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SUSTAINABLE ENERGY FOR ALL IN THE CARIBBEAN



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ABOUT ECLAC/CDCC

The Economic Commission for Latin America and the Caribbean (ECLAC) is one of five regional commissions of the United Nations Economic and Social Council (ECOSOC). It was established in 1948 to support Latin American governments in the economic and social development of that region. Subsequently, in 1966, the Commission (ECLA, at that time) established the subregional headquarters for the Caribbean in Port of Spain to serve all countries of the insular Caribbean, as well as Belize, Guyana and Suriname, making it the largest United Nations body in the subregion.

At its sixteenth session in 1975, the Commission agreed to create the Caribbean Development and Cooperation Committee (CDCC) as a permanent subsidiary body, which would function within the ECLA structure to promote development cooperation among Caribbean countries. Secretariat services to the CDCC would be provided by the subregional headquarters for the Caribbean. Nine years later, the Commission's widened role was officially acknowledged when the Economic Commission for Latin America (ECLA) modified its title to the Economic Commission for Latin America and the Caribbean (ECLAC).

Key Areas of Activity

The ECLAC subregional headquarters for the Caribbean (ECLAC/CDCC secretariat) functions as a subregional think-tank and facilitates increased contact and cooperation among its membership. Complementing the ECLAC/CDCC work programme framework, are the broader directives issued by the United Nations General Assembly when in session, which constitute the Organisation's mandate. At present, the overarching articulation of this mandate is the United Nations Sustainable Development Goals.

Towards meeting these objectives, the Secretariat conducts research; provides technical advice to governments upon request; organizes intergovernmental and expert group meetings; helps to formulate and articulate a regional perspective within global forums; and introduces global concerns at the regional and subregional levels.

Areas of specialization include trade, statistics, social development, science and technology, and sustainable development, while actual operational activities extend to economic and development planning, demography, economic surveys, assessment of the socio-economic impacts of natural disasters, climate change, data collection and analysis, training, and assistance with the management of national economies.

The ECLAC subregional headquarters for the Caribbean also functions as the Secretariat for coordinating the implementation of the Programme of Action for the Sustainable Development of Small Island Developing States. The scope of ECLAC/CDCC activities is documented in the wide range of publications produced by the subregional headquarters in Port of Spain.

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DIRECTOR'S DESK:

SUSTAINABLE ENERGY FOR ALL IN THE CARIBBEAN

Access to energy is one of the most serious challenges faced by the Caribbean. As a result, it is important for the subregion to improve energy efficiency as well as to promote the use of alternative sources of energy. Energy efficiency (EE) and renewable energy (RE) are especially relevant to the Caribbean since the subregion holds substantial renewable energy potential in relation to solar, wind and geothermal energy, but remains highly dependent on fossil imports for its energy needs.

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The last decade has seen an impressive evolution in the development and application of energy efficiency (EE) and renewable energy (RE) technologies. For example, in its 2014-2015 report, the International Renewable Energy Agency (IRENA) notes that globally renewable energy power capacity has grown by over 85 per cent over the past 10 years. Additionally, IRENA analyses have shown a decline in the cost of renewable energy technologies by more than 70 per cent over the period, thereby making it possible to provide competitive utility scale electricity services from renewable sources in many countries. In terms of investments, over US \$270 billion were invested in renewable energy technologies in 2014, which represents a 15 per cent increase compared to 2013, and more than five times that of the early 2000s. According to IRENA, the global energy transition has also

stimulated widespread socio-economic benefits, through the adoption of some form of renewable energy technology in 164 countries as at mid-2015, with as many as 7.7 million jobs already created from EE and RE activities as of 2015.

The Economic Commission for Latin America and the Caribbean's (ECLAC) engagement with countries and stakeholders has revealed tangible evidence to show that aspects of this energy revolution are also taking place in our subregion. Antigua and Barbuda recently completed the installation of its first solar power plant, with similar initiatives already operational in Saint Kitts and Nevis, and Aruba. Wind farms already dot the pristine Caribbean landscape in Jamaica, Aruba and Nevis, while both commercial and residential application of solar water heating is common place in Barbados, Saint Lucia and Grenada. The use of mini-hydro power plants is now a proven technology in Saint Vincent and the Grenadines; while Dominica and Saint Kitts and Nevis are on the way to tapping their geothermal sources of energy. The application of Ocean Thermal Energy Conversion technologies is receiving serious consideration in the Cayman Islands, and many other regional economies are already showing signs of gearing themselves to confront these changes.

Countries have also undertaken institutional, regulatory and policy

reforms. Among such adjustments are the decoupling of power generation and transmission in order to accommodate independent power producers; strengthening of utility regulatory frameworks; adjustment of energy metering and pricing strategies; and changes in the fiscal and incentive regimes, especially with respect to energy use for transportation.

While many Caribbean countries have joined the global transition towards sustainable energy, this is such a broad and all-encompassing subject that comprehensive energy policies are required in order to accomplish sustainable and clean energy security. Energy efficiency and renewable energy should be guiding principles to improve the performance of the transport sector, to reassess the process of transportation and distribution of water, to address the complex nature of the water-food-energy nexus and, in general, to improve efficiency in consumption behaviors and production patterns.

In this edition of Focus we highlight three issues of importance to energy efficiency and renewable energy in the Caribbean, namely (i) the importance of energy efficiency policies for the region; (ii) priority strategies to guide the transition to sustainable energy and energy efficiency; and (iii) the progress made in the region based on the experiences of Dominica and Saint

▶ (continued on page 14)



PROMOTING ENERGY EFFICIENCY POLICIES¹

Omar D. Bello

Do Caribbean countries need energy efficiency policies? Most international development institutions have claimed that Latin America and the Caribbean has one of the cleanest energy mixes.² in the world.³ This assessment could lead one to conclude that Caribbean countries do not need to further promote energy efficiency as part of their national energy policies. This conclusion, however, could be misleading. In order to gain a better understanding of the issue at hand, it is worth taking a detailed look at the energy matrix of countries in the Caribbean.

