



## 1. Project Data

**Project ID**  
P160170

**Project Name**  
Niger Solar Electricity Access Project

**Country**  
Niger

**Practice Area(Lead)**  
Energy & Extractives

**L/C/TF Number(s)**  
IDA-60820,IDA-D1980

**Closing Date (Original)**  
31-Jan-2024

**Total Project Cost (USD)**  
49,482,730.22

**Bank Approval Date**  
07-Jun-2017

**Closing Date (Actual)**  
31-Dec-2024

	<b>IBRD/IDA (USD)</b>	<b>Grants (USD)</b>
Original Commitment	49,890,000.00	0.00
Revised Commitment	49,890,000.00	0.00
Actual	50,126,746.31	0.00

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## 2. Project Objectives and Components

### a. Objectives

The Original Project Development Objective (PDO) was “to increase access to electricity through solar energy in rural and peri-urban areas of the Republic of Niger.” (Financing Agreement, page 6). The PDO was phrased identically in the Project Appraisal Document (PAD) (PAD, page 19).

The Project’s PDO was not revised during implementation.



For the purposes of this Implementation Completion and Results Report (ICR) review, the PDO will be assessed as a whole rather than parsed into separate objectives.

**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**

20-Aug-2020

**c. Will a split evaluation be undertaken?**

No

**d. Components**

**1. Original components**

**Component 1: Market Development of Stand-alone Solar Systems (cost at appraisal: US\$7.0 million; actual amount at closure: US\$5.0 million)** aimed to pilot a credit line for high-quality stand-alone solar systems, with the intention to scale it up if successful and thereby support market development. The credit line would include: (i) commercial bank lending to solar companies (importers, wholesalers, retailers, installers, and service providers); and (ii) microfinance institution (MFI) lending to households and farmers. A commercial bank and up to two MFIs would be competitively selected in accordance with World Bank Policy on Financial Intermediary Lending (OP 10.00). Technical assistance (TA) would be provided to strengthen solar companies' capacity to access commercial financing. Supported systems would offer low tiers of electricity service - from basic lighting and phone charging (three Watts for four hours per day) to solar water pumping - and only high-quality certified systems would be eligible. A subsidy program for solar companies could also be considered.

**Component 2: Rural Electrification through Service-based Solar Hybrid Mini-grids (cost at appraisal: US\$10.0 million; actual amount at closure: US\$6.7 million)** aimed to finance investment grants and subsidies to increase electricity access in rural localities without near-term grid connection but with sizable, dense populations and significant economic activity. The component would support 2 MW of solar PV and associated hybrid mini-grid systems, providing 6,000 connections for households, community facilities, and productive users. Generation would combine battery-supported solar PV and thermal backup. Two approaches were planned: (i) a top-down approach prioritizing the largest population centers, using competitive bidding to select Public-Private Partnerships (PPPs) to build and operate the systems; and (ii) the bottom-up approach targeting smaller localities, competitively selecting unsolicited proposals to construct isolated hybrid mini-grids. Under both approaches, the Project would provide investment grants to reduce developer costs and end-user tariffs, and connection fees would be subsidized.

**Component 3: Solar PV Hybridization of Isolated Thermal Mini-grids and Expansion of Access (cost at appraisal: US\$25.0 million; actual amount at closure: US\$27.4 million)** aimed to support the hybridization of diesel-based, isolated grids in rural areas with solar PV generation and battery storage, thereby increasing service hours and expanding electricity access for households, agribusinesses, and



irrigation and drinking water pumping. The component would support four MW of solar PV, along with connection equipment and meters, to provide 7,500 new connections and increase service hours for 3,000 existing customers. Electrification in selected localities would rise from 20 to 75 percent, with service improving from 8-12 hours per day to 16 hours or more.

**Component 4: Implementation Support and Technical Assistance (cost at appraisal: US\$7.89 million; actual amount at closure: US\$8.1 million)** aimed to strengthen project management and implementation capacity of the Nigerien Agency for the Promotion of Rural Electrification (ANPER) and the Nigerien Electricity Society (NIGELEC). It included capacity building, TA to off-grid electrification stakeholders, and monitoring and evaluation (M&E). Support would be provided to the Project Implementation Units (PIUs) in the Ministry of Finance (MoF), ANPER, and NIGELEC; to government agencies, financial sector entities, and private distributors and operators; and to public awareness campaigns.

**Note on implementation arrangements:** The Project Coordination Unit (UCP) within ANPER, under the Ministry of Energy, oversaw implementation. Three Implementing Agencies were responsible for specific components: ANPER (Components 2, 4, and 5), the Directorate General of Financial Operations and Reforms (DGOFR) (Component 1), and NIGELEC (Component 3).

#### **Revised Components:**

**Component 5: Contingency Emergency Response Component (CERC) (US\$2.78 million)** was introduced following Restructuring 2 in August 2020 to support the COVID-19 response – mainly the electrification of priority health centers.

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

**Project Cost:** The appraisal estimate was US\$49.89 million, while the actual disbursement at closure was US\$48.19 million (ICR, page 13).

**Project Financing:** The Project was financed through an IDA credit (appraisal estimate: US\$45.55 million, actual disbursement at closure: US\$47.26 million) and an IDA grant (appraisal estimate: US\$4.34 million, actual disbursement at closure: US\$2.87 million). Total disbursement at closure was US\$48.19 million, leaving US\$1.7 million undisbursed. Of this amount, US\$1,075,538 was transferred to the World Bank's *Niger: Accelerating Electricity Access Project* (HASKÉ, approved in November, 2021) to complete outstanding tasks. The rest was returned to the World Bank.

