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Report No: ICR00004639

IMPLEMENTATION COMPLETION AND RESULTS REPORT

TF-A1811

ON A

SMALL GRANT

IN THE AMOUNT OF USD1,000,000 MILLION

TO THE

Republic of Cabo Verde

FOR

Cabo Verde: Distributed Solar Energy Systems (SIDS DOCK) (P151979)  
June 28<sup>th</sup> 2019

Energy & Extractives Global Practice  
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## TABLE OF CONTENTS

<b>DATA SHEET .....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES.....</b>	<b>4</b>
<b>II. OUTCOME .....</b>	<b>11</b>
<b>III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME.....</b>	<b>13</b>
<b>IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME ..</b>	<b>14</b>
<b>V. LESSONS LEARNED AND RECOMMENDATIONS .....</b>	<b>16</b>
<b>ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS.....</b>	<b>17</b>
<b>ANNEX 2. PROJECT COST BY COMPONENT .....</b>	<b>21</b>
<b>ANNEX 3. RECIPIENT, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS.....</b>	<b>ERROR! BOOKMARK NOT DEFINED.</b>
<b>ANNEX 4. SUPPORTING DOCUMENTS (IF ANY) .....</b>	<b>22</b>

<b>Abbreviations</b>	
Cabo Verde Ministry of Tourism, Industry and Energy	MTIDE
Cape Verde Distributed Solar Energy Systems project	SIDS DOCK
Centro de Formação em Energias Renováveis e Manutenção Industrial	CERMI
Country Partnership Strategy	CPS
Energy Directorate	DGE
Gross domestic product	GDP
Heavy fuel oil	HFO
Independent power producer	IPP
Management Unit for Special Projects	UGPE
National Program for Energy Sustainability	PNSE
Plano Estratégico de Desenvolvimento Sustentavel	PEDS
Strategic Plan for Sustainable Development	PEDS
Supervisory control and data acquisition system	SCADA
Systemic Country Diagnostic	SCD
The Government of Cabo Verde	GOCV



**DATA SHEET**

**BASIC INFORMATION**

**Product Information**

Project ID	Project Name
P151979	Cabo Verde: Distributed Solar Energy Systems (SIDS DOCK)
Country	Financing Instrument
Cabo Verde	Investment Project Financing
Original EA Category	Revised EA Category

**Organizations**

Borrower	Implementing Agency
Republic of Cabo Verde	MTIDE, MTIDE

**Project Development Objective (PDO)**

Original PDO

The project development objective (PDO) is to increase the generation of solar renewable energy in Cabo Verde.

**FINANCING**

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
<b>Donor Financing</b>			
TF-A1811	1,000,000	1,000,000	875,825
<b>Total</b>	<b>1,000,000</b>	<b>1,000,000</b>	<b>875,825</b>
<b>Total Project Cost</b>	<b>1,000,000</b>	<b>1,000,000</b>	<b>875,825</b>



**KEY DATES**

Approval	Effectiveness	Original Closing	Actual Closing
28-Dec-2015	10-Feb-2016	31-Dec-2017	31-Dec-2018

**RESTRUCTURING AND/OR ADDITIONAL FINANCING**

Date(s)	Amount Disbursed (US\$M)	Key Revisions
22-Dec-2017	0.33	Change in Loan Closing Date(s)
21-Dec-2018	0.87	Reallocation between Disbursement Categories

**KEY RATINGS**

Outcome	Bank Performance	M&E Quality
Moderately Satisfactory	Moderately Satisfactory	Substantial

**RATINGS OF PROJECT PERFORMANCE IN ISRs**

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	07-Dec-2017	Moderately Satisfactory	Moderately Satisfactory	0.33
02	16-Oct-2018	Satisfactory	Satisfactory	0.59

**ADM STAFF**

Role	At Approval	At ICR
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## I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

### Context

1. **At the time of project approval in 2016, Cabo Verde was classified as a lower-middle-income country.** A small archipelago of ten islands located in the Atlantic Ocean about 500 km off the coast of Senegal, Cabo Verde had a population of about 500,000 and a gross domestic product (GDP) of US\$1.65 billion.
2. **For the last two decades, good governance, political stability, and sound economic management, including the responsible use of donor support and the adoption of effective social sector strategies, had produced a sustained growth.** The average GDP growth rate was 6 percent from 2000 through 2010, and per capita GDP grew from US\$1,215 to US\$3,323 during this period. However, the global financial crisis led to a recession and growth remained weak following this. GDP growth in 2015 was only 3 percent, with poor prospects for improvement. Cabo Verde's economy was closely tied to developments in Europe, the country's main trading partner, main donor, and main source of Foreign Direct Investment (FDI), remittances, and foreign deposits for the financial sector.
3. **The country's fiscal situation also deteriorated following the global financial crisis.** The government embarked on an ambitious public investment program in 2007, but this only provided modest returns. Expenditures were barely curbed in response to weaker than expected economic and revenue performance and double-digit deficits persisted, with public debt to GDP ratio exceeding 110 percent at the end of 2014.
4. **Cabo Verde's infrastructure and basic services had been insufficient to meet the demands and opportunities of a rapidly growing economy.** Cabo Verde had very limited natural resources and all fuel products had to be imported. More than 50 percent of the country's population was located in urban areas, where the level of social development was significantly higher than in rural areas. Infrequent and low rainfall, combined with lack of domestic sources of clean drinking water, has resulted in an ongoing water shortage in the country. More than 90 percent of the water injected into the public distribution network was coming from desalination units using electricity. In addition to issues of coastal erosion, climate change is projected to negatively impact local weather conditions, resulting in precipitation changes and increased water stress.

