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The Role of the Smart Utility

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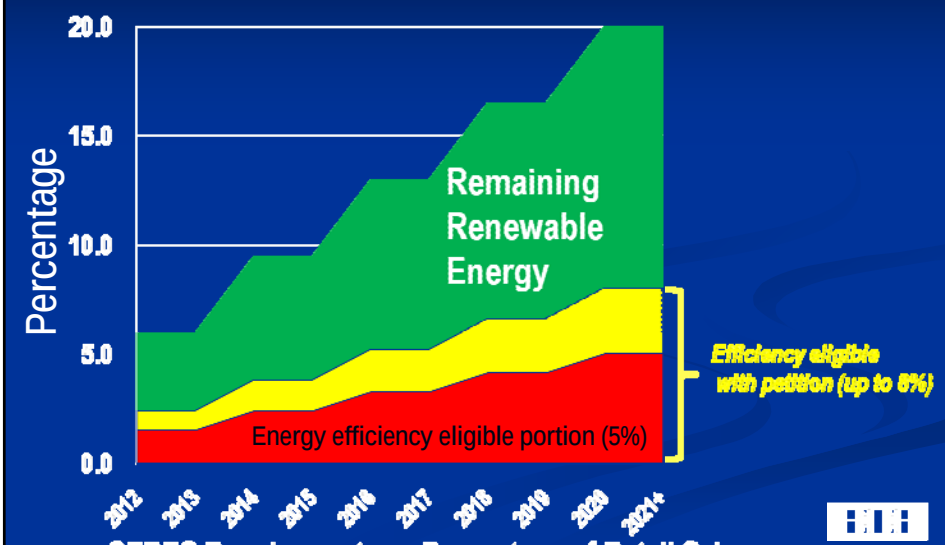
The Enhanced Role for Renewables

Waxman-Markey Combined Efficiency and Renewable Energy Standard

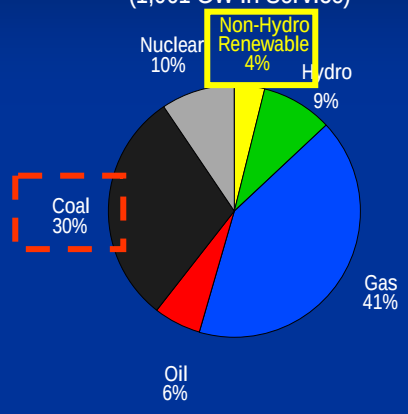


CERES Requirements as Percentage of Retail Sales

Planned Capacity Additions Reflect State RPS Requirements

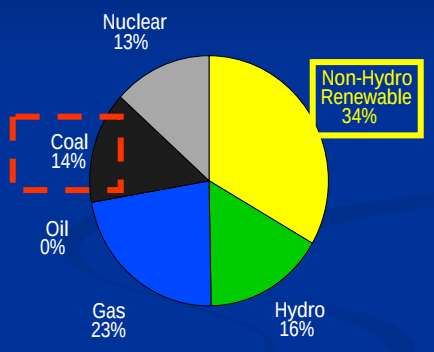
US Generation Capacity in 2008

(1,061 GW in Service)



Planned Capacity Additions to 2020

(352 GW)

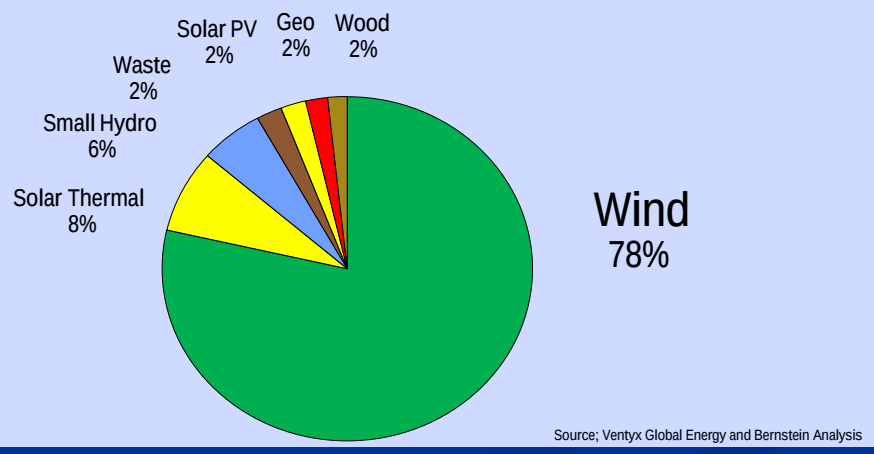


Source; Ventyx Global Energy and Bernstein Analysis

Non-hydro renewables make up 4% of US capacity today but 34% of planned capacity additions through 2020.

