

Ethiopian Regulatory Environment and Capacity Constraints in Off-Grid Energy Sector

Framework Contract for Mobilising Investment
for NDC Implementation Project in Ethiopia

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ABBREVIATIONS AND ACRONYMS

Abbreviation	Expended Notations
BPR	Business Process Reengineering
CBE	Commercial Bank of Ethiopia
CE	Citizen Engagement
CFL	Compact Fluorescent Lamp
CDKN	The Climate and Development Knowledge Network
CO ₂	Carbon Dioxide
CRGE	Climate-Resilient Green Economy
DBE	Development Bank of Ethiopia
DoE	Directorate of Electrification
DP	Development Partner
EAPP	Eastern Africa Power Pool
EEA	Ethiopian Energy Authority
EEP	Ethiopian Electric Power
EEPCo	Ethiopia Electric Power Corporation
EEU	Ethiopian Electric Utility
ERP	Enterprise Resource Planning
ESDP	Education Sector Development Programme
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoE	Government of Ethiopia
GTP	Growth and Transformation Plan
GW	Gigawatt
GWh	Gigawatt/hour
HDI	Human Development Index
HH	Household
HSPD	Health Sector Development Programme
IAIP	Integrated Agro-Industrial Parks
ICT	Information and Communication Technology
IDA	International Development Association
IDP	Internally Displaced Persons
IEC	International Electrotechnical Commission
IKI	International Climate Initiative
IPE Global	IPE Global Limited
IPP	Independent Power Producer
IRM	Implementation Roadmap
Km	Kilometres
KPI	Key Performance Indicator
Kw	Kilowatt
kWh	Kilowatt/hour
LED	Light-Emitting Diodes
LV	Low Voltage
MDCL	Market Development Credit Line

Abbreviation	Expended Notations
M&E	Monitoring and Evaluation
MFI	Micro Financial Institution
MIS	Management Information System
MoFEC	Ministry of Finance and Economic Cooperation
MoWIE	Ministry of Water, Irrigation, and Energy
MSME	Micro, Small and Medium Enterprises
MST	Minimum Subsidy Tender
Mt	Metric tons
MTF	Multi-Tier Framework
MV	Medium Voltage
MW	Megawatt
NBPE	National Biogas Program of Ethiopia
NDC	Nationally Determined Contributions
NEP	National Electrification Program
NES	National Electrification Strategy
NGO	Non-Governmental Organization
NICSP	National Improved Cookstove Program
OPEC	Organization of the Petroleum Exporting Countries
PAYGo	Pay as You Go
PPA	Power Purchasing Agreement
PPP	Public Private Partnership; Power Purchasing Parity
PSE	Private Sector Enterprise
PSNP	Productive Safety Net Program
PVOC	Pre-verification of Conformity
REB	Regional Energy Bureau
REF	Rural Electrification Fund
SC	Steering Committee
SDG	Sustainable Development Goals
SE4All	Sustainable Energy for All
SHS	Solar Home System
SME	Small and Medium Enterprises
SSA	Sub-Saharan Africa
SSN	SouthSouthNorth
TVET	Technical Vocational Education and Training
UEAP	Universal Electricity Access Program
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization
Wp	Watt Peak

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EXECUTIVE SUMMARY

Ethiopia has connected 33 percent of its population with grid electrification and 11 percent with off-grid pre-electrification, with the combined achievement of 44 percent of electricity access.¹ By the year 2025, to achieve universal access, access provision is targeted for at least 65 percent of the population (over 15 million people) with grid solutions.² The remaining six million households in rural areas (equivalent to 35 percent of the population in 2025) are targeted to be connected through off-grid energy solutions, including mini-grids.

Presently in nascent stages of growth, mini-grid scale-up in the country is being done through partnerships between public and private sector efforts. Along with the Ethiopian Electric Utility (EEU), Ministry of Water, Irrigation and Energy (MoWIE), Regional Energy Bureaus (REBs) and Cooperatives are the leading public sector bodies supporting the off-grid (mini-grid) sector. Private sector implementing agencies include private sector enterprises, microfinance institutions (MFIs), and other financial intermediaries. The recently established Directorate of Electrification (DoE) is the central institutional locus of the government to provide day-to-day oversight for the grid and off-grid programs under the supervision of MoWIE. Ethiopia has witnessed an acceleration of regulatory initiatives aimed at creating an empowering ecosystem for developing off-grid, including mini-grid solutions, as reflected in the improvised quality standards, reduced customs duties and lifting of testing requirements.

Currently, where grid power is not yet available, EEU operates 31 isolated diesel generation distribution systems. The European Union is financing five hydro mini-grids implemented by GIZ, testing a model for renewable energy – a distributed generation that is now based on Cooperatives but is aimed at scaling up the market for private or public agencies, as well as a combination of both. In collaboration with the Korean International Agency Cooperation, Universal Electricity Access Program was launched in 2017. In addition, solar, wind and other renewable mini-grids are being piloted in Ethiopia by private companies with support from development partners like USAID Power Africa. A summary of mini-grid activities in the country is provided in Annex I of this report. Recently, MoWIE and EEU have identified over 250 villages throughout the country that are to be connected via solar photovoltaic mini-grids. Prior to scaling up, MoWIE and EEU have launched 12 pilot projects in different regions of the country to determine technical, financial and operational feasibility of mini-grids at various locations. It has selected four international companies to design, develop and commission the private power generation system, and EEU will be responsible for developing and commissioning mini-grid distribution systems. EEU will take tariff decision for the 12 pilot mini-grids based on the experience of the four private firms with costs of establishing and running mini-grids in the nine regions, which differ geographically, demographically and socio-culturally. This is also an opportunity to test the business models relevant to the Ethiopian context along with setting up of economically viable tariff for mini-grids to motivate the private sector enterprises (PSEs). This study was commissioned to understand the mini-grid regulatory environment in Ethiopia, challenges of private and government stakeholders and ways to address them. The methodology for the study was guided by the UNDP Capacity Assessment Framework and the consultant used literature review and key informant interviews (KIIs) as methods of data collection. A total of 21 organisations were covered, and overall, 26 KIIs were conducted with government and private stakeholders as well as development partners. All the organisations covered under this study reported varying degrees of capacity constraints at policy, individual and organisational levels. Both private investors and the government

¹ National Electrification Program (NEP) 2.0

² Ibid.

face specific challenges that are detailed in the report and are summarized below: -

Private Investors' Challenges	Government's Challenges
1. Cost reflective mini-grid tariffs are yet to be established.	1. Mini-grid is a new concept in Ethiopia.
2. Prevailing licensing process has challenges.	2. Lack of trained off-grid/mini-grid human resources in government offices.
3. Private investors want more subsidies/incentives.	3. Challenges at grass root levels in sensitizing communities and Regional Energy Bureaus.
4. Arrival of the grid is a concern for private investors.	4. Sustainable financial support is required from the development partners.
5. Technical regulations need to be more private investment-friendly.	5. Quality assurance is a major concern in the off-grid sector.
6. Access to foreign exchange is a constraint.	6. Energy planning needs stronger coordination.
7. Telecom / mobile services are restricted in Ethiopia.	
8. Information and awareness-related barriers also impede private investment.	

To address the challenges noted above and see the momentum of decentralized off-grid energy systems gain traction, the size, scale, speed, and geographic coverage of the government's off-grid (including mini-grid) program requires full leveraging of all available implementing agents and resources— public, private, as well as public-private-partnerships and Cooperatives. Overall, the stage is set for amplification of off-grid, mostly mini-grids in Ethiopia. Based on primary and secondary research conducted under this study, we suggest the following measures to support faster growth of mini-grids in Ethiopia: -

- i. Licensing process needs to be facilitative.
- ii. Mini-grids tariff rate must be cost-reflective.
- iii. Mini-grid sector should be made less forex dependent.
- iv. Development Partners should support capacity building of government functionaries and private investors.
- v. Strong coordination and transparent communication are required between off-grid energy stakeholders.
- vi. Rural Electrification Fund (REF) must have funds earmarked explicitly for mini-grids.
- vii. Quality assurance of off-grid products/services needs strengthening.
- viii. Operations of the off-grid (including mini-grid) energy sector should be smooth and flexible.

CHAPTER 1: INTRODUCTION

1.1 Ethiopia Off-Grid Energy Context

The unfolding consequences of modern civilization's energy use, including climate change, together with the inevitable energy transition from fossil fuels to renewables, will be one of the defining trends of the current century. How we address the climate-energy dilemma will make a huge difference for the present and future generations of humans, and countless other species.³



Image 1 (Photo courtesy: GE.com)

The world derives the majority of its energy from fossil fuels. However, by the end of the century, it will depend primarily on renewable sources like solar, wind, biomass, and geothermal power, if we want to avoid catastrophic climate change and control on-going depletion of the world's non-renewable energy resources. Consequently, developed and developing countries, presently, are adopting clean energy measures to ensure climate-friendly sustainable growth.

As a responsible member of the international community, Ethiopia is aware of the vital role that developing countries play in combating climate change and has accordingly taken on a constructive role in international climate negotiations. Ethiopia's ambition to become a "green economy front-runner" expresses its belief in a sustainable model of growth and the potential to achieve it. Both the government and the International Monetary Fund expect Ethiopia to be one of the world's fastest-growing economies over the coming years. Building on its recent positive development record, Ethiopia intends to reach middle-income status by 2025. As outlined in the Growth and Transformation Plans (GTP) I and II, reaching this goal will require boosting agricultural productivity, strengthening the industrial base and fostering export growth. If Ethiopia were to pursue a conventional economic development path to achieve its targets, the resulting negative environmental impacts would follow the patterns observed all around the world. Under current practices, greenhouse gas (GHG) emissions would more than double from 150 Mt CO₂e in 2010 to 400 Mt CO₂e in 2030. A conventional development path could also be financially challenging as a significant share of GDP might need to be spent on fuel imports, putting pressure on foreign currency reserves of the country.⁴ Therefore, Ethiopian Climate-Resilient Green Economy (CRGE) initiative has identified "expanding electricity generation from renewable sources of energy for domestic and regional markets", as one of the four pillars of Ethiopia's green growth path to foster sustainable development.

In line with CRGE, GTP II and National Energy Policy, the Government of Ethiopia (GoE) launched its first National Electrification Program (NEP) 1.0 in November 2017, followed by its revised version- NEP 2.0, in March 2019. NEP 2.0 represents an action plan for achieving universal electricity access nationwide by 2025. It details the implementation progress and lessons learned since the launch of NEP 1.0, including from a multi-tier framework (MTF) global energy access survey and geo-spatial analysis, conducted in the year 2017.

³ Our Renewable Future-Laying the Path for One Hundred Percent Clean Energy by Richard Heinberg and David Fridley, Copyright @ 2016 Post Carbon Institute Published by Island Press

⁴ Ethiopia's Climate-Resilient Green Economy Green economy strategy- Federal Democratic Republic of Ethiopia

This MTF⁵ survey was conducted in both rural and urban areas to track progress towards the achievement of universal electricity access nationwide, and the results now constitute the baseline for access in the country. Through the tiers approach, the survey supplemented and complemented EEU customer accounts, gathered further information about the reliability and quality of grid services, and shed light on the current penetration—formal and informal—of off-grid technologies, as well as on the willingness and ability of rural and urban households to pay. A description of the MTF approach is described in image 2.

NEP 2.0 also includes findings of geo-spatial analysis and maps reflecting the digitized location of the existing medium voltage (MV) network, and the proximity to and density of the population, which allowed for the update of the costing of the grid program and informed the sizing, costing, and implementation mechanism for the off-grid program. The geo-spatial analysis also identified the location of roads, distribution channels and payment locations, which have informed the implementation framework for the off-grid program, comprising solar systems and mini-grids.

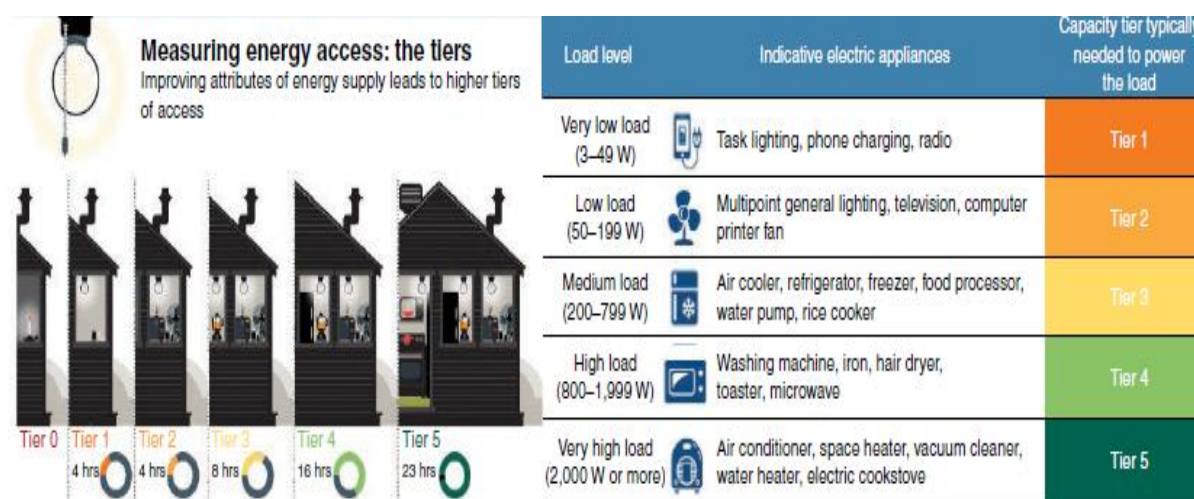


Image 2 (MTF approach)

Mini-grids-electrical generation systems of less than 10MW that serve customers through local distribution networks are emerging as promising complements to the traditional central grid in Africa⁶, and Ethiopia is fast catching up with the trend, even though it is facing challenges in scaling up the mini-grids.

Mini-grids are yet to experience a breakthrough at a global level. Countries such as Rwanda, Ghana, Sri Lanka, Argentina, Kenya and Tanzania have started piloting and testing different mini-grid business and financial models. Still, they are facing major problems as summarized here: -

- Lack of reliable market demand information related to demographics, data on potential consumers' ability to pay for off-grid (mini-grid) energy etc.

⁵ The MTF redefines energy access from the traditional binary count to a multidimensional and comprehensive definition of access and identifies the access rate based on the quantity of service available across six tiers (from 0 to 5), from a minimum of 4 hours per day to 23 hours per day, where Tiers 1–2 typically correspond to off-grid services, Tiers 3–5 to mini-grids and grid-based connectivity. The MTF comprehensive approach to service delivery defines access as “the ability to avail energy that is adequate, available when needed, reliable, of good quality, convenient, affordable, legal, healthy, and safe for all.” The MTF looks at electricity access “beyond connections,” locating at its center the end-user perspective on electricity services, that is, what is electricity going to be used for, depending on how much service is provided. In other words, the MTF looks at electricity as an intermediate factor, not an end goal in itself, thereby incorporating the human and economic development dimensions to service delivery

⁶ <https://www.wri.org/blog/2017/10/electrifying-africa-mini-grids-five-lessons-tanzania>

- Less technical guidance is available for making investment decisions.
- Dearth of a supportive policy and regulatory environment that provides adequate clarity on the role of mini-grids in rural electrification efforts.
- Limited coordination and facilitation of private sector participation by defining potential off-grid service zones.
- Insufficient concessions and other service arrangements.
- Lack of proven approaches towards tariff-setting that are suitable for mini-grids.
- Unavailability of streamlined approval and permitting processes for mini-grid installation and operation.

Limited availability of appropriate financial solutions that provide for higher up-front capital expenditure, longer payback periods than other off-grid electrification solutions and potential currency mismatches, where mini-grids typically rely on dollar-denominated inputs but receive income in local currencies, also impede the growth of the mini-grid sector in developing countries like Ethiopia.

In Ethiopia, 65 percent of access provision is targeted with grid solutions and 35 percent with off-grid technologies (solar off-grid and mini-grids) by 2025. While EEU will be the primary implementing agency for the grid program, off-grid scale-up will see the partnership of multiple stakeholders, comprising government, development partners and private sector under the coordination of Directorate of Electrification (DoE) with the below-mentioned roles: -

Implementing agents in Ethiopian off-grid space

Public Sector-EEU, MoWIE, Regional Energy Bureaus and Cooperatives.

Private Sector-Private Sector Enterprises, Micro Finance Institutions and other Financial Intermediaries.

- EEU service delivery in commercially attractive areas, where and when appropriate and to be flexibly determined based on implementation progress and lessons learned, with a focus on supporting productive uses and access to basic education and health services.
- Minimum Subsidy Tender (MST) system with EEU as the contracting authority and service provision in case of non-performance of private sector enterprises within and/or after the MST time-frame.
- Public sector support for the mini-grids program - EEU is already operating 31 diesel mini-grids and has established a mini-grids unit for the scale-up of efforts starting from the most remote communities and in support of social and productive uses, including for pre-electrification. All new mini-grids will be at least hybrids and at par with the most up-to-date technologies and standards for long-term functioning as well as integration with the main grid.
- Private sector market-based supply, delivery and aftersales service chains in proximate/commercially attractive rural areas for beneficiaries that are not located “under the wire,” with a focus on solar systems and in close collaboration with Micro Finance Institutions (MFIs) and Regional Energy Bureaus (REBs). The government intends to apply uniform network design and equipment standards, appropriate for rural mini/micro-grids, to ensure their technical integration into the network when the grid takes over. The government will also address explicitly, the need for adequate provisions in the regulatory framework to address in a fair, equitable, and transparent manner, any “stranded assets” of private operators, should that situation arise.

- Together with the MFIs, the REBs, especially the strong and more dynamic ones are expected to play an essential role in implementing the Ethiopian Off-Grid Program, and implementation support funding is earmarked for both. REBs have already performed similar roles in the past, and their experience is valuable for nationwide off-grid access scale-up. Public consultations with REBs are detailing their final roles and responsibilities for the implementation of the off-grid program, including the establishment of a grievance redressing mechanism, demand estimation, demand activation and educational campaigns, and coordinating the activities of PSEs and MFIs.

The Government of Ethiopia is focused on integrated—grid and off-grid electricity access under NEP 2.0. On-grid access, target beneficiaries are households located within 25 km from the existing grid, corresponding to about 65 percent of the population. In contrast, the remaining 35 percent will be served by off-grid by 2025. By 2030, 96 percent of the population will be served by the grid, and only 4 percent access provision is targeted by off-grid, under long-term electrification plan.

To expedite off-grid electricity access, in January 2018, the government has developed an implementation framework for off-grid program and formed a High-Level Task Force at the Ministry of Water, Irrigation, and Energy (MoWIE) within the Directorate of Electrification. This task force has since been shaping the design and implementation roadmap of the off-grid program.

The off-grid program focuses on deploying individual solar systems and isolated mini-grids as feasible, on providing pre-electrification solutions for beneficiaries not connected to the grid by 2025 and long-term solutions for those not expected to be connected at least-cost by the distribution network. Categorically, the Ethiopian Off-Grid Program aims at short-term pre-electrification (individual solar systems and isolated mini-grids), mid-term pre-electrification and long-term off-grid/deep rural electrification.

Overarching energy stakeholders in the Ethiopian energy context

Directorate of Electrification (DoE) is the central institutional locus of the Ethiopian Government to provide day-to-day oversight and coordination of NEP implementation for the grid and off-grid programs. It serves as the coordinator of a sector-wide geospatial data, network, and connections planning platform. It facilitates a consultative process among Ministry of Health, Ministry of Education, Ministry of Water, Irrigation and Energy, Regional Energy Bureaus, EEU, Ethiopian Electric Power (EEP).

Ethiopian Electric Authority (EEA) (Regulator) - EEA has licensing and regulatory oversight, including for private sector entry, across the functional value chain of generation, transmission, distribution, and sales functions within the power sector. The regulator is responsible for establishing standards and regulations required for the implementation of the grid and off-grid programs, including social, safety, and environmental safeguards, as well as their compliance.

Ethiopian Electric Power (EEP) (Operator) - EEP is responsible for generation and transmission of 132kV and above. Therefore, EEP is mandated to engage in large-scale hydro/geothermal/solar and wind power generation and transmission to the power grid.

Ethiopian Electric Utility (EEU) (Distributor) - EEU is responsible and accountable for network planning, design, and implementation of the grid component. As part of the unbundling program, the Universal Electricity Access Program (UEAP) has been integrated within the EEU in January 2016. EEU has prepared NEP operations program manual as the umbrella framework to plan, procure, organize, construct, and connect new customers to the distribution network, irrespective of the funding source, while proceeding with the extension of the grid.

Off-grid program—Consistent with the strategic directions outlined for the off-grid connections rollout program, and building on the results achieved to date, an expanded set of best-practice experiences will be deployed for scale-up through:

1. Public sector delivery in deep rural areas— Rural Electrification Fund (REF) unit redesigned (solar systems); EEU (solar systems and mini-grids).

2. Private sector market-based supply, delivery, and after sales service chains in rural areas, with a focus on solar systems.
3. Private sector mini/micro-grids predominantly for pre- electrification in rural areas until the outreach of the grid distribution network access is extended.

