GET.INVEST MARKET INSIGHTS

DEVELOPER GUIDE / MODEL BUSINESS CASE

GET.invest
Mobilising Renewable Energy Investments

Burundi: Small Hydropower and Rural Development

Developer Guide

In collaboration with

Alliance for Rural Electrification
Shining a Light for Progress

Burundi Renewable Energy Association
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A NOTE TO THE READER

This Developer Guide is meant to be a 'reference document' to inform early market exploration. The Guide is supplemented with Model Business Cases accessible at www.get-invest.eu.

ABOUT GET.INVEST MARKET INSIGHTS

The first series of GET.invest Market Insights was published in early 2019 covering four renewable energy market segments in three countries, namely: renewable energy applications in the agricultural value-chain (Senegal), captive power (behind the meter) generation (Uganda), mini-grids (Zambia) and stand-alone solar systems (Zambia).

This **Developer Guide** aims at informing project developers, private sector technology suppliers, innovators and entrepreneurs about opportunities for small hydropower (SHP) development in Burundi. The Guide is organised into four main sections: **1)** introduction; **2)** context for SHP development in sub-Saharan Africa; **3)** role of small hydropower in supporting local communities or industries in rural areas of Burundi; and **4)** "Route-to-market" – i.e., how to leverage the market research presented in the Guide to contribute to SHP development in Burundi.

Accompanying this Guide are two corresponding Model Business Cases, which provide financial analyses for concrete business examples. The two **Model Business Cases** included in this package analyse: **1)** a tea factory that develops a SHP project to power its operations; and **2)** a hybrid solar PV-small hydropower mini-grid that provides electricity to an off-grid community in rural Burundi.

The GET.invest Market Insights summarise a considerable amount of data that may inform early market exploration and pre-feasibility studies. It is therefore recommended to cross-read this Developer Guide and the Model Business Cases for a comprehensive overview. The products are accessible at www.get-invest.eu.

ABOUT GET.INVEST BURUNDI

GET.invest is a European programme that mobilises investment in renewable energy, supported by the European Union, Germany, Sweden, the Netherlands, and Austria.

Since October 2021, the programme has been operating a country window in Burundi funded by the European Union and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). Find out more at GET.invest Burundi.

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ABBREVIATIONS

ABER	Agence Burundaise de l'Electrification Rurale (Rural Electrification Agency)
ADB	Agence de Développement du Burundi (Burundi Development Agency)
AFD	Agence Française de Développement
AfDB	African Development Bank
ARCP	Agence d'appui à la réalisation des contrats de Partenariat Public – Privé (Agency for Public-Private Partnerships)
AREEN	Autorité de Régulation des secteurs de l'eau et de l'énergie (Regulatory Authority for Water and Energy Sectors)
AREF	Africa Renewable Energy Fund
BIF	Burundian franc
CAPEX	Capital expenditure
C&I	Commercial and industrial
CEPGL	La Communauté Economique des Pays des Grands Lacs (Economic Community of the Great Lakes Countries)
DEG	German Investment Corporation
DFI	Development finance institution
DGE	Direction générale de l'énergie (General Directorate of Energy)
DRC	Democratic Republic of Congo
EBRD	European Bank for Reconstruction and Development
EEGF	Energy Entrepreneurs Growth Fund
EIB	European Investment Bank
ESIA	Environmental and Social Impact Assessment
EU	European Union
EUR	Euro
FCDO	Foreign, Commonwealth and Development Office
FEI	Facility for Energy Inclusion
FI	Financial institution
FiT	Feed-in-tariff
GEF	Global Environment Facility
GWh	Gigawatt hour
ICSID	International Centre for Settlement of Investment Disputes
IEA	International Energy Agency
IFC	International Finance Corporation
IMF	International Monetary Fund
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
km	kilometre
KPLC	Kenya Power and Lighting Company
KTDA	Kenya Tea Development Agency
kWh	Kilowatt hour
MHEM	Ministère de l'Hydraulique, de l'Energie et des Mines (Ministry of Hydraulics, Energy and Mines)
MIGA	Multilateral Investment Guarantee Agency
MW	Megawatt
NGO	Non-governmental organisation
O&M	Operations and maintenance
OPEX	Operating expenses
PND	Le Plan National de Développement du Burundi 2018-2027 (National Development Plan of Burundi 2018-2027)
PPA	Power purchase agreement
PPP	Public-Private Partnership
RBF	Results-based financing
RE	Renewable energy

REGIDESO	Régie de Production et de Distribution de l'Eau et de l'Electricité (Water and Electricity Production and Distribution Board)
REPP	Renewable Energy Performance Platform
RSF	Risk Sharing Framework
SEFA	Sustainable Energy Fund for Africa
SHP	Small hydropower
SME	Small and medium-sized enterprise
SSA	Sub-Saharan Africa
UN	United Nations
UNEP	United Nations Environmental Programme
USD	United States dollar

EXECUTIVE SUMMARY

Burundi is a small, densely-populated country in East Africa characterised by high levels of poverty and a fast-growing population. The agricultural sector contributes to approximately 40% of GDP and employs about 90% of the workforce. Coffee and tea are the country's primary exports and are central to the rural economy.

Despite power market reform and liberalisation (the government unbundled the electricity sector and opened generation to IPPs in 2015) there has been limited private sector investment in Burundi's power sector to date, as the production and supply of electricity remains almost entirely state-owned. As of 2023, Burundi had approximately 97.2 MW of installed generation capacity, including about 49 MW of installed hydropower capacity, nearly all of which is owned and operated by the public utility, REGIDESO, or the rural electrification agency, ABER. Rates of electricity access in Burundi remain among the lowest in the world. In 2020, the national electrification rate was 12%, with a considerable difference between rates of access in urban (64%) and rural (3%) areas.[1] About three-quarters of the electrified population is in the capital, Bujumbura, where grid electricity is often unreliable, with frequent supply interruptions.

To address the country's power supply deficit and low electrification rate, with support from its development partners, the government of Burundi plans to expand the generating capacity of existing power plants, rehabilitate hydropower stations that are non-functioning and make improvements to electricity transmission and distribution networks. The Ministry of Hydraulics, Energy and Mines (MHEM) is responsible for managing the implementation of Burundi's various energy policies and plans, including the National Development Plan of Burundi 2018-2027 (PND), the National Policy on Climate Change and Vision Burundi 2025. In the PND, the government's energy strategy aims to ensure universal access to reliable, sustainable and affordable energy services for the population by 2027, mainly by promoting the development of decentralised sources of renewable energy, including small hydropower stations.[2]

Small hydropower (SHP) technology was introduced to Burundi by early missionaries and tea planters to power their mission bases and plantations. In off-grid areas, a small hydropower plant can support rural economic development by replacing diesel generators or other sources of energy in a cost-effective way. Mini-grid electrification powered by a small hydro system provides rural communities with access to clean and sustainable electricity, which has wide-ranging socioeconomic benefits, including increased employment and business opportunities, improved public services (schools, health facilities, water supply) better health and environmental outcomes (replacing polluting energy sources such as kerosene and wood fuels) and women's economic empowerment, among others.

With its vast network of rivers, Burundi is endowed with abundant hydropower resources. A previous assessment of the country's technical hydropower potential estimated it to be 1,700 MW, of which approximately 300 MW were economically exploitable. Only a small share (16.3%) of this potential has been realised to date, however, as Burundi lacks the supportive policies, regulations and incentives that are necessary to de-risk projects for developers and financiers and attract private investment in the sector. Incentive mechanisms that have been successfully deployed to support SHP development (including in neighbouring Rwanda and Kenya) include tax incentives, feed-in-tariffs for grid-connected SHP projects and grant funding, typically provided in the form of results-based financing (RBF).

It's fair to look at the small hydropower sector in Burundi with a degree of optimism. The country has only developed a small share of its immense hydropower potential. Although the population may lack the ability to pay for this power, the potential customer

1) "Tracking SDG7: The Energy Progress Report, 2022," IEA, IRENA, UNSD, World Bank, WHO, 2022: https://trackingsdg7.esmap.org/data/files/download-documents/sdg7-report2022-full_report.pdf

2) Plan National de Developpement du Burundi (PND Burundi 2018-2027), Republique du Burundi, (Juin 2018): https://www.presidence.gov.bi/wp-content/uploads/2018/08/PND-Burundi-2018-2027-Version-Finale.pdf

base for SHP mini-grids remains large, considering the country is densely populated and has low rates of electricity access.

An increase in SHP projects in Burundi could help catalyse crucial improvements in rural electricity access and economic development. An important rural power application is cold storage, which reduces spoilage losses from the agricultural sector (fruit and vegetable horticulture, meat and dairy, fisheries etc.) and enables storage of life-saving medicines and vaccines for the healthcare sector. Most important would be the contribution to economic growth made by new productive enterprises using electricity, which could help reverse the country's enduring trend toward increasing poverty (as the population continues to grow faster than the economy).

Developing the SHP sector would not be without challenges. Above all is the challenge of financing. A tea or coffee company could self-finance a small hydro installation and would almost immediately reduce expenses and improve profitability by eliminating recurrent costs of diesel power generation and/or interruptions to their operations due to unreliable grid power. It is less obvious how a community would be able to finance a SHP installation without significant financial support. There is also limited local technical capacity that would need to be developed through training and technical assistance programmes.

Notwithstanding these challenges, Burundi still has significant untapped potential for small hydropower. The government has made important improvements to the business environment and has made efforts to liberalise the electricity sector. However, the country's legal and regulatory framework needs to be reinforced in a way that is more favourable to renewable energy.

Burundi would benefit from a donor-funded project aimed specifically at the SHP sector (much like UNIDO's existing project in the country, *Promotion of Small Hydropower for productive use and energy services in Burundi*). Such a programme could provide grants to pay for project development costs, concessional debt for CAPEX, and RBF subsidies for new mini-grid connections. It would also need to include a technical assistance component for both public and private sectors.

SECTION 1

Introduction

10.2 MW Mpanda Hydropower Project being developed by Hydroneo East Africa Ltd. in Bubanza Province, north-western Burundi (Source: Hydroneo)

This Developer Guide is a reference document intended to inform project developers, private sector technology suppliers, innovators and entrepreneurs about opportunities for small hydropower (SHP)[3] development in Burundi. The Guide explores the current status of the SHP sector and its potential role in economic growth and development in Burundi. The Guide examines who the key market actors are, what business models are being deployed, what the potential market size is for SHP, what is driving or hindering market growth, who are the potential financiers, and other opportunities and challenges that exist for SHP development in the country.

This Guide is organised into three main sections (following this introduction):

1) **Small Hydropower Development in sub-Saharan Africa:** This section provides context for SHP development in sub-Saharan Africa, including an overview of the sector's policies, regulations, financing mechanisms and business models.

2) **Potential for Small Hydropower to Support Rural Development in Burundi:** This section looks specifically at the SHP market in Burundi and examines how small hydropower can support local communities or industries, particularly in rural areas of the country.

3) **Route-to-Market:** This section explores how to leverage the market research presented in this Guide to contribute to SHP development in Burundi.

This Guide is part of a package of products under the GET.invest Market Insights. Each package is country specific and covers a certain renewable energy market segment. In addition to this Developer Guide, the Market Insights package also includes corresponding Model Business Cases.

There are two Model Business Case documents that accompany this Guide:

1) **Commercial and Industrial (C&I) Hydropower Project:** The first Model Business Case examines a tea factory that develops a SHP project to replace unreliable grid electricity and/or power produced by a diesel generator to maintain its export-oriented tea business.

2) **Solar PV-Hydro Hybrid Mini-Grid:** The second Model Business Case analyses a hybrid solar PV-small hydropower mini-grid that provides electricity to households, small businesses and social infrastructure in an off-grid community in rural Burundi.

3) Throughout this Guide, small hydropower (SHP) refers to 'run-of-river' hydroelectric electricity generation typically with a capacity of up to 10 megawatts (MW). Within small hydropower, a distinction can be made between mini hydro (which typically ranges from 100 kW–1 MW capacity), micro hydro (5–100 kW capacity) and pico hydro (below 5 kW capacity), with each category having its own specific technical characteristics.

SECTION 2

Small Hydropower Development in sub-Saharan Africa

Mwenga Hydro and Rural Electrification Project, Tanzania (Source: Rift Valley Energy)

This section provides context for small hydropower (SHP) development in sub-Saharan Africa, including an overview of the sector's policies, regulations, financing mechanisms and business models.

2.1 SMALL HYDROPOWER FOR ENERGY SUPPLY AND RURAL DEVELOPMENT

Hydropower contributes to a significant share of power supply across sub-Saharan Africa. The International Energy Agency estimates that hydropower will account for approximately one-quarter of Africa's installed generation capacity by 2030. Most of the continent's planned hydropower capacity additions will come from Angola, DRC, Ethiopia, Mozambique and Zambia. Run-of-river small hydropower – which unlike large reservoir-based hydroelectricity has limited storage capability – accounts for about 5% of Africa's projected hydropower capacity additions through 2030.[4] Small hydro potential is largely concentrated in East and Southern Africa, where hydrological conditions are particularly favourable.

Hydropower is one of the most abundant sources of renewable energy (RE) in sub-Saharan Africa; yet, only a small share of this potential has been realised to date. Small hydropower technology was introduced to the continent by early missionaries and tea planters to power their mission bases and plantations, especially in East Africa (Kenya, Malawi and Tanzania).[5] The majority of SHP projects in the region are funded by international development organisations or NGOs. Many of these projects, which are often isolated power plants that were installed decades ago, are no longer operating or are in disrepair and in need of rehabilitation. More recently developed SHP projects tend to be implemented as part of national electrification plans according to least-cost studies and with more sustainable long-term business models.

Small hydropower is a mature clean energy technology and is among the least expensive RE sources. Although the development of a SHP project involves investment in civil works, the project's operating expenses are negligible. Small hydropower plants can either be grid-connected or off-grid and are typically managed by a private developer or local electric utility. In off-grid areas across Africa, a small hydropower plant can replace diesel generators or other sources of energy in a cost-effective way, as SHP does not require recurring fuel purchases. Mini-grid electrification powered by a small hydro system provides rural communities with access to clean and sustainable electricity, with wide-ranging socioeconomic benefits, including increased employment and business opportunities, improved public services (schools, health facilities, water supply), better health and environmental outcomes (replacing polluting alternative energy sources such as kerosene and wood fuels) and women's economic empowerment, among others.

