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WILL THE SMART GRID PROMOTE WISE ENERGY CHOICES?

Ahmad Faruqui, Ph. D.
925.408.0149

Illinois Smart Grid Initiative
Chicago, Illinois

August 5, 2008

The Smart Grid enables empowers the customer to make wise energy choices

Rising fuel prices and capacity costs, shrinking reserve margins and greenhouse gas emissions are setting the policy maker's agenda

Utilities and state commissions are placing a renewed emphasis on the demand side of the equation

Both energy efficiency and demand response can play a vital role in meeting future customer energy needs while controlling rising bills and keeping the lights stay on

In the new century, we need a multi-faceted approach for reaching the customer

Information about energy costs as they are incurred and ideas on how to manage those costs

Codes and standards for new appliances, buildings and industrial processes

Enabling technologies that control costs in real-time conditions such as price-sensitive thermostats and appliances

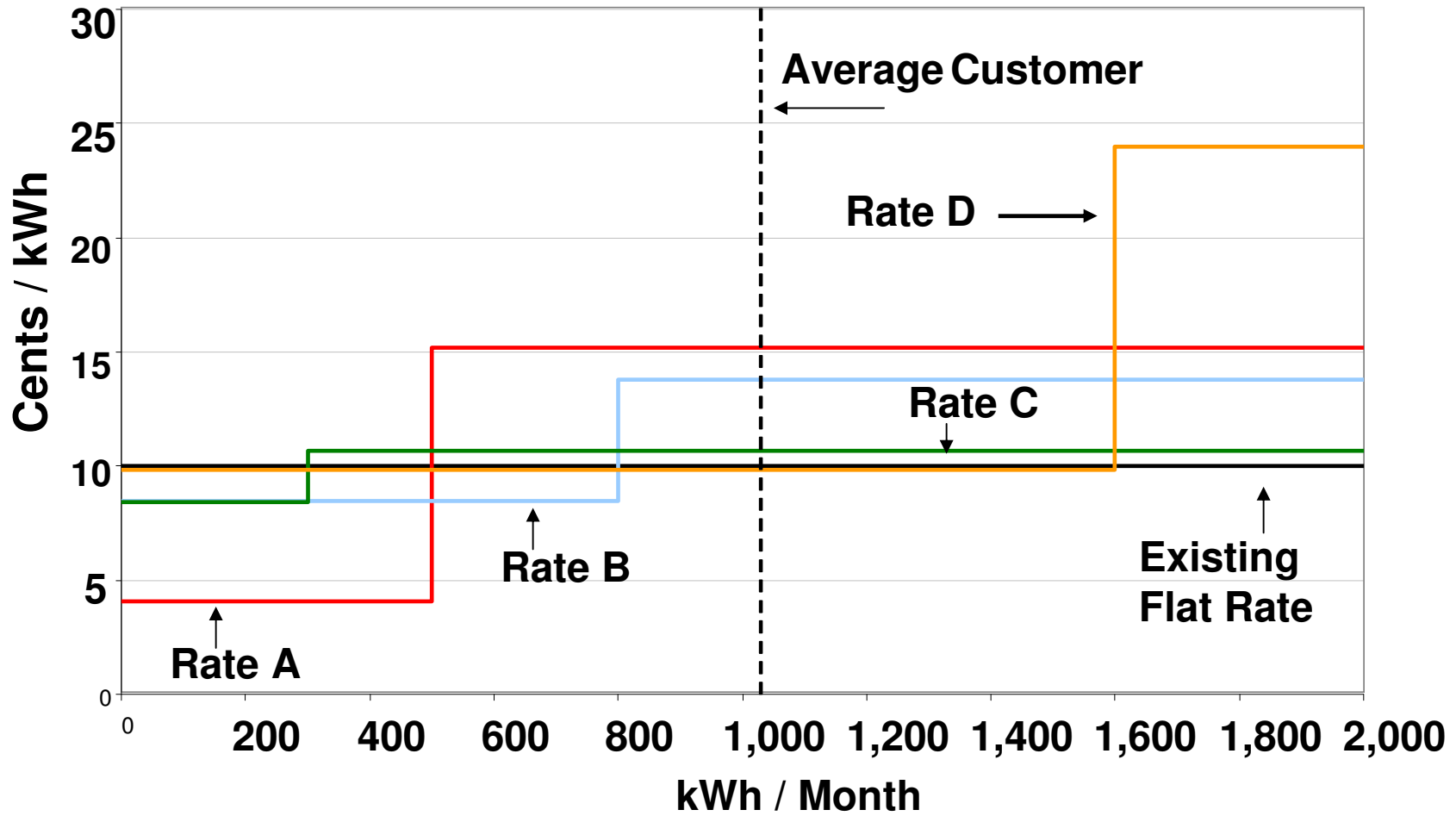
Rebates and financing for accelerating the adoption of smart end-use technologies

