



*Taking Responsibility*

RENEWABLE ENERGY: USHERING IN  
THE NEW CARIBBEAN ECONOMY

BACKGROUND BRIEF

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### SUMMARY

If recent investment trends in renewable energy technology continue and the environmental externalities of conventional fuels are incorporated into their market prices as expected, global energy markets will be completely transformed within the next decade. Electricity, heating, air conditioning and transportation systems will all increasingly rely upon both renewable and non-renewable sources of fuel.



The most recent renewable energy market data shows that:

- ✓ In 2008, USD\$120 billion was invested in renewable energy globally<sup>1</sup>. This represented a fourfold increase in annual investments since 2004<sup>2</sup>.
- ✓ Renewable power capacity expanded to 280 GW in 2008 (excluding that generated from large hydropower), a 75% increase from the 160 GW capacity of 2004. Of this capacity, 43% or 119 GW came from developing countries.
- ✓ In 2008, for the first time, both the USA and the EU added a greater amount of new power capacity from renewable energy technologies than from conventional sources.

This remarkable growth rate has been the culmination of specific government policies and the technological innovations they have allowed. Internationally, a variety of policies have been used to support large scale grid-connected renewable energy sources of electricity. The main policy instruments that have been used include:

1. Feed in Tariffs (FITs);
2. Renewable Portfolio Standards (RPS);
3. Tendering; and
4. Tax Credits

Within the current energy paradigm, renewables are not competitive on a strict financial basis. This is chiefly because the full economic cost of conventional electricity sources are not incorporated in their market price; and because renewables make use of newer technologies that have not yet achieved optimal economies of scale or learning. These dynamics are changing. However, for those governments

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<sup>1</sup> This mainly took the form of new wind farms; solar parks; biofuel plants and biomass and waste to energy installations (UNEP, SEFI and New Energy Finance 2009).

<sup>2</sup> REN21 Secretariat. *Renewables Global Status Report: 2009 Update*. Renewable Energy Policy Network for the 21st Century (REN21), 2009.



wishing to kick start their renewable energy sectors, these types of policies have been necessary. The two main arguments in favour of such government support have been:

1. Renewables have lower environmental impacts than non-renewable fossil fuels
2. Renewables enhance energy security<sup>3</sup>

There is a growing consensus amongst academics and policy makers that FITs have been “the most successful policy instrument yet devised for speeding the comparatively low-cost deployment of renewable energy technologies”<sup>4</sup>. However, Caribbean<sup>5</sup> policy makers should not necessarily be swayed by this rhetoric. Rather they need to examine their own energy markets dynamics and reasons for wishing to incentivise the deployment of renewable energy, and then determine the most suitable policy framework to achieve these goals. Below we present a brief outline of the policy regimes available to Caribbean policy makers wishing to usher in a new Caribbean energy era.

### 1. FEED IN TARIFFS

Feed in Tariffs are the result of legislation that mandates that an electric utility company purchases renewable energy sources of electricity (RES-E) at a fixed, favourable price. Thus FITs provide guaranteed grid access and revenues to renewable energy generators. The tariff is guaranteed for a fixed time period, say twenty years, and varies depending upon the fuel used (for example, there would be a different FIT for wind as opposed to geothermal generated electricity), and the size of the installation (in mega watts). FITs are phased out after a target renewable energy generation capacity is met – say fifteen percent of national generation capacity –

#### Advantages

By providing a guaranteed price, FITs ameliorate capital costs. Price security reduces investment risk thus financial institutions are more willing to provide capital to projects with a price

FITs can be designed to promote investment in a range of renewable technologies simultaneously.

FITs have low transaction and administrative costs. With the exception of setting and reviewing the tariff, government’s additional involvement in the sector is negligible.

FITs do not place a cap on the amount of energy to be generated from renewable fuels. If designed properly, by the time the FIT is phased out a market for RES-E has been created.

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<sup>3</sup> “Why Energy Diversification is in the Caribbean’s Interest” was the subject of a recent Caribbean Policy Research Institute briefing document. This can be found at <http://www.capricaribbean.org/research/energy-diversification-caribbean>.

<sup>4</sup> Mendonca, Miguel. *Feed-in Tariffs: Accelerating the Deployment of Renewable Energy*. London: Earthscan Ltd., 2007.

<sup>5</sup> The Caribbean is defined as those states participating in the Caribbean Renewable Energy Development Programme (CREDP): Antigua and Barbuda, the Bahamas, Barbados, Belize, British Virgin Islands, Cuba, Dominica, Grenada, Guyana, Jamaica, Montserrat, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Suriname and Trinidad and Tobago and Turks and Caicos (CARICOM Secretariat 2004).



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and generally have a provision whereby the prescribed tariff decreases annually, thereby encouraging immediate investment. Any difference between the retail price of electricity from conventional sources and the fixed tariff is passed on to consumers.

