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Enabling Technologies for Small Customers on Dynamic Pricing – 2005 Update

DR ETD - TAC Presentation to UCB DR Research Team

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Background

- In 2003, California embarked on Statewide Pricing Pilot (SPP), a study to determine customer responsiveness to dynamic pricing rates
  - Time of Use (two part)
  - Critical Peak Pricing (Fixed)
  - Critical Peal Pricing (Variable)
- $12M study designed to develop inputs into Advanced Metering Infrastructure business cases for 2005
- New areas of research needed for rate design, customer behavior, and technology applications

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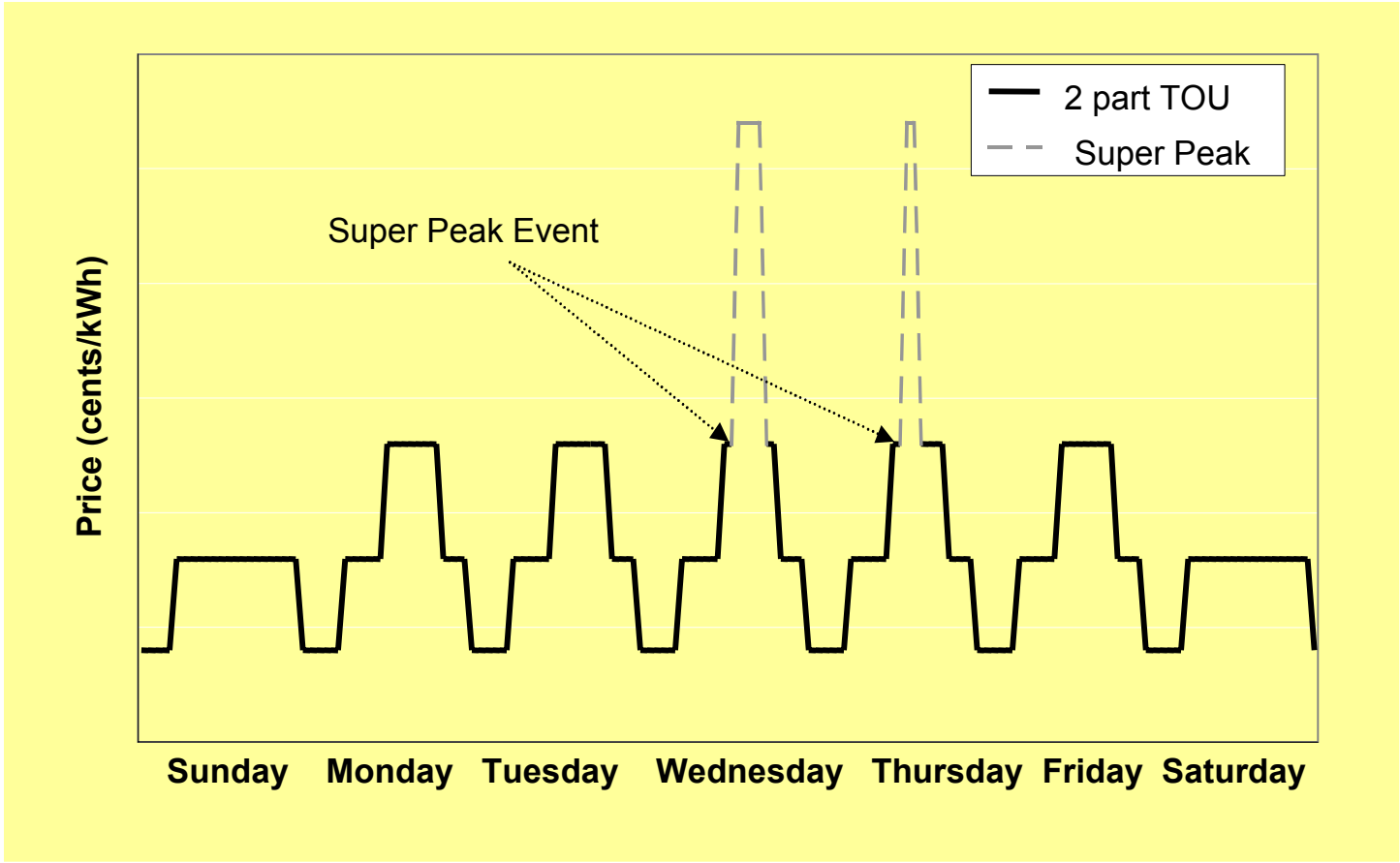
Example of Critical Peak Pricing



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Critical Peak Pricing Rate Concept

CPP-V (Smart Shift and Save)

