

DR Tools

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Presentation Overview

- PG&E's InterACT System – Available to PG&E's customers greater than 200 kW peak load with interval meters
- DR Automation Server – Available to PG&E's Automated DR Program Participants
- DR Quick Assessment Tool – Available to the Public



PG&E's InterACT System

https://interact.pge.com

File Edit View Favorites

Google

PG&E Pacific Gas and Electric Company

Home Curtailment Energy & Cost Analysis Help Logout

Daylight Saving Time Impact on InterAct Data - Energy Usage Reporting O

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Links

- [and InterAct Reports](#)
- [New Settlement Baselines](#)
- [Modification to PeakChoice Event Notification Times](#)
- [Critical Peak Pricing Ending in 2010](#)
- [Cost Analysis Reports Now Available](#)
- [Demand Response Makes a Difference](#)
- [About the Energy Analysis Module](#)
- [Scheduling Reports Saves Time](#)
- [800-254-5810 for Inter-Act Support](#)
- [Help & Support: Problem Exporting Data to Excel?](#)

Links

- [New 10-Day Baseline and Morning-of Adjustment](#)
- [Baseline Morning-of Adjustment Selection Form](#)

DST Impact on InterAct Data

AS A RESULT OF THE DAYLIGHT SAVINGS TIME EXTENSION FOR 2010, INTERACT REPORTS CONTAINING ENERGY USAGE WILL BE ONE HOUR BEHIND FROM MARCH 14, 2010 at 02:00 THROUGH APRIL 4, 2010 at 02:00, AND FROM OCTOBER 31, 2010 at 02:00 THROUGH NOVEMBER 7, 2010 at 02:00.

Due to legislation that extended Daylight Savings Time, energy information on PG&E's InterAct system will be impacted. From 1986 to 2006, Daylight Savings Time was the first Sunday in April to the last Sunday in October. Since 2007, Daylight Savings Time is observed from the second Sunday in March to the first Sunday in November, adding about a month. As a