Smart rate design such as inclining block rates and dynamic pricing rates

The smart grid will help customers make smart energy buying decisions

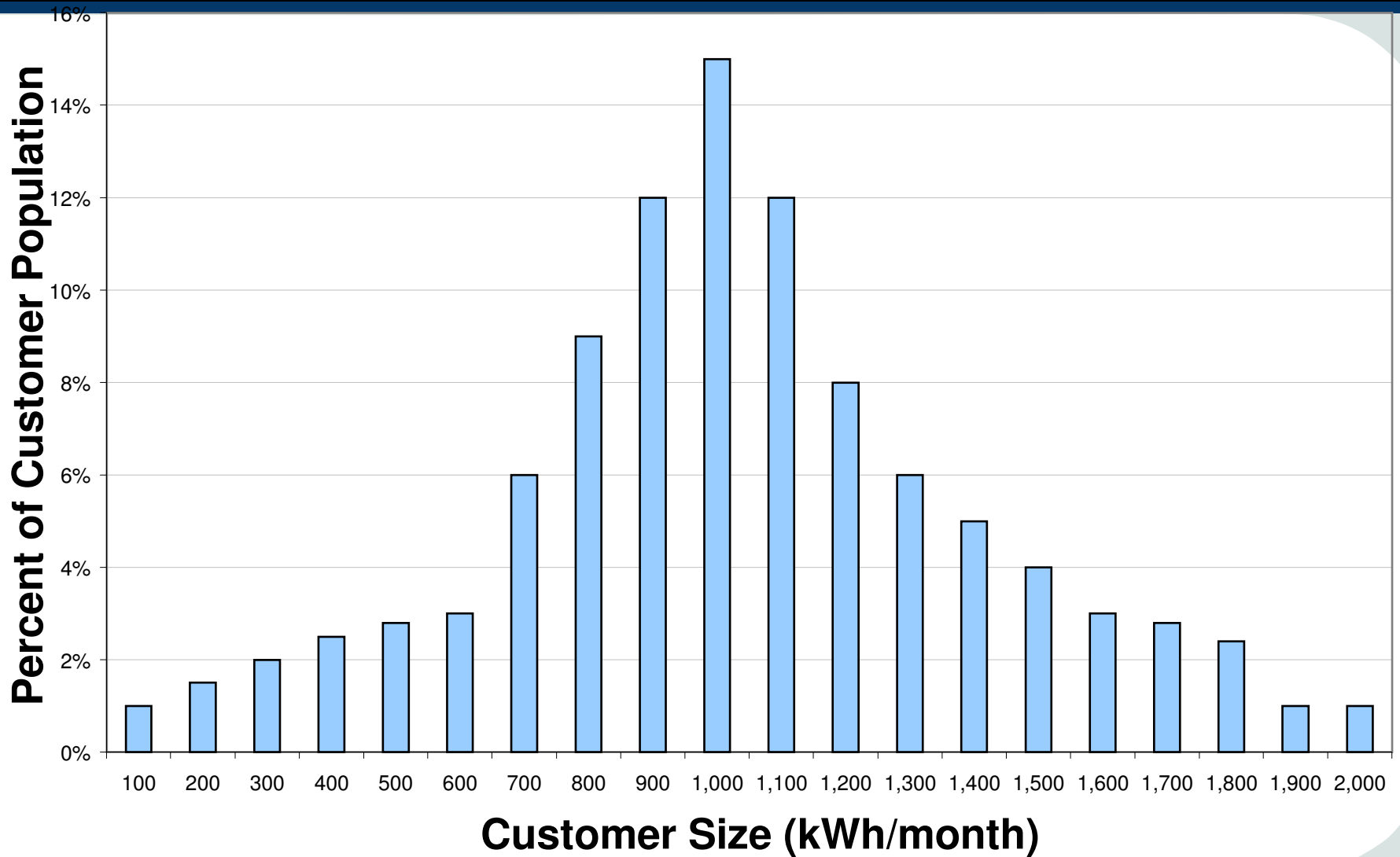
- Providing real-time feedback to customers on their energy consumption should help them better manage their energy behavior
- New empirical evidence from a number of pilots shows that in-home displays and similar devices that are enabled by the smart grid can lower energy use by up to 6 percent
- This has been observed to happen even with existing rate designs
- Of course, greater impacts will be observed if the rate designs are changed as well

