

# Targeted Demand-Side Management for T&D Deferral

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September 2013

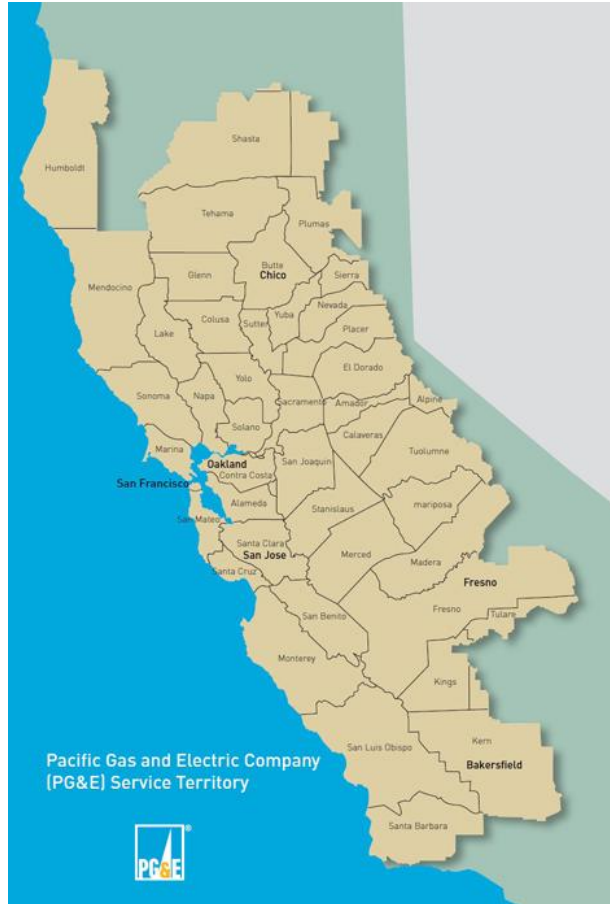
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**Customer Energy Solutions**  
**Pacific Gas and Electric Company**

# Agenda

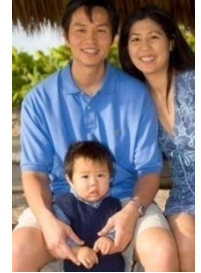
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- Company Overview
- Historical Perspective and Context
- Opportunity and Selection Criteria
- Tools
- Early Success
- Next Steps

# Company Overview



- Energy services to 15M people
  - 5.1M Electric customer accounts
  - 4.3M Natural Gas accounts
- 70,000 square miles with diverse topography and climate zones
- 20,000 employees
- A regulated investor-owned utility



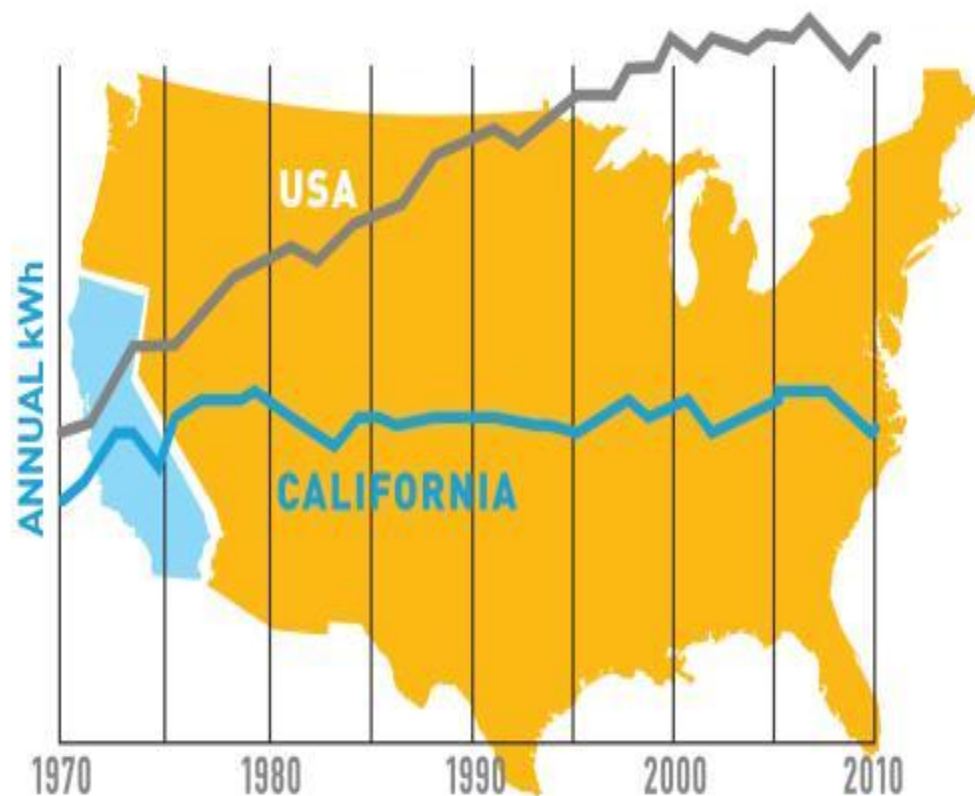
# Why Energy Efficiency Matters for California

