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Report No: PAD1301

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 67.70 MILLION  
(US\$95 MILLION EQUIVALENT)

TO THE

THE REPUBLIC OF RWANDA

FOR THE

ELECTRICITY SECTOR STRENGTHENING PROJECT

November 19, 2015

ENERGY AND EXTRACTIVES GLOBAL PRACTICE  
AFRICA REGION

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CURRENCY EQUIVALENTS  
(Exchange Rate Effective September 30, 2015)

Currency Unit = Rwandan Franc (RwF)  
729.80RwF = US\$1  
1.40374 US\$ = SDR 1

FISCAL YEAR  
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
AMI	Advanced Metering Infrastructure
AMR	Automated Meter Reading
BADEA	Arab Bank for Economic Development in Africa
BSSF	Business Support Services Firm
BTC	Belgium Technical Cooperation
CFL	Compact Florescent Lamps
CMS	Commercial Management System
CPAF	Common Performance Assessment Framework
CQS	Cost and Quality Selection
DMS	Distribution Management System
DPIT	Departmental Project Implementation Teams
EA	Environmental Assessment
EARP	Electricity Access Rollout Program
EASSDP	Electricity Access Scale-up and Sector Wide Approach Development Project
EDCL	Energy Development Corporation Limited
EDPRS2	Second Economic Development and Poverty Strategy
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
ELECTROGAZ	Etablissement de Production et de Distribution d'Electricité, d'Eau et de Gaz
EMP	Environmental Management Plan
ERP	Enterprise Resource Planning
ESMF	Environmental and Social Management Framework
EU	European Union
EUCL	Energy Utility Corporation Limited
EWSA	Energy and Water and Sanitation Authority
FIRR	Financial Internal Rate of Return
FY	Fiscal Year
GDP	Gross Domestic Product
GIS	Geographic Information System
GoR	Government of Rwanda
GRS	Grievance Redress Service
IBRD	International Bank for Reconstruction and Development
IC	Individual Consultant

ICB	International Competitive Bidding
IDA	International Development Association
IFC	International Finance Corporation
IFR	Interim Un-audited Financial Report
IRMS	Incident Recording and Management System
IPP	Independent Power Producers
IDMS	Integrated Distribution Management System
ITC	Internal Tender Committee
JBSR	Joint Budget Support Review
JICA	Japan International Cooperation Agency
JSR	Joint Sector Reviews
KPI	Key Performance Indicators
KV	Kilo Volt
KWh	Kilowatt Hour
LCS	Least Cost Selection
LV	Low Voltage
M&E	Monitoring and Evaluation
MCC	Metering Control Center
MDM	Meter Data Management
MINECOFIN	Ministry of Finance and Economic Planning
MININFRA	Ministry of Infrastructure
MIS	Management Information System
MoU	Memorandum of Understanding
MV	Medium Voltage
MW	Mega Watt
NCB	National Competitive Bidding
NCC	National Control Center
NPV	Net Present Value
O&M	Operations and Maintenance
OFID	OPEC Fund for International Development
OP/BP	Operational Policy/Bank Procedure
PAP	Project Affected Persons
PCU	Project Coordination Unit
PDO	Project Development Objective
PFM	Public Financial Management
PRAMS	Procurement Risk Assessment and Management System
PRMRS	Public Financial Management Reform Strategy
PIM	Project Implementation Manual
PISA	Project Implementing Support Agreement
PPA	Power Purchase Agreement
PSC	Project Steering Committee
PV	Photovoltaic
QBS	Quality Based Selection
QCBS	Quality and Cost Based Selection
RECO	Rwanda Energy Corporation
REG	Rwanda Energy Group

RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
RPP	Revenue Protection Program
RURA	Rwanda Utilities Regulatory Commission
RWASCO	Rwanda Water and Sewerage Corporation
SBD	Standard Bidding Documents
SCADA	Supervisory Control and Data Acquisition
SE4All	Sustainable Energy for All Initiative
SOE	Statement of Expenditure
SREP	Scaling Up Renewable Energy in Low Income Countries Program
SSS	Single Source Selection
SWAp	Sector-wide Approach
SWG	Sector Working Group
ToU	Time of Use
UNCITRAL	United Nations Commission on International Trade Law
WASAC	Water and Sanitation Corporation Limited

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# RWANDA

## ELECTRICITY SECTOR STRENGTHENING PROJECT

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## PAD DATA SHEET

Rwanda

Electricity Sector Strengthening Project (P150634)

### PROJECT APPRAISAL DOCUMENT

AFRICA

0000009058

Report No.: PAD1301

Basic Information			
Project ID P150634	EA Category B - Partial Assessment	Team Leader(s) Paul Baringanire	
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ]		
	Financial Intermediaries [ ]		
	Series of Projects [ ]		
Project Implementation Start Date December 11, 2015	Project Implementation End Date October 31, 2021		
Expected Effectiveness Date March 11, 2016	Expected Closing Date October 31, 2021		
Joint IFC: No			
Practice Manager/Manager Lucio Monari	Senior Global Practice Director Anita Marangoly George	Country Director Diariétou Gaye	Regional Vice President Makhtar Diop
Borrower: The Republic of Rwanda			
Responsible Agency: Ministry of Infrastructure			
Contact: Telephone No.: (+250) (0) 252573802	Ms Odette Mbabazi	Title: Email: ombabazi@eucl.reg.rw	Managing Director, Rwanda Energy Utility Corporation Limited
Project Financing Data(in USD Million)			
[ ] Loan	[ ] IDA Grant	[ ] Guarantee	
[ X ] Credit	[ ] Grant	[ ] Other	
Total Project Cost:	95.00	Total Bank Financing:	95.00
Financing Gap:	0.00		

<b>Financing Source</b>	<b>Amount</b>
BORROWER/RECIPIENT	0.00
International Development Association (IDA)	95.00
Total	95.00

<b>Expected Disbursements (in USD Million)</b>							
Fiscal Year	2016	2017	2018	2019	2020	2021	2022
Annual	5.0	9.50	19.00	28.50	19.00	9.50	4.50
Cumulative	5.0	14.50	33.50	62.00	81.00	90.50	95.00

**Institutional Data**

**Practice Area (Lead)**

Energy & Extractives

**Contributing Practice Areas**

**Cross Cutting Topics**

- Climate Change
- Fragile, Conflict & Violence
- Gender
- Jobs
- Public Private Partnership

**Sectors / Climate Change**

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Public Administration, Law, and Justice	Public administration-Energy and mining	25		
Energy and mining	Transmission and Distribution of Electricity	65		
Energy and mining	General energy sector	10		
Total		100		

I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

**Themes**

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Public sector governance	Other public sector governance	25



Urban development	Other urban development	10
Financial and private sector development	Infrastructure services for private sector development	55
Rural development	Rural services and infrastructure	10
Total		100
<b>Proposed Development Objective(s)</b>		
The Project Development Objective (PDO) is to enhance the operational efficiency of the utility and increase electricity access.		
<b>Components</b>		
<b>Component Name</b>	<b>Cost (USD Millions)</b>	
A. Electricity Sector Capacity Strengthening	20.00	
B. Increased Access to Electricity Services	70.00	
C. Technical Assistance and Project Implementation Support	5.00	
<b>Systematic Operations Risk- Rating Tool (SORT)</b>		
<b>Risk Category</b>	<b>Rating</b>	
1. Political and Governance	Substantial	
2. Macroeconomic	Low	
3. Sector Strategies and Policies	Substantial	
4. Technical Design of Project or Program	Substantial	
5. Institutional Capacity for Implementation and Sustainability	Substantial	
6. Fiduciary	Substantial	
7. Environment and Social	Moderate	
8. Stakeholders	Moderate	
9. Other – Sector Financial Sustainability	Substantial	
<b>OVERALL</b>	Substantial	
<b>Compliance</b>		
<b>Policy</b>		
Does the project depart from the CAS in content or in other significant respects?	Yes [ ]	No [ X ]
Does the project require any waivers of Bank policies?	Yes [ ]	No [ X ]
Have these been approved by Bank management?	Yes [ ]	No [ ]
Is approval for any policy waiver sought from the Board?	Yes [ ]	No [ X ]
Does the project meet the Regional criteria for readiness for implementation?	Yes [ X ]	No [ ]
<b>Safeguard Policies Triggered by the Project</b>	<b>Yes</b>	<b>No</b>

Environmental Assessment OP/BP 4.01		X	
Natural Habitats OP/BP 4.04			X
Forests OP/BP 4.36			X
Pest Management OP 4.09			X
Physical Cultural Resources OP/BP 4.11		X	
Indigenous Peoples OP/BP 4.10			X
Involuntary Resettlement OP/BP 4.12		X	
Safety of Dams OP/BP 4.37			X
Projects on International Waterways OP/BP 7.50			X
Projects in Disputed Areas OP/BP 7.60			X
<b>Legal Covenants</b>			
<b>Name</b>	<b>Recurrent</b>	<b>Due Date</b>	<b>Frequency</b>
Annual financial audits	X		Yearly
<b>Description of Covenant</b>			
Annual financial audits submitted within six months after the end of each financial year.			
Interim unaudited financial reports	X		Quarterly
<b>Description of Covenant</b>			
EUCL to prepare and furnish to the Association not later than forty-five (45) days after the end of each calendar quarter, interim unaudited financial reports for the Project covering the quarter, in form and substance satisfactory to the Association.			
New Electricity Connections Contributions Account	X		Yearly
<b>Description of Covenant</b>			
Not later than the 30 <sup>th</sup> of every month, the Project Implementing Entity to deposit the cash contributions for new electricity connections received in the preceding month into the Electricity Connections Contributions Account.			
EUCL Operating Revenue	X		Yearly
<b>Description of Covenant</b>			
The Recipient shall ensure that the Project Implementing Entity's Operating Revenue shall reflect the principles of Cost Recovery and be sufficient to cover Operating Expenses and Debt Service.			
Procurement Capacity Building Strategy	X	Six (6) months from Effectiveness	
<b>Description of Covenant</b>			
The Recipient shall, within six (6) months of the Effective Date adopt a procurement capacity building strategy and implementation plan.			
Subsidiary Agreement		Effectiveness	
<b>Description</b>			

The Subsidiary Agreement has been signed on behalf of the Recipient and the Project Implementing Entity.			
Project Implementation Arrangements		Effectiveness	
<b>Description</b> The Project Implementing Entity has appointed the Project Manager and has established the Project Steering Committee and the Departmental Project Implementation Teams (“DPITs”), all in accordance with the provisions of Section I.A of Schedule 2 to the Financing Agreement.			
Project Implementation Manual		Effectiveness	
<b>Description</b> The Project Implementing Entity has adopted the Project Implementation Manual in accordance with the provisions of Section I.B of Schedule 2 to the Financing Agreement.			
Project Implementation Support Agreement		Effectiveness	
<b>Description</b> The Project Implementation Support Agreement has been signed on behalf of the Project Implementing Entity and EDCL in accordance with the provisions of Section I.D of Schedule 2 to the Financing Agreement.			
Sector Financial Recovery Plan		Effectiveness	
The Recipient has developed and obtained Cabinet approval of the Sector Financial Recovery Plan.			

<b>Team Composition</b>				
<b>Bank Staff</b>				
<b>Name</b>	<b>Role</b>	<b>Title</b>	<b>Specialization</b>	<b>Unit</b>
Paul Baringanire	Team Leader (ADM Responsible)	Senior Energy Specialist		GEEDR
Yadviga Semikolenova	Team Member	Senior Energy Economist		GEEDR
Mulugeta Dinka	Procurement Specialist	E T Consultant		GGODR
Lillian Brenda Namutebi	Financial Management Specialist	Consultant		GGODR
Atsumasa Sakai	Team Member	Energy Specialist		GEEDR
Bernadette Tembo Milunga	Team Member	Program Assistant		GEEDR
Edward Felix Dwumfour	Safeguards Specialist	Senior Environmental Specialist		GENDR
Lara Born	Team Member	Jr Professional Officer		GEEDR
Laurencia Karimi Njagi	Team Member	Senior Energy Specialist		GEEDR
Norah Kipwola	Team Member	Senior Energy Specialist		GEEDR
Mary C.K. Bitekerezo	Safeguards Specialist	Senior Social Development Specialist		GSURR
Pedro Antmann	Team Member	Lead Energy Specialist		GEEDR
Stephen Mugendi Mukaindo	Counsel	Counsel		LEGAM
Sudeshna Ghosh Banerjee	Team Member	Senior Economist		GEEDR
Maiada Kassem	Finance Officer	Finance Officer		WFALA
Juliana Chinyeaka Victor	Team Member	Senior Monitoring & Evaluation Specialist		GPSOS
<b>Extended Team</b>				
<b>Name</b>	<b>Title</b>	<b>Office Phone</b>	<b>Location</b>	
Mark Owuondo	Consultant, Environment		Nairobi	

<b>Locations</b>					
<b>Country</b>	<b>First Administrative Division</b>	<b>Location</b>	<b>Planned</b>	<b>Actual</b>	<b>Comments</b>
Rwanda	Eastern Province	Rwamagana, Gatsibo, Ngoma	<b>X</b>		
Rwanda	Southern Province	Kamonyi, Huye	<b>X</b>		
Rwanda	Southern Province	Nyamagabe	<b>X</b>		
Rwanda	Western Province	Karongi, Rutsiro	<b>X</b>		
Rwanda	Northern Province	Burera, Rubavu	<b>X</b>		
Rwanda	Kigali City	Kigali	<b>X</b>		
<b>Consultants (Will be disclosed in the Monthly Operational Summary)</b>					
Consultants Required?		Yes			



## **I. STRATEGIC CONTEXT**

### **A. Country Context**

1. Rwanda is a landlocked country in the Great Lakes region of Africa, bordered by the Democratic Republic of the Congo, Burundi, Tanzania, and Uganda. Rwanda has made impressive development progress since the genocide and civil war that engulfed the country in the early 1990s. It is now consolidating gains in social development and accelerating growth while ensuring that these are broadly shared to mitigate risks to eroding the country's hard-won political and social stability. The results are noteworthy. From 2006 to 2011, Rwanda's poverty level dropped from 57 percent to 45 percent. Rwanda's 2013 human development index is above the average for countries in Sub-Saharan Africa. Rwanda has also been the leading reformer among African economies in Doing Business indicators, ranking 55 in the world in 2015. Annual GDP growth has averaged 6 percent over the period 2000-2014, and projections indicate annual GDP growth up to 8 percent in the coming years.

2. Rwanda's strategy for stimulating rapid and sustainable economic growth and reducing poverty is articulated in Rwanda's Vision 2020. Vision 2020, the national vision and policy framework, articulates key priorities for the country's development by the year 2020. This vision is further laid out in the Second Economic Development and Poverty Reduction Strategy Paper (EDPRS2), which delineates electricity as a key sector and a significant engine of inclusive growth for the country. The country's EDPRS2, aims to accelerate progress to middle income country status through a sustained annual GDP growth of at least 11.5 percent and accelerated reduction of poverty to less than 30 percent of the population by 2018. This would be achieved by the private sector serving as the engine of growth and job creation over the medium term (2013-2018) in addition to increased off-farm employment. In addition, the aid shortfall during the period 2012/13 and slowdown of foreign direct investment in 2012 as a result of global financial crisis revealed the urgency to shift from an aid-dependent, public sector-led development process to a private sector-led growth trajectory to meet the EDPRS2 goals.

3. Electricity remains one of the major challenges to the country's socioeconomic transformation. Ensuring access to modern, sustainable, and affordable energy services is integral to Rwanda's economic development, poverty eradication, and socioeconomic transformation agenda. Access, reliability, and cost of electricity are primary constraints to scaling-up investment flows, as articulated in Rwanda's Investment Climate Report (Private Sector Development Policy Note, 2014). Firms lose out on competitive advantage due to the high price of electricity which, at US\$0.22/KWh, is much higher than in neighboring countries (Kenya at US\$0.16, Uganda at US\$0.17, and Tanzania at US\$0.13). Industries present electricity as a binding constraint, an important consideration as they are the ones most likely to drive job creation, exports, and growth. According to the Enterprise Survey (World Bank, 2011), power outages contribute to 2.6 percent of annual losses for companies. Finally, while access has risen from 6 percent in 2009 to 22 percent by the end of 2014, a large majority of the population remains without access to electricity, particularly in rural areas.

4. Electricity features as key in two of the four thematic areas identified to achieve EDPRS2

goals: Economic Transformation for Rapid Growth, and Rural Development.<sup>1</sup> In the former, the outcome is to ensure sufficient generation to meet all of Rwanda's energy demand by increasing generation capacity to 563 MW (the generation target for 2018), which entails strengthening the enabling environment so as to attract robust private sector interest in generation projects. For the latter, the outcome is to increase access to electricity to new growth centers and the rural population through both grid and off-grid means. While grid electrification is underpinned by the ongoing national Electricity Access Rollout Program (EARP), the Government of Rwanda (GoR) also anticipates substantial scale-up of off-grid modes, particularly solar products delivered by the private sector.

5. An energy sector policy and sector strategic plan to complement the country's economic aspirations were approved in March 2015. This mandate is translated into three specific goals for the energy sector:

- i. Ensuring the availability and affordability of energy supply for all Rwandans;
- ii. Encouraging the rational and efficient use of energy; and
- iii. Establishing environmentally sound and sustainable systems of energy production, procurement, transportation, distribution and end-use.

6. To achieve these objectives, a scale-up of generation capacity, reduction of system losses, and bolstering of the energy sector financial situation are essential. To this end, the GoR has undertaken a wide-ranging reform program to create a viable and accountable sector that is able to deliver energy services in a commercially sustainable manner. These challenges and the sector and institutional context are presented in the next section.

## **B. Sectoral and Institutional Context**

### **Sectoral Challenges**

7. **Low Access.** In spite of important achievements since 2009, more than three out of four Rwandans, largely located in rural areas, lack access to electricity. The total number of electricity customers has risen substantially since January 2009, from about 6 percent to 22 percent by the end of 2014. However, the electrification rate remains largely concentrated in the top quintile, with almost negligible coverage in the bottom 40 percent of the population. To address the needs of the vast majority of the population and ensure sustainable poverty reduction and rural livelihoods, one of the priorities of the EDPRS2's rural transformation theme is to connect rural communities to economic opportunity through improved infrastructure, including increased access to electricity services which is widely associated with increased off-farm activity and increased economic interaction (e.g., agricultural market information and facilitation of trading through mobile money transfers through use of mobile phones). The overarching objective is to provide core infrastructure, including increased access to the electricity grid, required to: (i) stimulate investments and economic activities in rural areas; and (ii) contribute to improved public service delivery targeting community-based institutions used by the poor, such as schools, clinics, and hospitals for shared growth and prosperity. To attain this objective, the EDPRS2 target is to increase access to electricity to 70 percent by 2018 and access to the electricity grid to 48 percent,<sup>2</sup>

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<sup>1</sup> The remaining two thematic areas are Productivity and Youth, and Accountable Governance.

<sup>2</sup> The remaining 22 percent are targeted to be covered by off-grid solutions.

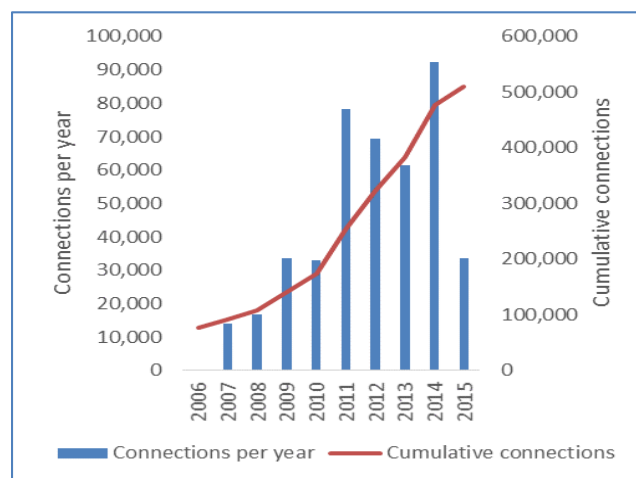


including 100 percent coverage of all the rural growth centers, secondary cities, and social infrastructure such as health centers, post primary schools, and sector public administrative centers.

8. In addition to the objective of increasing infrastructure access for rural development and specific targeting of community-based institutions used by the poor for shared growth and prosperity, the EARP also focuses on social equity (regional balance) and embeds elements to facilitate poor households to defray upfront connection fees and monthly bills. Mechanisms to do this include: (i) use of low-cost “ready boards”<sup>3</sup> for poor households to defray internal house wiring installation; (ii) payment of the connection fees over a period of up to two years after the connection date; and (iii) energy efficiency incentives (use of compact florescent lamps, CFLs) that not only help to save generation investments to meet incremental demand from new household connections, but also support the poor households who initially mainly use electricity for lighting (use of CFLs can achieve savings of about 75 percent compared to ordinary incandescent bulbs).

9. **Progress in Electricity Access.** In 2009 the GoR, with support from the World Bank, prepared a National Electricity Access Program Investment Prospectus in order to address challenges related to the lack of credible electricity access plans, which had led to a fragmented and underfunded approach. A geographic information system (GIS)-based spatial network plan was developed to optimize expansion in Rwanda through the year 2020 comparing, among others, the costs of electricity supply from alternative sources (grid and off-grid). The prospectus integrated technical, financing, and implementation planning components, and became known as the EARP. The World Bank has provided funding for the EARP as a lead donor since the initiation of the program, through successive International Development Association (IDA) funded operations, including the Electricity Access Scale Up and Sector Wide Approach (SWAp) Project approved in 2009 and its additional financing approved in 2013. Since then, the EARP has increased the national electricity access rate from about six percent in 2009 to 22 percent by the end of 2014.

**Figure 1. Growth in Electricity Connections in Rwanda**



Source: EARP

<sup>3</sup> These are ready-to-use pre-wired boards with a lighting point and socket that act as a termination for the incoming electricity supply and thereby obviate the need for internal house wiring for low income households.

10. This remarkable scale-up is a result of a robust design and implementation of the access program, highlighted as best practice by the Bank’s Independent Evaluations Group (IEG).<sup>4</sup> The IEG report highlights that: (i) the transition from low access to high, or universal, access can be made within two decades through strong and sustained grid-based expansion as in the case of Indonesia, Lao PDR, and Vietnam; (ii) a synchronized and comprehensive approach is essential, together with a clear government vision and commitment to the access goals; and (iii) a SWAp along with demonstrated government commitment so far have led to very significant financing commitments from various development partners. Rwanda is now considered an emerging success story in expanding energy access.<sup>5</sup>

11. Since its launch in 2009, EARP has been supported by several development partners, including the African Development Bank (AfDB), Arab Bank for Economic Development in Africa (BADEA), Belgium Technical Cooperation (BTC), the European Union (EU), Netherlands, Japan, OPEC Fund for International Development (OFID), Saudi Fund, the World Bank, and others.

**Table 1. EARP Funding, 2009-2014**

<b>Source</b>	<b>Amount (US\$m)</b>
World Bank	130
Government of the Netherlands	44.4
BADEA	11.2
OFID	22
Saudi Fund	11.7
BTC	37.74
AfDB	42
AfD	4.6
GoR	65
Consumer Contributions	27
<b>Total</b>	<b>395.64</b>

12. The access component (component B2) of this project aims at continuing to support the EARP; several other donors have also expressed their intent to provide additional parallel financing. Details of the pipeline funding to support the GoR targets are provided in Annex 2.

13. A rural electrification strategy is currently being prepared with the support from the EU to address the 22 percent of the population to get access to electricity through off-grid solutions. Although current levels of off-grid provision are low, there is a nascent industry, and the private sector can play a significant role. The GoR is already implementing activities to develop several small hydropower resources in the country, to provide electricity services to the off-grid population. In addition, various donor initiatives have supported the solar home systems and off-

<sup>4</sup> *The World Bank Group Support to the Electricity Access FY 2000-2015*, IEG, 2015.

<sup>5</sup> See *Livewire* note of the Energy and Extractives Global Practice of the World Bank: <https://openknowledge.worldbank.org/handle/10986/18680>

grid photovoltaic (PV) sector. For example, the World Bank-funded Energy Small and Medium Enterprise Project has provided gap financing and the market development assistance to selected low-cost mobile solar systems and solar lanterns. With assistance from the World Bank, the International Finance Corporation, and the AfDB, a draft investment plan for the Scaling Up Renewable Energy in Low Income Countries Program (SREP) has recently been prepared suggesting several options for an initial US\$50 million grant to support the off-grid and renewable energy sector.

14. ***Limited Investments in Generation Capacity.*** Rwanda’s installed generation capacity as of the end of 2014 was about 150 MW, with available capacity of about 130 MW and peak demand of about 110 MW. The GoR plans to expand the country’s generation capacity to about 563 MW by 2018, which requires an annual investment of approximately US\$167 million. To increase the country’s total installed generation capacity, GoR is making efforts to tap into methane, peat, and solar to secure a more balanced energy mix and lower the cost of supply. GoR’s policy is to have a private sector-led generation investment program. Albeit Rwanda’s high ranking in “Doing Business,” increased private sector participation in Rwanda’s energy sector has been constrained by lack of adequate staff with experience for effective management of the sector. As a result, sector policies, planning approach, and development plans have not been robust enough to identify optimal generation projects that are bankable for development by the private sector. Human resource constraints have also limited the sector’s capacity in the procurement of private sector investment and implementation of planned projects. As a result, there have been no clear procedures to implement new investments in electricity generation. Thus, the sector has been responding to unsolicited proposals for generation projects, which is hindered by a lack of standardized key documents, such as Power Purchase Agreements (PPAs), causing difficulties in negotiations. This has resulted in delays in bringing various generation investments to financial closure.

15. One of the major drivers behind the country’s ongoing sector reforms is to improve the electricity utility’s ability to be a viable off-taker for private generators. This also required granting operational autonomy to diligently develop the technical studies and field work required to assess the potential/availability of indigenous energy resources, and define and implement the approaches to be adopted to enable their effective use and development with private sector participation. Measures to create an attractive enabling environment for private sector participation have been undertaken and include the following:

- i. Establishing transparent licensing processes;
- ii. Opening specific sites to experienced and reputable developers selected through a competitive and transparent process;
- iii. Increasing the sector capacity to negotiate and supervise private sector-led transactions; and
- iv. Undertaking prefeasibility studies and upstream assessments for some of the investments, such as geothermal exploratory drilling.

16. Memoranda of Understanding (MoU) have been signed with a number of private developers for an additional capacity of about 175 MW in the next four to five years. Geothermal deep well drilling commenced in September 2013, and the assessment of the probable potential is ongoing. GoR is also in discussions with Kenya, Uganda, and Ethiopia on power imports. To date,

a PPA has been agreed with Kenya for supply of up to 50 MW commencing from 2016. Table 2 lists ongoing and planned generation projects in Rwanda.

**Table 2. Rwanda Ongoing and Planned Generation Projects**

Name/Type	Capacity (MW)	Expected Commissioning Date	Status
<b>Ongoing Projects</b>			
Kivuwatt (Methane)	25	December 2015	Construction ongoing.
Gishoma (Peat)	15	December 2015	Construction ongoing.
<b>Pipeline Projects</b>			
Kivuwatt (Methane)	75		PPA signed. Financial close contingent on commissioning Phase I.
Punj Lloyd (Peat)	50		PPA negotiations ongoing
Hakan (Peat)	50		PPA signed.
Rusumo (Hydro)	30	2018	Financing secured.
Ruzizi (Hydro)	45	2019	Developer selected. PPA negotiations ongoing.
Nyabarongo (hydro)	14		Developer selected. Feasibility study ongoing
Pico/Micro Hydros	7.5		Feasibility study and designs ongoing.
Geothermal			Feasibility assessments ongoing.
Power Imports (Uganda/Kenya/Ethiopia)	50-450	2016- 2018	A PPA has been signed between Rwanda and Kenya for 50 MW power imports starting 2016, and a MoU has been signed between Rwanda and Ethiopia for 400 MW starting 2018 <sup>6</sup> .

Source: Rwanda Energy Sector Strategic Plan, March 2015

17. **High System Losses.** One fifth of the electricity generated is lost in the system either as technical or commercial losses.<sup>7</sup> The current transmission network and sub-transmission network is mainly radial and cannot provide an alternative supply route in case of scheduled maintenance or unscheduled outages. In addition, some of the equipment is dilapidated and poses operational challenges, whereas others do not have features to enable remote monitoring and control. The sector has, in the recent past, undertaken several assessments that have recommended strategies to reduce system losses with the support from the World Bank. Without the implementation of these strategies, there is a likelihood of increasing technical losses, frequent equipment blow-outs, increased downtime due to localized network overloads, and increased network operations and maintenance costs. Infrastructure investment of about US\$1.2 billion are needed in the transmission and distribution system in order to improve reliability of supply in the next three years.