Guerra (2016) found the following three stylized facts looking at a case-by-case analysis of the energy matrices of Caribbean countries: (1) most countries in this subregion are net importers of some form of energy; (2) most of the energy supply comes from oil; and (3) energy losses are significant.

With respect to fact one, the total consumption exceeds primary energy supply in every country with the exceptions of Suriname and Trinidad and Tobago. For example, in 2012 the primary energy produced in Trinidad and Tobago was double the amount of its local consumption. This situation is atypical in the sense that the median Caribbean country consumes 25 per cent more energy than its primary supply. As a consequence, it is important to analyze the energy matrix on a country basis rather than as a regional aggregate, in order to ensure that the analysis is not skewed by the case of Trinidad and Tobago (because of its size and unique circumstance).

With respect to fact two, nearly 81 per cent of the energy supply of Caribbean states comes from oil products. Specifically, most energy imports are oil (refined) products. This fact makes Caribbean economies vulnerable to fluctuations in the price of oil on international markets.

With respect to fact three, energy processes in Caribbean countries are inefficient, with energy losses in electricity generation, transmission and distribution processes being quite significant. The production of electricity in the Caribbean requires more “energy inputs” than the Latin American region, (see Espinasa and Humpert, 2013). More energy inputs needed to produce electricity suggest inefficiencies during the process. For the majority of countries in our region of study, losses in the form of heat, waste and other sources exceed 60 per cent of the total amount of energy used to produce electricity for all Caribbean countries, with the exception of Belize.

ENERGY EFFICIENCY POLICIES IN THE CARIBBEAN

Given the current status of the energy matrix of Caribbean countries, the promotion of energy efficiency policies should be seen as a priority. With this in mind, it is important to understand the experience of the subregion to date in the implementation of these policies.

According to Guerra (2016), on average each Caribbean country (or territory) has one of the following energy policies in place: (a) energy efficiency standards for building construction; (b) tax credits for the adoption of energy efficiency policies; (c) tax reductions/

exemptions; (d) public demonstration (mostly education and awareness); (e) restrictions on incandescent bulbs; and (f) appliance labeling standards. Among these, tax reduction is the most likely, with one energy policy in the planning phase (usually promoting standards for building construction). That is, the typical Caribbean country (or territory) has only considered one out of six possible alternatives to promote energy efficiency within its boundaries, (see Table 1).

Moreover, out of 17 Caribbean countries and territories, four do not have a single policy related to energy efficiency or are in a planning phase, while another four have only given consideration to one policy. It is therefore safe to conclude that in nearly half of these Caribbean countries no energy efficiency policies have been promoted.

include Jamaica and Saint Vincent and the Grenadines, who have at most three policies currently implemented. Six of 16 countries are now considering new measures to promote efficiency in their energy sector, Dominica, Saint Vincent and the Grenadines, and Trinidad and Tobago being those which have the most visible efforts in promoting this type of initiative.

It is also important to note that this situation has evolved in a context of

¹ A This article is based on Sergio Guerra (2016). Energy Efficient Policies in the Caribbean: A manual to guide the discussion.

² The energy mix of a country refers to a quantitative representation of all energy available for use in various production processes. A similar concept is that of Total Primary Energy Supply (TPES)

³ UNDP. (2015, February 24). UNDP, IDB, ECLAC to boost access to sustainable energy in Latin America and the Caribbean. Retrieved December 3, 2015, from http://www.latinamerica.undp.org/content/rblac/en/home/presscenter/articles/2015/02/24/undp_idb_eclac_to_boost_access_to_sustainable_energy_in_latam_and_the_caribbean.html

Table 1: Energy efficiency programs and policies in the Caribbean countries

	Energy efficiency standards	Tax Credits	Tax Reduction / Exemption	Public Demonstration	Restrictions on Incandescent Bulbs	Appliance Labeling Standards
Antigua and Barbuda	Planning	n.a.	n.a.	Planning	Planning	Planning
Aruba	n.a.	n.a.	In place	In place	n.a.	n.a.
Bahamas	n.a.	n.a.	n.a.	n.a.	In place	n.a.
Barbados	Planning	Planning	n.a.	Planning	n.a.	n.a.
Belize	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cayman Islands	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Dominica	Planning	n.a.	In place	In place	Planning	Planning
Grenada	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Guyana	n.a.	n.a.	In place	In place	n.a.	n.a.
Jamaica	n.a.	In place	In place	n.a.	n.a.	In place
Dominican Republic	n.a.	n.a.	In place	In place	In place	n.a.
St. Kitts and Nevis	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
St. Vincent and the Grenadines	Planning	Planning	In place	In place	In place	Planning
St. Lucia	n.a.	n.a.	Planning	n.a.	n.a.	n.a.
Trinidad and Tobago	Planning	In place	In place	n.a.	Planning	Planning
Turks and Caicos Islands	n.a.	n.a.	n.a.	n.a.	In place	n.a.
Virgin Islands	n.a.	n.a.	n.a.	n.a.	In place	n.a.

Notes: There is no official legislative framework for energy policies in Suriname. n.a. means that this specific policy is neither in planning nor implemented in the specific country.

Source: Guerra (2016) based on the United States National Renewable Energy Laboratory and the International Renewable Energy Agency reports.

increasing oil prices, which is a positive incentive for the adoption of energy efficiency policies. However, following the boom phase of 1995 to 2009,⁴ oil prices have declined significantly, with the possibility that countries may no longer be as keen to adopt energy efficiency policies.

In light of the challenges posed to financing RE and EE strategies in the Caribbean (which has been made more difficult by their high debt burden), a strategy to address their fiscal burdens, and at the same time encourage energy policies may be helpful. One approach might be access to International Climate Change Funds. This could provide a welcome opportunity for the Caribbean to mobilize resources for financing energy efficiency projects. For instance, the Green Climate Fund (GCF), which operates within the framework of the United Nations Framework Convention on Climate Change (UNFCCC), was created as a mechanism to assist developing countries in the design of adaptation and mitigation practices to counter climate change. The GCF “will aim for a floor of 50 per cent of the adaptation allocation for particularly vulnerable countries, including Least Developed Countries, Small Island Developing States and African States.”⁵ In fact, one of the fund’s investment priorities is to enhance resilience in

Small Island Developing States (SIDS).