Rural Electrification Fund (REF) - In 2003, the Government established REF by Proclamation No.317/2003 with the mandate to oversee off-grid electrification. The REF supports public sector initiatives, Cooperatives and community- based organizations, NGOs, and other relevant developers through the provision of sub-loans and technical assistance. The REF is administered under MoWIE by Alternative Energy Technology Dissemination Directorate (AETD), which serves as the Rural Electrification Fund Administrator. A Rural Electrification Board (REB) directs the activities of the Directorate. The Directorate will provide loan and technical assistance to eligible rural electrification project promoters. The Directorate will disburse, track and collect the loan finance to the project promoters through an intermediary financial institution or Trust Agent. The Development Bank of Ethiopia (Trust Agent) is the financial intermediary between the Rural Electrification Fund and Project Promoters. The Development Bank of Ethiopia disburses funds during project implementation and later recovers loans in line with the loan agreement agreed upon by the Directorate and the Project Promoters.

Short-term pre-electrification - While the grid is expected to be the least-cost solution for 3.3 million households by 2025, its rollout will take up to seven years to materialize, and many households (HHs) will, therefore, need to wait for some time before getting access to electricity services. Hence, the government acknowledges this possible segment of beneficiaries of the off-grid program, for service delivery (market-based) to those communities that are expected to receive a grid connection in the later years of the grid program by 2025. The private sector is expected to support the government in its short-term pre-electrification targets by deploying individual solar systems and establishing mini-grids.

Mid-term pre-electrification—About 5 million target beneficiaries residing between 2.5 – 25 km away from the existing grid, where grid connectivity is projected at least cost, may have to wait several years before they receive grid access. Given their proximity to the existing network, these beneficiaries are expected to be connected to the grid by 2030. Till this segment of the population is able to access the grid, the government aims to provide off-grid energy access to these people with support from the private sector.

Long-term off-grid/deep rural—About 1 million HHs (about 4 percent of the population by 2030) are the targeted beneficiaries located beyond 25 km from the existing grid and located in progressively remote and scattered settlements and villages that are less likely to be served in a cost and time-effective manner by grid connectivity. They may also include some homes that are not far from the existing grid, but their isolation from neighbours' settlements and transformers raise the cost of connectivity significantly. As their location is still within the mandate of EEU (100 km), some areas may eventually be connected to the main grid in the long run, beyond 2030. However, until this happens, these HHs are expected to be served with off-grid energy. Tables 1 and 2 below describe illustrative contours of the off-grid program to achieve universal access by 2025, and the grid connections program and universal electricity access (2019-2025), respectively.

Table 1: Illustrative Contours of the Off-Grid Program to Achieve Universal Access by 2025

Year	Year Connections	Solar Systems	Mini-Grids
2019	200,000	190,000	10,000
2020	450,000	430,000	20,000
2021	650,000	620,000	30,000
2022	800,000	760,000	40,000
2023	1,000,000	950,000	50,000
2024	1,200,000	1,140,000	60,000
2025	1,400,000	1,330,000	70,000
Total	5,700,000	5,420,000	280,000

Table 2: Grid Connections Program and Universal Electricity Access (2019-2025)

Period		Total Households	Off- Grids Connections Added	Cumulative Off-Grid Connections	Off-Grid Access Rate
Program	Year	(Millions)	(Millions)	(Millions)	(percent)
GTP 2	2017	19.9	0.0	2.2	11%
	2018	20.4	0.0	2.2	11%
	2019	20.7	0.1	2.3	11%
	2020	21.1	0.5	2.8	13%
	2021	21.6	0.7	3.5	16%
GTP 3*	2022	22.0	0.9	4.4	20%
	2023	22.4	1.0	5.4	24%
	2024	22.8	1.2	6.6	29%
	2025	23.2	1.5	8.1	35%
GTP 4*	2026	23.6	-1.4	6.7	28%
	2027	24.0	-1.4	5.3	22%
	2028	24.4	-1.5	3.8	16%
	2029	24.8	-1.5	2.3	9%
	2030	25.2	-1.4	0.9	4%

**Assuming there would be follow up versions of the GTP*

By 2030, it is expected that most of the population could be connected to the grid (Annex H), with the remaining 4 percent of the population connected with off-grid solutions (either solar off-grid or mini-grids) as a long-term access solution.

The current off-grid program implementation framework focuses on two main technologies for service delivery to all the segments of beneficiaries: (i) Tier 1 and above solar off-grid solutions; and (ii) isolated mini-grids, as well as a coordinated combination of these.

To date, the off-grid program has provided access to over two million beneficiaries, broadly differentiated by the delivery modality deployed (public versus private sector-led), and spatially (rural and deep rural versus proximate urban locations). Ethiopia has achieved significant results in the availability and distribution of off-grid solutions. It shows a potential for market scale-up, being the largest unserved market yet in East Africa.

Regulatory initiatives that support off-grid sector in Ethiopia

Quality standards: Lighting Global (LG) standards are now mandatory for products up to 15 Wp. This is combined with the IEC standards that have been adopted for systems up to 350 Wp by the Ethiopian Standards Agency. For pico-PV products, the Government of Ethiopia has harmonized its national standards with the Lighting Global Quality Standards, as well as the test methods specified in IEC TS 62257-9-5. For larger systems, it accepts a variety of verification certificates from third parties.

Customs duties: The Ethiopian Revenues and Customs Authority (ERCA – now Ministry of Revenue) usually charges up to 35 percent duty and an excise tax of up to 100 percent on imported products. However, importers of solar products under 15Wp have been exempted from both, thanks to the proclamation from the Ministry of Finance and Economic Cooperation (MoFEC), now Ministry of Finance on renewable energy. Larger solar home systems with quality certificates are also benefiting from this exemption. However, 15 percent VAT and 3 percent withholding tax are applicable.

Lifting of testing: To streamline importation of off-grid solar products, the Council of Ministers has approved certification of products before shipment (Pre-Verification of Conformity, or PVOC). The Ministry of Trade has eliminated the taking of samples from every shipment, related testing fees, and a previous 0.5 percent deposit based on shipment value.

Over the past five years, the government has set the stage to increase the penetration of off-grid technologies, taking a series of essential measures to deregulate the market and establish an enabling environment, in line with the best practices. Recent years have witnessed an acceleration of regulatory initiatives aimed at creating an enabling ecosystem for the scale-up of off-grid solutions as reflected in the establishment of quality standards, reduction in customs duties and lifting of testing requirements. Through the public sector program under the Rural Electrification Fund (REF), various vital efforts have been made, including more than 45,000 Solar Home Systems (SHS) provided to unelectrified communities⁷ through almost 696 Rural Electric Service Cooperatives (RESC); at least 1,049 schools have been served; approximately 1,576 health posts gained access to off-grid solutions, in collaboration with the Ministry of Health; over 200 micro-technicians were trained in operation and maintenance of SHS; a solar PV testing facility was acquired and handed over to the Ethiopian Conformity Assessment Enterprise (ECAE) for quality control of products etc. Table 3 provides details on social facilities provided with off-grid stand-alone systems till 2018.

Table 3: Social Facilities Provided with Off-Grid Stand-Alone Systems, 2018

Electrified by	Health Post	Primary Schools	Health centres	Subtotal
Rural Electrification Fund (REF)	613	436		1,049
Federal Ministry of Health	1,109		467	1,576
Total				2,491

⁷ It is tier 0, unelectrified communities. As per the baseline, this segment has no access to grid or off-grid energy. The target is to provide energy to all Ethiopian by 2025 including this segment of population. (65 percent access provision by grid and 35 percent by off-grid)

The REF chairs the technical evaluation team for the private sector enterprises (PSEs) applying to the credit line at the Development Bank of Ethiopia (DBE). Along with REF, MFIs and PSEs have been key players in providing solar lighting, charging products and solar home systems in Ethiopia. Through a credit line⁸ at the Development Bank of Ethiopia (DBE) (serving as a financial intermediary for funding provided by the World Bank), over 70,000 solar home systems and 1.1 million Lighting Global certified solar lanterns have been distributed in Ethiopia. The MFIs and the PSEs are required to apply to DBE to access Market Development Credit Line (MDCL). The criteria and process needed for the application are detailed in the Market Development for Renewable Energy and Energy Efficient Products document enclosed in Annex F of this report. The rate of interest from DBE to PSEs is 12 percent and from DBE to MFIs is 8 percent. The MDCL is a component of the Electricity Network Reinforcement and Expansion Project (ENREP) under the June 2012 financing agreement between the Federal Democratic Republic of Ethiopia (FDRE) and the International Development Association (IDA). It was created in response to the growing demand for renewable energy technologies and products among customers not connected to the electricity grid.

With no local manufacturing, virtually 100 percent of the market currently requires imports of off-grid technologies. Ethiopian importers needed liquidity and access to foreign currency at affordable rates to bring leading international technologies in the market to Ethiopia. MFIs needed affordable local currency (Birrs) capital to enable their clients to purchase these products through payments in instalments to (i) provide access to affordable finance for off-grid renewable energy products to complement the electricity grid connection program; and (ii) promote private sector investments in renewable energy technologies and energy-efficient products in Ethiopia as well as develop a private-sector market, especially in rural areas. Hence, this credit line was designed with two windows:

A. Retail loans to Ethiopian private sector enterprises (PSEs) and small and medium enterprises (SMEs), with guaranteed access to foreign currency, for up to two years, (including a grace period of 6 months), at 12 percent interest.

B. Wholesale loans to Ethiopian MFIs in the local currency, for up to six years (including a grace period of 12 months) at 8 percent interest.

Under the credit line, training is also provided to ensure proper appraisal of technologies, products and services. Capacity-building activities to strengthen the capacity of MFIs in administering their credit lines, as well as coordination with other stakeholders (e.g., Regional Energy Bureaus), business development and community engagement is on-going. According to GoE, approved MFIs provide affordable financing to rural communities entering into tripartite agreements with Regional Energy Bureaus (REBs) and selected PSEs to procure and install off-grid products for the customer. DBE has mostly worked with 14 MFIs, and an Inclusion Committee was established to expand the network of participating ones to 30. The credit line at the DBE has already undergone two phases of implementation, with overall funding of USD 40 million. Phase I was implemented between 2012 and

Tripartite agreements

Tripartite agreements involved multiple stakeholders, including kebele associations, woreda associations, woreda energy desk, DBE branch offices, MoWIE, private sector enterprises, RESCs etc., and the process was complex. This kind of complicated stakeholder arrangement has been reduced to only three stakeholders now - with MoWIE at first requesting a region to identify a woreda that is keen to have solar energy and is willing to establish a woreda association and deposit 5 percent guarantee amount to the energy bureau. Once this happens, MoWIE works with the PSE to install the system in that specific woreda.

⁸ CDM Registered

2016 (USD 20 million), whereas Phase II started in 2017 with the same funding. Of this, only 32 percent has been disbursed whilst 68 percent was still available as of 31st March 2019. The rate of nonperforming loans (NPLs) has been kept at 0 percent since the opening of the windows. The Phase II credit line was made available under the MDCL with two fundamental changes: -

- A USD, 4.5 million collateral support facility, guaranteed up to 75 percent of the loan amount.
- A MoWIE policy to allocate 75 percent of MDCL funding for solar home systems and 20 percent for lanterns (5 percent is allocated to clean cooking technologies).

This phase of the credit facility has shown impressive results in just over a year, reflecting the market needs for both access to foreign currency and working capital. The performance of the credit line shows the growing interest of the market in distributing off-grid solar solutions for a higher quality of services, in line with the government's commitment to transition from lantern-based off-grid access. However, no private mini-grid project was financed by the credit line as no such application was received till 31st March 2019.



Image 3 (Eligible products under the credit line at the DBE)

It is found that DBE, through its External Fund and Credit Management Directorate, provides working capital loan for two years and project loan for five years. Many applicants who were initially interested in accessing DBE credit line to establish mini-grids were sceptical that a mini-grid project might not generate enough revenues to repay the loan within five years. Private investors are currently waiting for clear directives regarding distribution and sales licensing and mini-grid tariffs, which are under development by the Government of Ethiopia.

Development Partners are supporting the Government of Ethiopia in the advancement of off-grid (including mini-grid) sector. Mobilising Investment (MI) for Nationally Determined Contribution⁹ (NDC) project is one such initiative.

1.2 Project Background

The Mobilising Investment (MI) for Nationally Determined Contribution (NDC) project is an International Climate Initiative (IKI) funded project, supported by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMU), Federal Republic of Germany, which focuses on stimulating private sector investment into priority sub-sectors within seven target countries: Bangladesh, Dominican Republic, Ethiopia, Kenya, Peru, Philippines and Vietnam. The overarching project objective is to support public actors and the private sector to create favourable conditions for private financing of NDC implementation by incentivizing investments and increasing scale of demand. In doing so, this project seeks to strengthen national capacities and learning on financing NDCs by working through some of the practical challenges that the actors face.

Since September 2017, SouthSouthNorth (SSN) is implementing the IKI MI Project, which spans until March 2020, in the above mentioned seven countries in Africa, Asia and Latin America. This project aims to support the mobilization of capital (specifically, private sector capital) for implementing NDCs and thereby, assisting countries in achieving their low emission, climate-resilient development goals.

⁹ Nationally determined contributions (NDCs) embody efforts by each country to reduce national emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive nationally determined contributions that it intends to achieve.

Under the IKI MI Project, SSN undertook a scoping study in Ethiopia on the various sectors to identify priority sector and sub-sector opportunities, which hold the highest potential in mobilising private investment while aligning them with the Ethiopian NDC. The goal of the study was to identify one sub-sector opportunity that would be taken forward into the later phases of the project, focusing on creating a favourable environment for private investment.

During the initial analysis, the energy sector appeared most promising in terms of mobilizing private sector investment. The study, therefore, concentrated on subsector opportunities within the energy sector, with a detailed investigation into six subsector options/initiatives, including mini-grids; Expanding local manufacturing for off-grid technologies; Developing local entrepreneurship using the World Bank funds; Greening industry parks; Expanding the National Biogas Programme in Ethiopia; Investigation of the use of bio-ethanol as a charcoal replacement; and Scaling up the Cookstoves industry.

Organizations Consulted under this Study

- i. Ministry of Water, Irrigation and Energy
- ii. Ministry of Finance
- iii. Ministry of Trade
- iv. Ethiopian Energy Authority
- v. Ethiopian Conformity Assessment Enterprise
- vi. Universal Energy Access Programme (UEAP)
- vii. Ethiopia Electricity Utility
- viii. Development Bank of Ethiopia
- ix. Climate Resilient Green Economy
- x. The World Bank
- xi. GIZ
- xii. Swedish Embassy
- xiii. Se4all Africa Help Desk
- xiv. EU Delegation
- xv. IFC Lightning Africa
- xvi. SEDA-E
- xvii. Ethio Resource Group
- xviii. Solarkoisk Solution
- xix. Rensys Engineering & Trading PLC
- xx. Fosera
- xxi. BMLA Private Limited

Ultimately, mini-grids sub-sector was decided to be the most appropriate and viable for investigation in the next phase of the IKI MI project. Following a competitive selection process, SSN contracted IPE Global, to take the recommendations from the scoping study forward and undertake a comprehensive analysis of the recommendations proposed to understand the Ethiopian regulatory environment in relation to off-grid energy with a prime focus on mini-grids. There are three specific objectives of this assignment, as stated in the Ethiopia IKI MI Workplan:

- To identify the capacity constraints within the Ethiopian Electric Authority (EEA) and the Ethiopian Electric Utility (EEU) and other pertinent and relevant stakeholders.
- To understand the state of play of the regulatory environment in relation to private sector participation in the off-grid sector.
- To provide initial insight into the factors required to develop different off-grid business models that can be used to ensure that off-grid energy is viable for the investors and financiers in Ethiopia.

IPE Global initiated the assignment in November 2018. An inception report was submitted along with the methodology to be followed for the assignment. After that, a comprehensive literature review was initiated by the consultants (Annex B: List of documents reviewed). Simultaneously, the consultants had interactions with the government and private stakeholders, and development partners, through 26 Key Informant Interviews. The study covered a total of 21 organizations. In Annex C, the report provides information on main stakeholders in off-grid (including mini-grid) sector in Ethiopia.

CHAPTER 2: MINI-GRIDS IN ETHIOPIA

2.1 Present Status of Mini-Grids in Ethiopia

The Government of Ethiopia has incorporated off-grid solutions as a means to achieve universal access to electricity nationwide within the next six years. Among the off-grid sector, mini-grid technologies can provide a higher level of service. They can support higher loads, including for social institutions (e.g., health and school facilities) and for productive uses, energy-intensive businesses and even small-scale cottage industries. While still in the embryonic stages of market development, the performance of mini-grids worldwide provides evidence of the potential for communities electrified by mini-grids to become commercial centres for the surrounding villages. The adoption of a mini-grid program is part of the government's approach towards integrated planning, as mini-grids and solar home systems, as well as grid connectivity, are technologies that complement each other, supporting different levels of current and potential demand and reflecting a different time frame for access provision. Consistent with the green growth objectives of the government, only hybrid or renewable mini-grids will be developed in Ethiopia.

Renewable energy potential in Ethiopia

Ethiopia has been dubbed 'the powerhouse of Africa' due to its substantial renewable resources. Ethiopia has an estimated 45GW of exploitable hydropower, mostly located in the Western half of the country. It has significant biomass energy potential from agro-processing industries' waste, including sugar cane bagasse, cotton stalk, coffee hull and oil seed shells. Ethiopia's solar irradiation is well distributed across the country and averages over 2,000 kWh/m², which is comparable with South Africa and State of California. The Somali region is the priority region for wind projects with 1,060 GW of the 1,350 GW of Ethiopia's wind potential and localised wind speeds reaching over 10 m/s.

Presently, EEU operates several isolated diesel generation distribution systems (Table 4), where grid power is not yet available. Out of the 31 mini-grids constructed, five have been successfully connected to the grid.

Table 4: Installed Capacity and Connections Provided by EEU Diesel Mini-Grids

Installed kW	No. sites	%	Connections	No. Sites	%
100&150 kW	14	39%	No data	17	47%
200&250 kW	8	22%	1-250	11	31%
320&360 kW	8	22%	251-500	4	11%
520 kW	1	3%	501-750	2	6%
Grid Connected	5	14%	1,001-1,250	1	3%
			1,251-1,500	1	3%

About 35 percent of the mini-grids have an installed capacity of 100 kW, with one site at 520 kW and the remainder between 150 kW and 360 kW. About 8,000 connections are estimated to be currently provided through these existing installations. The government is also collaborating with the development partners for piloting the mini-grids powered by renewable energy sources. USAID is conducting a feasibility analysis for the conversion of EEU's diesel mini-grids to renewable energy power. Five new hydroelectric sites have been identified by Water Works Enterprise and several clusters of unelectrified villages to evaluate mini-grid solutions for access provision. The European Union is financing five new hydro mini-grids implemented by GIZ, testing a model for renewable energy-distributed generation that is currently based on Cooperatives but is aimed at scaling up the market for private or public agencies, as well as a combination of both.

In collaboration with the Korean International Cooperation Agency, UEAP also launched two hydro mini-grids in 2017. Also, solar, wind and other renewable mini-grid activities are being piloted. A summary of on-going and planned mini-grid activities in the country is provided in Annex I.



Image 4 (Mini-grid site in Ethiopia), (Courtesy ERG)

Recently, MoWIE and EEU have identified over 250 villages throughout the country that are far from on-grid substations and need to be connected via solar photovoltaic mini-grids. Before scaling up solar mini-grid projects, MoWIE and EEU want to launch pilot projects in different regions and demographics of the country to determine the technical, financial and operational feasibility of mini-grids. Out of the 250 villages, EEU has first identified 12 pilot villages (Table 5) that need to be electrified using solar and ESS¹⁰ power systems with backup diesel generators. Selected private organizations will design, develop and commission the private power generation system (PV array + ESS + diesel generator). EEU will be responsible for developing and commissioning mini-grid distribution systems. EEU is mainly considering 'Hybrid (DC-AC) Mini-grid Topology, AC Mini-grid Topology and so on, in these 12 pilot Mini-grids.¹¹ In June 2019, MoWIE awarded the contract to four international private companies - three Chinese and one Spanish firm, to design, develop and commission private power generation system in the 12 towns identified for intervention.

¹⁰ Energy storage system

¹¹ Bidding Document For Procurement of Plant Design, Supply, Installation, test and commissioning of Pilot Solar Mini - Grids Projects (6 lots) in 12 Towns/Villages

Table 5: Mini-Grid System Sizes for Towns and/or Villages

Location	PV (KW)	Genset (kVA)	Storage (kWh)	Private Companies
Afar-Kusrewad	75	40	200	Trama TecnoAmbiental S.L.
Amhara-Benbaho	275	90	400	Trama TecnoAmbiental S.L.
Benishangul-Gumuz, Albasa	275	65	600	CET and R Consortium
Oromia - Beltu	750	125	1,500	Norinco International Cooperation Ltd.
Oromia - Bahima	200	60	400	Norinco International Cooperation Ltd.
Gambella - Ungoge	175	50	250	CET and R Consortium
SNNP - Tum	550	130	750	Guodian Nanjing Automation Co. Ltd
Tigray - Arae	275	70	400	Trama TecnoAmbiental S.L.
Amhara- Wasel	300	120	450	Trama TecnoAmbiental S.L.
Oromia- Mino	225	55	450	Norinco International Cooperation Ltd.
SNNP- Omorate	375	100	600	Guodian Nanjing Automation Co. Ltd
Qorie, Somali	325	85	550	CET and R Consortium

These private companies will only build and commission the systems. They will not be involved in selling electricity to the community. EEU will take tariff decisions for the 12 pilot mini-grids later, based on the experience of the four private firms with costs of establishing and running mini-grids in the nine regions, which differ geographically, demographically and socio-culturally. This is also an opportunity to test the various business models relevant to the Ethiopian context, along with setting up of economically viable tariffs for mini-grids to motivate private investors in the country.