Given the potential for SHP as a decentralised RE generation option that can promote sustainable rural development, more governments are including the technology in energy sector policies, electrification plans and climate change mitigation strategies. For example, in Rwanda, where hydropower accounts for nearly half of the country's installed capacity, the government's National Electrification Plan has identified hundreds of off-grid settlements as potential sites for small hydropower systems and encourages SHP development through a renewable energy feed-in-tariff (FiT) and other supportive regulations and incentives.[6] Similarly, in Kenya, a RE feed-in-tariff policy that has been in place for more than decade has promoted private investment in small hydropower development.[7]

Several barriers to small hydropower development exist across sub-Saharan Africa. Some of the key challenges facing the SHP sector include a lack of supportive policies and regulations; limited available financing and technical capacity to develop, operate and maintain SHP projects; a general lack of data on hydropower resources; infrastructure, logistical and financial constraints around developing small power projects in remote areas; and the sector's vulnerability to climate change.

4) Africa Energy Outlook 2022, International Energy Agency, World Energy Outlook Special Report, (June 2022): https://www.iea.org/reports/africa-energy-outlook-2022
5) Kaunda, C., Kimambo, C., and Nielsen, T., "Potential of Small-Scale Hydropower for Electricity Generation in Sub-Saharan Africa," International Scholarly Research Network, Renewable Energy, (June 2012): https://downloads.hindawi.com/archive/2012/132606.pdf
6) "Rwanda Electricity Access Development Plan (2018-2024)," Rwanda Energy Group, (June 2022): https://www.reg.rw/fileadmin/user_upload/Rwanda_Electricity_Access_Development_Plan_2018-2024_updated_June_2022.pdf
7) "Feed-in-Tariffs Policy on Renewable Energy Resource Generated Electricity (Small- Hydro, Biomass and Biogas)," Ministry of Energy, Republic of Kenya, (January 2021): https://communications.bowmanslaw.com/REACTION/emsdocuments/fitPolicy.pdf

2.2 POLICY AND REGULATORY FRAMEWORK FOR SMALL HYDROPOWER DEVELOPMENT

In many countries across sub-Saharan Africa, policy and regulatory support for small hydropower is insufficient, as the sector is often left out of national energy policies or electrification strategies. A supportive government policy and regulatory framework is critical for small hydropower development. Consistent, enforceable and transparent regulatory guidelines that reflect the commercial and economic realities of the market help de-risk projects for developers, engender confidence in potential financiers and promote the long-term viability of small hydropower systems as an electrification model. Where policy and regulatory frameworks fall short of these standards, they constitute a barrier to private sector investment in the sector. Regulatory frameworks for small hydropower must also include provisions to support independent power producers (IPPs), mini-grids and community-based cooperatives to provide decentralised solutions.[8]

In addition to FiT mechanisms, another incentive that policymakers can offer SHP project developers is grant funding, typically provided in the form of results-based financing (RBF) based on verified installed capacity or connections to a SHP mini-grid. For example, in Rwanda, the GIZ EnDev Village-Grid RBF Programme supported development of a 11 kW mini-grid system powered by a small hydropower plant (**Box 1**). Most of the existing SHP capacity in sub-Saharan Africa has been subsidised by public or donor funding (see **Table 6** in **Section 3.3** for a description of donor-funded programmes in Burundi's SHP sector).

BOX 1. GIZ EnDev Rwanda Village Grid Results-based Financing Programme[9]

Between 2013 and 2020, with funding provided by UK Aid through the Foreign, Commonwealth and Development Office (FCDO), GIZ EnDev Rwanda supported the development of a SHP mini-grid and three solar mini-grids in Rwanda under its Village-Grid Results-based Financing Programme. Through these projects, more than 10,000 people, 350 MSMEs and 20 social institutions gained access to electricity. The first mini-grid supported by EnDev Rwanda was the 11kW small hydropower Nyakiramaba mini-grid, which was commissioned in 2016 and connected 266 customers. The project developer, ECOS, became one of the first private companies in Rwanda to construct and operate a commercial hydropower mini-grid. EnDev supported the project developer in obtaining financing from a local SME fund, Societe Mutuelle de Garantie et de Financement (SMGF) Limited, by using the RBF contract as one form of guarantee to convince the institution to lend to the developer.

8) Gaul, M., Kölling, F., and Schröder, M., "Policy and Regulatory Framework Conditions for Small Hydro Power in Sub Saharan Africa," GIZ and EUEIPDF Partnership Dialogue Facility, (July 2010): http://kerea.org/wp-content/uploads/2012/12/Policy-and-regulatory-framework-conditions-for-small-hydro-power-in-Sub-Saharan-Africa.pdf

9) "Enhancing energy access in rural Rwanda: Village Grid Results-based Financing Project Closing Report," GIZ EnDev, (February 2022): https://endev.info/wp-content/uploads/2022/02/RBFF-Rwanda-Village-Grid-Project-Closing-Report.pdf

2.3 SMALL HYDROPOWER BUSINESS MODELS

Small hydropower projects require significant funding to cover initial capital expenditures (CAPEX). Costs depend on site location, hydrological conditions, and the availability and quality of equipment, among other factors. There are several different business models that can be applied to small hydropower, including public/donor funding, private investment, and community-based/ownership models (**Table 1**).

TABLE 1. Small hydropower business models[10]

BUSINESS MODEL	DESCRIPTION
Utility-based model	— Under this model, an experienced state-owned or private utility owns and operates the main national grid(s), including SHP generation, mostly subsidised by the government.
Publicly funded model	— Under this model government, donor or public resources (financing, incentives, subsidies) are deployed to support the development of small hydropower projects. Public funds can be leveraged to overcome financing barriers and encourage private investment in the SHP sector (e.g., to promote investment in non-local components of infrastructure such as financing for the purchase of turbines).
Private sector-based model	— Under this model, a private entity finances the development of the SHP project, and typically owns and operates a mini-grid, including the SHP generation. Private companies often provide electricity more efficiently than the community-based model thanks to their experience (e.g., in O&M services).
Community-based model (integrated ownership)	— Under this model, a private developer may be responsible for upfront capital, construction and technical support, while the community is involved in collecting and managing payments and organising community contributions. A community committee can be established with some form of external support (e.g., from a donor or an NGO) to make decisions (e.g., on the tariff) and to ensure that there is a system in place to manage maintenance/repairs. This model requires extensive training and technical assistance. Community management is usually organised under a cooperative.
Hybrid model	— This model combines different aspects of the business models described above. Investment, ownership and operation of a SHP mini-grid might not be carried out by the same entity. Funding can come from public and private sources. Generation and distribution of electricity may be split and carried out by separate parties (e.g., by government utilities, private companies or communities). Alternatively, duties and responsibilities can be split according to who builds, owns, operates and maintains the system.

10) Zebra, E. I., van der Windt, H., Nhumaio, G., Faaij, A., "A review of hybrid renewable energy systems in mini-grids for off-grid electrification in developing countries," Renewable and Sustainable Energy Reviews, 144, (July 2021): https://www.sciencedirect.com/science/article/pii/S1364032121003269

Box 2 presents an example of a community-based utility business model that was deployed for SHP development in Tanzania.

BOX 2. Community-based utility model for small hydropower development in Tanzania[11]

The NGO, ACRA-CCS, has supported the development of two SHP projects in Tanzania: (i) a 300-kW mini-hydroelectric plant in Mawengi, which supplies energy to about 20,000 inhabitants of 7 villages; and (ii) a 1.7 MW hydropower plant in Lugarawa, which supplies energy to over 51,000 inhabitants of 20 rural villages. ACRA-CCS utilised an integrated local ownership business model, which included measures to stimulate electricity demand and promote business opportunities and income-generating activities in the newly-electrified communities. The construction of the SHP plant on the Kisongo River led to a distribution grid supplying three downstream communities – the villages of Lupande, Madunda and Mawengi. Local communities made financial contributions to the project and provided labour. A community-based utility was established under the Tanzanian legal framework for NGOs that is owned and managed by the three communities electrified by the SHP project. To ensure the project's viability, the utility developed a credit scheme and offered it to customers to finance the cost of power connections. Electricity demand for the SHP system is driven by local SMEs and agricultural processing/milling activities.

2.4 FINANCING SMALL HYDROPOWER PROJECT DEVELOPMENT

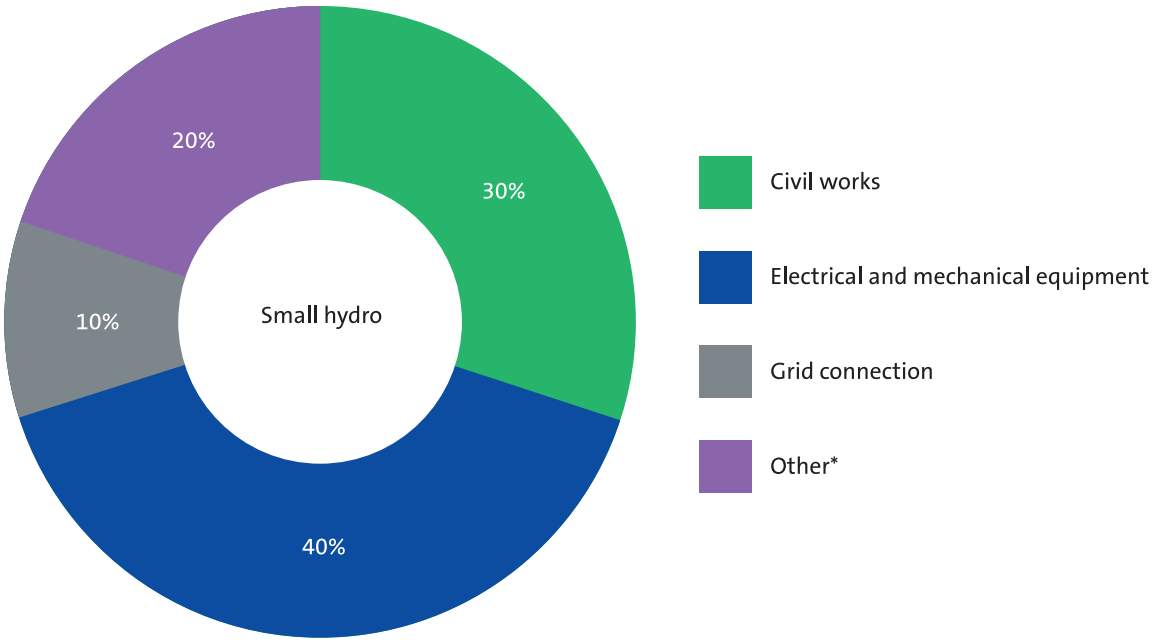
Financing is one of the main barriers to SHP development. Although SHP projects can generate revenue for a long time with minimal OPEX, the CAPEX to build the system is high relative to other RE technologies (such as solar PV projects) because of the civil works and electrical and mechanical equipment required, which account for over 70% of project costs (**Figure 1**). SHP development costs are also high because of the site-specific nature of these projects.

A SHP feasibility study requires the developer to measure the river flow over an extended period of time (typically at least two years) in order to be confident of the throughput and power generation potential. There are also costs associated with the Environmental and Social Impact Assessment (ESIA) for a SHP project, as there are concerns around the environmental and social impacts of hydro projects that may displace populations or water resources used downstream for irrigation and potable water.[12]

11) Ahlborg, H. and Sjöstedt, M., "Small-scale hydropower in Africa: Socio-technical designs for renewable energy in Tanzanian villages," Energy Research and Social Science, 5, (January 2015): https://www.sciencedirect.com/science/article/pii/S2214629614001510

12) Large hydropower project development can have negative environmental and social impacts. As an example, the construction of the Akosombo Dam in Ghana in the 1960s harnessed the flow of the Volta River and resulted in Lake Volta, the largest manmade lake in the world, at 8,500 square kilometres. It also resulted in a number of unforeseen negative socioeconomic impacts, including coastal erosion, changed hydrology, increase of vectors carrying disease (bilharzia, river blindness and malaria). The project flooded entire villages, turned farmers into fishermen and created immense poverty that continues to date. Small hydropower projects carry much less environmental and social risk. It should also be noted that hydropower technology has advanced significantly, with far fewer impacts today compared to outdated hydropower systems.

FIGURE 1. Typical investment cost allocation for small hydropower plants[13]



* Includes planning, project development, permitting, land acquisition, and environmental and social impact assessment and mitigation costs.
Source: International Energy Agency, Hydropower Special Market Report, 2021.

In contrast, solar mini-grid projects are not extremely site specific and generally have fewer engineering challenges and environmental and social risks. Compared to solar PV, the development costs for a SHP project are far more onerous (feasibility studies, ESIA, complex engineering and design, and commercial and legal structuring). Small hydropower projects are also extremely site specific and inevitably require civil works, frequently in mountainous areas that are difficult to access, which further increases costs.

In the absence of an equity financier with deep pockets, SHP development relies on funding from donors and development finance institutions (DFIs). The International Finance Corporation (IFC), KfW and the German Investment Corporation (DEG), and the Dutch FMO have a record of providing equity to SHP projects in sub-Saharan Africa. The French Development Agency (AFD) through Proparco, and the European Union (EU) through ElectriFI, have a track record of providing debt for RE power projects, including SHP. The European Bank for Reconstruction and Development (EBRD) employs a model known as the Risk Sharing Framework (RSF), where the bank takes on part of the risk of sub-loans made by partner banks to eligible clients, guaranteeing up to 50% of delinquencies.

In Burundi, both the African Development Bank's Sustainable Energy Fund for Africa (SEFA) and the EU have provided grants for SHP development. In both instances, the funding was in the form of one-off up-front grants, where the DFI accepted 100% of the risk that their investment in the project might fail. Unfortunately, the problem with these DFI grant programmes is that they will only fund one project at a time, meaning that there is

13) "Hydropower Special Market Report: Analysis and forecast to 2030," International Energy Agency, (July 2021): https://iea.blob.core.windows.net/assets/4d2d4365-08c6-4171-9ea2-8549fabd1c8d/HydropowerSpecialMarketReport_corr.pdf

no systemic scale to the sector. This is a limitation in a country like Burundi where energy access is extremely low and where dozens of SHP projects can be developed.

A local SHP developer needs to acquire long-term debt for a project. The challenge is that most commercial banks in sub-Saharan Africa would have difficulty evaluating a loan request from a cooperative of smallholder farmers. The confirmation of the cost and revenue projections and the location of the collateral are difficult to determine prior to project completion. Nevertheless, Standard Chartered Bank and ABSA Capital are commercial banks in Africa that have lent to SHP projects in the past.