According to the fund’s investment policies, its objective is to finance projects and programmes with the potential to promote a paradigm shift towards low-carbon and climate-resilient sustainable development. Additionally, policies mandate that only revenue-generating activities can qualify for loans by the fund. This condition will also improve project efficiency, as Caribbean countries would have to accurately measure the potential impact of their proposals.

CONCLUSION

The situation of the Caribbean subregion can be described as sub-optimal in terms of its energy matrix, meaning countries are net energy importers, with imports coming principally from crude oil products.

There are also serious inefficiencies related to their processes of electricity production, distribution and transmission, with little or no efforts in terms of promoting energy efficiency policies in the past.

Caribbean countries need energy efficiency policies, and the opportunity for improvement in this regard is considerable. The subregion has a

window of opportunity to re-think and plan strategically its energy sector for the future. In order to transform its energy matrix to one that is greener and more efficient, besides (sizable) investments in the sector, a credible and realistic commitment to develop and to implement a master plan that guides energy policy is also necessary.

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⁴ See Acquatella, J., O. Bello, and F. Berríos (2016). *Evidencia estadística de Super Ciclos en las series de precio de los metales y el petróleo 1900-2015*. Mimeo. Natural Resources and Infrastructure Division. ECLAC. Santiago, Chile.

⁵ <http://www.greenclimate.fund/ventures/funding#how-it-works> on February 25, 2016.



PRIORITY AREAS TO GUIDE ENERGY EFFICIENCY POLICIES

Leda Peralta

In 2014, Small Island Developing States (SIDS) adopted the SIDS Accelerated Modalities of Action (SAMOA) Pathway as a guiding instrument to move the Sustainable Agenda forward. Among other issues, the resolution incorporates sustainable energy as one key persisting challenge due to the effects that dependence on imported fossil fuels have on vulnerable economies. In addition, this dependence also hinders efforts to increase resilience to climate change and natural hazards.

The SAMOA Pathway highlights the importance of transformative and innovative measures to increase access to modern energy services, renewable energy and energy-efficient technologies, and to promote low carbon development. The emphasis on these specific components of sustainable energy was later reaffirmed by the Sustainable Development Goals (SDGs) as defined in the document *Transforming Our World - the 2030 Agenda for Sustainable Development*. The seventh goal focuses on affordable and clean energy; and notes that access to reliable and modern energy services needs to be supported by an increased use of renewable energy (RE) sources and improvement of energy efficiency (EE).

Despite the inclusion of sustainable energy in multiple development instruments,¹ access to and promotion of sustainable energy remains a challenge in the Caribbean subregion. Besides dependence on imported fossil fuels and its impact on national finances, which restricts investment capacity, Caribbean SIDS face a variety of technical and regulatory barriers that hinder the implementation of renewable energy and energy efficiency initiatives (see Table 1). The sector also faces governance issues, such as data gaps, ineffective/inadequate policies and regulations, overlapping mandates, outdated/inadequate tariffs, inefficient administration and maintenance, and monopoly over transmission and distribution, which result in some of the highest electricity

Table 1. Energy challenges in the Caribbean.

Technical	Socioeconomic
<ul style="list-style-type: none"> ✓ Isolated grid networks ✓ Small overall generation capacity ✓ Inability to meet existing and future energy demand ✓ Outdated equipment ✓ Low efficiency 	<ul style="list-style-type: none"> ✓ High electricity tariffs ✓ Vulnerability to rising, volatile fuel prices ✓ Missed opportunities for domestic investment and jobs ✓ Energy poverty^a

^a Energy poverty is defined as a lack of access to modern energy services. These services are defined as household access to electricity and clean cooking facilities (IEA). The CARICOM Energy Policy was approved during the XLI Special Meeting of the Council for Trade and Economic Development on Energy, held on 1 March 2013 in Trinidad and Tobago.

Source: CARICOM 2013.

Table 2. Regional sustainable energy targets.

Year	Percentage		
	Renewable power capacity	CO ₂ emissions reduction	Energy intensity ^b
2017	20	18	??
2022	28	32	??
2027	47	36	33

Source: CARICOM 2013

^b Energy intensity: measure of total primary energy use per unit of gross domestic product (IEA). The energy intensity target was established only for 2027.

costs in the world, low quality services and high technical and non-technical losses. As a region, the Caribbean has not explored its full potential for interconnection - also affected by small and isolated national grids -, and strategies and policies have not been fully integrated.

These barriers, combined with reduced

investment capacity, have deterred the use of renewable energy and energy efficient technologies notwithstanding the fact that the Caribbean's great potential for using renewable energy sources has been vastly improved and that energy efficiency measures are often referred to as the fifth fuel, as they offer quick and cheap reductions in energy costs.

¹ Energy related issues have been included in the Barbados Plan of Action (1994), the Mauritius Strategy of Implementation (2005), the SAMOA Pathway (2014), and the Sustainable Development Goals (2015), as well as in initiatives such as the United Nation's Sustainable Energy for All (2010).

Therefore, in an effort to benefit from economies of scale, and to address the multiple barriers faced by Caribbean SIDS, in 2013 CARICOM member States adopted an Energy Policy² to increase regional cohesion and benefits. The policy established a series of targets that would lead to a sustainable and efficient energy sector (see Table 2).

According to CARICOM (2015), energy efficiency measures should target sectors that: i) account for a large share of the economy's energy consumption; ii) are highly energy-intensive or inefficient; and/or iii) are central to the economy. These three indications are accompanied by a variety of technical and regulatory measures that are further explored in the next sections using the International Energy Agency (IEA) framework, which structures energy efficiency policies into priority areas: (i) cross-sectoral policies; (ii) appliances and equipment; (iii) lightning; (iv) buildings; (v) transport; (vi) industry; and (vii) energy utilities. This is an important framework which can help promote better energy policies in the region.

