PowerCentsDC™: Smart Pricing for the Smart Grid

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eMeter Strategic Consulting
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eMeter Strategic Consulting Experience

- **Anaheim Public Utilities** - Turn-key Spare the Power Days critical peak rebate program
- **PG&E** - Smart meters for PG&E's customers above 200 kW representing $3B annual revenue
- **California Large IOUs** - Data management for the California Statewide Pricing Pilot
- **PowerCentsDC™** – Project design, implementation and operation for Washington D.C. smart meter/thermostat pilot
- **Ontario Smart Price Pilot** – Project design, implementation, and operation for time-of-use and critical peak pricing pilot
- **Southern Company** – Integrated AMI-distribution automation pilot

PowerCentsDC Case Study

Smart Grid pilot

- About 1,000 residential customers throughout District of Columbia
- Smart meters and smart thermostats
- “Smart prices” that change at different times
- Consumers had ability to manage their energy costs
  - By reducing total electricity use
  - By shifting use from peak to other times

“Smart Meter Pricing Pilot, Inc.” public-private partnership

- Public Service Commission, DC
- DC Office of People’s Counsel
- Consumer Utility Board
- IBEW
- Pepco (utility)

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Program Design

Test goals

- How much do consumers reduce peak demand?
- How much do consumers save energy with their new tools?
- Done via random sample of control vs. treatment

Participation voluntary

- Recruitment by mail
- Sign-up by phone call or on website, www.PowerCentsDC.org

Customer groups

- Three different rates
- $100 thank-you payments for Critical Peak Pricing and Hourly Pricing
- No payment for Critical Peak Rebate

Customer service

- Email and toll-free phone number
- Website self-service (enrollment, price data, etc.)

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Schedule

Design – 2007

- Pricing plans
- Experimental groups
- Technology selection

Recruitment – 2007

Equipment installation – May to July 2008

Go live

- Meters and smart prices: July 2008
- Smart thermostats: July 2008
- Consumer engagement software: June 2009
- Surveys: late 2009, early 2010

Completion – 2010

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Critical Peak Price and Critical Peak Rebate

Standard rate

- Flat for energy pricing, inverted tiers for other services

Critical peak pricing (CPP)

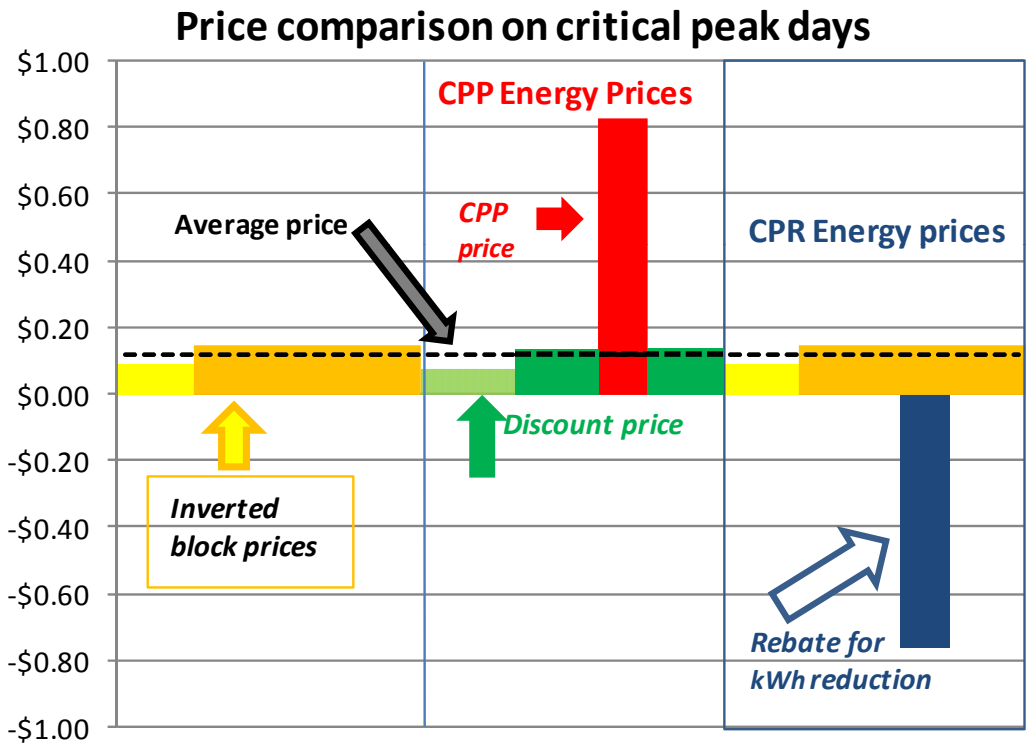
- CP days dispatched 10-15 days per year
- Prices 5x average for four hours on these days