There are several renewable energy specialty credit funds in Africa – such as Africa Renewable Energy Fund (AREF), Facility for Energy Inclusion (FEI), Energy Entrepreneurs Growth Fund (EEGF), Renewable Energy Performance Platform (REPP), etc. – all with track records of assessing and financing SHP projects. These facilities can offer loans in euros or dollars, but they need to consider currency risk when lending money in a stable currency while the client's business operates in a volatile local currency. Additionally, legal limitations may restrict indigenous businesses from holding hard currency in the project country.

Some of these specialty credit funds use donor funds to offer concessional debt, which offers subsidies on interest, waivers on down payment and longer repayment periods, thus making access to loans more affordable and accessible for project developers. Concessional finance can also come in the form of a first-loss guarantee, whereby a third party compensates lenders if the borrower defaults; having such a guarantee in place can help SHP developers leverage in private sector commercial investors. This is especially beneficial if the guarantee is made in the form of a cash deposit in the lender FI, rather than an external source that provides *peri-passu* guarantees (such as the African Guarantee Fund). In the latter case, the FI makes claims to the guarantee provider in the event of client default and hopes that the guarantor recognises the claim. The former model – the cash-on-hand deposit – is more reassuring to the local credit provider.

SECTION 3

Potential for Small Hydropower to Support Rural Development in Burundi

Hydropower station at Virunga National Park, DRC (Source: Virunga Energies)

This section provides an overview of the energy sector in Burundi and examines how small hydropower can support local communities and industries in rural areas of the country.

3.1 COUNTRY OVERVIEW

Burundi is a small, densely-populated country in East Africa that is subdivided into 18 provinces and six eco-climatic regions (namely the western plain of Imbo, the western escarpment of Mumirwa, the Congo-Nile Divide, the central plateau, the area of Kumoso in the east, and the area of Bugesera to the northeast). The climate of Burundi is humid and tropical and is characterised by an alternation of the rainy season (October to May) and dry season (June-September). In 2022, the country had an estimated population of 12.8 million and an annual population growth rate of 3%.

Burundi's agricultural sector contributes to approximately 40% of GDP and employs about 90% of the workforce. Coffee and tea are the country's primary exports and are central to the rural economy. Burundi consistently ranks among the poorest countries in the world according to the UN Human Development Index.[14] The World Bank estimates that 54% of the population lives below the international poverty line of USD 1 per day, and 88% of the population lives below USD 2 per day. Burundi's macroeconomic outlook slightly improved in 2022, with real GDP growth estimated at 4%, up from 3.1% in 2021.[15]

3.2 ENERGY SECTOR PROFILE

Institutional arrangements

Despite power market reform and liberalisation (the government unbundled the electricity sector and opened generation to IPPs in 2015), there has been limited private sector investment in Burundi's power sector to date, as the production and supply of electricity remains almost entirely state-owned. Three main public institutions lead development of the energy sector in Burundi – MHEM, REGIDESO and ABER:[16]

Ministry of Hydraulics, Energy and Mines (Ministère de l'Hydraulique, de l'Energie et des Mines, MHEM): Ministry responsible for developing and implementing national energy policy, as well as managing development of the energy sector. At the institutional level, MHEM is organised as follows:

- **General Directorate of Energy (Direction générale de l'énergie, DGE):** Responsible for the development of energy sector policies and plans
- **General Inspectorate of the Ministry:** Responsible for monitoring and evaluation of energy sector projects and programmes
- **Support Agency for the implementation of Public-Private Partnership contracts (Agence d'appui à la réalisation des contrats de Partenariat Public – Privé, ARCP):** Responsible for supporting the government in defining the vision, policy and legal framework for PPP contracts; the planning, design, negotiation, conclusion, and monitoring of PPP contracts throughout their cycle; and regulation and protection of the rights of users of PPP contracts throughout their cycle. The ARCP is made up of the National PPP Contracts Committee, and the National Coordination of the PPP Contracts Management Unit.

Regulatory Authority for the Water and Energy Sectors (Autorité de Régulation des secteurs de l'eau potable et de l'énergie, AREEN): Regulatory authority established in 2018 responsible for i) ensuring the control, regulation and monitoring of activities relating to the public electricity service; ii) promoting competition and private sector participation in the generation, transmission, distribution and sale of electricity; and iii) ensuring compliance by operators in the electricity sector with the conditions of performance authorisations, concession contracts, PPP contracts and their specifications.

14) Burundi UN Human Development Index: https://hdr.undp.org/data-center/specific-country-data#/countries/BDI
15) AfDB Burundi Economic Outlook: https://www.afdb.org/en/countries/east-africa/burundi/burundi-economic-outlook
16) Nsabimana, R., "Electricity Sector Organization and Performance in Burundi," Proceedings, 58, 26 (14 September 2020): https://www.mdpi.com/2504-3900/58/1/26#B7-proceedings-58-00026

Water and Electricity Production and Distribution Board (Régie de Production et de Distribution de l'Eau et de l'Electricité, REGIDESO): Vertically integrated public power and water utility under the supervision MHEM that is responsible for the generation, transmission, distribution and retail sale of electricity in Burundi.[17]

Burundian Rural Electrification Agency (Agence Burundaise de l'Electrification Rurale, ABER): Rural electrification agency established in 2011 responsible for man agement and implementation of rural electrification programmes, projects and infrastructure in Burundi (mainly isolated mini-grids).[18]

MHEM is responsible for managing the implementation of Burundi's various energy policies and plans, including the National Development Plan of Burundi 2018-2027 (Le Plan National de Développement du Burundi 2018-2027, PND), the National Policy on Climate Change and Vision Burundi 2025. In the PND, the government's energy strategy (*Stratégie Sectorielle pour le Secteur de l'Energie au Burundi*) aims to ensure access to reliable, sustainable and affordable energy services for the population mainly by promoting the development of decentralised sources of renewable energy, including small hydropower stations.[19] To achieve these objectives, the government intends to significantly improve the business climate, with a goal of attracting and securing foreign investment in the energy sector (**see Section 4.2**).

Electricity market overview

As of 2023, Burundi had approximately 97.2 MW of installed generation capacity, including about 49 MW of installed hydropower capacity, nearly all of which is owned and operated by REGIDESO or ABER (**Table 2**). Due to deteriorating equipment and seasonal fluctuations in the availability of water resources, Burundi's existing hydropower stations have an availability factor of only 30%, which is significantly lower than that of a normal hydropower plant, estimated around 80-90%. The country's high reliance on large hydropower makes the electricity supply vulnerable to climate change.[20] The remaining installed capacity comes from thermal power stations operated by REGIDESO totalling 41 MW and from the 7.5 MW Mubuga solar power plant in Gitega Province, which was commissioned in 2021 by Gigawatt Global (in 2023, the developer announced plans to double the plant's capacity).[21] Burundi supplements its domestic production with 15.5 MW of imported electricity from two hydropower plants located in the DRC – RUZIZI I (3.5 MW) and RUZIZI II (12 MW) – that were developed with funding from the Economic Community of the Great Lakes Countries (La Communauté Economique des Pays des Grands Lacs, CEPGL), a regional partnership between Burundi, DRC and Rwanda.

17) REGIDESO: https://regideso.bi
18) ABER: http://aber.bi/
19) Plan National de Developpement du Burundi (PND Burundi 2018-2027), Republique du Burundi, (Juin 2018): https://www.presidence.gov.bi/wp-content/uploads/2018/08/PND-Burundi-2018-2027-Version-Finale.pdf
20) World Bank Burundi Off-Grid Access Project (P164435), Project Information Document (PID), (April 2019): https://ewsdata.rightsindevelopment.org/files/documents/35/WB-P164435.pdf
21) "Multinational effort brings first solar field to Burundi," Gigawatt Global, (October 25, 2021): https://gigawattglobal.com/2021/10/25/multinational-effort-brings-first-solar-field-to-burundi/

TABLE 2. Existing power plants and installed generation capacity, 2023

POWER PLANT	INSTALLED CAPACITY (MW)	TECHNOLOGY (LOCATION/RIVER)	YEAR OF COMMISSIONING
Rwegura	18	Hydro reservoir (Kitenge)	1986
Ruzibazi	15	Hydro run-of-the-river (Ruzibazi)	2022
Mugere	8	Hydro run-of-the river (Mugere)	1982
Mubuga	7.5	Solar PV (Mubuga)	2021
Nyemanga	2.8	Hydro run-of-the river (Siguvyaye)	1988
Rushanga	1.5	Hydro run-of-the river (Ruvyironza)	1984
Gikonge	1	Hydro run-of-the river (Mubarazi)	1982
Buhiga	1	Hydro run-of-the river (Ndurumu)	1984
Kayenzi	0.8	Hydro run-of-the river (Kavuruga)	1984
Nyamyotsi	0.3	Hydro run-of-the river (Kaniga)	2018
Marangara	0.3	Hydro run-of-the-river (Ndurumu)	1986
Interpetrol	30	Thermal	2017
REGIDESO	11	Thermal	1989
	97.2		

Burundi also imports 15.5 MW of hydropower from the DRC: RUZIZI I (3.5 MW) and RUZIZI II (12 MW)
Source: REGIDESO

Rates of electricity access in Burundi remain among the lowest in the world. In 2020, the national electrification rate was 12%, with a considerable difference between rates of access in urban (64%) and rural (3%) areas.[22] About three-quarters of the electrified population are customers of REGIDESO in the capital, Bujumbura. Significant investment is needed to improve Burundi's electricity grid infrastructure, as the power network experiences high technical and commercial losses and frequent supply interruptions.

To address the country's power supply deficit and low electrification rate, with support from its development partners, the government of Burundi plans to expand the generating capacity of existing power plants, rehabilitate hydropower stations that are non-functioning and make improvements to electricity transmission and distribution networks. The government is also developing several new hydropower projects, whose installed capacity will reach an estimated 127 MW at the national level and 295 MW at the regional level by 2027.[23]

22) "Tracking SDG7: The Energy Progress Report, 2022," IEA, IRENA, UNSD, World Bank, WHO, 2022: https://trackingsdg7.esmap.org/data/files/download-documents/sdg7-report2022-full_report.pdf

23) Plan National de Developpement du Burundi (PND Burundi 2018-2027).

Challenges and market barriers

Table 3 describes some of the key market barriers/challenges facing the energy sector in Burundi.

TABLE 3. Summary of energy market barriers in Burundi

BARRIER	DESCRIPTION
Funding constraints (affordability, access to finance)	— Affordability is a constraint to the uptake of clean energy solutions given the relatively high up-front cost of the technologies and the low ability to pay of Burundi's population. — Renewable energy and SHP technologies require access to financing with attractive terms. Banks and financiers are often reluctant to invest in nascent technologies due to their risk perceptions and because they lack the training and skills to perform the appropriate project due diligence. — Developing projects in rural areas is capital-intensive (often requiring large sums to be tied up in receivables or equipment depending on the business model); very few operators in Burundi can mobilise the scale of financing that is necessary to meet demand in rural areas where most of the population lives.
Awareness	— A lack of awareness is a key barrier to the uptake of clean energy technologies, as the benefits of these solutions are not widely understood, particularly in rural areas of the country. — Awareness raising is critical to educate the public on the advantages and limitations of RE technologies and to introduce them to new business models and consumer financing options.
Capacity	— There is a lack of technical capacity and specialised skills that RE and SHP technologies require. — Training and technical assistance should be provided to public and private sector stakeholders to build local technical capacity; this can be in the form of capacity building for policymakers, training for financial institutions, and other certification programmes designed for local technicians to build their capacity in RE/SHP project development, operations and maintenance.
Institutional, policy and regulatory	— Although government agencies are willing to facilitate RE and off-grid market development, this has not yet translated into a coherent policy framework with clearly defined objectives, an implementation strategy and supportive regulations and incentives. Policy interventions should articulate a clear direction for energy service providers by establishing benchmarks, introducing goals/targets, providing appropriate incentives to leverage private sector investment and establishing a framework to monitor and evaluate progress. — Uncertainty about the regulatory environment can result in investors shifting away from the market. Fiscal and taxation policies can also be an issue, as VAT or import duties on RE products or components can have a sizeable impact on their cost/affordability.
Foreign currency constraints and exchange rate volatility	— Limited access to foreign currency and exchange rate volatility make power equipment in Burundi expensive. Local companies need USD to buy and import equipment, while foreign companies want to repatriate their profits.
Off-taker credit risk	— Given REGIDESO's poor operational and financial performance, the utility is not a creditworthy off-taker for grid-connected SHP project developers and IPPs. RE developers and investors face risk of project delays/non-payment, which reduces investor returns and increases risk premiums of investment.

