

# PV Feasibility in Puerto Rico: Design

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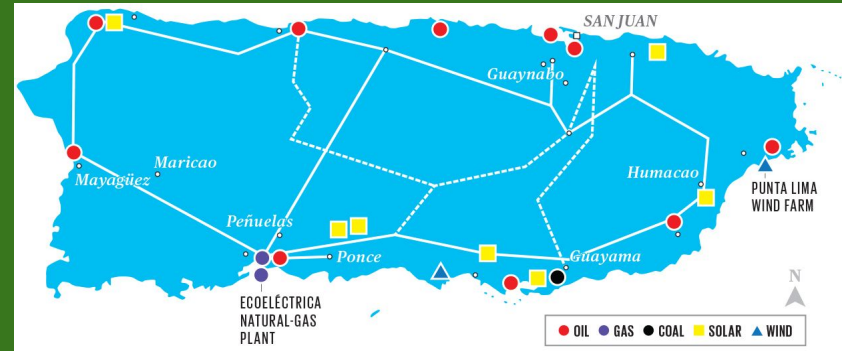
# Problem Statement

Our project aims to provide a plan for ensuring reliable and affordable power to all Puerto Rico using photovoltaics combined with battery storage units.

- Puerto Rico's grid is very unstable as a result of frequent hurricanes, outdated power plants, and poor management.
- Adds to Puerto Rico's goal of being 100% reliant on renewable energy by 2050.
- Renovation and modernization of the transmission, distribution, and generation systems.

## Residential Rooftop Solar Potential by County

Distributed Solar resource exceeds 20 GW of capacity technical potential.



# Unit Testing

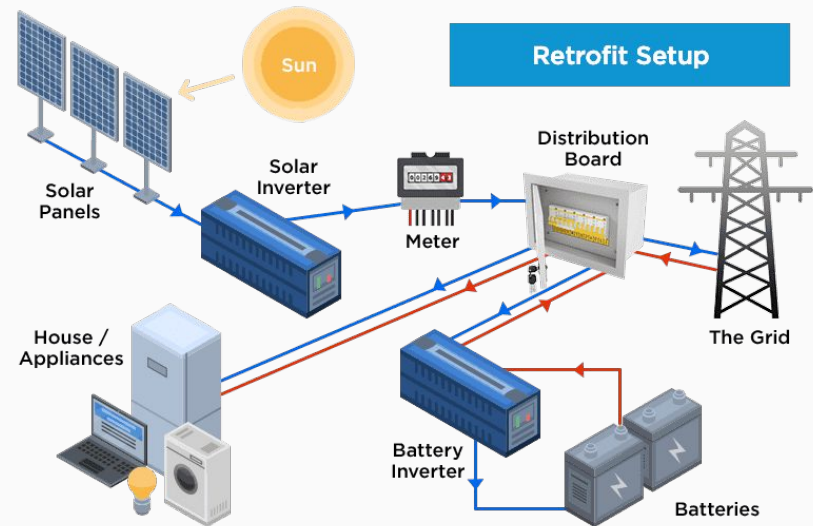
- Grid Model using PSS/E or similar software
  - Testing reliability
- Economic analysis of PV systems (rooftop & community)
- Total kWh of system compared to goal

# Interface Testing

## PV systems vs. Battery Storage

Calculating how many battery units  
\*ideally\* needed compared to  
real-life scenarios

Online solar calculators take into  
account latitude, hours of sun, etc.



# Integration Testing

- Use PSS/E to ensure integration of solar panels, transmission, and battery storage is seamless and successful
- Use IEEE standards to verify that our connections are safe and meet standards.

# System Testing

The most important aspect of our project is the feasibility. At the end of the project we will extensively look into the economic requirements and the timeline we planned out for the goal of 100% renewable energy. This would be recalculating the payback periods for the community solar farms and the rooftop PVs installed. We want to ensure our final design works as intended in the simulation software, and that our calculations for the economic aspect of our solution are correct and can feasibly be met by the Puerto Rican people.

# Regression Testing

During the course of our simulation of the microgrids and economic analysis for our report, we will have to ensure that any changes we make to either of our primary deliverables for this project result in changes that we expected to see.

Our project has very little code involved, so we will not have to be concerned with minor changes in code creating bugs and “breaking” any functionality we already had working.

# Acceptance Testing

One of our main goals is that residents will want to participate in either a rooftop PV or community PV program.

- Outreach to gauge willingness
- Economic analysis of income / financial ability
- Ensure that our estimated numbers line up with what is reasonable