**Borrower/Recipient (WAPP's) contribution:** There was no such contribution.

**Project Dates:** The Project was approved on June 7, 2017, and became effective on December 1, 2017. The mid-term review (MTR) was completed on January 20, 2020. The Project was restructured five times: (i) On June 11, 2018; (ii) on August 20, 2020; (iii) on August 31, 2022; (iv) on July 18, 2024; and (v) on November 4, 2024. The original closing date of January 31, 2024, was extended once for 11 months, and the Project closed on December 31, 2024.

#### **Restructurings:**



### **Restructuring 1 (June 11, 2018):**

- Reallocated funds across disbursement categories.

### **Restructuring 2 (August 20, 2020) involved significant scope reduction:**

- Reduced the scope of activities under Components 1 and 2 (stand-alone systems and hybrid mini-grids), with corresponding funding cuts, due to delays and the need to complete the Project within the remaining timeframe.
- Revised the Results Framework (RF) accordingly, lowering most targets, including for both PDO indicators:
  - “Beneficiaries of new or improved electricity service”: from 399,000 to 230,000 people;
  - “Generation capacity of energy constructed or rehabilitated”: from 9.5 Megawatts (MW) to 7.0 MW.
- Added the CERC component to support COVID-19 response.
- Reallocated funds across disbursement categories.

### **Restructuring 3 (August 31, 2022):**

- Reallocated funds across disbursement categories.
- Scaled down two Intermediate Results Indicator (IRIs) targets: “Number of households provided with electricity access from new solar mini-grid systems” and “Annual electricity output from mini-grids”.

### **Restructuring 4 (July 18, 2024):**

- Reallocated funds across disbursement categories.
- Made minor RF adjustments.

### **Restructuring 5 (November 4, 2024):**

- Extended the closing date by 11 months, from January 31, 2024, to December 31, 2024, to complete activities.
- Transferred some mini-grids activities to NIGELEC to streamline operations and enhance sustainability.
- Made minor RF adjustments.

**Split evaluation.** A split evaluation is applied, as there was a reduction in the Project’s scope and ambition during Restructuring 2 in August 2020.

## **3. Relevance of Objectives**

### **Rationale**



**Country and Sector Context.** At Project appraisal, Niger's electricity access rate was just 10 percent, far below the Sub-Saharan Africa average of 31 percent, and rural access was only one percent. While off-grid solutions could have helped, they were limited, and households were supplied by only 15 percent of the country's 5.2 MW of installed solar photovoltaic (PV) capacity. Most of this capacity consisted of stand-alone solar PV systems providing the lowest tiers of electricity service - up to four hours per day. The solar retail market was beginning to expand, driven by high demand and the presence of solar companies – including importers and installers - and MFIs. However, Banks and MFIs played a limited role in financing solar energy due to the high credit risks of small-scale independent solar businesses and the lack of long-term financing (over 12 months) needed given lengthy inventory cycles. Other barriers to market development were poor quality of the systems, maintenance issues, and an underdeveloped regulatory and legal framework. The World Bank's support aimed to address these obstacles and promote solar energy for rural and peri-urban communities historically underserved by the grid, improving living standards, and stimulating economic activity in some of Niger's poorest regions. (ICR, pages 1-2)

**Relevance to Government Strategies at closure.** The Project aligned with the Government of Niger's 2022-26 *Plan for Social and Economic Development* (PDES), which aims to drive a structural transformation of the economy, reducing energy costs, boosting industrial competitiveness, and supporting the development of the private sector - which requires expanding energy access. As part of its green growth strategy, the Plan supports RE expansion. The Project also aligned with the 2025 *Energy Sector Governance & Competitiveness Support Program* (PAGSEC), which aimed at raising national electricity access to 30 percent by 2026, leveraging agricultural demand as a key driver for rural electrification, and adding 240 MW of solar capacity by 2030 (including 50 MW by December 2026) (PDES 2022-26; PAGSEC 2025)

**Relevance to the WBG's Assistance Strategies at closure.** The Project aligned with the WBG's Country Partnership Framework (CPF) for FY2018-22, with was in effect at closure. Specifically, it aligned with *Pillar 1: Increased Rural Productivity and Incomes*, which supports improving access to energy (including electricity) in rural areas as a driver of productivity and economic growth and scaling up both on-grid and off-grid electrification - including solar and other RE solutions - to expand access to electricity for rural and underserved populations. (CPF FY2018-22)

**Previous sector experience.** The Project built on previous World Bank support to Niger's energy sector through the *Electricity Access Expansion Project* (P153743) and the experience of the EU/UNDP/GEF – financed 2014-16 solar electricity access pilot *PASE-Safo*. Lessons were also drawn from the World Bank's off-grid RE rural electrification initiatives in other countries, such as *Bangladesh Solar Home Systems Project* (P107906), *Ethiopia Electricity Network Reinforcement and Expansion Project* (P119893), *Kenya Household Energy and Universal Access Project* (P073036), *Mali Rural Electrification Hybrid System Project* (P131084), and *Senegal Electricity Services for Rural Areas* (P085708). (PAD, pages 26-28; ICR, page 2)

The PDO was aligned with the country's needs and government priorities, as well as with the WBG's assistant strategies at closure. The relevance of the PDO is rated as High.

## Rating

High



## 4. Achievement of Objectives (Efficacy)

### **OBJECTIVE 1**

#### **Objective**

To increase access to electricity through solar energy in rural and peri-urban areas of the Republic of Niger.

