City of Fremont & Gridscape Solutions, LLC

CEC PON 14-301: Demonstration of Low-Carbon based Microgrid for Critical Facilities
Introduction

- Demonstration of “Microgrid Systems” on Fire Stations
- Solar PV System + Battery + Smart Controller
- Systems operate with or independently from the grid
- Provides clean energy generation *plus* operational resiliency
Project Overview

• Project Costs
  $1,817,925 Grant from the CA Energy Commission (PON-14-301: Group 1)
  + $657,260 in matched funds
  = $2,475,185 total project value

• Proposed Sites
  – (3) Fremont Fire Stations

• Benefits to Sites
  – Resilience
  – Energy Cost Savings
  – Clean Energy Source

• Project Details (per site)
  – 37-43 kW Solar Canopy + 95 kWhr Energy Storage
  – Gridscape Microgrid Controller System
  – Gridscape Cloud-based Predictive Energy Management Software
Site Locations

Fire Station #6
4355 Central Ave., Fremont, CA 94536
- 13,224 sq. ft.
- 97,500 kWh/yr
- $17,900/yr electric bill (~18.3¢/kWh)

Fire Station #11 (LEED Gold)
47200 Lakeview Blvd., Fremont, CA 94538
- 10,375 sq. ft.
- 64,500 kWh/yr
- $12,500/yr elec. bill (~19.4¢/kWh)

Fire Station #7
43600 S. Grimmer Blvd., Fremont, CA 94538
- 10,161 sq. ft.
- 108,000 kWh/yr
- $19,000/yr elec. bill (~17.6¢/kWh)
City Contracting & Approval

• CA Government Code 4217.10-4217.18:
  – Public facilities can sole source for energy services contracts

• “Demonstration Period”
  – System design, Construction, and Testing per CEC grant requirements
  – City provides Gridscape access to sites; receives energy produced at no cost

• “Regular Term”
  – 10 yr PPA w/ system monitoring & maintenance
  – Electricity pricing at ½ cost of PG&E
PHASE 1: 2016 to 2018
Grant-Funded Demonstration Period

• $1.8M from CEC to Gridscape to Demonstrate Low-Carbon Based Microgrid for Critical Facilities
  – Gridscape designs, constructs, tests, & reports on system performance to CEC
  – City provides Gridscape access to sites & receives energy at no cost
PHASE 2: 2018 to 2028
Power-Purchase Agreement (PPA)

- City contracts with Gridscape to buy power generated by the systems for a 10 year period
  - Gridscape owns systems & provides all monitoring, maintenance, & warranties
  - City purchases energy for 1/2 of current PG&E rate

<table>
<thead>
<tr>
<th>Fire Station #6</th>
<th>Current PG&amp;E Rate</th>
<th>PPA Electric Rate</th>
<th>Annual Rate Escalator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18.3 ¢/kWh</td>
<td>9.16 ¢/kWh</td>
<td>2.5%</td>
</tr>
<tr>
<td>Fire Station #7</td>
<td>17.61 ¢/kWh</td>
<td>8.81 ¢/kWh</td>
<td>2.5%</td>
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<tr>
<td>Fire Station #11</td>
<td>19.42 ¢/kWh</td>
<td>9.71 ¢/kWh</td>
<td>2.5%</td>
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</tbody>
</table>
# Utility Bill Savings

<table>
<thead>
<tr>
<th></th>
<th>Station #6</th>
<th>Station #7</th>
<th>Station #11</th>
<th>COMBINED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PG&amp;E Bill Savings during Demonstration Period</strong></td>
<td>$9,574</td>
<td>$11,604</td>
<td>$10,849</td>
<td>$32,027</td>
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<tr>
<td><strong>Electric Bill Savings Over 10 Year PPA Term</strong></td>
<td>$60,886</td>
<td>$74,399</td>
<td>$79,559</td>
<td>$214,844</td>
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<tr>
<td><strong>Total Electric Bill Savings (Demonstration + PPA)</strong></td>
<td>$70,460</td>
<td>$86,003</td>
<td>$90,408</td>
<td>$246,870</td>
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</table>
Benefits to City

- Protects critical facilities against power outages
- Reduces demand on the grid through use of stored battery energy
- Increases community resiliency
- Reduces utility bills by $32,000 during Demonstration Period + $215,000 over 10 year PPA Term
- Reduces municipal greenhouse gas emission reductions by ~80,000 lbs/yr (~36 MTCO2e)
- Supports local cleantech company advancement & innovation
System Design & Power Flow

Solar Canopy Panels

Fire Station Building

Priority 1: Solar to Building
Priority 2: Solar to Battery
Priority 3: Solar to Grid (Reverse flow)
Priority 4: Grid to Building (Night time)

Gridscape Microgrid System
With Battery System

Auto Transfer Switch

PG&E Utility Net Meter

PG&E Utility Grid
Thank You!

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