

RESILIENT TOURISM AND BLUE ECONOMY DEVELOPMENT IN CABO VERDE

Study on opportunities for solar energy solutions in coastal infrastructure

Terms of Reference

1 Background and context

The Project “**Resilient Tourism and Blue Economy Development in Cabo Verde**” (RTBED), financed by the World Bank (WB) and the Government of Cabo Verde (GoCV), targets strategic interventions to support the economic recovery post COVID-19 pandemic by supporting investments, policies, and institutions that enable a resilient and sustainable recovery. The project supports the national strategies expressed under the umbrella of the Cabo Verde Vision 2030, notably the tourism and coastal zoning plans, tourism operational plan, the National Investment Plan for the Blue Economy (PNIEA in the Portuguese acronym), among others, fostering a conducive environment for more private and diversified investments to promote sustainable tourism and conservation of natural resources and cultural heritage with benefit to local communities.

Cabo Verde is committed to the global agenda of combating climate change, ratifying the Paris Agreement, in 2017, and submitting its updated National Determined Contribution (NDC), in 2021, with a long-term strategy towards an energy transition. The National Program for Energy Sustainability 2021-2026 (PNSE) reaffirms the goal of making the transition to a safe, efficient, and sustainable energy sector without dependence on fossil fuels, guaranteeing universal access and energy security and explicitly assumes the commitment to energy transition and decarbonization of the economy by 2050, in line with the NDC.

The commitments in the NDC are echoed in their recently approved Power Sector Master Plan 2018-2040 (PSMP). The PSMP elects the following least-cost targets:

- i) Achieve 30% of electricity production from renewable energy sources by 2025, per the mandatory commitment made by Cabo Verde at the Conference of the Parties (COP21);
- ii) To exceed 50% of electricity production from renewable energy sources by 2030, up to the percentage of integration that minimizes the costs of electricity production;
- iii) Maintain the focus on wind energy and start an ambitious program of solar energy development;
- iv) Promote the development of storage solutions (Battery Energy Storage Systems and others);
- v) Maintain the focus on promoting energy efficiency and combating energy losses as critical vectors for reducing energy costs.

Nevertheless, the current situation is that the weight of the energy bill represents one of the highest operating costs of companies. The energy sector is currently going through unbundling and privatization of thermal generation and distribution with the objective to reduce cost of service through increased renewable generation and reduced non-technical losses, support energy transition and private sector mobilization. As the energy matrix currently depends heavily on fossil fuels, many indirect emissions of pollutants into the atmosphere remain. With the application of various energy efficiency measures, the savings in energy consumption will translate into a reduction in the emission of greenhouse gases (GHG). On the other hand, with the production of electricity from the micro-production system based on renewable sources, electricity will be produced cleanly and without GHG pollution.

It is in this context that the WB is supporting the GoCV in assessing and identifying opportunities to introduce optimal solar energy solutions in fishery support coastal infrastructures to reduce the sector's environmental footprint and enhance its resilience to climate shocks.

2 Description of the assignment

2.1 Objectives

The assignment aims to undertake a feasibility study of solar energy and energy efficiency opportunities in select coastal infrastructure, by identifying energy saving opportunities and where feasible, assessing specific energy requirements and proposing sustainable solar solutions.

2.2 Expected results

This assignment shall produce the following results:

- i) Inventory of fisheries related coastal infrastructure eligible to benefit from solar energy and energy efficiency interventions;
- ii) Identification of opportunities for solar energy in selected eligible fisheries-related coastal infrastructure;
- iii) Technical feasibility assessment of proposed solar energy solutions in selected fisheries-related coastal infrastructure including by assessing detailed energy requirements (i.e., energy audit);
- iv) Assess sustainable business models for rooftop solar and solar-powered cooling. This would include assessment of rooftop solar and cooling market, potential demand and landscape of suppliers of energy efficient appliances, technology, policy, institutional set up and financing incentives and recommend sustainable business models leveraging local expertise and incorporating lessons learned from past experiences as well as international best practices;
- v) If feasible, preparation of detailed design and specifications for the micro production systems for each site, including cost estimates;
- vi) Photovoltaic (PV) solar solutions compatible with the local guidelines and regulations and approved by the electric utility and sector regulator;
- vii) Environmental and social screening of the proposed solutions and recommendations of further studies and actions to assess and mitigate the anticipated impacts;
- viii) Documents to procure the works and equipment required for implementing the different systems proposed; and Terms of Reference (TOR) that may be needed for additional studies (i.e., in case of structural issues);
- ix) Market assessment for solar direct drive refrigerators that could be leveraged for fisheries: demand and supply assessment, business models.

