Beating the Peak

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Jordan, MN
Presentation Overview

- MVEC overview
- Peak types and their importance to DR program value
- Programs – Tools in the toolbox
  - Capabilities
  - Constraints
- Managing load
- Summary of concepts and value drivers
MVEC Overview

- Distribution Cooperative
- Based in Jordan, Minnesota
- 90 employees
- 42,000 member-owners
- ACSI score of 89
- 900 sq mile service territory
- 10 consumers per mile
- 3 wholesale power suppliers
- $6M in DR savings annually
Wholesale Power Suppliers

* Wholesale Power agreements:
  * Great River Energy
  * Basin Electric
  * Alliant Energy

* Billed for demand and transmission based upon monthly system peaks
* All MISO market participants
* Each G&T has a different peak
Two Peak Types

- Basin peak – Non-COIN
- GRE Transmission Peak - COIN
Demand Response Programs

- Commercial and Industrial Interruptible loads
  - With generator
  - Without generator
- Air conditioning
  - Cycled
  - Wi-Fi thermostats
- Water heaters
  - Peak shave
  - Storage
- Interruptible heating
  - Peak shave
  - Storage
- Electric vehicles
  - Peak shave
  - Storage
  - Time-of-use

Beat the peak energy challenge
## Program Participation and Shed

<table>
<thead>
<tr>
<th>Program</th>
<th>Participants</th>
<th>Technology used</th>
<th>Groups</th>
<th>MW of controllable load</th>
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<tbody>
<tr>
<td>Commercial and Industrial Interruptible Loads</td>
<td>130</td>
<td>Direct load control (DLC)</td>
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<td>20 MW</td>
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<td>Air Conditioning</td>
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<td>Nest and Honeywell thermostats</td>
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<td>DLC</td>
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<td>6 MW</td>
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<td>DLC</td>
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<td>1 MW</td>
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<td>Interruptible Dual Heat</td>
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<td>DLC</td>
<td>4</td>
<td>10 MW</td>
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<td>65</td>
<td>DLC</td>
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<td>150 kW</td>
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<td>Electric Vehicles - TOU</td>
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<td>30 kW</td>
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<tr>
<td>Beat the Peak Energy Challenge</td>
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<td>Notifications – Email, Phone</td>
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<td>1.2 MW</td>
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<td>Spring</td>
<td>Summer</td>
<td>Fall</td>
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What is control for?

July High Temperatures
Normal distribution of 10 years of July high temperatures
Eliminating Extremes

July High Temperatures
Load vs Temperature Relationship

MVEC System Daily Peak Relationship to Temperature - Estimated No LM
When to Control?
Non-COIN Control – Done Well

Gen 2
Gen 3
Gen 5
Gen 6
Gen 7
Gen 8
AC 1+2
AC 3+4
WH 1+2
WH 3+4
BTP

Jul 6 Thu 2017
Non-COIN Control – Done Poorly

- Gen 5
- Gen 6
- Gen 7
- Gen 8
- AC 1,2,3,4
- WH 1,2,3,4
COIN Control

MW

3AM 6AM 9AM 12PM 3PM 6PM 9PM 11 Sat

105 MW
100 MW
95 MW
90 MW
85 MW
80 MW

Gen 1
Gen 2
Gen 3
Gen 5
Gen 6
Gen 7
Gen 8
PSWH 1+2
PSWH 3+4
DF 1+2
DF 3+4
31 Days of Weather to Manage!
Think about...

* Managing the resources and technologies
  * Dispatch – How many systems?
  * Notification – How many groups?
  * Analysis
    * Baselines – How many MW
    * ROI – Red or black?
    * Failure identification – Am I getting what I pay for?

* The business case for load control, under changing circumstances
  * RTO rules, G&T rates/incentives, coincident vs non-coincident peaks
Discussion?