In Ethiopia, all mini-grid implementation including EEU's mini-grids will be carefully coordinated with the Safety Net and other government programs, enabling local processing of agricultural products and leading to increased local value generation and job creation. While the geospatial analysis has preliminarily indicated the location of potential sites for mini-grids development, experience worldwide suggests the importance of field data gathering to measure and project demand loads. Some fundamental studies to be conducted will launch or finalize (as in the case of social institutions), the geo-referencing of demand loads and the identification of possible anchor customer for mini-grids. The following two on-going studies will be necessary for the development of the mini-grid program: -

1. A rapid assessment and a comprehensive nationwide survey for productive uses, including the areas already identified (at the woreda level) for agricultural development by the Ministry of Agriculture. This rapid assessment is expected to be conducted in collaboration with EEU within a three-month timeframe to kick off the mini-grids program promptly. At the same time, the more comprehensive study will proceed parallelly for further identification of possible candidate sites.
2. A comprehensive assessment and validation of estimates of electricity needs for schools and health facilities. While a preliminary investment prospectus and implementation program are identified under the NEP¹², more information would be gathered to detail the adequate provision of electricity services further.

2.2 Mini-Grid Regulations and Process

In Ethiopia, the energy sector is the responsibility of MoWIE. Under MoWIE, there are three central implementation bodies: Ethiopian Electric Power (EEP), Ethiopian Electric Utility (EEU) and the Ethiopian Energy Authority (EEA) that have specific roles in the Ethiopian energy sector. EEP is responsible for generation and transmission (132kV and above), EEU is responsible for distribution and the Universal Energy Access

¹² NEP defines access of education and health facilities (2015) to electricity and NEP-IRM targets, 2018–2025 along with details of geo-spatial least-cost planning and investment prospectus

Program (UEAP), and EEA is the regulatory body for the energy sector.

Besides, there are two relevant directorates under MoWIE - the Energy Study and Development Follow-Up Directorate (ESD); and the Alternative Energy Technology Development and Promotion Directorate (AETDPD). The ESD is a directorate for strategy and coordination within the energy sector. The AETDPD was originally an implementing agent, coordinating the Rural Energy Fund, but is now being developed into a strategy and dissemination institution along with the ESD.¹³

MoWIE does planning centrally, in partnership with regional energy agencies. These agencies coordinate energy activities within their regions, suggest priority settlements for electrification to MoWIE and are responsible for promoting and facilitating regional dissemination of modern energy technologies. The planning process is not done on a purely economic basis but involves balancing social development factors as well.

Main policies relevant to off-grid energy sector

- *National Electrification Program- Implementation Road Map and Financing Prospectus*
- *National Electrification Program 2.0*
- *Ethiopian Energy Policy (1994)*
- *The Electricity Proclamation, no. 86-1997*
- *Electricity Operations Regulations, no. 49/1999*
- *Pricing procedure for small and very small self-contained system (SCS), no. 2/200*
- *Climate-Resilient Green Economy (CRGE) strategy, 2011*
- *Electricity Feed-In-Tariff Law, 2012*
- *Investment Proclamation, no. 769/2012*
- *Energy Proclamation, Proclamation 810/2013*
- *Growth and Transformation Plan II (GTP II), 2015*
- *Ethiopia National Electricity Transmission and Distribution Grid Code, 2016*
- *Council of Ministers Energy Regulation, 2016*
- *investment incentive policies of bureau of economic and business affairs Ethiopia investment climate statement 2016*
- *Energy Efficiency Program- Ethiopian Energy Authority*
- *Proclamation No. 1085/2018, Amendment of Energy Proclamation*
- *Investment law related to the electricity, Government of Ethiopia*

There is a dedicated rural energy program called the Universal Energy Access Program (UEAP), sitting under EEU, which covers both grid and off-grid solutions. This program is the implementing vehicle for off-grid government programs. Previously, it only delivered grid extension programs. The UEAP has replaced the Rural Electrification Fund, run by the Alternative Energy Technologies Development and Promotion Directorate, as the primary implementation vehicle for off-grid public sector programs. The UEAP is administered by the EEU and the Rural Electrification Fund (REF) by MoWIE. Until now, EEU and UEAP have been responsible for grid electrification, whereas REF and MoWIE were promoting off-grid energy. Nevertheless, GoE has now integrated both grid and off-grid energy within the Directorate for Electrification under MoWIE.

Private developers can apply for off-grid energy transmission, generation and distribution sale licenses. The Council of Ministers' energy regulations (Please refer Annex D: Proclamation No. 810/2013: A proclamation on energy) cover the licensing of grid and off-grid generation, transmission and distribution. There is neither prioritized access to the grid for renewable energy nor are there specific operational rules for managing renewable energy.

A distribution and sales license gives an exclusive right for distribution and sale of electricity within its licensed area, as well as non-exclusive rights outside the license area. To be awarded an exclusive license, the developer must show that all demands can be addressed. All projects except that run by the Cooperatives require a license. The duration, renewal, amendment, replacement, transfer and termination of licenses and license fees are covered under Articles of the Energy Regulations.

¹³ Green Mini Grid Market Development Programme- SEforALL Africa Hub African Development Bank

A Certificate of Competency is required for any electrical work, conditions for which are set out in Article 10 and 11. Except for Cooperative projects, which are covered by the Cooperative Law, certain stages of mini-grid project development need to be followed under EEA's regulation, as detailed later in the report.

Ethiopian laws allow private and independent power producers (IPPs) and distributors to generate grid electricity. GTP II also allows delivery through PPAs with IPPs (using government and private financing). IPPs are eligible for market entry under the Electricity Operations Regulations (2016, 49/1999), Letter of Power Sector Policy (2003) and the Investment Proclamation (280/2004). Geothermal power projects are well supported under this regulatory framework, with developers able to buy exploration licenses and concessions.

Power purchase agreements are currently agreed initially with the off-taker- EEP. Final approval is given by the EEA, based on economic and technical feasibility and community considerations. The Ministry of Finance (MoF) is also involved in the financial aspects of PPAs. The utility is not obliged to buy or use any excess power and there are no rules defining the sharing of curtailment costs. In most cases, PPAs are expected to be agreed through competitive tendering.

2.3 Requirements for Private Sector in Developing Mini-Grids in Ethiopia

Transmission and supply of electrical energy through the Integrated National Grid System is exclusively reserved (single buyer model) for the Government of Ethiopia. However, Investment (Amendment) Proclamation No. 373/2003 allows private investors to engage in the generation of electricity in Ethiopia. In 2003, the Amendment Proclamation made the Ethiopian Energy Authority (former Ethiopian Electric Agency) as the responsible government organ for issuing, renewing and cancelling investment permits for generation, transmission and supply of electrical energy.

Accordingly, private actors are not only permitted to engage in the generation of electricity but also off-grid transmission and supply of electricity. However, the state-owned enterprise (SOE) still holds the exclusive rights with regards to the transmission, distribution and supply of electricity through the integrated national grid system (Investment Proclamation No. 280/2002). All other areas of investment in the electricity sector are open for foreign investors as specified by Regulation No. 84/2003 issued by the Council of Ministers.

The EEA regulates licensing of transmission, generation and distribution sale of mini-grids under the Council of Ministers' Energy Regulations.



Image 5 (Mini-grid photovoltaic system with ESS)

The EEA clarifies that an investor shall be allowed to import duty-free capital goods and construction materials necessary for the establishment of a new enterprise or for expanding or upgrading an existing enterprise if they are not produced locally with competitive price, quality and quantity.

Private investors are granted a customs duty exemption privilege to import duty-free capital goods necessary for their enterprise unless they are produced locally with competitive price, quality and quantity. Private investors are also eligible for duty-free importation of spare parts whose value is not more than 15 percent of the total value of the capital goods to be imported.

Capital goods imported free of customs duty shall not be transferred to third parties not entitled to similar duty-free privileges, unless prior payment of the customs duty is affected.

Expatriates may remit, in foreign currency, salaries and other payments per foreign exchange regulations. However, a foreign investor: a) re-investing his profits or dividends; or b) exporting at least 75 percent of his outputs shall not be required to allocate a minimum capital. Moreover, the government allows employment of expatriates if local labour market fails to provide Ethiopians with the necessary work qualifications and opening of foreign currency accounts in any authorized local bank according to the directives of the National Bank of Ethiopia. Adequate compensation in case of nationalization or confiscation of an enterprise for the sake of public interest is also provisioned.

To establish any off-grid (including mini-grid) set-up, first, an application must be made to the EEA in a form provided on their website¹⁴/office which contains all the requirements. The License Applicant for generation must provide a full document of the project that he/she intends to carry out. The document, as stated in the Regulation, shall contain: -

- | Pre-conditions of the investment law | |
|---|---|
| a) A feasibility study of the project, which includes, the social and economic impact of the project; estimated costs and returns of the project; duration of the project; and construction and installation plans and commencement date of operation. | • A minimum capital of USD 100,000 is required for a foreigner to invest on a single off-grid (mini-grid) project. |
| b) Environmental impact assessment, which includes, potential damages to the environment, along with mitigation, restoration or reclamation plan, including resettlement program for displaced residents; estimated cost of implementation of the plans and programs referred to above. | • USD 60,000 capital is required from a foreign investor to jointly invest with a domestic one. |
| c) Documents showing the applicant's financial situation, technical competence and experience. | • Any foreign investor having brought investment capital shall be registered at the National Bank of Ethiopia and obtain a certificate of registration. |
| d) Construction and installation designs. | • An investor should submit an agreement on technology transfer to the Ethiopian Investment Authority for approval and registration. |
| e) Source of electricity - if the source is hydro, the applicant is required to procure water use and waterworks construction permit from the MoWIE. If the source is coal, the applicant is required to procure permission from the Ministry of Mining. | • An investor can acquire external loan upon registration of loan by the National Bank of Ethiopia. |
| f) Map of the project at a scale determined by the EEA. | |
| g) Total power capacity of the project. | |
| h) Power purchase agreement, where appropriate. | |
| i) Land permit from the regional state where the project is proposed to be carried out. | |

The Agency must be satisfied that the License Applicant is a suitable person to hold the license. In determining this, the Agency may consider:

- The License Applicant's previous commercial and other dealings and the standard of honesty and integrity have shown in those dealings.
- The financial, technical and human resources available to the License Applicant.
- The officers and, if applicable, major shareholders of the License Applicant and their previous commercial and other dealings and the standards of honesty and integrity shown in those dealings (including breaches of statutory and other legal obligations).

¹⁴ www.eea.gov.et

Moreover, the License Applicant must demonstrate that he/she has the technical capacity to comply with the conditions of the license. The license holder has a statutory obligation to comply with the Proclamation/Regulation. License Applicant must demonstrate that he/she will be capable of complying with the provisions of the Proclamation/Regulation relevant to the class of license for which he/she has applied. To demonstrate his/her technical capacity to the Agency, the Applicant shall provide details of his/her experience in the electricity industry along with a summary of the skills and expertise of the License Applicants' Directors and Senior Managers, especially those relating to the electricity industry. If the License Applicant will rely on another entity to provide staff and resources, a summary of the relationship between the License Applicant and this entity, including any formal agreements to provide services and an overview of the entity's experience in the electricity industry is required. To demonstrate the Applicant's financial viability, audited financial statements for the past three years should be provided, where available. If such statements are not available, the Applicant shall contact the Agency to discuss the information he/she must provide as an alternative. The Applicant will be required to demonstrate that he/she is capable of being sued in its own name in an Ethiopian court; and that, if the Applicant is not an undischarged bankrupt; and that he/she has an acceptable credit rating or financial standing commensurate with the potential financial exposure.



Image 6 (H.E. Dr. Frehiwot Woldehana, State Minister of Energy, MOWIE providing his perspectives during the study)

The term of license as stipulated in the Regulation shall be based on the life of the project. However, the maximum duration for hydropower generation license is 40 years. The maximum length of license for non-hydropower generation will be determined by the directives issued by the Ministry of Infrastructure.

A license may be renewed for a successive period if the licensee has made an application to that effect two years prior to the expiry of the license; is not in breach of any provisions of the Proclamation, the Regulation and directives issued which constitutes grounds for revocation of his license; and, has agreed to upgrade his operations in accordance with the latest technology generally accepted in the power industry; provided, the duration of each renewal shall not exceed half of the initial period of the license.

Regarding payment of fees and charges, upon registration of his/her application, any applicant for electricity operation license shall pay in advance, 20 percent of the total license fees. However, such payments shall not be refunded upon refusal of license. A fee of Birr 1.00 per kilowatt shall be paid for generating license. However, the minimum fees shall be Birr 1,000. As per the Regulation, once the applicant has applied for the generating license and registered with the Agency, the next step is advertising the application in local newspapers, on radio and television, within three days of registration, to know if there is any objection on the proposed project. Any person who has an objection to the project can send a written objection to the Agency within 60 days from the last publication of the advertisement. If the Agency rejects the objection, it shall notify the person in writing by setting the reasons for the decision.¹⁵

¹⁵ Requirements for Electricity Operation Licensing

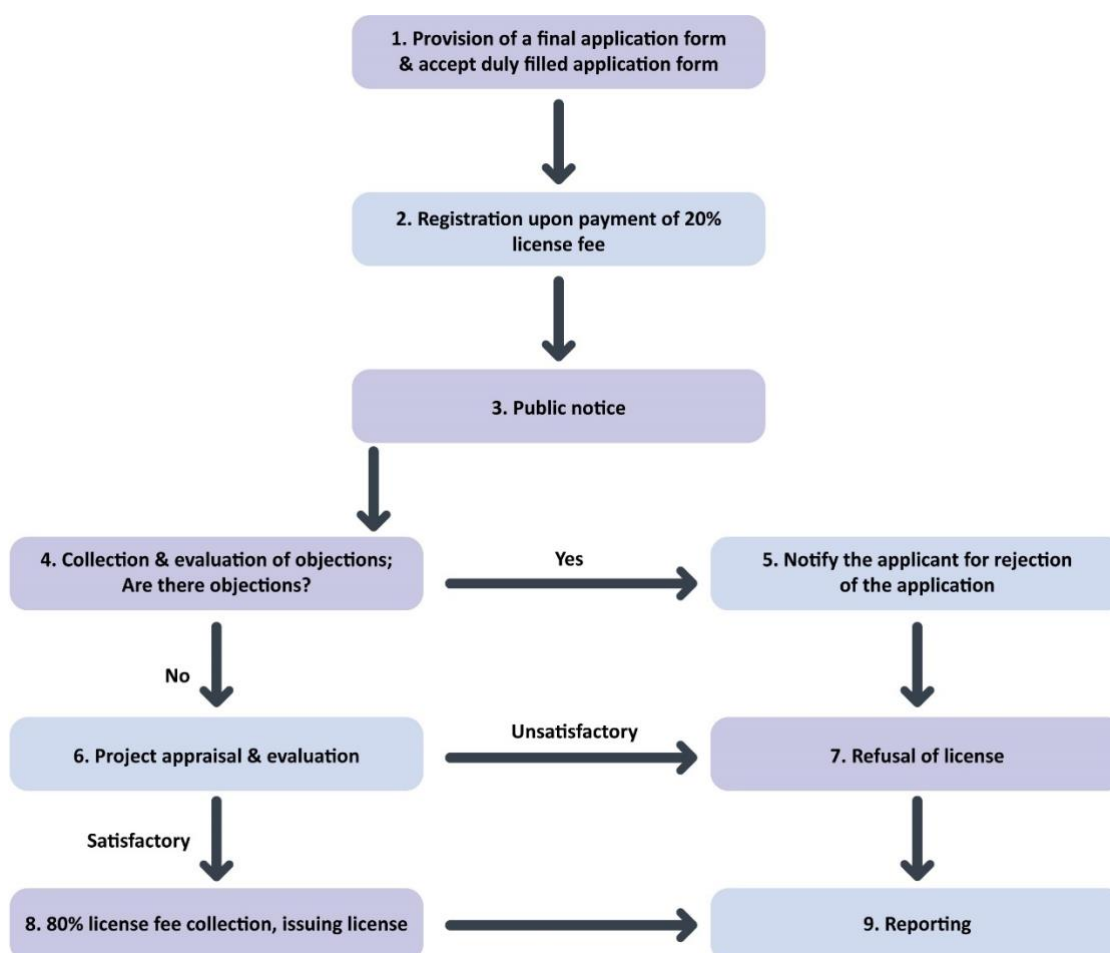


Image 7 (Electricity operation licensing process flow)

Average time taken for each process to develop a mini-grid in Ethiopia is explained as under based on the private investors' perspectives and as observed during the study: -

Table 6: Licensing Process as Explained by Private Investors

S. No.	Steps	Time taken	Observations	Risks	Potential Solution
1	Firstly, a private investor must get an Investment Permit from the Ethiopian Energy Authority (EEA) after presenting a feasibility study and other documents.	1 Week	Once Investment Permit is received, the investor, as per the feasibility study, identifies suppliers for import of off-grid/mini-grid products. The private investor now goes back to the EEA with all invoices to seek tax exemption letter, which is an easy task as EEA is very cooperative. Once the exemption is given, investor imports products install the setup and commissions the entire mini-grid system.	At this stage, EEA does not discuss/negotiate expected tariff. Investor fears that after making all the investment and setting up the mini-grid structure, if EEA does not agree on proposed tariff, the entire process will be futile.	Private investors propose that EEA should negotiate on proposed tariff before any import, installation, recruitment of human resources or any kind of investment is done.
2	Secondly, receive an import duty tax exemption letter from EEA.	1 Week	EEA is very supportive and quick in its response which private stakeholders appreciated.		
3	Build the mini-grid	Up to 6	No bottleneck is reported at this	Some private	GoE and

S. No.	Steps	Time taken	Observations	Risks	Potential Solution
	system (at this stage, private investor asks for electricity generation and distribution/ sale license also).	months	stage by any private investor. If the private investor has done his/her preparation and has the technical capacity, access to foreign currency, capital, efficient human resources, building mini-grids, as per feasibility study, this process is also smooth.	investors may lack technical capacity, face challenges in accessing foreign currency, human resources and infrastructure.	development partners need to build HR capabilities in mini-grids, ensure access to hard currency and must expand local manufacturing for off-grid technologies.
4	EEA reviews technical compliance of the system and asks for tariff estimate calculations.	Up to 2 months	Private investor expects EEA to have its own pre-decided tariff model that investors can adopt. As of now, such tariff models do not exist, even though work is in progress on this. NEP considers tariff issue in detail.	Ethiopia is yet to have cost-reflective tariffs for mini-grids. This demotivates private investors.	The GoE must expedite its process of finalizing tariff methodology and establish attractive tariffs.
5	Private investors must publicize their proposal to operate mini-grid in a specified area (in the national newspaper, radio, TV) and see objections/ concerns if any as per EEA regulations mentioned above.	Up to 2 months	Private investors state that publication in newspapers and radio must be enough as airtime on television is expensive. For example, what requires ETB 50,000 for using TV, can easily be done with ETB 10,000 in radio and newspapers. Also, this must be done before products are imported and installation of mini-grid set up is done as any serious objection may stall the whole process, thus, making all investments redundant.		
6	Private investors receive generation and distribution/ sales license.	Unknown	No private investor has received a generation and distribution/sales license in Ethiopia so far. EEA has no precedence till now. However, this issue will be shortly addressed as EEA is discussing modalities with regional governments and communities. EEA ultimately wants regional governments to regulate mini-grids	This is a major problem private investor are facing in the mini-grid sector in Ethiopia.	Development Partners must support the government to establish a clear process to provide generation and distribution/ sales license.

Ethiopia is presently reviewing its Energy Regulation. The updated Energy Regulation is expected to come up with business models with cost-reflective tariffs to attract private sector participation while decreasing the need for public support for mini-grids scale-up.¹⁶

¹⁶ Tariff Guidelines and Methodology for Off-Grid Systems (ZERO DRAFT)

A sustainable off-grid (including mini-grid) tariff, must cover the system's efficient and prudently incurred cost comprising the capital expenditure (CapEx) and operating expenditure (OpEx), including fuel costs. The cost of service for a typical mini-grid which supplies electricity to off-grid consumers should recover the local generation cost and mini distribution grid, including retail cost, as explained in Tariff Guidelines and Methodology for Off-Grid Systems (Draft).¹⁷

In determining and approving the off-grid tariff, EEA will undertake revenue requirement analysis, so that the Authority would be able to determine the actual cost of operating the off-grid system. The analysis will further establish the revenue-cost gap, if any, which can arise under both partly and wholly subsidized off-grid business models (These models are described in the second report on Financing Gap and Business Models in Off-Grid Energy Sector in Ethiopia).

