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PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE

Report No.: PIDA22274

Project Name	Uganda Energy for Rural Transformation III (P133312)
Region	AFRICA
Country	Uganda
GEF Focal Area	Multi-focal area
Sector(s)	Other Renewable Energy (100%)
Theme(s)	Rural services and infrastructure (100%)
Lending Instrument	Adaptable Program Loan
Project ID	P133312
Borrower(s)	Government of Republic of Uganda
Implementing Agency	Ministry of Energy & Mineral Development/ Rural Electrification Agency
Environmental Category	B-Partial Assessment
Date PID Prepared/Updated	15-Apr-2015
Date PID Approved/Disclosed	15-Apr-2015
Estimated Date of Appraisal Completion	10-Apr-2015
Estimated Date of Board Approval	05-Jun-2015
Appraisal Review Decision (from Decision Note)	

I. Project Context

Country Context

Over the past two decades, Uganda has made significant progress on the twin goals of reducing poverty and boosting shared prosperity. The proportion of households living in poverty more than halved from 1993 to 2013. The proportion of households living under the national poverty line declined from 56.4 percent in 1993 to 19.5 percent in 2013. Annual consumption growth of the bottom 40 percent has averaged around three percent over the 20-year period from 1993 to 2013, which is higher than most countries in the region. However, in relative terms, consumption growth of the bottom 40 percent has been slower than the consumption growth of the top 60 percent. As a result, inequality measured by the Gini index, albeit low by regional standards, increased from 0.36 in 1993 to 0.40 in 2013. Moreover, nearly 43.3 percent of Ugandans are still insecure non-poor, defined as those living above the poverty line but living on less than twice the poverty line. Between 2005 and 2009, two out of three Ugandans who were lifted out of poverty fell back into poverty.

Uganda has sustained one of the world's fastest economic growth rates over the last two decades,

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despite its geographical disadvantages and numerous exogenous economic shocks. Since 1987, Uganda has experienced a sustained period of high growth, averaging over six percent a year, largely explained by the combination of macroeconomic stability, post-conflict rebound, and pro-market reforms. This growth trickled down to the poorest households, contributing to the decline in poverty. Even though the rate of economic expansion decelerated from an average of 7.6 percent per year during FY2006-10 to 5.5 percent from FY2011-14, because of external factors, inconsistent fiscal and monetary policies, and a slowdown in the efforts by the government to implement further reforms, the responsiveness of poverty reduction to economic growth appears to have increased in recent years. This has helped offset to some extent the negative impact of lower economic expansion on the poor.

Sectoral shifts accompanied the economic growth over the past two decades. According to recently rebased Gross Domestic Product (GDP) numbers, the service sector contributes the most value-addition and agriculture's contribution has been declining. Between 1990 and 2014, agriculture's contribution to GDP fell from 55 percent to 25 percent. The contribution of services increased from 31 percent to 46 percent, with telecommunications and wholesale and retail trade contributing the most. The boom in construction raised the contribution of that sector to 13 percent, while manufacturing played a smaller role. Industrial sector growth has been helped with better availability of electricity at lower prices and activity arising from public sector road construction.

A key factor in the structure of medium-term growth is the continued structural transformation towards more productive activities. This future industrial sector growth will be bolstered by the indirect economic expansion that will follow the development of oil reserves in Uganda as well as the availability of affordable electricity as an input into industrial production. Agriculture also remains important, not least because it employs almost three-quarters of the labor force, but because of its potential for quick gains through enhanced productivity and agribusiness, which has been the fastest growing business sector over the past decade. Spatially, Uganda's urbanization is accelerating with the urban population growing at an average annual rate of 6.8 percent between 2002 and 2014; a greater proportion of future economic activity can be expected to be located in urban areas, including the central and the eastern regions, which will continue to attract people from rural areas.

Electricity will remain critical for Uganda to attain the growth trajectory and socio-economic transformation through better access to education and health care, improved quality of life at household level, better efficiency and service delivery from enterprises, and improved personal security. At an average annual growth rate of about 3.4 percent (sixth highest in the World), Uganda's population has increased rapidly, from about 26 million in 2002 to around 36 million in 2013. However, the overall household access to electricity is one of the lowest in Africa - about 14 percent at the national level and about seven percent in rural areas. The limited access to electricity and the high cost of electricity services has affected delivery of social services, constrained the development of small-scale industrial and commercial enterprises, and adversely affected the larger-scale industrial and commercial investments in the country. The recent increase in electricity generation through the commissioning of the Bujagali Hydropower Plant (BHPP) in 2012, and the continued strengthening of the transmission and distribution network, has lowered the cost of electricity and has improved power supply reliability in the country. However, with fast growing demand for electricity—about nine percent per annum—Uganda will need to harness its abundant natural resources more efficiently to provide reliable, cost effective electricity to support its fast growing economy and improve the social welfare of its citizens.

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The Government of Uganda (GoU) aims at transforming Uganda from an agrarian society to a modern and prosperous country within 30 years. Although sectoral shifts have occurred and urbanization is increasing, Uganda remains a predominantly rural country, and poverty rates are much higher in rural areas: nearly 84 percent of the Ugandan population lived in rural areas in 2013, making it one of the least urban countries on the continent. The GoU has articulated the Uganda Vision 2040, which lays out broad policy directives and includes a target of increasing access to electricity to 80 percent by 2040. In this context, access to electricity across the country remains a national priority, and the National Development Plan (NDP) of Uganda for the period FY11-15 focuses on increasing access and usage of electricity by investing in least cost power generation, promotion of renewable energy and energy efficiency in addition to strengthening and expanding the transmission and distribution infrastructure.

