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Fiscal incentives promoting REEE measures in Trinidad and Tobago

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Abstract

Purpose Dependence on foreign energy supplies has resulted in some islands successfully harnessing alternative and renewable energy (RE) sources in order to provide a small degree of self-sufficiency. However, the development of Trinidad and Tobago (T&T)'s RE industry has stagnated, largely due to the existence of substantial energy subsidies, which present cheap fuel and electricity prices thus providing a disincentive to RE investment. This paper seeks to re-enforce the necessity for an indissoluble government intervention in the establishment of well-designed, coordinated and innovative public–private partnerships for a successful RE industry in T&T.

Methodology This paper is based on a review of relevant social and economic literary sources; the research topic has been meticulously investigated.

Findings Initial outcomes indicate that the principal facilitators of RE proliferation in the Caribbean, and more so T&T, will require (i) gradual reduction of the energy subsidy; (ii) declining project costs via fiscal incentives and grant financing; (iii) expectation of beneficial rates of return on investment through the guarantee of optimal prices for renewable electricity or the revenue gained from the sale of carbon credits; and (iv) capacity building, institutional strengthening and implementation of appropriate legislative and regulatory instruments which provide open access to the national grid.

Research limitations/ implications With the exception of T&T, Caribbean nations are heavily dependent on oil and gas imports to meet their primary energy requirements. The investigation conducted has limited documentation on cases of a similar nature within the region. The outcome of the steps identified above are based on conjecture using information gained from international situations. Practical implications – The study helps clarify the crucial role of T&T's government in the successful development of our RE industry. Resources and earnings should be used to develop T&T's infant RE industry and hence reduce the carbon footprint of the nation.

Originality/value Past attempts by the government to promote RE and EE (energy efficiency) in T&T have been passive and prevaricated. In addition to outlining the existing fiscal initiatives available to the population, this paper provides short, medium and long term recommendations for the sustainability of RE in T&T. While subsidy reform, among others, poses a challenge it is nonetheless imperative if T&T is to move forward. With our abundance of solar, wind and waste-to-energy resources, there is great potential for a successful RE industry in T&T. More than just policy will be required to drive change; greater commitment by the government to ensure the sustainability and economic viability of T&T is required, while also attempting to alter the mindset of the citizenry to act as effective stewards of the island's resources for the wellbeing of future generations.

Keywords Renewable, Energy, Subsidy, Incentives, Investment

Paper type Research paper

Introduction

This article will attempt to provide a review of the social and economic measures which affect the feasibility of renewable energy (RE) utilisation in Trinidad and Tobago (T&T), and fiscal incentives which have been and should be implemented to promote greater sustainable energy development.

To date, many global economies are still in recovery mode stemming from the Global Financial Crisis while facing ascending oil prices and all-time high records of greenhouse gas (GHG) emissions. In essence, if the current modes of energy demand and supply from fossil fuels are left unhindered there will be a continued threat to global energy security, economic development, health and the environment, all of which are greatly unsustainable for present and future generations.

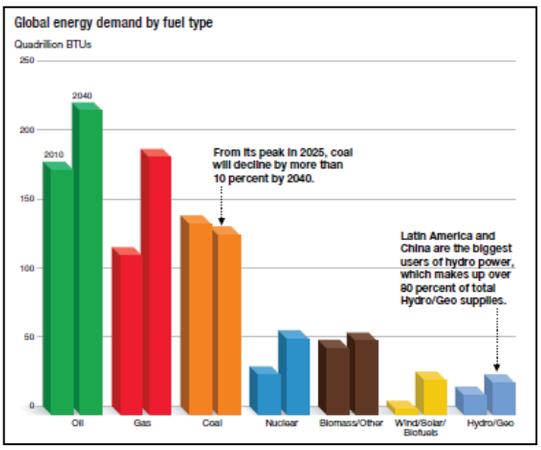

Figure 1. *Forecast of world primary energy demand by fuel type by (ExxonMObil, 2012)*

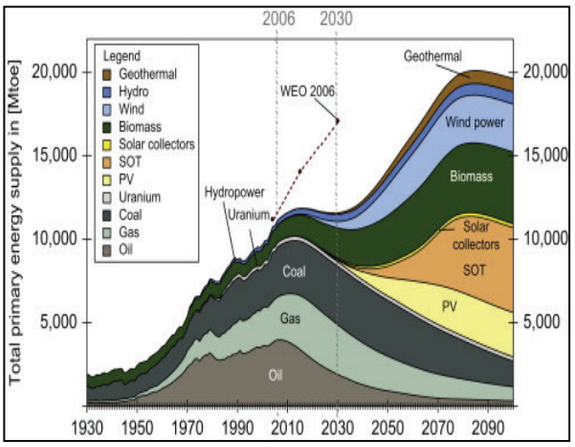

Figure 2. *Forecast of world primary energy supply by 2100 (Zerta et al., 2008)*

Studies on world energy consumption up to the year 2040 indicate that oil and gas will account for a %60 share of global energy demand as shown in Figure 1. Fortunately, other studies with projections as far as the year 2100 all produced similar forecasts: world energy supply will be dominated by RE sources, as in Figure 2.

