### PROJECT INFORMATION DOCUMENT (PID)
#### APPRAISAL STAGE

<table>
<thead>
<tr>
<th><strong>Project Name</strong></th>
<th>Additional Financing for Energy Access Project</th>
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<tbody>
<tr>
<td><strong>Region</strong></td>
<td>AFRICA</td>
</tr>
<tr>
<td><strong>Sector</strong></td>
<td>Power (80%); District heating and energy efficiency services (20%)</td>
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<tr>
<td><strong>Project ID</strong></td>
<td>P120172</td>
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<tr>
<td><strong>Borrower</strong></td>
<td>FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA</td>
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<tr>
<td><strong>Implementing Agency</strong></td>
<td>Ethiopia Electric Power Corporation (EEPCo) and Ministry of Mines and Energy (MME)</td>
</tr>
<tr>
<td><strong>Environment Category</strong></td>
<td>[ ] A [X] B [ ] C [ ] FI [ ] TBD (to be determined)</td>
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<tr>
<td><strong>Date PID Prepared</strong></td>
<td>March 3, 2010</td>
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<td><strong>Date of Appraisal Authorization</strong></td>
<td>March 22, 2010</td>
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<td><strong>Date of Board Approval</strong></td>
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1. **Country and Sector Background**

**Country & Sector Perspective:** Ethiopia has a population of about 79 million and is the second most populous country in Sub-Saharan Africa in terms of population. Its per capita GDP was about US$ 450 at the end of FY 2009. For the last several consecutive years the country experienced double digit growth rate in its economy. This high growth rate caused the country to face several constraints and the most difficult of these were the inability of the electricity sector to meet the electricity demand of the country – resorting to severe load shedding as the fallback option. Even after this significant growth in electricity demand in Ethiopia, the per-capita energy consumption was about 41kWh/year in FY 2009. To maintain a reasonable quality of life, average minimum energy consumption would be about 500kWh/year.

The Government of Ethiopia’s Plan for Accelerated and Sustained Development to End Poverty (PASDEP) is aimed towards achieving the Millennium Development Goals (MDGs) and centered around eight priority themes: (i) commercialization of agriculture and promoting much more rapid non-farm private sector growth; (ii) geographical differentiation; (iii) population; (iv) gender; (v) infrastructure – especially roads, energy and irrigation; (vi) risk management and vulnerability; (vii) scaling up service delivery to reach the MDGs; and (viii) employment. Cutting across these themes is an important emphasis on good governance, with plans to strengthen the civil service, accelerate local employment, and increase transparency and accountability. GOE is now updating its PASDEP for the second term and the development of energy sector will be given its due priority in this revised planning document.

Ethiopia is known to be blessed with huge renewable energy resources. Its hydro power potential is expected to be about 30,000 MW with only about 1,500 MW being tapped and another about 2,300 MW under construction. It is expected to have about 5,000 MW of geothermal potential with only 7.3 MW being tapped. Ethiopia is also known to have good wind and solar energy resources, with a small portion of it being tapped, a 120 MW Wind Farm is under construction.
Given the above resources, Ethiopia has the potential to become the power house of Eastern African Power Pool (EAPP). Given the relatively high energy generation cost of other EAPP member countries, Ethiopia could reap the benefit of its renewable energy resources if it strategically implements its power sector development program. The development of hydro resources and interconnection with Kenya are key investments for the development of a vibrant East Africa Power Market. The interconnection with Sudan and Djibouti are under construction.

Sector Background: Ethiopia Energy Sector is governed by the Ministry of Mines and Energy (MME). The Ethiopian Electric and Power Corporation (EEPCo) is a vertically integrated power utility, owned by the Government of Ethiopia (GOE), and is responsible for overall Ethiopia’s grid based electricity generation, transmission and distribution. EEPCo also serves some off-grid areas using diesel generators. The Ethiopia Renewable Energy Development and Promotion Center (EREDPC), working under the MME, promotes renewable energy resources through the private sector, cooperatives and for institutions like public school and health posts. The Ethiopia Energy Authority (EEA) acts as the regulator of the sector. The EEA reviews tariff application of EEPCo along with implementing policies to ensure energy efficiency and demand side management.

