

ENERGY INDEPENDENCE FOR VIEQUES

While nobody is surprised to discover that our electrical infrastructure was fragile and deteriorated before Maria; and while none of us ever felt that the power company was operating in our best interests; and given that everyone knew that the corruption at the top was responsible for the insanely high cost of electricity; we should be pleased to realize that now is the time to force changes. Education and awareness of the citizens are the keys to social change, and we are now informed.

We see behind the curtain. We have experienced the personal losses and the economic disaster that accompanies the non-temporary interruption of electricity. Just as the ATM has choked economic development in Vieques for over a decade, PREPA has single handedly destroyed any hope of prosperity in Puerto Rico for the next decade. PREPA has set us back years at a critical juncture of our debt crisis. But we have learned some things and understand that there are alternatives for Vieques.

Because we are isolated and dangle from an electrical cable coming from Naguabo, we are **not** integrated with, but rather plugged into, the grid at a single point. It is technically simple to unplug. In fact, we are currently “unplugged”. We can independently power our island in a variety of ways. The max capacity of our now defunct system was about 10MW, and we typically used under 7MW. Culebra was linked to the main island through Vieques like a daisy chain via a continuing underwater cable system. An oil based backup facility was built in Vieques over a decade ago comprised of two 6MW generators designed to run, I’m told, 12 hours on and 12 hours off in an alternating rotation. Lack of maintenance has damaged the equipment, but we will soon see if the systems are capable of running the island.

Historically, Vieques has been blessed with significant sunlight and strong winds. Research suggests that the best winds and the most sunlight are available on the east end of the island but other areas are certainly viable. Studies show that we have “good” conditions as rated by both wind and solar experts. We are not rated “excellent” due to the seasonal variations of winds and clear skies. Proposals for both wind and solar should be solicited and evaluated. The cost of both collection and storage has been dropping dramatically every year to the point that they are excellent, cost effective alternatives to our antiquated petroleum based service.

Centralization or Decentralization

Solar and wind technology can be utilized in both centralized and decentralized installations. The advantages of decentralization include: reduction or elimination of distribution lines, equipment, and costs, localized redundancy, as well as lessened vulnerability to storm damage. Potential advantages of centralization are greater efficiency, a lower original cost for the plants, and operational personnel savings.

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A large scale array can be placed in a single area and sized to supply the whole island. Alternatively, to reduce distribution costs, multiple (smaller) dispersed arrays could be located in or near various neighborhoods and commercial areas. Government land should be surveyed to find optimal locations for placement of the array(s) to tie into the existing infrastructure. Although much of our distribution system has been damaged by hurricanes, some may be usable, and further development worked around the existing systems. New distribution should be below ground, and existing elevated components should be buried as soon as practical.

Individual Rooftop Systems

To begin with, privately owned solar backup systems can be efficiently installed immediately on the flat roofs of most existing houses. These are light weight panels with or without batteries. They are connected to the house circuit breaker panel with a transfer switch which selects **either** the grid or the solar source. Power would pass through an inverter to convert the DC current to AC. A power conditioner would provide a constant, clean voltage for the devices connected within the house. Batteries could permit continuation of the supply of electricity while the sun is unavailable. The system is scalable: one could have just a couple of panels to run a refrigerator, electronics, a fan, etc., or an extensive system could be installed to cover everything in the house during sunshine and a couple of days of clouds. More complex systems integrated into our new grid for net metering are also possible.

Lithium-ion batteries have evolved dramatically, based in no small part on the efforts of Tesla and Solar City. Battery storage is already cost effective in many market areas and will be in PR when the monopoly-protecting obstacles placed by the power company and government officials are removed. Battery packs are scalable from single family home sized units to island-wide power banks.

