COUNTRY REPORT: BARBADOS

Caribean Region Report: The Caribbean An Emerging Framework for Renewable Energy in The CARICOM Region

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Abstract

The Caribbean Community (CARICOM) comprises a group of 15 Caribbean small island developing states (SIDS) united in a regional trading agreement (RTA). The group – as well as its sub-regional RTA of the Organisation of Eastern Caribbean States (OECS) – is vulnerable to the effects of their heavy reliance on fossil fuels, as well as the pernicious effects of the global phenomenon of anthropogenic climate change. In the wake of the economic downturn since 2008, and in an effort to foster economic and environmental sustainability in the region, CARICOM states have identified the use of indigenous sources of renewable energy as a viable alternative to achieve improved economic and environmental conditions. While challenges exist in fulfilling this objective, efforts have been ongoing at the regional and sub-regional level, and to a lesser extent the national level, to incorporate renewable energy into the energy equation. This Report explores the background and framework of fossil fuel and renewable energy use in the CARICOM region, before outlining examples of existing policy on renewable energy, and concluding with the future possibilities and continuing challenges to incorporating renewable energy into a formula for the energy security and sustainability of the region.

Introduction

Located in the region of the West Indies, the CARICOM Caribbean, as depicted in Map 1, may be considered to be a geo-political construct of Caribbean states which are members of

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the Caribbean Community (CARICOM) regional trading agreement. Guided by means of the 2001 *Revised Treaty of Chaguaramas*,[1] its members[2] are all Small Island Developing States (SIDS) – largely low-lying coastal countries that tend to share similar sustainable development challenges, including small but growing populations, limited resources, remoteness, susceptibility to natural disasters, vulnerability to external shocks, excessive dependence on international trade, and fragile environments.[3] Combined with the Organisation of Eastern Caribbean States (OECS)[4] – a sub-regional trading agreement comprising 7 of its members – CARICOM has become a forum for advancing efforts in renewables – primarily as a means to pursuing alternatives to petroleum, and to mitigating the effects of climate change.[5] At the OECS level, efforts are also ongoing under the aegis of the 2011 *Revised Treaty of Basseterre*, as well as Principle 16[6] of the 2006 *St. George's Declaration*.[7]

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[1] *Revised Treaty of Chaguaramas Establishing the Caribbean Community (CARICOM) including the CARICOM Single Market and Economy*, 7 May, 2001, entry into force 4 February, 2002, 2259 UNTS 293, online : http://www.caricom.org/jsp/community/revised_treaty-text.pdf.

[2] Art. 3 of the 2001 *Revised Treaty of Chaguaramas*. CARICOM is made up of the following member states: Antigua and Barbuda, the Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St. Lucia, St. Kitts & Nevis, St. Vincent & the Grenadines, Suriname and Trinidad and Tobago. The Community also includes the following associate members: Anguilla, Bermuda, British Virgin Islands, Cayman Islands and the Turks and Caicos Islands.

[3] United Nations General Assembly, Five-year Review of the Mauritius Strategy for the Further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States : Report of the Secretary-General, A/65/115, 6 July 2010, online : http://www.un.org/en/ga/search/view_doc.asp?symbol=A/65/115, para 12.

[4] The OECS is a regional trading agreement, comprising of 7 of CARICOM's members. Guided by the 2011 *Revised Treaty of Basseterre*, Art. 3 lists the members of the union as Antigua and Barbuda, Commonwealth of Dominica, Grenada, Montserrat, St Kitts and Nevis, St Lucia and St Vincent and the Grenadines. The chain is 'broken' by the French overseas territories of Martinique and Guadeloupe, which lie between St. Lucia and Dominica and Dominica and Montserrat respectively on the Lesser Antillean chain. The two most geographically isolated members, Anguilla and the British Virgin Islands, have only associate membership of the organisation, and although diplomatic missions of the OECS do not represent these two states, they are part of the Eastern Caribbean Supreme Court, and for the purposes of further discussing the membership, they are treated as equals of the full members. All full members of the OECS are also full members of CARICOM.

[5] See for example, the 2009 *Port of Spain Accord*, 2 June 1989, online: http://www.islandvulnerability.org/docs/portofspain1989.pdf; Arts. 15, 55, 58, 60, 61, 65 and 141 of the 2001 Revised Treaty of Chaguaramas; 2009 *Liliendaal Declaration On Climate Change and Development*, iissued by the Thirtieth Meeting of the Conference of Heads Of Government of the Caribbean Community, 2-5 July 2009, Georgetown, Guyana, online : http://www.caricom.org/jsp/communications/meetings_statements/liliendaal_declaration_climate_change_development.jsp.

[6] Manage and Conserve Energy.

[7] *St. George's Declaration of Principles for Environmental Sustainability in the OECS*, revised 2006, online: http://www.iadb.org/intal/intalcdi/PE/2009/03209.pdf.