Four illustrative inclining block rate designs



The likely impact of inclining block rates

Representative customer billing distribution

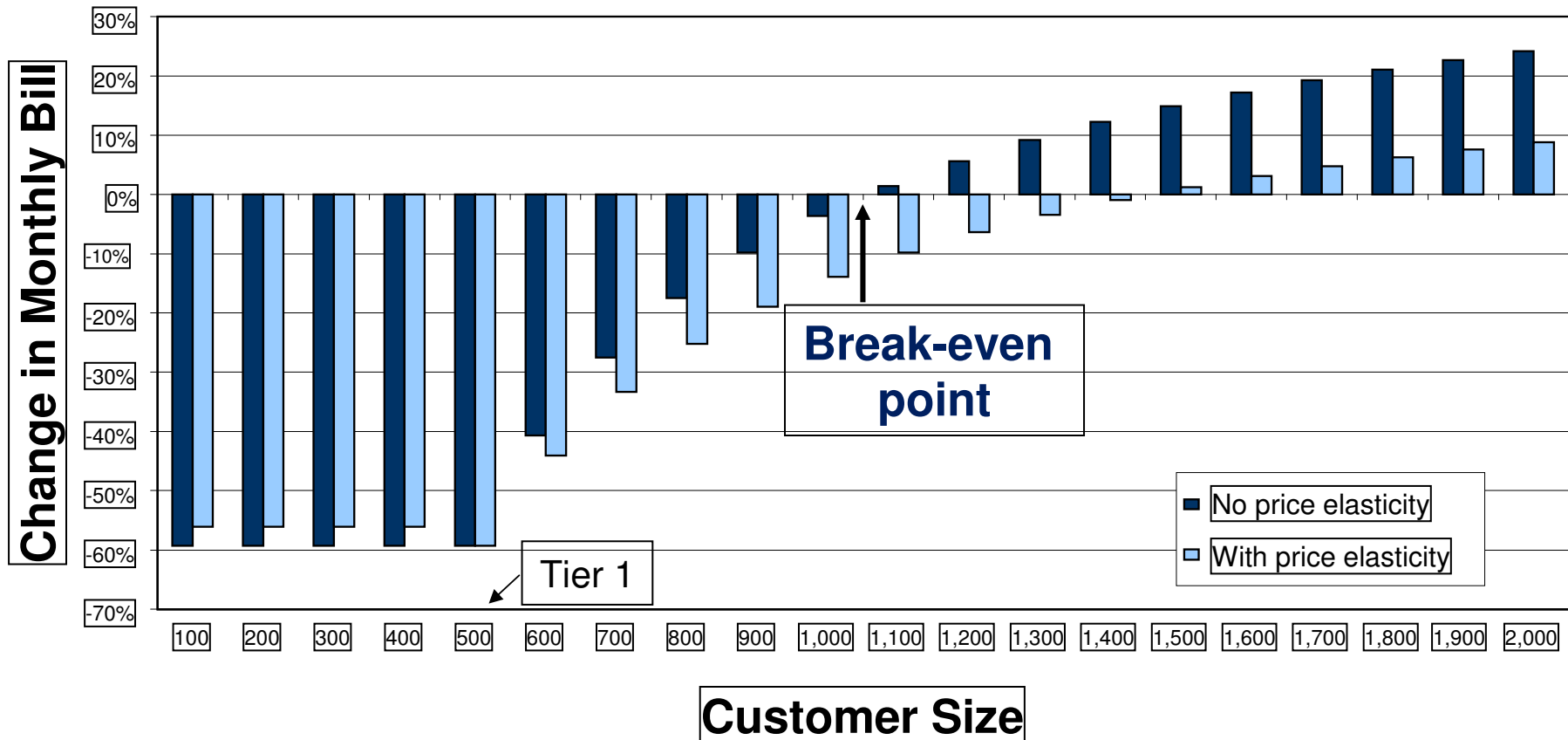


Energy use could decline by up to 5.9 percent and customer bills by up to 9.1 percent

Price Elasticity		Avg Percent Change in Usage			
		Rate A	Rate B	Rate C	Rate D
Short Run	Mean	-5.9%	-2.2%	-1.0%	-0.5%
	Std Dev	2.0%	0.8%	0.3%	0.2%
Long Run	Mean	-18.4%	-6.7%	-3.1%	-0.7%
	Std Dev	6.5%	2.4%	1.1%	0.4%

Price Elasticity		Avg Percent Change in Class Revenue			
		Rate A	Rate B	Rate C	Rate D
Short Run	Mean	-9.1%	-3.1%	-1.0%	-1.4%
	Std Dev	3.1%	1.1%	0.4%	0.5%
Long Run	Mean	-28.4%	-9.4%	-3.3%	-2.6%
	Std Dev	9.9%	3.4%	1.1%	1.0%

