as necessary, including ESS2, ESS3, ESS4, ESS5, ESS6, ESS7, and ESS8.

127. In addition to the ESMF and ESCP, the Recipient has prepared a Resettlement Policy Framework, an Indigenous Peoples Planning Framework (IPPF), a Stakeholder Engagement Plan, and Labor Management Procedures (LMP); they were disclosed on January 22, 2020. These instruments shall apply to all components of the project and will be tailored to different activities and implementation arrangements. In accordance with the ESMF, as well as other documents, the PCU shall prepare subproject ESA instruments and, as relevant, other documents (for example, Resettlement Action Plans (RAPs) and Indigenous Peoples Plans) during implementation once exact locations are determined and risks and impacts are screened. In addition, E&S standards will be described under the implementation manuals of specific activities: (a) MINHEM will prepare an implementation manual for all project components (effectiveness condition); and (b) a grant fund operation manual will be established for the grants and results-based facility of Component 3 and will describe E&S standards that private companies shall apply (disbursement condition).

128. Batwa communities in Burundi fulfill the four criteria by which ESS7 defines Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities and are among vulnerable groups. The project will ensure that the Batwa are not disproportionately affected by adverse impacts of project activities and experience its benefits. Selection of subprojects that would otherwise result in adverse impacts on land or natural resources traditionally owned or used by Batwa, relocation of Batwa communities, or impacts on Batwa cultural heritage, including intangible heritage, will not be eligible for financing. An IPPF was developed, consulted, and disclosed prior to appraisal to guide the development of Indigenous Peoples Plans during implementation, as necessary. The project will also ensure that the GRM developed under ESS10 will be appropriate and accessible for the Batwa; in particular, the GRM will allow for anonymous complaints and will rely on the traditional community conflict resolution process (which has proven efficient) as well as other means of communication (paper, telephone and email). Detailed complaints forms and processes for lodging and resolving complaints are described in the project ESMF and IPPF and will be disseminated among the Project affected persons.

129. The project will apply the Environmental and Social Standard on Cultural Heritage (ESS8), in case of chance find of cultural heritage due to earth movement during infrastructure construction or due to the presence of intangible cultural heritage in the local communities. As discussed in the ESMF, the chance-find procedure will follow national laws, as it relates to cultural heritage. The project will not finance project activities that will affect cultural heritage resources on sites. Where appropriate, the client shall develop a cultural heritage management plan during implementation, if it is deemed that a chance-find procedure is inappropriate to mitigate the potential risks/impacts on cultural heritage.

130. **Environmental and social capacity building.** The Government's E&S management system needs to be enhanced to comply with the ESSs. The ESMF includes a capacity assessment and proposes capacity-building activities and trainings and recommendations to ensure adequate M&E of the E&S aspects of the project and resources needed. The E&S specialists appointed in the PCU as well as some government agencies and private entities involved in project



implementation will comply with the ESS's instruments to properly address environmental and social risks that may occur during project execution. Capacity building activities relevant to the implementation of Environmental and Social Framework (ESF) instruments are reflected in the ESCP.

## V. GRIEVANCE REDRESS SERVICES

131. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For more information on how to submit complaints to the World Bank Inspection Panel, please visit [www.inspectionpanel.org](http://www.inspectionpanel.org).

## VI. KEY RISKS

132. The overall implementation risk of the project is assessed as **High**, mainly due to overall country political and governance risks. Appropriate corrective and supportive measures will be put in place to mitigate the risks. Key project level risks that are important to project success are described in the following paragraphs.

133. **Political and governance (High):** Political uncertainty is the main risk the project is currently facing as the 2020 elections are quickly approaching.<sup>43</sup> To mitigate the risk, the project has been developed through broad-based consultations, building on the existing consensus-building processes for the formulation of similar projects in other sectors.

134. **Macroeconomic (High).** A worsening of economic conditions could adversely affect project implementation, including through increased constraints to access to forex. Since 2015, Burundi has achieved a measure of economic stability with the Government adjusting its policies to bring in more revenue and consolidate spending. While there are serious downside risks, economic growth will require supportive policies and reforms, among them tighter monetary policy, a flexible exchange rate policy, elimination of statutory advances, and sound bank regulation and supervision.

135. **Sector strategies and policies (Substantial).** The enabling environment for off-grid expansion is lacking; and there is no rural electrification strategy, nor master plan for areas outside of the grid. Planning capacity (through training and the acquisition of tools to manage planning) needs to be established for the sector as a whole, while the regulatory agency is relatively new with little experience. The proposed project will assist the government in enacting a comprehensive but light-handed regulatory framework to reduce uncertainties, particularly for mini-grid investors,<sup>44</sup> while protecting users.

<sup>43</sup> Recently, the GoB ordered the United Nations High Commissioner for Refugees (UNHCR) to leave the country, the GoB boycotted fifth round of peace talks, a UN report alleged abductions and executions of opponents of a referendum of the President's fourth term, and so on. (<https://www.cfr.org/interactives/global-conflict-tracker#!/conflict/political-crisis-in-burundi>).

<sup>44</sup> The individual off-grid PV segments are less affected by this problem, because of their 'product' character, which makes them usually fall



136. **Technical design of project program (Moderate).** The project components do not present particular technical challenges, as they build on best practices from similar projects and the experience from Burundi. The approach focuses on using existing mechanisms to ensure sustainability of investments beyond project lifetime, which is the main challenge of the project design.

137. **Institutional capacity for implementation and sustainability (High).** Experience in project development and implementation is lacking, with MINHEM not directly in charge of the only energy IDA financed project in Burundi, Jiji and Mulembwe Hydropower Project (P133610). In addition, the off-grid sector is still nascent and private sector participation in energy has been limited until now. The project scale may stretch existing implementation capacity of government entities. To mitigate this risk, a focal group including all ministries/agencies involved in this project has already been created, while staff in MINHEM have been identified to supervise the various aspects of project preparation – on technical, fiduciary and safeguards aspects. This focal group will be converted into the Project Technical Committee. Staff have been receiving training on technical/safeguards/fiduciary aspects. In addition, the MINHEM PCU and ABER PIU will be further strengthened with experienced technical and fiduciary experts, and TA for building local capacities of the private sector and technicians will be provided under Component 4. Under Component 3, a grant administrator will be hired to support MINHEM in all activities.

138. Another important aspect of the project is that of sustainability of the investments beyond project life, especially under Component 1. The experience in Burundi shows that electrification programs of public facilities are often not economically sustainable once the warranty period has ended, as financiers focus on asset delivery and do not budget for proper routine and ad hoc maintenance. Also, financing needs for O&M are usually not met over the expected lifespan of the deployed energy solution but are rather geared towards 1 - 2 years after installation, if at all. As for the organizational sustainability, there is often no cross-sectoral collaboration in place between the line ministries of Health, Education and Energy. To mitigate this risk, the project will develop local capacity for installing and maintaining solar systems and CECs, including through the provision of training for local technicians as well as strengthening and establishing district maintenance centers. The project will help establish within MINHEM a sustainable mechanism for financing maintenance capacity beyond the project duration, such as through a budgetary line to be established by the ministry or through the operationalization of the rural electrification fund. Finally, a cross sectoral group (with representatives from MINHEM and, Ministries of Health and Education) has been working together since the beginning of project preparation. It will be transformed into a formal Steering Committee once the project is approved.

139. **Environmental and social (Substantial).** E&S risk classification is substantial to reflect low institutional capacity for implementation of the new ESF. The Government has mobilized, during project preparation, dedicated staff within MINHEM to prepare the ESF, with support from external consultants. The staff and consultants were provided training, and the project will further finance E&S experts to support the Government in implementing the ESF.

- i. **Environmental risk.** Renewable energy technology will have overall positive environmental impacts in terms of reduced GHG, as well as local pollution from diesel, kerosene, and other fuel-based alternatives. All investments will be appropriately screened for any negative environmental impacts, and mitigation planned, developed, and implemented. An e-waste study on how to collect and recycle batteries and other spare parts will also be performed.
- ii. **Social risk.** Overall, the project's social impacts are expected to be positive, as the project will contribute to improved electricity access. By providing affordable electricity to more people, the program will promote greater economic growth and equity, especially in rural areas. However, limited negative social impacts on

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in the category of consumer goods.



some segments of population are possible (for example entrepreneurs currently running cell phone charging stations would go out of business), and while resettlement of people is unlikely, there would likely be land acquisition and possibly temporary disruptions during construction of the mini-grids. To mitigate these risks, intensive stakeholder consultations have been carried out during preparation and will continue when subprojects are being implemented. At specific project-level, social safeguards assessments will be undertaken. Design of grant fund under the Component 3 of the project will take affordability and willingness to pay into account, supported by information, education and communication campaigns. A focus on gender equality is being placed on all project components.

- iii. **Social and conflict analysis** identified at the concept stage recommended that, once the exact location of project interventions will be known, the project shall assess the degree to which the project may (a) exacerbate existing tensions and inequality within society (both within the communities affected by the project and between these communities and others); (b) have a negative effect on stability and human security; (c) be negatively affected by existing tensions and conflict, particularly in circumstances of fragility and conflict. A social and conflict analysis will be carried out as part of the ESS1 during project implementation.

140. **Fiduciary (Substantial).** It has been agreed that MINHEM will host the PCU, while ABER will be an implementing agency and will house a PIU for Component 2. Neither MINHEM nor ABER has experience implementing World Bank financed projects. Both will be provided technical support to build its fiduciary capacity. MINHEM will establish a new PCU with the overall responsibility of project FM and procurement aspects. Therefore, the PCU and ABER should be strengthened with the recruitment of dedicated fiduciary experts familiar with World Bank procurement and FM procedures. The selection of these staff should be finalized within four months after project effectiveness.

141. **Stakeholders (Substantial).** There is strong commitment and consensus among sector stakeholders on the need to expand off-grid access in the country. In addition, several donors have in the past financed off-grid interventions, from electrification of public institutions to development of mini-grids and are keen to explore opportunities to newly support such initiatives. Many of them are currently formulating their intervention strategies. The preparation of the off-grid market assessment under the ESMAP as well as the preparation of a NES under Component 4 of the proposed project will include the organization of several stakeholders' forums to discuss ongoing studies, prepare a roadmap, and ensure broad consensus building.

142. **Other: Private sector participation risk (High).** Private sector participation is essential for the successful implementation of the project, and there is currently little participation of private investors in the off-grid market as the institutional/regulatory framework to define private sector involvement needs to be enhanced, with FOREX limitations being a key constraint. The risk of mini-grids being absorbed into the national grid could also discourage private investments. To mitigate these risks, project design focuses on establishing a transparent, competitive framework for private sector participation that provide certainty and incentives to the private sector. Under Component 2, selection criteria for mini-grids supported under the project have been agreed to avoid such risks as much as possible; under the focal group/Technical Committee (in which REGIDESO participates), the project will establish a coordination mechanism with REGIDESO; and under Component 4, the project will develop a regulatory framework, which will specify what happens when the grid arrives. In addition, Component 3 finances a grant fund to incentivize private sector participation in the off-grid market and Component 4 will provide TA to the Government to create the enabling environment. Lastly, with financing from the ESMAP, an off-grid market assessment assesses private sector willingness to invest in mini-grids, SHSs, and service provision to public facilities to help identify adequate regulatory tools and market instruments that will be supported under the proposed project.



**VII. RESULTS FRAMEWORK AND MONITORING**

**Results Framework**

**COUNTRY: Burundi**

**Solar Energy in Local Communities**

**Project Development Objectives(s)**

The objective of the Project is to expand access to energy services for households, enterprises, schools and health centers in rural areas of Burundi.