Critical peak rebate (CPR)

- "Carrot" instead of "stick"
- Customer earns rebates during critical peak hours by reducing usage below baseline
- Also called Peak Time Rebate

Price notifications

- CPP, CPR, and HP
- Via automated phone call, email, or text page



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Hourly Pricing

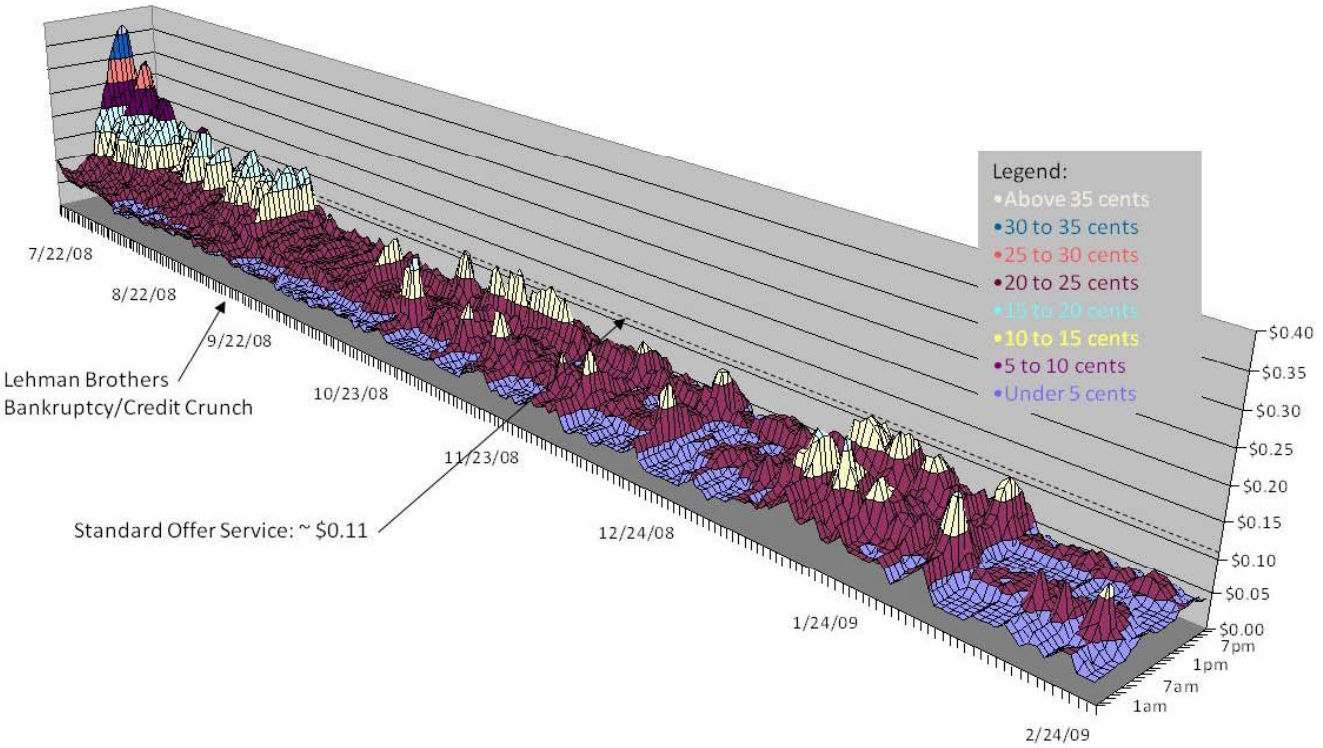
Real-time pricing

- Vary hourly according to PJM market price

First to combine with smart thermostat

Notifications provided prior to high-price days

Hourly Prices July 2008-February 2009



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PowerCentsDC Consumer Engagement Model

Consumer Engagement

Awareness **Influence** **Persistent Behavior Change**

Core Elements

Energy Info & Analytics	Consumer Analytics & Content	Notifications Engine	Demand Response