## SAVING

This “flat” consumption has saved California **over \$56 billion**



helped the state avoid building at least **30 standard natural gas-burning power plants.**



# PG&E Example: Sustainable San Francisco

## Overview

- PG&E made commitment to SF to target DSM efforts to help offset Potrero Hill Power Plant shutdown
- Project ran for four years (2008-2011)
- Resulted in ~47 MW of demand reduction
- Also included substation upgrades and TransBay cable



## Lessons Learned

- PG&E needed capability to quickly understand usage, location, and potential savings
- Offering additional incentives to spur DSM investment wasn't feasible due to cost-effectiveness constraints, as the current calculator estimates benefits on a system level

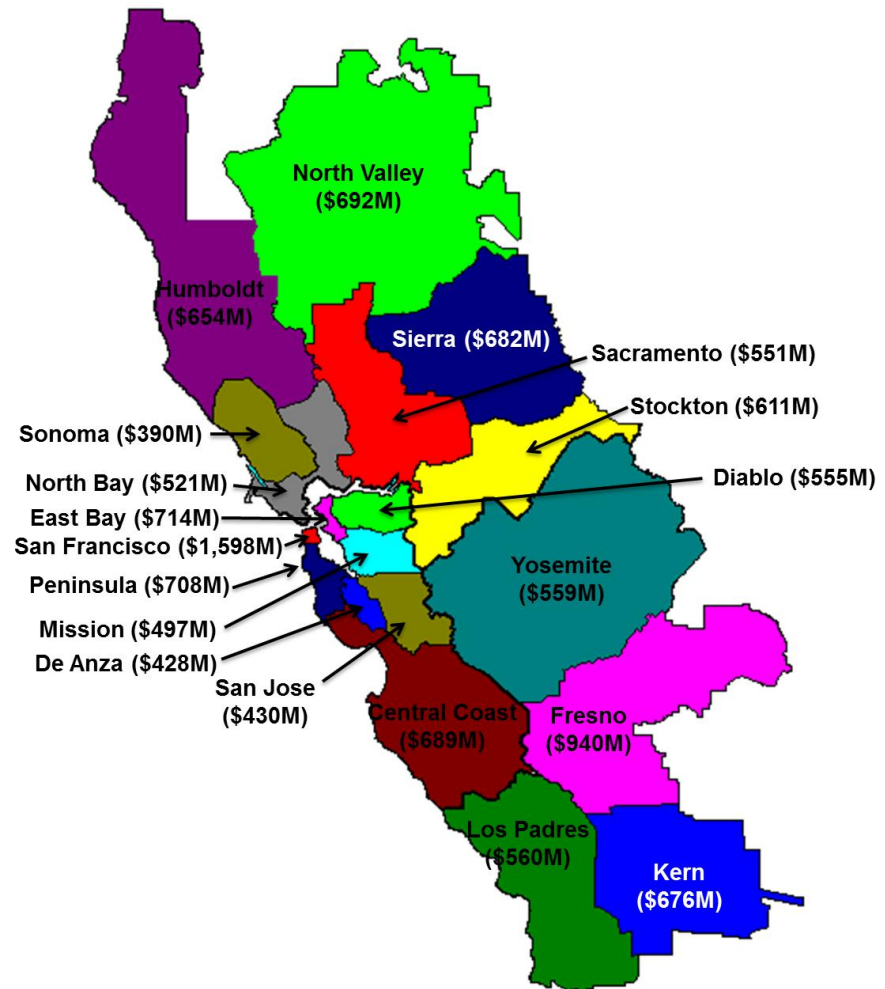
# Benchmarking

Other utilities' experiences demonstrate the feasibility of using cost-effective EE/DR to defer T&D investments.

