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Purpose of This Webinar

- Provide school districts with a framework on how to approach energy resiliency—from a momentary glitch in power quality to multi-day or week outages caused by Public Safety Power Shutoff (PSPS) events or other unexpected events.
- Discuss how resiliency, sustainability, and economic considerations factor into your ideal program.
Today’s Agenda

1. What is Energy Resiliency
2. Impact of Power Disruptions on CA Schools
4. Considerations When Planning Resilient Energy Solutions
5. Roadmap to Resilient Energy
ENGIE: A Global Energy Leader with Deep Local History

ENGIE Local Leadership
- 44+ years in operation
- Comprehensive and turnkey engineering/design, procurement, financing, PM/CM and educational services
- Robust and customized STEAM education programs
- Strong commitment to local labor and stimulating local economies
- Leading developer of turnkey distributed energy storage solutions in the U.S.
- #1 installer of commercial net energy metering (NEM) interconnections in 2019 (CALSSA)

ENGIE Global Presence
- Largest independent energy producer in the world
- More than 222 MW of microgrids and 230 district energy systems operational, including 163 MW in North America
- Operating in 70+ countries with $64 billion in revenue in 2019

El Dorado UHSD Flip the Switch Event
Resilient Physical Infrastructure Provides the Foundation for Preparedness and Learning

Much of the burden surrounding the coronavirus is currently "falling on the shoulders of local and state government."

Senator Kamala Harris

“As in the Great Recession commencing in 2008, we see school construction in California as a key economic driver that will help our state keep people working as fears of a recession continue to emerge.”

Julie Arthur, CASH Chair
Energy Resiliency: What Is It and Why Now?

According to the Department of Defense:

*Ability to anticipate, prepare for, and adapt to utility disruptions and changing environmental conditions, and to withstand, respond to, and recover rapidly from utility disruptions while continuing normal operations*

Why Now?

- Increased reliance on electricity
- Increased storms and other natural disasters
- Increased threat of wildfires
- Aging electrical infrastructure
- Emergency preparedness
- Public health & safety
- Decreased cost of implementation
- Potential economic benefits
Impact of Power Disruptions on CA Schools
Vulnerability of the Electric Grid

- Public safety power shut-offs (PSPS) events are likely to continue with unknown frequency and duration
- Lack of power alternatives and no near-term solutions
- PG&E bankruptcy status & future impacts
- Aging infrastructure
- Wildfires and other natural disasters
### PG&E PSPS Data from 2019

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Customers Impacted (meters)</td>
<td>~22,000</td>
<td>~50,000</td>
<td>~11,000</td>
<td>~732,000</td>
<td>~177,000</td>
<td>~941,000</td>
<td>~50,000</td>
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<tr>
<td>Counties in Scope</td>
<td>5</td>
<td>7</td>
<td>3</td>
<td>35</td>
<td>17</td>
<td>38</td>
<td>11</td>
</tr>
<tr>
<td>County Resource Centers Open</td>
<td>4</td>
<td>8</td>
<td>3</td>
<td>33</td>
<td>28</td>
<td>77</td>
<td>29</td>
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<tr>
<td>Peak Wind Gusts</td>
<td>63 mph</td>
<td>58 mph</td>
<td>51 mph</td>
<td>77 mph</td>
<td>80 mph</td>
<td>102 mph</td>
<td>75 mph</td>
</tr>
<tr>
<td>Damage/Hazard Incidents</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>116</td>
<td>26</td>
<td>328</td>
<td>15</td>
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</tbody>
</table>
Audience Poll #1
Impacts on Students, Families, and Staff

Physical health (e.g., increased respiratory illnesses)

Mental & emotional health

Childcare

Security
Impacts on School Operations

1. Food service
2. IT
3. Communications systems
4. Buses
5. Emergency systems/shelters

Macro Impact: Funding
CA Policy:
What’s Changing That Can Help School Districts?
CA Public Utilities Commission’s (CPUC’s) Self-Generation Incentive Program (SGIP)

- Recognized as one of the longest running distributed generation programs in the country
  - Greatly increased budget since 2016
  - Recently refocused on resiliency and equity solutions. The new program opened May 1

- How can schools use this funding?
  - Apply for large scale energy storage incentive
  - Regulatory conversations in-progress to include school districts in additional funding programs
All legislative efforts significantly curtailed due to COVID-19
- Resiliency does remain a priority so efforts will go into the state budget rather than direct legislation
- Federal & State stimulus efforts will attract attention
  - CARES Act & Successive Legislation
  - State agency level opportunities

California Energy Commission (CEC) Electric Program Investment Charge (EPIC) grants for microgrids
Considerations When Planning Resilient Energy Solutions
Decision Process

**Values**
- Energy Resiliency
- Economics
- Sustainability

**Current State**
- Energy Use
- Site Attributes

**Technology Options**

**Optimal Solution**
The “Right” Solution is a Tradeoff Among: Resiliency, Economics, and Sustainability
Energy Resiliency

How much load do you need backed up?