2.3 Scope of work and tasks

The scope of work is limited to the islands currently included in the RTBED project (Santiago, Sal, São Vicente, and Santo Antão) and fisheries-related coastal infrastructures on the Island of São Nicolau. Annex 1 presents an indicative list of locations and potential infrastructures. At inception, the Vendor should present an inventory of all fisheries support infrastructure in the islands to be included in the scope of work, including an initial assessment illustrating their location, technical characteristics, and mission to inform their eligibility to benefit from solar energy and energy efficiency solutions. The list of infrastructures to be included in the subsequent Tasks will be validated by the Client with the approval of the inception report.

The successful achievement of the objectives and expected results of the assignment involves, inter alia, the following tasks:

Task 1: Assessment and demand scenarios

A. Technical Feasibility Study

Identify opportunities for solar energy installments in eligible fishery support coastal infrastructure in selected locations/sites (Annex 1). Carry out technical feasibility assessments for proposed energy solutions including energy audits (containing surveys and analysis of existing systems and equipment at each eligible site). The detailed assessments should also identify all the requirements from the electric utility and sector regulator to complete the projects and provide the required service during the operation phase.

B. Demand scenarios

Anticipate the evolution of the demand and consumption needs of each site and prepare possible scenarios for meeting the demand. The scenarios should incorporate and present spatial, technical, operational, and investment criteria and include a recommendation of the best possible scenario.

At the end of Task 1, the Vendor should present a report, per coastal infrastructure, showing, where feasible, the scenarios possible for each site, mentioning the full details of electric and civil works needed including costing, identifying which roofs/areas can have solar installations, the estimated capacity on each, taking into consideration all electric utility requirements as well as regulatory requirements. The scenarios should also demonstrate how these proposed investments will be sustainably maintained.

Task 2: Detailed design documents for all sites

Once Client decides on the best scenario for each site, and if feasible, prepare the detailed design and specifications for the selected solar system for each of the eligible sites, taking into consideration the Clients' requirements.

At the end of Task 2, the Vendor should produce a report illustrating the detailed design for each site, including single line diagrams, sketches of all sites showing panels and structure, identifying the type of structure needed to tolerate wind, load and all other conditions, mounting system, and detailed technical specifications and bill of quantity (BOQ) of all solar system components, wiring, connection points, tests and certifications needed, and as a result a detailed TOR of implementation works, for each project site, will be delivered to the Client. The TOR should aim to build a green project that is green during construction, operation and maintenance so all types of green measures during these phases should be analyzed and outlined if feasible. The Vendor should perform any required external tests such as and not limited to roof, soil testing to ensure that the suggested design is valid before approving it.

Task 3: Environment and social screening

Conduct an initial mapping and assessment of the environmental and social risks of the proposed solution. The associated analysis, "screening", and discussion shall conclude if there is a need for more complex social and environmental studies, according to the applicable national laws and the Environmental and Social Framework (ESF) of the WB.

At the end of Task 3, the Vendor should prepare a report presenting the initial mapping and assessment of environmental and social risk of the proposed solutions to determine if specific studies need to be done.

Task 4: All approval documents

Support the process toward obtaining approvals from the technical regulator and electric utility and follow up on the process till the approval is granted for the target sites, and make any edits required by the regulatory parties on the design, specs, and others.

At the end of Task 4, a report should be submitted showing clearly for each site what was requested by both the electric utility and regulator, and what was submitted to them, and the expected timeline for granting the approvals. The approvals documents should be included, as an annex, in the assignment completion report.

Task 5: Prepare all procurement documents that are required for the implementation phase using the Standard Procurement Documents of the World Bank.

