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The Brattle Group

The Coming Wave of Price-Based Demand Response

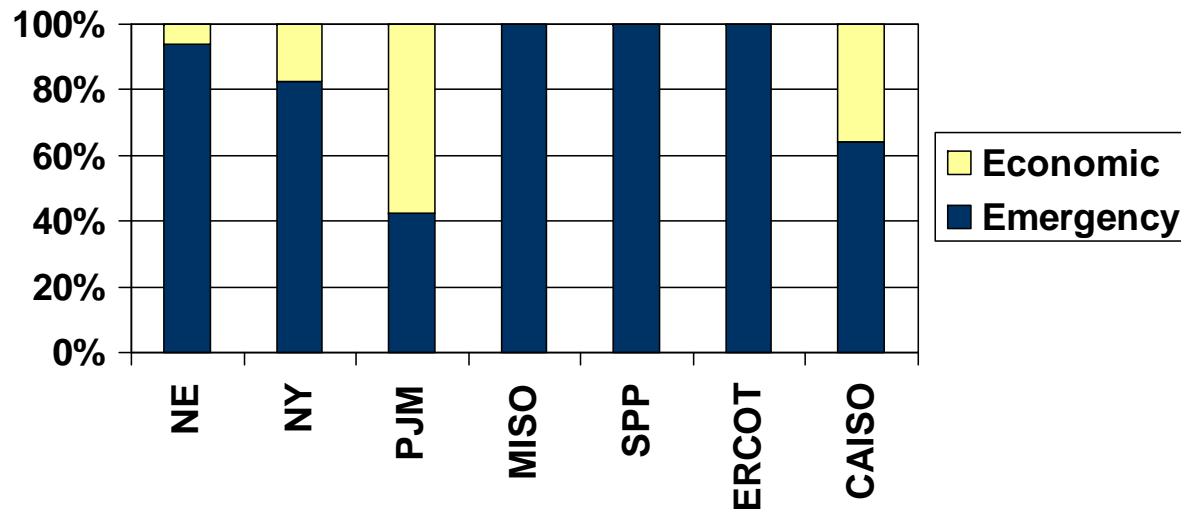
**Presented by
Ryan Hledik**

**DR Expo, Santa Clara
May 22, 2008**

Historically, most states have had traditional emergency-triggered DR programs

- 234 US electric utilities offer DR programs (FERC)
- DR programs exist in 42 of 50 states (DOE)
- Most of these are traditional emergency-triggered programs

Share of Total DR by Program Type and Region



What about price-based DR?

The price-based DR wave is on the horizon...

