

An aerial photograph of a vibrant Caribbean harbor, likely St. John's, U.S. Virgin Islands. The turquoise water is filled with numerous sailboats and two large cruise ships docked at the piers. The harbor is surrounded by lush green hills and a town with colorful buildings. A faint rainbow is visible in the upper left sky. The title 'Renewable Energy in the Caribbean' is overlaid in a large, black, serif font.

Renewable Energy in the Caribbean

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Background Information

- The Caribbean region is largely dependent on imported fossil fuels for the generation of electricity and for its transportation services.
- Caribbean island residents pay some of the highest retail electricity prices in the world.
- Most islands generate 90–100 percent of their electricity by burning expensive imported diesel or heavy fuel oil in large generators.
- Thus paying between \$0.20 and \$0.50/kWh in comparison to the average for mainland U.S. residential customers which is \$0.13/kWh.

Alternatives

- The Caribbean countries are blessed with an abundance of renewable domestic natural resources, which can be used to produce electricity, such as:
 - Geothermal
 - Solar
 - Wind
 - Biomass
 - Ocean or marine resources

Mass Adoption

- There's tremendous interest in adopting renewables across the region, but we still see a number of obstacles limiting uptake:
 - Policy and regulatory frameworks which aren't necessarily attractive to investing in these technologies.
 - Limited access to financing and the resources necessary to take on these technologies.
 - A continued need for knowledge sharing and capacity building to help us understand better how these technologies can be deployed in the region.
 - Being relatively small countries, the costs are sometimes higher than they would be in a larger country. There may be some added benefits to demand between multiple countries in the region, so that orders are larger or that projects developed are on a larger scale.

Clean Energy Investment

- Several islands have completed projects or made commitments:
 - The small island of Bonaire has 11 MW of wind capacity installed and battery storage of 6 MWh.
 - NRG Energy recently unveiled a 4 MW solar field in St. Croix.
 - For businesses with high electricity costs, such as resorts, the prospect of moving to large on-site generation is often attractive such as a hotel in St. Maarten.
 - BMR Energy announced financing for 36 MW of wind power in Jamaica at a cost of \$63 million.
 - Soventix begins work on a 30 MW PV project in the Dominican Republic.

Bonaire

- Small island off the coast of Venezuela (pop. 14,500).
- Originally relied on diesel fuel to generate electricity for residents, with a peak demand of 11 MW. In 2004, everything changed when a fire destroyed the existing diesel power plant.
- The island is now home to 12 wind turbines with a total of 11 MW of wind power capacity, which contribute up to 90 percent of the island's electricity at times of peak wind, and 40–45 percent of its annual electricity on average.
- Battery storage (6 MWh) is included in order to take advantage of available power in times of excess wind, and provide that stored electricity in times of low wind.

Bonaire

- The battery also boosts the reliability of the overall system – it is capable of providing 3 MW for over two minutes, allowing time for additional generation to be started when there is a sudden drop in wind.
- The Bonaire system also includes 14 MW of diesel generation, five total generators, which provide the necessary power to meet the load when there is not enough wind power available. The generators are equipped to run on both traditional diesel as well as biodiesel.
- This will allow Bonaire to operate a 100 percent renewable electricity system – with on average 40–45 percent from wind and 55–60 percent from biodiesel.

St. Croix

- Spanish Town Estate facility stands ready to generate 4 megawatts (MWac) of clean, emission-free energy, enough to power the homes of approximately 1,500 customers of the U.S. Virgin Island Water and Power Authority (WAPA).
- The Spanish Town Estate project will be an important step toward the U.S. Virgin Islands and St. Croix achieving their renewable energy goal to reduce fossil fuel-based energy consumption by 60 percent over the next decade.



St. Maarten

- With its installation of 2,602 solar panels with a 755-kilowatt capacity, the 317-room Westin Dawn Beach Resort & Spa on St. Maarten claims this crown: the largest solar resort in the Caribbean region.
- Company executives cited the abundance of sunshine on the Dutch Caribbean island and calculated a return on investment of four to five years, while saving 1.9 million pounds of carbon dioxide emissions annually.

Jamaica

- Wigton wind farm in Manchester province is Jamaica's first wind energy project.
- The 23-turbine scheme, with an installed capacity of 20 MW, was built by RES Americas for Wigton Wind Farm Ltd, a subsidiary of the Petroleum Corporation of Jamaica (PCJ).
- There are plans for 20 MW of PV solar to be installed to compliment the wind farm. In addition, Jamaica is offering benefits for any company or individual selling electricity to the grid from a renewable source.



Dominican Republic

- Soventix plans to put this first 30 MW stage into operation in February 2016. The project consists of 120,000 PV modules and 1000 inverters, each 30 kW in capacity. The project will allow savings of an estimated US\$250 million in imported fossil fuels.
- To date few megawatt-scale solar projects have been built in the Dominican Republic. Among the larger projects in the nation are a 1.5 MW project in the El Ciabao Airport and a 1.5 MW project which provides electricity to cement maker Cemex.
- As recognized by Hector Martinez, head of the Dominican Renewable Energies Business Association, “The main barrier for a larger deployment of renewable technologies was, and still is, finance. Dominican entrepreneurs see the opportunity and they see the potential, but there is currently no funding available for renewable energies.”

Future

- From Puerto Rico to the Dominican Republic, Caribbean governments are beginning to support the development of renewable energy projects.
- Similarly, utilities and independent power producers are actively instituting policies to enhance the investment in and development of renewable energy projects.
- Unfortunately, even with support for the development of renewable power sources, there are still substantial obstacles to overcome.
- For renewable energy projects to thrive in the Caribbean, it will be vital for local governments and international organizations to facilitate a more favorable investment environment, work towards instituting effective grid stability solutions, and for Caribbean islands to aggregate projects to create economies of scale.

References

- <http://www.greenbiz.com/article/will-caribbean-become-next-hotbed-renewable-energy>
- http://blog.rmi.org/blog_2015_01_07_a_caribbean_island_says_goodbye_to_diesel_fuel
- <http://www.worldbank.org/en/news/feature/2015/01/27/renewables-caribbean>
- http://intransit.blogs.nytimes.com/2014/04/11/a-caribbean-resort-goes-solar/?_r=5
- http://www.pv-magazine.com/news/details/beitrag/soventix-begins-work-on-a-30-mw-pv-project-in-the-dominican-republic_100020936/#axzz3oytIHaBp
- <http://investors.nrg.com/phoenix.zhtml?c=121544&p=irol-newsArticle&ID=1983048>
- <http://www.theguardian.com/global-development-professionals-network/2015/aug/06/caribbean-paradise-for-renewable-energy>
- <http://www.res-americas.com/en/portfolio/wind/constructed/wigton-wind-farm>
- <http://www.renewableenergyworld.com/articles/2013/03/unlocking-renewable-potential-in-the-caribbean.html>