User Notice

Event Report

Compensation

Load Analysis

Usage & Variance Analysis

Trending

Energy & Cost Benchmarking

Baseline Analysis

Peak Pricing Analysis

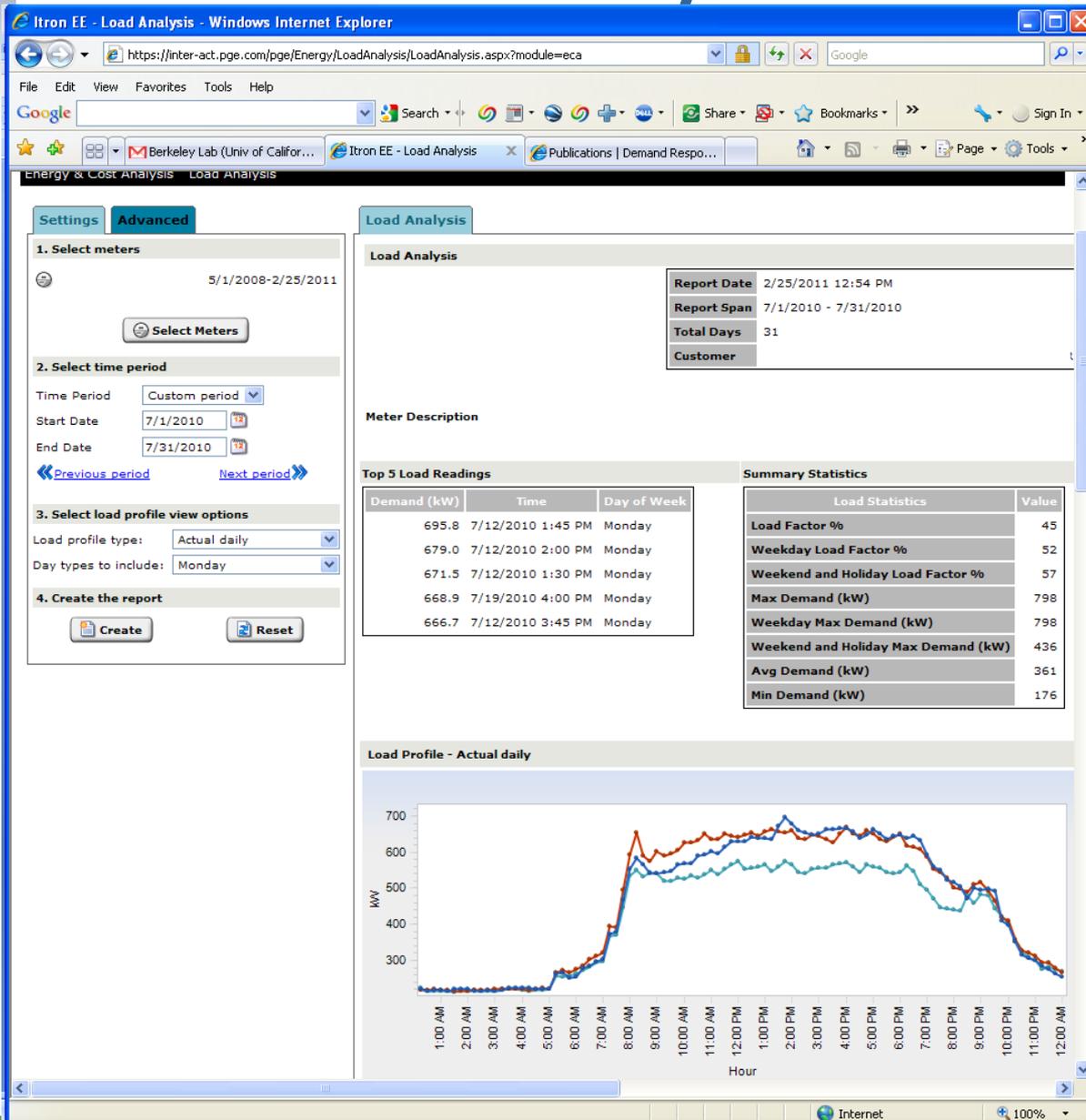
What If Analysis

Cost Variance

Bill Charges



PG&E's InterACT System – Load Analysis

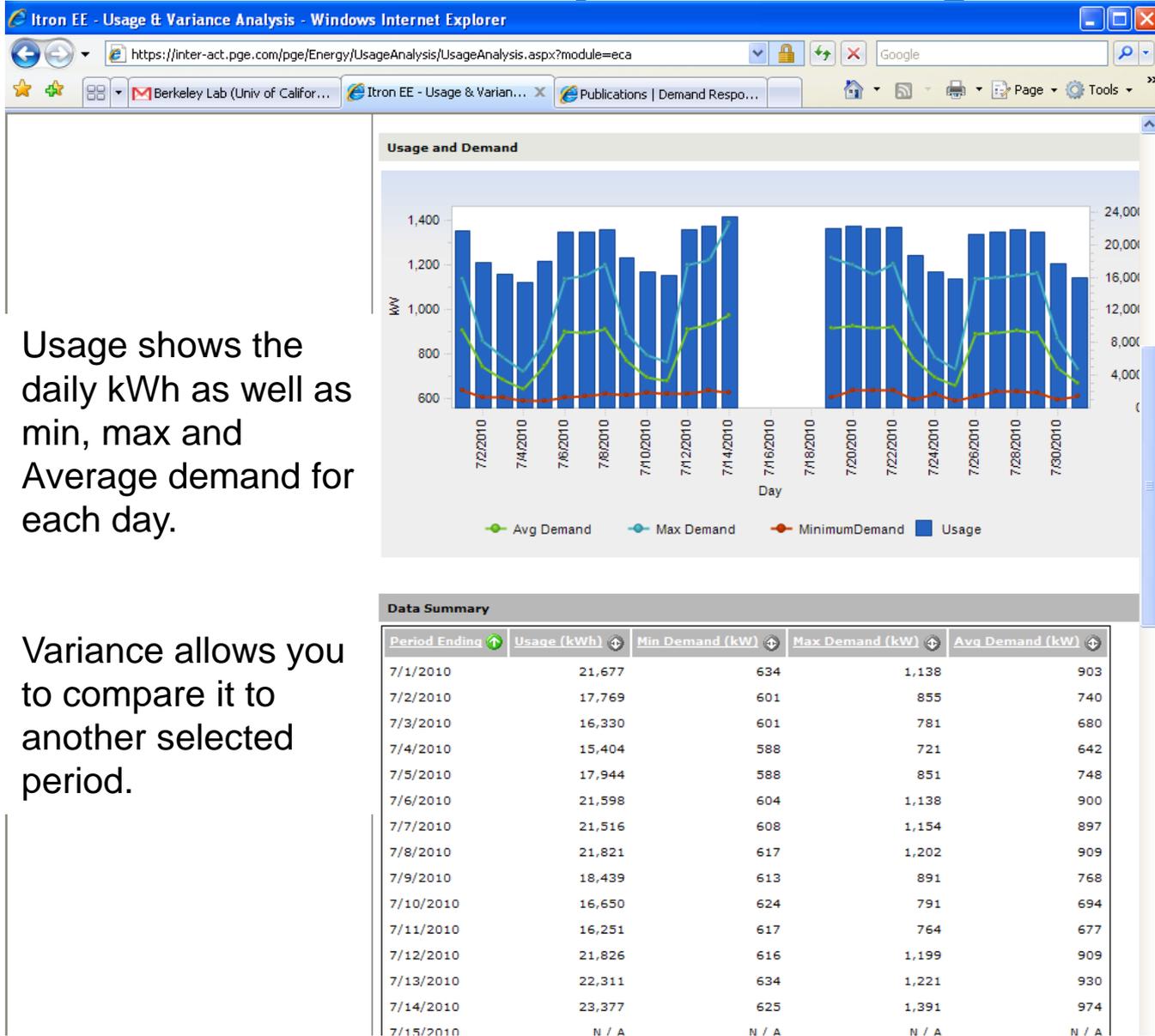


For any specified time period, the tool displays the load profile as well as:

- Load Factor (weekday and weekend)
- Max demand (weekday and weekend)
- Average Demand
- Min Demand



PG&E's InterACT System – Usage & Variance



Usage shows the daily kWh as well as min, max and Average demand for each day.

Variance allows you to compare it to another selected period.



PG&E's InterACT System - Trending

The screenshot shows the Itron EE Trending interface. On the left, the 'Settings' panel is expanded to 'Advanced'. It includes sections for:

- 1. Select meters:** A date range of 5/1/2008-2/25/2011 and a 'Select Meters' button.
- 2. Select time period:** 'Time Period' set to 'Custom period', 'Start Date' 7/1/2010, and 'End Date' 7/31/2010. Navigation links for 'Previous period' and 'Next period' are present.
- 3. Select chart trend option:** 'Chart' set to 'Demand', 'Compare to other meter channel(s)' checked, and 'Reactive Power' entered in a text box.
- 4. Select trend interval:** 'Trend interval' set to 'Metered'.
- 5. Create the report:** 'Create' and 'Reset' buttons.

The main 'Trending' area features a line chart showing demand in kW over time. The y-axis ranges from 600 to 1,400 kW. The x-axis shows dates from 7/2/2010 to 8/1/2010. The chart displays a highly volatile time series with multiple peaks reaching approximately 1,300 kW.

Below the chart is a 'Data Summary' table:

Meter	Min Demand (kW)	Min Timestamp	Max Demand (kW)	Max Timestamp	Avg Demand (kW)	Total Energy (kWh)
SAN MATEO 6345517045 1700 W HILLSDALE BLVD 2P1060 RN767-1	584.64	7/25/2010 1:15 AM	1,391.04	7/14/2010 2:30 PM	820.73	531,831.36

At the bottom, the 'Errors and Warnings' section contains a message:

```
[50092] Warning: s
(384 of 2976) Ener
RN767-1, 12.90 %,
[50092] Warning: s
```

For a given time period:

- Plots time series demand data
- Calculates min, max, average for a given time period



PG&E's InterACT System – Energy & Cost Benchmark

The screenshot displays the PG&E InterACT system interface. The main navigation bar includes 'Home', 'Curtailment', and 'Energy & Cost Analysis'. The 'Energy & Cost Analysis' section is active, showing 'Energy & Cost Benchmark'.

The interface is divided into several sections:

- Settings - Advanced:**
 - 1. Select meters:** Shows a date range from 5/1/2008 to 2/28/2011 and a 'Select Meters' button.
 - 2. Select time period:** Shows a 'Custom period' selected, with 'Start Date' as 8/1/2010 and 'End Date' as 8/31/2010. Navigation buttons for 'Previous period' and 'Next period' are visible.
 - 3. Select benchmarks:** A dropdown menu is open, showing options: 'Average Cost', 'Cost per Day', and 'Use per Day'. The 'Average Cost' option is highlighted with a red dashed circle.
 - 4. Create the report:** Includes 'Create' and 'Reset' buttons.
- Energy & Cost Benchmark Report:**
 - Report Date: 2/28/2011 6:49 AM
 - Report Span: 8/1/2010 - 8/31/2010
 - Total Days: 31
- Benchmark By Month - SAN MATEO 6345517045 1700 W HILLSDALE BLVD 2P1060 RN767-1:**
 - Time Period: 8/1/2010 - 8/31/2010
 - Chart: A bar chart showing 'Average Cost (\$/kWh)' for the period 8/1/2010 - 8/31/2010. The x-axis is labeled 'Meters' and ranges from 0.00 to 0.16. The y-axis is labeled '\$/kWh' and ranges from 0.00 to 0.16. A single blue bar represents the 'Average Cost (\$/kWh)' at 0.16.
 - Data Summary By Month - 1:**

Date	Cost (\$)	Usage (kWh)	Average Cost (\$/kWh)
8/1/2010 - 8/31/2010	91,207	574,137	0.16
 - Errors and Warnings:**

[50092] Warning: (132 of 2976) kVA RN767-1: 4.44 %

This feature allows the users to calculate:

Average Cost (\$/kWh),

Cost per Day (\$) or

Usage per Day (kWh)

for any given time period.

It does not, however, show each day during that time period.



PG&E's InterACT System – Baseline Analysis

Baseline Analysis

Report Date: 2/28/2011 6:55 AM
 Date analyzed: 8/1/2010
 Comparison date: N / A

Baseline Load Profile

Y-axis: kW (600 to 1,100)
 X-axis: Time (1:00 AM to 12:00 AM)

Legend: 8/1/2010 (blue line), Last 10 Week Days (orange line)

Data Summary

	Average (kW)	Max Value (kW)	Max Timestamp	Min Value (kW)	Min Time
8/1/2010	652	711	02:30 PM	589	01:00
Last 10 Week Days	878	1,087	11:15 AM	622	01:30

Baseline days

Name	Baseline days
Last 10 Week Days	7/19/2010, 7/20/2010, 7/21/2010, 7/22/2010, 7/23/2010, 7/26/2010, 7/27/2010, 7/28/2010, 7/29/2010

Available baselines include:

3/7

5/10

BIP (summer/winter)

CPP Baseline

DBP Baseline

Last 10 days

Last 10 weekdays

Like-Day

OBMC

PG&E

Yesterday



PG&E's InterACT System – Peak Pricing

Itron EE - Peak Pricing Analysis - Windows Internet Explorer

https://inter-act.pge.com/pge/Energy/PeakPricingAnalysis/PeakPricingAnalysis.aspx?module=eca

Berkeley Lab (Univ of Cali... Itron EE - Peak Pricin... Berkeley Lab (Univ of Cali... Gmail - Inbox (1347) - ski...

Settings **Advanced**

1. Select meters

5/1/2008-2/28/2011

Select Meters

2. Select time period

Time Period: Custom period

Start Date: 8/1/2010

End Date: 8/31/2010

Previous period Next period

3. Create the report

Create Reset

Peak Pricing Analysis

Peak Pricing Analysis

Report Date: 2/28/2011 7:03 AM

Report Span: 8/1/2010 - 8/31/2010

Total Days: 31

Event Days: 0

Summary Information

Element	Value
Meter	----- 1
Rate	PGE - E-20P
AllHours	Summer Hours between 00:00 and 24:00 All Days
PartialPeak	Summer Hours between 18:00 and 21:30 Weekdays
OnPeak	Summer Hours between 12:00 and 18:00 Weekdays
PartialPeak	Summer Hours between 18:00 and 21:30 Weekdays
OnPeak	Summer Hours between 12:00 and 18:00 Weekdays
OffPeak	Summer Hours between 00:00 and 24:00 Weekends and Holidays
AllHours	Annual Hours between 00:00 and 24:00 All Days
AllHours	Annual Hours between 00:00 and 24:00 All Days

Previous Days Usage

Note: Actual Billed Usage may vary

Legend: OffPeak (green), AllHours (cyan), PartialPeak (red), OnPeak (blue)

Data Summary

Date	Total Energy Usage (kWh)	OnPeak Energy Usage (kW)	PartialPeak Energy Usage (kW)	AllHours Energy Usage (kW)	OffPeak Energy Usage (kWh)
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Peak Pricing analysis summarizes on-peak, part-peak and off peak usage for each day in a selected period. If the customer participated in a DR event, it shows the distribution of kWh savings on that day.