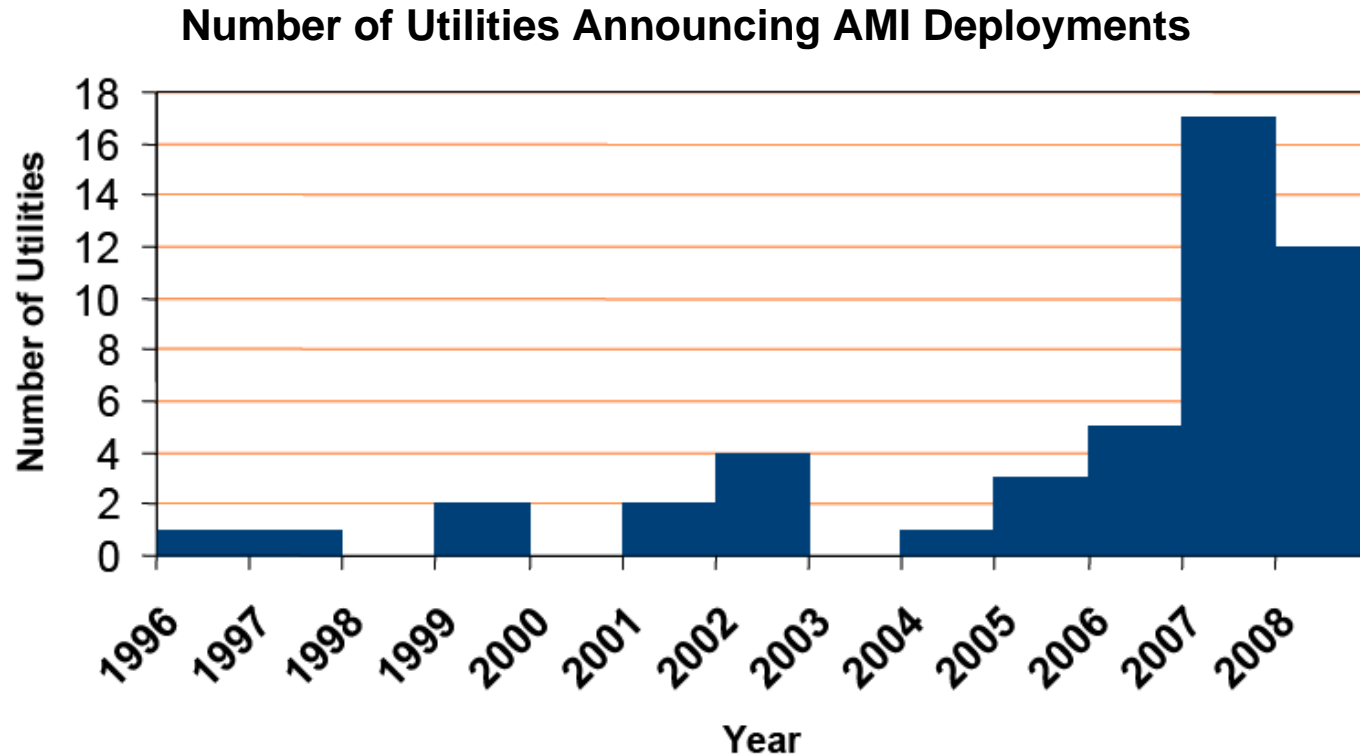
Indicators of the wave

- Increased investment in AMI
- New pricing experiments across the country
- More affordable enabling technologies
- New policy action

What does this mean for customers?

And can they benefit from it?

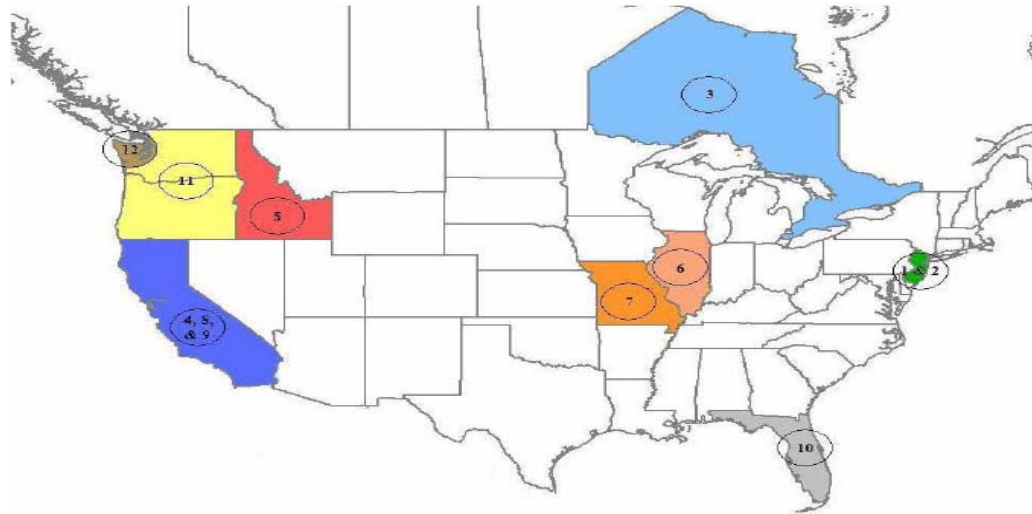
Investment in AMI has grown in recent years



Source: UtiliPoint International, 2007 FERC Assessment of DR & Advanced Metering

AMI will enable new forms of pricing for the mass market

Several new pricing experiments have been conducted across North America since 2000



- | | |
|---|-----------------------------------|
| 1- PSE&G Pilot Program | 7- AmerenUE Residential TOU Pilot |
| 2- GPU Pilot Program | 8- ADRS Pilot |
| 3- Ontario Energy Board Smart Price Pilot | 9- Statewide Pricing Pilot |
| 4- Anaheim Critical Peak Pricing Experiment | 10- The Gulf Power Select Program |
| 5- Idaho Residential Pilot Program | 11- Olympic Peninsula Project |
| 6- Energy-Smart Pricing Plan | 12- PSE TOU Program |