18. **High Cost of Service and Sector Financial Viability.** Rwanda's electricity cost of service is very high, at about US\$0.32/KWh. The current power generation mix is about 55/45 percent hydro/thermal, and the thermal generation is based on imported diesel fuel. Regional droughts put additional constraints on the hydropower supply, which is exacerbated by a lack of adequate grid interconnection capacity, leaving Rwanda with a limited possibility of sourcing electricity from its neighbors. Furthermore, the electricity system has been operating without a reserve margin. These system constraints have led to the continued reliance on rental diesel generators from private companies at a high cost.

19. **Financial Viability of the Sector.** In recent years, the financial performance of the sector has been weak and continues to rely on government subsidies. In FY2013, losses amounted to US\$3.9

<sup>6</sup> Uganda's contractual obligation is to provide "wheeling services"

<sup>7</sup> Rwanda Electricity Grid Audit, 2013.

million with an average operating loss of US\$0.09/KWh. In addition, the opaque, cross-subsidization of financial resources for electricity, water, and sanitation services under the former utility Energy and Water and Sanitation Authority (EWSA), now split into two separate utilities, has affected the efficiency of operations. Sector funds were focussed on short-term, recurrent expenditures leading to a neglect of crucial longer-term activities, such as planning and system maintenance.

20. To address the high cost of service, the sector has prepared a least cost power development plan which will help put in place prioritized investments needed to develop the sector from generation through transmission to distribution, including timing, procedures/implementation responsibilities, and financing. In addition, the sector has prepared a financial recovery plan that highlights the revenue requirements and sources of funding, which was endorsed by the Cabinet Economic Cluster Sub-Committee on October 26, 2015. The financial recovery plan is aimed at ensuring the availability of adequate resources needed for the priority generation investments outlined in the least cost power development plan in order to reduce the generation costs, the major contributor of the high cost of service in Rwanda. The average cost of service for the period 2015-2018 is estimated to reduce from the current US\$0.32/KWh to about US\$0.26/KWh as lower cost generation is commissioned (Table 2) and thermal generation based on imported diesel fuel decommissioned.

21. As part of immediate actions to address sector financial recovery, effective September 1, 2015 the average electricity tariff has been raised from 133 Rwf/KWh (US\$0.19) to 160 Rwf/KWh (US\$0.23/KWh)<sup>8</sup> whereby low voltage customers (residential and non-residential customers) will be charged 182 Rwf/KWh (US\$0.25/KWh) and medium voltage customers (industrial) will be charged 126 Rwf/KWh (US\$0.17/KWh) reflecting the corresponding cost of service. The impacts of tariff revision will be augmented by the ongoing restructuring process that separates electricity from water and sanitation, allowing more direct allocation of costs and efficiency in operations, such as reduction of system losses.

22. While GoR's immediate priorities with regard to the sector financial sustainability mainly focus on reducing cost of service and increasing operations efficiency (network loss reductions), it will also continue to provide operations subsidies to the utility. Thus the major challenge remains the need to cover some running costs of the utility to sustain operations. Unlike other countries in the region (Uganda, Kenya, Tanzania, Burundi), Rwanda does not implement a social tariff, therefore the challenge of balancing cost recovery with equity is magnified. However, Rwanda has implemented a pre-paid metering system (currently 90 percent of its consumers) that allows households to manage their consumption as well as a connection cost installment scheme, which allows households to pay the connection cost of US\$100 (about one-tenth of the total cost of service) over a period of up to two years. To address financial sustainability, the project includes a legal covenant related to ensuring that EUCL's operating revenue reflects cost recovery principles and remains sufficient to cover operating expenses and debt service.

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<sup>8</sup> Excludes 18% VAT.

## Institutional Context

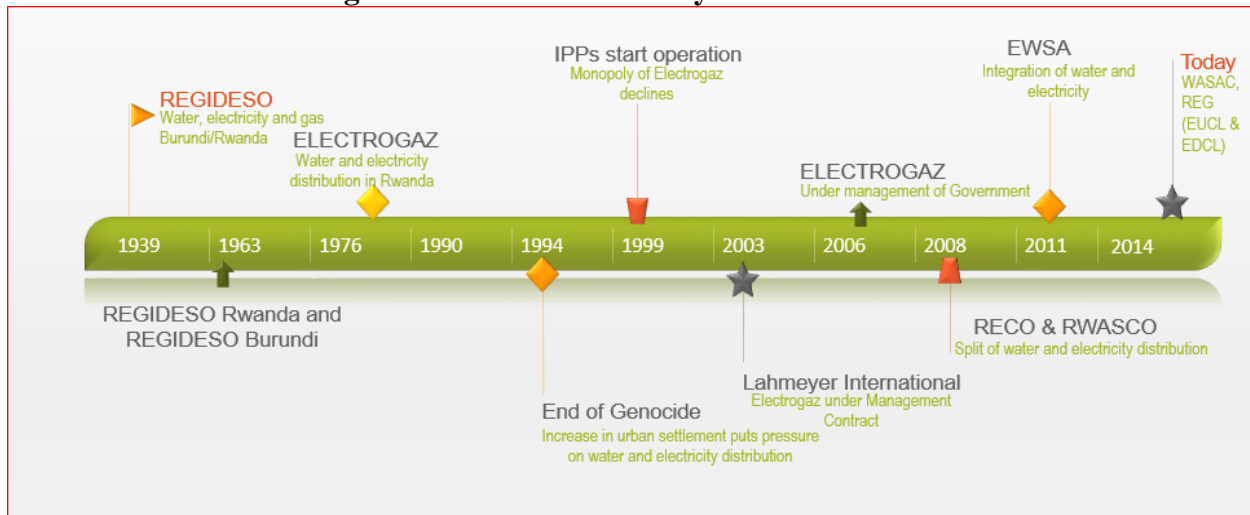
**Sector Reforms.** The institutional structure of the power sector has evolved significantly since the late 1990s (see Figure 2). The Public Utility Company, Etablissement de Production et de Distribution d'Electricité, d'Eau et de Gaz (ELECTROGAZ), had a monopoly on the production and distribution of water and electricity until 1999 when a law opened the power sector to private participation. ELECTROGAZ was then placed under a management contract with a private company (Lahmeyer International) between 2003 and 2006. However, the main purpose of the management contract – to improve the company operations – was not achieved. In 2008 ELECTROGAZ was split into two semi-autonomous agencies: the Rwanda Energy Corporation (RECO) and the Rwanda Water and Sewerage Corporation (RWASCO). In 2011 the two companies were integrated as the EWSA.

23. These reforms did not yield the desired results of efficiency in operations and financial viability mainly due to:

- i. Lack of autonomy;
- ii. Opaque cross-subsidization of financial resources; and
- iii. Ineffective management information system (MIS).

24. Lack of autonomy to make decisions in key areas such as determination of organizational structure, recruitment, attraction and retention of staff, procurement, and expenditure approval restricted the various managements' ability to make rapid decisions in the interest of the utility. Opaque cross-subsidization of financial resources affected the financial viability and efficiency of electricity, water, and sanitation services. Finally, an ineffective MIS led to unreliable management information, which further hindered effective decision making.

**Figure 2. Rwanda Electricity Sector Evolution**



Source: World Bank

25. Recognizing that effective institutional arrangements are crucial for the sector's long term sustainability, financial performance, and increased private sector investments, GoR undertook several consultations and considered options to organize the sector more effectively. The World

Bank played a role as technical advisor. On October 2013, a Cabinet decision was made to establish three corporate companies out of the EWSA:

- i. An electricity utility, the Electricity Utility Corporation Limited (EUCL);
- ii. An energy development company, the Rwanda Energy Development Corporation Limited (EDCL); and
- iii. A company responsible for water supply and sanitation services development and operations, the Rwanda Water and Sanitation Corporation Limited (WASAC).

26. The option for a service management contract for the new corporate energy companies was discussed and rejected by GoR in view of the past experience. Instead, the two energy companies, the EUCL and EDCL, were made subsidiaries of one holding company, the Rwanda Energy Group (REG) and report to one Board of Directors. The new agencies commenced operations in August 2014 following the Prime Minister's Orders dated July 2014.<sup>9</sup> While the government retains ownership of the corporatized entities, the government's role will be significantly reduced as the new utilities will be governed under the company law as opposed to the public service law.

27. With the new corporate institutional organization, sector oversight and management will now be the primary responsibility of three institutions: (i) the Ministry of Infrastructure (MININFRA) has the responsibility for setting the overall policy and strategy of the energy sector, and for coordinating the developments of the electricity sub-sector; (ii) the Rwanda Utilities Regulatory Commission (RURA) regulates and approves electricity tariffs; (iii) the REG, with its two subsidiaries, EUCL and EDCL, are responsible for electricity utility operations and new energy development activities, respectively. This split of utility operations and energy resource development will allow for clear financial accountability between energy development (non-revenue) and utility operations (revenue generating electricity business). The REG holding company has no operational responsibilities and will not participate in the day-to-day decisions of the subsidiaries. It plays an interfacing role between government policies enforcement and subsidiary companies' sustainable management. REG's key role is to ensure timely execution of the actions under the National Strategic Plan by the subsidiary companies while at the same time ensuring that the government provides appropriate economic resources to each subsidiary.

28. Following the enactment of the Law repealing the EWSA and establishing the REG and its subsidiaries; recruitment of key staff through a competitive process has been finalized. The exercise of separating the water and power assets and liabilities of the former EWSA and transferring the power assets and liabilities to the two subsidiaries of REG - EDCL and EUCL - is under implementation. The split of the activities between the two subsidiaries and capacity building is expected to take a minimum of six years and up to 10 years, after which electricity development is expected to have progressed sufficiently in order to reduce the activity of EDCL. At that point, it is envisaged that the capacity developed can be transferred to EUCL. A new Board of Directors for the REG has been appointed whose mandate, among others, includes: (i) set the Group Holding's strategy based on a clear interpretation of the government policy and sector strategy and to provide guidance to the strategic planning process of EUCL and EDCL; (ii) ensure alignment with the overall sector development priorities; and (iii) through the REG Chief

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<sup>9</sup> The institutional reorganization included enacting a new legal framework, Law No 97/2013 of 30/01/2014, allowing for creation of the new sector corporate entities.

Executive Officer, provide oversight to the inter-corporate relationships in planning and project implementation.

29. The capacity of the newly created sector institutions will need to be strengthened to realize improvements in sector performance. The previous utility, EWSA, lacked autonomy to put in place suitable arrangements, such as organization and salary structures, to attract and retain skilled staff which, coupled with the frequent organizational changes implemented in the sector in the last 10 years, resulted in high turnover of staff. The MIS presently being used by EUCL is inadequate to support critical business processes. A large part of the processes in EUCL, including management of outages and customer inquiries, are carried out manually. The basic customer relationship management system is not integrated with the rest of the operations. As a result, EUCL does not have timely access to reliable information on key parameters of operational and financial performance for effective decision making.

30. A concerted effort to strengthen the human resource and technical capacity of EUCL and EDCL, led by their common Board of Directors, has been made. The Board has approved organizational and compensation structures for the REG, EUCL, and EDCL aimed at attracting and retaining experienced staff. The recruitment of most senior staff is complete. Other than the Chief Executive Officer of REG and Managing Directors of EUCL and EDCL, recruitment of other staff has been carried out through a competitive process facilitated by a manpower development consultant. The recruitment targeted national talent, and there is a need to strengthen the technical and management capacity of the newly appointed managers in key functions, such as generation, transmission, distribution, human resources, and finance. It is expected that the local staff will have gained adequate experience and skills to be able to efficiently manage the utility on their own within three years.

31. Building the capacity of these new sector institutions to function as commercial companies will require a minimum of three to five years. Staffing the institutions appropriately is the first step. The staff will also need tools, such as an integrated MIS, to carry out business process reengineering to achieve the operational improvements envisaged under the sector reform program. Finally, investment prioritization will be undertaken as part of the ongoing financial recovery plan underpinned by the least cost power development plan. This project supports the implementation of the sector reform program as detailed in Annex 2.

32. This project represents the World Bank's support to implementation of the sector reforms. Aside from the World Bank, other development partners currently involved in the reform program include Belgium, which is providing comprehensive technical assistance support to MININFRA; the EU, which is preparing a EUR 200 million sector budget support operation that could potentially support several sector aspects, including system loss reductions (network strengthening) and the EARP; Japan International Cooperation Agency (JICA), which has provided support to the preparation of the least cost power development plan and is considering additional grants to EUCL. The implementation of sector reforms is coordinated by Rwanda's Energy Sector Working Group (SWG), which is co-chaired by the government (MININFRA) and development partners. The SWG provides a forum for sector dialogue between government, development partners, and other sector stakeholders and a mechanism for monitoring government programs and development partner support.



### C. Higher Level Objectives to which the Project Contributes

33. **Relationship to the Country’s Vision and Development Strategy.** Increased access to electricity services is a GoR priority under the country’s Vision 2020 and the EDPRS2, which implements the Vision, and has been supported by the World Bank and other development partners under a SWAp since 2009.<sup>10</sup> The goal of reaching 48 percent on-grid electrification rate by 2018 from the current level of 22 percent will require scale-up of current activities, and funding arrangements will need to be sustained and even increased. Based on EARP estimates, new connections amounting to 713,200 will have to be added (including both expansion and in-fill), and there remains a funding gap of about US\$400 million after taking into account the ongoing and committed funding arrangements. The proposed project will contribute to alleviating this gap, leveraging more finance, helping to sustain the GoR’s increased access to electricity services program, and aligning with World Bank’s experience to date on supporting energy access agenda.<sup>11</sup>

34. **Relationship to the Country Partnership Strategy.** The proposed project is aligned with the Rwanda Country Partnership Strategy FY2014-2018, particularly Theme 1: “Accelerating economic growth that is private-sector driven and job-creating.” Under this theme, energy is highlighted as the key sector for Bank support as increased access to electricity/energy services is core to both increased private sector investment and improved social welfare.

35. **Relationship to the Bank’s Twin Goals and Energy Directions Paper.** The proposed project is also aligned with the World Bank’s Energy Directions Paper, which is designed to help client countries secure affordable, reliable, and sustainable energy supply needed to meet the World Bank Group’s twin goals of poverty reduction and shared prosperity. Increased access to reliable electricity supply will not only lower costs and improve the profitability of business enterprises, but is also key to enabling the set-up of new private sector-led enterprises, which can help drive GDP growth. In addition to the project helping to increase access of poor households in some of the poorer areas of Rwanda, it will also enhance the ability of public institutions, especially those that serve the poor such as hospitals and schools, to deliver quality services. Increased access to electricity services will also stimulate rural transformation through increased off-farm activity and economic interaction, such as agricultural market information and facilitating trading through mobile money transfers through use of mobile phones.

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<sup>10</sup> Over the years, many development partners have supported the program, among them AfDB, BADEA, BTC, the EU, the Netherlands, Japan, OFID, the Saudi Fund, and the World Bank. The committed funds as of December 31, 2014 are around US\$400 million.

<sup>11</sup> The IEG Electricity Access Evaluation Report (2015) notes, “if the Bank Group is to help progress and achieve universal electricity access in 15 years in low-access countries, especially in Sub-Saharan Africa, there is a clear and urgent need to not only commit its own resources, but also to help countries mobilize resources that are tailored to the challenge and several orders of magnitude greater than it has to date.” The report also underscores that “timely and efficient achievement of universal access requires a sustained sector-level engagement, with a programmatic framework for syndication of the entire investment financing that can be sustained for at least a decade and possibly longer.”

## **Rationale for the Bank Involvement**

36. The Bank’s value proposition rests on its ability to support Rwanda’s long-term efforts to bring electricity to its people and businesses. The Bank’s involvement has: (i) enabled pooling of resources from diverse donors for access expansion; and (ii) drawing on global experiences in utility operations and utility management supported the design of a robust sector reform program. Thus the project reinforces the Bank’s ability to support not only the design, but also the implementation of programs and processes that allow for efficient and effective delivery of electricity services.

37. This project aims to enhance the electricity utility’s capacity to achieve the critical goals of electricity supply reliability and operating efficiency. This will involve helping to improve the utility’s performance in the short- and medium-term through the implementation of several integrated business improvement plans, including improving skills of personnel and an introduction of performance assessment, which will facilitate more transparent, faster, and cost-effective business processes.

38. The Bank has been in the forefront in supporting power sector reforms, including promoting efficient commercial operations; thus, it is uniquely positioned to provide technical assistance on policy, institutional, organizational, and regulatory aspects. The Bank’s involvement will help advance utility reform and operational efficiency. The Bank’s knowledge sharing has influenced the design of the sector reform program. GoR, supported with funding from the Bank, has completed the design and adopted an institutional organizational framework that would facilitate efficient and effective performance of the energy sector. However, it requires further support to operationalize the institutional reforms so that the sector is well-functioning, commercially-orientated, efficient, and financially viable.

39. The Bank has been the leading supporter of Rwanda’s electricity access initiative under the ongoing EARP. While global experience has informed the design of the EARP, implementation of this program has now become a “good practice” example itself. In fact, the SWAp was executed for the first time in Rwanda and has since become an example for many access engagements around the world, including the Sustainable Energy for All (SE4ALL) country action plans.<sup>12</sup> Similarly, the geospatial investment prospectus used in Rwanda is now considered a must-have for electrification planning in countries.

## **II. PROJECT DEVELOPMENT OBJECTIVES**

### **A. PDO**

40. The Project Development Objective (PDO) is to enhance the operational efficiency of the utility and increase electricity access.

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<sup>12</sup> <http://www.se4all.org/>

## B. Project Beneficiaries

41. The key project beneficiaries include:

- **Electricity Utility.** The electricity utility, EUCL, is expected to benefit from the improved operations efficiency as a result of skills enhancement and introduction of a comprehensive MIS. Improved efficiency, transparency, and accountability of operations will not only improve the institution's performance, but will enhance its image and credibility with shareholders and electricity customers alike, gaining support for sustained operations.
- **Household electricity consumers.** Around 72,000 households around the country will benefit directly from the project from having access to the grid. As Table 3 highlights, beneficiaries include those households in areas with high poverty levels and very limited energy access. Benefits derive from savings for these consumers in moving from traditional energy sources (kerosene or diesel) to electricity as well as from the provision of higher quality of lighting compared to kerosene lamps. Access to grid electricity and the related time gains also enables newly connected consumers to undertake productive and income-generating activities as well as children to study. Although hard to measure, health benefits are expected because of the reduction of indoor air pollution due to reduced kerosene consumption. Indirect benefits will also arise from the improved service provided by rural public institutions (e.g., health, education, water, and public administration) arising from their increased access to electricity. In addition, existing electricity customers, particularly those in the Kigali City area, are expected to benefit from improved supply reliability and better quality of service as a result of the project.

**Table 3. Rwanda's geographical pattern of electricity access and Poverty:** The project works across the country and focuses on the grey areas (shaded rows).

Province	District	Poverty level (%)	Access to grid-electricity (%)
Kigali City	Nyarugenge	10.1	72.1
Kigali City	Gasabo	26	59.7
Kigali City	Kicukiro	8.3	75.7
Southern Province	Nyanza	49.8	6.4
Southern Province	Gisagara	59.4	2
Southern Province	Nyaruguru	61.6	2
Southern Province	Huye	46.6	13.2
Southern Province	Nyamagabe	73.3	5
Southern Province	Ruhango	60.4	8.2
Southern Province	Muhanga	53.6	13.8
Southern Province	Kamonyi	46.7	7.1
Western Province	Karongi	61.7	6.5
Western Province	Rutsiro	53	3.3

Western Province	Rubavu	35.8	26.7
Western Province	Nyabihu	28.6	8.3
Western Province	Ngororero	51.9	4.1
Western Province	Rusizi	45	19.9
Western Province	Nyamasheke	63.4	7.2
Northern Province	Rulindo	42.9	5.6
Northern Province	Gakenke	56.6	2.8
Northern Province	Musanze	20.1	20.4
Northern Province	Burera	45.2	6
Northern Province	Gicumbi	49.3	5
Eastern Province	Rwamagana	30.4	14.1
Eastern Province	Nyagatare	37.8	17.9
Eastern Province	Gatsibo	43.1	11.5
Eastern Province	Kayonza	42.6	16.1
Eastern Province	Kirehe	47.9	11.3
Eastern Province	Ngoma	47.6	9.5
Eastern Province	Bugesera	48.4	8.8

- **Productive Enterprises.** Improved electricity supply reliability and access to the grid will contribute to increased productivity and income of enterprises (e.g., rural markets, tea processing plants, telephone towers, agro-processing) as they will reduce their dependency on expensive diesel generation whose per unit cost is more than the grid supply. In addition, increased supply reliability would increase the existing firms' profitability from increased labor productivity (reduced idle hours) and reduced materials' waste.

42. Better quality of electricity services would also contribute to the overall perception of the country as a viable investment destination for local, regional, and international investors. This is critical to the country's vision of fostering sustainable, private sector-led economic growth. In addition, improvements in public service delivery are expected through improved electricity connection, especially of rural institutions such as schools, clinics, and hospitals used by poor and vulnerable households, which would contribute to improving the socioeconomic welfare of Rwanda's general population.

### C. PDO Level Results Indicators

43. The key results envisaged under the project are:
- People provided with access to electricity under the project (additional 324,000 people will get access to electricity by connecting about 72,000 households, of which 50 percent are female beneficiaries);
  - Improved performance of electricity sector in Rwanda:
    - (i) Reduction in commercial losses (from 7.6 percent to 4 percent);
    - (ii) Reduction of technical losses (Kigali City, annual energy savings of 7.18 GWh).

### III. PROJECT DESCRIPTION

#### A. Project Components

44. The project has three components: component A, electricity sector capacity strengthening; component B, increased access to electricity services; and component C, technical assistance and project implementation support. Component A will support EUCL to establish a comprehensive MIS to ensure efficient, transparent, and accountable processes covering network operations and maintenance (O&M); commercial functions; and management of corporate resources. The primary activities will include the design, supply, installation, and operationalization (including staff training) of an integrated MIS with several modules covering commercial, network operation, and corporate functions. Component B will support electricity connections of new consumers all over Rwanda and network reinforcements, where required, to ensure that network expansion does not compromise the quality of supply; and strengthening of the Kigali 15KV distribution network to provide sufficient capacity to meet increased demand from new economic activities. Kigali City and its environs constitutes the biggest load center in Rwanda, currently consuming about 57 percent of the total energy supplied to the national grid. Component C will support studies to enhance sector performance and sector development, especially as related to grid supply and reliability, as well as providing support for project management and the SWG.

#### **Component A: Electricity Sector Capacity Strengthening (US\$20 million equivalent).**

##### *Sub-component A-1: Management Information Systems (US\$10 million equivalent)*

45. The proposed project will support the development of an integrated MIS covering core business functions, including network operations and maintenance, commercial functions, and management of corporate resources. The integrated MIS will include a new commercial management system (CMS), an integrated distribution management system (IDMS), including an incident recording and management system (IRMS), and an enterprise resource planning (ERP) system.

- **Commercial Management System (CMS):** This subcomponent will finance the design, procurement, and implementation of a new CMS in order to provide support to the utility's business functions related to revenue and customer management. The objective is to improve customer service and at the same time strengthen business performance, especially the reduction in commercial losses. The CMS will include aspects related to customer database, billing, and commercial processes and procedures.
- **Integrated Distribution Management System (IDMS):** The objective of the IDMS is to support improvements in the reliability of electricity supply, operating efficiency, and outage management to assure increased customer satisfaction. The IDMS will include several modules:
  - A geographic information system (GIS);
  - An outage management system, including incident recording;
  - Distribution systems operations and maintenance; and

- Distribution supervisory control and data acquisition (SCADA).
- **Enterprise Resource Planning (ERP) System:** The ERP system will cover core corporate functions, including human resources, finance, procurement, and asset management. The objective is to support the utility to better plan and manage all of its resources for increased efficiency and accountability.

***Sub-component A-2: Revenue Protection Program (US\$5 million equivalent)***

46. The main objective of the revenue protection program (RPP) is to sustainably protect EUCL's revenues from electricity sales to large and medium customers. These are currently less than three percent of the total customer base, but represent around 50 percent of total sales. The implementation of the RPP will ensure that the billing for these "high value" customers is systematic and accurate according to their full metered consumption. The RPP will protect utility revenues by providing accurate, reliable, and timely billing information, thus promoting greater billing transparency and reduced consumption disputes, while also identifying network theft, which will contribute to a significant reduction/control of commercial losses. To this end, this sub-component will finance: (i) the creation of a metering control center (MCC) and investments in infrastructure needed for its operations (applicable to all customers, large and small); (ii) incorporation of state-of-the-art meter data management (MDM) software and training of staff of the MCC in its proper use to ensure systematic use of the information provided by the metering system so that corrective field action can be undertaken as needed; and (iii) supply and installation of advanced metering infrastructure (AMI) for the targeted 1,500 large customers. The AMI will include an integrated system of smart meters, communications networks, and data management systems to enable two-way communication between the MCC and the targeted customers. The deployment of the AMI, including smart meters together with the proposed IDMS, will not only contribute to EUCL's operations efficiency and customer service quality, but also provide a platform for further distribution grid modernization as the utility develops and deploys more functions related to "smart grid" functionality.

***Sub-component A-3: Strengthening of Technical Capacity of Key Functions in EUCL (US\$5 million equivalent)***

47. The subcomponent will support the strengthening of the technical capacity in key functions of the EUCL, namely, operations, commercial services, finance, and corporate services. The technical assistance shall include but not be limited to: (i) coaching, mentoring, and enhancing the capacity of EUCL staff in areas of their technical expertise; (ii) assisting EUCL to develop and document functional processes and operational procedures; (iii) assisting EUCL to implement the MIS and the RPP (components A-1 and A-2); (iv) assisting EUCL to collect and keep data records to be used as baseline data in performance targets setting; and (v) through the assistance of a strategy execution consultant, preparing and implementing a corporate strategic plan and developing a performance-based dashboard.

**Component B: Increased Access to Electricity Services (US\$70 million equivalent).**

***Sub-Component B-1: Strengthening the distribution network around Kigali Area (US\$25 million equivalent)***

48. The subcomponent will finance improvements in overall network operations efficiency, including: (i) rehabilitation of key 15KV medium voltage switching stations in the Kigali electricity distribution network to enhance safety; (ii) upgrading of the Kigali network to increase loading capacity thereby improving supply reliability and reduction of technical losses; and (iii) installation of equipment that will facilitate monitoring and control of the network from the National Control Center (NCC) to reduce unscheduled downtime.

***Sub-Component B-2: Grid Extension to New Load Centers (US\$45 million equivalent)***

49. This subcomponent is aimed at continued support of the ongoing EARP and will finance activities to connect new consumers in various parts of Rwanda (see Table 3 above) through the purchase of equipment for grid extensions, reinforcements, consumer connections, and installation services, including upstream system reinforcements, where required, to ensure that network expansion does not result in the deterioration of the quality of supply. The project will support investments that will result in 72,000 new connections to the national electricity grid, which is estimated to benefit 324,000 people in support of the GoR's connection target. The areas selected for new connections under the project were chosen based on the following factors: (i) provision of electricity to social infrastructure, such as hospitals, health centers, sector offices, schools, etc., as the national objective was to have these covered 100 percent by 2018 to provide improved social services; (ii) cost optimization using parameters such as the distance from the existing network, number of connections and energy sales; (iii) government set targets per district to ensure national equity; and (iv) social demand, i.e., greenfield areas where no electricity existed in a sector.

**Component C: Technical Assistance and Project Implementation Support (US\$5 million equivalent).**

50. This component will finance technical assistance and project implementation support. The technical assistance will support studies required to have in place the requisite plans, bankable projects, and management capacity to foster improved sector expansion and efficient operations.