Map 1

Map of the CARICOM Caribbean)

Source: http://www.thehabarinetwork.com

This trend occurs for a variety of reasons. Firstly, with the exception of the petroleum producing state of Trinidad and Tobago,[8] CARICOM's non-oil producing States are vulnerable to fluctuations in global energy prices, given their high dependence on fossil fuels.[9] The goods and services exports of these countries are insufficient to offset the costs for oil imports,[10] which therefore constitute a considerable fiscal burden.

Accordingly, the use of renewable energy sources has emerged as a viable course of action to reduce the percentage GDP spent on fuel by CARICOM states, and to channel this revenue into other sectors of their developing economies. Secondly, in the wake of warnings concerning the impacts of climate change,[11] the region has embraced the objective that

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[8] UNEP. *Caribbean: Environmental Outlook*, 2004 (Nairobi, United Nations Environment Programme, 2004), online: http://www.pnuma.org/deat1/pdf/GEO%20Carribean%20Environment%20Outlook%20Ing%202004.pdf.

[9] See Caribbean Renewable Energy Development Programme. Final Evaluation Report. (UNEP/GEF, 2011); Zia Mann, "Energy Options for the Caribbean," *Jamaica Gleaner*, 6 October 2013, online: http://jamaica-gleaner.com/gleaner/20131006/focus/focus3.html .

[10] CARICOM. Caribbean Community Regional Aid for Trade Strategy 2013–2015, (Georgetown: CARICOM, 2013), online: http://www.caricom.org/Caribbean_Community_AfT_Strategy_final.pdf, p. 5.

[11] See for example, Intergovernmental Panel on Climate Change, *Climate Change 2013: The Physical Science Basis*, Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Summary for Policymakers (Switzerland: IPCC, 2013), online: http://www.climatechange2013.org/images/uploads/WGI_AR5_SPM_brochure.pdf

adaptation and mitigation measures must be immediately[12] employed to reduce the pernicious effects of climate change.[13] The effects of global warming for CARICOM states are potentially catastrophic, and therefore cannot be ignored. It is no surprise therefore, that CARICOM states are concordant in their ratification rate of both the *United Nations Framework Convention on Climate Change*[14] and its *Kyoto Protocol*.[15] These agreements jointly comprise the basis of the majority of the bloc's strategies to counter the effects of climate change.[16]

This Report outlines the existing background of energy policy in the CARICOM region, delineates the regime of fossil fuel use in the region, and identifies the potential avenues for renewable energy in the region. Against this background, the current law and policy on renewable energy in the CARICOM region – at the regional, sub-regional[17] and national levels – are examined, and a general conclusion made on the emerging paradigm for the region.

Background on Energy Policy in the Caribbean Region

Apart from the notable exception of the twin-island Republic of Trinidad and Tobago,[18] the CARICOM region's heavy dependence on fossil fuels is directly linked to the lack of oil, natural gas and coal resources in the region. More than 90% of the power supply in the region is dependent on imported fossil fuels,[19] which makes the region one of the most

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[12] See generally, Nicholas Stern, *The Economic of Climate Change: The Stern Review* (London: HM Treasury, 2006).
[13] Martin L. Parry *et al*, Summary for Policymakers in *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge Printing Press, 2007) at 11
[14] *United Nations Framework Convention on Climate Change*, 9 May 1992, 1771 U.N.T.S. 107, entered into force 21 March 1994, online: UNFCCC http://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf.
[15] *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, 11 December 1997, 2303 U.N.T.S. 148, entered into force 16 February 2005, online: United Nations Treaty Series http://unfccc.int/resource/docs/convkp/kpeng.pdf.
[16] See for example, Climate Change and the Caribbean: A Regional Framework for Achieving Development Resilient to Climate Change (2009-2015) (Belize City: CCCCC, 2009), online: http://www.iadb.org/intal/intalcdi/PE/2013/10773.pdf.
[17] At the level of the OECS.
[18] Trinidad and Tobago. Trinidad and Tobago has abundant sources of oil and gas, which have earmarked it as a major fossil fuel suppler in the region.
[19] Angelika Wasielke, Energy-policy Framework Conditions for Electricity Markets and Renewable Energies: 23 Country Analyses (Eschborn, Germany 2007) at 2.

import-dependent in the world where petroleum is concerned.[20] The region's high dependence is directly related to providing for the needs of domestic, commercial and the principal economic activities in the region, such as tourism and related industries.[21] In some states such as Trinidad and Tobago, Jamaica and to a lesser extent Barbados, there are also industrial activities which require constant and reliable sources of power.[22] The grim consequences of chronic dependence on imported energy are reflected in the expenditure by many CARICOM governments of as much as half of their export revenues on imported fossil fuels.[23] Expending a significant percentage of their GDP on the importation of fossil fuels, means that much of the financial resources of CARICOM states are diverted away from progress on health, education and other developmental agendas. Specifically, it has been recognized that high energy prices stifle economic growth in the Caribbean region, especially in light of the trade policies where the region needs to maintain competitiveness in the production of goods and services. The unavailability of readily available and reliable sources of energy can also stymie the development of industry in a state – for example, the high energy requirements of maintaining an aluminum smelter proved unsustainable, and the facility was forced to close in the 1980s. Most recently, the Canadian owned Reunion Gold, which is operating a manganese mine in Guyana, has had to explore possibilities with neighbouring Trinidad to build a processing plant, primarily because of the cheaper cost of power there.[24] As these examples illustrate, the majority of CARICOM countries have recognised that pursuing energy independence is important progress towards national development.[25]

