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Report No: 106476

IMPLEMENTATION COMPLETION AND RESULTS REPORT

ON A

GLOBAL ENVIRONMENT FACILITY GRANT

IN THE AMOUNT OF US\$1.82 MILLION

TO THE

REPUBLIC OF BURUNDI

FOR AN

ENERGY EFFICIENCY PROJECT (TF-12460)

June 08, 2016

Energy and Extractives Global Practice Country Department AFCE1

CURRENCY EQUIVALENTS (Exchange Rate Effective April 15, 2016)

Currency Unit = Burundi Francs (BIF) BIF 1557.00 = US\$1 US\$1 = SDR 0.71

FISCAL YEAR January 1 - December 31

ABBREVIATIONS AND ACRONYMS

CAS	Country Assistance Strategy
CFL	Compact Fluorescent Light
CO_2	Carbon Dioxide
EEP	Energy Efficiency Project
EIRR	Economic Internal Rate of Return
ESMF	Environmental and Social Management Framework
GEF	Global Environment Facility
GEO	Global Environment Objective
GoB	Government of Burundi
ICR	Implementation Completion and Results Report
IDA	International Development Association
ISR	Implementation Status and Results
kWh	Kilowatt hour
LED	Light Emitting Diode
M&E	Monitoring and Evaluation
MSWEIP	Multi-sectoral Water and Electricity Infrastructure Project
MW	Megawatt
NPV	Net Present Value
PAD	Project Appraisal Document
PIU	Project Implementation Unit
QAG	Quality Assurance Group
REGIDESO	Agency for Production and Distribution of Water and
	Electricity (<i>Régie de Production et de Distribution d'Eau</i>
	et a Electricite)

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BURUNDI ENERGY EFFICIENCY PROJECT

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DATA SHEET

A. Basic Information				
Country:	Burundi	Project Name:	Burundi - Energy Efficiency Project	
Project ID:	P117225	L/C/TF Number(s):	TF-12460	
ICR Date:	10/30/2013	ICR Type:	Core ICR	
Lending Instrument:	IPF	Borrower:	GOVERNMENT OF BURUNDI	
Original Total Commitment:	USD 1.82M	Disbursed Amount:	USD 1.82M	
Revised Amount:	USD 1.82M			
Environmental Category: B Global Focal Area: C				
Implementing Agencies: REGIDESO				
Co-financiers and Other External Partners: N/A				

B. Key Dates

j				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	04/20/2011	Effectiveness:	09/26/2012	
Appraisal:	09/30/2011	Restructuring(s):	N/A	
Approval:	03/08/2012	Mid-term Review:	N/A	
		Closing:	12/15/2015	12/15/2015

C. Ratings Summary			
C.1 Performance Rating by ICR			
Outcomes:	Moderately Unsatisfactory		
Risk to Global Environment Outcome	Substantial		
Bank Performance:	Moderately Unsatisfactory		
Borrower Performance:	Moderately Satisfactory		

C.2 Detailed Ratings of Bank and Borrower Performance				
Bank	Ratings	Borrower	Ratings	
Quality at Entry:	Moderately	Government:	Moderately Setisfactory	
Quanty at Entry.	Unsatisfactory	Government.	wouchatery Satisfactory	
Quality of Supervision	Moderately	Implementing	Moderately Setisfactory	
Quality of Supervision.	Unsatisfactory	Agency/Agencies:	Woderatery Satisfactory	
Overall Bank	Moderately	Overall Borrower	Madamataly, Satisfactory	
Performance:	Unsatisfactory	Performance:	Moderatery Satisfactory	

C.3 Quality at Entry and Implementation Performance Indicators				
Implementation Performance	Indicators	QAG Assessments (if any)	Rating	
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	None	
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA):	None	
GEO rating before Closing/Inactive status	Moderately Satisfactory			

D.	Sector	and	Theme	Codes	
_ .	Dector	unu	1 meme	Cours	

	Original	Actual
Sector Code (as % of total Bank financing)		
Energy efficiency in Heat and Power	74	74
Public administration- Energy and mining	26	26

Theme Code (as % of total Bank financing)		
Climate change	83	83
Infrastructure services for private sector development	17	17

E. Bank Staff

Positions	At ICR	At Approval			
Vice President:	Makhtar Diop	Obiageli K. Ezekwesili			
Country Director:	Bella Bird	Mercy Miyang Tembon (A)			
Practice Manager:	Lucio Monari	Lucio Monari			
Project Team Leader:	Vonjy Miarintsoa Rakotondramanana	Peggy Mischke			
ICR Team Leader:	Vonjy Miarintsoa Rakotondramanana				
ICR Primary Author:	Maria Alexandra Planas				

F. Results Framework Analysis Global Environment Objectives (GEO) and Key Indicators (as approved)

The Project's global environmental objectives were (i) to develop and adopt selected policy frameworks for energy efficiency and (ii) to selectively improve the energy efficiency of households and buildings in Bujumbura city.

Revised Global Environment Objectives (as approved by original approving authority) and key indicators and reasons/justifications

The GEO was not revised during Project implementation.

(a) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years						
Indicator 1:	Energy savings (MWh) ¹		-	_						
Value (quantitative or qualitative)	10,000	90,000	N/A	65,984						
Date achieved	12/2011			12/2015						
Comments (incl. % achieved)	Target 76 percent achieved closing due to delay in the di to accrue and are shared bet supply side, avoiding the ne the suppressed demand; and lower electricity bills which	Target 76 percent achieved. The target was not fully achieved by the project closing due to delay in the distribution of CFLs. The energy savings will continue to accrue and are shared between (i) the reduction of thermal generation on the supply side, avoiding the need to add expensive emergency generation to meet the suppressed demand; and (ii) the reduction of energy consumption resulting in lower electricity bills which allows consumers to save money.								
Indicator 2:	CO ₂ emissions avoided/reduced in Bujumbura city (tonnes)									
Value (quantitative or qualitative)	30,000	140,000	N/A	71,138						
Date achieved	12/2011			12/2015						
Comments (incl. % achieved)	Target 51percent achieved. The target was not fully achieved due to the initial implementation challenges and security issues in the country that delayed the distribution of CFLs.									
Indicator 3:	National guidelines, policies	and regulations de	eveloped and ad	opted						
Value (quantitative or qualitative)	No	Yes	N/A	Partially achieved						
Date achieved	12/2011			12/2015						
Comments (incl. % achieved)	Guidelines and regulations have been developed, but were not adopted by Project closing due to the political crisis that erupted in Burundi. The guidelines concern the standards, labels, and technical specifications for energy efficient equipment and appliances, which would be applied in Burundi. Energy efficiency regulations will facilitate a longer-term market transformation appropriate for Burundi's context. The guidelines, policies, and regulations were finalized in December 2015 and were awaiting Cabinet approval at Project close									
Indicator 4:	Number of direct beneficiari	ies (% female)								
Value (quantitative or qualitative)	312,000 (50 percent female)	312,000 (50 percent female)366,000 (50 percent female)N/A								
Date achieved	12/2011			12/2015						
Comments (incl. % achieved)	Target exceeded. The priori there is concentration of c allowed the Project to exceed	tization of the dist onnected househol d the target by 35 p	ribution of CFI lds with larger percent.	Ls in areas where family members						

¹ Energy savings based on number of incandescent light bulbs replaced by CFLs and resulting cumulative energy saving

(b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years					
Indicator 1:	Number of CFLs distributed								
Value (quantitative or qualitative)	200,000	400,000	N/A	400,000					
Date achieved	12/2011			12/2015					
Comments (incl. % achieved)	distribution and awareness campaign financed by the Project was completed in December 2015. The main conclusions of the survey are that the distribution and awareness campaigns have resulted in a positive change on the households regarding the use of CFLs.								
Indicator 2:	Marketing and pro	motion plan develo	ped and imp	lemented					
Value (quantitative or qualitative)	No	Yes	N/A	Yes					
Date achieved	12/2011			12/2015					
Comments (incl. % achieved)	Target fully achieved.								
Indicator 3:	Number of local advisory services delivered from REGIDES energy efficiency unit								
Value (quantitative or qualitative)	0	15	N/A	0					
Date achieved	12/2011			12/2015					
Comments (incl. % achieved)	Target not achieved. The demonstration equipment needed to provide advisory services arrived to the country only in December 2015. Therefore REGIDESO's Energy Efficiency Unit was not able to start								
Indicator 4:	Completion of energy utility audit								
Value (quantitative or qualitative)	No	Yes	N/A	Yes					
Date achieved	12/2011			12/2015					
Comments (incl. % achieved)	Target fully achieved. The energy utility audit was originally included under the Project. However, due the need to accelerate the completion of the audit, it was financed under the Bank-supported Burundi Emergency Energy Project (P122217).								
Indicator 5:	Completion of des audit recommenda	ign of selected inve tions	estment pack	ages to implement					
Value (quantitative or qualitative)	No	Yes	N/A	Yes					
Date achieved	12/2011			12/2015					
Comments (incl. % achieved)	Target fully achiev	Target fully achieved.							

