

Communicating Thermostats for Residential Time-of-Use Rates:

They Do Make a Difference

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Authors of the Report

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Goals of the Pilot

- To understand how residential customers react to price signals (Time-of-Use Rates)
- To test residential customer reaction to the opportunity to conserve when power is in peak demand (Critical Peak Period Rates)
- To learn if enabling technology (communicating programmable thermostats) can help customers save more and improve on behavioral response to those rates

Overview of the myPower Pilot

700 customers were recruited to be billed on a special myPower rate for a year and a half.

The myPower rate included TOU and CPP components.

Half of the customers received a programmable thermostat that could automatically respond to TOU and CPP events based on criteria set in advance by the customer.

A matched control group of 450 customers was developed to provide baseline data.

Two types of price signals were used

Time-of-Use rates (TOU) and Critical Peak Pricing rates (CPP)

	Summer				Non Summer					
	Jun-Sept 2006		Jun-Sept 2007		Oct 2007		Nov '06-Mar '07		Apr-May 2007	
	M-F	SS	M-F	SS	M-F	SS	M-F	SS	M-F	SS
9AM-1PM										
1PM-5PM	On-Pk & Critical	Base	On-Pk & Critical	Base		Base		Base		Base
5PM-6PM					Critical		On-Pk & Critical		Critical	
6PM-9PM										
9PM-10PM										
10PM-6AM	Night		Night		Night		Night		Night	
6AM-9AM					Base		Base		Base	

Base Rate	9.2032¢	8.6775¢	8.667¢	8.667¢	8.667¢
Night	- 5¢	- 5¢	- 4¢	- 4¢	- 4¢
On-Peak	+ 8¢	+ 15¢		+ 3¢	
Crit-Peak	+ 69¢	+ \$1.37	+ 23¢	+ 23¢	+ 23¢