In an effort to address this issue, states have embarked on a variety of short to medium term policies, to either address their acquisition of fossil fuels, or to pursue alternatives to fossil fuels. With respect to the former, a notable example is the Petrocaribe Agreements between

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[20] See, Joseph Williams, "A Strategic Regional Approach to Sustainable Energy: Challenges, Solutions & Role of CARICOM" (slide show presented to the Caribbean Renewable Energy Forum, 15 October 2009).
[21] See, Glenn J. Berger & J. Alexander Cooke, "Procuring Cost-Effective and Climate-Friendly Electrical Generation in the Caribbean: A Primer" (2009) 7 Industry Journal 14 at 14.
[22] Jamaica and Trinidad & Tobago are the loci of the region's manufacturing sector, including industries based on oil and natural gas in Trinidad & Tobago and the extraction of bauxite and the smelting of aluminum in Jamaica. Barbados, which is primarily service based economy, has progressively expanded its manufacturing sector over the last 10 years.
[23] See, Commission on Sustainable Development, Renewable Energy Essential for the Well-Being of Small Island Developing States, Commission on Sustainable Development Told, ENV/DEV/893, 8 May 2006, online: http://www.un.org/News/Press/docs/2006/envdev893.doc.htm.
[24] Cheaper Power Matthew's Ridge Firm Signs MoU with T&T for Manganese Processing Plant, Kaieteur News, 21 January 2014, online: http://www.kaieteurnewsonline.com/2014/01/21/cheaper-powermatthews-ridge-firm-signs-mou-with-tt-for-manganese-processing-plant/.
[25] See Maxine Nestor, "Energy Policy in the Caribbean" (2009) 1 CARICOM Energy, online : http://www.caricom.org/jsp/community_organs/energy_programme/cc_energy_1_1.pdf, 4.

Venezuela and some Caribbean territories[26] to purchase 185,000 barrels of oil *per* day at market value. Beneficiary states pay a percentage of the cost up front, with the balance over 25 years at 1% interest. Additionally, these nations could settle their debt to Venezuela using goods and services.[27] With respect to pursuing alternatives to fossil fuels, some states have implemented incentives to encourage the use of alternative sources of energy, while others have begun tentative moves to foster investment in alternative sources of energy. Barbados, which has one of the lowest domestic electricity rates in the Caribbean region, due in part to a more diverse fuel mix,[28] is an example of a CARICOM state which has long embraced incentives. From as far back as 1980, the island state has incorporated incentives to encourage the use of solar energy,[29] and most recently, introduced the Renewable Energy Rider, as a pilot programme. Under the Rider, customers with renewable resource generation facilities utilising a wind turbine, solar photovoltaic or hybrid (wind/solar) power source, can enter into a power-purchase agreement to provide the national grid with electricity generated.[30] With respect to fostering an environment which is friendly to investment in renewable energy, Nevis – the smaller of the two islands comprising the state of St Kitts-Nevis, has drafted the 2008 *Geothermal Resources Development Bill*. The *Bill* was tabled as the first step to encouraging investment in geothermal energy, while providing a regulatory framework in the twin-island state. The OECS states of Grenada and Dominica are also pursuing geothermal energy – Grenada has conducted a renewable energy readiness assessment,[31] also has legislation in draft.[32] Dominica has announced that it is taking steps to become the first carbon negative economy in the hemisphere by developing geothermal energy.[33]

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[26] The countries that are signatories to this agreement are: Antigua and Barbuda, the Bahamas, Belize, Cuba, Dominica, the Dominican Republic, Grenada, Guyana, Jamaica, Nicaragua, Suriname, St Lucia, St Kitts and Nevis, and Saint Vincent and the Grenadines. Cuba, the Dominican Republic, Haiti, Honduras and Guatemala are also party to the agreement. Barbados and Trinidad & Tobago are not parties to the agreement.

[27] Robert Buddan, In Search of Development: Chavez and PetroCaribe, in Jamaican Gleaner, 28 August 2005, online: http://jamaica-gleaner.com/gleaner/20050828/focus/focus2.html.

[28] CARILEC. Tariff Survey Among Member Electric Utilities (Castries: CARILEC, 2010).

[29] The 1980 *Homeowner Tax Incentive* was introduced in the 1980 budget, and has been cited as the watershed event in encouraging the now widespread use of solar energy in Barbados

[30] See Barbados Power and Light, Renewable Energy Rider, online: http://www.blpc.com.bb/bus_energyrider.cfm.

[31] IRENA. Grenada Renewable Energy Assessment (IRENA, 2012), online: http://www.irena.org/DocumentDownloads/Publications/Grenada_RRA.pdf.