•Cost •Usage •CO_2	• Cost Projections • Facts & Tips • CSR Tool	• Alerts • Summaries	• Dynamic pricing plans • Event Management • Response Analysis

Access Points

Web

Email

Mobile/SMS

In Home Display

Bill insert

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Electric Usage Report

Comes each month with bill

Shows more detail on energy usage

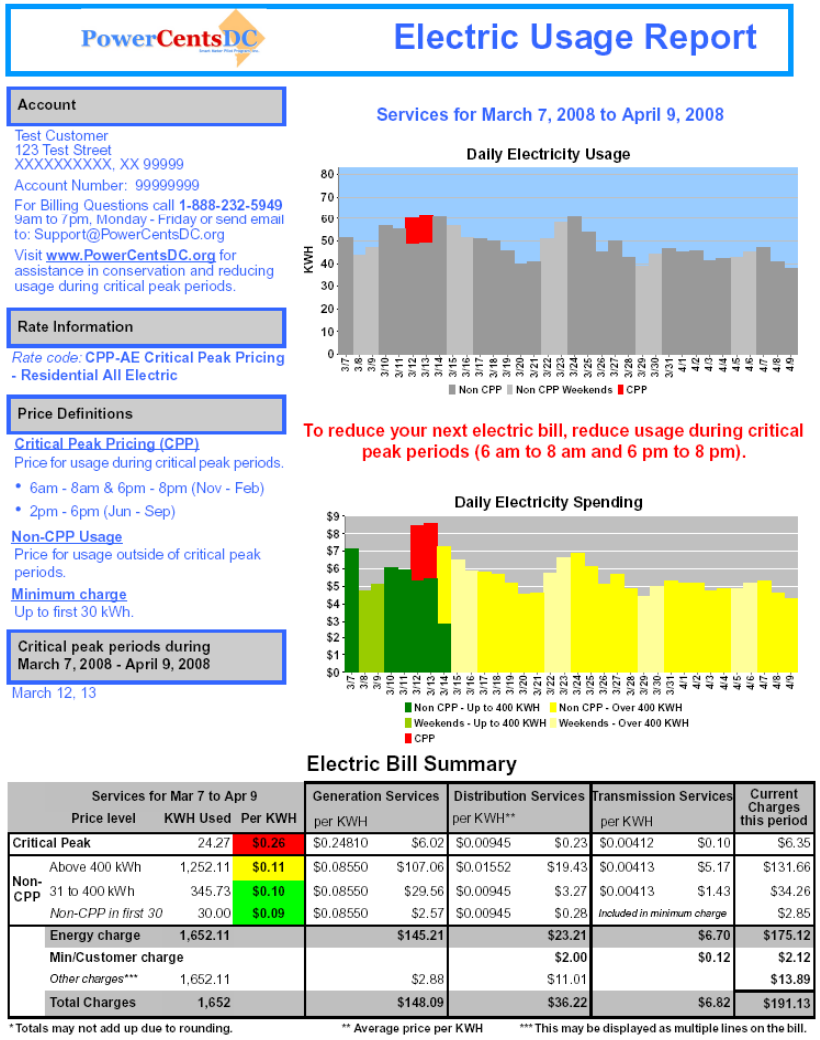
- By tier
- During critical periods

Gives more information on energy spending

- In parallel with usage

Colorful graphs allow quick reference

Ontario Pilot result: 93% found such reports useful



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Electric Usage Report

Account

Test Customer
123 Test Street
XXXXXXXXXX, XX 99999

Account Number: 99999999

For Billing Questions call **1-888-232-5949** 9am to 7pm, Monday - Friday or send email to: Support@PowerCentsDC.org

Visit www.PowerCentsDC.org for assistance in conservation and reducing usage during critical peak periods.

