



Enabling The 21st Century Utility

**Nexus Energy Software Client Conference
March 28, 2007**

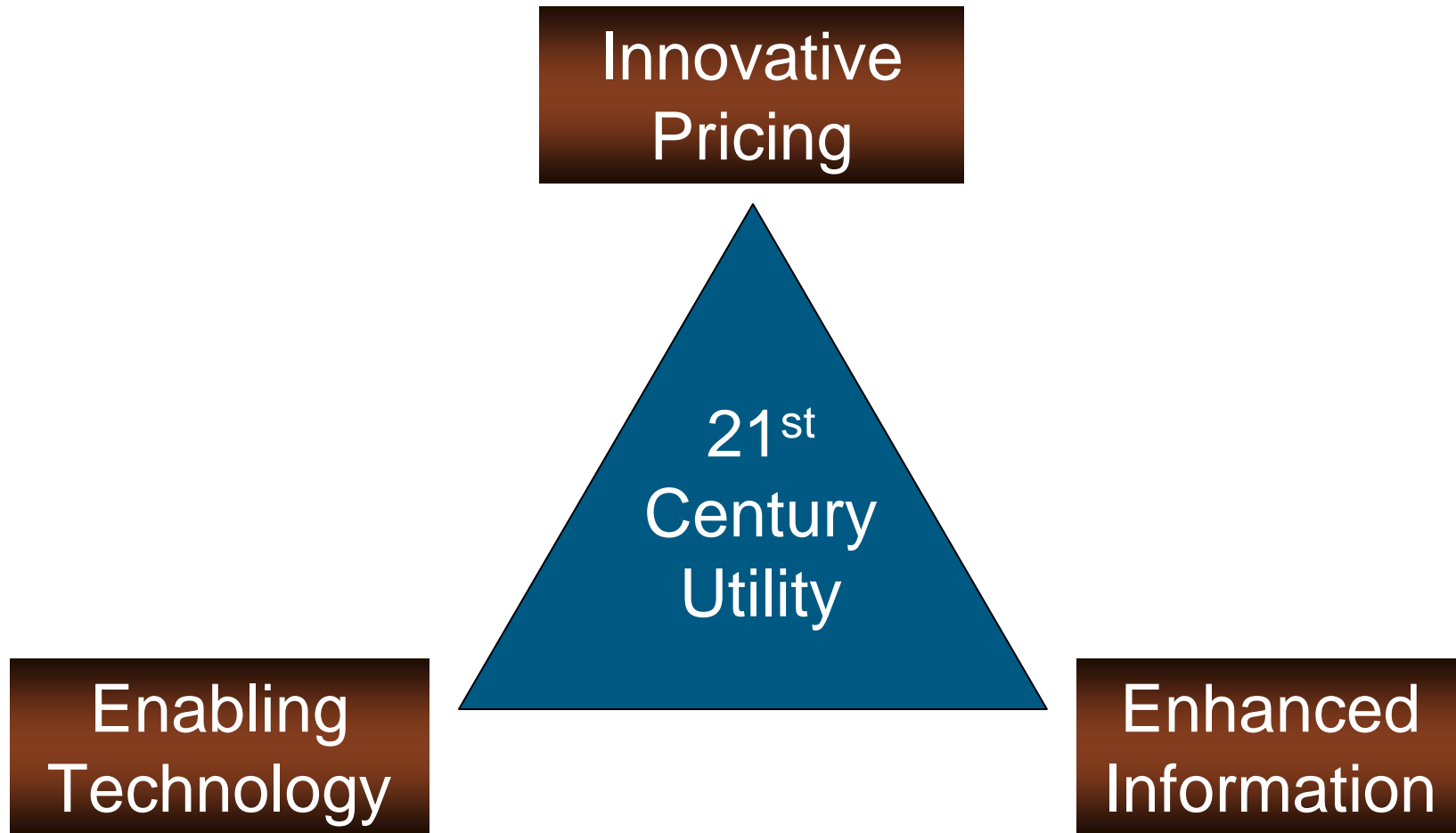
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