EEPCo has a total of about 1,500 MW of installed capacity. About 99% of EEPCo’s electricity is generated from hydro electric power plants and only about 1% is generated from diesel or HFO fired plants. Starting from FY 2008 the installed power plants of EEPCo were not able to meet the growing electricity demand of Ethiopia and EEPCo had to resort to load shedding. EEPCo rented 60 MW of diesel power plants to reduce the load shedding in FY 2008 and has been operating 30 MW of its own thermal generator. While generation from hydro plants in FY 2008 and FY 2009 remained at almost FY 2007 level of about 3,300 GWh, generation from diesel plants increased from 40 GWh in FY 2007 to about 418 GWh in FY 2009. The cost implication was significant since the diesel generation was about 20 US cents per kWh or more. However, with the commissioning of Tekeze (300 MW) in November 2009 and Gilgel Gibe II (420 MW) in January 2010, the supply situation improved significantly. EEPCo is also hoping to commission a third power plant – Beles (460 MW) in April 2010.

At present EEPCo has three hydro power plants under construction. These are, i) Beles 460 MW, ii) Gibe III 1,870 MW and (iii) Amerti Neshi 97 MW. In addition to these three hydro power plants, EEPCo is also constructing a 120 MW wind power plant in Ashegoda. EEPCo has an ambitious electricity generation expansion program and is actively looking for financing support to implement this program.

In addition to the electricity generation projects, EEPCo is constructing Transmission interconnection with Sudan and Djibouti. It has signed Power Purchase Agreement with these countries and is expecting to start exporting electricity from July 2010. Transmission interconnection with Kenya is at feasibility study stage.

2. Objectives

The proposed Additional Financing aims at scaling-up certain components of the original project and does not change the Project Development Objective of the original project. The Project
Development Objectives are: (i) expanding the populations’ access to electricity and improving the quality and adequacy of electricity supply; (ii) improving energy end-use efficiency, (iii) developing renewable energy resources; and (iv) strengthening institutional capacity.

3. Rationale for Bank Involvement

Support Economic Growth: The primary rationale for IDA to provide this additional financing project is to continue its assistance to an important sector in Ethiopia which has the potential for economic growth through increased electrification. The Government of Ethiopia attaches high priority to the provision of adequate and cost effective electricity supply and rapidly scaling up electricity coverage and access for all its citizens. The aims are to support economic growth nationally, enabling the MDGs, and address the basic energy needs of the poor to improve their quality of life. EEPCo, the implementing agency of this project, is responsible for the planning and implementation of the Universal Electricity Access Program (UEAP), an aggressive grid network extension program – that seeks to rapidly increase coverage of towns to meet the Government’s target of 50% town coverage by 2010 and universal town coverage of 100% by 2015. This rapid push for "expansion" of the grid is a result of the huge backlog that built up because of historically low investments in the sector.

4. Description

Expand Electricity Access: In respect to end-user access– by 2009 year end, EEPCo had about 1.8 million customers, which translates to about 12% - 13% access. In addition, EEPCo has been steadily ramping up its implementation capacity: starting from around 29,000 connections in 2002, to about 100,000/year by 2005, and in 2008 about 300,000 connections were achieved. Looking ahead to the next national state period (2011-2015), EEPCo is planning for further and significant acceleration of the MV and LV grid rollout to increase access to households, enterprises, priority social and administrative facilities, etc. Under the proposed project, EEPCo is planning to connect more than a million consumers in three years. This implies that EEPCo will maintain or even enhance the annual connection rate of ~300,000 achieved in 2008.

Intensification in Connected areas: Electricity penetration to households in connected towns currently ranges from 10% to 30%. Hence increasing the level of electrification in connected areas is a Government priority. Previously, connecting consumers in an electrified town was considered as an operational activity and was only supported by EEPCo’s operational budget. Hence, this activity didn’t receive the required attention that was needed to increase the access rate. Under this Additional Financing Project, in addition to supporting the further extension of the electrical network, EEPCo will be supported in its effort to connect about 350,000 consumers each year.

