Caribbean Community
Climate Change Centre

PILOT PUBLIC SCHOOL BUS TRANSPORTATION SYSTEM FOR ST. KITTS USING RENEWABLE ENERGY

TERMS OF REFERENCE FOR AN INDIVIDUAL CONSULTANT

TECHNICAL FEASIBILITY STUDY FOR TRANSFORMATION OF THE ST. KITTS AND NEVIS' PUBLIC TRANSPORT SECTOR TO ELECTRIC VEHICLES

1. INTRODUCTION AND BACKGROUND

St. Kitts and Nevis (SKN) is overwhelmingly dependent on imported petroleum products to satisfy its growing energy demand. More than 90% of the country's energy needs is met from imported petroleum products. The final consumption of the imported fuel is dominated by the electricity and transport sectors. According to the 2011 NEP, the "transportation sector consumes a large proportion of the imported petroleum products in the form of gasoline, diesel and aviation kerosene. The transportation sector in the Caribbean region is a major contributor of greenhouse gas emission. In addition to significant fuel requirements and greenhouse gas emissions, fossil fuel combustion for transportation energy has substantial negative effects on local pollution, noise, congestion, health, and safety. Interventions are therefore required to reduce the country's reliance on fossil fuels in the transportation sector. Alternate measures that will conserve or reduce petroleum-based fuels for transportation must be considered. An increase in the use and efficiency of these alternatives will have long-term economic and environmental benefits for the Federation.

Although the transport sector is a significant contribution to GHG emissions and national expenditure, the mitigation potential of transportation is often overlooked in the Caribbean. This is primarily a result of lack of readily available information. It is against these two considerations that the pilot project has been developed. St. Kitts and Nevis, through the *Electric School Bus and Charging Stations Pilot* initiative, will pilot green technology electric school buses to improve data collection and capture lessons learned for up-scaling nationally and across the region.

1.1 Project Objective

The overall goal of the project is to achieve emissions reduction in the transportation sector in St. Kitts and Nevis through the deployment of clean technology, as well as, improve data collection. Specific objectives of this project are to:

1. Collect data and assess the technical feasibility of an electric vehicle transportation system in St. Kitts and Nevis that could be replicated within the Caribbean region;

2. Fill critical data gaps in the transportation sector for electric vehicle options, e.g. in terms of types and specifications for electric vehicles suitable for the typography within St. Kitts & Nevis, electric power requirements, life-cycle of batteries and disposal requirements, renewable energy powered charging facilities etc.;
3. Develop local capacity through training in operations and maintenance of transportation systems;
4. Provide hands-on educational opportunities for young people in transportation green technology; and
5. Scoping for achieving verified GHG credits for emissions reductions projects.

Key transferrable outcomes expected from this project include:

1. Verification of electric vehicle suitability in a SIDS context, specifically taking into consideration any peculiarities of St. Kitts & Nevis and the broader Caribbean region;
2. Opportunities for coupling electric vehicles with renewable energy installations;
3. Replication of feasibility assessment outcomes; approaches for mitigating environmental and social risks of new electric vehicle technologies; and
4. Best practices for full life cycle assessments and decommissioning of non-compliant fossil fuel vehicles.

By piloting electric school buses, this initiative will have a strong health and green technology educational component.

2. OBJECTIVE OF THE CONSULTANCY

2.1 Purpose and Objective

The purpose of this consultancy is to provide the technical assessment to guide decision-makers in St. Kitts & Nevis on options available for transitioning the public sector transportation fleet to electric vehicles.

The objective of this consultancy is to undertake a Technical Feasibility Study using a life cycle approach, to establish the technical requirements to support the transition from fossil fuel powered vehicles to electric vehicles, powered by renewable energy, in public transportation.

3. THE TASK

3.1 General Tasks

The DOE requires the services of a consultant to provide technical assistance in conducting a technical feasibility assessment and produce a report with specific recommendations for implementation of the pilot project in public school transportation using electric buses charged by a charging station powered by PV system that could be scaled up.

The selected Consultant must demonstrate a thorough understanding of and familiarity with the subject matter, practical experience in the specific areas and fields and knowledge and familiarity

with the transport and energy sectors as well the Nationally Determined Contribution (NDC) of St. Kitts and Nevis under the United Nations Framework Convention on Climate Change (UNFCCC).

The scope of the Technical Feasibility Study is to inform decision-makers in St. Kitts and Nevis regarding options available for the transformation of the public sector's transportation fleet to low emission technology.

3.2 Specific Tasks

Specific activities under the Technical Feasibility Study include:

1. Facilitate an inception meeting with the DOE, the Centre and other key stakeholders where a work plan will be presented by the Consultant to guide the implementation of the consultancy.

2. Review all the relevant documents provided by the DOE, the Energy Department in the Ministry of Public Works, and the Ministry of Education, including the project document, the project work plan and any other source documents deemed necessary to complete the consultancy.

3. Consult with all key stakeholders, including the DOE, the Energy Department in the Ministry of Public Works and the Ministry of Education, private bus and taxi operators and as required.

