Report Number: ICRR0024683

1. Project Data

Project ID P160699	**Project Name** Renewable Energy Fund	
Country Rwanda	**Practice Area(Lead)** Energy & Extractives	
L/C/TF Number(s) TF-A4969,TF-A4990	**Closing Date (Original)** 30-Sep-2023	**Total Project Cost (USD)** 48,940,000.00
Bank Approval Date 20-Jun-2017	**Closing Date (Actual)** 31-Dec-2024	

	IBRD/IDA (USD)	Grants (USD)
Original Commitment	0.00	48,940,000.00
Revised Commitment	0.00	48,940,000.00
Actual	0.00	48,940,000.00

Prepared by	Reviewed by	ICR Review Coordinator	Group
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2. Project Objectives and Components

a. Objectives

According to the Strategic Climate Fund Scaling-up Renewable Energy Program (SCF-SREP) Loan and Grant Agreements (p.6 in both agreements) dated July 7, 2017, and the Project Appraisal Document (PAD, p.22) the project development objective (PDO) was “to increase electricity access in Rwanda through off-grid technologies and facilitate private sector participation in renewable off-grid electrification”.

For assessing the project’s performance, the PDO is parsed as follows:

Objective 1: To increase electricity access in Rwanda through off-grid technologies,

Objective 2: To facilitate private sector participation in renewable off-grid electrification.

b. Were the project objectives/key associated outcome targets revised during implementation?

Yes

Did the Board approve the revised objectives/key associated outcome targets?

Yes

Date of Board Approval

27-Jun-2024

c. Will a split evaluation be undertaken?

Yes

d. Components

Rwanda Renewable Energy Fund (REF) consisted of two components:

1. Line of Credit and Direct Financing for Off-grid Electrification (Estimated Cost at Appraisal: US$45.94 million; Actual Cost at Closing: US$45.94 million). The component included four windows: **Window 1: Onlending through Savings and Credit Cooperatives (SACCOs) to households and micro-enterprises.** This window was to provide a wholesale line of credit to Development Bank of Rwanda (BRD) for onlending to SACCOs that comply with established eligibility criteria. SACCOs were to onlend the funds to eligible households and micro enterprises for purchasing Tier 1 and above solar systems. **Window 2: Onlending through banks (commercial and microfinance) to households and small and medium enterprises (SMEs).** This window was to provide a wholesale line of credit to BRD for onlending to eligible commercial banks and microfinance institutions, which were to extend sub-loans to households and SMEs for the purchase (and possibly, in the case of SMEs, distribution) of solar systems of Tier 1 and above access level. **Window 3: Direct financing of mini-grid developers.** This window was to provide direct financing to eligible mini-grid developers to finance up to 75 percent of the construction of renewable energy based mini-grid systems. **Window 4: Direct financing of locally registered Off-grid Solar Companies (OSCs) supporting Tier 1 or higher solar systems.** This window was to provide direct financing to eligible, locally registered OSCs offering Tier 1 and above solar home systems and ongoing maintenance services to their clients through delayed payment options. The Window 4 was to be activated after the completion of a detailed assessment of experience under Windows 1, 2, and 3 that was to be conducted one year after project effectiveness to inform the activation of Window 4.

2.Technical Assistance, Capacity Building, and Project Implementation Support (Estimated Cost at Appraisal: US$3 million; Actual Cost at Closing: US$3 million). This component was to provide the necessary technical assistance and capacity building on a need basis to BRD and participating entities (SACCOs, banks, and private companies engaged in off-grid electrification) as well as provide project implementation support to BRD as the host of REF.

Revised components: The project’s first restructuring introduced some changes in the components. These changes were: 1) introduction of a new window (Window 5) which was to establish a RBF providing partial grants facility to tackle the affordability gap through provision of subsidies for purchases of off-grid solar systems by low-income households; 2) opening of window 1 and window 2 to private sector participation and enterprises of any size; 3) improving the eligibility criteria for increased participation of financial intermediaries (SACCOs) and private sector companies to the credit line.

Please see Section 2.e. below for details of the restructurings.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project cost: The project cost was originally estimated at US$48.94 million. The actual cost at project closing was also US$48.94 million. The project funds were fully disbursed.

Financing: The estimated financing at appraisal was US$48.94 million which consisted of a loan (US$27.50 million) and a grant (US$21.44 million) from the Strategic Climate Fund- Scaling-up Renewable Energy Program (SCF-SREP). At closing, all project funds were disbursed.

Borrower contribution: At appraisal, no borrower contribution was foreseen, and none had materialized at closing.