Increased Reliability and Capacity of Urban Networks: The original Energy Access project targeted support for renovation of several major cities of Ethiopia as those were in a severe state of disrepair and needed urgent attention. Unfortunately, the fund allocated for the Urban Distribution and Load Dispatch could only support renovation of the Addis Ababa city and an associated Load Dispatch center. Other major towns had to be left out due to funding constraints. Over the last eight years, the electricity demand in those cities has increased
significantly and the existing overloaded distribution networks have become increasingly unreliable and require immediate attention. Under the proposed additional financing, the investment and feasibility studies carried out earlier will be updated and the renovation of the network in these cities will be supported. Besides increasing reliability, this intervention will serve to enhance the network capacity, thus enabling additional new connections. By serving new commercial and industrial loads and boosting private and public sector activities, the enhanced supply of power will contribute to equitable growth around the entire country.

Energy Conservation and Energy Efficiency: The Government of Ethiopia carried out an aggressive campaign for energy conservation and energy efficiency in 2009 as it faced severe shortages of supply due to commissioning delays of three large hydropower plants (300 MW, 420 MW and 460 MW). The Energy Access project provided technical assistance to EEPCo for implementing a demand-side-management scheme to introduce about 5 million compact fluorescent lamps (CFLs) in exchange for incandescent lamps. The investment cost of the CFLs was financed under the Bank financed ongoing Electricity Access and Rural Expansion Project. As a result, about 80 MW of load was reduced at peak hours. Now Ethiopia has commissioned two power plants with total installed capacity of 720 MW, almost doubling its previous generation capacity. The third plant is expected to be commissioned before June 2010. The Government however intends to continue the successful energy efficiency scheme and further expand its scope. As a plan to move forward, EEPCo wants all its new consumers to meet their lighting needs from CFLs. EEPCo is now planning to replace all incandescent, fluorescent, mercury and sodium lamps (urban street lamps) with energy saving lamps. The expanded urban distribution and rural electrification components of this project would therefore support this energy efficiency and conservation initiative of the government through the proposed additional financing.

Diversification of Generation Resources: Until FY2009 EEPCo’s total installed capacity was about 850 MW, of which more than 90% was hydropower. In FY 2010, EEPCo targeted to commission three hydropower plants with total generation capacity of 1,180 MW, two of which have been recently commissioned (Tekeze Hydropower Plant (300 MW) commissioned on November 14, 2009 and Gilgel Gibe II Hydropower Plant (420 MW) commissioned on January 13, 2010). Other power plants under construction are predominantly hydro based as well with only one wind based power plant of 120 MW in the pipeline. Thus Ethiopia’s energy generation capacity is highly dependent on climatic changes and droughts can significantly reduce EEPCo’s electricity generation capacity. During FY 2008-09, EEPCo faced severe generation shortages and had to rent thermal power plants at high cost to meet its electricity demand. While installing thermal standby generator could help EEPCo mitigate its hydropower generation risk, given the high operating cost of thermal plants, the Government is interested to utilize available geothermal resources to diversify its overall generation resource mix and maintain an affordable level of electricity generation cost. In addition, unlike diesel, geothermal energy is a clean and renewable resource. This will further help Ethiopia to reduce its green house gas emissions. GOE has requested IDA support to develop geothermal renewable energy resource by financing required number of exploration and appraisal wells. The funding for such exploration is not available from commercial sources and such development cost is conventionally borne by governments. Once proven resources are available, private developers can be expected to invest in power plants that use these resources. The project proposes to allocate about US$ 10 million
as technical assistance for the exploration and development of Ethiopia’s geothermal resources. The Government of Japan (GOJ) has already indicated an interest in co-developing this renewable energy resource through its financing for initial investigation and surveys to expand a pilot geothermal plant in Aluto Langano. Recent discussions indicate that Government of Ethiopia may receive a total support of about US$ 15 million equivalent from GOJ in this regard.

Capacity Building and Technical Assistance: GOE has requested IDA to support updating its power sector master plan. EEPCo would need focused capacity building support to improve its procurement, project implementation and contract management functions and hence an enhanced Technical Assistance and Capacity Building component is being proposed under the project. The original project provided successful technical assistance to the Ministry of Mines and Energy to develop regulation of the Mining Sector to ensure private sector participation. The Government of Ethiopia has applied to the Extractive Industries Transparency Initiative (EITI) Secretariat to become a member of EITI. This application is under review. The Ministry of Mines and Energy will also have access to this Capacity Building and Technical Assistance Component to develop rules, regulations, policy and laws to ensure sustained growth of this important sector.