Overview of Trinidad and Tobago's energy landscape

In 2011, T&T's energy sector accounted for %45.3 of GDP, %57.5 of government revenues, %82.3 of exports and %3 of total employment (MOF, 2012). T&T experienced notable economic booms between 82–1973 and 08–2002 as illustrated in Figure 3, both of which stemmed from the energy sector.

These events resulted in T&T experiencing the classic case of "Dutch Disease", which is characterised by the side effects of a boom in a large important sector, such as energy, on the rest of the country's economy (Figure 4) (CBTT, 2012). These effects tend to include:

- *increasing inflation and cost of living;*
- *lack of economic competition;*
- *lack of development of other economic sectors such as agriculture and manufacturing;*
- *transmission of benefits via government budgets;*
- *corruption and political instability.*

The possibility of another such boom is unlikely as hydrocarbons have a finite lifespan (Figure 5). It is therefore beneficial for T&T to focus on further developing alternative forms of energy as well as non-energy related aspects of the economy whilst operating in a manner which anticipates the improbability of a third recurrence. The uses of oil and natural gas in T&T are primarily for power generation, transportation and petrochemical manufacturing. In terms of electricity, natural gas and diesel account for %99 and %1 respectively of primary fuel for generation. With the exception of the Bahamas, T&T's power demands greatly surpass those of other Caribbean islands (as seen in Figure 6). In 2012, approximately %57 of the power generated was consumed by T&T's light and heavy industries, %30 by the residential sector, with the remaining percentage allocated to the commercial sector and street lighting at %11 and %2 respectively (Seebaran, 2012). T&T is said to demonstrate one of the highest levels of energy consumption per capita globally which can be attributed to the subsidy-derived low cost of electricity at US0.06$/kWh (Blechinger et al., 2011). This price is one of the lowest rates, not only in the Caribbean region, but also Latin America, which has resulted in a complete lack of efficient energy use and significant amounts of wastage. Furthermore, T&T's peak power demand is expected to increase to 2700MW by 2020 due in part to economic development activities and higher standards of living (REC, 2011; Trinidad Express Newspapers, 2013). The dominance of T&T's energy sector, high energy consumption per capita, low energy efficiency of utilisation has further resulted in the country being recognised as the second largest emitter of carbon dioxide per capita globally in 2012 (CDIAC, 2012). Despite having a negligible overall contribution to global greenhouse gas emissions of > %0.1, T&T is nonetheless vulnerable to the effects of climate change as the majority of its coastal populations and infrastructure will come under threat from rising sea levels, for example.

Non-sustainability of Trinidad and Tobago's fuel subsidy

The removal of fossil fuel subsidies globally is expected to impact upon governments' national budgets, climate change and energy markets (IEA, 2012). In 2011, global energy consumption subsidies were estimated to be 523$ billion where oil and oil product subsidies represented more than %50 of this figure (see Figures ,7 8) (IEA, 2012). Alternatively, for the same period subsidies for RE sources amounted to 88$ billion (IEA, 2012).

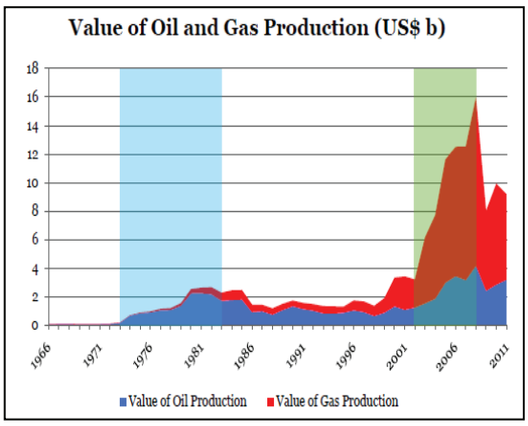

Figure 3. *Boom I was due to an oil price shock resulting in higher production; Boom II also resulted from a spike in oil prices but was dominated by the gas effect (CBTT, 2012)*