G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	GEO	IP	Actual Disbursements (USD millions)
9	06/11/2012		Moderately Satisfactory	0.00
10	12/01/2012		Moderately Satisfactory	0.00
11	06/05/2013		Moderately Satisfactory	0.50
12	06/29/2013		Moderately Satisfactory	0.53
13	01/08/2014	Moderately Satisfactory	Moderately Satisfactory	0.54
14	11/11/2014	Moderately Satisfactory	Moderately Satisfactory	0.92
15	04/06/2015	Moderately Satisfactory	Moderately Satisfactory	0.99
16	11/24/2015	Moderately Satisfactory	Moderately Satisfactory	1.27

H. Restructuring (if any)

Not applicable.

I. Disbursement Profile



Original ---- Formally Revised --- Actual

1. Project Context, Development Objectives and Design

1.1 Context at Appraisal

Country Background

1. At appraisal, Burundi, a small, landlocked country that straddles Central and East Africa, with total land area of 27,834 km² and approximately 8.5 million inhabitants, had emerged from a cycle of political-ethnic conflict that lasted more than 13 years and claimed the lives of about 300,000 people while displacing about 16 percent of the population. The years of recurring conflict had a devastating effect on Burundi's economy. The country's per capita income fell by about 40 percent between 1993 and 2007, from US\$180 to US\$110, making Burundi one of the poorest countries in the world. As a result of the conflict, Burundi suffered from extreme infrastructure gaps in road access, power generation, communications infrastructure, and access to water and sanitation. The poor state and coverage of infrastructure implied high costs that discouraged domestic and foreign investment and constrained economic growth. The "Vision 2025" developed by the Government of Burundi (GoB) in 2011 placed great emphasis on economic recovery and identified infrastructure development, in particular energy, agriculture, and tourism as priority areas for the near future.

Sector Background

2. Burundi's long-term conflict had largely destroyed the country's electricity generation, transmission, and distribution systems. The country's installed generation capacity was about 50 megawatts (MW). Domestic and regional hydropower resources accounted for about 90 percent of the country's electricity generation. However the country's domestic hydroelectric potential (about 1700 MW, of which 300 MW were estimated to be economically exploitable) was still underdeveloped. Most of the country's electricity was generated by seven hydroelectric plants operated by REGIDESO, the state-owned, vertically integrated power and water utility under the supervision of the Ministry of Energy and Mines (MEM). Rainfall shortages and droughts frequently decreased the electricity production during the dry season by limiting the water storage capacity of the associated hydropower reservoirs. REGIDESO also operated a 5.5 MW thermal power plant in Bujumbura. The total annual supply of electricity increased slightly, from 189 gigawatt/hour (GWh) in 2007 to 242 GWh in 2010.

3. At about two percent, energy access in Burundi was among the lowest in Africa, and the average per capita consumption of electricity at 23 kilowatt hour/year (kWh/year) was also among the lowest in Africa. REGIDESO was serving electricity to 59,827 clients; providing energy to meet Burundi's demand was among the biggest challenges faced by the GoB. Major energy supply crises occurred in the 2009, 2010, and 2011 dry-seasons, resulting in large scale and systematic load-shedding and severe electricity shortages for all basic services (e.g., water supply, hospitals, and administrative services), households and private businesses. The steadily growing power supply deficit in the short term was due to a combination of several factors including lack of investments in the country's hydropower generation capacity during the civil war; rapidly increasing power demand in the Bujumbura capital area; over-reliance on hydro power, immediately affecting power supply during droughts; high technical and commercial losses in the electricity distribution network; and frequent failures to operate the existing (yet limited) thermal power plant due to lack of funds for fuel purchase and spare parts. With no immediate relief from

adequate new power generation projects under construction, immediate reinforcement of thermal production capacity and implementation of energy efficiency measures were important to economize the scarce energy supply and to minimize load shedding, while waiting for the installation of new, less expensive hydro power plants to be completed in the coming years.

Rationale for Bank and GEF Assistance

4. The Global Environment Facility (GEF) Energy Efficiency Project (EEP) was aimed at promoting energy-efficient technologies and practices in appliances and buildings in Burundi through a combination of both "supply push" and "demand pull" activities in order to harness market forces and transform markets for energy efficient technologies and products. This was consistent with the GEF-4 Strategic Program in the Climate Change Focal Area Promoting Energy Efficiency in Residential and Commercial Buildings. The project was also part of GEF's Strategic Africa Energy Program (2008-2015) that focused on practical interventions and projects to demonstrate the technical and economic viability of promising renewable energy and efficient energy technologies and measures. Finally, the project would build on the results of GEF's Efficient Lighting Initiative (1999-2009), which focused on the reduction of global greenhouse gas emissions through the transformation of the global market toward efficient lighting technologies and accelerated phase-out of inefficient lighting.

5. Energy efficiency measures were being piloted by REGIDESO as part of Burundi's first consistent and coordinated energy efficiency program since the end of the country's long term conflict. With support from the World Bank funded Multi-sectoral Water and Electricity Infrastructure Project (MSWEIP), the first energy efficiency awareness raising campaign combined with a bulk procurement and distribution of 200,000 compact fluorescent lights (CFLs) was initiated in 2011.² The GEF EEP was designed to complement the scope and effectiveness of the country's energy efficiency program under development. An overall assessment of potential savings from the continuous promotion of energy efficient lighting in Burundi were expected to be considerable. An estimate at the time of project appraisal revealed that the potential market of CFLs in the country would increase to about four million by 2030, resulting in energy savings of about 467 GWh/year. The MSWEIP and EEP projects aimed at putting in place the regulations, capacity and institutional structure for initiating the energy efficient transformation.

1.2 Original Global Environment Objectives (GEO) and Key Indicators

6. The GEF EEP was designed to complement the IDA-financed MSWEIP, which was already under implementation.³ The project development objectives of the parent MSWEIP were to: (i) increase access to water supply services in peri-urban areas of Bujumbura; (ii) increase reliability and quality of electricity services; (iii) increase water supply quality and reliability in Bujumbura; and (iv) Strengthen REGIDESO's financial sustainability. The MSWEIP closed on June 30, 2013 and the Implementation Completion and Results Report (ICR) for the MSWEIP was completed January 30, 2014 with a satisfactory outcome.⁴

² The MSWEIP (P097974) was approved on May 13, 2008, with an original IDA grant of SDR 30.4 million (US\$50 million equivalent). Component 1 of the MSWEIP co-financed the GEF EEP with an amount of US\$21.6 million.

³ GEF Energy Efficiency Project, Project Appraisal Document, Report No: 66125-BI, World Bank, February 13, 2012. ⁴ Report No. ICR00002985.

7. The Project's Global Environmental Objectives (GEO) were (i) to develop and adopt selected policy frameworks for energy efficiency and (ii) to selectively improve the energy efficiency of households and buildings in Bujumbura city. This ICR is based on the GEO indicators listed below which are specific to the EEP and were not monitored in the MSWEIP. The ICR is being completed separately from the MSWEIP ICR since the GEF EEP closed later than the MSWEIP.

8. The GEO level indicators were:

- Application guidelines, policies, and regulations for energy efficient products and appliances developed and adopted by Government (Number);
- Electricity savings in Bujumbura city (MWh/year);
- Carbon Dioxide (CO₂) emissions avoided/reduced in Bujumbura city (tonnes CO₂ equivalent);
- Direct project beneficiaries (number), of which female (percent).

The GEO level indicators and intermediate outcome indicators with baseline and target values are shown in the table below.

GEO Indicators								
Indicator	Baseline Value	Original Target Values	Formally Revised Target Values					
Projected lifetime energy savings (MWh)	10,000	90,000	N/A					
CO ₂ emissions avoided/reduced in Bujumbura city (tonnes)	30,000	140,000	N/A					
National guidelines, policies and regulations developed and adopted	No	Yes	N/A					
Number of direct beneficiaries (% female)	312,000 (50 percent female)	366,000 (50 percent female)	N/A					
Intern	nediate Indicators							
Number of CFLs distributed	200,000	400,000	N/A					
Marketing and promotion plan developed and implemented	No	Yes	N/A					
Number of local advisory services delivered from REGIDESO energy efficiency unit	0	15	N/A					
Completion of energy utility audit	No	Yes	N/A					
Completion of design of selected investment packages to implement audit recommendations	No	Yes	N/A					

 Table 1. GEO Indicators and Intermediate Indicators

1.3 Revised GEO (as approved by original approving authority) and Key Indicators, and reasons/justification

9. The GEO and key indicators were not revised during project implementation.

1.4 Main Beneficiaries

10. Original Project beneficiaries were not explicitly stated in the Project Appraisal Document (PAD), but can be inferred from the GEO and indicators as households and large and medium size businesses of Bujumbura. The GoB and REGIDESO were also expected to benefit from the reduced energy consumption due to the energy efficiency measures supported by the project.

1.5 Original Components

11. In complement to the MSWEIP, GEF EEP resources were targeted to support the distribution and promotion of CFLs and other energy efficient technologies and appliances, implement an audit of the electricity grid and about 200 large electricity consumers, and introduce guidelines, policies, and regulations for energy efficient appliances. The GEF components, which complemented the MSWEIP's Component 1 on electricity⁵, are summarized below.