**Project Development Objective Indicators**

Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
<b>expand access to energy services for households, enterprises, schools and health facilities in rural</b>				
People provided with new or improved electricity service (CRI, Number)		0.00	118,000.00	457,500.00
People provided with new or improved electricity service - Female (CRI, Number)		0.00	59,800.00	232,200.00
Health centers provided with new or improved electricity services (Number)		0.00	157.00	445.00
Health centers provided with new or improved electricity services by standalone systems (Number)		0.00	150.00	400.00
Health centers provided with new or improved		0.00	7.00	45.00



Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
electricity services by mini-grids (Number)				
Schools provided with new or improved electricity services (Number)		0.00	170.00	535.00
Schools provided with new or improved electricity services by standalone systems (Number)		0.00	150.00	400.00
Schools provided with new or improved electricity services by mini-grids (Number)		0.00	20.00	135.00
Households provided with clean and efficient cookstoves (Number)		0.00	100,000.00	300,000.00
Schools provided with clean and efficient cookstoves (Number)		0.00	150.00	400.00

**Intermediate Results Indicators by Components**

Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
<b>Energy Services for Schools and Health Centers</b>				
Renewable energy generation capacity of systems installed at health centers (Megawatt)		0.00	0.50	1.50
Renewable energy generation capacity of systems installed at schools (Megawatt)		0.00		0.01
<b>Energy Services for Rural Communities</b>				
Mini-grids constructed under project (Number)		0.00	7.00	45.00
Households provided with access to electricity		0.00	4,100.00	26,500.00



Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
services by mini-grids (Number)				
Small and Medium enterprises provided with access to electricity service by mini-grids (Number)		0.00	650.00	4,320.00
Renewable energy generation capacity of mini-grids constructed under the project (Megawatt)		0.00	2.30	15.75
Finalization of bidding documents for mini-grids Lot 1 (Yes/No) (Yes/No)		No	Yes	Yes
<b>Energy Services for Households, including the poor and vulnerable</b>				
Households provided with new electricity connections by stand-alone systems (Number)		0.00	19,500.00	65,000.00
Households provided with clean and efficient cookstoves (Number)		0.00	90,000.00	300,000.00
Volume of grants channeled to private solar and CEC companies (Amount(USD))		0.00	1,620,000.00	5,400,000.00
Volume of results-based financing channeled to private solar and CEC companies (Amount(USD))		0.00	2,400,000.00	8,000,000.00
<b>Technical Assistance, Capacity Building and Project Implementation Support</b>				
National Electrification Strategy and Plan prepared and adopted (Yes/No)		No	Yes	Yes
Geospatial analysis and planning platform established and operational (Yes/No)		No	Yes	Yes
Technicians trained in the provision of O&M services for solar systems (Number)		0.00	50.00	200.00
Consumer awareness program developed, with a focus on female members of households and SMEs (Yes/No)		No	Yes	Yes
Assessment of barriers to female entrepreneurship completed and action plan delivered (Yes/No)		No	Yes	Yes



Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
Female employment of mini-grid operators (Percentage)		0.00	10.00	30.00
Earmarked grants for female enterprises (Percentage)		0.00	10.00	20.00
Grievances received addressed (Percentage)		0.00	100.00	100.00

**Monitoring & Evaluation Plan: PDO Indicators**

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
People provided with new or improved electricity service		Semi-annually	Semi-annual report	MINHEM PCU and ABER Project Monitoring	MINHEM and ABER
People provided with new or improved electricity service - Female		Semi-annually	Semi-annual report	MINHEM PCU and ABER	MINHEM and ABER
Health centers provided with new or improved electricity services	Health centers provided with new or improved electricity services under the project	Semi-annually	Semi-annual Report	MINHEM PCU Monitoring	MINHEM
Health centers provided with new or improved electricity services by standalone systems	Health centers provided with new or improved electricity services by standalone systems deployed under Component	Semi-annually	Semi-annual Report	PCU Monitoring	MINHEM PCU





	1 of the Project.				
Health centers provided with new or improved electricity services by mini-grids	Health centers provided with new or improved electricity services by mini-grids deployed under Component 2 of the Project.	Semi-annually	Semi-annual report	ABER Monitoring	ABER
Schools provided with new or improved electricity services	Schools provided with new or improved electricity services under the project	Semi-annually	Semi-annual report	MIHNEM PCU Monitoring Unit	MINHEM
Schools provided with new or improved electricity services by standalone systems	Schools provided with new or improved electricity services by standalone systems deployed under Component 1 of the Project.	Semi-annually	Semi-annual report	PCU Monitoring	MINHEM PCU
Schools provided with new or improved electricity services by mini-grids	Schools provided with new or improved electricity services by mini-grids deployed under Component 2 of the Project.	Semi-annually	Semi-annual report	ABER Monitoring	ABER
Households provided with clean and efficient cookstoves	Households provided with clean and efficient cookstoves under the project	Semi-annually	Semi-annual report	Grant Administrator monitoring and verification	MINHEM PCU
Schools provided with clean and efficient cookstoves	Schools provided with clean and efficient cookstoves under the project	Semi-annually	Semi-annual report	MINHEM PCU monitoring	MINHEM PCU



**Monitoring & Evaluation Plan: Intermediate Results Indicators**

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Renewable energy generation capacity of systems installed at health centers	Renewable energy generation capacity of solar systems installed at health centers under the project	Semi-annually	Semi-annual report	MINHEM PCU Monitoring	MINHEM
Renewable energy generation capacity of systems installed at schools	Renewable energy generation capacity of solar systems installed at schools under the project	Semi-annually	Semi-annual report	MINHEM PCU Monitoring	MINHEM PCU
Mini-grids constructed under project	Mini-grids constructed under project	Semi-annually	Semi-annual report	ABER Monitoring	ABER
Households provided with access to electricity services by mini-grids	Households provided with access to electricity services by mini-grids under the project	Semi-annually	Semi-annual report	ABER Monitoring	ABER
Small and Medium enterprises provided with access to electricity service by mini-grids	Small and Medium enterprises provided with access to electricity service by mini-grids under the project	Semi-annually	Semi-annual report	ABER Monitoring	ABER
Renewable energy generation capacity of mini-grids constructed under the project	Renewable energy generation capacity of mini-grids constructed under the project	Semi-annually	Semi-annual report	ABER Monitoring	ABER
Finalization of bidding documents for mini-grids Lot 1 (Yes/No)	Preparation and approval of bidding documents finalized.	Semi-annually	Semi-Annual Report	ABER Monitoring	ABER



Households provided with new electricity connections by stand-alone systems	Households provided with new electricity connections by stand-alone systems distributed by companies receiving grant support under the project	Semi-annually	Grant Administrator Semi-annual report	IVA Monitoring	MINHEM
Households provided with clean and efficient cookstoves	Households provided with clean and efficient cookstoves distributed by companies receiving financial support under the project	Semi-annually	Grant Administrator Semi-annual report	IVA Monitoring	MINHEM
Volume of grants channeled to private solar and CEC companies	Volume of grants channeled to private solar and CEC (clean and efficient cookstove) companies under the project	Semi-annually	Grant Administrator Semi-annual report	Grant Administrator Monitoring	MINHEM
Volume of results-based financing channeled to private solar and CEC companies	Volume of results-based financing channeled to private solar and clean and efficient cookstove (CEC) companies under the project	Semi-annually	Grant Administrator Semi-annual report	Grant Administrator Monitoring	MINHEM
National Electrification Strategy and Plan prepared and adopted	National Electrification Strategy and National Electrification Plan developed and adopted	Annually	Annual report	MINHEM	MINHEM
Geospatial analysis and planning platform established and operational	Geospatial analysis and planning platform established and operational and relevant staff trained on	Annually	Annual Report	MINHEM	MINHEM



	its use				
Technicians trained in the provision of O&M services for solar systems	Local technicians trained in the provision of O&M services for solar systems	Semi-annually	Semi-annual report	MINHEM PCU	MINHEM
Consumer awareness program developed, with a focus on female members of households and SMEs	Consumer awareness campaign completed under project	Semi-annually	Semi-annual report	MINHEM	MINHEM
Assessment of barriers to female entrepreneurship completed and action plan delivered	Assessment of barriers to female entrepreneurship completed and action plan for mini-grids and standalone system markets delivered	Semi-annually	Semi-annual report	MINHEM PCU	MINHEM
Female employment of mini-grid operators	Female employment of mini-grid operators selected under the project	Semi-annually	Semi-annual report	ABER Monitoring	ABER
Earmarked grants for female enterprises	Earmarked grants for female enterprises	Semi-annually	Grant Administrator Semi-annual report	Grant Administrator monitoring	MINHEM
Grievances received addressed	Percentage of grievances received through the project grievance redress mechanism that are addressed.	Semi-annually	Semi-annual report	PCU Monitoring	MINHEM PCU





## ANNEX 1: Implementation Arrangements and Support Plan

### COUNTRY: Burundi Solar Energy in Local Communities

#### Implementation arrangements

1. The project will be implemented by **MINHEM** over six years. MINHEM will create a MINHEM PCU to coordinate all project activities, with a coordinator, two accountants, as well as energy, health, education, FM, procurement, and E&S safeguards specialists, the latter with specific experience in World Bank fiduciary procedures and E&S requirements. The PCU will be responsible for overall project oversight and monitoring progress and will supervise ABER to ensure effective implementation of project activities. The PCU will also be responsible for consolidation of all information related to project implementation, including (a) sites to be developed by the project, (b) aggregation and consolidation of information from ABER and partners (see below) and broader M&E, and (c) independent verification of project implementation. The PCU will be staffed within four months of project effectiveness.
2. **Component 1.** MINHEM will manage procurement, installation and maintenance of equipment under this component. For the duration of the project, the PCU will maintain a close link with the Ministries of Education (namely *Ministère de l'Éducation, de l'Enseignement Supérieur et de la Recherche Scientifique* (Ministry of Education, Higher Education and Scientific Research, MEESRS) department in charge of school feeding and the BISEM department in charge of school infrastructure and maintenance) and Health (mainly the PBF). Because MINHEM is not familiar with CECs, a UN agency will be contracted by the PCU as a service provider (under output agreement) to assist with installation and maintenance of CECs in schools at the start of the project. During this phase, the UN agency will also be contracted to provide capacity building for the PCU to effectively take over and execute the activities for the remaining duration of project implementation. Following the first batches of contracts, an assessment will be done regarding the capacity of the PCU to carry out the stoves procurement itself, while schools will be supported by the project to ensure maintenance of stoves. Detailed implementation for the use of existing Government maintenance mechanisms for infrastructure of health centers and schools will be detailed in the Project Operations Manual.
3. **Component 2.** The rural electrification agency, ABER, will be responsible for activities related to mini-grid development. ABER will establish a PIU and will be in charge of tendering out asset procurement, installation, and mini-grid operation, and will be the authority in charge of tendering as well as supervision of contract implementation. In particular, ABER will be responsible for providing due diligence on relevant project activities and evaluation of proposals/applications under consideration. It will also be responsible for (a) land acquisition for the construction of mini-grid sites; (b) implementation and monitoring of E&S instruments; (c) preparation of tender documents and management of the procurement process for mini-grid developers; and (d) coordination with AREEN to (i) provide licenses or license exemptions to successful mini-grid developers and to ensure compliance with technical service standards and (ii) monitor mini-grid construction and operation to standard specifications.
4. ABER PIU will carry out fiduciary responsibilities for all activities developed under this component, including managing procurement and payments, subject to 'No objection' from the PCU who will send a request to the World Bank. While the technical and fiduciary capacity of ABER needs to be strengthened, ABER already has experience working with international development partners (EnDev) in the deployment of mini-grids. ABER will be expected to create a PIU, hire a project manager (competitively selected), and appoint dedicated FM, procurement and E&S safeguards staff for the project, who will be supported in the early phase of project preparation and implementation by consultants with



experience in World Bank fiduciary procedures as well as an owner's engineer. A transaction adviser will be hired to facilitate the preparation of the tender documents and to establish and implement the mini-grid procurement process. The PIU should be staffed within four months of project effectiveness.