Restructurings: The project had three level 2 restructurings:

Restructuring No.1 (May 19,2020): This restructuring established Results-Based Financing Window (Window 5) for Off-grid Solar Connections. This change was to address the affordability constraints with the provision of partial grants as subsidies for low-income households. Prior to this restructuring lack of affordability of Tier 1+ off-grid solar systems had been a key challenge for the scale and speed of distribution of off-grid technologies in the country. An Endev/Power Africa Pro-poor subsidy pilot scheme was used to design the RBF window, including a basic Eligibility Tool for subsidies which proved to be successful. Another change introduced by the first restructuring was the opening of Window 4 to off-grid solar companies serving the Government's Program for the Poorest Households. In addition, the restructuring clarified the eligibility criteria for SACCOs and beneficiary enterprises under Windows 1, 2, and 4. This change was to remove current limits to borrowing for suppliers of off-grid technologies and by removing current limitations to the size of OSCs eligible. The restructuring introduced following revisions in the results framework: 1) a new indicator was introduced to track disbursement under the window 5 ("Total result-based grant financing provided)", with an end-target of US$ 15 million); 2) targets for four of the intermediate results indicators were reduced; 3) targets for "Total funding onlent to off-grid solar companies" and "Total financing leveraged by the facility from private and other sources" were increased.

Restructuring No.2 (May 5, 2023): The project experienced some initial delays due to the protracted establishment of the Project Implementation Unit (PIU) at BRD, downward revision of the areas demarcated for off-grid electrification under the National Electrification Plan (NEP), revision of quality standards requirements and affordability constraints for off-grid Solar Home Systems (Second Restructuring Paper, p.3). As a result, this restructuring extended the Project closing date by 15 months from September 30, 2023 to December 31, 2024 to allow full utilization of the project funds.

Restructuring No.3 (June 27, 2024): This restructuring increased the target for PDO indicator #1 (the number people provided with new or improved electricity) from 1.8 million to 2 million due to the strong uptake driven by partial grants. On the other hand, the restructuring reduced the target for PDO indicator #2 (enterprise connections) from 27,500 to 2,500 due to the: (a) limited numbers of enterprises in the off-grid areas; (b) reduced coverage of areas designated for off-grid solutions under the National Electrification Policy 2021 (NEP); (c) low participation by the SACCOs and participating financial institutions (PFIs); and (d) non-implementation of mini-grids (ICR, p. 5).

Dates: The project was approved on June 20, 2017, and became effective on November 3, 2017. The mid-term review was conducted in November 2019. The project's original closing date was extended by 15 months from September 30, 2023 to December 31, 2024 at the second restructuring of the project. The project closed on December 31, 2024.

Justification for a split assessment of the project outcome: The ICR review implements a split rating since at the third restructuring, target for one of the PDO indicators (enterprise connections) was decreased while reducing the scope of the project.

3. Relevance of Objectives

Rationale

Country context: Rwanda's long-term development vision is to transform the country from a low-income, agriculture-based economy to a knowledge-based and service oriented, middle-income economy. Rwanda identifies energy supply as a key for sustainable growth and development. The Government of Rwanda (GoR) finds it essential to provide appropriate, reliable, and affordable energy supplies for all Rwandese in order to achieve middle-income status. With this perspective, the second of the five-year Economic Development and Poverty Reduction Strategies (EDPRSs) covering 2013-2018 intended to address the primary constraints to scaling up investment flows, including access, reliability, and cost of energy, limited generation capacity, low efficiency of electricity supply, low household demand, and affordability constraints. The country adopted a Rural Electrification Strategy (RES) in 2016 which assigned a significant role of 35-38 percent to off-grid electrification in achieving the 70 percent overall access target. The RES involved specific programs for enabling low-income households to access basic solar systems, establishing a risk mitigation facility to make solar products more affordable through the private sector, and facilitating private sector development of mini grids. In this context, the PDO of REF was well aligned with the country strategies and priorities since it supported establishment of a risk mitigation facility to make solar products more affordable through the private sector, addressed affordability to enable access of low-income households to basic solar systems and facilitation of private sector development of mini grids. The PDO was also aligned with the economic transformation pillar of the medium-term framework, the National Strategy for Transformation (2017-2024), which focused on leveraging the private sector, the knowledge economy, and natural resources to accelerate inclusive growth and jobs creation.

The World Bank strategy: At closing, the PDO remains aligned with the World Bank Group's Country Partnership Framework (CPF) for Rwanda for the period FY21-26. The third objective of the CPF "Expanded Access to Infrastructure and the Digital Economy" supports improved access to energy and efficiency and reliability of energy service delivery to households, businesses, and public institutions in Rwanda. The PDO was also aligned with the Bank Group's Energy Directions Paper which aimed to help client countries secure affordable, dependable, and sustainable energy supply needed to meet the Bank's twin goals of reducing poverty and improving prosperity.

