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National Energy Policy Consultations: Carbon Reductions Strategies

Ministry of Energy and Energy Affairs, Government of the Republic of Trinidad and Tobago

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NATIONAL ENERGY POLICY CONSULTATIONS

CARBON REDUCTION STRATEGIES

Re-fueling T&T's economic engine:
A new policy for energy, 2011-2015

Carbon Reduction Strategies

Global Context

The United Nations Framework Convention on Climate Change (UNFCCC) entered into force in 1994 and was developed to provide a framework for member countries to work towards the stabilization and ultimately the reduction of greenhouse gas (GHG) concentrations in the atmosphere. The UNFCCC was later complemented by the 1997 Kyoto Protocol under which member countries are committed to achieving specific emissions reduction targets by December 2012. The goal is to stabilize greenhouse gases at a level that will limit dangerous human interference with the world's climate system, and in a timeframe that would allow ecosystems to adapt naturally so that it will not hamper food production and will allow sustainable economic development. In order to fulfill these objectives many governments have developed and are implementing National Carbon Reduction Policies and Strategies which are designed to address specific areas of critical carbon emission.

Trinidad and Tobago (T&T) is ranked 7th in the world with respect to emissions per capita (16.8) and 72nd in the world with respect to annual total carbon dioxide (CO₂) emissions. [2003 Source International Energy Agency]

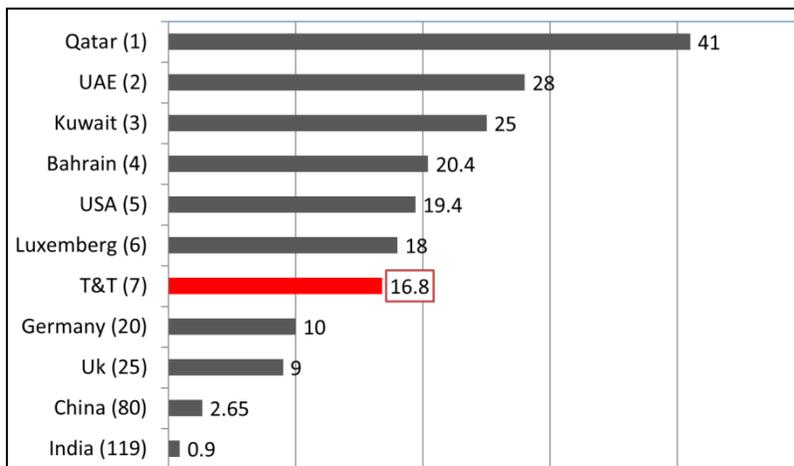


Figure 1 Ranking and per capita comparisons

Regional Efforts

Carbon Reduction initiatives in the Latin American and Caribbean region are generally complementary to efforts primarily focused on improving energy security and

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reducing exposure to the high price volatility traditionally associated with an extreme reliance on imported liquid fossil fuels. For these countries Energy Efficiency improvements, fuel switching to natural gas and the integration of renewables into the energy mix either directly or through electricity interconnection all result in an overall reduction in their national carbon footprint.

Trinidad and Tobago

Government Policy Initiatives

The Republic of Trinidad & Tobago is a ratified signatory to both the UNFCCC and the Kyoto Protocol. In support of our attendant obligations to these international arrangements, the Government has agreed to the following:

1. Development of a Climate Change Policy.
2. Establishment of a Renewable Energy Committee.
3. Establishment of a Carbon Reduction Strategies (CRS) Task Force.

A Draft Climate Change Policy document has already been prepared and circulated for public comment. A series of national consultation have been conducted and valuable feedback from various stakeholders is currently being reviewed and considered for integration into the final policy document.

The Renewable Energy Committee has developed a Draft Renewable Energy Policy and has identified and proposed several initiatives many of which are already at various stages of implementation. These include the promotion of alternative energy technologies and the introduction of fiscal incentives designed to improve the commercial viability of conversion and accelerate the transition to renewable alternatives.