5. **Component 3.** A grant fund will be established under this component. The fund will be managed by MINHEM through the PCU. In particular, the PCU and Project Steering Committee will competitively recruit a grant administrator (a firm) to manage all grant and RBF windows, including the screening and selection of grant beneficiaries under this Component. Taking into account the experience of the PDLE Project, selection of companies to be supported by the fund will be carried out by a committee composed of representatives from the energy sector and specialists from the Catalytic Fund and supported by TA bringing international expertise in specific applications of solar power and CEC market development. MINHEM will determine the technical criteria for companies to qualify to participate in the grants and voucher program as well as set minimum electrification requirements and quality standards for the market.

6. External expertise and delivery mechanism is needed because the design demands the evaluating entity possess: (a) deep technical, financial and commercial expertise in evaluating and appraising clean energy businesses; (b) financial and organizational systems that are aligned with the need for timely feedback on operational/administrational issues as well as just-in-time financial disbursements considering the dynamic cash flow nature of the commercial solar sector; and (c) regular communication and socialization of the support with private sector companies to attract additional market entrants and build trust on support of the public sector to the private sector. Component 3 will initially be supported by the PCU of the PDLE to train the SOLEIL PCU in establishment and management of the grant fund and procure the grant administrator.

7. **Component 4.** Activities under Component 4 will be procured and supervised by the PCU in collaboration with relevant entities (ABER, AREEN, REGIDESO, and Ministries of Health and Education) for technical inputs. Under Component 4, the PCU will provide targeted marketing and consumer education. An experienced program manager will be competitively selected to support the administration of the program.

8. The PCU will be responsible for M&E of project implementation progress and results indicators as well as progress toward achievement of the PDO. Therefore, the PCU will have a dedicated M&E Officer responsible for M&E and preparing monthly and quarterly progress reports for discussion by the project coordinator and the World Bank during implementation and support missions. The PCU will also have a dedicated gender and community awareness specialist, responsible for informing the public of project objectives and progress, liaising with officials in engaging the county governments and communities, and overseeing actions focused on women's employment and productive uses of energy. The gender and community awareness specialist, also called the CPLO, will play a critical role in ensuring citizen engagement and accessible (including vulnerable groups) consultations at the local level for all project activities.

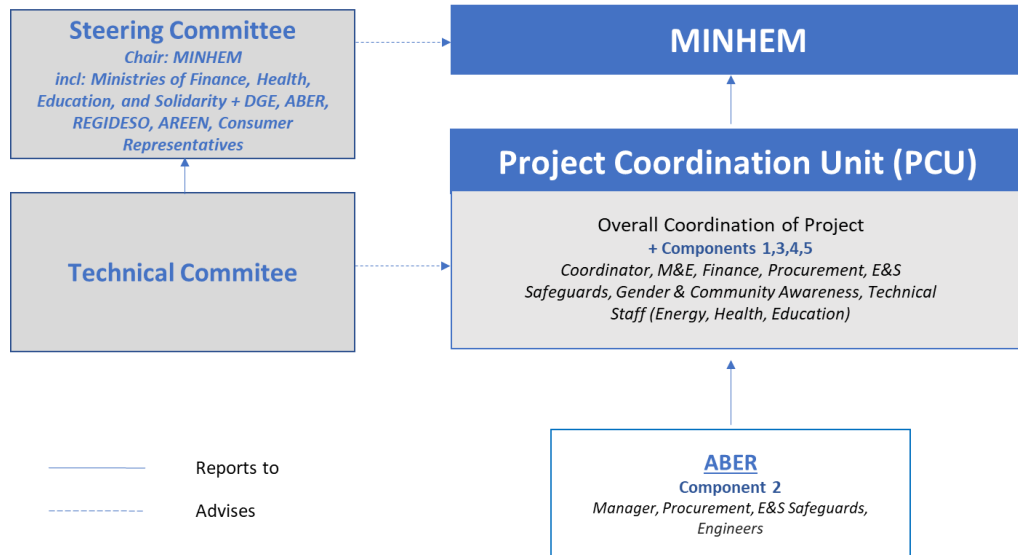
9. **A Project Steering Committee** will be established with high level representatives from MINHEM (as the chair of the committee), the Ministries of Health, Education, Finance, and Solidarity and ABER, AREEN, REGIDESO, and consumer representatives and will meet bi-annually to oversee project implementation, review progress, approve Annual Plans and Budgets, provide policy guidance, and resolve any high-level challenges facing the project.

10. During project preparation, a focal group was created by MINHEM, which includes representatives from MINHEM, ABER, AREEN, REGIDESO, and the Ministries of Health, Education and Finance. MINHEM requested the convening of a weekly focal group meeting, to monitor progress during preparation and identify any emerging issues. Once the project moves to implementation, the focal group will be formally established as the **Project Technical Committee** that meets



monthly. The PCU will report back to the Technical and Steering Committees of the project on a regular basis.

Figure 1.1. Overview of Implementation Arrangements



### Support Plan

11. **To support implementation of Components 1 and 2, TA will be provided under Component 4 to ensure adequate capacity within MINHEM and ABER to oversee the electrification of public facilities and the development of mini grids.** MINHEM and ABER have had some experience with electrification of public facilities and development of mini-grids. However, neither has had experience implementing World Bank financed activities. In both entities, various staff will be appointed to carry out the implementation of the activities, with the creation of a dedicated PCU within MINHEM and PIU within ABER. ABER will also be supported by external consultants experienced in technical, fiduciary and E&S safeguards aspects for at least the first year of project implementation. In addition, a transaction adviser will be hired to support ABER.

12. **To support implementation of Component 3, a grant administrator and program manager will be hired to provide the required technical and financial expertise.** The grant administrator will be competitively selected to ensure the independent management of funds allocated to the off-grid solar and CEC companies, according to the objectives and key performance indicators defined in the grant administrator’s ToRs. The grant administrator will be bound to strictly apply the criteria to be outlined during project preparation to ensure transparency and competitiveness in the use of funds. Outsourcing the implementation of the off-grid component to an experienced grant administrator will address the GoB capacity constraints and lack of experience with the off-grid sector.

13. **MINHEM will also hire an IVA to support monitoring of results.** The IVA will be appointed in accordance with the ToRs to be reviewed by the World Bank. Its main mission will be verifying the transparency and compliance on the part of selected off-grid solar and CEC companies supporting Components 1 and 3.





## ANNEX 2: Economic and Financial Analysis

### COUNTRY: Burundi Solar Energy in Local Communities

1. This annex presents the economic<sup>45</sup> analysis of the SOLEIL project. The analysis uses a cost-benefit framework to determine the development impact of the project and presents the rationale for public sector financing as the appropriate vehicle for its delivery. It also presents the value added of the World Bank's support and how it maximizes the development impact of staff efforts.

2. The analysis finds that the project is economically viable with an EIRR of 44 percent and an NPV of US\$60.9 million at 6 percent discount rate. The NPV of the project increases to US\$70.6 million and the EIRR to 52 percent when accounting for emissions reduction. The results remain robust under significantly higher-cost and lower-benefit scenarios with a positive NPV with cost increase of up to 43 percent.

#### PROJECT RATIONALE AND DEVELOPMENT IMPACT

3. Low electricity access rates in Burundi inhibits human capital development, and its effects are more profound on the poor, women and children. Thus, access to affordable and sustainable electricity remains top of development strategies, with a goal of 30 percent access rates by 2030. In addition, traditional cooking stoves pose a health and environmental burden in Burundi. Households in rural areas typically cook with wood or residues on the traditional three stone stove, while urban households use charcoal in metal or metal-ceramic combination stoves; this puts tremendous pressure on woodstock. Therefore, provision of CEC is a priority as it has direct benefits for women and children, who have primary exposure to these cooking practices, as well broader impacts on the environment.

4. The tight fiscal space of the GoB makes it difficult to extend the grid at a pace rapid enough to ensure universal access by 2030. Over the last 14 years, the average change in electricity access rates have been estimated at around 6 percent. A simple analysis of the trends over the last two decades indicates that at the current pace, universal access cannot be achieved until 2056. This implies that many people in Burundi, especially in rural areas will be excluded from the vast opportunities that access to modern energy services provide.

5. Electricity access rates are not only low among households but also in health and education facilities. Only 5 percent of the 4,000 primary schools (*écoles fondamentales*), 36 percent of the 980 secondary schools (*écoles post fondamentales pédagogique générales*) and 67 percent of the technical secondary schools (*post fondamentales techniques*) have functional electrical installations. While national, regional and district hospitals usually are electrified, only 30 percent of the 943 health centers are electrified.<sup>46</sup>

6. The project leverages energy as a fundamental catalyst of human capital development by strengthening health and education service provision and developing productive activities in rural areas. In particular, the proposed project aims at expanding access to energy services for Burundian households, businesses, and health and education facilities in rural areas. A broad range of electrification solutions will be leveraged to meet the diverse needs of these beneficiaries,

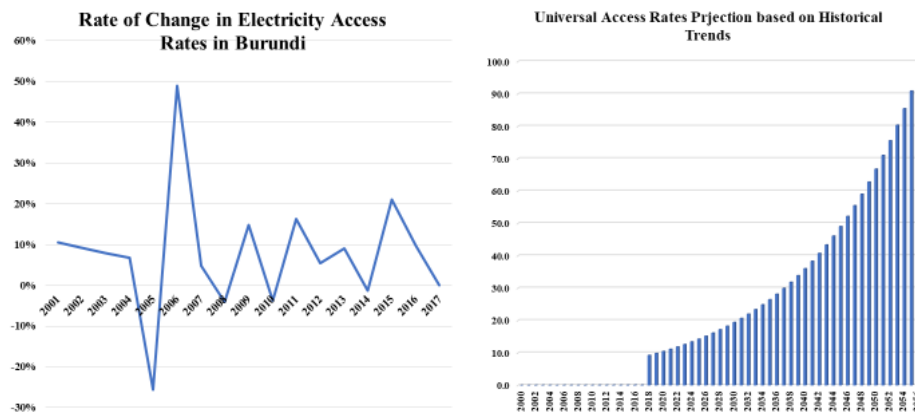
<sup>45</sup> The economic analysis is consistent with the following guidelines: (a) World Bank IPF Policy and Directive (b) Power Sector Policy and Investment Projects: Guidelines for Economic Analysis, and (c) Discounting Costs and Benefits in Economic Analysis of World Bank Projects 2016.

<sup>46</sup> Data provided by ENABEL. Health centers receive electricity either through a grid-connection to REGIDESCO (11 percent) or from a stand-alone solar PV system (19 percent).



including solar systems and mini-grids. The project also includes a clean cooking component that aims to provide more efficient, safer, healthier, time-effective and sustainable cookstoves for households and schools.

**Figure 2.1. Household Electricity Access Rates in Burundi**



### Methodology: Cost-Benefit Analysis

7. This economic analysis follows a standard cost-benefit framework, which compares the present value of incurred costs to the stream of attributable benefits. The EIRR and NPV of the project inform the project’s viability over its economic life-time. The economic benefits of the project are assessed using the avoided-cost approach (for Component 1 and 3) and willingness- to- pay approaches for Component 2. The project benefits are quantified as the costs of electricity services in non-electrified households and institutions that would be replaced by the solar systems, mini-grids and CECs. These services include lighting (provided largely by kerosene lamps, candles and torch cells), TV and radio (provided largely by dry cells and rechargeable batteries), and cooking (provided by firewood and charcoal). Net benefits of the project were calculated by comparing the economic costs and benefits of the ‘with Project’ and ‘without Project’ scenarios.

8. The avoided-cost approach estimates the lower bound of economic benefits as it does not account for the greater level and quality of service that such systems can provide employment generation, health benefits derived from the displacement of alternate sources of electrification services such as kerosene and wood, the avoided health hazards from unsafe cookstoves, and the range of local environmental and social externalities such as forest conservation. As such, the results of the economic analysis are conservative estimates of the economic returns of the project.

