CTCN CLIMATE TECHNOLOGY CENTRE & NETWORK	**CTCN Technical Assistance** Request Submission Form

Guidelines:

- This Request Submission Form should be completed by the organisation requesting technical assistance from the Climate Technology Centre & Network (CTCN) in collaboration with the National Designated Entity (NDE) of the country in question.
- The Form must be signed by the NDE.
- The Form can be submitted as a Word file containing a digital signature, or as a signed and scanned PDF file in combination with an unsigned Word file.
- NDEs have the opportunity to submit CTCN requests in collaboration with National Designated Authorities (NDAs) for the Green Climate Fund (GCF) if targeting the GCF Readiness Programme.

Requesting country or countries:	Tanzania
Request title:	Technical assistance for the acquisition and integration of energy storage systems (ESS) for battery swapping stations and EV charging on the outskirts of Dar es Salaam
NDE	Dr. Gerald Majella Kafuku Manager of Innovation and Technology Tanzania Commission for Science and Technology (COSTECH) P.O. Box 4302, Dar es Salaam, Tanzania kafukugm@gmail.com, gerald.kafuku@costech.or.tz +255 766 604977
Request Applicant:	Elico Foundation Plot No. 288, Makwaia Street, Regent Estate P.O. Box 79708, Dar es Salaam, Tanzania info@elicofoundation.org Contact person: Sisty Basil Email: sisty.basil@elicofoundation.org Mobile: +255787252585

Climate objective:
☐ Adaptation to climate change
☒ Mitigation of climate change
☐ Combination of adaptation and mitigation of climate change

Geographical scope:

☐ Community level

☒ Sub-national

☐ National

☐ Multi-country

If the request is at a sub-national or multi-country level, please describe specific geographical areas (provinces, states, countries, regions, etc.).

Peri-urban areas and outskirts of Dar es Salaam Region, and the neighbouring districts of Kibaha, Bagamoyo and Mkuranga in Pwani Region. Final sites (3–5) will be selected during the inception phase.

Problem statement related to climate change (up to one page):

The outskirts of Dar es Salaam, covering the peri-urban parts of the city and the neighbouring districts of Kibaha, Bagamoyo and Mkuranga in Pwani Region, are urbanising fast. Demand for transport there is met mostly by petrol motorcycles (boda-boda) and three-wheelers (bajaji for passengers, guta for cargo). Tanzania has about 135,450 three-wheelers, and electric units make up only about 0.13% of them (E3W Market Assessment, ELICO, Nov 2024). A petrol three-wheeler emits roughly 11.5 kg of CO2 per 100 km; at about 120 km a day that is around 5 tCO2 per vehicle per year from the tailpipe alone, plus local air pollution and noise. Electrification makes economic sense for drivers. There is estimated savings of up to TZS 14,955 (approx. USD 6) per 100 km against petrol (roughly 60% of operating costs), and 61% of the ICE three-wheeler drivers surveyed said they would consider switching. The bottleneck is energy infrastructure. There is few charging and swapping stations in Tanzania and mostly in Dar es Salaam with no Level 3 (DC fast) charger.

The national power system has headroom with installed capacity of 4,300 MW against a peak demand of less than 2500 MW, but the problem is at the local distribution level. Peripheral feeders suffer voltage fluctuations, limited transformer capacity and frequent outages. A battery swapping station (BSS) or charging hub that charges many batteries at once creates sharp peaks that weak feeders and transformers cannot carry. Operators then fall back on diesel generators or accept unreliable service, which erodes both the climate benefit and the business case. Pairing solar PV with a battery energy storage system (ESS) can solve this. The ESS charges slowly from the grid and solar and discharges quickly into swapped batteries, which flattens the peak seen by the grid. But local operators, transport cooperatives and municipal authorities do not have the expertise to size an ESS, design a safe solar-hybrid swapping station, buy reliable equipment, or meet grid and safety requirements.

Tanzania's national EV policy framework (December 2024) calls for reliable, renewable-powered charging infrastructure. Therefore. this request supports the practical, site-level step needed to get there, in an area where the grid is weakest.

Past and on-going efforts to address the problem (up to half a page):

Policy groundwork. The earlier CTCN technical assistance "Developing a national framework for deploying and scaling up e-mobility in Tanzania" produced the National EV Policy Framework (December 2024), a market assessment, an implementation framework with business models,

and a communication strategy. COSTECH's October 2025 technical white paper turns these into action guides for TANESCO, EWURA, TBS, TRA and others, and recommends that charging investors be supported to include renewable energy.