TABLE 3. *Continued*

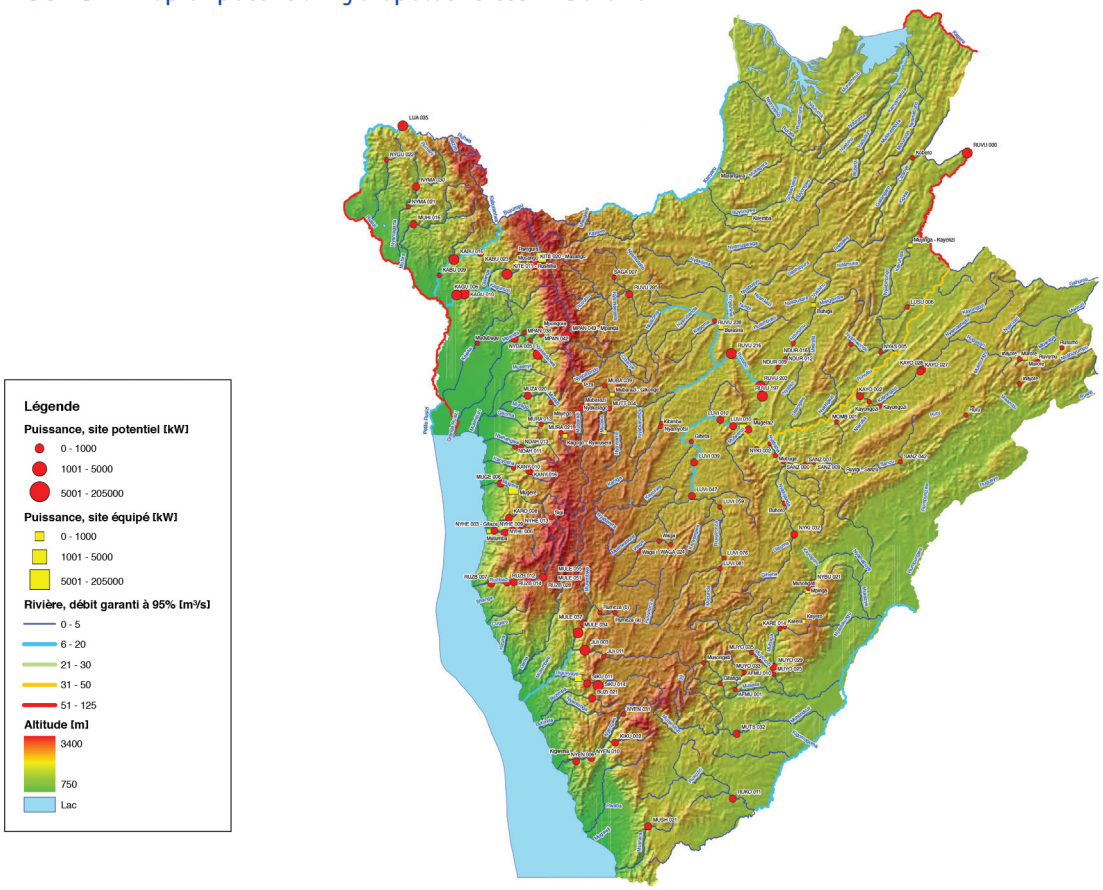
BARRIER	DESCRIPTION
Electricity grid network and power transmission infrastructure	— Electricity service in Burundi is often unreliable, with frequent supply interruptions forcing customers to rely on expensive backup diesel generators. Significant investment is needed to improve power transmission infrastructure for grid-connected RE to be viable. — The obsolescence of equipment, the lack of water at the end of the dry season due to changing climatic conditions/seasonal drought, limited maintenance of dams and insufficient reservoirs inhibit stable hydropower production throughout the year.
Underdeveloped transportation infrastructure	— RE project development – especially SHP project development – in Burundi faces geographic, logistical and infrastructure barriers given the country's mountainous topography and poor road and transportation infrastructure, which increases the cost of transporting equipment and delivering services. Building a strong rural distribution and service network in remote off-grid areas is an expensive undertaking for early-stage companies with limited financial resources.

3.3 SMALL HYDROPOWER DEVELOPMENT IN BURUNDI

Government and private sector SHP development

With its vast network of rivers, Burundi is endowed with abundant hydropower resources. The last comprehensive study of Burundi's hydropower sector was undertaken in 2012. The analysis identified 156 potential hydropower sites for development (**Figure 2**). A previous assessment of Burundi's technical hydropower potential estimated it to be 1,700 MW, of which approximately 300 MW were economically exploitable. The country also has many existing hydropower installations that can have their capacity expanded or that are in disrepair and in need of rehabilitation (**Box 3**).

FIGURE 2. Map of potential hydropower sites in Burundi[24]



Source: Ministry of Hydraulics, Energy and Mines (MHEM) and Belgian Technical Cooperation (SHER), 2012.

BOX 3. Hydropower plant rehabilitation in Burundi

Munyax Eco is a private energy company receiving funding to rehabilitate a hydropower plant in Burundi and add a solar component to boost its energy. The goal of adding solar to existing hydro plants is to provide more energy to off-grid communities and small businesses. By rehabilitating an older plant, and by adding a solar system, more reliable energy is available to more households and SMEs. The solar PV system provides electricity during the daylight hours, while the hydropower installation provides electricity at night, replacing the need for batteries linked to the solar installation. Munyax Eco implemented a solar-hydro hybrid project in Burundi, as well as trained the local staff. ABER, who owns the plant, is responsible for follow up operations and maintenance.[25]

24) "Investment opportunities in renewable energy in Burundi," Ministry of Energy and Mines, Republic of Burundi, (October 2012): https://proreds.eu/wp-content/uploads/2014/02/Investment-opportunities-in-renewable-energy-Burundi.pdf

25) Please refer to the Model Business Case accompanying this Guide, which explores the solar-hydro model in further detail.

ABER currently operates six micro-hydroelectric power stations in Burundi, totalling an estimated 1 MW of installed capacity (**Table 4**). One of these plants (Nyabikere) is a hybrid solar-hydro power station.

TABLE 4. Micro-hydropower plants operated by ABER

POWER PLANT	INSTALLED CAPACITY (kW)	LOCATION/RIVER	YEAR OF COMMISSIONING
Kayongozi	500	Kayongozi	2011
Butezi	200	Sanzu	1990
Nyabikere	195	Nyabisi	1990
Kigwena	62	Nzibwe	1984
Ryarusera	30	Kagogo	1984
Mirore	24	Rusumo	1987
	1.01 MW		

Source: Rapport de l'ABER, 2018

Since the 1960s, several private entities have installed micro-hydropower stations across Burundi, totalling an estimated 630 kW of installed capacity (**Table 5**). Many of these operators were early missionaries and tea planters that utilised SHP to power their mission bases and plantations.

TABLE 5. Micro-hydropower plants operated by private entities

POWER PLANT	INSTALLED CAPACITY (kW)	LOCATION/RIVER	YEAR OF COMMISSIONING
Teza	360	Nyabigondo	1971
Kiremba	64	Buyangwe	1981
Mutumba	45	Kirasa	1983
Kiganda	44	Mucece	1984
Mugera	30	Ruvyironza	1962
Masango	25	Kitenge	1979
Burasira	25	Ruvubu	1961
Mpinga	16	Click	1983
Gisozi	15	Kayokwe	1983
Musongati	6	Nyamabuye	1981
	630 kW		

Source: Rapport du ministère de l'eau et de l'Energie et mines, 2018

The government and private sector are currently developing several large (reservoir) hydropower projects and SHP (run-of-the-river) systems, most of which are expected to be commissioned by 2025. These include the 48 MW Jiji Mulembwe Hydropower Project being developed in Bururi Province; the 20 MW Kabu 16 Hydroelectric Power Station being developed in Cibitoke Province; a 16 MW SHP project being developed by Kirasa Energy SA on the Kirasa River; the 10.2 MW Mpanda Hydropower Project being developed by Hydroneo East Africa Ltd. in Bubanza Province; two SHP stations with a combined capacity of 10 MW being developed by Songa Energy on the Upper Ruvyironza site; and another two SHP projects – the 9.6 MW Dama station at Rumonge (Dama River) and the 12.4 MW Sigu station at Bururi (Siguvyaye River) – being developed by Tembo Power (see **Section 4.6** for detailed profiles of these project developers).

Donor-funded programmes and initiatives

In addition to the activities of the public and private sector, donor agencies and international development partners are also supporting development of small hydropower in Burundi (**Table 6**).

TABLE 6. Donor-funded programmes in Burundi's small hydropower sector

FUNDING AGENCY / IMPLEMENTING PARTNERS	PROGRAMME	DESCRIPTION
UNIDO	UNIDO Promotion of Small Hydro Power (SHP) for productive use and energy services in Burundi[26]	— Launched by UNIDO in 2015, the 'Promotion of Small Hydro Power for productive use and energy services in Burundi' project aims to scale up SHP for rural electrification and productive uses in small and medium-sized industries in Burundi. The project aims to promote SHP development for electricity generation for productive uses at potential sites. — Among the programme's key objectives is to provide training to 150 new policy implementers and to support the approval or enactment of supportive laws, regulations and policies in the SHP sector.
Foreign, Commonwealth & Development Office European Investment Bank UN environment programme	Renewable Energy Performance Platform REPP managed by camco clean energy	— The Renewable Energy Performance Platform (REPP) – initiated by the European Investment Bank (EIB) and United Nations Environment Programme (UNEP) and supported with funding from the UK FCDO – was founded in 2015 to catalyse the growth of sub-Saharan Africa's renewable energy sector by helping developers overcome barriers to finance. — In 2021, the REPP provided a USD 1 million development loan to help build the 10.2-MW run-of-river Mpanda hydro plant in Burundi.[27]

26) United Nations Industrial Development Organization (UNIDO), Promotion of Small Hydro Power for productive use and energy services in Burundi: https://open.unido.org/projects/BI/projects/140332

27) "REPP invests in 10.2-MW Mpanda small hydro project in Burundi," Hydro Review, (June 16, 2021): https://www.hydroreview.com/business-finance/finance/repp-invests-in-10-2-mw-mpanda-small-hydro-project-in-burundi/#gref

TABLE 6. *Continued*

FUNDING AGENCY / IMPLEMENTING PARTNERS	PROGRAMME	DESCRIPTION
	European Union Africa-EU Green Energy Initiative / EU-ECGLC Cooperation	— At the 2022 European Union-African Union Summit, the EU launched the Africa-EU Green Energy Initiative, which aims to increase electricity production and access to energy, promote sustainable energy uses, support sector reforms towards a conducive regulatory environment for private investments, and foster market integration. Under this initiative, the EU is engaging in a cooperation agreement with the Economic Community of the Great Lakes Countries (ECGLC) to support energy sector development in Burundi, DRC and Rwanda. — One component of the regional cooperation will focus on developing the hydroelectric potential of the River Ruzizi through the rehabilitation of the Ruzizi I and II and the construction of Ruzizi III and IV hydropower plants.[28]
WORLD BANK GROUP	World Bank Burundi Off-Grid Access Project[29]	— The World Bank is engaged with the Government of Burundi to improve its enabling environment for competitive procurement of private sector investment in renewable energy generation infrastructure. To this end, the Bank is working with the Public-Private Infrastructure Advisory Facility (PPIAF) to support MHEM and AREEM in the development of a complete, functioning regulatory framework. — Through SEforALL, the World Bank financed the preparation of a distribution masterplan for the energy sector, with the AfDB financing the generation and transmission plan. — In the hydropower sector, the Bank is supporting the Government of Burundi with development of the Jiji and Mulembwe Hydropower project, co-financed by the AfDB, EU and the European Investment Bank, and is also co-financing the Rusumo Falls project together with the EU and AfDB.

28) "A renewed EU Great Lakes strategy: Council approves conclusions," Council of the European Union, (20 February 2023): https://www.consilium.europa.eu/en/press/press-releases/2023/02/20/a-renewed-eu-great-lakes-strategy-council-approves-conclusions/

29) World Bank Burundi Off-Grid Access Project (P164435), Project Information Document (PID), (April 2019): https://ewsdata.rightsindevelopment.org/files/documents/35/WB-P164435.pdf

3.4 SMALL HYDROPOWER BUSINESS MODELS IN BURUNDI

There are different SHP business models in Burundi. Small hydropower projects are typically developed and operated either by the public sector or by a private entity – or some combination of these. If a project is privately-owned, private companies must still obtain various authorisations from the public sector in order to install and operate the power plant. **Table 7** presents the main SHP business models, together with their corresponding administrative and financial requirements.

TABLE 7. Main business model options for small hydropower businesses operating in Burundi

BUSINESS MODEL	DESCRIPTION	ADMIN/FINANCIAL REQUIREMENTS	EXAMPLE(S)
Authorisation Regime	This regime gives the developer/operator the right to build and operate a power plant issued by order of the government.	Permission/permits are required from the government; private financing is required for CAPEX and OPEX.	This model was implemented by early missionaries; the system is privately owned but authorisation is needed from the government/utility to operate.
Concession Model	Under this model, there is an agreement by which the Licensor (public agent) gives the Concessionaire (private company) the responsibility of carrying out, at its own expense, the investments necessary for electrification and to operate the power system at its own risk, being remunerated through fees collected from users.	Private financing is required to front capital and maintenance costs (for the Concessionaire); good knowledge of the market and the region is required, as is a good relationship with the local population to ensure a reliable stream of income.	
Public-Private Partnership (PPP)	A contract by which a public agent enters a partnership with an individual or a private company to produce goods or provide public services that the population needs.	Relationship established between a company and the public sector; significant transparency required; some capital cost may be incurred but is usually either subsidised or the revenue stream following the initial investment is guaranteed by the government.	A model where a state-owned company (REGIDESO) signs a PPA with a private developer (Gigawatt Global), to acquire the electricity produced by a solar PV installation. The PPA specifies that REGIDESO will purchase the energy generated by Gigawatt for 25 years.[30]

30) Gigawatt Global Signs PPA with Burundi: 25-Year Solar Deal Signed in Burundi: https://gigawattglobal.com/burundi-media-room/gigawatt-global-signs-ppa-with-burundi/

TABLE 7. *Continued*

BUSINESS MODEL	DESCRIPTION	ADMIN/FINANCIAL REQUIREMENTS	EXAMPLE(S)
Public-owned hydro plants – installed by a private company (EPC, or engineering, procurement and construction)	In this scenario, the government opens tenders to which private companies can apply. The plant will be owned and managed by the public sector; the private sector only builds it and trains the local staff for its maintenance.	Managed by ABER or the public company that will use the infrastructure.	L'Office du The du Burundi (OTB) is a publicly managed tea production company constituted of five different factories across the country (Teza, Ijenda, Rwegura, Tora and Buhoro), under the supervision of the Ministry of Agriculture. The tea is mainly produced for the export market, with a total production of approximately 9,000 tonnes/year. One of the sites, TEZA, has a SHP plant that is the property of OTB.

3.5 LINKING SMALL HYDROPOWER WITH COMMERCIAL AND INDUSTRIAL RURAL DEVELOPMENT

Under a typical commercial and industrial (C&I) power project, electricity is provided to C&I businesses by a project developer utilising renewable energy sources (e.g., solar PV, small hydropower) or some hybrid of clean energy technology and fossil fuels. Commercial and industrial applications can be both urban and rural; however, the focus of this Guide is on rural industrial development powered by small hydropower. **Table 8** describes the key market actors and supply chain activities in five key C&I sectors in Burundi – coffee, tea, palm oil, sugar and rice.

TABLE 8. Commercial and industrial sector supply chains in Burundi

SECTOR	COMPANY	LOCATION / PROVINCE	SUPPLY CHAIN ACTIVITY	DESCRIPTION
Coffee	CBC COFFEE BUSINESS CENTER Ltd	All regions	Processing and marketing	Coffee Business Centre (CBC) Burundi founded in 2007. It operates with 500 farmers and offers services for other producers from all regions in Burundi with an annual output of 400 MT for Arabica AA, AB coffee grades.
	ODECA Pour un Café aux Saveurs et Arômes Exceptionnels!	Bujumbura	Growing, processing and marketing	The Office for the Development of Burundi Coffee (ODECA) is a public industrial and commercial entity established by decree No. 100/001 of January 7, 2020. The purpose of the Office is to coordinate, regulate and monitor all activity in the coffee sector.