#### **Rationale**

A Theory of Change (ToC) was not included in the PAD, as it was not required at approval; it was developed for the ICR. It outlined the Project's activities, outputs, intermediate outcomes, PDO outcomes, and long-term impacts. To achieve the PDO, the Project supported the following activities: (i) market development of stand-alone solar systems; (ii) rural electrification through service-based solar hybrid mini-grids; (iii) solar PV hybridization of isolated thermal mini-grids; and (iv) implementation support and TA. Expected outputs included: (i) new renewable energy (RE) connections through stand-alone systems and mini-grids for households and productive users; (ii) additional RE generation; (iii) solar companies funded; (iv) credit lines established; and (v) solar pumps delivered to farmers. Intermediate outcomes included: (i) an expanded solar market; (ii) increased electricity access, (iii) expanded RE-based and hybrid generation; (iv) strengthened institutional capacity; and (v) enhanced availability of health services during COVID-19. The PDO outcome was increased access to electricity through solar energy in rural and peri-urban Niger. The ToC also identified critical assumptions: (i) political and social stability and continued government commitment; (ii) local community support; (iii) technical viability and cost-effectiveness of solar technologies for rural electrification; and (iv) adequate financing mechanisms to ensure affordability of solar systems.

Overall, the ToC is logical and clear and comprehensive. Its clarity could have been further strengthened by separating long-term outcomes (i.e., "improved agricultural productivity" and "enhanced economic activities") from intermediate outcomes and by consolidating intermediate outcomes across components.

The RF included two PDO indicators – PDO indicator 1: people provided with new or improved electricity service, and PDO indicator 2: new or rehabilitated generation capacity - and 16 IRIs. The IRIs covered new connections and increased service hours, provision of solar pumps to farmers, funding through credit lines and direct financing to solar companies, additional electricity generation, private operators managing solar mini-grids, and health centers electrified. The RF was well aligned with the clearly defined PDO and the ToC. It was technical, comprehensive, and clear, supporting efficient monitoring. The IRIs were linked to the PDO indicators: PDO indicator 1 was underpinned by several IRIs, while PDO indicator 2 underpinned three IRIs - on electricity generated (by stand-alone systems and mini-grids) and on extended service hours. Some IRIs monitored intermediate outcomes important for achieving the PDO, such as the volume of credit-line financing, the number of farmers acquiring solar pumps, the number of private operators managing solar mini-grids in rural areas, and average generation cost. Others measured outputs, including the number of solar companies financed, grievances addressed, and beneficiary feedback incorporated.

#### **IRI results:**

#### ***Market Development of Stand-alone Solar Systems:***



1. “Number of Lighting Africa-certified solar products sold” (baseline: zero, target: 100,000). The achievement was 14,174 products; the target was 14.1 percent (barely) achieved. This indicator measured the adoption of quality-verified off-grid solar systems. The shortfall was due to the availability of cheaper but inferior products from neighboring markets (such as Nigeria), low awareness of certified options, and logistical challenges due to the worsening security situation (ICR, page 12).

2. “People provided with electricity access from solar standalone systems (Number)” (baseline: zero, target: 300,000). The achievement was 98,518 people; the target was 32.8 percent (barely) achieved.

3. “Number of solar companies financed by the Project” (baseline: zero, target: 10). The achievement was 11 companies; the target was exceeded.

4. “Number of farmers acquiring solar pumps through solar companies financed by the Project”. The target was met (baseline: zero, target: 1,000). The achievement was 1,823 farmers; the target was exceeded. The ICR noted that this result not only represents a significant contribution to underserved regions but also is expected to have a transformative impact on agricultural productivity through solar-powered irrigation (ICR, page 13).

**5. “Volume of Project Funding: Line of Credit - Solar Energy Sector (households and enterprises) (US\$)”** (baseline: zero, target: US\$8,500,000). The achievement was US\$3,520,509; the target was 41.4 (partially) achieved. The indicator measured the financing that reached the beneficiaries (solar companies, households, and farmers) through the Project-financed credit line.

#### ***Rural Electrification through Service-based Solar Hybrid Mini-grids:***

1. “Number of households provided with electricity access from new solar mini-grid systems” (baseline: zero, target: 6,000). The achievement was 1,464 households; the target was 24.4 percent (barely) achieved. The gender specific sub-target (share of female-headed households) was reached.

**2. “Annual electricity output from renewable energy (service-based solar hybrid mini-grids) (Megawatt-hour per year (MWh/year))”** (baseline: zero, target: 3,300). The achievement was 902 MWh/year; the target was 27.3 percent (barely) achieved.

**3. “Number of private operators managing solar mini-grids in rural areas”** (baseline: zero, target: 10). This indicator was later removed due to the lack of progress. Regulatory delays and the absence of an enabling legal framework created uncertainty, leading private companies to hesitate to invest in or operate mini grids, and ultimately resulting in the transfer of this responsibility to NIGELEC.

#### ***Solar PV Hybridization of Isolated Thermal Mini-grids and Expansion of Access:***

1. “Households provided with new electricity access from solar hybridization of existing NIGELEC mini-grids” (baseline: zero, target: 7,500). The achievement was 19,283 people; the target was exceeded.

2. “Households provided with additional hours of electricity from solar hybridization of existing NIGELEC mini-grids” (baseline: zero, target: 3,000). The achievement was 3,473 people; the target was exceeded.



3. “Annual electricity output from renewable energy (MWh/year)” (baseline: zero, target: 12,700). The achievement was 14,775 people; the target was exceeded.

4. “Average electricity generation cost (US\$/kWh) of isolated grids in hybridized mini-grids” (baseline: US\$0.38/kWh, target: US\$0.24/kWh). The ICR noted that the PIU failed to monitor this indicator; therefore, this target is considered unmet (ICR, page 12).

