



## **Terms of Reference for Potential Study Agreement**

This document serves to provide an overview of the underlying project relevant to the Subnational Climate Fund (SCF), context on data availability and goals of the mandate, as well as an estimated scope of work requested from the consultant. Final details of the mandate should be covered by the subsequent proposal submitted by the consultant.

### **1. The Subnational Climate Fund**

The SCF is a blended finance impact fund formed to pursue attractive risk-adjusted returns for private investors while generating measurable and certified environmental and social impacts. The Fund is focused exclusively on pursuing investments in mid-size climate infrastructure with nature-based solutions in various developing countries across Latin America and the Caribbean, Africa, the Mediterranean, and Asia. The Fund is managed by Pegasus Capital Advisors, a commercial Private Equity impact fund manager and further benefits from a separate, grant-funded Technical Assistance facility managed by The International Union for the Conservation of Nature (IUCN) and implemented by Catalytic, IUCN, and Gold Standard.

### **Context of the Potential Study Agreement**

#### **Introduction**

The SCF is considering a potential investment opportunity relating to a company which develops electrical mobility and charging infrastructure, starting with Kigali and Nairobi. The company is asset financing the motorbikes and is responsible for customers, payments and customer risk. Manufacturing partners are responsible for technical risk. By 2030 the project developer, a private company, aims to deploy over 35,367 E-motorbikes in Rwanda, reducing CO2 emissions of approximately 51,637 Tons.

Transportation in Rwanda is mostly based on internal combustion engine (ICE) vehicles that have negative environmental impacts in the form of air pollution hazardous to health, emission of greenhouse gases that accelerate climate change, noise pollution, among others. The country is highly dependent on imported fuel and diesel for transportation services, with a reality that growth increases dependency on fuel imports and there by experts a negative impact on trade balance and exposure to volatile global commodity markets.

The SCF's Technical Assistance facility has approved funds in February 2024 for a feasibility study to assess a new Battery-as-a-service (BaaS) model, enhanced by advanced battery data analytics. This model will help e-mobility companies in Africa, including Rwanda to scale-up electric motorcycles with battery swapping.

The project developer developed a smart, high-performance, and durable lithium battery pack tailored for electric moto-taxis in Africa and will provide e-mobility companies access to fleets of batteries designed and financed by the company.

A IoT system has been integrated into the project developer's batteries to connect them to a battery fleet management software.

The current version of the battery fleet management software focuses on battery tracking and operational management of battery swapping. In the project, new features aiming at making battery swapping systems economically viable and scalable will be developed. These features are:

- Real time battery safety monitoring
- Battery predictive maintenance
- Battery lifetime monitoring and optimization
- Real time asset economic performance monitoring

In addition to the above, the objective is to furthermore integrate the project developer's technology in order to demonstrate the possibility to create a universal model of battery swapping for electric motorcycles in Africa.

After integrating the company's batteries with the battery fleet management software, the project aims at deploying a first batch of 30 company batteries into the fleet of electric motorcycles in Nairobi. Through the battery fleet management software developed by a partner company, real-time data from the project developer's batteries will be collected and analyzed, allowing to assess their performance and durability.

### **Need assessment, approach and innovation**

Electric motorcycles have a clear potential to replace fuel motorcycles for moto-taxi usage in Sub-Saharan Africa. By switching to electric, moto-taxi riders can save up to 3 USD a day on fuel and maintenance relative to fuel motorcycles and increase their net income by up to 50%. More than 10 African countries in East and West Africa have implemented new policy incentives on reduced taxation or electricity tariffs to support electric motorcycles.

Companies deploying electric motorcycles in Africa are building networks of battery swap stations where riders can exchange an empty battery by a full battery in one minute. Battery swapping lifts the barriers of range anxiety, long charging times and high up-front cost of batteries for riders.

Companies invest in fleet of batteries that they provide 'as-a-service' to their riders. The process of charging and swapping batteries in stations is simple. However, e-mobility struggle to scale-up their fleets. Companies must finance large amount of CAPEX to purchase fleets of batteries (about 700 to 900 USD per battery), which is difficult because of lack of battery reliability and uncertainty on battery durability. E-mobility start-ups have issues of batteries dying prematurely and do not have visibility on the actual life span of their batteries. When a battery underperforms, claiming the warranty to an Indian or Chinese manufacturer is practically impossible.

Most of these companies also experienced issues of battery safety, including battery fires caused by thermal runaway. The project developer is launching a new offering of battery-as-a-service, enabling companies to access fleets of high-quality lithium-ion batteries sourced and financed by the company.

To ensure that the project developer's batteries are operated safely and efficiently while reaching a long-life span (>2,000 cycles), the project developer is combining its technology with partner software to develop features such as proactive management including for example monitoring, optimization and alerts for the technology.

While a few companies have been trying to source their own batteries and develop their own battery telematics, the project developer together with the developer of the battery fleet management software will introduce on the market the first data-enabled B2B battery-as-a-service offer to help e-

mobility companies scale their business. The project will introduce on the market the first connected battery inter-operable with multiple models of electric motorcycles tailored for Africa.

While most African e-mobility companies struggle to become vertically integrated into the e-motorcycle value chain, the project developer's battery-as-a-service enhanced by battery analytics will enable companies to access a battery tailored for their needs and focus on deployment. By accessing real-time battery data from the battery fleet management software, the project developer will quickly iterate on the design of its battery pack, keeping a competitive edge towards other potential battery-as-a-service providers.