Previous sector experience: The World Bank has been a major strategic partner in Rwanda's electricity sector development and actively supported development, implementation, and monitoring of the RES particularly. The REF was built on previous World Bank projects supporting electricity access expansion in Rwanda. These projects were: Electricity Access Scale-Up and Sector Wide Approach (eSWAp) Development Project (EASSDP, P111567), the Rwanda Electricity Sector Strengthening Project (RESSP, P150634), and the programmatic development policy operations (2017-2021). The projects supported increasing access for reliable and cost-effective electricity services in the country. The development policy operations supported sustainability of the utility company, regional integration, and energy access.

Overall, the PDO was well aligned with the priorities and the strategies of the GoR and the WB strategies. The PDO addressed increasing access and private sector participation in off-grid electrification through supporting implementation of the country's RES programs. The project was the first to support electricity access expansion specifically through off-grid access technologies (Meeting with the project team, October 31, 2025). In this context the PDO was consistent with progress overt time as compared with earlier projects. Based on this assessment the relevance of objectives is rated High.

Rating

High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective

To increase electricity access in Rwanda through off-grid technologies

Rationale

Theory of change: The project inputs were to be used to finance the project activities consisting of the following:

a) provision of lines of credit to local financial institutions through SACCOs, commercial banks and microfinance institutions; b) provision of direct loans to private companies engaged in off-grid electrification (mini-grid developers and potentially locally registered OSCs), and c) provision of partial grants through RBF for the off-grid solar connections. These activities were expected to lead to outputs of number of sub-loans and partial grants to households, sub-loans to micro, small, and medium enterprises and direct loans to mini grid developers and OSCs. These outputs were to result in outcomes of increased electricity access through off-grid technologies. In the longer term, increased electricity access would result in more reliable and affordable energy contributing to reducing poverty and shared prosperity.

The critical assumptions were that basic solar packages would be affordable for the low-income households and the availability of zones and clear expansion plans for mini grids. The PDO was clear. The casual links among activities, outputs and outcomes were direct and the results achieved were attributable to the activities implemented. Some of the activities and outputs (i.e. direct financing to OSCs and mini grid developers, lines of credit to SMEs for distribution of solar systems) also support objective 2.

Outputs:

- The activities implemented by market enablers covered 30 districts. Target (30 districts) was achieved.
- Outputs expected by the implementation of credit lines (Windows 1 and 2) did not yield anticipated results. Both windows underperformed. The ICR reports following reasons for underachievement: a) the commercial bank's cumbersome loan approval processes and stringent collateral requirements reflecting risk averseness despite the offer of risk mitigation measures; and b) building the capacity for SACCOs did not yield results within the life of the project. Following achievements could be reported:
    - **Onlending through SACCOs (Window 1):** During implementation of the project, 57 SACCOs took part in onlending activities while exceeding the target of 30 SACCOs. These SACCOs drew slightly over US$1.8 million of project funds (target was US$4 million). Total funding onlent by SACCOs to households and enterprises remained at US$ 366,717 (target: US$4 million). Share of total funding onlent by SACCOs to female applicants was 36 percent, exceeding the target of 30 percent. The average Non-performing loan (NPL) ratio of SACCOs portfolio was 7 percent by project closing. Target of 5 percent could not be achieved. Within the scope of the project, 68 SACCOs (target of 30 SACCOs exceeded) received training on managing credit lines, establishing partnerships with private sector and increasing awareness on off-grid technologies.
    - **Onlending through commercial banks (Window 2):** During the implementation of the project, 8 commercial banks participated in the project activities (target:10 commercial banks). Total funding drawdown by Banks from the facility was close to US$3 million. Target of US$8 million could not be achieved. Total funding onlent by Banks to households and enterprises was close to US$1.3 million. Target of US$8 million was not achieved. Female participants did not receive funding from the commercial banks. The average NPL ratio of Banks portfolio was calculated at 5 percent and achieved the target.
- The project provided 2,050,023 people with access to electricity by household connections (off-grid solar) while exceeding the original target of 1,695,000 people.
- By project closing total funding onlent to off-grid solar companies was US$6,021,089. Target of US$13.9 million could not be achieved. Average NPL ratio of off-grid companies was 4 percent (target: 5 percent)
- The project supported development of 7.40 MW of renewable energy generation capacity from solar home systems and exceeded the original target of 6.6 MW.
- Total result-based grant financing provided (new indicator introduced at the project's first restructuring) was US$35,328,715. The original target was US$15 million. Target was exceeded.
- Within the scope of the project 60 citizen engagement events (target:10 events) and 33 knowledge sharing events (target:10) were organized. These activities were organized under Component 2 of the project.

