FEDERAL UTILITY PARTNERSHIP WORKING GROUP SEMINAR
November 15-16, 2017
Ontario, California

Air Force Perspective on Resilience

Hosted by:

FEMP
Federal Energy Management Program

SOUTHERN CALIFORNIA EDISON
Air Force Energy Flight Plan

Enhancing Mission Assurance Through Energy Assurance

1. Improve Resilience
2. Optimize Demand
3. Assure Supply
A well-orchestrated attack (physical or cyber) on the grid could cripple the electric system, cause tremendous economic damage, put the country's vulnerable populations at risk, and compromise the Air Force's ability to conduct its mission.
AF Planning End State

Outage Extent

- Northeast Blackout 2003: 50 million people, 2 days
- Hurricane Sandy: 9 million people, 2 weeks
- EMP
- Ukraine Cyber Attack: 225K customers, outage <1 day, manual mode for months
- Incirlik Air Base: 2,700 DoD personnel, 8 days
- Kinetic: 3-6 months to replace electrical equip

Outage Duration

- 1 day
- 1 week
- 1 month
- 3 months

MOST USAF PLANNING SCENARIOS

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Battery Storage Procurement

- ESPCs/UESCs
- PPA
- EUL
- Supporting pathways
  - Utility transmission asset
  - California IOU storage procurements
# Solar + Battery PPA

<table>
<thead>
<tr>
<th></th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV Size</td>
<td>10 MW</td>
<td>10 MW</td>
<td>10 MW</td>
</tr>
<tr>
<td>Battery Size</td>
<td>N/A</td>
<td>0.5 MW, 5.0 MWh</td>
<td>5.0 MW, 16.0 MWh + 2.0 MW generator</td>
</tr>
<tr>
<td>Resiliency</td>
<td>None directly</td>
<td>Island feeder load (0.5 MW) 24 hrs/day</td>
<td>Island substation load (5 MW) 24 hrs/day</td>
</tr>
<tr>
<td>PPA Rate</td>
<td>&lt;&lt; Utility rate</td>
<td>~ Utility rate</td>
<td>&gt;&gt; Utility rate</td>
</tr>
</tbody>
</table>

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ISO Ancillary Service Market Participation

Otis Air National Guard Base

- Wind+Diesel+Battery Microgrid
- ISO NE Freq. Reg. Market
- Cyber-Secure Connection to ISO
  - Authority to Operate
Contact OEA

Mr. Shawn Bennett  
Senior Advisor  
Air Force Office of Energy Assurance  
2530 Crystal Drive, 8th Floor  
Arlington, VA 22202

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