The output of the project will be to set-up a joint Battery-as-a-service offer ready for scale-up and commercialization in Kenya as well as in other African countries where the company is already operating. This requires validating the technology, the business model, and the terms of collaboration between the company and the developer of the battery fleet management software (including a framework for data sharing).

### **Outcomes and route to market**

The project developer is the leading asset financing partners of the fastest growing EV operators in Africa and is removing the burden of high upfront cost which is the major obstacle to the adoption of electric 2-wheelers in major African cities. Leveraging its massive distribution network, the project developer is targeting commercial motorcycle users who depend on these assets as a means of livelihood. However, high battery cost remains a major challenge for EV company looking to scale in African cities.

Through their joint offering of Battery-as-a-service enhanced by a battery fleet management software, the project developer and the partner company developing the battery fleet management software are targeting as clients all e-mobility companies that are deploying electric motorcycles with battery swapping systems in Kenya and Africa. This new offering enables companies to access a turn-key solution to manage their fleet of batteries, including access to a high-performance and durable battery provided and financed by the project developer, and a battery fleet management software. Together, the project developer and the partner developing the battery fleet management software lift major barriers faced by e-mobility companies in Africa to accelerate the deployment of electric motorcycles: high up-front cost of batteries, limited battery life span, lack of battery safety and reliability, low utilization rate of batteries.

The objective is to prove a concept of universal technology that allows operators and financier to have independence from OEM (original equipment manufacturers). This reduces capital outlay for the charging infrastructure and provides an opportunity to extend the network rapidly across the country (for a given Capex). The project will test compatibility with at least 2 OEMs.

## **2. Scope of Work for a Feasibility Study**

The consultant is expected to provide the following assessment:

### **Assessing feasibility of Battery-as-a-service model (BaaS)**

- Technical assessment and validation of the new battery technology.
- Evaluate the market to sell the new battery technology to other technology providers.
- Assess the markets of electric mobility in the company's target countries in Africa including market growth including split between ICE and EV.

- Assess market and regulations regarding acceptance of interoperability of batteries across different players.
- Review the unit economics.
- Compare the new battery technology vs the battery technology currently used by technology providers and manufacturers in terms of energy consumption, materials quality, recycle disposal.
- Evaluate the potential of the BaaS project as a step in the direction of standardization of EVs, batteries, chargers etc.

### 3. Deliverables

At least one final feasibility report in PPT and in Word format (using the SCF's layout for TA studies), consisting of the following elements:

- Executive Summary
- A table of acronyms
- Analytical part covering the results of the work outlined in section 3 (scope)
- List of Sources/Bibliography

### 4. Indicative Timeline

Work is expected to commence immediately after the consultant is appointed. The work is expected to be completed within **nine months** after signing the service contract. The delivery of services and reporting timeframes are anticipated to be as follows:

Feasibility Study	
Activity / Deliverable	Indicative timeline
Publication of the Terms of Reference on the SCF website and invitation to submit quotes	Week 8 – 12 April 2024
Online Q&A session about the scope of work	Week of 15 -19 April 2024
Deadline for submission of quotes	<b>Tuesday 23 April 2024, COB CET</b>
Evaluation of quotes, selection, and appointment of consultant. Disbursement of first payment tranche.	24 April – 3 May 2024
Kick-off meeting: Establish communication channels for initial information exchanges, confirm the project schedule and scope of work.	Week 6 – 10 May 2024
Draft report provided to Catalytic. Disbursement of 2nd payment.	Week 13 – 17 Jan 2025
Final report provided to Catalytic. Disbursement of final payment.	Week 3 – 7 February 2025

## **5. Form of Proposal & Requirements**

Please prepare a brief proposal for the performance of this work, including the scope of work, project team and qualifications, and estimated costs.

**1) Scope of Work:** The scope of work should include a description of the specific activities that will be performed in order to accomplish the required tasks identified in Section 3. This should include any proposed site visits/reconnaissance, documents to be reviewed, interviews, etc. If the Consultant feels that additional tasks or components within a required task are suggested or warranted, these should be stated and delineated as “Optional Tasks”.

**2) Project team and qualifications:**

This should include the name of the principal staff members and any sub-contractors, and a brief description of their role within the project team. Qualifications of staff should include relevant technical capabilities, full CVs, specific previous experience like this assignment, specific in-country experience and knowledge.

**3) Estimated costs:**

A total time and expenses cost estimate (not to be exceeded), in US Dollars, must be provided for the required scope of work. A breakdown of the estimated costs by task must also be presented in tabular format and should include Direct Labour Costs (number of hours or days per staff and their associated unit costs) and Indirect Labour Costs (i.e. travel, per diem, sub-contractors, etc.). Please note that Catalytic is exempt from VAT. Your financial proposal should therefore not include VAT. If field visits are necessary, travel costs will be covered by the SCF separately from the consultancy fee.

**4) Conflicts of interest:**

As part of the proposal, the Consultant shall also confirm that they do not have a conflict of interest and that they are in a position to provide an adequate, accurate and objective review.

## **6. Online Question and Answer Session**

We will organize a virtual, 45-minute Q&A session in the week of 15 – 19 April in case you have questions on the scope of work. Please submit your questions one day before the meeting by sending them to [project@catalyticfinance.org](mailto:project@catalyticfinance.org).

## **7. Submission**

Please submit your proposal by 23 April, 2024 (COB CET) to [project@catalyticfinance.org](mailto:project@catalyticfinance.org)