

The Caribbean Energy Grid, a win-win project

by [Kenneth D. McClintock](#) on Friday, May 6, 2011

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Politicians and government officials know that their ideas have reached full maturity when the academia discusses the issues associated with their implementation. In my view, this conference is a clear measure of how far the idea of a regional electrical grid has advanced...

...I, as well as Governor Luis Fortuño, could not be more satisfied that the *4th CIEMADES International Conference* has been devoted to the technical, environmental and economic aspects of *Electrical Interconnection of the Caribbean...*

...and would like to express my gratitude and appreciation to the International Center for Environmental and Sustainable Development Studies, which we know as CIEMADeS, and the Universidad del Turabo of the Ana G. Méndez University System for their leadership and vision in putting together this conference.

To Ada Torres-Ramirez, Executive Director of CIEMADeS, thank you for your hard work and perseverance... you stayed the course and it paid off.

It was only fitting that CIEMADES -an organization that arose of the cooperation between Haiti, the Dominican Republic, and Puerto Rico- would organize a conference that will serve to further greater cooperation and interdependence in the region through the interconnection of the electric power grids.

Recognition is also due to the Puerto Rico Energy Center (PREC) for their cooperation and the Organization of American States (OAS) for their support -I was pleased to see Mark Lambrides in the program.

...and special thanks are in order to the many sponsors that made this conference possible including the Puerto Rico Science, Technology & Research Trust, the *Universidad Nacional Pedro Henriquez Ureña* of the Dominican Republic, the Latin American and Caribbean Consortium of Engineering Institutions (LACCEI), the Dr. Samuel P. Massie, Chairs of Excellence Program of the U.S. Department of Energy, the Caribbean Electric Utility Service Corporation (CARILEC), and the Puerto Rico Electric Power Authority (PREPA).

There is an underlying message... it took the collaboration of many to make this conference possible and it will certainly take a regional effort to make a Caribbean Basin electrical grid a reality.

We have come a long way. In April 2009 at Port of Spain, President Obama called for an *Energy and Climate Partnership for the Americas* (ECPA) through which we can cooperate to

improve the efficiency of energy production, integrate our energy markets, and increase access to energy while protecting our environment and building a more prosperous future.

Energy isolation presents a challenge to the implementation of ECPA in the Caribbean Basin -particularly in the Eastern Caribbean. Most Caribbean countries have small electric power systems and markets with insufficient reserve capacities and inefficient transmission infrastructure that have no links to other electric power grids.

Being Puerto Rico where the United States becomes a Caribbean nation, we naturally wanted to take part in making possible the promise of ECPA. In December 2009, at the *Miami Conference* organized by Caribbean Central American Action (CCAA), the Government of Puerto Rico proposed the interconnection of the electricity grids in the Caribbean Basin as a means of reducing the cost of energy and making the generation of electricity from renewable energy more economically viable.

A regional electric grid would create a large-scale transnational electricity market in which Caribbean countries could trade renewable energy rather than oil. And certainly, cheaper electricity will facilitate investment, competitiveness and job creation that can reduce poverty and social inequalities.

Having the presence at the conference of the Minister of Natural Resources and Climate of Nevis and of Kerry McDonald, CEO of West Indies Power, I would like to publicly acknowledge that one of the factors that helped to shape my thinking with respect to the benefits of electrical interconnection in the Caribbean was the proposal to bring geothermal power from Nevis by means of a submarine cable.

2010 was a promising year for electric interconnection and energy integration in the Caribbean Basin with many advances that present exciting possibilities.

In January, 2010 Franz Gerner, Senior Economist of the World Bank, in his presentation at the 10th Platts Annual Caribbean Energy Conference entitled *Regional Energy Solutions for Power Generation in the Caribbean: An Assessment* pointed-out that "integrating power systems, building submarine cable connections and sub-regional power markets are win-win solutions."

At the Energy and Climate Ministerial of the Americas in April 2010, Energy Secretary Steven Chu, endorsed the idea of electrical interconnection in the Caribbean by saying:

"Some of these islands-states have wind and solar resources... in order to make them more economical it would be nice if you could connect these islands-states to each other... that would make the investment in clean energy renewables much accessible, more profitable"

And he added:

"Underwater High Voltage DC lines have the potential to link Caribbean islands, make clean energy more accessible and profitable, and make island economies more energy secure."