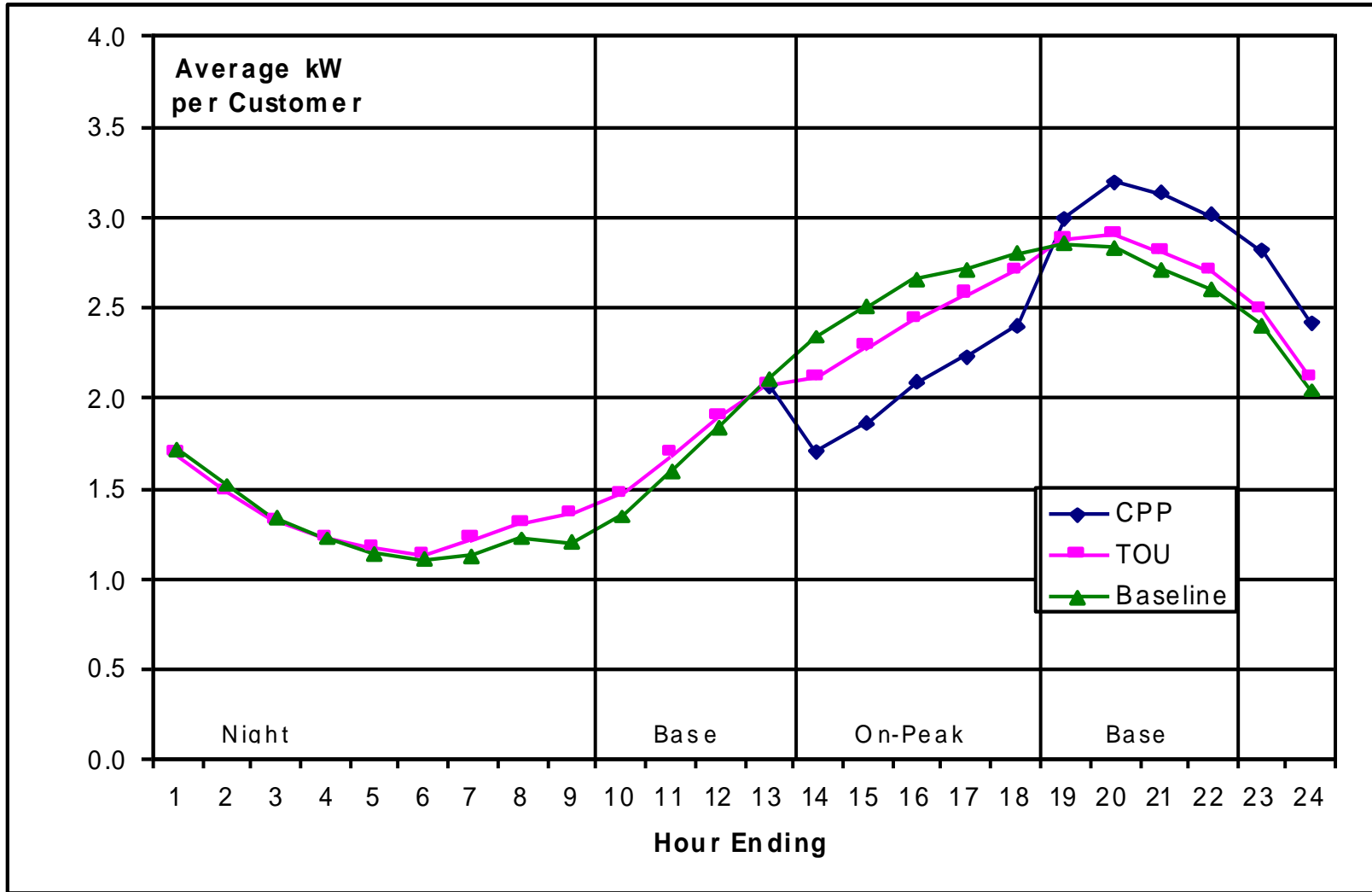
Summer Peak Day Impacts

Both groups of participants showed demand reduction in response to the TOU and CPP rates.

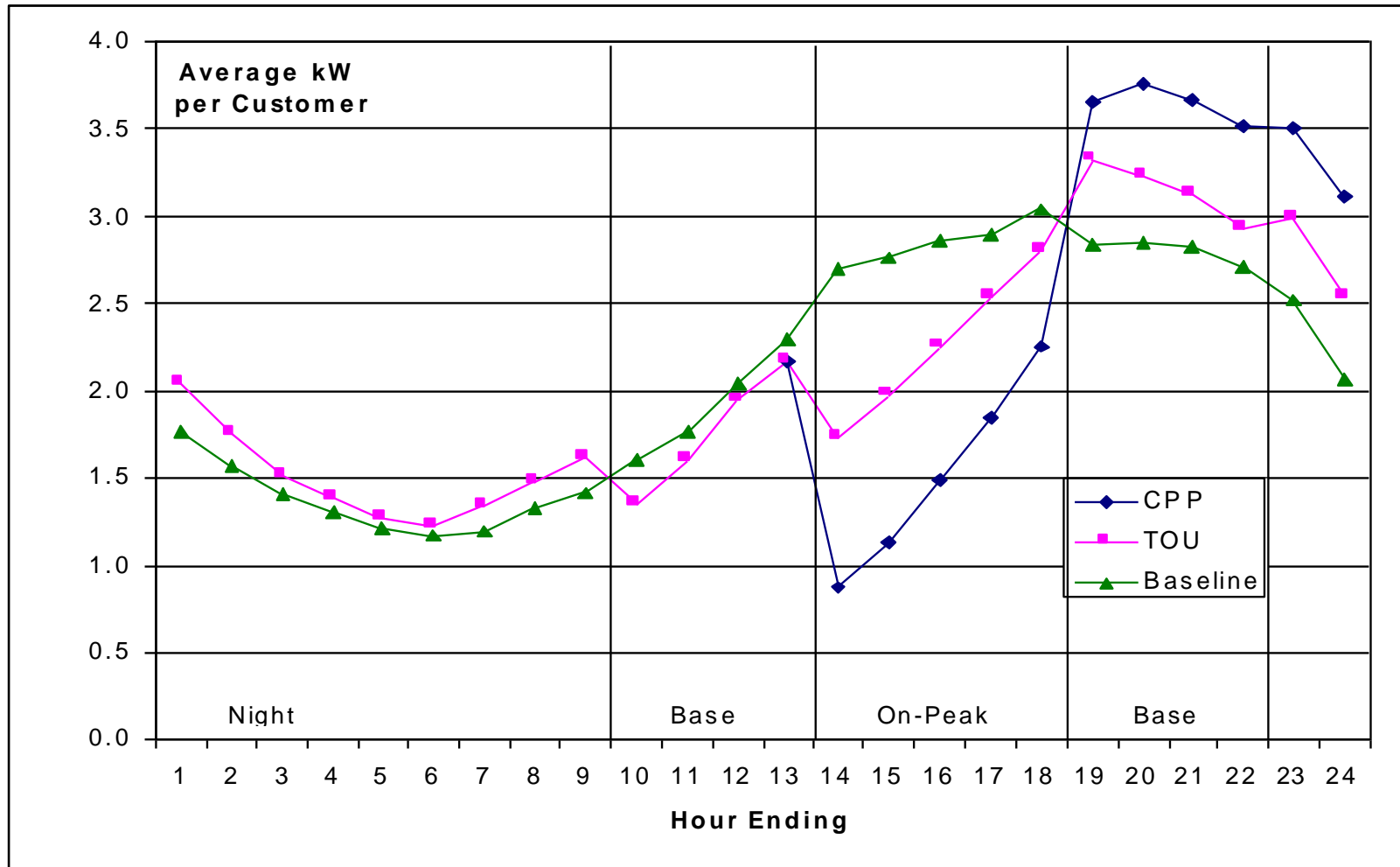
The reduction was substantially greater for those customers that had received programmable communicating thermostats.