In coordination with the Client, prepare the TOR to tender for the implementation of each of the proposed systems in each site. The full tender package will include, but not be limited to, the technical specifications and BOQ for each system and the Operations and Maintenance scope that will be required from the appointed contractor. Also provide the technical evaluation criteria of the proposals submitted by bidders for the implementation phase. Additionally, the Vendor should develop a risk matrix for the implementation phase that defines risks probability and impact, and advisable classification and response times and response actions to be followed by the implementation contractor.

At the end of Task 5, the Vendor should provide all inputs needed to prepare the bidding document, including all technical specifications, for the tender of construction and operation and maintenance works of the solar systems, design the tender evaluation criteria and technical evaluation framework to assess the bids, and the implementation support tools.

Additionally, the Vendor, with the support of the Client, should organize an in-country workshop to disseminate and validate the findings, recommendations and proposed solar solutions.

2.4 Deliverables

The deliverables to be produced by the Vendor as a result of the tasks listed above are the following:

| Nº | Title | Description | Language | Deadline |
|-----------|---|--|------------------------|--------------------------|
| 1 | Inception | Word document containing a detailed presentation of methodological components toward delivering on the project's objectives and expected results, revised workplan with specific due dates for the deliverables. The report should include a detailed inventory of all fisheries-related coastal infrastructure in the islands included in the scope of work with a clear recommendation on the infrastructures that will be considered in the subsequent Tasks. | Portuguese | 10 days after Start Date |
| 2 | Detailed assessment of all eligible sites | Word document presenting the detailed design for each site as per Task 1. | English and Portuguese | 30 days after Start Date |
| 3 | Detailed design of the selected sites | All detailed design documents as per Task 2. | English and Portuguese | 60 days after Start Date |

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|---|---|---|------------------------|---------------------------|
| 4 | Environment and social screening report | Word document presenting the initial mapping and assessment of environmental and social risk of the proposed solution as per Task 3. | English and Portuguese | 80 days after Start Date |
| 5 | Approvals documents from both-utility and technical regulator | Word document showing clearly, for each site, what was requested by both electric utility and regulator, and what was submitted to them, and the expected timeline for granting the approval as per Task 4. | English and Portuguese | 120 days after Start Date |
| 6 | Implementation tender documents | TOR & BOQ and other related implementation tender documents as per Task 5 | English and Portuguese | 130 days after Start Date |
| 7 | Assignment Completion Report | Word document including a summary of all tasks performed, recommendations for the implementation phase, risk matrix and corresponding mitigation measures, and the approval documents of the detailed design for each site issued by the electric utility and technical regulator. The report should also include recommendations on energy efficiency measures to address the inefficiencies identified during the assignment. | English and Portuguese | 150 days after Start Date |

With the exception of deliverable 1, all deliverables shall be submitted in Portuguese and English for allowing consultation and dissemination among local stakeholders. They can be translated from English if the Vendor finds it more efficient.

Deliverables shall be submitted (electronically) to the attention of the Unit for the Management of Special Projects of the Ministry of Finance and Business Development (UGPE).

3 Duration

The assignment will have a total duration of five months. During this time, the Vendor shall include at least two field missions, including field visits to all relevant coastal infrastructures (Annex 1).

4 Supervision

The Vendor will report to UGPE, who will coordinate with all relevant stakeholders to provide guidance and feedback to the Vendor regarding the outputs of this assignment.

5 Staffing requirements for the Assignment

The services are expected to be delivered by 3 (three) key experts with the following profile and qualifications:

| Staff | Qualifications, skills and experience |
|---|--|
| Renewable Energy/Technical Expert (Team Leader) | ➤ At least a bachelor's degree in electrical or mechanical engineering or Masters in Renewable Energy or any other relevant subject with minimum of 15 years of experience |