Other outputs reported in the ICR without any targets:

- The REF helped to build the BRD's institutional capacity through component 2 for implementing off-grid electrification projects. During the implementation, the BRD's performance improved significantly. BRD is now implementing several Bank supported projects across different sectors. The capacity building activities conducted under component 2 included advisory and consulting services for project implementation; development of a monitoring, evaluation and learning platform for the REF and pipeline development through a Deal Origination Agency Program for PFIs and OSCs to hire field agents to market their products; and training support for handling grievance redress mechanisms.

Outcomes:

- By project closing, 2,050,023 (1,067,383 female) people were provided with new or improved electricity service, exceeding the original target of 1,800,000 people. Target for the number of females served was: 936,000. Both targets were achieved.
- The number of enterprises provided with electricity was 2,516, remaining below the original target of 27,500 enterprises. The ICR reports following reasons for underachievement: i) the limited presence of enterprises in the off-grid areas; ii) the reduction in the area allocated for off-grid electrification under the NEP 2021; and iii) absence of a rigorous survey of the off-grid market which led to setting an overambitious target for this indicator.
- Target for annual electricity output from renewable energy was exceeded with an output of 13,522 MWh (Target: 13,000 MWh).

Other outcomes reported in the ICR without any targets:

- The BRD conducted a post monitoring exercise. The exercise revealed that most beneficiaries were satisfied with the project, with 61% reporting high or very high satisfaction and 85% being at least moderately satisfied. The ICR reports that the dissatisfaction mainly stemmed from the lack of after-sales services and unaddressed maintenance issues. Despite these challenges, based on interviews with a sample of beneficiaries, the BRD reported that the REF made notable improvements with respect to lighting, gender relations, security due to the provision of lighting, environmental conservation, increases in study time, reduced energy costs, and employment (solar system installers, sales agents, and customer support jobs).

Overall, despite the underperformance of the credit lines (Windows 1 and 2), through the strong performance of the RBF facility (Window 5), the project supported increasing electricity access by household connections using off-grid solutions. Target for one of the three outcome indicators (number of enterprises provided with electricity) could not be achieved.

Rating
Substantial

OBJECTIVE 1 REVISION 1

Revised Objective
To increase electricity access in Rwanda through off-grid technologies

Revised Rationale
Theory of change: The objective was not revised. The theory of change remained essentially the same. The third restructuring increased the target for PDO indicator #1 (the number of people provided with new or

improved electricity) and reduced the target for PDO indicator #2 (enterprise connections). Targets for some of the Intermediate Results Indicators (IRIs) were also revised.

Outputs:

- SACCOs drew US$1.819,939 of project funds, almost achieving the revised target of US$1,830,000. Total funding onlent by SACCOs to households and enterprises remained at US$366,717. The revised target of US$1,830,000 was not achieved.
- During the implementation of the project, eight commercial banks participated in the project activities and achieved the revised target of eight banks. Total funding drawdown by these banks from the facility was close to US$3 million, achieving the revised target of US$3 million. Total funding onlent by Banks to households and enterprises was close to US$1.3 million. The revised target of US$3 million was not achieved.
- By project closing total funding onlent to off-grid solar companies was US$6,021,089 (revised target: US$5 million). Target was achieved.
- The project provided 2,050,023 people with access to electricity by household connections (off-grid solar) while exceeding the revised target of 1,800,000 people.
- The project supported development of 7.40 MW of renewable energy generation capacity from solar home systems. The revised target was 8 MW. Target was almost achieved.
- Total result-based grant financing provided (new indicator introduced at the project's first restructuring) was US$35,328,715. The revised target was US$30 million. Target was achieved.

Outcomes:

- By project closing, 2,050,023 people were provided with new or improved electricity service, exceeding the revised target of 2,000,000 people. Target for the number of females served was 1,067,383 (Revised target: 1,040,000).
- The number of enterprises provided with electricity was 2,516, achieving the revised target of 2,500 enterprises.

Overall, the project achieved all three of its outcome targets.

Revised Rating
High

OBJECTIVE 2
Objective
To facilitate private sector participation in renewable off-grid electrification

Rationale
Theory of change: The project inputs were to be used to finance the project activities of provision of direct loans to mini-grid developers and locally registered OSCs. These activities were expected to lead to outputs of developed mini grids and new solar systems. These outputs were to result in outcomes of increased electricity access through off-grid technologies. In the longer term, increased electricity access would result in

more reliable and affordable energy contributing to reducing poverty and shared prosperity. The critical assumption was that the mini grids would be viable with provision of construction finance and operational subsidies by donors. The PDO was clear. The casual links among activities, outputs and outcomes were direct and the results achieved were attributable to the activities implemented, the activities under this objective support Objective 1 as well.