Hottest Summer Days – Information Only Group



Hottest Summer Days – Technology Enhanced Group



TOU and CPP Demand Reduction on Summer Peak Days in 2006 and 2007

Segment	Baseline Avg On Peak kW	TOU On-Peak Period Reduction		Additional CPP Reduction		TOU Plus CPP Reduction	
		kW	%	kW	%	kW	%
Technology Enhanced with Central AC	2.85	0.59	21%	0.74	26%	1.33	47%
Information Only with Central AC	2.60	0.07	3%	0.36	14%	0.43	17%

Source: Summit Blue analysis of PSEG myPower data

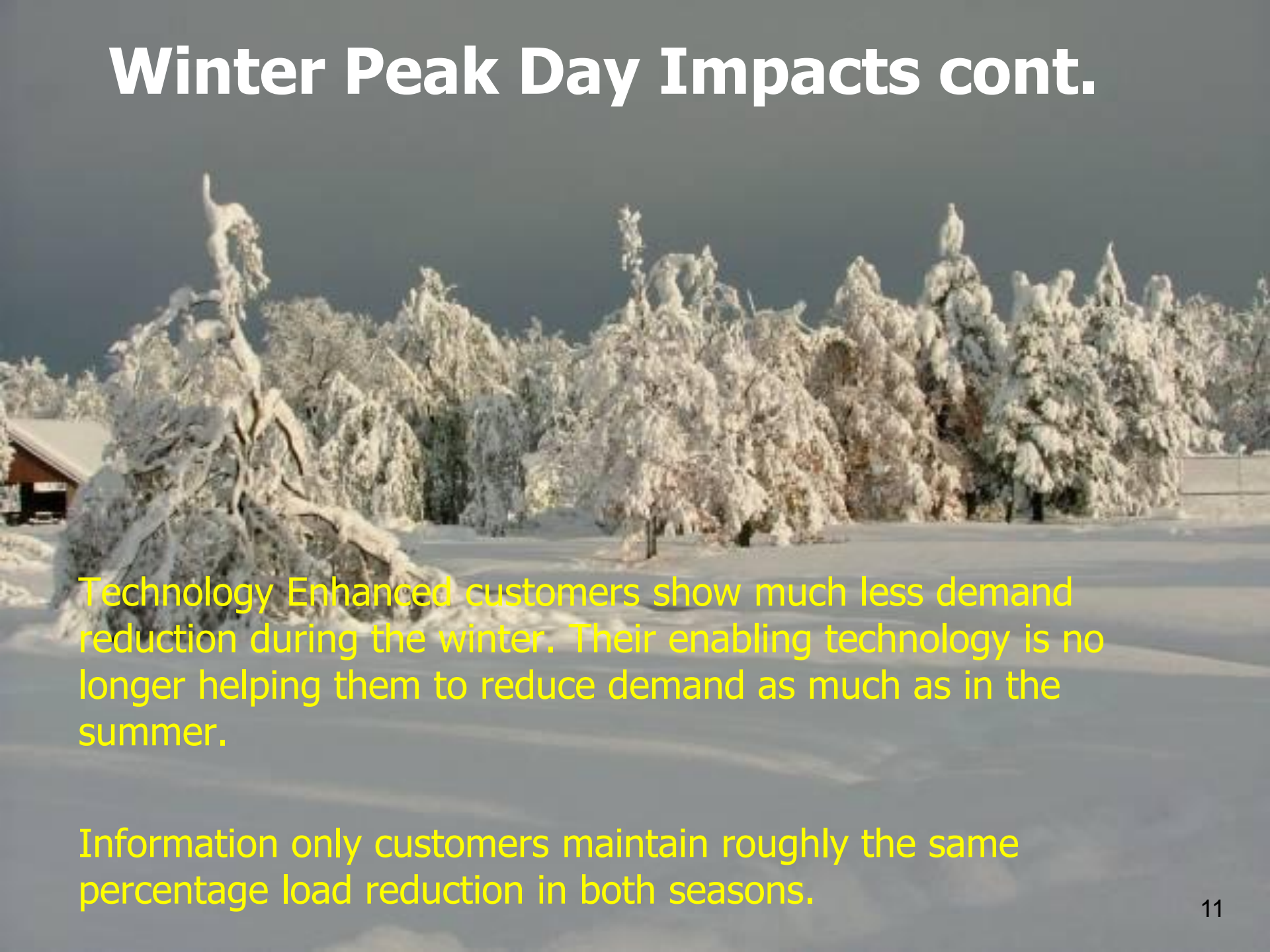
Winter Peak Day Impacts