Component 1(e) A: Distribution and promotion of Compact Fluorescent Lights (CFL): (US\$900,000)

12. Sub-Component 1(e) A1: Distribution compact fluorescent lights (CFL) (US\$400,000) – the first phase of the distribution and promotion of 200,000 CFLs under the IDA-financed MSWEIP would be complemented by an additional 200,000 CFLs procured and distributed under the GEF project;

13. Sub-Component 1(e) A2: Development and implementation of media communication and public awareness for energy efficient lights (US\$350,000)- the first phase participatory media and awareness raising campaign under the MSWEIP would be complemented to provide continuous capacity building and consumer advise on the use of a variety of energy efficient products, including environmental, economic, safety, and health aspects;

14. Sub-Component 1(e) A3: Technical and managerial capacity building (US\$150,000) – targeting the promotion of energy efficient products including workshop series to raise awareness of government agencies (ministries, regulatory and inspection authorities), private sector players, and standardization institutes on energy efficient products and appliances, and support policy and regulatory reforms.

Component 1(e) B: Utility energy audit: (US\$147,000)

15. This component would finance the implementation of a program of activities aimed at supporting the application of results generated from the audit of energy consumption financed by the MSWEIP. It included the development of an action plan with short, medium, and long term objectives to prioritize energy efficiency investments, and the design of small investment packages for energy efficiency;

⁵ The MSWEIP had three components: (1) Electricity; (2) Water; and (3) Institutional Strengthening of REGIDSEO and the Ministry of Water, Energy and Mines.

Component 1(e) C: Promotion of Energy Efficiency Investments to large consumers: (US\$590,000)

16. Sub-Component 1(e) C1: Energy efficiency advice to large public institutions, commercial and industrial consumers (US\$300,000) - the project would finance technical assistance to promote energy efficiency technology and build local capacity to provide energy efficiency advice to large public institutions, private sector companies and the National Standardization Institute.

17. Sub-Component 1(e) C2: Develop national guidelines for application of energy efficient technologies in new housing and commercial real-estate (US\$290,000) – the sub-component was aimed at providing technical assistance to develop national guidelines for energy efficient technologies, including an evaluation of best practice international energy efficiency standards, labels, and technical specifications for energy efficient equipment and appliances for their application in Burundi. Considering that the institutional frameworks, monitoring mechanisms, and regulatory systems of the main stakeholders were weak, this component would provide analytical support and recommendations to facilitate a longer term market transformation by providing inputs for future energy efficiency policies and regulations appropriate for Burundi's context.

Component 1(e) D: Support to project management, monitoring and evaluation (US\$ 181,182)

18. This component included support to project coordination, management, monitoring and evaluation (M&E), and implementation of an energy efficiency unit in the REGIDESO Project Implementation Unit (PIU), preparation of financial audits and periodic evaluations.

1.6 Revised Components

19. The components were not revised during project implementation.

1.7 Other significant changes

20. The project did not undergo any significant changes during implementation.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

21. Assessment of Project Preparation and Quality at Entry. Project preparation and quality at entry were sound. The background analysis for project preparation was thorough and included surveys and market studies that confirmed the energy efficiency potential in households and in the service sector, in particular for energy efficient lighting.⁶ A CFL survey conducted by the

⁶ The lighting market was not structured and low quality products were imported from various countries. Households in Burundi used an average of 10 light bulbs, about 53 percent of incandescent type and 45 percent of fluorescent tube

MSWEIP project served to design the first phase of the distribution of 200,000 CFLs including technical specifications and household preferences. The distribution of the additional 200,000 CFLs under the EEP was built on the experience of the first phase. Data derived from a 2010 tariff study also suggested that the residential sector was a priority sector with projected increases in energy demand of 10 percent per year, thus offering considerable returns in an energy efficiency program. There was no Quality at Entry assessment undertaken by the Bank's Quality Assurance Group (QAG).

22. Assessment of Project Design. The EEP was designed to complement the country's energy efficiency program under development by the MSWEIP. Energy efficiency was still at its early stages and facing barriers at all levels in Burundi. Household surveys conducted in Bujumbura identified the following main barriers to energy efficiency: (i) low awareness of energy efficient products and appliances, (ii) unregulated markets for energy efficiency products and appliances, (iii) lack of quality technical and service standards for energy efficiency products and appliances, and (vi) limited information on the energy demand and end-use energy consumption patterns for the building sector. The EEP project was designed to address those barriers, including building capacity for government agencies and private market players in designing, executing and monitoring energy efficient investment programs.

23. However, the GEO and its indicator were overly ambitious as the preparation and the approval of important laws and regulations on energy efficiency were expected to be done within the project period. Experience in other countries shows that the preparation of laws can be completed in a relative short time but their approval and adoption are more uncertain as they depend on the political agenda. In the specific case of Burundi, the difficult political context made such an approval more difficult. The other GEO and target indicators were relevant, precise, clearly defined and targeted at the city of Bujumbura, which was adequate considering the small financing amount available. Project components were aligned and complemented activities being implemented by the MSWEIP. Component 1(e) A provided additional funds to continue with activities being implemented under the MSWEIP (distribution of an additional 200,000 CFLs, public awareness campaign and support to increase managerial capacities and the Energy Efficiency Unit at REGIDESO); Component 1(e) B and Component 1(e) C were aimed at applying the results of the energy audit that was planned to be conducted by the MSWEIP. The GEF EPP was designed to be implemented by the PIU for IDA operations at REGIDESO. In retrospect, the implementation arrangements were overly ambitious considering the extensive amount of work being done by the PIU regarding the implementation and preparation of other energy sector projects, the Project could have included as a condition of effectiveness the hiring of the Project Support Consultant.

24. *Assessment of Risk.* The overall risk of the GEF EEP was assessed as "Low" at the design stage. This took into account low risk ratings in the following categories: capacity; design; social and environmental; program and donor; delivery monitoring and sustainability; and consumer preference for low-cost efficient appliances and equipment. The main justification for the low risk rating, which is considered justified at the time, was that the Project design was kept simple

lights. Efficient light bulbs, when available, were of low quality, and could not withstand the high voltage fluctuations of the Burundi grid.

considering the country's post-conflict environment, and was fully aligned with the institutional, fiduciary, and safeguards arrangements established within REGIDESO under the MWSEIP. The only risk category not rated low was governance, which was rated moderate. Government commitment was considered strong, however the financial viability of the utility was seen as risk. It was considered moderate due to the implementation of REGIDESO Performance Improvement Plan with support from the MSWEIP as well as the application of a progressive tariff adjustment program. These mitigation measures were appropriate to justify the rating of the risk on governance as moderate which did not materialize. However, one risk assessed as low that materialized was the difficulty that the existing PIU could face in implementing a new project due to time and capacity resource constraints. To minimize that risk, it was agreed that the GEF EEP would increase the PIU capacity to deal with new, energy efficiency issues, through the establishment of an Energy Efficiency Unit within the REGIDESO PIU. Unfortunately, there were delays in establishing the Energy Efficiency Unit and hiring the support consultant. This resulted in delays in Project implementation that affected the achievement of some of the GEO target indicators as discussed in Section 3.2.

2.2 Implementation

25. The Project was approved by the Board on March 8, 2012 and became effective on September 26, 2012. It closed as planned on December 15, 2015.

26. The GEF EEP complemented the MSWEIP, which closed on June 30, 2013. The ICR rated MSWEIP satisfactory overall, and the following activities of the MSWEIP, which were complementary to the GEF EEP activities, were satisfactorily completed: (i) procurement and distribution of 200,000 CFLs including first media and awareness campaign, an energy efficiency workshop, and implementation of a monitoring program; and (ii) installation of 15,000 prepayment meters for increasing household connections and for improving the ability to monitor electricity consumption. The implementation of the first phase of the energy consumption audit was initially planned under the MSWEIP, but due to shortages of funding was implemented under a separate project, the Emergency Energy Project (P122217). The energy audit represented a key input for the EEP as it would serve to design and develop small investment packages. The energy audit was completed in January 2014.

27. Despite the fact that the EEP faced some implementation challenges as described below, most Project activities were completed by Project closing. However, one of the key activities – the adoption of energy efficiency laws and regulations was not achieved by Project closing. The other activity that was not delivered was the 15 local advisory services to be carried-out by REGIDESO's Energy Efficiency Unit (independently of Project funds) to selected consumers due to delays in receiving the demonstration equipment in the country. However, the equipment was ordered and successfully delivered under the Project. Thus, disbursement of the funds under the GEF EEP was 100 percent.

28. The two major challenges faced by the Project were initial capacity constraints of the PIU and security issues due to the political situation faced by the country towards the end of Project implementation. Further information is provided below.

Slow start of implementation due to PIU capacity constraints

29. GEF EEP implementation experienced a slow start. As mentioned in various Implementation Status and Results Reports (ISRs), this was due to two main factors: (i) the PIU staff was overstretched as it was implementing in parallel two other Bank-funded projects, the MSWEIP (US\$21.6 million) and the Emergency Energy Project (US\$15.4 million), both of which included large and complex procurement processes, and was preparing the Bank-funded Jiji and Mulembwe Hydro Generation Project (P133610); and (ii) delays in hiring a Support Consultant to assist REGIDESO in Project implementation and management. In this context, the only activity that was initiated by the PIU during the first year of GEF EEP implementation was the launch of the procurement of the 200,000 CFLs. The contract was signed with the supplier in September 2013 and by June 2014 the CFLs were received in Bujumbura. The distribution of the CFLs started in March 2015.