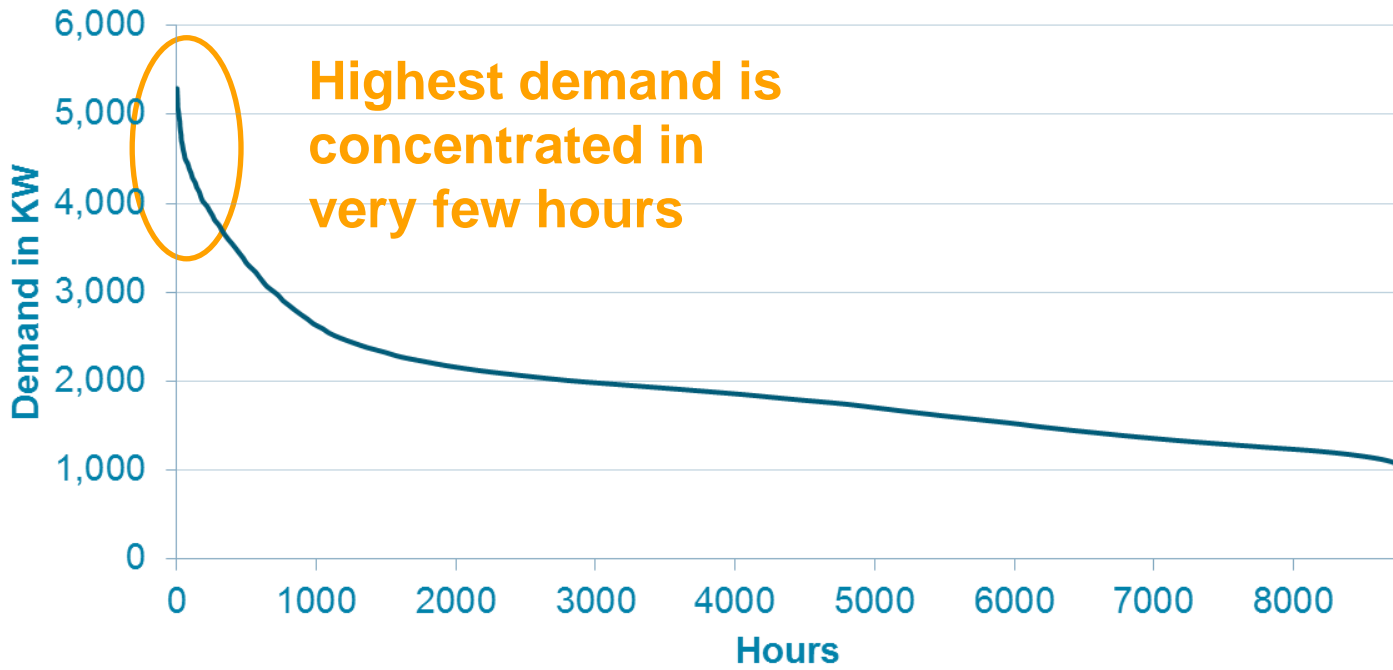
- Southern California Edison
  - To mitigate system reliability issues due to the continued SONGS outage, SCE has proposed measures to achieve EE & DR in constrained areas.
  - Has \$2.6M CircuitSaver program to use AC cycling for distribution deferral.
  
- Con Edison
  - Routinely assesses whether targeted EE could cost effectively defer investments in its distribution system.
  - From 2003-2010, Con Edison has saved over \$75 million when comparing the cost of targeted DSM to the avoided T&D costs.
    - Contracts with ESCOs to deliver targeted demand reductions.
  
- Efficiency Vermont
  - In 2007-2009, Vermont's "geo-targeting" strategy of targeted EE contributed to avoiding the need for system upgrades in three regions of the state.

