



**The World Bank**

Accelerating distributed electricity and lighting in Ethiopia (P171742)

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# Project Information Document (PID)

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Concept Stage | Date Prepared/Updated: 05-Nov-2019 | Report No: PIDC28022

**BASIC INFORMATION****A. Basic Project Data**

Country Ethiopia	Project ID P171742	Parent Project ID (if any)	Project Name Accelerating distributed electricity and lighting in Ethiopia (P171742)
Region AFRICA	Estimated Appraisal Date May 04, 2020	Estimated Board Date Jul 30, 2020	Practice Area (Lead) Energy & Extractives
Financing Instrument Investment Project Financing	Borrower(s) Government of Ethiopia	Implementing Agency Ministry of Water, Irrigation and Energy, Ethiopia Electric Utility	

**Proposed Development Objective(s)**

The development objective is to increase access to electricity and lighting for households, social institutions and enterprises in Ethiopia.

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

Total Project Cost	400.00
Total Financing	400.00
of which IBRD/IDA	400.00
Financing Gap	0.00

**DETAILS****World Bank Group Financing**

International Development Association (IDA)	400.00
IDA Credit	400.00

Environmental and Social Risk Classification

Concept Review Decision



Moderate

Track II-The review did authorize the preparation to continue

Other Decision (as needed)

## B. Introduction and Context

### Country Context

1. **Located in the Horn of Africa, Ethiopia is a populous and diverse country, with significant potential to reap the demographic dividend.** With an estimated population of over 100 million (World Bank, 2018), out of which more than 80 percent live in rural areas, Ethiopia is the second most populous country in Sub-Saharan Africa. Ethiopia is a land of 98 nationalities and peoples, with roughly 93 languages spoken. Ethiopia is undergoing a fast demographic transition with a rapidly rising working-age population that presents both opportunities and challenges.
2. **Ethiopia's economy experienced strong, broad-based growth in the past decade as one of the world's fastest-growing economies.** This period of robust growth of about 10 percent was driven by large-scale public investment in infrastructure and energy, which was made possible by favorable commodity prices and international debt-relief efforts in the mid-2000s. Extreme poverty<sup>1</sup> declined from 55 percent in 2000 to 25 percent in 2018, one of the most impressive poverty reduction results recorded internationally. Primary enrollment rate quadrupled, child mortality rate halved, and the number of people with access to clean water more than doubled. Average life expectancy has increased by about one year annually since 2000 and is now higher than the averages for both Sub-Saharan Africa (SSA) and low-income countries worldwide.
3. **Ethiopia's recent economic success has occurred in a context of modest structural economic transformation and private-sector development.** Massive public infrastructure investment has been at the center of the country's economic strategy. The Government has sustained high levels of public investment which has driven strong growth in agriculture and services. Ethiopia was able to achieve a substantial expansion of energy, road, railway, and telecom infrastructure, financed by domestic and external public borrowing. Nevertheless, there has been relatively slow progress in the development of a vibrant private sector especially in manufacturing and modern services, growing indebtedness including in major state-owned enterprises (SOEs) and persistent inflation. The government is shifting its focus to expand private-sector participation to enhance economic dynamism and leverage financing and technical resources to achieve GTP II social and economic growth targets.
4. **Nevertheless, Ethiopia remains within the 20 poorest countries in the world, with a per capita income of US\$772 (2018).** Vulnerability to return to poverty remains high, especially for those engaged in rural livelihoods depending on rain-fed small-scale agriculture. Access to education has increased, but only 57 percent of children starting first grade will complete ninth grade. Gender disparities are profound, and a combination of cultural norms and socioeconomic inequality greatly increases the risks faced by women. Global Gender Gap report of 2018 ranked Ethiopia 117 out of 149 countries; in terms of economic participation and educational attainment the rank is 111 and 137 respectively

<sup>1</sup> Extreme poverty is measured at the international poverty line of US\$1.9 per day in 2011 purchasing-power-parity terms. 2018 poverty rate based on Macro Poverty Outlook 2018, World Bank.