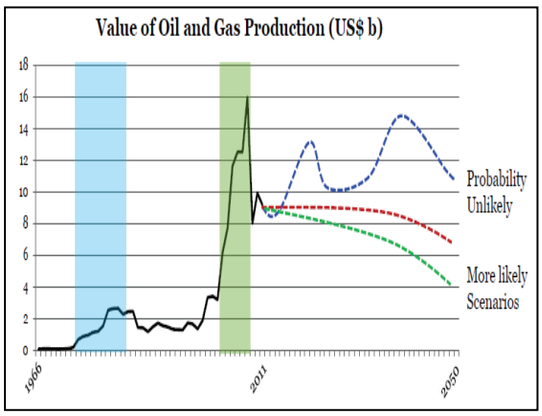

Figure 5. *Predictions of a third oil and gas boom in T&T (CBTT, 2012)*

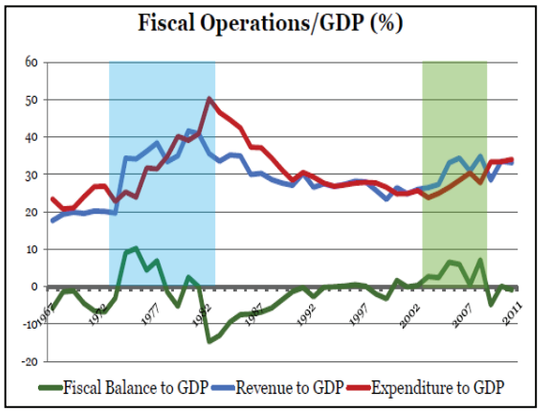

Figure 4. *Revenue increased immediately with surpluses accumulating during boom episodes which were the followed by deficits(CBTT, 2012)*

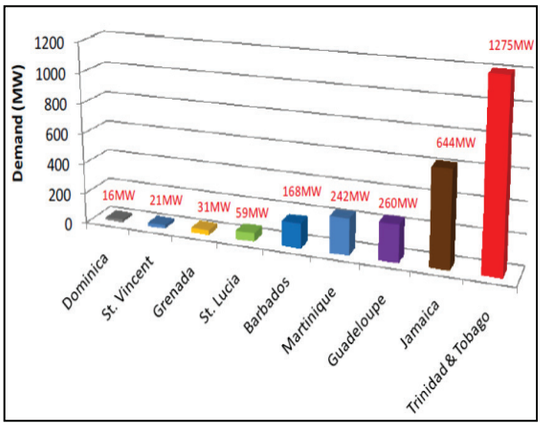

Figure 6. *T&T's high energy demands in comparison to other selected Caribbean islands (Seebaran, 2012)*

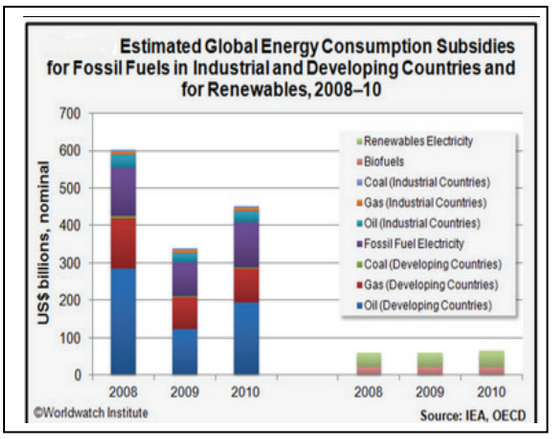

Figure 7. *Estimates of global energy subsidies according to fuel type. Compared to 2011, energy subsidies in 2010 amounted to 412$ billion (IEA, 2010)*

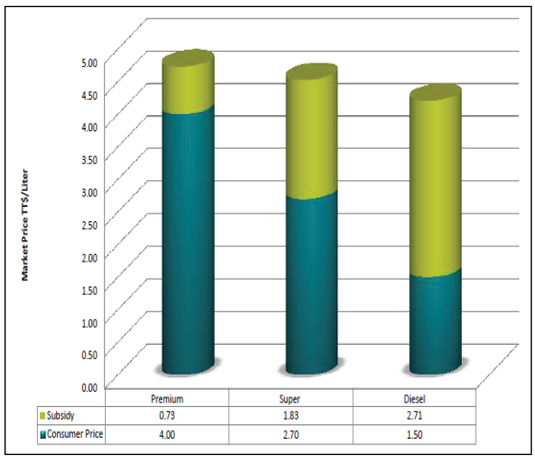

Figure 8. *Prices for premium unleaded, super and diesel fuel in T&T with and without the 2012 fuel subsidy (EC, 2012)*