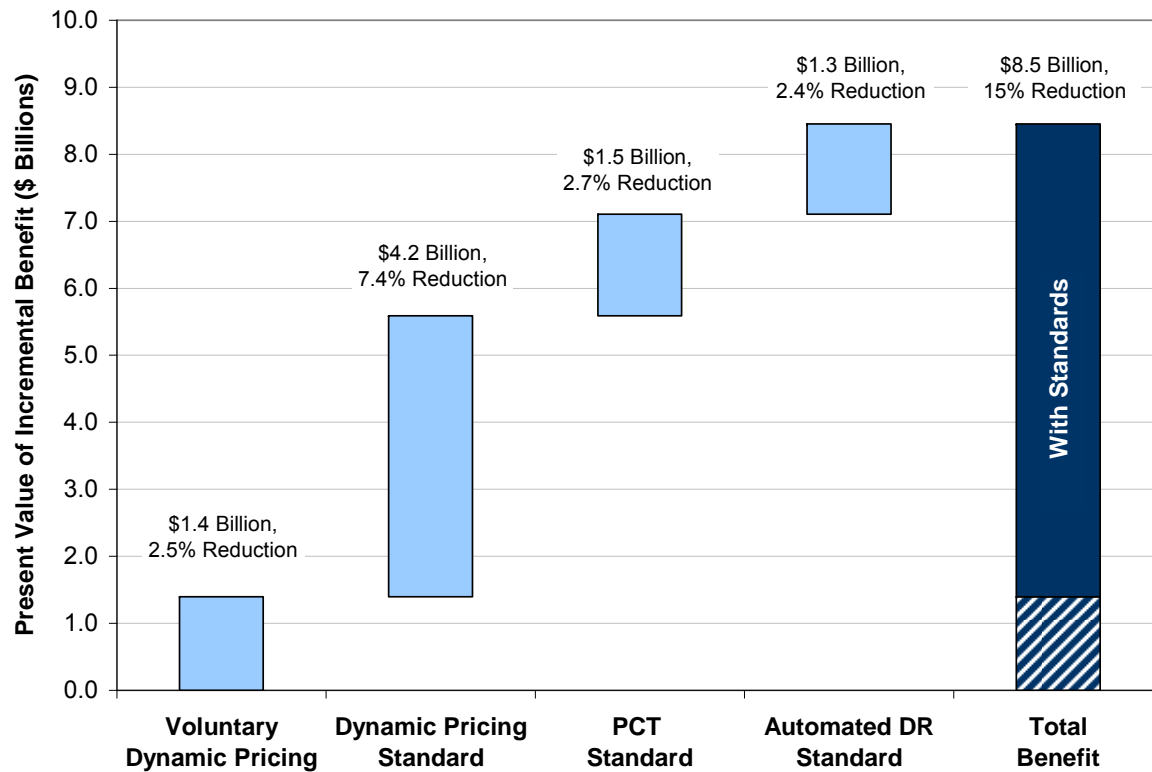
- These experimental pilots have primarily focused on residential and small C&I segments
- We are currently working with utilities in several other states to examine pricing options and to implement and evaluate pilots
 - ▶ New England, Mid-Atlantic, Midwest, Southwest, Pacific Northwest

Simultaneously, the cost of DR-enabling technologies is coming down

- AMI
 - ▶ Cost effective on basis of operational benefits + avoided costs
 - ▶ Sometimes operational benefits alone cover costs
- In-home displays
 - ▶ Real-time electricity consumption information
- Automated DR
 - ▶ Gateway systems to automate response
- Programmable Communicating Thermostats (PCTs)