Rate Information

Rate code: **CPP-AE Critical Peak Pricing - Residential All Electric**

Price Definitions

Critical Peak Pricing (CPP)
Price for usage during critical peak periods.
- 6am - 8am & 6pm - 8pm (Nov - Feb)
- 2pm - 6pm (Jun - Sep)

Non-CPP Usage
Price for usage outside of critical peak periods.

Minimum charge
Up to first 30 kWh.

Critical peak periods during March 7, 2008 - April 9, 2008

March 12, 13

Services for March 7, 2008 to April 9, 2008

Daily Electricity Usage

To reduce your next electric bill, reduce usage during critical peak periods (6 am to 8 am and 6 pm to 8 pm).

Daily Electricity Spending

Electric Bill Summary

	Services for Mar 7 to Apr 9 Price level	KWH Used	Per KWH	Generation Services per KWH		Distribution Services per KWH**		Transmission Services per KWH		Current Charges this period
Critical Peak		24.27	$0.26	$0.24810	$6.02	$0.00945	$0.23	$0.00412	$0.10	$6.35
Non-CPP	Above 400 kWh	1,252.11	$0.11	$0.08550	$107.06	$0.01552	$19.43	$0.00413	$5.17	$131.66
	31 to 400 kWh	345.73	$0.10	$0.08550	$29.56	$0.00945	$3.27	$0.00413	$1.43	$34.26
	Non-CPP in first 30	30.00	$0.09	$0.08550	$2.57	$0.00945	$0.28	*Included in minimum charge*		$2.85
	Energy charge	**1,652.11**			**$145.21**		**$23.21**		**$6.70**	**$175.12**
	Min/Customer charge						**$2.00**		**$0.12**	**$2.12**
	*Other charges****	1,652.11			$2.88		$11.01			**$13.89**
	Total Charges	**1,652**			**$148.09**		**$36.22**		**$6.82**	**$191.13**

*Totals may not add up due to rounding. ** Average price per KWH *** This may be displayed as multiple lines on the bill.

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Smart Thermostat

Automated cycling during critical peak events

- 2 pm-6 pm summer
- 6-8 am & 6-8 pm winter

Feedback display

- Current price, updated hourly
- Monthly bill to date
- Monthly usage to date
- LED indicator during events

Adoption

- One-third of participants asked for a thermostat
- One-quarter read the display

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Consumer Engagement Software