30. The hiring of the Support Consultant was completed in November 2013, more than a year after the Project became effective. It was key for establishing the Energy Efficiency Unit at REGIDESO, which was expected to help implement the Project; and for preparing, procuring, and supervising all consultancy services financed by the Project. As a result, the pace of Project implementation accelerated significantly. The major consultancies were launched during 2014, including the consultancy for the distribution and awareness campaign for the CFLs; the assessment of the institutional and legal framework for energy policy development; and the energy audit of large and medium consumers. The Energy Efficiency Unit at REGIDESO was established at the end of 2014, more than a year later than originally anticipated.

Deterioration of the political situation during the last year of Project implementation

31. Despite the fact that the political situation in the country deteriorated during 2015, which resulted in the suspension of Bank missions to the country, the implementation the GEF EEP achieved significant progress and the PIU was able to complete most of the planned activities. By Project closing in December 2015, all of the CFLs had been distributed; the Energy Efficiency Unit was operational; the draft energy efficiency policies and legislation had been prepared and validated and were awaiting Cabinet approval; the utility energy audit was completed; capacity building and workshops to raise awareness on energy efficiency for large- and medium-size consumers of REGIDESO were delivered, as was the evaluation of the impacts of the distribution of the CFLs.

32. The combination of the initial delays in Project implementation and the deterioration of the political situation in the country had an impact on the achievement of the energy savings target as the distribution of CFLs was only completed by Project closing and not, as anticipated, during the second year of implementation. It also had an impact on the adoption of the energy efficiency policies, laws, and regulations and the delivery of advisory services to large consumers as there was not enough time to complete those activities before the Project closed.

Key factors that contributed to the successful completion of Project activities

33. One of the factors that significantly contributed to the successful completion of most Project activities was the strong Bank supervision during the last year of implementation. Despite the difficult political situation, the Bank team was able to conduct three missions and one videoconference during 2015. Moreover, the aide memoires and ISRs show that the Bank and PIU set tight timelines and action plans for each of the pending activities and continuously followed-up to ensure progress on each activity.

34. Another element that was key for the implementation of the Project was the dedication and professionalism of the PIU staff and consultants that despite the challenging situation on the ground in 2015 continued with the implementation of Project activities, especially the distribution of all CFLs.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

35. **Design of M&E System.** The design of the M&E framework was well aligned with the objectives of the GEF Grant, but the GEO indicator related to the adoption of energy efficiency laws and regulations in a relatively short timeframe is considered overly ambitious. Experience in other countries demonstrate that the adoption of laws, if implemented, normally takes a long time, especially in countries were the political situation is complex and fragile. The GEO outcome indicator could have been less ambitious by requiring for example the preparation of the laws and endorsement by the line Ministry (not Cabinet approval). The other three outcome indicators and targets were relevant, specific, and measurable. It should be noted that three of the four outcome indicators (i.e., electricity savings in Bujumbura city, CO₂ emissions avoided/reduced in Bujumbura city, and direct project beneficiaries) were not only related to the activities financed by the GEF EEP, but also to the achievements of the parent IDA operation, the MSWEIP. While the implementation delays of the EEP did not allow for the full achievement of the outcome indicator on energy savings (although the indicator was close to achieved, at 76 percent of the target) and on the CO₂ emissions reductions, it did not impact the achievement of the outcome indicator on direct beneficiaries due to the fact that all the purchased CFLs were fully distributed. Consistently with the appraisal document of the EEP, energy savings and emission reductions were calculated based on the avoided additional thermal generation capacity required to reduce the suppressed demand. Energy savings are distributed as follows: half of the energy savings is counted as avoided thermal generation and the other half as decreased suppressed demand. This approach is commonly used in Bank energy projects.

36. Three of the five intermediate outcome indicators (i.e. number of CFLs distributed, completion of energy utility audit, and number of local advisory services delivered from REGIDESO energy efficiency unit) were adequately designed to monitor implementation progress of the key activities supported by the Project. However, the targets for two intermediate indicators (i.e., the completion of design of selected investment packages to implement audit recommendations and marketing and promotion plan developed and implemented) could have been better measured by the number of interventions and not by yes or no, as was the case. Those changes could have better captured the achievements of the Project.

37. *Implementation and utilization of the M&E System.* Monitoring and evaluation of Project activities was challenging during the first two years of Project implementation not only due to the delays in hiring a M&E specialist as reported in various ISRs and aide-memoires, but also due to lack of advance on the implementation of key activities. The monitoring of the Project improved once the M&E consultant came on board in early 2015 and helped the PIU and the Bank to closely monitor progress and to agree on a tight timeline with the PIU to complete most Project activities by Project closing. For instance, collected data on number of distributed CFLs were used to calculate the energy savings and emission reductions, which helped the Energy Efficiency Unit at REGIDESO to demonstrate with tangible results the benefits of energy efficiency activities being implemented with Project support. The M&E system also served to help REGIDESO estimate the energy demand.

2.4 Safeguard and Fiduciary Compliance

38. *Financial Management.* Financial management of Project funds was rated satisfactory throughout project implementation. PIU staffing for financial management remained adequate and proper books of accounts and supporting documents were kept in respect of all expenditures. The auditors' opinions on the annual financial statements were submitted on time and were unqualified. The interim un-audited financial reports were also submitted on time and the quality of the reports was satisfactory.

39. *Procurement.* Procurement was rated either moderately satisfactory or satisfactory throughout project implementation. All project components were implemented following the Bank's applicable procurement guidelines for works, goods, and services. The PIU was staffed with a Procurement Specialist proficient in Bank's procedures.

40. *Safeguards*. An Environmental and Social Management Framework (ESMF) was developed by REGIDESO, reviewed by the Bank, and disclosed under the parent IDA project. That ESMF also applied to the GEF EPP. Given the nature activities undertaken by the GEF Project, no potential large scale, significant, and/or irreversible environmental and social impacts were expected. As required, REGIDESO has stored all replaced incandescent bulbs in secured containers for later disposal. While no Environmental and Social Management Plan has been prepared yet for the safe disposal of the CFLs as it was not required by the ESMF and, the potential impacts of the mercury contained in the CFLs should be addressed and it is recommended that the Bank should continue working with the Government of Burundi in identifying mechanisms for the safe disposal of CFLs, including under the ongoing Jiji and Mulembwe Hydropower Project and/or a potential follow-up GEF operation. The Project is in compliance with all safeguard requirements and was rated satisfactory throughout Project implementation.

2.5 Post-completion Operation/Next Phase

41. By setting up an Energy Efficiency Unit at REGIDESO and by financing the drafting of energy efficiency policies and regulations that are expected to be approved soon, it is envisaged that the advances made in the area of energy efficiency through the Project will not only be consolidated but will also be expanded to other areas, such as household appliances and energy efficiency in large and medium enterprises. If the policies, laws and regulations awaiting Cabinet

approval are implemented as planned, it is expected that the country will significantly improve its energy efficiency with significant savings in energy consumption and important environmental benefits. Even though the proposed laws identified financing sources for its implementation, it is expected that significant resources will be needed. As mentioned above, a follow-up operation could consolidate and expand the achievements of the EEP.

42. It is also expected that the Bank-supported Jiji and Mulembwe Hydro Generation Project (P133610) still under implementation would be used as a vehicle to follow-up with the Government on the adoption of the energy efficiency national guidelines, policies, and regulations. However, the country is currently facing a political crisis and this situation is likely to hamper REGIDESO's efforts to sustain the implementation of energy efficiency measures due to security reasons. Another concern is the funding availability for the Energy Efficiency Unit. According to the Borrower's Project Completion Report, the Unit does not have its own operational budget nor a defined work program within REGIDESO.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

Rating: High

Relevance of Objectives

43. The relevance of the Project objectives is assessed as High. The objectives of the Project were relevant to the development priorities of the Government as set out in its second Poverty Reduction Strategy Paper (2011-2015), which identified "persistent electricity deficit" as one of Burundi's six main development challenges. The paper noted that the power deficit is a major obstacle to developing industry and services and reducing poverty. The Project was also consistent with the strategic priorities of the 2008-2012 World Bank Country Assistance Strategy (CAS) for Burundi of improving access to social services where quality electricity services, including energy efficiency measures and policies, were expected to play a crucial role in accelerating industrial and commercial activity and hence contribute to the country's economic growth. The Project is also aligned with the strategic priorities set out in the FY13-16 CAS,⁷ which included as its first pillar, "to improve competitiveness by establishing an enabling environment for inclusive growth," which focuses, among others, on improving production and access to electricity.