***Sub-component C-1: Feasibility and Diagnostic Studies (US\$3.5 million equivalent)***

51. This sub-component will support studies to address sector performance improvements in the medium to long term, especially those related to grid supply and reliability as well as options for sector development. For the former, assessments will include (but not be limited to) identification of investments required to (i) increase electricity distribution network reliability, and (ii) reduce network down time and operations costs through network automation. In addition, the assessments will include distribution network protection studies (fault calculations and protection grading) that will be required to enable the proposed network automation. For the latter, studies will support required feasibility studies and just-in-time policy advisory notes that are required to inform decision making regarding emerging sector issues. This subcomponent will also finance

technical assistance activities to develop strategies, including strengthening the functions of investment planning covering aspects such as feasibility studies and projects due diligence.

***Sub-component C-2: Project Implementation Support (US\$1.5 million equivalent)***

52. This subcomponent will support the Project Coordination Unit (PCU), including project management, procurement, financial management, safeguards, and monitoring and evaluation (M&E) staff, as well as the SWG secretariat, and capacity building and operating costs. Execution, design, and supervision consultants to assist with project implementation and sector coordination will also be supported as necessary.

**B. Project Costs and Financing**

53. The project will be entirely financed by IDA. The lending instrument is Investment Project Financing. Table 4 summarizes the project components and costs.

**Table 4. Project Components and Costs**

<b>Project Components</b>	<b>Project Cost (US\$ Millions)</b>	<b>IDA Financing</b>	<b>% Financing</b>
A. Electricity Sector Capacity Strengthening	20.0	20.0	100
B. Increased Access to Electricity Services	70.0	70.0	100
C. Technical Assistance and Project Implementation Support	5.0	5.0	100
<b>Total Costs</b>	95.0	95.0	100
Total Project Costs	95.0	95.0	100
Front-End Fees	0.0	0.0	0.0
<b>Total Financing Required</b>	95.0	95.0	100

**C. Lessons Learned and Reflected in the Project Design**

54. Lessons from the World Bank’s experiences with electricity sector strengthening projects across Sub-Saharan Africa (including Kenya, Tanzania, and Liberia) and elsewhere (such as Turkey and India) have informed the design of the project. Project design and preparation also builds on lessons learned from the ongoing Bank financed Rwanda Electricity Access Scale-up and Sector Wide Approach Development Project (EASSDP) and other similar Bank financed projects. Detailed lessons learned are presented in the following paragraphs.

55. **Ownership of institutional capacity strengthening.** Experience from similar operations regarding sector institutional strengthening has shown that the best enabler of institutional performance is the government. Strong government leadership and commitment is key to the success of institutional reforms. To this end, project preparation was preceded by: (i) a strong sector dialogue to assure government ownership; and (ii) diagnostic assessments, which have informed the government’s actions related to the establishment of the new sector agencies and the enactment of the requisite legal framework to ensure their operating autonomy and independent corporate governance. The new agencies, the REG and its subsidiaries, are now being encouraged by its shareholder, the GoR, to apply good corporate governance practices while adopting ‘best-



in-class' business processes. Component A of the project is designed in alignment with these principles.

56. **All-encompassing institutional capacity development.** Experience from similar activities in Kenya and from several of India's Electricity State Companies has shown that infusing an efficient and accountable performance culture in an organization is dependent on three core elements:

- i. An appropriate organizational structure with a clear vision that is supported by a robust strategy that gets executed;
- ii. A skilled workforce that understands the corporate strategy and is incentivized to implement it; and
- iii. Tools and systems to support staff performance and inform decision making.

57. The reform design has embedded these elements to ensure staff ownership of the change process. The process for creating new organizational structures and an open and transparent recruitment process for lower level staff is ongoing. The proposed project includes support to mentoring and coaching the newly recruited staff over a period of two to three years and will support them with defining the EUCL's vision. There will be an all-inclusive consultative process in the preparation of the corporate strategic plan and the associated business plans to ensure ownership and diffuse a high performance culture. The project will also augment staff ability to use MIS tools to improve performance. The MIS will be implemented by the various user departments who will participate in the definition and re-engineering of the business and operational processes and practices through a hands-on and learning-by-doing experience during implementation of the MIS.

58. **Solutions adapted for low-income households and energy efficiency.** Lessons from similar access projects highlight that high upfront connection fees and monthly bills could severely impinge on the project outcomes and impact (increased access and use of the service). Component B-2 includes elements to support initiatives to buy down connection costs for the poorest households by: (i) providing low-cost "ready boards" for poor households to defray internal house wiring installation; and (ii) staggering payment of the connection costs. In addition, the design includes energy efficiency incentives (use of CFLs) that not only help to defray generation investments to meet incremental demand from new household connections, but also support the poor households who initially mainly use electricity for lighting (as noted, use of CFLs can achieve savings of about 75 percent compared to the use of ordinary incandescent bulbs).

59. **Evaluating development impact.** The project will continue to support activities related to an impact evaluation on electricity access, started under the ongoing Bank-financed EASSDP component of the EARP program and as part of the agreements reached during the IDA17 replenishment negotiations. Following the baseline surveys completed in mid-2014, which includes gender disaggregated data, follow-up surveys will be undertaken in 2016, and the data collected will be evaluated to inform and document the impact of not only the Bank financed component, but that of the overall country's increased access to electricity services under the EARP. The impact evaluation will measure development outcomes at individual, household, and community levels, with sex disaggregated data. Rwanda's impact evaluation will join a handful of such comprehensive assessments in Vietnam, Bangladesh, Nepal, Mongolia, etc. The evaluation

also includes questions on multi-tier measurement of electricity access.<sup>13</sup> As such, not only will the evaluation highlight the benefits of access, but it will also estimate Tier Level<sup>14</sup> of access the beneficiaries received as a result of the project intervention.

60. **Realism in project implementation planning.** Lessons learned from similar Bank financed projects have shown that it takes time to build sector capacity of the kind envisaged under the project's component A and benchmark performance against performance improvement targets. The six-year project implementation period allows for: (i) an initial two years to set-up the MIS; (ii) a third year to test and fine-tune business processes using the MIS (benchmarking and understanding the status quo); and (iii) the fourth to sixth years to use the MIS to track progress towards achieving the set performance improvement targets, and make use of the available, real-time data to inform decision making.

## **IV. IMPLEMENTATION**

### **A. Institutional and Implementation Arrangements**

61. The EUCL shall be the designated project implementing entity and signatory to the Project Agreement for the IDA credit. The project components fall within EUCL's core business processes and systems, including the MIS, revenue protection, business support, corporate strategy preparation and execution support, and strengthening of the distribution network around and in the Kigali City area. In addition, the assets from the project will be owned and operated by EUCL. In order to effectively implement the project, EUCL will appoint a Project Manager and will also establish: (i) a Steering Committee chaired by the Managing Director of EUCL to provide leadership and oversight of project implementation; and (ii) Departmental Project Implementation Teams (DPIT) in the relevant departments with functions covered in the scope of the project.

62. The procurement, safeguards, financial management, M&E, and project management functions required by EUCL for the implementation of the project will be provided by the existing EARP-PCU at the EDCL. The EARP-PCU has the necessary capacity for project coordination, fiduciary, and safeguards management aspects. Noting the autonomy of the EDCL and EUCL, there shall be a Project Implementation Support agreement between the EUCL and EDCL to define the contractual responsibilities of the EARP-PCU at the EDCL vis-a-vis EUCL as the project implementing entity and owner of the assets from the project. The project implementation arrangements and coordination between the various agencies shall be detailed in the Project Implementation Manual (PIM).

### **B. Results Monitoring and Evaluation (M&E)**

63. The M&E activities will be undertaken with support from the EARP-PCU M&E team and the SWG Secretariat. The EARP-PCU will be responsible for collecting, verifying, and collating

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<sup>13</sup> [http://www.esmap.org/sites/esmap.org/files/DocumentLibrary/Multi-tier%20BBL\\_Feb19\\_Final\\_no%20annex.pdf](http://www.esmap.org/sites/esmap.org/files/DocumentLibrary/Multi-tier%20BBL_Feb19_Final_no%20annex.pdf)

<sup>14</sup> SE4ALL approach to measuring energy access. Each tier reflects the ability of the energy supply to cater to specific energy applications.

information, integrating the M&E reports, and submitting to the Bank both the quarterly and annual progress reports. The SWG secretariat will be responsible for integrating the overall sector performance indicators and preparing sector reports for the bi-annual SWG Joint Sector Performance Review discussions. The results framework in Annex 1 identifies result indicators for the project as a whole as well as for each of its components, including the annual target values for the results indicators and baseline data against which project implementation progress and results will be measured.

64. The EARP-PCU will establish a database for each component of the project to periodically monitor the evolution of implementation, outputs, and results, with systems for regular data gathering and processing of information required to monitor the main performance indicators and intermediary indicators as defined in the results framework.

65. Impact evaluation follow-up surveys and assessments shall be jointly led by the EARP-PCU and the SWG Secretariat with support from specialized technical assistance. The baseline survey of EARP was completed in mid-2014 and the follow-up survey is scheduled for 2016, in time for lessons to be incorporated in the implementation of this proposed project.

66. Following the commissioning of the MIS (expected in the third year of project implementation), the EUCL shall prepare a set of key performance indicators (KPIs) covering the key business functions. This will enable tracking performance as a result of improved MIS and staff capacity building activities envisaged under the project. The KPIs shall include both medium-term performance improvement targets and annual work plan targets. The annual targets will be used to develop and implement a performance dashboard that will be used to track and measure performance on a real time basis.

### **C. Sustainability**

67. The wide-ranging sector reforms aim to put in place systems, processes, and incentives that will allow electricity services to be provided in a sustainable manner. Owned by the GoR, the management improvement plans and financial recovery plan are going to be implemented and managed over the long-term by a new set of professionals recruited competitively from the market. Finally, by focusing on quality of service delivery – expanding access and improving quality – this project will contribute to the socioeconomic development and firm competitiveness over the long-term. These elements are described further below.

68. **Ownership and commitment.** The GoR recognizes that strong institutional arrangements are core to the sector's long-term sustainability and financial performance. In this regard, the GoR has shown a strong commitment to the institutional strengthening of the electricity sector for improved performance. To that end, the GoR decided on the new institutional structure after widespread consultations and technical advice. The new agencies that split out of the integrated water and electricity utility commenced operations in August 2014. The new agencies are supported by a new legal framework giving them autonomy to make decisions in key areas such as organization structure determination, recruitment, attraction and retention of staff, procurement, and expenditure approval, which should in the medium term contribute to a turn around the

performance culture of the sector. Additional details are provided in Annex 6 (Sector Policy Letter).

69. **Skills re-development and performance assessment.** An in-house, all-inclusive strategy involving staff at all levels will be a key component of sector performance management improvement. It is envisaged that the existing staff will be part of the core team for the defining and implementing the business improvement plans, which will facilitate on-the-job training. Mentoring, coaching, capacity building, and career development opportunities will empower staff, build participation in the change process, and ensure that new skills, practices, and processes are internalized. A Business Support Services Firm, playing an advisory role, will be retained to support the initial operations with a clear exit strategy to ensure that a team of well-trained staff is in place and is running the sector within the next two to three years.

70. **Transparency and Accountability.** Efficient sector operations hinge on the development of Management Improvements Plans for the utility, to inform decision making and put in place the tools and processes required to operate effectively. The integrated MIS—comprised of the CMS, IDMS, and ERP systems—will help improve (i) the quality of service by reducing network down times and technical losses; (ii) financial performance by improving billing and revenue collection; (iii) accountability by improving accounting, procurement, human resources and facilities management; and (iv) efficiency by providing management with key information to allow more effective decision making. Improved efficiency, transparency, and accountability of operations will not only improve the sector’s performance, but will enhance the sector’s image and credibility with shareholders and electricity customers alike, gaining support for sustained operations.

71. **Sector Financial Recovery Plan.** The new agencies’ autonomy and adequacy of resources are key basic conditions to enable them to effectively execute the sector corporate strategy and business plans and drive overall transformation and performance improvements. The EUCL has prepared a financial recovery plan, underpinned by the sector financial performance review (Annex 5), which was endorsed by the Cabinet Economic Cluster Subcommittee October 26, 2015. The plan assures that the utility has adequate resources needed for priority investments, and that operations will enable the achievement of results related to efficiency and accountability in electricity service delivery.

## V. KEY RISKS AND MITIGATION MEASURES

### A. Overall Risk Rating Explanation

72. The overall risk rating for the project is substantial. The key risks and proposed mitigation measures are outlined in the paragraphs below.

73. **Political and Governance.** The risk is substantial noting the potential systemic challenges in governance and management processes of the sector, which could lead to piecemeal or ineffective implementation and non-adherence to the business improvement plans. To mitigate such risks, the recruitment of senior managers of the key sector institutions has already followed an open and competitive process. The project will support the coaching and mentoring of these

new senior managers to ensure that they are able to manage the utility operations in the next two to three years. The project will also support acquisition and implementation of business improvement systems to guide the day-to-day utility operations, including training of staff in their use, thus equipping the staff to manage and undertake the electricity operations more efficiently. As part of the implementation process, the project will share with policy and decision makers success stories of how these systems have led to gains in and promoted a culture of accountability.

74. **Sector Strategies and Policies.** Key risks in this area: (i) sub-optimal implementation of the EARP, leading to lower than the targeted access rates and increased cost per connection; (ii) continued poor sector financial performance as a result of reliance on high cost thermal generation with the tariffs unable to cover operating costs; and (iii) lack of progress on sector governance and/or limited sector autonomy. During implementation, the SWG will review progress towards attaining EARP targets, including funding arrangements to ensure that sector undertakings are aligned with the least cost power development plan and the sector's financial recovery plan. As described above, the assessment of medium-term revenue requirements and preparation of a tariff trajectory as well as the preparation of a least cost power development plan and a sector financial recovery plan have been undertaken, and the project will support measures to further sector governance reforms.

75. **Technical Design of Project.** The project's component B on increased access to electricity services is not unique nor does it include new or untested technology. It is based on the experiences of the EARP, will adopt the same concept, and will be informed by lessons learned from EARP operations. Risk is assessed higher for component A since the design, procurement, and implementation of an integrated MIS will need to be tailored to the institutional requirements and current specifications as well as be flexible enough to address future needs. This will require strong technical, management, and leadership capacity in the utility and among the newly recruited staff. The attainment of the PDO related to this component will depend on the capacity of the utility to implement the new systems and to follow up on the information received through these systems. Based on lessons learned from utilities that have successfully implemented an integrated MIS, the project will include definition and re-engineering of the business and operational processes and practices to align them with the corporate strategic objectives of improvement of operational and financial performance and service delivery. To assure the robustness of the project design, several experts have supported the EUCL in defining the scope, detailed specifications, and other preparatory activities.

76. **Institutional Capacity for Implementation and Sustainability.** Limited experience of recently recruited staff in the REG and its subsidiaries may lead to project implementation delays and constrain the ability to assure efficiency and accountability in sector. To ensure that newly recruited staff are able to fully take over the company management and operations in a period of two to three years, the project will finance experts to coach and mentor the new staff in the aspects of utility operations and management. In addition, the experts, together with local counterparts, will: (i) actively get involved in the implementation of the new systems; (ii) set up systems to follow up on the information received through these systems, including performance benchmarking; and (iii) prepare and implement a corporate strategic plan, including key business performance indicators aimed at diffusing a performance driven culture.

77. **Financial Performance of the Sector.** Sector financial sustainability is a key issue, which mainly hinges on GoR's implementation of the least cost power development plan and ensuring adequate financing to the sector to cover the revenue requirements. The GoR has already set the path for implementing its ambitious generation plans to expand the country's generation capacity to about 563 MW by 2018, including signing of MoUs with a number of private developers, geothermal deep well drilling, as well as methane and solar scoping to secure a more balanced energy mix and lower cost of supply. In addition, the GoR has initiated discussions with Uganda, Kenya, and Ethiopia for possible power imports. As a result, the average cost of service is expected to decrease from the current US\$0.32/KWh to about US\$0.26/KWh between 2015 and 2018. The Government has also undertaken an assessment of the medium-term revenue requirements and a tariff trajectory has been prepared. Following these assessments, including preparation of a least cost power development plan, a sector financial recovery plan has been prepared and endorsed by the Cabinet Economic Cluster Subcommittee. An important first step for financial recovery has been a tariff increase, effective September 1, 2015, that raises average tariffs from 133 Rwf/KWh (US\$0.19) to 160 Rwf/KWh (US\$0.23). While the tariffs remain below cost, the GoR has been providing regular subsidies to the sector and this is expected to continue in the future. A financial covenant has been included under this project to ensure that the EUCL is at least able to meet its operational cost and debt service revenue requirements for the duration of the project. As part of the national budgeting process, sectors are required to have in place work plans and associated KPIs that are reviewed and endorsed by the SWG as part of the annual joint sector review. Through this fora, the sector dialogue will seek to ensure that the power sector investments are aligned with the least cost power development plan and sector financial recovery plan, including fast tracking priority generation investments that will in the medium term support reducing the overall high cost of generation, a major contributor to the sector's current poor financial standing.

78. **Fiduciary- Financial Management.** The financial management assessment noted areas of significant weaknesses that require attention. Notably the budgets for the last two years including for fiscal years 2012/13 and 2013/14 were approved by the then EWSA Board despite the requirement that the Board approves the annual budgets. Audit reports for the two years were qualified and follow up on audit recommendations has not been sufficient. The Board was required to form an audit committee, but this was not in place. There were also a number of internal control issues raised in the external audits. The internal audit is functional but has not regularly audited project transactions and systems due to the enormous work load.

79. The REG Board of Directors, appointed August 2014, has initiated strong reforms in the financial management of the business. These reforms include restructuring the finance department, re-staffing, and documenting major processes in operational manuals; they are now in the process of procuring new information technology systems to support decision making. Reputable consultants (PwC and KPMG) were contracted to assist with this exercise, which has largely been successful. An audit committee of the Board has been appointed and there is increased oversight over the finance function. The 2015/16 budget was presented to and approved by the Board of Directors in June 2015.

80. **Mitigation Measures.** To mitigate the identified weaknesses, the following actions will be undertaken: (i) recruitment of an internal auditor to support project activities; (ii) formation of a functional audit committee of the Board; (iii) timely approval of the annual project budgets; and

(iv) revision and update of the financial management manual to include the project specific implementation arrangements as agreed under the Project Implementation Support Agreement (PISA). In addition to these specific actions, the ERP system will include development of robust financial management procedures as part of the MIS Business Improvement Plans. Details of the financial management assessment and mitigation measures are provided in Annex 3.

81. **Climate and Disaster Risks.** Short- and long-term climate change and disaster risks that could potentially affect the sustainability of outputs and outcomes of the project include mainly temperature increases, floods, and landslides. Using the Climate and Disaster Screening Tool, the forecasted temperature increases are 0.44°-0.6°C in 2020, and 1.3°-1.9°C in 2050, the overall frequency of floods in the country is forecasted at 2-21 floods per 100 years, and the risk of landslide hazards is low to moderate (rated 1-5; 10 being the highest risk level). The abundance of rivers and lakes in Rwanda makes it impossible to avoid areas that might be affected by floods while some of the project lots are located in areas of high risk for landslides. The temperature rise is not expected to have an impact on the performance of the facilities to be installed under the project as the associated equipment are designed to operate under a wide temperature range. Floods and landslides might affect the distribution lines to be constructed under the project; however, the mechanical design is robust enough to withstand the strong winds and floods and the line route selections will be chosen in such a way as to avoid areas prone to landslides.

## VI. APPRAISAL SUMMARY

### A. Economic and Financial Analysis

82. **Rationale for Public Financing and Bank Value Added.** The project aims to enhance the electricity utility's capacity to achieve the critical goals of electricity supply reliability and operating efficiency, which will lead to energy cost savings and contribute to the GoR's strategy of closing the financing gap in the sector. Ensuring efficiency and financial viability will attract private sector investments in generation. Given the situation of the sector, in the near to medium term public sector financing is the most suitable financing vehicle. The Bank has been in the forefront in supporting power sector reforms and is thus well positioned to provide technical assistance on policy, institutional, organizational, and regulatory aspects. The Bank's involvement will help advance utility reform and operational efficiency.

83. The results of the economic analysis show a positive evaluation of the project. The project is expected to have a Net Present Value (NPV) of US\$71.99 million at a discount rate of 10 percent with an Economic Internal Rate of Return (EIRR) of 30.18 percent. The analysis uses the following quantifiable benefits deriving from the project: (i) energy cost savings resulting from reduced non-technical (commercial) losses among large and medium customers as envisaged under component A; (ii) energy cost savings resulting from reduced technical losses and reduced unscheduled outage duration under component B1; and (iii) energy cost savings for households, community services, and productive enterprises resulting from switching from traditional energy sources (kerosene and diesel) to electricity under component B2. Component C is excluded because of the difficulty to value the outcomes of a technical assistance activity. Results per component analyzed are shown in Table 5.

**Table 5. Economic Analysis Summary**

Component	EIRR (%)	NPV (US\$m)
A- Sector Performance Improvement	40.28	15.67
B1 – Kigali Distribution Network	26.39	11.95
B 2 – Increased Access to Electricity	28.17	44.37
<b>Project</b>	<b>30.18</b>	<b>71.99</b>

84. The high EIRR is due to the high cost of unserved energy in Rwanda. Due to the high EIRR, the project is robust to changes in relevant parameters, as shown in Table 6 below.

**Table 6. Summary of the Sensitivity Analysis**

Sensitivity					
EIRR		Component A	Component B1	Component B2	Project
Base case		40.28%	26.39%	28.17%	30.18%
Project Costs = +15		35.01%	22.23%	25.08%	26.30%
Project Costs = +20		33.46%	21.05%	24.20%	25.19%
Commercial loss reduction to 5% (instead of 4%)		29.83%	26.39%	28.17%	28.04%
Reduction of average duration of service interruption to 60 (instead of 50)		40.28%	25.76%	28.17%	30.04%
Only 50% connection target met (36,000 instead of 72,000)		40.28%	26.39%	14.59%	22.27%
1 Year delay		28.07%	20.06%	23.61%	
2 Years delay		16.67%	14.85%	19.86%	
NPV		Component A	Component B1	Component B2	Project
Base case		\$ 15,670,837	\$ 11,945,701	\$ 44,373,696	\$ 71,990,234
Project Costs = +15		\$ 14,138,636	\$ 10,030,449	\$ 40,926,243	\$ 65,095,328
Project Costs = +20		\$ 13,627,902	\$ 9,392,032	\$ 39,777,093	\$ 62,797,027
Commercial loss reduction to 5% (instead of 4%)		\$ 8,542,690	\$ 11,945,701	\$ 44,373,696	\$ 64,862,086
Reduction of average duration of service interruption to 60 (instead of 50)		\$ 15,670,837	\$ 11,428,172	\$ 44,373,696	\$ 71,472,705
Only 50% connection target met (36,000 instead of 72,000)		\$ 15,670,837	\$ 11,945,701	\$ 9,534,311	\$ 37,150,849
1 Year delay		\$ 8,708,276	\$ 7,458,476	\$ 33,491,218	
2 Years delay		\$ 2,840,070	\$ 3,546,037	\$ 23,987,033	

85. Details of the economic analysis, including details of the sensitivity analysis, are provided in Annex 4.

86. A sector financial performance review was carried out by the REG, to define the contours of the sector financial recovery plan (a summary of the plan is provided in Annex 5). The new generation capacity contracted by the GoR is expected to lower the cost of service over the period 2015-2018. The recently effective tariff increase (tariffs were frozen since 2012) is also expected to contribute to improving sector financial performance. Looking ahead and based on the two simulated two scenarios (business-as-usual versus the more aggressive Vision 2020), it is evident that the contingent liabilities associated with the new contracted capacity will be much lower and subsidy requirements from the GoR will be much lower in the Vision 2020 scenario.

## B. Technical

87. **Technology.** All the technologies applied in the project, particularly as regards component B, have been widely used in other countries with similar conditions and in the region; hence, the project does not raise any significant technical concerns. The access component of the project will continue to use the “appropriate engineering” approach to adapt the available and tested



reticulation methods, including low-cost technologies, to the specific conditions in Rwanda. The “appropriate engineering” approach, under the ongoing EARP activities made it possible to reduce the MV line cost from US\$55,000 per kilometer to about US\$25,000 per kilometer. The rehabilitation and upgrade of the dilapidated distribution infrastructure supplying the Kigali City area will improve network operations efficiency (reduced technical losses) and increase loading capability thereby improving electricity supply reliability. Rehabilitation of the dilapidated switching cabins will enhance the operations safety and eliminate the risk of fatality while operating the equipment.

88. ***Electricity Sector Capacity Strengthening.*** Component A will support the electricity sector to implement Business Management Improvement plans including an integrated MIS expected to result in efficiency of electricity sector operations. Such an approach, as in the case of the Kenya Power and Lighting Company Limited and others, has proven to be effective in improving revenue management, reducing network system losses and improving supply reliability and efficiency of operations in the use of corporate resources.

### **C. Financial Management**

89. A financial management assessment, carried out as part of project preparation, aimed to determine if the financial management arrangements: (i) are capable of correctly and completely recording all transactions and balances relating to the project; (ii) facilitate the preparation of regular, accurate, reliable and timely financial statements; (iii) safeguard the project’s assets; and (iv) are subject to auditing arrangements acceptable to the Bank. The assessment complied with the Financial Management Manual for World Bank-Financed Investment Operations that became effective on March 1, 2010 and AFTFM Financial Management Assessment and Risk Rating Principles. The assessment concluded that the current project financial management arrangements are adequate to meet the World Bank’s minimum requirements as outlined in OP/BP10.00.

### **D. Procurement**

90. Procurement under the project will be implemented by the EARP-PCU. The PCU has the necessary experience for the project implementation, including procurement and other functions. Lessons learned from implementation of these projects and procurement assessments carried out with regard to the adequacy of procedures, organizational structure and functions, past experience, staff skills, procurement cycle management, quality and adequacy of supporting and control systems and record keeping are the basis of the procurement capacity assessment.

91. Procurement under the proposed project will be carried out in accordance with the World Bank’s *“Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants”* dated January 2011(Revised July 2014); *“Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants”* dated January 2011(Revised July 2014); *“Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants, (the Anti-Corruption Guidelines)”* dated October 15, 2006 and revised January 2011; and the provisions stipulated in the Legal Agreement. The various items under different expenditure categories are described in the attached

procurement plan in Annex 3. The procurement methods, thresholds, and requirements for prior review are also presented in the Procurement Plan.

#### **E. Social (including Safeguards)**

92. The project is expected to have significant positive effects both for households and small businesses that directly benefit from a connection to the electrical grid, and for society as a whole. The country's schools, health centers, and local administrative offices that have been identified in the project preparation stage will be able to offer improved services with electricity access. This project will therefore contribute to improved education, health, and communication services outcomes.

93. The project will contribute to increasing productive use of electricity in the targeted areas to stimulate firm competitiveness and job creation. The project has included spatial mapping and targeting of growth centers, including rural markets and other clusters of commercial activities like tea processing plants, communication towers for various telephone companies, and other businesses especially for agro-processing. To increase access to electricity and improve reliability of the electricity network, the project will strengthen the Kigali distribution network, which involves rehabilitation of key existing 15KV medium voltage switching stations to enhance safety standards and installation of equipment. The rehabilitation of the network has no need for land acquisition.

94. Construction of the medium voltage (MV) and low voltage (LV) distribution lines will however require access to land and affect crops and trees resulting in both temporary and permanent land acquisition, thus triggering OP/BP 4.12 Involuntary Resettlement. However, the Project-Affected Persons (PAPs) are allowed to use these areas as long as they maintain the vertical clearance of three meters. In addition, the right of way and way-leave distances should be observed and assets/resources of PAPs will be addressed in the most participatory and inclusive manner. Past experience of construction of MV and LV lines have shown no displacement or demolishing of structures, but loss of crops and trees. Although the proposed project will have limited earth works associated with rehabilitation and construction of distribution network, it may include chance finds of physical cultural artifacts thus triggering OP/BP 4.11.

95. **Safeguards Instruments.** Since the details and scope of works for the specific lines will only be known during implementation, a Resettlement Policy Framework (RPF) has been prepared to guide the preparation of Resettlement Action Plans (RAPs), and disclosed both in-country on October 9, 2015 (REG Website and EUCL Offices and Rwanda Environmental Management Authority offices) and at the World Bank's Infoshop on October 7, 2015, respectively. Site specific RAPs will be prepared and implemented during project implementation. Other social impacts such as community safety and access to community facilities like roads, etc., resulting from construction will be addressed through the prepared and disclosed Environmental and Social Management Framework (ESMF).

