NEHES 2019 Fall Conference

Building a Business Case for Energy Resiliency

Hospital Energy
Best Practices, Business Planning

CPower
Grid and Utility Incentives

Connecticut Children’s Medical Center
Case Study
Hospital Energy

Business Planning for Energy Resiliency
California utilities eye power cuts amid fire danger

By OLGA R. RODRIGUEZ, Associate Editor

2 hrs ago
AHA Best Practice Principles

Alignment of Facilities, Finance, and Supply Chain leaders.

Aggregation of system spend to increase negotiating power.

Analysis of energy risks and opportunities using financial analytics and business planning tools.
Resiliency Essential Concepts

- Hospital campuses are being repurposed, so that old energy technology may no longer fit the future need.

- The energy sector is undergoing profound technological and financial change, (same as healthcare).

- Natural disasters are increasing dramatically in severity and frequency.
Resiliency Master Planning

➤ Create Energy Master Plan that Aligns with System Facilities Plan.
  Note: Yesterday’s technology is already outmoded.

➤ Calculate the Financial Value of Campus Energy Resiliency.
  Note: All energy equipment is competing in a market.

➤ Calculate Cost of Not Having Energy Resiliency.
  What’s the cost of shut down when the community needs you most?
CMS Campus Resiliency Rules
CMS Campus Emergency Generation Rules

New CMS interpretive guidance on emergency generation requires hospitals to meet the subsistence needs of staff and patients... including... **alternate sources of energy** to maintain temperatures to protect patient health and safety and for the safe and sanitary storage of such **provisions. ....”**

The guideline further states that the hospital can avoid installing generators to maintain temperatures only if:

1) patients are safely in areas that meet temperature rules; or
2) the hospital plans to evacuate all patients in emergency.
Complying with CMS Emergency Power Rule

- Most hospitals have less than 25% of electricity load backed up by generators.

- Adding air conditioning to an emergency power supply system would require a system large enough to provide approximately 60 percent of a hospital’s normal electrical load, more than twice the current minimum requirement.

- Leading IDN: “Our backup power is sufficient only to keep lighting and fire suppression going during evacuation.”
• Capacity refers to power generation that must be maintained by the grid to serve system peak load.

• Capacity and its twin, utility demand, are charged to the hospital based on the campus load metered at the highest few hours of annual grid demand. The charge is fixed for the next 12 months.

• Capacity is now 25-40% of the electricity supply bill and climbing higher due to federal intervention in support of non-economic coal and nuclear plants.

• Capacity costs can only be addressed by running on-site generators at the specific times when grid energy demand is at its annual peak.
Generators Arrayed in Three Modes

Cogeneration  Demand Response  Emergency Backup
Questions/Discussion

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Resiliency

- Resiliency is increasingly important
- Resiliency is hard to pay for
Who is CPower?

- 125 dedicated employees
- National experience. Local expertise.
- 44+ demand-side programs
- 3,500 MWs enrolled
- 15+ utility programs
- 1,300+ customers, 7,000+ sites
- Demand-side solutions including: automation, storage and generator analysis
- End-to-end, in-house, full service operations, dispatch and fulfillment
- Trusted by several states as the CSP of record for demand side management
- DR aggregator
- Experienced Demand-side Energy Management Solutions for your industry
Generator Requirements for Hospitals

Coverage Code Requirements:

- NFPA99
- NFPA110

Testing Requirements:

- Testing 12 times per year
- 30 minutes minimum of 30% of maximum output
- The generator must also be tested once every three years for four consecutive hours

Today's Landscape -

Generators are an essential need, but a capital expenditure and sunk cost
How can Demand Response help?
Create a ROI from your Generators

Two Routes:

1. Buy new generators that meet Non-emergency emissions requirements
   - Diesel - Tier 4 final Engine
   - Gas - Tier 2 non-emergency certified

2. Retrofit/Re-permit Current Generators
   - Lower the emissions
   - Stack Testing
   - Re-Permit for non-emergency use
Demand Response can help you:

- Run the generators on load in middle of the day to practice emergency measures while the grid is still reliable to understand any issues
- Get advanced warning on when a real emergency is on the horizon
- Increase the life of your units by transferring loads to the generators more often
# New England Demand Response Options

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Customer Obligation Hours</th>
<th>Notification lead time</th>
<th>Typical Event Length</th>
<th>Typical Curtailment Frequency</th>
<th>Administrator</th>
<th>Earnings/Savings per MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Demand Capacity Resource</td>
<td>24/7/365</td>
<td>30 minutes</td>
<td>3.5 Hours</td>
<td>2 x 1 Hour Mandatory Tests</td>
<td>ISO-NE</td>
<td>$28,000/year</td>
</tr>
<tr>
<td>Connected Solutions</td>
<td>June-September 2 pm – 5pm OR 3pm – 6 pm OR 4pm – 7 pm</td>
<td>Day Ahead</td>
<td>3 hours</td>
<td>2-6 calls per season</td>
<td>Utility</td>
<td>$36,000/year</td>
</tr>
<tr>
<td>Peak Demand Management (Cap Tag)</td>
<td>Voluntary</td>
<td>Day Ahead &amp; Day Of</td>
<td>3 hours</td>
<td>2-6 calls per year</td>
<td>CPower</td>
<td>$71,000/year</td>
</tr>
</tbody>
</table>
Summer Event: September 3, 2018

Summer Strain on the grid is generally caused by hot and humid conditions resulting in transmission lines inability to carry the required power.

There was a grid emergency event on September 3, 2018 for ADCR participants.