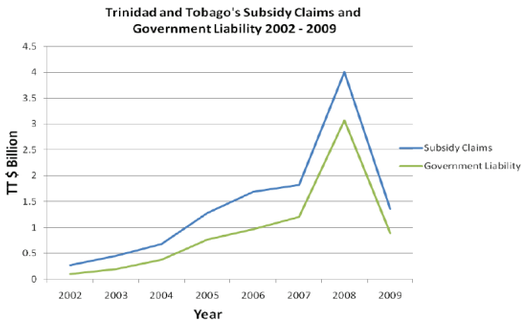

Figure 9. *Growth in T&T's fuel subsidy from 09–2002 (REC, 2011)*

It is necessary for governments to support the gradual phase-out of inefficient hydrocarbon fuel subsidies which promote wasteful energy consumption activities (IEA, 2012). Like many other countries, T&T must pursue reforms; however, social, economic and political obstacles must be overcome in order to achieve lasting benefits (IEA, 2012).

Petroleum subsidies were introduced to T&T in 1974 via the Petroleum Production Levy and Subsidy Act for the purposes of protecting consumers from the impacts of increasing oil prices on transportation costs, stemming inflation and promoting economic growth.

Economic rents resulting from T&T's oil and gas reserves have provided the government with enough revenue to be able to subsidise fuel for transportation and electricity for the entire population, as opposed to those most in need. However, the fuel subsidy has grown unsustainably over the past decade, as indicated in Figure 9, with

fluctuations in global oil prices and fuel consumption levels becoming an increasing burden for the government to maintain. For example, the fuel subsidy in 2012 was recorded at TT4.4$ billion of which %52 or TT2.3$ billion was allocated to diesel (EC, 2012). However, the effect of allowing the whole population to benefit from fuel subsidies is that the higher income households tend to benefit disproportionately.

Statistics indicate that increasing quantities of transport fuel (super, premium, regular, kerosene, diesel) are being consumed locally and the provision of fuel at levels below market price has increased its demand but also encouraged its wasteful and inefficient use. This development, coupled with declining oil production rates since 2000, has inadvertently put T&T in a gradually escalating unsustainable fiscal situation. This disparity between rising fuel consumption and declining supply continues to widen.

Given the significant role that energy plays in T&T's economy, the reform and reduction of the fuel subsidy should be analysed in the context of sustainable development, particularly in terms of economic growth, poverty reduction and environment. However, steadily increasing oil prices, partly due to growing economic activity in developing nations and predictions of declining global reserves, provide support for continuing the fuel subsidy. Government provision of this subsidy has encouraged high levels of consumption but negligible efficiency of energy use or conservation. The state of the macro-economy must also be considered as the government attempts to shield the population from the true market price of fuel despite the significant cost to the state and to the detriment of other national priorities.

The existence of this fuel subsidy has also delayed the advancement of alternative energy sources and energy efficiency (EE) measures due to the inability to attract sufficient investors and inadequate buy-in from fuel consumers for the utilisation of CNG for transport. In theory, the removal of the fuel subsidy should provide opportunities for the reallocation of funds to renewable and alternative energy development, as well as other areas of national importance.

Challenges to subsidy reform

An implication arising from an increase in the price of artificially inexpensive fuel is that the less fortunate groups in society will be unequally disadvantaged, with the potential to create civil unrest, as observed in other countries which have attempted to remove their fuel subsidies.
Some of the documented impacts which have occurred worldwide following a reduction in energy subsidies include:

- *restricted access to electricity services;*

- *an estimated %86 higher cost of fuel at the pump;*

- *increased transportation costs by about %42;*

- *a rise in overall prices by approximately %48 (IEA, 2012).*

These potential impacts all threaten the economic survival of the less wealthy groups in society. To this effect, it appears that a full-scale removal of the fuel subsidy can be likened to a form of political suicide.

Trinidad and Tobago's current hydrocarbon reserves position

By the end of 2011, T&T was estimated to have 0.1 thousand million tonnes or 0.8 thousand million barrels of remaining proved oil reserves (BP, 2012). For the same period, T&T's remaining proved natural gas reserves were estimated at 14.2 trillion cubic feet (tcf) or 0.4 trillion cubic metres (BP, 2012).

T&T's oil production is steadily declining with a rate of approximately 91,000 bopd in 2012 down from a 1978 high of around 230,000 bopd (MEEA, 2013). At this time however, oil imported from various countries (see Figure 10) is required to sustain the local oil refinery, which has an estimated capacity of around 175,000 bopd (MEEA, 2013).