making the country a laggard on gender equality issues in the region. Addressing inequalities between men and women in term of access to education and decision making, rights, unpaid labor, land and productive resources is essential for economic growth in the country.<sup>2</sup>

**5. Ethiopia aims to achieve lower-middle-income status by 2025, as defined in the Government's Growth and Transformation Program II (GTP II, 2015–2020).** GTP II, which builds on the GTP I, 2010–2015, places strong emphasis on structural transformation, industrialization, urbanization, and export promotion. The energy sector is a pivotal driver to achieving Ethiopia's GTP II targets, and universal electrification is at the core of its 2025 poverty reduction and development agenda. Adequate, affordable, and reliable access to electricity is vital to enable a structural transformation of Ethiopia's economy and society, including aspirations around domestic manufacturing capacity adequate for local needs and exports, industrial parks, entrepreneurship, information and communication technology (ICT), and financial sectors.

#### Sectoral and Institutional Context

**6. Ethiopia's power sector is underpinned by a broad policy, legal, and strategic framework, and structured by the National Energy Policy (2013; up-dated in 2019).** The Ministry of Water, Irrigation and Energy (MoWIE) oversees, plans, coordinates and monitors overall energy development. It is also responsible for capacity building in the sector, research, development and dissemination of knowledge on renewable energy technologies and improved energy technologies. In 2013 (through Council of Ministers Proclamation No.302/2013), the vertically integrated utility, Ethiopian Electric Power Corporation (EEPCo), was unbundled into two public enterprises: (a) the Ethiopian Electric Power (EEP) Company, responsible for the generation and transmission sub-sectors; and (b) the Ethiopian Electric Utility (EEU), responsible for power distribution, sales, and customer services. The GoE also established a regulatory agency Ethiopian Energy Authority (EEA), responsible for developing effective rules, directives, and standards for sector.

**7. Ethiopia's energy sector has witnessed a significant transformation through the implementation of an ambitious reform program implemented by the Government of Ethiopia (GoE) to enhance efficiency and performance in the sector.** Some of the key pillars of this sector reform program include (i) a new legal framework that included unbundling of EEPCo followed by business restructuring of the utilities EEU and EEP and re-defining the role and mandate of the regulator EEA; (ii) the creation of a state-of-the-art legal and regulatory framework for Public-Private Partnerships (PPPs), overseen by the MOF, to promote private-sector investment, and the development of a strong pipeline of PPP transactions in the power sector; and (iii) a comprehensive program for the financial restructuring of the sector to free up resources for investment in service enhancement. Consequently, Ethiopia has witnessed significant improvement in the sector regulatory environment. According to Regulatory Indicators for Sustainable Energy, Ethiopia's overall score for regulatory environment improved from 29 points to 48 points in 2017. Regulatory framework specifically for electricity access also improved from 49 points to 79 points for the same period.

**8. The sector's transformation has been accompanied by outstanding achievements across the energy value chain.** Generation capacity has quadrupled in the last decade from around 1,100 MW in 2009 to 4,500 MW in early 2019, the third highest available generation capacity in Sub-Saharan Africa. The electricity sector can also become a major driver of the wider regional integration agenda, placing Ethiopia as the regional power hub under the East Africa

<sup>2</sup> World Bank (2008) estimates indicate that reducing basic gender inequalities in education and the labor market could increase the annual GDP growth in Ethiopia by around 1.9 percentage points – which would be an important contribution to poverty reduction given the elasticity of growth to poverty reduction.



Power Pool umbrella. Based on the Government's plans, by 2025, Ethiopia could export nearly 1,000 MW of power, generating over US\$ 500 million in export revenue. The GoE is also advancing efforts to diversify its energy mix with wind, solar, and geothermal sources to complement the large base of hydro resources development and mitigate the risk of overreliance on hydropower and vulnerability to fluctuations in rainfall. Substantial investments of grid expansion have led to the extension of the MV network to about 60 percent of towns and villages in the country. In 2005, the GoE launched the Universal Electricity Access Program (UEAP) to provide grid-based electrification to rural towns and villages. This program was implemented by EEP until January 2016, when it moved to EEU. Between 2005 and 2015, electricity grid was spread to about 6,000 towns and villages from the initial 667. UEAP ranks among the most successful grid electrification programs in Africa with extension of the MV grid network to about 60 percent of towns and villages in the country. As a result, 80 percent of the population lives in close vicinity to the medium voltage network.