- No cost calculations are completed.



PG&E's InterACT System –What If Analysis

Energy & Cost Analysis What If Analysis

Settings **Advanced**

1. Select meters
5/1/2008-2/28/2011
[Select Meters](#)

2. Select time period
Time Period: Custom period
Start Date: 5/1/2010
End Date: 10/31/2010

3. Select alternative rates(s) (optional)
 PGE - E-20P - Proposed PDP Rate (2 - 6 PM) - 15 Days
 PGE - E-20P - Proposed PDP Rate (2 - 6 PM) - 9 Days
[Select alternative rates](#)

4. Apply Load Change (Optional)
[Apply Load Change](#)
[Clear Load Change Settings](#)
 Load Changes Applied

5. Create the report
[Create](#) [Reset](#)

Applied To: User defined | Period: Period 1 | Start Date: 2:00 PM | End Date: 6:00 PM | Demand (%): -10.00

Monthly Results:

Date	PGE - E-20P-Actual	PGE - E-20P-Adjusted	PGE - E-20P - Proposed PDP Rate (2 - 6 PM) - 15 Days-Actual	PGE - E-20P - Proposed PDP Rate (2 - 6 PM) - 15 Days-Adjusted
5/1/2010 - 5/31/2010	67,571.14	67,571.14	64,714.18	64,714.18
6/1/2010 - 6/30/2010	71,173.74	71,173.74	69,541.72	69,541.72
7/1/2010 - 7/31/2010	72,660.63	72,660.63	74,848.25	74,848.25
8/1/2010 - 8/31/2010	77,616.28	77,616.28	82,267.62	82,267.62
9/1/2010 - 9/30/2010	74,637.89	74,637.89	87,607.21	87,607.21
10/1/2010 - 10/31/2010	72,537.39	72,537.39	68,128.83	68,128.83
Total	436,197.07	436,193.68	447,107.81	447,107.81

Cost Savings Summary:

Rate Name	Before	After	Difference	% Difference	
PGE - E-20P	436,197.07	436,193.68	-3.39	-0.00078	EAST PALO ALTO :
PGE - E-20P - Proposed PDP Rate (2 - 6 PM) - 9 Days	433,784.94	433,754.34	-30.60	-0.00705	EAST PALO ALTO :
PGE - E-20P - Proposed PDP Rate (2 - 6 PM) - 15 Days	447,107.82	447,077.22	-30.60	-0.00684	EAST PALO ALTO :

Cost Savings Summary (Bar Chart):

Legend:

- PGE - E-20P-Actual
- PGE - E-20P-Adjusted
- PGE - E-20P - Proposed PDP Rate (2 - 6 PM) - 9 Days-Actual
- PGE - E-20P - Proposed PDP Rate (2 - 6 PM) - 9 Days-Adjusted
- PGE - E-20P - Proposed PDP Rate (2 - 6 PM) - 15 Days-Actual
- PGE - E-20P - Proposed PDP Rate (2 - 6 PM) - 15 Days-Adjusted

Allows the users to compare their current rate with Peak Day pricing.

Options include:

- Demand reduction (kW or %)

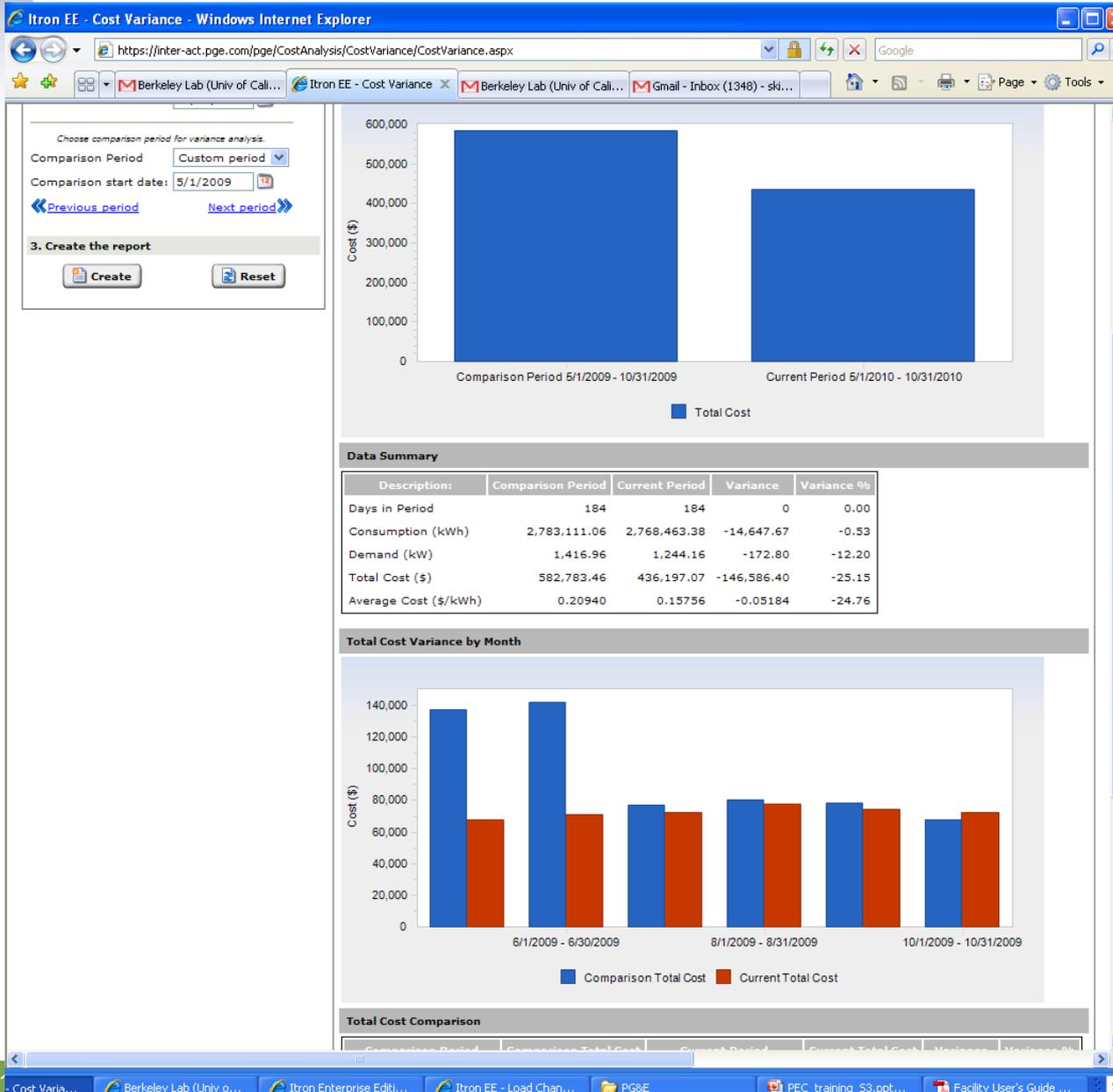
- PDP with 9, 12 or 15 days

- For any give time period

- DOES NOT allow for a customer to apply Capacity Reservation



PG&E's InterACT System – Cost Variance



Users can compare their usage (kW and kWh) and cost between two different periods such as month-to-month or year-to-year.

Caution : if the facility is weather sensitive, the consumption may depend on weather sensitive loads and not how the facility was managed between the two compared periods.