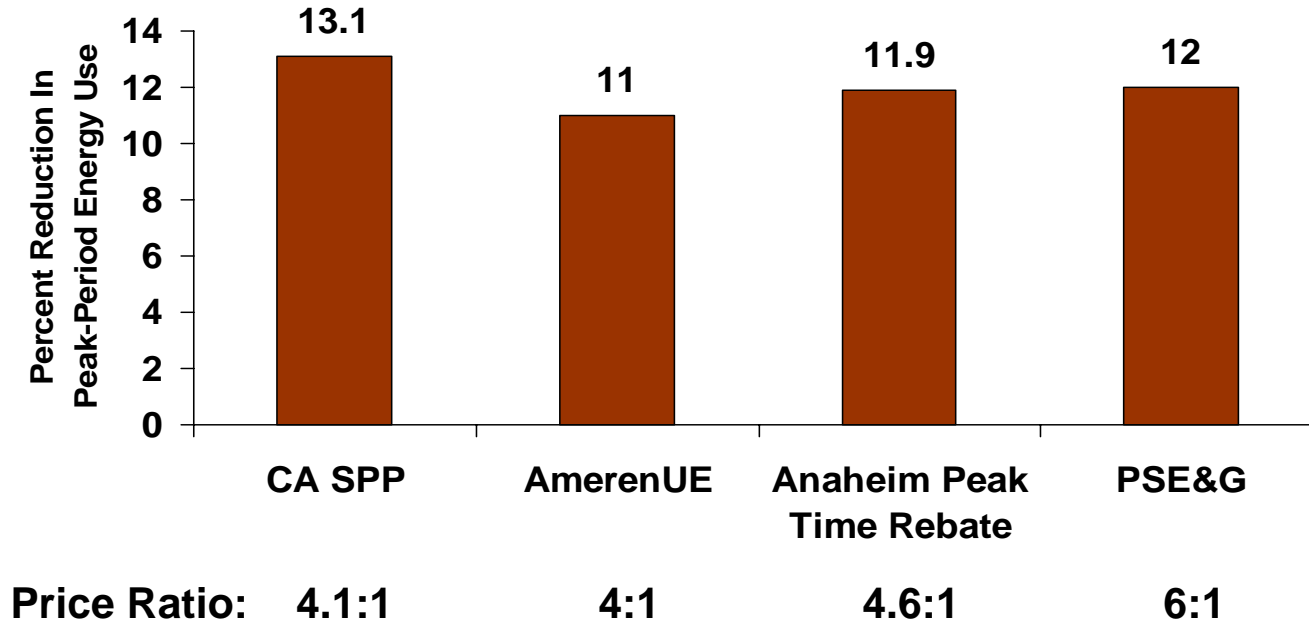
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What will it take to be a 21st Century Utility?