5. “Number of productive users provided with electricity access from mini-grid systems” (baseline: zero, target: 675). The achievement was 177 people; the target was 26.2 percent (barely) achieved.

#### **Implementation Support and Technical Assistance:**

1. “Project-related grievances registered under the project grievance redress mechanism and addressed (%)” (baseline: zero, target: 100). The achievement was 100 percent; the target was reached.

2. “ANPER published reports on beneficiary feedback and how it has been incorporated in the Project (Yes/No)”. The target was not met.

#### **PDO results:**

1. “People provided with new or improved electricity service (Number)” (baseline: zero, target: 399,000). The achievement was 244,363 people; the target was 61.2 percent (partially) achieved. The gender specific sub-target (share of female beneficiaries) was reached.

2. “Generation capacity of energy constructed or rehabilitated (Megawatts (MW))” (baseline: zero, target: 9.5 MW). The achievement was 6.76 MW; the target was 71.2 percent (substantially) achieved.

**Overall**, the Original Project modestly achieved its PDO, as results were mixed. Although the PDO indicator targets were partially and substantially met, a closer look shows that this was primarily driven by strong performance in solar hybridization of existing isolated thermal mini-grids. In contrast, the IRIs related to stand-alone systems and solar mini-grids were barely achieved. Among intermediate outcomes not directly linked to the PDO indicators, some targets were exceeded (e.g., farmers acquiring solar pumps), some were partially met (e.g., financing reaching beneficiaries through the credit line), and others were barely achieved (e.g., sales of Lighting Africa–certified products).

#### **Non-RF results (ICR, pages 16-17):**

- **Policy.** The Project supported development of solar energy policies and regulations for scale-up and grid integration, and solar energy inclusion in the national electrification strategy.
- **Private sector mobilization.** The Project provided financial incentives through credit lines, increasing sales of high-quality solar products, and advocated for reduced import duties and value-added tax on solar products.
- **Institutional development.** The Project enhanced capacity of ANPER, ANERSOL, and NIGELEC through training on energy technologies, project management, and customer service; and enhanced collaboration among government, private sector, and local community stakeholders.
- **Gender.** The Project promoted women's economic empowerment by employing women-owned businesses and female agents to sell solar appliances, and training female business owners on using



modern energy to improve productivity. The project generated temporary and permanent jobs, 39 percent of which were filled by women.

- **Gender-based violence (GBV).** The Project integrated child protection and GBV codes of conduct into all staff contracts and monitored compliance. Procedures for addressing GBV were incorporated into the Grievance Redress Mechanism.

**Rating.** The efficacy rating for Original Project is Modest, as the Project barely met or did not meet several outcome targets. While PDO indicator 1 target was partially met, it was due to strong hybridization results, with negligible performance in stand-alone systems and solar mini-grids. PDO indicator 2 (new generation capacity) was substantially met, but its underlying IRIs on electricity produced showed mixed results: targets for hybridization were exceeded, whereas those for mini-grids were barely met. Several other important outcome-level IRIs were also barely achieved.

**Rating**  
Modest

## **OBJECTIVE 1 REVISION 1**

### **Revised Objective**

To increase access to electricity through solar energy in rural and peri-urban areas of the Republic of Niger (same as in the Original Project).

### **Revised Rationale**

Refer to the ToC discussion and the RF discussion under the Original Project.

### **IRI results:**

#### ***Market Development of Stand-alone Solar Systems:***

1. "Number of Lighting Africa-certified solar products sold" (baseline: zero, revised target: 50,000). The achievement was 14,174 products; the target was 28.1 percent (barely) achieved. See details under Original Project.
2. "People provided with electricity access from solar standalone systems (Number)". The target was met (baseline: zero, revised target: 150,000). The achievement was 98,518 people; the target was 65.7 percent (partially) achieved.
3. "Number of solar companies financed by the Project" (baseline: zero, target: 10). The achievement was 11 companies; the target was exceeded.
4. "Number of farmers acquiring solar pumps through solar companies financed by the Project". The target was met (baseline: zero, target: 1,000). The achievement was 1,823 farmers; the target was exceeded. See details under Original Project.



5. "Volume of Project Funding: Line of Credit - Solar Energy Sector (households and enterprises) (US\$)" (baseline: zero, revised target: US\$5,000,000). The achievement was US\$3,520,509; the target was 70.4 (substantially) achieved.

***Rural Electrification through Service-based Solar Hybrid Mini-grids:***

1. "Number of households provided with electricity access from new solar mini-grid systems" (baseline: zero, revised target: 1,700). The achievement was 1,464 households; the target was 86.1 percent (substantially) achieved. The gender specific sub-target (share of female-headed households) was reached.

2. "Annual electricity output from renewable energy (Megawatt-hour per year (MWh/year))" (baseline: zero, revised target: 1,000). The achievement was 902 MWh/year; the target was 90.2 percent (substantially) achieved.

***Solar PV Hybridization of Isolated Thermal Mini-grids and Expansion of Access:***

1. "Households provided with new electricity access from solar hybridization of existing NIGELEC mini-grids" (baseline: zero, target: 7,500). The achievement was 19,283 people; the target was exceeded. The gender specific sub-indicator (share of female-headed households) was not reported.

2. "Households provided with additional hours of electricity from solar hybridization of existing NIGELEC mini-grids" (baseline: zero, target: 3,000). The achievement was 3,473 people; the target was exceeded. The gender specific sub-indicator (share of female-headed households) was not reported.

3. "Annual electricity output from renewable energy" (baseline: zero, revised target: 10,700). The achievement was 14,775 people; the target was exceeded.