PG&E's InterACT System –Bill Charges

Itron EE - Bill Charges - Windows Internet Explorer

https://inter-act.pge.com/pge/CostAnalysis/BillCharges/BillCharges.aspx

Pacific Gas and Electric Company powered by Itron

Home Curtailment Energy & Cost Analysis Help Logout

Energy & Cost Analysis Bill Charges Customer: Search

Settings **Advanced**

1. Select meters

5/1/2008-2/28/2011

Select Meters

2. Select time period

Time Period: Custom period

Start Date: 5/1/2010

End Date: 10/31/2010

3. Create the report

Create Reset

Bill Charges report

Report Date: 2/28/2011 7:41 AM

Report Span: 5/1/2010 - 10/31/2010

Total Days: 184

Service Provide
Account Number
Meter Number
Rate

Summary of All Period Charges:

Charge Name	Quantity	Avg Price	Amount (\$)
Demand			
Demand Charge - E20P	1,244 kW	114.98	143,032.60
Subtotal Demand			143,032.60
Energy			
Energy Charge - E20P	2,768,463 kWh	0.10	287,522.79
PGE - State Energy Commission Tax	2,768,463 kWh	0.00	609.06
Power Factor Adjustment	2,768,463 kWh,kVArh	0.00	-1,013.93
Subtotal Energy			287,117.92
Fixed			
Customer Charge - E20P			6,046.55
Subtotal Fixed			6,046.55
Total Charges For Period 5/1/2010 - 10/31/2010			436,197.07

Summary Usage for PGE - Demand - Summer/Winter All Hour - Summer - AllHours

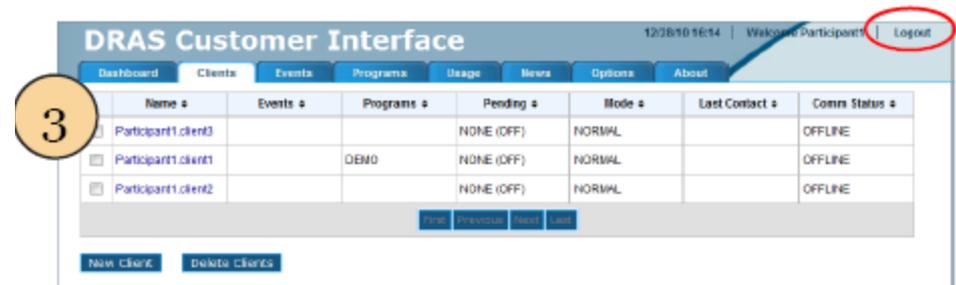
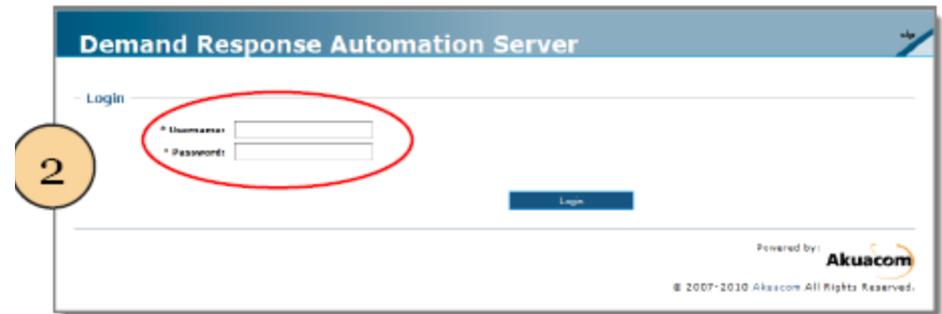
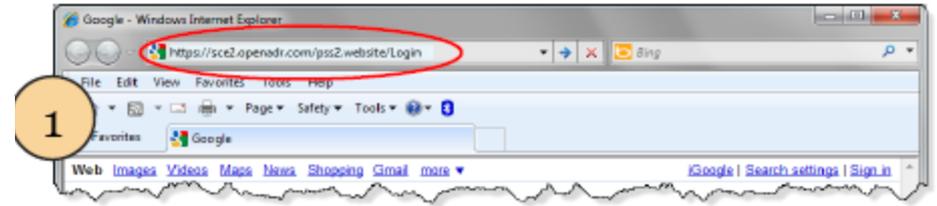
Date	Value (kW)	Date Occurred
5/1/2010 - 5/31/2010	1,002	5/30/2010 2:00 PM
6/1/2010 - 6/30/2010	1,140	6/6/2010 4:15 PM
7/1/2010 - 7/31/2010	1,140	7/3/2010 3:30 PM
8/1/2010 - 8/31/2010	1,244	8/24/2010 6:30 PM
9/1/2010 - 9/30/2010	1,210	9/6/2010 2:45 PM
10/1/2010 - 10/31/2010	1,106	10/10/2010 2:30 PM

Users can calculate their bill charges for a selected period. This feature displays the entire period as well as each month within the selected period.



Demand Response Automation Server (DRAS) & My Site

1. [Logging In To the DRAS](#)
2. [Changing Your User Password](#)
3. [Creating Clients](#)
4. [Assigning Clients to Programs](#)
5. [Managing Shed Strategies](#)
6. [Managing Client Contacts](#)
7. [Configuring Notifications](#)
8. (Optional) [Toggling Clients' Control Mode](#)
9. [Monitoring Events](#)
10. [Opting Out Clients from Events](#)
11. (Optional) [Managing a Client's Password](#)



DRAS

When you log in to the DRAS, the Customer Interface is displayed, which includes:

1. Logout button—Logout from your session.
2. Tab controls—Enable you to perform the following functions:



- **Dashboard**—View a summary of your entire system on a single Web page; see [About the Dashboard View](#).
- **Clients**—Monitor and manage your clients; see [About the Client Summary View](#) and [About the Client Detail View](#).
- **Events**—Monitor all pending and active DR events, and optionally opt out a given client from a given event. If there are no pending or active DR events, then the display is empty; see [Monitoring Events](#) and [Opting Out Clients from Events](#).
- **Programs**—View the available DR programs and which clients are assigned to them.
- **Usage**—Monitor detailed energy usage statistics and a graphical representation of projected normal usage and current usage, for any calendar day; see [Monitoring Energy Usage](#).
- **News**—View messages provided by your Utility.
- **Options**—Change your user password; see [Changing Your User Password](#).
- **About**—View DRAS version information and utility contact information.



DRAS

When you navigate to the **Dashboard** tab, the resulting **Dashboard View** shows a summary of your entire system:

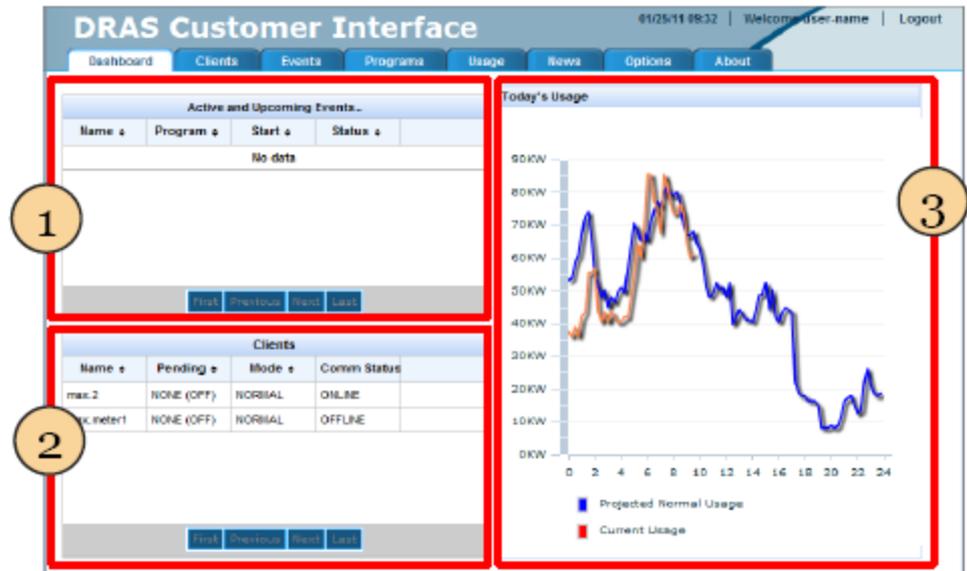
1. **Active and Upcoming Events**—Lists events, which program they belong to, their start time, and status. Click the column headings to sort by a given column.

To view more event details, see [Monitoring Events](#).

2. **Clients**—Lists all your clients, their DR signal's *pending* field value and *mode* field value, and their communications status. (For more details, see [About the Clients Summary View](#).)

3. **Usage**—Graphical representation of the actual usage data for the day and a baseline to compare it against. In addition if there was an event that day, the start and end times of the event are shown.