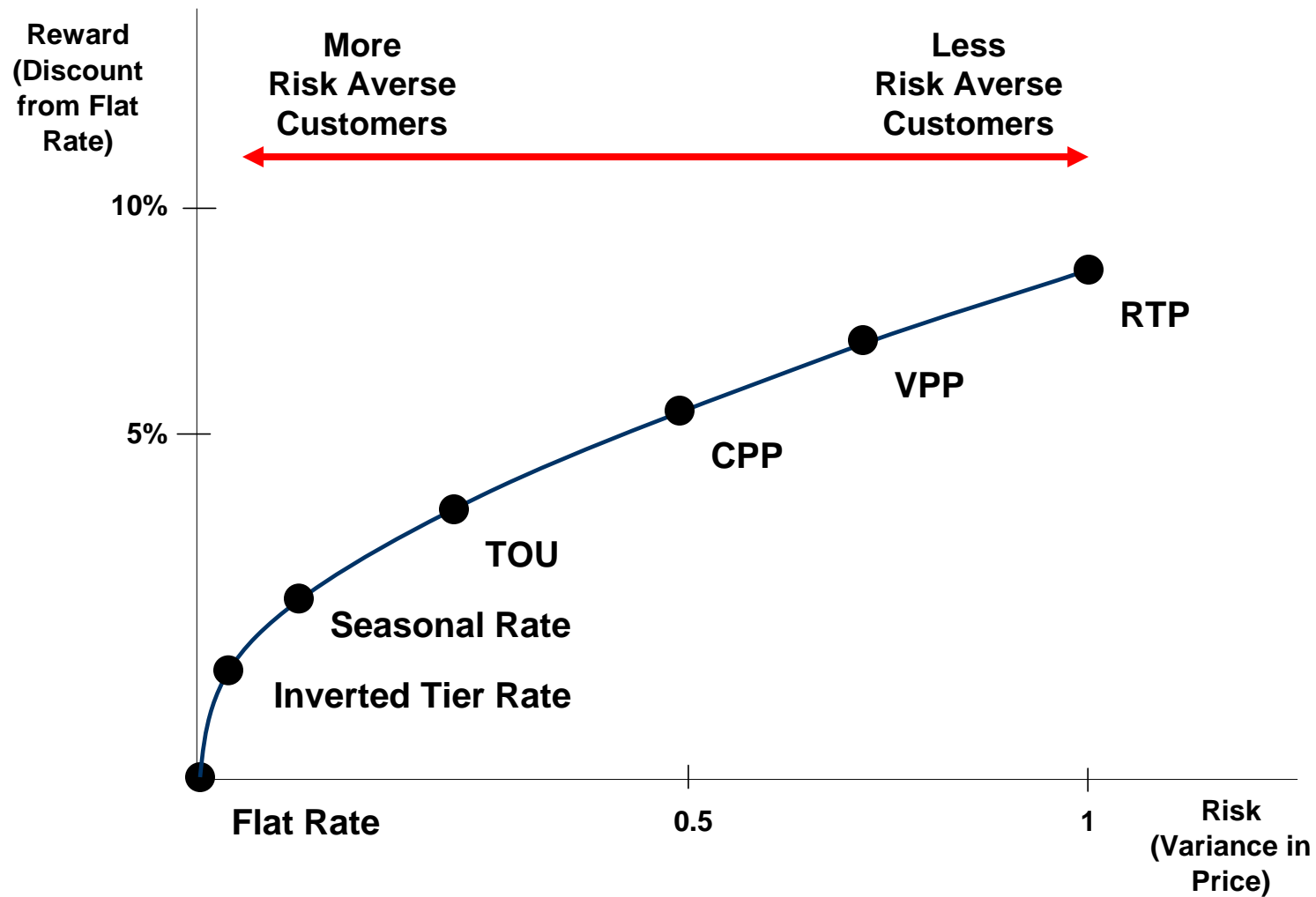
Policy action could mandate demand response in some regions

The Potential Impact of Load Management Standards in California



The California Energy Commission's current proceeding on load management standards is one such example

This would mean more options for the customer



We have simulated the potential impact of dynamic pricing

- Simulations were based on estimates of customer response developed during the California Statewide Pricing Pilot

Average Change in Peak Per Medium C&I Customer

Rate	kWh/hr	%
RTP	-1.40	-4.5%
TOU	-1.78	-5.9%
CPP/TOU	-3.00	-9.9%

The average medium-sized commercial customer could produce a peak reduction of 5% to 10% with dynamic pricing

Load shifting would lead to modest bill savings for the average medium-sized commercial customer