**9. Ethiopia has committed to universal electrification by 2025 and adopted a national electrification program.** In spite of the great success achieved by UEAP in connecting towns and villages, across the country, last mile-connections did not keep pace with network expansion. The electrification rate remained low in 2015, at around 20 percent. In 2017, the Government launched the National Electrification Program (NEP), expanding its electrification approach from infrastructure development to service delivery. The NEP presents the platform for an integrated approach, building on UEAP's achievements on grid expansion, placing greater focus on last-mile electrification (grid and off-grid connectivity) for households, institutional users, and business and industrial activities. The Bank is supporting the implementation of grid roll-out program of the NEP through the Ethiopia Electrification Project (ELEAP, P160395) since 2018. The program is financing over 1 million grid connections, with EEU as the key implementing agency. ELEAP presents the first phase of NEP grid roll-out (densification) and targets last-mile connections to households that are near the existing network infrastructure of the EEU. These connections mostly require short low voltage (LV) expansion, service drops, and meters. The second phase of the NEP grid roll-out will target connecting new customers who are not proximate to the existing grid. These connections will require both medium voltage (MV) and LV extensions (as well as possible reinforcement of the transmission network and energy generation). Detailed network design for grid expansion will be informed by the comprehensive geospatial least-cost rollout plan.

**10. The GoE has achieved impressive results in densification during the first years of NEP's implementation.** Currently 44 percent of the population has access to electricity energy, where 33 percent is provided through grid connections, and 11 percent through off grid solutions. The program has achieved impressive results in access to electricity within early 150,000 additional households connected to the grid. Institutional capacity has improved through having put in place key planning systems, allocation of budget across the key functions in the utility and the creation of dedicated teams and an M&E framework at both the ministry and utility level. A flagship gender and citizen engagement 5-year program has been developed and is in implementation under EEU's leadership. Earlier identified bottlenecks with regards to operational health and safety were also significantly improved through the program putting the utility in an adequate position to further deliver on the grid connection program.

**11. Nonetheless, Ethiopia's electricity access deficit still remains one of the largest in the world.** In 2017, approximately 58 million Ethiopian did not have access to electricity. This represents approximately 7 percent of SSA's total electricity access deficit and is the third largest in SSA after Nigeria and Democratic Republic of Congo. Therefore, Ethiopia's progress on electrification significantly contributes to the attainment of global effort for universal access to modern energy services – as stipulated under Sustainable Development Goal 7.

**12. While Ethiopia's electrification efforts have largely focused on grid densification and expanding access in urban and peri-urban areas, the greatest access deficits are found in rural and deep-rural areas.** About 96 percent of urban



households are connected to the grid (99.9 percent in Addis Ababa), while only 27 percent of rural households have access to electricity services. The highest deficits are experienced in deep-rural areas, where 5 percent of people have access to electricity; followed by rural areas, with 5 to 10 percent of access; and the peri-urban areas, where 20 percent of people have access. The geo-spatial analysis conducted for the country identifies the least-cost technology solution by location and over time, indicating the progressive extension of the grid footprint and simultaneously the pockets for off-grid as follows: (i) Short-term pre-electrification solution for 3.3 million households, for which the grid, the least-cost option, will not become available during the years of the grid program by 2025; (ii) Mid-term pre-electrification for about 5 million target beneficiaries residing between 2.5–25 km away from the existing grid and expected to be connected to the grid by 2030; and (iii) Long-term off-grid/deep rural solution for about 1 million households. Based on this, off-grid solutions are preliminarily expected to provide services to 35 percent of the population, while acknowledging possible short-term electrification solutions for those households and communities waiting to get a grid connection by 2025, for a total of 9 million connections. The NEP 2.0 also contains an embedded commitment and strategy on closing gender gaps on off-grid value chains related to women entrepreneurs, jobs and consumers.

