GRIDSCAPE

Fremont Fire Stations Microgrid Project

Project Overview

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Presented to:

STATE OF CALIFORNIA
ENERGY COMMISSION
SINCE 1975

Gridscape Solutions

- Leading & Cost-Effective Smart Energy Solutions Provider & Systems Integrator
  - *Founded in 2013*
  - *Global Presence – US, UK, India*
  - *45 Engineers*
- Turnkey Smart, Efficient Energy Solutions for
  - *Enterprises*
  - *Utilities*
  - *Manufacturers*
- Experts in Solar, Storage, Demand Response & EV Infrastructure integration

Customers:

Schneider Electric, nrg eVgo, ABB, chargepoint, blink, STRATEGEN Strategies for Clean Energy, eluminocity, DELTA, greencharge networks

Affiliations:

openADR Alliance, Open Charge Alliance, BOMA International, DGC Dynamic Grid Council, CESA California Energy Storage Alliance

Case Studies:

- *OpenADR Solution for EV Charging*
- *EV Charging Network Integration*
- *Mobile Applications for EV Charge Sharing*
- *Utility Back-office Integration*
- *Solar PV Design and Energy Portal*

Visit www.grid-scape.com for details

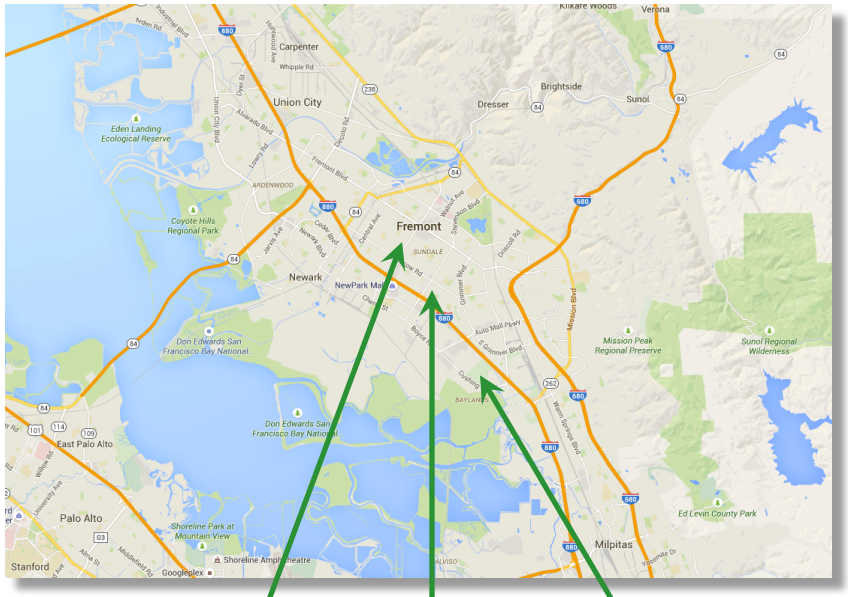
GRIDSCAPE

Gridscape Mission Statement

Our mission is to provide grid intelligence, drive energy independence, enable electric transportation, and deploy renewable microgrids globally.

CEC Microgrid Award

- Total Award
  - $2.4M
- Proposed Sites
  - Three Critical Facilities – Fire Stations in the City of Fremont
- Benefits to State and City
  - Minimum 3 hour Renewable Energy Islanding
  - 50%-80% of Net Energy Cost Savings
  - Clean & Sustainable Energy
- Partners:



- Project Details
  - 25-55KW Solar Canopy System
  - *95-100 kWhr Energy Storage System*
  - *Gridscape Microgrid Controller*
  - *Gridscape Cloud-based Predictive Energy Management Software*

Project Introduction/Goals

A two year Microgrid System Demonstration that:

- Protects critical facilities from service interruption
- Delivers energy savings
- Integrates with renewable generation
- Reduces fossil fuel usage
- Efficiently manages resources with automation
- Provides technical and economic microgrid performance data
- Identifies any barriers to commercial deployment

California Energy Commission Requirements

- Project must include Microgrid Controller and Energy Management System
  - ✓ Identify, isolate and efficiently serve critical loads
  - ✓ Drop non-critical loads
  - ✓ Coordinate and control storage
  - ✓ Prevent export of power during over-generation
- Microgrid to serve critical facilities
- Automatically disconnect and operate independently from main grid
- Operate in islanded mode for a minimum of 3 hours
- Capable of being made commercially available
- Use smart inverters

Use Cases

1. Grid-tied/ON Grid Mode: Charge Battery & serve loads from Grid
2. Grid-tied/ON Grid Mode: Charge Battery & serve loads from Solar
3. Daytime Islanding: Off-Grid Mode/Island Mode: Use Solar and Battery to power loads
4. Nighttime Islanding: Off-Grid Mode: Discharge Battery to loads
5. Energy usage analytics on Gridscape eScope Dashboard

Fire Station #11 – permit-ready design

- 37KW Solar Canopy
- 95kWhr Li-On Battery
- Smart Inverter
- Microgrid Controller
- eScope

Fire Station #6 – proposed design

- 25KW Solar Canopy
- 95kWhr Li-On Battery
- Smart Inverter
- Microgrid Controller
- eScope

Fire Station #7 – proposed design

- 55KW Solar Canopy
- 95kWhr Li-On Battery
- Smart Inverter
- Microgrid Controller
- eScope

Gridscape eScope Dashboard

Project Status

- Microgrid Container:
  - Prototype Completed, Tested all use cases at Gridscape Fremont lab
  - Microgrid Container, currently staged at CM

- Fire station #11:
  - City of Fremont Council Approval: Sept 13, 2016
  - Permit Issued: Sept 30, 2016
  - Solar Canopy: Structural, Electrical Installation: Nov 2016
  - Microgrid Operational: Nov-Dec 2016

- Fire station #6 & #7 :
  - Preliminary Design Started
  - Permit Ready drawings: Oct/Nov 2016
  - Permits Issued: Dec 2016
  - Solar Canopy: Structural, Electrical Installation: Jan-Feb 2017
  - Microgrid Operational: March 2017

Lessons learnt

- Commercial & Operational Issues
  1. Agreement with City is a challenge. Multiple departments need to align and agree
  2. Value of Microgrid is not clearly understood by Cities and hence it took us long time to explain the value and get an agreement.
  3. Solar PPAs are easily understandable. Storage Efficiency agreements are fairly understandable. However, benefits of Microgrids are hard to explain
  4. Placement of Solar Canopies in fire stations is bit challenging

- Technical Challenges
  1. No standards available for common interface to smart inverters. Every inverter is different. IEEE 2030.7 is still in infancy phase
  2. 3-way automatic transfer switches (ATS) are hard to find
  3. Prototype testing with larger portable solar (>2KW) was a challenge for us

Thank You

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