TABLE 8. *Continued*

SECTOR	COMPANY	LOCATION / PROVINCE	SUPPLY CHAIN ACTIVITY	DESCRIPTION
Coffee *(continued)*	BUDECA / SODECO SONGA	Gitega	Processing and marketing	Founded in 2012, Sodeco Songa, which is now Budeca S.A., operates in the husking of Burundian coffee crops.
	CIVCA	Ngozi	Processing and marketing	
	HORAMAMA	Ngozi	Growing and processing	
	IKAWA NZIZA	Ngozi	Processing	
	MPUNGA	Kayanza	Processing	
Tea	BUHORO	Cibitoke	Culture and processing	The Buhoro tea factory is one of the five estates that make up the Burundi Tea Board (Office du Thé du Burundi, OTB). The Buhoro factory has been operational for 25 years, exclusively producing black tea.
	IJENDA	Bujumbura Rurale	Culture and processing	The Uenda Tea Estate is one of the five estates that make up the Burundi Tea Board. The Ijenda Tea Estate started its milling activities in 1984. Village plantations have been established since 1973.
	RWEGURA	Kayanza	Culture and processing	The Rwegura Tea Complex is one of the five estates that make up the Burundi Tea Board and the largest in terms of the extent of plantations and production of dry tea for sale.
	TORA	Bururi	Culture and processing	The Tora Tea Project started in 1969 and has grown to 300 hectares.
	TEZA	Muramvya	Culture and processing	The Teza Tea Complex begin operating in 1963 with the establishment of an industrial block that currently covers 600 hectares.
	PROTHEM 61 GISOZI TEA USINE	Mwaro	Culture, processing and marketing	Prothem Usine is the largest privately-owned tea processor in Burundi. Prothem provides financial services to farmers through its subsidiary SOCADE Microfinance.

TABLE 8. *Continued*

SECTOR	COMPANY	LOCATION / PROVINCE	SUPPLY CHAIN ACTIVITY	DESCRIPTION
Tea *(continued)*		Bujumbura	Promotion and marketing	O.T.B. is a public agribusiness company created in 1971 with a mission to support the production of tea in Burundi through the supervision of small producers, the management of industrial plantations, the processing of tea and the marketing of dry tea.
Palm Oil	OPH (HUILERIE DE RUMONGE)	Rumonge	Growing, processing and marketing	
		Bujumbura	Growing, processing and marketing	Established in 1970, Savonor is currently the largest manufacturing company specialised in food products and one of the largest private companies in Burundi.
Sugar		Rutana	Growing, processing and marketing	SOSUMO is a sugar cane cultivation, production and marketing company created in 1982 in the form of a mixed economy company under private law (S.A.R.L).
Rice	SRDI	Bubanza	Growing, processing and marketing	SRD Imbo is involved in the entire rice value chain, from production to marketing, including the supervision of rice farmers, collection of paddy, milling and marketing. Irrigated rice farming is practised on the Imbo plain on an area of over 1,500 hectares.
	Union des Cooperatives Umugara (Umugara Cooperatives Union)	Kirundo	Growing, processing and marketing	

Most agro-processing businesses in Burundi must rely on unstable power supply from the grid and/or diesel generators to meet their electricity needs. A SHP system or mini-grid can significantly reduce the operating expenses for these companies, who no longer need to pay recurring generator fuel and maintenance costs. The hydropower plant provides these businesses with a reliable and predictable source of electricity, thus reducing power supply interruptions and improving their productivity. Depending on the SHP project's business model, in cases where the rural enterprise does not consume all of the electricity generated by the power plant, surplus electricity can be sold to the utility through an IPP arrangement, creating an additional revenue stream for the business.[31] **Box 4** and **Box 5** present two case studies of how SHP can support rural tea and coffee factories in Kenya and Tanzania, respectively.

31) Revisions to the 2015 electricity sector legislation (Law No. 1/13 of April 23, 2015 on the Reorganization of the Electricity Sector in Burundi) also include provisions for renewable energy feed-in-tariffs.

BOX 4. Small hydropower development supporting tea production in Kenya[32]

Tea companies have become drivers of SHP development in East Africa. The Kenya Tea Development Agency (KTDA), which is cooperatively owned by nearly 600,000 Kenyan smallholder tea farmers, established a subsidiary, KTDA Power Company, which has made investments in several small hydropower projects, including the 5.8 MW Gura SHP (Nyeri), the 5.6 MW North Mathioya SHP (Muranga County) and the 0.9 MW Chania SHP (Kiambu). The Gura SHP, which was installed in 2016 at a cost of EUR 8.5 million (with 35% coming in equity from the tea farmers), provides captive power to four tea factories. Excess electricity is sold to the national utility, Kenya Power and Lighting Company (KPLC), under a feed-in tariff arrangement. The power made available by the small hydropower system to the factories and neighbouring villages is predictable, both in terms of supply and cost, and the farmers earn additional income through dividends resulting from the sale of excess electricity to KPLC.

BOX 5. Mwenga Hydro and Rural Electrification Project, Tanzania[33]

In 2012, with financing from the European Union, the Swedish government and Tanzania's Rural Energy Agency, the Rift Valley Corporation, through its subsidiary Rift Valley Energy, Ltd. (RVE), installed the 4 MW Mwenga Hydro and Rural Electrification Project in Iringa, Mufindi District in the Southern Highlands Region in southwestern Tanzania. The project provides affordable, renewable electricity to more than 4,800 customers in 32 rural communities across the region, as well as a reliable source of electricity to local tea and coffee factories, such as the Mufindi Tea and Coffee Company factory – which prior to the hydropower project, received electricity only intermittently from the national grid and had to rely on a backup diesel generator during outages. The project also provides renewable electricity to the TANESCO national grid. To best service its rural network community, RVE has set up its own rural distribution company (Mwenga Power Services Ltd., MPS), which has developed and deployed a mobile money-based, pre-paid-electricity payment service system.

32) "World Small Hydropower Development Report, 2019: Case Studies - Small Hydropower for Productive Use," United Nations Industrial Development Organization (UNIDO) and the International Centre of Small Hydro Power, (2019): https://www.unido.org/sites/default/files/files/2020-05/Small%20Hydropower%20for%20Productive%20Use.pdf

33) "Mwenga 4 MW Hydro & Rural Electrification Project," Rift Valley Energy Corporation, (2017): https://www.riftvalleyenergy.com/projects/mwenga-hydro/

The most significant development impacts that a SHP project brings to a previously un-electrified community are likely to arise from private sector SMEs. Service and commercial sector businesses (shops, restaurants, etc.) operate longer into evening hours, generating additional income for these businesses, while artisans – from tailors to carpenters – can begin using electric equipment, increasing their productivity. An important rural power application is cold storage, which reduces spoilage losses from the agricultural sector (fruit and vegetable horticulture, meat and dairy, fisheries etc.) and enables storage of life-saving medicines and vaccines for the healthcare sector.

Access to sustainable electricity has wide-ranging socioeconomic benefits for rural communities. These include increased employment and business opportunities, improved public services (schools, health facilities, water supply), better health and environmental outcomes (replacing polluting energy sources such as kerosene and wood fuels) and women's economic empowerment, among others. As an example, in the DRC, small hydropower is providing sustainable electricity access and driving rural economic development in off-grid communities neighbouring the Virunga National Park (**Box 6**).

BOX 6. Small hydropower supporting rural community development in Virunga National Park, DRC[34]

Virunga National Park in the Democratic Republic of Congo is a driver of economic growth in the North Kivu Region, promoting tourism, providing sustainable energy, and supporting entrepreneurship and agricultural transformation across the region. The park includes a system of lakes and rivers that contain considerable small hydropower potential that the park is developing to serve the local economy. Small hydropower produces reliable, low-cost electricity available to approximately 4 million people living in villages surrounding the park, powering SMEs and stimulating employment – thus reducing the need (and economic incentive) to illegally chop down Virunga's trees to make charcoal, which encroaches on habitat needed by gorillas and other wildlife in the park.

34) Yee, A., "The Power Plants That May Save a Park, and Aid a Country," New York Times, (August 30, 2017): https://www.nytimes.com/2017/08/30/business/congo-power-plants-poaching.html

SECTION 4

Route to Market

Small hydropower station at the Teza Tea Factory in Burundi (Source: Teza Tea Plantation)

4.1 INVESTMENT OPPORTUNITIES AND MARKET SIZING FOR SMALL HYDROPOWER IN BURUNDI

The government of Burundi defines small hydropower as plants of up to 1 MW in capacity. Based on this definition, as of 2019, Burundi has developed only 10% of its estimated SHP potential, or 3.1 MW of installed capacity out of approximately 30.5 MW of potential (**Figure 3**). However, going by the more widely accepted classification of SHP as plants of up to 10 MW in capacity, the country has developed 25% of its estimated SHP potential, or 15.8 MW of installed capacity out of approximately 61 MW of potential.[35]

The estimated investment potential for SHP in Burundi is based upon the following assumptions:

— The potential of SHP up to 10 MW is 61 MW (UNIDO/International Centre of Small Hydropower, 2019)

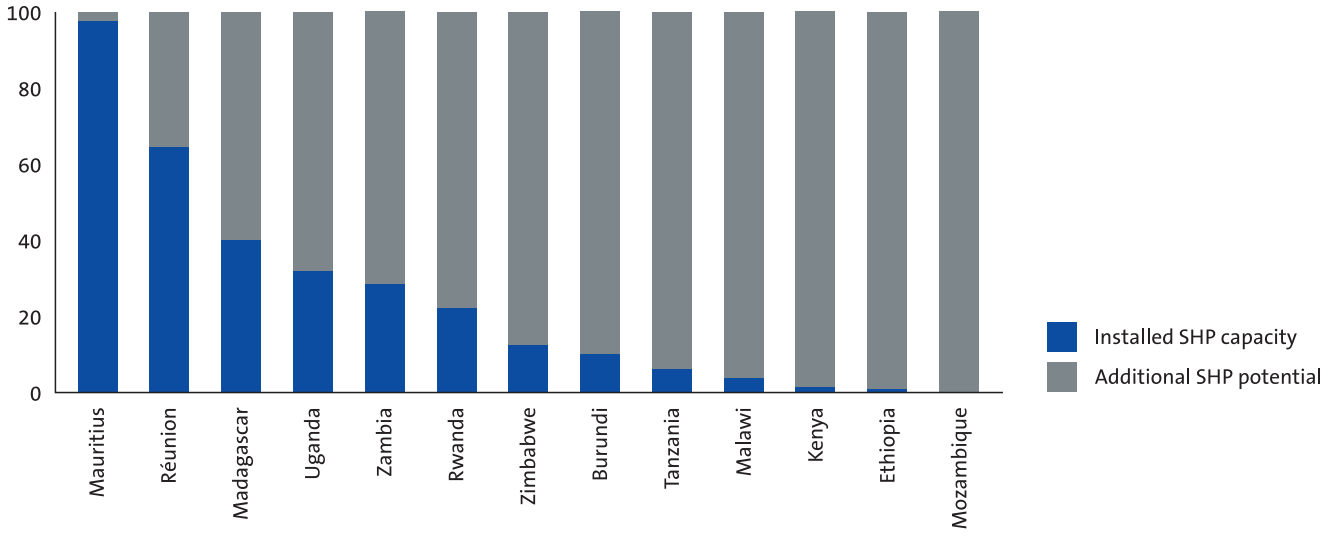
— Assuming 30% of these sites can actually be developed economically, the total sites available for potential development have a capacity of 18.3 MW (30% of 61 MW)

— The average investment cost for a typical small hydropower plant in Africa is approximately USD 4,000 per kW, or USD 4,000,000 per MW (IEA, 2021)[36]

Based on these assumptions, the investment potential for small hydropower in Burundi is approximately **USD 73 million** (18.3 MW x USD 4 million).

If that 18.3 MW (18,300,000 kW) ran 24 hours/day for 365 days/year, it would generate 160,308 MWh of electricity. Sold at USD 0.10/kWh, that would generate slightly more than USD 16 million per year. Thus, the USD 73 million invested could be recovered in less than five years, and the installed capacity would continue to generate USD 16 million per year for perhaps another 25 years, amounting to a return on investment of USD 400 million.[37]

FIGURE 3. Utilised small hydropower potential by country in East Africa, 2019 (%)



Source: United Nations Industrial Development Organization and the International Centre of Small Hydro Power, 2019.

35) "World Small Hydropower Development Report 2019: Africa," United Nations Industrial Development Organization (UNIDO) and the International Centre of Small Hydro Power, (2019): https://www.unido.org/sites/default/files/files/2020-02/Africa%20Regions.pdf

36) "Hydropower Special Market Report: Analysis and forecast to 2030," International Energy Agency, (July 2021): https://iea.blob.core.windows.net/assets/4d2d4365-08c6-4171-9ea2-8549fabd1c8d/HydropowerSpecialMarketReport_corr.pdf

37) Please refer to the Model Business Cases accompanying this Guide, which provide more detailed financial analysis of the SHP sector in Burundi.

4.2 LEGAL AND REGULATORY FRAMEWORK FOR SMALL HYDROPOWER IN BURUNDI

Legal mechanisms for investment protection

In 2000, the government of Burundi adopted the Law on the Liberalisation of Water and Electricity that was subsequently revised in 2015 (Law No. 1/13 of April 23, 2015 on the Reorganization of the Electricity Sector in Burundi), which guarantees any natural or legal person wishing to set up the production of electricity in Burundi, the possibility of establishment and investment of capital, and the right to property. In addition to the investment code, Burundi's legal framework includes both national and international regulations to protect investments, including the following:[38]

- Freedom of establishment and investment of capital
- Recognition of the right of ownership to any natural or legal person without any discrimination
- The prohibition of any discrimination based on nationality in the acquisition or rental of real estate
- The free transfer of foreign capital and its profits
- Free transfer of professional income by foreign employees
- The free transfer of capital remuneration in the form of dividends
- Non-nationalisation and non-expropriation of investments made on Burundian territory

Domestic legal mechanisms for investment protection are complemented by international mechanisms (which usually supersede local laws that are subject to change). Burundi recently adopted international laws enshrining the protection of investment. Bilateral investment protection agreements have been signed with several countries, including China, during the negotiation of cooperation agreements. Within the framework of the promotion of foreign investment, Burundi has ratified international conventions relating to the guarantee and protection of investment. These include Burundi's membership in the Multilateral Investment Guarantee Agency (MIGA) and the International Centre for Settlement of Investment Disputes (ICSID).