Source: Bernstein Research

Wind Dominates Proposed Renewable Capacity Additions Thru 2020



Source; Ventyx Global Energy and Bernstein Analysis

- Wind is 78% of planned renewable additions, solar thermal 8%, solar photovoltaic 2%
- Wind's off-peak capacity limits usefulness on power grids

Integrating Renewables *Operational Challenges*

- Higher RPS levels can create significant surplus energy
  - Has created excess energy at night
- Requires more system backup to maintain reliability
  - Quick start and fast ramping technologies (peaking / storage) to manage generation variability and maintain reliability when wind falls off or clouds appear
- Smart grid can help mitigate some of these problems
  - Energy storage / off-peak electric vehicle charging can mitigate problem
  - Smart grid will help enable these new technologies

What Will Be Role of Utilities?

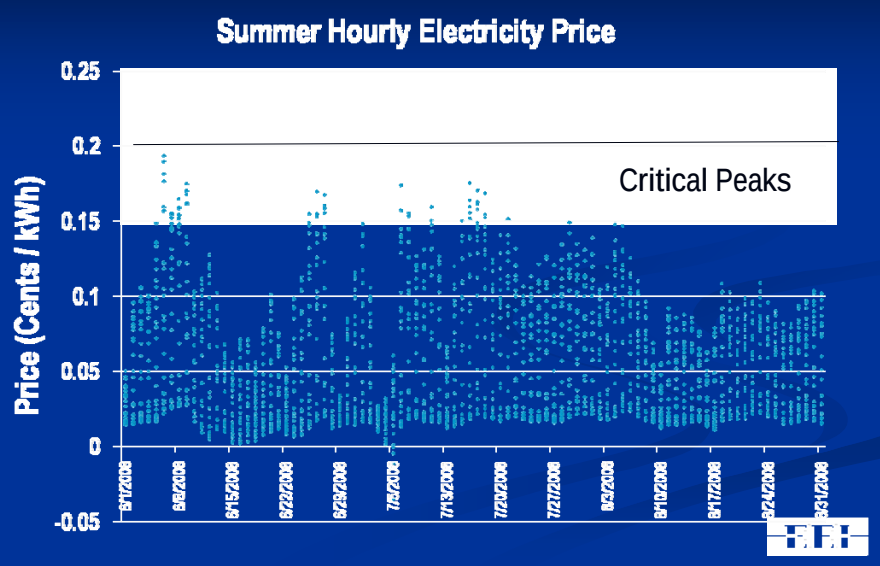
Multiple Revenue Streams

- Installed smart devices can do multiple tasks
  - Aggregate demand response to reduce wholesale market peaks and prices
  - Provide consumers with information and tools to optimize energy usage
  - Relieve congestion at transmission and distribution level
  - Avoid or defer G, T & D infrastructure investments
  - Optimize use of existing resources
  - Coordinate integration of new renewables and storage devices
  - Improve customer, distribution and grid reliability

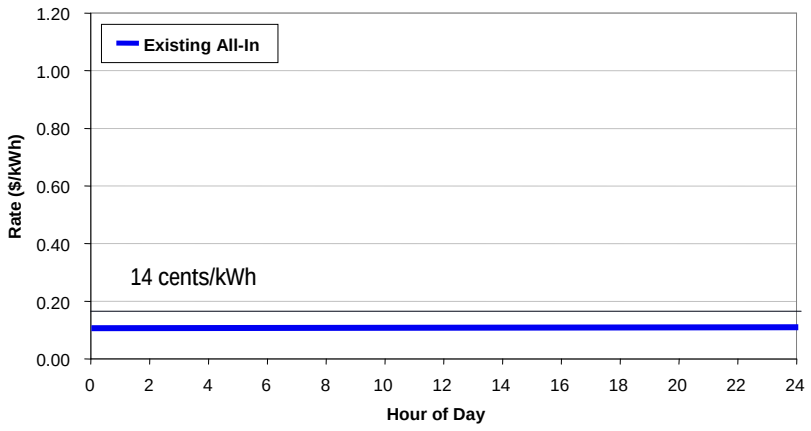
Utilities are uniquely positioned to *optimize* the new smart grid and *maximize* the benefits from smart grid investments

How Does It Add Value For Consumers and Utilities?