# Opportunity

- Utilities are in the unique position to capture significant financial value by integrating EE/DR with T&D planning and operations
- PG&E plans to spend \$12.5B on T&D capital investments from 2012-2016
  - \$2.8B dedicated to T&D capacity expansions
  - Nearly \$900M/year planned for distribution capacity expansions



# Hourly Demand on Circuit



% of Max Demand	Demand Threshold in KW	Hours	Time of Day	Days
Max Demand	5,292	1	5 PM	1
5%	5,027	11	3 to 6 PM	5
10%	4,762	20	2 to 7 PM	9
15%	4,498	60	2 to 8 PM	21
20%	4,233	131	1 to 8 PM	33

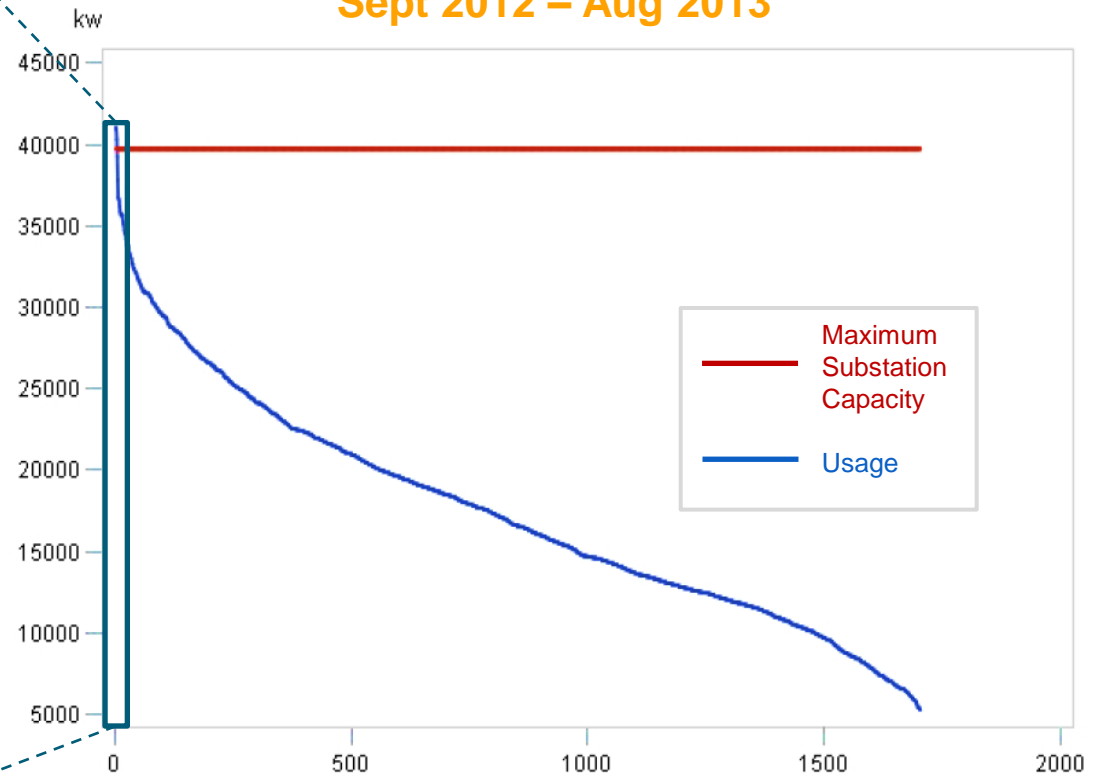


# Targeted Customer Selection Process Example

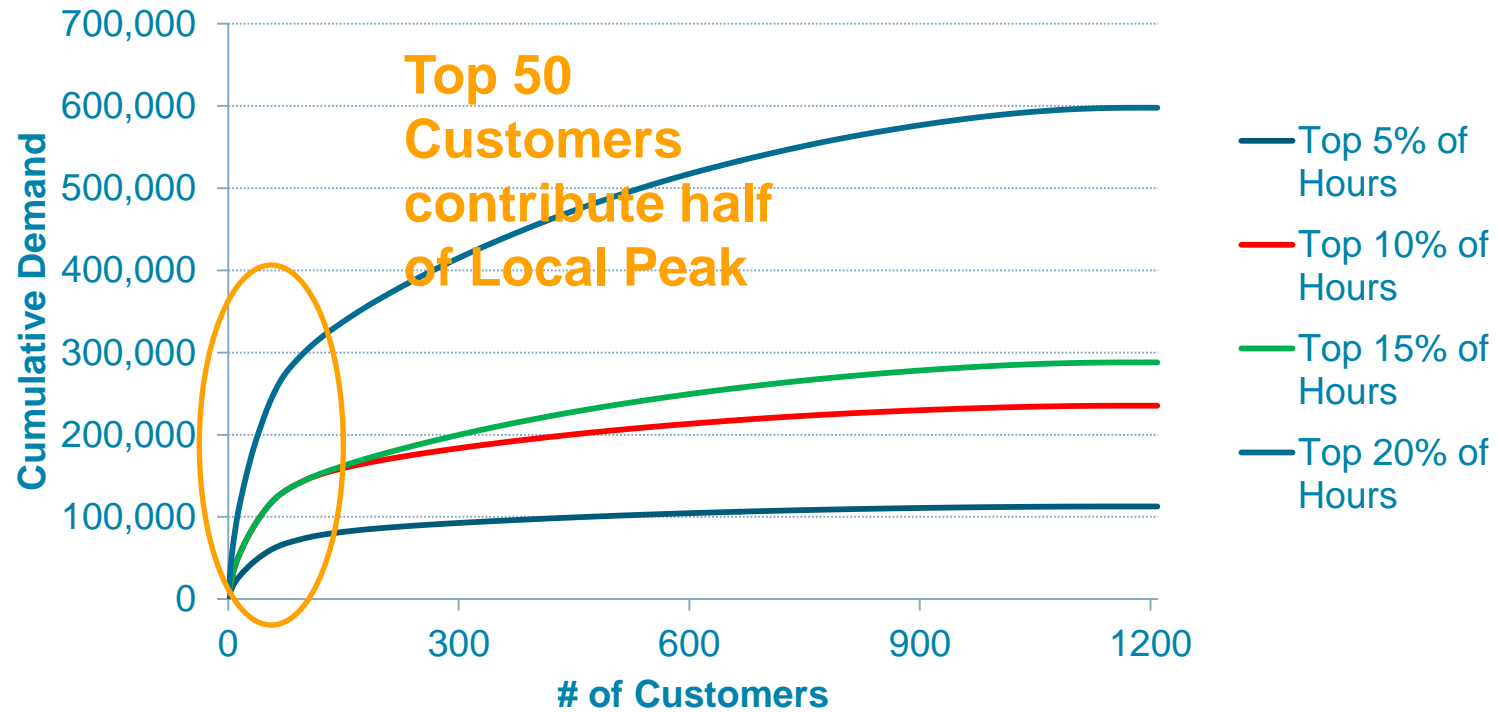
## Top 15 Customers in Order of Contribution to Peak Load

Customer	%
Food Processing	10.26%
Food Processing	3.19%
Manufacturing	3.06%
Retail	2.00%
Retail	1.57%
Manufacturing	1.30%
Retail	1.12%
Automotive	0.82%
Food Processing	0.80%
Manufacturing	0.55%
Retail	0.52%
Retail	0.48%
Retail	0.47%
Hospitality	0.42%
Food Processing	0.35%

## Substation MW intervals Sept 2012 – Aug 2013



# Cumulative Demand



% of Max Demand	Hours	Contribution of Top 50 Customers
5%	11	50%
10%	20	47%
15%	60	39%