As the results of each new pricing pilot become available, a common story is developing: customers respond to dynamic price signals

Peak-Period Reduction on Critical Peak Days



More experimental results are on the way?

- Xcel Energy's pricing pilot is complete and a regulatory filing is due in April
- The regulatory log-jam that stalled the Pepco (SMPPI) pricing pilot finally broke earlier this month
 - Will examine CPP and Peak Time Rebates side-by-side
- Energy Australia (NSW) is the first to test dynamic pricing with In-Home Displays (IHDs)
- An experiment getting underway in Victoria, Australia will test CPP only, CPP/TOU and IHDs (with and without pricing)
- Similar results are being seen across a wide spectrum of pricing concepts (CPP, RTP and PTR)

There is 30 year's of research indicating that mass-market customers can and will respond to time-varying price signals. Is it time to stop doing experiments and just get on with it?



Combining price signals with control technology significantly increases demand response

- California's Statewide Pricing Pilot showed
 - Peak-period impacts on critical days increased 50 % for residential customers with air conditioning and Programmable Communicating Thermostats (PCTs)
 - For C&I customers with demands less than 20 kW, there was no reduction on critical days without PCTs but a 13% reduction with PCTs
 - For C&I customers with demands between 20 and 200 kW, there was a 5% reduction without PCTs and a 10% reduction with PCTs

Combining price signals with control technology significantly increases demand response

- In the Ameren pilot, reductions doubled with PCTs for residential consumers
- PSE&G's pilot showed a 50% increase in DR with PCTs
- Gulf Power's program is the poster child for enabling technology combined with dynamic pricing
 - But the population characteristics are unusual so it's difficult to extrapolate to other regions

The real challenge is getting customers to try time-varying prices

- Market research and experience indicate that customers are reluctant to sign up for CPP tariffs due to risk aversion
 - Customers like time-varying rates once they try them, but when considering whether or not to sign up, they focus more on down-side risk than upside potential
 - It is difficult to overcome this inherent risk aversion with the “carrot-and-stick” incentives associated with CPP tariffs
- There is no political will to place customers on default dynamic rates
 - Massachusetts’ examination of this is encouraging and CA keeps talking about it
- The high participation rates in the SRP and APS TOU programs give people hope but many are looking for new options

SDG&E has proposed a Peak Time Rebate (PTR) tariff for all mass-market consumers

- A “carrot-only” pricing strategy that pays customers to reduce peak-period energy use on critical days
 - Customers would be paid 65 ¢/kWh for each kWh difference between usage on a critical day and a reference value
 - Customers would also avoid the average price of 15 ¢/kWh for each kWh not used, so the total financial savings is 80 ¢/kWh
- No proactive steps would be required to “participate” or sign up for this tariff
 - Customers would be notified of the opportunity to save money on critical days through mass media and other communication channels
- Preliminary analysis suggests that DR impacts are very similar to those of a CPP tariff
- SCE is moving to make PTR a cornerstone of its AMI filing and DR strategy



The key enabling technology for the 21st Century utility is AMI

- The newest developments in AMI stem from growing market demand for open communication standards
- OpenAMI, Grid Wise, Intelligrid, and others are touting the benefits of open communication protocols between an AMI system and end-use devices
 - Eventually, this could allow consumers to purchase control and display devices at Home Depot and foster competition among suppliers
- DCSI (and others) are going to market with offerings that meet this requirement



CA is developing the most DR friendly infrastructure in North America

- The CPUC approved PG&E's AMI application in June 2006
 - PVRR of \$2.2b to replace 5+ million electric meters (PLC by DCSI) and 4+ million gas meters (RF by Hexagram)
- SDG&E has received preliminary approval to proceed with AMI subject to refinements that would enable connectivity with in-home devices
- SCE's RFP is requiring AMI suppliers to have Zigbee compatible meter communication capability
- The CEC has proposed to modify building standards so that all new construction and all HVAC retrofits will have PCTs
 - PCTs will have one-way radio or paging capability (with no override) to be used for reliability and a port through which Zigbee or other protocols can be incorporated for use by utilities for economic dispatch



The third ingredient for the 21st Century Utility is information provision

- Preaching to the choir at a Nexus client conference
- Three avenues through which consumers can receive information to help improve energy decision making
 - Bill content
 - Web portals
 - In-home displays

Bill presentment and Web portals can provide valuable information

Save Peak Energy - Save Money
Saving money and Peak Energy makes good sense.

John Doe | Account#: 1234567 at 123 Something Lane, City
Bill Period: 07/28/2004 - 08/23/2004

You could save \$250 - \$500*

July	August	September	October
420 kWh	621 kWh	349 kWh	**609 kWh to go...

Peak Savings Goal: 1999 kWh

*You could save \$250- \$500 if you reduce your peak energy usage by 1999kWh or 20%.
** To reach your goal of 1999 kWh, you need to save an additional 609 kWh.

1. Peak Energy is Expensive. Use it wisely

Remember during the summer season:

Critical Peak Energy: \$0.60/kWh
- noon to 6 p.m.
- Monday through Fridays on days that are declared by SCE as a Critical Peak Day.

