General Information

- Please be sure to sign in at back of room
- Restrooms located in the lobby west of the floating wall
- Emergency exits located at the northwest exit and west entrance
Upcoming Events

New Technologies for HVAC and Demand Control
October 17, 8:30-10 a.m.
Colorado River Community Room, 222 Laporte Ave

Have you wondered if those trendy new products actually deliver the savings they promise? Find out the answer, while joining us to discuss a variety of emerging energy efficiency technologies.

Second Annual Efficiency Works Contractor Appreciation Social
November 15, 4-6:30 p.m.
Budweiser Event Center
Suite Level - Ranch Bar and Grill

Join your peers in celebrating another successful year of Efficiency Works projects. Platte River Power Authority and Fort Collins Utilities staff will share project successes and highlights from 2017. The evening will also feature a cash bar, door prizes, a sneak peek at 2018 program changes and an Efficiency Works project/contractor award ceremony. Join us to see if you are a recipient.
• For a limited time, customers can save an additional 50 percent on efficient lighting improvements.
• This offer is valid on all commercial building projects that are pre-approved, completed and submitted for payment from August 15 through November 15, 2017.
• The bonus rebate will be applied *in addition* to current Efficiency Works incentives.
• Details, requirements and annual maximums available at fcgov.com/bonus-lighting-rebate.
Demand Management Options for Commercial Customers

Pablo Bauleo, Ph.D.
Sr. Energy Services Engineer
Fort Collins Utilities
Outline

• Electric bill components
  • Facility Demand vs Coincident Peak Demand
  • PRPA Peak Hour

• Tools
  • MVWeb, Email notifications, Peakload & OpenADR

• OpenADR 101
  • VTNs, VENs, etc
PRPA and Fort Collins Utilities

Energy Supply

Transmission

Distribution

Customers

115 – 230 kV

13.2 kV

Platte River Power Authority

Fort Collins Utilities

PRPA services Fort Collins, Longmont, Estes Park and Loveland
Electric Bill Components
Large Commercial & Industrial

• **Energy**: (~$0.045/kWh, seasonal dependent)
  - How many kWh you used
  - Covers fuel costs

• **Facility demand**: (~$6.50/kW)
  - Your highest hourly demand in the month
  - Covers transformers, cables, equipment, etc. for Fort Collins.
  - *Known at the end of the month*

• **Coincident peak**: (~$12/kW summer, or ~$9/kW)
  - Your demand at the time of PRPA monthly peak (peak hour)
  - Covers PRPA generation & transmission needs
  - *Known at the end of the month*
Energy Bill Breakdown
What can I do to save?

Average Energy Bill Breakdown

- Facility Demand, 25%
- Coincident Peak, 35%
- Energy, 40%

Set by all hours of the month: Have to be efficient all hours of the month.

Set by only 1 hour of the month:
- Have to schedule processes every day of the month.
- Have to shift processes, maybe 8 hrs/month.

Set by only 1 hour of the month.
Facility Demand and Coincident Peak Demand

Facility Peak

PRPA Peak Hour

Day of Month (December, 2000)
Peak Hour: *Highest hourly demand combining Fort Collins, Loveland, Longmont and Estes Park*

Determined at the end of the month
(no way to know when the highest hour was until all hours are known)

Coincident Peak Demand Charge is your own contribution to the PRPA regional peak
Peak Hour Occurrence

Tend to happen on weekdays

- Rare (but known) weekend Peak Hours

Summer (AC load)

- Between 2 to 6 pm on a very hot afternoon

Winter (Lights + Electric Heat)

- Between 6 to 9 pm on a very cold evening

Spring/Fall

- Anytime from noon to 9 pm (weather driven)
Hot Shot ("The Light")

- Started in 1982
- One-Way devices / Hardwired
- Equipment discontinued
- Support ended in 2016

Peak Partners

- Started in 2014 (Residential)
- Two-Way devices
- Wi-Fi Thermostats / Water Heaters
- Automation via OpenADR (vendor agnostic)
Tools

Facility Demand

• Your own peak
• ElectriConnect (MV-Web)
• Identify Energy Use Patterns
• Want access to tool? Email to utilitiescustomeraccounts@fcgov.com

Peak Partners C&I Program

• Your contribution to the NoCo electric grid peak
  • Peakload page (fcgov.com/peakload)
  • Email notifications
  • OpenADR
Conservation Events

It is not possible to know when the Peak Hour will be.

However with analytics and operational experience we can identify a few hours per month as "candidate hours".