9. **Project Benefits.** The evaluation of the project benefits is confined to the activities that generate benefits for which an economic value can be clearly identified and measured, that is, investments under Components 1, 2 and 3. The benefits of the TA component are excluded from the assessment because of the difficulty in valuing the outcomes of such activities.

10. The economic benefits of the project identified include (a) increased access to electricity for schools and health centers; (b) increased access to electricity for enterprises; (c) increased access to electricity for households; (d) reduced indoor air pollution; and (e) reduced deforestation. The project also presents some indirect benefits which include increased economic activity and household incomes, improved quality of energy services, improved test scores for students, and enhanced health services. These indirect benefits are discussed, but not included in the evaluation of project benefits.

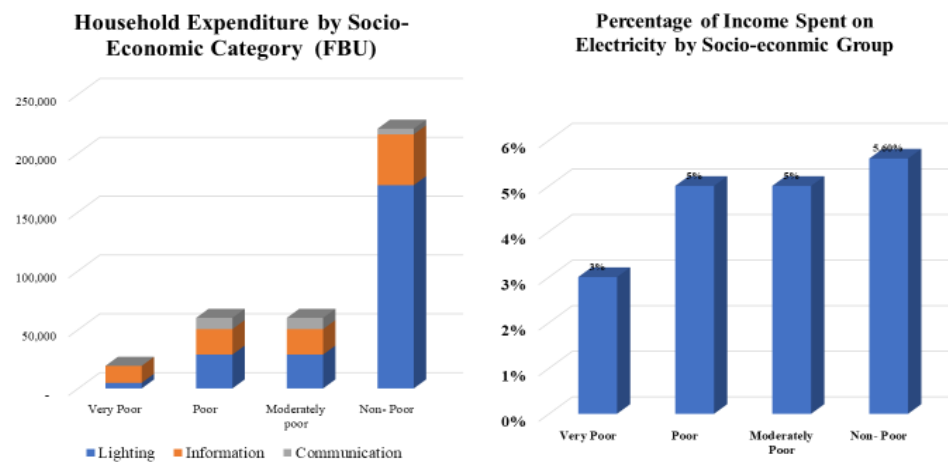


11. **Electricity for schools and health centers.** The economic returns from electrifying schools and health centers are estimated as the avoided costs of electricity from diesel gensets. With the emerging emphasis on institutional access to electricity, it is expected that in the absence of this project, diesel gensets would be used to provide these services; diesel is already used in health centers. Electricity from diesel production is assumed to cost 0.46 cents per kWh.

12. **Clean cook stoves.** The clean cooking component also offers important economic, health and environmental benefits. However, the health benefits of CECs in this analysis are not included as data requirements for such an analysis are limited. Using a conservative estimate of 30 percent wood efficiency, the benefits of clean-cooking as the value of conserved fuel due to CEC are estimated. In a recent study, 95 percent of respondents reported using wood as a source of energy for cooking, and 5 percent use charcoal. Firewood is often collected on personal properties and often done by women and children. When fuel is purchased, it was estimated that the monthly cost of wood for two weeks and a month was FBu 6,000 and FBu 10,000 respectively. With the new and improved CEC, households are expected to save 30 percent of these costs reducing the annual expenditure from FBu 120,000 to FBu 84,000. The savings of FBu 36000 per household represents the economic returns of the project for each household. A conservative assumption is made that each school uses twice the quantity of wood used by households. Based on this, it is estimated that each school saves FBu 72,000 on wood expenditure with CECs for the school feeding program.

13. **Household expenditures on electricity.** To characterize the ability of rural households to pay, this analysis refers to the Food and Agriculture Organization (FAO) socioeconomic categorization of household incomes and expenditures. Households are classified as Very Poor, Poor, Moderately poor and non-poor. A study by AVSI<sup>47</sup> and by the information collected by the municipal administrators (six out of six visited) identified that 20 percent, 35 percent, 29 percent, and 16 percent of the population could be classified as Very Poor, Poor, Moderately poor, and non-poor, respectively. The AVSI study also found that energy use was a function of household income. Households commonly used electricity for lighting, information and communication in the surveyed area.<sup>48</sup> It was estimated that expenditures on lighting, radio, and telephone charging were about 3 percent for the poorest, 5 percent for the poor and moderately poor, and 5.6 percent for the non-poor. The study found that the monthly expenditure that each socio-economic category can afford to dedicate to electricity services is FBu 1,500 for the very poor, FBu 5,000 for the poor, FBu 10,000 for the moderately poor, and FBu 22,800 for the non-poor. Thus, on average, households spend US\$62.65 on electricity annually.

Figure 2.2 Household Expenditures on Electricity in Burundi



<sup>47</sup> This involved a visit to 11 out of 18 sites with 22 focus groups attended by at least 550 people).

<sup>48</sup> These three uses are basic and are not exhaustive in the case of middle and better-off categories who also have other uses.



14. **Project costs.** The economic costs were estimated based on the preparatory studies developed for the project and adjusted to remove duties and taxes. The total economic cost of the investment component is estimated at US\$80 million that is assumed to be disbursed over a five-year period across the different project components. The economic costs of the CAPEX and the operating expenditures (OPEX) have been estimated on an individual (per project component) basis. However, for the project implementation, it is expected that the different components will be bundled and tendered based on geographical clusters as this will maximize the economies of scale in the provision of the installation and maintenance activities.

15. The project will invest in providing off-grid energy solutions. The technical solutions include the (a) provision of 400 CECs and solar systems for 400 primary schools that are part of the National School Canteen Program, (b) provision and maintenance of solar systems for 400 health centers, (c) provision of 31,000 connections to mini-grids, and (d) provision of solar products to 65,000 households and CECs to 300,000 households. The estimated economic capital investment costs (CAPEX) of the components and the yearly economic cost for the O&M (OPEX) activities for each project component are summarized in table 2.1.

**Table 2.1. Estimated Economic Costs Per Technology Solution and Beneficiary (excluding taxes and duties)**

Project Components	Description	Capital Cost (US\$)	Operating and Maintenance Cost	Financing (US\$ million)
<b>Component 1:</b> Energy Services for Schools and Health Centers	CECs, solar kits, and community services for 400 schools; stand-alone solar systems and maintenance for 400 health centers	US\$14,170 per school; US\$41,250 per health center	6 percent (yearly) for schools; US\$900 for maintenance and initial component replacement at health centers	27
<b>Component 2:</b> Energy Services for Rural Communities	45 mini-grids, each connecting 550 households and 100 commercial/institutional users	US\$777,850 per system	7 percent (yearly)	37
<b>Component 3:</b> Energy Services for Households, including the poor and vulnerable	65,000 SHSs distributed; 300,000 CECs distributed	SHSs US\$150 per unit (with an expected lifespan of five years); CECs US\$40 per unit	3 percent (yearly)	17

### Other Assumptions

16. **Discount rate.** An economic discount rate of 6 percent is assumed in the absence of a reliable growth projections of Burundi, in accordance with World Bank guidelines.

17. **Consumption levels.** Consumption levels for schools and health centers are estimated based on the estimates by the United States Agency for International Development (USAID) in Kenya. USAID assumed a consumption rate of 5 - 10 kWh for health centers; given the high population density and lower quality of life in Burundi means that demand on health centers may be particularly high, a consumption estimate of 10 kWh per health center per day is assumed. For schools, electricity demand is conservatively estimated at 1 kWh a day for each school.



18. **Market penetration.** For Component 3, a market penetration of 85 percent for the very poor and the poor, and 90 percent for the moderately poor and non-poor is assumed. The risk of overestimating the market penetration assumption is therefore small.

19. **Project life.** The economic life of the project is assumed to be 5 years for Subcomponent 1.1, 10 to 15 years for Subcomponent 1.2, 20 years for Component 2 and 5 years for Component 3. The project life for Subcomponent 1.2 is extended by an additional 5 years for all project beneficiaries and 10 years for 50 percent of the project beneficiaries.

20. **Exchange Rates.** An exchange rate of US\$0.00053 to 1 Fbu is assumed.

**Results**

21. The analysis finds the project to be economically viable with an EIRR of 44 percent and an NPV of US\$60.9 million at 6 percent discount rate.

22. The economic viability of the project is further enhanced when incorporating benefits from reduction in GHG emissions. A total of 102,361 tons of CO<sub>2</sub> of emissions are avoided through the project. Accounting for emissions reduction increases the NPV to US\$70.6 million and EIRR to 52 percent.

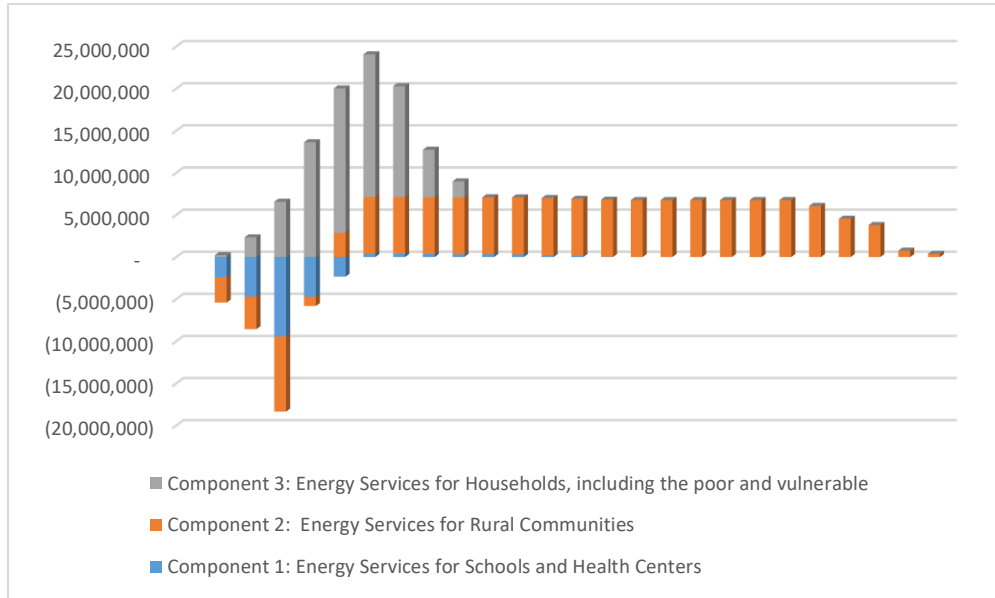
23. Table 2.2 shows key results from the analysis and figure 2.3 shows the contribution of the various components of the project to the NPV. The project breaks even in 2026 and crosses the hurdle rate of 6 percent in year 2027.

**Table 2.2 Key Results from the Economic Analysis**

Composition of NPV	Net Value at Discount Rate of 6% (US\$ millions)
Total Cost	107.7
OPEX	64.4
CAPEX	43.3
<b>Total Benefit without GHG</b>	<b>168.6</b>
<b>Total Benefit with GHG</b>	<b>178.3</b>
<b>Net Benefit without GHG</b>	<b>60.9</b>
<b>Net benefit with GHG</b>	<b>70.6</b>
<b>EIRR without GHG</b>	<b>44%</b>
<b>EIRR with GHG</b>	<b>52%</b>



Figure 2.3. Net Benefits of the Project (excluding climate classification benefits) (US\$ millions)



24. **Sensitivity Analysis.** A sensitivity analysis in the form of switching values has been performed to the economic analysis to test the robustness of the economic results to changes in the cost components of the project. The analysis is performed as a stress case scenario, assuming all CAPEX or OPEX components increase at the same time. This scenario is estimated to be a low probable one since the proposed project consists of three different investment components that are not directly interlinked, except for the fact that they could be bundled to maximize the economies of scale during project implementation. Nonetheless, this stress case provides valuable information on the overall resilience of the economic analysis to changes in the cost components of the project.