96. **Gender.** Spatially, the project will target areas suitable for grid connections in high density rural areas previously not connected, at low cost, for both household and productive use connections. Both men and women will benefit from better access to electricity in households and

communities even though women have the primary responsibility for domestic tasks in the household and are therefore the main users of energy. Further, access to electricity is expected to increase economic opportunities by lengthening the opening hours of businesses, diversifying business activities, and establishing new employment opportunities in which women are involved. For purposes of inclusion of the vulnerable groups, affordability of connection fees has been explored and is addressed through the extension of the payment period to a maximum of two years. As part of the surveys to be undertaken under the project impact evaluation, the project will make every effort to generate sex disaggregated data for the electricity connections and use. The results from the impact evaluation can then potentially be translated into technical assistance that will assist the utility with a gender-sensitive corporate practice.

#### **F. Environment (including Safeguards)**

97. The project is Environmental Assessment (EA) Category B - Partial Assessment. It triggers OP/BP 4.01, Environmental Assessment as the project activities are likely to have limited and reversible environmental impacts that can be readily mitigated. The policy is triggered due to anticipated negative impacts to the bio-physical environment that would arise from the implementation of component B. The civil works involved with activities will lead to relatively minor air, land, and water pollution during the construction phases as well as noise around the neighboring areas. The works are not expected to impact negatively on physical cultural resources as project sites will be screened for these.

98. *Stakeholder Consultations.* In accordance with the World Bank Operational Policies, stakeholder consultations with public and private sector institutions, communities formed part of the ESMF and RPF preparations. The consultative meetings were held with the purpose of listening to the stakeholders especially the potential beneficiaries, and seeking their feedback on the project and its potential impacts on them, incorporated their comments and suggestions especially those related to compensation for their crops along the right of way for the distribution lines into the safeguards instruments. Stakeholders and PAPs will be consulted on an ongoing and regular basis during project implementation.

#### **Safeguards Policies triggered under the Project**

	<b>Yes</b>	<b>No</b>
Environmental Assessment OP/BP 4.01	X	
Natural Habitats OP/BP 4.04		X
Forests OP/BP 4.36		X
Pest Management OP/BP 4.09		X
Physical Cultural Resources OP/BP 4.11	X	
Indigenous Peoples OP/BP 4.10		X
Involuntary Resettlement OP/BP 4.12	X	
Safety of Dams OP/BP 4.37		X
Projects on International waterways OP/BP 7.50		X
Projects in Disputed Areas OP/BP 7.60		X

## **G. World Bank Grievance Redress**

99. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit [www.worldbank.org/grs](http://www.worldbank.org/grs). For information on how to submit complaints to the World Bank Inspection Panel, please visit [www.inspectionpanel.org](http://www.inspectionpanel.org).

## **H. Citizen Engagement**

100. In order to ensure effective service delivery in meeting customers' expectations, the utility organizes accountability workshops once a year across the country. The objective of these consultations is to learn about customers' and others' concerns, evaluate the level of service delivery, solve problems, and raise awareness of the utility's products and services. The inputs and feedback from customers will be collated and brought to the attention of the utility's senior management for consideration in resolving customers' and others' concerns. Annual reports on inputs, outputs, and outcomes of the consultations will be shared with the Bank team and will be taken into account during the project implementation to ensure the feedback loop.

## Annex 1: Results Framework and Monitoring

**Country: Rwanda**  
**Project Name: Rwanda Electricity Sector Strengthening Project (P150634)**  
**Results Framework**

### Project Development Objectives

PDO Statement: The Project Development Objective (PDO) is to enhance the operational efficiency of the utility and increase electricity access.

Project Development Objective Indicators								
		Cumulative Target Values						
Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	YR6	End Target
People provided with access to electricity under the project by household connections (Number) - (Core)	0.00	0.00	0.00	129,600	226,800	291,600	324,000	324,000
Direct project beneficiaries (Number) - (Core)	0.00	0.00	0.00	129,600	226,800	291,600	324,000	324,000
Female beneficiaries (Percentage - Sub-Type: Supplemental) - (Core)	0.00	0.00	0.00	50.00	50.00	50.00	50.00	50.00
Reduction in commercial losses (Percentage)	7.60	7.60	7.60	7.00	6.60	5.60	4.00	4.00
Reduction of technical losses in the Kigali City 15KV distribution network (total annual-GWh savings)	0.00	0.00	0.00	2.50	4.0	5.50	7.18	7.18

<b>Intermediate Results Indicators</b>								
<b>Indicator Name</b>	<b>Baseline</b>	<b>Cumulative Target Value</b>						
		<b>YR1</b>	<b>YR2</b>	<b>YR3</b>	<b>YR4</b>	<b>YR5</b>	<b>YR6</b>	<b>End Target</b>
Community electricity connections constructed under the project (Number) - (Core)	0.00	0.00	0.00	317	554	712	792	792
Schools - (Number - Sub-Type: Breakdown)	0.00	0.00	0.00	165	288	370	412	412
Administrative Centers (Number - Sub-Type: Breakdown)	0.00	0.00	0.00	136	238	306	340	340
Health facilities (Number - Sub-Type: Breakdown)	0.00	0.00	0.00	16	28	36	40	40
Reduced average annual outage duration in 15 KV system of Kigali distribution network (Hours)	100.00	100.00	100.00	75.00	60.00	50.00	50.00	50.00
Reduced average receivables debtors age for postpaid customers (Days)	90.00	90.00	90.00	80.00	75.00	65.00	60.00	60.00
Preparation of quarterly financial reports by the 5th day of the end of each quarter (Number)	0.00	0.00	0.00	4.00	4.00	4.00	4.00	4.00
Industrial consumers covered by RPP (Percentage)	0.00	0.00	0.00	25.00	50.00	75.00	75.00	75.00
Development of a corporate strategic plan (including key KPIs and a dash board) (Yes/No)	No	No	No	Yes	Yes	Yes	Yes	Yes
Switching stations rehabilitated and added to the SCADA/EMS in Kigali distribution system (Number)	0.00	0.00	0.00	16.00	17.00	18.00	19.00	19.00
Distribution lines constructed or rehabilitated under the project- (Kilometers) - (Core)	0.00	0.00	0.00	430.00	854.00	1666.00	1666.00	1666.00
Utility publishes annual report on citizen engagement (Yes/No)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

<b>Indicator Description</b>				
<b>Project Development Objective Indicators</b>				
<b>Indicator Name</b>	<b>Description (indicator definition etc.)</b>	<b>Frequency</b>	<b>Data Source / Methodology</b>	<b>Responsibility for Data Collection</b>
People provided with access to electricity by household connections (Number)	This indicator measures the number of people that have received an electricity connection under the project via new connections aimed at connecting households. The baseline value for this indicator is expected to be zero.	Annual	EUCL Utility Database  Targets are equal to the number of people directly benefiting from the project as a result of household connections (household connections under the project are expected to be 72,000, multiplied by an estimated 4.5 people per household)..	EUCL
Direct project beneficiaries (Number)	Direct beneficiaries are people or groups who directly derive benefits from the interventions. Supplemental Value: Female beneficiaries (percentage). Based on the assessment and definition of direct project beneficiaries, specify what proportion of the direct project beneficiaries are female. This indicator is calculated as a percentage.	Annual	EUCL Utility Database  The indicator captures people benefiting from electricity access under the project (also captured by the indicator above). Community services and capacity building beneficiaries have not been included since these are difficult to quantify.	EUCL
Female beneficiaries (Percentage)	Based on the assessment and definition of direct project beneficiaries, specify what percentage of the beneficiaries are female.	Annual	EUCL Utility Database  50 percent of the beneficiaries are estimated to be female.	EUCL
Reduction in commercial losses (Percentage)	This indicator measures the non-technical (commercial) losses under the project through activities under Component A.	Annually	EUCL Utility Database  According to the Consultant's report (Manitoba), the current commercial losses are	EUCL

			estimated at 7.6 percent. The proposed activities under the project can contribute to a reduction to 4 percent.	
Reduction of technical losses in the Kigali City 15KV distribution network (total annual-GWh savings)	This indicator measures the technical losses as in annual energy savings under the project through activities under Component B2.	Annually	EUCL Utility Database	EUCL
<b>Intermediate Results Indicators</b>				
Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Community electricity connections constructed under the project (Number)	This indicator measures the number of new community connections constructed under the project. "Community connections" are electricity services provided to hospital, schools, community centers, or other establishments that provide services to a larger pool of people in remote areas. The baseline value for this indicator is expected to be zero.	Annual	EUCL Utility Database  Community services include schools, administrative centers and health facilities. Targeted numbers are based on the following assumptions: Community connections = 1.1 percent of total connections (out of which 52 percent are schools; 43 percent administrative centers and 5 percent health facilities).	EUCL
Reduced average annual outage duration in 15KV system of Kigali distribution network (Hours)	The indicator measures the average outage of unscheduled outages in the Kigali distribution network.	Annually	EUCL Utility Database  According to the World Bank Enterprise Survey, companies observe on average 4 outages per month. Based on NCC data, the average duration of unscheduled outages is 2.12 hours resulting in 8.48 hours per month, or 101.76 per year. The proposed activities will result in a reduction of power outages by 50 hours per year	EUCL



			(from the current 100 hours per year).	
Reduced average receivables debtors age for postpaid customers (Days)	This is the rolling average age (in number of days) of the debt receivable from the post-paid customers.	Per billing cycle (monthly)	EUCL Utility Database  Baseline and target provided by EUCL based on assumptions. Exact measurements currently not available due to lack of MIS. Figures might be revised after successful installation of the MIS in Year 3 of the Project.	EUCL
Preparation of quarterly financial reports by the 5th day of the end of each quarter (Number)	Preparation of quarterly financial reports by the 5th day of the end of each quarter.	Annual	EUCL Utility Database	EUCL
Industrial consumers covered by RPP (Percentage)	Percentage of industrial consumers to be covered by the RPP by the end of the Project	Annual	EUCL Utility Database  Baseline was set to zero, since currently no industrial consumers are covered under the RPP. Based on experiences in other countries (e.g., Kenya), the target was set to 75 percent.	EUCL
Development of a corporate strategic plan (including key KPIs and a dash board) (Yes/No)	Development of a corporate strategic plan (including key KPIs and a dash board) by the third year of the Project	Annual	EUCL Utility Database	EUCL
Switching stations rehabilitated and added to the SCADA/EMS in Kigali distribution system (Number)	This indicator measures the amount of switching stations rehabilitated and added to the SCADA/EMS in the Kigali distribution system.	Annual	EUCL Utility Database	EUCL
Distribution lines constructed or rehabilitated under the project (Kilometers)	This indicator measures the length of the distribution lines constructed or rehabilitated/upgraded under the project. The	Annual	EUCL Utility Database  The targets include lines constructed under Component	EUCL

	baseline value for this indicator is expected to be zero.		B1 (Kigali Distribution Strengthening) and B2 (EARP).	
Utility publishes annual report on citizen engagement (Yes/No)	Publication of annual report on citizen engagement.	Annual	EUCL will hold annual consultative meetings to assess the consumer satisfaction and engage customers. A report will be published which summarizes the results of these meetings. Relevant feedback from the meetings will be taken into account during project implementation.	EUCL

## Annex 2: Detailed Project Description

### RWANDA: Electricity Sector Strengthening Project

1. The project has three components: (A) Electricity Sector Capacity Strengthening, to improve sector capacity in the short- to medium-term through the establishment of an integrated management information system (MIS), integrated business improvement plans, and capacity building activities for the relevant institutional bodies; (B) Increased Access to Electricity Services, through the provision of additional connectivity and up-grading of existing networks; and (C) Technical Assistance and Implementation Support.

2. **Component A. Electricity Sector Capacity Strengthening (estimated cost US\$20 million equivalent).** The objective of this component is to: (i) assist EUCL to establish a modern, comprehensive MIS for efficient management of its customers and corporate resources; (ii) strengthen the technical, management, and leadership capacity of the newly appointed EUCL staff to be able to efficiently manage the utility on their own within three years; and (iii) support the EUCL management team to develop a corporate business plan, and implement a strategy/execution plan that includes diffusing a performance driven culture within the organization.

3. The energy sector, as with other sectors in Rwanda, lacks adequate staff with experience for effective management of the sector. As a result, the sector policies, planning approach, and development plans have not been robust enough to identify optimal generation projects that are bankable for development by the private sector. Human resource constraints have also limited the sector's capacity in the procurement of private sector investment and implementation of planned projects. Assessments<sup>15</sup> carried out have attributed the limited human resource capacity development to the following two main factors:

- Firstly, the energy sector has undergone frequent major restructuring in the last 10 years, which created institutional instability and an environment that has not been conducive to human resource development, resulting in high turnover of staff. Notable changes included: (i) placement of the then water and electricity utility ELECROGAZ under a management contract with Lahmayer International between 2003 and 2006; (ii) split in 2008 of ELECTROGAZ into the Rwanda Energy Corporation (RECO) and the Rwanda Water and Sewerage Corporation (RWASCO); (iii) re-integration in 2011 of water and electricity functions and creation of the Energy and Water and Sanitation Authority (EWSA); and (iv) separation in 2014 of water and electricity functions and vesting of these functions in newly established companies, the Rwanda Energy Group (REG) and its two subsidiaries, and the Water and Sanitation Company (WASAC).
- Secondly, there has been little autonomy for the sector and its agencies to define their organizational and salary structures to be able to attract and retain skilled staff since the approach has been to centrally prescribe a uniform structure across the public service. As a

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<sup>15</sup> World Bank (2013); Developing Sustainable Public Sector Capacity for Rwanda's Vision 2010- Enhancing Human Resource Development.

<sup>15</sup> PSCBS/AGI (August.2010), Strategic Capacity Building Project – Capacity Constraints within the Governance of the Electricity Sector.

result, the sector has relied heavily on short-term technical experts provided by development partners or contractors for performance, which has in turn held back a more institutionalized form of sector capacity development and reduced the scope for professionals to develop.

4. The GoR recognizes that effective institutional arrangements are crucial for the sector's long-term sustainability, financial credibility, and increased private sector investments. In this regard, the GoR has recently embarked on a comprehensive sector restructuring to improve efficiency, transparency, and accountability to improve creditworthiness of the utility and its role as an off-taker of private generation capacity. After numerous consultations during the period 2011-2014 among key stakeholders, the sector restructuring program that involves creation of new institutions was approved by the Cabinet in October 2013. This was followed by: (i) enactment of law No 97/2013 of 30/01/2014 incorporating the new energy sector agencies, namely the Rwanda Energy Group (REG) and its two subsidiaries, the Energy Utility Corporation Limited (EUCL) and Energy Development Corporation Limited (EDCL); and (ii) Prime Ministers Orders dated July 2014 providing the legal instruments for the operations of the new agencies. The new agencies commenced operations effective August 2014.

5. The new legal framework provides the new agencies greater autonomy as the agencies are now corporatized providing for managerial independence. The government's role, as the owner of the corporatized entities, will now be limited to policy guidance, monitoring and oversight of the performance of the utility in terms of key outputs, such as costs and quality of service. The government's role in regulating inputs such as structures, salaries and procurement processes will be significantly reduced as the new utilities will be governed under the company law as opposed to the public service law. This legal autonomy is expected to lead to efficient operations, especially decision making as well as the ability to attract and retain skilled professionals as the company salary structure will no longer be pegged to the public service scale.

6. The MIS presently being used by EUCL is inadequate to support critical business processes. A large part of the processes in EUCL, including management of outages and customer inquiries, are carried out manually. The basic customer relationship management system used to track customer phone calls is not integrated with the rest of the operations. As a result, the corporation does not keep a record of key parameters of the system availability and service delivery, which is necessary for management to review operational performance and take decisions on needed improvements. In addition, the commercial function uses different billing and customer charging systems and, as a result, customer information is spread across applications, making it difficult for EUCL to have a complete record of its customers and timely reports on revenue collection. This is exacerbated by the fact that the commercial system and the financial systems are not integrated, which results in differences in accounts balances in finance system and the customer service system. In addition, EUCL is not able to produce management financial reports in a timely manner for decision making with regard to budget performance monitoring.

## **Component A Detailed Description**

7. *Subcomponent A-1. Management Information Systems (US\$10 million).* A scoping study has been carried out that has identified the management information systems needed to support the operations of the REG in general and the EUCL in particular. The study recommended

a mix of three systems, namely: enterprise resource planning (ERP); commercial management system (CMS); and a distribution management system (DMS) including incident recording management system (IRMS). The design of the management information systems subcomponent, as detailed in the paragraphs below, is substantially based on the recommendations of the management information system scoping study.

8. The MIS component will finance the following specific investments:
  - a. *Commercial Management System (CMS)*. This subcomponent will include the design, procurement and implementation of a new CMS to manage and track all commercial activities. The CMS functionality will include new connections applications, meter reading, billing, prepaid electronic token management, revenue collection and debt management. The objective of the CMS is to assist EUCL improve customer service through enhanced billing accuracy and faster resolution of customer complaints and inquiries. At the same time, the CMS will assist EUCL to improve its revenue collection, enhance sales, and reduce commercial losses and bad debt.
  - b. *Distribution Management System (DMS)*. This sub component will include development of a distribution incident management system to track among others, all customer calls, outages, and their respective service. The DMS will include: (i) a Geographic Information System (GIS); (ii) Outage Management System, including Incident Recording and Management System (IRMS); (iii) Distribution Systems Operations and Maintenance; and (iv) Distribution Supervisory Control And Data Acquisition (SCADA). The IDMS will provide a comprehensive network management system for effective operation of distribution system by enhancing routine network monitoring, fault location and restoration and will support EUCL to achieve one of its key goals of improving supply reliability and operating efficiency.
  - c. *Enterprise Resource Planning (ERP) System*. The subcomponent will include the design, supply, and implementation of a corporate ERP system covering the modules related to corporate functions such as human resources, finance, procurement and asset management to support the utility to better plan and manage all of its resources. The objective of the ERP is to provide a platform for a shared database integrating information flow within the EUCL to improve the operational performance and enhance corporate governance of the EUCL. This will provide the company with tools to enable increased transparency and accountability. The ERP will be integrated with the commercial systems (CMS, RPP, IRMS) and network operations system (DMS), which will enable real-time access to corporate data. The global real-time view of the EUCL business data will not only enable the EUCL to address concerns proactively and drive improvements based on the agreed performance targets/indicators but also provide a platform to assess performance. The integrated system will also help have in place streamlined processes in the core business areas of corporate resources, commercial and revenue management, and network operations, and also enable the EUCL personnel to have access to the same information for their specific needs and faster decision making.

9. EUCL is currently updating its customer and electricity networks databases. The update will include the incorporation of a GIS and linking of customers' premises and electricity network assets in the system. This data will be critical during the development and use of the MIS. It is expected that with a reliable database, the performance of EUCL in commercial functions and management and monitoring of supply interruptions will improve significantly.

10. The proposed MIS is being used by service utilities in both developed and developing countries all over the world for efficient and accountable execution of operations, while at the same time enabling effective recording and monitoring of the quality of technical and commercial services provided to each individual end user. In Africa, a similar MIS is being successfully used by a number of electricity utilities, such as Eskom of South Africa, Electricity Company of Ghana, Zambia Electricity Supply Company, Electricidade de Mozambique, the Kenya Power & Lighting Company Limited, Umeme of Uganda, and Ethiopian Electric Power Corporation.

11. ***Subcomponent A-2: Revenue Protection Program (US\$5 million)***. This component will finance implementation of a revenue protection program (RPP), based on the application of advance metering infrastructure (AMI), and the adoption of organizational arrangements, i.e., creation of one or more Metering Control Centers (MCCs), aimed to optimize the systematic use of the information provided by the metering system and undertake consistent corrective field actions as needed. The main objective of the RPP is to protect EUCL's revenues it receives from sales to large customers, ensuring that all users in that high value segment are systematically billed according to accurately metered consumption.

12. About three percent of the total number of customers are connected to the medium voltage network and represent 50 percent of total energy currently billed. Sustainable protection of the revenues generated by consumers in this high value segment is key for EUCL's operational and financial sustainability. This starts by ensuring that all the large customers are billed according to their actual fully metered consumption. This will reduce EUCL's commercial losses (non-technical losses).

13. Relevant experiences in several developing countries show that the sustainable recovery and protection of the revenues generated by large customers can be achieved by managing their consumption (metering, reading, and billing) through advanced metering infrastructure. This includes the installation at each customer's premises of consumption metering systems including communication devices that make it possible to periodically transmit their records to remote points where they are systematically analyzed, processed, and monitored by staff at the MCCs, created for that specific purpose. The MCCs will use Meter Data Management (MDM) software packages to monitor, detect, and correct irregular conditions in electricity use.

14. At present EUCL has incorporated one-way communication (also known as automated meter reading, or AMR) to remotely record consumption of most of its large customers supplied from the medium voltage network. However, the company has not implemented the MCCs as permanent organizational units responsible for revenue protection. Besides, the MDM currently used needs to be replaced by a new software package specifically designed to enable systematic effective monitoring of consumption for the purpose of revenue protection. Thus, the RPP to be developed by EUCL shall include: (i) creation of the MCCs and investments in infrastructure

needed to operate them; (ii) incorporation of a state-of-the-art MDM designed for the specific purpose of revenue protection and training of staff of the MCCs in its proper use; (iii) supply and installation of AMI for all the medium voltage customers, and (iv) incorporation of those customers to the respective MCCs.

15. The proposed RPP includes tools for the systematic gathering, storing, processing, analyzing, and monitoring of information on consumption and loads of the targeted customers, as well as a two-way communication between the MCCs and the customers. The adoption of this AMI technology will contribute to reducing commercial losses, increasing the accuracy of billing, avoiding loss of revenue, and enabling the load profiling of electricity consumers to improve load forecasting.

16. Commercial losses in EUCL are about 7.6 percent of its total energy generated. As implementation of the RPP will permanently protect 50 percent of total current EUCL's sales and eliminate the commercial losses associated with the targeted large consumers, it is expected to have a significant impact by sustainably reducing overall commercial losses.

17. ***Subcomponent A-3: Strengthening the technical capacity of key functions in EUCL (US\$5 million).*** Based on the lessons learned from utilities that have successfully implemented an integrated MIS, the MIS program will include definition and re-engineering of the business and operational processes and practices to align them with the corporate strategic objectives of improvement of operational and financial performance and service delivery to customers. The reengineered processes and practices will be supported by the state of the art MIS.

18. The Board of Directors of the REG in October 2014 approved new organizational and compensation structures for the REG, EUCL, and EDCL aimed at attracting and retaining skilled staff. Recruitment of senior staff (excluding the Chief Executive Officer of REG and Managing Directors of EUCL and EDCL, who were appointed by cabinet) was carried out through an open competitive process with the assistance of an independent manpower development consultant. The recruitment targeted identifying and nurturing national talent, thus the need to strengthen the technical and management capacity of the newly appointed managers of EUCL to be able to efficiently manage the utility on their own within the next three years through the support proposed to be provided under A-3-1 and A-3-2.

19. ***A-3-1: Supporting utility operations in EUCL (US\$3.5 million).*** This will be achieved through engagement of experienced technical staff in each of the four functions, namely operations, commercial services, finance, and corporate services, to be provided preferably by one firm ("Business Support Services Firm") with experience in utility operations. Appointment of the Business Support Services Firm to provide the technical staff will be made through a competitive process. The subcomponent will also finance the cost of additional training and capacity building of EUCL staff. The EUCL substantive managers will be accountable for performance results whereas the external technical staff will among others: (i) coach, mentor, and enhance the capacity of their EUCL counterparts in areas of their technical expertise; (ii) assist EUCL to develop and document the functional processes and operational procedures (business reengineering); (iii) assist EUCL to implement the MIS; (iv) assist EUCL to collect and keep record of performance data to

be used as baseline data in performance targets setting; and (v) assisted by a strategy execution consultant, prepare and implement a corporate strategic plan.

20. ***A-3-2: Corporate Strategic Plan and Performance Management (US\$1.5 million).*** International experience shows that the success of any organization is driven by a clear vision that is supported by a robust strategy and individual staff plans that are aligned to the strategy. Experience also shows that the only good strategy is one that gets executed. The objective of this sub component is to assist EUCL to develop the vision and strategic plan.

21. Specifically, the subcomponent will finance engagement of a strategy development and execution consultant for a period of two to three years to assist the top leadership team of EUCL to: (i) define the mission and vision of the Corporation; (ii) originate a robust medium-term strategic plan that is simple, communicable, and easy for all staff to understand; (iii) develop the Managing Director's annual plan; and (iv) cascade the corporate strategy and Managing Director's annual plan to senior management, and critical functions within the organization, e.g., where the actual implementation of the strategy takes place. An integral part of the strategy execution support will include training focused on aligning people and behaviors to the corporate purpose and values to obtain individual commitment. This is aimed at instilling a values driven culture of performance and results.

22. The strategy execution consultant will assist EUCL leadership to align staff's annual performance contracts and targets with the corporate strategy and Managing Director's annual plan. Interdependencies and accountabilities between functions will be identified and addressed, thereby helping to breakdown organization silos and create an aligned organization. To assist EUCL top management to track and measure performance on real time basis country wide, the consultant will assist EUCL to develop and implement a dashboard. The dashboard will cover senior staff from the Managing Director. Leveraging the data and trend analysis supplied by the performance dashboard, the strategy execution consultant will assist the top EUCL management, departments, etc., to conduct monthly performance reviews. The consultants will facilitate the EUCL teams to have open discussions in monthly meetings on performance, conduct root-cause analysis of performance gaps, and formulate agreement on individual actions for urgent attention before the next monthly performance reviews. This will help shape a performance based culture, transparency, and accountability in the organization. During the duration of the strategy execution consultancy contract, an internal team will be coached to continue to carry out the annual performance plans cascade and performance reviews once the consultancy contract is completed.

23. ***Component B- Increased Access to Electricity Services (US\$70 million equivalent).*** The component will support: (i) connection of new consumers and network reinforcements, where required, to ensure that network expansion does not compromise the quality of supply; and (ii) strengthening of the Kigali 15KV distribution network to provide sufficient capacity to meet increased demand arising out of increased economic activities.

24. ***Sub-Component B-1: Strengthening the distribution network around Kigali Area (US\$25 million).*** The subcomponent will finance the rehabilitation of 19 switching stations in the Kigali distribution to enhance safety standards and installation of equipment that will facilitate their monitoring and control from the National Control Center (NCC). This will improve the



overall network operations efficiency. In addition, the Kigali electricity distribution network will be upgraded to increase loading capacity thereby improving supply reliability. The network strengthening activities will also focus on reducing technical losses and increased reliability.

25. Kigali City and its environs constitutes the biggest load center in Rwanda, currently consuming about 57 percent of the total energy supplied to the national grid and with a peak power demand of about 53 MW. The energy and power demand has been growing at a rate of about 10 percent per annum for the last five years. Being the country’s major economic hub, the area’s infrastructure has been growing rapidly with new upcoming office buildings, hotels, residential buildings as well as industrial establishments, among which is the special economic processing zone.

**Table A2-1 Kigali Primary Substation (110/15KV) Peak Demand**

Year	2008	2009	2010	2011	2012	2013	2014
<b>Substation</b>	Peak Demand (MW)						
<b>Gikondo</b>	22.8	27.8	26.1	22.8	23.9	24.6	31.8
<b>Birembo</b>			7	7.5	12.7	13.8	16.9
<b>Gasogi</b>	1.6	1.6	3.1	3.1	2.8	3.8	1.4
<b>Jabana</b>	9.9	10.4	10.9	11.7	12.2	16.2	10.5
<b>Mt Kigali</b>					6	5.8	12.7
<b>Musha</b>			4	4.4	4.4	4.6	7.5

Source: National Control Center

26. The existing feeders are unacceptably long, with high technical losses as evidenced from the poor voltage profiles, with some of them having reached their thermal loading capacity. In addition, most of the 15kV network switching stations have equipment that is old and dilapidated, which poses a significant risk to the safety of operations staff. The 15kV feeders, which form the distribution network, are not equipped with facilities such as automatic load break switches. Thus in a case of a fault or scheduled maintenance, all the customers along the feeder are affected, which greatly contributes to the city’s poor supply reliability with unnecessary loss of service to customers and revenues to EUCL. In addition, the equipment at the various switching stations does not have features that could enable them to be connected to the NCC. This creates challenges of not being able to monitor and control most of the Kigali distribution network efficiently and reliably, with average restoration time of about three hours per outage. Recent surveys have indicated that poor supply reliability is one of the major constraints impacting the profitability of enterprises in Kigali.<sup>16</sup> This is exacerbated by the fact that some MV feeders are overloaded and in case of a fault or scheduled maintenance, there is limited load transfer capacity to other feeders. There is thus an urgent need to rehabilitate these stations to at least meet the basic safety standards and installation of equipment that could facilitate their monitoring and control from the NCC to improve the overall network operations efficiency.