20%	131	39%

# Targeted DSM – Project Selection Criteria

- Projects needed to address localized forecasted overloads
- Relatively small overloads (~ 1 MW)
- Overload must be near end of 5-year planning cycle
- Several large customers on the affected feeders & banks
- Availability of SCADA data
- Want minimum 5 years of deferral
- Ratio of potential savings to overload >200%

# Targeted DSM Project List

Substation	Top 50 Load (MW)	Realistic Potential (MW)	Normal Deficiency (MW)	Potential-to-Deficiency Ratio (%)	SCADA Data Availability	Good Candidate?
Highway	3.05	0.46	0.9	51%	Banks	No
<b>Martell</b>	<b>5.88</b>	<b>0.88</b>	<b>0.4</b>	<b>220%</b>	<b>Banks &amp; Feeders</b>	<b>Yes</b>
Rincon	5.35	0.80	2	40%	Banks & Feeders	No
Eureka	6.43	0.96	0.8	120%	No SCADA	No
<b>Manteca</b>	<b>19.23</b>	<b>2.88</b>	<b>1.2</b>	<b>240%</b>	<b>Banks &amp; Feeders</b>	<b>Yes</b>
Point Arena	0.72	0.11	0.5	22%	EI Data – Banks & Feeders	No
<b>Bogue</b>	<b>13.31</b>	<b>2.00</b>	<b>0.3</b>	<b>666%</b>	<b>Banks</b>	<b>Yes</b>
Menlo	1.28	0.19	0.2	96%	Banks & Feeders	No
Beresford	4.07	0.61	0.1	611%	No SCADA	No
Mendocino	1.93	0.29	0.2	145%	Bank 2	No
Clear Lake	4.34	0.65	0.3	217%	No SCADA	No