FITs were first introduced in the United States with the passage of the 1978 Public Utility Regulatory Policy Act (PURPA). As of early 2009, 45 countries and 18 states/ provinces/ territories had adopted some form of feed in tariff legislation. FITs have been particularly effective at incentivizing the uptake of renewable energy in Germany, Denmark and Spain.

FITs are currently the preferred policy framework for governments seeking to encourage the development of their renewable energy sector. In particular, the German experiment is touted for having created a €21.6B industry that employs over 200,000 people in less than two decades. Although FITs, like any other policy regime, require consumers to bear the cost of adjustment, it is important to note that the cost of any adjustment will fall on the end-buyers: better a predictable, stable price than the kind of sharp adjustments to which consumers have had to adapt in an age of volatile oil prices.

### *Key Considerations*

*Effective FITs:*

- *are guaranteed for a defined long-term time frame;*
- *prescribe different tariffs for different technologies;*
- *unambiguously articulate all eligible technologies; and*
- *periodically decrease the prescribed tariff and completely phase it out after a prescribed generation capacity from RES-E is met.*

*Determining the right tariff is difficult. Too high a price transfers wealth from consumers to power providers and provides no incentive for least cost technologies to be used, while too low a price does not generate an investment opportunity and thus results in no investments being made.*

*To protect the consumer, the tariff has to be revised periodically in keeping with technical innovations in the different RES-E sectors.*

*FIT schemes have generally been implemented in conjunction with other mechanisms of RES-E support e.g. interconnection standards.*

## 2. RENEWABLE PORTFOLIO STANDARDS

Renewable Portfolio Standards (RPS) are quota systems. RPS legislation mandates what percentage of a utility's power production must be met from RES-E within a given time frame. The law defines what constitutes an eligible RES-E; and they are usually limited to grid-connected renewables. The RPS is staggered as a series of increasing sub-targets that ultimately culminates in the government's long term policy objective<sup>6</sup>. As such, unlike FITs, RPS dictate the amount of electricity that must be generated from renewable energy technologies rather than prescribe the price that should be paid for such electricity.

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<sup>6</sup> Thus an ultimate target of 20% by 2015 could be broken down as 10% by 2011, 15% by 2013 and 20% by 2015.



RPS were initially introduced in the United States in the mid-1980s. By 2008, they existed in over 49 territories. Japan's 'Special Measures Law'; Australia's 'Mandatory Renewable Energy Targets' and the UK's 'Renewables Obligations' are all examples.

While quota systems are elegant theoretical constructs, recent evaluations of existing schemes have often been unfavourable<sup>7</sup>. This does not necessarily mean they should not be considered as a policy instrument. Rather, past failures emphasise how important it is to take into account the key considerations noted above in designing a suitable RPS mechanism.

### Advantages

Quotas ensure a target amount of RES-E is brought on stream by a set date. Thus it can be directly linked to policy targets.

The utility is only required to prove that the target has been met on time. As such, it is free to decide whether to generate the electricity itself or to purchase it from independent power producers.

The terms of any resulting power purchase agreements are negotiated by the relevant parties. This is thought to ensure cost savings for the consumer because there is an ever present incentive for the renewables power producer to maintain cost competitiveness.

Quotas tend to have very low administrative costs and limited direct impact on national budgets.

### Key Considerations

*Design considerations include:*

- *an appropriate target;*
- *eligible technologies;*
- *applicability (power produced vs. installed capacity; what constitutes a qualifying producer); and*
- *the designation of an appropriate authenticating and monitoring body.*

*Quota schemes, where they have been most successful, have been mandatory with strict and credible non-compliance penalties.*

*All quota schemes have been implemented in conjunction with other mechanisms of RES-E support e.g. tax credits.*

*Quotas do not mandate a price. As such, quota systems tend to favour large or vertically integrated utilities because they are best able to assume price risk.*

<sup>7</sup> See: Jacobs, David, Benjamin K. Sovacool, and Miguel Mendonça. *Powering the Green Economy: The Feed-in Tariff Handbook*. London: Earthscan Ltd., 2009 for a detailed discussion.



### 3. TENDERING

These are government administered tenders. The government specifies the total amount and or percent of electricity generation capacity to be generated from renewable sources; the maximum price per kWh it is prepared to support; and the relevant selection criteria that it will use to evaluate proposals. Separate bids are run for different technologies – thereby ensuring, for example, that a wind energy project does not compete with a small hydro plant). The bid that best matches the selection criteria, which is usually the bid that can meet the requirement at the lowest price and most appropriate technology, wins the contract. Thus the winning bid earns a guaranteed purchase power agreement.

Once the project is completed, electricity consumers pay regular market prices for all electricity generated, with any difference between the sale and purchase price of the additional renewable energy capacity being financed via a government tax on domestic energy consumption.

Tendering systems have been used in China, France, the USA and the UK, amongst others.

#### Advantages

The government is able to directly control the amount of renewable energy generated and the type of technology used.