27. In a fast changing world, expectations with respect to system reliability cannot be overemphasized. It is therefore imperative that EUCL makes use of current advances in

<sup>16</sup> The World Bank Group (2015). Doing Business. <http://www.doingbusiness.org/data/exploreeconomies/rwanda>

technology, especially use of ICT in system management and operation. Currently, whenever a power failure occurs on a particular 15kV feeder, it results in a power failure for an entire area supplied by that feeder. When the diagnosis and repairs are handled manually, teams of technicians have to physically inspect the feeder to locate the faulty section before it can be isolated for repairs. This takes time causing the outages to last for extended periods, highly inconveniencing the customers and at the same time EUCL loses revenue in unsold energy. With an automated system it will be possible for system controllers to remotely monitor and control virtually any aspect of the operation. Information is provided in a real-time environment that identifies problems as they occur and corrective actions are immediately taken when needed. Distribution automation will also facilitate load shifting between several feeder lines. From the NCC, one can detect mismatches between the load and the demand in any feeder and re-route the power from an adjacent line to alleviate the problem in seconds. In summary, connecting most of the switching stations to the NCC combined with a reinforced main feeder network will: (i) reduce the duration of outages by fast fault detection, localization, isolation, and restoration of power supply via alternative lines available; (ii) shorten of times for repair works by faster localization of faults and instructions to repair personnel; and (iii) provide accurate data for distribution network planning and maintenance planning. All these will contribute to improve the management and operations of the Kigali distribution network.

28. The subcomponent will fund activities to: (i) increase the capacity of some feeders (increasing their loading capacity) so that N-1 reliability can be secured in Kigali electricity distribution network and also reduce the technical losses; (ii) rehabilitate and install new switchgear at 19 switching stations with facilities for remote monitoring, control, and data acquisition; and (iii) SCADA and tele-control connection of the new substations to the NCC. The remote monitoring and control will minimize the extent of outages caused by faults and scheduled maintenance, ease fault location and thus reduce the duration taken to restore supply.

29. ***Sub-Component B-2: Increased Access to Electricity Services (US\$45 million)***. This subcomponent will support the country's ongoing electricity access program, the EARP, and will finance activities to connect new consumers through grid extensions and consumer connections. It will also include upstream distribution network reinforcements, where required, to ensure that network expansion does not result into the deterioration of the quality of supply in the existing network. The subcomponent will support investments that will result into adding about 72,000 new connections to national electricity grid, estimated to benefit 324,000 people.

30. This subcomponent will also support the continued annual surveys to inform the impact evaluation of the EARP program, started under the ongoing EASSDP. Annual surveys will be undertaken over the project years 2016-2019 following the baseline surveys completed in 2014. The objective of the evaluation is to measure changes in welfare outcomes attributable to electrification under the EARP. The continued surveys will help document the medium term economic and social outcomes attributable to the electrification program.

31. The GoR recognizes that limited access to electricity is constraining the country's poverty reduction and economic growth as well as broad-based welfare gains. The country's economic development and poverty reduction strategy for the period 2013-2018, has set a target of increasing the national access rate to the electricity grid to about 48 percent by end 2018 from about 22

percent as of end December 2014. The government's overarching objective is to provide core infrastructure, including increased access to the electricity grid, required to: (i) stimulate investments and economic activities in rural areas; and (ii) contribute to improved public service delivery targeting community-based institutions used by the poor, such as schools, clinics, and hospitals for shared growth and prosperity. The areas to be electrified under the project have been selected following the EARP planning and prioritization criteria summarized in the following paragraphs.

32. In 2009 the GoR and with support from the World Bank, prepared a National Electricity Access Program Investment Prospectus in order to address challenges related to lack of credible electricity access plans, which in turn led to a fragmented and underfunded approach. The prospectus integrated technical, financing, and implementation planning components, hereto known as the EARP. The World Bank has participated in the EARP as a lead donor since the initiation of the program, through successive IDA funded operations – Electricity Access Scale Up and Sector Wide Approach Project in 2009 and its additional financing in 2013.

33. The access rollout was prioritized based on weights given depending on demographic and cost factors, including proximity to the existing grid, inter household distances, social infrastructure, access to road networks, and the ability of consumers to afford electricity. The objective of this prioritization was to ensure that the EARP maximizes the benefits of electrification, while minimizing program costs. The results of the country-wide access rollout prioritisation highlighted that the GoR electricity access targets could be optimized by concentrating initially on increasing the number of connections within the areas already reached by the MV network and simultaneously but progressively extending the MV network. Given the high population density in Rwanda, the prioritisation also highlighted that most areas of the country could eventually expect to be connected to the national grid (Annex 7 Map 2 provides a snapshot of the grid coverage).

34. A detailed electrification planning study was undertaken during 2011-2013, further to the 2009 Access Prospectus. This geo-referenced plan targeted an access rate of 70 percent by 2018. The country's provinces were prioritized into various zones based on two major criteria: (i) energy sales per investment cost (this targeted productive use of electricity); and (ii) cost per customer connection (focused on meeting the national target access rate). The implementation roll-out was further ranked taking into consideration several sub-criteria among which are: (i) social infrastructure, such as hospitals, health centres, sector offices, schools, etc., as the national objective was to have these covered 100 percent by 2018 to provide improved social services; (ii) distance from the existing network; (iii) government set targets per district to ensure national equity; and (iv) social demand, i.e., greenfield areas where no electricity existed in a sector. The rollout plan also took into account the fact that zones closest to the existing network had to be connected first before the zones further from the network, a factor that constrained the overarching "least cost/connection" priority.

35. The planning study also included detailed load flow analysis to assure proper network operations and optimised losses as a result of the network extensions. From the load flow results, recommendations were made to ensure normal network operations and optimized losses which include construction of new MV substations and network strengthening to address technical issues

such line overloads, low voltage, and substation transformer overloading, in addition to optimizing overall network losses per feeder.

36. Table A2-2 below provides a summary of the results (annual number of new households connections required to achieve the 70 percent target). The planning results highlighted that the 70 percent grid access target by 2018 would be difficult to achieve given the number of in-fills required as it is heavily dependent on the rate of growth of new households in the already electrified areas (fill-ins).

**Table A2-2 Target Annual Household Connections/Region to Attain 70 Percent by 2018**

Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Existing connections (base 2011)	243,468					
New potential Connections (based on existing households and population growth)	114,363	43,561	98,843	91,405	83,257	45,075
Fill-ins	0	161,487	170,458	179,430	188,401	197,373
Year Total	114,363	205,048	269,301	270,835	271,658	242,447
Cumulative (No.)	357,831	562,879	832,180	1,103,015	1,374,673	1,617,120
Total Household Number (3% p.a. growth)	2,031,656	2,092,606	2,155,384	2,220,045	2,286,647	2,310,171
<b>National Access rate (cumulative-%)</b>	<b>17.61</b>	<b>26.90</b>	<b>38.61</b>	<b>49.68</b>	<b>60.12</b>	<b>70.00</b>

Source: EARP Planning Report-March 2013

37. GoR has since reviewed the national targets and set a 48 percent target by 2018 (the remaining 22 percent will be electrified through off-grid solutions). Based on the current access rate of about 24 percent (510,000 households), the EARP will need to scale-up connections and increase access by about 24 percent translating into an average of about 150,000 new household connections per annum over the next four years.

38. **Progress towards Achieving the GoR's National Targets.** The EARP has increased the national access rate from about six percent in 2009 to 22 percent by the end of 2014. The table below provides an overview of the cumulative annual connections and increase in the national access rate, the scale up being attributed to the EARP. This remarkable access scale-up is as a result of a robust access program design and implementation approach, highlighted as best practice by the Bank's Independent Evaluations Group (IEG) in the report *The World Bank Group Support to Electricity Access, FY2000–FY2014* (2015). The report highlights that: (i) the transition from low access to high, or universal access can be made within two decades through strong and sustained grid-based expansion as in the case of Indonesia, Lao PDR, and Vietnam; (ii) a synchronized and comprehensive approach is essential, together with a clear government vision and commitment to the access goals; and (iii) a SWAp along with demonstrated government commitment so far have led to very significant financing commitments from various development partners.

**Table A2-3 Total Number of Electricity Consumers**

Year	2009	2010	2011	2012	2013	2014	2015
Total number of Electricity consumers	141,736	174,765	253,050	322,585	383,897	476,307	510,000
National Access rate (%)	6	9	13	16	18	22	24

Source: EARP- June 2015

39. **Role of Development Partners.** The rapid achievements in expanding access to electricity were made possible by the applications of a sector-wide approach (SWAp) in the electricity sector; with a strong government ownership and multiple development partners' support. In 2006, in the run-up to the SWAp rollout, the GoR adopted an aid policy aimed at harmonization and alignment. In 2008, the government began implementing the EDPRS, which included a Common Performance Assessment Framework (CPAF) that used SWAps for various sectors, including energy. The energy SWAp has been implemented by a Sector Working Group (SWG) made up of key stakeholders including development partners active in the sector. The SWG has provided a forum for joint planning and coordination among all key stakeholders. Typically, a SWAp would also streamline finances by employing basket or pooled funding, where all development partners pledge their funds into a joint account managed by the government or a sector utility. In the case of Rwanda, however, funding was not pooled and instead development partners pick activities to fund from the prioritized list of projects.

40. EARP has been supported by a number of development partners since its launch in 2009, including the African Development Bank (AfDB), Arab Bank for Economic Development in Africa (BADEA), Belgium Technical Cooperation (BTC), European Union (EU), Netherlands, Japan, OPEC Fund for International Development (OFID), Saudi Fund, the World Bank, and others. Table A2-4 below highlights contributions from the various development partners.

**Table A2-4 EARP Funding- 2009/20 (Committed and Pledged)**

Development Partners (Ongoing and pipeline support)	Funds available (US\$m)
World Bank (ongoing)	130.0
World Bank (Pipeline)	45.0
AfDB (Ongoing)	42.0
EU (pipeline)	155.4
BADEA (Ongoing)	11.2
Saudi funds (Ongoing)	11.7
Kingdom of Belgium/BTC (ongoing)	37.74
AFD (completed)	4.6
AFD (Pipeline)	22.0
Government of Netherlands (completed)	44.4
OFID (completed)	22.0
GoR	65.0
Consumer Contributions	27.0
<b>Total</b>	<b>618.04</b>

Source: EARP, June 2015

41. **Target Connections to be funded by the Project.** The areas to be electrified under the project have been selected following the above described prioritization and ranking criteria. A

number of these areas also belong to the poorer regions in the country as highlighted in Table A2-5 below. Other development partners have also expressed their intent to provide additional parallel financing towards achievement of the national access targets.

**Table A2-5 Rwanda’s geographical pattern of electricity access and Poverty:** The project works across the country and focuses on the grey areas (shaded rows).

Province	District	Poverty level (%)	Access to grid-electricity (%)
Kigali City	Nyarugenge	10.1	72.1
Kigali City	Gasabo	26	59.7
Kigali City	Kicukiro	8.3	75.7
Southern Province	Nyanza	49.8	6.4
Southern Province	Gisagara	59.4	2
Southern Province	Nyaruguru	61.6	2
Southern Province	Huye	46.6	13.2
Southern Province	Nyamagabe	73.3	5
Southern Province	Ruhango	60.4	8.2
Southern Province	Muhanga	53.6	13.8
Southern Province	Kamonyi	46.7	7.1
Western Province	Karongi	61.7	6.5
Western Province	Rutsiro	53	3.3
Western Province	Rubavu	35.8	26.7
Western Province	Nyabihu	28.6	8.3
Western Province	Ngororero	51.9	4.1
Western Province	Rusizi	45	19.9
Western Province	Nyamasheke	63.4	7.2
Northern Province	Rulindo	42.9	5.6
Northern Province	Gakenke	56.6	2.8
Northern Province	Musanze	20.1	20.4
Northern Province	Burera	45.2	6
Northern Province	Gicumbi	49.3	5
Eastern Province	Rwamagana	30.4	14.1
Eastern Province	Nyagatare	37.8	17.9
Eastern Province	Gatsibo	43.1	11.5
Eastern Province	Kayonza	42.6	16.1
Eastern Province	Kirehe	47.9	11.3
Eastern Province	Ngoma	47.6	9.5
Eastern Province	Bugesera	48.4	8.8

42. The table below summarizes the scope of the project including the project cost estimates.

**Table A2-6 Summary of Connections under the Project**

<b>Province</b>	<b>MV LINES (km)</b>	<b>LV LINES (km)</b>	<b>Estimated No. of new connections</b>	<b>Est. COST (USD millions)</b>	<b>Cost / Connection (USD)</b>
<b>East</b>	150.0	263.5	10,446	7.5	<b>718.00</b>
<b>West</b>	162.1	298.9	11,893	8.0	<b>672.66</b>
<b>North</b>	137.9	218.3	14,305	9.5	<b>664.10</b>
<b>South</b>	219.3	186.9	10,741	8.0	<b>744.80</b>
<b>In-fills (All provinces)</b>			25,000	12.5	<b>500.0</b>
<b>Total</b>	<b>669.3</b>	<b>967.6</b>	<b>72,385</b>	<b>45.0</b>	<b>621.70</b>

Source: EARP

43. **Component C. Technical Assistance and Project Implementation Support (US\$5 million equivalent).** This component will finance project implementation support, advisory services, and technical assistance. The technical assistance will support studies required to have in place the requisite plans, bankable projects, and management capacity to foster improved sector expansion and efficient operations.

44. **Sub-component C-1: Feasibility and Diagnostic Studies (US\$3.5 million).** This subcomponent will support studies to address sector performance improvements in the medium-to long-term, especially those related to grid supply and reliability as well as options for sector development. For the former, assessments will include (but not be limited to) identification of investments required to (i) increase the electricity distribution network reliability, and (ii) reduce network down time and operations costs through automation of network. In addition, the assessments will include distribution network protection studies (fault calculations and protection grading) that will be required to enable the proposed network automation. For the latter, studies will support required feasibility studies and just-in-time policy advisory notes that are required to inform decision making regarding emerging sector issues. This subcomponent will also finance technical assistance activities to develop strategies including strengthening the functions of investment planning covering aspects such as feasibility studies and projects due diligence.

45. **Sub-component C-2: Project Implementation Support (US\$1.5 million).** This sub-component will finance execution, design, and supervision consultants to assist the entities in project implementation, sector management and coordination. This subcomponent will also support key functions at the EARP-PCU (project management, procurement, financial management, safeguards, and M&E) for project implementation, the SWG secretariat, capacity building, and operating costs.

### **Annex 3: Implementation Arrangements**

#### **RWANDA: Electricity Sector Strengthening Project**

1. The sector oversight and management is a primary responsibility of : (i) the Ministry of Infrastructure (MININFRA), which has the primary responsibility for setting the overall policy and strategy of the energy sector, and for coordinating the developments of the electricity sub-sector; (ii) the Rwanda Utilities Regulatory Authority (RURA), which regulates and approves water and electricity tariffs; and (iii) the Rwanda Energy Group Holding Company (REG) with its two subsidiaries, the Rwanda Electricity Utility Corporation Limited (EUCL) responsible for electricity operations, and the Rwanda Energy Development Corporation Limited (EDCL), in charge of energy development activities. The REG holding company plays an interfacing role between government policies enforcement and subsidiary companies' sustainable management. REG's key role is to ensure timely execution of the actions under the National Strategic Plan by the subsidiary companies while at the same time ensuring that the government provides appropriate economic resources to each subsidiary.

#### **Project Implementation Arrangements**

2. EUCL will be the Project Implementing Entity and will be responsible for the implementation of the project. In order to provide leadership, coordination, and effectively implement Components A-1 (Management Information Systems); Component A-2 (Revenue Protection Program); Component A-3-1 (Strengthening the technical capacity of key functions in EUCL); Component A-3-2 (Corporate Strategic Plan and Performance Management) and Component B-1 (Strengthening of the distribution network around in the Kigali city area), EUCL shall establish project implementation arrangements as detailed below. Component B-2 will be managed by EARP-PCU housed in EDCL.

a. **Project Manager:** EUCL will appoint a Project Manager who will report directly to the Managing Director of EUCL. The Project Manager will have the overall responsibility of: (a) the project implementation management and coordination; and (b) project reporting covering progress of implementation and project's outcomes with regard to components A and B-1 and shall provide reports and information to the SWG and the EARP-PCU. The Project Manager shall be supported by EUCL technical specialists (Departmental Project Implementation Teams, DPITs) as shall be nominated by the respective directors of the beneficiary/user departments.

b. **Project Steering Committee (PSC):** EUCL shall establish a Project Steering Committee (PSC) which will be chaired by the Managing Director of EUCL. The membership of PSC shall comprise the directors, managers, and heads of units responsible for Corporate Services Finance, Commercial, Operations, IT, the Project Manager, the EARP-PCU Project Coordinator and such other staff as the Managing Director will determine to be necessary. The equivalent technical specialists procured under the Business Support Services Firm (BSSF) shall also be members of PSC. The mandate of the PSC shall be to provide leadership, guidance and oversight during the project implementation. The PSC shall also have the responsibility of approving: (i) the operational procedures and functional processes prepared



by the DPITs; and (ii) project technical designs submitted by the DPITs. The PSC shall meet at least monthly to review the progress of implementation of the various activities.

**c. Departmental Project Implementation Teams (DPIT):** EUCL shall establish Departmental Project Implementation Teams (DPITs) in the relevant departments with functions covered in the scope of the project, including operations, customer service, IT, and corporate resources. Each DPIT shall be led by the respective head of department/section and shall include dedicated staff from the department with skills and experience in the operations of the department. The technical specialists procured under the Business Support Services Firm shall be members of their respective DPIT. The DPIT shall be responsible for performing the following roles, among others: (i) preparing, reviewing and documenting the operational procedures and functional processes related to their functions to be supported by the MIS for approval by the PSC; (ii) preparing functional and technical designs as inputs to the bidding process; (iii) act as counterparts to the consultants and contractors during the implementation of the various project activities. The Project Manager shall have the overall responsibility of coordinating and managing the DPITs.

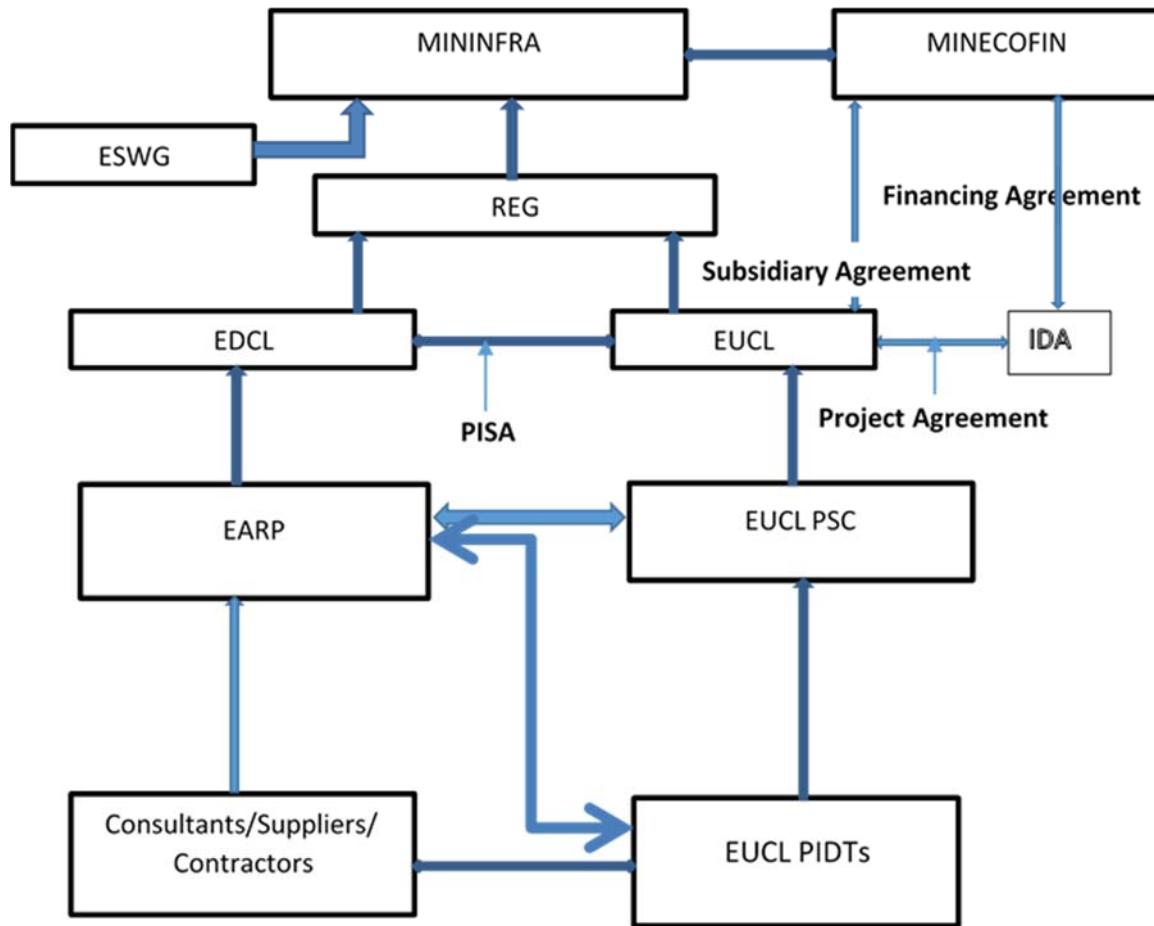
**d. EARP Project Coordination Unit (EARP-PCU).** The EARP-PCU, which has been responsible for implementing the EARP and has also managed previous Bank funded projects, shall provide project implementation support services to the EUCL with regard to the project procurement, financial management, social and environmental aspects, M&E, contracts management, and overall project reporting to the SWG and IDA. Noting the institutional autonomy of the EDCL and EUCL, both companies shall enter into a Project Implementation Support Agreement (PISA) which shall detail the roles and functions of the EARP-PCU implementation support to EUCL. The EARP-PCU, headed by a Project Coordinator, will have the following responsibilities: (a) management of the financial, procurement and safeguards functions; (b) facilitate coordination with the EUCL as well as among all relevant institutions and development partners; and (c) provide reports and information to the SWG and financiers, including the project monitoring and evaluation. The PCU shall be staffed with various specialists who will cover the key functions required for project implementation related to contracts management, procurement, financial management, safeguards, and M&E. The PCU professional and support staff shall be financed under the project and will work primarily only on the project. The PCU staff, where required, will be supported/reinforced with short term experts, on an advisory basis.

3. Other activities, related to feasibility studies and assessments will be led by either the heads of departments or technical specialists in the respective departments of the Ministry, the REG, EUCL, or EDCL to ensure oversight and ownership by the user/beneficiary departments and skills transfer but reporting to EUCL and the EARP-PCU.

4. The Energy SWG, chaired by the Permanent Secretary of MININFRA, provides a forum for sector dialogue, ownership, and accountability. The forum provides an interface between government, the development partners, and other sector stakeholders to support coordination and harmonization of processes, procedures, implementation and monitoring of government programs. The SWG will be supported by a full time SWG Secretariat comprised of the following: the SWG Coordinator, Economist, External Links and Donor Coordinator, and an M&E Specialist.

5. Consultants will be hired to provide technical assistance to the EARP-PCU and the EUCL:
- A ***Business Support Services Firm (BSSF)***, with experience in utility operations, will be hired to support the EUCL to strengthen its technical capacity in key functions of corporate resources, commercial and network management and operations. The experts provided by the BSSF will work as managers/advisors twinned with the newly recruited EUCL counterparts for a period of two to three years. The EUCL will develop a strategy of tailoring the expert services to transition from managerial to advisory support over a period of two to three years to ensure that the local counterparts are coached and mentored to be able to fully take over the company management and operations within this period. The experts will *inter alia*: (i) assist the EUCL staff to maintain and over time improve the current level of service; (ii) coach, mentor, and enhance the capacity of their EUCL counterparts in the areas of their technical expertise; (iii) assist EUCL to develop and document organizational guidelines and procedures (operational manuals); (iv) assist EUCL to implement the MIS and RPP systems; (v) assist EUCL to collect and keep record of performance data to be used as baseline data in performance targets setting; and (vi) together with their EUCL counterparts, participate in the preparation and implementation of the corporate strategic plan and annual business plans.
  - Key technical experts to support the DIPTs and the EARP-PCU, where required, for instance in the (i) scope definition, detailed design, preparation of technical specifications and terms of reference for various activities; and (ii) supervision of contractors.

**Figure A3-1 Project Institutional and Implementation Arrangements**



## Financial Management, Disbursements and Procurement

### Financial Management

6. As part of the Rwanda Electricity Sector Strengthening Project, the Bank's financial management team conducted a financial management assessment of the Electricity Development Corporation Limited's (EDCL) project coordination unit (EARP-PCU). The overall Project Implementing Entity will be the Electricity Utility Corporation Limited (EUCL) while the project financial management will be implemented by the EARP-PCU. The objective of the financial management assessment was to determine whether the financial management arrangements (i) are capable of correctly and completely recording all transactions and balances relating to the project; (ii) facilitate the preparation of regular, accurate, reliable and timely financial statements; (iii) safeguard the project's assets; and (iv) are subject to auditing arrangements acceptable to the Bank. The assessment complied with the Financial Management Manual for World Bank-Financed Investment Operations that became effective on March 1, 2010 and AFTFM Financial Management Assessment and Risk Rating Principles.

7. The assessment concluded that the current project financial management arrangements are adequate to meet the World Bank's minimum requirements as outlined in OP/BP10.00. A Project Implementing Support Agreement (PISA) will be signed between EUCL and EDCL. The EARP-PCU has experience in implementing World Bank projects and has the minimum requirements for a sound financial management system. EARP-PCU implemented the Sustainable Energy Development Project (P097818) which closed December 2013 and the Electricity Access Scale-up and Sector wide Approach Development Project (P111567) still on going. The last EASSDP implementation support rated the FM risk as Substantial. EUCL on the other hand does not have experience in Bank funded projects especially that it was recently set up. The overall financial management residual risk rating is *Substantial* for the proposed project.

8. **Country Issues.** Public Financial Management (PFM) is regarded as a key sector of public sector governance in Rwanda, as it cuts across different sectors as well as different levels of government.<sup>17</sup> The main objective of the PFM sector is "to ensure efficient, effective and accountable use of public resources as a basis for economic development and poverty eradication through improved service delivery". The government embarked on comprehensive PFM reforms more than five years ago with the comprehensive Public Financial Management Reform Strategy (PFMRS) in 2008-2012. Building on progress of the PFMRS, the PFM Sector Strategic Plan 2013-18 was formulated in 2013 to advance reforms in the sector. PFM systems and processes of the GoR have both strengths and challenges as shown in recent PFM diagnostic reports.<sup>18</sup> The strengths of the PFM system include: (i) the simplified public financial guidelines for chief budget managers which provide clear descriptions for the various PFM processes<sup>19</sup>; (ii) the orderly,

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<sup>17</sup> For example, the EDPRS2 states that "Rwanda's public finance management system is the platform for the efficient management of the nation's resources. Its reporting, audit and oversight functions are essential elements in providing effective Accountable Governance" (Para 6.27).

<sup>18</sup> Such as the Public Expenditure and Financial Accountability Assessments 2007 and 2010; sector public expenditure review reports; public expenditure tracking survey reports; and independent mid-term and end-term evaluations of the Public Financial Management Reform Strategy (2008-2012).

<sup>19</sup> <http://www.minecofin.gov.rw/fileadmin/documents/MINICOFIN-PFM-Guidelines-July-2011.pdf>

participatory, and transparent planning and budget preparation process, and (iii) a strong financial management legal framework. On the other hand, a number of challenges still remain with regard to: (i) dearth of suitably qualified officials to handle PFM functions coupled with high turnover of few trained staff; (ii) a relatively un developed internal audit; (iii) internal control weaknesses, and (iv) weaknesses in expenditure management. A follow up PEFA has been initiated and is ongoing. The Country has also done a second Report on the Observance of Standards and Codes and the results of both assessment will inform on the status of PFM reform and the extent of implementation.