4. "Average electricity generation cost (US\$/kWh) of isolated grids in hybridized mini-grids" (baseline: US\$0.38/kWh, target: US\$0.24/kWh). The ICR noted that the PIU failed to monitor this indicator; therefore, the target is considered unmet (ICR, page 12).

5. "Number of productive users provided with electricity access from mini-grid systems" (baseline: zero, revised target: 500). The achievement was 177 people; the target was 35.4 percent (partially) achieved.

***Implementation Support and Technical Assistance:***

1. "Project-related grievances registered under the project grievance redress mechanism and addressed (%)" (baseline: zero, target: 100). The achievement was 100 percent; the target was reached.

2. "ANPER published reports on beneficiary feedback and how it has been incorporated in the Project (Yes/No)". The target was not met.

**PDO results:**

1. "People provided with new or improved electricity service (Number)" (baseline: zero, revised target: 230,000). The achievement was 244,363 people; the target was exceeded. The gender specific target (share of female beneficiaries) was reached.



2. “Generation capacity of energy constructed or rehabilitated (Megawatts (MW))” (baseline: zero, revised target: 7.0 MW. The achievement was 6.76 MW; the target was 96.6 percent (almost fully) achieved.

**Non-RF results (ICR, pages 16-17):**

- See under Original Project
- Following the introduction of CERC during Restructuring 2, 73 priority health centers were identified for electrification. All were electrified by Project closure, benefiting 1,184,772 people.

**Overall**, the Revised Project substantially achieved its PDO. The PDO indicator targets were exceeded and 96.6 percent (nearly fully) achieved, driven largely by strong performance in solar hybridization of existing isolated thermal mini-grids, while targets for other PDO indicator-related IRIs - for stand-alone systems and solar mini-grids - were met substantially or partially. Among intermediate outcomes not directly linked to PDO indicators, performance was generally strong: several IRI targets were exceeded or substantially met (e.g., farmers acquiring solar pumps and financing through credit lines). However, one outcome-level IRI - Lighting Africa-certified solar products sold - was barely achieved.

**Rating.** The efficacy rating for Revised Project is Substantial, as PDO targets were exceeded or almost fully met, and related IRIs were exceeded or met substantially or partially. Two other important IRI targets – farmers acquiring solar pumps and credit line financing – were exceeded and substantially met, while only one IRI—Lighting Africa—certified solar products sold - was barely achieved.

**Revised Rating**  
Substantial

**OVERALL EFFICACY**

**Rationale**

Efficacy is rated Modest. While the PDO indicator targets were partially and substantially met, these aggregated results mask divergent performance across the corresponding IRIs: targets were exceeded for solar hybridization of existing isolated thermal mini-grids but barely met for stand-alone systems and solar mini-grids. Other important outcome-level IRIs were also barely met.

**Overall Efficacy Rating**  
Modest

**Primary Reason**  
Low achievement

**OVERALL EFFICACY REVISION 1**  
Overall Efficacy Revision 1 Rationale



Efficacy is rated Substantial. Timely restructuring improved performance, with both PDO targets exceeded and most outcome-level IRIs exceeded or met substantially or partially. Only one IRI – Lighting Africa-certified sales – was barely achieved.

### **Overall Efficacy Revision 1 Rating**

Substantial

## **5. Efficiency**

### **a. Economic Analysis (PAD, pages 11, 103-116; ICR, pages 14, 45-46):**

A cost-benefit analysis (CBA) was conducted for Components 1, 2, and 3 at both appraisal and closure using comparable methodologies, with a 6-percent discount rate and a 20-year Project life. Economic benefits for previously unconnected consumers were calculated as avoided costs of: (i) diesel-powered water pumps (replaced by solar water pumps); (ii) lamps using dry cell batteries and kerosene, candles, and mobile phone chargers (replaced by solar lanterns and PV stand-alone home systems); (iii) electricity substitutes - batteries, kerosene, and candles, diesel engines; and (iv) diesel generation (due to hybridization of diesel generation with solar PV and batteries). While appraisal calculations were done both with and without GHG reduction benefits, these were not included at closure.

#### **I. Results of economic analysis at appraisal:**

- Component 1: NPV of US\$2.1 million and EIRR of 33.1 percent.
- Component 2: NPV of US\$1.5 million and ERR of 7.5 percent.
- Component 3: NPV of US\$10.4 million and ERR of 11.2 percent; with GHG reduction benefits, NPV increases to US\$11.2 million and EIRR to 11.5 percent.
- Project overall: an NPV is US\$12.5 million and an ERR of 10.2 percent; with GHG reduction benefits, EIRR rises to 10.9 percent.

#### **I. Results of economic analysis at closure:**

- Component 1: NPV of US\$1.65 million and EIRR of 28.2 percent (32.7 in annex 7),
- Component 2: NPV of US\$1.07 million and ERR of 5.1 percent (7.1 in annex 7)
- Component 3: NPV of US\$11.93 million and ERR of 11.7 percent
- Project's overall: NPV is US\$12.51 million (13.2 in annex 7), with an average ERR of 10.1 percent

**Overall**, NPVs were positive at both appraisal and closure, with total Project NPV nearly unchanged, indicating the expected value added was delivered. The overall Project EIRRs exceeded the opportunity cost of capital (i.e., the discount rate) at both stages, with slightly higher returns at appraisal, suggesting that the implementation was not least-cost overall, except Component 3, where the EIRR at closure exceeded appraisal due to higher than anticipated electricity output (ICR, page 14). The ICR also noted that GHG emissions avoided



over the economic life of installed systems were estimated at 243,000 tons at appraisal and at a higher level of 300,000 tons at closure.