Relevance of Design and Implementation

44. The relevance of the Project's design is assessed as Substantial. The Project design was consistent with the development objectives of the GoB and the Bank strategic priorities for the country as discussed above, but the first Global Environmental Objective of "adopting selected policy frameworks for energy efficiency" was overly ambitious. The second GEO "to selectively improve the energy efficiency of households and buildings in Bujumbura city" was adequate and

⁷ International Development Association and International Finance Corporation Country Assistance Strategy for the Republic of Burundi for the Period FY13-16, Report No. 72334-BI, September 18, 2012.

achievable. The design included activities that directly addressed the two objectives. The continuing relevance of the design (and the objectives) was also demonstrated by the absence of changes to the objectives, components, indicators, and implementation arrangements during the life of the Project. The Project objectives are also consistent with the GoB priorities for the energy sector regarding energy efficiency as demonstrated by the endorsement by the Ministry of Energy and Mines of the draft legislation on energy efficiency.

45. The relevance of the Project's implementation is assessed as substantial. Although there were delays at the outset due to the delay in hiring the support consultant, procurement of CFLs did progress early on. In addition, during the last year of implementation the GEF EEP achieved significant progress, even in spite of the country's security problems as a result of the political crisis. Implementation of most Project activities was achieved by the closing date, i.e., all the CFLs had been distributed and an evaluation of their impact completed; the Energy Efficiency Unit was operational; the draft energy efficiency policies and legislation had been prepared and validated and were awaiting Cabinet approval; the utility energy audit was completed; capacity building and workshops to raise awareness on energy efficiency for large and medium size consumers of REGIDESO were delivered. However, the timeframe for Project implementation could have been longer considering that one of the two key objectives was to adopt policies and laws which is more uncertain and usually take a longer time as experience in other countries suggests. Another option could have been to extend the Project closing date to allow more time for the adoption by Cabinet of the laws and regulations.

3.2 Achievement of Global Environment Objectives

46. The achievement of the GEOs is rated Moderately Unsatisfactory. One of the four GEO indictor targets was exceeded, i.e., direct beneficiaries. The target on projected lifetime energy savings was 76 percent achieved and the target on the CO_2 emissions avoided/reduced in Bujumbura city was 51 percent achieved. The target on the development and adoption of national guidelines, policies, and regulations for energy efficiency was not achieved as the laws and regulations were only finalized and presented to the sector agencies by December 2015. Cabinet approval is still pending. Table 2 below shows the status of achievement of the indicators.

47. Regarding the lifetime energy savings target and the CO₂ emission reduction, due to the initial implementation challenges and security issues in the country that delayed the distribution of CFLs, the electricity savings target, at 76 percent, and the emission target, at 51 percent, were not fully achieved. The energy savings will continue to accrue and are shared between (i) the reduction of thermal generation on the supply side avoiding the need to add expensive emergency generation to meet the suppressed demand; and (ii) the reduction of energy consumption resulting in lower electricity bills, which allows consumers to save money. A survey and evaluation report on the impacts of the CFL distribution and awareness campaign financed by the Project was completed in December 2015. The main conclusions of the survey are that the distribution and awareness campaigns have resulted in a positive change on the households regarding the use of CFLs, especially when combined with the pre-payment meters installed under the MSWEIP. The target for the reduction of carbon emission in Bujumbura city was achieved and the indicator related to the number of direct beneficiaries exceeded its target (135 percent achieved) due to the fact that the distribution of CFLs was prioritized in areas where there is concentration of connected

households with larger family members. It should be noted that these three GEF EEP targets incorporate the energy savings, greenhouse gas emissions reductions, and beneficiaries from the first CFL distribution financed by the MSWEIP.

48. In regard to the national guidelines, policies, and regulations, these include (i) an energy efficiency law that mandates an improvement in energy efficiency at the national level through the increased use of renewable energy for electricity generation; the rationalization on the use of energy; the use of more energy efficient equipment and more energy efficient buildings; the reduction of energy consumption by the transport sector; the promotion of energy efficiency products and measures; the implementation of periodic energy audits for the large consumers; (ii) the creation of an autonomous National Energy Efficiency Agency under authority of the Ministry of Energy and Mines responsible for the implementation of the Energy Efficiency Law; (iii) the establishment of and Energy Efficiency Fund financed, among others, by taxes on vehicles and a surcharge on the electricity bill for the industrial, commercial, and service sectors and by grants and credits from development partners; and (iv) regulations regarding the import and sale of equipment and appliances, and the establishment of labeling program for appliances (air conditioners, cookstoves, refrigerators, washers and dryers, etc.). These were prepared and discussed with relevant stakeholders during Project implementation. However, due to time constraints and the political crisis that erupted in the country in 2015, they were not approved by the Cabinet before the Project closed. At the time of Project closing, the guidelines, policies and regulations were awaiting Cabinet approval. Once approved and under implementation, the laws, policies, and regulations are expected to considerably improve energy efficiency in the country.

49. Regarding the intermediate indicators, four of the five indicators were achieved. The target for the number of CFLs distributed, the implementation of the marketing and promotion plan, the completion of the energy utility audit and the design of investment packages were achieved. The fifth intermediate indicator related to the number of local advisory services delivered was not achieved due to delays in receiving the demonstration equipment in the country. Those activities not only helped improve the energy efficiency of the beneficiary households in Bujumbura and to raise awareness on energy efficiency in large- and medium-size enterprises, but also served to demonstrate the benefits energy efficiency can bring to the consumers in terms of reduced electricity costs.

50. In a broader sector context, the EE laws and regulations prepared under the EEP, once adopted, will facilitate the promotion of RE for electricity generation, the optimization of energy consumption through the use of more efficient equipment and through the audit of large consumers. In addition, the CFL program implemented under the EEP reduced the suppressed demand and economized the scarce energy supply while waiting for the installation of national and regional hydro power plants to be completed in the coming years including the Jiji and Mulembwe hydro generation project.

Table 2: Achievement of GEO and Intermediate Indicators

(a) GEO Indicators

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years				
Indicator 1:	Energy savings (N	/Wh) ⁸		-				
Value (quantitative or qualitative)	10,000	90,000	N/A	65,984				
Date achieved	12/2011			12/2015				
Comments (incl. % achieved)	arget /o percent achieved. The target was not fully achieved by the project closing due to delay in the distribution of CFLs. The energy savings will continue to accrue and are shared between (i) the reduction of thermal generation on the supply side, avoiding the need to add expensive emergency generation to meet the suppressed demand; and (ii) the reduction of energy consumption resulting in lower electricity bills, which allows consumers to save money.							
Indicator 2:	CO ₂ emissions ave	oided/reduced in Buj	umbura city (tonr	nes)				
Value (quantitative or qualitative)	30,000	140,000	N/A	71,138				
Date achieved	12/2011							
Comments (incl. % achieved)	Target 51 percent achieved. The target was not fully achieved due to the initial implementation challenges and security issues in the country that delayed the distribution of CFLs.							
Indicator 3:	National guideline	es, policies and regul	ations developed	and adopted				
Value (quantitative or qualitative)	No	Yes	N/A	Partially achieved				
Date achieved	12/2011			12/2015				
Comments (incl. % achieved)	Guidelines and regulations have been developed, but were not adopted by Project closing due to the political crisis that erupted in Burundi. The guidelines concern the standards, labels, and technical specifications for energy efficient equipment and appliances, which would be applied in Burundi. Energy efficiency regulations will facilitate a longer-term market transformation appropriate for Burundi's context. The guidelines, policies, and regulations were finalized in December 2015 and were awaiting Cabinet approval at Project close.							
Indicator 4:	Number of direct	beneficiaries (% fem	ale)					
Value (quantitative or qualitative)	312,000 366,000 (50 percent female) (50 percent female)							
Date achieved	12/2011			12/2015				
Comments (incl. % achieved)	12/2011 12/2015 Target exceeded. The prioritization of the distribution of CFLs in areas where there is concentration of connected households with larger family members allowed the Project to exceed the target by 35 percent							

(b) Intermediate Outcome Indicators

⁸ Energy savings based on number of incandescent light bulbs replaced by CFLs and resulting cumulative energy saving

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years						
Indicator 1:	Number of CFLs dis	stributed								
Value (quantitative or qualitative)	200,000	400,000	N/A	400,000						
Date achieved	12/2011			12/2015						
Comments (incl. % achieved)	awareness campaign financed by the Project was completed in De 2015. The main conclusions of the survey are that the distribut awareness campaigns have resulted in a positive change on the hou regarding the use of CFLs.									
Indicator 2:	Marketing and prom	otion plan developed	and implement	nted						
Value (quantitative or qualitative)	No	Yes	N/A	Yes						
Date achieved	12/2011			12/2015						
Comments (incl. % achieved)	Target fully achieved.									
Indicator 3:	Number of local advisory services delivered from REGIDESO efficiency unit									
Value (quantitative or qualitative)	0	15	N/A	0						
Date achieved	12/2011			12/2015						
Comments (incl. % achieved)	Target not achieved. The demonstration equipment needed to provide advisory services arrived to the country only in December 2015. Therefore REGIDESO's Energy Efficiency Unit was not able to start this activity by Project closing									
Indicator 4:	Completion of energ	y utility audit								
Value (quantitative or qualitative)	No	Yes	N/A	Yes						
Date achieved	12/2011			12/2015						
Comments (incl. % achieved)	Target fully achieved. The energy utility audit was originally included under the Project. However, due the need to accelerate the completion of the audit, it was financed under the Bank-supported Burundi Emergency Energy Project (P122217).									
Indicator 5:	Completion of designeed recommendations	gn of selected investr	nent packages	to implement audit						
Value (quantitative or qualitative)	No	Yes	N/A	Yes						
Date achieved	12/2011			12/2015						
Comments (incl. % achieved)	Target fully achieve	Target fully achieved.								