# Targeted DSM - Top 5 Peak Loads for Bogue Banks

- The peak loads on both Bogue banks coincide nicely.
- The coincidence of peak loads between the banks indicates an external factor such as temperature is the driver of peak load on Bogue.

Bank 1			Bank 2		
<i>Date</i>	<i>Time</i>	<i>MW</i>	<i>Date</i>	<i>Time</i>	<i>MW</i>
8/13/12	5:48 p.m.	35.6	8/13/12	5:51 p.m.	29.6
7/12/12	5:33 p.m.	34.2	7/12/12	5:40 p.m.	27.7
7/22/12	6:07 p.m.	32.7	7/22/12	5:52 p.m.	27.6
9/9/11	4:39 p.m.	31.8	9/9/11	4:41 p.m.	26.0
7/31/12	5:50 p.m.	31.8	8/2/12	5:22 p.m.	25.7

# Analysis & Reporting Tool (ART)

## Segment Customers by Size and Sector

### Customer Segments

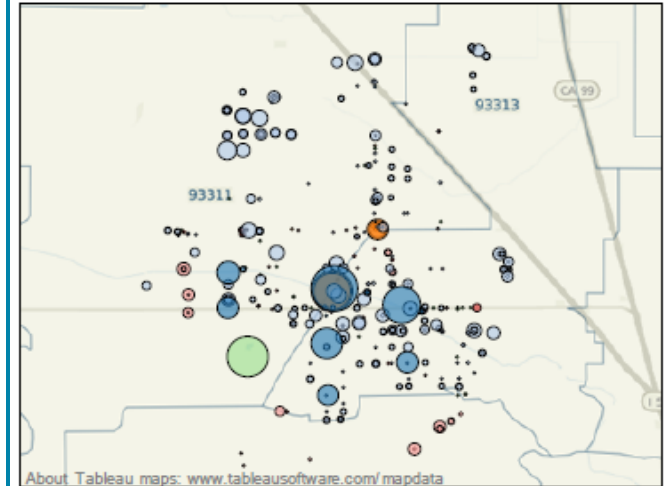
Select to highlight customer location.

		<200 kW	>200 kW
 Agricultural Manuf. & Transportation	Agricultural Manuf. & Tra..	7	7
 Agriculture	Agriculture	207	13
 Food Processing	Food Processing	2	3
 Manufacturing & Transportation	Petroleum	22	
 Petroleum	Manufacturing & Transp..	21	1
 Offices	Offices	12	
 High Tech	Uncategorized	17	
 Uncategorized	High Tech	6	
 Government	Government	11	
 Wastewater & Water Treatment	Wastewater & Water Tre..	1	
 Unallocated	Unallocated	2	
 Retail	Retail	1	



## Map Customer Locations/Sizes

Customer Locations  
size = Annual Average billed demand ( kW )  
Color = facility's segment



Target Customers



## Identify Who Has Participated

Who has participated in EE?  
What have they done?

Total MW Savings (EEProjects)	
2006, 2007, 2008, 2009	0.3693
2010, 2011, 2012	0.7220
<b>Grand Total</b>	<b>1.0913</b>

Feeder(s) Non-Res Customers with MW Savings since 2006

CUSTOMER NAME	YEAR							Grand Total
	2006	2007	2008	2009	2010	2011	2012	
Customer 1					0.15	0.19	0.03	0.36
Customer 2			0.05		0.07	0.23		0.35
Customer 3	0.00	0.19				0.04		0.23



# June 7, 2013: Use of DR for Distribution Operations

## Description:

On Friday morning, the Livermore substation in the East Bay experienced an un-scheduled outage. Throughout the day, due to high temperatures, the demand on the Livermore circuit was very high. Late Friday afternoon, Distribution Operations became concerned about overloading on the Livermore circuit and convened a conference call with Area 2 ES&S Representatives for a potential DR event (SmartAC Program and possibly AMP or BIP).