Sectoral and institutional Context

Sector Background

Major electricity sector reforms have redefined the role of Government in the electricity sector as enabler for private investments in the sector. The GoU approved a power sector reform strategy in 1999 that called for developing Uganda's hydropower resources through Independent Power Producers (IPPs), and adopting a commercially-oriented approach to increase power access and improve performance. The main functions of the government became to (i) create an enabling environment for private investment in the sector by leveling the playing field for private sector participants; (ii) to establish a regulatory framework that supported private sector development; (iii) to facilitate the setting of cost reflective tariffs; and (iv) to develop a transparent subsidy transfer and financing mechanism.

As a consequence, Uganda has progressively advanced in restructuring the sector and has established a number of new entities. To implement the power sector reform strategy, the GoU passed the 1999 Electricity Act and established an independent Electricity Regulatory Authority (ERA) in 2000 to regulate all sector activities. The Government also unbundled the vertically integrated Uganda Electricity Board (UEB), which had been established in 1948, into power generation, transmission, and distribution companies in 2001. A Rural Electrification Board (REB) was also established in 2001 to oversee the implementation of rural electrification activities. The REB is chaired by the Permanent Secretary (PS) of the Ministry of Energy and Mineral Development (MEMD), and the Rural Electrification Agency (REA) is the secretariat to the REB to support the day-to-day operations.

The unbundled electricity sector adopted the "single buyer" model where the transmission operator is the sole buyer and wholesaler of electricity while the private sector plays significant roles in power generation and distribution. Most of the fixed assets along the electricity supply chain are owned by three public enterprises: the Uganda Electricity Generation Company Limited (UEGCL) for power generation, the Uganda Electricity Transmission Company Limited (UETCL) for power transmission, and the Uganda Electricity Distribution Company Limited (UEDCL) for power distribution. UETCL is the single off-taker of electricity from the government-owned generation companies, IPPs, and Small Private Power Producers (SPPPs) that are connected to the main electricity network. In turn, UETCL sells electricity to the distribution companies at the Bulk Supply Tariff, which is in principle uniformly applied to the distribution companies (with marginal

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difference in adjustment formula). To introduce private sector efficiencies into management and operation, UEGCL's Kira and Nalubaale hydropower plants were leased to Eskom (Uganda) Limited in 2002; and UEDCL's distribution assets in the major load centers were leased to Umeme Limited (Umeme) in 2005. All other distribution assets in the non-Umeme concession areas covering some parts of the country were constructed by the REA and contracted out to seven other electricity distribution Service Providers (SPs) for operation and maintenance on a commercial basis. Currently, there is no provision in the tariff to cater for the recovery of depreciation expenses of the distribution lines owned by public companies. However, there are some revenue sources not directly linked to the depreciation of assets: in the case of the UETCL, instead of depreciation, the ERA provides for repayment of loan principal and a small allowance for investments to be funded from internal resources; for UEDCL, part of the expenses are recovered from lease fees from Umeme; and the retail tariff provides for a rural electrification levy equivalent to five percent of the power purchase cost by UETCL that is transferred to REA. Umeme's investment is reflected in tariff.

Significant results have been achieved under the current configuration. Electricity demand has grown at an annual average of nine percent since 2005. Peak demand in 2014 was 540 MW. The country has been relatively successful in attracting private investment in the sector to meet the demand. Installed power generation capacity increased from about 300 MW in 2002 to 852 MW through private investment, including Bujagali (hydro, 250MW) commissioned in August 2012 and other mini-hydro power plants. In addition, 100 MW of liquid fuel based thermal power plants are currently standing-by: Namanve (diesel, 50 MW) and Tororo (thermal, 50 MW) that were implemented during the power crisis years before the commissioning of Bujagali. The transmission network has grown from 1,165 km in 2003 to 1,627 km in 2014. Transmission losses were 3.7 percent in 2014. In the distribution sub-sector, energy purchase from UETCL in 2014 totaled 2,317 GWh of which Umeme accounted for over 93 percent (2,163 GWh) and 154 GWh purchased by the other SPs combined. After years of inadequate maintenance and under-investment that had caused the distribution network to deteriorate and electricity losses to reach nearly 40 percent in 2005, losses in the Umeme service areas were reduced to 21.3 percent in 2014 and the bills collection rate improved from 80 percent to 100 percent. The number of customers connected to the national grid has been increasing at over 50,000 per annum since 2009, and reached 613,000 in 2013.

Several tariff adjustments and associated revisions to the tariff setting formula have considerably improved the sector's financial viability. The retail tariffs are set by ERA based on revenue requirements of the generation, transmission, and distribution companies and the terms of various contracts with the private generation and distribution companies. The basic principle is that the sector is expected to be financially viable provided that each generation, transmission, and distribution company meet the performance targets specified in the respective licenses. There have been several adjustments to the retail tariff in the past, including an average increase of 48 percent in January 2012, when the GoU phased out the subsidy that had kept the retail tariff below the costs. ERA approved a multi-year tariff with quarterly automatic adjustments for fluctuations in fuel costs, exchange rates, and inflation in 2014. Key subsidy elements remaining in the supply chain as of November 2014 are UETCL's capacity payments for stand-by thermal power plants amounting to US$23 million in 2014.