**13. Despite strong demand for off-grid solutions and an active market in Ethiopia, a set of long-standing challenges have prevented the supply of solutions in rural and deep-rural areas.** Mini-grid experience in Ethiopia is limited to 31 EEU-operated diesel mini-grids in the Somali region and a few donor-funded hydroelectric mini-grids run by cooperatives. Through World Bank financed credit lines at the Development Bank of Ethiopia (DBE), approximately 72 thousand solar home systems and 1.2 million Lighting Global certified solar lanterns have been distributed to the Ethiopian population. With close to 10 active companies and more than 490,000 products sold in 2018, Ethiopia is considered an active market<sup>3</sup>. Still the market remains behind its potential and has not yet scaled. Companies have not been able to penetrate rural and deep rural areas, and a market for larger systems is underdeveloped due to a number of barriers: (i) lack of efficient physical, digital, and financial infrastructure (roads, network, bank and microfinance branches and agents, mobile money) and distribution channels (markets) to deliver off-grid and mini-grid solutions to the most remote, underserved areas; (ii) lack of enabling regulatory frameworks for the development of off-grid solutions, affecting both mini-grids and Pay as You Go (PAYGo) business models that have successfully scaled-up Solar Home Systems in East Africa; (iii) licensing and investments restrictions limiting the playing field for private sector enterprises in the delivery of off-grid energy services; (iv) intermittent supply of products due to lacking access to FOREX for importation; (v) absence of digital payments (mobile money) credit mechanisms to enable affordability for rural and deep-rural consumers; and (vi) institutional capacity constraints at the utility and ministry level in planning for access expansion specially in these challenging areas, and lack of technical and institutional capacity on off-grid solutions (technology, regulations, business models). As a result, local companies struggle with sufficient access to finance; current regulation restrict international companies that have demonstrated rapid scale in other markets from entering the Ethiopian market; and productive use of electricity solutions such as water pumping, and irrigation have not yet found inroads into the market. Nevertheless, the large number of off-grid solar products that have already penetrated the Ethiopian market even in these sub-optimal conditions, is an indication of a very large potential for a rapid penetration scale-up once these constraints are removed or mitigated.

**14. The GoE recently launched NEP 2.0, an updated full-fledged off-grid program to reach over 35 percent of the population by 2025 through public and private efforts, leveraging technical and analytical inputs recently made available.** NEP 2.0 operationalized the Multi-Tier Framework-MTF- survey for the first time, with a customer centric approach to access and identification of most appropriate technology solutions, in space and time, based on electricity needs (demand) in combination with GIS tools. This allowed the program to tailor optimal (least-cost) technology choices by geographic location, while ensuring timely access provision and priority to disadvantaged

<sup>3</sup> GOGLA (2019): Global Off-Grid Solar Market Report H2 2018



groups and social institutions. The NEP 2.0 also introduces the concept the minimum subsidy tender (MST), which uses competitive bidding process to support private sector enterprises that can cost-effectively provide off-grid electricity services.

**15. The GoE has requested financial and technical support from the World Bank to enable the rollout of the off-grid electrification program.** The proposed operation – Accelerating Distributed Electrification and Lighting in Ethiopia (ADELE, P171742) – supports the GoE recently launched NEP updated off-grid electrification program through public and private efforts. The off-grid program identifies the investment requirements as well as the main barriers for off-grid solutions scale-up and provides a comprehensive account of priority technical assistance and capacity building activities for the effectiveness and efficiency of the program. It also contains a set of interventions to engage women in service delivery e.g. focusing on financing and business skill gaps of female enterprises and upskilling programs for solar engineers and at the beneficiary level by e.g. investigation affordability constraints and product preferences of women versus men. Alongside the grid densification and intensification program financed by ELEAP, ADELE complements the existing efforts by financing the off-grid program of NEP and establishing a framework for off-grid electrification focusing 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 that are designed to handle grid-level loads, as well as a coordinated combination of these technology solutions. The off-grid program is technology neutral, reflecting the needs (demand) of the population, and economic and administrative centers, as well as social institutions on the ground. The implementation framework and operational design is informed by experiences of the pilot program launched in ELEAP, best practices and established international experiences as well as recent off-grid innovations that have taken place in SSA and globally. The overall financing requirements of NEP amounts US\$6 billion (US\$3.2 billion for grid, US\$2.5 for off-grid and US\$0.5 billion for technical assistance component). For the off-grid component, the Government contribution is estimated to be of about 40 percent—US\$1 billion—and the remaining—US\$1.5 billion—for syndication through development partners<sup>4</sup> and private sector resources.