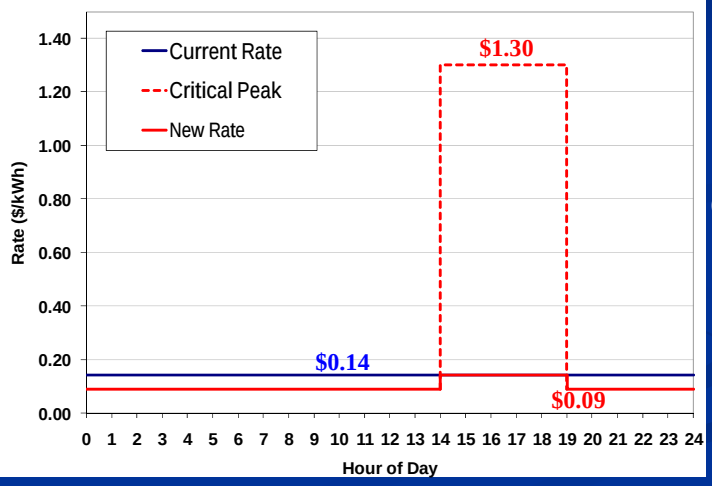
How Smart Grid and Smart Rates Can Help



Flat Residential Rate



Dynamic Peak Pricing: Weekdays (excluding Holidays)

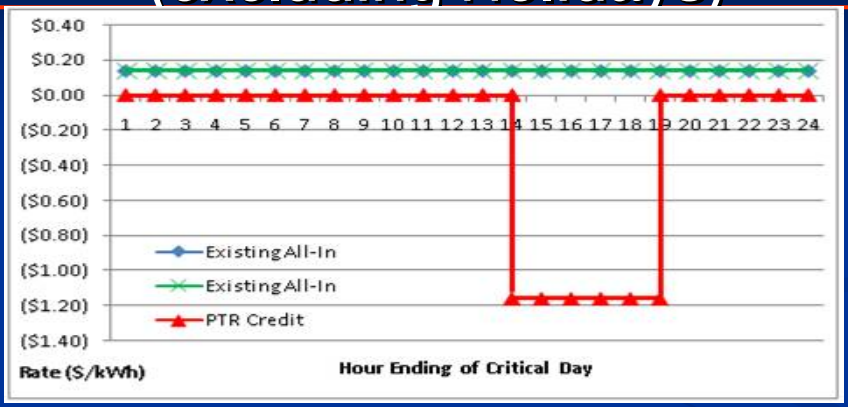


Pilot Pricing
All – in Rate*

Critical	$1.30425
Peak	$0.14425
Off-Peak	$0.09425

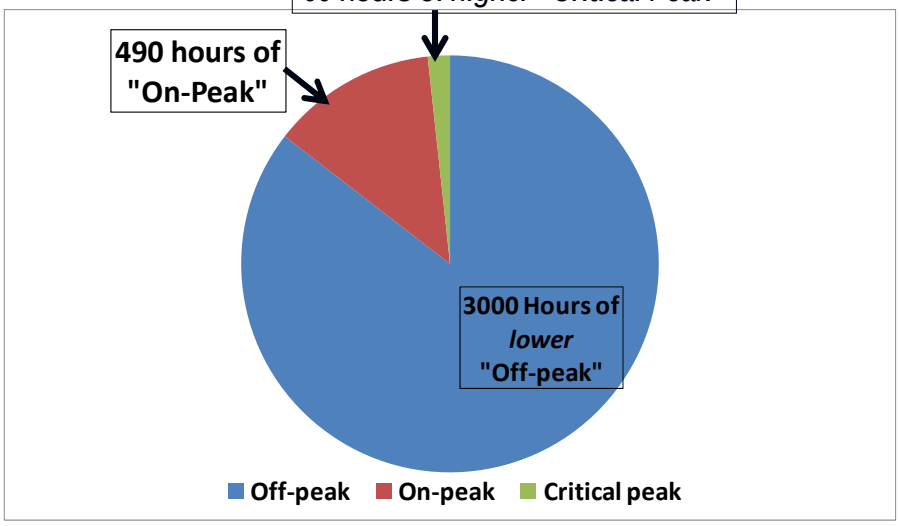
Includes generation, transmission and delivery