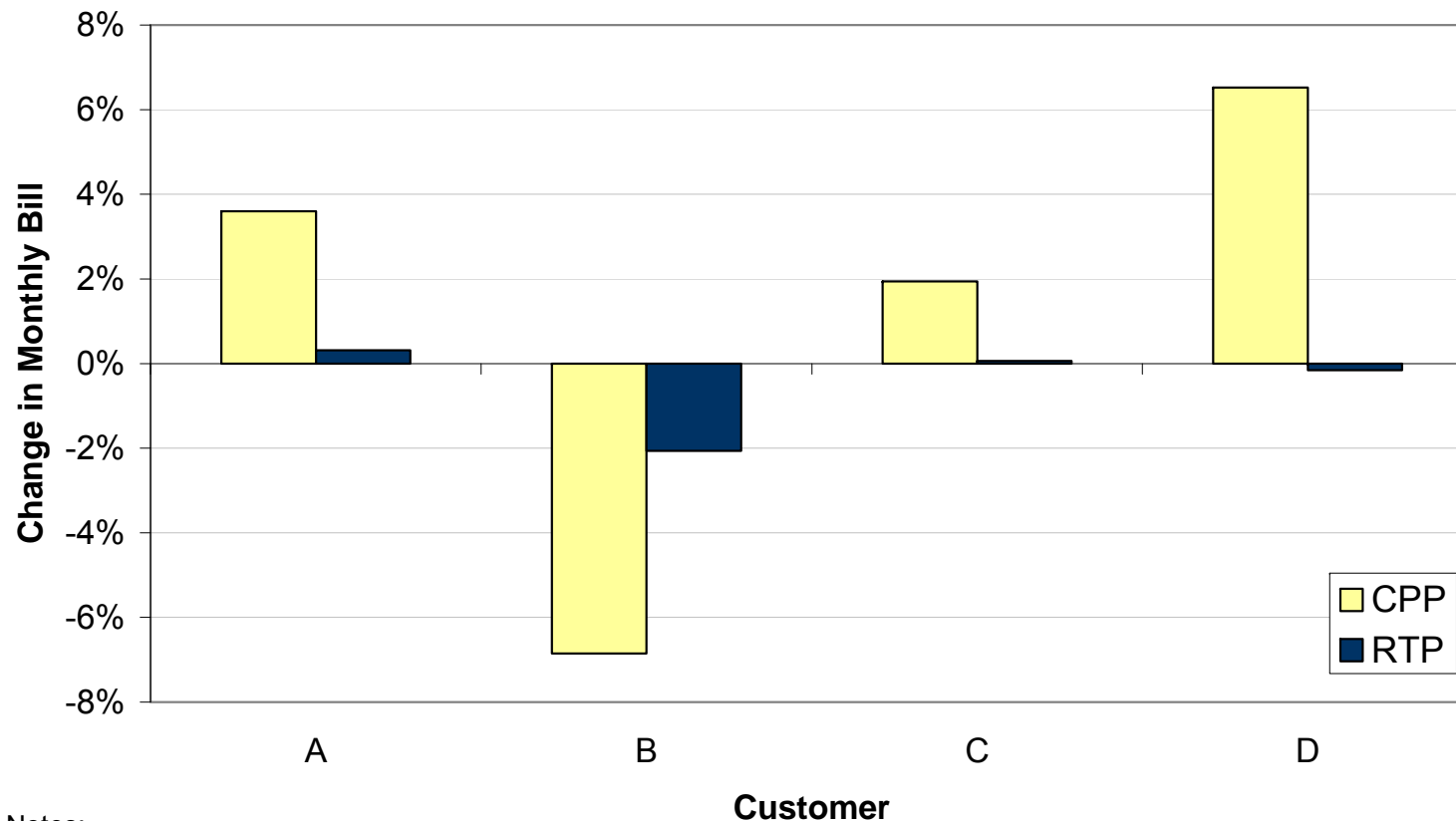
Average Change in Monthly Bill Per Medium C&I Customer

Rate	\$/Month	%
RTP	-7.03	-0.4%
TOU	-49.05	-1.9%
CPP/TOU	-57.40	-2.2%

Bill impacts would be larger for “peakier” or “flatter” customers

Bill impacts for a sample of large commercial customers (> 500 kW) ranged from -7% to +6%

Bill Impacts for a Sample of Large Commercial Customers



Notes:

RTP bill change is annual average. CPP bill change is summer only.

Impacts are approximate and are for the period from 11/2006 through 10/2007.

Catching the wave...

- Customers can respond to dynamic pricing
 - ▶ Many don't respond at all
 - ▶ Some respond a little
 - ▶ Some respond a lot
- Enabling technology will facilitate DR
 - ▶ AutoDR, PCTs, ...
 - ▶ More load shifting leads to larger customer bill reductions
 - ▶ Greater peak reductions lead to larger utility cost savings
 - ▶ Responsive demand improves grid reliability