Web 2.0 dashboard

- Minimal charts
- Large headings
- Not too much text

Costs

- Month to date
- Projection

Usage

- Compared to last month

Carbon emissions

Context

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Usage Details

Drill down
- Monthly
- Daily
- Hourly

Color coding
- By tier
- Critical peaks

Appliances
- Disaggregation

Peer comparison

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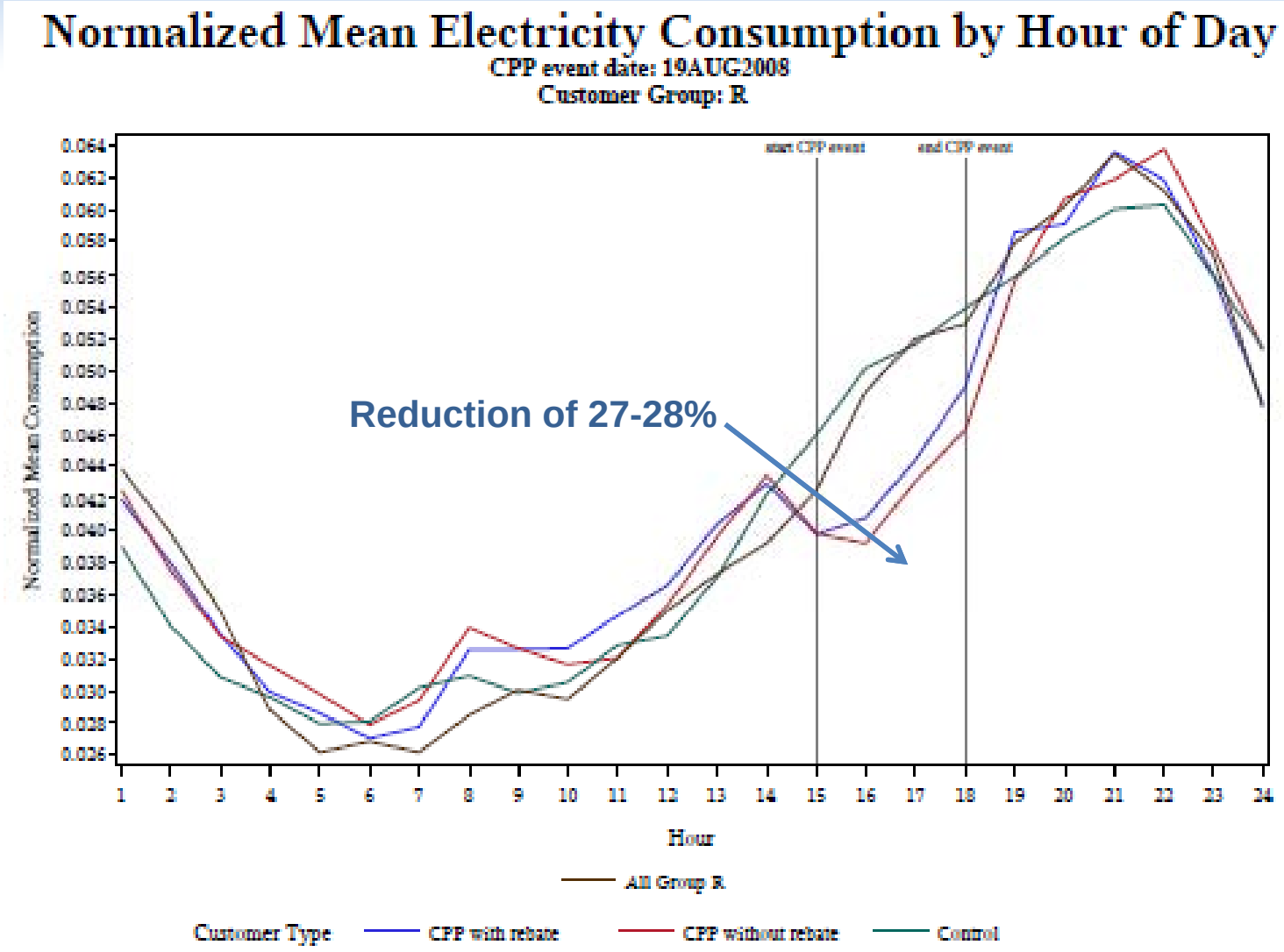
PowerCentsDC Peak Demand Reduction



Results are from Interim Report, covering July 2008 to February 2009.

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Peak Demand Reduction Results

All participant groups responded to the price signals

Higher price differentials led to greater load shifting

Rate Plan	Summer Peak Reduction	Winter Peak Reduction
CPP	25%	10%
CPR	11%	(n/s)
HP	4%	4%

Results are from Interim Report, covering July 2008 to February 2009.