To monitor more energy usage details, see [Monitoring Energy Usage](#).

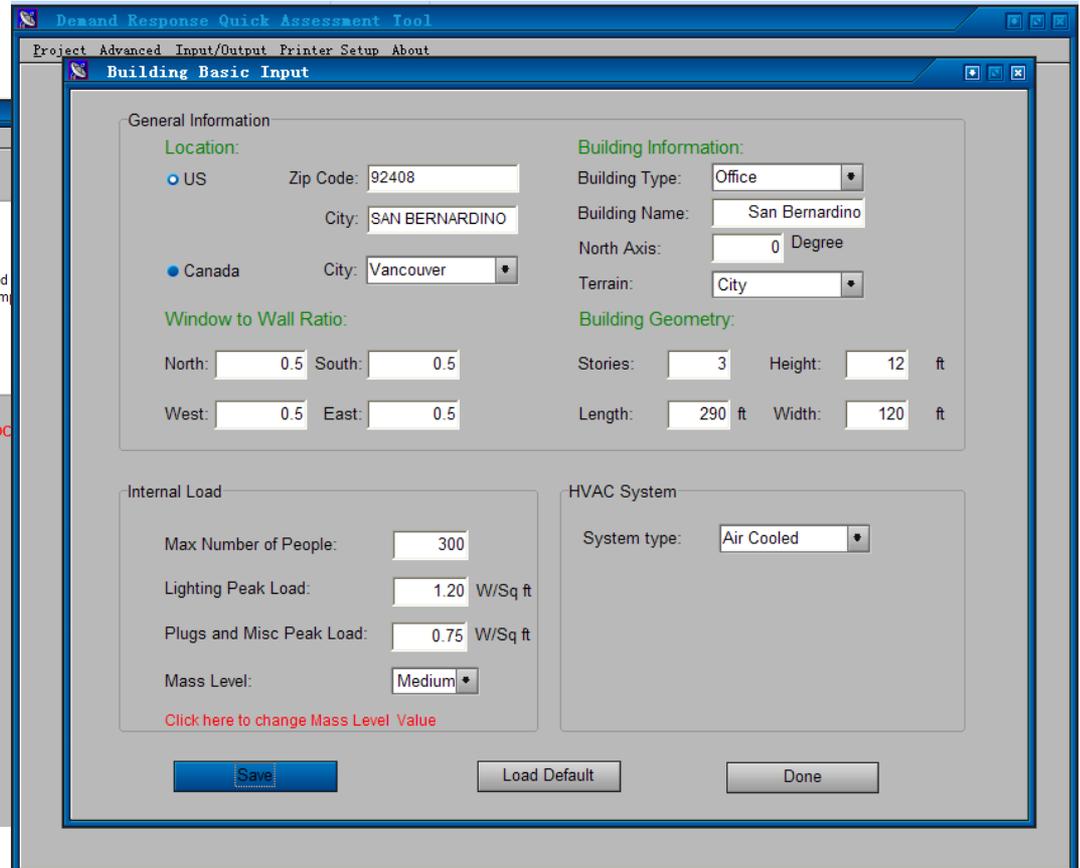
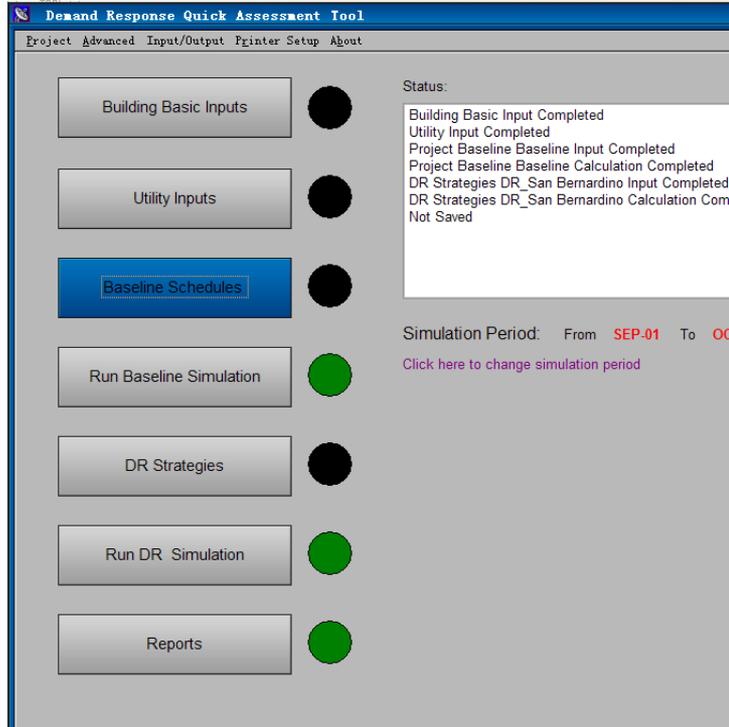


Introduction to DRQAT

- DRQAT (Demand Response Quick Assessment Tool) is a tool for simulating large commercial buildings developed by LBNL
- Up to April, 2010, DRQAT version was 3.0.0 and EnergyPlus version applied into DRQAT was 4.0.0
- Large commercial buildings differ from small commercial building in terms of building materials and size, equipment, and utility rates
- This tool is based on EnergyPlus simulations of prototypical buildings and HVAC equipment
- It incorporates prototypical buildings and equipment and allows the user to specify a relatively small number of important parameters in order to determine a quick assessment of demand response for building thermal mass strategies



DRQAT Screenshots



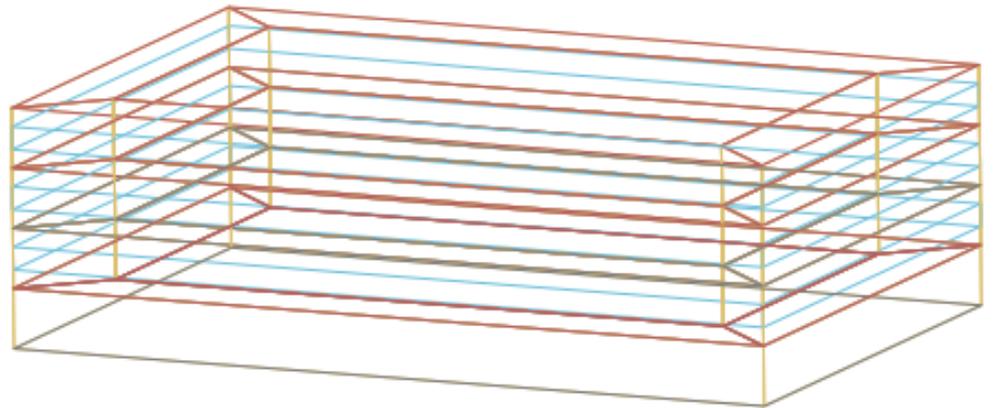
Descriptions of Prototypical Model - Office

Model Description - Geometry

2-D Plan View



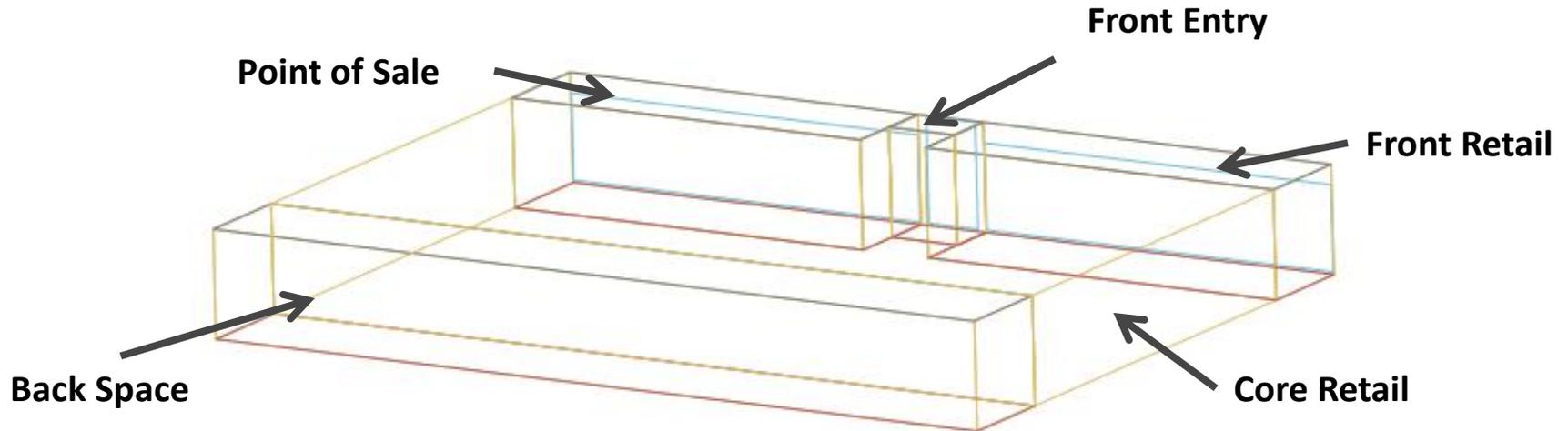
3-D View



- **Model Description - HVAC**
 - Rooftop Unit +VAV system
 - Air flow and capacity are auto-sized by EnergyPlus