A well designed tender process generates the lowest price solution.

#### *Key Considerations*

The tendering process has to be carefully designed. One of many design considerations is how to maximise bid participation.

Bidders have the incentive during the bidding process to underbid in order to win. However if they underbid, they will be unable to design an economically viable project at their bid price<sup>8</sup>.

A tendering system does not generate a renewable energy market. Each time the government wishes to augment RES-E a new tender process has to be designed and implemented. It is because of this and the other inefficiencies of tendering, that RPS and FITs are the more prevalent policy options.

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<sup>8</sup> In 2003, of 3270MW awarded under the UK's Non-Fossil Fuel Obligation, only 960MW had been installed. This discrepancy was largely attributed to bidders backing out of projects after realising their winning bid was too low to support a viable project.



## 4. Supporting Legislation: Tax Credits

Governments have used a host of other measures to provide direct support for the renewables sector. These include providing low interest loans, public research and development grants, system benefit charges<sup>9</sup> and tax incentives. In addition, provisions in national building codes, land policy and national energy policies have also facilitated the growth of the sector. Tax credits, particularly in the USA, have been used to encourage investment in the renewable energy sector.

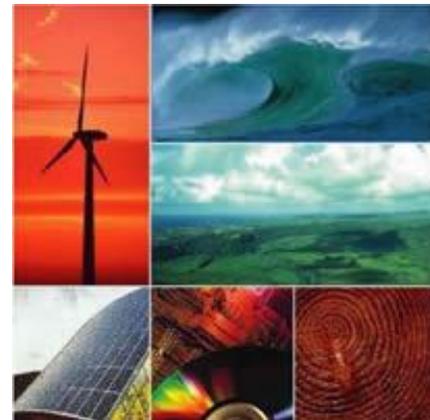
Two types of tax credit schemes have featured prominently in the promotion of renewable energy technology world wide: investment tax credits (ITCs) and production tax credits (PTCs). By themselves PTCs and ITCs do not provide strong enough incentives to catalyze investment in the renewable energy space. As such they are best thought of as complementary legislation to FITs or RPS.

Examining the USA case study, at the federal level, PTCs enable a qualifying facility to claim annual tax credits against the amount of electricity it has generated during the year. PTCs are most effective when they are long lasting and relatively stable. The intermittent nature of the USA's PTC legislation largely explains the cyclical nature of the American wind industry. Nevertheless, in the USA, it is estimated that PTC legislation has incentivised an estimated USD\$13B worth of investment in the renewable energy sector.

ITCs provide a partial tax write-off to taxpayers who decide to invest capital in prescribed renewable energy technologies. The amount of ITCs one can earn varies with the renewable energy technology employed. For example, in the USA the ITC legislation allows investors to write off up to 10% of the cost of a geothermal project and up to 30% of a commercial solar project. However, ITCs only enable taxpayers to claim any credits earned when filing one's tax returns; thus an ITC does not reduce the initial overall cost of the project.

As they specifically target investments, ITCs incentivise investments in renewable energy technology, rather than actual electricity generation. For example, India rapidly developed a wind power industry; however, because firms earned credits from installing, but not operating wind farms, the sector's poor performance yet rapid development has been at least partly attributed to the design of India's ITC legislation.

It is undeniable that PTCs and ITCs cost governments in terms of foregone revenue. In addition, they create significant administrative and monitoring costs. They are thus best suited for jurisdictions with superior tax administration departments, equipped



<sup>9</sup> This is a tax levied on every kWh of electricity generated. The revenues generated by the tax are then channelled into clean energy projects.



with the resources to properly monitor and audit claims made under any scheme established. For this reason, they should probably be regarded with extra caution in most Caribbean countries.

### CONCLUSION

In 2008 renewable energy policy targets existed in over 73 countries and development assistance, specifically targeting renewables in developing countries, exceeded USD\$2B. Today 137 countries and the European Union have signed the Statute of the International Renewable Energy Agency (IRENA) which was launched on January 26, 2009.<sup>10</sup> IRENA is to provide advice and support to governments worldwide on renewable energy policy, capacity building and technology transfer. If Caribbean governments wish to create a modern progressive renewable energy policy framework that is consistent with their own policy objectives, they should move aggressively, since the resources with which to do so are available.

Now is the perfect opportunity to launch such a policy framework, since much of the Caribbean's energy infrastructure will have to be replaced or upgraded within the medium-term. This presents regional policy makers with an important chance to use policy to ensure any infrastructure upgrades or replacements are compatible with renewable generation technology. There currently exists substantial investor demand for "green/ socially responsible" investment products. This demand is only likely to increase as a result of the ongoing Copenhagen summit. A modern progressive renewable energy policy framework is one of the most cost-effective ways for the region to attract these types of investors while expanding the region's renewable energy generation capacity.



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<sup>10</sup> Within the Caribbean region, only Antigua and Barbuda and Grenada are signatories.



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