The 2011 Ryder Scott report indicated that T&T had around 10 years remaining of proven natural gas reserves at an estimated quantity of 13.257tcf. Over the same period, the estimates of proven and probable reserves declined to 19.292tcf from a 2010 average of 21.1tcf while the country's exploration potential increased to 30.83tcf, bringing the entire basin potential to 56.28tcf (BP, 2012). In late 2012, a natural gas discovery of approximately 1tcf was made, which increased natural gas production levels in T&T up to approximately 4.2bcf per day (MEEA, 2013).

For comparative purposes, T&T was recorded as having less than 0.05 mtoe consumption of wind, solar, biomass, geothermal and waste energy in 2011 (BP, 2012).

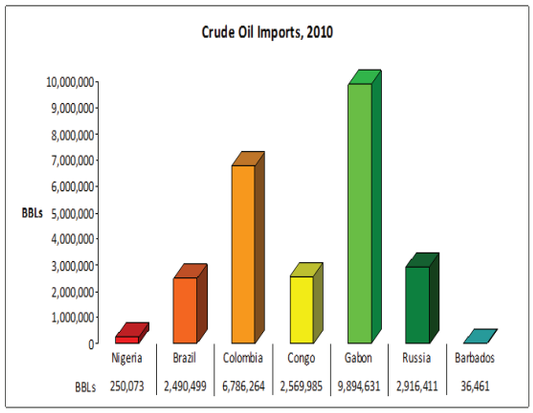

Figure 10. *Crude oil imports into T&T for 2010 (MEEA, 2010)*

High cost of production of Trinidad and Tobago's deepwater resources

T&T's deepwater acreage comprises an area measuring approximately 40,000 km2 east of the currently producing fields. This acreage has been divided into 36 exploration blocks, four of which were won by BHP Billiton in the 2012 deepwater bid round (Rigzone, 2013). T&T's deepwater areas have been underexplored due to a number of reasons, one in particular being the significant costs of deepwater operations (Bowman et al., 2012). For example, BHP will be committing funds totalling US565$ million for the exploration stage which involves attaining over 5000 km2 in seismic data and the drilling of six exploration wells and a further US459$ million for other phases (Rigzone, 2013). The oil and natural gas potential of these deepwater blocks is estimated to be 428 to 4,200 million barrels of oil and 2.4 to 23.6 tcf respectively. As technology advances and exploration and production costs become less expensive, more of T&T's deepwater blocks may be explored, which has the potential to further delay the development of the local RE sector.

Challenges to renewable energy development in Trinidad and Tobago

Some of the challenges and limitations associated with RE implementation in T&T are briefly acknowledged below:

Subsidised electricity and fuel prices act as disincentives

Subsidisation of "petroleum product prices" under The Petroleum Production Levy and Subsidy Act has produced some of the lowest fuel and electricity prices throughout the Caribbean and Latin America (REC, 2011; Trinidad Express, 2013).

Absence of appropriate domestic policy, legislative and regulatory frameworks

T&T presently refers to its out-of-date 1998 Green Paper for a National Energy Policy which comprises minimal provisions for alternative energy sources and EE mechanisms. A more current Energy Policy and RE Policy are however, in the draft phases with the latter having a Framework for Development of a RE Policy published in 2011.

In terms of legislation, the Trinidad and Tobago Electricity Commission Act focuses on natural gas-fuelled power generation and lacks provisions for grid interconnection by RE generators. Furthermore, no guidelines exist for establishing net-metering, open access or feed-in tariffs to facilitate distributed generation (MEEA, 2011). Other pieces of legislation requiring immediate revision to aid RE development include the RIC Act; Fiscal Incentives Act; Petroleum Act; and Petroleum Production Levy and Subsidy Act (REC, 2011).

Despite T&T's policies currently being in the formulation phase, a CARICOM Energy Policy was established in March 2013 which encompasses issues such as sustainability, RE, EE and conservation, climate change and environment for its Member States. In addition to individual country energy policies this regional policy is considered vital to achieving sustainable development within the Caribbean (CEP, 2013).

Market and commercialisation

T&T's RE market is in its infancy stage and faces hurdles such as inadequate RE resource baseline information; restricted capital access and high transaction costs (MEEA, 2011). Due to limited land space, T&T's ability to benefit from economies of scale is inhibited. Commercialisation is also difficult due to the economy's deficient absorptive capacity to fully utilise the synergies achieved through large-scale processes. Therefore to offset this restrictive market, an innovative system for marketing and distribution ought to be pursued.

High capital costs

The capital expenditure associated with RE technologies and the manufacture of such equipment locally is presently a deterrent as the cost is significantly higher when compared to fossil fuel technologies despite the overall lower operating costs. These higher technology costs translate into high prices per unit of renewable electricity produced, as shown in Figure 11. RE technologies, thus require greater private sector financing, but with the lack of local venture capitalists, government support via financial instruments is vital to make RE an attractive option.