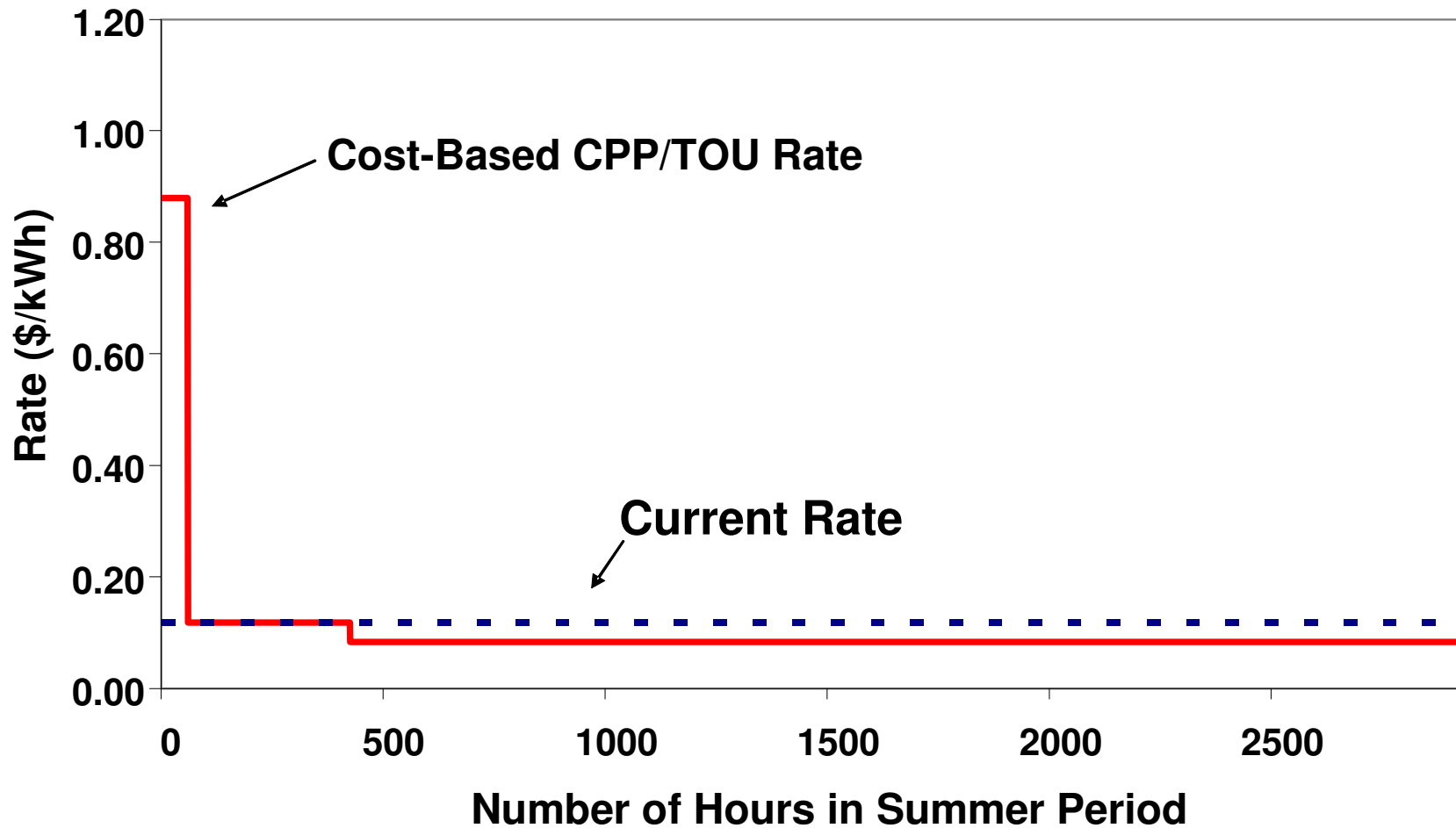
Price response mitigates the impact on high use customers by shifting the breakeven point