During the scheduled conference call, Distribution Operations requested the assistance from Demand Response by issuing a SmartAC event.

## Chronology of Events:

### *June 7<sup>th</sup>, 2013 (Friday)*

**5:57PM** – ES&S requests a conference call for potential curtailment for Livermore area; Calendar invite sent to DR Programs and DR Operations.

Invitees included: Distribution Operations, Government Relations, ES&S, DR Programs, and DR Operations.

**6:00PM** – DR Programs contacts DR Operations Program Manager to join the conference call to discuss the potential demand resource for the SmartAC Program.

**6:05PM** – DR Programs and DR Operations joins the conference call. Communicates the following information on the conference call:

- SmartAC customers on the Livermore circuit (336 residential customers).
- Potential load reduction on the Livermore circuit (~250-280KW).
- SmartRate Program event will end at 7:00pm and customers' usage may ramp-up.
- SmartAC Program must be called for the PGEB (East Bay) sub-lap to achieve load reduction at the Livermore substation.
- SmartAC Program needs a 15-minute lead time to schedule the event.
- SmartAC Program can operate for 6 hours per day as defined in the tariff.
- Identified available BIP load reduction on adjacent circuits.

\*\*Note: SF Dispatch Center was NOT on the conference call.

**6:50PM** – Decision made by Distribution Operations to utilize SmartAC as a demand response resource from 7:00pm – 10:00pm

**6:51PM** – DR Operations sends an email to SF Dispatch Center to schedule the SmartAC event for the PGEB (East Bay) sub-lap.

**6:56PM** – DR Operations schedules SmartAC event due to the urgency of the requested demand response resource.

**7:06PM** – DR Programs sends an email to PG&E CCO that a SmartAC event has been issued due to substation constraints at the Livermore substation.

**7:18PM** – SF Dispatch Center calls DR Operations confirming if the event has been scheduled and that no action is required by the SF System Dispatcher.

Note: A possible event was also discussed for June 8 for Bakersfield area, but it was decided that it was not needed .

# Use of DR for Distribution Operations

## Chronology of Events: June 7, 2013

Time	Events
5:57PM	Energy Solutions & Service (ES&S) requests a conference call for potential curtailment for Livermore area; Calendar invite sent to DR Programs and DR Operations. Invitees included: Distribution Operations, Government Relations, ES&S, DR Programs, and DR Operations.
6:00PM	DR Programs contacts DR Operations Program Manager to join the conference call to discuss the potential demand resource for the SmartAC Program.
6:05PM	DR Programs and DR Operations joins the conference call. Communicates the following information on the conference call:
<b>6:50PM</b>	<b>Decision made by Distribution Operations to utilize SmartAC as a demand response resource from 7:00pm – 10:00pm</b>
6:51PM	DR Operations sends an email to SF Dispatch Center to schedule the SmartAC event for the PGEB (East Bay) sub-lap.
6:56PM	DR Operations schedules SmartAC event due to the urgency of the requested demand response resource
7:06PM	DR Programs sends an email to PG&E Customer Care Operations that a SmartAC event has been issued due to substation constraints at the Livermore substation.
7:18PM	SF Dispatch Center calls DR Operations confirming if the event has been scheduled and that no action is required by the SF System Dispatcher.



# Project Update – Fall 2013

## Key Workstreams

- Identify full-time DSM resource to co-lead a working team with T&D
- Executive oversight by VPs of both DSM and T&D organizations
- Coordinated outreach to targeted substations will begin in fall 2013
  - Final list of up to 7 targeted substations to be developed by October 1
  - Detailed outreach strategies to large non-res customers on targeted subs are being prepared through coordination between PG&E Sales, Engineering, Products/Programs teams
  - Customer Services to coordinate Smart AC outreach to residential customers on targeted subs
  - Premium peak demand reduction incentives levels approved for customized projects on targeted subs (\$250/kw vs. standard incentive of \$100/kw)
  - Premium incentives being considered for other offerings as well (deemed rebates, DR programs, etc.)

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# Thank You!

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