¹⁷ Ibid.

CHAPTER 3: CAPACITY CONSTRAINTS AND CHALLENGES IN MINI-GRIDS

The Government of Ethiopia is keen on advancing equity, inclusion and shared prosperity, irrespective of where one happens to live. The mini-grids' role is critical to pursue this aspiration, owing to their capacities of meeting the electricity demand of the rural population. Alongside grid densification and intensification, GoE has launched a revamped off-grid program to create an enabling environment for the growth of mini-grids and a lot of credible work is on-going in this sector.

Nevertheless, specific barriers at the policy, organizational and individual levels in Ethiopia, challenge the development of sustainable mini-grids. All organizations covered under this study informed that capacity constraints exist in off-grid (mini-grid) sector at these three levels, in varying degrees. Out of the total 21 organizations consulted, at least eight reported capacity challenges at policy levels, seven recalled challenges due to organizational constraints, and six stated barriers at individual levels. Review of available documents also validates a need to update policies, regulations, and incentives supportive of the whole off-grid (mini-grid) ecosystem across the value chain, from importers to customers. As well, adoption and enforcement of enabling regulations, quality standards and financial support programs targeted to ensure equity, economic growth and gender balance across the country are required to boost the mini-grid sector.

Equal sex ratio, gender equality and social inclusion are embedded in all developmental actions of the Government of Ethiopia at the design and implementation levels, across sectors. Both the government and development partners are aware of the existing gender gaps in off-grid (mini-grid) energy sector. Gender gaps in access to finance and entrepreneurship are being bridged in the DBE Market Development for Renewable Energy and Energy Efficient Product Credit Line.¹⁸ A large gender-gap identified in female applicants and beneficiaries of credit line led to a focus on the women segment. A workshop was organized in February 2017 with all MFIs engaged under credit line to map barriers and opportunities to address the gender gap. In 2018 also, necessary actions were undertaken to advance the gender equality agenda in the off-grid sector.

Capacity Constraints to Promote off-grid (mini-grid) Energy Sector

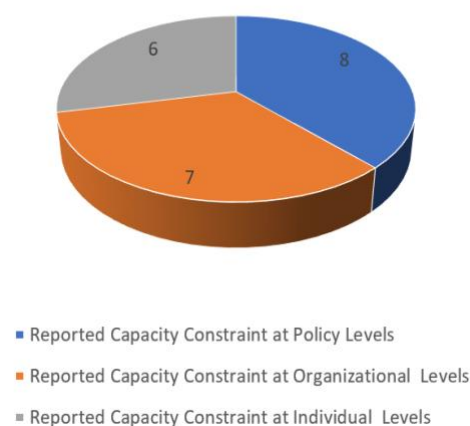
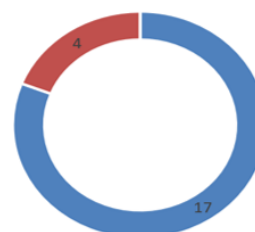


Image 8 (Capacity constraints observed under this study)



Organisations without a Gender Equality and Social Inclusion (GESI) Policy
Organisations with a GESI Policy

Image 9 (Status of GESI policy in organisations covered)

Recent development to bridge gender gaps in Ethiopian off-grid energy sector

- Women's business associations and female entrepreneurs were engaged in a half-day information session co-hosted by DBE on the opportunities available in the off-grid sector together with the World Bank (WB), International Finance Corporation (IFC) and the Ethiopia Climate Innovation Center (ECIC). In the months following the session, four female entrepreneurs have come forward to apply for a total of USD 1.5 million of funding to import off-grid technologies, from a baseline of only nine male-headed entrepreneurs accessing finance.
- As part of the technical assistance for MFIs under the DBE credit

¹⁸ NEP 0.2

The entire design of this study was done employing a gender and social inclusion lens. We found that out of the 21 organizations covered, at least 17 have gender equality and social inclusion (GESI) policy. The remaining four do not have any such policy presently, but they are working towards adopting a GESI policy soon.

line, a specific module focused on reaching more women with financing solutions has been delivered in January 2019 to all MFIs actively engaged in consumer finance aspects of off-grid. The training focused on the business cases for reaching women, case studies globally on what works and designing new approaches that focus on women as target market segment.

As per the study's methodology, private stakeholders were first consulted to understand their challenges related to investment in off-grid (mini-grid) energy sector, and later key informant interviews were carried out with development partners and the government to obtain their perspectives.

3.1 Political and Regulatory Institutional Challenges of Private Sector

1. Cost reflective mini-grid tariffs are yet to established

The EEA is responsible for reviewing, recommending and approving tariffs for all grid and off-grid projects. The general principles guiding the review of grid-related tariffs and approval of off-grid tariffs are listed in Article 28 of the Energy Regulations. The Energy Regulations detail requirements such as the production of a general tariff study every four years and the need for a uniform system of accounts and annual audited reporting. The pricing procedure for small off-grid systems is outlined in the Pricing Procedure for Small and Very Small Self-Contained System (SCS) No. 2/2005¹⁹. This covers small (100 KVA to 5000 KVA peak demand) and minimal (less than 100 KVA peak demand) self-contained systems (SCSs). Price structures for SCSs are submitted every four years, based on marginal and average costs. The EEA reviews Price structures before being submitted to MoWIE for approval.²⁰

Example of proposed tariff for mini-grid by a private investor

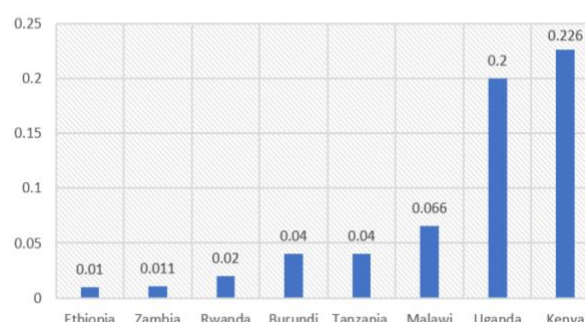
Investment per user in mini-grids is expected in the range of USD 300-1000. This means a mini-grid with 100 customers/users will cost USD 30,000 to 100,000. The tariff should enable the private mini-grid operator to recover all costs (capex and opex) in a maximum of 10 years. In the first week of April 2019, Ethio Resource Group (ERG), a private stakeholder has proposed to charge its mini-grid customers ETB 60/month for 2 lamps and 1 socket outlet for 5 hours a day. ERG, EEA and the woreda administration in kebele 0/8 of Menz Gera woreda in Amhara invited all prospective 215 consumers to agree upon a tariff for mini-grid electricity. Mixed reactions were observed by community members on this proposed tariff and many people considered it as too high, but to reduce these prices further will make the project economically unviable for ERG. Results of this tariff negotiation is pending with EEA. Based on the recently developed draft of Tariff Guidelines and Methodology for Off-Grid Systems drafted by EEA in consultation with private and development stakeholders, ERG is hopeful to get approval to collect its proposed tariff.

Ethiopia is yet to have established tariffs for mini-grids. Generally, the governments want to provide electricity access to all citizens at a universal tariff, i.e. reflecting the principle that all citizens should be able to gain electricity access (via grid or off-grid) at the same price. The Government of Ethiopia also does not want a major price difference between tariff rates for the grid and mini-grid energy. However, grid tariffs in Ethiopia are cheap for households at approx. \$ 0.01/kWh for the first 50kWh. When compared to other countries, they are even less expensive. Table 7 provides information on the grid and off-grid tariffs for selected countries.

¹⁹ <https://chilot.me/wp-content/uploads/2011/04/pricing-procedure-for-small-and-very-small-self-contained-systems-scs-no-2-2005.pdf>
²⁰ Green Mini Grid Market Development Programme-SEforALL Africa Hub African Development Bank Mini Grid

The costs of establishing and operating mini-grids are high and private sector developers invest if they believe that they will be able to earn a profit on their investment. Given the freedom to charge what they like, private sector project developers will charge tariffs that are likely to be significantly higher than grid tariffs, to ensure a return on investment. If the tariff levels are too low, then even high rates of tariff collection will be insufficient to provide the necessary return. Yet, if the tariffs are too high, affordability issues arise, making the customers unwilling to pay for the service, resulting in lowered collection rates.

ON GRID COST PER COUNTRY PER KWH IN USD FOR THE FIRST 50 KWH



In the absence of cost-reflective tariffs, many private investors consider solar home systems (SHS) a better option than mini-grids for small-scale lighting purposes, considering the higher operational expenses of mini-grids. Unless tariffs are subsidized, or an anchor tenant can cross-subsidize the community household tariffs, mini-grid for small-scale lighting purposes may not be commercially viable. The government understands that if on-grid tariffs were not subsidized, and instead captured the real economic cost for supplying to remote areas, it would likely make on-grid tariffs in rural areas much higher.

Currently, the Ethiopian Energy Authority is testing the draft of Tariff Guidelines and Methodology for Off-Grid Systems. This document has been prepared in consultation with the private investors and development partners and is expected to be finalized in August 2019. In addition, EEU is also testing 12 solar pilot mini-grids to be designed, developed and commissioned by private companies, which will inform capex, and opex costs to outline cost-reflective tariffs in Ethiopia.

Table 7: Grid and Off-Grid Tariffs in Selected Countries

Country	On-Grid Tariff	Mini-Grid Tariff
India	\$ 0.04/kWh ²¹	Husk Power Systems-\$ 2.41/mo WBREDA (PS)-\$ 1.28-\$4.32/mo ²²
Burundi	\$ 0.04/kWh for first 50 kWh per 2-month billing cycle	Unavailable
Ethiopia	For households approx. \$ 0.01/kWh for the first 50kWh plus a service charge of approx. \$ 0.10, with tariffs increasing in blocks based on consumption	Not finalized yet but expected to be in the range of 0.30 US\$/kWh to 1.20 US\$/kWh
Kenya	\$ 0.226/kWh for residential customers	Off-grid (including mini-grids) \$0.50 - \$0.80/kwh
Malawi	\$ 0.066/kWh for first 50kWh	Not finalized but a cost-reflective tariff method is currently under development
Rwanda	\$ 0.20 /kWh between 15 and 50 kWh	Off-grid licensees are free to set their own tariffs under supervision of Regulation authorities
Tanzania	\$ 0.04-0.16 p/kWh for residential customers	Off-grid (including mini-grids) tariff ranges between \$0.5-\$2/kWh
Uganda	\$ 0.20 / kWh for residential customers	For Off-grid tariff, developers have to apply for a license, part of which is to obtain tariff approval
Zambia	Residential \$ 0.011 /kWh up to 200kWh	Tariff exemption for mini-grids under 100kWp, cost-reflective tariffs for above 100kWp

²¹ Largest power company, NTPC, sells electricity from its coal-based generation units at a princely Rs 3.20 per kWh. <https://qz.com/india/984656/solar-power-is-now-cheaper-than-coal-based-electricity-in-india-but-the-math-makes-no-sense/>

²² Comparison of costs to be recovered by Tariffs (Schnitzer et al 2014)

Response from the Government / Development Partners on this challenge

"The Energy Regulation is currently under review. We expect to come up with cost-reflective tariffs to attract private sector participation while decreasing the need for public support for mini-grids scale-up. Cost reflective tariffs are currently expected to be in the range of 0.30 US\$/kWh to 1.20 US\$/kWh, according to other countries' experiences, but to be validated over implementation in various regions. If a need is felt for public subsidies in the pre-electrification areas, they will likely be provided to the operator per kWh sold to third party household and public customers. Also, fully automatic monitoring of electricity sold through information technology is also a key requirement for the smooth implementation of the cross-subsidy under NEP. We are working on developing a clear and transparent tariff calculation methodology for mini-grid tariff setting, and potential fixed aspects to be contained in the licenses issued (i.e. a fixed payment and a kWh-based payment). This issue of tariffs will be shortly resolved."

An EEA Officer

2. Prevailing licensing process has challenges

Private investors covered under the study consider the prevalent licensing process as complicated, prolonged and to certain degrees, unempirical. Private stakeholders expect simpler and faster processing of generation, distribution and sale licenses. Challenges have been observed mainly in receiving distribution and sale licenses. One private company operating in the mini-grid sector in Ethiopia has not received a distribution and sale license even after a year of completion of compliance requirements. Additionally, the EEA does not review the proposed tariffs when issuing investment permits. Tariffs are evaluated and approved only after the system is commissioned. This forces the developers to commit to investment before they know whether they will be able to recover their costs.

Response from Government / Development Partners on this challenge

"Both EEA and MoWIE are working towards simplified licensing application processes mainly for small mini-grids (up to 5 MW of distributed power) with an integrated generation, distribution and sales license. Many concerns of private investors related to licensing regulations will be addressed very soon."

A MoWIE Officer

3. Private investors want more subsidies/incentives

A working credit subsidy for low carbon technologies is available through the Rural Electrification Fund Credit Line. Administered by the Development Bank of Ethiopia and funded by the World Bank (through a USD 40 million initial funding), it provides a credit line to micro-finance institutions to support household spending on renewable energy and energy-efficient products. This credit line forms an integral part of the World Bank's future engagement in Ethiopia, alongside two other credit lines for tackling women's entrepreneurship and SME development. Private investors are entitled to the duty-free import of machinery and equipment. An investor is exempted from taxes and duty for machinery and equipment, intended for the project and costs of spare parts to the extent of 15 percent of the project cost. With respect to batteries, they must be imported with solar equipment to be



Image 10 (Off-grid product testing lab at Ethiopian Conformity Assessment Enterprise)

eligible for customs duties exemptions. However, there are no VAT exemptions. Also, challenges arising from the import of solar products currently exist due to the lack of capacity at the Conformity Assessment Enterprise, which is responsible for testing of imported products. Given their speed of testing, many products are stranded in customs for long periods of time, leading to additional substantial storage costs. Private investors request the government to make off-grid sector VAT exempted and expect subsidies/concessions on storage of products at the Conformity Assessment Enterprise.

Response from Government / Development Partners on this challenge

“The practice in the past was that quality verification was done/to be done by the ECAE for each individual item imported into Ethiopia. This was difficult as the ECAE could not verify all imports by its very limited resources. The recommendation by the Ministry of Trade was, to let external verifiers, such as the SGS, before shipment to Ethiopia (just like any other product imported into Ethiopia). Ethiopia Conformity Assessment Enterprise is presently drafting pre shipment verification of conformity procedures for DC plug and solar home system up to 300W and solar lantern up to 15W. For larger systems, the government will also accept verification certificates from third parties as mentioned in NEP 2.0. However, this is yet to be put into practice. The government is working towards it.”-

An ECAE Officer

4. Arrival of the grid is a concern

By 2030, it is expected that 96 percent of the Ethiopian population could be connected to the grid. The remaining 4 percent of the population will be served with off-grid solutions (either solar off-grid or mini-grids) as a long-term access solution. Private investors, thus, expect precise information about the government’s grid expansion plans before considering investing in mini-grids in Ethiopia. They are also anxious about the future of their mini-grid investment when the grid arrives/established in their area of operation.

Government has established a geospatial planning framework (Combining MTF and GIS) for a data-driven approach to inform decision-making regarding grid and off-grid investments in electricity service delivery. It has already established two geospatial platforms, one within MoWIE—to supervise and monitor NEP progress—and one within EEU—for network planning purposes. The geographic map for grid expansion planning and identification of off-grid pockets are detailed in NEP 2.0. Also, the Council of Ministers is currently reviewing the Energy Regulation that will provide EEA with authority to safeguard private investments in case of grid arrival. EEA’s draft of Tariff Guidelines and Methodology for Off-Grid Systems contains the following provisions for private investors when the grid arrives/established: -

- i. *Distribution Energy Service Company (Desco) mini-grid Model:* This is where an existing isolated mini-grid, which is ‘enveloped’ or ‘engulfed’ by the main grid, is given the option to convert to a Small Power Producer, while the national distribution licensee operates the distribution mini-grid unit, to supply the off-grid community.
- ii. *Grid-connected Small Power Producer:* This is where the previous isolated mini-grid operator which has been ‘enveloped’, decides to focus on electricity generation and sales, to the main grid licensee and no longer engages in electricity generation and retail to off-grid consumers.
- iii. *Sale of mini-grid assets to the national grid licensee:* This refers to the situation where an existing mini-grid operator decides to sell all its assets (i.e. the distribution network and/or the generating unit), to the main distribution or network licensee.

Response from Government / Development Partners on this challenge

"Government is also cognizant of this matter. After the pending approval of the Energy Regulation, the improvement of the regulatory environment for mini-grid developments will consider compensation clauses, and related calculations, for grid arrival and integration of mini-grid into the main grid to ensure proper risk management of mini-grid investments. We will use methodologies and best practices adopted by other countries for calculating the compensation using the equivalent of the current value of the assets according to depreciation plus the revenue of the last twelve months. The zero draft of Tariff Guidelines and Methodology for Off-Grid Systems has detailed various options proposed by the GoE for private mini-grid developers when the grid arrives."

An EEU Officer

5. Technical regulations need to be more pro-private investment

All projects that utilize electrical power systems must adhere to the national grid codes, specified by the government, including off-grid projects (which are included non-specifically as power systems). This precludes the development of direct current mini-grids. There are no further specific technical rules or specifications to which mini-grid projects must adhere. Technical regulations for rural power distribution should be appropriate to rural demographic and other characteristics.

Besides, private investors are challenged by specific hardware standards and availability of low-cost distribution hardware, which is not readily available in Ethiopia. For example, the treated power pole costs Birr 2,000 per piece, which is costly for investors. Private investors want GoE to work towards lowering the distribution costs (without compromising on quality) through further research and development.

Response from Government / Development Partners on this challenge

"Mini-grid sector is relatively new in Ethiopia, although solar home systems etc., are more common in the country. In Ethiopia, we do not have much data on the challenges private investors are facing. We are happy that you are doing this study to understand the problems of private investors. We are presently revising energy regulations and hope that many of these points will be duly addressed in the revised regulations. Also, as of now, renewable energy sector depends on imports, to have local manufacturing capacities will take some time and we expect support from industrial Development Partner."

A MoWIE Officer

6. Access to foreign exchange is a constraint

To establish the generation assets, the private sector/ Cooperatives would need access to low-interest rate loans. To be financially viable, mini-grids usually require capital with ten years or more of tenure in local currency with a reasonable interest rate in project finance like structure (low or no collateral beyond the mini-grid assets). At the same time, developers would also need access to foreign exchange, especially, hard currency, to procure and import system components. For externally funded projects to access foreign exchange to import off-grid products is easy, but to take mini-grid projects to scale substantial private investment is required. Investors need hard currency to

"We did not have any hard currency challenges for our current mini-grid projects because we had a grant from Power Africa. However, we wish to scale up our mini-grids but now we have hard currency constraints. An international company named Empower New Energy expressed interest in investing with us in Ethiopia and it was our chance to get easy access to hard currency. However, due to unclear financial processes and regulations related to foreign investment and procedural delays, this company lost interest in investing with us and invested in Tanzania. Many private investors are missing good opportunities due to similar reasons. Foreign companies want to invest in mini-grid area in Ethiopia, but the regulations are not clear so far. Even though EEA is very cooperative and supportive, more clarity is needed in this area"

A Private Mini-Grid Investor

procure and import system components. However, it is not easy, more so in the present days. Foreign private companies from European countries like Spain, Netherlands, etc. and those from Asia are willing to invest in the off-grid sector in Ethiopia. This can noticeably increase the availability of foreign exchange. However, owing to the present financial regulations, these international private investors chose other African nations like Kenya, Rwanda and Tanzania over Ethiopia.

Response from Government / Development Partners on this challenge

"Consultations on efficient access to finance solutions for mini-grid developers have already been initiated by MoWIE. The Government is discussing possible ways to ensure regular availability of hard currency to off-grid and mini-grid investors. You are aware of available credit lines and such initiatives will go on to support private investment in mini-grids. The Government has identified measures that support increased access to forex in the market. We want to decrease the need to access foreign currency through increased foreign private sector participation in Ethiopian supply chain to reduce the mark-up applied to the products exported to a closer cost to the production one, through remittances support from the Ethiopian diaspora, etc. A Diaspora Trust Fund has been established to manage their channelling. Also, development of local manufacturing capacity to overall reduce the need for imports and to support foreign investments under the current regulatory framework is ongoing."

A MoWIE Officer

7. Telecom / Mobile services are restricted in Ethiopia

Telecom and finance sectors play a critical role in supporting off-grid systems. Both these sectors are tightly controlled in Ethiopia, although nascent mobile money services are available to facilitate payments for power services. Ethiopia has one national telecom provider, Ethio Telecom, through which all other telecom-based services must operate. Ethio Telecom has coverage of approximately 85 percent, with the gaps mainly in the peripheral regions of Afar and Somali. About 96 percent of the rural population is now within five km range of telephone services.