Triggers:
Load was running significantly higher than forecast by over 2500 MW
• Several generation resources had significant outages and reductions totaling approximately 1,600 MW
• The peak temperature and dew point for the daytime hours in Boston were 94 and 73 with a forecast of 89 and 70
• ISO-NE declared an Emergency Alert at 3:15p, just before the DR dispatch took effect at 3:41 pm
Performance on Utility Meter

Performance is determined as the average hourly difference between baseline and actual load.

- Performance is determined by ISO-NE through use of near real-time load data from installed metering equipment
- Note that failing Performance can lead to reduction of payment

*For information purposes only*
Real-Time Usage

Dashboard

Dashboard
Marketplace
Event Performance
Historical Usage
Price Tracker
Financial Summary
Weather
Settings
Sign Out

CBL is unadjusted

* The unadjusted baseline is a preliminary calculation using available usage data. An adjusted baseline will display closer to the event when there is enough real time meter data (15 minutes of data prior to dispatch) to calculate the adjustment.

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NEHES
New England Healthcare Engineers' Society
Stacking benefits
ADCR Value (ISO-NE 30-minute)

<table>
<thead>
<tr>
<th>Commitment Period</th>
<th>ISO-NE kW Reduction</th>
<th>ISO-NE Payments</th>
<th>Customer Share</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Summer</td>
<td>Winter</td>
<td>Rate</td>
</tr>
<tr>
<td></td>
<td>(8 months)</td>
<td>(4 months)</td>
<td></td>
</tr>
<tr>
<td>June 1, 2020 - May 31, 2021</td>
<td>1,000</td>
<td>1,000</td>
<td>$4.00</td>
</tr>
<tr>
<td>June 1, 2021 - May 31, 2022</td>
<td>1,000</td>
<td>1,000</td>
<td>$4.00</td>
</tr>
<tr>
<td>June 1, 2022 - May 31, 2023</td>
<td>1,000</td>
<td>1,000</td>
<td>$3.80</td>
</tr>
<tr>
<td>June 1, 2023 - May 31, 2024</td>
<td>1,000</td>
<td>1,000</td>
<td>$3.80</td>
</tr>
<tr>
<td>June 1, 2024 - May 31, 2025</td>
<td>1,000</td>
<td>1,000</td>
<td>$3.80</td>
</tr>
</tbody>
</table>

Total Customer Benefit: $139,677
Connected Solutions (Utility Day-Ahead)

**HOW MUCH COULD YOU EARN?**

Payment for the Connected Solutions program follows a simple formula:

\[
\text{Capacity Payment} = \$35 \text{ per kW per year}
\]

\[
\text{Curtailed Load} \times \text{Capacity Payment} = \text{Revenue Earned}
\]

- 1000 KW (performance) x $60 (capacity/performance) x 60% (share) =
  - Summer/Winter 2020- $36,000
  - Summer/Winter 2021- $36,000
  - Summer/Winter 2022- $36,000
  - Summer/Winter 2023- $36,000
  - Summer/Winter 2024- $36,000
  - **Total = $180,000**
### What is the value of managing your Capacity Tag?

<table>
<thead>
<tr>
<th>Cap-Tag is set Summer of this year</th>
<th>ISO-NE Zone</th>
<th>Cap Tag Power Year</th>
<th>Cap-tag Value $/kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>WCMA</td>
<td>2021-2022</td>
<td>$55.57</td>
</tr>
<tr>
<td>2021</td>
<td>WCMA</td>
<td>2022-2023</td>
<td>$45.60</td>
</tr>
<tr>
<td>2022</td>
<td>WCMA</td>
<td>2023-2024</td>
<td>$45.60 (expected)</td>
</tr>
<tr>
<td>2023</td>
<td>WCMA</td>
<td>2024-2025</td>
<td>$45.60 (expected)</td>
</tr>
</tbody>
</table>

- **Cap Tag value drops by 1000 KW in summer 2020**

- **Value is realized from June 2021 through May 2022**: 
  
  - 1000 KW x $55.57 x RM = $\underline{82,015}$ over 12 months
  - 22-23= $\underline{67,313}$
  - 23-24= $\underline{67,313}$
  - 24-25= $\underline{67,313}$
  - **Total = $\underline{283,954}$**

*assuming capacity is passed through on your power contract*
Stacking Benefits

- **June 2020-May 2025:**
  - **ADCR (ISO) –**
    - Year 1 - $28,794
    - Year 2 - $28,802
    - Year 3 - $27,360
    - Year 4 - $27,360
    - Year 5 - $27,360
  - **Connected Solutions (Utility) –**
    - Year 1 - $36,000
    - Year 2 - $36,000
    - Year 3 - $36,000
    - Year 4 - $36,000
    - Year 5 - $36,000
  - **Peak Demand Management (Cap tag) –**
    - Year 2 savings - $82,015
    - Year 3 savings - $67,313
    - Year 4 savings - $67,313
    - Year 5 savings - $67,313

- **Offset Revenues [$319,667] + Capacity Savings [$283,954] =**

**Year 5 Total Energy Benefit = $603,631**
DR in Action: Connecticut Children's Medical Center
**Benefits:**
- Earned Jan 2018- November 2019 – $65K (3 hours of dispatch)
- Projected Earnings/Savings – December 2019 through May 2025 - $494K
- Non-Emergency Permit in hand
- Turnkey upgrades:
  - (controls, permit, testing) - $83K

**Discussion:**
- Action plan for programs
- Issues
- Solutions
- Advice for other hospitals
Thank You!

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