Sector Challenges

Despite the achievements, the power sector faces a number of challenges that hinder the country's

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efforts to reduce poverty and promote shared prosperity.

Access to electricity in Uganda remains low both by global and regional standards, and it is constraining the achievement of national social and economic development objectives (Figure 1). The overall access to electricity is estimated at approximately 14 percent nationally and only 7 percent in rural areas. As a consequence, Uganda has a low per capita electricity consumption which, at 80 kWh/year, is far below its peers - Kenya at 155 kWh/year and Ghana at 300 kWh/year; and not comparable to industrialized economies such as South Africa at 4,694 kWh/year, or South Korea at 8,502 kWh/year. This is constraining the effort to accelerate economic development and improve people's livelihoods, as exemplified by the country's low performance of service delivery in health and education, which limit the achievement of national socio-economic objectives.

The set-up of the electricity distribution sub-sector remains complex. The country is divided into 14 Service Territories (STs) that are operated by 8 SPs (Table 1), including the Umeme service footprint. UETCL supplies electricity to the electricity distribution SPs at a Bulk Supply Tariff. Most electricity distribution assets are owned by the public sector except in the West Nile region where the current isolated network (distribution and generation) is owned by a private SP (WENRECO). In the main grid covering the remaining STs, Umeme operates the distribution assets owned by UEDCL, which extends over 90 percent of the m ain grid including major load centers. Most new distribution lines are constructed and owned by REA and are operated by the remaining SPs . In the STs without designated SPs, UEDCL acts as an SP of last resort in the interim. UEDCL therefore has a dual role to act as the asset owner for the Umeme footprint and to operate the areas without assigned SPs on an interim basis. As the Umeme network intersects every ST except West Nile, electricity wheeling arrangements are in place between Umeme and other SPs. Accordingly, there are two SPs (Umeme and another SP assigned) operating in most of the STs. This increases the need to coordinate network planning, operations and maintenance, and service quality.

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Past efforts in accelerating access to electricity encountered a number of challenges. Between 2001 and 2012, the rural electrification program was based on the first Rural Electrification Strategy and Plan (RESP-1), which aimed to increase access to electricity in rural areas from one percent in 2001 to 10 percent by 2010. However, the outcome of the RESP-1 was not satisfactory and access to electricity in rural areas at the end of 2010 was less than four percent. The under-performance was attributed to: (i) the unclear roles and responsibilities of the different agencies involved in expanding access; (ii) the limitation of expanding the service network under the initial concessions; (iii) the insufficient incentives for the private SPs to increase access particularly amongst the rural poor; (iv) weak capitalization of some SPs and inadequate managerial and operating expertise; (v) affordability constraints relating to internal house wiring costs and service connections charge (on average US$200 per connection); (vi) inadequate efforts to sensitize rural households about the benefits of electricity usage and to mobilize them to prepare and apply for service connections; and (vii) ineffectual delivery mechanisms for the off-grid solar photovoltaic (PV) program.

Significant investment is required at every level of electricity supply chain to secure adequate and reliable supply of electricity. At the current pace of growth, demand for electricity is expected to surpass the current available generation capacity by 2016. The generation capacity shortfall is expected to remain until one of the planned large hydropower plants is commissioned. As an additional effort to avoid power shortages and reliance on expensive thermal power plants, the GoU through the Global Energy Transfer Feed-in-Tariff (GET FiT) program is also promoting the development of small private power producers that can be commissioned faster and could be

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developed simultaneously without imposing financial and managerial burden on the GoU.

Recovering the full cost of electricity supply while maintaining financial viability and expanding access remains a key challenge. Uganda experienced seven droughts between 1991 and 2000. Subsequently, the persistent drought between 2003 and 2009, for instance, reduced the available capacity of the existing hydropower plants, which prompted increased reliance on emergency thermal generation. As a result, the average cost of power purchased by UETCL increased from US $0.10/kWh in 2009 to US$0.15/kWh in 2011. As the retail tariff was not adjusted until January 2012, the volatility squeezed the financial position of UETCL. As of February 2015, the weighted average retail tariff is US$0.14/kWh (they are US$0.03 in Ethiopia, US$0.12 in Tanzania, and US $0.17 in Kenya). The increased level of electricity tariff over the years has also put household budgets under pressure. The impact evaluation carried out for ERT-1 reveals that some districts experienced a decline in access due to high electricity tariffs. Reducing the cost of electricity supply therefore remains an important policy priority. In this context, low cost technology for electrification, improved efficiency across the electricity supply chain, continuation of the cost recovery tariff policy, and some policy instruments to protect the poorer segments of consumers need to be pursued.

Strategies to Address Sector Challenges

The GoU is addressing these sector challenges through the following measures: (i) reviewing the results of the power sector reform and designing its next phase; (ii) adopting an implementation framework for distribution and rural electrification, accompanied by a reorganization of the distribution segment (STs and SPs); and (iii) concomitantly expanding the generation and transmission infrastructure.

Reviewing the results of the power sector reform

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A review of the sector reform and current institutional set-up for electricity access will be undertaken by the GoU. As part of sector dialogues and a technical assistance under the ongoing Electricity Sector Development Project (ESDP, P119737), the Bank is supporting the Government’s initiative to review and take stock of the sector reform experience. The objective of the review is to evaluate the current sector policy and regulatory set up and human resource and financial constraints. Based on the review findings, recommendations will be made to: (i) improve sector performance and operational efficiency; (ii) attract and sustain adequate investments; (iii) increase access to electricity; and (iv) improve reliability and security of electricity supply. The new electrification model under the pro posed project would provide incentives for REA to collaborate with the SPs to expand access and support strengthening the regulatory aspects. Its implementation would generate empirical information to be used for the review. In addition, the Bank will be engaged in conducting a thorough financial analysis of UETCL, the off-taker and lynchpin of the sector’s financial viability, to enhance resilience of the sector to external shocks such as hydrological and foreign exchange risks.

