PennState
College of Earth and Mineral Sciences

John and Willie Leone Family
Department of Energy and Mineral Engineering

The Effectiveness of the New York REV Program

Scott Beckman

EME Summer Research Internship Program 2021

Introduction

In an effort to create a cleaner, more efficient, and more reliable energy grid, New York State initiated the **REV** (**Reforming the Energy Vision)** program. In this program private companies and utilities conducted demonstration projects that aimed to provide insight into potential solutions. Several of these projects evaluated the costs and benefits of prosumer (producer/consumer) resources. These prosumer resources include things such as rooftop solar and batteries that use net metering, virtual power plants, and microgrids. Microgrids utilize energy resources (such as solar) connected on a small scale that work together to achieve a continuous feed of reliable power.

Objectives

The goal of this research was to summarize and **evaluate what is involved in creating a prosumer project such as a microgrid or virtual power plant** and the learning available from the projects conducted to date.

While the technology to create a microgrid that is both more reliable and more efficient does exist, there has not yet been any large-scale implementation of this set-up. Of the REV projects done to date, several have been to create microgrids. By analyzing the documentation on these projects, our goal was to determine the root causes for failure or success, as these may provide insight into alternative approaches that may be all around more successful.

Results

Project	Goal(s)	Insights Gained
Con Edison's Virtual Power Plant	Use distributed energy resources (DERs) which consist of aggregated solar and battery installations and tie them into the wholesale grid. Find rate design and system management strategies that could be used on other microgrids.	Failed due to fire codes that blocked the installation of the lithium-ion batteries.
National Grids Microgrid Proposal for Potsdam	Use DERs such as gas generators, and small hydro dams to provide power (via underground power lines) no matter the weather conditions. Main goal was system reliability.	Even though customers said they would want a system like this, none wanted to pay for it. This lack of interest led to a no-go decision for the project.
National Grids Neighborhood Solar Project	Use a utility owned model where the utility would pay for the rooftop solar upgrades, and in return provide a monthly bill discount to customers. The electricity generated from solar would be aggregated and sold. Then a portion of that revenue would be redistributed to the neighborhood residents.	This approach was cost prohibitive and resulted in a large financial loss for the company.

Materials and Methods

1. Conduct database search: Using the New York state website, navigate to the Rev Demonstration Projects page where all the projects and their respective documents are listed.
2. Review for relevance: First reading initial documentation, determine what the project was about and what it aimed to accomplish.
3. Analyze: If the project was relevant, read through all the succeeding reports including the implementation plan and the quarterly reports. Identify key considerations and root causes of failure or success.
4. Summarize: Prepare written summary including details and conclusions about each project.

Conclusions

By reading through these demonstration projects several conclusions can be made:

1. Microgrids and virtual power plants are **technologically feasible** and can provide reliable and clean energy to individuals of all income brackets.
2. **Microgrids and solar installations can be very expensive**. Not one of these projects was profitable for the utility and the losses would often be a substantial amount, sometimes in the millions.
3. For utilities, it is difficult to take advantage of economies of scale with rooftop solar.
4. Home solar and battery systems are a new technology that require a lot of home improvements and regulators do not yet trust them (for safety reasons).

References

- Rev demonstration projects website: REV - Demonstration Projects (ny.gov)
- Con Edison Project: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B461C16BB-C470-4EDC-8C02-10D2F7A69666%7D
- National Grid Potsdam Project: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BAA3FCB7E-726D-4D7B-88B5-067DB1709B76%7D
- National Grid Neighborhood Solar Project: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BAFABE824-60F5-4800-9D28-5FC1A69B4D83%7D

Project Team

Project Team: Professor Andrew Nathan Kleit, Professor Hannah Wiseman