Investor incentive mechanisms

Alongside these investment protection mechanisms, a series of incentive measures have been implemented to attract external investment to Burundi, given the generally limited capacity of local investors. These include both fiscal and non-fiscal incentives (**Table 9**). Among the most important recent non-tax incentives include the establishment of an Investment Promotion Agency, the Burundi Development Agency (Agence de Développement du Burundi, ADB) under Law No 1/19 of June 17, 2021 (see **Table 11**). Among other objectives, ADB is responsible for organising and monitoring the registration process for any person having the quality of trader, any commercial company, any cooperative company under Burundian law as well as any branch of a foreign company.[39]

38) Ref: Loi no. 1/19 du 17 juin 2021 portant modification de la loi no. 1/24 du 10 septembre 2008 portant code des investissements du Burundi.

39) Burundi Development Agency (ADB): Invest in Burundi: https://investburundi.bi/wp-content/uploads/2023/04/Booklet-ADB.pdf

TABLE 9. Fiscal and non-fiscal investment incentives

TAX INCENTIVES	NON-FISCAL INCENTIVES
The tax incentives offered to certified investors are as follows (see **Table 11**):	Non-fiscal incentives consist of free support and assistance that the Agency grants to potential investors, which includes (but is not limited to) the following:
— Exemption from customs duties on raw materials and equipment; — Exemption from transfer duties in the event of acquisition of fixed assets (land or building); — Payment of countervailing duties of 5% instead of between 10 to 25% on semi or finished products intended to carry out its investment project (consumables are not concerned); — Reduction of 5% or 2% of the tax rate on profits (30%) depending on whether the promoter declares and proves that he employed during the financial year at least 200 employees or between 20 and 200 Burundian employees.	— Organisation of stays (make an appointment with the authorities and/or potential partners); — Free transport (from Bujumbura Airport to the Agency); — Support in obtaining, if necessary, entry and establishment visas; — Support and assistance in setting up a business; — Support in Bujumbura and in the provinces; — User-friendliness and support for rapid integration; — Provision of real-time information (website, mailing, telephone, brochures, leaflets, pamphlets, etc.); — Provision of information on real investment potential (project sheets); — Make available to the investor all the requirements (licenses and authorisations required) according to the sectors; — Assist, guide, lead and advise the investor in the preparation of his business plan; — Assist the investor in the second appraisal of his project; — Assist the investor in the search for land and premises; — Support in obtaining licenses; — Recommendation of human resources (labour); — Technical guidance in the search for funding for your project.

Table 10 presents the specific conditions of eligibility for investment incentives in Burundi. Completing all of these procedures and acquiring all of the required documentation can pose challenges or require a lot of time. Investors can make use of specialised local offices to help manage this administrative process (especially if they are not based in Burundi).[40]

40) One such service provider is called Intercontact Services Ltd.: https://intercontactservices.com/en/

TABLE 10. Specific conditions of eligibility for investment incentives and documentation required

SPECIFIC CONDITIONS FOR ELIGIBILITY TO INVESTMENT INCENTIVES	DOCUMENTATION REQUIRED
— Have a profitable and feasible investment project in time and space	— Copy of the identity card of the Head of the company
— Submit the complete application file (see the elements of the file below)	— Copy of NIF (Tax Identification Number)
— Pay the application fees	— Copy of the RC (Commercial Register)
— Create at least 10 permanent jobs in Burundi where at least half of the executives are Burundians	— Copy of the company's articles of association
— Commit to ensuring the protection of the environment and carry out an environmental impact study (if necessary) in order to have an environmental compliance certificate issued by the Ministry in charge of environmental protection	— Copy of the title deed, / or Copy of a legalised lease contract with the lessor's telephone number in the event of rental
— Comply with land use plans	— Copy of construction plans if applicable — Authorisation to build — Calculation notes for multi-story buildings — Certificate of environmental compliance — Authorisation to set up the factory

Electricity sector laws and regulations

With support from the World Bank and other development partners, the government of Burundi has adopted a legal and regulatory framework that aims to encourage private investment in the country. In the electricity sector, market liberalisation began in 2000 (Law No. 1/014 of August 11, 2000 on the liberalisation of water and energy sectors) and continued in 2015 with the opening of the generation segment to IPPs (Law No. 1/13 of April 23, 2015 on the reorganization of the electricity sector in Burundi). In 2018, the Regulatory Authority for the Water and Energy Sectors (AREEN) was established. **Table 11** summarises a series of laws and decrees that the government has adopted over the last 25 years with a view to better organising the electricity sector.

TABLE 11. Electricity sector laws and regulations in Burundi

LAW/REGULATION	DESCRIPTION
Law No. 1/19 of June 17, 2021 on the Investment Code in Burundi	— Amends Law No. L/2-4 of 10 September 2008 — Promotes and facilitates investment and exports in Burundi — In order to be eligible for the benefits set in the Code, a foreign investment project should be of at least $500,000 (or the equivalent in Burundian franc for Burundian investors) if the investment takes place in Bujumbura, and at least $250,000 in other localities
Decree No. 100/086 of October 19, 2020 on the Missions, Organisation and Operation of the Ministry of Hydraulics, Energy and Mines[41]	— Establishes the organisation and functioning of the Ministry of Hydraulics, Energy and Mines, whose main missions include designing and implementing national policies on hydraulics, energy, geology, mines and hydrocarbons
Law No. 1/19 of July 19, 2019[42]	— Amends Law No. 1/14 of April 27, 2015 on the General Regime of Public-Private Partnership Contracts[43] — Establishes procedural rules applicable to contracting authorities responsible for managing the procurement, enforcement, monitoring and evaluation of public-private partnership contracts — Defines regulation for setting up special purpose companies, governance, risk sharing arrangements under PPP frameworks, etc.
Decree No. 100/159 of November 05, 2018 on the Statutes of the Regulatory Authority for the Water and Energy Sectors (AREEN)[44]	— Establishes AREEN, whose mandate is to lead the regulation of electricity markets for the benefit of end consumers
Decree No. 100/132 of June 23, 2016 on Procedures for the Development of a Production Plant for Exclusive and Commercial Use[45]	— Establishes applicable procedures for the development of a power plant for commercial or exclusive use — Requires that the development of a generation plant will commence with feasibility studies authorised by the Ministry, followed by obtaining a construction and operation permit
Decree No. 100/131 of June 23, 2016 relating to the Production, Import and Export of Electricity[46]	— Fixed under law no. 1/13 of April 23, 2015 (Reorganisation of the Electricity Sector in Burundi), establishes conditions relating to the production, import and export of electricity in Burundi

41) https://www.presidence.gov.bi/2020/10/20/decret-no-100-086-du-19-octobre-2020-portant-missions-organisation-et-fonctionnement-du-ministere-de-lhydraulique-de-lenergie-et-des-mines/
42) https://www.arcp.gov.bi/2022/04/20/law-no-1-19-of-july-19-2019-amending-law-no-i-14-of-april-27-2015-on-the-general-regime-of-public-private-partnership-contracts/
43) https://www.presidence.gov.bi/2015/04/27/loi-n1-014-du-27-avril-2015-portant-regime-general-des-contrats-de-partenariat-public-prive/
44) https://www.presidence.gov.bi/2018/11/09/decret-n1000159-du-05-novembre-2018-portant-statuts-de-lautorite-de-regulation-des-secteurs-de-leau-potable-et-de-lenergie-areen/
45) https://www.presidence.gov.bi/2016/06/23/decret-n100-0132-du-23-juin-2016-portant-procedure-de-developpement-dune-centrale-de-production-de-lenergie-a-usage-exclusif-et-commercial/
46) https://www.presidence.gov.bi/2016/06/23/decret-n100-0131-du-23-juin-2016-relatif-a-la-production-a-limportation-et-dexportation-delectricite/

TABLE 11. *Continued*

LAW/REGULATION	DESCRIPTION
Decree No. 100/130 of June 23, 2016 on the Reorganization of the Transport, Distribution and Marketing of Electricity[47]	— Sets the procedures for the construction of electricity transmission lines, provisions relating to the sale of electricity by private producers (PPAs) and the provisions relating to the quality of electricity
Law No. 1/13 of April 23, 2015 on the Reorganisation of the Electricity Sector in Burundi[48]	— Creates a legal framework favourable to private investment in the electricity sector and introduces provisions for electricity market liberalisation: - Brings an end to REGIDESO's monopoly in electricity generation - Permits private generation of electricity, subject to certain conditions - Generation systems above 500 kW require authorisation, while generation systems below 500 kW must only be declared - Hydroelectric projects larger than 1 MW are subject to a concession - PPP contracts must be signed if projects are on state-owned land
Law No. 1/02 of March 26, 2012 on the Water Code in Burundi[49]	— Establishes rules and the institutional framework to ensure the rational and sustainable management of water resources, facilities and hydraulic works of public interest, as well as conservation and protection measures of water resources against all forms of degradation
Law No. 1/13 of August 9, 2011 on the Revision of the Land Code of Burundi	— Establishes rules that determine the land rights recognised or that may be recognised on all lands located in the national territory as well as all that unites and incorporates therein, either naturally or artificially — The Land Code is the main instrument that regulates real estate management in Burundi
Decree No. 100/318 of December 22, 2011 on the Statutes of the Burundian Agency for Rural Electrification (ABER)	— Establishes ABER, whose mandate is to develop and implement rural electrification programmes and projects, in particular mini hydroelectricity, solar and wind energy, and any other form of energy that can enable the production of electricity at supply to the rural population
Law No. 1/09 of May 25, 2021 amending the Environmental Code of the Republic of Burundi[50]	— Defines rules for the management of the environment and its protection against all forms of degradation in order to safeguard and enhance the rational exploitation of natural resources, to combat various forms of pollution and to improve living conditions for the people of Burundi while respecting the balance of ecosystems
Law No. 1/014 of August 11, 2000 on the liberalisation of water and energy sectors	— Concerns the liberalisation and regulation of the public services of water and electrical energy
Decree No. 100/164 of September 5, 1997	— Harmonises the Statutes of the Water and Electricity Production and Distribution Board "REGIDESO SP" with the Code of Public and Private Companies

47) https://www.presidence.gov.bi/2016/06/23/decret-n100-0130-du-23-juin-2016-portant-reorganisation-du-transport-de-la-distribution-et-de-la-commercialisation-de-lelectricite/
48) https://www.presidence.gov.bi/2015/04/23/loi-n1-013-du-23-avril-2015-portant-reorganisation-du-secteur-de-lelectricite-au-burundi/
49) http://admin.theiguides.org/Media/Documents/loi%201-02%20du%2026%20mars%202012%20portant%20Code%20de%20l'eau.pdf
50) http://obpe.bi/images/pdf/BDI_Code_Env.pdf

The government of Burundi's efforts to liberalise the electricity sector and attract private investment to the country have been largely unsuccessful to date. The country would greatly benefit from energy sector legislation that specifically promotes renewable energy development. Moreover, as explained in **Section 2.2**, small hydropower requires additional targeted policy and regulatory support, with clear regulatory guidelines that reflect the commercial and economic realities of the SHP market in order to de-risk projects for developers and financiers.

In 2022, the European Union began funding and deploying technical assistance in order to support the government of Burundi with the revision of its electricity law (Law No. 1/13 of April 23, 2015 on the Reorganisation of the Electricity Sector in Burundi) and the elaboration of the different technical Decrees and Orders. This support is helping the government revise and update certain articles and decrees that pertain to power generation and distribution with the aim of further liberalising the electricity sector and encouraging private sector investment in the generation and distribution market segments. The new law is expected to be adopted in early 2024.

Environmental laws

Although socioeconomic indicators such as electricity access, job creation, etc. are commonly cited advantages of hydropower, the technology also has very important environmental benefits for Burundi. In a country where nearly all the cooking fuel is provided by wood (firewood or charcoal), fuel-switching to electricity from a clean energy source such as SHP or solar energy can greatly reduce deforestation. However, the construction of a hydropower plant can also have undesirable effects on the environment. Building a power plant in the middle of a watercourse requires significant intervention to build access roads, transport and install equipment, develop networks of powerlines, support poles for electric wires etc. All of these developments require the preparation of the ground, thus leading to the destruction of trees, fauna and flora, forcing certain plant and animal species to migrate etc.

In order to alleviate negative environmental impacts, mitigation measures need to be planned, implemented and monitored. These measures include adhering to the Environment Code of Burundi and the Water Code of Burundi, which establish fundamental rules for managing and protecting the environment and water resources of Burundi against degradation (see **Table 11**). In addition, hydropower developers and operators are expected to implement technical measures to avoid, reduce or offset the potential environmental impacts of the project, including the installation of the following:

- Discharge valves to evacuate sediments
- Fish passes to promote fish migration or upstream migration
- Grids adapted to prevent fish from passing through the turbines
- Overflow drains or pipes to prevent flooding

Specific regulation and construction procedures for a hydroelectric power station

As there are no laws specific to SHP plants, this section will address regulations that are relevant to the development of a hydroelectric power plant in Burundi regardless of its size. The legislation that is specifically applicable to hydroelectric power projects in Burundi includes the following (see **Table 11**):

- The Environmental Code
- The Water Code
- Decree No. 100/132 of June 23, 2016 on the Procedure for the Development of an Energy Production Plant for Exclusive and Commercial Use
- Law No. 1/13 of May 23, 2015 on the Reorganization of the Electricity Sector in Burundi

Provisions of the Environmental Code related to the construction of hydroelectric power stations

The Environmental Code of 2021 establishes fundamental rules intended to allow for the management of the environment and the protection of it against all forms of degradation. The series of articles (from Article 35 to Article 49) deal with environmental and social impact assessment (ESIA) procedures. An ESIA is required before carrying out any works and installations in the electricity and water sectors to assess and mitigate the environmental and social impacts of a given project. Articles 50, 51 and 53 reference an environmental audit that must be carried out at any time at the discretion of the environmental ministry. With respect to hydroelectric power stations, Articles 93, 94 and 95 of the code address works and developments to be carried out in water networks, rivers and lakes in the country.