#### Relationship to CPF

**16. The proposed operation is consistent with Ethiopia's Country Partnership Framework (CPF) 2018-2022 and supports the World Bank's twin goals of poverty reduction and shared prosperity.** The proposed operation is directly linked to achieving Objective 1.2. Increased access to reliable energy supply, under Focus Area 1 of the CPF: Promote Structural and Economic Transformation Through Increased Productivity. The CPF explicitly includes a target to increase electricity access rate (including both on-grid and off-grid) to 50 percent by 2021.

**17. The operation also supports the government's transformation and energy goals under GTP II by taking actions to achieve universal access to energy through improved service delivery and the rollout of an off-grid electrification program.** The energy sector is a pivotal driver to achieving Ethiopia's GTP II targets, and universal electrification (connectivity) is at the core of its 2025 poverty reduction and development agenda. Adequate, affordable, and reliable access to electricity is vital to enable a structural transformation of Ethiopia's economy and society, including aspirations around domestic manufacturing capacity adequate for local needs and exports, industrial parks, entrepreneurship, information and communication technology (ICT), and financial sectors. Universal access to energy is at the center of the socioeconomic development agenda, aiming to close the access deficits between urban and rural areas, electrify institutional users (such as health and education centers) and power productive opportunities for business, commercial, and industrial users. The project will also contribute towards transformations that the GoE envisioned to achieve on gender equality in GTP II. These include increasing women's benefit from micro and small

<sup>4</sup> Contribution to be confirmed during appraisal.



enterprises, increasing women's decision-making role, women benefited from vocational adult education program, participation and benefits for women in improving crop productivity and improving maternal health.

**18. The proposed operation presents a platform to attract private solutions to expand access.** The off-grid electrification program under NEP 2.0 calls for combined private and public efforts to deliver around 9 million off-grid connections by 2025 with an estimate investment requirement of US\$6 billion. In that sense, the public sector alone will not be able to deliver solutions at the pace and scale required to achieve universal access by 2025 and leveraging private participation in off-grid energy delivery is crucial to achieve the results at the pace and scale required. The proposed operation entails engaging upstream in a policy dialogue with sector agencies to promote the creation of an enabling environment to bring in private sector capital and sustainable financing structures, to augment technical knowhow, and to help improve the speed and reach of energy service delivery to households, economic centers, and social institutions (health and education centers).

**19. The proposed operation will support delivery of energy services with potential to enable productive use in peri-urban, rural, and deep-rural areas.** The delivery of energy services through off-grid solutions can support productive and income-generating activities in agriculture (i.e. irrigation, and processing) and commercial sectors, improving the livelihoods of fragile and vulnerable communities.

**20. The proposed operation will support GoE's endeavor to scale renewable-based electricity service.** Ethiopia currently sources all of its grid electricity from renewable sources, largely from hydroelectric power. Through its Climate Resilient Green Economy (CRGE) Strategy and Nationally Determined Contribution to the United Nations, GoE is committed to further scale investment in renewable energy to expanding electricity access in the country and beyond. The proposed operation will primarily support solar-based electrification, which contributes to Ethiopia's ambition for fully renewable-based electricity services.

### C. Proposed Development Objective(s)

The development objective is to increase access to electricity for households, social institutions and enterprises in Ethiopia.