The CRS Task Force has also commenced its deliberations. Its mandate is:

1. To develop a National “Carbon Reduction Strategy”
2. To develop a regulatory & policy environment for carbon capture, storage, utilisation and credit trading.
3. To recommend suitable projects and incentives to attract investment from companies and research bodies interested in exploring and pursuing Carbon Reduction initiatives.

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The National Carbon Reduction Strategy is expected to define and incorporate a Carbon Capture and Storage Project which identifies the key stakeholders, the technologies and the implications, if any, for existing and future natural gas-based industrial facilities.

Carbon Reduction Strategies

Options to manage CO₂ emissions can generally be placed in two broad categories:

1. Strategies that enable use of less carbon such as Energy Efficiency (EE) improvements and energy conservation.
2. Strategies that result in less carbon emissions, such as fuel switching (including the integration of renewables), CO₂ re-use and carbon capture and storage.

Trinidad and Tobago CO₂ Emission Profile

Trinidad and Tobago has been utilizing natural gas as a feedstock for producing petrochemicals and generating power since 1959. Gas utilization has experienced phenomenal growth over the last thirty years since the establishment of the Pt. Lisas Industrial Estate and particularly over the last decade with the commissioning and subsequent expansion of Atlantic LNG's natural gas liquefaction facilities at Pt. Fortin.

Recent studies have estimated that T&T produces approximately 40 million tons of CO₂ per year. The three largest sources of CO₂ emissions include petrochemical manufacture, power generation (including power for LNG) and the primarily liquid fuel- based transportation sector. These sources combined account for about 93% of the total CO₂ emissions. The main contributors to the level of emissions in T&T can be seen in figure 2 below. [Source UTT, Boodlal and Al Taweel (2010)]

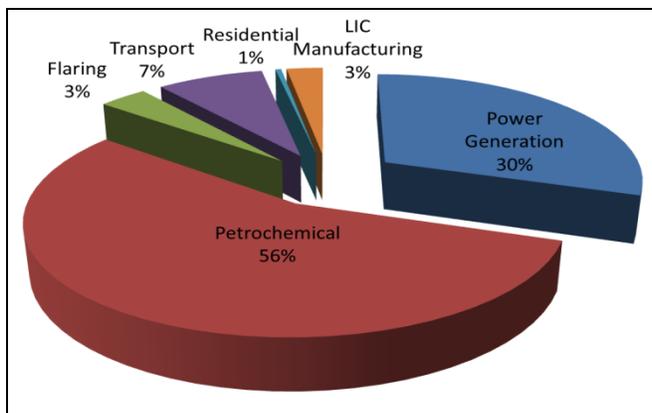


Figure 2 Major contributors of CO₂ emissions in T&T

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Reduction initiatives should therefore strategically target these major contributors if we are to achieve any significant reduction in the overall national carbon footprint.

Energy Efficiency and Conservation

Energy efficiency (EE) is usually at the top of the policy agenda in many countries. Trinidad and Tobago is no different and as such we are currently seeking to quantify and improve our national energy efficiency index.

A key intervention in this area is improvement in the energy efficiency of electricity generation through the phase out and retrofitting of simple cycle gas turbine generating capacity and the adoption of combined cycle technology as the predominant mode of power generation. In addition to these infrastructural changes particular attention will also be focused on improving operational efficiency throughout the electricity generation, transmission and distribution system.

In the context of the limited and finite nature of our natural gas resource base and the country's continued thrust into sustainable gas-based development via our energy and industrial sector improvements in this area will be of critical importance. It is therefore imperative that EE must be integral to the operations of existing plants and must be a significant feature of the design basis and implementation strategy for the development of new projects.

In this regard the National Energy Corporation (NEC) has been recently mandated to embark on a study to establish a framework for the execution of energy audits and the determination of baseline data for the petrochemical plants at the Point Lisas Industrial Estate. The Terms of Reference (TOR) for this study includes:

1. Development of an Energy Efficiency Policy
2. Establishment of a framework for development of an Energy Efficiency Programme that involves the following:
 - Establishment of baseline data
 - Development of an energy audit programme including an energy audit manual and mechanisms for industry compliance
 - Design of training programs for development of local auditing expertise
 - Identification of areas for improvement in energy efficiency
 - Development of a benchmarking programme

The results of the study will provide:

1. The structure and basis for a sustainable policy that promotes energy efficiency and provides a roadmap for formulating plans and programmes for achieving relevant targets in appropriate timeframes.