### Sector context

5. **Cabo Verde's grid-connected power generation in 2014 was 390 GWh.** Its installed capacity was 134 MW (thermal 99 MW, wind 28 MW, PV solar 7 MW). The ratio of annual generation to installed capacity was low due to the small size of each system. Even when the upgrade of distribution networks was completed on all the islands, Cabo Verde still had eight different power systems - one per island – that had to be operated and balanced independently. Until 2011, the country's energy needs were being met exclusively through imported petroleum production. At that time, the country had begun to develop renewable energy (RE) production, primarily wind power and solar photovoltaic (PV) generation sources providing around 20% of the national generation needs. Since then, no other significant RE power plants were installed. Tariffs in 2016 were around 0.26USD/kWh.



6. **Between 2000 and 2009, Cabo Verde made remarkable progress towards increasing access to electricity, which went from an access rate of 50% to over 95%.** The Government of Cabo Verde (GoCV) had a goal of achieving universal energy access by the end of 2017. However, the progress on access was not accompanied by sufficient investments in the infrastructure or by improvement in operation efficiency by ELECTRA (the national power utility). Generation was characterized by insufficient capacity, provided by antiquated and inefficient power plants, a situation made worse by the quasi cessation of preventive maintenance that the utility was no longer able to finance. In addition, antiquated and undersized distribution networks further contributed to high costs and low reliability. Besides, in 2016 electricity losses were very high at 27%.
7. **In response to this challenge, the GOCV embarked on a comprehensive recovery and reform plan for the sector with the support of several development partners, including IBRD.** Key investments to modernize the sector included the modernization of thermal generation (more efficient and larger plants, substitution of diesel by heavy fuel oil – HFO), the expansion of renewable generation capacity, and an upgrade of distribution networks as well as a loss reduction plan including a revenue protection program financed by IBRD.
8. **With these investments, Cabo Verde did not need to further expand thermal generation for the medium term.** Electricity demand growth had slowed to below 5 percent. The slower rate in electricity demand growth was attributed to the already high rate of access to electricity (approaching 100 percent) and average GDP growth also slowing significantly after 2008. Electra’s focus was therefore turning to maintenance of existing generation assets, more efficient operation, and the integration of intermittent renewable generation.
9. **In 2011, wind power was by far the most economic option for utility scale renewable generation in Cabo Verde and PV was suitable for off-grid and distributed generation.** In January 2011, the country passed a law on Promotion and Incentives for the Use of Renewable Energy (n.1/2011), which established a framework for renewable micro-generation. The legislation created a simplified “micro-generation” regime applicable to renewable generation facilities up to 100kW of capacity. At the time of project appraisal, two experimental micro-grids were in operation (Vale da Costa Project, with 22kW in solar PV and an additional 15 KW in wind power, and Monte Trigo with approximately 30kW in solar PV capacity). In addition, a few large rooftop PV systems were operating in Praia. These rooftop systems were operating at a capacity between 10-30kW, and were connected to the main grid. These systems were demonstrating the use of renewable generation for grid-connected buildings, but they had not been installed through an optimized design to maximize their profitability. Scaling-up distributed solar systems therefore required further demonstration of their financial viability, as well as reduced equipment and installation costs as well as improved maintenance. Technical regulations and financing incentives for distributed generation were also required to provide the necessary legal framework to attract investments and implement this type of technologies.

#### Rationale for World Bank assistance

10. **A previous WB energy Project in Cabo Verde (the Recovery and Reform of the Electricity Sector Project – P115464 – closed on March 30, 2018) focused, inter alia, on the expansion of electric power generation in the islands of Sao Vicente and Santiago.** It was decided at the time of appraisal to complement the RRESP project with a pilot trust fund focusing exclusively on the generation of solar energy. The Distributed Solar Energy Systems (SIDS DOCK) Project was therefore approved as part of an initiative to support the GOCV to adapt to a rapidly changing environment of renewable energy technology in order to test and develop renewable energy sources, in particular solar energy.



11. **Developing renewable energy sources such as solar PV would contribute to macroeconomic and fiscal stability by reducing both the cost of electricity generation and the exposure to petroleum price fluctuations.** In 2016, a quarter of the electricity generated in Cabo Verde came from renewable energy sources and the Government's intention is to increase this to over 50% by 2030. The Government of Cabo Verde had established in its Strategic Plan for Sustainable Development (PEDS) that energy security, price stability and reduction of the energy bills are central objectives operationalized through the National Program for Energy Sustainability (PNSE). Both PEDS and PNSE envision reaching a 54 percent penetration rate for renewable energy by 2030 and the installation of more than 150MWp of new solar PV projects.
12. **To achieve these goals significant investment and financial support would be required.** SIDS DOCK would provide support to demonstration investments on solar PV-based systems for distributed generation and the creation of the enabling environment for the private sector participation to scale up these systems.