Increasing access to electricity in rural areas

The GoU formulated a new rural electrification strategy in 2013. The Second Rural Electrification Strategy and Plan (RESP-2) covers the period 2013-2022 and sets a policy guideline that mandates REA to increase electricity access in rural households from an estimated seven percent in 2012 to

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26 percent by 2022. The Bank Group has been supporting Uganda in increasing access to electricity through concession arrangements of the public electricity distribution infrastructure, including IFC's equity investment for Umeme, and through the Energy for Rural Transformation (ERT) Program. The Bank also provided assistance in preparing the RESP-2 through a study financed by the United Kingdom Department for International Development (DFID).

The RESP-2 endeavors to address some of the access challenges in the following manner:

(i) Roles and responsibilities for program implementation, investment, and operations and maintenance are being defined. Under the RESP-2, planning and management of rural electrification are centralized under REA (the ST arrangements are described in para 14). The Lease Agreements between REA and SPs define the ST areas, establishes the rights and obligations of REA and the SPs, and include monitorable performance targets (with appropriate penalty and bonus clauses) to be evaluated each year. Moreover, REA enters into Maintenance and Operations Contracts with UEDCL for the management of distribution networks in in their STs.

(ii) Concessions are now expanded to cover the entire country. In contrast with the concessions based on individual distribution lines under the RESP-1, all potential customers now fall under an ST under the RESP-2. As the Umeme network intersects every ST except West Nile, electricity wheeling arrangements are in place between Umeme and other SPs. The interface between the Umeme footprint and other SPs needs coordination between the SPs operating in the contiguous areas.

(iii) Incentive for private SPs to increase access is taken into consideration. In the past, private SPs who operated distribution lines on concessions had limited incentives to connect households. In the case of Umeme: (i) customer connection is not part of the Key Performance Indicator (KPI) under their existing concession license; (ii) there is a cap on capital expenditures to cushion their impacts on the retail tariff, which discourages the company from investing in new connections; (iii) there is a cap on Umeme's operations and maintenance (O&M) expenditures that discourages the company from connecting low consumption households; and (iv) the removal of the "growth factor," which allowed the company to retain revenues exceeding the previous year's sales. The project addresses these issues by: (a) establishing customer connection targets for households under the project (project will not finance connections for commercial and industrial customers, which will be financed by Umeme's regular arrangements); and (b) distinguishing capital expenditures and O&M expenses for project-related activities from the existing revenue requirement for tariff calculation. In the case of other SPs operating outside the Umeme footprint, the incentives for connection under the RESP-2 include: flexibility in planning the network expansion within their STs through master plans, which would give them the opportunity to connect new customers; increases in areas of operation which would allow enlarged customer base; adequate tariff to cover operating costs; and additional bonuses in case they exceed connection targets under the Lease Agreements with REA. Moreover, the cost pressure from serving the areas with relatively low electricity consumption is absorbed by REA's publicly-funded investment in expanding the distribution lines.

(iv) Capital and capacity requirements of the SPs will be strengthened. SPs have varying degree of experience and implementation capacity, ranging from the well-established distribution utility to cooperatives that are relatively new to the electricity supply business. REA has established a department dedicated to SPs' development, which will be staffed with utility experts. Depending on

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the capacity needs of SPs, REA will plan and provide appropriate support mechanisms, including technical assistance and in-kind contributions and leasing of equipment during the early stage of implementation, which would also mitigate their working capital constraints. The project will support strengthening of SPs' implementation capacity during the initial years.

(v) Affordability of connection costs will be addressed. A consumer financing arrangement for household connections will be established to ensure affordability of connection. Under the proposed scheme, the GoU will pre-finance cost of connections and consumers are expected to pay back the cost of connection (and ready board and earthing for those who cannot afford house wiring themselves). It would fund the connection costs, including service drops (electric meters, service connection cable, and accessories) and ready boards in case customers who cannot afford internal house wiring costs. Households who opt for this financing scheme will be required to repay these costs over a period time not exceeding 60 months through deductions from their energy purchases. The interest-free repayment will be collected by participating SPs for onward remittance to a REA-managed revolving fund that will continue to fund connections beyond the closing of the Project. This financing arrangement will help remove affordability barriers for household connections by: (i) limiting the upward pressure on retail tariffs as the connection costs will not be part of the capital expenditures to be recovered through the tariff; (ii) improving affordability of connection and wiring costs by allowing installment payments; and (iii) allowing a standardized treatment of connection charges across the STs irrespective of funding sources. The financial mechanism would initially be applied to no-pole connections, due to budget constraints, with a possibility of future extension to more than one-pole connections. The proposed mechanism will accommodate contributions for connection works from the GoU and development partners.

(vi) Consumer sensitization and mobilization programs are being implemented and will be continued under the project. REA has initiated, under the on-going ERT-2 project, a consumer sensitization and mobilization programs to help prospective electricity consumers acquire electricity connections. This is done through Consultants commissioned to proactively disseminate information about benefits of electricity supply, connection application processes, and house wiring and testing. Additionally, the Consultant will help complete connection application forms and submit them to SPs. These sensitization and mobilization activities will be continued under the proposed project.