Programmable thermostats control both heating and cooling load. Large electric load reductions are expected in summer because air-conditioning is an electric end-use. However, few customers have electric space heat so the thermostat is not expected to have a large effect on winter loads.

Winter peaks are different than summer peaks. These peaks are shorter and occur later in the day, from 5:00 p.m. to 9:00 p.m.

Winter total loads are much lower than in the summer, and rate differentials are much lower.

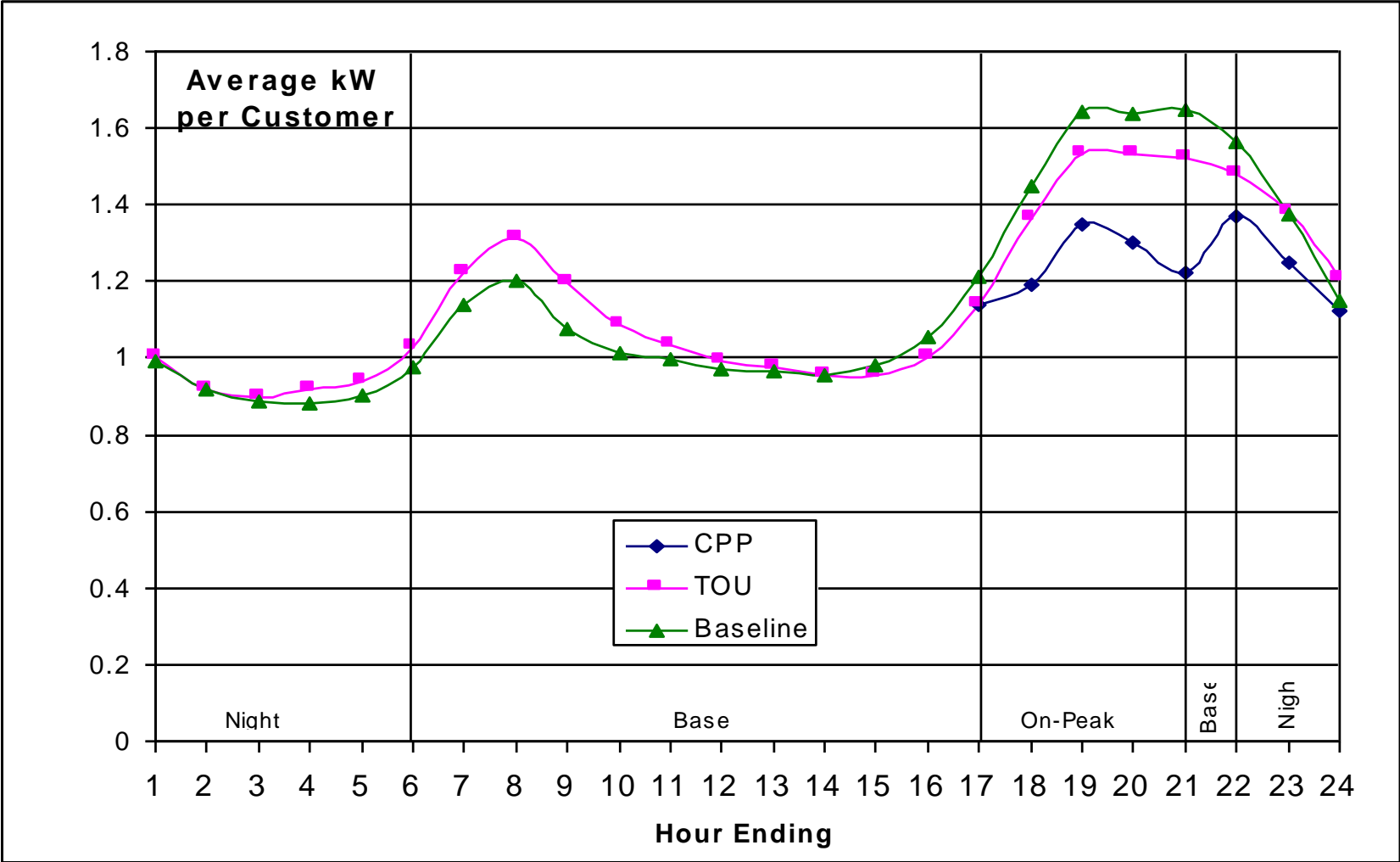
Winter Peak Day Impacts cont.