Outputs:

- By project closing total funding onlent to off-grid solar companies was US$6,021,089 (Original target: US$13.94 million). Target was not achieved. The average NPL ratio of off-grid solar companies' portfolio was 4 percent. Target was 5 percent. Target was achieved.
- Total financing leveraged by the facility from private and other sources reached US$111,374,215 and exceeded the original target of US$79 million.
- The activities in relation to mini grids were not implemented. Therefore, the targets of indicators identified for mini grids (Total funding direct lending by BRD to mini-grid developers, number of people provided with access to electricity by household connections through mini grids, renewable energy generation capacity in mini-grids constructed under the project) were not achieved. The ICR (p.5) reports that activities in relation to mini grids were not implemented due to following reasons including: high construction costs without the benefit of capital subsidies resulting in unaffordable electricity prices; the limited number of zones/villages allocated to mini grids under the NEP 2021; and uncertainty about grid expansion plans.

Outcomes:

- The leveraged private sector investment estimated at appraisal was US$41 million. The realized investment was US$54 million based on the new methodology adopted during the implementation. It can be reasonably concluded that the project contributed to leveraging private sector investment. However, the level of achievement is unclear since the target for this indicator defined at appraisal is no longer comparable with the actual achieved due to the change of methodology. The ICR (p. 8) reports that initially private sector investment was envisaged to include contributions by the PFIs and OSCs to the funds on-lent to final beneficiaries plus contributions by households and enterprises. During implementation, it was realized that the methodology excluded the upfront working capital used by the OSCs to purchase stocks of solar products. The methodology was, therefore, revised to incorporate this component in line with the approach used in similar projects.

Overall, the project contributed to participation of OSCs in renewable off-grid electrification. However, the level of achievement is unclear since the target for this indicator defined at appraisal is no longer comparable with the actual achieved due to the change of methodology. The activities in relation to mini-grids were not implemented.

Rating
Substantial

OBJECTIVE 2 REVISION 1

Revised Objective
To facilitate private sector participation in renewable off-grid electrification

Revised Rationale
Theory of Change: The objective did not change. The relevant PDO indicator and its target did not change either. The targets for two of the intermediate results indicators were revised.

Outputs:

- By project closing total funding onlent to off-grid solar companies was US$6,021,089 (revised target: US$5 million). Target was achieved.
- Total financing leveraged by the facility from private and other sources reached over US$111.374 million and exceeded the revised target of US$72 million.

All relevant PDO indicators and intermediate results indicators were achieved.

Revised Rating
High

OVERALL EFFICACY
Rationale
The efficacy of the first objective and the second objective are both rated as Substantial, the overall rating is therefore assessed as Substantial. The project contributed to overall increased access to electricity through off-grid technologies.

Overall Efficacy Rating
Substantial

OVERALL EFFICACY REVISION 1
Overall Efficacy Revision 1 Rationale
Under Revision 1, the overall efficacy is assessed also as High since both objectives 1 and 2 are rated as High.

Overall Efficacy Revision 1 Rating

High

5. Efficiency

Economic analysis:

Ex-ante: The economic analysis was conducted for Component 1 (all four windows) by taking costs and benefits of the project. Component 2 (technical assistance) was not taken into analysis since the economic benefits were difficult to quantify. The main economic benefits of the project for households and commercial enterprises were avoided costs of lower-quality electricity and lighting alternatives resulting from improved electricity access by switching from Tier 0 energy access to Tier 1-2 access. The net economic benefits were assessed over a 30-year horizon in line with the loan tenor offered by BRD to SACCOs, commercial banks, micro-financial institutions, mini-grid developers, and off-grid solar companies. The economic costs were system costs and battery replacement costs for Windows 1, 2, and 4, and mini-grid connection costs for Window 3. Since Window 5 was included in the project at the first restructuring, it was not part of the economic analysis conducted at appraisal. The analysis at appraisal accounted greenhouse gas (GHG) emissions only from large enterprises but excluded GHG from household connections. The net present value (NPV) at appraisal was estimated at US$83.1 million (US$84.8 million with GHG benefits from household connections) and economic internal rate of return was calculated as 35.3 percent (35.8 percent with GHG benefits from household connections). The NPV of benefits and costs was calculated using a discount rate of 6 percent at both appraisal and ICR stage. The expenditure on alternative lighting/charging was assumed to be US$2 per month.