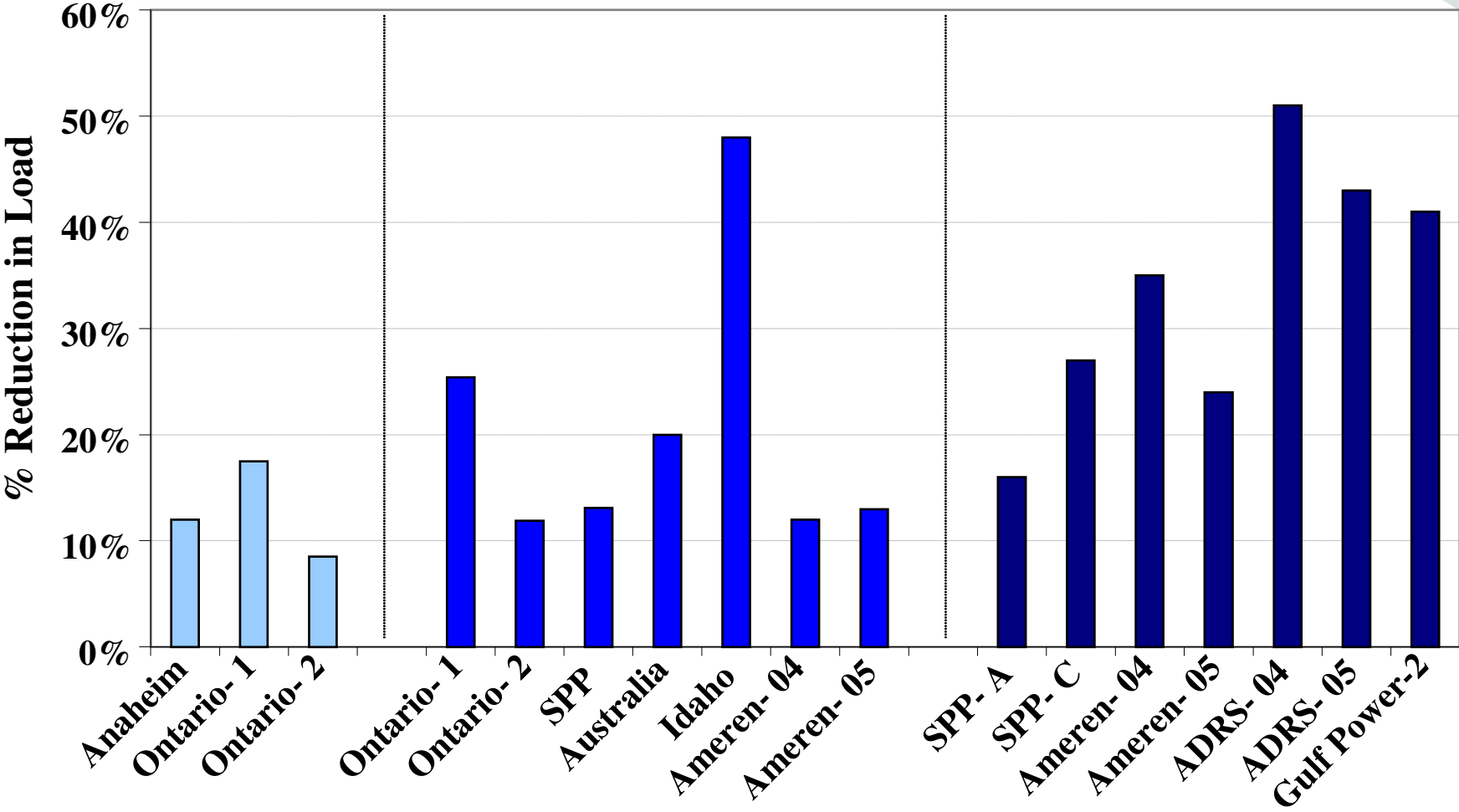
The likely impact of dynamic pricing rates