There are two main providers of mobile money payment services: M-BIRR provided by an Irish company MOSS ICT, and helloCash by Belcash Technology Solutions PLC. The M-BIRR service works through five main micro-finance institutions that have a collective coverage of 95 percent. M-BIRR is working with Azuri Technologies to provide their pay-as-you-go model for solar home systems in Ethiopia. The company, currently has 4,000 points of presence (branches and agents), serving 280,000 customers and is expanding rapidly. The main constraint is the tight national restrictions on the telecom and finance sectors. This includes requirements from the national bank for agents to have an existing business license, which is rare in remote settlements. These restrictions and slow progress in providing mobile and internet services impact mobile payment for off-grid electricity, mobile phone and internet-related value-added services in the off-grid areas.

Response from Government / Development Partners on this challenge

"We are working on updated mobile payment solutions for grid served EEU customers for bill payment collection, a technical assessment will identify a roadmap for the establishment of a payment platform for an EEU progressive expansion of mobile payment solutions, starting from big customers and progressively expanding to the rest of the population. For off-grid sector also, more mobile payment options are being explored."

An EEU Officer

8. Information and awareness-related barriers also impede private investment

Information on mini-grids is scanty for the investors on aspects of resource potentials, available provisions, tax regime, and possible benefits of mini-grids development, including lessons learned and experiences from Ethiopian pilot projects. Above all, there exists no central 'learning/knowledge platform', which would act as a source for new potential developers to access tips and lessons learned.²³ Various activities were performed to inform the implementation of the electrification program and its update. Under the South-South knowledge exchange program, two exchange programs were undertaken in 2018, one in Indonesia and one in Vietnam. Both were tailored to gather an operational understanding of fast-paced universal access programs from the two countries that led the way in the achievement of nationwide universal access, starting with low-income segments. The outcome of these visits was documented systematically. Besides, the government with the support of the regional bureaus, leveraging university and technical vocational education and training (TVET) colleges, is trying to fast-track knowledge transfer of solar pumps for irrigation along with other similar support. However, a centralized, digitized knowledge-sharing platform is yet to be established in the off-grid sector by the government, even though the development partners have been taking initiatives like Green Mini-Grid Developers Help Desk and some online platforms.

Response from Government / Development Partners on this challenge

"We welcome private investment in off-grid energy sector and are keen on learning more on this. We would like to seek feedback from Ethiopian investors about their experiences on mini-grids so far. In fact, it is good to have knowledge exchange visits as one can learn from other's experience."

A MoWIE Officer

3.2 Challenges Faced by the Government of Ethiopia

1. Mini-grid is a new concept in Ethiopia

Over recent years, Ethiopia has gained considerable experience in stand-alone solar solutions, but mini-grid is a relatively new technology in the country. Lack of expertise and accessibility of established and sustainable business models, tariff methodology, private sector engagement modalities etc. are significant challenges for the Government of Ethiopia. Under the present circumstances, to motivate private investors to operate in deep rural areas is even trickier. In Ethiopia, various business models, including Utility Operated Model, Private Sector Operated (Supported by development partners), and Community Owned Models are currently being piloted. Recently, EEU has contracted four private international companies to test the Hybrid model for 12 mini-grids across all the regions, as explained in this report earlier. The GoE is willing to escalate 'Ethiopian Electric Utility (EEU) - led with Engineering, Procurement and Construction (EPC), and private sector or Cooperatives model to install generation assets, operate and maintain the system, where EEU would retain ownership of the distribution assets, as most of the sites are expected to be connected to the grid.'²⁴ Nevertheless, it will take some time to have established business models in Ethiopia. Same is the case with the availability of cost-reflective tariffs.

2. Lack of trained off-grid/mini-grid human resources in Government offices

Government counterparts require more technically trained human resources in the off-grid (mini-grid) sector. Since the off-grid sector is an emerging concept in Ethiopia, not many educational institutes provide this expertise. To hire international mini-grid technology experts without any budgetary support from the development partners is difficult for the government.

3. Challenges at grass root levels in sensitizing communities and REBs

The growth of mini-grids throughout the world is hindered by the low perceived value of the service and risk

²³ Scoping assessment of subsector opportunities for NDC implementation in Ethiopia

²⁴ Detailed in second report on Financing Gap and Business Models in Off-Grid Energy Sector in Ethiopia

of households defaulting on payments for power consumption. Moreover, to convince communities to pay a different tariff than the grid tariff is even more difficult.

The Government of Ethiopia, with support of grass-root administration at kebele levels, is working with private investors to negotiate tariffs for on-going mini-grids. Also, rural households typically have unpredictable cash flows and may not be able to pay for electricity at regular intervals. Government is sensitizing communities to ensure that economically viable tariffs can be agreed upon with private investors and regularity of payment is guaranteed.

Besides, EEA wants the regional governments to be ultimately responsible for the day-to-day administration of mini-grids and is making efforts in this direction. However, as REBs hitherto have less or no experience in the mini-grid sector, the progress on this front is slow.

4. Sustainable financial support is required from Development Partners

To pilot workable mini-grid models until the standards are established, the government needs financial support from international development partners.

5. Quality assurance is a major concern in the off-grid sector

Government is concerned about the availability of counterfeit products (solar bulbs, lanterns etc.) in the country as it could stall the growth of the Ethiopian off-grid sector by ruining communities' trust in this new technology itself. It has taken necessary steps to adopt regulatory standards (Lighting Global), ensuring the quality of off-grid technologies for the Ethiopian population, as well as the lifting of customs duties to ensure an adequate supply of quality products to the market. Training is envisaged to guarantee that the staff at customs are fully empowered and up to date with the latest regulations on technical standards and custom duty policies and can easily recognize the different kinds of off-grid technologies and appliances. However, lack of quality assurance is a big concern for the government.

6. Energy planning needs stronger coordination

There are some problems with the business-as-usual approach to off-grid electricity planning in Ethiopia. Due to the multiplicity of stakeholders with competing approaches, agendas and interests, having a coordinated strategy in this sector is a challenge, even though, efforts are being made in this direction. This leads to limited effectiveness and a slow impact. However, under the revised NEP, the issue of multisectoral coordination has emerged. But it is expected to improve over time.

CHAPTER 4: LESSONS LEARNT AND RECOMMENDATIONS

The GoE has defined the components of the off-grid program (including mini-grids), based on geospatial analysis of the location of beneficiaries, distance from the existing grid and expected timing for receiving a grid connection. Mini-grid sites have been preliminarily identified with priority services in deeply rural areas, and the mini-grid program will also support pre-electrification needs, particularly for productive uses and access to adequate basic services (health and education).

However, serving six million HHs in rural and deep rural areas by 2025 through off-grid, including mini-grids is a daunting task, if not an impossible one. This would require coordinated efforts from both public and private stakeholders. Based on the limited mini-grid interventions involving private investors, the below feedback/lessons learnt are shared by private mini-grid organizations.

4.1 Lessons Learnt

Location and technology choice

In Ethiopia, various renewable energy technologies are available for all locations and a range of customers (poorest to richest), at a lower cost and much higher quality than current power sources such as kerosene wick lamps. Mini-grid developers should think of a mix of technologies in a setting – they should never avoid the use of only technology or size. It is apparent that the wind-solar hybrid is more reliable than just wind; a small and very small cluster of customers can be served with different size of microgrids (microgrids to serving only 10 households, or grids serving 100 customers). Also, locating consumers with medium to high ability and willingness to pay in high concentration is the key for commercial viability of mini-grids in this country.

Private investors should try to maximize customer concentration on a location and should provide a range of power services for all types of customers. Mini-grid developers should provide a range of alternative technical solutions for consumers – power from a microgrid for those close to the power source; solar home systems and lanterns for those further away to ensure increased uptake of off-grid technology. Mini-grid developers need to be flexible in user payment schemes – cash sales, lease, lease to own and tariffs. Also, they should initiate power supply for consumers at an affordable level (what they can pay for) and then increase it with tariff. The government should promote low-power consuming appliances such as LED TV and small, efficient refrigerators along with solar bulbs, lanterns, pumps etc.

Development and construction

The low cost, distribution hardware required to develop mini-grids is not readily available in Ethiopia. The cost of distribution poles is very high. Thus, lowering distribution costs (without compromising quality) should be a priority area for Research & Development. Also, the potential to produce components of wind systems locally should be explored; a strong local team is essential during construction as well as operation of mini-grids (wind, solar). While establishing mini-grids, engaging the local government early in the development cycle is critical. Consumers must understand that service sustainability depends on proper use and regular payments. This requires sensitization of communities at early stages, and the local government plays a more prominent role in increasing awareness at grass root levels. People trust the local government more than private developers, development partners etc.

Regulations

The EEA does not review the proposed tariffs when issuing investment permits. Tariffs are evaluated and approved only after the system is commissioned. This forces the developers to commit to an investment before they know whether they can recover their costs. EEA should ask and approve preliminary tariffs when it issues investment permits, then review this tariff after commissioning. Also, EEA should provide simple guidelines for the developers to follow. At present, the developers must make their own estimates (or use

other sources) to compute and present their tariff proposals. EEA may provide an easy to use tariff estimation template to mini-grid developers. Simpler and faster licensing processing is also required, mainly for distribution and sale licenses. No private investor has yet received a distribution and sale license in Ethiopia. In addition, the high cost of public announcement inviting objection to the proposed investment is a problem for private investors. The current law requires the developers to announce the investment in newspapers, radio and television (TV), requiring more than Birr 50,000. Announcement on newspaper and radio should be adequate, and it would also be much economical than using a TV. As well, it is a challenge to get low-cost distribution hardware (a treated power pole costs Birr 2,000 per piece). Technical regulations for rural power distribution should be appropriate to rural demographic and other characteristics.

4.2 Recommendations

This study has observed that the Government of Ethiopia is aware of the bottlenecks impeding the growth of private investment in the mini-grid sector and is making efforts to increase access to finance, streamline imports, quality assurance of products and improve supply chains to ensure affordability of off-grid energy technology. Based on primary and secondary research, we would like to make the following recommendations to accelerate the growth of the mini-grid sector in Ethiopia:-

1. Licensing process needs to be facilitative

The process of obtaining generation, distribution and sale licenses should be more straightforward, cheaper and quicker, especially, the process related to distribution and sale licenses. Very small mini-grids up to 50 kW should be exempted from any license regulations. Besides, the GoE should consider the possibility of a delegation of licensing authority to Regional Energy Bureaus, especially for small mini-grids.

2. Mini-grids tariff rate must be cost-reflective

Government endeavours to ensure that all the Ethiopians should be able to gain access to electricity (via the grid or off-grid) at almost the same price. The grid tariffs for households in Ethiopia are very cheap at \$ 0.01/kWh for the first 50kWh when compared to other countries (Please refer Table 7). However, mini-grids are cost-intensive, particularly when sites are in deep rural areas. For-profit mini-grid companies invest intending to generate a profit on their investments. Mini-grid tariffs are yet to be finalized but are expected to be in the range of 0.30 US\$/kWh to 1.20 US\$/kWh. These rates may be cost-reflective in some regions and may not be in others, due to geographical diversities between the regions. The government should establish cost-reflective tariffs for mini-grids across regions to motivate private investors. Moreover, EEA should provide tariff estimation tools (e.g. EXCEL workbook), which the private mini-grids developers can use to estimate the proposed tariffs.

3. Mini-grid sector should be made less forex dependent

Mini-grid private investors need access to credit and foreign exchange to import and commercialize products. The government has identified measures that support increased access to forex in the market, as well as decrease the need to access it all together. The GoE is promoting increased foreign private sector participation in the Ethiopian supply chain to reduce the mark-up applied to the products exported to a closing cost to the production one, through remittances, and development of local manufacturing capacity.

Public-Private Partnership (PPP) projects in the mini-grid energy sector are also likely to encourage some foreign companies to work with the Ethiopian private stakeholders in the mini-grid sector. Lastly, the GoE should support national private companies to access international energy funds like Private Finance Advisory Network (PFAN), Sustainable Energy Fund for Africa (current funding-USD 995,000), the World Bank financing (current funding-USD 200 million) and others, to ensure availability of foreign currency.

4. Development Partners should support capacity building of Government functionaries and private

investors

Mini-grids are a new concept in Ethiopia for both the government and private investors. Government counterparts are constrained on setting streamlined licensing process, develop standard designs and undertake installation of mini-grids, establish tariff-setting procedures, conduct quality testing and power quality measurement etc. International energy partners may support by dissemination of best practices in these areas. Knowledge exchange visits, mainly in countries like Vietnam, India, and China, will also be beneficial to expedite finalizing procedures and regulations related to mini-grid tariffs and related aspects.

5. Strong coordination and transparent communication are required between off-grid energy stakeholders

Government is trying to create an enabling environment for private investment in mini-grids through favourable policies and regulations; tariff methodologies, business models and measures for private mini-grids developers when grid coverage is established, as detailed in the draft of Tariff Guidelines and Methodology for Off-Grid Systems, and GoE is undertaking many similar initiatives. Yet, due to lack of advocacy and communication initiatives, many investors, particularly at the international and regional levels, are not aware of the efforts the government is making to promote mini-grids in the country. Hence, the Government of Ethiopia may increase communication initiatives to inform potential investors about its enabling policies/activities to support the growth of the mini-grid sector.

6. Rural Electrification Fund (REF) must have funds earmarked explicitly for mini-grids

Although the Development Bank of Ethiopia is providing loans to private investors directly for off-grid energy products and services, a few government stakeholders have suggested that energy policy should ensure that significant funds under the REF are ring-fenced for mini-grids. In addition, local banks have no experience in lending money to the private investors for mini-grids, which is a constraint for financing mostly at the grass root levels. Hence, the technical skills of banks must be improved through capacity building initiatives, including training and experience visits. Besides, the challenges related to collateral requirements also need attention. Collateral requirements for solar lanterns and solar home systems (SHS) are already high, but collateral requirements for mini-grids will be even higher. SHS are mostly sold on cash to customers, whereas mini-grid operators will have to operate mini-grids in remote areas and recover their costs over many years.

7. Quality assurance of off-grid products/services needs strengthening

Lighting Global (LG) standards are now mandatory for products up to 15 Wp. This is combined with the IEC²⁵ standards, which the Ethiopian Standards Agency has adopted for systems up to 350 Wp. For pico-PV products, the Government of Ethiopia has harmonized its national standards with the Lighting Global Quality Standards, as well as the test methods specified in IEC TS 62257-9-5. For larger systems, it has decided to accept a variety of verification certificates from third parties. It is evident that the quality assurance of off-grid products is a prime concern for the GoE. Low quality, counterfeit products at Kebele levels have the potential to spoil the market. Private companies must adhere to appropriate standards in line with the local context, specifically for renewable off-grid mini/microgrids, as they have considerable market potential in Ethiopia. To ensure quality, both the government and private investors must work together.

8. Operations of off-grid (including mini-grid) energy sector should be easy and flexible

The government should facilitate a Single Window Clearance mechanism to ensure timely support to the project developers with minimal requirements for approvals and clearances. The GoE may publish all documents in formats, which are in the public domain for the stakeholders to access and make the process of mini-grid development quick, easy and flexible.

²⁵ The International Electrotechnical Commission

CHAPTER 5: CONCLUSION

The Government of Ethiopia intends to achieve transformative growth and a middle-income country status by 2025. One major requirement to attain this goal is the timely provision of adequate, affordable, and reliable electricity access to all. Clean electricity availability is an essential pillar of sustainable socio-economic development in Ethiopia. Off-grid energy is expected to complement grid connection rollout targets of the government in the following years to achieve universal electricity access nationwide by 2025. Mini-grids will play a pivotal role in this area.

Having the capacity to generate electricity close to where it is needed and with the advantage of flexibility and scale, mini-grids promise hope for millions of rural Ethiopians who live far from the grid and who would otherwise have to wait for several years, for gaining access to electricity connection. To meet the energy needs of its 65 percent population by 2025, Ethiopia needs both grid and off-grid (including mini-grid) sources of energy.

Ethiopia is becoming more familiar with the concept of mini-grids. Small-scale pilot interventions are on-going with support from the government (EEU) and development partners like Power Africa, DFID, GIZ/EnDEV, EEU, GIZ and others, coupled with the cooperation of the private investors. However, challenges related to policies, organizational capacities and human resources exist to intensify mini-grid interventions. The size, scale, speed, and geographic coverage of the government's off-grid (including mini-grid) program requires fully leveraging all the available implementing agents and resources— public, private, as well as public-private-partnership and Cooperatives. All efforts need to be scaled-up and stepped up to meet the challenges of universal access provision. The eventual degree of public and private participation will be determined based on implementation progress and the quality of service provision. All activities related to off-grid (including mini-grid) energy will also be closely coordinated with the Safety Net and other government programs and related Ministries (e.g. Ministry of Agriculture), enabling local processing of agricultural products and leading to increased local value generation and job creation²⁶.

The implementation of off-grid (including mini-grid) program seeks to build on the comparative advantage of public and private actors and their potential for scale-up in the Ethiopian context under the overall planning, monitoring, and enabling role of the government. The recently launched NEP 2.0 identifies a comprehensive menu of implementation support and technical assistance activities deemed vital for the success of the program and its sustainability over the years. In addition, the inclusive approach of the off-grid program, the role and responsibilities of sector institutions, implementation framework and enabling ecosystem requirements for its success have been informed by the latest developments in the off-grid market and lessons learned from international best practices in Kenya, Rwanda, Nigeria, Myanmar, Bangladesh, Peru, and Argentina.

Overall, the stage is set for the amplification of off-grid solutions. Public, private and development stakeholders are working towards solving issues related to technical capacities, business models, economically viable tariff methodologies and other policy and infrastructural issues with a gender-balanced and socially inclusive mindset.

This study has observed that the government, development partners and private stakeholders are willing to strengthen the mini-grids sector in Ethiopia. With the right planning and implementation coordination among all the stakeholders, the prevailing technical, financial and operational challenges in the sector can be tackled, paving the way for a cleaner, sustainable and environment-friendly power generation in Ethiopia.

²⁶ NEP 2.0

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ANNEXES

Annex A: Summary of Priority Technical Assistance and Capacity Building Support

A summary of immediate priority technical assistance and capacity building support activities for the implementation of the NEP integrated approach to service delivery, 2019

	Activity	Scope	USD Million	Leading Agency
Integrated planning	1. Nationwide geospatial least-cost rollout plan	Optimal modality (grid and off-grid) for access provision, considering technical and economic viability, geo-referenced demand centres, and load forecast. The plan will update the NEP connections rollout and investment prospectus		DoE, EEU
Demand estimates and affordability	2. Nationwide demand estimates and modelling and expenditure assessment	Data gathering on nationwide demand and expenditure for electricity and coping mechanisms through the expansion of the MTF survey and EEU customer data. Data gathering will inform demand modelling as an input for the Master Plan and the implementation of the grid and off-grid programs under the NEP. The study will also further inform the design of the connection policy and provide input parameters for the Master Plan	3	DOE, EEU
Integrated planning	3. Generation, Transmission, Distribution Master Plan	Integrate sector-wide Master Plan, GIS informed. The updated Master Plan will also be informed by the demand estimates and affordability study to be conducted for the whole country for the geo-referencing of loads and understanding of customers' consumption behaviour		DoE, EEU
Human capital development	4. Social institutions priority connection implementation design	Finalization of geo-referencing of education and health institutions and assessment of electricity needs for service delivery (cold chain, simple vaccine and medicine refrigeration, lighting, sterilization), and of quality and reliability of current services. Design of least-cost access program for timely and equitable provision of adequate access to electricity services to the social infrastructure in the country	1	DoE
Human capital development	5. Safety net beneficiaries' priority connection implementation design	Assessment of access needs among beneficiaries of the PSNP program and design of a tailored least-cost access plan, including technology options and implementation mechanisms	2	DoE, EEU, in collaboration with the Ministry of Agriculture
Human capital development	6. Productive uses rapid assessment	Rapid assessment of productive uses location and electricity needs to inform the design of mini-grid sites for piloting of the mini-grid program	0.5	DoE, EEU, in collaboration with the Ministry of Agriculture
Human capital development	7. Productive uses detailed priority implementation program design	Nationwide assessment of productive uses locations and electricity service needs. Identification of least-cost technology solutions in space and time for adequate support to economic growth. The study will include a focus on barriers faced by female entrepreneurs	1	DoE, EEU, in collaboration with the Ministry of Agriculture
Citizen engagement	8. Communication and educational	Design and launching of a consumer awareness and education campaign on-grid and off-grid	1	DOE, EEU, in collaboration

	Activity	Scope	USD Million	Leading Agency
and awareness raising	campaign	technologies, expected timing for grid connection, rights and duties of end-users, and available grievance redressed mechanisms		with REBs
M&E	9. Comprehensive performance tracking and monitoring system	Establishment of a GIS-informed platform for monitoring of key performance indicators for the grid and off-grid electrification programs. KPIs include tracking of efficiency, effectiveness, and equity of the NEP	2	DoE, in collaboration with EEU and PSEs
Capacity building	10. Sector-wide capacity building	Training, capacity building, and financial support to sector stakeholders for the implementation of the NEP grid and off-grid programs and establishment of an enabling policy, regulatory and institutional enabling ecosystem. Includes day-to-day administration of the NEP, EEU grid and off-grid implementation capacity, EEA regulatory support	15	
	Total		25.5	

Annex B: Detailed List of Documents for Literature Review

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Annex C: Main Stakeholders in Off-Grid (Mini-Grid) Sector in Ethiopia

GOVERNMENT AND AGENCIES

Organizations that currently have the greatest impact and influence over prospects for green mini-grids in Ethiopia are those in the public sector. Since the concept of cost-effective non-grid electrification is relatively new to Ethiopia, there is limited private sector involvement outside of SHSs. Final approval for most aspects of energy sector development comes from the Council of Ministers. The Council of Ministers is the cabinet of the Government of Ethiopia, comprising the Prime Minister, Deputy Prime Minister and Heads of Ministry. The Ministry responsible for the energy sector in Ethiopia is the Ministry of Water, Irrigation and Energy (MoWIE). Under it, there are three main implementing institutions formed from the former utility Ethiopian Electric Power Corporation (EEPCo); Ethiopian Electric Power (EEP), Ethiopian Electric Utility (EEU) and the Ethiopian Energy Authority (EEA). EEP is responsible for generation and transmission (132kV and above), EEU is responsible for the distribution, including the Universal Energy Access Program (UEAP), and EEA is the regulatory agent. The Ministry of Finance and Economic Coordination (MoFEC) is also important and is involved in financial aspects such as Power Purchase Agreements (PPAs). There are two relevant directorates under the MoWIE: The Energy Study and Development Follow-Up Directorate (ESD); and the Alternative Energy Technology Development and Promotion Directorate (AETDPD). These organisations are detailed separately below.