At the Energy and Climate Ministerial of the Americas, Secretary of State Hillary Clinton also made statements that clearly indicate the commitment of the United States to support interconnection initiatives in the Caribbean. Let me share with you a few quotes from her remarks:

"Yesterday, the OAS, the Caribbean energy ministers, CARICOM, the World Bank, the IDB, and officials from Puerto Rico and the U.S. Virgin Islands launched a dialogue to explore the possibility of installing undersea electric cables in the region to give the Caribbean access to new power supplies."

"Another exciting possibility would link Puerto Rico with the U.S. Virgin Islands and a third would link the islands of Nevis and St. Kitts."

"So we have a lot we can do and we have to get started. Imagine a future in which instead of waiting for those oil tankers to come and dock, Caribbean nations are supplying each other with energy, whether it's geothermal power from Dominica or gas from Trinidad."

During 2010 the governments of the Dominican Republic and Puerto Rico began discussing the potential for interconnecting our electric power grids. And, in October, President Leonel Fernández and Governor Luis Fortuño agreed to create a joint working group within the *Dominican Republic - Puerto Rico Strategic Alliance* that will consider and oversee, at the highest level, all aspects of a possible interconnection project. The first step would be assisting The World Bank in conducting a study.

I am pleased that the government of Spain has made available the funds that will make possible for The World Bank to conduct a pre-feasibility study on the potential for the interconnection between the electrical grids of the Dominican Republic and Puerto Rico and that next week I will receive a delegation from The World Bank -led by Philippe Benoit, Energy Sector Manager at the Bank's Sustainable Development Department for the Latin America and the Caribbean Region- that will lay the groundwork for such a study.

As you heard during the case study presentations, InterAmerican Energy Sources LLC (IAES), a subsidiary of the Puerto Rico Electric Power Authority (PREPA), and the U.S. Virgin Islands Water and Power Authority (VIWAPA), with the support of the U.S. Department of Energy, are on the verge of signing a Letter of Intent that would make possible the interconnection of the USVI and Puerto Rico electric power grids. SIEMENS was selected to perform the technical viability study which we expect to be completed this summer.

While the U.S. Virgin Islands - Puerto Rico interconnection would not be international, but domestic to the United States, we believe that it can serve as a test bed in which many of the issues that may be faced in linking different electrical systems in the Caribbean by means of undersea cables can be identified and addressed.

The Central American Electrical Connection System or *Sistema de Interconexión Eléctrica para America Central* (SIEPAC) continued to make great advances in its implementation of the project. And on November 25, 2010 the first stretch of the interconnection -a transmission line interconnecting Panama and Costa Rica- was energized.

In March of this year the World Bank released *Caribbean Regional Electricity Supply Options Toward Greater Security, Renewables and Resilience*, a synthesis report based on Nexant's technical report of March 2010 entitled *Caribbean Regional Electricity Generation, Interconnection, and Fuels Supply Strategy* that was groundbreaking in terms of considering interconnection as an energy strategy in the Caribbean.

Also in March, the White House released the *Report by the President's Task Force on Puerto Rico's Status* which made important recommendations regarding energy that reflect the discussions of the Fortuño administration with federal officials. Allow me to quote from the *Report*:

"First, the U.S. Department of Energy (DOE), along with Puerto Rican and the U.S. Virgin Islands (USVI) government agencies, should participate in a feasibility study to examine the technical and economic potential of a subsea electrical interconnection between Puerto Rico and USVI. Furthermore, to advance discussions in the Caribbean region on the potential for subsea electrical interconnection under the Energy and Climate Partnership of the Americas, the Department of State, through a grant to the Organization of American States, should fund a pre-feasibility study to examine an interconnection between Puerto Rico and St. Kitts and Nevis."

And, as you heard, the implementation of these recommendations is already underway.

Having reviewed the incremental process that has taken us where we are today, let us now look ahead. Will an incremental process lead us to a Caribbean Basin energy grid? What should be done in order for the promise of interconnection to be fulfilled in the region?

Ideally, one would wish to see an electric power ring encompassing the whole Caribbean Basin to which energy producers and consumers could connect -a concept promoted by CARITrans, a group which has been highly represented in several sessions of this forum- as this setup would be the most likely to create an integrated electric power market encompassing the whole region. While this ring could possibly be built in stages, addressing the financial, political, and legal issues involved in such a large-scale multinational endeavor would likely take many years. As a point of reference, the countries of Central America began discussing plans to link the region's electricity grids in 1987.