(vii) A market-driven approach to off-grid energy access is emerging that can scale-up energy services for off-grid customers. In the last 3-4 years, several companies emerged in Africa, India and Latin America and quickly amassed over 150,000 Solar Home Systems (SHS) customers with affordable rent to own or fee for service plans. The emergence of this new breed of companies may be attributed to three recent developments which they appear to have taken full advantage of: (i) the recent drop in international module prices that is still continuing , (ii) advances in pico solar, LED and "super-efficient" appliances , and (iii) the widespread growth of "mobile money" financial transactions in Africa. These companies are working capital-intensive businesses, and maintain significant amounts of inventory and receivables. Their scale-up is therefore constrained by access to working capital financing. In Uganda, despite the recent gains made by REA with the PV Targeted Market Approach (PVTMA) mechanism under the on-going ERT-2 project, several implementation problems limited the pace of installation of SHS. The problems include inadequacies with the subsidy mechanism and the verification process of the PVTMA, and ge neral constraints within this nascent sub-sector. It is estimated that about 80 percent of the market growth took place outside the PVTMA scheme . A Solar PV Options Study undertaken by REA in

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2014 recommended that the proposed project focus on enforcement of product standards and working capital support for solar companies to scale-up off-grid access.

A large investment is required to implement the RESP-2, and the Bank can support and catalyze additional resources. The RESP-2 requires a total investment of approximately US$1 billion to achieve its targets over 10 years. The GoU remains the largest financier of the program, with an indicative commitment of about US$500 million from its internal resources (transmission levy and national budget). To meet the financing gap, the GoU is in discussions with other development partners. In terms of actual funding, there is approximately US$10 million in annual flows from transmission levy, and the latest Medium Term Expenditure Framework (FY2014-19) allocates approximately US$100 million for rural electrification from the Consolidated Fund (national budget). Several development partners have expressed interest in providing financing under the ERT umbrella, and the proposed project can provide a model for the Government to mobilize additional resources. Coordination among the development partners is maintained by MEMD through an active Energy and Mining Development Partners Group (EMDPG).

Expanding the electricity supply infrastructure

Resilience of the power sector to external shocks is being developed through interconnection with neighboring countries and diversification of the national energy-mix. The GoU has been diversifying the generation mix by promoting the implementation of renewable energy projects, such as small hydro and co-generation. Moreover, it is also planning to build a strong interconnected national grid with links to neighboring countries to (i) ensure reliability and security of supply and (ii) increase potential for electricity trade between East African Community (EAC) countries. UETCL has a 30 MW non-firm Power Purchase Agreement (PPA) to purchase electricity for the next five years. A 220 kV transmission line between Kenya and Uganda is under implementation and scheduled to be commissioned in 2015, while the 220 kV line between Uganda and Rwanda will be completed by December 2016. Uganda is also pursuing interconnections with Eastern Democratic Republic of Congo (DRC) and South Sudan.

Investment in renewable energy and pursuing improvements in energy efficiency measures are underway. Currently, out of the 800 MW of installed generation capacity, 630 MW is based on large hydropower plants, 100 MW is based on liquid-fuel run thermal power plants (maintained mostly on a stand-by mode), and the remaining includes small hydro power and cogeneration. Due to international treaties and hydrological restrictions, only 470 MW of capacity is available from large hydropower plants. The current recorded peak demand is 540 MW. At the current estimated annual demand growth of close to nine percent, generation shortages are expected to return in 2016 and continue until new hydroelectric generation facilities are commissioned. In the interim, the GoU is promoting the development of small hydro power plants (SHPP) and other renewable energy resources (such as solar PV, geothermal, and biomass) by the private sector. More recently, IDA approved a guarantee operation to support the development of small hydro power plants by the private sector with a total capacity between 120-150 MW. In addition, energy efficiency measures are pursued in the country, including the time-of-use electricity pricing, installation of solar water heaters, and power factor correction equipment among commercial and industrial electricity users.

The national transmission network system is also being expanded. UETCL is responsible for the planning and operation of the transmission network. Transmission investments are articulated in the

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Grid Development Plan, a strategic document that directs and guides the overall planning and development of the backbone transmission network. The Plan identifies and prioritizes transmission investments mainly for the: (i) evacuation of new generation projects, (ii) provision of requisite transmission capacity to meet the projected national load growth, (iii) reduction of technical losses, and (iv) facilitation of energy exchanges with neighboring countries. UETCL is strengthening the national transmission network system to evacuate power to the load centers and ensure reliability of supply. While IDA is financing the implementation of a 137 km, 220 kV Kawanda-Masaka transmission line (including associated substations) and preparatory studies (feasibility and safeguard studies) for a 132 kV Lira-Gulu-Nebbi-Arua transmission line for a possible future IDA operation, other development partners are actively engaged in supporting the development of various segments of the country's transmission network.

Rationale for Bank Involvement

Public sector involvement is key to facilitate rural access. Earlier efforts to mobilize private sector to invest in rural electrification were unsuccessful due to insufficient financial returns. For example, the results of economic and financial analyses on the on-grid electrification under the proposed project suggest that the activities in rural electrification are economically viable but financially not. For this reason, to ensure energy services are provided in rural areas, public sector engagement, such as REA's investment in distribution network, is important.