1	THE COUNCIL OF MINISTERS Contact: Dr. Sahle-work Zewde President Link: http://www.ethiopia.gov.et/en_GB/offi The Council of Ministers is the cabinet of the Government of Ethiopia and is made up of the Prime Minister, Deputy Prime Minister and the minister of each ministry. It is, among other things, responsible for financial approval of various important government decisions such as major legislative changes and government strategy documents. This is defined entirely in Article 77 of Proclamation 691/2010. Policies such as the National Electrified Strategy, new Energy Code or the tariff review conducted by EEU and EEP will need to be ratified by the Council.
2	THE MINISTRY OF WATER, IRRIGATION AND ENERGY Contact: Mr. Yiheyis Eshetu, Coordinator for NEP Ministry of Water, Irrigation and Electricity Office: +251116627368 Mobile: +251911974164 Fax: +251116630455 Link: http://www.mowie.gov.et/en_GB/overview Responsible for water resources management, medium- to large-scale irrigation and electricity resources. This regulatory body is engaged in planning, developing and managing these resources; developing guidelines, strategies, policies, and programs; developing and implementing sectoral laws and regulations; conducting studies and research activities; providing technical support to regional water and energy bureaus; and signing international agreements. The Ministry has two directorates, directly relevant to electricity: the Alternative Energy Technology Development and Promotion Directorate and the Energy Study and Development Follow-Up Directorate. These are detailed below.
3	THE MINISTRY OF FINANCE AND ECONOMIC COOPERATION Contact: Ministry of Finance and Economic Cooperation of the Federal Democratic Republic of Ethiopia (MOFEC) Addis Ababa Ethiopia +251111552400 Link: http://www.mofed.gov.et/ Responsible for three strategic pillars: public finance administration and control, resource mobilization and effective utilization and economic leadership and management. Its mission is to: “Make real a prosperous Ethiopia by formulating development policies, preparing a development plan and budget, mobilizing and

	administering external resources, installing modern, efficient, effective and accountable public finance and property administration and controlling systems." In relation to the energy sector, the MoFEC is involved in financial aspects such as PPAs and currently is setting up a PPA team within EEP to increase coordination in this role.
4	ETHIOPIAN ELECTRIC UTILITY Contact: Gosaye Mengistie, Chief Operating Officer, gosayea@gmail.com Link: www.eeu.gov.et Responsible for distributing and selling electrical energy, with the current threshold for EEU's responsibilities being 66kV and below. EEU's responsibilities now include the Universal Energy Access Program, which is the primary government- implementing vehicle for both on and off-grid development under GTP II. The EEU was established by Regulation No. 18/1997 after the division of the Ethiopian Electric Power Corporation (EEPCo). EEU can also build and operate distribution networks for IPPs, unless this is done directly by the IPP, with either method needing agreement from the EEA. The EEU and EEP are currently conducting a tariff review, and EEU has other programs including organizing a joint off-grid pilot project with the Government of South Korea and working with Poland to get soft loans to implement a Polish hybrid technology.
5	ETHIOPIAN ELECTRIC POWER Contact: Mr. Azeb Asnake, Chief Executive Officer azebasnake@gmail.com Link: http://www.eep.gov.et/ Responsible for transmission (132kV and above) and generation, including managing negotiation and delivery of power exports. EEP is currently the sole provider of bulk electricity to users, mainly to the EEU and currently has over 10GW of capacity, either operational or under construction. This includes new projects such as the Ethiopian Grand Renaissance Dam (6GW large hydro) and four new wind farms totalling 551MW. EEP recently signed an agreement with the Corbetti Geothermal Company for Ethiopia's PPA (500MW, July 2015). Under GTP II, many projects will be delivered through this new PPA modality. EEP has negotiated Ethiopia's power exports, which currently includes 100MW to Djibouti, 2GW to Kenya and 1.2GW to Sudan. By 2018 this will include a further 400MW to Tanzania and discussions are underway with Egypt for a 3.2GW interconnector, as well as a potential undersea interconnector to Yemen through Djibouti. EEP was previously also the host for the Universal Energy Access Program, although this responsibility has now transferred to the EEU.
6	THE ENERGY STUDY AND DEVELOPMENT FOLLOW-UP DIRECTORATE (ESD) Contact: Mr Sahele Tamiru Fekede, Director sahelETF@yahoo.com Link: http://www.mowie.gov.et/en_GB/directorates This directorate, under the Ministry of Water, Irrigation and Electricity, is responsible for sector and policy-level strategy in the energy sector, as well as for guiding the implementation of strategic energy projects. This directorate sits with two other directorates under the State Minister for Electricity: the Alternative Energy Technology Development and Promotion Directorate and the Hydro Power Study and Dam Administration Directorate. This is complementary to the original mandate of the AETDPD, which was for the operation of such strategic projects, such as the Rural Electrification Fund. The ESD is directly involved in the planning for electrification coordination with the rural energy authorities and has been working with AETDPD and NRECA (funded by the World Bank) on the National Electrification Strategy and Off-Grid Master Plan. ESD is the source for the provision of energy-related data and information.
7	THE ALTERNATIVE ENERGY TECHNOLOGY DEVELOPMENT AND PROMOTION DIRECTORATE (AETDPD)

	Contact: Mr Asress Giorgis, Director w.asress@gmail.com Link: http://www.mowie.gov.et/en_GB/directorates This directorate, under the Ministry of Water, Irrigation and Electricity, sits with the two other directorates under the State Minister for Electricity: The Energy Study and Development Follow-Up Directorate and the Hydro Power Study and Dam Administration Directorate. The AETDPD is responsible for manufacturing, laboratory and training support for alternative energies, which include biomass, solar, wind, mini-hydro and other alternative technologies. The AETDPD is also responsible for the Rural Electrification Fund (REF), of which Mr Bacha Alemayehu is the Technical Coordinator. AETDPD has disseminated over 45,000 SHSs through various REF programs and is now turning its attention towards mini-grids. It has completed design studies for mini-hydro sites identified under GTP II and has been working with ESD and NRECA on the National Electrification Strategy and Off-Grid Master Plan. The AETDPD is being refocused as a strategy and dissemination institution, along with the ESD, with EEU taking responsibility for implementing off-grid projects. This is due to its lack of capacity for handling large funds or implementing large schemes. The future housing of the REF is unclear at this point but remains with the AETDPD under current plans. The new implementing mandate of EEU does not explicitly reference the invalidation of AETDPDs mandate. As a result, there is currently disagreement over the responsibility of implementation of government off-grid projects.
8	CENTRAL STATISTICS AGENCY (CSA) Contact: Sahelu Tilahun, Population Statistics Directorate, sahelutilahun@yahoo.com, 011-111-31 Link: http://www.csa.gov.et/ The Central Statistics Agency is the Government agency responsible for collecting, analysing and disseminating statistical data in Ethiopia. This is primarily done through censuses, sample surveys, administrative records and registrations. There is an atlas on rural services on their website, covering the location of public services, commercial services, infrastructural services and agricultural development centres, last published in 2013-14. There are several directorates, predominantly under the three deputy directors for Statistics Surveys and Census; Population and Vital Statistics; and National Statistics System Coordination and Operation.
9	MINISTRY OF TRADE Contact: Public Relation and Communication Affairs Tel :-0115539177; 0115150704; 0115528803; 0115152887; 0115501697 http://www.mot.gov.et/ The Ministry of Trade was re-established in August 1995 under -- proclamation No. 4/1995 issued to provide for the definition of powers and duties of the executive organs of the Federal Democratic Republic of Ethiopia (FDRE). The Ministry was again reorganized with a proclamation No. 619/2003 issued to amend the reorganization of the executive organs of the Federal Democratic Republic Ethiopia Proclamation No. 256/2001. With this proclamation and by other laws, the Ministry has been given the power to supervise and coordinate five government institutions that are involved in the promotion & development of trade, industry and investment activities. The Ministry is organized under one minister, implementing departments, five support services, one Civil Service Reform Office and trade branch office that enable the ministry to effectively perform its duties and responsibilities vested with it.
10	ETHIOPIAN CONFORMITY ASSESSMENT ENTERPRISE Contact: Gashaw Tesfaye, Deputy DG Deputy Director General Mobile: +251 911 226446

	Email: gashawtesfaye@yahoo.com Link: https://www.eca-e.com ECAE is the acronym for “Ethiopian Conformity Assessment Enterprise”. In February 2011, ECAE was established as a federal owned Public Enterprise, governed by the Ministry of Science and Technology. At present, ECAE is the major conformity assessment organization in the country providing Testing laboratory, Inspection, and Certification services to the industry and to the public. ECAE has about 190 core and supportive staffs throughout Ethiopia. The headquarters and main laboratory facilities are located in Addis Ababa and an additional eight branch offices are operational in various parts of the country.
11	DEVELOPMENT BANK OF ETHIOPIA Contact: Dr. Behailu Kasaye Director for External Fund and Credit Management Directorate Behailu17@gmail.com Link: https://www.dbe.com.et “The Development Bank of Ethiopia is a specialized financial institution established to promote the national development agenda through development finance and close technical support to viable projects from the priority areas of the government by mobilizing fund from domestic and foreign sources while ensuring its sustainability. The Bank earnestly believes that these highly valued objectives can best be served through continuous capacity building, customer focus and concern to the wider environment”.
12	CLIMATE RESILIENT GREEN ECONOMY Contact: Mohammed Andoshe Director, Climate Change Planning Implementation and Coordination Directorate Mobile: +251 0913 28 09 61 Link: http://www.ethcrge.info The Government of Ethiopia has developed a Climate Resilient Green Economic (CRGE) plan. The vision of CRGE is to achieve middle-income status by 2025 in a climate-resilient green economy. As set forth in the Growth and Transformation Plan (GTP), reaching this goal will require boosting agricultural productivity, strengthening the industrial base and fostering export growth. Ethiopia's ambition to become a "green economy front-runner" expresses its belief in and the potential to attain a sustainable model of growth. The growth will result in a significant shift in GDP shares: In 2025, agriculture would contribute only 29% to the GDP, industry 32%, and services, the remaining 39%. If Ethiopia were to pursue a conventional economic development path to achieve its ambition of reaching middle-income status by 2025, GHG emissions would more than double from 150MtCO₂e today to 400MtCO₂e in 2030.
MINI-GRID PRACTITIONERS AND PRODUCT DEVELOPERS There are a few off-grid practitioners in Ethiopia to date, operating in solar PV, solar home systems and mini-grid providers. A non- exhaustive list is provided below:	
13	STIFTUNG SOLAR ENERGY FOUNDATION Contact: Mr Samson Tsegaye, Country Director samson@solar-energy-foundation.org Link: www.solar-energy-foundation.org/ A German foundation working also in Kenya and the Philippines. This foundation has driven the solar off-grid market in Ethiopia for ten years through training of technicians and support for local manufacturing. The foundation also provides a credit facility to rural households to purchase the technology. The Country Director, Samson Tsegaye, is also a founder of the Solar Energy Development Association-Ethiopia. The

	foundation has spawned two commercial entities: Solar Technologies Manufacturing (an investment company) and SunTransfer as its corporate arm. This second business aims to increase access and service impact. As part of this service impact, SunTransfer now also installs mini-grid systems. Yonas Workeye is the Managing Director for SunTransfer (yonas@suntransfer.com, www.suntransfer.com).
14	BESHAH INTERNATIONAL SOLAR & INFORMATION TECHNOLOGY (BISIT) Contact: Tameru Beshah, General Manager, temeru.beshah@bisitgroup.com, +492273595962 Link: www.bisit-group.com A private German company supplying solar energy applications across Ethiopia and Africa. Main solutions include SHSs and solar refrigeration, pumping and lighting systems.
15	GREEN LIGHT PLANET Contact: Selamekristos Belay, Brand Manager selame@greenlightplanet.com Link: www.greenlightplanet.com/ An Indian-based for-profit social business solar home systems and solar lamp kits developer, manufacturer and supplier. The products go by the name of SunKing. Green Light Planet is a member of the Global Off-Grid Lighting Association.
16	LYDETCO PLC Contact: Dereje Walelign, Owner/Managing Director, dwalelign@lydetco.com.et, + 251 114 660 26 Link: http://www.lydetco.com/ A solar home systems manufacturer linked with the distributors Phaesus, Newlong and Linuo Ritter.
17	NIWA SOLAR Contact: Ti el Attar, Founder and Executive Director, sales@niwasolar.com Link: www.niwasolar.com A developer, manufacturer and distributor of solar home systems and highly efficient appliances.
18	SOLARTECH Contact: Yohannes Shiferaw, Expert, yohannesshi@gmail.com Link: www.solartech.org.uk A solar technology distributor also offering installation, support and consultancy services.
19	AZURI TECHNOLOGIES Contact: Simon Bransfi, Chief Executive Officer, sbg@azuri technologies.com Link: http://www.azuri-technologies.com/ Azuri is a commercial provider of pay-as-you-go solar systems for rural off-grid communities. The business model is built around mobile payment, and Azuri has partnered with M-BIRR to provide this service in Ethiopia.
20	ETHIO RESOURCE GROUP Contact: Mr. Getnet Tesfaye, Director of Consulting, getnet_t@yahoo.com Link: http://ergethio.com/ Ethio Resource Group is a private energy and environment research and consulting organization based in Addis Ababa. The services provided include policy and strategy consultancy; project development and

	evaluation; research design, installation and supervision of projects; and capacity development. ERG is establishing six wind-powered micro-grids in Menz-Gera as detailed in Section 4.6.
21	SOLAR ENERGY DEVELOPMENT ASSOCIATION (SEDA-E) Contact: Mr. Dereje Wondyefraw, CEO derejeww@gmail.com Link: https://www.gogla.org The Solar Energy Development Association (SEDA-E) is an independent non-profit association dedicated to facilitating the growth and development of solar energy business in Ethiopia.
22	SOLARKIOSK Contact: Mr. Gezachew Fekadu Managing Director gezachew.fekadu@solarkiosk.eu Link: https://www.solarkiosk.eu SOLARKIOSK enables and empowers the sustainable economic development of Base-of-the-Pyramid (BoP) communities worldwide, through the provision of clean energy services, quality products and sustainable solutions. Intertwining an award-winning technology solution with an inclusive business model, SOLARKIOSK fosters local entrepreneurship at the BoP.
23	RENSYS ENGINEERING & TRADING PLC Contact: Adafre, Energy Officer adafrezl@gmail.com Rensys Engineering & Trading PLC is a company located in Addis Ababa, Ethiopia. The company is mainly working in Electric & Electromechanical Installation business sectors. They are operating development partner-funded mini-grids in the country.
24	FOSERA Contact: Thomas Koepke, General Manager thomas.koepke@fosera.com Link: https://www.fosera.com Team comprised engineers, salespeople and operation managers. They are driven by the vision to electrify Africa, Asia and Latin America with the use of clean, sustainable and affordable solar energy systems and to provide customers with solar solutions, which are perfectly fitted to their needs.
25	BMLA PRIVATE LIMITED Contact: Yimam Kebede, Acting Technical Manager dcsoft2010@gmail.com We are engaged in import of machinery, equipment and supplies. Our company is mainly involved and interested in house household energy and productive uses, based on renewable energy resources (such like solar home systems, solar water pumps and solar thermal) to individuals and communities in rural Ethiopia without access to grid connected power.
26	SOLAR DEVELOPMENT PLC Contact: Mr. Nabil Ishak, Managing Director nabil.i@soldev.net Link: https://soldev.net

	Solar Development PLC integrates and provides a wide range of solar systems from Pico Solar Home Systems (PSHS) up to autonomous village power supplies, Street lights, DC refrigerator/freezers, Solar Pumping Systems, and Thermo-siphon Solar Water Heaters. Further, we are engaged in power- backup systems for grid connected areas.
BILATERAL AND MULTILATERAL DONOR ORGANIZATIONS	
27	THE WORLD BANK Contact: Rahul Kitchlu, Senior Energy Specialist, rkitchlu@worldbank.org Link: http://www.worldbank.org/en/country/ethiopia The World Bank's engagement in Ethiopia is through its lower income branch, the International Development Association (IDA). The World Bank has been engaged with the Government of Ethiopia to support its medium- to long- term development agenda through policy support, capacity building, financing and implementation initiatives. Previous focuses of support have been accessing and infrastructure expansion, connection intensification geothermal power and interconnectors. The World Bank is currently engaged with the government on the restructuring of the energy sector's institutional framework, as well as the National Electrification Strategy and Off-Grid Master Plan. The current US\$ 250 million phase of funding is primarily focused on grid intensification. However, approximately US\$ 40 million of this funding phase was allocated to the Development Bank of Ethiopia Credit Line, which provides concessional financing for low carbon technologies. This facilitates both the supply (entrepreneurs) and demand side (customers through microfinance) and is detailed further in Section 4.6. The previous World Bank credit program went through the Alternative Energy Technology Development and Promotion Directorate, which had insufficient capability to handle large finances. Another project stream in Ethiopia is geospatial analysis and planning. The World Bank is developing a GIS-based planning tool, targeting operation by the end of 2016, which builds upon the UNDESA Universal Electrification Access Tool (un-desa-modelling.github.io/Electrification). This tool will incorporate an opportunity assessment methodology for practitioners, allowing them to adjust various criteria according to their criteria and business model. This analysis aspect of the tool will be completed at some point in 2017, in addition to other data collection activities that the World Bank will run to populate the model.
28	USAID POWER AFRICA Contact: Gene Lin, Senior Energy Advisor, glin@usaid.gov Link: https://www.usaid.gov/powerafrica/ethiopia PowerAfrica has been strongly engaged with the Government of Ethiopia on a number of policy and institutional issues, as well as prioritizing geospatial analysis and planning. PowerAfrica has also been leading informal coordination of donors in Ethiopia. PowerAfrica has supported the development of the national electrification master plan, the legal and regulatory framework for geothermal generation and current development of government geospatial management capabilities. They have also been a consultant to the government on its short- to long-term energy strategies, which includes mini-grid developments targeting diesel-powered irrigation and agricultural processing systems. PowerAfrica is also looking into the issue of foreign currency liability in the energy sector. PowerAfrica has employed the National Renewable Electricity Cooperative Association (NRECA) to deliver several projects, including USAID's Beyond the Grid, which centres on establishing business models for off-grid generation in Ethiopia. This examines four sets of projects: 1) full feasibility studies of the hydro sites for which the AETDPD did design studies; 2) the 37 diesel mini-grids operating legally in Ethiopia; 3) some of the 150 village areas identified for mini-gridss under GTP II; and 4) medium to large irrigation sites that currently use diesel-generation. NRECA is also looking into the tariff structure for off-grid projects.
29	AFDB

	Contact: Mr Girma Mekuria Abiyehoy Senior Energy Officer g.abiyehoy@afdb.org Link:http://www.afdb.org/en/countries/southernafrica/ethiopia The AfDB has historically been engaged mainly in large infrastructure projects in Ethiopia and is currently working on the Kenya interconnector with the World Bank and French Development Agency, AFD. The Ethiopia office is also working on two AfDB-funded projects, involving the electrification of 335 towns and planned 170,000 connections. Funding under the AfDB is available through two windows: the African Development Fund (public sector with sovereign guarantee) and the African Development Bank Window (commercial). Through these windows, Ethiopia has received a commercial loan for local water supply development in four towns, and recently, also for transmission and sub-stations for a mining company. The Sustainable Energy for All Africa Hub, hosted by the AfDB, is currently implementing a green mini-grid market development programme (GMG MDP) to facilitate greater investment into GMGs across the continent. To achieve the SEforALL objectives, Africa will require substantial investments into national power grids, off-grid solar home systems, and isolated mini-grids. AfDB's program will provide business development services to green mini-grid developers, assisting them on a wide range of issues, from business planning, market development and grid design to project finance, grid operation and maintenance. The first phase of the Green Mini-Grid Market Development Programme was launched in late 2015. The Program consists of five business lines: • Market intelligence relative to GMG development at the African country level; • Business development services; • Policy and enabling environment development; • Access to financing for GMG project developers; and • Technical standardization and quality control of mini-grids, which will be operationalized in a second phase of the MDP. This Program works in close collaboration with other partners and was also referenced in the G20 Action Plan on Energy Access in Sub-Saharan Africa adopted in October 2015.
30	GIZ Contact: Mr. Samson Tolessa, Deputy Director, Energizing Development Ethiopia Mob. +251911211284 samson.tolessa@giz.de Link: https://www.giz.de/en/worldwide/336.html The Energising Development (EnDev) program is a multi-donor initiative delivered by Germany's GIZ and the Netherlands' Enterprise Agency (RVO). It is funded by the Governments of the Netherlands, Germany, Norway, Australia, the United Kingdom, Switzerland and Sweden. EnDev Ethiopia promotes household electrification through pico hydro power and micro hydro power plants, by providing technical assistance and introducing appropriate low-cost designs for hydro power. The program has established operational community-owned mini-hydro schemes: four in Sidama and one in Oromia Gima, with EU financing. These schemes are centred on operational or derelict low-mills, as these ensure existing social structures, a critical base load industry and existing infrastructure. This program trains local scouts to promote hydro power and assist municipalities in identifying and developing suitable sites. EnDev provides fire sources to cover parts of the investment costs and the local community contributes with civil works. EnDev selects the personnel to do the installation of the machinery, the supervision of the civil works and the wiring. Partners from local institutions were sent to Indonesia to be trained in turbine manufacturing.

