

Terms of Reference

Development of a Regional Electric Mobility (E-Mobility) Policy and Program for the Pacific Island Countries and Territories (PICTs)

1. Background

The Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE) was inaugurated on 26 April 2017 in Nuku'alofa, Tonga, at the margins of the Third Pacific Regional Energy and Transport Ministers' Meeting. The center works towards integrated and inclusive markets for sustainable energy products and services by promoting economies of scale and equal progress between countries through regional exchange, tools and methodologies. PCREEE has a strong private sector mandate and promotes activities with high relevance for domestic businesses, entrepreneurs and industry.

PCREEE is co-hosted by the Pacific Community (SPC) and the Government of Tonga and operates under the umbrella of the two coordinating mechanisms for the Framework for Action on Energy Security in the Pacific (FAES) – the Pacific Energy Oversight Group (PEOG) and the Pacific Energy Advisory Group (PEAG). PCREEE receives technical support by UNIDO under the umbrella of the Global Network of Regional Sustainable Energy Centres (GN-SEC) and financial assistance by the Governments of Austria, Norway and Republic of Korea.

The Third Pacific Regional Energy and Transport Ministers' Meeting adopted a 100% renewable energy vision and requested PCREEE and UNIDO to support PICTs particularly in the area of efficient land transport. An integrated approach that promotes the expansion of renewable energy power generation, e-mobility and electrical storage simultaneously can have mutual benefits and become a paradigm shift in power and transport sectors of PICTs in the long-term. Therefore, PCREEE is currently developing an innovative regional programmatic approach, which will assist PICTs in the creation of enabling environments for the uptake of e-mobility markets within their renewable energy expansion plans.

An harmonized regional approach can help to address existing barriers more effectively and at lower cost. It can promote equal progress and standards between countries and create the needed economies of scale to influence international vehicle supply chains and investments in charging infrastructure and e-mobility based business models. On regional level, the program will address the nexus between the Framework for Action on Energy Security in the Pacific (FAESP), the Framework of Action on Transport Services (FATS), as well as the Framework for Resilient Development in the Pacific (FRDP). The programmatic approach will include south-south and triangular cooperation with other SIDS regions and pioneering e-mobility countries/islands (e.g. China, Norway, Canarias, Azores) within the Global Network of Regional Sustainable Energy Centers (GN-SEC). Currently, the CCREEE¹ and ECREEE² are developing similar e-mobility programs.

The PCREEE efforts are based on latest international developments and technology innovations. The global electric vehicle (EV) market is growing exponentially. In 2017, the global stock of electric cars surpassed 3 million vehicles. Around 40% of the global electric car fleet is in China, while the European Union and the United States each accounted for about a quarter of the global total. Electric cars accounted for 39% of new car sales in Norway in 2017. Electrification of other transport modes is also developing quickly, especially for 2-wheelers and buses. In 2017, sales of electric buses were about 100.000 and sales of two-wheelers are estimated at 30 million (both mostly in China).

¹ www.ccreee.org, based in Barbados

² www.ecreee.org, based in Cabo Verde

By considering the changing policy environment for Internal Combustion Engine Vehicles (ICEVs) and the pace of EV cost reductions (CAPEX), due to dropping lithium battery prices, experts expect the standard electric car to reach cost parity by 2021 in Europe and China. It is projected that by 2040, 35% of new car sales globally and 25% of the world's car fleet will be electric cars. If based on locally available renewable energy sources, e-mobility offers an opportunity to decrease fossil fuel imports and spending (contributes to energy security), to enhance transport affordability (due to lower OPEX of EVs), to localize parts of the transport value chain and to reduce air, noise and GHG emissions.

E-mobility can represent a paradigm shift if the technical characteristics and regulatory frameworks of the transport and power sectors are smartly integrated. This requires both close cooperation between and key stakeholders in the power and transport sectors, as well as strengthening of their technical capacities. Combined with the latest digital innovations (e.g. internet of things devices) and the shift of vehicle ownership to shared modalities, e-mobility concepts open up opportunities for new business models, such as vehicle-to-grid (V2G) and grid-to-vehicle (G2V) services. A number of developing countries have also started to assemble basic EVs locally (e.g. 3-wheelers in Nepal).

Advanced EV countries (e.g. China, Norway, US, individual EU countries) have introduced targets, enabling policies, monetary and non-monetary incentives to promote the market introduction of EVs and the expansion of charging infrastructure (e.g. tax and duty reductions/increases, public procurement, stricter environmental standards, permit the use of carpool or bus lanes, public charging or concessional finance for charging infrastructure).