9. An assessment of the systems and processes for dealing with fraud and corruption issues also shows that Rwanda has a strong institutional, organization, and legal frameworks for controlling fraud and corruption. Rwanda further strengthened the legal frameworks in 2013 with the amendment of the law to allow the Office of the Ombudsman to prosecute cases of corruption. There is an ongoing transition to enable the Office of the Ombudsman to be properly prepared to take over prosecution of corruption cases from the National Public Prosecution Authority. Rwanda also passed the Whistle Blowers Protection Act, 2013.

10. **Project Financial Management Arrangements.** The overall fiduciary function of the project will be the responsibility of the EARP-PCU through a Project Implementation Support Agreement (PISA) with EUCL. The EARP-PCU is under the management of a Project Coordinator and Finance Director. Overall project implementation will be under EUCL. A Project Steering Committee charged with monitoring and coordinating the activities of the project will meet semi-annually to assess progress and approve the annual work plan and budget.

11. The EARP PCU has a financial management manual that details the internal control system and implementation arrangements. This will be updated to include the new project and recent changes within the organization. The staff within the PCU have been trained in World Bank policies and procedures with the exception of the Finance Director. EUCL at the time of the assessment was in the process of recruiting an accountant who will work together with the PCU staff on the project. The TOMPRO software will continue to be used for records and financial reporting.

12. The financial management assessment noted areas of significant weaknesses that require attention prior and during project implementation. Notably the budgets for the last two years including for FY 2014/15 have not been approved by the Board despite the requirement that the Board approves the annual budgets. Audit reports for the previous two years have been qualified and follow up on audit recommendations has not been sufficient. The Board is required to form an audit committee, but has not been functional under the EWSA. There are also a number of internal control issues raised in the external audits. The Internal audit is functional but has not regularly audited project transactions and systems due to the enormous work load and therefore an internal auditor will be recruited to support the project transactions and compliance. To mitigate the identified weaknesses, the following actions will be undertaken:

- a. to recruit an internal auditor to support project activities;
- b. Agree on the interim un-audited financial report (IFR) format and audit template,
- c. Revise and update the financial management manual to include the project specific implementation arrangements as agreed under the PISA.

13. **Budgeting Arrangements.** Project budget preparation process is initiated by preparing the procurement plan which is approved by the World Bank. EUCL's Department of Construction and Contracts Management prepares bills of quantities to determine the quantities required to achieve the annual performance targets which are then used to prepare the procurement plan. EUCL's Finance Department plans the timing of the cash flows and outflows for capital expenditures and service contracts. Both the capital and recurrent budgets are submitted to the Bank for approval. The final budgets are submitted to the Board of Directors for approval, however the board has not approved budgets in the last two years. Although senior management approves the budget, the board has not fulfilled its role of giving the final approval. The EUCL shall set up a Project Steering Committee as detailed above which shall be responsible for approval of the project annual budget which shall be submitted to IDA for a No Objection.

14. The project will follow the GoR's planning and budgeting procedures as set out in the Organic Budget Law to the extent applicable to the project. The PCU will prepare annual plans on the basis of the project procurement plan which will be translated into annual budgets. The overall budget will be integrated in the sector budget for MININFRA.

15. At the project level, the PCU will prepare the budget, work plan, and cash flow forecast for each component and submit to the steering committee and the IDA for its no objection. The use of IFMIS will reinforce the budgetary control. To further improve the budgeting and monitoring process for the project, the project budget will be broken down into quarters to facilitate the quarterly monitoring as part of the IFR reporting. The project reporting on performance and budget utilization will include variance analysis in the quarterly IFRs and reasons for any variance that may have occurred during a given period.

16. **Accounting Arrangements.** Accounts are prepared on a modified cash basis and to the extent possible in accordance with International Public Sector Accounting Standards issued by IFAC and where appropriate disclosures are made to ensure compliance with the requirements of Article 70 of the Organic Law on State Finances and Property: Law No. 37/2006 of 12 September 2006 now 12/2013 of September 12 2013, and Ministerial Order N°002/07 of 9 February 2007 relating to Financial Regulations, and the legal agreement. The project accounting will continue to be based on a modified cash basis and will cover all project funds including IDA and any other contributions.

17. **Staffing Arrangements.** There are five staff in the PCU currently with a Director Finance heading the finance unit. The Director Finance is qualified with a BA Economics and ACCA. Other staff have a bachelor degree each except for one with a diploma, one accountant has a masters, and three of the accountants have enrolled for ACCA. The team at the PCU have been trained with the exception of the Finance Director. There will be one accountant specifically designated to primarily work on the project financial management aspects and shall be paid from the project proceeds.

18. **Accounting Manual.** The PCU has a financial management manual which articulates the financial management processes and internal control system. This is further reinforced by the Accounting Manual for government. The financial management manual will be revised and updated with the current project and changes which have happened since 2013 before project effectiveness.

19. **Transaction currency.** The base currency will be US Dollar (US\$). Assets denominated in currencies other than the US Dollar shall be translated into US Dollars at the rate of exchange prevailing at the end of the year/month under review. Transactions denominated in foreign currency shall be translated into US Dollars at the rate of exchange ruling on the day. Exchange gains will be recognized as income while exchange losses are not eligible expenses.

20. **Books of accounts and chart of accounts.** The EARP-PCU will maintain the books of accounts for the Project. Such books of accounts to be maintained shall include: a cash book, ledgers, journal vouchers, fixed asset register and a contracts register, accounts payable and receivable. They will include appropriate records and documentation to track commitments and to safeguard assets. The PCU shall ensure that: (i) all important business and financial processes are adhered to; (ii) adequate internal controls and procedures are in place; (iii) IFRs are prepared on a timely basis; (iv) The financial information required by management and World Bank will be provided promptly; (v) The financial statements are prepared on a timely basis and in accordance with International Accounting Standards or International Public Sector Accounting Standards; and (vi) The external audit is completed on time and audit findings and recommendations are implemented expeditiously.

21. **Information systems.** The PCU currently uses TOMPRO for accounting transactions and financial reports. The system is adequate to meet the project reporting requirements.

22. **Internal Control and Internal Auditing.** The EARP-PCU has a financial management manual which lays down the internal control system for the PCU. This is also reinforced by the Accounting Manual of Government. The financial management manual was last updated January 2013 and since then a number of changes have taken place including the split of EWSA and thus it is recommended to update the manual. The external audits for World Bank projects implemented by the PCU were qualified mainly due: (i) to non-remittance of contributions collected by EWSA to EARP; (ii) weak stock management where a couple of thefts have been experienced; (iii) a number of un-reconciling items on the bank reconciliation; (iv) unapproved budget by the Board; and (v) poor follow up on audit recommendations. The PCU has recently acquired a new stock management software and a team has been trained. There still remains to put in place a proper system for stores management.

23. **Internal Audit.** The previous EWSA internal audit arrangements were inadequate and only one audit report has been received and reviewed in regard to internal audit. However, under the new REG structure internal audit will be directly under the Board of Directors, but providing services to both EDCL and EUCL and will need to be strengthened in order to provide a quality service to the two entities. An internal auditor shall be recruited whose primary function shall be of auditing and supporting projects. In addition, the Board Audit Committee shall also be required to provide the required oversight to the internal audit.

24. **Governance and Anti-Corruption issues.** The project implementation shall be carried out in accordance with the provisions of the World Bank Anti-corruption guidelines. To ensure that measures are in place to deter fraud or corruption, the following mitigation measures will be embedded in the financial management arrangements of the project: (i) specific aspects on corruption auditing would be included in the external audit terms of reference; (ii) the internal auditor of the project will report to the Board audit committee as well as present quarterly audit reports to the World Bank; (iii) the PCU will design a payment checklist in such a way that at all levels/steps necessary to ensure compliance are undertaken and signed by each person involved in the process to hold individuals accountable; (iv) ensure that the processes are not flouted especially procurement procedures; and (v) strong financial management arrangements (including qualified Financial Management Specialist, periodic IFR including budget execution and monitoring; and (vi) measures to improve social accountability and transparency are built into the project design.

25. **Financial Reporting Arrangements.** The PCU will prepare IFRs on a quarterly basis to be submitted to the World Bank within 45 days after the end of the calendar year quarter. Advances received will be documented through Statement Of Expenditures (SOEs) which will be submitted to the Bank for accountability. The IFR submitted shall include the following: (a) A statement of Sources and Uses of Funds; (b) statement of Uses of Funds by Project Activity/Component; (c) Variance analysis; (d) Designated account activity statement; (e) Executive summary and notes to the accounts; and (f) Procurement Report on prior review contracts. The IFRs will be prepared in accordance with International Public Sector Accounting Standards (IPSAS). The Project Accountant, Finance Director and Internal Auditor will be trained on the preparation of SOEs and IFRs. The project together with the Bank agreed on the IFR format at negotiations.

26. **External Auditing Arrangements.** The external auditing for the project will be undertaken by the Office of the Auditor General of Government. The Auditor General has the constitutional responsibility for carrying out all audits for the Government of Rwanda. IDA funding may be used to pay the cost of the audit. The audits will be conducted in accordance with International Standards on Auditing and the accounts and shall be prepared using the International Public Sector Accounting standards. The accounting year end for the project/grant will be June 30<sup>th</sup>. The audited financial statements for the project shall be submitted to the Bank within six months after the financial year-end; i.e. by December 31. The financial statements of the project will consist of:

- (i) *A Statement of sources and uses of funds.* This statement will account for all cash receipts, cash payments and cash balances controlled by the entity and separately identifies payments by third parties on behalf of the entity.
- (ii) *A statement of accounting policies adopted with explanatory notes.* This statement and notes should be presented in a systematic manner with items on the Statement of Sources and Uses of Funds being cross-referenced to any related information in the notes. Examples of this information include a summary of fixed assets by category of assets, and a summary of statement of Expenditure Withdrawal Schedule, listing individual withdrawal applications; and



(iii) *A Management assertion on use of funds.* The management will provide a statement asserting that Bank funds have been expended in accordance with the intended purposes as specified in the relevant World Bank legal agreement.

27. The arrangements for the external audit of the financial statements of the project will be communicated to IDA through agreed terms of reference. Appropriate terms of reference for the external audit were agreed upon during the negotiations. The audit reports for the project that will be required to be submitted to the Bank are:

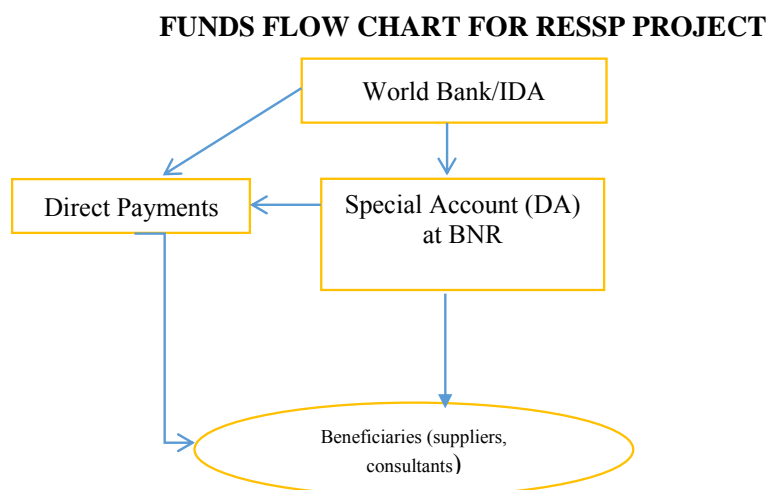
<i>Audit Report</i>	<i>Due Date</i>
Project Specific Financial Statements	Submitted within <b>six</b> months after the end of each financial year.

### Disbursements

28. **Banking Arrangements.** A Designated Account denominated in US Dollars for the Rwanda Electricity Sector Strengthening Project will be opened at the National Bank of Rwanda. A local account in Francs may be opened to receive transfers from the USD account. The authorized ceiling of the Designated Account will be US\$6 million. The ceiling amount will be calculated to cover approximately six months expected expenditures of the project.

29. Disbursement of IDA funds to the Designated Account will be Transaction-Based through the use of statement of expenditures (SOE). The project may follow one or a combination of the following disbursement methods: Designated Account, Direct Payment, Reimbursement and Special Commitment.

**Figure A3-2 Proposed Funds Flow**



30. **Disbursement Arrangements.** Disbursements from IDA will initially be made on the basis of four months forecast. Subsequently requests for replenishments to the designated account

will be made on the basis of statement of expenditure (SOE) into the project Designated Account for the project/grant to expedite project implementation.

31. **Reporting on use of IDA Credit Proceeds and SOE limits.** Disbursements for all expenditures shall be made against full documentation except for contracts valued at less than: (i) US\$200,000 for works; (ii) US\$200,000 for goods; (iii) US\$100,000 for consulting firms and (iv) US\$50,000 for individual consultants. Training and workshops, and operating costs on all contracts regardless of the amount will be claimed on the basis of SOEs. All supporting documentation for SOEs will be retained at the PCU. They will be kept in a manner readily accessible for review by regular IDA missions and internal and external auditors. The statement of expenditures will be included in the Withdrawal Applications that will be submitted to IDA.

32. The supporting documentation for reporting eligible expenditures paid from the Designated Account will be summary reports and records evidencing eligible expenditures for payments against contracts valued above the SOE thresholds defined above. The supporting documentation for direct payment requests shall be records evidencing eligible expenditures (i.e., copies of receipts, suppliers' invoices, etc.). The project shall submit a bank statement and a reconciliation of the Designated Account together with the Withdrawal Application.

33. **Minimum Value of Application.** The Minimum Value of Applications for Direct Payment and Special Commitments will be US\$200,000. Disbursements will be made in accordance with procedures and policies outlined in the Bank's Disbursement Handbook.

34. **e-Disbursement.** All project withdrawal applications shall be conducted following the Bank e-Disbursement as in effect since January 2013. All associated supporting documents shall be scanned and transmitted on line through the Bank's Client Connection system. The e-Disbursement functionality was introduced to: (i) expedite World Bank processing of disbursement requests; (ii) prevent common mistakes in filling out Withdrawal Applications (WAs) (Form 2380); and (iii) reduce the time and cost of sending paper WAs and supporting documentation to the Bank.

35. Upon credit effectiveness, the PCU will be required to submit withdrawal applications for initial deposits to the Designated Account for the project drawn from the grant/credit. Replenishment of funds from IDA to the Designated Account will take place upon evidence of satisfactory utilization of the advance, reflected in the SOE. Replenishment applications would be required to be submitted regularly on a monthly basis. If ineligible expenditures are found to have been made from the Designated Account, the PCU will be obligated to refund the same. If the Designated Account remains inactive for more than six months, the PCU may be requested to refund to IDA amounts advanced to the Designated Account. IDA will have the right, as reflected in the grant/credit Agreement, to suspend disbursement of the Funds if reporting requirements are not complied with.

36. **Risk Assessment and Mitigation** The table below shows the results of the risk assessment and the risk rating summary that identifies the key risks project management may face in achieving project objectives. It also provides a basis for determining how management should address these risks.

**Table A3-3 Financial Management Risk Assessment and Mitigation**

<i>Risk</i>	<i>Risk Rating Before mitigation</i>	<i>Risk Mitigating Measures Incorporated into Project Design</i>	<i>Residual Risk Rating</i>
<b>Inherent Risk</b>			
<b>Country Level;</b> Findings of the repeat PEFA Assessment in 2010 identified certain areas that still need strengthening which included weaknesses in Accounting processes, annual reporting, certain aspects of budgeting and capacity gaps.	M	Key issues raised in the November 2012 independent evaluation report on the implementation of the PFM Reform Strategy (2008/09-2012/13) have been integrated in the 2013 – 2018 PFM SSP and the World Bank Public Sector Governance PforR Project is addressing some of these areas.	M
<b>Entity Level</b> EUCL as an implementing entity does not have experience in implementing World Bank Projects, it is a newly established entity and is in the process of recruiting staff for Finance. EARP-PCU on the other hand has World Bank project implementation experience and their systems are somewhat established.	S	A PISA will be signed between EUCL and EARP-PCU to provide Financial Management Support to EUCL. The functions of the PCU will be clearly articulated in the Agreement.  Capacity building is foreseen in the project hence the Finance team of both the PCU and EUCL will be trained under the project.	S
<b>Project Level</b> The scope of the project is small and does not involve many implementing entities. However the project implementation arrangement may cause delays in form of coordination given that the implementing entity, will not be responsible for the project Financial management.	S	The PISA will clearly specify the obligations of each entity and coordination arrangements	S
<b>Control Risk</b>			
<b>Budgeting</b> Budgetary execution, control, and budget monitoring are still areas of weaknesses that require more strengthening. Project budgets prepared at the project level however for the last 2 years 2013 and 2014 were not approved by the EARP-PCU governance body EWSA Board.  Budget monitoring is not regularly done and clear explanations on variances are not provided.	S	The project will follow the same planning and budget preparation process as that of the government. A steering committee will be responsible for the budget approval together with the Bank.  The project will have an accounting and financial management manual that will clearly lay out the budget preparation, monitoring and approval process. Quarterly budget execution reports will be prepared and shared with the Bank, these will include clear explanations of budget variances and corrective action taken or to be taken.	S
<b>Accounting</b> The PCU has an accounting manual but since the split from EWSA it has not been updated. Issues have been raised on how receivables are being accounted for, and there are uncertainties regarding balances on receivables for the ongoing projects.	S	The PCU to recruit qualified and experienced project accountant to ensure that the project is ring fenced from existing issues of splitting the entities.  The Director of Finance to ensure the existing issues for the split do not affect the project.	S

<p><b>Internal Control</b> An internal control framework at the EARP-PCU exists, it is laid down in the financial management manual however requires updating and there may be a risk of application of the manual.</p> <p>The 2013/2014 and 2012/13 management letters raised significant weakness in the internal control system of EARP especially with the stores management, non-compliance with the OBL on timely reporting, Long outstanding reconciling items, non-approval of budgets, poor stock records, failure to follow up on audit recommendations.</p>	S	<p>The Financial Management manual to be updated capturing the changes since the last update and ensuring that Internal control procedures are properly reconciled.</p> <p>All EARP-PCU accountants to be given a manual for ease of reference in their day to day work and internal audit to review compliance on a more regular basis.</p>	S
<p><b>Internal Audit</b> Internal audit according to the FMM is to be provided by REG internal audit however the only report that has been reviewed is for 2012, hence no other report was provided.</p> <p>The audit committee is inactive and not providing oversight to internal audit Follow up on audit recommendations is not adequately done.</p>	H	<p>Recruit an internal auditor for the PCU and have the Board Audit committee constituted and functional.</p> <p>Train the internal auditor to build capacity.</p>	S
<p><b>Funds Flow;</b> The PCU will be responsible for the flow of funds, a Designated account will be opened for the project. The risk here may be in monitoring of the account and delay in submission of SOEs.</p>	M	<p>Training to be provided for the finance staff on disbursement arrangements, and preparation of SOEs.</p>	L
<p><b>Financial Reporting;</b> The PCU has experience in preparing IFRs however the quality of IFRs has been varied hence a risk that this project reporting may be affected.</p>	S	<p>Project IFRs will be prepared by the PCU, and the project accountants will be trained on how to prepare IIFRs and SOEs.</p> <p>IFR templates were agreed upon with IDA during project negotiations.</p>	M
<p><input type="checkbox"/> <b>Auditing;</b> The GoR SAI has the overall responsibility for external audit, however capacity issues may affect the timely submission of audits and the quality of the audit reports. Most recent audits under the PCU for the Bank funded project were qualified.</p>	S	<p>The Auditor General's office will audit the project, and terms of reference will be developed and agreed upon during negotiations.</p>	S
<p><b>Overall Risk Rating</b></p>	S		S

Risk rating: H (High Risk), S (Substantial Risk), M (Modest Risk), L (Low Risk)

37. The overall financial management risk rating for this project is assessed as Moderate after mitigation measures. Follow up on the suggested mitigation measures to be done during implementation support and the risk may change as measures are put in place to reduce the assessed risk.

38. **Financial Management Arrangements and Reporting.** The following are the main Financial Management, Financial Reports and Audits Accountabilities:

- (a) Maintain acceptable financial management arrangements

- (b) Quarterly reporting: the PCU will prepare quarterly un-audited Interim Financial Reports (IFRs) for the project in form and content satisfactory to the Bank and submits these to the Bank within 45 days after the end of each calendar quarter.
- (c) Audit-The project shall have its accounts audited annually by auditor acceptable to the Bank and submit the audit reports in form and content satisfactory to the Bank within six months after the end of each FY.

39. **Implementation support plan.** Supervision missions to review financial management will be an integral part of the project's implementation reviews. The budget for supervision will take into account the need to increase the efficiency of financial controls and related support in project implementation. It is also envisioned that joint supervision missions with procurement staff to strengthen Bank control and support will be conducted. There will be annual supervision visits to the field.

## **Procurement**

40. **Organizational Structure of the Procurement Unit.** The EARP-PCU shall provide project implementation support services with regard to the project procurements, financial management, social and environmental, M&E, contracts management, and overall project implementation. The PCU, a unit that existed under EWSA and now under the EDCL, has been responsible for implementing the Electricity Access Program that is mainly funded by donors including the World Bank. The PCU has the necessary experience for the project implementation including procurement and other functions. The PCU will get technical support from EUCL and EDCL in its contract management responsibility. This arrangement ensures having a single project unit for procurement and finance management of both the EDCL and the EUCL. However the responsibility of contract award shall remain with EUCL's internal tender committee (ITC) while overall procurement management responsibility and custody of the procurement documents will be that of the PCU.

41. The PCU will be headed by the Project Coordinator, who will be responsible for the general oversight of the Project and effective coordination between the PCU and the EUCL. Noting the institutional autonomy of the EDCL and EUCL, both companies shall enter into a Project Implementation Support Agreement (PISA), which shall detail the roles and functions of the EARP-PCU implementation support to EUCL. The procurement unit of the PCU will be staffed with qualified and adequate number of procurement specialists/officers and one procurement specialist/officer shall be dedicated for the project. The project procurement specialist/officer shall be financed under the project and will primarily work on the project.

42. **Adequacy of Procurement Procedures of the Recipient.** Implementation of projects under the Access program in the past was based on public procurement law enacted 2007 and revised April, 2013 and development partners' procedures as required. The Government of Rwanda public procurement legal framework is based on the United Nations Commission on International Trade Law (UNCITRAL) model, and it is quite robust and covers all aspects of public procurement at all levels of Government. However REG Ltd and its subsidiaries (EUCL and EDCL) are not governed by the national procurement law, but will have their own procurement manuals approved by the REG Ltd Board of Directors. It is in light of this that the EDCL and

EUCL have prepared procurement procedural manuals that detail procurement procedures and contracts implementation decision making framework. The manuals also provide the composition and procedure by which the Internal Tender Committees (ITCs) of respective subsidiary agencies are established, procurement organizational structure, in terms of how responsibilities are allocated, its reporting relationships, its decision-making authority and its business performance standard. Currently there are no Standard Bidding Documents (SBDs) developed for the corporations for national competitive bidding (NCB) contracts. NCB procurements shall use the Bank's Standard Bidding Documents until their own have been approved.

43. **Control Systems.** The Audit unit under the REG reporting to the Board of Directors, thus autonomous of EUCL and EDCL, shall provide the independent internal oversight of the project procurements as related internal control mechanisms to provide checks and balances. In addition, the Office of the Auditor General and the Office of Ombudsman may provide external procurement oversight. In view of these, the risk related to procurement support and control system is rated as moderate.

44. **Summary of Risk Assessment.** The risk to procurement under the project and Risk Mitigation Measures are summarized as here below.

45. **Inherent Risk.** Procurement Legislative and Regulatory Framework is fundamental to a well-functioning of procurement system whose inadequacy makes the procurement Risk rating as HIGH. Since the REG and its subsidiaries are no longer governed by the national procurement legal framework, there is a risk that they may not comply with the adopted manuals with regard to the principles that assure transparent, fair, efficient, accountability and value for money. The Bank procurement team reviewed and provided detailed comments to the draft manuals to ensure that they adequately embed principles to assure transparent, fair, efficient, accountability and value for money. The Project Procurement Supervision missions will undertake regular reviews to ensure compliance.

46. **Procurement Governance and Capacity Risk.** Procurement Governance and Capacity Risk of EARP-PCU is substantial, due to inadequate number of staff of the procurement unit. In addition, given the ongoing institutional changes there could be risks related to: (i) culture of meeting defined business standards; (ii) effectiveness of procurement processes, quality assurance, and accountability systems; and (iii) having strategies for procurement capacity building and clear career development path, etc.

47. **Procurement Risk Mitigation Measures.** The measures to mitigate the above risks are: (i) EDCL and EUCL have prepared comprehensive procurement procedural manuals and approved by the Board of Directors; (ii) following approval of procurement procedural manuals, EDCL and EUCL has established their respective ITC; (iii) re-structure the procurement unit depending on anticipated workload and filling the positions with staff with appropriate qualification and with one officer primarily assigned for the project; (vi) ensuring the important role and independence of "Audit Unit"; and (vii) procurement capacity building strategy both at REG and subsidiary agencies level.

48. **Action Plan to Mitigate the Project Risks.** The following preliminary risk mitigation action plan is recommended.

No	Issue/finding	Recommended action	Time bound and responsibility
1	Compliance to procurement procedural manuals	Procurement Procedures to be included in the Project Implementation Manual	Project Implementation
2	Lack of having SBD adopted for EDCL & EUCL for NCB	SBD for EDCL & EUCL for NCB to be drafted and approved by the board of directors. As an interim the project shall use World Bank SBDs for NCB procurements.	Project Implementation
3	Capacity limitations in Procurement and Contract Administration of Bank Financed Project	EDCL & EUCL will have in place procurement capacity building strategy Provision of Procurement and contract management  Training/clinics to procurement unit of EARP-PCU	(i) within six (6) months of project effectiveness  Project Implementation

49. **Applicable Procurement Guidelines.** Procurement under the project will be carried out in accordance with the World Bank's Guidelines:

- (a) *Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants*" January 2011 Edition, July 2014 revised version;
- (b) *Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers*" dated January 2011 Edition, July 2014 revised;
- (c) Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants, (the Anti-Corruption Guidelines)" dated October 15, 2006 and revised in January 2011; and
- (d) Provisions stipulated in the Legal Agreement.

50. The various items under different expenditure categories are described in the procurement plan. For each contract to be financed by the credit, the different procurement methods or consultant selection methods, estimated costs, prior review requirements, and time frame will be agreed between the Borrower and the World Bank in the Procurement Plan. The Procurement Plan will be updated at least annually, or as required to reflect the actual project implementation needs and improvements in institutional capacity. The Borrower as well as contractors, suppliers, and consultants will observe the highest standards of ethics during procurement and execution of contracts financed under this project.

51. National Standard Bidding Documents acceptable to the Bank may be used for procurement of goods, works and non-consulting services under National Competitive Bidding (NCB) procedures. Alternatively, the Bank's SBDs may be used with appropriate modifications. Furthermore, in accordance with para.1.16 (e) of the Procurement Guidelines each bidding document and contract financed out of the proceeds of the credit shall provide that: (i) the bidders,

suppliers and contractors, and their subcontractors, agents, personnel, consultants, service providers or suppliers shall permit the Bank, at its request, to inspect their accounts, records, and other documents relating to submission of bids and contract performance and to have said accounts and records audited by auditors appointed by the Bank; and (ii) deliberate and material violation by the bidder, supplier, contractor or subcontractor, of such provision may amount to an obstructive practice as defined in paragraphs 1.16(a)(v) of the Procurement Guidelines.

52. **Procurement of Works.** Procurement for works will include “Supply, Install and commission” and “Design, Supply, Install and commission” of substation equipment and lines etc. Contract packages estimated to cost US\$10 million equivalent per contract and above will be procured through International Competitive Bidding (ICB) procedures. Contracts estimated to cost less than US\$10 million equivalent per contract can be procured through National Competitive Bidding (NCB) procedures using agencies’ SBD or the national SBD, provided the SBD is reviewed and acceptable to the Bank. Small works contracts estimated to cost less than US\$200,000 equivalent per contract may be procured through Shopping procedures by comparing prices for quotations received from at least three (3) reliable contractors or suppliers. In such cases, request for quotations shall be made in writing and shall indicate the description, scope of the works, the time required for completion of the works and the payment terms. All quotations received shall be opened at the same time. Direct Contracting (DC) for works may exceptionally be an appropriate method in emergency situation, provided the Bank is satisfied in such cases that no advantage could be obtained from competition and that prices are reasonable.