[32] 2011 Geothermal Resource Development Bill and 2011 Geothermal Resources Environmental and Planning Regulations.

[33] Geothermal Project Moves to Next Level, Dominica News Online, 13 November 2013, online: http://dominicanewsonline.com/news/homepage/news/economy-development/geothermal-project-moves-next-level/.

Additionally, for quite some time governments in the region have been raising concerns over the negative environmental impacts of the use of fossil fuels.[34] While the region contributes to the global phenomenon of anthropogenic climate change because of the *res communis* nature of the resource, CARICOM states, as compared to developed and industrialised states, produce markedly lower levels of greenhouse emissions. This is primarily because the largely developing economies have effected a shift away from agriculture to services,[35] and with few exceptions, are not considered industrialised nor urbanised.[36] However, because of their geographic location, and as SIDS, CARICOM states are severely vulnerable to the effects of climate change and the associated sea-level rise. This is primarily as a result of their size, proneness to natural hazards, external shocks, and low adaptive capacity,[37] which all translate into impacts on marine and coastal systems, freshwater resources,[38] ecosystems,[39] crop productivity[40] and low-lying areas.[41] These impacts comprise persistent and pervasive threats for the countries of the region, which will adversely impact on the region's overall tourism product, reduce the amenity value for the coastal populace, as well as for tourists,[42] and inherently shock other economic activities such as the fishing industry. Socio-cultural norms of coastal populations will also undoubtedly be disrupted.[43]

One of the main efforts at the CARICOM level has been to launch the Caribbean Community Climate Change Centre (CCCCC), whose objective is to coordinate the region's response to climate change, and work on effective solutions and projects to combat the

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[34] See, Fanz Gerner, "Towards a Regional Caribbean Energy Market" (slide show presented to the Caribbean Renewable Energy Forum, 15 October 2009) online: http://www.caribbeanenergyforum.com.

[35] Caribbean Community Regional Aid for Trade Strategy 2013–2015, *supra* note 5.

[36] Jamaica and Trinidad & Tobago with populations of approximately 2.8 million and 1.3 million respectively are the union's second and third most populated members (Haiti with a population of 9.9 million is by far the most populated), and are also the most urbanised and industralised members of the union. Other members have populations either under 100,000 or a few 100,000 (Barbados, Guyana, Suriname), and are largely dependent on service industries such as tourism, banking, agriculture and fisheries.

[37] See, Nobuao Mimura *et al*, "Small Islands" in Martin Parry *et al*, *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change 2007* (Cambridge: Cambridge University Press, 2007) 687 – 716 at 689.

[38] Martin L. Parry *et al*, *supra* note 13.

[39] Ecosystems will be affected including the destruction of coastal and marine ecosystems through ocean acidification, coral bleaching and the demolition of coastal barriers.

[40] Extreme weather affect the ability of natural resources to regenerate, rising temperatures themselves will have a massive impact and the ability to continue growth of foods associated with particular climates.

[41] Coasts are projected to be exposed to increasing risks, including coastal erosion, due to climate change and sea-level rise. The effect will be exacerbated by increasing human-induced pressures on coastal areas.

[42] Martin L. Parry *et al*, *supra* note 13 at 12.

[43] Caribbean Community Regional Aid for Trade Strategy 2013–2015, *supra* note 10.

environmental impacts of climate change and global policy. The development of the Centre followed 3 main projects – Caribbean Planning for Adaptation to Climate Change (CPACC)[44] Project; Adapting to Climate Change in the Caribbean (ACCC) Project,[45] and the Mainstreaming Adaptation to Climate Change (MACC) Project[46] – all of which were aimed at mitigating and adapting the effects of the phenomenon in the region. To date, the Centre has coordinated several projects, including the 2011–2015 Caribbean Regional Resilience Development Implementation Plan and the 2009–2021 Regional Planning for Climate Change Development in the Region.[47]

For their part, the OECS states have been the beneficiaries of the 5-year US 2.5 million Reduce Risks to Human & Natural Assets Resulting from Climate Change (RRACC) Project.[48] The project aims to reduce climate risks and foster adaptation in 11 OECS states, including those who are also members of CARICOM.[49] The OECS has also identified renewable energy as a thematic area falling under the shared competency[50] of the union, and has embarked on several efforts including the establishment of an Eastern Caribbean Energy Regulatory Authority (ECERA),[51] the Eastern Caribbean Energy Labeling Project[52] and *Policy Framework Options and Elements for Enhanced Efficiency of Energy Use in the OECS States.*[53]

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[44] Lasting from 1997 to 2001, the goal of the CPACC project was to build capacity in the Caribbean region for the adaptation to climate change impacts, particularly sea level rise. See CARICOM Secretariat, online: http://www.caricom.org/jsp/projects/macc%20project/cpacc.jsp.