CROSS-SECTORAL POLICIES

Cross-sectoral policies require important public involvement since they affect nearly all energy consumption sectors. They are usually related to regulation and to accurately and timely measure the outcomes of energy efficiency policies.

Cross-sectoral policies arise mainly because of standard market failures: time-inconsistent preferences, asymmetries of information, non-competitive markets, externalities and public goods. The International Energy Agency recommends the following actions:

- a. Promote the collection of reliable, timely and detailed data on energy end uses and market technologies.
- b. Regularly update strategies and policies based on up-to-date evidence.

c. Minimize market distortions caused by subsidies and other disincentives to EE and RE.

d. Facilitate private investments in energy efficiency.

The IEA, in collaboration with ECLAC, held the regional workshop Energy Efficiency Policies for Latin America and the Caribbean in 2014, and participants added a few more actions to the list to adjust it to the regional context: (i) strengthen local expertise and capacity; (ii) strengthen coordination and planning between Ministries; (iii) improve quality and availability of data; and (iv) identify financing mechanisms for EE. In line with these recommendations, CARICOM observes that (nationally and regionally) the Caribbean lacks a long term vision with clear and concise implementation mechanisms. Therefore, policies and accompanying instruments remain inadequate as it is difficult to monitor and evaluate progress through imprecise targets and actions. This situation has improved since all CARICOM member States adopted the regional Energy Policy and have designed national energy strategies. However, the situation is not the same for energy efficiency measures, as less than half of CARICOM members have established improvement targets or strategies.

In addition, the Energy Policy aims at strengthening cohesion within the region by establishing common goals and benefiting from a regional approach to sustainable energy. A regional approach has the potential of creating economies of scale, producing energy locally or wherever it is cheaper, promoting investment in EE and RE, and reducing operation costs.

APPLIANCES & EQUIPMENT AND LIGHTING POLICIES

Policies oriented towards lighting, appliances and equipment, target (but are not limited to) the residential sector

to facilitate the entrance of new energy technologies and to promote the exit of outdated high-energy consuming appliances.

The Caribbean residential sector consumes important volumes of electricity which, combined with inefficient appliances and equipment, exerts additional pressure on already burdened and outdated electric grids. According to CARICOM, appliances are cheap to acquire but expensive to operate, given the lack of efficiency standards in the region.

The incorporation of labels and standards for household appliances and equipments could have multiple benefits in the Caribbean. First, energy-efficient equipments would reduce energy consumption, thus contributing to energy conservation. This is particularly relevant considering the inefficiency of electric grids and the high technical and non technical losses suffered in most Caribbean SIDS, which are then exacerbated by inefficient appliances and equipment. Additionally, the introduction of such practices would encourage widespread use of efficient equipments, contributing to changes in consumption patterns. It is worth noting that labeling should be accompanied by regulations and fiscal incentives that are attractive and user-friendly.

Even though this practice is still incipient in the Caribbean, the region's Energy Policy incorporates numerous activities to promote labeling and efficiency standards for lightning and appliances. Moreover, some CARICOM member States have already started implementing mandatory labeling and standards, and the Organization of Eastern Caribbean States concluded the implementation of the first phase of the Eastern Caribbean Energy Labeling Project in Antigua and Barbuda, Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia and Saint Vincent and the Grenadines.

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² The CARICOM Energy Policy was approved during the XLI Special Meeting of the Council for Trade and Economic Development on Energy, held on 1 March 2013 in Trinidad and Tobago.

PRIORITY AREAS TO GUIDE ENERGY EFFICIENCY POLICIES

Also targeting the residential sector, countries such as Barbados and Saint Kitts and Nevis have established loan programs and/or tax exemptions to promote the use of solar water heaters, which are being widely used in the region.

During the regional workshop on Energy Efficiency Policies for Latin America and the Caribbean (2014), participants identified four recommendations to move this issue forward: “(i) implement mandatory Minimum Energy Performance Standards (MEPS) and energy labels for lighting, appliances and equipment; (ii) phase-out least efficient products through MEPS, taxation, subsidies and regulations; (iii) engage in regional collaboration and harmonization of standards and testing procedures to reduce compliance and testing costs and increase demand for energy efficient products; and (iv) promote market transformation policies.” Furthermore, since lighting tends to be part of an integral design system, building codes that promote the use of natural light should be encouraged.

BUILDING POLICIES

In 2012, the use of energy in buildings represented 16 per cent of total energy consumption in Latin America and the Caribbean (IEA 2015), and this share is expected to increase with urbanization in the region.

In order to improve efficiency in the sector, the workshop Energy Efficiency Policies for Latin America and the Caribbean (2014) recommended that attention should be given to improving energy performance of buildings and its components by establishing minimum energy performance standards (MEPS) and an enabling regulatory framework.

Additionally, updated and mandatory building codes should guide any new developments and improvements to existing infrastructure.

The CARICOM Energy Policy highlights the importance of establishing efficient building codes as well as performance standards accompanied with incentives to promote use of energy efficient technologies and equipment. However, high initial investment costs and lack of awareness of efficient technologies could hinder the materialization of these savings. In this regard, CARICOM (2015) identified five strategies that could boost improvements in buildings and their components:

- a. Establish performance standards for cheap and readily available technologies, such as cooling, ventilation and insulation systems, and lighting. Besides savings in energy, initial focus on available and simple technologies would encourage further changes in consumption and production patterns.
- b. Simplify permitting procedures by establishing clear guidelines for users.
- c. Implement tax incentives and encourage energy audits.
- d. Fund case studies or pilot projects.
- e. Use post-disaster situations to promote resilient reconstruction processes that incorporate energy efficiency and use of renewable energy.