53. **Procurement of Goods.** Goods procured under the project would include IT Systems and Non-Consulting Services comprising of “IT-Design, Supply, Install and Commission of MIS covering a customer management system (CMS), an incident recording and management system (IRMS), and an enterprise resource planning (ERP) system-(Software and Hardware)” and “Revenue Protection Project- Design, Supply, Install and Commission (Software and Hardware)”. Contract packages estimated to cost US\$1 million equivalent per contract and above will be procured through International Competitive Bidding (ICB) procedures. Contracts estimated to cost less than US\$1million equivalent per contract can be procured through National or Agencies’ Competitive Bidding (NCB) procedures. Small contracts estimated to cost less than US\$200,000 equivalent per contract may be procured through shopping procedures by comparing prices for quotations received from at least three (3) reliable contractors or suppliers. In such cases, request for quotations shall be made in writing and shall indicate the description and specifications, quantities, delivery period and payment terms. All quotations received shall be opened at the same time. As a general rule, a qualified supplier who offers goods or materials that meet the specifications at the lowest price shall be recommended for award of the contract. Limited International Bidding (LIB) for goods may exceptionally be used when there are only a limited number of known suppliers worldwide. Direct Contracting (DC) for goods may exceptionally be an appropriate method in emergency situation, provided the Bank is satisfied in such cases that no advantage could be obtained from competition and that prices are reasonable.

54. **Procurement of non-consulting services.** Non-consulting services which are services that are not of intellectual or advisory in nature will include insurance services. The procurement of non-consulting services shall follow the existing Bank’s SBDs for ICB, or EUCL and EDCL SBDs for NCB, with appropriate modifications.



55. **Selection of Consultants.** Contracts with firms estimated to cost US\$200,000 equivalent per contract and above will be selected using Quality and Cost Based Selection (QCBS) Method. Quality Based Selection (QBS) and/or Fixed Budget Selection (FBS) may be used for assignments which meet the requirements of paragraph 3.2 and 3.5 of the Consultants Guidelines respectively. However, consultants used for assignments of a standard and routine nature such as audits and other repetitive services would be selected through Least-Cost Selection (LCS) method in accordance with paragraph 3.6 of the Consultants Guidelines. Contracts for consulting services, using firms, estimated to cost less than US\$200,000 equivalent per contract and for which the cost of a full-fledged selection process would not be justified may be selected on the basis of Consultant Qualifications (CQS) in accordance with paragraphs 3.7 of the Consultants Guidelines. Short List of consultants for services estimated to cost less than US\$200,000 equivalent per contract may be comprised entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. For consulting assignments of engineering and contract supervision, short list of consultants for services estimated to cost less than US\$300,000 equivalent per contract may be comprised entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

56. *Single-Source Selection (SSS)* of consulting firms or individuals would be applied only in exceptional cases if it presents a clear advantage over competition when selection through a competitive process is not practicable or appropriate and would be made on the basis of strong justifications and upon Bank's concurrence to the grounds supporting such justification.

57. *Individual Consultants (IC)* will be selected on the basis of their qualifications by comparison of CVs of at least three candidates from those expressing interest in the assignment or those approached directly by the Implementing Agency in accordance with the provision of Section V of the Consultants Guidelines.

58. *International and National Competitive Bidding:* Except as otherwise provided below, goods, works and non-consulting services shall be procured under contracts awarded on the basis of International and National Competitive Bidding. National Competitive Bidding (NCB) shall follow the Recipient's procurement procedures subject to prior Bank's review and agreement.

59. **Prior Review Thresholds.** The prior review thresholds of the project will automatically be set based on the Bank Procurement Risk Assessment and Management System (PRAMS) risk rating and may change during the project implementation. The current PRAMS rating shows that the project risk is Substantial. Based on this risk rating; the following prior review thresholds have been set at the project appraisal stage. Works and Design, Supply and Installation contract with estimated contract value of US\$10 million and above; Goods contract with estimated value of US\$1 million and above; consultancy services with estimated value of US\$0.5 million and above for firms and US\$0.2 million for individual consultants; are subject to Bank's prior review. All Single Source Selection and Direct Contracting with estimated contract value of US\$0.1 million and above are subject to Bank's prior review. Terms of Reference of all consultancy services, irrespective of their value shall be cleared by the Task Team Leader. The initial procurement plan prepared by the Borrower and was reviewed and agreed during negotiation. Procurement supervision and post-reviews and audits will be conducted annually. All the first two year

procurement contracts will be subject to the Bank's Prior Review, regardless of the threshold as part of hands on support to the implementing agency.

60. **Procurement Plan.** The initial procurement plan will cover the first 18 months of the project and then updated annually or earlier as necessary. The Borrower, has prepared a procurement plan that project management will use to procure all goods and services for the Project. The plan has been prepared in a format acceptable to IDA. This plan has been agreed between the borrower and the Bank Team and is available at the EUCL's offices Kigali, Rwanda. It will also be available in the Project's database and on the Bank's external website. The Procurement Plan will be updated annually, in agreement with the Project Team, or as required to reflect actual project implementation needs and improvements in institutional capacity. The EARP-PCU will finalize the global 18-months procurement plan (simplified procurement plan) presented in Table below, which will provide the basis for the procurement methods. This plan was concluded and agreed on by the government and the project team at negotiations.

**Table A3-4 Simplified Procurement Plan**

S. No	Contract Description	Cost Est. (US\$ million)	Procurement/ Selection Method	Review by Bank (Prior/ Post)	Expected Bid/ Proposal Submission Deadline	Expected Contract Completion Date
<b>I</b>	<b>Supply &amp; Installations</b>					
1	Design, Supply, Install and commission of 15KV substation equipment	10.00	ICB	Post	March 30, 2016	January 30,2018
2	Supply, Install and Commission of 15KV line equipment and cables	3.00	ICB	Post	March 30, 2016	January 30,2018
3	Design, Supply, Install and Commission of MV and Lines in the North Province	10.00	ICB	Post	December 3, 2015	October 30 2017
4	Design, Supply, Install and Commission of MV and Lines in the West Province	10.00	ICB	Post	December 3, 2015	October 30, 2017
5	Design, Supply, Install and Commission of MV and Lines in the East Province	10.00	ICB	Post	December 3, 2015	October 30, 2017
6	Design, Supply, Install and Commission of MV and Lines in the South Province	10.00	ICB	Post	December 3, 2015	October 30, 2017
<b>II</b>	<b>IT Systems and Non-Consulting Services</b>					
7	IT-Design, Supply, Install and Commission of MIS covering a customer management system (CMS), an incident recording and management system (IRMS), and an enterprise resource planning (ERP) system-(Software and Hardware)	10.00	ICB	Prior	November 2, 2015	June 30,2017
8	Revenue Protection Project- Design, Supply, Install and Commission (Software and Hardware)	5.00	ICB	Post	December 30, 2016	June 30, 2018

III	<b>Consultancy Services</b>					
9	Consultancy services-Business Support Services Firm	3.0	QCBS	Prior	January 30,2016	June 30, 2018
	Project Management Services for Contracts 3-6	0.60	QCBS	Prior	March 30,2016	November 30, 2017

61. Tables A3-5 and A3-6 provide the details of the procurement arrangements involving international competition.

**Table A3-5 Procurement Arrangements for Goods, Works and Non Consulting Services**

No	Procurement Method (Goods and Works)	Contract Value Thresholds in US Dollars	Prior Review Thresholds in US Dollars	Comments
1	International Competitive Bidding (ICB) (Goods)/ Non Consultants Services	<1,000,000 Agencies' SBD acceptable to the Bank ≥1,000,000 Bank SBD must be used	≥ 3,000,000	Sample contracts shall be reviewed outside of PROCYS
2	Limited International/National Bidding (LIB/ LNB)/ (Goods)/Non-Consultants Services	No specific ceiling	All contracts	
3	National Competitive Bidding (NCB) (Goods)/ Non Consultants Services	< 1,000,000	None	Sample contracts shall be reviewed outside of PROCYS
4	National Shopping (NS) (Goods)/ Non-Consultants Services	< 100,000	None	
5	Direct Contracting	No specific ceiling	≥ 100,000	
6	IT Systems, and Non-consulting Services - ICB	<1,000,000 national systems acceptable to the Bank ≥1,000,000 standard bidding documents must be used	≥ 3,000,000	Sample contracts shall be reviewed outside of PROCYS
7	IT Systems, and Non-consulting Services - NCB	<1,000,000	None	Sample contracts shall be reviewed outside of PROCYS
8	ICB (Works)	<10,000,000 national systems acceptable to the Bank ≥10,000,000 standard bidding documents must be used	≥ 15,000,000	Sample contracts shall be reviewed outside of PROCYS
9	NCB (Works)	< 10, 000,000	None	Sample contracts shall be reviewed outside of PROCYS
10	Shopping (Works)	< 200,000 per contract	None	Sample contracts shall be reviewed outside of PROCYS
11	Direct Contracting	No specific ceiling	All contracts ≥100,000	
12	Community Participation	Amount not specified	N/A	

**Table A3-6 Procurement Arrangements for Consulting Assignments**

No	Selection Method (Consultants)	Threshold	Prior Review Threshold	Comments
1	Consulting Services – Firm QCBS, QBS, LCS, CQS	≥1,000,000	All	All TORs are subject to prior review regardless of contract amount. Sample contracts, irrespective of their values, shall be prior reviewed outside of PROCYS
2	Single Source (SSS) (Firms)	≥100,000	All	All TORs are subject to prior review regardless of contract amount
3	<b>Individual Consultant (IC) (SSS)</b>	≥100,000	All	All TORs are subject to prior review regardless of contract amount
4	<b>Individual Consultant (IC) (CV Cop)</b>	≥200,000	All	All TORs are subject to prior review regardless of contract amount. Sample contracts, irrespective of their values, shall be prior reviewed outside of PROCYS

62. *Pre-qualification.* Bidders for works contract and Plant Design, supply and installation estimated to cost equivalent or above US\$10 million may be prequalified in accordance with the provisions of paragraphs 2.9 and 2.10 of the Guidelines, unless specifically agreed otherwise. For this project, it is agreed that the post qualification procedure will apply unless otherwise the government recommends for pre-qualification process.

63. *Short list comprising entirely of national consultants.* Short list of consultants for services, estimated to cost less than \$0.2 million equivalent per contract, may comprise entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

64. Procurement Plan: The global 18-months procurement plan (simplified procurement plan) presented in Table A3-2 above, provides the basis for the procurement methods. This plan was concluded and agreed on by the government and the project team at negotiations. It will also be available in the project’s database and in the Bank’s external website. The procurement plan will be updated in agreement with the project team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

65. **Advance Contracting and Retroactive Financing.** To advance project implementation and project impact, the EUCL is proceeding with procurements of several contracts and these may be signed before the credit effectiveness. The contracts include: (i) Design, Supply, Install and Commission of MIS covering a customer management system (CMS), an incident recording and management system (IRMS), and an enterprise resource planning (ERP) system-(Software and Hardware); (ii) Design, Supply, Install and Commission of MV and Lines; and (iii) Business Support Services Firm. The procurement procedures, including advertising, shall be in accordance with the Guidelines as outlined in the preceding paragraphs in order for the eventual contracts to be eligible for Bank financing, and the Bank shall review the process used by the Borrower for these contracts. Retroactive financing of up to US\$9,500,000 is provided under the Project to cater for advance payments for eligible expenditures incurred under the Project in accordance with Bank procurement rules on or after November 1, 2015.

## **Environmental and Social (including safeguards)**

66. The proposed project will have positive impacts as it will increase access to electricity and improve reliability of the electricity network. This will also provide sufficient capacity to meeting increased demand arising out of economic activities for both existing customers and new connections.

67. The project is assigned an Environmental Assessment (EA) Category B - Partial Assessment, triggering OP/BP 4.01: Environmental Assessment. The project activities are likely to have limited and reversible environmental and social impacts that can be readily mitigated. The policy is triggered due to anticipated negative impacts to the bio-physical environment that would arise from the implementation of Component B-Increased Access to Electricity Services. This component activities will entail: (i) the construction of medium and low voltage distribution lines in key productive centers in urban and peri-urban areas; and (ii) strengthening of the Kigali network by rehabilitating and upgrading of the existing medium voltage substations, that includes the design, supply, installation and commissioning of the switch gear and associated tele control equipment and reinforcement of key feeders supplying the city and its environs. The civil works involved with activities will lead to relatively minor air, land and water pollution during the construction phases as well as noise around the neighboring areas. The works are not expected to impact negatively on physical cultural resources as project sites will be screened for these.

68. The project has prepared an Environmental and Social Management Framework (ESMF) that identifies potential negative environmental and social impacts of the distribution lines to be constructed, and provides guidance on the preparation of site specific Environmental Impact Assessments/Environmental Management Plans (EMPs). EIAs/EMPs will be prepared, cleared, and disclosed prior to the commencement of the works. The ESMF was disclosed both in country and at the World Bank Infoshop on October 1, 2015 and September 30, 2015, respectively.

69. OP/BP 4.12 Involuntary Resettlement is also triggered. The construction of new electricity distribution lines is likely to attract land acquisition for the purpose. Therefore land, crops, trees, etc. may be lost to make right of way for the lines. No displacement is anticipated. For such losses, compensation will be made as outlined in the Resettlement Policy Framework (RPF) that provides guidance for the preparation and implementation of resettlement action plans (RAPs). The RAPs will be prepared and implemented prior to the beginning of the works. The RPF was disclosed both in country and the World Bank Infoshop on October 9, 2015 and October 7, 2015, respectively. Although the proposed project will have limited earth works associated with rehabilitation and construction of distribution network, it may include chance finds of physical cultural artifacts thus triggering OP/BP 4.11.

70. Each subproject progress report will include monitoring the implementation of the site-specific RAP and other social issues covered by the ESMF. Each site specific RAP will also be disclosed both in-country and at the Bank Infoshop. The RAPs include among others grievance redress mechanisms in Rwanda that use existing systems and structures to record and resolve complaints raised by the project affected people.

71. *Borrower Capacity.* An environmental and social audit undertaken for the preparation of this project assessed REG’s capacity for environmental and social management shows that for the entire EARP program there are only three safeguards specialists that include one environment officer and two social specialists for the purpose. Effective implementation of both the ESMF and RPF will require that adequate capacity enhancement within institutions and other stakeholders be undertaken. Further, capacity building in social safeguards (land acquisition, including compensation procedures) is critical for REG and its subsidiary institutions, EDCL and EUCL. It is important that these companies hire additional staff responsible for social impacts management of the various project interventions in the energy sector. The current staff will prepare and deliver tailor made training for the new staff.

72. *Stakeholder consultations.* In accordance with the World Bank’s operational policies, stakeholder consultations with public and private sector entities and communities have been undertaken as part of the ESMF and RPF preparations. The consultative meetings were held with the purpose of listening to the stakeholders especially the potential beneficiaries, and seeking their feedback on the project and its potential impacts on them, incorporated their comments and suggestions especially those related to compensation for their crops along the right of way for the distribution lines into the safeguards instruments. Stakeholders and the PAPs will be consulted on an ongoing and regular basis during project implementation.

<b>Safeguard Policies Triggered by the Project</b>	Yes	No
<a href="#">Environmental Assessment (OP/BP 4.01)</a>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Natural Habitats ( <a href="#">OP/BP 4.04</a> )	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pest Management ( <a href="#">OP 4.09</a> )	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Indigenous Peoples ( <a href="#">OP/BP 4.10</a> )	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Physical Cultural Resources ( <a href="#">OP/BP 4.11</a> )	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Involuntary Resettlement ( <a href="#">OP/BP 4.12</a> )	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Forests ( <a href="#">OP/BP 4.36</a> )	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Safety of Dams ( <a href="#">OP/BP 4.37</a> )	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Projects on International Waterways ( <a href="#">OP/BP 7.50</a> )	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Projects in Disputed Areas ( <a href="#">OP/BP 7.60</a> )*	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## Monitoring & Evaluation

73. The M&E activities will be undertaken with support from EARP PCU M&E team and the SWG Secretariat. The EARP PCU will be responsible for collecting, verifying, collating information and integrating the M&E reports and submitting a consolidated report to the Bank together with the quarterly progress reports. The SWG on the hand will be responsible for integrating the overall sector performance indicators and preparing sector reports for the bi-annual SWG Joint Sector Performance Review discussions. The results framework, attached as Annex 1, identifies result indicators for the project as a whole as well as for each of its components including the annual target values for the results indicators and baseline data against which project implementation progress and results will be measured.

74. The EARP-PCU will establish a database for each component of the project to periodically monitor the evolution of implementation, outputs and results; with systems for regular data gathering and process information required to monitor the main performance indicators and intermediary indicators as defined in the results framework.

75. Impact evaluation follow-up survey (scheduled in 2016) and assessments shall be jointly led by the EARP-PCU and the SWG Secretariat with support from specialized technical assistance.

76. ***EUCL Key Performance Indicators.*** To enable tracking of improved performance as a result of improved MIS and staff capacity building activities under component A of the project, during the third year of the project implementation and following the commissioning of the MIS systems, the EUCL shall prepare a set of KPIs covering the key business functions. The KPIs shall include both medium-term performance improvement targets and annual work plan targets. In addition, the annual targets will be used to develop and implement a performance dashboard that will be used to track and measure performance on a real time basis.

### **Role of Partners and Overall Sector Performance**

77. In July 2006, Rwanda adopted its Aid Policy that seeks to harmonize and align the Aid it receives with the country's overall development objectives and includes a Common Performance Assessment Framework (CPAF). The CPAF is integrated into the planning and budgeting processes for monitoring the sector performance and is led primarily at the sector level. Reporting on the CPAF indicators is led primarily at the sector level through biannual joint sector reviews (JSRs) in advance of the joint budget support review (JBSR). The JBSR provides a forum for dialogue around the performance of both the GoR and its Development Partners whereas the JSR provides a fora for the sector performance review, the sector dialogue, ownership and accountability.

78. Previously, lack of credible sector and realistic plans with clearly stated long-term objectives had led to implementation of the energy strategy with piecemeal and ineffective results. A Power Sector Least Cost Development Plan has been prepared and will inform future GoR sector priorities in addition to ensuring a harmonized and coordinated sector support with clear set objectives and outcomes. The Sector Working Group as part of the annual budgeting process will review the sector plans and progress towards attaining the set targets including funding arrangements to ensure that sector undertakings are aligned with the least cost development plan and the sector's financial recovery plan.

79. In addition to the coordination at the SWG level, several development partners have expressed their intent to provide parallel financing to support the sector activities among which are: (i) EU (Euro 200 million) as sector budget support including geothermal resource assessment and SE4ALL, (ii) BTC (Euro 50 million) towards increased access, private sector support in generation, and capacity building; (iii) JICA (US\$30 million) towards distribution network strengthening; (iv) AfDB (US\$41.5 million) towards increased access. Other Donors supporting the sector include OFID, AFD, GIZ, OFID, Saudi Fund and BADEA.

## Annex 4: Economic Analysis

### RWANDA: Electricity Sector Strengthening Project

1. **Rationale for Public Financing.** Rwanda is particularly hit by high cost of electricity supply at about US\$0.32/KWh due to the high contribution of thermal in the electricity energy mix and continued reliance on rental diesel generators from private companies at a high cost to meet peak demand or during recent droughts. The financial performance of the sector has been weak and continues to rely on government subsidies. To address the high cost of service, the GoR has recently initiated the following immediate as well as long-term actions focusing at reducing the financing gap: (i) preparation of a least cost power development plan which will help put in place prioritized investments needed to develop the sector from generation through transmission to distribution; (ii) preparation of a financial recovery plan that highlights the revenue requirements and sources of funding; and (iii) a tariff increase effective September 1, 2015. Although the tariff increase will reduce the gap between revenues and cost of service, the high cost of service is still imposing a burden on the utility's finances.

2. While GoR's immediate priorities with regard to the sector financial sustainability mainly focus on reducing cost of service and increasing operations efficiency (network loss reductions), it will also continue to provide operations subsidies to the utility; thus the major challenge remains the need to cover some running costs of the utility to sustain operations. The project aims to enhance the electricity utility's capacity to achieve the critical goals of electricity supply reliability and operating efficiency, which will lead to energy cost savings and contribute to the GoR's strategy of closing the financing gap. Ensuring efficiency and financial viability will attract private sector investments in generation. Due to the circumstances described, in the near term public sector financing is the most suitable financing vehicle.

3. **World Bank's Added Value.** The Bank has been the leading supporter of Rwanda's electricity access initiative under the ongoing EARP. While global experience has informed the design of the EARP, implementation of this program has now become a "good practice" example itself. The Bank's value proposition rests on its ability to support Rwanda's long-term efforts to bring electricity to its people and businesses by creating a framework to pool resources from diverse donors for access expansion, by customizing global experiences in utility operations and utility management, and by advising on the design of a fundamental power sector reform program drawing on lessons from around the world. The Bank has been in the forefront in supporting power sector reforms, including promoting efficient commercial operations; thus, it is uniquely positioned to provide technical assistance on policy, institutional, organizational, and regulatory aspects. The Bank's involvement will help advance utility reform and operational efficiency.

4. **Methodology.** The economic analysis adopts cost-benefit methodology to estimate the net present value of the benefit stream from the two components of the project - *Sector Performance Management Improvement* and *Increased Access to Electricity Services*. Component A will support EUCL to establish comprehensive management information systems (MIS) to ensure efficient, transparent, and accountable processes covering the network operations and maintenance (O&M); commercial functions; and management of corporate resources. Component B has two sub-components. The first one (B1) will finance the rehabilitation of several switching stations and electricity feeder reinforcement in the Kigali City electricity distribution network to enhance



safety and improve supply reliability. The second (B2) will continue support to the ongoing EARP to finance the activities to about connect 72,000 new connections among which are households, schools, health services, administrative centers and industries. Component C is excluded because of the difficulty to value the outcomes of a technical assistance activity.

5. The analysis focuses on the quantifiable benefits deriving from the project. The following main sources of benefits have been identified:

- i. Energy cost savings resulting from reduced non-technical (commercial) losses among large and medium customers as envisaged under component A;
- ii. Energy cost savings resulting from reduced technical losses and reduced unscheduled outage duration under component B1;
- iii. Energy cost savings for households, community services, and productive enterprises resulting from switching from traditional energy sources (kerosene and diesel) to electricity under component B2.

6. The total cost of the project is US\$95 million, split in US\$20 million for component A; US\$25 million for component B1; US\$45 million for component B2; and US\$5 million for component C (technical assistance). The capital costs used for the economic analysis exclude VAT of 18 percent as well as pricing and contingencies of 10 percent and are therefore as follows: US\$14.4 million for component A, US\$18 million for component B1, and US\$32.4 million for component B2. The economic evaluation spans over 10 years for component A; 15 years for component B1, and 20 years for component B2, in line with the typical economic life of MIS and electricity distribution infrastructure. The disbursement of the capital cost is assumed to be spread across the six years of the project, with middle years (years three to five) carrying most of the disbursement flows. Operation and maintenance (O&M) costs are assumed at a standard two percent per year of the cost of infrastructure procured under component B1 and B2. O&M costs under component A are assumed much higher at 10 percent given the higher operation and maintenance cost of the MIS. The annual growth rate is assumed to be 10.8 percent.<sup>20</sup> The net present value (NPV) of benefits and costs is calculated using a discount rate of 10 percent.

7. **Summary.** The Economic Internal Rate of Return (EIRR) for the project as a whole is 30.18 percent, for a NPV of US\$71.99 million at a discount rate of 10 percent. Results per component are shown in the table below.

**Table A4-1: Summary**

Component	EIRR (%)	NPV (US\$m)
A- Sector Performance Improvement	40.28	15.67
B1 – Kigali Distribution Network	26.39	11.95
B 2 – Increased Access to Electricity	28.17	44.37
<b>Project</b>	<b>30.18</b>	<b>71.99</b>

8. **Component A- Sector Performance Improvement.** This component will support EUCL to establish comprehensive management information systems (MIS) to ensure efficient, transparent and accountable processes covering the network operations and maintenance (O&M); commercial

<sup>20</sup> REG (2015). Preliminary financial recovery plan.

functions; and management of corporate resources. The primary activities will include the design, supply, installation and operationalization (including staff training) of key management systems covering commercial, network operation and corporate functions. Commercial loss reduction achieved by this subcomponent has an economic benefit because customers who pay for the energy they consume will reduce their consumption, thereby generating benefits that will be evaluated by assuming a price elasticity of demand.

9. The economic benefit deriving from this component is the reduction of generation costs associated with reduced commercial losses. Based on a loss reduction audit conducted by Manitoba Hydro International in April 2013, the current commercial losses are estimated to be 31.95 GWh, or 7.6 percent. The component will reduce steadily commercial losses to seven percent in year three, 6.6 percent in year four, 5.6 percent in year five, and four percent after completion of the project in year six. With a current input energy of 420.39 GWh and at an avoided cost of generation of US\$0.32/KWh, reduced losses translate into savings of US\$1.1 million after establishment of the MIS in year three, up to US\$13.5 million after 10 years. These economic benefits result in a NPV of US\$15.67 million with EIRR of 40.28 percent.

10. ***Component B-1: Strengthening the distribution network around Kigali Area.*** The subcomponent will finance the rehabilitation of several switching stations in the Kigali distribution to enhance safety standards and installation of equipment that will facilitate their monitoring and control from the NCC. This will improve the overall network operations efficiency. In addition, the Kigali electricity distribution network will be upgraded to increase loading capacity thereby improving supply reliability and reduced technical losses.

11. The two beneficial factors that contribute to the economic viability of the project are energy savings from the reduced losses (which lead to reduction in generation costs and the associated fuel subsidy from Government) as well as reduced outage time during which consumers do not have to cope with expensive alternative of diesel fuel.

12. The switching stations will be installed in several strategic locations along the main 15KV distribution feeders supplying the Kigali City area and its environs in the Kigali Area. The frequency of the unscheduled outage is assumed at four times a month<sup>21</sup> or 48 times a year with an average outage time of two hours<sup>22</sup>, a total of 100 hours per year. The project will reduce this outage time to about 50 hours per year, starting to reduce the time to 75 in year 3, 60 hours in year 4, and 50 hours from year 5 onwards. It is assumed that the majority of the consumers in the Kigali area will run a diesel generator during the time of the outage at a cost of US\$0.38/KWh (based on the current diesel price in Rwanda of US\$1.15/liter). Thus the estimated benefits for consumers deriving from cost savings represents US\$312,182 in year 3 (with a 25 percent reduction of unscheduled outage time), US\$487,172 in year 4 (with a 40 percent reduction) and US\$603,832 from year five onwards (with 50 percent reduction of unscheduled outage time).

13. Another beneficial factor for the economy are the energy savings due to the improved network efficiency. The MV feeder upgrade will reduce the technical losses equivalent to energy

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<sup>21</sup> World Bank (2012). WB Enterprise Survey 2012: <http://www.enterprisesurveys.org>

<sup>22</sup> Based on data provided by the National Control Center (NCC).

savings of about 7.18 GWh/year,<sup>23</sup> energy that is generated but not consumed as it is lost in the network. This will result into a generation cost saving, and hence reduction in equivalent fuel subsidies from the central treasury of about US\$2.3 million per year.

14. Using the benefits above, the economic analysis of this component suggests that the NPV is US\$11.95 million while the EIRR is 26.39 percent. The sub-component reaches hurdle rate in FY19.

15. **B2 - Grid Extension to new load centers.** Non-electrified consumers currently use traditional energy sources (such as kerosene for lighting in the case of residential households) or diesel generators for public or industrial consumers. Hence, benefits for these consumers are the savings from expenditures on lighting and mobile charging using traditional energy sources (such as kerosene) in comparison to the expenditures based on the current tariff. Benefits for schools, health services, administrative centers and industries take into account the savings of diesel by switching from diesel generator to electric connections.