### **Project relevance to high-level objectives**

13. **The project's objective and design are directly in line with the World Bank's Country Partnership Strategy (CPS) FY 15-17 for Cabo Verde at the time of appraisal and implementation.** The CPS identified the high cost and inadequate supply of electricity as one of the most important constraints to the economic development of the country, stressing the importance of the Bank's assistance to the GoCV in the infrastructure sector, especially in energy. The CPF's pillar II, on improving competitiveness and private sector development, included improved electricity sector performance as an outcome. Supporting renewable energy was cited as a way in which the WB will work towards reaching this outcome. The CPS also emphasized the importance of supporting the environmentally sustainable development path for Cabo Verde's predicted economic growth. The Country Partnership Framework (CPF) FY20-25, recognizes the support of the WB to promote of renewable energies in Cabo Verde to attract private sector investment supporting the Government of Cabo Verde achieving sustainable and inclusive private sector-led growth.
14. The Plano Nacional de Ação para as Energias Renováveis (PNAER), the national renewable energy plan, approved in 2015, aimed at the installation of 150 MW renewable energy by 2020. The Project was to support several actions identified in PNAER through the development of distributed micro-generation in public buildings.
15. The Programa Nacional para a Sustentabilidade Energética (PNSE), the sustainable energy plan of Cabo Verde, aims to accomplish the transition to a resilient, efficient and sustainable energy sector less dependent on fossil fuels. One of the main axes is to develop the renewable energy potential. The Strategic Plan for Sustainable Development (PEDS) 2017-2021, foresees to promote investments on renewable energies which will have a catalytic impact on the wider economy. Regarding distributed generation, the GoCV has established a target of 12MW of solar PV distributed generation systems (5% of the overall potential for this technology). This project contributed to the objectives of these recent national development strategies.