On-Peak Energy: \$0.25/kWh
- noon to 6 p.m.
- Monday through Fridays on non critical peak days

Off Peak Energy: \$0.14/kWh
- 6 p.m. to noon the next day
- Monday through Friday and all day Saturday and Sunday

2. Save Money by Using Less Peak Energy - Especially on Critical Peak Days.

Critical Peak vs. On-Peak

Aim to make your critical peak bar lower than your on-peak bar

💡 Critical Peak Usage: increased from an average of 4.5 kWh/day to 6 kWh/day. As a Result: increase in bill by \$25

💡 On-Peak Usage: used 18% of your energy during on peak As a Result: you saved 349kWh

3. Take Action- Especially on Critical Peak days!
Check off items on the personalized checklist below to see how much peak energy and money you can save!

Savings Checklist	Estimated Monthly Savings
<input type="checkbox"/> Give your A/C a Break Raise your thermostat 5 degrees to remain comfortable while decreasing your energy usage. More...	\$90 - 130 456 kWh
<input checked="" type="checkbox"/> Flip the switch Turn off unnecessary lights - especially the high-wattage floodlights typically used in recessed lighting. More...	\$190 - 230 234 kWh
<input type="checkbox"/> Run your pool pump less The National Spa and Pump Institute recommends that you fully filter your pool water once per day. More...	\$190 - 230 234 kWh
<input type="checkbox"/> Flip the switch Turn off unnecessary lights - especially the high-wattage floodlights typically used in recessed lighting. More...	\$90 - 130 144 kWh
<input type="checkbox"/> Run your pool pump less The National Spa and Pump Institute recommends that you fully filter your pool water once per day. More...	\$190 - 230 234 kWh

For more information, try...

- Load Shift Calculator**
You can save money by changing when you use your energy. Load Shift calculator can show you how
- Home Energy Center**
Looking for ways to save money and be more energy efficient? Home Energy Center can show you the way!
- Thermo Calculator**
Easy and quick savings by adjusting your thermostat settings

Save Energy During Peak Hours

Do you know how you use your energy? Check out the chart below that shows how you use your energy during peak energy hours.

To save money during peak hours, target appliances that are costing you the most.

Peak energy is expensive- Use it Wisely

Take action, especially on Critical Peak days

Links to additional content and tools

Save money by using less peak energy, especially on Critical Peak days

How do I spend my energy dollars during Peak Periods?

A load shift calculator can help customers decide what actions to take to shift load

Here's how much you'll save by shifting your use to the "off-peak" period.

Annual Savings from shifting use to off-peak period			
	Annual On-peak cost	Annual Off-peak cost	Annual Savings
Showers or baths taken:	\$ 120	\$ 74	\$ 46
Dishwasher loads:	\$ 84	\$ 52	\$ 32
Clothes washer loads:	\$ 75	\$ 46	\$ 29
Clothes dryer loads:	\$ 60	\$ 37	\$ 23
Hours Pool Pump is running:	\$ 443	\$ 274	\$ 169
Total	\$ 782	\$ 483	\$ 299

[More energy-saving tips](#)

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Real-time information feedback using IHDs is gaining attention

- Hydro One's experiment was the first statistically rigorous study of the impact of real-time information feedback on energy use
 - More about energy conservation than demand response
 - Roughly 400 customers monitored over 2.5 years
 - Provided with usage, dollar and CO2 emissions per hour, total to date and predicted
 - 6.5% average reduction across all households
 - Reductions were lowest for households with electric space heating (1.2%) and highest for households with electric water heating but no electric space heating (16.7%)
- Does SRP have anything to add?

The 21st Century Utility

- Will have AMI
- Will use the AMI platform to offer consumers
 - Innovative pricing
 - Information services and devices that will help optimize energy use and improve customer satisfaction
 - In-home control devices that will support demand response and energy efficiency, thus lowering customer bills and avoiding unnecessary capital investment in generation, transmission and distribution resources



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