25. The results show that the project remains economically viable up to cost increase of 43 percent. Also, the analysis indicates that the economic viability of the project may depend on the market penetration of the SHSs which can be ascertained after designing the subsidy structure.



## ANNEX 3: Financial Management and Disbursement Arrangements

### COUNTRY: Burundi Solar Energy in Local Communities

#### I. Overview

1. It has been agreed that a new PCU will be established within MINHEM to ensure the day-to-day coordination of the project's FM activities for Components 1, 3, 4 and 5, while ABER will retain FM responsibility of project activities under Component 2.
2. The FM assessments of the proposed PCU arrangement and ABER were carried out to determine whether they have acceptable FM arrangements in place. The assessments have considered the degree to which (a) reasonable records are maintained and financial reports produced and disseminated for decision making, management, and reporting; (b) funds are available to finance the project; (c) there are reasonable controls over project funds; and (d) independent and competent audit arrangements are in place. The FM assessments were carried out in accordance with the World Bank Directive: Financial Management Manual for World Bank IPF Operations, issued on February 4, 2015, and latest revision on February 10, 2017 and the World Bank Guidance Financial Management in World Bank IPF Operations, issued and effective February 24, 2015.
3. Both the MINHEM PCU and ABER PIU are yet to be established and lack experience in managing World Bank financed projects. In addition, the project will manage many transactions. The inherent country fiduciary risk is high; there is a lack of experience managing grant funds to develop the off-grid market; and there will be two implementing agencies and the need to coordinate with other ministries during project implementation.
4. The conclusion of the assessment is that the FM risk is High and mitigation measures have been proposed to address some of the issues and fiduciary risks identified.
  - a. Experienced FM staff (FMs, accountants and Internal auditor) will be recruited to coordinate the day-to-day financial activities of the project at the PCU level.
  - b. ABER is planning to detach some of its staff to be dedicated to the project and long-term qualified consultants will be hired to support this team during a given period.
  - c. Under Component 1:
    - i. A UN agency will be contracted by the PCU as a service provider (under an output agreement) to install and maintain CECs in schools during a defined period. The agency will also provide capacity building for the PCU to subsequently execute these activities.
    - ii. The project will leverage the existing mechanisms of the Ministries of Health and Education to ensure preventive maintenance of the equipment provided to the health centers and schools.
  - d. Under Component 3, the PCU will recruit an independent consulting firm ('grant administrator') which will carry out the selection of the beneficiaries of the grants under this component.



- e. The PCU and ABER will acquire an accounting software (TOMPRO highly recommended) to maintain the project accounts and generate all the required financial reports (IFRs, withdraw applications, and project financial statements).
  - f. The PIM that includes FM procedures should be developed by the PCU by the effectiveness date of the project.
  - g. An independent audit firm will be recruited for the audit of the project financial statements (shortlist and ToRs should be submitted for World Bank 'no-objection') no later than six months after project effectiveness.
5. Once these risk mitigation measures are implemented, the residual risk rating should be **Substantial**.

## II. Staffing

6. **PCU/FM unit.** Staff will be responsible for ensuring compliance with the FM requirements of the World Bank including preparing and submitting the quarterly unaudited IFRs and audited annual financial statements (AFSs) to IDA. It will maintain adequate FM arrangements to support the deployment of project resources in an economic and effective manner to achieve the stated development objectives. The PCU will be staffed with an experienced FM team comprising the following:

- a. a qualified and experienced FM specialist (*'Responsible Administratif et Financier'*, RAF) with tracked experience in accounting, and FM.
- b. At least one accountant and one assistant accountant to handle the project's accounting system and records with tracked experience in accounting in private sector. Experience on the World Bank or international donors' projects should be an asset, experience with accounting software such as TOMPRO should be an asset, and so on.
- c. A qualified and experienced internal auditor.

7. **ABER/FM unit.** ABER will be implementing Component 2 of the project. For this purpose, ABER will transfer some of its current staff to the dedicated unit to be set up. This team should comprise at least one FM specialist and one accountant. This team will be handling the day-to-day activities of Component 2.

8. ABER will also recruit two senior consultants (FM and accountant) to strengthen the capacity of the dedicated team for one or more years. The project unit will acquire a simplified version of the accounting software to record the transactions and facilitate the integration of its transactions in the accounting system of the PCU. Key administrative and accounting procedures with key internal control procedures from transaction initiation, review, approval recording, and reporting will be developed with clear segregation of duties at the central level and the implementing agency level.



### III. Planning and Budgeting Arrangements

9. The annual work plan and budget (AWPB), along with the disbursement forecast, will be developed by the PCU with input from different implementing agencies both at the central and decentralized levels. Review and approval process as well as the budget will be detailed in the PIM and monitored by the fiduciary unit within the PCU. The FM team should ensure that the annual budget is integrated in the accounting system to ensure automated monitoring of the budget. The quarterly IFRs will be used to monitor the execution of the consolidated AWPB. However, each implementation agency should set up budget monitoring of its annual workplan.

### IV. Accounting Arrangements

10. The current accounting standards in use in Burundi for ongoing World Bank-financed projects will be applicable to the proposed project. A multi project software capable of generating reports such as the IFRs, withdraw applications, bank reconciliations, and financial statements will be purchased. The project code and chart of accounts will be developed to meet the specific needs of the project and documented in the PIM. The FM software should be operational no later than four months after the effectiveness of the project.

11. **Internal control and internal auditing arrangements.** Key administrative and accounting procedures (including in the PIM), with key internal control procedures from transaction initiation, review, approval recording, and reporting will be developed with clear segregation of duties at the central level and the implementing agency levels. ABER should develop a light manual of procedures to manage the projects operations. As a condition for disbursement, the PCU will need to develop a specific manual of procedures for managing Component 3. The PCU/FM staff should ensure that during the implementation of the project, the proposed procedures defined in the PIM are adequately carried out to ensure that funds are used for the intended purposes.

12. Table 3.1 below summarizes the risk assessment and key mitigations measures agreed.

**Table 3.1. Risk Assessment and Mitigation Measures**

Risk	Risk Rating	Risk-Mitigating Measures Incorporated into Project Design	Conditions for Effectiveness (Y/N)	Residual Risk
<b>Inherent risk</b>	<b>S</b>			<b>S</b>
<b>Country level.</b> Burundi is a high-risk country from the fiduciary perspective. The Public Expenditure and Financial Accountability (2008, 2014) as well as the UCS reports outlined weaknesses in public financial management (PFM) at both the central and decentralized levels.	H	The Government is committed to a reform program that includes the strengthening of PFM through an IDA project ( <i>Projet De Renforcement des Capacités</i> ). This project will enhance the Government's institutional capacity to adopt and use IDA FM procedures.	N	H
<b>Entity level.</b> MINHEM and ABER have limited capacity in managing World Bank-financed projects. Giving fiduciary responsibility to the civil servants with no experience in managing World Bank financed projects may undermine the FM	H	New PCU to be established. The PCU will be staffed with experienced staff. The staff should be recruited competitively.	N	S



Risk	Risk Rating	Risk-Mitigating Measures Incorporated into Project Design	Conditions for Effectiveness (Y/N)	Residual Risk
performance of the project.				
<p><b>Project level.</b> The project is complex with several agencies involved, some are not yet clearly identified at this stage of project preparation, there are thousands of beneficiaries, and so on. This may inherently increase the risk exposure to the transparent use of project funds.</p>	H	<p>New PCU to be established. Competent and experienced fiduciary staff will be recruited competitively.</p> <p>Staff appointed by MINHEM to prepare the project should be provided support by other existing PIUs and external consultants during the transitional period of 12 months maximum.</p> <p>ABER's FM team will receive TA during at least the first 12 months.</p> <p>A PIM (including FM procedures) will be developed.</p> <p>The project will benefit from the experience of other existing project arrangements (for example PDLE) to limit the delay in establishing the project implementation arrangements</p>	<p>N</p> <p>N</p> <p>N</p> <p>Y</p> <p>N</p>	S
<b>Control Risk</b>	S			S
<p><b>Budgeting.</b> The AWPB may not be reliable or may not reflect project needs. Risk of cost overruns and adverse variations in expenditure could arise due to potential slow implementation and depreciation of local currency.</p> <p>The PCU team may not put in place appropriate tools to monitor the budget and provide reliable information for decision making. The difficulty for the PCU to produce a consolidated annual workplan and ensure an appropriate budget monitoring is presenting a potential risk as the project involved many implementing agencies.</p>	H	<p>The PIM will define the arrangements for budgeting, budgetary control, and the requirements for budgeting revisions. Annual detailed disbursement forecasts and budget will be required. The IFRs will provide information on budgetary control and analysis of variances between actual and budgeted expenditure.</p> <p>Accounting software will be a parameter to allow the PCU to get accurate and timely budget monitoring. The annual budget should be integrated in the software.</p>	Y	S
<p><b>Accounting.</b> Poor policies and procedures and delays in keeping reliable and auditable accounting records.</p>	S	<p>Accounting procedures will be documented in the PIM.</p> <p>The FM functions will be carried out by qualified staff (RAF and at least two accountants).</p>	<p>Y</p> <p>N</p>	S





Risk	Risk Rating	Risk-Mitigating Measures Incorporated into Project Design	Conditions for Effectiveness (Y/N)	Residual Risk
<b>Auditing.</b> Poor quality audit Delays in submitting financial audit reports; Delays in the implementation of audit recommendations	S	Only qualified audit firms will be shortlisted.  The ToRs for the auditor as well the short list will be reviewed by the World Bank.  The IFR will be produced on a quarterly basis and the project financial statements will be made available by three months after the end of the fiscal year.	N	M
<b>Governance and accountability.</b> Possibility of circumventing internal control and abuse of administrative positions are potential risks; mis-procurement and so on, is a critical issue.	H	(a) The PIM including FM Procedures Manual will be developed for the implementation of the activities of the project; (b) robust FM arrangements will be designed and their operating effectiveness monitored during FM implementation support missions; and (c) measures will be taken to improve transparency such as providing information on the project status to the public; and (d) FM supervision will be increased, if necessary.	Y for (a)	S
<b>OVERALL FM RISK</b>	<b>H</b>			<b>S</b>

Note: H = High; S = Substantial.

**V. Reporting Arrangements:**

13. The PCU will record and report on project transactions and submit to the World Bank IFRs no later than 45 days after the end of each calendar quarter. At a minimum, the financial reports must include the following tables with appropriate comments: (a) sources and uses of funds; (b) uses of funds by project activity/component and comparison between actual expenditures and budget; (c) uses of funds by project categories (refer to the Financial Agreement) and comparison between actual and cumulative expenditures and budget; (d) DA activity statement; and (e) notes to the IFR. The PCU will be responsible for collecting and recording all the financial information and for preparing the consolidated IFRs.

14. At the end of each fiscal year, the project will issue the project financial statements, comprising (a) a balance sheet; (b) a statement of sources and uses of funds; (c) a statement of budget execution; (d) accounting policies and procedures; and (e) notes related to significant accounting policies and accounting standards adopted by management and underlying the preparation of financial statements. Detailed reporting requirements from the PCU and ABER will be defined in the PIM.



**External Auditing Arrangement.**

15. An independent and qualified external auditor will be recruited based on ToRs acceptable to the World Bank. The external audit will be carried out according to International Standards on Auditing and will cover all aspects of project activities implemented and will include verification of eligibility of expenditures and physical verification of goods and services acquired. Audit reports must be submitted to IDA within six months after the end of each fiscal year. The project will comply with the World Bank disclosure policy of audit reports (for example, making them publicly available promptly after receipt of all final financial audit reports, including qualified audit reports) and disclose the report on the official website within one month after the final version is accepted.