3.3 Efficiency Rating: High

51. While there was no ex-ante economic analysis of the Project, an ex-post economic analysis was carried out to evaluate the efficiency of Project sub-components A1 and A2. Table 3 below summarizes the results of this analysis. The overall economic analysis was computed by adding the costs and benefits of Components A1 and A2. The economic internal rate of return (EIRR) for the Project is 157 percent, with a Net Present Value (NPV) of US\$2.7 million at a six percent discount rate.

Table 3: Project Economic Results

	NPV (US\$)	EIRR (%)
Components A1 and A2	2.7 million	157 percent

52. The calculation of the Project's economic benefits was based on the electricity savings resulting from substituting traditional incandescent lights for more efficient CFLs; those savings are assumed to: (i) reduce the amount of the electricity generated, valued at the marginal generation price (diesel generator) and (ii) reduce some of the suppressed demand in the country, valued at the average end-user tariff.

53. To overcome the lack of economic analysis in the PAD, the Project has been benchmarked to a similar project in Mexico for which an energy efficiency component using CFL was also used.⁹ The benchmark project shows an ex-ante EIRR of 182 percent and an ex-post EIRR of 145 percent. The EIRR of this project (157 percent) fits in the range of the benchmark project.

54. Based on the economic returns of the Project, the efficiency for the overall Project is rated as **High**. See Annex 3 for the economic analysis.

3.4 Justification of Overall Outcome Rating Rating: Moderately Unsatisfactory

55. The overall outcome of the Project is rated Moderately Unsatisfactory. This takes into consideration the high relevance of the project, the moderately unsatisfactory achievement of objectives, and the high rating for efficiency. The Project's objectives remain highly relevant today. Despite the difficult political situation during the second half of Project implementation, most Project activities were completed by Project close with the important exception of the approval of policies, guidelines, and regulations and the number of local advisory services delivered to large and medium consumers that are expected to be completed by mid-2016 according to the PIU.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

56. Poverty and social impacts of the Project are not easily estimated due to the lack of specific baseline analysis. However, it should be noted that at the household level, the Project contributed to a decrease in the monthly electricity bill. For the GoB, the Project contributed to better management of the energy crisis and the deficit in generation capacity. At the private sector level, it contributed to the creation of conditions for the development of a market for energy efficient products, especially CFLs.

(b) Institutional Change/Strengthening

57. Through the support and capacity building provided by the Project, the technical capacities related to energy efficiency in REGIDESO were strengthened. Staff from the newly created Energy Efficiency Unit, from the Ministry of Energy and Mining, and from the Bureau of Norms

⁹ ICR00003706 – Mexico, Efficiency Lighting and Appliances Project. March 24, 2016.

and Standards were provided with extensive training on energy efficiency issues. The details are as follows: eight participants received training on the energy audit of medium and large consumers, including staff from REGIDESO, Ministry of Energy and Mining, and Bureau of Norms and Standards; three staff from REGIDESO received training on the promotion and distribution impact evaluation of CFLs; and five technicians received training on the energy consumptions management. The Project also increased awareness of energy efficiency issues at the level of government, privates sector, large and medium consumers, and households through the CFL awareness campaigns.

(c) Other Unintended Outcomes and Impacts (positive or negative)

58. N/A

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

59. An initial survey was conducted in the context of the MSWEIP project and a first phase of 200,000 CFLs were distributed under the same project. The CFL technical specifications were tailored toward the consumers' needs. The distribution of the second phase of additional 200,000 CFLs under the EEP project was built on the experience of the first phase. The CFLs procured and distributed followed the technical specifications of the IFC/GEF Lighting Initiative (2006 version). The CFLs were individually packaged and the labeling included the technical characteristics of the lamps (wattage, color, size, etc.) as well as REGIDESO's logo and a legend stating that they could not be sold. The CFLs had a rating power of 20 watts, a minimum 0.8 power factor and a lifetime duration of 10,000 hours which replaced 100, 60, and 40 watts incandescent lamps. The mercury content of distributed CFLs were limited to 5mg per CFL in accordance to the European Commission Directive on Restriction of Hazardous Substances (RoHS). They also had to follow ISO 9001-2000 standards or equivalent for its manufacturing and had a one year manufacturers guarantee. The cost per CFL was US\$ 1.54. The free CFLs were distributed using door to door approach in exchange of all functioning incandescence lamps in the households between three and six CFLs per household.

60. The survey and evaluation report on the impacts of the CFL distribution and awareness campaign financed by the Project was completed in December 2015. The report reviewed the impacts of the 2011 CFL distribution and awareness campaign (financed by the MSWEIP) and evaluated the impacts of the 2015 CFL awareness and distribution campaign (financed by the GEF EEP). The report identified the needs and barriers for the development of a sustainable market of CFLs at the national level. The survey was conducted in 100 households in Bujumbura that received the free CFLs. It estimates that the 400,000 CFLs distributed under the Project can displace 6 MW of peak capacity and reduce consumption by 14 GWh per year, or 56 GWh total for the estimated five years lifetime of the CFLs.

61. Even though the survey did not measure the "rebound effect"¹⁰ which has been observed to a smaller or larger degree in similar programs, qualitative evidence showed that the distribution and awareness campaigns have resulted in a positive change on the households regarding the use of CFLs, especially when combined with the pre-payment meters installed under the MSWEIP. According to the survey results, those households that also had pre-paid meters installed tended to be more aware of their energy consumption, turning off the lights when they left a room or having the lights turned on less hours per day.

However, there is still a lot to be done to develop a sustainable market for CFLs. Awareness campaigns should be continuously conducted in order to maintain and increase the use of CFLs. Other measures that could strengthen the market for CFLs include the reduction of import taxes, making them more affordable to the consumers. The report also recommends the establishment of guidelines and regulations for the disposal of CFLs, classified as dangerous due to their mercury content.

62. In addition, a labeling program should be prepared for other household appliances (including refrigerators, air conditioners, and irons) as well as establishing minimum standards of performance of those appliances. Those standards should be complemented with a ban on the import of appliances that do not meet the minimum standards. Such a program would allow the elimination of low efficiency appliances thus creating a market for higher efficiency products.

4. Assessment of Risk to Development Outcome Rating: Substantial

63. This ICR rates the risk to the sustainability of the development outcomes as Substantial. An Energy Efficiency Unit has been established at REGIDESO, the energy efficiency laws and regulations have been prepared and approved by the sector, and there has been important capacity building and sensitization of the benefits of energy efficiency for large and medium consumers as well as for the households in Bujumbura. Important training on energy efficiency has been provided to the staff of the newly established Energy Efficiency Unit that will allow them to continue with their function of promoting and supporting the adoption of energy efficiency measures at the consumer level. It is also expected that the Bank-supported Jiji and Mulembwe Hydro Generation Project (P133610) under implementation would continue to provide support to sustain the achieved outcomes of the GEF EEP. However, the country is currently facing a political crisis and this situation is likely to hamper REGIDESO's efforts to sustain the implementation of energy efficiency Unit. According to the Borrower's Project Completion Report, the Unit does not have its own operational budget nor a defined work program within REGIDESO. Moreover,

¹⁰ This effect means that some part of the energy saving does not occur because i) consumers add more lamps getting more light for the same money or ii) keep lamps on for longer time because it is more affordable.

the EE laws are still awaiting Cabinet approval and without their approval there is an important level of uncertainty on the continuity of the energy efficiency path initiated by the country. Finally, if approved, the new laws will require significant resources to implement and financing needs to be identified.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance(a) Bank Performance in Ensuring Quality at Entry Rating: Moderately Unsatisfactory

64. The Bank's performance during Project preparation is rated Moderately Unsatisfactory. The Bank designed a well-targeted Project that responded to real needs faced by the country at the time of Project appraisal. The Project was also in line with the country's development priorities, the Bank's strategy and goals in support of those development priorities as well as GEF priorities. However, the GEO was overly ambitious as it expected the adoption of key energy efficiency laws and regulations in a short timeframe and in a fragile political environment. In addition, it should be noted that a key risk – the capacity of the PIU to implement the Project - was underestimated, which resulted in delays in Project implementation. The design of the M&E system also had some minor deficiencies. The targets for two intermediate indicators (i.e., the completion of design of selected investment packages to implement audit recommendations, and the completion of energy audits) could have been better measured by the number of interventions and not by 'Yes' or 'No' as was the case.

(b) Quality of Supervision Rating: Moderately Unsatisfactory

65. This rating reflects the fact that Bank supervision during the first two years of Project implementation was not as strong as needed. It should be highlighted that supervision of the Project was significantly strengthened during the third and last year of implementation when three missions and one videoconference were conducted by the Bank team, allowing the successful completion of key activities. During the last year of Project implementation the Bank assumed a more proactive role in supervision, establishing detailed targets and timetables for Project implementation and closely supervising their implementation even though during 2015 Bank missions to the country were restricted due to the political crisis.

