NDC-TEC Output 4 - Electric Boat for Marine Protection Area (Grenada)

Table of Contents

1 Abbreviations

ABYC	American Boat and Yacht Council
CAD	Computer Aided Drawings
CCREEE	Caribbean Centre for Renewable Energy and Energy Efficiency
GIZ	Gesellschaft für internationale Zusammenarbeit (the German governmental agency for international cooperation)
kW	kilowatt
kWh	kilowatt-hour
MPA	Marine Protected Area
Nm	Newton-meters
NM	Nautical Miles
SoC	State of Charge
USCG	United States Coast Guard

2 Project Context and Background

The project “Supporting the implementation of NDCs in the Caribbean - transforming the transport and energy sectors towards a low-carbon and climate-resilient future” (NDC-TEC), funded by the German Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety through the International Climate Initiative (IKI) aims to support CARICOM Member States in enhancing the ambition of their NDCs and in implementing transformative actions within the energy and transport nexus. It offers tailored support to Antigua & Barbuda, Belize, Grenada, Jamaica, and Saint Lucia in accelerating the implementation and raising the ambition of their NDCs in the energy and transport sectors. Strategic access to climate financing for NDC implementation is facilitated. In Grenada, Jamaica and Saint Lucia (“flagship countries”), flagship projects introduce new and market-disruptive technologies, which lead to long-term climate change mitigation and increased resilience. The flagship projects comprise technology demonstrations, capacity building and enabling frameworks for a long-term sectoral shift and serve as a model for further uptake in the region. Through knowledge products, dissemination and regional outreach, all CARICOM member states will benefit from good practices and are encouraged to position themselves as leaders for comprehensive and innovative NDC implementation. The project is implemented by Climate Analytics, CCREEE, CDB, UWI and GIZ as consortium lead.

Many CARICOM state remains heavily dependent on imported fossil fuels for transport and marine activities. Therefore, the Grenada flagship, implemented by GIZ and CCREEE, seeks to demonstrate the feasibility of electric propulsion in the marine sector as a pathway to reducing greenhouse gas emissions, lowering operating costs, and strengthening climate resilience. The Grenada flagship focuses on introducing electric propulsion for boats, complemented with shore-based solar charging infrastructure.

Therefore, GIZ seeks to procure **an outboard motor and battery for a boat** used for marine protection by the Government of Grenada.

3 Electric Boat Hardware Requirements

GIZ seeks to procure all components required for electric propulsion of one existing boat which is used for patrolling the Marine Protected Areas in Grenada. The typical use will involve trailering to the location (on land) for that day, launching and transiting to the MPA site then patrolling at trolling speeds for 4-8 hours. Operations will be in all conditions in which the boat can safely operate and all year round. The vessel has undergone a complete overhaul, and the following system will be needed for installation on the existing vessel:

- One (1) Electric Outboard Motor
- Marine Grade Battery Bank
- Control System
- Shipping, Installation and Vessel Commissioning
- Training – Operations and Maintenance
- Warranty

3.1 Outboard Motor Specifications

See below specifications for one (1) Electric Outboard Motor

Table 1 – Electric Outboard Motor Requirements

Specification	Requirement	Requirement Met (Yes/No)	Supplier Comments on Requirement
Vessel Operational Parameters	Vessel will be used for patrolling marine protected areas. System must provide operations for 5 to 8-hour shift for a 15-20ft boat operating at trolling speeds for most of the day and cruising speeds when getting to and from patrol locations (typically less than 10 nautical miles from shore).		
Power	Minimum acceptable: ≥ 75 kW		
Torque	Minimum acceptable: ≥ 275 Nm Include a torque curve that includes continuous and peak torque capabilities. Continuous means 60 minutes of operation.		
Maximum Operating Range	Range at cruising speed: min: ≥30 nautical miles		
Dimension limitations	Dimensions must be comparable to those of a standard gasoline outboard engine – no greater than double the size		
Motor Efficiency	Motor should be sized appropriately to comfortably achieve operational range based on the proposed battery and general vessel operational parameters. Provide efficiency map, QA tests or other supporting data for the outboard motor so that this can be validated by the technical evaluation committee.		
Material	System must be designed for ocean/saltwater use.		
Mounting	Standard outboard mounting required		
Propellor	Propeller match system and must perform ≥5000 before replacement required		
Safety or Performance Standards	System must meet current ABYC standards including E-30 and A-31 or equivalent standard.		