Ex-post: The economic analysis at the ICR adopted the same cost-benefit methodology as the one implemented at appraisal. However, some revisions were introduced: The calculations at the ICR included costs and benefits associated with Window 5. In addition, it accounted GHG emission benefits from household connections which revealed to be significant by the Fifth National Census of Rwanda (2022). Lastly, the assumptions in relation to number of people gaining off-grid access, number of enterprise connections and average cost of the system under all four windows were updated. According to the ICR (p. 31) when GHG benefits from household connections were excluded from the economic analysis, the values at completion (NPV: US$62.1 million, EIRR: 23.3 percent) are lower compared to the estimates. The ICR explains this by the modest performance of the credit line and project financing windows (Window 1-4) which were originally assumed to support higher capacity systems and mini-grid connections, while the strong performance of Window 5 contributed to positive NPV and EIRR (ICR, p.31). When the GHG benefits from household connections are included, the ICR's economic analysis resulted in a significantly higher EIRR of 57.6 percent and an NPV of US$187.9 million.

Operational and administrative efficiency: The project did not experience significant operational or administrative inefficiencies. The project team identified the barrier for the uptake of solar systems at an early stage and introduced Window 5. The new window provided subsidies for purchase of off-grid solar systems by low-income households and thus addressed the affordability barrier. In addition, the revisions introduced through the restructurings including the extension of the implementation period allowed for realization of project outputs and outcomes and full utilization of funds.

Overall, the economic analysis conducted at closing resulted in higher EIRR and NPV compared to estimates made at appraisal when household GHG emissions are considered. The project did not experience any significant operational and administrative inefficiencies. Based on this assessment, the efficiency of the project is rated High.

Efficiency Rating

High

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	35.80	0 ☐ Not Applicable
ICR Estimate	✓	57.60	93.90 ☐ Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

As mentioned in section 2.e above, this ICR review will undertake a split assessment of the project outcome. The calculations are presented below:

Relevance PDO	High	
Efficacy PDO	**Original**	**Revision**
Objective 1	Substantial	High
Objective 2	Substantial	High
Overall Efficacy	Substantial	High
Efficiency	High	
Outcome Ratings	Satisfactory	Highly Satisfactory
Numerical value of the outcome ratings	5	6
Disbursement	US$42.85 million	US$6.09 million
Share of disbursement	87.5% (0.875)	12.5% (0.125)
Weighted value	4.375	0.75
Final outcome rating	4.375+0.75=5.125 (*) Satisfactory	

Based on the split evaluation, the ICRR rates the Project’s outcome as Satisfactory.

(*) When a split rating is applied, outcome ratings are assigned a numeric value from 6 (highly satisfactory) to 1 (highly unsatisfactory) as per Guidance Manual for Independent Evaluation Group Validators (May 2024). The numeric value of 5 corresponds to a Satisfactory rating.

a. Outcome Rating

Satisfactory

7. Risk to Development Outcome

Technical: The technical sustainability of the installed solar products constitutes one of the key risks. Beneficiaries of the project find the provision of after-sales services within and/or after the warranty period inadequate. Although the relevant authorities including BRD and chair of the off-grid steering committee-Ministry of Infrastructure have been taking measures to ensure provision of such services, this issue will require close monitoring and enforcement of compliance with the identified obligations. Financing of replacement of batteries is also a key risk since it is costly for low-income households and may require financial support.

Government ownership/commitment: This risk is low. The government is committed to increase access to electricity, and this intention is revelated in the relevant policy documents and strategies. In this regard, off-grid electrification is likely to remain a priority. The follow-up projects implemented by the WB such as Accelerating Sustainable and Clean Energy Access Transformation in AFE MPA (ASCENT - Rwanda) (P180575) and the Mission 300 agenda –a joint World Bank Group and African Development Bank initiative which aims to connect 300 million people to electricity in SSA using grid and off-grid technologies – support the implementation of this policy line.

8. Assessment of Bank Performance

a. Quality-at-Entry

The project was strategically relevant with the priorities and policies of the GoR. The PDO was also in line with the Bank's strategies. Regarding the technical, financial, and economic aspects, the project adopted an approach of providing designated credit lines for off-grid systems through financial intermediaries. Regarding addressing affordability and generating demand for SHS, the design at appraisal remained insufficient. The team addressed this barrier by introducing an RBF window at the first restructuring. The project's implementation arrangements were adequate. For Component 1, BRD was to function as a wholesale institution for Windows 1 and 2, as well as lend directly to mini-grid developers under Window 3 and locally registered OSCs under Window 4. BRD was to host the PIU and was to be responsible for monitoring indicators, supervising the credit lines and direct loans, and implementing the necessary technical assistance to the beneficiaries. The PIU in BRD was to also to manage TA and capacity building, conduct studies like impact assessments and beneficiary assessments, and preparation of annual audits. The ICR (p.16) reports that the lack of an upfront requirement for staffing key positions in the PIU resulted in substantial project implementation delays in the first 2 years of the project. Three risks were identified at appraisal, with an overall rating of

Substantial. All three risks (technical design of project risk, the institutional capacity for implementation and sustainability risk and sector strategies and policies risk) were rated substantial. Overall, risk assessment was thorough and candid and included relevant mitigation measures such as provision of capacity building and training to relevant market participants (SACCOS, BRD, private sector and OSCs) on managing credit lines, establishing partnerships with private sector and increasing awareness on off-grid technologies, training of the BRD FM staff on World Bank FM procedures. Monitoring and Evaluation (M&E) system had a few shortcomings (please see Section 9.a below).