An illustrative dynamic pricing rate design

Price Duration Curve



Customers respond to dynamic pricing



PTR

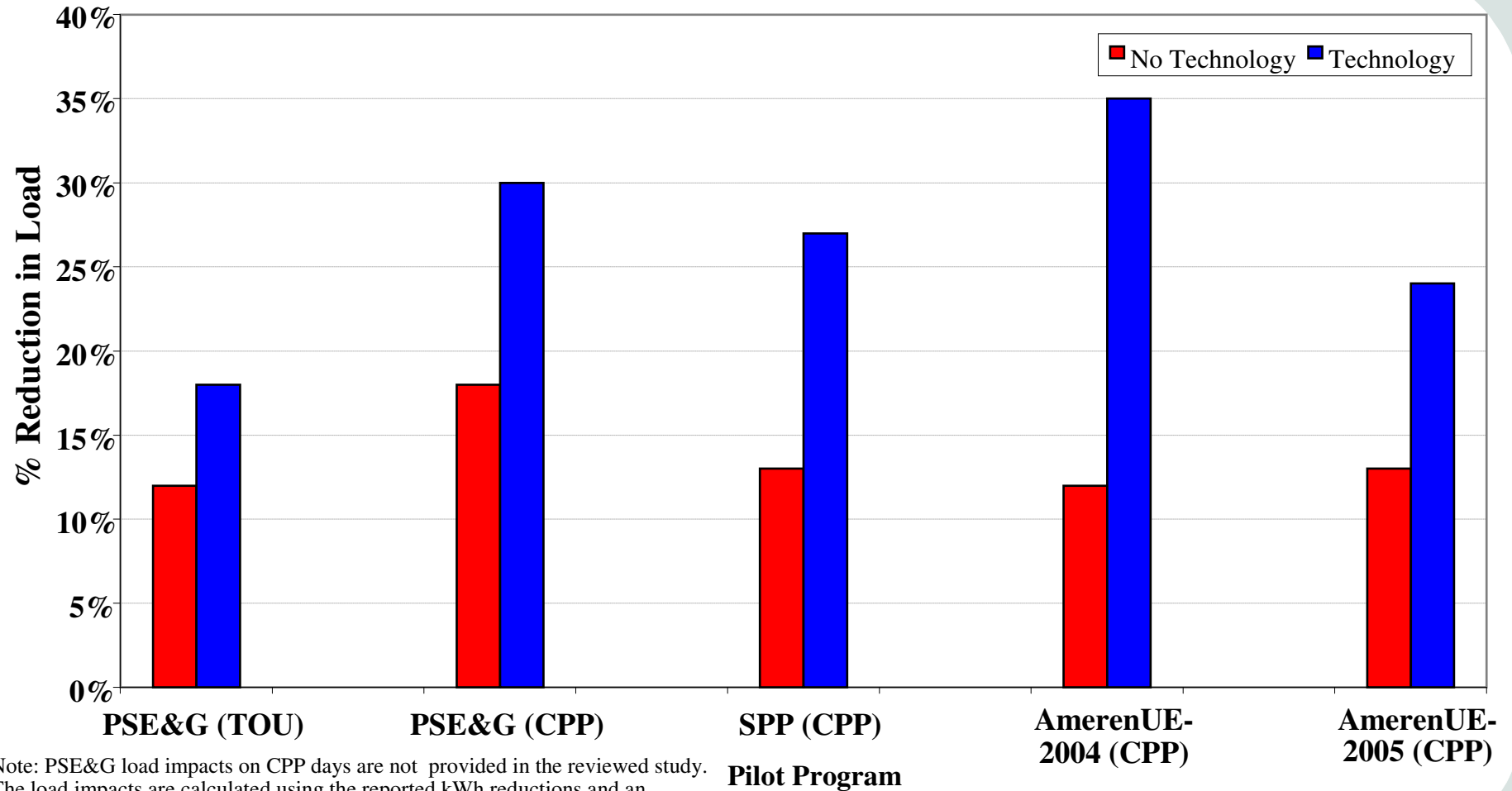
CPP

CPP with Technology

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Enabling technologies magnify demand response

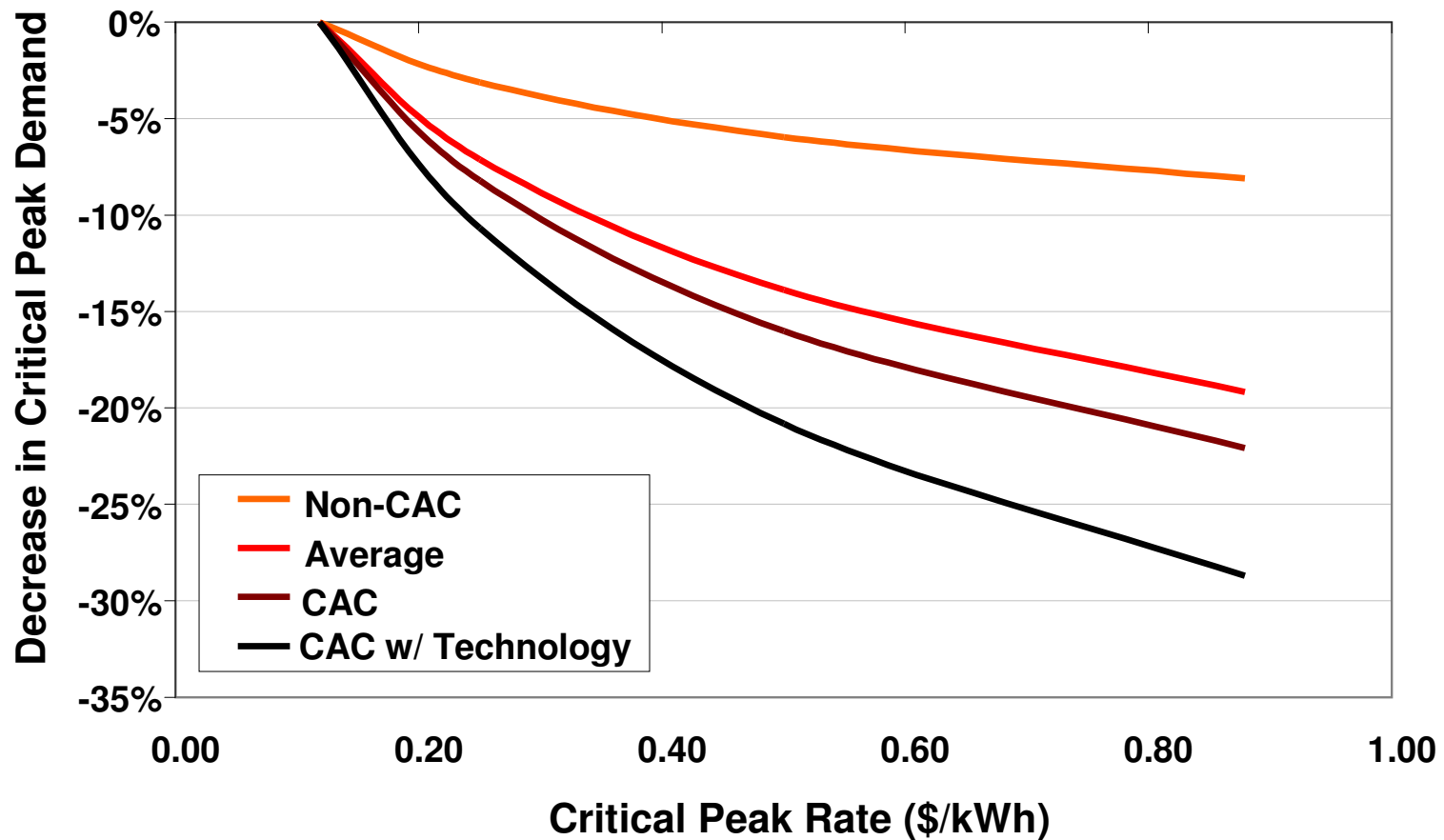
Role of Technology on Pilot Program Impacts



Note: PSE&G load impacts on CPP days are not provided in the reviewed study. The load impacts are calculated using the reported kWh reductions and an estimate of consumption during peak on CPP days.