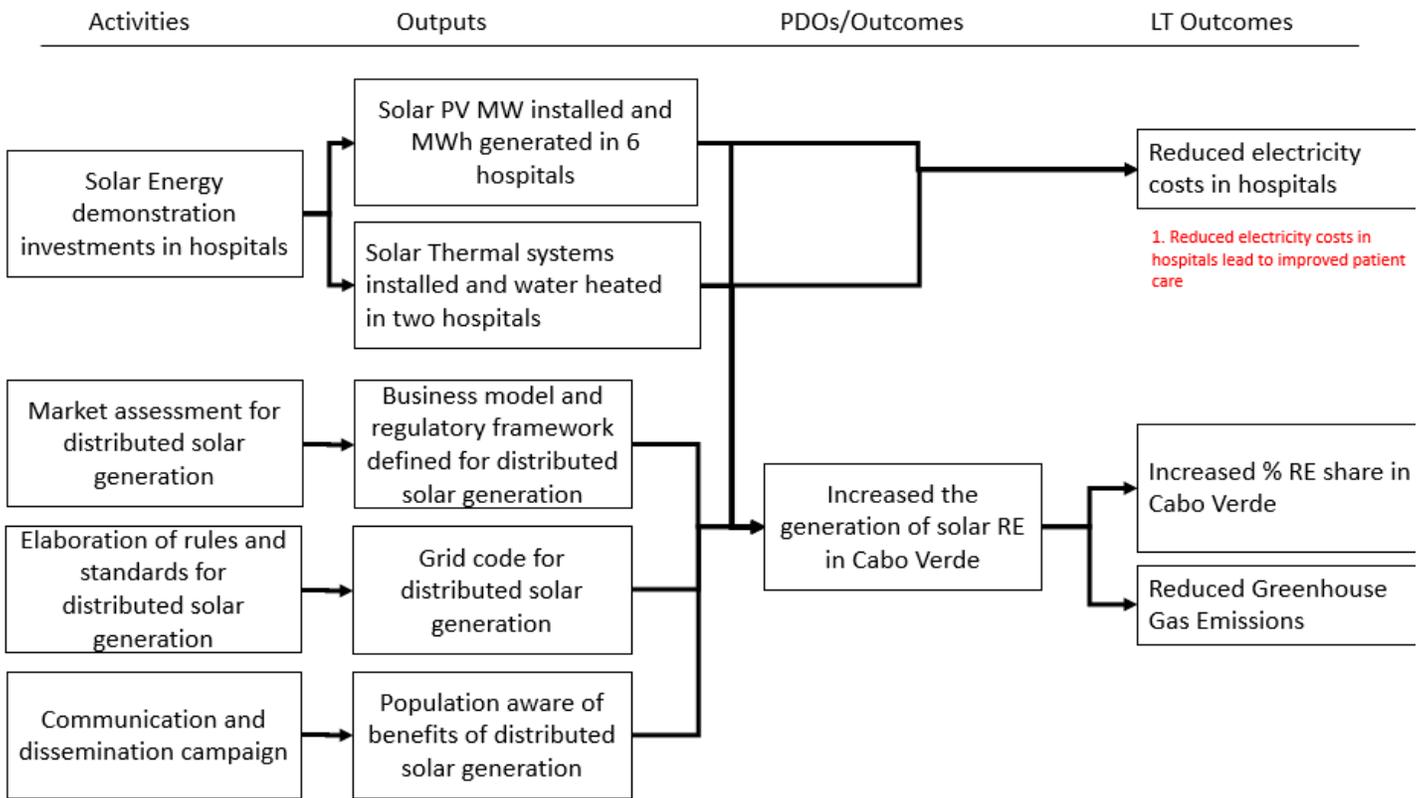
### **Theory of Change**

16. **The Project ultimately aimed to improve socio-economic development in Cabo Verde by increasing renewable energy as a share of the energy mix, reducing greenhouse gas emissions and reducing electricity costs for hospitals.** The theory of change underlying this development outcome follows four different paths that all feed



into the PDO of increasing solar PV generation in Cabo Verde. The demonstration investments in solar PV (acquisition and installation of solar panels and solar water heating for the selected hospitals) lead to an output of the installation of 300kW of solar PV in six hospitals and water heating equipment in two hospitals; which results in an outcome of 840,000 kWh of solar PV generated. The study of the market potential for rooftop solar PV for distributed generation in Cabo Verde, and the activities to improve the enabling regulatory framework, informed policy makers, suppliers, service provider, local banks, and potential users enhancing investment climate and serving as a catalyst for further investments in solar PV. Finally, the communication campaign has led to increased awareness of distributed solar PV amongst Cabo Verde’s population. All of these paths led to accomplishing the Project’s PDO of increased solar PV generation capacity in Cabo Verde. **Error! Reference source not found.** presents a results chain diagram to summarize the pathways by which increasing renewable energy infrastructure can contribute towards reaching the development outcomes.

Figure 1: SIDS DOCK theory of change



**Project Development Objectives (PDOs)**

17. The project development objective is to increase the generation of solar energy in Cabo Verde.



**Key Expected Outcomes and Outcome Indicators**

**18. Achievement of the PDO was to be assessed using the following PDO indicators:**

- i) solar energy generated (kWh); and
- ii) reduce greenhouse gas emissions (CO2 tons)

Both indicators were directly related because electricity generated through solar energy avoided the equivalent thermal electricity generation, thus decreasing greenhouse gas emissions. The intermediate results indicators are included in Table 1, an overview of the project indicators and targets.

Table 1: Project indicators and targets

	Core sector indicator	Unit of measure	Baseline	Target value <sup>1</sup>	Description
<b>PDO indicators</b>					
Solar energy generated		kWh	0	840,000	Solar energy generated from PV (rooftop systems to be equipped with meters) and solar water heating installed in the hospitals
Reduced greenhouse gas emissions		Tons CO2	0	609.0	Avoided Co2 emission reductions from demonstration investments in hospitals
<b>Intermediate results (component 1): demonstration investments</b>					
Generation capacity of renewable energy (other than hydropower) constructed under the Project	X	MW	0.2	0.3	Solar PV capacity installed in the hospital
Generation capacity of renewable energy constructed - solar	X	MW	0.2	0.3	Solar PV capacity installed in the hospitals
<b>Intermediate results (component 2): assessment of market potential and support to enabling framework for distributed solar generation</b>					
Market potential assessment study		Yes/No	No	Yes	Study to assess market potential for solar roofs in Cabo Verde
Regulatory framework study		Yes/No	No	Yes	Study to define conducive regulatory framework for the development of distributed energy
<b>Intermediate results (component 2): implementation support, communication, and dissemination</b>					
Feasibility studies		Number	0	5	Feasibility studies carried out for each hospital

**Components**

**Component 1: Demonstration Investments (original cost: US\$437,250; actual cost US\$396,154.37)**

19. **This component supported the installation of 300kW of solar PV and water heating equivalent in a minimum of three sites.** The project co-financed the initial investments on solar systems with the beneficiaries. As requested by the GOCV, the demonstration investments targeted regional hospitals at a minimum of three sites<sup>2</sup>

<sup>1</sup> The original project was assessed on an eighteen-month timeframe. With the implementation delays, the Project’s solar generation has only been operational since July 2018



as well as solar water heaters in at the main two hospitals in the country (Praia and Mindelo). This choice was justified by the following considerations:

- a) The electricity generated by the PV systems would come in substitution to existing electrical consumption and the generated heat from solar thermal systems would be used for water heating.
- b) Interest on the part of the beneficiaries: The Ministry for Health had had a long-standing interest in the use of renewable energy in order to reduce energy costs and improve quality and comfort for patients. In this sense, it was agreed that the hospitals would co-finance the investments.
- c) Relative ease of implementation and monitoring: targeting a small number of regional hospitals would facilitate implementation (reduced number of beneficiaries with staffing and capacity) and make possible adequate monitoring (existence of baseline for energy consumption) to define the business case and scale-up the model on distributed generation.