For how long?

- Least Energy Load: Front office, phone, IT
- Cafeteria and gym
- Whole building
- Entire campus

- Minutes
- Hours
- A day
- Multiple days
Economics
Upfront Cost vs. ROI

What are your district’s economic goals?
- Do you want lowest upfront cost or highest return on investment?
- What funding is available for the project?

Cost Implications of Duration and Load

The larger the load, the longer the duration and the more complexity, and the higher the upfront cost.
Audience Poll #2
## Tradeoffs Across Energy Resiliency Solutions

<table>
<thead>
<tr>
<th></th>
<th>Diesel Generator</th>
<th>Natural Gas Generator</th>
<th>Solar + Storage w/ Back-up</th>
<th>Microgrid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resiliency</strong></td>
<td>Weeks (w/ Refilling Risk)</td>
<td>Weeks (relies on utility)</td>
<td>Days</td>
<td>Weeks</td>
</tr>
<tr>
<td><strong>Economics</strong></td>
<td>Lowest Upfront</td>
<td>Lower Upfront</td>
<td>Highest ROI</td>
<td>Added Complexity Increases Cost</td>
</tr>
<tr>
<td><strong>Sustainability</strong></td>
<td>Lowest</td>
<td>Low</td>
<td>Highest</td>
<td>TBD</td>
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</tbody>
</table>
### Current State

**Feasibility and Solution Options**

<table>
<thead>
<tr>
<th>Current State</th>
<th>Considerations</th>
<th>Technology Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical Load</td>
<td>Space</td>
<td>Facility Efficiency</td>
</tr>
<tr>
<td>Utility Rates</td>
<td>Local Permitting Requirements</td>
<td>Lighting</td>
</tr>
<tr>
<td>Emergency Response Plans</td>
<td>Interconnection</td>
<td>HVAC retrofits</td>
</tr>
<tr>
<td>Existing Distributed Energy Resources (DERs) On-site</td>
<td>Incentives</td>
<td>Energy Load Management (EMS)</td>
</tr>
<tr>
<td>Historical Outages</td>
<td>Solar Investment Tax Credit (ITC)</td>
<td>Microgrid Controls</td>
</tr>
<tr>
<td>Defined Critical Loads</td>
<td>Self-Generation Incentive Program (SGIP)</td>
<td>On-site Generation</td>
</tr>
</tbody>
</table>

- **Other**
Use Case: Campus Serves as Emergency Shelter
Power Shutoff with Resilient Backup Power = Critical Services Maintained

- Lighting/HVAC operational
- Communications/IT connected
- Emergency shelter open
- Food service available
Roadmap to Resilient Energy
High-Level Considerations

- Fully-integratable, flexible infrastructure solutions that can advance and adapt with your organization
- Technology agnostic
- Combined solutions (e.g., generator + microgrid)
- Attainable procurement and funding
Where to Begin?
We help our customers work towards a comprehensive and resilient energy solution

Do you have emergency back up power?

YES
What is the source of back up power?

Diesel or Natural Gas Generator
Is this backing up all of your critical services?
Consider clean energy augmentation

Solar and Storage with Backup
If this serves your current needs, recommend check-in after a few years
If this doesn’t serve your current needs, recommend review of system

NO
Have you identified its critical loads?

YES
An energy evaluation for efficiency, solar, storage is a good place to start
To back up non-critical loads, solar+storage is often sufficient

NO
Recommend a needs assessment to better understand facility operations and protocols
To back up critical loads, microgrid controls could help with load prioritization
Immediate Next Steps for School Districts Getting Started

- Understanding needs from a diverse set of stakeholders
- Assessing emergency preparedness
- Assessing existing systems & technologies
- Defining what is critical
- Taking advantage of existing upgrades/modernization plans
- Selecting your partners/vendors
- Staying informed on funding opportunities
Thank you!
Contact us!

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