31	EU DELEGATION Contact: Ms. Céline TOUGERON Project Manager – Regional and Infrastructure Team Delegation of the European Union to Ethiopia celine.tougeron@eeas.europa.eu Link: http://eeas.europa.eu/delegations/ethiopia/index_en.html The EU's role in Ethiopia is in grant funding through the government, targeting physical projects on energy and infrastructure. A EUR 60 million funding pot is available until 2020, and allocation will be driven primarily by government demand. The EU's aim is to use this funding as seed money for larger projects, such as the EUR 10 million given to the GIZ EnDev Project. The two main focal points for the EU with respect to its energy strategy are energy efficiency and renewable energy. As renewable development is comparatively stronger in Ethiopia, the EU's energy priorities to date have been in energy efficiency. This includes supporting the EEA in developing an energy efficiency master plan. Future projects include, community mini-hydro under the GIZ EnDev project and a biogas digester project with SNV that are under financial approval. Others include, the Regional Development and Protection Project that provides electricity and sustainable cooking to refugee camps and their host communities and a solar kiosk program for African, Caribbean and Pacific states, which is under development.
32	UNDP Contact: Ms. Kidanua Abera, Programme Analyst - Energy and Low Carbon Development, kidanua.abera@undp.org Link: http://www.et.undp.org/ UNDP is predominantly focused on supporting delivery of the country's priorities under its GTP II, which also aligns with the Sustainable Development Goals. Support programs have three strategic pillars: growth and poverty reduction, climate change and environment vulnerability, and governance. The pillar focuses mostly around agriculture. The UNDP has therefore supported the design of Ethiopia's multi-donor funded national Agriculture Growth Programme (AGP). Governance focuses around capacity building and leadership at senior level, including training and twinning with institutions such as think tanks. Finally, the climate, risk and resilience program focus on support for the implementation of Ethiopia's 2011 Climate Resilient Green Economy document (CRGE).
33	KOREA INTERNATIONAL COOPERATION AGENCY (KOICA) Contact: Doh Young Ah, Country Director, yadoh@koica.go.kr Link: www.koica.go.kr The Korea International Cooperation Agency was established in 1991 as a government organization responsible for official development assistance and is tasked with implementing the government's grant aid and technical cooperation programs. Its focus sectors are education, health, public administration, rural development, energy technology and industry (water, energy, transportation and science, technology and innovation) and the cross-cutting issues of climate change, gender, human rights and information and communication technology (ICT). In Africa, within which Ethiopia is KOICA's biggest recipient, KOICA is focused on health, education and rural development. In Ethiopia, this includes a joint off-grid pilot program under development in partnership with EEU.
34	EUROPEAN INVESTMENT BANK (EIB) Contact: Eva Romer, Head of Secretariat of AITF E.Romer@eib.org Link: www.eu-africa-infrastructuretf.net/ The EU-Africa Infrastructure Trust Fund (EU-AITF) was established in 2007 and aims to increase investment in infrastructure in Sub-Saharan Africa by blending long-term loans from participating financiers with

	Infrastructure Trust Fund grant resources. Private and public sector co-financing is encouraged, and projects must be financed by at least one member of the EU-AITF Project Financiers Group. The grant funding is composed of two envelopes, the regional envelope, which focuses on regional infrastructure projects, and the SEforALL envelopes, which supports regional, national and local energy projects targeting SEforALL objectives. No funds are targeted at private sector developers.
35	EIB - ENERGY ACCESS VENTURES FUND Contact: Thomas Andre, Schneider Electric, thomas.andre@schneider-electric.com Link: http://www2.schneider-electric.com/documents/press-releases/en/shared/2015/03/20150302_PRF_AfricaEnergyAccessFund_EN.pdf Technical and financial assistance targeting small energy access businesses. The Fund will be managed by Aster Capital (Energy Access Venture jointly backed by Schneider Electric and the CDC Group), the UK's Department for International Development (DFID), European Investment Bank, FISEA (PROPARCO, OFID, and AFD) and FFEM. The Fund has secured commitments of EUR 54.5 million to invest in Africa.
36	EIB - ENERGY ACCESS VENTURES FUND Contact: Thomas Andre, Schneider Electric, thomas.andre@schneider-electric.com Link: http://www2.schneider-electric.com/documents/press-releases/en/shared/2015/03/20150302_PRF_AfricaEnergyAccessFund_EN.pdf Technical and financial assistance targeting small energy access businesses. The Fund will be managed by Aster Capital (Energy Access Venture jointly backed by Schneider Electric and the CDC Group), the UK's Department for International Development (DFID), European Investment Bank, FISEA (PROPARCO, OFID, and AFD) and FFEM. The Fund has secured commitments of EUR 54.5 million to invest in Africa.
OTHER RELEVANT ORGANISATIONS AND INITIATIVES Other local organisations and initiatives that can provide useful background information regarding prospects for GMGs in Ethiopia include:	
37	THE SCALINNG –UP OF RENEWABLE ENERGY IN LOW INCOME COUNTRIES PROGRAMM (SREP) Contact: Dessalegne Mesfi Fanta, Deputy Executive Director, Environmental Protection Authority, epa-dd@ethionet.et Link: https://www-cif.climateinvestmentfunds.org/country/ethiopia The Climate Investment Funds (CIF) is made up of the key development banks (the African Development Bank, the Asian Development Bank, the European Bank for Reconstruction and Development, the Inter – American Development Bank and the World Bank Group). The SREP is a US \$ 839 million finance Window of the CIF, working across 28 countries to scale up the deployment of the renewable energy solutions to increase energy access and economic opportunities. US \$ 50 million has been allocated to Ethiopia to date and has included the US\$ 25 million Geothermal Sector Development Project and US\$ 1.6 million Lighting Ethiopia project. The SREP investment plan details the full investment strategy for this project.
38	EAST AFRICAN POWER POOL (EAPP) Contact: Mr. Lebba Changullah, Secretary General lchangullah@eappool.org Link: http://www.eappool.org/ The EAPP has ten member countries: Burundi, DRC, Egypt, Ethiopia, Kenya, Libya, Rwanda, Sudan, Tanzania and Uganda. The EAPP was formed under an Inter-Governmental Memorandum of Understanding (IGMoU) between the countries' energy ministers, and an inter-utility MoU between the countries' power utilities. This organisation seeks to facilitate the further regional integration of its member countries and to thereby realise sustainable growth and development. The primary document of the EAPP is the EAPP Regional Power System Master Plan, which outlines the plan for the expansion of the East African electricity

	transmission system. This details a number of scenarios for the least-cost investment in generation and transmission for the entire system. An interconnection code compliance program is an integral part of enabling this regional integration.
39	PLAN INTERNATIONAL SPAIN Contact: Carlos Sordo Olive, RE and EE Department Manager, carlos.sordo@plan-international.org, (+34) 915241222 Extension 106, Skype: Carlos.sordo.plan Link: http://plan-espana.org/ Plan International is an international aid and development organisation focused on safeguarding the rights of children. Plan International provides financial knowledge and logistical assistance to increase the impact of several Plan International programmes through the use of energy resources. It aims to provide energy access to rural communities in Ethiopia.
40	SCHNEIDER ELECTRIC Contact: Thomas Andre, Strategy & Performance - Access to Energy program, +33141393163, thomas.andre@schneider-electric.com Link: http://energy-access.schneider-electric.com/ Schneider Electric is a French multinational corporation specializing in electrical distribution, industrial control and automation products, systems and services. Schneider Electric's Access to Energy Program delivers technical and financial assistance on clean off-grid solutions, including product development, commercialization and investment assistance.
41	STATERA CAPITAL Contact: David L. Ross, Managing Director, david@stateracapital.com Link: www.stateracapital.com Statera Capital is an impact investment banking and transaction advisory focused in Sub-Saharan Africa. Statera Capital acts as an advisor to organizations such as Agence française de développement (AFD) and DFID on mini-grid investments, offering advice on capital structures and capital raising for renewable energy sources.
42	SUSTAINABLE AGRICULTURE COMMUNITY DEVELOPMENT PROGRAMME (SACDEP-KENYA) Contact: Polly Wachira, Outreach and Networking Manager, 254-020-2614690, sacdepkenya@iconnect.co.ke Link: www.sacdepkenya.org SACDEP-Kenya's mission is to facilitate sustainable development for communities in Kenya and the East African Region that have low access to resources to enable livelihood improvement through sustainable agricultural principles and practices. SACDEP's support to communities includes facilitating access to wind, biomass and solar energy for domestic uses.
43	ACCENTURE DEVELOPMENT PARTNERSHIPS Contact: David Taylor, Senior Strategist, David.taylor.jr@accenture.com Link: www.accenture.com/us-en/accenture-development-partnerships Accenture Development Partnerships is a consultancy involved in strategic development, assessment and analysis of mini-grids in select developing countries. Their Energy Access for Development Impact (EADI) program provides technical assistance across all technology types.
44	ADDIS ABABA UNIVERSITY Contact: Dr. Tassew Woldehanna, Vice President for Research and Technology Transfer, vprrtt@aau.edu.et,

	+251-111-239769 Link: www.aau.edu.et Ethiopia's main university has several schools and departments involved in renewable energies and rural electrification, including the Center for Energy and Technology (Addis Ababa Institute of Technology) and the Horn of Africa Regional Environment Centre and Network. These are led respectively by Dr. Ing. Ababayehu Assefa, Head of the Energy Center, and Dr. Araya Asfaw, Executive Director.
45	ARBA MINCH UNIVERSITY Contact: Dr. Damtew Darza Sozo, President, presidentoff@amu.edu.et, damtew.darza@amu.edu.et Link: http://www.amu.edu.et Arba Minch University has several courses and research groups relating to renewable energy and rural electrification within its Institute of Technology. The university set up a solar competence centres in cooperation with Sahay Solar Engineering, which trains engineers, electricians and rural Ethiopians on solar technologies. It also runs an applied education entrepreneurship program to develop off-grid business applications, in partnership with Neu-Ulm University of Applied Sciences.
46	WOLDIA UNIVERSITY Contact: Professor Yalew Endawoke President, +251 0335 400 609 Link: http://www.wldu.edu.et Woldia University has several courses and research groups relating to renewable energy and rural electrification. The university is the host for a 100MW/annum Solar PV mini-grid manufacturing plant that has been built in partnership with Global Trade and Development Corporation and AIB Stimaken. Source: Green MiniGrid Market Development Programme- SEforALL Africa Hub African Development Bank and organisations' Websites.

Annex D: A Proclamation on Energy

 የኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፐብሊክ ፌዴራል ነጋሪት ጋዜጣ FEDERAL NEGARIT GAZETTE OF THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA		
የደንብ ቁጥር አዲስ አበባ ጥር ፳፱ ቀን ፳፻፲፮ ዓ.ም	በኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፐብሊክ የሕዝብ ተወካዮች ምክር ቤት ጠባቂነት የወጣ	20 th Year No. 12 ADDIS ABABA 27 th January, 2014
ማውጪያ አዋጅ ቁጥር ፳፻፲/፳፻፲፮ ዓ.ም የኢነርጂ አዋጅ፲፮፡፳፻፲፮ አዋጅ ቁጥር ፳፻፲/፳፻፲፮ በሰራተኛ የወጣ አዋጅ		CONTENTS Proclamation No. 810/2013 Energy Proclamation Page 7221 PROCLAMATION No. 810/2013 A PROCLAMATION ON ENERGY
ለአገሪቱ የተፋጠነ የኢኮኖሚና ማህበራዊ እድገት ዋነኛ ከሆኑ ግብዓቶች ውስጥ ኢነርጂ አንዱ በመሆኑ፤ በሥራ ላይ ያለውን የኤሌክትሪክ አዋጅ ከወቅቱ ብሔራዊ እና አካባቢያዊ የኢነርጂ ቁጥጥር አሰራር እድገት አንጻር ማሻሻልና የኢነርጂ ብቃትና ቁጠባ ቁጥጥርን በማሳደግ በአዲስ የኢነርጂ አዋጅ መተካት በማስፈለጉ፤ በኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፐብሊክ ሕገ-መንግስት አንቀጽ ፶፭(፩) መሠረት የሚከተለው ታውጧል፡፡ ክፍል አንድ ጠቅላላ ፩. አጭር ርዕስ ይህ አዋጅ “የኢነርጂ አዋጅ ቁጥር ፳፻፲/፳፻፲፮ ተብሎ ሲጠቀስ ይችላል፡፡ ፪. ትርጓሜ የቃሉ አገባብ ሌላ ትርጉም የሚያሰጠው ካልሆነ በስተቀር በዚህ አዋጅ ውስጥ፡- ፩/ “ኢነርጂ” ማለት ከውሃ ኃይል፣ ከፀሐይ፣ ከህፋስ፣ ከከርሶ ምድር አንፋሎት ወይም ከሌላ ምንጭ የሚገኝ የኤሌክትሪክ ኃይል ነው፤ ፪/ “ማመንጨት” ማለት ኤሌክትሪክ ማምረት ነው፤ ፫/ “ማስተላለፍ” ማለት በከፍተኛ ፕልቲድ የኤሌክትሪክ ኃይል ማጓጓዝ ነው፤		WHEREAS, energy is one of the indispensable inputs necessary for accelerating the economic and social development of the country; WHEREAS, the existing Electricity Proclamation needs to be revised based on the current national and regional development of energy regulations and be replaced by a new energy law that include regulations of both electricity and energy efficiency and conservation; NOW, THEREFORE, in accordance with Article 55(1) of the Constitution of the Federal Democratic Republic of Ethiopia, it is hereby proclaimed as follows: PART ONE GENERAL 1. Short Title This Proclamation may be cited as the “Energy Proclamation No. 810/2013”. 2. Definitions In this Proclamation unless the context otherwise requires: 1/ “energy” means electric power generated from hydropower, solar, wind, geothermal or other sources; 2/ “generation” means the production of electricity; 3/ “transmission” means the transportation of electricity through high voltage lines;
ያንዱ ዋጋ Unit Price 14.60		ነጋሪት ጋዜጣ ፖ.ሣ.ቁ ፳፻፲፮ Negarit Gazette P.O.box 80,001

Full proclamation can be accessed at -<https://chilot.files.wordpress.com/2014/09/proclamation-no-810-2013-energy-proclamation.pdf>

Annex E: List of Documents Relevant to the Energy Sector and Rural Electrification

Since the Ethiopian Energy Policy (1994) there have been significant developments in the structuring of regulation and operation of Ethiopia's energy sector. Provided below are the main policies and policy documents relevant to the energy sector and rural electrification. Besides, several documents are available on the EEA website, including PPA templates and relevant regulatory laws.²⁷

NATIONAL ELECTRIFICATION PROGRAM IMPLEMENTATION ROAD MAP AND FINANCING PROSPECTUS

Ethiopia's National Electrification Program (NEP) - Implementation Roadmap (IRM) presents the government's action plan for achieving universal electricity access nationwide by 2025, in a strategic and comprehensive, as well as efficient and transparent manner, for the benefit of all its citizens. Towards this end, the key operational action elements of the NEP-IRM target are detailed in the document²⁸.

NATIONAL ELECTRIFICATION PROGRAM 2.0 INTEGRATED PLANNING FOR UNIVERSAL ACCESS

Ethiopia has launched the updated version of National Electrification Program (NEP 2.0) on 27 March 2019. The program was launched at 'Africa Energy Forum: Off the Grid' and 'Regional Energy Co-operation Summit' meeting kicked off in Addis Ababa. This is the first updated version of NEP 1.0, initially launched at the end of 2017, with a programmatic framework for achieving universal electricity access by 2025 with targets and timetables, roles and responsibilities of sector institutions, and a sector-wide approach for the coordination of activities and harmonization of sector planning for electrification. In the NEP 2.0, the government provides an update on the progress achieved over the past year and provides a detailed framework for the integration of off-grid technologies with grid connectivity, leveraging on both public and private sector efforts for the achievement of 35 percent of off-grid access by 2025²⁹.

THE ELECTRICITY PROCLAMATION, NO. 86-1997

The 1997 Electricity Proclamation established the Ethiopian Electricity Agency (now the Ethiopian Energy Authority) as an autonomous institution, mandated to regulate the operation of the energy sector, including tariffs and standards.³⁰

ELECTRICITY OPERATIONS REGULATIONS, NO. 49/1999

The Electricity Operations Regulations provide for the regulation of electricity operations, detailing registration, application, issuance and refusal of licenses as well as electricity prices, tariffs and standards of safety, technical and quality of service of electricity services. This has been replaced by the Council of Ministers Energy Regulation, 2016 Attached at Annex D
(<http://www.ethioenergyauthority.gov.et/attachments/article/43/Regulation%20no.49-1999.pdf>)

PRICING PROCEDURE FOR SMALL AND VERY SMALL SELF-CONTAINED SYSTEM (SCS), NO. 2/2005

Pricing Procedure for Small and Very Small Self-Contained System No. 2/2005 details the pricing procedure for systems that are isolated from the national grid. This applies to systems smaller than 500 KVA. This document guides licensees in the preparation of pricing submissions to EEA as part of their license conditions and guides the EEA in its review of pricing submissions and of licensee price performance under license. Support to licensees includes, formulas dictating the final analyses to be conducted; for example, price adjustment with the cost of diesel or the allowed forecast of revenue for subsequent financial years based on previous year revenue.³¹

²⁷ <http://www.ethioenergyauthority.gov.et/>. And www.eea.gov.et

²⁸ Link-<http://mowie.gov.et/rural-electrification-project>

²⁹ Link- <https://www.east-africa>

³⁰ (<http://www.ethioenergyauthority.gov.et/attachments/article/43/Proclamation%20No.280-2002.pdf>).

³¹ Link - <https://chilot.f11/04/pricing-procedure-for-small-and-very-small-self-contained-systems-scs- no-2-2005.pdf>

CLIMATE-RESILIENT GREEN ECONOMY (CRGE) STRATEGY, 2011

The Climate-Resilient Green Economy Strategy, along with the GTP, outlines the national economic and social development plans. CRGE, which focuses on green growth as a necessity to mitigate and adapt to the effects of climate change, is built on a plan targeting Ethiopia to become a middle-income country by 2025, with four key pillars; agriculture, reforestation, power and transportation. Within these priority growth pillars, implementation plans are developed, with the power pillar detailing the generation from renewable sources for domestic and regional markets. CRGE establishes the target of limiting 2030 emissions to 150 Mt CO₂e (level of 2010 emissions), approximately 250 Mt CO₂e less than in the business-as-usual scenario. It also establishes a target to increase generation capacity by 25,000MW by 2030 (hydro 22,000MW, geothermal 1,000MW and wind 2,000MW), as well as establishes biogas and cook stove programmes.³²

ELECTRICITY FEED-IN-TARIFF LAW, 2012

The Feed-in-Tariff law targeted a diversification of the national energy mix to increase the robustness of supply against weather and market conditions. This law considers energy projects for up to 10 MW of generation capacity. Although, diversification is still a key priority for the energy sector, the government is not currently pursuing the feed-in-tariff approach.