***Component 2: Assessment of market potential and support to enabling framework for distributed solar generation (original cost: US\$346,500; actual cost US\$83,921.15)***

**20. This component supported a comprehensive assessment of the market for rooftop solar panels and water heaters in the residential, commercial, and industrial sectors in Cabo Verde, and targeted technical assistance to the GOCV for the design and implementation of enabling regulations.**

- A) *Market potential assessment study*: the scope of this study included a review of the existing policies and regulations regarding the policy and regulatory framework for distributed solar, and a qualitative and quantitative market potential assessment by sub-segment. The assessment was informed by international experience and comparable markets, ensuring that the recommendations were appropriate for a small potential market and would not require excessive institutional implementation resources.
- B) *Supporting enabling regulations for distributed PV generation*: this task included a review and development of the necessary rules and standards to facilitate the development of distributed solar generation and technical assistance for their implementation. It informed the elaboration of a financing facility from the GoCV to reduce the interest rates of loans provided from commercial banks to install distributed generation. It also financed the finalization of the grid code, necessary to ensure adequate installation of distributed generation systems in the network.

***Component 3: Implementation support, communication, and dissemination (original cost: US\$216,250; actual cost: US\$243,961.18)***

**21. This component supported incremental expenses related to project implementation, including stakeholder engagement (consultants, workshops, and travel).** The component financed feasibility studies and elaboration of bidding documents for the six regional hospitals in Cabo Verde. The communication campaign portraying the results of the project was also financed by this component.

**B. Project costs**

**22. The project's final disbursement rate was 91%.** The final disbursement of the project was concluded in February 2019.



23. **The project had cost savings in two components.** In component 1, the costs of the PV systems dropped significantly during these years and were lower than initially planned (initially budgeted at 2.65USD/kW of PV without battery installed and it resulted at less than 2USD/kWh), which yielded savings of US\$220,000. These savings were used to co-finance the installation of the solar thermal systems, which were relatively more expensive. The GoCV obtained addition funds from the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) to finance 30 percent of the investment costs for the installation of two solar thermal systems for water heating in the two main hospitals of the country. The GoCV also provided \$132,000 on co-financing on behalf of the hospitals as part of the financing agreement for the installation of the PV systems. These two funding sources (GoCV and ECREEE) provided \$385,000 of co-financing to the Component 1 of the project, representing 49 percent of the component costs and 35 percent of total project financing at closing (see Table 2). In component 2, the costs of the market assessment were significantly less than anticipated. On June 7, 2018, the project received approval of fulfillment of the disbursement conditions to withdraw funds under category 2 of the grant agreement.

Table 2: Project costs

Project component	At appraisal			At closing		
	Project costs (US\$)	Grant financing (US\$)	% WB financing	Project costs (US\$)	Grant financing (US\$)	% WB financing
1) Demonstration investments	874,500	437,250	50%	781,154.37 <sup>1</sup>	528,433.68	51%
2) Market assessment and enabling environments	346,500	346,500	100%	83,921.15	83,921.15	100%
3) Implementation, communications	216,250	216,250	100%	243,961.18	345,729.04	100%
<b>Total project costs</b>	<b>1,437,250</b>	<b>1,000,000</b>	<b>70%</b>	<b>1,109,036.70</b>	<b>724,036.70</b>	<b>65%</b>

1) Cofinancing is comprised of US\$ 132,000 from ECREEE and \$253,000 from GoCV

## SIGNIFICANT CHANGES DURING IMPLEMENTATION

24. **The PDO remained unchanged throughout the project.** Two minor restructurings were processed, but the changes did not have any implication on the theory of change. The restructurings included:

- (i) **September 2017: an extension of the grant closing date was processed** for one year, from December 31, 2017 to December 31, 2018, to provide more time for the implementation of the demonstration investments; to allow for the (i) completion of demonstration investments under implementation; and (ii) completion of follow-on activities to promote distributed energy in Cabo Verde as well as communication campaign
- (ii) **December 21, 2018: a reallocation between disbursement categories was processed** to reallocate proceeds between the two disbursement categories. The project savings (on the solar PV systems and the solar market assessment) were reassigned to the investment category to finance the solar thermal systems in the two hospitals.



## II. OUTCOME

### A. Assessment of Relevance of PDOs

Rating: **Substantial**

25. **The Project's PDOs were directly in line with the World Bank's Country Partnership Strategy (CPS) FY 15-17 for Cabo Verde.** The CPS identified the high cost and inadequate supply of electricity as one of the most important constraints to the economic development of the country, stressing the importance of the Bank's assistance to the GoCV in the infrastructure sector, especially in energy. The CPF's pillar II, on improving competitiveness and private sector development, included improved electricity sector performance as an outcome. Supporting renewable energy was cited as a way in which the WB will work towards reaching this outcome. The CPS also emphasized the importance of supporting the environmentally sustainable development path for Cabo Verde's predicted economic growth.
26. **Improving the power sector in Cabo Verde is also emphasized in the 2018 Systemic Country Diagnostic (SCD), which is the precursor to a new CPF that is currently under preparation.** The SCD emphasizes how Cabo Verde has made important progress towards its policy commitment of 50 percent renewable energy by 2020, but that further scaling of renewable energy would require: procedures for renewable energy to access the grid, support for distributed generation, and the government's insufficient capacity to launch and supervise renewable energy IPP transactions.<sup>3</sup>
27. **In the Cabo Verde Strategic Plan for Sustainable Development 2017-21 (Plano Estratégico de Desenvolvimento Sustentavel, PEDS), the Government's priorities for the power sector are:** (i) carry out systematic planning of investments needed in all segments of the electricity supply chain to respond to demand as per the applicable standards on quality and reliability; (ii) reduce cost of electricity service provision and improve the commercial performance of ELECTRA; and (iii) increase the share of renewables in the energy mix. SID DOCKS contributed to each of these objectives, but most notably objective (iii) increasing the share of renewable energy.
28. The Project besides financing demonstration systems for distributed generation, also financed the technical assistance for legal and regulatory activities that informed the launch of a financial facility to support investments on distributed generation and finalized the grid code necessary to ensure appropriate installation of the systems.