Peak Time Rebate: Weekdays (excluding Holidays)

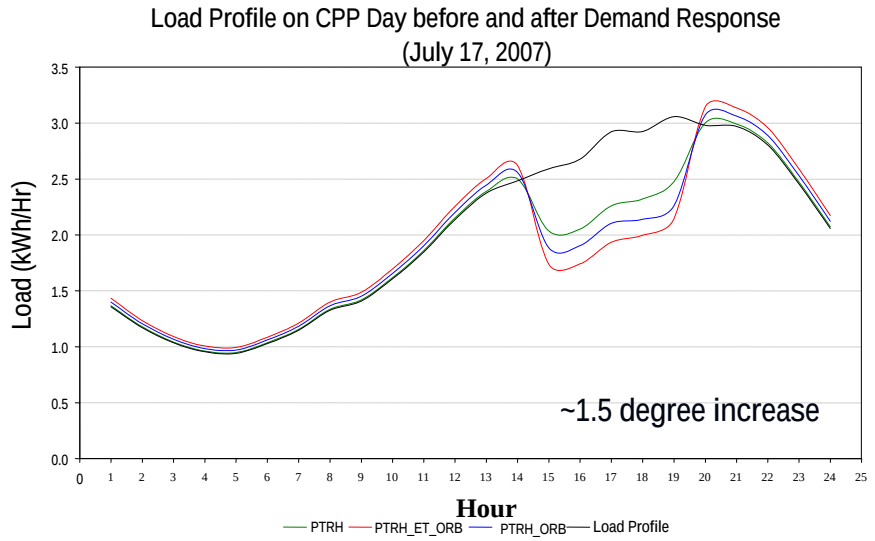


- Schedule R summer rates are $0.14 / kWh for all summer hours
- Up to 12 critical peak days will be called by 6 p.m. the prior day
- Customers who use less during the critical period (2 – 7 p.m.) on any critical peak day will receive a rebate. Two levels being tested:
  - $1.75/kWh and $1.16/kWh