A photograph of a winter landscape. The ground is covered in a thick layer of snow. In the foreground, there are several trees heavily laden with snow, their branches drooping under the weight. In the background, a line of more snow-covered trees stretches across the horizon. To the left, a portion of a brown building with a dark roof is visible. The sky is a clear, pale blue.

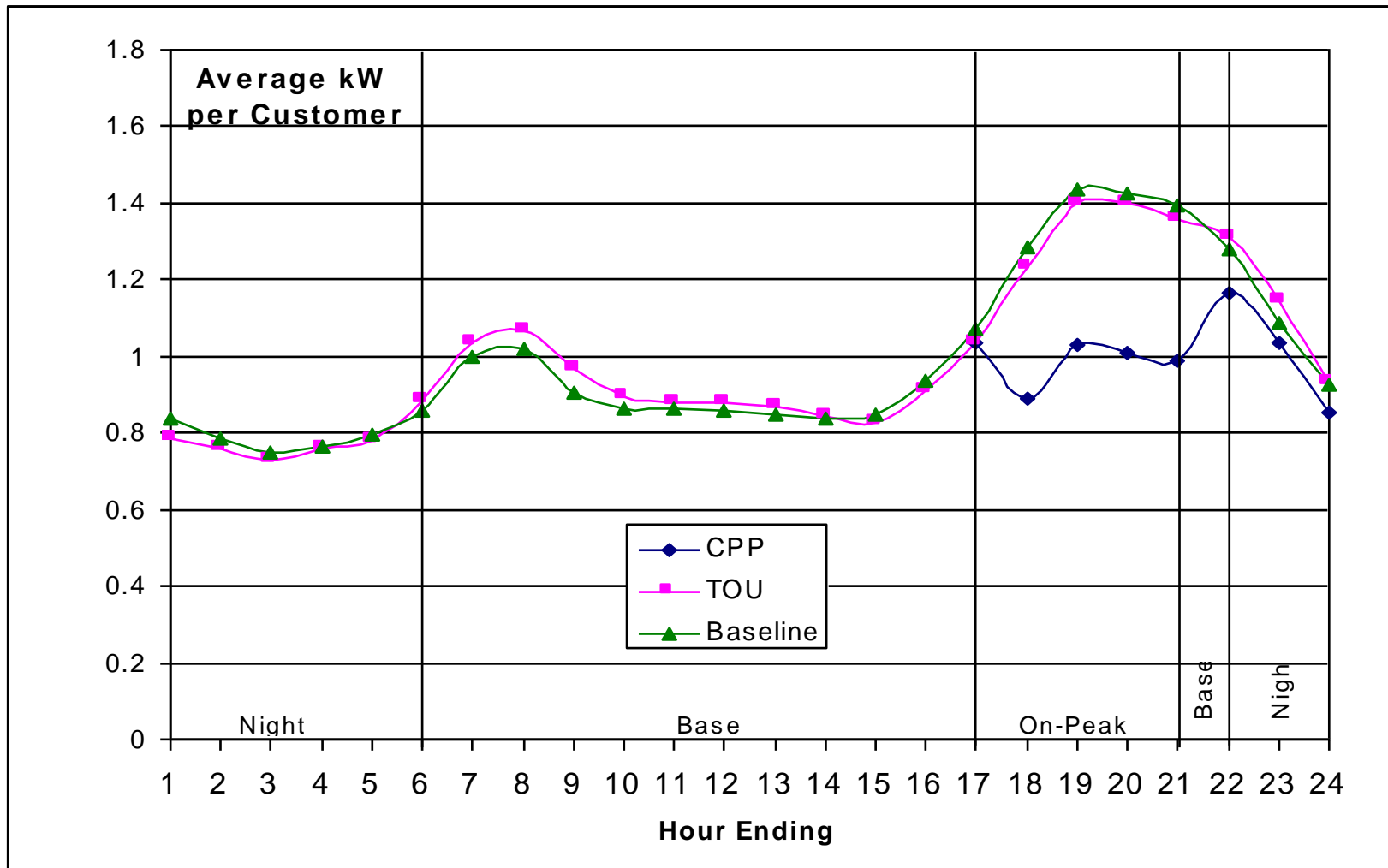
Technology Enhanced customers show much less demand reduction during the winter. Their enabling technology is no longer helping them to reduce demand as much as in the summer.