Market and standards. The government grants a reduced 10% duty rate on completely knocked-down electric tricycle and motorcycle kits. The Tanzania Bureau of Standards (TBS) has revised its three-wheeler standard to cover electric models, and standards for EV rechargeable storage systems, two-wheelers and charging stations are at publication stage.

Operators and partners. AG-Energies runs six swapping stations for e-2W and e-3W. Kinglion has battery-swap cabinets in about ten garages in Dar es Salaam. TRi operates charging points and won a DART tender (August 2024) to install chargers at BRT stations under the EU-funded SOLUTIONSPlus project. The Tanzania Electric Mobility Association (TAEMA) is registered and active.

Gap. None of these efforts covers energy storage or solar-hybrid design for weak-grid, peri-urban sites. Existing swapping stations depend on the grid as it is, there are no local design or procurement guidelines for ESS, and the policy framework has not yet been translated into engineering, procurement and grid-connection packages that operators can use.

Specific technology barriers (up to one page):

Weak distribution grid and missing grid data: Voltage fluctuations, limited transformer capacity and outages on the outskirts; capacity data for transformers is unavailable in many TANESCO regions, so operators cannot judge whether a site can host a station.

Peak demand from simultaneous charging: Charging many batteries at once overloads local transformers and leads to downtime or reliance on diesel back-up. This has also been one of foreseen challenges for level 3 chargers.

Lack of ESS and solar-hybrid design capacity: Local operators lack the engineering skills to size an ESS, integrate PV, inverters and chargers, and design safe swapping architectures and thermal management for lithium storage.

Procurement risk and weak quality assurance: Risk of buying substandard, mismatched or unsafe batteries and chargers from foreign suppliers. National standards for EV storage systems and charging stations are still being published, and TBS cannot yet test the remaining capacity of used batteries.

Regulatory and safety gaps: The Electricity Act (2008) has no EV-specific provisions, TANESCO has no protocol for monitoring charging stations, and there is no clear guidance on grid interconnection of storage, licensing or tariffs for swapping stations, or fire-safety and thermal-runaway procedures.

High upfront cost and limited financing: An ESS adds capital cost. Drivers rank total cost of ownership as the top barrier alongside vehicle performance (Elico's E3W survey), and there are no incentives or financing products for storage at charging sites.

Limited O&M skills and end-of-life planning: Few technicians can maintain battery management systems and storage safely. Current e-waste regulations do not cover EV batteries, so recycling and second-life use are unplanned.

Data gap on peri-urban demand: There is no load-profile or swap-frequency data for outskirts locations, so the right ratio of grid, solar and storage cannot be determined.

Sectors:

Please indicate the main sectors related to the request:

☐ Coastal zones	☐ Early Warning	☐ Human Health	☒ Infrastructure
☐ Marine and Fisheries	☐ Water	☐ Agriculture	☐ Carbon fixation
☒ Energy Efficiency	☐ Forestry	☐ Industry	☒ Renewable energy
☒ Transport	☐ Waste management	☒ Urban planning	

Please add other relevant sectors: energy storage and grid integration; battery lifecycle management (e-waste).

Cross-sectoral enablers and approaches:

Please indicate the main cross-sectoral enablers and approaches

☒ Communication and awareness	☒ Economics and financial decision-making
☒ Governance and planning	☒ Community based
☐ Disaster risk reduction	☐ Ecosystems and biodiversity
☒ Gender	

Technical assistance requested (up to one page):

1. Overall objective

The overall objective is to enable the safe, cost-effective and bankable acquisition and deployment of solar-supported energy storage systems for battery swapping stations and EV charging on the outskirts of Dar es Salaam (including Kibaha, Bagamoyo and Mkuranga), by providing expert technical assistance to Elico foundation as local operator as well as provide trainings to other identified transport operators and authorities. The assistance covers feasibility, design, procurement support, regulatory and grid-integration preparation, and capacity building. It also includes funding the purchase of batteries, chargers; and any other hardware that will be identified under technical assistance.

2. Anticipated groups of activities to be performed by the technical assistance

I. Needs assessment and feasibility study

a) Select 3–5 target BSS/charging sites with TANESCO, EWURA and other local authorities using agreed criteria (demand, grid weakness, land availability, solar potential).
b) Profile loads from projected e-2W/e-3W numbers and swap frequencies; collect baseline data on grid capacity (transformers, feeders, outages) and solar irradiance at each site.
c) Build techno-economic models to find the best mix of grid power, solar PV and ESS for each site, including a comparison with diesel back-up and with grid-only supply.

II. Technical design and engineering

a) Design the ESS architecture (for example lithium iron phosphate) as a peak-shaving buffer: slow charging from grid and solar, fast discharge to swapped batteries.
b) Prepare single-line diagrams, civil works requirements and thermal management and fire-safety plans for ESS containers or cabinets.
c) Specify the smart-charging and energy-management software needed for load balancing, metering and remote monitoring.