Quality-at-Entry Rating

Satisfactory

b. Quality of supervision

The Bank conducted 19 implementation support missions during the seven years of project implementation. This enabled the Bank to provide robust progress assessments. The project benefited from skills mix of the project team which delivered coordination with the Finance Competitiveness and Innovation and Social Protection teams on finance markets and social targeting of subsidies. Although the Bank team leadership changed hands about five times, the consistency of supervision was achieved by retaining core team members in place during transitions (ICR, p.16). The Bank team worked closely with the client to resolve the implementation problems. The Bank team was proactive in addressing the project's critical issues, including restructuring the project to overcome affordability barrier and introducing a new window accordingly. The issues with the M&E system mentioned in the Quality at Entry section above were mostly resolved by the Bank Team's intervention during the implementation. Although not part of the RF, the number of household connections were tracked and used to calculate the number of people provided with new or improved electricity services. On the other hand, although activities on the mini-grids could not be implemented, these activities were not dropped. A more realistic target for enterprise connections could only be introduced at the third restructuring. The ICR (p.16) reports that such revision was not fully under the control of the Bank team because the SREP donors, who exercised an approval role on restructuring decisions, remained optimistic for a positive turnaround and, thus, preferred to retain the target until close to the completion of the project.

Quality of Supervision Rating

Highly Satisfactory

Overall Bank Performance Rating

Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The objectives were clearly specified. The PDO was assessed based on four PDO outcome indicators. These indicators were overall relevant and connected to the PDO. The third PDO indicator had shortcomings as mentioned in section 4. The M&E design involved 23 IRIs. These IRIs were mostly adequate and specific in capturing the impact of the activities and outputs towards achieving the project's objectives. The M&E design had a few shortcomings. These were: A clear analytic basis for setting a target for enterprise connections (second PDO indicator) was absent. An indicator to measure the number of expected household connections was not included in the results framework making the estimation of the number of people targeted for new or improved electricity services (first PDO indicator) incomprehensible. Lastly, a clear methodology for calculating leveraged private sector investment was not available. Monitoring of project implementation progress and results indicators, as well as progress toward achievement of the PDO, were the responsibility of BRD as well as participating entities (SACCOs, banks, and private companies engaged in off-grid electrification, mini-grid developers and OSCs). The PIU in the BRD was to collect data and reports from participating entities and present progress in achieving the key and intermediate indicators to the World Bank quarterly.

b. M&E Implementation

During the implementation, the PIU regularly prepared quarterly reports by tracking progress of PDO and intermediate results indicators. The ICR reports that some incompleteness and inaccuracies were observed in the data provided by the participating entities. A verification process was conducted for clarification and overcome this problem. The Bank conducted frequent supervisions (19 missions in 7 years) some of which were conducted virtually due to travel restrictions imposed by COVID-19. Most of the M&E design shortcomings mentioned above were addressed during the implementation. In this respect, although not part of the RF, the number of household connections was tracked and used to calculate the number of people provided with new or improved electricity services. In addition, the methodology for calculating leveraged private sector investment was updated during implementation.

c. M&E Utilization

The M&E findings were regularly reviewed by the project team and the PIU. The findings of the M&E were used to inform decision making and modify project implementation. The M&E framework enabled the project team to make adjustments to the implementation plan, depending on the status of physical progress. The project underwent its first restructuring as a result of the MTR and accordingly the Window 5 was included in the project design with an aim to speed up uptake of the solar systems under Component 1. The ICR (p.14) reports that in early 2023 the M&E arrangement for indicator "Enterprises provided with access to electricity" was found to be inadequate and was supplemented with verification calls to beneficiaries and implementation of a 100 percent post monitoring survey.

Although the M&E design had a few shortcomings, overall the M&E system was sound and supported the project team in assessing project performance and decision making.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

At appraisal, the project was classified as Category FI- Financial Intermediary Assessment. World Bank policies OP/BP 4.01 (Environmental Assessment), OP/BP 4.04 (Natural Habitats), OP/BP 4.11 (Physical Cultural Resources), and OP/BP 4.12 (Involuntary Resettlement) were the only safeguard policies triggered by the project in light of environmental and social risks from proposed activities. An Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF) were prepared in 2017. BRD had already a sound E&S system aligned with national regulations and increased its capacity by hiring additional experts during the implementation. Since activities related to mini grids were not implemented, RPF and related resettlement action plans were not implemented as well. The ESMF was implemented through establishing an environmental and social screening process, embedding risk mitigation into agreements, providing training, and monitoring compliance—particularly regarding e-waste disposal.