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| | <p>including minimum 5 years of experience in the field of solar energy technology.</p> <ul style="list-style-type: none"> ➤ At least 5 years' experience in developing energy auditing, standards and labelling. ➤ Experience in carrying out feasibility studies of solar micro-production systems. ➤ Good knowledge of PV standards and experience on resource assessment and calculation of energy yield for solar PV projects. ➤ Have good organizational skills, proven experience in coordinating with national stakeholders and expert teams, organizing multi-stakeholder consultation processes, gathering documentation of results. ➤ Must be proficient in English (oral and written) and proficient in Portuguese (oral at least). ➤ Previous experience in small island nations or similar context is desired. |
| Civil Engineer | <ul style="list-style-type: none"> ➤ Master's degree or academic degree equivalent in civil engineering, port engineering, structural engineering or equivalent. ➤ At least 10 years of experience in the field of fisheries infrastructure planning and design. ➤ Experience on similar projects in relation to preparatory studies (feasibility studies, detailed design) of marine/coastal infrastructure. ➤ Must be proficient in English (oral and written) and proficient in Portuguese (oral at least). ➤ Familiarity with the region will be an asset. |
| Environmental and Social Safeguards Specialist | <ul style="list-style-type: none"> ➤ At least a master's degree in environmental science Anthropology, Sociology, Applied Social Science, Environmental Science or other related fields. ➤ At least 10 years of experience related to social and environmental safeguards and/or impact assessment of infrastructure projects; ➤ Excellent oral and written communication skills in English and Portuguese. ➤ Familiarity with the World Bank E&S Framework will be an asset. |

Vendors are free to mobilize additional experts (non-key experts) for specific tasks (for instance, fisheries expert, power system specialist, topographer, for specific analysis if necessary). All non-key experts must be independent and free from conflicts of interest in the responsibilities accorded to them. The consulting team should have a good understanding of national policy and institutional structures, and ability to advice on institutional capacities and relations.

For information purposes, the Vendor shall indicate the location from which the key team members will be performing their respective tasks.

Annex 1. Indicative list of potential location and fisheries-related coastal infrastructures to be assessed

| No. | Site description | Location | Island |
|-----|---|-----------------------------|-------------|
| 1 | Social and Technical Center of Porto Mosquito | Município da Ribeira Grande | Santiago |
| 2 | Cidade Velha | Município da Ribeira Grande | Santiago |
| 3 | Praia Fishing Complex | Município da Praia | Santiago |
| 4 | Fishing Harbor of Pedra Badejo | Município de Santa Cruz | Santiago |
| 5 | Social and Technical Center of Pedra Badejo | Município de Santa Cruz | Santiago |
| 6 | Social and Technical Center of Achada Ponta | Município de Santa Cruz | Santiago |
| 7 | Fishing Harbor of Ribeira da Barca | Município de Santa Catarina | Santiago |
| 8 | Social and Technical Center of Ribeira da Barca | Município de Santa Catarina | Santiago |
| 9 | Social and Technical Center of Porto Rincão | Município de Santa Catarina | Santiago |
| 10 | Veneza | Município de São Miguel | Santiago |
| 11 | Chão Bom | Município do Tarrafal | Santiago |
| 12 | Cidade de Tarrafal | Município do Tarrafal | Santiago |
| 13 | Pedra de Lume | Município do Sal | Sal |
| 14 | Palmeira | Município do Sal | Sal |
| 15 | Santa Maria | Município do Sal | Sal |
| 16 | São Pedro | Município de São Vicente | São Vicente |
| 17 | Salamansa | Município de São Vicente | São Vicente |
| 18 | Calhau | Município de São Vicente | São Vicente |
| 19 | Tarrafal de Monte Trigo | Município do Porto Novo | Santo Antão |
| 20 | Monte Trigo | Município do Porto Novo | Santo Antão |
| 21 | Cidade de Porto Novo | Município do Porto Novo | Santo Antão |
| 22 | Fishing Harbor de Ponta do Sol | Município da Ribeira Grande | Santo Antão |
| 23 | Cruzinha | Município da Ribeira Grande | Santo Antão |
| 24 | Vila das Pombas | Município do Paul | Santo Antão |
| 25 | Janela | Município do Paul | Santo Antão |
| 26 | Carriçal | Município da Ribeira Brava | São Nicolau |
| 27 | Preguiça | Município da Ribeira Brava | São Nicolau |
| 28 | Fishing Complex of Tarrafal | Município do Tarrafal | São Nicolau |