III. Procurement support and vendor selection

a) Draft technical specifications and requests for proposals for ESS, inverters, PV and chargers, aligned with TBS and international (IEC) standards.
b) Evaluate technical bids and check supplier quality, including warranty, battery lifetime and performance guarantees.
c) Advise on contract negotiation, warranty, performance and after-sales support clauses.
d) Support in purchasing, installation and handing over ESS infrastructure to Elico foundation as well as establishing a sustainable business model.

IV. Regulatory compliance and grid integration

a) Prepare the technical documentation needed by identified authorities for each site.
b) Design grid-interconnection schemes, including protection relays and anti-islanding features.
c) Summarise regulatory gaps found for storage-backed charging and swapping (interconnection, licensing, tariffs, safety) as input to EWURA, TANESCO and TBS and other identified authorities.

V. Capacity building and handover

a) Develop operation and maintenance manuals adapted to local conditions.
b) Train at least 30 local technicians and operators on ESS safety, battery management systems and emergency response, including thermal-runaway protocols, working with learning and vocational colleges.
c) Hold a handover and experience-sharing workshop with operators, authorities and financiers, and prepare a short guide for replication in other peri-urban areas.

3. Anticipated outputs to be delivered by the technical assistance

a) Site selection report and baseline data set (load profiles, grid capacity, solar resource) for 3–5 sites.
b) Feasibility study and techno-economic models for ESS-supported BSS and charging at each site.
c) Technical designs: single-line diagrams, civil works, thermal-management and fire-safety plans, smart-charging specification.
d) Procurement package: technical specifications, requests for proposals, bid evaluation reports and contract guidance.
e) Grid-interconnection and regulatory documentation.
f) O&M manuals, training materials and training report, with at least 30 technicians trained.
g) Physical ESS infrastructure acquired and installed in selected sites.
h) Final report with replication guide.

Expected timeframe:

The expected duration of the CTCN technical assistance is 12 months.

Anticipated gender and other co-benefits from the technical assistance:

Mobility needs differ between women and men, but women are almost absent from commercial transport in Tanzania: only 1 of the 154 three-wheeler drivers interviewed in the 2024 E3W Market Assessment was a woman. Electrification and the new businesses around it (swapping stations, charging services, battery servicing, energy management) are a chance to open jobs and enterprise opportunities that are not tied to driving.

The assistance will address gender by: (a) setting a target of at least 30% women among technicians and operators trained; (b) encouraging women-led enterprises and cooperatives as BSS and charging operators and as suppliers of services; (c) designing stations to be safe, well lit and accessible for women users and staff; (d) collecting sex-disaggregated data on training, employment and users; and (e) promoting access to finance for women entrepreneurs in energy and e-mobility.

Other co-benefits include lower local air pollution and noise in peri-urban communities; lower fuel costs for drivers; about 5 tCO2 per vehicle per year of tailpipe emissions avoided (indicative, before counting emissions from grid electricity, which solar-supported storage reduces further);

no need for diesel generators at stations; lower stress on grid network; green jobs in installation, maintenance and battery management; and a model that can be replicated in other cities.

Key stakeholders:

Stakeholders who will be involved in the implementation of the requested CTCN technical assistance and their roles:

Stakeholders	**Role to support the implementation of the technical assistance**
National Designated Entity (NDE)	Tanzania Commission for Science and Technology (COSTECH). Submits and endorses the request, coordinates with CTCN, links the work to the National EV Policy Framework and other national policies.
Request Applicant	Elico Foundation. Beneficiary of this technology transfer, operate the ESS, leads local coordination of activities, works with transport operators and cooperatives, supplies site and market data, hosts consultations, and coordinates trainings and report on progresses and impact.
TANESCO	Provides grid and transformer data, supports site grid assessments, and reviews interconnection designs and documentation.
EWURA	Advises on licensing, tariff and technical-regulatory requirements for charging and swapping stations and storage.
Tanzania Bureau of Standards (TBS)	Advises on applicable national and international standards for EV storage systems, chargers and installations, and on equipment quality checks.
Ministry of Energy	Policy guidance on solar-hybrid and storage integration in the power system.
Ministry of Transport	Policy guidance on the EV types served and links to transport planning.
Vice President's Office, Division of Environment	National Designated Authority; links results to climate priorities and potential climate finance.
Ministry of Finance and Tanzania Revenue Authority	Advise on tax treatment of storage and charging equipment.
Local authorities (Kibaha, Bagamoyo and Mkuranga, and Dar es Salaam municipalities)	Support site selection, land use and permits; engage communities.
Transport cooperatives and boda-boda / bajaji associations	Direct beneficiaries of skills; provide demand data and operator input; take part in training.