**VII.Funds Flow Arrangements**

16. Funds will flow from the grant account to the DA opened at the Central Bank by the Government in US dollar. For payment in local currency purpose, the PCU should open a DA in local currency at the Central Bank or any commercial bank. This local currency account will be replenished from the DA in US dollar or will serve to capture revenue resulting from the sale of bidding documents and balances on expenses not entirely spent. It is also recommended that ABER opens separate World Bank account to receive the funds for the activities it will manage under Component 2.

17. To manage the FOREX risks and constraints, the payments of the solar equipment’s suppliers should be done as possible through direct payment or by the PCU through the DA.

18. The PCU may also use digital payment service provider (mobile money or cash transfer) for payment to ensure that final targeted beneficiaries are effectively reached.

19. The World Bank will make direct payment to relevant UN agency retained to support implementation of Component 1.

**VIII.Governance and Accountability.**

20. The risk of fraud and corruption within project activities is substantial, given the country context, the nature of the project (many solar systems to be distributed to school and health centers) with limited ability to frequently conduct inventories, and the variety of key players involved. The effective implementation of the proposed fiduciary mitigation measures should help strengthen the control environment.

**IX.FM Action Plan.**

21. An FM action plan has been developed to mitigate the overall FM risks.

**Table 3.2. FM Action Plan**

No.	Action	Due By	Responsible
1	Recruit a qualified and experienced finance specialist (RAF) and at least two accountants (accountant + an assistant)	Four months after project effectiveness	Government with the support of the Jiji and Mulembwe PCU
2	Develop the PIM that includes FM procedures	By the effectiveness date of the project	Government with the support of Jiji and Mulembwe PCU
3	Acquire accounting software (TOMPRO) package that would be used to maintain the	Four months after the project effectiveness	PCU



No.	Action	Due By	Responsible
	project accounts for the PCU / and light version for ABER		
4	Recruit an independent audit firm for the audit of the project financial statements (short list and ToR submitted for World Bank 'no-objection')	Six months after project effectiveness	PCU
5	Set up ABER FM unit and recruit the consultants	Four months after project effectiveness	PCU/ABER
6	Develop ABER's administrative and financial procedures for the project unit	Four months after project effectiveness	PCU/ABER

**X.Supervision Plan.**

22. Supervision missions will be conducted over the project's lifetime. The project will be supervised on a risk-based approach. Supervision will cover but not be limited to the review of the audit reports and IFRs and advice to the task team on all FM issues. Based on the current residual risk rating (Substantial), the project will be supervised at least twice a year and may be adjusted when the need arises.

**Table 3.3. Implementation Support Plan**

FM Activity	Frequency
<b>Desk reviews</b>	
IFR review	Quarterly
Audit report review of the program	Annually
Review of other relevant information such as interim internal control systems reports	Continuous as they become available
<b>On-site visits</b>	
Review of overall operation of the FM system	Semiannually (implementation support mission)
Monitoring of actions taken on issues highlighted in audit reports, auditors' management letters, internal audit, and other reports	As needed, but at least during each implementation support mission
Transaction reviews (if needed)	As needed
<b>Capacity-building support</b>	
FM training sessions by World Bank FM team	Following the project transition and thereafter, as needed

**XI.Disbursements**

23. A DA will be opened at the Burundi Central Bank on terms and conditions acceptable to IDA under the fiduciary responsibility of the PCU. ABER and any other IA will also open a separate bank account for the project activities. Replenishments to the DA will be made against withdrawal applications supported by Statements of Expenditures or records and other documents as specified in the Disbursement Letter. Upon project effectiveness, transaction-based disbursements will be used. The option to disburse against submission of quarterly unaudited IFRs (also known as report-based disbursements) could be considered subject to the quality and timeliness of the IFRs submitted to the World Bank and the overall FM performance as assessed in due course. The other methods of disbursing funds (reimbursement and direct payment) will also be available to the project. The project will have the option to sign and submit withdrawal



applications electronically using the e-signatures module accessible from the World Bank’s Client Connection website. Details will be provided in the PIM.

24. In addition to the DA, the project will open an account denominated in Burundian francs at the Central Bank or at any commercial bank to capture revenue resulting from the sale of bidding documents and balances on expenses not entirely spent.

**Table 3.4. Eligible Expenditures by Category under IDA Grant**

<b>Category</b>	<b>Amount of the Grant Allocated (expressed in SDR)</b>	<b>Percentage of Expenditures to be Financed (inclusive of taxes)</b>
(1) Goods, works, non-consulting services, and consulting services, Training and Operating Costs for the Project except Part 2.	25,400,000	100%
(2) Goods, works, non-consulting services, and consulting services, Training and Operating Costs for Part 2 of the Project	26,800,000	100%
(3) Maintenance Grants under Part 1.B of the Project	8,700,000	100%
(4) Subgrants under Part 3 of the Project	11,500,000	100%
(5) Emergency Expenditures under Part 5 of the Project.	0	
<b>TOTAL AMOUNT</b>	<b>72,400,000</b>	



## ANNEX 4: Status of Off-grid Market in Burundi

### COUNTRY: Burundi Solar Energy in Local Communities

#### Status of Off-grid Market

1. A preliminary assessment of Burundi's market for off-grid solar products and CECs was performed and concluded that the market is nascent. However, several companies with potential to grow the clean energy market are already operating in Burundi, especially in improved cooking. There is also interest of proven regional companies in expanding to Burundi and high international manufacturers already working to cultivate partnerships with local companies.
2. Several successful initiatives have happened in the stove arena, with technical support from German Endev-GIZ, Italian AVSI, UNHCR and the WFP, all of which provided technical development and dissemination of stoves both on a purchase and distribute as well as market-oriented basis. As a result, at least three mid-size companies are active in the production of CECs as well as 10 to 15 smaller artisan groups. They collectively have disseminated over 100,000 individual stoves of various designs in refugee camps and at the household level; these stoves remain simple and cheap to fit local purchase capacities but are nonetheless improving on the current baseline. In addition, three mid-size briquetting companies are actively producing and selling large briquettes based on compacted harvest residues and are selling these products to institutional or large users such as army camps, refugee camps, schools, restaurants or bakers-butchers in substitution of wood. At least one of these briquette manufacturers also produces stoves and is looking into modifying its tooling to target households, should it obtain financial and technical support.
3. Four companies are also selling quality verified solar products, with One Acre Fund having sold 17,000 lanterns from 2012 to 2018, with 6,000 sold in 2018 alone. However, the market is still considered nascent, as most activities were halted during the conflict in 2015 that limited private sector access to FOREX and have only begun to pick up again in the last two years.
4. Discussions were held with key partners and private sector companies active in the Burundian clean energy market to assess what financial and non-financial barriers exist, which if eased, would enable them to scale quickly and more effectively. Some of the key challenges that private sector companies in Burundi are facing include the following:
  - a. **Access to foreign currency** in Burundi is limited, tightly regulated, and has only been available in the past few years for national-level strategic purchases. The private sector will require foreign currency to import equipment and its only current source is the black market, with a high premium of over 50 percent.
  - b. **Collateral:** Burundian banks have shown a lack of willingness to accept commercial risk with SMEs and require extensive collateral, usually at least 100 percent of the borrowed amount.
  - c. **High interest rates.** Burundi is still facing a high interest rate environment. Micro, small and medium enterprises are offered rates between 9 percent and 24 percent and require heavy collateral, thus inhibiting access to finance. Local currency finance will be essential for long term company growth.





- d. **Affordability.** Nearly two-thirds of Burundians are poor and live below the national poverty line; and 39 percent even live in extreme poverty and cannot meet the minimum nutritional requirements of 2,200 Kcal per adult equivalent per day. The country is now the second poorest in Africa after Malawi. Furthermore, around half of the non-poor population stagnates at a consumption level right above the poverty line, within a range of around US\$0.5 per capita per day (in 2011 purchasing power parity) and are therefore prone to fall back into poverty in case of unexpected economic shocks. Creative financing mechanisms targeted at both suppliers and consumers will be required to bring down product costs and fully service rural markets.
- e. **Political risk.** Key SHS providers and their investors may prefer to invest in other countries, given the political risk surrounding the upcoming 2020 elections, which would significantly slow the development of the Burundian market.
- f. **Market insights.** Burundi lacks an in depth, national, and comprehensive description and assessment of the market issues relevant for capable SHS companies to make business decisions.
- g. **Lack of capacity to test and ensure quality control.** The country lacks means, knowledge and enforcement capacities to reassure serious CEC or solar products investors that they will not be undercut by cheap low-quality products.

#### Role of SOLEIL

5. The goal of Component 3 of SOLEIL is to significantly increase the market for stand-alone solar products and clean cookstoves in Burundi to provide access to electricity to 65,000 and clean cooking to 300,000 Burundian households without any access to clean energy. Overall, latent demand for solar products and CECs tends to be high in Burundi. The gap, therefore, is one of supply, financing, and awareness: the shortage of capable providers of solar and cookstoves as well as the dearth of FOREX and consumer financing combined with limited awareness of the benefits of these technologies makes the purchase of these solutions out of reach for most Burundian consumers.
6. The focus for accelerating the market under Component 3, therefore, is to encourage those capable providers to enter the market, invest in growing their operation, and reach rural consumers. This will be done using a grant-based approach which has been catalytic for building a private sector led clean energy market in other countries.
7. In an effort to grow the clean energy sector in Burundi and overcome the barriers described earlier, SOLEIL will offer three different types of grants to the private sector:
  - a. Start-up grants for companies with viable, scalable and sustainable business models to initiate their operations in Burundi and pilot new approaches.
  - b. Grants for early stage growth of clean energy businesses. These grants will be partially results-based and disbursed based on pre-determined business plan milestones
  - c. RBF for quality verified solar and CEC products to support the penetration of high-quality products in the Burundian market and build customer confidence in these products. These grants will be provided against verified sales/installations of quality-certified products.
8. The project targets all areas of the country, but additional grant incentives may be awarded to companies operating in particular geographic areas of strategic interest such as those surrounding the public institutions identified in Component 1 or the mini-grids of Component 2 to maximize the impacts across components.
9. In small, nascent, and risky markets such as Burundi, a well-designed grant mechanisms can play a catalytic role

by de-risking the market entry of experienced clean energy companies into the Burundian market supporting the growth of young, local businesses, cooperatives, or NGOs who are not yet ready to take on debt or investment, and encouraging businesses in related sectors (such as telecoms, MFIs, and agri-businesses) to pilot new business models. By taking the early risk and proving the market, the project will then be able to attract additional finance to the market that can begin to address the working capital and FOREX needs of the private sector. Many private investment funds have also emphasized the need for grant capital in this market as they will only be able to enter the Burundian market pending the successful scale up of these nascent startups or the entry of experienced companies that can take on US\$300,000-US\$400,000 in debt capital.

### Solar and CEC Companies

10. Table 4.1 below provides an extended overview of the current private sector company activities in clean energy.

**Table 4.1 Current Activities of Solar and CEC Companies in Burundi**

Company Name	Product Type	Description
Greenbox Solar	Lanterns and SHS	Actively importing and selling Lighting Global certified solar products to NGOs and MFIs and preparing to establish a direct to consumer PAYGO operation.
FEST	SHS	MFIs participated in an EnDev program, where they provided SHSs on credit to customers. They are interested in continuing these activities. 80 members took advantage of the loan product during the pilot.
Virago	Lanterns and SHS	Local retailer that imports and sells Lighting Global certified solar products through its network of shops in addition to other fast moving consumer goods. Only 15 products sold to date.
Nambiar	Lanterns	Intern services provider that imports and sells solar products through its shop.
ITCO	Lanterns and SHS	Actively importing and selling Lighting Global certified solar products as well as running a PAYGO pilot.
Bizisol/Star Systems	Lanterns and SHS	Actively importing and selling Lighting Global certified solar products through a direct to consumer PAYGO operation.
Burundi Quality Stoves	Clean stoves and briquettes	Producing improved stoves (clay and clay-metal) as well as briquettes. Looking into the production of agricultural residue char pellets as a replacement of charcoal.
KTF solutions	Clean stoves and briquettes	Rice husk briquette producer, has developed a stove to provide a combined stove and briquette solution
Bioenergy; Alfacó	Briquettes	Briquette producers, with interest in stove development
Cooperatives and artisans	Clay and metals stoves	Multiple small cooperatives and artisan groups, often supported by international NGO or donors, that produce and distribute improved stoves.