[45] The Adaptation to Climate Change in the Caribbean (ACCC) Project, succeeded the Caribbean Planning for Adaptation to Climate Change (CPACC) project. ACCC, which lasted from 2001 to 2004, the project was designed to sustain activities initiated under CPACC, and to address issues of adaptation and capacity building not undertaken by CPACC, thus further built capacity for climate change adaptation in the Caribbean region, See CARICOM Secretariat, online: http://www.caricom.org/jsp/projects/macc%20project/accc.jsp.

[46] Scheduled for 2004 to 2007, the project's main objective is to mainstream climate change adaptaion strategies into the sustainable development agendas of the small island and low-lying states of CARICOM. MACC adopted a learning-by-doing approach to capacity building, consolidating the achievements of CPACC and ACCC. It will build on the progress achieved in these past projects by furthering institutional capacity, strengthening the knowledge base, and deepening awareness and participation. See CARICOM Secretariat, online: http://www.caricom.org/jsp/projects/macc%20project/macc.jsp

[47] See, Caribbean Community Climate Change Centre, Projects, online: http://www.caribbeanclimate.bz/projects/projects.html

[48] International Institute for Sustainable Development, OECS' RRACC Newsletter Highlights Progress in New Reducing Climate Risks Project, January 2012, online: http://climate-l.iisd.org/news/oecs-rracc-newsletter-highlights-progress-in-new-reducing-climate-risks-project/

[49] Ibid.

[50] Art. 14.2 of the 2011 *Revised Treaty of Basseterre* identifies issues concerning the environment as an area of shared competence under the union.

[51] See Eastern Caribbean Energy Regulatory Authority, online: http://www.oecs.org/our-work/projects/ecera.

[52] See Eastern Caribbean Energy Labeling Project, online: http://www.ecelp.org/.

[53] See OECS. Identification of Policy Framework Options and Elements for Enhanced Efficiency of Energy Use in the OECS States (OECS, 2001).

Taken holistically, renewable energy may be viewed as a medium to long-term solution to both the region's energy quandary, and a means of furthering the objectives of the 1992 *Climate Change Convention*. However, as will be outlined in the next section, there exists a gap between the region's desire to move toward renewable alternatives, and the ability to realise this objective.

Renewables – A Move Away from Oil & Natural Gas in the CARICOM Caribbean:

Overview of the Law and Policy of the CARICOM Caribbean

Reducing the dependence on fossil fuels will have a direct effect on the balance of payments deficit of CARICOM states, and will also reduce the vulnerability of the energy system in light of the international geopolitical climate.[54] Coupled with the objective of mitigating and adapting to climate change, there has emerged the recognition that CARICOM needs to embrace the development of renewable sources of energy indigenous to the region.[55] Renewable energy refers to all forms of energy that are "alternative" to "conventional" fossil and nuclear fuels.[56] Within the context of the CARICOM region, these include biomass, geothermal energy, hydropower, wave, tidal, ocean thermal energy, offshore wind, solar energy, and wind energy.[57]

While the CARICOM group of countries has embarked on an agenda for pursuing renewable energy as one strategy to mitigate and adapt to climate change, there exist considerable obstacles to the deployment of renewable energy in the Caribbean. These generally comprise a lack of baseline data on resource potential, limited technological awareness, inadequate financing, limited capacity and inadequate policy, and regulatory and legislative frameworks to encourage renewable energy development.[58] For the most part, efforts to address these hurdles at the regional level have inadequate financing.[59] However, in the last 5 years, efforts at both the policy and technical level have proceeded against the premise that for any significant advancement of the development of renewable energy in the

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[54] See, David Ince, "The Use Regulation in Promoting the Development of Renewable Energy Technologies in the Caribbean" (2006) Industry Journal 13 at 14.
[55] Ibid.
[56] See, Paul Kruger, *Alternative Energy Resources: The Quest for Sustainable Energy* (New Jersey: John Wiley & Sons Inc., 2006) at 137.
[57] See generally UNDP/GEF. Caribbean Renewable Energy Development Programme (CREDP): Final Evaluation Report (UNDP/GEF, 2011).
[58] Williams, *supra* note 20.
[59] See, David Ehrhardt, "Promoting Efficient Renewable Energy Generation in the Caribbean: Jamaica's Renewables Tender and Possible Alternatives" (slide show presented to the Caribbean Renewable Energy Forum, 15 October 2009) online: http://www.caribbeanenergyforum.com.

region to occur, there needs to be more political, regulatory, legal and institutional initiatives, which will in turn address the financial challenges.[60]

To address these challenges, the region has slowly, but steadily embarked on a suite of measures to provide an enabling environment for renewable energy and attract investment for the sector. At the CARICOM level, the forum for elaborating policies and strategies on renewable energy identified by the supreme organs[61] of the union, is at the Council of Trade and Environment (COTED).[62] By the *Treaty*, COTED is mandated by the Conference[63] and the Community Council of Ministers[64] to "promote measures for the development of energy and natural resources on a sustainable basis."[65] Under the aegis of COTED, in 2008, CARICOM commenced the Energy Programme and elaborated a regional policy in the form of the 2009 Draft *Liliendaal Declaration* on Climate Change and Development.[66] The *Declaration* was endorsed by the CARICOM Conference at its Thirteenth Meeting, and sets out broad commitments relating to *inter alia,* satisfying commitments under the 1992 *Climate Change Convention*, support for the development of renewable energy in the Caribbean and addressing both the immediate, as well as long-term adaptation needs[67] of CARICOM SIDS and LDCs.[68] In March 2013, at the Forty-First Special Meeting of COTED under the theme of energy, a CARICOM Energy Policy was approved.[69]