Descriptions of Prototypical Model - Retail

Model Description - Geometry



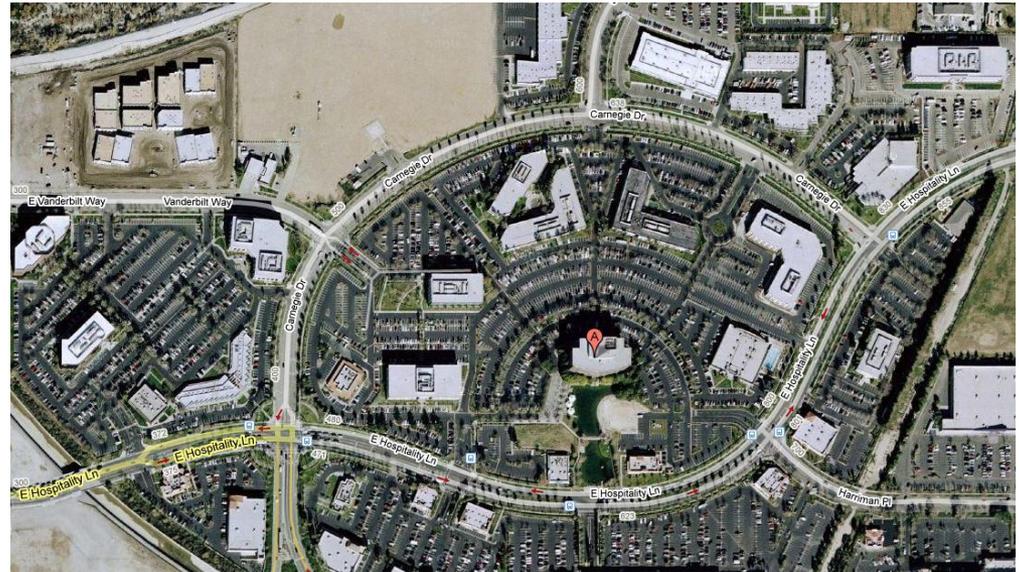
Model Description - HVAC

- Rooftop Unit +VAV system
- Air flow and capacity are auto-sized by EnergyPlus



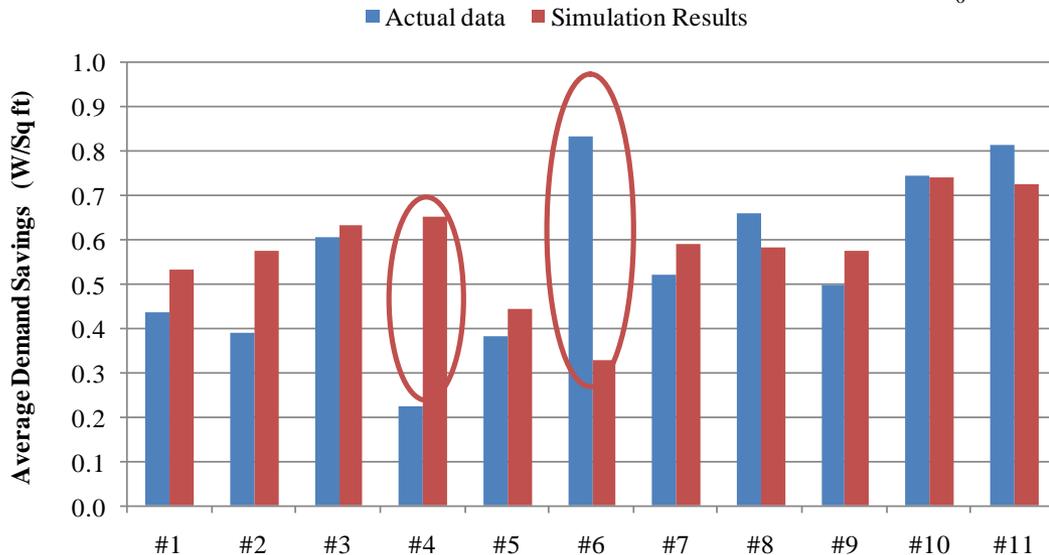
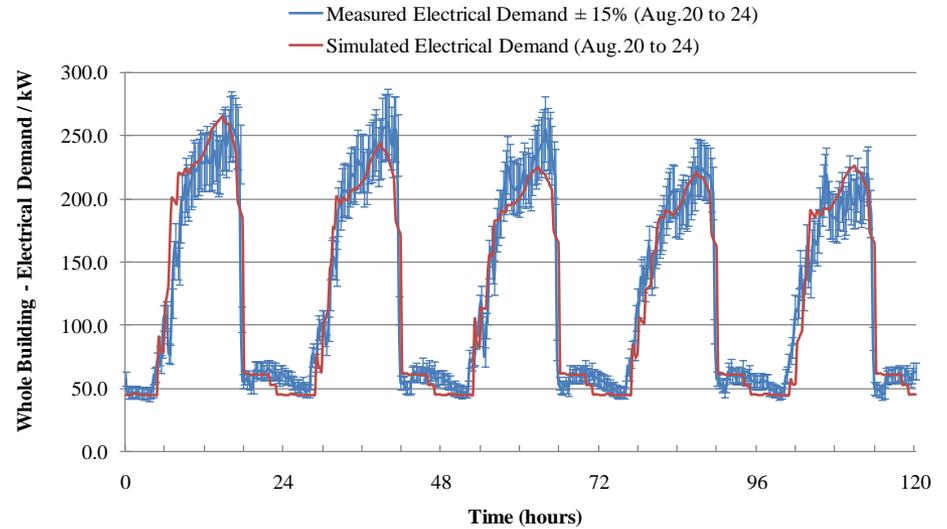
2008: Test Site in San Bernardino

- Pre-cooling in office buildings
 - 11 days of pre-cooling field tests
- DRQAT is used to optimize pre-cooling strategy
- Buildings participated in Critical Peak Pricing (CPP) with pre-cooling strategies
- Building Information
 - 11 buildings in complex
 - Building areas range from $\sim 3500 \text{ ft}^2$ – 11000 ft^2
 - The window-to-wall ratio is ranges from 25%-60% on all sides



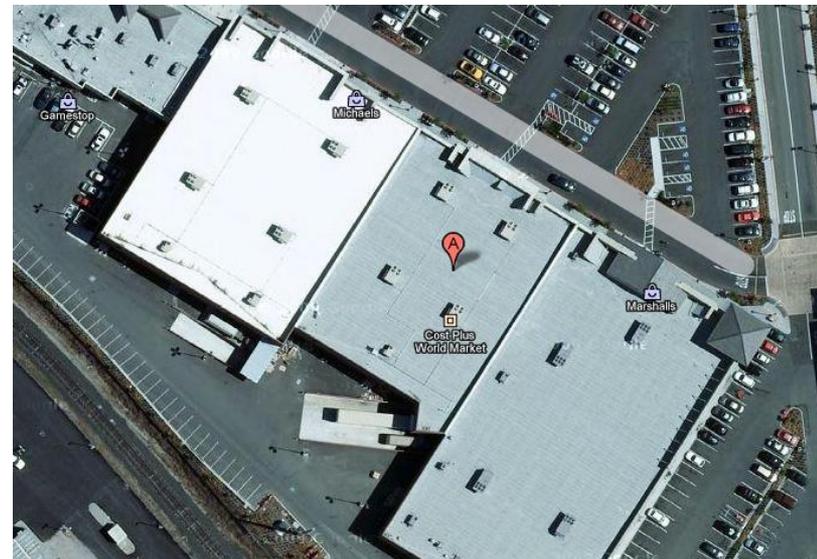
2008: 11 Buildings in Tri-City Corporate Center in San Bernardino