We should not sit idle waiting for the ring... a Caribbean Basin energy market can begin with a single interconnection. You have heard me say before that one pole does not make a fence but that a fence starts with one pole. Therefore, with multilateral support, as we have had from The World Bank, we should continue to pursue bilateral and/or subregional interconnections that are technically viable and make sense economically -and this is already happening with the Dominican Republic and the U.S. Virgin Islands.

However, successive point-to-point interconnections of electric power grids in the Caribbean may, or may not, lead to an integrated regional electric power network or to the creation of a common Caribbean Basin energy market.

Let me explain. Interconnection is not synonymous with integration. While interconnection benefits pairs of countries, each pair being a consumer and a producer, integration would benefit the whole region.

Therefore, we should pursue bilateral and/or subregional interconnections with the set purpose that the interconnections that are designed to fulfill present energy needs do not hinder the creation of sub-regional energy markets or even a Caribbean Basin energy market.

What are some of the challenges?

- A power purchase agreement (PPA) may restrict the use of an undersea cable thereby turning it into a large-scale extension cord that links an energy supplier to an energy consumer.

- While energy diversification and economic interdependence are desired, control of undersea cables by energy producers may lock countries into energy dependence and dissuade investment in renewable energy production.
- Different cable technologies and diverse specifications in current, capacitance, frequency, phase and voltage may prevent or hinder the use of point-to-point undersea cable interconnections to build a sub-regional or Caribbean Basin-wide network.

While we pursue viable point-to-point interconnections, we should foster greater cooperation and encourage discussion of best practices within the Caribbean Basin. The countries of Central America have amassed a great deal of experience in addressing the political, financial and technical challenges of interconnection which can be shared with the countries of the Caribbean.

A conference or forum can be arranged in which the Central American and Caribbean countries can meet and share experiences in meeting electric power demand, improving the efficiency and stability of the generation and transmission infrastructure, reducing the cost of energy, and increasing the use of renewable technologies.

This conference is a big step in the right direction and I was encouraged to see in the program a representative of the Regional Operations Entity that owns SIEPAC's transmission lines.

The creation of a regional energy market in the Caribbean Basin, or even subregional energy market integration, may also benefit from additional analysis that does not focus on electrical interconnection as a means of providing the least costly source of energy.

The benefits of an integrated energy market through interconnection are not be limited to lowering cost of generating electric power. Other benefits include:

- Balancing and compensating the intermittent power generated from wind and solar sources with steady power from other generation technologies thereby allowing the creation of a large-scale renewable energy market;
- Providing redundancy to protect against power failures resulting from natural disasters (such as earthquakes, hurricanes and floods), and from changes in hydrological conditions resulting from climate change or terrorism.
- The possibility of improving telecommunications by increasing broadband capacity at a reduced cost. Composite undersea cables that combine an insulated copper conductor and fiber optic lines are possible. Therefore, by combining electric power and telecommunications the cost of laying a submarine cable would be reduced when compared to laying a cable for electric power transmission only. And,
- Investment and jobs creation related to manufacturing of the undersea cables needed for the regional electric power network and to the manufacturing of renewable energy generation devices, such as solar panels and wind turbines, resulting from the creation of a large-scale renewable energy market.

Some have raised the issue that the creation of a regional or subregional energy markets in the Caribbean Basin may not be warranted because of low electrical demand.

I would like to offer some thoughts. When the cost of energy in the Caribbean can be as high as \$0.38 per kWh -among the highest in the world- one would expect demand to be low. One of the most fundamental concepts of economics is the law of demand which states that, if all other factors remain equal, the higher the price of a good, the less people will demand that good. In other words, the higher the price, the lower the quantity demanded.

Still, electricity demand is growing fast in the Caribbean and it would grow even faster at a lower cost making the tourism industry more profitable and competitive, and making viable manufacturing in the Caribbean thereby increasing demand for electric power.

Therefore, electrical interconnection should not be viewed only as a cost alternative within various generation technologies or sources of energy, but as a means to reap the benefits of a common energy market in the Caribbean Basin.

Ironically, the duties that have contributed to being invited to address this conference have also prevented me from attending the sessions. I returned from Washington yesterday afternoon where I had meetings at the Department of Energy and the State Department. However, today I have watched the livestream of the conference as much as possible.

Therefore, I would like to conclude my remarks in order to begin an exchange with the members of this superb panel who can bring to the discussion the ideas raised during the conference. And, if we have the time, perhaps answer questions from the audience.

Thank you very much for your attention.