The Bank has been a major strategic partner in Uganda's electricity sector development. Since the 1980s, the Bank has supported Uganda's power sector reforms including the restructuring of UEB, implementation of policy measures to improve financial viability of the sector, and contribution to major power investments such as Bujagali hydropower plant and the expansion of key transmission networks. With its focus on rural transformation and increased access to electricity in rural areas, the ERT program that started in 2001 has been a major element of this partnership.

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The ERT Program supports the establishment of a long-term platform for scaling-up electricity access. In November 2001, the Bank approved the ERT program as a three-phase Adaptable Program Loan (APL). The purpose of the ERT program was to develop Uganda's energy and ICT sectors, so that they make a significant contribution in bringing about rural transformation. These sectors were expected to facilitate increased productivity of enterprises and enhance the quality of life of households. ERT-1 primarily supported the creation of electricity sector entities, such as ERA and REF, and capacity development of the implementing agencies. Building on the institutional framework developed under ERT-1, the on-going ERT-2 supports the expansion of necessary infrastructure into rural areas. The additional financing for ERT-2 (ERT-2 AF) supports activities by providing connection materials and consumer sensitization and mobilization. ERT-2 is also supplemented by the Global Partnership on Output Based Aid (GPOBA), a results-based subsidy mechanism for the poor household that cannot afford the connection charges. Moreover, through the Uganda Accelerated Rural Electrification Project (UAREP) implemented in conjunction with ERT-2, the Bank has supported the GoU to articulate the RESP-2.

The proposed project will build on earlier engagements and facilitate the implementation of the RESP-2. The GoU requested Bank's continued support in accelerating rural access and helping mobilize additional resources required to achieve the goals specified in the RESP-2. The project will continue to support in the Government's access goals in a timely manner, and will ultimately

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pave the way for reaching the developmental goals of Uganda's Vision 2040 and the SE4ALL initiative .

II. Project Development Objective(s) / Global Environmental Objective(s)

A. Project Development Objective(s)

The Project Development is to increase access to electricity in rural areas of Uganda.

B. Global Environmental Objective(s)

The Global Environmental Objective is to increase access to electricity in rural areas of Uganda and reduce greenhouse gas emissions

III. Project Description

Component Name

On-grid Energy Access

Comments (optional)

This component covers on-grid investments and off-grid activities to be implemented by REA.

Component Name

Off-grid Energy Access

Comments (optional)

This component covers off-grid energy access, including the installation of solar PV systems for public institutions in rural areas; business development support; provision of credit facilities to enhance electricity access and quality standards enforcement support.

Component Name

Institutional Strenghtening and Impacts Monitoring

Comments (optional)

This component will finance technical assistance and capacity development required to accelerate electricity access.

Component Name

Contingency

Comments (optional)

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IV. Financing *(in USD Million)*

Total Project Cost:	153.20	Total Bank Financing:	135.00
Financing Gap:	0.00		

For Loans/Credits/Others	**Amount**
BORROWER/RECIPIENT	10.00
International Development Association (IDA)	135.00
Global Environment Facility (GEF)	8.20
Total	153.20

V. Implementation

A. Institutional and Implementation Arrangements

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Project implementation will be carried out by REA, five line ministries (MoH, MoWE, MoESTS, MoFPED, and MEMD), and two agencies (PSFU and UECCC). The PCU for the ERT-2 will continue to coordinate and monitor overall implementation of project activities including all safeguard and fiduciary aspects. The PCU has been strengthened and will coordinate procurement and implementation of activities undertaken in particular by MEMD, MoH, MoWE, MoESTS, MoFPED, PSFU, and UECCC. The Bank will mainly interact with the PCU and REA on a day-to-day basis.

Several coordination mechanisms will be incorporated in the project design: (i) Coordination Meeting, chaired by PS Ministry of Energy and Mineral Development (MEMD) and consisting of MEMD, PCU, REA, ERA, and SPs for high-level coordination of on-grid connection activities; (ii) PCU oversight for all the project components; (iii) regular meetings held on sub-topics, including on-grid energy access activities (REA, SPs), and off-grid energy access activities (REA, UNBS, UECCC, PSFU).

Component 1 (On-grid Energy Access) will be implemented mostly by REA. Sub-Components 1-1, 1-2, 1-3, and 1-4 will involve extension of the distribution network infrastructure to serve selected rural areas, intensifying the existing grid (adding existing LV lines, poles, and transformers), facilitating last mile connections to the grid (service drop to households), and providing necessary implementation support for REA and SPs. REA will coordinate all the activities under this component.

REA will play a key role in planning and coordinating the component. For grid extension, REA will identify priority lines in accordance with the master plans (the Indicative Rural Electrification Master Plan (IREMP) and new master plans in each ST), and manage EPC contracts for extension of the distribution network infrastructure in close coordination with the SPs. The IREMP identified priority projects based on the potential for expanding access to electricity and for supporting economic development. In the areas that require coordination between Umeme and other SPs, including the network planning, operations and maintenance, and service quality, REA will facilitate coordination among the concerned SPs.

For the grid intensification and household connection, REA will review the proposed areas for electrification to be submitted by the SPs. The SPs, assisted by consultants funded by the project for consumer sensitization and mobilization, will identify target areas and households for expanding access in their master plans to be agreed with REA. As the SPs' levels of experience in the utility business vary significantly, the implementation arrangements will be kept flexible, and the modality for grid intensification and connection will take into consideration: (i) the implementation capacity of SPs; and (ii) SPs' preference. For those SPs that have the capacity to implement the proposed activities, the SPs can either: (a) undertake the activities themselves; or (b) directly manage the procurement of turnkey contracts. In either case, REA will verify the connections and physical installation of the equipment. For those SPs that have relatively less experience in procurement and installation, REA will manage turnkey connection contracts for connection activities to take place in their respective STs (this arrangement is similar to the grid extension). The approach to be taken for each SP will be determined by REA, in consultation with the Bank, after the SPs' technical, financial and procurement capacity to carry out such activities is assessed. Performance of the different approaches to connection will be reviewed and calibrated as appropriate as part of the systematic review of project implementation.