Information only customers maintain roughly the same percentage load reduction in both seasons.

Coldest Winter Days – Information Only Group



Coldest Winter Days – Technology Enhanced Group



TOU and CPP Demand Reduction on Winter Days 2006/2007 Season

Segment	Baseline Avg On Peak kW	TOU On-Peak Period Reduction		Additional CPP Reduction		TOU Plus CPP Reduction	
		kW	%	kW	%	kW	%
Technology Enhanced	1.39	0.04	3%	0.37	27%	0.41	30%
Information Only with Central AC	1.59	0.11	7%	0.22	14%	0.33	21%

Note: On Peak hours are 1:00p.m. to 6:00 p.m. in summer, and 5:00 p.m. to 9:00 p.m. in winter.

Source: Summit Blue analysis of PSEG myPower data

Energy Savings

Customers who only received information created greater year-round energy savings on a percentage basis.

	Summer Energy Savings	Winter Energy Savings
Technology Enhanced	3.3%	0.0%
Information Only	3.7%	1.7%

Secondary Finding

It is thought that Information Only customers needed to change their behavioral energy use patterns during the summer to benefit from the TOU and CPP rates. This raised their energy consciousness which was reflected in actions throughout the year.

The technology enhanced participants only needed to program their thermostat once to achieve summer benefits from the rates. They did not have to make regular changes in their energy-using behavior. During the winter season they did little to change their regular energy use behaviors.

Customer Satisfaction

Satisfaction was based on a 10 point scale where 10 was extremely satisfied.

Technology enhanced customers rated the program 7.4

Information only customers rated the program 7.7

Bill savings was the most frequently cited reason for program satisfaction for both groups of customers.

Bill savings was also the main reason for dissatisfaction. Some customers had expected greater bill saving than they attained.

Customer Info on Bill Savings

Each monthly bill showed a comparison of the customer's actual bill under the myPower program and what their bill would have been had they used the same amount of electricity under the otherwise applicable Residential Service (RS) rate schedule.

The bill also provided a similar comparison of program-to-date impacts.

Average Bill Impacts

	Higher Bills		Lower Bills	
	Percent of Customers	Average Annual Bill Increase	Percent of Customers	Average Annual Bill Decrease
Technology Enhanced	14%	\$44.41	86%	(\$156.91)
Information Only	29%	\$44.36	71%	(\$95.88)

Conclusion

The summer peak impact: Both groups of participants showed demand reduction in response to the TOU and CPP rates. The reduction was substantially greater for those customers that had received programmable, communicating thermostats. The electric demand reduction was primarily due to reduction in air-conditioning load.

The winter peak impact: During the winter months when air-conditioners were not in use the achieved demand reduction was similar for both Technology Enabled customers and Information Only customers. The total level of demand reduction in winter was less than summer.