INVESTMENT PROCLAMATION, NO. 769/2012

The investment proclamation (769/2012) is an amendment to Ethiopia's investment proclamation (280/2004), which provides for the establishment of state-and privately-run industrial development zones (IDZs). These IDZs are given favourable investment, tax and infrastructure incentives. This amendment increased the minimum capital requirement to US\$ 200,000 per project for wholly owned foreign instruments and US\$ 150,000 for joint investment with domestic investors. A foreign investor reinvesting profit may not be required to allocate minimum capital. Also relevant is the Council of Ministers Regulation on Investment No. 270/ 2012, the Commercial Registration and Business Licensing Proclamation No. 686/2010 and its amending proclamation No. 731/2012.³³

ENERGY PROCLAMATION, PROCLAMATION 810/2013

The Energy Proclamation expands on previous energy sector policies, specified in the national approach to independent PPAs, fully off-grid systems and on-grid energy efficiency. This law makes the EEA responsible for the negotiation of off-grid IPPs as well as the national grid, accountable to MoWIE. This includes defining EEA's responsibility for the issue and regulation of the implementation of guidelines for and financial approval of, off-grid tariffs. This is in addition to the EEA's responsibilities for setting performance standards, issuing licenses and regulating the power sector.

GROWTH AND TRANSFORMATION PLAN II (GTP II), 2015

The Growth and Transformation Plan is the government's development plan for 2015-20, including targets and strategies for the power sector. The GTP ran from 2010 to 2015. GTP I focused on growth through institutional capacity building and on energy generation, transmission and distribution systems. GTP II focuses on delivering the target to become a middle-income country by 2025, building as well on the CRGE Strategy. Private sector development and a climate-resilient green economy is seen as the strategic pillars of GTP II, including further support to MSMEs in all sectors. GTP II targets 90% village access, as well as 18.9GW of additional generation capacity. This includes 7.6GW of hydro, 500MW of geothermal, 5.2GW of wind, 5.2GW of solar and 420MW of backup thermal generation.³⁴

³² Link - <http://www.undp.org/content/dam/ethiopia/docs/Ethiopia%20CRGE.pdf>

³³ Link - <http://www.mot.gov.et/documents/27281/0/Proc+No.769-2012-investment-proclamation.pdf/190b309b-18dc-47bc-b1ce-6ab2d9219363?version=1.1>

³⁴ Link-<https://www.africaintelligence.com/c/dc/LOI/1415/GTP-II.pdf> (GTP I www.iea.org/media/pams/ethiopia/Ethiopia_GTP_2010to2015.pdf)

ETHIOPIA NATIONAL ELECTRICITY TRANSMISSION AND DISTRIBUTION GRID CODE, 2016

The National Grid Code is a set of documents that outline the rules and responsibilities for all entities relating to the electrical power system's planning and operation. Its purpose is to "legally establish technical and other requirements for the connection to, and use of, an electrical power system by parties in a manner that will ensure reliable, efficient and safe operation."³⁵

COUNCIL OF MINISTERS ENERGY REGULATION, 2016

The draft Energy Regulation, released on 28th September 2016, has been ratified by the Council of Ministers. It builds on the previous 2015 draft Regulation of Energy Operations. This relates to the already ratified New Energy Law (810/2013) and governs EEA's regulation of energy operations. Specifically, this covers procedures for licensing energy operations, the rights and obligations of licensees, tariff regulations, safety and quality of service standards, conflict resolution and regulation of energy efficiency and conservation measures³⁶.

Other key national development policies that have impact on the energy sector are the:

- National Electrification Strategy and Off-Grid Master Plan
- Renewable Energy Proclamation, reportedly in development
- Rural Development Policy and Strategy
- Environmental Policy
- Science and Technology Policy
- Water Resources Management Policy etc.

³⁵ Transmission link- <http://www.ethioenergyauthority.gov.et/attachments/article/74/ENTGC%202016%20Preliminary%20Draft%20Feb2016.pdf>

Distribution link - <http://www.ethioenergyauthority.gov.et/attachments/article/74/ENDGC%202016%20August%202016>.

³⁶ <http://www.ethioenergyauthority.gov.et/attachments/article/66/English%20Draft%20Energy%20Regulation%20September%202016.pdf>

Annex F: Checklist for Market Development for Renewable Energy and Energy Efficient Products

Development Bank of Ethiopia

External Fund and Credit Management Directorate

Market Development for Renewable Energy and Energy Efficient Products

I. Documents Required from Applicants to Participate for the Credit facility

1. License

- a. Renewed trade license
- b. Principal registration certificate
- c. Tax payer identification certificate (TIN)
- d. Value added tax registration certificate (VAT)
- e. Line of Business
- f. Work permit/Investment certificate from the concerned Government Authority
- g. Legal form of business (If PLC, or S.C. state the share holders, attach article and memorandum of association)

2. Company Address and Location

a. Bureau Address

- i. City
- ii. Sub-city
- iii. Kebele
- iv. House number
- v. Telephone
- vi. P.O.Box
- vii. Fax
- viii. E-mail

b. Warehouse

- i. City
- ii. Sub-city
- iii. Kebele
- iv. House number
- v. Telephone

3. Marriage Certificate/Sole Proprietorship

- | | |
|---------------------------|---|
| - For married applicants: | - Marriage certificate |
| - For single applicants: | - Written evidence of being single from the concerned Government Body |
| - For divorced applicant: | - Divorce certificate and evidence of being single |

4. Track Record

a. Credit History

Bank's reference on the applicant credit history stating the following

- Name of the lending Bank (if applicable)
- Date borrowed, and for how many times?
- Present status of the debt

b. Business Record

- Other business owned Yes: _____ No: _____

If yes clearly indicate on the following table

No	Name of Owner	Name of Business	Address			Status of Business		
			Zone	Woreda	Kebele	Profitable	Loss	New

N.B. Attach audited statements for at least three consecutive years

c. Social interaction

A recognition letter for his/her social relationship (if any)

d. Credit status of shareholders with other bank

No	Name of Share holders	Name of the Bank	Type of Loan				Status of Loan			Collateral		
			Term loan	Merchandise Loan	OD	Other	Pass	Sub-Standard	loss	FA	Merchandise	Other

Status of Loan (attache)

- *Date of Loan Granted and*
- *Date of Loan Expiry*

FA – Fixed Asset

5. Management (Company General Manager & Project Manager)

- Address
- Educational background
- Overall work experience
- Relevant work experience
- Attach CV with reference document

6. Collateral

- For working capital loan
 - Collateral equivalent to the loan amount is required
- For project loan
 - Fixed asset of the project can be used as a collateral

7. Support Letter from Ministry of Water Irrigation & Energy about the Technology

Checklist for Market Development Renewable Energy

1. Audited financial statement (3 years)
2. Article of Association and Memorandum of Association
3. Principal Registration Certificate
4. Performa Invoice
5. Lighting Africa Certificate/or Third party approved certificate for SHS
6. 100%/50% collateral
7. Equity Contribution 25%
8. Authorization letter or distributor slips agreement from the manufacturer.

CHECKLIST FOR OFF GRID AND ENERGY EFFICIENT EQUIPMENTS OF SOLAR TECHNOLOGY TO EVALUATE BUSINESS PLANS SUBMITTED BY IMPORTERS/COMPANIES		
No	Criteria	Remark
I	For Solar Lanterns (less than 8Wp) and Solar Home Systems(greater than or equal to	
	8Wp) ,	
a	Approved by Global Standard	
	• Lighting global/Africa • Third party certification • To be checked by quality assurance authority/if necessary	
b	Approval by the owner of the product	
	• Manufacturer Authorization • Agent agreement	
c	License and approval to work on the sector	
	• Renewed trade license • Recognition from relevant sector authority	
d	After sales service works:	
	• Stated maintenance issues and spare part reserves of the product	
e	Warrantee Document	
f	Intervention Area	
	• Area of distribution indicated by region, wereda or locality	
g	Previous distribution area and list of technologies distributed. (must be as per regions kebele selection and applied for loan renewal)	
h	Product specification and certification	
i	All pages of the BP document to be signed and stamped	
II	Biogas	
1	Imported appliances manufactured by certified owner of the product (lumps with accessories, pressure gauge, stove, gas valve, rubber hose, water drain, main ball valve, gas line pipe and fixtures, etc)	
2	Size of plant and building material type.	
3	Trained and Certified Constructing mason or BCE (Biogas Construction Enterprise)	
4	License and approval to work on the sector	
	• Certified trade license • Recognition from relevant sector authority	
5	After sales service works:	
	Stated maintenance issues and spare part reserves of the product	
6	Warrantee Document	
7	Intervention Area:	
	Area of distribution indicated by region, wereda or locality	
8	Previous distribution area and list of technologies distributed. (must be as per regions kebele selection and applied for loan renewal)	
9	Proper data base of the plant and PILS record. (Plant Identification and Location System) e.g. GPS reading.	

- It is to be considered that the Loan Proportion has to be as per the stakeholders' signed agreement. (75% SHS, 20%lantern & 5% Biogas.

Annex G: Pricing Procedure for Small and Very Small Self-Contained Systems (SCS)

PRICING PROCEDURE FOR SMALL AND VERY SMALL SELF-CONTAINED SYSTEMS (SCS) NO 2/2005

SECTION ONE: GENERAL

CHAPTER ONE

General

Art. 1 Issuing Authority

This Price Setting Procedure is issued by the Agency in accordance with Art 32(2) of the Council of Minister's Electricity Operation Regulations No. 49/1999.

Art. 2. Short Title

This Procedure may be cited as the "Pricing Procedure for Small and Very Small Self-Contained System (SCS) No. 2/2005"

Art. 3 Definitions

In this procedure, unless the context requires otherwise:

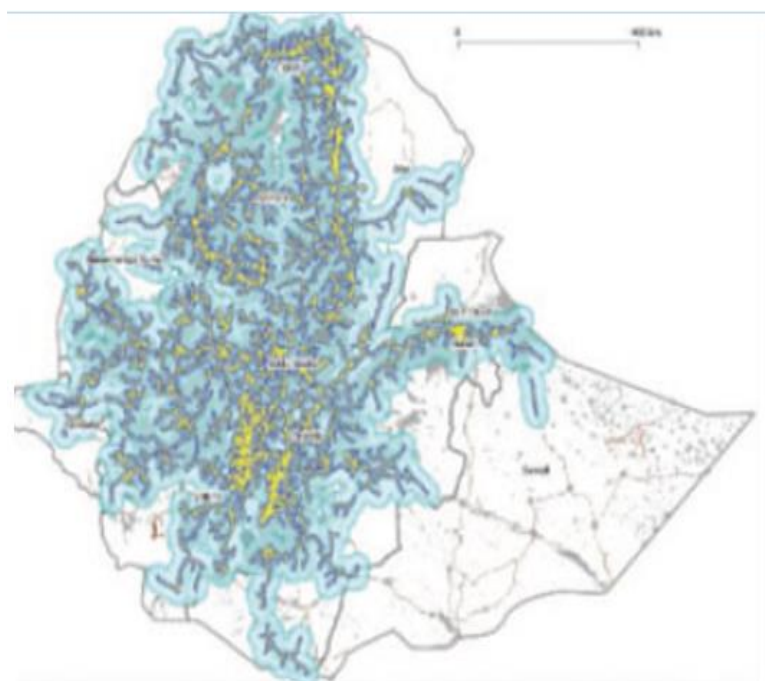
1. "c used as a subscript" mean the subscript c next to a symbol denotes that this symbol refers to the Current Financial Year;
2. "c+1 used as a subscript" means the subscript c+1 next to a symbol denotes that this symbol refers to the Following Financial Year;
3. "c-1 used as a subscript" means the subscript c-1 next to a symbol denotes that this symbol refers to the Previous Financial Year;
4. "c+2 used as a subscript" means the subscript c+2 next to a symbol denotes that this symbol refers to the Financial Year after the Following Financial Year;
5. "Current Financial Year" means the financial year at the time when a Pricing Submission is made. This will normally be at the end of the Financial year;
6. "Independent Distributor" means a distribution Licensee other than EEPCo;
7. "Following Financial Year "means the Financial Year after the Current Financial Year;
8. "Forecast Allowed Revenue" means the allowed revenue calculated ex ante using forecast financial data (rather than actual data). that is used in the Price Applications;
9. "Financial Year" means the Ethiopian financial year, from 8, July to 7, July (Hamle 1 to Sene 30 in the Ethiopian calendar);

10. "Licence" means a License for generation, transmission, distribution and sale, export or import that is issued by the Agency;
11. "Licensed Activity" means the activity or activities that the Licensee is Licensed by the Agency to undertake;
12. "Licensee" means a person holding a Licence to undertake electricity operation;
13. "Multiple Licence Holder" means a person holding more than one Licence;
14. "Outturn Actual Revenue" means the audited revenue that is actually collected by the Licensee;
15. "Outturn Allowed Revenue" means the allowed revenue calculated ex post using actual financial data (rather than the forecast data) that is used in price submissions;
16. "Outturn Costs" means costs actually incurred in the previous financial year.
17. "Peak Demand" means the highest level of demand for electricity, averaged over any one-hour period, experienced on a Licensee's network in a Financial Year. In the case of Multiple License Holders the highest level of demand for the purposes of this procedure shall be the sum of the Peak Demands for each of the distribution networks;
18. "Previous Financial Year" means the Financial Year before the Current Financial Year;
19. "Regulatory Asset Base" means the assets that are allowed by the Agency for the purpose of calculating the allowed profits (normally calculated using a rate of return on assets) and depreciation charges. The value of the Regulatory Asset Base may differ from the value of net fixed assets reported in a Licensee's statutory accounts since some assets may have been disallowed by the Agency;
20. "Small Isolated System Licensees" means Licensees that are isolated from the ICS and with a Peak Demand of 500 kVa or less but greater than 100 kVa;
21. "Very Small Isolated System Licensees" means licensees that are isolated from the ICS and with peak demand of 100Kva or less;
22. "Price Submission" means a submission that is annually made by a licensee for a subsequent price review to be made by the Agency;
23. "Price Application" means an application made by a Licensee, when price changes are required to allow revenues to be sufficient to cover operating costs and finance new investment and to demonstrate the cost build up and performance of the existing price to the EEA. A Pricing Application is not related to a change in the structure or design of Pricing;
24. "Price Structure" means the details relating to the Pricing schedule including customer categories, demand and kWh charges, Pricing blocks, lifeline rates, seasonal and time-of-use charges, fixed charges, charges for reactive power, charges for unmetered supplies, charges for supply at different voltages, and other characteristics of the Electricity price;

Full document can be accessed at- <https://chilot.me/wp-content/uploads/2011/04/pricing-procedure-for-small-and-very-small-self-contained-systems-scs-no-2-2005.pdf>

Annex H: Population Connected to the Grid

Population within 2.5 Km (Dark blue, 65 percent) and 25Km (light blue, 96 percent from existing grid)									
Distance from Grid	2017 HH Est	2017 Pct of HH	2017 Cuml. HH	2020 HH Est	2020 Pct of HH	2025 HH Est	2025 Pct of HH	2030 HH Est	2030 Pct of HH
<1Km	8677338	44%	44%	9350481	44%	10516316	45%	11724019	45%
1-2.5Km	3284656	17%	60%	3459962	16%	3735663	16%	3986267	16%
2.5-5Km	3507734	18%	78%	3691820	17%	3977267	17%	4229794	17%
5-10Km	2357113	12%	90%	2472932	12%	2648552	11%	2797772	11%
10-25Km	1272349	6.4%	96%	1335698	6.3%	1431270	6.2%	1511760	6.0%
25-50Km	286203	1.4%	98%	301735	1.4%	325557	1.4%	346376	1.4%
50-100Km	163022	0.8%	98%	174538	0.8%	193080	0.8%	210775	0.8%
100-200Km	141217	0.7%	99%	151416	0.7%	167714	0.7%	183155	0.7%
>200Km	190449	1.0%	100%	204928	1.0%	228510	1.0%	251382	1.0%
	19880083	100%	100%	21143509	100%	23223929	100%	25241301	100%



Annex I: Summary of On-going Mini-Grid Initiatives in the Country (Apart from EEU Diesel Mini-Grids)

Development Partner	Organization	Name of the Project/ Initiative	Stage of Development and Time Frame	Size (Kw installed capacity)	Source of Fuel	Business and Institutional Model	Connections (actual projected)	Location	Cost (US\$)	Capacity Building Description (TA)	Costing TA (\$US)	Further Information
Power Africa	Ethio-Resource Group PLC	Six Wind power micro-grids	Installed and operational: Awaiting distribution and sales license	6 kW (1 kW each)	Wind	Private model	300 households, 20 enterprises, and 1 health clinic	Menz district, Amhara region	\$100,000 grant support through U.S. African Development Foundation, Energy Challenge Award	USAID/ Power Africa assisting them in getting distribution and sales license	—	Six 1-kilowatt wind turbine systems powering six micro-grids
Power Africa	Rensys Engineering and Trading PLC	Solar mini-grid system	Installed and operational: Awaiting distribution and sales license	12 kW	Solar	Private model	198 households, small businesses, and institutions	Deke (Lake Tana), Amhara region	\$100,000 grant support through U.S. African Development Foundation Energy Challenge Award	USAID/ Power Africa assisting them in getting distribution and sales license	—	—
DFID		Green mini-grid Regional Facility	Funding allocated to WB and AfDB	N/A (TA)	Renewables	TA for developing mini-grids	N/A	N/A	c. 1.3 m	Work with GoE and EEU/EEP	c. 1.3 m	
EUD		SE4ALL TAF assignment	Pre-feasibility studies of 3 sites, Q1 2019			TA for developing mini-grids tender documents	Q1 2019	Q1 2019	Q1 2019	MoWI E/EEU		
GIZ/ EnDev		Engrin	Tendered. Finalization late 2019	30	Hydro	Cooperative	252 households projected	Amhara 10.88 3342° 37.16 6393°	124,169	Knowledge transfer + on-the-job training	Tender procedure on-going. TBD	Cost includes 33% grid cost to be paid by the Reg. Govt.

Develo ment Partner	Organiz ation	Name of the Projec t/ Initiati ve	Stage of Develo pment and Time Frame	Size (Kw insta lled capa city)	Source of Fuel	Busine ss and Institut ional Model	Connec tions (actual project ed)	Locati on	Cost (US\$)	Capaci ty Buildin g Descri ption (TA)	Costi ng TA (\$US)	Furthe r Inform ation
GIZ/ EnDev		Abaye	Tender ed. Finalizat ion late 2019	50	Hydro	Cooper ative	420 househ olds project ed	Amhar a 11.23 0909° 36.98 7210°	206,94 8	Knowl edge transfe r + on- the-job trainin g	Tend er proce dure ongoi ng. TBD	Cost include s 33% grid cost to be paid by the Reg. Govt.
GIZ/ EnDev		Timbil	Tender ed. Finalizat ion late 2019	30	Hydro	Cooper ative	327 househ olds project ed	Amhar a 11.02 8972° 36.53 2505°	124,16 9	Knowl edge transfe r + on- the-job trainin g	Tend er proce dure ongoi ng. TBD	Cost include s 33% grid cost to be paid by the Reg. Govt.
GIZ/ EnDev		Idris	Tender ed. Finalizat ion late 2019	30	Hydro	Cooper ative	170 househ olds project ed	Oromi a 9.073 567° 36.85 1200°	124,16 9	Knowl edge transfe r + on- the-job trainin g	Tend er proce dure ongoi ng. TBD	Cost include s 33% grid cost to be paid by the Reg. Govt.
GIZ/ EnDev		Waro	Tender ed. Finalizat ion late 2019	25	Hydro	Cooper ative	220 househ olds project ed	Oromi a 7.529 914° 36.80 7061°	103,47 4	Knowl edge transfe r + on- the-job trainin g	Tend er proce dure ongoi ng. TBD	Cost include s 33% grid cost to be paid by the Reg. Govt.
GIZ/ EnDev		Naso	Tender ed. Finalizat ion late 2019	35	Hydro	Cooper ative	320 househ olds project ed	Oromi a 7.739 350° 36.48 8167°	144,86 3	Knowl edge transfe r + on- the-job trainin g	Tend er proce dure ongoi ng. TBD	Cost include s 33% grid cost to be paid by the Reg. Govt.
GIZ/ EnDev		Gibe	Tender ed. Finalizat ion late 2019	30	Hydro	Cooper ative	256 househ olds project ed	Oromi a 7.620 150° 36.61 8383°	124,16 9	Knowl edge transfe r + on- the-job trainin g	Tend er proce dure ongoi ng. TBD	Cost include s 33% grid cost to be paid by

Development Partner	Organization	Name of the Project/ Initiative	Stage of Development and Time Frame	Size (Kw installed capacity)	Source of Fuel	Business and Institutional Model	Connections (actual projected)	Location	Cost (US\$)	Capacity Building Description (TA)	Costing TA (\$US)	Further Information
												the Reg. Govt.
GIZ/ EnDev		Amek a	Tendered. Finalization late 2019	50	Hydro	Cooperative	435 households projected	SNNPR 7.817 313° 37.75 9877°	206,948	Knowledge transfer + on-the-job training	Tender procedure ongoing. TBD	Cost includes 33% grid cost to be paid by the Reg. Govt.
GIZ/ EnDev		Fuamo	Tendered. Finalization late 2019	52	Hydro	Cooperative	575 households projected	SNNPR 7.764 899° 37.74 4989°	215,226	Knowledge transfer + on-the-job training	Tender procedure ongoing. TBD	Cost includes 33% grid cost to be paid by the Reg. Govt.