### A. Achievement of PDO (Efficacy)

Rating: **Substantial**

29. **The project's objective was to increase solar energy generation in Cabo Verde.** The project installed a total capacity of 299.34 kW of solar PV systems in six hospitals (Agostinho Neto, Santiago Norte, Baptista de Sousa,

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<sup>3</sup> Systemic Country Diagnostic, "Republic of Cabo Verde: Adjusting the Development Model to Revive Growth and Strengthen Social Inclusion," World Bank Group, 2018, pg 45-46



Fogo, Santo Antão e Sal). The PDO target indicator was to install 300 kW, therefore this objective was achieved at 99%. The project additionally financed the installation of solar thermal systems in the two main hospitals of the country (Praia and Mindelo), totaling a capacity of heated water of 16 m<sup>3</sup> (or 16,000 liters). This investment increased the generation of solar energy although it was not part of the project indicators.

30. The PDO indicator target was calculated assuming that the system would be operational 18 months before project closing, however, the Project was only operational for 5 months prior to closing. For this reason, the indicator value at closing was far below the expected target (186 kWh against the target of 840 kWh, which is an achievement of 22%. At the time of the ICR (9 months of the systems operating), the average recorded monthly generation was 45.6 MWh per month. Taking into consideration this value, after 18 months of operation the systems are expected to yield 840 MWh which represents an achievement of 98%.
31. The same rationale is applied to the second PDO indicator, as the reduction of the greenhouse emissions are directly related to the electricity generation of the PV systems. Projected over 18 months, the Project has a total avoided CO<sub>2</sub> of 570 tonnes, 94 percent of the target indicator of 609 tonnes. The PDO target indicators and the results at project closing are displayed in Table 3.

Table 3: Actual and projected Project outcomes

	Target value	Result at project closing	% of target value achieved	After 18 months of operation (projected) <sup>4</sup>	% of target value achieved (projected)
Solar energy generated (kWh)	840,000	186,680	22%	840,000	98%
Reduced greenhouse gas emissions (tons CO <sub>2</sub> )	609.0	130	30%	530,000	94%

32. The intermediate indicator results are presented in table 4. All intermediate indicators were achieved or nearly achieved.

Table 4: Intermediate results indicator results

	Unit of measure	Baseline	Target value	Result at project closing	Comment
<b>Intermediate results (component 1): demonstration investments</b>					
Generation capacity of renewable energy (other than hydropower) constructed under the Project	MW	0.2	0.3	.29	Solar PV capacity installed in the hospitals
Generation capacity of renewable energy constructed - solar	MW	0.2	0.3	.29	Solar PV capacity installed in the hospitals
<b>Intermediate results (component 2): assessment of market potential and support to enabling framework for distributed solar generation</b>					
Market potential assessment study	Yes/No	No	Yes	Yes	Study to assess market potential for solar roofs in Cabo Verde

<sup>4</sup> Based on project generation data to date (see attached document 11 in Annex 4)



Regulatory framework study	Yes/No	No	Yes	Yes	Study to define conducive regulatory framework for the development of distributed energy
<b>Intermediate results (component 2): implementation support, communication, and dissemination</b>					
Feasibility studies	Number	0	5	Yes	Feasibility studies carried out for each hospital

### Overall Outcome Rating

33. **The overall outcome rating is Moderately Satisfactory.** The project is projected to almost meet its PDO indicators but required an extended timeframe for all the benefits to materialize due to implementation delays. The intermediate results indicators were all met in the timeframe of the project.
34. **Achieving these indicators has created the basic conditions for similar initiatives to be carried out and replicated in Cabo Verde.** For the project beneficiaries, the 6 regional hospitals who received additional installed solar PV capacity and thermal systems (for two of them), this pilot project has resulted in more reliable sources of electricity, with no black-outs, reduction of electricity bills and therefore more resources to be invested in health-related activities. For the country, the project enabled the Government of Cabo Verde (GoCV) to finalize the grid code allowing this type of technologies to be installed in the country and informed the approval of a financing support mechanism of the GoCV to new solar PV distributed generation systems to be installed in the country.

**The market assessment study is particularly relevant for the sustainable development of solar rooftops in the country,** as banks will be interested to understand demand/technical potential, taking into account technical constraints in order to ensure continued service quality.