#### Key Results

21. The following are the key preliminary PDO indicators, which will also be gender disaggregated:

- a. Number of people provided with access to electricity through mini grid and off-grid solutions;
- b. Number of enterprises (farmers, business, commercial, industrial users) provided with access to electricity through mini grid and off-grid electricity solutions;
- c. Number of institutional users (schools, health centers, government buildings) provided with access to electricity through mini grid and off-grid electricity solutions;

**D. Concept Description**

- 22. The proposed project implements Ethiopia's National electrification Program (NEP) Implementation Roadmap (IRM) and updated off-grid electrification program (NEP 2.0).** The proposed project supports Ethiopia's plan to achieve universal access to energy by 2025 by a combination of grid and off-grid electrification (65 percent through grid, and 35 percent through off-grid, including pre-electrification connections<sup>5</sup>). The Government has identified, through the NEP 2.0, that 9 million off-grid connections are required to achieve coverage of 35 percent of the population through off-grid.
- 23. The proposed project will increase access to electricity for households, commercial, and industrial users, and social institutions in the peri-urban, rural and deep-rural areas through off-grid solutions leveraging public and private delivery modalities.** The project has also focused areas of intervention on gender and citizen engagement to ensure women get access to quality, reliable and affordable off-grid household energy and public lighting to reduce energy poverty and give women and men additional income-earning opportunities.
- 24. The design of the proposed project is underpinned by a number of analytic assessments and technical assistance supported by ESMAP and the Public-Private Infrastructure Advisory Facility (PPIAF).** First, establishment of a GIS-based off-grid tracking system for monitoring of off-grid electrification. This will be informed by experiences, inside Ethiopia and abroad, in establishing tracking capacity for off-grid electrification (DBE, Ci-Dev, others). This support is key in enabling MoWIE to track and monitor progress of key performance indicators for efficiency, effectiveness, and progress against the off-grid electrification program targets and for course adjustments as and when necessary. Second, establishment of an institutional and regulatory framework for mini-grids including capacity building and implementation support in key sector institutions. This includes support to EEA to develop a policy and regulatory framework for mini-grids (among others, establishment of technical standards for mini-grids, establishment of licensing rules and procedures, tariff setting, and overall conditions for the participation of private sector investors, etc.) as well as design and setup of adequate institutional framework for mini-grids under EEU, including potentially the creation of dedicated teams, informed by results on the business models' analysis. Third, creation of a sound enabling environment for private sector participation in off-grid electrification, especially providing technical assistance to the GoE to attract private sector innovation, investment, and participation in the off-grid electrification program with emphasis on working on mobile payments and access to finance solutions. Fourth, development of gender equality strategy for off-grid sector at the enterprise and customer level. These analytical assessments and technical assistance will be provided alongside project preparation in order to adequately inform the operation and assist the sector institutions in implementation readiness of the proposed components.
- 25. The project is envisioned to have four main components:** (1) Solar home systems for households (HHs), small-holder farmers and small businesses leveraging the private sector; (2) Solar mini grids for rural economic development; (3) Standalone solar systems for social institutions (particularly schools and health centers); and (4) Capacity building, technical assistance and implementation support.
- 26. The project will include a comprehensive strategy focused on enhancing gender equality in the off-grid sector at the enterprise, employee and customer level.** Recognizing the main challenges affecting women's participation in the sector, the following dimensions have been identified as needing support for the successful implementation of universal electrification. Key issues covered include:

<sup>5</sup> Communities for which the grid still represents the optimal solution but would not be reached within the next 5-10 years.



- Women entrepreneurs often lack information about access to finance options in the country. In addition, development of enterprises requires technical assistance support tailored to women's needs. Partnering with networks such as the Ethiopian Chamber of Commerce, Alliance of Women Enterprise Program (AWEP) and Association of Women in Business (AWiB) is key to creating awareness about the credit line among women entrepreneurs. At the institutional level, focus will be given to assessing credit worthiness of women entrepreneurs within the overall scale-up of access to finance procedures and requirements. Potential solutions proposed could include creating a "priority window" for women entrepreneurs to reduce loan processing times and requirements.
- Financial services—not only accounts, but payments, savings, and credit—give women some basic tools they need to enhance their livelihoods and economic status. Under the current ecosystem, bank accounts are key to ensure payments for off-grid solar, and strategies need to be developed to ensure women's participation to the financial sector and solar market. The use of digital payments can further reduce access barriers for women. Options will be outlined so that the women's segment is not left behind in access to off-grid technologies and benefits such as e.g. health outcomes, time savings and productivity gains.
- Job creation and livelihood opportunities will be mapped out in the last-mile delivery of the products in rural areas as part of local job creation and skills development. For instance, having women sales agents and local suppliers will create opportunities for women buyers to feel more comfortable interacting with them.