5. Financing

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<td>Total</td>
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</table>

6. Implementation

EEPCo has considerable experience of implementing Bank financed projects. At present there are four Bank financed projects that are being implemented by EEPCo. The existing project implementation units implementing the original Energy Access Project will continue to implement the Additional Financing Project. The Urban Distribution Rehabilitation component of the original project is being implemented by Urban Distribution Rehabilitation Project Unit and the Rural Electrification Component is implemented by the Universal Electricity Access Project (UEAP) Department.

EEPCo will strengthen its Urban Distribution Rehabilitation Project office to ensure timely implementation of rehabilitation projects in Addis Ababa and seven other cities, namely (i) Bahir Dar, (ii) Mekele, (iii) Jima, (iv) Awassa, (v) Dessie, (vi) Nazareth, and (vii) Dire Dawa. The same project office will also implement the energy efficiency component of the project targeted for urban consumers. The UEAP will be responsible to intensify consumer connections in already connected villages.

The Ethiopia Renewable Energy Development and Promotion Centre (EREDPC) has established the Rural Electrification Fund (REF) to implement the off-grid rural electrification component, mainly using renewable energy resources. This component is being implemented and the funds allocated under the original project remains adequate. Hence, no additional financing is
provided for this component.

To carry out the appraisal and evaluation of the geothermal resource, EEPCo will establish a Project Management Unit (PMU) within its Strategic Corporate Planning Department. This PMU will be staffed by EEPCo staff to carry out management, fiduciary and safeguards activities. The Ministry of Mines and Energy will provide Technical Staff to this unit from the Geological Survey of Ethiopia, to ensure that the PMU have adequate experience and skill base to carry out the project implementation activities.

The PMU for each component will issue quarterly reports. Independent auditors acceptable to the Bank would audit project financial statements in accordance with generally accepted auditing standards. Audit reports should be submitted to the Bank not later than 6 months after the close of each fiscal year.

7. Sustainability

This project enables EEPCo to renovate its old and dilapidated urban distribution network. Addis Ababa and the other 7 cities included in this project have the highest concentration of load in EEPCo system and hence renovation of these networks will help EEPCo reduce its technical system loss effectively. The project will further improve the reliability of its service standards and would help industrial use of electricity – contributing to sustainable economic growth.

In addition to support expansion of electricity access in new areas, the project will intensify consumer connection in previously connected areas. This will increase the utilization of existing infrastructure and help the development of small and medium enterprises in rural Ethiopia.

The evaluation and appraisal of Ethiopia’s geothermal resource base will help the sector to diversify. This project will help GOE to test whether geothermal resource can be effectively used as a sustainable electricity generation resource in Ethiopia. Further, this will also open an avenue for GOE to check whether it can bring in private investment to build geothermal power plant in Ethiopia.

The installation of about 5 million CFLs helped EEPCo reduce its peak demand by about 80 MW. EEPCo will continue this demand side management and efficiency improvement under this additional financing project. To ensure introduction of CFLs for future use, the GOE has taken measures to provide incentive to build market based promotion of CFLs in Ethiopia. As a start, they have waived all taxes and custom duties from CFLs. The Government further plans to introduce tax on selling incandescent lamps in Ethiopia to discourage use of inefficient lamps.

Under the original project, GOE introduced private sector led off-grid renewable energy development. As means to provide incentive to the private sector and to help develop a renewable energy generation and distribution market, the government has waived all taxes and custom duties on Solar PV products. Furthermore, a Feed in Tariff Law is under preparation. The Ethiopia Electric Authority (EEA) has the responsibility to draft this law, and EEA has shared this law with the stakeholders and is following a consultation process to get comments and inputs on this draft law.
8. Lessons Learned from Past Operations in the Country/Sector

There are several lessons learned from the Bank’s engagement to date with the Ethiopia’s electricity sector. Some of these are discussed below.

Effective and timely implementation of projects requires strong capacity of implementing agencies. The additional financing project will be mainly implemented by EEPCo, which has strong implementation capacity and experience in managing projects. To further strengthen the procurement management capacity of EEPCo and train new PMU staffs, EEPCo has decided to appoint an internationally experienced procurement specialist, knowledgeable on World Bank financed project procurement procedures, to help its project offices in procurement related activities.