Other challenges include the lack of education and public awareness, slow decision-making processes in T&T and the %20 penetration limit placed on the grid (REC, 2011).

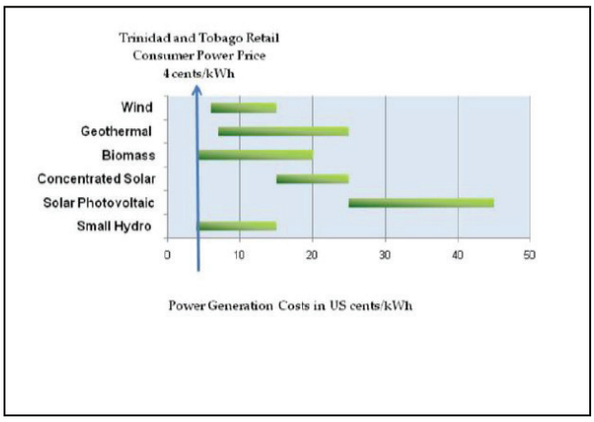

Figure 11. *Higher costs involved in generating renewable energy electricity compared to natural gas generated power (REC, 2011)*

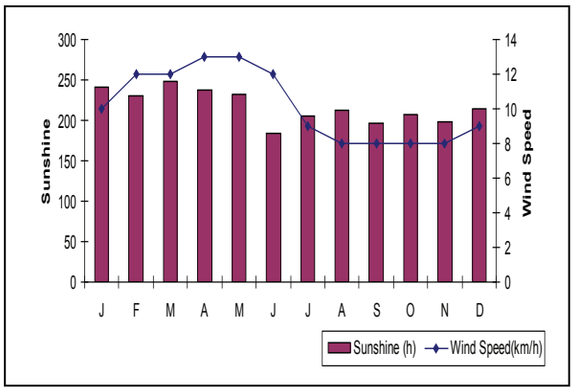

Figure 12. *Average wind speeds and sunshine hours data for T&T recorded in Piarco, Trinidad and Tobago*

Renewable energy options for T&T

One of the government's recent areas of focus is the sustainable development of T&T's energy industry. As such, RE sources most applicable to T&T at this time based on the country's natural advantages and technology maturity include solar energy, wind energy and waste-to-energy.

Solar energy

the average number of sunlight hours per month experienced in T&T is recorded to be greater than 200, exclusive of the month of June (Figure 12). Such solar potential suggests the feasibility of solar photovoltaics, solar thermal and concentrated solar power technologies which can be utilised for power generation both onshore and offshore and small-scale applications like water heating and crop drying (REEEP, 2010).

Wind energy

T&T is influenced by the North East Trade Winds and experiences an average annual wind speed of 9 knots or around 4m/s (Figure 12). Wind is presently the favoured alternative source for bulk power generation but is also an option for small-scale off-grid supply in remote locations throughout the country (MEEA, 2010). T&T's mean annual wind speeds are lower compared to other Caribbean islands but are nonetheless exploitable, particularly on the eastern coast (REEEP, 2010).

Waste-to-energy

many proposed waste-to-energy projects are under consideration as they produce less carbon dioxide emissions compared to natural gas-powered plants, whilst providing ways to handle T&T's mounting waste management problems in addition to the methane gas emission leakages at the major landfills. However, to initiate such projects a national waste segregation programme must first be established (Warren, 2011).

Existing fiscal initiatives for renewable energy and energy efficiency

Many Caribbean island governments have implemented financial incentives

to facilitate the increasing penetration of RE sources into their individual energy mix. These incentives include tax incentives, tax holidays, grants and accelerated depreciation. From an international perspective, other mechanisms for Caribbean governments to consider are subsidies, rebates, production tax credits; and the implementation of taxes or financial penalties on the production of various GHG emissions. For the latter, such schemes range from fuel and energy taxes to carbon taxes, carbon pricing and carbon trading schemes.

A number of fiscal incentives were introduced in T&T's 2010–11 and 2011–12 National Budgets in an effort to promote alternative energy use and EE. A number of these incentives however, require revisions to T&T's "Customs Act, Income Tax Act and VAT Act" (ECTT, 2011).

Solar Energy incentives included:

• *Import duty reduced to 0% on regional imports of solar water heaters (SWHs).*

• *0% VAT rating on SWHs.*

• *25% Tax allowance on value of SWHs up to maximum $10,000.*

• *150% Wear and Tear Allowance of on-cost of SWHs.*

• *150% Wear and Tear Allowance on plant, machinery and equipment used to manufacture SWHs and SPVs.*

Wind Energy incentives included:

• Import duty reduced to 0% on imports of wind turbines and related equipment.