Also, a small number of Governments in Small Island Developing States (SIDS) have started to assess the feasibility and viability of renewable energy based e-mobility futures. Limited driving distances, high fossil fuel (import) costs, significant renewable energy potential, and the need for grid storage solutions make PICTs and SIDS in general, an interesting place to invest in e-mobility concepts. A number of pioneering SIDS have made already substantial progress (e.g. Barbados, Bahamas). Other SIDS have undertaken first assessments or demonstrations (e.g. Cabo Verde, Saint Lucia, Saint Vincent and the Grenadines, Fiji, and Tonga). However, despite some progress, e-mobility markets have not reached the required economies of scale and did not transform into a vibrant private-sector driven business sector.

Due to the complexities in the power and transport sectors, e-mobility faces manifold barriers on the demand (consumer) and supply(ier) side. Some of these barriers originate from policy and regulation (incl. standards), lack of monetary and non-monetary incentives (incl. fossil fuel subsidies and high duties/taxes on car imports), weak coherence and integrated planning in the transport and power sectors, technical limitations (e.g. grid stability), lack of knowledge and data planning, qualification and certification gaps, lack of locally available EVs and latest technology innovations, economic and financial constraints (e.g. higher CAPEX of EVs, cost of charging infrastructure), non-availability of tailored and tested financial/insurance products and business models.

Therefore, UNIDO and PCREEE seek consultancy support for the development of a regional e-mobility program for the PICTs region to be presented for adoption at the Fourth Pacific Regional Energy and Transport Ministers' Meeting, scheduled to take place by the end of September 2019 in Apia, Samoa.

2. Objectives and deliverables of the assignment

The assignment has the following scope and includes the following key tasks:

- The contractor will develop a technical background/briefing paper (around 30 A4 pages) to inform the Fourth Pacific Regional Energy and Transport Ministers' Meeting on the social, economic and environmental opportunities/benefits and risks/costs of integrated e-mobility and renewable energy power scenarios in PICTs. The analysis will briefly describe the benchmark

for renewable energy power integration and e-mobility in PICTs. It will also provide a short overview on existing renewable energy and e-mobility targets, policies and markets. The analysis will consider but not focus on other aspects of efficient transport (e.g. fuel efficiency standards, behavioral change, shared mobility). The paper will incorporate the entire value chain of e-mobility (EV sales, mobility services, installation and maintenance of charging infrastructure, charging station operations, V2G, G2V, V2B services, second-life storage). It will primarily focus on land/road transport options, including battery electric vehicles (BEV), hybrid electric cars (HEC) and plug-in hybrid electric vehicles (PHEV). It will consider light-duty vehicles (passenger cars, 2- and 3-wheelers), as well as heavy-duty vehicles (e.g. trucks, busses). It will also take into account the different requirements and business cases of e-mobility with regard to commercial and private uses (freight, taxis, private and public buses). The latter usually accumulates significantly more mileage per year than an average household car. The analysis will also demonstrate the potential economic benefits created on macro- and micro-level through fuel costs savings over the vehicle life-time (usually 15 to 20 years in the case of e-cars in comparison to 10 to 15 years for ICEVs), localized parts of the value chain and new business models (e.g. servicing, charging, V2G and G2V services). The analysis will also discuss potential environmental benefits through reduced air, noise and GHG emission reductions. Due to the higher efficiency of EVs (90% to 95% in comparison to 20% to 30% of ICEVs) they generate less GHG emissions even in the case of high fossil fuel penetration rates. The technical paper will also highlight the potential use of e-mobility solutions in key island industries (e.g. agriculture, food processing, fishery, tourism, manufacturing and logistics). In this context, the paper will take a closer look at the cost-effectiveness of small-scale e-ferries and e-boats in the small-scale fishery sector. It will also describe the potential benefits of shifting vehicle ownership to shared mobility and digitalized mobility-as-a-service (MaaS) concepts. Finally, the paper will identify the main barriers for the uptake of integrated renewable energy power and e-mobility markets and provide recommendations on how a regional programmatic approach could help to address them.