### **Component 1: Solar home systems for households (HHs), small-holder farmers and small businesses**

**27. This component will address constraints to accelerating growth of the off-grid solar market and leverage mechanisms that will be put in place to ease the access to foreign currency, access to finance for households and businesses, strengthen financial infrastructure, improve affordability of solar electricity services, and encourage productive use of electricity.** The component will support off-grid solar (OGS) companies that can credibly demonstrate a capacity to sell or provide services with Lighting Global quality approved products or productive use equipment of adequate quality, commit to honor warranties for end consumers, and demonstrate how funds have translated to new customer connections. This component will also be designed to strengthen access to financial service access points and financial infrastructure, a goal identified by the government in NEP2.0. This means working with payment and financial service providers, whether banks, MFIs, or non-bank financial actors, to give current and future electricity users access to financial services, including digital payments and mobile money.

**28. Sub-Component 1.1: Access to Finance to Increase off-grid solar penetration in Ethiopia.** Limited access to finance (especially in foreign currency) has restricted OGS companies from upscaling the off-grid market and importing more systems into Ethiopia. The credit facility will provide both (a) foreign exchange loans for purchase of hardware inventory (equipment, supplies) into the market, and (b) local currency loans for the financing of operating costs, including consumer financing. Organizations eligible to access this credit facility will be private sector enterprises (specially to promote PAYGo), MFIs, and SACCOs, which all provide a form of consumer finance that helps users access overcome affordability constraints in accessing off-grid solar products, including larger solar home systems. This sub-component will build on the previous success of the FOREX and local currency credit line for off-grid solar products under the previous Bank's ENREP project, currently managed by the Development Bank of Ethiopia (DBE) on behalf of MoWIE. The new facility will incorporate lessons from the ENREP project and will be managed by a competent financial institution (to be selected in the preparation stage), complying with the Bank's OP10 to ensure that the interest rate is commercially oriented and not subject to non-commercial pressures, and to ensure that the financing framework for the project fits in the larger financial market context without creating distortions.



29. **Sub-Component 1.2: Incentivizing Market Expansion and Innovation.** This sub-component will set up a Results-based financing (RBF) facility, which will offer competitively awarded incentives to off-grid solar companies to accelerate off-grid solar expansion in Ethiopia, with a particular focus on deep rural areas. The RBF payments will partially offset the initial costs and risks associated with off-grid solar companies expanding their operations and setting up their sales and service infrastructure in new regions, thereby incentivizing the private sector to serve more rural and underserved areas. A percentage cap will be set within each woreda so that multiple companies will have the opportunity to operate within the space. RBF will specify installment payments based on the achievement of pre-agreed connection milestones and satisfactory after-sales service support. The amount of the incentive will vary per lot and system size, granting higher incentives to those companies that enter deeper rural areas. In the first year of the operation, this traditional form of RBF may be complemented with a challenge RBF, which could provide larger incentives for innovation in technologies and business model, with a particular focus on (i) increasing affordability for poor rural households, (ii) supporting growth of smaller local or new companies, and (iii) promoting off-grid solution for agriculture and other productive use. The supply side RBF may be complemented by a pilot for a demand-side RBF, which will provide support to the poorest households that would otherwise be unable to afford the off-grid solar service, e.g. in the form of a voucher, which could be administered through social safety net channels. The feasibility of challenge and demand-side RBF schemes will be further determined during project preparation.