66. This rating also takes into account the fact that the Project was not extended to allow the country more time to adopt the energy efficiency legislation, which, as mentioned above was one of the two key objectives of the Project.

(c) Justification of Rating for Overall Bank Performance Rating: Moderately Unsatisfactory

67. Based on the two moderately unsatisfactory ratings for quality at entry and supervision, respectively, overall Bank performance is rated Moderately Unsatisfactory.

5.2 Borrower Performance(a) Government PerformanceRating: Moderately Satisfactory

68. The Government performance is assessed based on the performance by central government stakeholders of the Project, mainly the Ministry of Energy and Mines as head of the energy sector and the Council of Ministers responsible for the approval of key laws and regulations. Performance of the GoB is rated Moderately Satisfactory. This rating recognizes the efforts of the Ministry of Energy in supporting the energy efficiency measures proposed by the Project, including the establishment of an Energy Efficiency Unit at REGIDESO and the support to the energy efficiency policies and regulations developed under the Project but also reflects the delays by the Cabinet in approving those laws after receiving endorsement by the Ministry.

(b) Implementing Agency or Agencies Performance Rating: Moderately Satisfactory

69. The rating for the implementing agency is Moderately Satisfactory. This rating reflects the delays of the PIU at REGIDESO in the first year of Project implementation due to time and staff constraints as well as delays in M&E that only started once an M&E specialist was recruited during 2015.

70. Despite the weaknesses mentioned above, the rating also reflects the efforts of the PIU in accelerating the implementation of the key activities once the Project support coordinator was recruited. The PIU adequately handled its financial management, procurement and safeguard responsibilities as reflected in the satisfactory or moderately satisfactory ratings throughout Project implementation. The PIU also set up the Energy Efficiency Unit and provided capacity building and training to enhance their skills in carrying out their energy efficiency functions. The PIU completed most of the anticipated activities by Project closing, without extending the closing date or making any changes to the Project objectives, implementation arrangements or indicators.

(c) Justification of Rating for Overall Borrower Performance Rating: Moderately Satisfactory

71. The overall rating for Borrower performance is Moderately Satisfactory. In spite of the political difficulties and the initial weak performance of the utility, the Moderately Satisfactory rating recognizes the vast amount of work done by the PIU in a difficult political context. This allowed the completion of most project activities and the partial achievement of the GEO. The rating also reflects the delays in obtaining Cabinet approval for the laws and regulations for energy efficiency developed by the Project.

6. Lessons Learned

- 72. The main lessons learned include:
- *Positive impact of CFL campaigns of reducing suppressed demand.* The Project demonstrated the important impact that the replacement of incandescent bulbs by CFLs had on reducing the suppressed demand prevalent in the country. Estimates showed that 400,000 CFLs

distributed under the two campaigns were able to reduce up to 6 MW of generation capacity that was used to meet part of the estimated 10 MW suppressed demand, therefore avoiding the need to contract expensive emergency generation.

- *Realistic project objectives are needed especially in fragile states.* The Project set an overly ambitious objective aimed at developing and adopting key energy efficiency laws and regulations in a relatively short timeframe and in a politically fragile environment. Experience in similar projects in other countries show that the documentation (guidelines, policies and regulations) is developed, but their adoption usually takes time and sometimes it's uncertain because of the political agenda. The Burundi EEP further supports this evidence confirming the fact that setting ambitious objectives related to the adoption of regulation requiring political approval should be more realistically considered, either allowing more time or having less ambitious objectives.
- *Need for well-timed implementation capacity support.* The GEF grant set an ambitious Project implementation timeframe for the PIU at REGIDESO, while at the same time implementing other large energy sector projects and addressing other sector priorities. This situation delayed implementation. As soon as the PIU hired the implementation support consultant, the pace of implementation accelerated significantly. It is necessary to strengthen the PIU capacity from the beginning of Project implementation to avoid delays, especially in countries with low capacity such as Burundi. In retrospect, the Project implementation arrangements could have required the hiring of a GEF EEP support consultant during preparation of the GEF EEP or as an effectiveness condition, a lesson to bear in mind for future projects.
- Strong Bank supervision is essential in low capacity environments. Supervision of the Project was weak during the first two years of implementation and that was reflected in the slow pace of implementation. During the third and last year, Bank supervision was stepped up (with three missions and one VC), defining detailed activities and timelines to be implemented in a short timeframe, which resulted in an accelerated pace of implementation. This shows that strong Bank supervision plays a key role in the pace of implementation, especially in countries with low implementing capacity.
- Continuous awareness and sensitization campaigns are needed to maintain and consolidate advances in energy efficiency. The survey conducted towards the end of the Project showed that in order to ensure that the households that received the free CFLs would voluntarily purchase additional or replacement CFLs requires a continuous awareness campaign that reinforces their benefits.
- A combination of pre-paid meters and CFLs have more significant impact in reducing consumption and increasing awareness of the benefits of the CFLs. The end of the Project survey also showed that those households that received the free CFLs and had pre-payment electricity meters installed were more aware of the reduction in electricity consumption brought by the more efficient lighting than those that only received the free CFLs.
- *Continuous support from development partner is essential to ensure sustainability of outcomes.* The EEP initiated an important energy efficiency path for the country including the

distribution of CFLs for free but the sustainability of this path is not ensured without a continuous support from development partners. This is the case especially in fragile and poor countries where resources are limited and the sector demands are extensive. Without continuous support, the achievements reached by the Project have a substantial risk of not being maintained or expanded, even though the benefits are important. A follow-up GEF operation could maintain and expand the Project achievements including continuing the efficient lighting support with LED technology.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

73. Draft copies of this ICR were discussed and comments from the Borrower/Implementing Agency were received and included in this report.

74. A Borrower's Final Completion Report was received. It considers the results of the Project as moderately satisfactory. All the planned activities were implemented, however some of the activities could not be finalized by the Project closing date, especially the adoption of the energy efficiency law and regulations and the receipt of the demonstration equipment needed to provide the advisory support to the medium and large consumers. The biggest challenge is the sustainability of the achievements of the Project. Some of the studies were only received by Project closing, especially those related to the legal and regulatory regime for energy efficiency, after the budgets for the agencies in charge of implementing the recommendations have been adopted, which can result in delays in implementing key recommendations to promote energy efficiency. The delays can be explained by the large work program of the PIU, delays in energy efficiency capacity building to the PIU staff, delays in hiring the Project support coordinator, and the complexity of the studies.

75. The report raises concerns on the design of the M&E framework that did not allow sufficient time to adequately measure progress on certain activities, and the overestimation of some indicators, such as the energy savings target.¹¹

(b) Co-financiers

N/A

(c) Other partners and stakeholders (e.g. NGOs/private sector/civil society)

¹¹ Insufficient time for measuring indicators was a function of the delay in hiring the M&E specialist to assist REGIDESO monitoring indicators.

Annex 1. Project Costs and Financing

	(
Components	Appraisal Estimate (US\$)	Actual/Latest Estimate (US\$)	Percentage of Appraisal (%)
1(e) A. Distribution and promotion of CFLs	900,000	747,436	83 percent
1(e) B. Utility Energy Audit	147,000	394,537	268 percent
1(e) C. Promotion of EE investments to large consumers	590,000	334,839	57 percent
1(e) D. Project Management	181,182	335,002	185 percent
Special account balance		6,318	
Total Baseline Cost	1,818,182	1,818,131	100 percent
Total Project Costs	1,818,182	1,818,131	100 percent

(a) **Project Cost by Component (in USD Million equivalent)**

(b) Financing

Source of Funds	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
GEF	1.82	1.82	100

Annex 2. Outputs by Component

1. The achievement of the GEF components are summarized below.

Component 1(e) A: Distribution and promotion of Compact Fluorescent Lights (CFL): (estimate US\$900,000, final cost US\$747,436)

2. Sub-Component 1(e) A1: Distribution compact fluorescent lights (CFL) – this subcomponent successfully procured and distributed free of charge 200,000 CFLs of 20 watts in exchange for incandescent bulbs in Bujumbura, Gitega and Ngozi. It also collected 200,000 incandescent bulbs and stored them in secure containers at REGIDESO. The distribution of the CFLs also allowed to survey 49,389 households on their ownership of electric appliances. The results of the appliances survey are as follows: Irons: 34.77 percent; Refrigerators: 24.55 percent, TVs: 51.6 percent, Electric stoves: 1.19 percent, Microwaves: 1.82 percent.

3. Sub-Component 1(e) A2: Development and implementation of media communication and public awareness for energy efficient lights - a participatory media and awareness raising campaign similar to the one undertaken by the MSWEIP was completed. It included the following phases:

- Phase 1: Preparation of the communication materials;
- Phase 2: Implementation of the campaign;
- Phase 3: Organization of an Energy Efficiency national fair.

4. Sub-Component 1(e) A3: Technical and managerial capacity building – this activity was merged with 1(e) C1. This activity financed a series of workshops to raise awareness of government agencies (ministries, regulatory and inspection authorities), private sector players, and standardization institutes on energy efficient products and appliances, and to gather support for policy and regulatory reforms. It also acquire the demonstration equipment for the large and medium consumers for the sensitization campaign as well as the evaluation of the two phases of CFL distribution.