• 0% VAT rating on wind turbines.

• 150% Wear and Tear Allowance on cost of wind turbines and supporting equipment.

• Wear and Tear Allowance of 150% on equipment used to manufacture wind turbines.

Energy Efficiency incentives included:

• *150% Tax allowance on cost of commissioning energy audits and design and installation of energy saving systems.*

• *Accelerated depreciation of 75% on acquisition of smart energy efficient systems.*

• *25% Wear and Tear Allowance on plant, machinery and equipment acquisition.*

Other fiscal amendments which have been, or will be, enacted to attempt a reduced reliance on the more polluting fossil fuels include:

• *Increased price of premium fuel from TT$4 per litre to TT$5.75 per litre.*

• *Decreased price of CNG from TT$1.07 per litre to TT$1 per litre.*

• *Provision of lots of land for RE business developments by the National Energy Corporation at subsidised costs.*

Nevertheless, without simultaneously increasing public awareness, skills and training, research and development, and necessary regulations, these financial incentives are not enough to thrust the population towards greater utilisation of RE sources and EE mechanisms.

Further fiscal recommendations

As T&T was successful in developing its petroleum industry, the country should be well equipped to efficiently develop its RE industry via the existing energy platform and ability to attract major local, regional and international investors and financiers.

In general, the fiscal regime incorporated to advance the increased use of RE and EE methods in T&T should:

• *Promote a secure business environment.*

• *Offer adequate returns to the government and companies balancing risk and reward.*

• *Avert complexity and restrict administrative burden.*

• *Encourage competition and market efficiency.*

Short term recommendations

• *Increase the Green Fund Levy Tax to more than 0.1% of total oil and gas sales to enable funding of a larger number of viable "green" projects.*

• *Implement tax holidays for locally based RE technology manufacturing plants for a period of up to eight years. The larger the capacity of the plant, the greater the potential tax holiday. This incentive is meant to encourage foreign direct investment.*

• *Increase the SWH tax allowance to 35% on units with a maximum value of TT$20,000 over a period of five years.*

• *Implement a tax holiday of three years to registered, accredited companies providing energy audit services.*

• *Provide tax breaks on the import of energy efficient household and office appliances and equipment or discounts on the purchase of energy efficient appliances in store.*

• *Provide energy efficient light bulbs and efficient shower heads on a per customer basis at regular intervals via the appropriate state-owned public utility companies.*

• *Allocate a percentage of the annual National Budget to retrofitting all government buildings and offices to utilise small-scale RE systems and adhere to green building codes in an attempt for the state to lead the way.*

• *Implement an energy conservation and RE tax deduction ranging from TT$5000 – TT$10,000 pa for individuals and TT$25,000 pa for SMEs.*

• *Provide a rebate of TT$5000 to farmers for retrofitting their facilities with RE technologies; and utilising energy and water conservation methods.*

• *Provide concessions to hotels for the replacement of electric water heaters with SWHs, installation of solar panels and implementation of energy efficiency and water conservation schemes.*

• *Provide some or all of the cost of conducting prefeasibility and feasibility studies for RE investment decisions by private investors via grants or low-interest loans.*

• *Provide long term financing for RE projects by banks and lenders backed up by government guarantees to provide investor confidence as well as ensuring the worthiness of the debtor.*

• *Offer financial incentives to individuals, businesses, schools and communities which undertake water conservation practices including rain water harvesting.*

Medium term recommendations

• *Gradually reduce the fuel subsidy by approximately 12.5% per year over an eight-year period or place an upper limit on the subsidy to allow the reallocation of revenue toward the various activities involved in the development of the RE industry.*

• Increase the petroleum levy paid by energy companies to alleviate a percentage of government burden in supporting the fuel subsidy.

• Implement an initiative similar to a Renewable Portfolio Standard and provide financial incentives to mandate that a percentage of power supplied to consumers be produced from RE sources. This percentage should also gradually increase annually.

• Facilitate the creation of a local or regional spot market for the trade of carbon dioxide emissions via carbon credits akin to the European Union Emissions Trading Scheme by setting initial high floor and ceiling prices for credits to attract interest.

• Implement tax breaks and allowances for the establishment of waste-to-energy plants inclusive of all activities involved in waste management and sorting as well as landfill methane gas capture technologies.

• Establish property tax reductions for the use of land for sustainable development projects.