	All standards must be listed. Only internationally recognised standards will be accepted		
Motor Warranty	Warranty period measured from commissioning of vessel. Minimum of 6 months unlimited warranty and 2 years warranty on failed manufacturer components		

3.2 Marine Battery Specifications

Table 2 – Marine Battery Specifications

Specification	Requirement	Requirement Met (Yes/No)	Supplier Comments on Requirement
Battery Capacity	Battery must be appropriately sized to achieve operational range of ≥ 30 nautical miles. The breakdown of the max expected time at cruising and trolling speeds must be specified. Please state size of the battery pack proposed.		
Expandable Battery Pack	Battery pack should be capable of expansion.		
Enclosure Protection Rating	IP67 or better enclosure		
Fire Rating	A0 or better fire rating		
Marine Standards	ABYC E-30 and A-31 or equivalent standard. Only internationally recognised standards will be accepted.		
Battery Thermal and Safety Management System	Battery should have active thermal and safety management system appropriate for operation in Tropical Caribbean Climate. The system should have the appropriate sensors and functions to mitigate the risks associated with the proposed battery chemistry. Battery chemistry must be specified with explanation		

	of how critical technical challenges are managed. e.g. thermal runaway Details of battery thermal and safety management system should be explained as this forms part of the technical evaluation of the battery.		
Sensors	Thermal monitoring sensors, smoke sensors and fire sensors are required.		
Fire Control and Management Procedure	Fire management and emergency procedures must be described.		
Battery Warranty	Warranty period measured from commissioning of vessel. Minimum of 6 months unlimited warranty and 2 years warranty on failed manufacturer components		

3.3 Control System Specifications

Table 3 – Control System Specifications

Specification	Requirement	Requirement Met (Yes/No)	Supplier Comments on Requirement
Steering wheel, throttle control	Provide vessel operation controls and remote/mobile access for monitoring e.g. notifications when turned on or remote lock out		
Displays and monitoring devices	Speed Guage Battery State of Charge Battery Voltage Monitor		
Back-end safety data	Provide data that describes the health of the system for ongoing monitoring. E.g. • Voltage • Faults • SoC – historical • Battery Temperature • Any other critical parameters • Audible or lighted alarm for critical battery failure/alerts.		

Any other specifications	Describe safety standards being met by system with respect to USCG standards. >12 Passenger rating **NOT** required		

4 Installation of Hardware

Hardware must be installed on site in Grenada by company representatives. Commissioning of the system must be completed by company representatives. Training of the local team to complete the installation and commissioning. Installation and commissioning training is optional and at the discretion of the vendor.

4.1.1 Physical Details of MPA Boat which will be retrofit

System will be installed on a vessel similar to the following:

Photo 1 – Photo of MPA Vessels and similar vessels

The vessel general characteristics are as followed:

Approximate dimensions

- Length: 23ft/7M
- Beam: 8ft/2.4M
- Draft: 16”/40cm
- Weight: 4600lbs
- Material: Fibreglass

4.1.2 Positioning and Mounting of Battery and other components

Batteries should be mounted in a position to maximise operational space for the operations team. Any requirements for ventilation and safety of the batteries when installed must be clearly described. Costs related to this must be estimated.
Mounting must be secure, and an anti-theft system/procedure supplied (e.g. Locks, remote alarms). Mounting must allow the system to be operated with ease. Mounting must allow the system to be removed if required.

Please describe any standards the installation will be compliant to.

4.1.3 Any considerations for electrical and communications installation

If wiring is required, it must be completed with marine grade materials and work oversight by an expert marine electrician. An electrician must sign off on the installation.

4.1.4 Vessel Operational Parameters

The operational mandate of this vessel is to monitor activity in Marine Protected Areas (MPA). The vessel will be operating at trolling speeds for most of the day. It will transit to location then troll for 4-5 hours then return home. The transit distance is less than 15NM and it is expected that the journey would take less than 60mins. The vessel will have 2 people typically and may

have additional people or weight during occasional emergencies (e.g. rescue an injured windsurfer or paddleboarder).

4.1.5 Vessel Handover

The vessel handover will occur when the vessel has been commissioned, and the owner is able to successfully operate the vessel. Any questions or concerns must be promptly answered by the vendor for 6 months after commissioning.

5 Warranty – Workmanship

Handover of the vessel and system will occur after the commissioning and first trip. **Installation workmanship** will be warrantied for **3 months**.

6 Training

Vendor must provide operation and maintenance training to the Grenada team.

7 Shipping and Logistics

Items required for installation will be exempt from import duties and taxes (exemption will be organised by GIZ and the Government of Grenada). Items should be shipped to Grenada.

GIZ and the government of Grenada will work with their broker to clear the items from the port once the appropriate shipping documents and Bill of Laden are provided.

8 Project Delivery Time

The complete handover and vessel commissioning should be completed within **90 days (or 12 weeks)** of issuing a purchase order. Shorter delivery times are welcomed!

9 After-sales support

International suppliers should, where possible, identify local or regional companies or individuals (e.g. within the Caribbean or US) who could provide after-sales support for the equipment supplied. After-sales support should be provided for a minimum of 2 years after the supply of the equipment.

In addition, contracts for this specific procurement can only be made with companies registered in the Caribbean or the United States. Therefore, international suppliers not based in the Caribbean or the United States should partner with a regional company who would be the contracting entity for this procurement.

Proponents should provide examples and references for similar projects done in the past.