Understanding the weight of this sector in the total energy consumption, as well as the impact that energy-efficient buildings and components could have in the region, CARICOM member States held the workshop Energy Efficiency Standards and Regulations in Buildings in 2016 supported by several regional organizations. The meeting agreed to

establish a realistic Regional Energy Efficiency Building Code and Minimum Energy Performance Standards in line with the current energy policy. Both instruments are expected to be presented to the Council for Trade and Economic Development (COTED) in November 2017.

TRANSPORT POLICIES

Transportation policies are complex given the weight of the sector as one of the main consumers of fuel, but also given its interactions with areas such as commerce, manufacturing, and tourism.

Even though transportation accounted for 36 per cent of the total energy consumption in Latin America and the Caribbean in 2012, it remains understudied and there are important data gaps which hamper decision-making and a comprehensive understanding of the sector. In addition, transport-related policies are so varied that they require important investments and systemic changes, such as urban planning, development of public transportation alternatives, establishment of sectoral emissions goals, introduction of tax incentives to promote use of EE vehicles, and behavioral changes. Therefore, the International Energy Agency (IEA) recommendations are less ambitious and (probably) less costly from the government’s perspective:

- a. Adopt (and measure) vehicle fuel efficiency standards.
- b. Provide incentives (labels, subsidies and infrastructure) to boost vehicle efficiency.
- c. Adopt stricter standards in a vehicle’s non-engine components (particularly tires and A/C systems).
- d. Take into account that urban

³ Körner (2012) suggests that governments need to implement a comprehensive strategy exclusively to gather useful information to guide energy efficiency policies in the transport sector. According to the author, national statistical offices need a top-down and bottom-up approach to collect data on: transport activity, transport structure, energy intensity data and, carbon intensity data. He also summarizes the complexity of the problem with the following idea. “The most energy efficient trip is the one that is not performed [and that] can be addressed by: (1) land use planning, (2) parking policy (3) urban design and, (4) alternative work concepts” such as telecommuting. All proposed solutions require government interventions at the national and subnational levels.

planning should incorporate the transport implications on energy demand.

Although transportation is the second most important consumption sector in the Caribbean, governments have less degrees of freedom to effectively promote policies in this area³ given the complexity of the sector and the unavailability of data for comprehensive analyses. Along with access to reliable electricity, inefficient transportation systems are also an important barrier to development in the region, as suboptimal systems increase the cost of goods and services throughout the Caribbean. Furthermore, countries in the region are currently under utilizing public transportation, which could reduce the use of personal vehicles, but requires urban planning and implementation of attractive public transportation options.

The CARICOM Energy Policy suggests improving vehicle fuel economy⁴ by promoting the use of fuel-efficient vehicles, establishing efficiency standards for new vehicles and regulating the second-hand vehicle market. Additionally, the region could benefit from using electric and/or hybrid vehicles, the distance limitations of these types of vehicles adjust well to the small size of Caribbean SIDS. It is estimated that electric and hybrid vehicles could reduce fuel consumption by 73 per cent and 47 per cent respectively (CARICOM 2015).

Several countries have started implementing tax incentives to promote the use of hybrid and/or electric vehicles, as well as measures to incentivize conversion of conventional

vehicles to operate with sustainable fuels. Seven CARICOM member States have established improvement targets for the sector⁵ and Belize is part of the SIDS-DOCK initiative, which established a 20-30 per cent reduction in petroleum use in transportation by 2033 (CARICOM 2015).

INDUSTRY POLICIES

Industry policies aim at promoting the use of energy-efficient equipment and industrial systems, as well as identifying the barriers that hinder a more widespread use of efficient technologies and equipments.

Like previous strategies, policies in this area should promote investments through tax incentives, removal of subsidies and access to finance. It is also important to differentiate enterprises based on their size and design measures to support energy efficiency in small and medium-sized enterprises.

Considering that this sector accounted for 32 per cent of total energy consumption in Latin America and the Caribbean in 2012, it is critical to establish performance indicators and promote benchmarking. This highlights the importance of data collection and analysis, and monitoring and reporting. Energy management systems, such as ISO50001,⁶ support transition to more efficient processes and contribute to monitoring progress and identifying areas of improvement.

This sector poses an additional challenge in the Caribbean, as efficiency measures are needed for both the industry and the energy sectors. This means that energy-intensive industrial sectors

must be able to rely on stable and efficient grids for their electricity needs. Considering that many Caribbean SIDS have energy-intensive industrial sectors - such as construction, manufacturing, cement, mining and oil - production and storage systems must be scaled up to meet total energy demand. Besides the savings in energy and reduction in operation costs, a stable grid would improve the performance of industries, especially considering that access to and cost of reliable electricity remains one of the most important challenges to competitiveness in the Caribbean. In this regard, the *Energy Policy* underscores the importance of integrating industries to the energy transition movement through efficiency measures, but also by promoting co-generation. Self-generation allows companies to overcome instability issues and would boost the use of renewable energy. However, this type of initiative must be accompanied by the appropriate regulatory framework, cost-efficient feed-in tariffs⁷ and other incentives, as well as by modern (smart) grids.⁸

ENERGY UTILITIES

Energy utilities allow governments to access customers and their consumption behavior more directly. Utility companies are expected to increase efficiency and cost-effectiveness in their operations. At the same time, (targeted and non-targeted) customers are exposed to energy-efficient technologies and practices, and all these changes are reflected in energy tariffs.

Therefore, this component is strongly linked with cross-cutting policies, such as those that address subsidies and other market distortions.

▶ (continued on page 12)

⁴ Vehicle fuel economy: units of fuel consumed to travel a determined distance.

⁵ Antigua and Barbuda, The Bahamas, Grenada, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Suriname and Trinidad and Tobago. Jamaica has also incorporated measures to promote ethanol and biofuels.

⁶ ISO 50001 is a framework that considers the following requirements: (i) develop a policy for more efficient use of energy, (ii) fix targets and objectives to meet the policy, (iii) use data to better understand and make decisions about energy use, (iv) measure the results, (v) review how well the policy works, and (vi) continually improve energy management (www.iso.org).