The efforts of the organs[70] of CARICOM have been complemented by efforts through institutions and programmes of the union specifically mandated to address particular issues such as energy, climate change, *et cetera*. An example is the CCCCC, through which the

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[60] See, Fanz Gerner, supra note 34.
[61] By Arts. 11, 12 and 13, these are the Conference of Heads of Government and the Community Council of Ministers.
[62] Art. 15, 2001 Revised Treaty of Chaguaramas.
[63] The Conference of Heads of Government is the supreme decision making organ of CARICOM, the Heads of Government of the Member States or a Minister or other person to represent him or her at any Meeting of the Conference.
[64] The Community Council of Ministers which shall be the second highest organ of CARICOM
[65] Art. 15(2)(f), 2001 Revised Treaty of Chaguaramas.
[66] The *Liliendaal Declaration On Climate Change and Development*, issued by the Thirtieth Meeting of the Conference of Heads Of Government of the Caribbean Community, 2-5 July 2009, Georgetown, Guyana, online: http://www.caricom.org/jsp/communications/meetings_statements/liliendaal_declaration_climate_change_development.jsp.
[67] The Liliendaal Declaration on Climate Change and Development *supra* note 66.
[68] Haiti is actually the only lesser developed country (LCD) in CARICOM.
[69] CARICOM. CARICOM Energy Policy, 1 March 2013, online: http://www.caricom.org/jsp/community_organs/energy_programme/CARICOM_energy_policy_march_2013.pdf and CARICOM. CARICOM's Energy Policy in a Nutshell, online: http://www.caricom.org/jsp/community_organs/energy_programme/CARICOM_energy_policy_in_a_nutshell.pdf.
[70] Art. 10 of the 2001 Revised Treaty of Chaguaramas.

bloc has developed a regional framework to achieve development resistant climate change pursuant to the *Liliendaal Declaration*, [71] and to seek sustainable solutions for its implementation.[72]

While renewable energy is on the agenda of the region, given the benefits to energy security, the reduction in greenhouse gas emission, the creation of jobs and opportunities for saving foreign exchange,[73] a 1999 study[74] found that the current amounts of electricity generated from these renewable sources are nowhere near the region's potential. Since then however, there have been a number of energy policy reports that have promoted the advancement of renewable integration.[75] In 2012 and 2013, the Caribbean Renewable Energy Forum (CREF), released annual editions of the CREF/Castalia Renewable Energy Index.[76] The Index, which utilises 3 parameters,[77] is meant to be a useful tool which CARICOM governments can utilise to attract renewable energy investment, and adjust their policies and plans relating to renewable energy.[78]

Another effort to address the lack of baseline data and awareness within the region is the establishment of the Caribbean Information Platform on Renewable Energy (CIPORE).[79] CIPORE, which forms part of the Caribbean Energy Information System (CEIS),[80] was developed for the provision of information on renewable energy in the region, and acts as a clearing house, network and capacity building forum for renewable energy in the region.

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[71] *Climate Change and the Caribbean: A Regional Framework for Achieving Development Resilient to Climate Change* (2009-2015) (Belize City: CCCCC, 2009), online: http://www.iadb.org/intal/intalcdi/PE/2013/10773.pdf .

[72] At the Twenty-Third Inter-Sessional Meeting of the Conference of Heads of Government of the Caribbean Community, held in Suriname 8 – 9 March, 2012, the Heads of Government approved the 'Implementation Plan for the Regional Framework for Achieving Development Resilient to Climate Change' which defines the Region's strategic approach for coping with climate change for the period 2011 – 2021.

[73] Daniel Kammen and Rebekah Shirley. "Renewable Energy Sector Development in the Caribbean: Current Trends and Lessons from History" (2013) 57 Energy Policy, 244.

[74] Caribbean Council for Science and Technology, *Renewable Energy in the Caribbean, Where We Are; Where we should be* (LC/CAR/G.565/CCST/99/1) (4 June1999) at 2, online: Economic Commission for Latin American http://www.eclac.org/publicaciones/xml/3/10253/carg0565.pdf.

[75] For example, D. Loy, Energy-Policy Framework Conditions for Electricity Markets and Renewable Energies (Caribbean Chapters), (Eschborn, Germany: Division Environment and Infrastructure, TERNA Wind Energy Programme. CREDP Caribbean Energy, 2007).

[76] Gianmarco Servetti, Castalia-CREF Renewable Energy Islands Index, 10 October 2013, online: http://www.caribbeanenergyforum.com/themes/cref/pdf/cref-castalia-index-2013.pdf.