Demonstrated government support is an important factor for success. The renovation of Addis Ababa network required timely support from Addis Ababa Municipality, Addis Ababa Water Authority, Ethiopia Telecommunication Company, etc. Without strong commitment of the Government to ensure proper coordination between these agencies, the Energy Access Project couldn’t be implemented successfully.

Importance of balanced development cannot be overemphasized. EEPCo increased its electricity access after inception of the Universal Electricity Access Program. To meet the increased demand created by these new consumers, EEPCo started building several power plants. Unfortunately, several of these power plants couldn’t be completed on time and hence for about two years, EEPCo had to ration its supply and load shed severely. EEPCo also had to rent expensive thermal power plants to generate additional electricity to meet consumer demands. The industrial sector had suffered the most during this time as EEPCo had to reduce electricity supply to most of the industries considerably.

Intensifying consumer base is as important as increasing access. While increasing access to electricity benefits new areas and population, intensifying consumer base increases utilization of existing infrastructure and reduce overall cost of supply. Hence it increases utility efficiency and reduce tariff requirement to serve consumers.

Diversifying energy resource base can increase energy security significantly. Though EEPCo has access to affordable hydroelectric generation potential, it is important that it develops some other electricity generation resource base, such as geothermal resources, to ensure energy security.

9. Safeguard Policies (including public consultation)

The safeguard category of the project is B since there are no significant and/or irreversible adverse environmental and social issues in components financed under the project. The project upgrades the existing distribution network in selected cities and rehabilitates existing substations which have saturated their capacity to supply additional load. The Geothermal Development Component of the project will appraise and explore the capacity of geothermal resources, which will require drilling exploration wells to study and understand the capacity of the resource.
The upgrading and rehabilitation of the urban distribution network and substations along with appraisal and exploration of geothermal resources are likely to trigger four safeguard policies namely: (i) Environmental Assessment (OP/BP 4.01), (ii) Involuntary Resettlement (OP/BP 4.12), Physical Cultural Resources (OP/BP 4.11) and Projects on International Waterways (OP/BP 7.50). The first policy would be triggered because of the anticipated geothermal exploration and likely contamination from old transformers that will be removed from the system during the upgrade of the urban electricity distribution network. In addition, there may be areas where there could be high bird/power line interactions, resulting in high death of birds. OP/BP 4.12 has been because there could be some minor displacement and relocation occurring as a result of loss of land and damage to crops for geothermal exploration and other construction associated with power lines and substations. These may be ephemeral in scope. Also, OP 4.11 has been triggered, and this is signaling that “chance find” could be expected during geothermal explorations. Related to the proposed micro-hydro power plant development under the original project (Energy Access), OP/BP 7.50 will be triggered. In this regard, the GOE intends, working in collaboration with the Bank, to finalize procedures for informing riparian countries because the micro-hydro plants could have impact adversely on major rivers draining into neighboring countries and affect the use of those drainage systems downstream the hydropower plants.

For expanding access to new areas and extending lines to connect new consumers, the implementing agency is updating its original Environmental and Social Management Framework (ESMF) for screening of individual projects. The project will further prepare a Resettlement Policy Framework (RPF) as part of the ESMF. The procedures, including chance-finds procedures will be taken care of within the ESMF. In the event that the exploratory drilling operations are deemed likely to result in temporal displacement of people, loss of income and means of livelihoods, the project will formulate and implement Environment and Social Management Plans (ESMPs) and abbreviated Resettlement Action Plans acceptable to the Bank, prior to commencement of the actual exploration work.

The following table summarizes the safeguard policies triggered under this project.

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<th>Safeguard Policies Triggered</th>
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<td>Environmental Assessment (OP/BP 4.01)</td>
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<td>Projects on International Waterways (OP/BP 7.50)</td>
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<tr>
<td>Projects in Disputed Areas (OP/BP 7.60)</td>
<td></td>
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</table>
10. List of Factual Technical Documents

1. “Project Implementation Plan”, EEPCo Strategic Planning, January 2010
2. “Procurement Capacity Assessment of EEPCo”, World Bank, March 2010
3. “Updated Environmental and Social Management Framework”, EEPCo, February 2010
5. “UEAP Assessment on How to Use the World Bank Financing for the UEAP Program”,
   UEAP, EEPCo, October 12, 2005

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