- Based on the findings and recommendations of the technical paper, a regional policy document outlining the short-term and long-term vision of PICTs (max. 10 A4 pages) with regard to integrated e-mobility and renewable energy power markets will be developed. The policy is fully in line with the adopted 100% renewable energy vision and will reconfirm the “climate leadership” of PICTs also in the transport sector. The policy will be an important nexus contribution to the FAESP, FATS and FRDP and complement existing national renewable energy policies and roadmaps. It will propose regional e-mobility targets for the PICTs region by 2030 and 2050 and include a regional implementation and monitoring framework with concrete priority actions. Currently, most PICTs energy, climate and industrial development policies (incl. the NDCs) do not include concrete targets and support modalities for renewable energy based e-mobility concepts. Moreover, most utilities do not consider e-mobility in their demand projections and renewable energy integration plans. The potential negative (peak stress) and positive (flexible storage for intermediate renewables) impacts of uncontrolled or controlled “smart” charging require particular attention. Since non-commercial EVs remain parked most of the time, batteries can provide “flexible” ancillary and peak shaving services during their life-time in the vehicle but also afterward during their “second life” as stand-alone-storage. EV batteries are replaced when the capacity declines to 70-80%. This offers a life-time extension of up to 10 years. Modelling exercises in Tenerife and the Azores have proven that EVs can help to increase the renewable energy penetration if charging patterns are smartly introduced. Smart charging practices (e.g. through dynamic pricing and/or charging possibilities at offices and commercial buildings) can lower costs and the environmental footprint by shifting e-mobility loads to times of high renewable energy penetration.
- The contractor will develop a project document on the PCREEE E-Mobility Program (max. 40 A4 pages incl. results framework with measurable gender aggregated indicators and five-years

budget) to be executed by PCREEE in partnership with UNIDO and other international partners. The program will position PCREEE as a regional knowledge and service hub for the promotion of e-mobility markets in PICTs. The program will address existing barriers through targeted regional actions in the areas of policy and regulation, knowledge management and awareness, qualification and certification, demonstration of technology and business models, as well as the promotion of investment, entrepreneurship and innovation. The program will be closely linked to international e-mobility initiatives operating under the Paris Declaration on Electro-Mobility and Climate Change (e.g. Clean Energy Ministerial IEA EVI Initiative, UN Environment’s E-Mobility Program). The program will also have a SIDS-SIDS cooperation component within the scope of the Global Network of Regional Sustainable Energy Centres (GN-SEC). Knowledge and technology transfer from pioneering countries in SIDS (e.g. Barbados, Bahamas) and internationally (e.g. Norway, China, US, individual EU countries) will be part of the program.

Deliverable 1:

- Final inception report (incl. list of documents to be reviewed, interviews and meetings to be held)

Deliverable 2:

- Technical paper and policy document including a short summary for policy makers

Deliverable 3:

- Project document on the regional e-mobility program (incl. results framework and budget, gender aggregated indicators, risk assessment) and publishable summary;

3. Scope of work and time schedule

TASKS	DELIVERABLES	Working days (w/d) spread over 4 months
1. Review existing PCREEE and PICTs renewable energy and e-mobility documents; discussion and finalisation of the inception report in consultation with PCREEE and UNIDO (skype meeting);	Final inception report which includes the detailed work plan, implementation methodology and draft tables of content of the technical background/briefing paper, policy and project documents;	5.00 Home based
2. Compile a list of documents/studies to be reviewed and key stakeholders to be contacted during the assignment; the list requires approval by UNIDO and PCREEE; review the documents and provide electronic copies/files to PCREEE and UNIDO;	List of relevant documents List of Stakeholders	2.00 Home based
3. Develop a <u>technical background/briefing paper (around 30 A4 pages)</u> to inform the Fourth Pacific Regional Energy and Transport Ministers’ Meeting on the social, economic and environmental opportunities/benefits and risks/costs of integrated e-mobility and renewable energy power scenarios in PICTs (required contents are describe above under section 2). The paper requires quality assurance and	Final technical background/briefing paper in English (incl. concise one page summary) fully edited and ready to be published;	12.00 Home based