**Component 2: Solar mini grids for rural economic development**

30. **The component will finance the roll-out of mini-grids with local LV networks and powered by appropriate renewable energy resources (solar photovoltaic in combination with battery or diesel), implemented through a combination of public and private sector led approaches based on a pipeline of pre-identified sites leveraging geospatial planning.** Sites will be prioritized according to a set of economic parameters, including total population, population density, local demand profile (number of schools, health centers, households, SMEs) and potential for productive uses, such as agricultural and industrial demand centers. Interventions will also focus on how to close productivity gaps between male and female businesses owners and farmers e.g. business skills training, access to finance, enhancing access to markets and technology adoption for productive activities and to enhance reduction in time poverty and drudgery. An initial market screening under the NEP 2.0 has demonstrated potential for the rollout of approximately 300 mini grids implemented by the EEU, as well as technical potential for approximately 1,150 implemented by the private sector or cooperatives. As part of project preparation, a detailed analysis will be carried out to determine the best business models for the rollout of portfolios of mini grids.

31. **This component will also support the opportunities to bundle mini-grid electrification with efficient appliances for households and for additional income-generating activities (productive uses) in newly electrified communities.** As part of this effort, consideration will be given to the provision of consumer credit through credible financial intermediaries for the purchase of alternating current (AC)-based productive and domestic appliances. In addition, the component will support a program of early community engagement and training to ensure timely uptake and sustained demand for the electricity to be made available through the mini grids. Finally, the proposed component may incorporate investments to hybridize existing diesel-based mini grids (approx. 37), with a particular focus on those operating in the Somali region of the country. Experiences from other countries in electrifying households and enterprises will be considered and tailored to Ethiopian context.

**Component 3: Standalone solar systems for social institutions (particularly schools and health centers)**

32. **This component will finance provision of off-grid energy solutions for institutional users identified under the NEP 2.0 through geospatial mapping.** These institutional users include schools (primary and secondary), health



centers (health post, health centers and hospitals), as well as other public institutions. The institutions will be powered by a combination of solar photovoltaic and batteries.

**33. The long-term sustainability of the installed systems will be enhanced through a combination of long-term operation and maintenance (O&M) contracts, remote service monitoring systems, and local capacity building for basic maintenance.** In addition, to ensure ownership and accountability by the institutions, there will be a cost-sharing mechanism between the project, central authorities, and local authorities. During project preparation, the team will perform a demand assessment of the energy needs of selected beneficiary institutions to identify the service level requirements, ideal technology solutions, and delivery models that focus on sustained operations and maintenance, beyond procurement of assets.

#### **Component 4: Capacity building, technical assistance and implementation support**

34. This component will finance various technical assistance, capacity building and implementation support activities to ensure EEU, MoWIE, EEA, the local private sector, mobile network operators and financial institutions, and other sector stakeholders have adequate technical, planning, and operational capacity to implement the off-grid electrification program. Activities under this component will be closely coordinated with existing donor initiatives in the off-grid space.

**35. Project Cost and Financing:** The total project cost is estimated at US\$400 million. An indicative breakdown by component is provided in the table below.

Components	Amount (in US\$ million)
Component 1: Solar home systems for households (HHs), small-holder farmers and small businesses	TBD
Component 2: Solar mini grids for rural economic development	TBD
Component 3: Standalone solar systems for social institutions (particularly schools and health centers)	TBD
Component 4: Capacity building, technical assistance and implementation support	TBD
<b>Total</b>	<b>400</b>

**36. Choice of Instrument:** The proposed operation will be prepared as an Investment Project Financing (IPF)-Instrument selected due to (i) limited capacity and experience of the implementing entity on off-grid electrification that will require close supervision during project implementation; and (ii) country fiduciary and safeguards systems that require further assistance and support. Given the relatively low capacity and inexperience of the sector institutions in implementing an off-grid electrification program, reliance on country systems, like in a Program-for-results instrument, is not advisable. However, during project preparation, the team will assess suitability of including disbursement-linked indicators for activities using results-based financing.



Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No
Summary of Screening of Environmental and Social Risks and Impacts	

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**APPROVAL**

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**Approved By**

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