The manufacturing costs of both panels and batteries have been decreasing by roughly 20% year after year. We cannot afford to invest in the antiquated technology and business model of the AEE power company. [[Clean Disruption](#)] Tony Seba]

The Vision

There are **many possible solutions** to our problem, but nothing happens overnight. We could phase a solution for energy independence. As an example, we could establish an interim fix that would consist of four steps:

- Implement a short term (maybe 1 to 2 year) operation of our backup generators as the primary source of power to our grid - if the generators are repairable at reasonable cost and if not, build an LNG plant;
- Begin work on a centralized solar system to become the primary power source for Vieques quickly;
- Simultaneously encourage the installation of private decentralized solar systems on houses and other buildings or groups of buildings; and
- Retire the generators to a backup status.

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Government land south of Mosquito Pier would allow easy grid access for the solar arrays (and/or wind generators) and minimize transportation for the 10,000 gallon tanks for a new LNG plant – if required. The cost of electricity with LNG and/or solar will be far less than with diesel.

Finance

Traditional financing for utility projects is through bonds which are structured to ensure repayment through customer fees for service. Because PR has broken the mold and tainted this long standing practice, it is unlikely that any entity would be interested in a bond issue. Another development method gaining popularity is that of a PPA, or a Purchase Power Agreement. This long term arrangement is based on a contract with the provider to build and operate a power plant (and optionally the distribution network) and bill customers directly for their power. The method of pricing the power can be a bulk figure per month for a specified minimum quantity or simply a fixed charge per KWH. Ownership of the infrastructure can be private and/or municipal. This is a flexible relationship that is molded to fit both parties.

It may be that grants and other semi-philanthropic agreements could be secured for the sustainable power components. In that case, the initial phase of diesel or LNG generator dependence can provide us the time to apply for and implement alternative energy plant(s). As the sustainable operation grows, the traditional generators would become supplemental or backups. Initial savings in our electrical rates could also be applied to help finance the solar development if we agreed to delay the price drop. Ultimately, the rates would fall significantly.

PREPA Agreement

It is totally unclear how independence from PREPA would be accomplished, but there are several points to consider:

- PREPA is bankrupt, and cannot sell assets without court approval;
- The Junta, or Fiscal Control Board, will want to weigh in on any plan to privatize;
- The Central Government will attempt to flex its muscles as well;
- The union, UTIER, will no doubt fight this in court and through the illegal strong-armed tactics for which it is known; and
- A privatization of Vieques power will ultimately save PREPA money.

Assets purchased from PREPA should be negotiated based upon the book value of the infrastructure. While the existing distribution systems are old, new equipment has been added at a very slow pace. The majority of system extensions, however, have been paid for by the customer, and most of the emergency repairs have been provided by outside sources, NOT the utility company. A strong case can be made that the distribution systems have long since been paid for and represent **zero** book value. According to *Caribbean Business*, (Agustin Criollo Oquero & Rosario Fajardo, September 7, 2017):

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Prepa Executive Director Ricardo Ramos Rodríguez recently said the powerlines carrying electricity in the public corporation's system are in such a deteriorated state that a strong storm could leave the island without power for weeks.

"The lifespan of most of Prepa's equipment has expired...." [Ramos]

[anonymous employee]said that much of Prepa's equipment dates back to the 1950's – and the more "modern" equipment that is still functional dates from the 1990's....

PREPA probably will not wish to give up control of Vieques, but it should be non-negotiable for us. We overpay for fuel and distribution to the extent of roughly \$.10/KWH while we are underserved by the same amount in lack maintenance.

Summary

We can become a green island and a model to the world. There has never been a better time, and there may never be again. We must act now to free ourselves from the parasitic clutches of PREPA. We need to simultaneously attract vendors to secure legitimate proposals that we can use to negotiate our energy independence, and educate our citizens on the value of small scale solar for their homes - while aiding the growth of local expertise to provide sales and service. This is how we take control of our energy infrastructure and reinforce our desired image as a sustainable island community. This is hugely important. It's an opportunity we can't afford to miss.