Component 1(e) B: Utility energy audit: (estimate US\$147,000, final cost US\$394,537)

5. This component financed the implementation of a program of activities aimed at supporting the application of results generated from the audit of energy consumption. It included the development of an action plan with short, medium, and long term objectives to prioritize energy efficiency investments, and the design of small investment packages for energy efficiency.

6. Medium and large consumers' energy audits were carried out in seven industrial companies, hospitals, government and social sector organizations. They allowed the collection of information and data for the preparation of the national energy efficiency action plan and to provide capacity building for the Energy Efficiency Unit staff at REGIDESO in carrying-out energy audits. It included three capacity building sessions, one of which was conducted in Tunisia. It should be noted that not all members of the Energy Efficiency Unit participated in all the training sessions, therefore their capacities to carry-out energy audits still need to be strengthened.

Component 1(e) C: Promotion of Energy Efficiency Investments to large consumers: (estimate US\$590,000, final cost US\$334,839)

7. Sub-Component 1(e) C1: Energy efficiency advice to large public institutions, commercial and industrial consumers - the Project financed technical assistance to promote energy efficiency technology and build local capacity to provide energy efficiency advice to large public institutions, private sector companies and the National Standardization Institute. It included a series of workshops intended to sensitize government institutions, private sector and the National Standardization Institute. It was undertaken with 1(e) A 3. This activity also included the delivery of local advisory services to large and medium size consumers, but due to lack of time before Project closing, the advisory services were not delivered. It is expected that the Energy Efficiency Unit will deliver these advisory services during the first semester of 2016.

8. Sub-Component 1(e) C2: Develop national guidelines for application of energy efficient technologies in new housing and commercial real-estate – this sub-component financed technical assistance to develop national guidelines for energy efficient technologies, including an evaluation of best practice international energy efficiency standards, labels, and technical specifications for energy efficient equipment and appliances for their application in Burundi. The final report was delivered and discussed with key stakeholders, endorsed by the Ministry of Energy and Mines, and is now awaiting Cabinet approval.

Component 1(e) D: Support to project management, monitoring and evaluation (estimate US\$181,182, final cost US\$335,002)

9. This component included support to Project coordination, management, M&E, and implementation of an energy efficiency unit in the REGIDESO PIU, preparation of financial audits and periodic evaluations. Under this component a project implementation support consultant was recruited. Also, an M&E consultant was hired towards the end of the Project to support the PIU in this area.

Annex 3. Economic Analysis

1. This annex provides an ex-post economic analysis of the subcomponents A1 and A2 under the GEF EEP in Burundi. These components include: the purchase and distribution (free of charge to the customer) of 200,000 CFL (subcomponent A1); and the development and implementation of a media communication and public awareness campaign for energy efficient lights (subcomponent A2). All the other project components are related to technical assistance for which an estimation of the economic benefits is difficult to determine under reasonable assumptions.

2. The Project was successfully able to purchase and distribute the 200,000 CFL by November 2015 at a total cost of US\$308,000; in addition, the promotion and distribution activities were also carried out satisfactorily at a cost of US\$339,436. Therefore, the total (actual) cost of the subcomponents under economic analysis was US\$647,436.

3. The economic analysis adopts a cost benefit framework to calculate the present value of the stream of net benefits derived from the project investments – the purchase, promotion, and distribution of 200,000 CFLs. The following benefits have been estimated: (i) generation savings resulting from the decrease in energy consumption; and (ii) decrease in suppressed demand as more capacity is made available. The main modelling assumptions for the benefits are presented in the table below.

Assumptions	Value	Unit	Note
Savings per CFL	58.4	kWh/yr.	Assumes a 4 hours use per day
Average CFL lifetime	5	years	
CFL yearly mortality rate	15	percent	Percentage of the installed lamps that break per year
Savings to generation reduction	50	percent	
Technical losses	20	%percent	
Marginal generation cost	120	US\$/MWh	Based on diesel power plant
Decrease in suppressed demand	50	percent	
Coefficient of simultaneity	0.9		
Average end-user tariff	9.0	US\$c/kWh	

4. Based on these assumptions, an estimation of the net economic benefits for the Project was prepared (see table below). The analysis shows the Project has a NPV of US\$2.7 million (at 6 percent discount rate) and an EIRR of 157 percent.

Table 1. Net economic benefit estimation	Table	1:	Net	economic	benefit	estimation
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Concept	0	1	2	3	4	5
Lamps	\$ (308,000)					
P&D costs	\$ (339,436)					
Increase in Demand		\$ 402,084	\$ 341,771	\$ 290,506	\$ 246,930	\$ 209,890
Generation Savings		\$ 714,816	\$ 607,594	\$ 516,455	\$ 438,986	\$ 373,138
NET SAVINGS	\$ (647,436)	\$ 1,116,900	\$ 949,365	\$ 806,960	\$ 685,916	\$ 583,029

5. Two sensitivities were prepare (as switch values) to estimate the Project's resilience to changes in the mortality rate of CFLs and on the marginal generation costs (assuming all savings translate into a reduction of power generation). The results show that the maximum CFL mortality rate that the Project would sustain is 65 percent (meaning that each year 65 percent of the CFLs break down) and that the minimum generation costs that would make the project feasible is 17 US\$/MWh. Both sensitivities show very good level of resilience to change in key benefit drivers.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Peggy Mischke	Energy Specialist	AFTEG	Task Team Leader
Deo Marcel Niyungeko	Senior Municipal Engineer	AFTU2	Task Team Leader
Vonjy Rakotondramanana	Energy Specialist	AFTEG	Energy
Sara Nso	Energy Analyst/JPO	AFTEG	Energy
Gayatri Kanungo	Consultant	AFTEN	Climate change
Anastasia Gnezditskaya	Climate Change Consultant	AFTEN	Climate Change
Jens Wirth	JPA	SEGEN	Safeguards
Ferdinand Bararuzunza	Economist	AFTP2	Economic analysis
Steffi Stallmeister	Senior Country Officer	AFTCTZ	Country context
Nneoma Veronica Nwogu	Counsel	LEGAF	Legal
Jean Paul Feno	Senior Environmental Specialist	AFTEN	Safeguards
Cheick A.T. Sagna	Senior Social Specialist	ASPEN	Safeguards
Melance Ndikumasabo	Procurement Specialist	AFTPR	Procurement
Bella Lelouma Diallo	Senior Finance Manager Specialist	AFTFM	FM
Jutta Kern	M&E Specialist	AFTDE	M&E
Aissatou Diallo	Senior Finance Officer	CTRFC	FM
Anta Loum Lo	Language Program Assistant	AFTEG	Team support
Clarette Rwagatore	Team Assistant	AFMBI	Team support
Supervision/ICR			
Vonjy Rakotondramanana	Senior Energy Specialist	GEE01	Task Team Leader
Deo Marcel Niyungeko	Senior W&S Specialist	GWASA	Energy
Kyran O´Sullivan	Lead Energy Economist	GEE07	Energy
Melance Ndikumasabo	Senior Procurement Specialist	GGO07	Procurement
Bella Lelouma Diallo	Senior Finance Manager Specialist	GGO25	FM
Christian Simbananiye	Financial Management Specialist	GGODR	FM
Pacifique Ndoricipima	Program Assistant	BPSAF	Team support
Martine Ndikumana	Program Assistant		Team support
Bernadette Tembo Milunga	Program Assistant	GEE01	Project Processing

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)		
	No. of staff weeks	USD Thousands (including travel and consultant costs)	
Lending			
Total:	10.63	25,060.43	
Supervision/ICR			
Total:	34.65	50,731.65	

Annex 5. Summary of Borrower's ICR and/or Comments on Draft ICR

1. A Borrower's Final Completion Report was received. It considers the results moderately satisfactory. Project implementation was conducted in accordance to the legal agreements regarding procurement, disbursement and financial management. All the planned activities were implemented however, some of the activities could not be finalized by Project closing, especially the receipt of the demonstration equipment needed to provide the advisory support to the medium and large consumers. The biggest challenge is the sustainability of the achievements of the Project. Some of the studies were only received by Project closing, especially those related to the legal and regulatory regime for energy efficiency, after the budgets for the agencies in charge of implementing the recommendations have been adopted which can result in delays in adopting key regulations to promote energy efficiency. The delays can be explained by the large work program of the PIU, delays in energy efficiency capacity building to the PIU staff, delays in hiring the Project support coordinator, the complexity of the studies, and limited interest of the market in supplying the requested goods which resulted in procurement delays.

2. The Borrower's report strongly recommends to integrate the Energy Efficiency Unit in the REGIDESO organigram for it to benefit from a work program and a budget allocation.

3. The report raises concerns on the design of the M&E framework that did not allow to adequately measure progress on certain activities, or the overestimation of some indicators, such as the energy savings target.

Annex 6. List of Supporting Documents

- Energy Efficiency Project Appraisal Document
- Energy Efficiency Project Legal Agreements
- Multi Sector Water and Electricity Infrastructure Project Appraisal Document
- Multi Sector Water and Electricity Infrastructure Legal Agreements
- ICR00002985
- ISRs
- Aide Memoires
- EEP Completion Report
- CFLs Survey Report
- EE draft laws and regulations