⁷ A feed-in tariff (FIT) is defined as an energy supply policy that promotes the rapid deployment of renewable energy resources. A FIT offers a guarantee of payments to renewable energy developers for the electricity they produce (NREL).

⁸ Smart grids are electricity networks that use digital and other advanced technologies to monitor and manage the transport of electricity from all generation sources to meet the varying electricity demands of end-users (IEA).



TRANSITIONING TO SUSTAINABLE ENERGY – FINANCING A MAJOR CARIBBEAN CHALLENGE

Willard Phillips

This article examines the challenge faced by Caribbean Small Island Developing States (SIDS) in transitioning from their current dependence on imported fossil energy to greater efficiency in energy use, and a higher reliance on renewable energy sources.

For the past three decades, many Caribbean economies have been exploring sustainable energy solutions through the implementation of renewable energy, and more recently energy efficiency initiatives. The energy transition experience of Dominica and Saint Lucia is used in the elaboration of this analysis.¹

Both countries are highly dependent on oil imports to satisfy their energy needs². Dominica imports approximately 1,000 barrels of oil per day, and uses as much as 70 per cent of this for electricity generation. Saint Lucia imports 3,000 barrels per day utilizing more than 95 per cent of this to satisfy its energy needs (ECLAC 2013a).

In terms of commonality of strategies, both Dominica and Saint Lucia have identified geothermal energy sources as a key element of their future sustainable energy strategy. In both cases, National Energy Policies (NEP) and Sustainable Energy Plans (SEP) have been prepared to strengthen their legislative “armory” as they seek to develop their frameworks for RE and EE. Moreover, both countries have engaged many partners including, but not limited to, the Caribbean Renewable Energy Development Programme (CREDP), Caribbean Development Bank (CDB), ECLAC, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ),

The Global Sustainable Energy Islands Initiative Consortium (GSEII), and the United Nations Industrial Development Organization (UNIDO) in this process.

Both countries have also made significant financial investments in research, testing and pilot studies in order to assess their potential for renewable energy. In the case of Dominica, for instance, the government has already invested more than US \$12 million on geothermal explorations (Muller, 2013).

Although these initiatives and efforts have demonstrated the strong potential of these countries to address energy issues, no significant and sustained developments have been realized, partly because these efforts have been short term in nature and have not addressed the core barriers to the development of renewable energy in the Caribbean. Most of these barriers have been identified under the ECLAC/GIZ project and are summarized in Box 1. It is worth noting that one important barrier is project design and management, as projects are often prepared without clear objectives or implementation strategies, thus affecting their overall impact. Based on the experience of Dominica and Saint Lucia, it is clear that any attempt to improve the region’s ability to obtain funding for development must address this deficiency. The next section briefly

describes the issue of project financing as one of the key considerations related to the preparation and successful implementation of energy transition projects.

CONSIDERATIONS FOR PROJECT FINANCING

Possibly one of the most important challenges for Caribbean SIDS in transitioning to sustainable energy is the issue of costs and financing. Given the generally small size of Caribbean energy markets, it is often difficult for these countries to prepare bankable projects which can attract the attention of international financiers.

Research under the ECLAC/GIZ project identifies a broad schematic for the preparation of financing proposals for EE and RE through careful consideration of the following:

- ⌚ Energy balance forecasting and goals financing
- ⌚ Interests of donors, funders and sponsors
- ⌚ Identification of intermediary entities
- ⌚ Identification of financing lines of entities that offer financing
- ⌚ Documentation and formalisation

¹ This article is based on the assessments of national energy status undertaken under GIZ/ECLAC project entitled “Sustainable Energy in the Caribbean: Reducing the Carbon footprint in the Caribbean through the Promotion of Energy Efficiency and the Use of Renewable Energy Technologies.”

² This profile is largely typical of Caribbean SIDS, with the notable exceptions of Trinidad and Tobago which is the region’s only energy exporter, and Suriname, which already generates most of its electricity from renewable energy sources.

The *energy balance forecast and goals financing* describes the amount of energy a country requires for the next 20 – 30 years. In order to prepare feasible proposals, countries are advised to ensure that the purpose of sourcing financing is clearly articulated in the project proposal – that is, whether it is to conduct a pilot study, undertake social analyses, or design a commercial project. It should be noted that the type of work required for each of these projects is quite distinct. For example, while pilot studies require a financial evaluation, social projects on the other hand need a cost-benefit analysis and commercial projects require comprehensive technical, economic and financial evaluations.

Project proposers should also be mindful of the interests of *donors, funders and sponsors* as these would frame the type of project each of these financiers would fund. Among these entities are government donors or sponsors; philanthropic institutions; national or international financial institutions; and other institutions. Often the latter act as intermediary bodies, or the conduit between global or international institutions.

With respect to *intermediary entities*, there are projects that could find commonality between national initiatives and multilateral regional programmes. There are also institutions that address these kinds of projects, such as Sustainable Energy Initiative Organizations (SEIOs). Among the most well-known of these are: the International Renewable Energy Agency (IRENA); the Renewable Energy and Energy Efficiency Partnership (REEP); the Global Sustainable Energy Islands Initiative Consortium (GESII)

and, within the Caribbean region SIDS DOCK – 5Cs³ – SPREP⁴; and the Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS).

Considering the *identification of financing lines of entities that offer financing*, it is essential that project proposers are aware of the priorities of the respective financing institutions. There may be in some cases a *call for projects*, which usually has very definite objectives and priorities.

Finally, there are specific *prerequisites* (documentation and formalisation) that must be satisfied in order to facilitate the release of funds, and financing opportunities are often closely aligned to the nature of the project. Therefore careful examination of each stage of the financing process is critical to securing adequate funding.

CONCLUSIONS

Notwithstanding the Caribbean's challenge in transitioning to a more sustainable energy path, the efforts of *Dominica and Saint Lucia to date indicate that this is certainly possible. Indeed, Dominica can now boast that 30 per cent of its electricity generation is being sourced from hydropower and wind.*

There are many other examples throughout the region that also point to this possibility, as Caribbean SIDS attempt to stabilize their energy security in providing a better future for their nationals. A key challenge however remains the capacity to secure adequate financing over a sustained period in order to achieve the necessary investments for such transition. This issue is even more relevant considering the financial

heterogeneity of Caribbean countries and the burden that high levels of debt pose in their investment capacity.