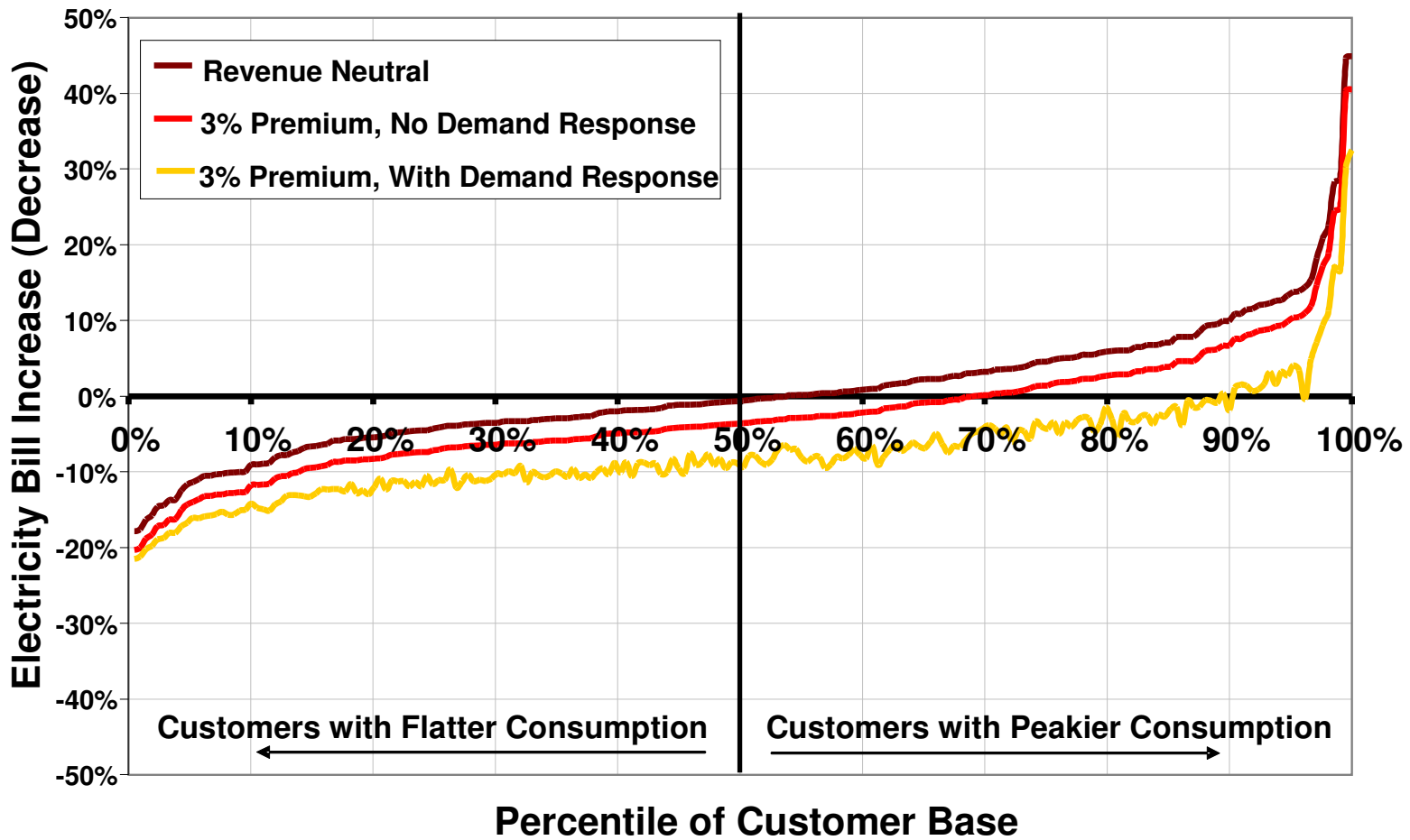
Customer response in the mass market varies by segment