Provisions of the Water Code related to hydroelectric power stations

The Water Code includes fundamental rules and the institutional framework intended to ensure the rational and sustainable management of water resources, of hydraulic installations and works of public interest, as well as their protection against nuisances of any kind. Articles specific to hydroelectric power stations include Article 35, which deals with taxes and fees relating to the use of water. Natural and legal persons who use drinking water or any other water used for productive or income-generating purposes are subject to the payment of a fee, the rate of which is set by regulation.

This code also deals with the regime under which the exploitation of water in the public hydraulic domain is exercised, which can be either under that of authorisation or that of concession. According to Article 95, the activities or operations listed below are subject to the concession regime:

- The development of hydraulic/hydroelectric infrastructure and the distribution of drinking water
- Boreholes or withdrawals of water from the hydraulic public domain as well as their exploitation for the purpose of producing hydroelectric energy carried out by means of water intakes, hydraulic power stations or other works of a permanent nature

Article 97 in turn specifies that the request for authorisation or concession is addressed to the Ministers having in their attributions, respectively the management of the water resource and the activities requiring the use of water whose authorisation or concession is requested.

Decree No. 100/132 of June 23, 2016 on the Procedure for the Development of an Energy Production Plant for Exclusive and Commercial Use

This decree sets the procedure applicable in the development of a power plant for commercial or exclusive use. By developing a plant, we mean carrying out studies, financing, construction, operation and maintenance of the plant. Pursuant to the Water Code, it includes the types of contracts open for the developer of hydroelectric power stations which are:[51]

- **Public-Private Partnership contract (PPP):** A contract defined and applied according to Article 2 paragraph 3 of Law No. 1/19 of July 19, 2019 on the General Regime of PPP contracts.
- **Concession:** A contract for the development of a power station using a mode other than the PPP. It is a mode of service consisting of a public authority, the grantor, entrusting an individual, or most often a company, the grantee, by an agreement with the latter, with the task of carrying out with its own capital the investments necessary for the creation of the service and to operate it at its own risk and peril, being remunerated by means of fees collected from users.[52]
- **Declaration:** An act by which any person informs the competent administration of the installations, works and other activities related to water that he plans to carry out.
- **Authorisation:** The right to build and operate a power plant within defined limits issued by Order of the Minister.[53]

Table 12 provides the criteria required for each contract.

51) http://obpe.bi/images/pdf/BDI_Code_Env.pdf
52) Per Law no 1/13 of April23, 2015 on the reorganization of electricity in Burundi, the duration of a concession in Burundi depends on the duration of the amortisation of investments or financing methods chosen.
53) Per Article 13 of the Authorisation Scheme, the Minister responsible for electricity is required to take its decision within a period not exceeding thirty (30) days of receipt of an application for authorisation.

TABLE 12. Procedures for requesting authorisation or declaration for the construction and operation of a power plant for exclusive or commercial use

CASE NO.	CATEGORY OF PRODUCTION	USE OF THE STATE'S PUBLIC DOMAIN: YES, OR NO?[54]	INSTALLED CAPACITY	FEASIBILITY STUDY?	FORM OF AUTHORISATION
		EXCLUSIVE USE			
1	Produce for yourself	No	500 kW-1,000 kW	Not required	Statement
2	Produce for yourself and cede the surplus to the Main Operator	No	500 kW-1,000 kW	Required	Authorisation of the Minister
3	Produce whatever the use	No	1,000 kW and above	Required	Authorisation of the Minister
4	Produce for yourself	Yes	From 1 to 1,000 kW	Required	Authorisation of the Minister
5	Produce for yourself and cede the surplus to the third party	Yes	From 1 to 1,000 kW	Required	Authorisation of the Minister
6	Produce for yourself and cede the surplus to the Main Operator	Yes	From 1 to 1,000 kW	Required	Authorisation of the Minister
7	Produce whatever the use	Yes	1,000 kW and above	Required	Concession or PPP contract
		COMMERCIAL USE			
1	Produce for commercial use	No	Less than 500 kW	–	–
2	Produce for commercial use	No	From 500 kW to 1,000 kW	–	–
3	Produce for commercial use	Yes	Less than 500 kW	Required	Authorisation of the Minister
4	Produce for commercial use	Yes	From 500 to 1,000 kW	Required	Authorisation of the Minister
5	Produce for commercial use	No	Greater than 1,000 kW	Required	Authorisation of the Minister
6	Produce for commercial use	Yes	Greater than 1,000 kW	Required	Concession or PPP contract

Source: Decree No. 100/132 of June 23, 2016, on the procedure for the development of an energy production plant for exclusive and commercial use, Article 12.

54) Meaning a publicly-owned land or water resource.

The procedure related to the development of a power plant is divided into two stages:

1) Carry out feasibility studies authorised by an Order of the Minister

2) Obtain a permit to build and operate a power plant issued by Decree of the President of the Republic or Order of the Minister depending on the category

The request for authorisation to carry out feasibility studies for the construction and operation of a hydroelectric power station is made after obtaining the relevant contracts with service providers. In support of the administrative documents, the applicant sends a letter to AREEN with a copy to the Minister containing in particular:

- A copy of the application form duly completed and signed by the applicant
- A receipt for payment of the costs of the file
- Proof of registration in the Commercial Register
- The tax identification number
- The certificate of non-tax liability
- The site and the source of energy requested
- The projected work programme with an indicative timetable as well as the related budget
- The justifications of the technical capacities such as the CVs of the technical staff, the equipment and materials to be used as well as the technical references
- A justification of financial capacities
- Any other document deemed necessary

The specific provisions provided for by Law No. 01/13 of May 23, 2015 on the Reorganisation of the Electricity Sector in Burundi

This law establishes a legal framework favourable to investment in the electricity sector and introduces provisions for electricity market liberalisation in Burundi in compliance with the conditions of fair and loyal competition and the rights of users and operators. It applies to electricity generation, transmission, distribution and marketing activities. The specific provisions that apply to installations in the course of a river allowing the use of this driving force for the production of electricity are the following:

- **Article 37:** No one may dispose of the energy of lakes and rivers in Burundi without a Concession or Public-Private Partnership (PPP) contract, as referred to in Chapter 1, concluded between him and the State of Burundi
- **Article 38:** Installations whose power exceeds a threshold of 1 MW are placed under the concession or public-private partnership (PPP) regime
- **Article 39:** No PPP contract, no concession, no authorisation, no declaration is granted without prior consultation with the local authorities, on whose territory the energy is produced
- **Article 40:** The Hydroelectric Concession or the PPP contract requires its holder to comply with Specifications. The Specifications determine in particular:
  - Water regulations and in particular measures relating to the protection of the environment
  - The contractual term of the Concession or the PPP contract, which is 25 years, renewable
  - The water reserves that the concessionaire is required to provide
  - The financial and tax conditions of the concession
  - The conditions under which the State can terminate the concession as well as the material conditions for the return and recovery of goods and tools
  - The scope and conditions for exercising the technical and financial control to which the concession or public-private partnership is subject

The Specifications model, as well as the Concession Agreement signed between the Granting Authority and the Concessionaire, as well as the PPP Agreement, are approved by decree.

Transmission, distribution and marketing of electricity

Any electricity marketing activity is subject to prior authorisation granted by MHEM according to pre-determined criteria. Authorisation to build an electricity transmission or distribution line to supply third parties in isolated areas, or due to insufficient means implemented by the delegated public service, may be issued to the operator of a self-production facility for exclusive use, taking into account the following criteria:

- Possession of a road permit issued by the Municipal Administrator or the Mayor of the city
- Compliance with environmental requirements
- Compatibility with the imperatives of general interest and fulfilment of public service missions
- The nature of electricity as a complement to the direct line, when public networks, the works of the public networks, existing or in progress, do not make it possible to fulfil, under equivalent or better conditions, with regard to the proper functioning of the public service of electricity, the same functions as the planned direct line
- The safety and security of the public network, installations and associated equipment
- Compliance by the direct line with the regulatory technical conditions that must be met by public electricity network structures

Pricing structure

Pricing is critical for encouraging investors. In the case of Burundi, the adoption of a common tariff for all electricity producers poses a major challenge for MHEM. On the one hand, the Ministry has a desire to attract private investors to finance the sector; on the other hand, the Ministry wants to keep electricity tariffs affordable for the majority of the population, which is particularly challenging given the low purchasing power of the majority of households in the country. Indeed, the cost of electricity paid by low-income households is extremely low and in no way covers production costs. However, the most recent tariff increases in 2012 were poorly perceived by consumers insofar as the vast majority of them have very low purchasing power. For less fortunate consumers, the kWh is at BIF 138/kWh (USD 0.04/kWh) and the effective price (actual price paid on average taking into account fixed costs and average consumption) is BIF 260/kWh (USD 0.09/kWh).[55]

In order to avoid discouraging private investors, MHEM proposes a negotiated tariff, where each investor proposes tariffs with a view to discussing them with the regulatory authority (AREEN) on the basis of the business plan. According to the services of the Ministry, each project developer uses a technology that is not necessarily the same as that of the other developers, which explains the adoption of different tariffs in order to avoid the exploitation of some by others.

4.3 REGISTERING A BUSINESS IN BURUNDI

According to the World Bank's Doing Business Report, Burundi ranks favourably for starting a new business (44th out of 190 countries).[56] The Commercial Code in Burundi provides for four types of companies, namely:

1) The One-Person Company (SU)
2) The Limited Liability Company (SPRL)
3) The Société Anonyme (SA)
4) The Cooperative Society (SC)

Key definitions:

- A single-person company is a company created by a single natural or legal person who only bears the debts of the company up to the amount of its contributions

55) Ministry of Hydraulics, Energy and Mines.
56) World Bank: Ease of Doing Business in Burundi: https://archive.doingbusiness.org/en/data/exploreeconomies/burundi

- The limited liability partnership is a company formed by two natural or legal persons at least and fifty at most who bear the debts of the company only up to the amount of their contributions and whose rights are only transferable under certain agreed conditions between members
- A public limited company is a company whose capital is divided into shares, and which is constituted by at least three natural or legal persons. Shareholders are only liable for the debts of their company up to the amount of their contributions
- The cooperative society is a society founded on the idea of union, solidarity and mutual aid, whose members have come together voluntarily to achieve a common economic or social goal and have accepted to assume the particular responsibilities linked to their membership

Setting up a business in Burundi is relatively easy. In accordance with Order No. 120/VP2/027 of 01/31/2013, creating the Single Window for Business Creation located at the Burundi Development Agency, it is possible to create a business in 24 hours. **Table 13** summarises the procedures.

TABLE 13. Procedures to create a business in Burundi, by business type

BUSINESS TYPE	INDIVIDUAL SHAREHOLDER	LEGAL ENTITY SHAREHOLDER
Creation of a Sole Proprietorship NB: *a Sole Proprietorship cannot create another Sole Proprietorship*	— Physical presence of the sole shareholder as a natural person — Present 1 colour passport photo of the sole shareholder / natural person — Present the original + 1 copy of the identity document (CNI or Passport) of the sole shareholder / natural person — Payment of related costs (BIF 42,000)	— Present the notarised statutes of the shareholder legal person — Present the certificate of registration of the shareholder legal person — Present the minutes of the General Meeting of shareholders authorising the creation of the company — Physical presence of the representative of the legal entity — Present an original +1 copy of the identity document of the representative of the legal person — Payment of related costs (BIF 42,000)
Creation of a Limited Liability Company (SPRL)	— Two shareholders at least and fifty at most — Physical presence of each partner. Failing this, the partner that is not present sends a notarised power of attorney in the country of origin, designating the person who will represent him during the creation of the company by attaching a copy of his identity document.	— Two shareholders at least and fifty at most — Present the notarised statutes of each shareholder legal person

TABLE 13. *Continued*

BUSINESS TYPE	INDIVIDUAL SHAREHOLDER	LEGAL ENTITY SHAREHOLDER
Creation of a Limited Liability Company (SPRL)	— Present 1 original + 1 copy of the identity document of each partner and possibly of the mandated — Payment of related costs (BIF 42,000)	— Present the certificate of registration of each shareholder legal person — Present a notarised report, for each legal person shareholder, of the General Meeting of Shareholders authorising the creation of the company in Burundi and designating a representative of each legal person shareholder — Physical presence of the representative of each legal entity — Present 1 original + 1 copy of the identity document of each partner and possibly of the mandated — Payment of related costs (BIF 42,000)
Creation of a public limited company (SA)	— At least three shareholders — Physical presence of each shareholder. Failing this, the shareholder that is not present sends a notarised power of attorney in the country of origin, designating the person who will represent him during the creation of the company by attaching a copy of his identity document. — Present 1 original + 1 copy of the identity document of each shareholder and possibly of the authorised representative — Payment of related costs (BIF 42,000)	— At least three shareholders — Present the notarised statutes of each shareholder legal person — Present the certificate of registration of each shareholder legal person — Present a notarised report, for each legal person shareholder, of the General Meeting of Shareholders authorising the creation of the company in Burundi and designating a representative of each legal person shareholder — Physical presence of the representative of each legal entity — Present 1 original + 1 copy of the identity document of each representative — Payment of related costs (BIF 42,000)

TABLE 13. *Continued*

BUSINESS TYPE	INDIVIDUAL SHAREHOLDER	LEGAL ENTITY SHAREHOLDER
Creation of a Cooperative Society	— At least two shareholders — Present the minutes of the Constituent General Assembly of the cooperative company establishing the cooperative company and appointing the Chairman of the Board of Directors — Physical presence of the Chairman of the Board of Directors — Present 1 original + 1 copy of the identity document of the Chairman of the Board of Directors — Payment of related costs (BIF 42,000)	— At least two shareholders — Present the notarised statutes of each shareholder legal person — Present the certificate of registration of each shareholder legal person — Present a notarised report, for each legal entity shareholder, of the General Meeting of shareholders authorising the creation of the cooperative company — Present the Minutes of the Constituent General Assembly of the cooperative society establishing the cooperative society and appointing the Chairman of the Board of Directors — Physical presence of the Chairman of the Board of Directors — Present 1 original + 1 copy of the identity document of the Chairman of the Board of Directors — Payment of related costs (BIF 42,000)

Corporate taxation and social contributions required in Burundi

The main taxes that companies in Burundi are subject to include the following:

— Corporate income tax at a rate of 30%

— Tax on movable income 15%

— Value Added Tax 18%

— Property tax 15%

Added to these taxes are taxes specific to the field of activity and local taxes. The law also provides for both full and partial pensions. For full pension, a worker must be 60 years old with at least 180 months (15 years) of contributions. The old-age pension of 30% of the average monthly salary earned in the first 15 years of the worker's coverage is paid. The pension is increased by 2% of the average monthly salary for each 12-month period of coverage above 180 months. The maximum pension is 80% of the average monthly salary of insured workers.

