

To Call or Not to Call: When to Call Demand Response Events

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Agenda

- *Background and management challenges*
- *Key findings*
- *How many days?*
- *What are the criteria?*
- *Example processes*
- *Customer satisfaction and compensation*
- *Event days for pilot programs*
- *Actions to consider*

Background and Management Challenges

Calling Event Days can be Tricky

- DR events must be called on the “right” days to deliver maximum value to a utility
 - Target the system peak day and the next highest load days
 - These are most often the hottest summer days
- The challenge is to actually call events on those days
 - Decide how many days to call each season, and manage those days throughout the season
 - Develop criteria that maximize the probability of calling events on the target days
 - Establish a process for calling days that considers program goals, the number of days, and the criteria used.

Key Findings

Seven Program Managers Share their Experiences

Utility Demand Response Programs			
<i>Utility Name</i>	<i>Participants</i>	<i>Program Name</i>	<i>Program Type</i>
ComEd	60,000	Nature First	A/C Cycling
Georgia Power	43,000	Power Credit	A/C Cycling
Gulf Power	9,000	GoodCents Select	CPP
Idaho Power	100	Energy Watch	CPP
Nevada Power	55,000	Cool Share	A/C Cycling
Pacific Gas and Electric	50,000	Smart AC	A/C Cycling
Southern California Edison	NA	<i>Proposed Program</i>	PTR

Key Findings

The Big Picture

- Program commonalities
 - All seven programs call event days using an informal process that is judgment based and flexible.
 - In general program managers were concerned about the way that the total number and frequency of events impacts customer satisfaction and compensation.

- Program differences
 - The number of days allowed per program varied greatly, ranging from 10 to unlimited.
 - The Criteria used in each program ranged from very simple system reliability standards to more complex methods including soft and hard triggers.
 - A few programs use or are considering using direct load control to enhance a dynamic pricing program.

How many days?

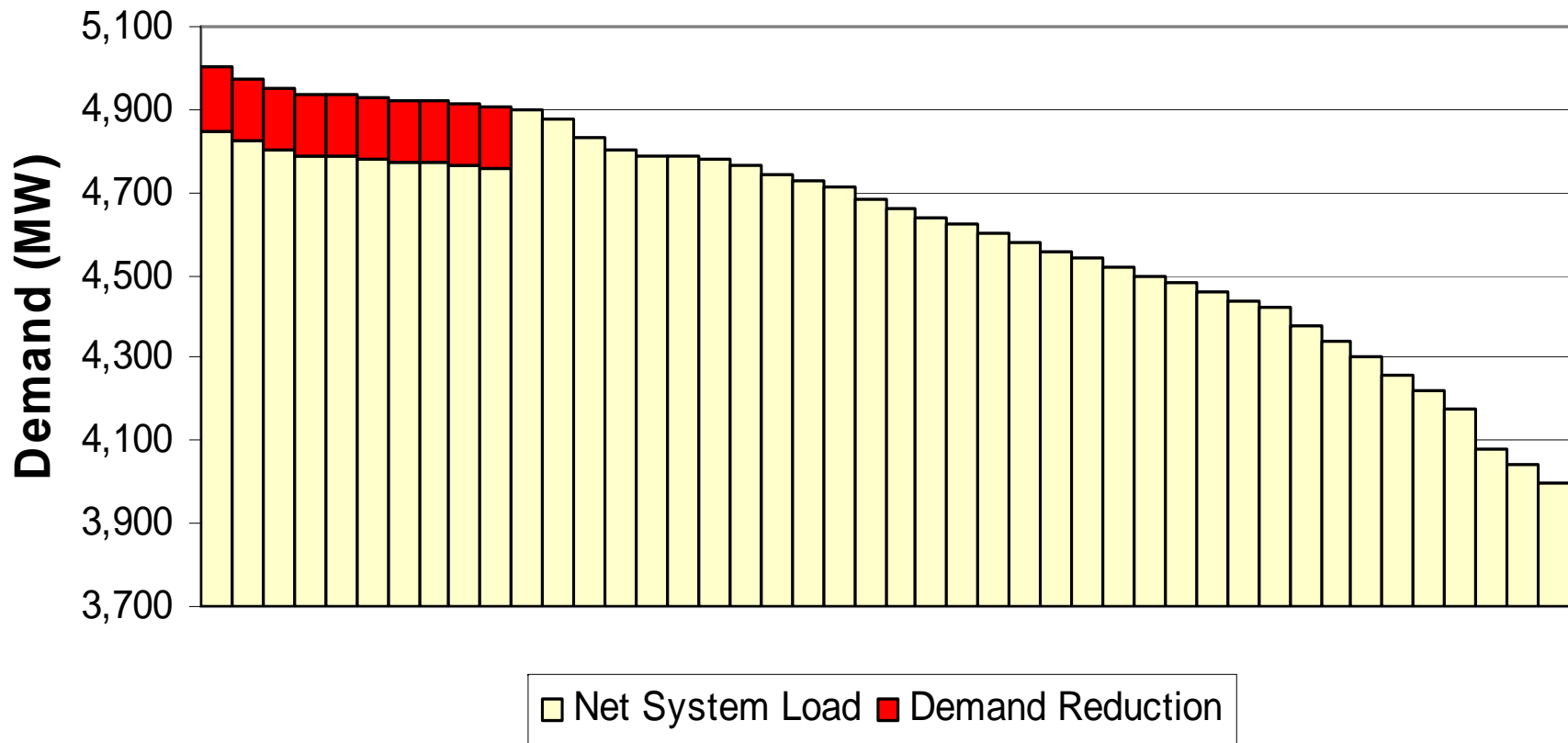
Allowed Events vs. Planned Events

- How many events should a utility plan on calling?
 - Program goals: reliability programs need fewer events while generation replacement will require more events.
 - Customer satisfaction: customers may not tolerate frequent events, or events called back to back.
 - Determining the number of events often relies heavily on judgment
- How many events will the program allow?
 - Limiting the number of event days or event hours requires careful management
 - An unlimited number of event days or hours provides flexibility but is not problem free.
- Additional considerations:
 - Weekend and holiday calls, duration, back-to-back calls

How many days?