Peak Demand Reduction by Customer Type

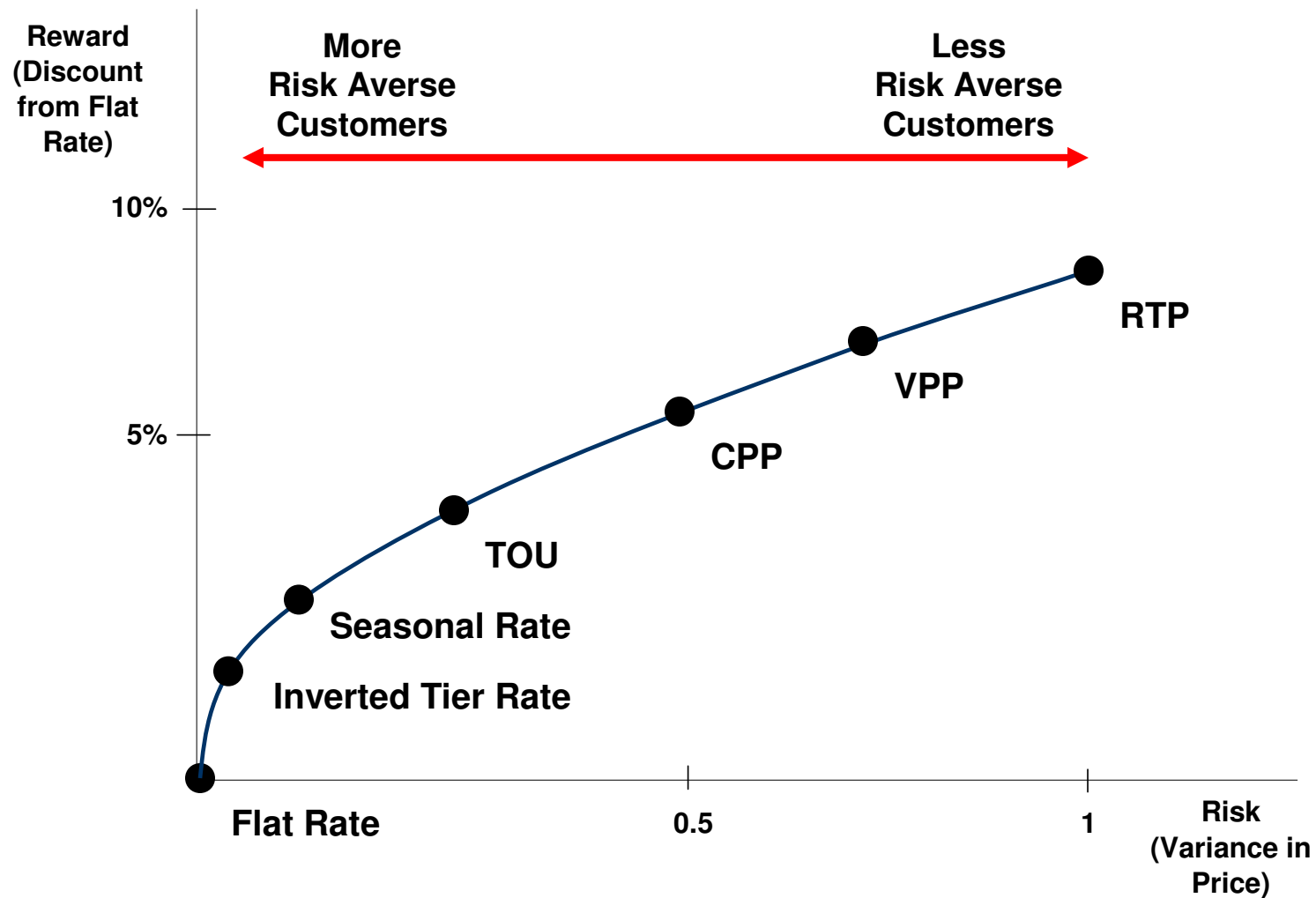


Crediting customers for the hedging premium broadens the appeal of dynamic pricing

Distribution of Bill Impacts High CPP Rate



The way forward is to offer customers a menu of pricing options



The smart grid enables smart energy buying decisions

Providing real-time feedback to customers can lower energy use by a few percentage points

Inclining block rates can reduce energy consumption by up to 6 percent in the short run and may additionally lower peak demand

Dynamic pricing rates can reduce demand by 13 to 27 percent during critical peak periods

These demand reductions will lower energy costs even for the non-participating customers

Taken together, these measures can make a substantial contribution to meeting Illinois' future energy needs at a reasonable cost

The digital library

- **Ahmad Faruqi, “Inclining toward Energy Efficiency,” Public Utilities Fortnightly, August 2008**
- **Ahmad Faruqi and Sanem Sergici, “The Power of Experimentation,” Discussion Paper, The Brattle Group, May 11, 2008 (Downloadable from www.brattle.com)**
- **The Brattle Group, “Quantifying the benefits of dynamic pricing,” Edison Electric Institute, January 2008 (Downloadable from www.eei.org/ami)**
- **Plexus Research, Inc., “Deciding on Smart Meters,” Edison Electric Institute, September 2006 (Downloadable from www.eei.org/ami)**
- **Federal Energy Regulatory Commission, “Demand Response and Advanced Metering,” Staff Report, August 2007 (Downloadable from www.ferc.gov)**
- **US Department of Energy, “Benefits of Demand Response in Electricity Markets and Recommendations for Achieving Them,” February 2006 (Downloadable from www.oe.energy.gov/information_center/reports.htm)**