Difficulties related to business creation in Burundi

To create a company in Burundi, certain difficulties are encountered, including the lack of foreign currency, administrative delays in obtaining certain documentation, mobility difficulties and expensive communication costs. However, these difficulties can often be circumvented depending on the capabilities and resources of the developer.

4.4 CHALLENGES FOR PROJECT DEVELOPERS IN BURUNDI

Small hydropower project development in Burundi comes with a set of challenges, most of which are regulatory and context-dependent. Stakeholder consultations with private sector actors revealed that the situation has improved since the government began to promote renewable energy, as projects have witnessed slightly improved facilitation, and the country's enabling environment is more conducive to businesses. However, with major obstacles still unaddressed, many private developers have given up on entering the market, while others continue trying with the hope that their efforts will bear fruit. There are certainly opportunities to develop small hydropower projects in Burundi, as the country has a huge amount of un-exploited resources; however, realising the country's SHP potential will require significant efforts to overcome market barriers. **Table 14** summarises the main challenges for project developers in Burundi and offers possible solutions.

TABLE 14. Challenges for project developers in Burundi and recommended solutions

BARRIER/CHALLENGE	DESCRIPTION	POSSIBLE SOLUTION(S)
Governance and transparency	Governance and transparency issues need improvement across all levels.	Awareness raising, complaint management, legal reform.
Lack of awareness	Awareness of the potential of the SHP sector for economic growth in Burundi is low, but essential if the sector is to achieve the scale needed for universal electrification.	Awareness raising campaigns and events should target rural enterprises (e.g., tea and coffee companies), future rural electricity consumers and their farmer associations, political and administrative authorities, as well as civil society organisations. Projects aimed at building local technical capacity for SHP development would also have the effect of raising awareness of the sector and its potential for the country's economy.
Lack of human capital	Limited capacity to develop projects, both within the public and private sectors.	Promote technical training and capacity building at all levels (public, private, financial sector).
Administrative delays	Government also has limited capacity to process project applications at the multiple approvals required, resulting in project delays.	Government should set realistic targets for each approval to be processed and monitor and evaluate progress.
Tariffs setting for off-grid projects	There is no agreement on off-grid energy tariffs versus REGIDESO tariffs.	Apply the model whereby the developer proposes and negotiates a tariff based on the business plan (e.g., SESMA Burundi provides solar to five villages in Makamba and Gitega provinces).
Foreign currency access	Access to hard currency in the country is an issue, although seemingly improving.	Borrow outside of the country and mobilise guarantees.
Legal and institutional framework	Though much reformed since 2015, many reforms have yet to be visibly implemented.	Addressing reforms is part of the World Bank's energy sector programme in Burundi.
Lack of knowledge / experience on PPA (PPPs)	PPA tariff setting is a key topic for hydro projects. Need more lobbying so government understand that tariffs need to be sustainable.	This is a capacity building issue addressed through technical assistance to the government.

TABLE 14. *Continued*

BARRIER/CHALLENGE	DESCRIPTION	POSSIBLE SOLUTION(S)
Burundi is an expensive place to operate	Issues with local capacity partially explain why project costs are higher than in neighbouring countries. Local credit is also expensive due to the currency volatility.	Capacity building, with developers developing their own talent, combined with donor-funded training projects. Borrow in hard currency outside of the country.
Limited presence of developers active in Burundi	Lack of developers (or developers whose projects do not progress) does not allow for benchmarking or validating track records. Absence of project tenders so few international developers, and under-developed market so few local developers.	Incentive programmes, including grant and concessional debt; public sector capacity building to expedite project development.
Decision-making is top-down	Ministries, and government entities like ABER do not have enough decision-making power. Decisions are taken at the top of the pyramid.	Public sector capacity building and awareness raising to promote bottom-up solutions.
Limited hydrological data	Apart from the hydro Atlas, no data is easily available to potential investors.[57]	Shared lessons learned, workshops, private sector involvement in the sector, as well as transparency.

4.5 FINANCING SMALL HYDROPOWER IN BURUNDI

Burundi has one of the smallest financial markets in sub-Saharan Africa. The country's banking sector remains strongly underdeveloped, contributing only marginally to economic growth. The market also lacks adequate regulatory and institutional support. Consequently, access to capital and achieving scale for SHP development remains a huge challenge.

Due to the capital-intensive nature of SHP development, long-term debt is most often required. However, Burundian financial institutions are largely unwilling to offer longer tenor loans at affordable interest rates due to the absence of such products in their debt portfolios or a gap in their technical capacity to assess SHP projects. Most FIs are not even permitted to offer loans in foreign currencies, which any SHP developer would need to purchase turbines and other equipment from foreign suppliers.[58]

Solving the SHP financing challenge in Burundi is likely to require a mix of significant sponsor equity, offshore (perhaps concessional) debt and subsidies. Equity from Burundian investors can come from actors in a number of stronger sectors in the economy (e.g., tea and coffee).

It is difficult to imagine a SHP project developer successfully financing a project solely by raising local debt in Burundi, given the stage of development of the country's financial sector and currency restrictions. Offshore debt is often concessional when deploying foreign assistance capital. Concessional debt would offer subsidies on interest, waivers on down payments and longer repayment periods, which would make access to loans and debt repayment more affordable and accessible for project developers.

57) The EU TAF is conducting a feasibility study on the 4-6 most promising hydro sites in Burundi, in collaboration with MHEM/DGE.
58) The European Investment Bank, ElectriFi and the IFC are providing credit in foreign currency.

Concessional finance can also include a first-loss guarantee, whereby a third party compensates local lenders if the borrower defaults; having such a guarantee in place can help SHP developers gain leverage with private sector investors. This is especially beneficial if the guarantee is made in the form of a cash deposit in the lender FI, rather than an external source that provides *peri passu* guarantees (such as the African Guarantee Fund). In the latter case, the FI has to make a claim directly to the guarantee provider in the case of a client default and has to hope that the guarantor chooses to recognise the claim. The former model – the cash-on-hand deposit – is more reassuring to the local credit provider.

Foreign equipment suppliers (often from Scandinavian countries, especially for SHP projects) and their governments will often provide credit to foreign buyers of equipment for purchases, such as turbines and generators. However, these lenders are often unwilling to finance orders under EUR 10 million in value and will usually only work with mature companies. SHP developers are also in dire need of short-term loans of up to 12-months duration to finance project development and construction. Yet, such loans are often hard to come by for developers in Burundi. Grant instruments can play a pivotal role for SHP developers, allowing them to secure the initial seed funding to develop SHP projects. A typical DFI-sponsored grant window targeting the SHP sector would likely focus heavily on *ex-poste* results-based financing (however, this would not mean that it would necessarily exclude ex-ante up-front grants for project development and CAPEX). There are currently no grant programmes in Burundi targeting the SHP sector; however, the World Bank is developing a grant facility to support mini-grids, and by extension the facility could also support SHP projects that allow for increased electricity connection of rural households. Other DFIs such as AfDB may be potential sources for supporting SHP developments in Burundi.

Results-based financing (RBF) is a financing structure in which payments are made to project developers based upon the delivery of a pre-agreed output (a SHP project developer would be eligible for an RBF grant based on verified installed capacity or connections to a SHP mini-grid). Public funding for the mini-grid sector usually comes in the form of RBF, where the public finance takes the form of a subsidy that is paid per new established mini-grid connection. RBF can also be applied to the sale of productive use equipment, such as a cold storage facility or the connection of an electric grain mill to the SHP mini-grid. In addition to RBF, grant programmes can offer *ex-ante* grants. This may be necessary in early-stage markets such as Burundi, where local companies and local finance institutions are very small.

Grant windows can play a catalytic role during the seed phase of the SHP development lifecycle by helping companies leverage commercial financing. These windows are used for product research and development, proof of concept, market studies, marketing, capacity building, technical assistance, and for the purchase of equipment. The recipient usually does not repay the grant unless there is an agreement for the grant to be returned or if the developer establishes a successful project and achieves some pre-agreed milestones. Returnable grants are appropriate when supporting risky activities that are potentially highly profitable, where no commercial lender will get involved because the repayment risk is too high.

4.6 PROFILES OF HYDROPOWER DEVELOPERS IN BURUNDI

Small hydropower technology was introduced to Burundi more than half a century ago by early missionaries and tea planters to power their mission bases and plantations. Many of these developers only implemented one project and then left the market. **Table 15** presents is a list of SHP developers that are currently active in Burundi's SHP market.

TABLE 15. Hydropower project developers active in Burundi

DEVELOPER	DESCRIPTION	ACTIVITIES IN BURUNDI / EAST AFRICA
Hydroneo East Africa Ltd. (Mpanda Hydropower)	— Hydroneo East Africa Ltd. is a renewable energy IPP that provides sustainable electricity in sub-Saharan Africa, with a focus on developing, financing, building and operating hydropower plants up to 30 MW in capacity. — Hydroneo East Africa Ltd. operates 31 projects across 7 countries totalling 318 MW in cumulative installed capacity.	— Mpanda Hydropower – a Hydroneo East Africa subsidiary – is developing a 10.2 MW hydropower project in Bubanza Province. — The PPP contract and the PPA were finalised and executed in May 2021. Mpanda Hydropower is working closely with the UK government-funded Renewable Energy Performance Platform (REPP) to mobilise the capital investment. — The international financial advisory firm, Finergreen, helped structure the financing for a USD 1 million loan to fund project development activities until the financial closing of the project, which is expected in 2023.[59]
Kirasa Energy SA	— Kirasa Energy SA is a Burundian company that leads the design, financing and operation of renewable energy infrastructure in Burundi, with a focus on the hydropower sector.[60]	— Kirasa was established to develop a 16 MW SHP project on the Kirasa River, in Bujumbura Province. — The estimated date for the project's commercial operation is 2025.
Songa Energy	— Songa Energy is registered as a corporation in Burundi and is a joint venture between Songa Energy US and Virunga Power. — Songa Energy is a hydropower project developer that is developing small (1 MW to 15 MW), grid-connected hydropower plants in rural areas of Burundi.[61]	— In 2015, Songa Energy was given exclusive rights by the government of Burundi to study four hydropower sites in central Burundi. — Songa Energy prioritised two of the four sites for immediate development (with a combined capacity of 10 MW) and feasibility studies for both sites were completed in 2016. — Power purchase agreements and PPP agreements have been signed for both sites, detailed studies and design were completed in 2022, and construction began in May 2023 on the Upper Ruvyironza site.
Tembo Power	— Tembo Power Holdings is a Mauritius-based company founded in 2015 that develops run-of-the-river hydropower projects in sub-Saharan Africa. — Tembo Power has a current power portfolio of 13 projects, with an expected total capacity of 300 MW.	— In 2022, Tembo Power issued a solicitation for financing to develop two run-of-the-river hydropower projects in Burundi. — The projects include the 9.6 MW Dama station at Rumonge (Dama River) and the 12.4 MW Sigu station at Bururi (Siguvyaye River).[62]

59) Takouleu, J., "Burundi: Mpanda hydropower project receives REPP funding," Afrik21, (June 16, 2021): https://www.afrik21.africa/en/burundi-mpanda-hydropower-project-receives-repp-funding/
60) Kirasa Energy SA: https://kirasaenergy.com/en/home/
61) Songa Energy: https://www.songaenergy.com/about-songa-energy/
62) "Tembo Power seeks investors for 22 MW of hydropower projects in Burundi," Green Energy Africa Summit, (March 16, 2022): https://greenenergyafricasummit.com/articles/tembo-power-seeks-investors-for-22-mw-of-hydr

4.7 MARKET OUTLOOK

It is fair to look at the small hydropower sector in Burundi with a degree of optimism. The country has only developed a small share of its immense hydropower potential. The added benefit of SHP mini-grids is that the power is cheaper when compared to that from a solar PV mini-grid. Although the population may lack the ability to pay for this power, the potential customer base for SHP mini-grids remains large, considering the country is densely populated and has low rates of electricity access. Additionally, it is likely that Burundian households already spend more on energy products and services (kerosene, batteries, phone charging) than they would on electricity from a SHP mini-grid.

An increase in SHP projects in Burundi could help catalyse crucial improvements in rural electricity access and economic development. An important rural power application is cold storage, which reduces spoilage losses from the agricultural sector (fruit and vegetable horticulture, meat and dairy, fisheries etc.) and enables storage of life-saving medicines and vaccines for the healthcare sector. Most important would be the contribution to economic growth made by new productive businesses using electricity, which could help reverse the country's enduring trend toward increasing poverty (as the population continues to grow faster than the economy).

Developing the SHP sector would not be without challenges. Above all is the challenge of financing. A tea or coffee company could self-finance a small hydro installation and would almost immediately reduce expenses and improve profitability by eliminating recurrent costs of diesel power generation and/or interruptions to their operations due to unreliable grid power. It is less obvious how a community would be able to finance a SHP installation without significant financial support.

A community would need to source the 30% equity needed for an average project's CAPEX (about USD 120,000 for a 100 kW project) as well as debt for the remaining 70% on the terms that the project would require (low interest rates and long tenors). Local commercial banks or microfinance institutions are unlikely to consider such an investment; moreover, the community would need hard currency debt to purchase and import the turbines and other equipment. Donor agencies or development partners could consider extending concessional debt to SHP mini-grids (perhaps as a compliment to an RBF programme for solar mini-grids).

Notwithstanding these challenges, Burundi still has significant untapped potential for small hydropower. The government has made important improvements to the business environment and has made efforts to liberalise the electricity sector. However, the country's legal and regulatory framework needs to be reinforced in a way that is more favourable to renewable energy.

Burundi would benefit from a donor-funded project aimed specifically at the SHP sector (much like UNIDO's existing project in the country, *Promotion of Small Hydropower for productive use and energy services in Burundi*). Such a programme could provide grants to pay for project development costs, concessional debt for CAPEX, and RBF subsidies for new mini-grid connections. It would also need to include a technical assistance component for both public and private sectors.

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