### **Regional Experiences Deploying Grants**

11. The strategy of deploying grant capital along with intensive TA for private sector development to attract equity and debt capital to a market is not unique to Burundi. Several countries across the region have utilized similar approaches.

12. The Nigeria Electrification Program will be deploying grants to stimulate and accelerate the Nigerian market. The main purpose of this grant instrument will be to reduce risk for investors and help them commit the larger investments needed to accelerate their capacity to reach and serve Nigerian households and micro, small and medium enterprises at scale. Grant funds can also be used directly by grantees to provide additional direct working capital to enable faster investment in the activity and inventory needed to move quickly. The rationale for this approach was that SHSs scale rapidly when capable private companies and their investors commit and invest. Nigeria, like Burundi, presents additional barriers to such companies compared with other places they can invest: local debt is limited and high cost, forex access remains a risk, and upfront capital investments are significant especially for PAYG business models with capacity of expanding faster who will need to lock in significant amount of capital up front. In this type of setting, lump sum grants can act to secure their investment into scaling the market.

13. In Haiti, several companies have started to test PAYG solutions, complementing an already active market for solar lanterns. However, Haiti's domestic barriers (high import duties and VAT, a high level of market spoilage due to low quality products, and difficulties in accessing financing) have constrained market growth. The World Bank funded Renewable Energy for All Project, therefore, introduced grants in addition to equity and debt financing for private sector companies. The focus of the grants is on (a) supporting companies to increase the penetration of higher quality products into the Haitian market, (b) grants for piloting viable, scalable and sustainable business models, and (c) growth of early stage off-grid businesses with viable business plan.

14. Like Burundi, energy access in Malawi is extremely low. The current electrification rate is at 11 percent, with only a four percent access rate in rural areas. USAID Power Africa recently introduced the Solar Home System Kick-Starter Program for Malawi. The SHS Kick-Starter Program is designed to expand energy access and grow the private sector in Malawi by providing SHS companies with streamlined access to a wide array of support, including operational support and RBF. Overall, USAID has committed US\$2 million in grant funding. The program will work in tandem to introduce grantees to private investors who can bring in working capital, similar to what is envisioned under SOLEIL.

15. It should be re-emphasized that in all of these case studies, grants played/will play an essential role in scaling small, nascent companies de-risking challenging investment environments, and presenting opportunities for new business models and helping to attract private capital in time. At present, public support remains essential for developing the Burundian clean energy market and creating the conditions for gradually phasing out public support in favor of private investments as the market gains more confidence in the new off-grid energy solutions and the private sector grows in experience.



**ANNEX 5: Donor Activity in Burundi Energy Sector**

**COUNTRY: Burundi**  
**Solar Energy in Local Communities**

**Table 5.1 Donor Supported Activities in Burundi’s Energy Sector**

<b>Name</b>	<b>Installed Power Capacity/Intervention</b>	<b>Financing</b>	<b>Expected Commissioning</b>
<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, EU, 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	2021
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, EU	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	EU	Ongoing
Resilience project	Energy services for small communities	EU	Selection process ongoing
Electrifi	Supporting private sector for off-grid energy	EU	To be launched end 2020
Social Services Electrification	PV electrification of 30 schools and 20 clinics	EU	Completed in 2017
Institutional support program to health sector	PV electrification of 29 health centers in 2018; 15 additional expected for 2020	ENABEL	November 2014 – October 2020



<b>Name</b>	<b>Installed Power Capacity/Intervention</b>	<b>Financing</b>	<b>Expected Commissioning</b>
Support to Vocational and Technical Training centers	PV electrification of 13 vocational training centers from June 2015 to June 2020	ENABEL	December 2019
<i>Service d'Électricité Solaire avec des Microréseaux en Afrique</i>	Solar electrification of communities of Gitega, Rutana and Makamba	EU with TramaTechnoAmbiental.	May 2020
Solar fridges for health centers	Provision of self-standing solar fridges to around 750 health centers that offer vaccination services	UNICEF	Ongoing



## ANNEX 6: Gender Gap Analysis and Action Plan

### COUNTRY: Burundi Solar Energy in Local Communities

1. Women play a significant and dominant role within household energy use. Generally, women and girls do most of the cooking and, therefore, are disproportionately affected by household air pollution caused by the inefficient burning of solid biomass cooking fuels. They are also often required to spend a significant amount of time and effort collecting the traditionally used biomass fuels, a physically draining task that can take 20 or more hours per week and can expose women and girls to risk of sexual harassment and sexual violence when seeking fuel in unsafe and isolated areas.
2. Households using CECs have been shown in some contexts to save significant amounts of time and use less fuel than those using traditional stoves. In one study, women who saved time reported spending more time to increase involvement in social and family activities, including spending time with children. In addition, this study found that female-headed households were more likely to adopt cleaner cooking solutions than male-headed households, and women who were part of social groups were more likely to own a CEC or use cleaner fuels.<sup>49</sup> On the other hand, women and girls may sell firewood or charcoal as a source of income, which may be disrupted by expanded access to solar kits and CECs.
3. Women's extensive experience makes them an invaluable source of knowledge and expertise on environmental management and appropriate actions. As the main users of natural resources through their work in agriculture, fuelwood, and water collection for household consumption purposes, women play a crucial role in the widespread adoption and use of modern household cooking solutions or solar energy products. As consumers and users of household energy, women are not just victims but a critical component of the sector's ability to scale. Women must be fully integrated into the process of designing products and safe solutions (including CECs, solar kits, household use of energy through mini-grids, and a voucher system for vulnerable households) through consultations and trainings, because without their opinions and input, products will not meet their needs and will not be used. Women are therefore powerful agents of change and have huge potential to impact sustainable development and conservation.<sup>50 51</sup>
4. The project has mapped some of the initial gender gaps in Burundi at the national level and the sector level. They are described as follows:
  - a. **Electricity access and household spending.**<sup>52</sup> While in the bottom three quintiles of household spending, female-headed households have marginally higher levels of access to electricity than male-headed households (about 1 percent higher), in the fourth and fifth quintiles, the access rate of male-headed households is higher – 3 percent higher in the fourth quintile and 17 percent higher in the top quintile.
  - b. **Cost of getting electricity and having subsistence electricity every month.**<sup>53</sup> The cost of subsistence electricity consumption of 30 kWh/month is a little over US\$1.5 per month for an average household in Burundi which is over 7 percent of the monthly gross income for a household in the bottom 40 percent of the population. Expenditure of over 5 percent of the monthly spending on subsistence electricity is considered onerous.

<sup>49</sup> Global Alliance for Clean Cookstoves. 2014. 'Gender and Livelihoods Impacts of Clean Cookstoves in South Asia'. <https://www.energia.org/study-on-gender-and-livelihoods-impacts-of-clean-cookstoves-in-south-asia/>.

<sup>50</sup> <https://www.cleancookingalliance.org/impact-areas/women/index.html>.

<sup>51</sup> <https://www.worldwildlife.org/stories/improved-cookstoves-empower-women-in-the-democratic-republic-of-congo>.

<sup>52</sup> Source: GMD [SSA] [TSD] /World Bank – latest available year

<sup>53</sup> Source: Regulatory Indicators of Sustainable Energy (RISE), 2018



- c. **Access to cooking fuels.**<sup>54</sup> Electricity and liquefied petroleum gas make up less than 1 percent of cooking fuels used in both male and female-headed households and they depend predominantly on wood and charcoal for cooking fuel (91 percent, male-headed households and 93 percent, female-headed households).
  - d. **Access to finance.**<sup>55</sup> About 19 percent of the female population has a bank account compared to 21 percent of the male population.
  - e. **Land ownership and credit.**<sup>56</sup> Women have limited access to inputs for agricultural production, such as credit and land. According to a 2008 General Population and Housing Census, 80.2 percent of the Burundi population owns land—62.5 percent are men and 17.7 percent are women.
  - f. **Inheritance.**<sup>57</sup> The absence of an inheritance law deprives women of the right to inheritance and property, further limiting their access to credit. About 57 percent of respondents in a 2012 AfroBarometer survey believe that girls and women should not have the same right to inheritance as their brothers.
  - g. **Income.**<sup>58</sup> The United Nations Development Programme’s Human Development Report derives the GNI per capita of male and female members of the population based on the ratio of female to male wages, and female and male shares of economically active population. In Burundi, the GNI per capita for the average female member at US\$807 is higher than that of the average male member at US\$594.
  - h. **Labor.**<sup>59</sup> According to International Labor Organization data from 2018, of the total female population ages 15+, 80.2 percent participate in the labor market. For the same category for males, the labor force participation rate is 77.5 percent. Although the unemployment rate in Burundi is fairly low at 1.6 percent and the female to male unemployment ratio is encouraging at 0.55<sup>60</sup>, over 92 percent of those employed have vulnerable employment that is, the employed people are engaged as unpaid family workers and own account workers. This is an important consideration while assessing unemployment rate.
  - i. **Entrepreneurship.**<sup>61</sup> The Enterprise Survey 2016 collected data on 157 firms from the manufacture and service industries that can be disaggregated by owner/managers gender. In Burundi, 44 percent of firms have female participation in firm ownership, and 9 percent of the firms had majority female ownership, with 16.3 percent of the firms having females in top management positions. The survey also showed that 25 percent of the full-time workforce comprised female workers.
  - j. **Manufacturing.**<sup>62</sup> In manufacturing firms, 9 percent of the workforce is female in production activities and 45.7 percent is female in non-production activities.
5. The project can positively contribute towards enhancing gender equality with a focused TA component. Providing household and community electricity access can promote gender equality and women’s empowerment, provide new employment opportunities for women, enhance access to finance for the adoption of off-grid technologies which would

<sup>54</sup> Source: Burundi 2016-17 DHS.

<sup>55</sup> Ibid.

<sup>56</sup> Source: Ndikumana, Alain, Gender Equality in Burundi: Why does Support not Extend to Women’s Right to Inherit Land? (Afrobarometer Policy Paper No. 22, 2015). <https://banyanglobal.com/wp-content/uploads/2017/07/USAID-Burundi-Gender-Analysis-Final-Report-2017.pdf>.

<sup>57</sup> Ibid.

<sup>58</sup> Source: Human Development Report – Burundi <http://hdr.undp.org/en/countries/profiles/BDI>.

<sup>59</sup> Source: ILO (International Labor Organization) (2018a). ILOSTAT database. [www.ilo.org/ilostat](http://www.ilo.org/ilostat).

<sup>60</sup> Source: HDRO calculations based on ILO (International Labor Organization) (2018a).

<sup>61</sup> Source: Enterprise Survey <http://www.enterprisesurveys.org/data/exploreeconomies/2014/burundi#gender>.

<sup>62</sup> Ibid.



increase the efficiency of productive activities and enhance outcomes such as time-saving and reducing drudgery, and improve health and education for women and girls.<sup>63</sup> The following findings have been made in-country through discussions with a range of stakeholders including ministries, UN organizations, MFIs and private sector counterparts as part of the project preparation.