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2. Guidelines and action items for design, implementation and evaluation of energy efficiency programmes specifically formulated for existing and future facilities in the local Petrochemical Sector.

Transportation Fuel Conversion

The policy goal for the transportation sector, as outlined in the Draft Renewable Energy Policy is to reduce carbon emissions by the choice of fuels used for transportation. The policy recommends the following for the transportation sector:

- Promotion of research and development on Biofuels (ethanol and diesel) to make the production of biofuels a practical method of reducing GHG emissions and providing RE;
- Promotion of the importation of cars that run on alternative forms of energy by providing incentives for the importation, sale and purchase of hybrid vehicles;
- Research and development will be encouraged into alternative energy to continuously improve the efficiency of the transportation sector and reduce GHG emissions; and
- Consideration to the gradual phasing out of existing subsidies on gasoline and diesel fuels to encourage conservation and a switch to alternative fuels.

Government has stated its intent to move towards the development of Compressed Natural Gas (CNG) as a major vehicular fuel in Trinidad and Tobago in order to reduce the amount of liquid fuels consumed in the country. Environmental and economic benefits of this would include: improvement in the emissions to the environment from vehicles by the use of CNG instead of liquid fuels, reduction in the petroleum products subsidy and increase in foreign exchange earnings from export of the liquid fuels which are no longer consumed locally.

Some of the fiscal and operational measures to be put in place include:

- Establishment of CNG Conversion Centres
- Development of an adequate National Network of CNG refueling service stations
- Use of composite cylinders instead of steel cylinders for storage of CNG in the vehicles
- Removal of Customs Import Duty on both the CNG conversion kits and the CNG cylinders required for a vehicle to convert from using gasoline to CNG
- Import of dedicated CNG Vehicles

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Carbon Dioxide (CO₂) Capture, Re-use and Sequestration

One of the key opportunities available to use CO₂ includes its use for CO₂ EOR (3 billion barrels increased potential). It has been suggested that all CO₂ emitted in the country by large point sources can be captured and directed to EOR projects using CO₂ as the displacing fluid. CO₂ EOR has been employed with good success in other jurisdictions and has been found to be very attractive for reservoirs at the end of primary and secondary production, where there is still substantial remaining oil in the formations. This technique can also add new life to many mature steamfloods no longer on injection. There is potentially a great opportunity for improved recoveries in Trinidad and Tobago due to the presence of significant heavy oil located in reasonable proximity to CO₂ sources, such as the petrochemical facilities in the Point Lisas area, with multiple ammonia plants located there. At the present time, relatively pure CO₂ derived as a waste product of ammonia production appears to be the best option for capture and utilization in these projects.

One of the historical challenges to the use of CO₂ for EOR has been the economics of the establishment and operation of appropriate infrastructure to support the reliable delivery of CO₂ from emission sources (gas-based plants) to locations where it can be effectively utilized (producing fields).

The CRS Task Force is currently developing a business model for rollout to key stakeholders and potential investors. The model will in the first instance focus on CO₂ from the Pt. Lisas area and is expected to include relevant information to inform forward investment decisions and will incorporate the following:

- Identification and characterisation of all sources of CO₂
- Determination of current and projected CO₂ utilization for Urea and Methanol production.
- Determination of the surplus quantities of CO₂ available for export from the estate.
- Design and technology selection for effective and efficient capture & treatment of CO₂.
- Compression & transmission infrastructure for CO₂ delivery from the Pt Lisas area to oilfields located mainly in the southern basin. This will include a consideration right of way availability, as appropriate.
- HSE systems and procedural requirements.
- Identification of other possible CO₂ utilization alternatives at other locations besides use in CO₂ EOR and CO₂ sequestration.

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- Costs associated with the capture, compression, transmission and possible storage of CO₂.
- Determination of relevant Legislative and fiscal support, if required.