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Component 2 (Off-grid Energy Access) consists of several sub-components that will be implemented by various implementing agencies. Implementation of solar PV systems for rural public institutions (schools, health centers and water pumping stations) will be carried out by the respective line ministries (MoESTS, MoH and MoWE) in close coordination with the PCU. The PSFU will facilitate business development support for electricians, organization of solar companies' associations, and development of three pico and three micro hydro power plants through the private sector. UECCC will provide financial instruments to the financial institutions to facilitate access to finance for consumers and suppliers for off-grid electricity services.

REA will implement Sub-Component 2-4 (Market Development for Solar Home Systems), in close cooperation with the UNBS. In an effort to accelerate access to modern energy service in rural areas, this sub-component will support complementary market activities such as: (i) public awareness campaigns; (ii) quality standards adoption; and (iii) quality standards enforcement.

Component 3 (Institutional Strengthening and Impacts Monitoring) will be implemented by the MEMD, in close coordination with ERA, and will comprise mostly of carrying out studies and institutional strengthening. The MoFPED will continue with its evaluation and information dissemination activities.

Implementation Capacity

Sector-wide Coordination and Planning. Achieving the scaled-up access targets would require, among others, coordination of activities to be undertaken by multiple stakeholders in fostering investment and operations across the electricity supply chain. Accordingly, sector planning, financing, and overall management will need to be coordinated further. To foster sector-wide coordination, MEMD will regularly coordinate activities to be undertaken by all the relevant agencies in rural electrification through coordination meetings.

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REA's Capacity Strengthening. REA has continuously been strengthening its capacity to deliver access to electricity through such measures as increasing the number of engineers and their field presence and enhancing internal quality control systems. To facilitate achievement of the connection targets of the RESP-2, however, REA's implementation capacity will need to be strengthened further. Some of the measures to be implemented include: (i) strengthening REA's contract management (Lease Agreements with the SPs as well as works and supply contracts with contractors); (ii) consultancy for standardizing procedures (consolidating various documents to produce the construction manual and the national standards and specification for the distribution network in close collaboration with ERA); and (iii) enhancing accountability through public disclosure of investment plans and implementation status. On the safeguards management, an additional Social Development Specialist was recruited and the environment section is adequately staffed with two Environmental Specialists. Capacity building of REA/SPs in areas of building a GIS platform will be addressed through an appropriate consultancy service financed under a technical assistance program of the Carbon Initiative for Development (Ci-Dev) . The AFD-financed project will have funds allocated for capacity building activities, which will be implemented in close coordination with IDA.

Service Providers' Capacity. While REA will continue with development of the rural electrification infrastructure, the SPs, other than Umeme, will be contracted by REA for O&M of their respective STs under its supervision. Umeme, the largest SP in the country, has been commercially operational

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since 2005 and is managing over 25,000 km of electricity distribution assets covering major load centers in the country. The company's performance has been strong, especially on its key performance indicators (loss reduction and higher revenue collection). WENRECO, owned by an international foundation, has been operating the independent grid in West Nile since 2003. For other smaller private SPs, a Bank-funded consultant has assessed capacity development needs of four SPs (BECS, FESL, KIL, and PACMECS) in the areas of inventory and stores management, accounting systems, billing, and customer relations to effectively manage their operations. KRECS is the newest SP that started operations in 2013. A due diligence and capacity development needs assessment will be conducted for KRECS, UEDCL, and WENRECO. UEDCL, the public SP of last resort, retains implementation capacity through retention of technical staff on a contractual basis. In case some of its STs are concessioned to a third party, its staff can potentially be transferred to the concession. REA has established the ST Development Operations Unit to facilitate operations by SPs in their respective STs, and a unit manager was appointed. Moreover, as mentioned above, REA and IDA will verify and confirm the technical, financial, and procurement capacity of the SPs to carry out connection activities before the connection works are implemented.

B. Results Monitoring and Evaluation

To ensure that the implementation of the new model for electricity access is on the right track, and to inform necessary adjustments at the mid-term, the project will include technical assistance for systematically reviewing the project implementation progress and performance. The review will examine various aspects of the implementation arrangements including, among others, on-the ground process of consumer applications, connection works, functioning of the proposed financing mechanisms, implementation capacity of SPs, the planning and coordination role of REA, and contractual management by REA and SPs.

Over the years, the PCU and MoFPED have developed adequate capacity to undertake monitoring and evaluation (M&E) and impact evaluation of the project activities. This will continue under the proposed project. All monitoring and evaluation activities will continue to be carried out by the PCU, which will also be responsible for tracking the project's indicators, using data from the implementing agencies and stakeholders. The Budget Monitoring and Accountability Unit of the MoFPED will lead monitoring and impact evaluation.

As the proposed electrification model for ERT-3 contains various new elements, the capacity of PCU and REA for M&E will need to be strengthened further. Component 3-1 includes a systematic review of the project implementation. Moreover, Component 1-4 will strengthen REA's planning and coordination roles that includes, among others, the capacity to enhance monitoring of results achieved, SPs' performance, and resource management.