- Good agreement between estimated and actual DR savings



2009: Test Site in San Jose, CA

- Pre-cooling in retail
 - 4 days of pre-cooling field tests, 9/11/2009, 9/21/2009, 9/23/2009, 11/3/2009*
- DRQAT is used to optimize pre-cooling strategy performance
- Comfort surveys by Center for Built Environment
- Building Information
 - Built in 2006
 - Total floor area = 18,894 ft²
 - The window-to-wall ratio is nearly 100% on north side, no windows on other sides
- Thermal Mass Level
 - Home furnishings and living room furniture
 - High mass building compared to other types of commercial buildings



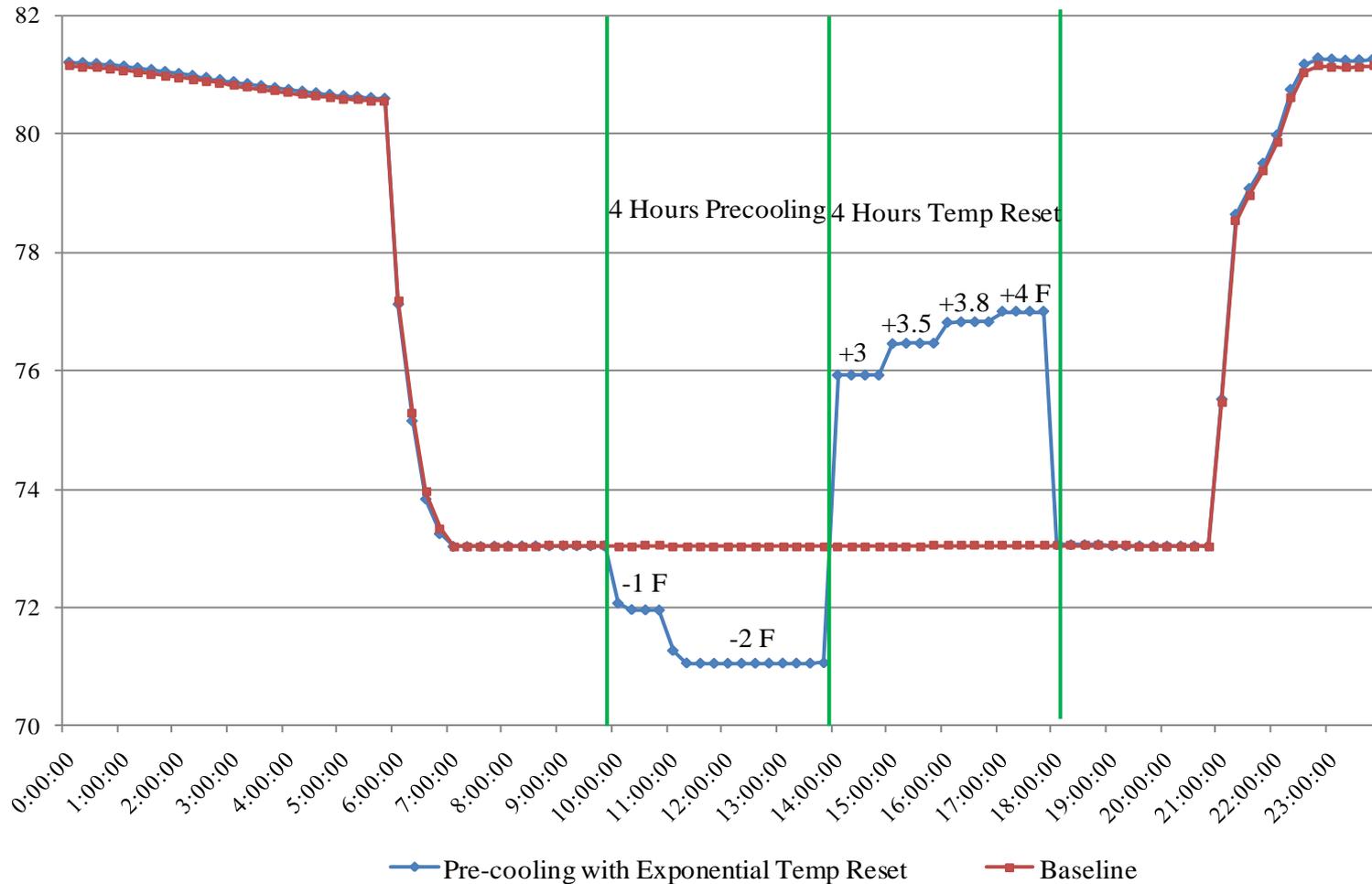
Cost Plus Building Operation and HVAC System

- Normal building operation hours:
 - 3:50-22:15 on weekdays
 - 6:50-22:15 on Saturday
 - 7:50-20:15 on Sunday
- During normal operation, the HVAC system starts as early as 4 a.m.
- Normal zone temperature setpoints were around 73 deg F.



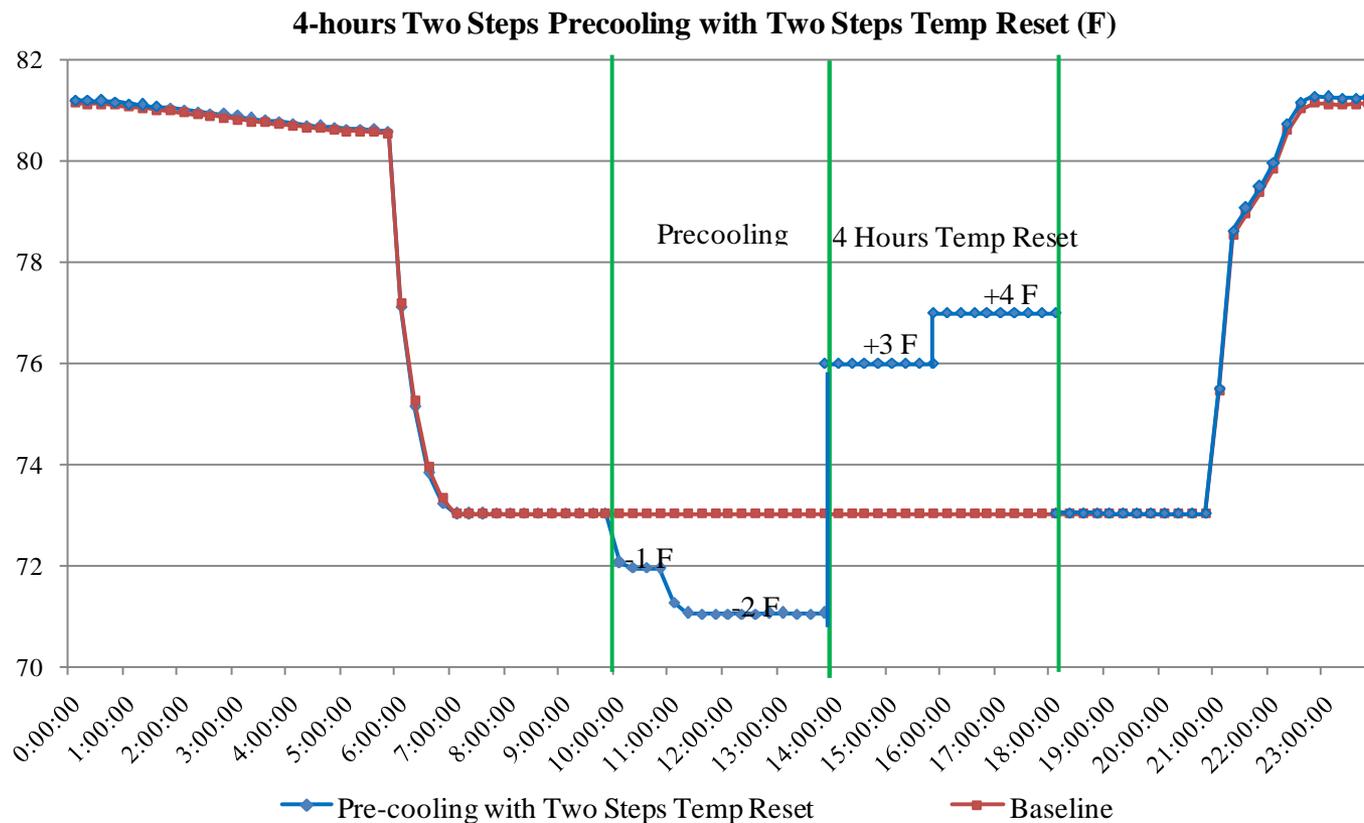
Proposed Demand Response Strategy

4-hours Two Steps Precooling with Exponential Temp Reset (F)