4. Collect quantitative and qualitative data and information to support a market analysis.

5. Assess the available options and design a pathway for the conversion of the public sector's transportation fleet to electric vehicles following a staged basis as follows:
   - Stage I: starting with the school bus fleet
   - Stage II: wider government fleet
   - Stage III: wider public sector fleet

   Such 'Pathway' must include strategies for routing the pilot school bus system; future expansion and use of electric vehicles within St. Kitts & Nevis, spatial distribution of charging stations.

6. Conduct a Geographic Information System (GIS) spatial analysis for the optimal distribution of electric vehicle charging stations in St. Kitts and Nevis, highlighting the renewable energy requirements and design for the charging stations.

7. Identify and make recommendations on measures to address technological barriers including:
   - performance uncertainty;
   - market availability of technology and products;
   - high adjustment costs;
   - infrastructure barriers;
   - investment uncertainty
   - maintenance requirements for electric vehicles; and

- lack of standards.

8. Prepare the Technical Specifications and cost estimate for the procurement and installation of: (i) two (2) charging stations powered by PV system; and (ii) three (3) electric school buses.

9. Prepare a final report of the work undertaken in this consultancy. The report must include clear recommendations as well as the provision of information and data on the type and specifications for electric buses, the number of buses to be used in the pilot, electric power requirements, re-charge facilities, life cycle of batteries, etc.

4. OUTPUTS OF THE CONSULTANCY

The Consultant will plan and effectively undertake the required preparatory field work, establishing dialogue and a working relationship with stakeholders (funding partners, national counterparts and local communities), on the timely delivery of the agreed documents. It is within this broad context that the project will seek to complete the following outputs below.

At a minimum the consultant must produce and deliver the following reports and outputs:

1. **Inception report and work plan -** The Work Plan must reflect proposed dates and cover all activities pertaining to this assignment and should include, but is not limited to the following activities:

    - Inception meeting and the presentation of a work plan to the DOE/the Centre;
    - Consultation with key stakeholders;
    - Review of documentation and preparation of draft plans and reports;
    - Presentation deliverables;
    - Presentation of draft and final reports.

2. GIS data set and analysis of charging station distribution.

3. Draft Technical Feasibility report and the presentation of findings on matters including:
    - Options and strategy for the transportation pathway with supporting implementation plan;
    - GIS data set and analysis of charging station distribution with supporting maps and design drawings;
    - Technical specifications for the two (2) charging stations and three (3) electric school buses; and
    - Analysis of technological barriers and proposed solutions.

4. Final Technical Feasibility report that incorporates comments from stakeholders, including data sets, maps, etc.

5. REQUIREMENTS

5.1 Level of effort

The level of effort required for the completion of the tasks is estimated at a total of forty (40) person days and is expected to commence on or about January 15, 2018 and be completed by March 16, 2018.

5.2 Personnel

This assignment will be undertaken by an Individual Consultant. This position is open only to nationals of CARICOM, preferably a national or resident of Saint Kitts & Nevis.

The selected Consultant may sub-contract any portion of the assignment with the written consent of the Centre, but will be responsible for the preparation and presentation of the draft and final technical feasibility study reports and other required documents and reports to the DOE, as well as, all activities towards achieving the objectives of this terms of reference.

Minimum Qualifications and skills: Bachelor's degree in mechanical/electrical engineering, transport, planning, sustainable energy with specialisation in sustainable transportation or related field.

Post-graduate degree and specialised training in renewable energy, GIS, environmental management or related fields will be considered an asset.

General professional experience: At least five (5) years working experience in the field of transport modelling, sustainable transport or travel planning.

Specific professional experience: A minimum of three (3) years of experience with a proven experience assessing public, private and commercial transportation needs and analysing and devising new road/transportation schemes taking account of the introduction of electric vehicles and sustainable transportation requirements within the Caribbean. The consultant(s) should also be familiar with the energy/transport scenario in St. Kitts and Nevis or similar countries; and demonstrated evidence of successful project management and development of workflows, use of GIS technology and software, moderating consultations and meetings, team coordination and reporting. The consultant(s) should also be fluent in English and possess strong analytical and communication skills

6. SUPERVISION AND REPORTING

6.1 Supervision

The selected Consultant will report to the DOE Project Coordinator and will be responsible for the preparation and delivery of a comprehensive report of the activities undertaken within the terms of this consultancy, including those outputs/reports described above. The DOE Project Coordinator will be delegated responsibility for day to day liaison with the Consultant to ensure

that the expected outputs are achieved.

6.2 Reports

An electronic copy of the various reports and other outputs will be presented to the Head of the DOE and the Centre's Project Manager for distribution and review within the Ministry, the Centre and among other stakeholders.
The consultant will incorporate comments, feedback and inputs from the DOE and other stakeholders into the final report and other documents.

7. DURATION OF THE CONSULTANCY

It is expected that the implementation of this activity will be completed over the period commencing on January 15, 2018 and ending March 16, 2018 and will not exceed forty (40) total working days.

8. PLACE OF WORK

The Consultant will be required to make one trip to Saint Kitts for no less than 5 working days to hold consultations with stakeholders and to conduct field surveys. All other work will be conducted at the Consultant's home base.