[77] The 3 parameters are 1. Enabling environment for renewable energy investments; 2. Renewable energy projects already implemented and 3. Potential renewable energy projects.

[78] Notes to the Castalia-CREF Renewable Energy Islands Index, 10 October 2013, online: http://www.caribbeanenergyforum.com/themes/cref/pdf/cref-castalia-index-2013-notes.pdf, 1.

[79] See Caribbean Information Platform on Renewable Energy, online: http://www.cipore.org/home/.

[80] The Caribbean Energy Information System (CEIS) is the energy information arm of the Caribbean set up to provide a regional energy information service through a network of Caribbean countries in support of planning and decision making. See CEIS, online: http://www.ceis-caribenergy.org/.

For its part, the University of the West Indies, Cave Hill Campus, is collaborating with various universities on renewable energy initiatives, including an international project spearheaded by the Small Developing Island Renewable Energy Transfer project (DIREKT).[81] The general objective of the project is to strengthen Cave Hill's science and technology capacity in renewable energy by means of technology transfer, information exchange and networking. It has enabled UWI to host renewable energy workshops and foster partnerships with regional businesses and universities in other small-island states that face similar development problems to Barbados.[82] The University also offers a Master's Degree in Renewable Energy Management,[83] and there exist programmes and courses aimed at building the capacity of the region's professionals, policymakers and public on related topics such as climate change, energy, oil & gas law and renewable energy law. These include the Climate Change stream of the Masters of Natural Resource and Environmental Management[84] and the Caribbean Energy & Gas Law course available by the Faculty of Law.

From a Regional to a National Agenda? Future Possibilities and Continuing Challenges

Renewable energy has clearly been identified as a crucial component for contributing to environmental sustainability, as well as to energy security. For CARICOM states, the utilisation of renewable sources of energy is seen as a viable course of action to safeguarding a sustainable future[85] by reducing the effects of deforestation, desertification, biodiversity loss and climate degradation commonly associated with conventional methods of energy generation. On the other hand, while fossil fuels continue to play a major role in energy supply in the region, it is broadly recognised that Caribbean economies are vulnerable to market pressures and volatile costs. Accordingly, as the demand for energy, as well as the amount expended on energy, continues to increase, so do the energy security concerns of the region. It is against this reality that one alternative to paying higher fossil fuel

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[81] Campus Out Front on Renewable Energy, Press Release of 23 January 2012, online: http://www.cavehill.uwi.edu/news/releases/release.asp?id=380.
[82] Ibid.
[83] See University of the West Indies, Faculty of Pure and Applied Sciences, MSc. Renewable Energy Management, online: http://www.cavehill.uwi.edu/gradstudies/resources/programmes/documents/prospectus/msc-renewable-energy.aspx.
[84] See Centre for Resource Management and Environmental Science, online: http://cermes.cavehill.uwi.edu/gradprogs.htm.
[85] See, the International Renewable Energy Agency, Vision and Mission, online: The International Renewable Energy Agency,http://www.irena.org/menu/index.aspx?mnu=cat&PriMenuID=13&CatID=9

costs, which the region has come to consider, is reducing import demand or increasing indigenous supply through the development of renewable forms of energy.[86]

However, despite the benefits of pursuing renewable energy as a tool in energy and environmental management, CARICOM states still face formidable obstacles to surmount in their quest for a renewable energy agenda. Most CARICOM states do not have an established national energy policy, long-term energy strategy nor energy action plan.[87] Further, there is a universal monopoly on the part of governments for electrical utilities in CARICOM states,[88] which can directly hamper private sector participation in pursuing alternative energy strategies. The involvement of private sector, especially in the form of technical assistance and investment, is a necessary framework condition for large scale renewable energy investment and development.[89] However, this has proven to be a measure states have been reluctant to make.

Thus far, renewable energy initiatives have all been elaborated within the context of the existing regulatory structure – most of which were developed around traditional forms of energy generation, or by creating subsidiaries to manage the specific initiative. This is true of the Renewable Rider Project in Barbados, and the Wigton Wind Farm Project located in St. Elizabeth, Jamaica. Wigton is registered by the *Climate Change Convention* under the clean development mechanism, and since 2005, has been successfully trading carbon credits under an emission reduction purchase agreement (ERPA) with the Dutch government.[90] There is also the proposed Amaila Falls Hydropower Project in Guyana, where the construction of a new 165MW hydroelectric is slated to be constructed at the confluence of the Amaila and Kuribrong Rivers meet, and provide electricity to Guyana's capital, Georgetown, and its second largest town, Linden, by an electric transmission line.[91] Amaila is envisioned to meet approximately 90 % of Guyana's domestic energy needs, and

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[86]For example, the 2009 *Liliendaal Declaration*. See also Barry Barton *et al*, "Energy Security in the Twenty-First Century" in Barry Barton *et al Energy Security: Managing Risks in a Dynamic Legal and Regulatory Environment* (New York: Oxford University Press, 2004) at 469 for further discussion of the issue.