6. **Policy level.** Thus far all legislation, policies and strategies for the energy sector are gender blind. There are gender focal points in place, but they do not have any budget to launch and implement any initiatives in the country. There is also a lack of sex-disaggregated data and indicators in projects and programs. At the institutional level the Ministry of Human Rights, Social Welfare and Gender interacts with various ministries but currently has no active engagement with the MINHEM. The ministry has established family and community centers in all provinces that will be partnered with for energy related outreach at the community level. These centers also provide “medical, legal and judicial assistance, reintegrating, prevention and care for GBV survivors, as well as the coordination of the operations of all initiatives to combat GBV” which will be useful for GBV related portfolio risks. TA support will focus on ensuring that the policy commitments on gender equality in the energy sector are strengthened and included in all key government policy and institutional documents.

7. **Leaders.** There is limited female leadership in the sector overall with gaps rooted in sociocultural expectations that women oversee household and childcare responsibilities. Gradual changes have been observed for example the 2015 Afrobarometer revealed that 81 percent of the respondents are in favor of men and women having the same rights and opportunities to be elected to leadership positions. The DGE expressed interest in child care facilities at its premises to address issues around women’s care burden and career progression and advancement. The project will establish formal interventions to foster and showcase female talent in the sector through for example leadership training and targeted mentorship programs. Various women’s groups and agricultural associations exist in Burundi which will be leveraged to enhance women’s leadership at the regional level in community engagement and decision making. They will also be an important point of contact for outreach and energy education related activities.

8. **Employees.** Assessments in-country revealed gaps between women and men in obtaining STEM degrees in Burundi and a national target has been set to get to 30 percent female employment in the sector with the current female labor force participation at 15 percent. Energy stakeholders consulted on women’s representation in mini-grid companies and off-grid companies indicated that the staff footprint ranges from around 10 to 15 percent. Of the 110 solar technicians trained across the region by Burundi Renewable Energy Association, three female technicians have been certified (0.03 percent) indicating scope for more in-depth focus on recruitment strategies and messaging on job opportunities as the mini-grid and off-grid market is developed in Burundi. Consultations revealed interest by stakeholders in the energy sector to investigate the drivers behind these gaps and the need to establish a scholarship program for women to support their school to work transition. Additional ideas explored included providing grants and mentorship to female engineering students for their research projects and rolling out norms training for staff currently employed in the energy sector to start discussing gender equality issues.

9. **Off-grid.** Off-grid companies and MFIs revealed a strong interest to engage women as retailers of products to enhance the retail network and enable women to create additional income streams. Steps that enable this to be set-up include (a) conducting a survey on the ground to identify women and women’s group with the capacity to retail products; (b) developing a training for retailers to register clients, keep an inventory, obtain business skills, market tools and

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<sup>63</sup> Most of the gender benefits accrue because women tend to spend more time at home, initiate economic activities that are often in the vicinity of their homes, and are responsible for household chores that can be carried out more productively with electricity. However, available evidence shows that these benefits are not always automatic. Complementary actions are often needed to ensure that benefits indeed accrue to women and the project is therefore integrating specific actions, based on the 2019 Gender Action Plan, to support positive impacts of electrification on women as both consumers and suppliers of energy.





understand the products and how to maintain them; and (c) potentially developing a grant mechanism so that retailers are not burdened by high interest rates and short repayment periods factors that often make it unfeasible for women to purchase stock for retailing purposes. Women have significantly less access to financial services and products in Burundi, borrow smaller amounts and have a lower risk appetite. Additional barriers that would need to be considered when designing such a program at the national and regional level include mobility constraints of women (men drive bicycles and scooters), and household norms around women earning income and managing their care responsibilities.

10. **Entrepreneurs.** Consultations with MFI organizations confirmed distinctive differences between female and male entrepreneurs. The absence of an inheritance law deprives women of the right to inheritance and property, further limiting their access to credit given collateral requirements. In addition, women have less access to bank accounts, face informational barriers, and mobility constraints and have limited networks and presence in higher-earning industries. The Enterprise Survey 2016 collected data on 157 firms from the manufacture and service industries and found that 44 percent of firms have female participation in firm ownership, and 9 percent of the firms had majority female ownership, with 16.3 percent of the firms having females in top management positions. The survey also showed that 25 percent of the full-time workforce comprised female workers setting a dynamic foundation to foster female entrepreneurship and employment opportunities in the off-grid sector.

#### **Actions to Address Identified Gender Gaps**

11. After mapping gaps between women and men in the energy sector related to women's access to finance, jobs and entrepreneurships that are relevant for SOLEIL, the following entry points were identified.

12. **Women's leadership and employment.** Given the identified issues, TA under Component 4 will focus on establishing a full scholarship program for women studying STEM related degrees for 40 female candidates supported by the DGE who wish to join the energy work force after graduation. It is important to establish formal interventions to foster and showcase female talent in the sector through for example leadership training and targeted mentorship programs. Requirements will also be put in place in terms of a minimum of 30 percent employment of women in overall jobs through mini-grid development with tailored TA provided to support private sector companies map out relevant employment opportunities. Opportunities were identified in the mini-grid component around women's employment during construction, and O&M, especially around maintenance aspects such as for example solar panel cleaning and small-scale gardening activities and also upstream in terms of the mini-grid company staff footprint with local partners. Companies will be expected to report annually on their staff footprint and sex-disaggregated data on female versus male employment to ensure equitable benefits in terms of for example monetary income versus unpaid labor which women are expected to provide.

13. Overall support focused on ensuring the policy commitments on gender equality in the energy sector is strengthened and included in all key government policy and institutional documents.

14. **Entrepreneurship and access to finance.** To ensure tangible commitment on fostering female entrepreneurship in the sector, 20 percent of the start-up grants will be earmarked for female-headed or majority female-owned companies. The grant terms will be the same (and can be adjusted if deemed necessary), but a tailored call for applicants will be issued as this has proven to attract more interest and successful applications from female entrepreneurs. Complementary actions will include (a) hosting information sessions targeting female business associations and networks (the Chamber of Commerce was contacted, and it recommended *Association des Femmes d'Affaires au Burundi* as a point of contact for such engagements); (b) business skills development support; and (c) exploring the possibility of a dedicated window managed by grant administrator.

15. **Consumer.** At the consumer level, attention will need to be placed on women's lower purchasing power in Burundi. Under Component 3, differentiated subsidies will be provided to companies serving vulnerable households,



making it conducive to targeted female consumers to increase the purchase of off-grid systems (asset ownership). Further focus will also be placed on mapping the preferences of the women's segment at the household and enterprise level (micro enterprise or farming and so on.) to see what off-grid products they prefer and associated affordability constraints. Under SOLEIL the positive impacts for women adopting of off-grid products in terms of time savings, drudgery reduction and livelihoods (savings or income generating) will be captured during project implementation.

16. **M&E.** The project will track the closure of gender-gaps through intermediate results indicators linked to components including an indicator to track consumer awareness program developed, with a focus on female members of households and SMEs, assessment of barriers to female entrepreneurship developed and action plan delivered, tracking of female employees of mini-grid operators (target 30 percent) and earmarked grants for female enterprises (target 20 percent).



ANNEX 7: Relevant Policy Reforms in Health and Education Sectors

COUNTRY: Burundi
Solar Energy in Local Communities

1. Policy frameworks of the health and education sectors in Burundi have gradually been strengthened over the last decades. Two important policy reforms have been the introduction of a national policy of Free Primary Education in 2005 and of FHC for pregnant women and under-five children as well as a national policy of contracting in 2006, which gradually improved service delivery in both sectors.

Box 7.1 Health Sector – National Performance Based Financing Strategy and Health District Reform

In 2006, Burundi undertook the decentralization of its health system through the creation of health districts to bring health facilities closer to decision-making bodies. The health district is the basic operational entity of the health system covering on average two to three communes and a population of 150,000 to 250,000 inhabitants. The country has 47 health districts, each consisting of an administrative base (Health District Office), a district hospital serving as the first referral hospital and a network of 15 to 20 Health Centers. Support for health centers in planning, supervision, management, monitoring, evaluation and maintenance is organized from the health district.

As part of its decentralization approach, Burundi further introduced a national policy of FHC for pregnant women and under-five children in 2006 and launched the Performance Based Financing strategy in 2010. Under the FHC-PBF, beneficiaries have access to all services available at public and contracted private facilities (health centers and hospitals). Facilities are paid based on their performance of delivering quality basic health care services to the population with particular focus on pregnant women and under-five children. To date, this program includes 701 health centers and 57 hospitals. Other design elements of the PBF include quarterly quality assessment, regular and complete remote M&E, strong verification of the accuracy of the reported levels of services, a three-tier audit process, a database, annual budgeting and maintenance plans, and a comprehensive website.

The combined FHC-PBF program of Burundi is financed by the Government and partners. The Government has steadily increased its own contribution for the Free Health / RBF program overtime (for instance increase of 15 percent from fiscal year 2018-2019 to fiscal year 2019-2020) and is one of the largest contributors to the national FHC / RBF program. Even during the peak of the 2015 political conflict, the Government has maintained its financial commitment. Three other important contributors are IDA (World Bank), the EU through ENABEL and KfW through CORDAID. The ongoing IDA-funded Health Systems Support Project (KIRA, US\$ 50 million grant, P156012) was approved in February 2017 and builds on the achievements of the first IDA Health Project (HSDSP, P101160) that funded the initial FHC-RBF. Under the ongoing KIRA project, the focus is on performance (rather than results), on FHC and improving access and quality of care, especially in basic health facilities. Significant results achieved so far is that the poorest and the richest are equally using health services.

2. After introducing free primary education in 2005, the Government has been key in further establishing a program that addresses the nutritional need of children at primary schools and made provisions to improve the financial resources available at primary schools to maintain infrastructure.

64 Under the current mechanism, the focus has shifted from producing results to attaining performance, which explains the new acronym of the mechanism: PBF (Performance Based Financing).

65 The 701 health centers include 578 public health centers, 104 accredited (generally for religious congregations) and 19 private ones.

66 The 57 hospitals include 39 public, 12 accredited and 6 private ones.

67 www.fbpsanteburundi.bi/.

68 KIRA means wealth and good health in Kirundi.



**Box 7.2 Education Sector – National School Canteen Program**

The GoB launched the National School Feeding Program in November 2018 which is well aligned with the PND 2018 - 2027 in which it states that “all school children should enjoy good nutritional health favorable to learning through the provision of a balanced diet”. Burundi’s school feeding program, implemented by the WFP, in collaboration with the MEESRS Department is in charge of school feeding (*Direction Nationale des Cantines Scolaires*), currently provides food to pupils in schools selected for support, and also supports the improvement of school infrastructure. The program is currently operational in Kirundo, Muyinga, Ngozi, Cibitoke, Bubanza, Gitega and Bujumbura. The program currently covers 426,000 pupils in basic education and 6,000 preschool pupils in these provinces and is financed by WFP, other donors and the GoB. The GoB contributes US\$2 million annually to the program. Other donors include the Principality of Monaco, the Embassy of the Netherlands, the EU and multilateral donors. As for long-term impact, the PND determines when the WFP would end its support. It specifies that “the municipalities must support school feeding through the activities contained in the Communal Community Development Plans (PCDC) and adopt appropriate measures to perpetuate the school feeding program.”

As a result of the implementation of a national policy for the maintenance of school infrastructure, Government signed the joint Ministerial Order N 620/540/834/2019 on 05/02/2019 which increases the budget of basic schools to allow the maintenance of infrastructure. In line with this activity, the ongoing IDA-funded Early Grade Learning Project (*Projet d’Appui à l’Amélioration des Apprentissages en Début de Scolarité*, PAADESCO, US\$40 million, P161600) introduced a Maintenance Grant to help maintain overall school infrastructure. PAADESCO was approved in May 2018 and extended the school feeding program to additional schools in two provinces (Kirundo and Muyinga). It further finances the provision of CECs to 97 schools. As for the school infrastructure, the annual transfer of about US\$17 (of FBu 30,000) per classroom per school goes to a special bank account of each school (approximately 4,000 in 2018), along with an approved list of authorized maintenance work.