Conservation Event

Candidate hours for peak hour of the month

If you reduce energy use during a conservation event you can save $
Conservation Events

Typically between 75 and 100 hours/year
Current load information
- Trends in the load
- Information on upcoming “conservation events”

Historical data
- Previous Peak Hours
- History of Conservation Events

- Want access? Visit the page and follow instructions
Peakload page
http://fcgov.com/peakload
<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Event Duration</th>
<th>Event Type(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tue, Aug-01-2017</td>
<td>4-6:05 p.m.</td>
<td>125 min</td>
<td>COMM</td>
</tr>
<tr>
<td>Wed, Jul-19-2017</td>
<td>4-4:20 p.m.</td>
<td>20 min</td>
<td>COMM</td>
</tr>
<tr>
<td>Mon, Jul-17-2017</td>
<td>5-6 p.m.</td>
<td>60 min</td>
<td>HVAC, WH</td>
</tr>
<tr>
<td>Tue, Jul-11-2017</td>
<td>4-6 p.m.</td>
<td>120 min</td>
<td>HVAC, WH</td>
</tr>
<tr>
<td>Wed, Jul-05-2017</td>
<td>4:15-6:15 p.m.</td>
<td>120 min</td>
<td>HVAC, WH</td>
</tr>
<tr>
<td>Wed, Jul-05-2017</td>
<td>4-6:15 p.m.</td>
<td>135 min</td>
<td>COMM</td>
</tr>
<tr>
<td>Wed, Jun-21-2017</td>
<td>3-5:35 p.m.</td>
<td>155 min</td>
<td>COMM, HVAC, WH</td>
</tr>
</tbody>
</table>
Sign up for Email Notifications
(utilitiescustomeraccounts@fcgov.com)

Emails include

• Advanced notice of upcoming event
  • Often 1 (and up to 2) hrs notice
• Details on start/end time
• Event reminders (Starting now, Ending now)
• Updates (shortening, canceling)
• *Email will only notify you of “Commercial” events*
Email Notification Sample

A conservation event has been scheduled from 08/09/2016 at 14:00 MDT to 08/09/2016 at 16:00 MDT.

Fort Collins Utilities Peak Partners
p: 970-221-6700
www.fcgov.com/peakload
A conservation event is starting on 08/09/2016 at 14:00 MDT. It is scheduled to end 08/09/2016 at 16:00 MDT.

Fort Collins Utilities Peak Partners
p: 720.221.6700
www.fcgov.com/peakload
This event has concluded.

---

Fort Collins Utilities Peak Partners
p: 970-221-6700
www.fcgov.com/peakload
How about automated response?

If you have a Building Automation System
  • Turn off lights
  • Setback HVAC
  • Turn off higher stages of HVAC system
  • …..

If you have notification of upcoming events
  • Precool/Prewarm your building
  • Run up compressors before event (fill up tanks for compressed air)
  • Other things?
Conservation Event Response at 222 Laporte Connection via OpenADR – Automation via JCI
OpenAD… what?

- OpenADR is a protocol designed to exchange information on demand response (conservation events)
- It runs over internet
- It is meant to be used in automated systems
- It is supported by many vendors (like Wi-Fi)
OpenADR Lingo

OpenADR 2.0a and 2.0b:
  • Basic and Deluxe versions
  • We support both

VTN: Virtual Top Node
  • Typically the Utility
  • Sends information out

VEN: Virtual End Node
  • Typically a commercial or industrial facility
  • Responds to VTN information (reduces energy use)
VTN, VEN and BAS

Utility

VTN (server)

OpenADR

C&I Customer

VEN (server)

Any

Customer Control system (BAS)
VTN, VEN and BAS

Utility

VTN (server)

OpenADR

VEN (server)

C&I Customer

Any protocol

Customer Control system (BAS)
OpenADR and other protocols

Any other link (Modbus, BACnet, LonMark, etc)

Customer C
Operations Building
Multiple locations

Customer C

Customer B

Customer A

Utility

OpenADR 2.0 link
Implementing OpenADR in your facility

- If your Building Automation Systems support OpenADR
  - Work with your automation provider to implement it
  - Work with Fort Collins to get credentials

- If your Building Automation Systems does not support OpenADR
  - Look for interfaces
    - Relays (ISY994r, Eagle200, etc)
    - OpenADR 2 Modbus / OpenADR 2 BacNet
  - Often one device is enough

- If you don’t have any automation system
  - Look for interfaces with relays (ISY994r)
  - Each HVAC/Compressor/Equipment will need its own ISY994r
Q&A
Open Standard Automated Demand Response Protocol

**Open Standard**: Open to the public, vendor agnostic

**Automated**: Machine-to-Machine (server to BAS)

**Demand Response**: Reduce energy use for a period of time

**Protocol**: Guidelines for network (computer) communication
OpenADR Event Parameters
VTNs, VENs and all that Jazz