approval by PCREEE and UNIDO;		
4. Develop a <u>policy document</u> (max. 10 A4 pages) on the regional short- and long-term e-mobility vision of PICTs, incl. a regional implementation and monitoring framework with identified priority actions (required contents are describe above under section 2). The policy document requires quality assurance and approval by PCREEE and UNIDO;	Final Policy document in English (incl. concise one page summary) fully edited and ready to be published;	10.00 Home based
5. Develop a project document on the <u>PCREEE E-Mobility Program</u> (max. 40 A4 pages) incl. results framework with measurable gender aggregated indicators and program budget for the period 2020 to 2025. The policy document requires quality assurance and approval by PCREEE and UNIDO;	Fully edited and publishable project document incl. results framework with gender aggregated indicators and budget for the period 2020 to 2025; publishable summary;	10.00 Home based
6. Support PCREEE and UNIDO in the presentation of the draft documents at the Ministers meeting in September in Apia, Samoa, as well as one additional meeting (most probably in Suva, Fiji); incorporate comments into the final documents;	PowerPoint presentations on the technical paper, policy and program	6.00 in PICTs region (Samoa and Fiji)
TOTAL		45 Working Days

The activities under this contract should be completed within a period of 4 months from its countersignature. A total amount of 45 working days within this period is foreseen. The assignment will require mainly desktop work and may include two travels to the PICTs region (Samoa, Fiji). The indicative work-time diagram and payment schedule is indicated below:

Deliverables	1	2	3	4
Deliverables 1 to 2 – Inception Report (1 st payment of 20%)	█			
Deliverables 3 to 4 – Draft Technical Paper and Policy Document (2 nd payment of 40%)	█	█		
Deliverables 5 to 6 – Final Project Document, paper and policy (Final payment 40%)		█	█	

In addition, the contractor will be required to deliver the following:

- Item High-resolution photographs (min. 3 MB, at least 20) – that illustrate the undertaken activities. The consultants will cede all appertaining rights to unlimited use of the respective pictures to PCREEE (SPC) and UNIDO.
- Item All used raw files and calculation sheets in editable form (e.g. xls)

4. Coordination and Reporting

The contractor works under the general guidance of the PCREEE and UNIDO Management Team. The contractor will closely coordinate with the PCREEE National Focal Institutions (NFIs) relevant key stakeholders in SPC Member States and other partners. The developed documents will be presented for consideration by the Fourth Meeting of the Pacific Ministers on Energy and Transport. All developed products under this assignment (incl. raw files and editable forms) will become property of PCREEE (SPC) and UNIDO.

5. Qualification and Evaluation Criteria

QUALIFICATION AND EVALUATION CRITERIA

- Registered consultancy company, individual consultant (registered as company) or organisation with at least five (5) years of existence and public and private energy consulting experience;
- The offered team must demonstrate sound knowledge of the PICTs sustainable energy landscape and SIDS energy issues;
- The offered team leader shall have at least 10 years of work experience in sustainable energy consulting;
- Quantity and quality of the demonstrated academic background of the project team in sustainable energies. At least one expert obtains a relevant Master's with specialisation in energy and/or environmental technologies; at least one expert demonstrates expertise in the area of electric mobility;
- Quantity and quality of the provided track-record of the project team regarding the preparation of technical papers and policy documents in the area of renewable energy and energy efficiency; experience with e-mobility assignments is a strong added value;
- The project team as a whole shall be fluent in English. Additional knowledge of French is an added value;
- Experience with gender mainstreaming strategies is an added value;
- Strong problem solving, communication, research and outstanding analytical writing skills, with a proven ability to write analytical reports;
- Ability to communicate effectively in order to communicate complex and technical information to technical and general audiences;
- Proven ability to lead and coordinate multidisciplinary teams;
- Immediate availability of the contractor;
- Full availability of the project team throughout the whole consultancy period; regularly engage in skype meetings with the PCREEE and UNIDO core team;

6. Application Procedure

Applicants shall submit their written proposals in English:

- Short technical proposal (including proposed approach and methodology, work and activity plan, detailed CVs of experts, copies of university degrees, certifications, licenses as well as proven track record of implemented assignments);
- Financial proposal in EUR including all costs and taxes (includes a detailed work-time-expert-diagram indicating daily rates for individual team members);
- Documents demonstrating the track-record of the project team;

7. Further information

Applicants are requested to submit their proposals in English no later than **June 27, 2019, 23:00 hrs, CEST**, by registering on the UNIDO procurement system (www.unido.org/procurement). In case of difficulties, submissions could exceptionally be sent to procurement@unido.org by providing a convincing explanation for doing so. Applicants can get in touch with the PCREEE Secretariat based in Tonga.

8. Further information

PCREEE Project Document
SPC Energy and Climate Policies
www.pcreee.org
www.spc.org
www.unido.org
www.gn-sec.net