Still, the global march towards more modern and sustainable energy use means that the Caribbean subregion could greatly benefit from the momentum enjoyed by energy efficiency and renewable energy initiatives. Numerous projects and funding facilities have devoted significant resources to support this transition, both in terms of technological advancements and the building up of national technical capacity. Countries such as Dominica and Saint Lucia have used this opportunity to establish clear transition paths.

Additionally, technological advances have significantly helped reduce investment costs in certain technologies, such as solar PV. This global context, combined with the financial restrictions faced by the region, offer the Caribbean a great opportunity to access international technical assistance and funding to improve energy efficiency and promote the use of renewable energy sources. However, in order to benefit from this transition, Caribbean governments must continue to signal their commitment to improving energy efficiency and modernizing their systems to support further use of renewable energy sources. At the same time, they must strengthen their internal capacities to design sound investment projects with clear goals and implementation mechanisms. If this were to be achieved, the millions of dollars and the years of research to date would not have been in vain.⁵ ■

³ Caribbean Community Climate Change Centre (5Cs)

⁴ Secretariat of the Pacific Regional Environment Programme.

⁵ A more comprehensive discussion can be found in the ECLAC documents *lcarw13* and *lcar14*

PRIORITY AREAS TO GUIDE ENERGY EFFICIENCY POLICIES

The IEA suggests the promotion of a competitive environment as a way of fostering improvement and modernization. Providers should deliver cost-effective energy by reducing losses, adjusting tariffs, and providing customers with adequate information and technology. However, given that most countries' energy sector is monopolized, independent power producers (IPP) of renewable energy have struggled to benefit from the sector's transformation, as many countries have not enacted enabling regulatory frameworks and even fewer have set (cost-effective) tariffs to promote the use of RE and improve EE. Additionally, administrative processes tend to be time-consuming and onerous, creating further disincentives. According to CARICOM (2015), "vertically integrated utilities tend to resist measures that allow consumers to connect distributed renewable energy systems and sell power to the grid". This problem is also exacerbated by the absence of regulatory bodies in many countries. Nevertheless, State control over monopolies would allow the incorporation of structural changes such as *renewable portfolio standards*, which mandate utility companies to obtain a pre-determined share of their energy from RE sources.

Another issue faced by utilities is related to high levels of technical and non technical losses due to outdated and inefficient generation, transmission and distribution systems, and theft and under billing, which cause losses between 7 and 34 per cent in the region.⁹ This results in high electricity costs, which affect access and competitiveness, and impede investments to improve EE and RE use.

Considering that this sector offers a great opportunity for transformation, some Caribbean SIDS have already implemented net metering schemes,¹⁰ thus promoting the use of RE in countries like Barbados, Grenada, Jamaica and Saint Lucia. CARICOM suggests that increased participation of Independent Power Producers (IPPs) and use of net metering or feed-in tariffs have proven to be effective measures to promote the use of RE. IPPs could also increase the resilience of the system by reducing costs and losses associated with movement of power over great distances, and by promoting the use of decentralized systems. However, in order to mainstream the use of RE and increase EE, it is necessary to upgrade electric grids and storage capacity within the region.

Finally, interconnection within the region is largely underexploited regardless of the numerous benefits it could yield, such as economies of scale, reduced investment and operation costs, and adaptation of reserve margins. A study by Nexant already identified six economically and technically feasible interconnections: Nevis-Saint Kitts, Dominica-Martinique; Dominica-Guadeloupe; Nevis-Puerto Rico; Nevis-U.S. Virgin Islands; and Dominican Republic-Haiti (CARICOM 2015).

CONCLUSION

The global context created by the various instruments of the 2030 Development Agenda provides an enabling financial and technical environment for Caribbean SIDS to pursue a cleaner and more efficient energy matrix and benefit from

international cooperation, however, this process must be triggered by consistent national efforts towards a greener and more efficient energy sector.

The implementation of most of these measures can be managed by national governments if they take advantage of international practices and lessons learned, benefiting from past experiences at the same time that they signal the subregion's commitment to sustainable energy. In view of the vulnerabilities faced by Caribbean SIDS, it is fundamental to strategically design and structure energy policies in order to allow an efficient use of financial and technical resources, both from national and international/multilateral origin, thus maximizing the scope and effects of each policy or program.

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⁹ Losses vary greatly in the region, countries with fewer losses include Barbados (7 per cent in 2009), Dominica (8.6 per cent in 2011) and Saint Vincent and the Grenadines (8.3 per cent in 2008); while other countries experience elevated losses, such as Antigua and Barbuda (23 per cent in 2009), Guyana (34.2 per cent in 2008) and Haiti (approximately 50 per cent) (CARICOM 2013).

¹⁰ Net metering is a billing mechanism that credits solar energy system owners for the electricity they add to the grid (SEIA).

BOX I. BARRIERS TO IMPLEMENTING RENEWABLE ENERGY STRATEGIES

Prepared by Esther Kissoon

1. Regulatory frameworks and policies

Ownership structure of utility: most electrical utilities in the region are monopolies in electricity generation, transmission and distribution and have not implemented net-metering or feed-in-tariffs which would encourage independent power producers (IPP). Even where net metering is available and IPPs permitted, there are significant restrictions on their operations, such as onerous, long and unclear application procedures.

Lack of institutional capacity: lack of capacity and expertise in the fields of energy efficiency and use of renewable energy has been identified as an important obstacle. In addition, policies and other strategies lack clear implementation activities, as well as monitoring and reporting, and other deficiencies in project development. Moreover, there are important data gaps that affect informed decision-making processes, as well as establishment of realistic improvement targets.