Consider System Peak Load Variation

Sample Daily Peak Load Duration Curve



How many days?

Number Event Days Allowed by Program

Demand Response Program Event Day Details			
<i>Utility Name</i>	<i>Program Name</i>	<i>Program Type</i>	<i>Number of Hours Allowed</i>
ComEd	Nature First	A/C Cycling	20 days
Georgia Power	Power Credit	A/C Cycling	Unlimited
Gulf Power	GoodCents Select	CPP	87 hours, unlimited days
Idaho Power	Energy Watch	CPP	10 days
Nevada Power	Cool Share	A/C Cycling	Unlimited
Pacific Gas and Electric	Smart AC	A/C Cycling	100 hours, unlimited days
Southern California Edison	<i>Proposed Program</i>	PTR	Unlimited

What are the criteria?

Event Day Triggers and Notification

- Hard vs. Soft Triggers
 - A hard trigger is a criteria under which an event is *always* called.
 - A soft trigger is a criteria under which an event *may* be called.
 - A program may use a hard trigger, soft trigger or a combination of the two.

- 3 Types of Notification
 - No Notification is required if customers do not need to take action.
 - Day ahead notification is important if customer action is required.
 - Day of notification is the most sophisticated and requires real-time communication with the customer

What are the criteria?

Common Event Day Criteria

- System Conditions
 - Almost always a hard trigger
 - Regional or internal system operators determine if an event is called
- Wholesale Electricity Prices
 - High prices can be used as a soft trigger.
 - The procurement group has the ability to call an event rather than purchase power on the open market.
 - One utility is developing an economic dispatch algorithm that would include wholesale prices as a hard trigger.
- Weather Triggers
 - A temperature threshold can function as a soft or hard trigger.
 - The threshold is generally based on historical temperature data and the planned number of event days.

What are the criteria?

Types of Criteria Used by Program

Demand Response Program Criteria and Notification				
Utility Name	Program Name	Program Type	Criteria Used	Type of Notification
ComEd	Nature First	A/C Cycling	System reliability, wholesale prices	None
Georgia Power	Power Credit	A/C Cycling	System reliability, wholesale prices	None
Gulf Power	GoodCents Select	CPP	Temperature, real-time-price, system	Day-of
Idaho Power	Energy Watch	CPP	Temperature	Day-ahead
Nevada Power	Cool Share	A/C Cycling	Temperature	None
Pacific Gas and Electric	Smart AC	A/C Cycling	System reliability, wholesale prices	None
Southern California Edison	<i>Proposed Program</i>	PTR	Temperature, system load	Day-ahead

What are the criteria?

Example Processes

- Idaho Power: Day-ahead
 - Hard Trigger: system conditions. An event is called if system load approaches the most recent peak.
 - Soft Trigger: temperature threshold. Call events on days forecast to be in the 90s.
 - The process is informal, where a small group comes together to plan for each week's events.
- Gulf Power: Day-of
 - A PCT makes hour ahead calls possible
 - Hard Trigger: system conditions
 - Soft Triggers: temperature threshold (95°) and wholesale prices
- Pacific Gas and Electric: No Notification
 - Hard Trigger: California ISO stage two emergency.
 - Soft triggers: internal system conditions and wholesale prices.
 - The process is informal and flexible.

Customer satisfaction and compensation

Considerations for Number of Events

- Annual and One-time credits
 - From the customer's point of view, the fewer events called the better
 - Even though many programs with annual payment allow 10 or more events, most programs only call one or two events per year.
- Pay per event
 - If compensation is tied to the number of events it is more important to call the planned number of events
- Dynamic Price
 - CPP programs compensate customers indirectly through discounted non-event hours
 - PTR programs pay for reduction directly, however there is concern about revenue loss associated with PTR programs

Customer satisfaction and compensation

Compensation by Program

Demand Response Program Customer Compensation			
Utility Name	Program Name	Program Type	Compensation Provided
ComEd	Nature First	A/C Cycling	\$20-\$40 annual credit
Georgia Power	Power Credit	A/C Cycling	\$2 per event
Gulf Power	GoodCents Select	CPP	Dynamic price
Idaho Power	Energy Watch	CPP	Dynamic price
Nevada Power	Cool Share	A/C Cycling	\$1 per event
Pacific Gas and Electric	Smart AC	A/C Cycling	\$20 one-time credit
Southern California Edison	<i>Proposed Program</i>	PTR	Dynamic price

Event days for pilot programs

Pilot Programs are Different

- Pilot programs and fully deployed programs have different goals. A pilot is designed to answer specific research questions and measure customer response.
 - Test customer response on various day types
 - Test the sustainability of response over sequential days
 - Test the duration of response over different time periods
- The criteria for a pilot program may not be rigorously developed therefore program criteria should be carefully considered before full deployment.

Actions to consider

Considerations for Program Design

- Number of events
 - A limited number of event hours rather than a limited number of event days can increase flexibility.
 - Consider the variance of the daily system peak to add concrete information when deciding the number of events to call.
- Event day Criteria
 - Include event day criteria as part of the planning for demand response program implementation.
 - Develop criteria carefully to help ensure that events are called on the highest load days.
- Customer Compensation
 - Consider compensating customers participating in direct load control programs on a per event basis to tie the costs of the program more directly to benefits.

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