The Grievance Redress Mechanism (GRM) for the Project was functional at multiple levels including 26 district committees. Most complaints received through the GRM were concerning delays in delivery of systems and loan processing by SACCOs. All these complaints were resolved by project closing.

b. Fiduciary Compliance

Procurement: Procurement activities were conducted under Component 2 only. The limited capacity of PIU on Bank policies and procedures resulted in implementation delays during the first year of the project. The PIU was staffed with a procurement specialist 18 months after the effectiveness of the project. Despite this delay the procurement activities were completed and procurement performance improved over the implementation period.

Financial management: The PIU's financial management performance was adequate. The interim financial reports and unqualified reports were submitted on time except the reporting under COVID-19 pandemic in 2019. The ICR (p.15) reports that although some weaknesses were identified during an internal audit of the project activities, these were addressed in due course. The final external audit report was received by the World Bank and had unqualified opinion (Written response of the project team to IEG's questions, October 27, 2025).

c. Unintended impacts (Positive or Negative)

None.

d. Other

None.

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Highly Satisfactory	Satisfactory	ICRR rates both objectives as Substantial before restructuring.
Bank Performance	Highly Satisfactory	Satisfactory	Both the ICR and the ICRR rate Quality at Entry as Satisfactory and Quality of Supervision as Highly Satisfactory. As per Bank Guidance, these sub-ratings lead to an overall Bank Performance rating of Satisfactory.
Quality of M&E	Substantial	Substantial	
Quality of ICR	---	Substantial	

12. Lessons

The following lessons are from the ICR with some adaptation of language:

- **Identifying affordability constraints before the start of implementation can help designing tools to address this barrier and can contribute to achievement of increasing electricity access.** In the case of REF, an affordability assessment at appraisal confirmed that solar packages were affordable to off-grid households who spent about US$2/day on energy, but about two years after implementation started, it became evident that the more affluent households were already connected and that those unconnected were the poorest who needed subsidies. The flexible design of the project allowed the project team to restructure and add a new RBF window to deal with this challenge.
- **Using piloting while improving the design of the projects or implementation mechanisms can help development of effective solutions for the projects.** In the early years of implementation, original design of Component 1 remained ineffective. To improve project implementation and meet country needs an EnDev/Power Africa Pro-poor subsidy pilot scheme was used to design the RBF window, including a basic Eligibility Tool for subsidies. The piloting proved to be effective, and the new design contributed to the achievements of the project.
- **In order to ensure sustainability of the solar systems, designing payment milestones for RBF subsidies that are extended through warranty period can support continuity of provision of after sales services by OSCs.** This approach required OSCs to demonstrate their capacity to provide after-sales services and inclusion of after sales services obligations in their financing agreements. In addition, establishing systems for verification of status of customer’s solar system equipment and establishing communication channels for customers to report on issues or request service can help progression of the system.

- **In small low-income countries with limited populations distant from the national gird, including private sector development and operation of mini-grids in the projects for electricity access expansion may not lead to expected results.** In the context and small size of Rwanda, the potential sites for mini-grids were located within short distances from the grid. Although there was no certainty on the timing of grid expansion to these sites potential investors would have considered the risks of creating assets that could become stranded upon grid encroachment. These risks materialized with the policy changes which reduced the number of villages demarcated for mini grids in 2021.
- **Engaging with governments through a series of projects and analytical work to introduce solutions for increasing electricity access through continual learning from applications in the sector, other countries and region can help development of projects delivering expected results.** The REF has generated important lessons on affordability, sustainability, the design of pro-poor targeted subsidy schemes, and verification of results for RBF financing. These lessons have influenced the design of larger ongoing operations in Rwanda (EAQIP and ASCENT). In addition, it influenced other country operations in SSA including Liberia, Mozambique, Malawi, and Sierra Leone.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

The ICR provides a good overview of the project. It is candid in explaining the issues encountered at different phases of implementation. The report is concise and follows most of the guidelines. The report is mostly internally consistent. The ICR provides evidence based on the measurement of the indicators in the results framework. The ICR is to be especially commended for its clear discussion in the Lessons and Recommendations section which provided useful evidence for the future projects to be implemented on increasing electricity access in similar contexts as Rwanda. The ICR has a few shortcomings. The rating of the overall Bank Performance was not in line with the Bank Guidance. There was some missing information in the results framework regarding achievements with respect to intermediate results indicators on activities of SACCOs and commercial banks. These were completed/clarified during the meeting with the project team (dated October 31, 2025).

a. Quality of ICR Rating

Substantial