Price distortions: fossil fuel subsidies can significantly reduce the price of energy thereby limiting the incentives to switch to cleaner energy sources, Caribbean countries provided direct or indirect fuel subsidies which ranged from 0.1 per cent of GDP for Saint Kitts to 2 per cent of GDP for Trinidad and Tobago. Such distortions can restrict the development of RE even if financial incentives exist. This issue is exacerbated by monopolistic practices and vertically integrated utility companies that resist innovation through EE and RE.

Transaction costs: excessive bureaucracy is also a major impediment to the development of RE, as interested stakeholders are faced with burdensome requirements and unclear procedures. In addition, lack of integration of RE initiatives in the region increase investment and operation costs, hindering further penetration.

Inconsistent and short-term policy: several studies have identified inconsistencies in government policy which can generate uncertainty with respect to the objectives of the government thereby limiting long-term private sector investment in RE. In order to mainstream RE, countries should improve grid efficiency and storage capacity; although EE measures are not costly and provide quick wins, it still faces serious challenges. Furthermore, national policies are not always aligned with regional targets or do not establish clear goals or expected accomplishments.

Lack of regional technical cooperation: the development of the RE sector can be impeded by the lack of coordination between the vast number of players and initiatives in the RE sector across the region. However, regional and international organizations have promoted stakeholder interaction to raise awareness, increase technical knowledge and allow exchange of experiences.

2. Informal institutions

Strong traditional ties to conventional energy sources: the development of RE can prove difficult where there is a deep affinity with fossil fuels. Such ties to fossil fuels are strongest in petroleum producing countries like Trinidad and Tobago.

Lack of knowledge and awareness: despite the fact that the cost of RE technology has fallen significantly and several studies reveal significant economic and environmental benefits to RE development, many individuals still harbour reservations which sometimes stem from bad experiences in the past.

3. Costs and financing

High initial costs: this barrier exists both at the utility and at the private sector levels and it is particularly acute where conventional energy systems are already in place. Nevertheless, it should be noted that certain technologies have seen substantial price reduction over the past years, signalling further reductions in the short and mid terms.

Availability of funding: given the high initial cost of RE technology, the availability of low-cost financing is also a major barrier. Most financial institutions in the region provide inadequate financial products for investments in RE resulting in heavy reliance on financing from international developmental agencies. At the national level, countries such as Barbados, Saint Kitts and Nevis and Saint Lucia have implemented loans, tax exemptions and other measures to incentivize widespread use of residential RE technologies.

4. Market barriers

Small market size: the low energy demand and small size of Caribbean countries do not allow economies of scale from many RE projects. The potential power generation of RE resources like geothermal power on several islands is greater than the current demand thus limiting the incentives for their development. Regional interconnection is presented as an option to create economies of scale, reduce operation costs, incentivize investment and strengthen a sustainable energy market.

Sources:

¹ ECLAC (2013a) An assessment of the economic and social impacts of climate change on the energy sector in the Caribbean. LC/CAR/L.397

² IDB (2014) Website, retrieved on December 6, www.irena.org

³ National Renewable Energy Laboratory (NREL) 2015, Energy snapshot, Saint Lucia. United States Department of Energy, Office of Energy Efficiency and Renewable Energy Muller. N. What lies beneath: geothermal energy in Dominica, Caribbean Beat, Issue 124, November/December, 2013.

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Lucia. The articles suggest that the region has a vast potential to expand the use of renewable energy sources and could obtain important socio-economic and technical benefits from implementing energy efficiency policies. These are less costly than other types of improvements in energy sustainability, and offer quick gains to implementing countries - an attractive option for highly indebted Caribbean Small Island Developing States (SIDS). In this view, this issue of Focus discussed the need for energy efficiency and renewable energy policies, and how to structure this transition in light of regional and international experiences and best practices. In addition, using Saint Lucia and Dominica as examples, we analyze the experience of the Caribbean in this global transition considering the

commitment and push for energy efficiency and the promotion of renewable energy use.

ECLAC recognizes that the global winds of change in energy provide us with a golden opportunity to broaden and deepen our support in the area of the socio-economics of energy in the subregion. Supported by the SIDS Accelerated Modalities Of Action (SAMOA) Pathway, the Sustainable Development Goals - *ensure access to affordable, reliable, sustainable and modern energy for all* -, the Paris Agreement and other instruments of the 2030 Development Agenda, ECLAC reaffirms its commitment to substantially engage its member states and partners to better prepare our region to confront questions such

as the macro-economic implications of the global energy transition; the potential fiscal and monetary impacts; likely result on balance of payments and trade; implications for foreign and domestic investments; and the welfare effects of energy changes particularly on the poor and vulnerable in our societies.

Yours in Focus,



Diane Quarless



Photo of the attendees of the Regional Energy Policy Dialogue and Training Workshop. — May 2016.

RECENT AND UPCOMING MEETINGS

2016

SEPTEMBER

8 September

Evaluation of the project 'Sustainable Energy in the Caribbean: Reducing the Carbon Footprint in the Caribbean through the Promotion of Energy Efficiency and the Use of Renewable Energy Technologies' - *Trinidad and Tobago*

19 - 23 September

Regional workshop: Strengthening the technical capacity of public finance managers in selected Caribbean Small Island Developing States (SIDS) - *Trinidad and Tobago*

OCTOBER

11 - 21 October

Regional training workshop on the development of REDATAM applications for the dissemination of population and housing census data - *Suriname*

25 - 28 October

Thirteenth Regional Conference on Women in Latin America and the Caribbean - *Uruguay*

NOVEMBER

15 - 17 November

Expert Group Meeting Advancing the Rights and Perspectives of Women and Girls with Disabilities in Development and Society - *Chile*

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No. LC/L.4132

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Regional approaches to e-government initiatives in the Caribbean

No. LC/CAR/L.493

April 2016

Evaluation report of the training course on disaster assessment methodology (Arequipa and Ica, Peru)

No. LC/CAR/L.494

April 2016

Evaluation report of the training course on disaster assessment methodology (Panama City, Panama)

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