**b. Administrative Efficiency (ICR, pages 13-14, 18-20, 24; PAD, pages 26-28, 32-33), Restructuring Paper (August 2020), page 5):**

The Project was well-structured, with a clear PDO and an RF that supported comprehensive monitoring of expected outcomes across Project components and activities, although initial targets were overambitious and later downscaled. It drew on lessons from off-grid RE rural electrification, including Niger's 2014-16 solar access initiative *PASE-Safo*, financed by EU/UNDP/GEF, and Bank projects, such as the *Bangladesh Solar Home Systems Project (P107906)*, *Ethiopia Electricity Network Reinforcement and Expansion Project (P119893)*, *Kenya Household Energy and Universal Access Project (P073036)* and *Mali Rural Electrification Hybrid System Project (P131084)*, and *Senegal Electricity Services for Rural Areas (P085708)*. Key risks – including security challenges, macroeconomic pressures, underdeveloped off-grid electrification policies, and the introduction of innovative technologies – were adequately mitigated through planned implementation flexibility, careful planning of concession scales, prior approval of policies essential for Component 2, and a learning-by-doing approach. Implementation benefited from a close engagement with government agencies, including during the instability following the 2023 coup d'état.

However, the Project was extended by 11 months while activities were scaled down due to both external factors and inefficiencies. External factors included COVID-19-related delays, supply chain disruptions, weak institutional and regulatory frameworks, financial sanctions on Niger by the Economic Community of West African States (ECOWAS), and security challenges - particularly in the Tillabery Region - which triggered *OP 7.30: Dealings with de Facto Governments* and froze disbursements.

Internal factors included a six-month gap between approval and effectiveness, delays in recruiting international consultants, and prolonged completion of critical technical studies. Later delays stemmed from underestimating the time required for implementing innovative activities in the energy sector in Niger, including technical document preparation, response to the bids, and deployment of rural electrification business model. Under Component 1, delays were caused by slow disbursement of credit lines by MFIs due to high upfront costs of quality solar systems, low household purchasing power, delayed awareness campaigns, price competition from low-quality counterfeit imports, and perceived high credit risk for solar small-scale developers. Also, recruitment of specialists, including a financial analyst, was delayed, leading to poor management of the Component 1 credit line. Under Component 2, public-private partnership arrangements were insufficiently defined at appraisal, creating uncertainties and bottlenecks. Weak coordination among implementing agencies also caused delays.

Despite the Project's well-structured design, hands-on implementation support, and timely Restructuring 2, the underestimated time requirements - given the country's capacity constraints - and multiple implementation issues that led to scaling down the Project, as well as the slightly lower EIRR at closure compared with appraisal result in an efficiency rating of Modest.

## Efficiency Rating

Modest



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	✓	10.20	84.20 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	10.10	78.30 <input type="checkbox"/> Not Applicable

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

## 6. Outcome

	Original Project:	Revision 1 Project:
Relevance of objectives	High	
Efficacy	Modest	Substantial
Efficiency	Modest	
Outcome	Moderately Unsatisfactory	Moderately Satisfactory
Outcome value	3	4
Amount disbursed, US\$ million	7.37	40.8
Disbursement percentage	15.3%	84.7%
Weight value	0.46	3.39
Total weight	3.85	
Overall outcome rating	Moderately Satisfactory	

The relevance of objectives is High, while efficacy is Modest for the Original Project and Substantial for the Revision 1 Project, and efficiency is Modest. Based on the shares of the disbursed funds before and after Restructuring 2 (US\$7.37 million or 15.3 percent and US\$40.8 million or 84.7 percent), the overall Project outcome rating is Satisfactory\* ( $0.153 \times 3 + 0.847 \times 4 = 3.85$ ).

\* Based on a six-point scale, where: 1 = Highly Unsatisfactory, 2 = Unsatisfactory, 3 = Moderately Unsatisfactory, 4 = Moderately Satisfactory, 5 = Satisfactory, and 6 = Highly Satisfactory.

a. **Outcome Rating**  
Moderately Satisfactory

## 7. Risk to Development Outcome

**Political.** The Project was affected by political instability and changes in government. Persistent security concerns continue to undermine foreign investment, constrain domestic production, and divert public



spending toward security. Political and governance risks remained at Project closure, though mitigated through close dialogue with government stakeholders to maintain collaboration. (ICR, page 32)

**Geopolitical.** Niger's recent withdrawal from ECOWAS introduces risks to the Project's development outcomes. As an ECOWAS member, Niger benefited from regional energy cooperation through the West African Power Pool (WAPP). Exiting the bloc may lead to trade limitations and disruptions of imports of solar equipment. This risk can be mitigated by prioritizing national energy self-sufficiency, pursuing partnerships outside ECOWAS, and alternative financing for rural electrification. (ICR, page 25)

**Policies.** Although the Project supported the development of sector strategies and policies for off-grid electrification, the process was only initiated, leaving limited strategic and policy direction and a weak regulatory framework, threatening the sustainability of outcomes. To mitigate this risk, the Project required the approval of a sector-wide Rural Electrification Implementation Framework (REIF), which clarified key policy elements such as differentiated off-grid tariffs, capital and connection subsidies, and financing mechanisms for rural electrification. (PAD, page 32)

**Institutional.** The institutions responsible for rural electrification were relatively new. ANPER had only recently become operational and had not previously implemented major rural electrification subprojects. O&M mechanisms were absent. Private sector small enterprises importing and selling standalone systems had limited experience with service-based models, such as solar water pumping. Financing institutions also had little experience with credit lines to solar companies. These risks were mitigated through TA and incentives. (PAD, p. 33) Additionally, the HASKE Project aimed at strengthening institutional capacity, sector coordination, and enabling environment for decentralized energy solutions. (ICR, page 25)

