Capstone Project Proposal

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Springboard Python Data Science Intensive

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# Summary

Provide a summary analysis report for quarterly use of the solar PV installations in Net Energy Metering within California’s large investor owned utilities (IOUs). This report will be used for presentations and business decisions related to demonstration projects in renewable integration efforts.

# Background

Renewable energy in increasing at a rapid pace in California. California is progressive on its environmental policies. For example, California is known globally in the energy industry for its Renewable Portfolio Standard which aims to achieve 33% of its energy from renewable energy sources by 2020, 50% by 2030 (SB 350). Regulators at California Public Utility Commission (CPUC) actively set requirements for electric utilities like Southern California Edison (SCE) to comply with. Much of the work that utilities like SCE are faced with is updating a legacy, outdated electric system with new intelligent and communication devices.

This effort is called Grid Modernization, which was born from the fact that distributed energy resources like solar PV panels and energy storage batteries are increasing at a rapid and exponential rate. These devices are changing the technical and physical requirements of a grid that was built for a different purpose, namely, to deliver energy in only ONE direction, from plant to customer. With increase of solar panels, the grid will need to change and serve as a bi-directional system for energy flow to and from customers and the utility. Being able to predict and understand the adoption of solar PV among California residents and businesses will help utilities like SCE to better meet the needs of their customers and requirements set forth by the CPUC.

# Objectives:

Client is SCE Advanced Technology Department. Goal is to provide client with plots that are reproducible every quarter and the following information:

* Identify how SCE is performing in solar installations compared to other California IOUs
* Investigate questions from data, such as any changes in solar installations over time
* Identify strongest vendors in solar installations
* & any trends related to changes in the above data

# Client & Needs

Southern California Edison’s (SCE) mission is to provide clean, reliable, and safe power to its customers. In order to meet the clean energy demands of its customers, SCE has many teams and projects aimed to meet the demands for increased solar PV systems by its customers. It is also conducting studies to better understand the adoption of solar PV systems by commercial customers. SCE research and development engineers will use this analysis on a quarterly basis to keep track of the increase of solar on the grid, and to compare and track performances against other CA IOUs. This analysis will help SCE’s Advanced Technology (AT) engineers to identify potential partners for demonstration projects as well as keep under

## Data:

California Solar Statistics publishes all investor owned utility (IOU) solar PV net energy metering (NEM) interconnection data per CPUC Decision (D.)14-11-001, and all IOU data from the California Solar Initiative incentive program per California Senate Bill 1 (SB-1). Data available at:  <https://www.californiasolarstatistics.ca.gov/data_downloads/>. With this data accessible, California residents and vendors have more information available to them. Vendors and utilities are able to keep track of their performance of PV interconnections, thus allowing for higher adoption rates of solar PV panels.

# Approach & Deliverables

**Steps/Approach:**

1. Pull data (Python) and exploration (Power Bi or Tableau) for what will be analyzed. Determine what plots to use
   * Utility installations
   * installers vs installation over time
   * Could also look at installers with increasing rate of installation
   * Could also look at utility application time
   * ...
2. Review with client, get feedback
3. Answer data questions and update visualization based on recommendations
4. Once we know what to do with the data, script in python to easily plot
5. Save scripts on server & provide access to this data & scripts to client engineers
6. Incorporate automatic pull from the web to plot them.
7. Provide web/interactive plots
8. Complete final presentation to client (SCE AT) & Springboard

**Deliverables:**

* Code that automatically pulls the most recent CSI data saved on lab database
* Easily generate reports with time-stamped data
* Provide easy way for engineers to analyze data easily (in a tool like Tableau or Power BI)