National Energy
CORPORATION OF TRINIDAD AND TOBAGO

THE DESIGN, PROCUREMENT, SUPPLY, DELIVERY AND INSTALLATION OF A 100-KILOWATT SOLAR PHOTOVOLTAIC (PV) ROOFTOP MOUNTED SYSTEM AT THE PREYSAL SERVICE STATION

Trinidad and Tobago (T&T) is targeting and working towards a 15% reduction in cumulative greenhouse gas emissions by 2030; in absolute terms, this represents an equivalent to 103 million tonnes of Carbon Dioxide Equivalent (CO_2e) being removed from the environment. The Government of Trinidad and Tobago (GORTT)'s commitment to the Paris Agreement is that this reduction would come from industry, power generation and the transport sector from a business-as-usual 2013 baseline.

The Preysal Service Station project is a model for T&T that integrates renewable energy (RE) into a commercial business operating model. The service station will provide the public with the full range of liquid fuels, Compressed Natural Gas (CNG) and electric vehicle (EV) charging from renewable energy.

This project is an opportunity to collaborate with local universities to examine optimisation of the installed designed model against site specific collated performance data. Installation of a power management system that facilitates remote access to real-time operational data and development of advanced analytic capabilities to support decision-making, is a unique feature where technology was leveraged.

This project presents tremendous opportunities for:
- The promotion of renewable and sustainable energy use in T&T.
- Reduction in carbon footprint by using RE.
- Public awareness and education in the use and benefits of RE technology.
- Sustainable community development.
- Setting the standard for the adoption of RE technology in commercial applications to drive further implementation.

National Energy's Role

National Energy's strategic focus and experience in implementing RE and energy efficiency projects provided a perfect opportunity for the Company to develop and manage the Design, Procurement, Supply, Installation, Testing and Commissioning of a 100-kilowatt (kW) Solar PV System for the Preysal Service Station. All other electrical, civil and site works were executed by the National Petroleum Marketing Company Limited (NPMC).

National Energy's role in the project included the provision of project management services which encompassed:
- Contract and Tender Management for the Design, Procurement, Supply, Installation, Testing and Commissioning of a 100-kW Solar PV Rooftop-mounted System.
- Provision of consistent technical, engineering, and general support to all key stakeholders during the execution of the project to ensure that all prerequisites for a total system was delivered.
- Consistent interfacing and close monitoring and management of the project execution phase.

Project Objectives

- Design the capacity of the Solar PV system to be 100kW during peak operation.
- Installation of solar panels on the service station canopy.
- The solar PV system consisted of all the components necessary for the provision of the required power capacity, such as solar panels, inverters, batteries, electrical cabling/wiring, cable trays, charge controllers, mounting racks for the panels, power control units, temperature sensors, weather sensors, system performance and monitoring units.
- A battery bank designed to provide power autonomy for 24-hours.
- The PV system loads include:
- One rapid direct current (DC) charging port for EVs in the first instance.
- Canopy and peripheral lighting.
- Convenience Store in store and peripheral lighting.
- Liquid fuel dispensers.

The station is to be used as a Research and Development Platform for tertiary institutions.

The intention of the project is to:
- Introduce a new service station model for use as a template.
- Further demonstrate on a national level National Energy's capability in installing RE technologies.
- Demonstrate GORTT's continued commitment to the inclusion of renewable energy technologies at the national level.

Project Implementation

National Energy provided scope development, project design requirement development, budget estimate development, pre-qualification exercise, competitive tendering to successful pre-qualified contractors and coordination with the NPMC and NGC CNG to support project implementation.

National Energy was responsible for the Solar PV component of the station, while NPMC and NGC CNG were responsible for all other aspects of works related to the station.

National Energy conducted a public prequalification exercise through which responses from contractors were assessed and a Request for Proposal was issued to the pre-qualified contractors.

The tenders were evaluated by a cross functional team led by National Energy and comprised of members from the National Gas Company of Trinidad and Tobago Limited (NGC) and its other subsidiaries. A contract was executed in March 2020 during the COVID-19 pandemic.

The required Health Safety Security and Environment (HSSE) measures were immediately enforced, and the project continued, albeit under COVID-19 regulations/guidelines. The Trinidad and Tobago Electricity Commission (T&TEC) and Government Electrical Inspectorate (GEI) were engaged to ensure that the system met the required codes, standards, design specifications and other requirements.

To ensure compliance with design and construction standards, the Contractor was required to, at a minimum, ensure that all equipment and works met all local and international applicable standards for Solar PV systems.

Electrical Supply

T&TEC supplies the service station with a 12kV, 3 Phase power supply. The 12kV supply is distributed via two Ring Main Unit (RMU) switches and stepped down to utilization voltages via two pad mounted transformers. The utilization voltages are 480/277V, 3 Phase and 230/115V, 3 Phase, for the CNG electrical distribution system and all other loads, respectively.

The PV system is a bimodal system with battery storage. A bimodal PV system can operate in either utility-interactive or stand-alone mode. Battery autonomy was designed to support the estimated load throughout the average period of 24-hours.

Conclusion

The project represents a 'new and first of its kind' service station in T&T and is a model not only for future service stations, but for other commercial applications. National Energy and by extension, the NGC Group of Companies, continue forward on implementation of its Green Agenda while changing the local narrative and conversations on integrating RE into the local commercial and industrial landscape. This project signals that the energy transition is here in T&T and National Energy is ecstatic to be at the forefront of this energy evolution!