## B. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

35. **The UGPE served as PIU, with full fiduciary responsibility and implemented the project satisfactorily.** Originally established in 1999 at the Ministry of Finance, the UGPE is not located in MTIDE and reports to DGE. The UGPE has developed a strong track record for executing donor-funded projects. The PIU was supported in implementing Components 1 and 2 by the Ministry of Energy, which assisted in defining the energy policy priorities related to distributed generation and monitoring the performance of the investments. The implementation arrangements established the roles and responsibilities of the PIU and Ministry of Energy. The organizational capacity and human resources available in the PIU were, in general, adequate. The project became effective with no delays and there were no fiduciary issues. The project was rated Environmental Assessment category C and no safeguard policies were triggered.

### Key factors during preparation

36. **Project preparation began on January 9<sup>th</sup>, 2015 and the project was approved 12 months later, on December 28<sup>th</sup>, 2015.** The Ministry of Energy lead the preparation of the project and the PIU was invited at the end of the preparation phase and detected discrepancies between the description of the activities



of the Project Paper and the Procurement Plan. The PIU harmonized these discrepancies and took full ownership of the project at the end of the preparation phase. In parallel, the Ministry of Energy replaced the Directorate of Energy creating a leadership vacuum and delayed responsiveness which affected the finalization of project preparation and delayed the initial stages of Project implementation.

### Key factors during implementation

37. **The project became effective on February 10<sup>th</sup>, 2016.** It would take seven months for the first distribution to be made, on September 16<sup>th</sup>, 2016. During the initial implementation phase, the project faced several delays due to a lack of readiness of the procurement activities and the difficulties encountered to engage the selected hospitals. This led to substantial delays in the implementation of the Project and the GoCV requested a 12-month extension of the project with a new closing date December 31, 2018. The revised implementation schedule for project completion agreed between the Bank and the Borrower, was fully implemented by the Borrower.
38. **The Project experienced delays following the change of Government in May 2016, which resulted in a restructuring of the public administration.** The DGE was restructured during implementation and downgraded to a Service Directorate of Energy, creating a temporary vacuum in the sector oversight for 12 months. As a result of the transition, the Ministry was slow to confirm the design of the project, specifically regarding the decision to install solar panels and solar water heaters for two of the six regional hospitals selected.
39. **Another reason for delays in project implementation was the fact that, despite initially being very interested in the project, hospitals became reluctant to sign MoUs with DGE for the implementation and co-financing of the projects.** The WB team responded by arranging for the Ministry of Finance request that the Ministry of Health cover the co-financing part of the hospitals, since the Ministry effectively pays electricity bills for the hospitals. Defining a technical solution for the cohabitation of solar PV panels and solar water heaters also slowed implementation, but this was eventually resolved with the completion of the technical and financial feasibility studies.

## C. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

### A. Quality of monitoring and evaluation

40. **The overall score for M&E design, implementation and utilization was substantial.** No theory of change was presented in the Project Paper, but the other aspects of M&E were adequate to track the project's impact. A simple results framework was included in Annex 1 of the Project Paper. Two ISRs were filed. Results monitoring was the responsibility of the implementing agency, the UGPE. An oversight was not including the solar water heater as part of the results framework.

### B. Environmental, Social, and Fiduciary Compliance



41. **The project did not trigger any safeguard policies and the project risk was rated low.** The project was rated category C for environmental assessment, as demonstration activities took place exclusively on a voluntary basis, without exceptions, and none of the activities involved involuntary resettlements. The UGPE had a satisfactory safeguard implementation record for two Bank energy projects as well as for project funded by JICA and AfDB.

### **C. Bank Performance**

42. **The Bank's performance was moderately satisfactory.**

43. **The Bank team provided sufficient and constructive oversight of the project to help ensure it reached its objective** Initial difficulties were encountered during project preparation, but the WB team responded to these and ensured there was adequate commitment from all key stakeholders for the project to succeed. For example, the June 2016 mission made site visits to some of the hospitals and highlighted important considerations, such as the need for co-financing amounts to be available before any payments could be made under the project. While a 12-month extension was required to complete the project's activities, all activities were carried out in a satisfactory manner. However, during the restructuring process, the Bank team could also revise the targets of the PDO indicators as it was already known the delays in the implementation.

### **D. Risk to development outcome**

44. **The risk to development outcome is moderate.** The operation and maintenance of the systems will ensure the achievement of the outcomes in the long term. All technical staff in the hospitals have been trained to carry out basic operations and preventive maintenance of the systems. Besides, given the positive financial impact of the systems, the directors and administrators of the hospitals are actively overseeing the good performance of the systems. At the national level, the GoCV is committed to develop distributed generation providing financial incentives and the regulator has passed the net metering regulation. These financial and regulatory developments provide the basis to further development of solar distributed generation systems in the country.

### **E. Justification of Overall Rating of Bank Performance**

45. **The overall Bank performance is moderately satisfactory.** The Bank team provided sufficient and constructive oversight of the project to help ensure it reached its objective. When implementation delays occurred, the Bank responded adequately to ensure that the project would reach its objectives. However, the team failed to revise the target of the PDO indicator when the delays on implementation were already acknowledged. Besides, the M&E could be improved because it only monitored outputs.