**Technical.** The Project introduced several innovative technologies and approaches. It was the first initiative in Niger to establish a financial intermediary scheme to provide a line of credit for the individual solar PV market. It also pioneered a bottom-up rural electrification approach for hybrid mini-grids based on private sector participation. To manage the associated risks, implementation relied on a learning-by-doing approach, flexible financing and TA arrangements, and a longer planned implementation timeline. (PAD, page 33)

## 8. Assessment of Bank Performance

### a. Quality-at-Entry

The Project was well structured, with a clear PDO, a comprehensive and technically sound RF, and robust M&E arrangements. Most risks were correctly identified, and the major ones - security conditions, macroeconomic pressures, underdeveloped off-grid electrification policies, and the introduction of innovative technologies – were mitigated at appraisal to the extent possible.

However, there were shortcomings. Sector diagnostics were not fully incorporated in the design due to delays in completing critical technical studies. The time and effort needed to implement innovative activities were underestimated given limited country capacity. This included TA to solar companies and financial institutions, awareness-raising campaigns, preparation of technical documents for procurement and market outreach, and rollout of the rural electrification business model. The readiness of the market for stand-alone systems was also overestimated, with insufficient consideration of low affordability, competition from low-quality counterfeits, and high perceived credit risk for solar projects. Under the mini-



grid component, public–private partnership arrangements were not clearly defined, later creating uncertainties and bottlenecks. These underestimations were reflected in overambitious RF targets. (ICR, pages 13-14, 19-20, 24)

### **Quality-at-Entry Rating**

Moderately Satisfactory

#### **b. Quality of supervision**

The ICR noted that the Bank team provided strong implementation support, characterized by proactive and consistent engagement and regular on-site supervision, with at least two missions per year. Supervision was strengthened by an in-country TTL and a locally hired energy specialist, enabling close oversight. The Bank demonstrated effective risk management and adaptability in navigating significant challenges, including COVID-19 and the political instability following the 2023 coup d'état, maintaining constructive dialogue with government counterparts and adjusting supervision strategies to address logistical constraints. The timely and effective Project restructuring in August 2020, which reduced scope, enabling the team to address emerging issues and keep progress on track to achieve the PDO. (ICR, pages ICR, pages 13-14, 19-20, 24-25)

Overall, Bank performance is rated as Satisfactory. Several shortcomings encountered at design were effectively addressed during implementation through timely restructurings and strong stakeholder engagement especially in an FCV context.

### **Quality of Supervision Rating**

Satisfactory

### **Overall Bank Performance Rating**

Satisfactory

## **9. M&E Design, Implementation, & Utilization**

### **a. M&E Design**

The RF at design was aligned with the clearly defined PDO and included time-bound, specific, objective, and Project-attributable indicators, most of which were quantitative with established baselines and targets. It was technical and comprehensive, adequately covering expected outcomes and outputs across activities. Some IRIs monitored critical intermediate outcomes – including credit line financing, farmers acquiring solar pumps, private operators managing solar mini-grids, and the cost of generation - while others measured outputs, such as the number of solar companies financed, grievances addressed, and beneficiary feedback incorporated in the Project. The IRIs were linked to the PDO indicators: they underpinned PDO indicator 1 (people provided with electricity), while PDO indicator 2 (generation capacity



constructed or rehabilitated) itself underpinned three IRIs - on electricity generated by stand-alone systems and mini-grids and extended hours of electricity service.

The ICR noted that the M&E system was well integrated into the implementation framework, ensuring systematic tracking of progress. ANPER oversaw M&E activities and prepared progress reports, while each implementing agency collected data for its respective activities and produced quarterly reports (ICR, page 21).

However, a shortcoming was that several indicator targets - including both PDO indicators - were overambitious given the country's capacity constraints and were reduced during implementation.

## **b. M&E Implementation**

M&E implementation was carried out as planned, with regular reporting through 15 ISRs. Local staff received training in data collection and monitoring, and institutional capacity was strengthened. M&E specialists were hired to support reporting and coordinate performance discussions, ensuring timely implementation adjustments. Major revisions occurred during Restructuring 2, when several RF targets were scaled back and one IRI—the number of private operators managing solar mini-grids—was dropped due to regulatory delays and the lack of an enabling framework. (ICR, page 21)

Some shortcomings are noted: the PIU failed to monitor the outcome level IRI on average electricity generation cost, and two gender-specific sub-indicators were not monitored because mechanisms for collecting and analyzing sex-disaggregated data were insufficiently robust (ICR, page 22).

## **c. M&E Utilization**

The ICR noted that the M&E system played a critical role in implementation, enabling regular monitoring of core results and generating evidence on Project progress. This data-driven approach supported evidence-based decisions, enabling response to implementation challenges and providing real-time insights for adaptive management. (ICR, page 22)

The quality of M&E is rated Substantial. The M&E design, implementation, and utilization were adequate, despite some noted shortcomings in design and implementation.

### **M&E Quality Rating**

Substantial

## **10. Other Issues**

### **a. Safeguards**

**Environmental and Social (E&S) Safeguards.** At appraisal, the Project was classified as Environmental Category B (Partial Assessment), triggering four safeguards policies: (i) OP/BP 4.01 Environmental Assessment; (ii) OP/BP 4.11 Physical Cultural Resources; and (iii) OP/BP 4.12 Involuntary Resettlement.