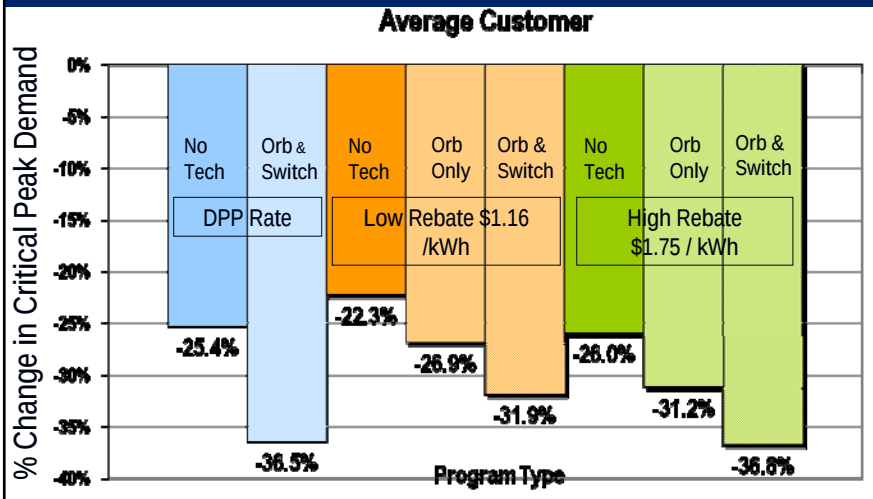
Hours in Each Summer Pricing Period



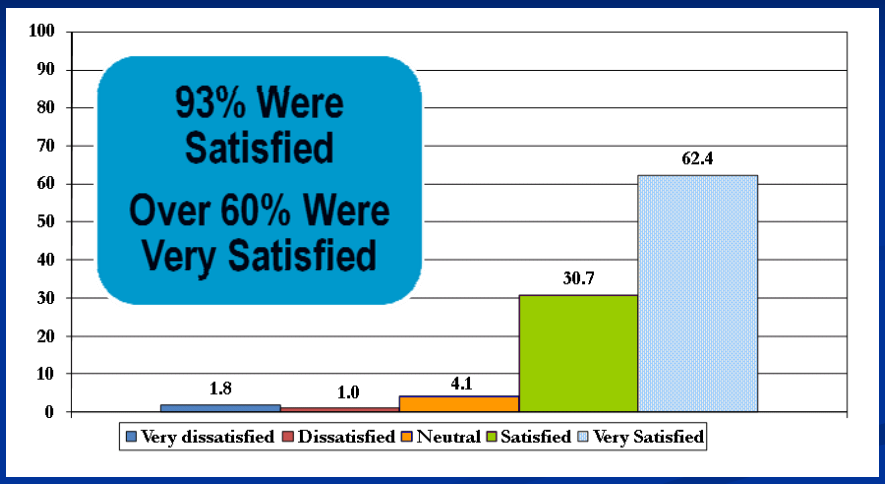
Actual Load Shapes for Participants and Control Group during Critical Peak Event



Summer 2008 Pilot Smart Energy Pricing - Peak Demand Reductions *

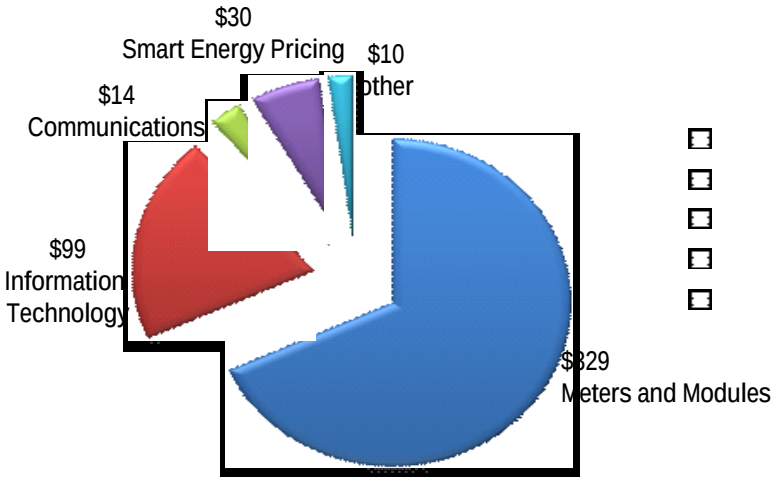


Customers Were Satisfied with Smart Energy Pricing!

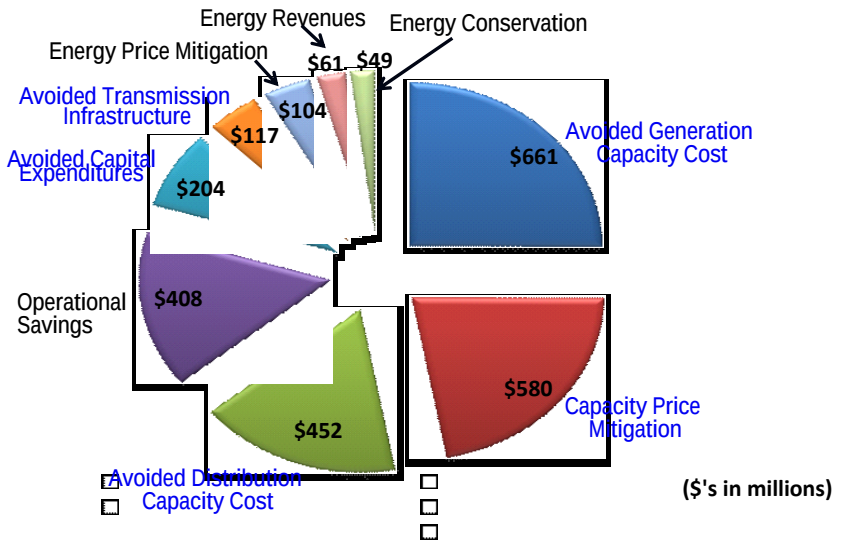


On a scale of 1 to 5, where 1 is "Very Dissatisfied" and 5 is "Very Satisfied", please rate your overall satisfaction with the pilot program. (77% response rate)

Estimated BG&E Deployment Costs $ 482 Million (2009-14)



Customer Savings Greatest Benefit
Projected Life-cycle Saving >$2.6 B



OPTIMIZE the electric system for benefit of all consumers

MAXIMIZE the benefits from all the new technology investments