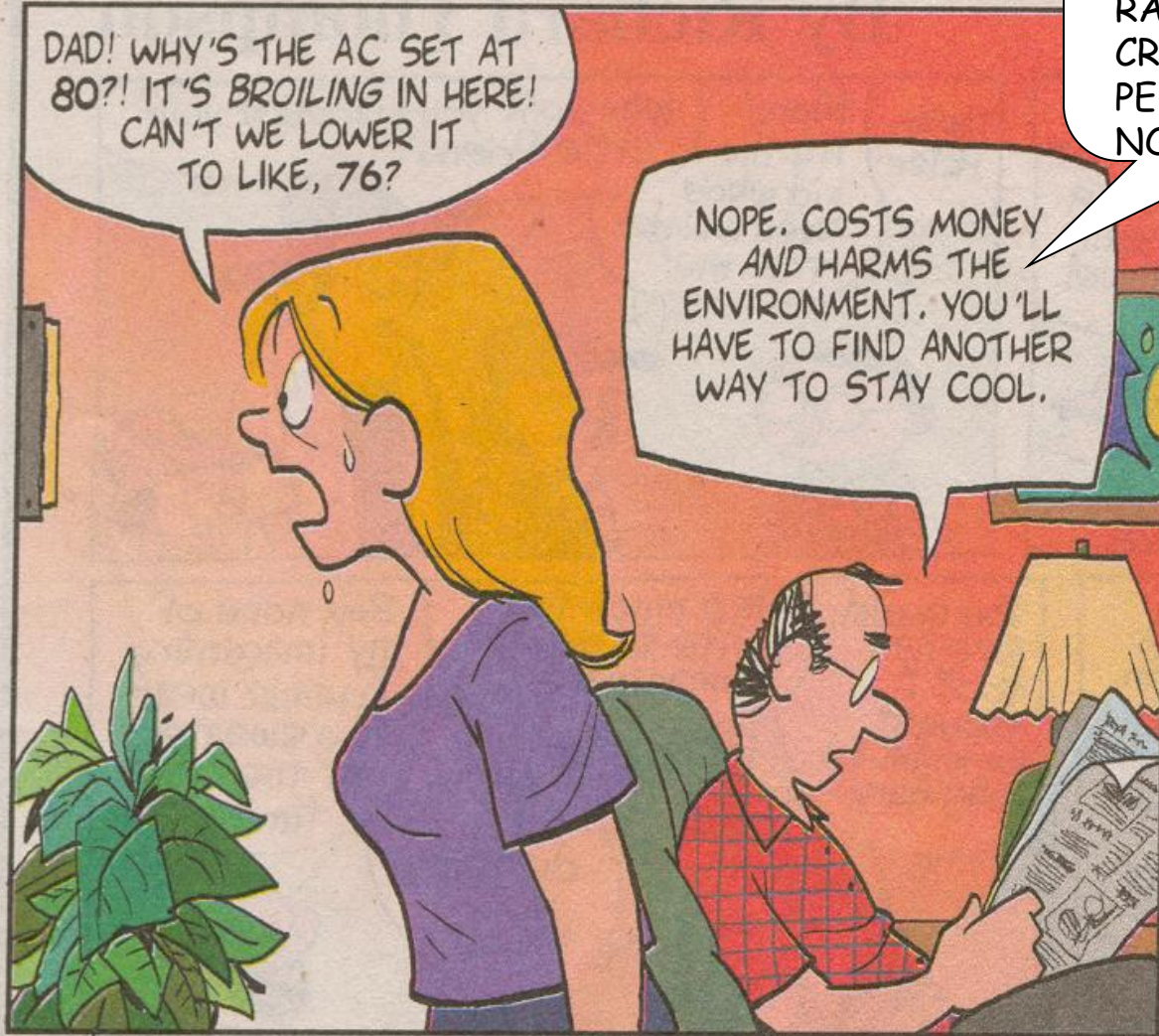
The annual energy savings: Information only customers created greater year-round energy savings on a percentage basis.

LUANN

DAD! WHY'S THE AC SET AT 80?! IT'S BROILING IN HERE!
CAN'T WE LOWER IT TO LIKE, 76?

NOPE. COSTS MONEY AND HARMS THE ENVIRONMENT. YOU'LL HAVE TO FIND ANOTHER WAY TO STAY COOL.

PLUS, WE'RE SAVING MONEY ON THE myPOWER RATE. IT'S A CRITICAL PEAK PERIOD RIGHT NOW.



By Greg Evans