C. Sustainability

The Government is fully committed to rural electrification and there is a broad support for accelerating the achievement of universal access. The issue of sustainability mainly relates to the on-grid service connections, SHS installations, and solar PV systems for rural public institutions.

Demand-side sustainability of the on-grid connections: Limited ability of rural households to make timely payments for the connection charges and upfront cost of house internal wiring has constrained the uptake of electricity connections. Moreover, current connection procedures seems

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cumbersome and present a considerable burden for new customers to be connected. To address these demand-side issues, a consumer mobilization campaign has been initiated to help inform future and existing consumers on the benefits of electricity use and help overcome some of the transaction barriers that new consumers may face such as facilitating internal house wiring, filling up application forms and understanding usage costs. This would allow the SPs to proactively reach out to the potential customers and to connect new consumers in larger batches rather than individually. To address the affordability barriers, a proposal to establish a public financial mechanism is under discussion that would fund part of the connection costs in conjunction with the project.

Supply-side sustainability of the on-grid connections: To ensure that the investment in distribution network expansion, intensification, and household connections is made sustainable, and operations and maintenance are continued, several elements will need to be in place, including: coherent planning and coordination to be undertaken by REA in all activities undertaken across the country; financial commitment of GoU to expand the network infrastructure; and strong implementation capacity of all entities concerned, especially REA, ERA, and SPs. To help the Government strengthen these areas, the project includes technical assistance specifically targeted at REA, ERA, and SPs in planning and coordination as well as project implementation capacity. Moreover, the project will help mobilize additional financial resources from other development partners. Finally, the project includes technical assistance for systematically reviewing the implementation of the activities supported to inform any adjustments in project design that may be required in the course of implementation.

Sustainability of tariffs and financial viability of SPs: To ensure the sustainability of the rural electrification program, tariffs need to be set at least at the level that recovers operating costs. Rural population should also be able to afford the cost of connections and electricity. ERT-3 proposes arrangements that would make the connection-related costs affordable, while the tariffs structure, with low charges for consumption of the first 15 kWh per month, makes electricity affordable to the rural poor. Electricity Distribution and Sales Licenses issued by ERA include the Bulk Supply Tariff, approved distribution retail tariffs for domestic and commercial consumers, approved distribution loss targets, and applicable wheeling charges. In principle, approved tariffs should recover costs as long as the SPs are meeting performance targets. Tariff proposals are reviewed by ERA, taking into consideration the individual operating costs of each SP including system operating and administrative expenses, approved capital expenditure recovery through a depreciation allowance, financing costs, and/or an established rate of return on capital invested corresponding to the investments made by the SPs. The Implementation Agreements to be concluded between REA and SPs will stipulate technical, financial, and fiduciary capabilities of SPs to enter into implementation arrangements, and will be submitted to IDA.

Sustainability of off-grid solar home systems: The pace of installation required by the new target can only be sustained if the installed systems are properly maintained and customer satisfaction remains high. Recent advances in PV technology reduced the level of effort required for maintenance. For example, efficient plug and play pico solar PV systems require much less maintenance than the classical SHS. Integrated controller designs would allow continuous monitoring of system condition, and enable diagnosis and routine maintenance to be carried out remotely. In addition, ERT-3 provides working capital loans for pre-qualified solar companies that are extending credits for SHSs to households, to encourage a shift to lease-to-own, pay-as-you-go, and fee-for-service business models. These models should increase the affordability and create a

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long term relationship between solar companies and their customers, strengthening solar companies' efforts to carry out maintenance and customer support and remove risks from consumers for defective equipment or installation.

Sustainability of off-grid institutional solar systems: Close monitoring of the ongoing activities under ERT-2 has revealed some shortcomings that compromise the sustainability of investments made in institutional solar PV systems. These include: (i) inadequate duration of maintenance contracts that only run until the fifth year of operation; (ii) technical faults and damages arising from adverse weather incidents and vandalism; (iii) insufficient budgetary allocations to cater for the replacement of batteries to ensure full life usage of the systems installed. To address these issues, the MEMD, in coordination with the other line ministries (MoWE, MoESTS, and MoH), has agreed to allocate budget to cover the cost of maintenance, repair, and replacement of system parts beyond the first five years of operation. As vandalism was a particular concern for the solar systems installed at post-primary schools, MoESTS issued a Ministerial Circular, which underlined headmasters' responsibilities for maintaining the solar systems installed and that in case the systems are found not properly functional, administrative sanctions will be applied. In addition, MoESTS has developed a preventive plan of action to curb vandalism, which includes: (i) establishment of security committees composed of teachers and students to monitor the security of systems; (ii) increased security at night, (iii) welding of lockable cages for the internal components to prevent ease of access; and (iv) increased sensitization of students and community on the protection of the solar systems. The MoESTS's component will be implemented on a smaller scale than under ERT-2, and randomized monitoring of post-primary schools will be strengthened.

VI. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	×	
Natural Habitats OP/BP 4.04	×	
Forests OP/BP 4.36	×	
Pest Management OP 4.09		×
Physical Cultural Resources OP/BP 4.11	×	
Indigenous Peoples OP/BP 4.10		×
Involuntary Resettlement OP/BP 4.12	×	
Safety of Dams OP/BP 4.37		×
Projects on International Waterways OP/BP 7.50		×
Projects in Disputed Areas OP/BP 7.60		×

Comments (optional)

VII. Contact point

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