An Environmental and Social Management Framework (ESMF) was prepared, as well as Environmental and Social Management Plans (ESMPs) for specific Project components. A Resettlement Policy Framework (RPF) guided the preparation of Resettlement Action Plans (RAPs) during implementation. A Grievance Redress Mechanism (GRM) was put in place, with Grievance Redress Committees (GRCs) at various levels. The mechanism functioned well, with evidence that it was accessible and used, and all recorded complaints (fourteen) were properly addressed and resolved. The overall Project's safeguard compliance was rated satisfactory throughout implementation. (ICR, page 23)

## **b. Fiduciary Compliance**

**Financial management (FM).** The ICR noted that FM performance was overall adequate. The FM team consistently reviewed expenditures and documentation to ensure compliance with Bank policies, with strong oversight reflected in audited financial statements that provided detailed analyses of financial position, resource use, and adherence to accounting standards. Although disbursements were significantly delayed during the first half of implementation - only 34.4 percent by October 2021 - 97 percent of funds were ultimately disbursed by Project closure. Some shortcomings were noted in staff recruitment, as key posts such as the accountant and financial analyst remained vacant for extended periods; the absence of a financial analyst in particular weakened financial oversight and management of the Component 1 credit line. In addition, some external auditor recommendations—such as recruiting internal auditors and accountants—were not fully implemented, leading to delays and temporary payment suspensions. However, all audit reports were submitted on time except one, which was delivered a few weeks behind. No issues were raised except on proper filing of procurement documents, assigning asset numbers to project assets. FM ratings were Satisfactory in the final six ISRs. (ICR, page 24)

**Procurement.** The ICR noted that the Project faced significant procurement challenges throughout its implementation, with substantial delays in key activities, such as hiring an incubation company for off-grid solar developers and launching a communication campaign for stand-alone solar systems. The time needed to prepare technical procurement documents and elicit market responses to the bids was underestimated, and delays were exacerbated by a vacant PIU procurement specialist position and limited responses to international consultant recruitment due to security and complex requirements. However, these issues were eventually addressed by the PIU, following World Bank recommendations. Procurement ratings were Moderately Satisfactory in the last six ISRs. (ICR, pages 15-16)

## **c. Unintended impacts (Positive or Negative)**

There were no unintended impacts.

## **d. Other**

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## **11. Ratings**



Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Moderately Satisfactory	Moderately Satisfactory	
Bank Performance	Satisfactory	Satisfactory	There is no disagreement - the ICR also provided a Satisfactory rating, there is an error in the online system.
Quality of M&E	Substantial	Substantial	
Quality of ICR	---	Substantial	

## 12. Lessons

The following lessons were derived from the ICR (ICR, pages 25-26):

### 1. Financing mechanisms are vital for solar market development, but they need to be implemented with consideration for institutional capacity, market conditions, and consumer affordability.

The Project invested in developing a new market for stand-alone solar systems by piloting a credit line and building capacity for solar market actors. However, it focused primarily on access to finance for solar companies, while other parts of the system – including market dynamics and consumer preferences – received less attention. Although the expected results were not fully achieved, the effort demonstrated the catalytic impact of financial instruments and of improved capacity of local banks and MFIs to manage and deploy RE-focused credit lines. Project-supported businesses reported increased productivity, participating financial institutions noted improved knowledge and growing interest in adding solar products to their portfolios, and the government realized a significant return on its investment. Still, the MFI credit line was underutilized due to misalignment of the financing mechanisms, market conditions, and institutional capacity. While intended to improve access to finance for solar companies, the credit line was hindered by other barriers - such as the limited affordability of high-quality products for low-income customers and competition from cheaper counterfeit imports. Outcomes would have been stronger had the Project addressed broader systemic issues, such as regulatory gaps enabling counterfeit products and affordability challenges for target consumers.

### 2. In projects aiming at solar market development, comprehensive market assessments and active engagement with end-users help identify high-demand products and thus improve overall outcomes.

The Project significantly exceeded its expected result for providing solar pumps to farmers due to strong demand. While the target was to support 1,000 farmers in acquiring pumps through Project-financed solar companies, 1,823 farmers ultimately bought them. This uptake demonstrated robust interest in the agricultural sector, driven by enhanced productivity, reduced operational costs, and more cost-effective irrigation – factors that had not been fully anticipated due to a limited prior market knowledge. This positive experience highlights the importance of conducting comprehensive market assessments and engaging end-users early in future projects to ensure adequate focus on high-demand solutions – and to avoid misalignment with actual market needs.

### 3. Appropriate regulatory frameworks are essential for facilitating private sector participation in managing mini grids in rural areas.

The Project faced significant challenges in engaging private



operators, and the related RF indicator was eventually removed due to lack of progress. Regulatory delays and the absence of an enabling legal framework created uncertainty, limiting private sector interest and ultimately leading to the transfer of mini-grid management responsibilities to NIGELEC. This experience underscores the importance of supporting the development and enforcement of adequate regulations and carefully considering the regulatory environment when designing projects and setting targets.

### **13. Assessment Recommended?**

No

### **14. Comments on Quality of ICR**

The ICR provides comprehensive technical information and robust analysis on all main aspects of Project implementation, including relevance of objectives, efficacy, administrative efficiency, economic analysis, key factors affecting preparation and implementation, M&E, risk to development outcome, costs, and restructurings. It is internally consistent and clear, and the lessons learned are based on the ICR discussion and useful for similar projects. Minor shortcomings are: (i) split rating calculations should have included ratings for relevance of objectives and efficiency; and (ii) the safeguards section could have provided more information on implementation.

On balance, given the comprehensive information, strong analysis, and logical presentation, with only minor shortcomings, the quality of ICR is rated Substantial.

#### **a. Quality of ICR Rating** Substantial