• Motor vehicle tax reduced to 0% for six years on imports of electric and hybrid electric vehicles as an alternative to CNG fuelled vehicles.

• Implement favourable fiscal terms for long term contracts between NGC and T&TEC to allocate a percentage of natural gas production for electricity as fuel for electric and hybrid electric vehicles.

• Enforce a ban on imports of gasoline fuelled foreign used vehicles or introduce a tax on owners of gasoline fuelled foreign used vehicles to reimburse a portion of the fuel subsidy.

• Provide a rebate of 50% on a maximum of TT$7500 for renovating wells utilised for water management.
• Provision of grants to cover the cost of compliance programmes for parties interested in trading emission credits on an international carbon market.

• Mandate utilities and industries to monitor and report on waste heat rates and implement plans to improve efficiency of processes and ways to administer waste heat recovery. A financial penalty should be administered for failure to complete such tasks.

Long term recommendations

• Implement tax allowances for the establishment of large-scale RE developments to provide at least 30% or 360MW of T&T's peak energy demand by 2050.

• Establish long term (15–20 years) power purchase contracts between the power utility, T&TEC and RE generators to sell all the renewable electricity generated to the utility at a price above US$0.06 (optimal price of US$0.15). Penalties for non-delivery or non-purchase of renewable electricity should also be established.

• Remove high floor and ceiling prices for carbon credits and allow the market to determine prices.

• Increase the price of electricity from US$0.06/kWh to US$0.08/kWh such that US$0.02 can be put toward renewable energy development. To prevent a threat to the livelihood of the lower income groups in society a monthly cash transfer equivalent to the increased cost experienced should be provided.

• Provide a Feed-in Tariff rate for renewable electricity greater than US$0.06/kWh to encourage the generation of renewable electricity while placing a cap on the quantity of

electricity which can be sold back to the grid to avoid overloading of transmission lines and profit-making purposes at the expense of the state.

• Offer tax incentives to international oil and gas companies in return for investing or lending expertise to the advancement of RE locally. At present bpTT is a vital contributor to T&T's energy landscape and is viewed as a major potential influencer of change. If bpTT therefore were to become a 'first-mover' of RE in T&T's oil and gas industry, this could provide the momentum necessary to drive the needed transition. For example, BP Alternative Energy owns and operates a number of wind farms globally while bpTT has begun investing in small solar technologies for some offshore platforms such as helicopter landing and navigation warning lights. Such international expertise can be used to further develop T&T's RE sector.

• Provide attractive mortgage rates for building new homes equipped with solar PV cells and/or energy efficient designs.

• Tax exemption of 150% of the cost to businesses which attain internationally recognised environmental accreditation.

Conclusion

Trinidad and Tobago's RE potential is clear cut with the abundance of solar, wind and waste-to-energy resources which should ultimately be incorporated into the local energy mix. Despite the global declining costs of RE technologies with advances in technology, fossil fuels are likely to maintain the advantage in terms of cost. Therefore government support is necessary to allow RE to compete with non-RE sources either by raising the price of fossil fuels, decreasing the cost of RE or enhancing the rate of return on RE and EE investments.

Significant amounts of research and development funding is being allocated globally to developing RE sources, EE and conservation measures and carbon abatement strategies. However, in T&T, due to the existence of cheap fuel and electricity, this assertive attitude towards achieving sustainable energy usage is generally absent.

As the country's petroleum industry is at a mature stage, contributing in excess of %40 of government revenues, these resources and earnings should be used to develop T&T's infant RE industry and reduce the carbon footprint of the nation.

Restructuring and reforming T&T's fuel subsidy is a fundamental element in promoting alternative energy development despite the many economic, social and political challenges it poses. As a result, the reform must occur gradually and in a sustainable manner in order to be successful and avoid considerable opposition.

Also of importance is the price per unit of renewable generated electricity offered to distribute RE generators, which signifies whether their investment is profitable. The provision of various tax holidays and incentives may have negligible impact on the viability of a large-scale RE project. For example, revenues obtained from the sale of power to utilities are insufficient to cover costs due to low pricing per kWh.

T&T has begun the process of addressing its energy and sustainable development concerns by drafting policies and establishing various fiscal

incentives. However, having a policy is not sufficient to drive change in a country spoilt by cheap fuel and electricity prices and T&T must do much more to catch up to other Caribbean and developed nations. Capacity development and regulations are required to impart obligations on utilities to follow efficient operating standards. Additionally, the various recommendations made in this article can also assist in ensuring the sustainability and economic viability of T&T while also attempting to alter the mindset of the citizenry to act as effective stewards of the island's resources for the wellbeing of future generations.

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