# T&TEC's Role in the Development of Renewable Energy Technologies in Trinidad and Tobago

A steady increase in the demand for electricity, coupled with the growing awareness that fuel reserves will not last forever, has led countries worldwide to seek alternative means of electricity production. These considerations, along with the negative impact that the burning of fossil fuels has on the environment, has resulted in international focus being placed on the development of renewable energy (RE) technologies.

The Government of Trinidad and Tobago has put forward a mandate that 10% of electrical energy must be generated from renewable sources by 2021. To that end, the Trinidad and Tobago Electricity Commission (T&TEC), as a member of the Cabinet-appointed Renewable Energy Committee(REC), is involved in the formulation of a national policy on renewable energy and is currently engaged in research on the development of renewable energy sources, in particular, wind and solar, with additional research planned for tidal and waste-to-energy.

T&TEC acknowledges that reliable, sustainable energy sources are critical for national development and stability and already several initiatives focusing on alternative sources of energy, have been implemented.

Leading by example, grid-connected solar panels are operational at T&TEC's Stanley Ottley Building at Mt. Hope and have been collecting data since early 2013. A hybrid project at the Islamic Children's Home in Gasparillo combines solar panels and wind turbines, and solar panels are installed at the University of Trinidad and Tobago's (UTT) O'Meara campus. Additionally, the Housing Development Corporation (HDC), an agency of the Ministry of Housing and Urban Development has a project in the Mayaro area that is powered by wind turbines. T&TEC expects that other projects will come on stream in the near future.

**As a member of the Cabinet-appointed Renewable Energy Committee (REC), T&TEC has been conducting research on the following RE sources:**

## Wind Energy

The conversion of wind energy to electricity on a large scale requires the use of wind farms that constitute wind turbines connected to a power grid.

A pivotal step in the process towards the development of a wind farm is the formulation of an Annual Energy Production (AEP) estimate. The AEP estimate helps determine the economic and environmental benefits of any proposed wind turbine system.

T&TEC had the opportunity to analyse existing wind speed data records of BPTT and the Meteorological Office of Trinidad and Tobago in order to conduct an AEP estimate. However, neither record fully captured all the information required for the formulation of an AEP estimate.

In an effort to mitigate the extended length of time required for the study, the Commission has set about to screen sites which might be suitable for wind power. To this end, a preliminary survey along the Toco Main Road and the Manzanilla Mayaro Road was carried out to obtain 'spot readings' as well as observe permanent vegetation deformation as an effect of prevailing winds. The data and evidence gathered was found to be sufficient for further investigation.

A similar approach was also applied to Tobago and consequently, a wind measurement and resource assessment study was commissioned in 2015. T&TEC is on its second and final phase of data collection from wind measurement stations on the island. Already the two locations - Ministers Bay and Flag Staff Hill, overlooking Charloteville - have recorded "optimistic" readings. The data collection project is expected to be completed by the third quarter of 2016. The findings will provide a realistic assessment of the available wind energy and guide the possible installation of small to medium sized wind farms in Tobago and the specifications for infrastructure.

In anticipation of 'Micro' wind turbines (less than 10KW) as power sources eventually being added to the power generation mix, the Ministry of Public Utilities is expected to make significant strides before the end of 2016 when amendments to the T&TEC Act will be laid in Parliament to allow for the generation of electricity from renewable sources. This will also apply to solar panels installed on roof tops at domestic installations.

## Solar Energy Initiatives

Like the wind, the sun's rays during the day can be viewed as a limitless source of energy just waiting to be accessed. Photovoltaic (PV) technologies seek to do just that via the use of materials that convert solar radiation into electricity.

In an effort to facilitate research and development, as well as training, in the area of PV, the Ministry of Energy and Energy Affairs funded three projects which T&TEC undertook in collaboration with the Electrical Code Committee of the Board of Engineering of Trinidad and Tobago (B.O.E.T.T.), as well as the University of Trinidad Tobago, the Government Electrical Inspectorate and the Ministry of Public Utilities. The pilot projects examined the very important issue of real-time grid integration, with safety and metering considerations in mind.

## Waste to Energy and Tidal Energy Initiatives

The Commission is currently involved in preliminary discussions regarding the research and development of technologies to use waste and tidal currents as energy sources. The application of tidal energy is expected to be very small localised projects with a potential of approximately 0.5MW each. The much more attractive source of alternate energy really comes in the form of 'Waste to Energy'. T&TEC recognises that waste to energy is a dispatchable source of energy, as the energy output is not affected by the variability of naturally occurring energy sources such as wind or sunlight, which can only be used when available.

Trinidad's dump sites located at Beetham and Forres Park can potentially generate power that can be produced and sustained 24 hours a day, 7 days per week, thus making it very dependable. Equally important to the country, is that waste to energy technology removes large amounts of waste in an environmentally friendly manner, creates jobs and provides an opportunity to reduce the size of present dump sites. The gas generated from this technology known as 'Syngas' or 'Producer Gas' need not be burnt at existing dump sites but can be blended with the existing natural gas and transported to established generating sites to generate electricity.

There is tremendous potential to add renewable energy to the electricity production mix in Trinidad and Tobago. T&TEC is prepared and able to make this transition, there being no technical hurdles.