Smart Thermostats

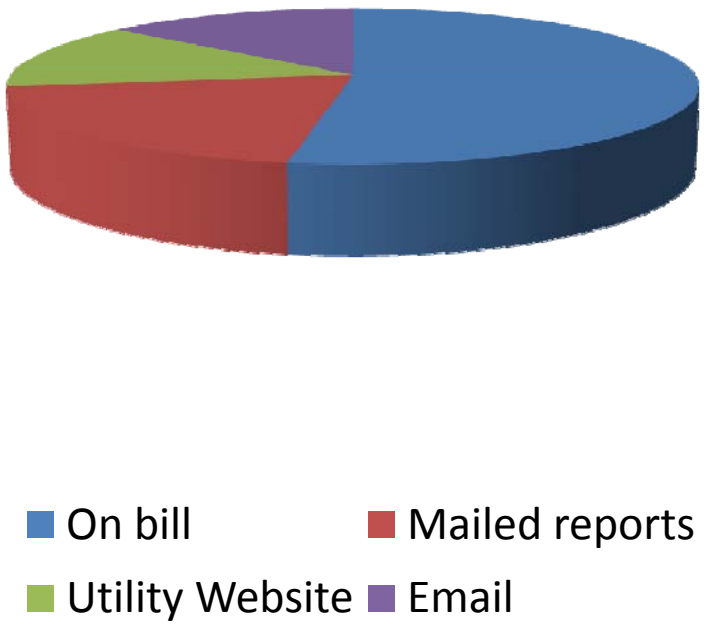
CPP customers with smart thermostats had much higher peak reductions

Customer Type	No Smart Thermostat	With Smart Thermostat
Regular (R)	22%	34%
All Electric (AE)	29%	50%

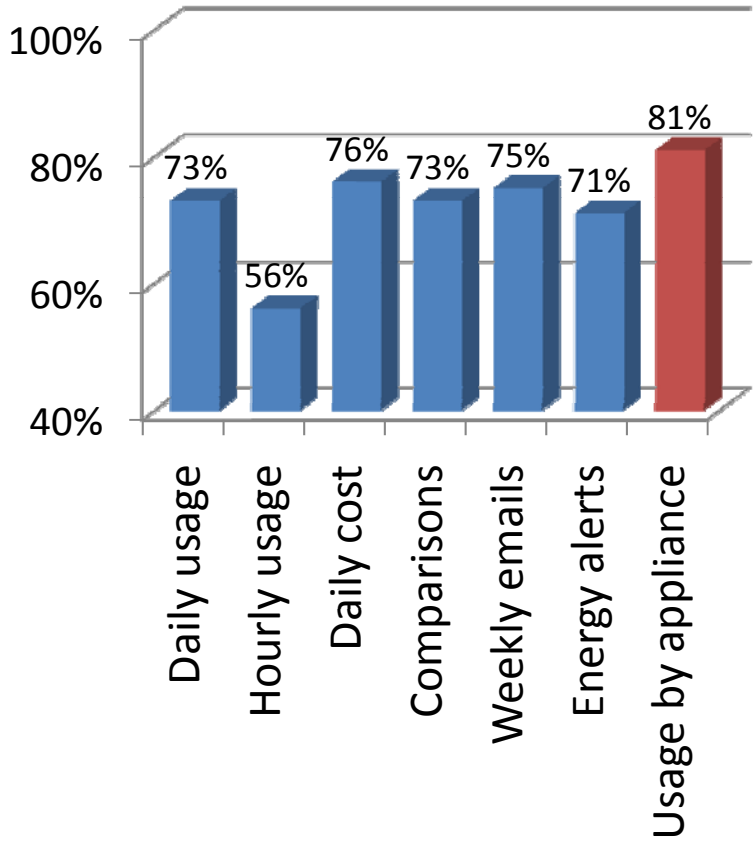
Results are from Interim Report, covering July 2008 to February 2009.

Control Customer Survey

Preferred Means of Receiving Information



Interest in Specific Data Types



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Best Practices Summary

When smart meters go in

- IT platform in place
- Energy report bill inserts
- Online data access with “push” option (email)
- Month-to-date usage and cost
- Dynamic pricing options
- Business processes and IT systems to catch exceptions (billing and installation errors)

When ready

- Activate standard HAN interface