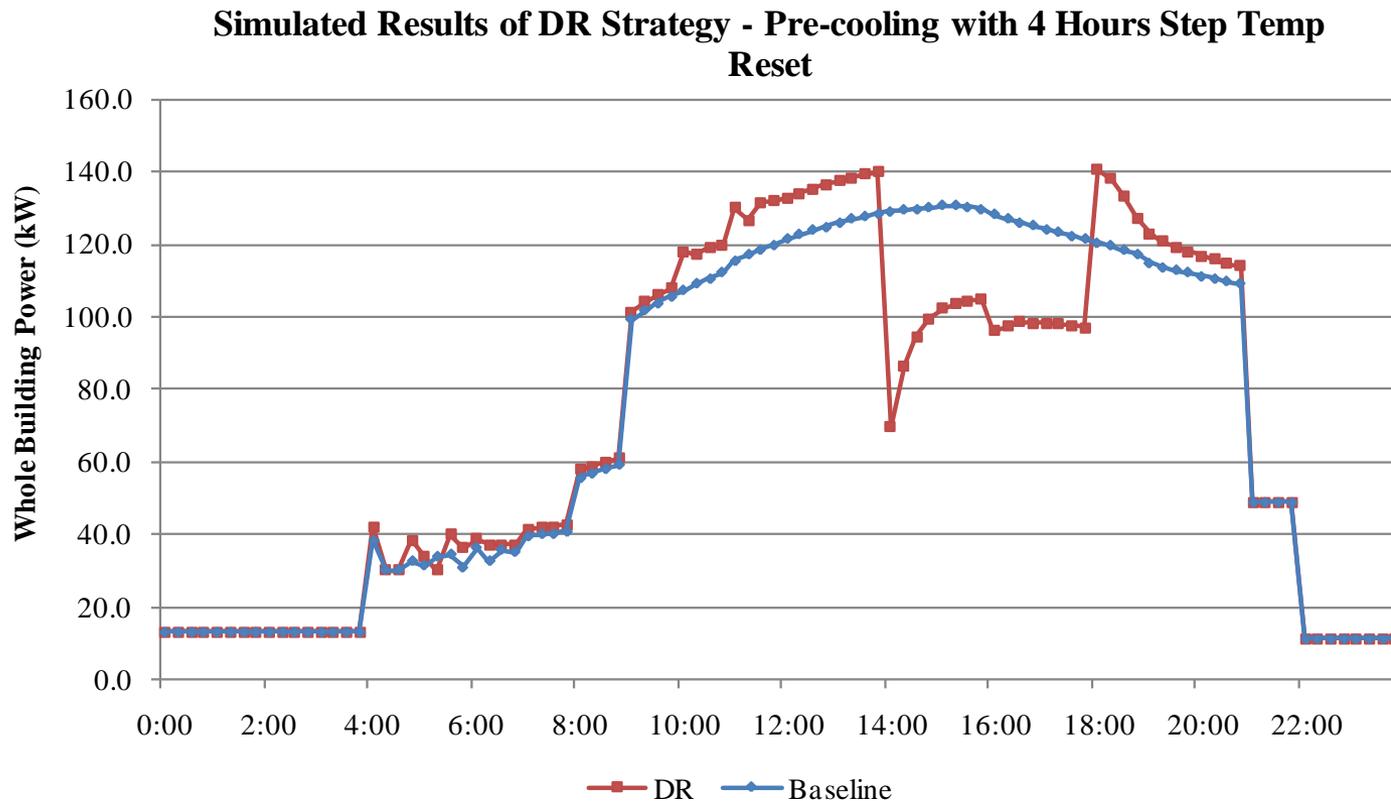
Implemented Demand Response Strategy

- In field study, could not adjust zone temp setpoint by preferred 0.1°F
- Manual Demand Response Control was used



Simulation Results

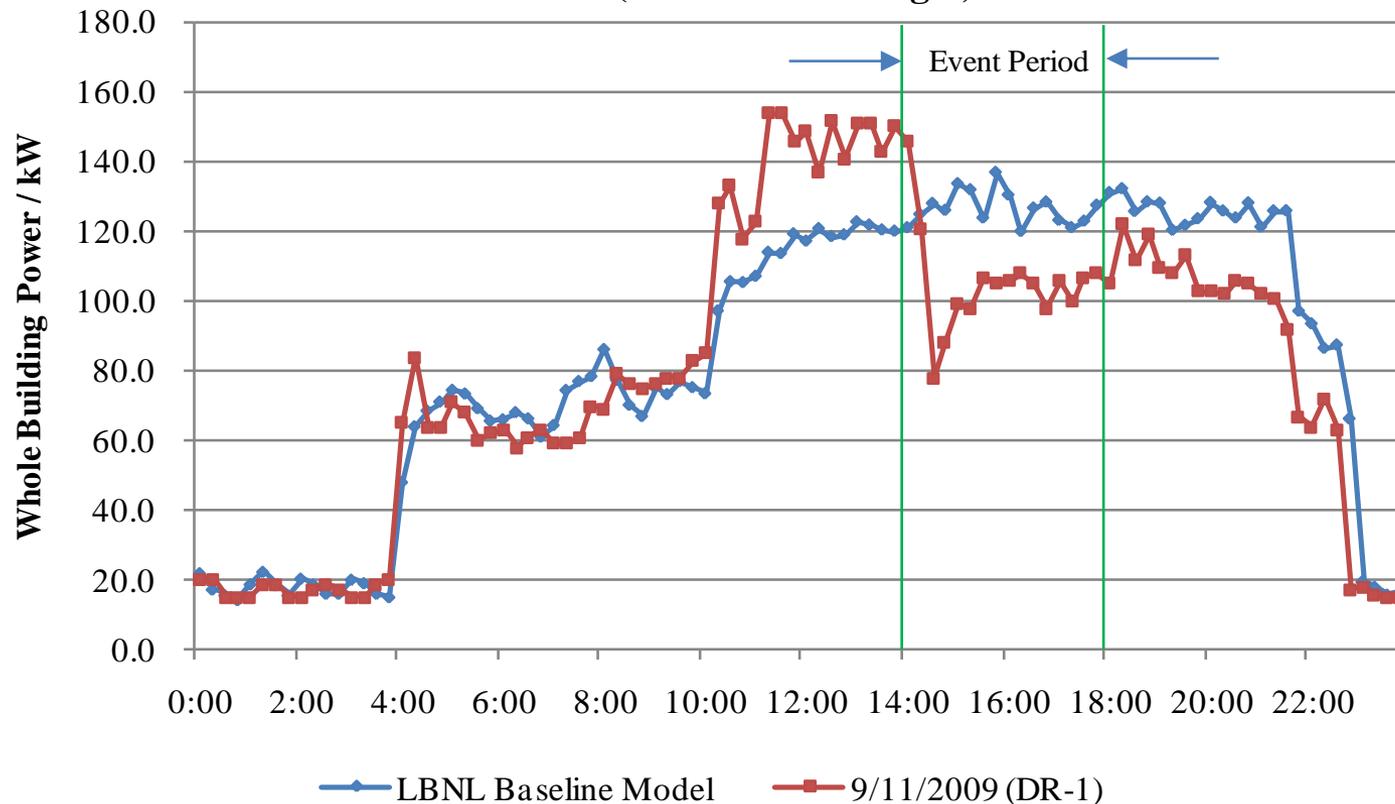
- Simulation Results of Whole Building Power for Implemented Demand Response Strategy



Field Test Results Analysis

Pre-cooling Test 1 – 9/11/2009

Pre-cooling and Demand Response Test at Cost Plus on 9/11/2009
(Max OAT: 90 deg F)



Conclusion

- Being able to predict the loads and sheds is key to DR participation
- Many factors effect prediction of single loads and sheds.
- Need for tools that assist in understanding loads and DR opportunities.
- Tools to incorporate increased need in storage on the grid.