#### **D. LESSONS LEARNED AND RECOMMENDATIONS**

46. **Developing early engagement and commitments from all key project stakeholders is essential to smooth project implementation.** The health institutions were not participating to the project preparation phase and that caused delays in the provisions of the co-financing obligations to allow project implementation. This is partially due to the stakeholders lacking a complete understanding of the project. Once this was addressed, their level of commitment improved but implementation was finally delayed for around twelve months.
  
47. **The project has created the conditions for this pilot project to be scaled-up further.** With a grid code to approve distributed generation licenses, the regulations approved, an inventory of existing distributed generation systems and a financial mechanism to promote these investments, a foundation has been established for further investments in solar PV in Cabo Verde. However, communication and awareness raising is key to scale up these investments throughout the country well beyond the finalization of the demonstration project.



**ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS**

**A. RESULTS INDICATORS**

**A.1 PDO Indicators**

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Solar energy generated	Megawatt hour(MWh)	0.00	840.00	840.00	186.00
		30-Mar-2016	29-Dec-2017	30-Jun-2018	31-Dec-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Reduced greenhouse gas emissions	Metric ton	0.00	609.00	609.00	130.00
		30-Mar-2016	30-Mar-2016	30-Jun-2018	31-Dec-2018

Comments (achievements against targets):



**A.2 Intermediate Results Indicators**

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Generation Capacity of Renewable Energy (other than hydropower) constructed	Megawatt	0.00 30-Mar-2016	0.30 29-Dec-2017	0.30 30-Jun-2018	0.29 31-Dec-2018
Generation Capacity of Renewable Energy constructed-Solar	Megawatt	0.00 30-Mar-2016	0.20 29-Dec-2017	0.30 30-Jun-2018	0.29 31-Dec-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Market potential assessment study	Yes/No	N 30-Mar-2016	Y 29-Dec-2017	Y 30-Jun-2018	Y 31-Dec-2018

Comments (achievements against targets):

Indicator Name	Unit of	Baseline	Original Target	Formally Revised	Actual Achieved at
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	Measure			Target	Completion
Regulatory framework study	Yes/No	N	Y	Y	N
		30-Mar-2016	29-Dec-2017	30-Jun-2018	31-Dec-2018

Comments (achievements against targets):

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Feasibility studies	Number	0.00	5.00	5.00	6.00
		30-Mar-2016	29-Dec-2017	30-Jun-2018	31-Dec-2018

Comments (achievements against targets):



**B. ORGANIZATION OF THE ASSESSMENT OF THE PDO**

<b>Project Development Objective (PDO)</b> The project development objective is to increase the generation of solar energy in Cabo Verde	
Outcome indicators	<ol style="list-style-type: none"><li>1. Solar energy generated from PV and solar water heating installed in the hospitals. (kWh)</li><li>2. Reduced greenhouse gas emissions/ avoided CO2 emission (tons CO2)</li></ol>
Intermediate indicators	<ol style="list-style-type: none"><li>1. Generation capacity of renewable energy (other than hydropower) constructed under the Project (MW)</li><li>2. Generation capacity of renewable energy constructed – solar (MW)</li><li>3. Market potential assessment study (yes/no)</li><li>4. Regulatory framework study (yes/no)</li><li>5. Feasibility studies (number)</li></ol>
Key output by component	



**ANNEX 2. PROJECT COST BY COMPONENT**

<b>Components</b>	<b>Amount at Approval (US\$M)</b>	<b>Actual at Project Closing (US\$M)</b>	<b>Percentage of Approval (US\$M)</b>
Component 1: Demonstration investments	874,500	781,154	89%
Component 2: Market assessment and enabling environment	346,500	83,920.70	24%
Component 3: Implementation support, communication, dissemination	216,250	243,960.81	113%
<b>Total</b>	<b>1,437,250</b>	<b>1,109,037</b>	<b>77%</b>



### **ANNEX 3. SUPPORTING DOCUMENTS (IF ANY)**

#### **World Bank Project Documents**

1. SIDS DOCK Project Assessment Document (Report no. PP1458)
2. SIDS DOCK Restructuring Paper
3. SIDS DOCK Implementation Status Results Reports, sequence 1 and 2
4. SIDS DOCK Financial Agreement
5. SIDS DOCK - Project P151979 - Grant No. TFOA1811- Reallocation of Funds Request
6. SIDS DOCK - Project P151979 - Grant No. TFOA1811- Reallocation of Funds Approval
7. SIDS DOCK - Project P151979 - Grant No. TFOA1811- Fulfillment of Disbursement Condition Under Category (2) Request
8. SIDS DOCK - Project P151979 - Grant No. TFOA1811- Fulfillment of Disbursement Condition Under Category (2) Approval

#### **World Bank Cape Verde Country Documents**

9. World Bank Systemic Country Diagnostic for Cabo Verde 2018
10. World Bank Country Partnership Framework for Cabo Verde for FY15-17 report no. 92248-CV