16. Residential users consume an average of 20 KWh/month (mainly for lighting and phone charging), while schools, health services and administrative centers consumer about 150 KWh/month (lighting and small electric appliances). Based on the existing industrial user base, these customers consume about 2000 KWh/month.<sup>24</sup>

17. Residential consumers, health services, and administrative centers are charged with a flat line tariff of 134 RwF/KWh, while industries are able to apply for a Time of Use (ToU) tariff subject to approval by RURA. The ToU is as follows:

**Table A4-2: Time of Use Tariff**

Time of day	Tariff	Unit
7:00-17:00	126	RWF/KWh
17:00-23:00	168	RWF/KWh
23:00-7:00	96	RWF/KWh

18. Based on the existing industrial consumer base, 20 percent of the sales are charged with a high tariff (168 RwF/KWh); 50 percent with the mid tariff (126 RwF/KWh), and 30 percent with the low tariff (96 RwF/KWh). This results in an average tariff for industrial consumers of 129 RWF/KWh (US\$0.18/KWh).<sup>25</sup>

19. There are two benefits from new connections. First, is the savings for the newly connected consumers in moving from small wick lamps of kerosene to electricity. Non-electrified consumers currently spend 2910 RwF/month and pay additional 3751 RwF/month to charge their mobile phones. These expenditures translate into savings of about US\$69/year if switching to grid connected electricity. For non-electrified public and industrial consumers who currently use

<sup>23</sup> Based on NCC data.

<sup>24</sup> EUCL consumer and industrial database.

<sup>25</sup> Effective September 1, 2015, a new tariff system will be introduced whereby low voltage customers (residential and non-residential customers) will be charged 182 RwF/KWh and medium voltage customers (industrial) will be charged 126 RwF/KWh.

diesel, switching to grid electricity results in the following changes: US\$340/year for schools, health services and administrative centers, and US\$4673/year for industries.

20. Second, is the consumer surplus from households enjoying higher quality lighting. This is because electric light bulbs are about hundred times more efficient than kerosene lamps in converting energy to lighting translating into a higher price per unit of lighting energy (in kilolumen-hour) for kerosene than that for electricity. Such savings form the basis of consumer surplus, an accepted way of measuring potential savings from the adoption of electricity. While households enjoy consumer surplus when they consume either kerosene or electricity, consumer surplus with the latter is much higher because of its lower unit price, and as a result, there is a gain in consumer surplus whenever they switch from kerosene lighting to electric lighting.

21. The gain in consumer surplus has been calculated using the average kerosene and electricity consumption of the households (per month), prices of kerosene and electricity, and types of lighting appliances they use. Using figures from the 2014 Impact Baseline Survey, households without electricity use about 2.5 liters of kerosene per month, which they purchase at US\$1.2 per liter, and the households with electricity consume 20 KWh of electricity per month at a price of US\$0.22 per KWh, the gains in consumer surplus by making a transition from kerosene lighting to electric lighting could be about US\$17 per month.<sup>26</sup>

22. In addition to these measurable benefits, the subcomponent also provides substantial socioeconomic and welfare benefits, which are hard to measure. A recent survey in Rwanda found that rural dwellers that had been connected to the electricity grid are awake 14-40 minutes longer per day; that time that can be used for productive and income generating activities or studying. In fact, 16 percent of the electrified households used electric appliances for productive purposes, whereas only 5 percent of control communities did the same.<sup>27</sup> Another benefit derived from access to electricity is related to health. The major source of indoor air pollution is cooking with traditional biomass, typically not affected by electrification projects. However, generated electricity avoids certain air-emissions associated with kerosene lighting. Interviews undertaken for the impact evaluation conducted by the Dutch Ministry of Foreign Affairs reported that indoor air pollution had decreased since accessing electricity from the grid even if medical tests were not part of the evaluation. Another significant health benefit of shifting away from kerosene lighting is that of burn injuries. In Rwanda there is also a significant effect on school enrollment: 20 percent more families send their children to school if they have access to electricity.

23. The NPV for a 20-year life is US\$44.37 million, and the EIRR is 28.17 percent. Taking into account the above benefits related to consumer surplus from better quality of lighting, the NPV is US\$56.92 million with EIRR of 32.62 percent. The subcomponent reaches hurdle rate in FY19.

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<sup>26</sup> Here we assume that households use wick lamps and hurricane for kerosene lighting, and 14 watt and 20 watt incandescent light bulbs for electric lighting.

<sup>27</sup> Ministry of Foreign Affairs (2014). *IOB Evaluation No. 396– Access to Energy in Rwanda. Impact evaluation of activities supported by the Dutch Promoting Renewable Energy Programme.*

**Table A4-3: Sensitivity analysis**

Sensitivity					
EIRR		Component A	Component B1	Component B2	Project
Base case		40.28%	26.39%	28.17%	30.18%
Project Costs = +15		35.01%	22.23%	25.08%	26.30%
Project Costs = +20		33.46%	21.05%	24.20%	25.19%
Commercial loss reduction to 5% (instead of 4%)		29.83%	26.39%	28.17%	28.04%
Reduction of average duration of service interruption to 60 (instead of 50)		40.28%	25.76%	28.17%	30.04%
Only 50% connection target met (36,000 instead of 72,000)		40.28%	26.39%	14.59%	22.27%
1 Year delay		28.07%	20.06%	23.61%	
2 Years delay		16.67%	14.85%	19.86%	
<b>NPV</b>					
		Component A	Component B1	Component B2	Project
Base case		\$ 15,670,837	\$ 11,945,701	\$ 44,373,696	\$ 71,990,234
Project Costs = +15		\$ 14,138,636	\$ 10,030,449	\$ 40,926,243	\$ 65,095,328
Project Costs = +20		\$ 13,627,902	\$ 9,392,032	\$ 39,777,093	\$ 62,797,027
Commercial loss reduction to 5% (instead of 4%)		\$ 8,542,690	\$ 11,945,701	\$ 44,373,696	\$ 64,862,086
Reduction of average duration of service interruption to 60 (instead of 50)		\$ 15,670,837	\$ 11,428,172	\$ 44,373,696	\$ 71,472,705
Only 50% connection target met (36,000 instead of 72,000)		\$ 15,670,837	\$ 11,945,701	\$ 9,534,311	\$ 37,150,849
1 Year delay		\$ 8,708,276	\$ 7,458,476	\$ 33,491,218	
2 Years delay		\$ 2,840,070	\$ 3,546,037	\$ 23,987,033	

24. The project is robust to changes in relevant parameters. If capital cost increase by 15 or 20 percent, EIRR and NPV will still be 26.30/25.19 percent and US\$65.1/62.8 million respectively. If commercial losses are only reduced to 5 percent and not 4 percent as targeted by the project's Component A, the overall EIRR is 28.04 percent, while the Component's EIRR drops from 40.28 percent to 29.83 percent. Average duration of service interruption has only limited effects on the analysis. If the duration is not reduced by 50 percent as targeted by Component B1 of the project but only by 40 percent, the project remains viable with EIRR of 30.04 percent (25.76 percent for Component B1) and a NPV of US\$71.47 million (US\$11.43 million for Component B1).

25. A switching value analysis has also been carried out for each component to identify the variation in parameters that would make selected components unviable. NPV of component A is zero if commercial losses are reduced to 6.2 percent instead of four percent. Generation costs can drop as low as US\$0.16 (currently US\$0.32) for component A and component B1. Energy savings for households from avoided kerosene consumption and mobile phone charging need to be at least US\$9 (instead of US\$69) and household connection can drop from 72,000 to 26,148 in order to reach NPV=0 under component B2.

26. A one year delay affects the components' EIRR as follows: 28.07 percent for component A (compared to 40.28 percent), 20.06 percent for component B1 (compared to 26.39 percent) and 23.61 percent for component B2 (compared to 28.17 percent). A two year delay in project implementation drops the EIRR to 16.67 percent for component A, 14.85 percent for component B1, and 19.86 percent for component B2. That means that even with a two year implementation delay, the project will remain economically viable.

**Annex 5: Sector Financial Performance Review**  
**RWANDA: Electricity Sector Strengthening Project**

1. Since 2007, the former utility EWSA has made pre-tax losses reaching US\$11.7 million per year. Sharp increases in losses in recent years are primarily due to the heavy reliance on thermal power despite the government’s support towards fuel costs (amounting US\$38 million in 2012/13). In addition, transmission and distribution losses have been increasing since 2010: 17.6 percent in 2010/11, 18.9 percent in 2011/12, 21.7 percent in 2012/13 and 2014/2015. In 2011/2013 revenue lost and uncollected for every one percent of transmission and distribution losses was estimated at US\$1.17 million.

2. Electricity tariffs were frozen between 2012 and 2015. They were increased by 20 percent effective July 1, 2012, but remained below cost of service. In 2012/13 the weighted average electricity revenue was estimated at US\$ 0.22/KWh, compared to the cost of service of US\$0.32/KWh. The GoR, as of August 6, 2015, has announced a new tariff schedule where low-voltage residential and non-residential consumers will pay 182 Rwf, a 36 percent increase from 133 Rwf. The tariffs for medium-voltage industrial consumers remains unchanged at 126 Rwf. The average tariff is now 160 Rwf/KWh. What this implies is that government took a decision to move the tariffs closer to the cost before the low-cost generation comes on-line and reduces the cost of service.

**Table A5-1: New Tariff Schedule, as of August 6, 2015**

Customer Category	New			Existing		
	Demand + Energy	Standing	Reactive	Demand+ Energy	Standing	Reactive
	Rwf / KWh	Rwf / month	Rwf / KVArh	Rwf /KWh	Rwf / month	Rwf / KVArh
Medium Voltage (Industrial)	126	123	126	126	10,000	126
Low Voltage – All (Residential and Non-Residential)	182	-	-	134	-	-

Source: RURA

3. The former utility EWSA was separated in August 2014 into two separate companies, the WASAC and the REG which is comprised of two subsidiaries the EDCL and the EUCL. The sector’s financial projections, were developed by Emmerton Associates hired by REG, and the report<sup>28</sup> was submitted in August 2015. The analysis presented below draws from this report and showcases two scenarios – business-as-usual and vision 2020<sup>29</sup> that aims to transform Rwanda into a middle-income country.

<sup>28</sup> Emmerton Associates, 2015. Consultancy for medium-term generation and financial sustainability plan for Rwanda’s power sector. Final Report Submitted to Government of Rwanda.

<sup>29</sup> <http://edprs.rw/content/vision-2020>

4. Rwanda’s electricity consumption has grown steadily in the last five years at a compound annual growth rate of around 11.5 percent. In the business-as-usual scenario, the GDP growth to 2020 could be expected to be six percent and Vision 2020 GDP target is 11.5 percent (associated sectoral GDP targets are met), and a target electrification rate achievement by 2020. The achievement of the objectives of Vision 2020 requires that the demand for electricity grow at a 5 year compound annual growth rate of 14.4 percent, compared to a rate of 6.5 percent for the business-as-usual case. For the vision 2020 scenario, the rate of customer growth from 10.3 percent to 15.9 percent (Table A5-2).

**Table A5-2: Growth in consumption until 2020**

<b>Growth Driver</b>	<b>Unit</b>	<b>Business as Usual</b>	<b>Vision 2020</b>
Annual residential electricity connection rate (count under EARP)	Count	120,000	230,000
Average annual growth in Residential Class (MW)	MW	62	100
Average annual growth in Commercial customers to 2030	Count	3,200	11,000
Average annual growth in Commercial Class (MW)	MW	26	35
Average annual growth in Industrial customers to 2030	Count	65	115
Average annual growth in Industrial Class (MW)	MW	39	45

Source: Emmerton Associates (2015)

5. The supply mix, in the financial projections, was determined using a least cost dispatch technique and cost projections were then calculated according to the availability and performance characteristics of each group of independent power producers (IPPs). REG has moved to an IPP-based service provider model wherein IPP contracts (or Power Purchase Agreements, PPAs) have been established for all power plants. All plants have assigned PPA energy rates. As a result of these PPAs, the contingent liabilities varies between the business-as-usual and vision 2020 scenarios. A contingent liability arises from 2017 to 2019 of around US\$106 million falling to US\$91 million in the business-as-usual scenario and a contingent liability falls from US\$86 million to US\$2.5 million in the vision 2020 scenario (Table A5-3).

**Table A5-3: Contingent liabilities of PPAs (‘000 \$)**

	Business-as-usual	Vision 2020
2015		
2016		
2017	106526	85802
2018	97077	57563
2019	91815	2476

Source: Emmerton Associates (2015)

6. The size of the transmission and distribution network impacts the expenditure, including Capex and Opex. EUCL’s network has 8000 km of MV lines and 10000 km of LV lines. Capital expenditure in transmission and distribution arises from four factors – growth (allowing for loss reduction), asset replacement (aging assets), reliability / quality and new connections. Looking

ahead, EUCL’s forward projections of expenditure against each category using benchmark comparisons are presented in Table A5-4.

**Table A5-4: Transmission & Distribution Investments (US\$m)**

Investments	2016/17	2017/18	2018/19	2019/20
Load Growth	75	73	9	9
Asset Replacement	13	13	13	13
Reliability	2	5	5	4
Loss Reduction	28	28	28	28
Sub-total	118	119	55	54
EARP	55	55	55	55
Total	173	174	110	109

Source: Emmerton Associates, 2015

7. To assess the required revenue to support the purchase, transmission, distribution and supply of energy to consumers, the financial model computes an average tariff based on required revenue and expected energy sales. Tariffs can be maintained on current basis or escalated with the balance of revenue requirements met by subsidy. There are two tariff scenarios and the results are presented in Table A5-5.

- The current tariff rate of 160 RwF per KWh was maintained to end 2019;
- The current tariff was escalated in constant real terms such that subsidies were fully removed by 2019.

**Table A5-5: Tariff scenarios**

Case	2015/16	2016/17	2017/18	2018/19	2019/20
<b>BAU Case – Current Tariff maintained</b>					
Tariff (RwF per KWh)	140	160	160	160	160
Tariff % increase	14%	0%	0%	0%	0%
Subsidy (RwF millions)	70,919	17,135	106,111	108,182	110,294
<b>BAU Case - Current Tariff escalated to eliminate subsidies</b>					
Tariff (RwF per KWh)	140	160	160	220	303
Tariff % increase	14%	0%	0%	38%	38%
Subsidy (RwF millions)	70,919	17,135	106,111	65,270	(0)
<b>Vision 2020 - Current Tariff maintained</b>					
Tariff (RwF per KWh)	140	160	160	160	160
Tariff % increase	14%	0%	0%	0%	0%
Subsidy (RwF millions)	70,919	18,175	83,548	69,561	45,235
<b>Vision 2020 - Current Tariff escalated to eliminate subsidies</b>					
Tariff (RwF per KWh)	140	160	160	178	198
Tariff % increase	14%	0%	0%	11%	11%
Subsidy (RwF millions)	70,919	18,175	83,548	52,377	(0)

Source: Emmerton Associates (2015)

8. Based on the financial analysis, the report suggests four actions:
- Implement a load building strategy and consider to provide regulatory incentives to EUCL to build load;
  - Invest in the transmission and distribution network to ensure that congestion is eliminated and service levels rise;



- Establish user-based tariff trajectories – maintain industry tariffs and increase tariffs for other classes. Establish a safety net tariff to protect the most vulnerable residential customers from the impact of tariff increases;
- Ensure that in the long term the supply mix develops according to sound planning principles (Long-Run Marginal Cost of supply method).

**Annex 6: Sector Policy Note**  
**RWANDA: Electricity Sector Strengthening Project**

REPUBLIC OF RWANDA

Kigali, 30 OCT 2015

No 3280/10/157 CE



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Ms. Carrie TURK  
World Bank Country Manager for Rwanda  
P. O. Box 609,  
Kigali

Dear Ms. Carrie,

**RE: Policy letter on electricity sub-sector**

This letter summarizes the major policy objectives and the strategies that the Government of Rwanda (GoR) is implementing in order to ensure a sustainable supply of affordable and reliable electricity to the Country's population and the enhancement of the financial viability of the power sector.

Economic Development and Poverty Reduction Strategy (EDPRS 2) 2013-2018, prioritizes key initiatives to accelerate economic growth and thereby drive socioeconomic transformation. The Rwanda Energy sector Policy, 2015, has been put in place with the sole purpose, of guiding a harmonized approach to the extraction, development, and use of Rwanda's energy resources in a strategic, transparent, and sustainable manner. To this end, meeting the demand for energy and investing in hard and soft infrastructure were identified amongst the critical levers.

In order to effectively address the challenge of meeting the demand for energy, a holistic approach has been developed aimed at achieving the following medium term objectives;

- i) Increased power generation that substitutes thermal generation with cheaper sources ;
- ii) Accelerated investment in transmission and distribution infrastructure necessary to evacuate power from generation nodes to key load centers;
- iii) Progressive reduction of system losses(technical and commercial) by at least 2% annually from the current 22%, and;
- iv) Increased access to affordable and reliable electricity supply to at least 70% of our population.

### **Legal Framework**

The Government of Rwanda has undertaken reforms in the energy and water sector, which have been concretized by the separation of energy from water operations. Government adopted the corporatization model as a vehicle to implement the required reforms. The main objectives being; to have sector focused and efficient operations; attract more investment; improve planning and accountability; and increase access to services by the population.

The enactment of the Law repealing EWSA Law No.97 /2013 of January 30, 2014, paved the way for the unbundling of the formerly vertically integrated EWSA. The Rwanda Energy Group and its two subsidiaries; The Energy Utility Corporation Ltd (EUCL) and The Energy Development Corporation Ltd (EDCL) is entrusted with energy development and utility service delivery while the Water and Sanitation Corporation (WASAC) has the mandate to develop and operate water and sanitation infrastructure and deliver related services in the country.

The two corporate entities were incorporated in July 2014 with 100% government shareholding. Subsequently, a Prime Minister's Order No. 87/ 03 of August 16, 2014 was gazetted in which inter alia, provided for the transfer of Assets, Liabilities and Staff of EWSA to the successor companies mentioned above. In pursuit of its mandate, REG took over energy assets and operations in the industry and is the executing agency to deliver the above mentioned objectives.

### **Increasing Generation**

The current high cost energy mix is a key challenge in reaching the growth targets embodied in the vision 2020. As envisaged in the EDPRS 2, Government has taken a multi-pronged approach to increasing generation of electricity using a blend of both private and public resources. The key objective is to achieve increasing generation with reducing dependency on thermal generation. The current generation projects' pipeline has medium term cumulative targets of 58MW from Methane, 95MW from Peat and about 46 MW from Hydro expected to be on stream by 2018.

These sources are to be supplemented by import sources that will grow from 30MW in 2016 up to 150MW depending on demand. This will shift the thermal capacity contribution from the current 45% to 10% by 2020 as peaking and emergency capacity. Given that significant proportion of the energy cost is generation, this would enable the industry to have a tariff profile that supports our growth objectives going forward.

### **Transmission and Distribution Infrastructure**

Increasing generation capacity requires corresponding transmission and distribution infrastructure so as to supply growing load centers, some of which are in the established industrial zones. Government is progressively committing resources from the budget and additional mobilized from its development partners. This is to ensure that there is adequate infrastructure to eliminate delivery bottlenecks thereby

addressing efficiency and reliability aspects of supply. Investments in these projects include cross-border interconnection projects of 220Kv connecting Rwanda and her neighbours exceeding 450km; internal transmission projects at 110Kv of up to 150km are part of this effort to be attained by 2019.

### **Increasing Access to Electricity**

Government has had successful phases of the current electrification strategy embodied in the Energy Access Rollout Programme (EARP) where the target set in EDPRS is 70% by year 2018. Going forward, the rollout effort will prioritize rural productive centers, rural towns and growth centers and adjoining residential settlements. Facilitating agro-processing investments, carpentry, metal works, schools, health and commercial centers has tremendous impact on improving household incomes and ultimately enabling people living in these areas increase their energy uptake and thus sustainable energy investments thereby driving social transformation.

### **Enhancing Performance of the Energy Companies**

The Rwanda Energy Group has recently concluded a massive recruitment drive that covered the selection of competent staff from within and outside the industry. This was accomplished alongside the finalization of the asset separation exercise and general tariff review. The Group's next focus is working on setting up systems and procedures accompanied by a comprehensive capacity building programme for the newly recruited staff.

This will include establishing comprehensive management information systems to ensure efficient, transparent and accountable processes covering the network operations and maintenance (O&M); commercial functions; and management of corporate resources. In addition, the Company has started on a Strategic and Business Planning process that will include setting of Key Performance Indicators (KPIs) that will be imputed in a new performance management system.

On the technical side, the Energy Utility Corporation Limited has embarked on the implementation of short and medium term measures to refurbish and upgrade the distribution network and adjoining facilities to improve supply reliability. To this end Government is committing budget resources and support from its Development Partners to ensure that this program is executed efficiently and in a timely manner.

### **Financial Sustainability of the Power Sector**

Growth and sustainability of the power sector is predicated upon serving a growing industry, commercial and other arms of the productive sectors of the economy a key premise in the EDPRS objectives. The sector has prepared a least cost power development plan which will help put in place prioritized investments needed to develop the sector from generation through transmission to distribution, including timing, procedures/implementation responsibilities, and financing requirements. Developing new generation projects based on principles that optimize the overall


industry generation cost, prioritizing least cost sources will remain central in the timing and development of the energy supply industry.

We have considered load growth prospects and have established that the sustainability of the generation plans is predicated on a forecast of robust economic performance. This enables optimal dispatch of generation plants and has modest implications for further tariff adjustments in the estimated at 11% for the period 2018 to 2020. Lower growth patterns would inevitably imply higher tariffs and more commitments on subsidies. Therefore all Government stakeholders have been tasked to do what it takes to attract large load business and commercial investments in the economy.

In order to succeed in this endeavour, there is need to achieve a tariff regime that enhances the regional competitiveness of Rwanda. On the other hand, the current energy mix does not permit a tariff regime that can recover all sector costs without undermining the latter objective. Therefore, for the medium term, Government continues to offer significant support to the sector costs by way of subsidies as new generation initiatives are yet to mature in the medium term. Adjusting tariffs to ensure an equitable contribution of the consumers to the cost of service is an ongoing policy and effort albeit keeping the affordability of our people in perspective.

We are confident that as these initiatives are being executed in the medium term, the Power Sector in Rwanda will be able to recover to stable performance. In addition, the new program support will also contribute effectively to the socioeconomic transformation the Country.

Sincerely,

  
**Claver GATETE**  
Minister





**Annex 7: Implementation Support Plan**  
**RWANDA: Electricity Sector Strengthening Project**

**Strategy and Approach for Implementation Support**

1. **Strategy and approach to implementation support.** The strategy for implementation support has been developed on the basis of the nature of the project and its risk profile. The strategy has been designed so as to guarantee efficient and flexible support to the client and facilitate implementation of the risk mitigation measures outlined in the main text.
2. **Country and sector environment.** The Bank’s project team will maintain a close dialogue with the GoR and the REG to ensure that proper focus on sector institutional reforms, sector financial sustainability and project implementation is maintained. Through the SWG, the Bank team will maintain a strong dialogue to ensure that sector activities that are aligned with the least cost development plan and sector financial sustainability including fast tracking priority generation investments that will in the medium term support reducing the overall high cost of generation, a major contributor to the current sector’s poor financial standing.
3. **Project preparation and implementation capacity.** The Bank will closely liaise with the GoR to ensure that advance procurement activities are timely completed to minimize delays in implementation post project effectiveness. Assessments to define the scope of activities as related to the MIS, RPP, Institutional Technical Capacity Assistance (business support services), and the Kigali network and access components have been completed. Procurement of the various goods and services is ongoing and expected to be completed by the end of 2015.
4. **Sector Performance Strengthening.** In coordination with the REG, the Bank’s project team will closely monitor the installation of the MIS and technical assistance activities to (i) coach and mentor the new staff in the aspects of utility operations and management; (ii) set up systems to follow up on the information received through the new MIS, including performance benchmarking; and (iii) prepare and implement a corporate strategic plan, including key business performance indicators.
5. As part of the implementation process, the project will share with policy and decision makers success stories of how having in place and use of the MIS and business re-engineering has led to gains in and promoted a culture of accountability. The Bank team will continuously encourage the top management to actively involve staff at all levels in the implementation of the new systems and preparation of the corporate strategic plan and the annual business plans. This will include conducting several in-house workshops and retreats that will be supported by a strategy execution consultant to promote a culture of awareness of interdependencies and accountabilities between functions, to help to breakdown organization silos and create an aligned organization.

## **Implementation support plan**

6. Bank team members will be based both at headquarters and in the Rwanda Country Office to ensure timely, efficient, and effective implementation support to the client. The Bank has a Senior Energy Specialist located in Kigali, who will continue to work with the government, implementing agencies and other development partners to ensure adequate consultation, coordination and support. The Bank's Procurement Specialist and Financial Management Specialist supporting the project are also based in Kigali and can ensure continued support, advice, and monitoring to the implementing agencies. Formal implementation support missions and field visits will be carried out twice per year.

7. **Technical support.** During project implementation, technical supervision is required to ensure that contractual obligations are met. The Bank's project team and project management staff will conduct site visits to project sites on a regular basis throughout the duration of the project. The project implementation team will include Project Steering Committee, Project Manager, Departmental Project Implementation Teams, as well as Supervising Consultants to oversee the various project activities.

8. **Procurement requirements and inputs.** The EARP-PCU will discharge all procurement functions for the project. The Bank's project team will help strengthen procurement management efficiency by: (i) reviewing relevant procurement documentation and providing timely feedback to the PCU; (ii) providing detailed guidance on the Bank's Procurement Guidelines to the PCU as needed; and (iii) monitoring procurement progress against the Procurement Plan, which will be updated as required to reflect project implementation needs and improvements in institutional procurement risk rating. In order to ensure long-term sustainability, the Bank Procurement team will support the new agencies to prepare and adopt the procurement manuals and standard bidding documents in addition to conducting tailor made procurement training courses to the REG and its subsidiaries.

9. **Financial management requirements and inputs.** The Bank's project team will perform regular supervision on financial management functions and provide advice and capacity building on financial planning, budget preparation, reporting and other relevant matters as detailed in Annex 3. The PMU will be responsible for the timely preparation and submission of project financial statements

10. **Audit.** Internal control functions will have to be strengthened under the Project as detailed in Annex 3 with the appointment of an auditor for the project and ensuring that the Board Audit Committee is set up and functional. The Bank's project team will closely monitor financial management activities to identify in advance potential delays in the preparation of the financial and audit reports and undertake corrective measures. Project financial statements will be audited by an external auditor hired under the Project under terms of reference acceptable to the Bank.

11. **Environmental and Social safeguards.** Compliance with environmental and social safeguards will be a primary responsibility of the PCU. The RAPs will be prepared and disclosed before commencement of construction activities and the GoR will be required to provide sufficient

funds for expropriation as part of the annual budget. The Bank’s project team will pursue close monitoring of environmental and social management under the project.

12. **Donor Coordination.** The project team will maintain close dialogue and coordination with relevant development partners, active in the sector to avoid overlap of project activities with other donor initiatives and sector dialogue at the SWG.

**Table A6- 1: Implementation Support Plan**

<b>Time</b>	<b>Focus</b>	<b>Skills needed</b>	<b>Resource<sup>30</sup> estimate</b>
First 12 months	Complete design and tendering of the MIS systems and the RPP	Technical, Procurement	US\$150,000
	Procurement of EPC Contractors for the Kigali 15KV distribution network reinforcement and Increased Access contracts	Technical, Procurement	
	Recruitment of the Business Support Services Consultant	Technical, Procurement and Financial Management	
	Implementation of environmental and social safeguards (preparation of the specific EMP and RAPs) for the access component contracts	Environmental, Social, Communication	
12-60 months	Technical supervision	Power Engineer/ Utility reform	US\$600,000
	Safeguards supervision	Safeguards	
	M&E supervision	M&E	
	Procurement& Financial Management supervision	Procurement/Financial management	

**Table A6-2: Skills Mix Required**

<b>Skills Needed</b>	<b>Number of Staff Weeks/year</b>	<b>Number of Trips</b>	<b>Comments</b>
General supervision and project management (TTL)	12	3/year	
Senior Energy Specialist/Power Engineer	24	Field Staff	
Utility Lead Specialist Energy Specialist	4	2/year	
Procurement Specialist	4	Field Staff	
Financial Management Specialist	4	Field Staff	
Environmental Specialist	4	2/year	
Social Development Specialist	2	2/year	
Administrative support	4		

<sup>30</sup> Implementation support supervision costs estimated at US\$150,000 per year.



## Annex 8: Project Maps

### RWANDA: Electricity Sector Strengthening Project

**Map 1: Least-cost Grid Prioritization to 2020**