[87] "Energy Situation in the Caribbean Region: Main Characteristics of Electricity Markets (2)" in Detlef Low, *Energy Policy and Planning Approaches throughout the Region*, slide show presented to the Caribbean Renewable Energy Forum (Dominica March 25 2009). See Also Thomas M. Scheutzlich, *Existing and Future Opportunities for Investment in Caribbean Renewables*, slide show presented to the Caribbean Renewable Energy Forum.

[88] CARILEC, online: http://www.carilec.com/.

[89] Thomas M. Scheutzlich, Existing and Future Opportunities for Investment in Caribbean Renewables, (slide show presented to the Caribbean Renewable Energy Forum, 15 October 2009) online: http://www.caribbeanenergyforum.com.

[90] Wigton Windfarm Project, Wigton II Project, online: http://www.pcj.com/wigton/about/factsheet.html

[91] Guyana REDD+ Investment Fund, Amaila Falls Hydropower Project, online: http://www.guyanareddfund.org/index.php?option=com_content&view=article&id=93&Itemid=119.

is viewed as the flagship[92] of Guyana's *Low Carbon Development Strategy*.[93] Jamaica and Guyana have been able to secure a larger quantum of investment utilising mechanisms under the climate change regime – the clean development mechanism (CDM) in the case of Jamaica,[94] and a bilateral arrangement[95] patterned on REDD+ in the case of Guyana. However, neither of these countries has elaborated a legal framework which specifically addresses this new paradigm in energy production and management. In Belize, after many legal challenges,[96] the Chalillo Dam was constructed, and energy is supplied through a subsidiary under a power purchase agreement with Fortis-Canada for energy derived from the hydropower facility at the Chalilo Dam.[97] Kentish has also suggested that OECS states may consider the use of the marine environment to establish their renewable energy projects,[98] but has pinpointed that this strategy will require a revamping of the current institutional and legal framework relating to energy in OECS states.

Perhaps the most ambitious renewable energy schemes in the CARICOM region to date, is the proposed construction of a fully commercial OTEC plant in the Bahamas – a project that will reportedly cost US$100m.[99] Cold water will be pumped from the ocean depths to provide cooling for a holiday resort, and eventually, the plan is to turn this into a full-fledged 10MW power station, as well as a desalination and aquaculture facility.[100] The agreement also includes a power purchase agreement, which means that the electricity and potable water generated from the facility will be sold to the Bahamian utility companies.

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[92] Ibid.
[93] Guyana's Low Carbon Development Strategy was launhed in 2009 and outlines Guyana's vision to promoting economic development, while at the same time combatting climate change. See Low Carbon Development Strategy, online: http://www.lcds.gov.gy/index.php?option=com_content&view=article&id=404&Itemid=157.
[94] Guyana REDD+ Investment Fund, Amaila Falls Hydropower Project, online: http://www.guyanareddfund.org/index.php?option=com_content&view=article&id=93&Itemid=119.
[95] In 2010, Guyana and Norway signed a bilateral memorandum of understanding, where Norway committed to providing Guyana with up to US$ 250 M by 2015 for avoided deforestation, provided certain performance indicators were met. See Guyana-Norway Parthnership, online: http://www.lcds.gov.gy/index.php?option=com_content&view=article&id=405&Itemid=158.
[96] See Belize Alliance of Conservation Non-Governmental Organizations v. DOE and Belize Electricity Company Limited,(No. 1), 2003, Privy Council 47 and Belize Alliance of Conservation Non-Governmental Organizations v. DOE and Belize Electricity Company Limited (No. 2), 2004, UKPC 6.
[97] Belize Produces Electricity at Chalillo Dam, The San Pedro Sun, 26 January 2006, online: http://www.sanpedrosun.com/old/06-043.html.
[98] See Kerith T. Kentish, A New Governance to Designing an Effective Arrangement for the Sustainable Management of Renewable Marine Resources in the OECS Region, Masters of Laws thesis, Dalhousie University (Halifax, Nova Scotia, 2010)
[99] Power from the Sea … Second Time Around, *The Economist*, 7 January 2012, online: http://www.economist.com/node/21542381.
[100] Ibid.

Conclusion

The Caribbean region is currently heavily dependent on fossil fuel combustion, with petroleum products accounting for the lion's share of its commercial energy consumption. These conventional methods of electricity production have occasioned drastic economic and environmental effects on the region – *inter alia*, difficulties with balance of payments, contributing to air, land and water pollution, as well as comprising a primary source of greenhouse gas (GHG) emissions. The exploitation of renewable energy resources indigenous to the region is therefore viewed as a prospective alternative for the sustainable development of CARICOM states. This is because the use of renewables can address economic, social and environmental issues associated with the expenditure and use of fossil fuels. However, despite the Caribbean's substantial renewable energy resources, exploitation lags far below their potential, due to policy, financing, capacity and awareness barriers. While efforts are moving ahead on the regional and sub-regional levels, these efforts need to be translated into more robust strategies, which can be utilised to revolutionise the renewable energy paradigm at the national level.