BSS and charging operators and e-mobility companies (e.g. AG-Energies, Kinglion, TRi, Ekoglobe)	Share operating data and experience, host demonstration sites during TA, and share data on the designs and procurement package.
TAEMA and TAREA	Advocacy, awareness and uptake by industry; dissemination of guides and training.
Universities and technical institutions	Technical input and training delivery; integration of ESS and BMS content into curricula.
NEMC, OSHA and Fire and Rescue Force	Advice on battery safety, fire response, workplace safety and end-of-life handling of batteries.
Development partners and financiers	Review business cases and consider future financing the hardware investment for replication to other regions.

Alignment with national priorities (up to 2000 characters including spaces):
National EV Policy Framework (Dec 2024): supports Pillar 3 (synergy with renewable energy and GHG reduction, including incentives for charging operators) and Pillar 4 (reliable charging infrastructure, grid upgrades, pilots, regulations and standards). **Nationally Determined Contributions 2021:** contributes to promoting renewable (clean) energy in transport systems and low-emission transport. **National Energy Policy 2015:** supports fuel switching to electricity in transport (section 3.1.5) and sustainable use of energy resources. **National Transport Policy 2003:** supports efficient, cost-effective transport with minimum environmental degradation. **National Climate Change Response Strategy 2021–2026 and Technology Needs Assessment (Mitigation, 2016):** supports mitigation technologies in energy and transport. **EV technical white paper (Oct 2025):** responds to its action guides on grid upgrades, charging market rules, standards, renewable energy in charging stations, and EV battery management.

Reference document (please include date of document)	**Extract** (please include chapter, page number, etc.)
Nationally Determined Contribution (NDC), 2021	Section 4.2, page 18
National EV Policy Framework, December 2024	Pillars 3 and 4, sections 4.3–4.4, pages 40–46
EV technical white paper (COSTECH PWG), October 2025	Sections 6.2–6.4 and 6.7
National Energy Policy, 2015	Section 3.1.5 (fuel switch in transport)
National Transport Policy, 2003	Policy objective on efficient, cost-effective transport

Development of the request (up to 2000 characters including spaces):

This request was prepared by Elico Foundation with the NDE (COSTECH). It builds on the national documents produced under the earlier CTCN technical assistance (National EV Policy Framework, December 2024), COSTECH's EV technical white paper (October 2025), and Elico's Tanzania Electric Three-Wheelers Market Assessment (November 2024), which drew on a survey of 154 drivers in Dar es Salaam, Dodoma, Mwanza and Arusha and on interviews with e-mobility companies.

Background documents and other information relevant for the request:

The request has not been developed with the support of the CTCN request incubator.

Other information and background documents include:

a) Tanzania Electric Three-Wheelers Market Assessment Report, ELICO Foundation, November 2024
b) National Electric Vehicles Policy Framework, Ministry of Transport, December 2024
c) Technical White Paper for Operationalization of the Electric Vehicles Policy Framework, COSTECH, October 2025
d) e) Nationally Determined Contributions, 2021; National Energy Policy, 2015; National Transport Policy, 2003; National Climate Change Response Strategy 2021–2026

OPTIONAL: Linkages to Green Climate Fund Readiness and Preparatory Support

Please indicate whether this request has been identified as preliminarily eligible by the NDA to be considered for readiness support from the GCF.

☐ Initial engagement: The GCF NDA of the requesting country has been engaged in the design of this request and the NDA will be involved in the further process leading to an official agreement for accessing GCF readiness support.

☐ Advanced engagement (preferred): The GCF NDA of the requesting country has been directly involved in the design of this request and is a co-signer of this request, the signature indicating provisional agreement to use readiness national funds to support the implementation of the technical assistance.

NDA name:

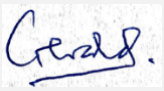
Date:

Signature:

Monitoring and impact of the assistance:

By signing this request, I affirm that processes are in place in the country to monitor and evaluate the technical assistance provided by the CTCN. I understand that these processes will be explicitly identified in the CTCN Response Plan and that they will be used in the country to monitor the implementation of the technical assistance following standard CTCN procedures.

I understand that, after the completion of the requested assistance, I shall support CTCN efforts to measure the success and effects of the support provided, including its short, medium and long-term impacts in the country.

Signature:	
NDE name:	Dr. Gerald Majella Kafuku
Date:	November 4th, 2026
Signature:	

THE COMPLETED FORM SHALL BE SENT TO CTCN@UNEP.ORG

The CTCN is available to answer all questions and provide guidance on the application process.