- Residential and commercial rate
  - Peak period between noon and 6 pm on weekdays
  - Off peak all other times
- 15 times a year customer experiences “Super Peak” period of either 2 or 5 hours in duration
- Price of electricity goes up about 3 to 5 times normal rate during Super Peak
- Customers are alerted by telephone that morning that a Super Peak period will be coming
- Customers are also offered a “smart thermostat”

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Smart Thermostat – Enabling Technology

- CPP-V customers were offered “smart thermostats” as basic enabling technology
- These thermostats automatically adjust customer’s HVAC temperature during Super Peak period
- Residential customers were also offered water heater and pool pump controls
- Some commercial customers were offered small energy management systems
- CPP-V group showed highest rate of responsiveness in the pricing pilot, but not a strong as expected

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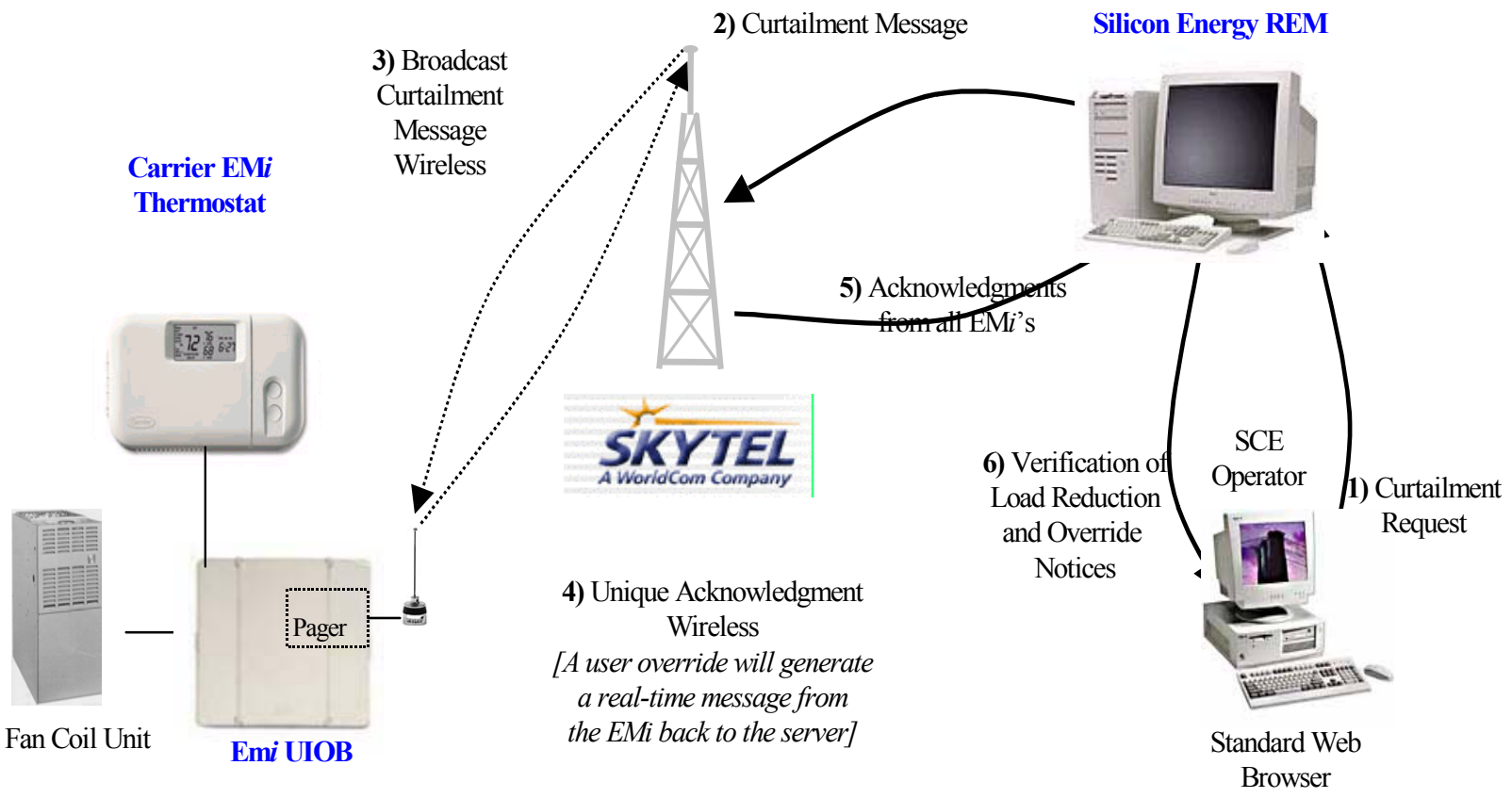
SCE and SDG&E Smart Thermostat



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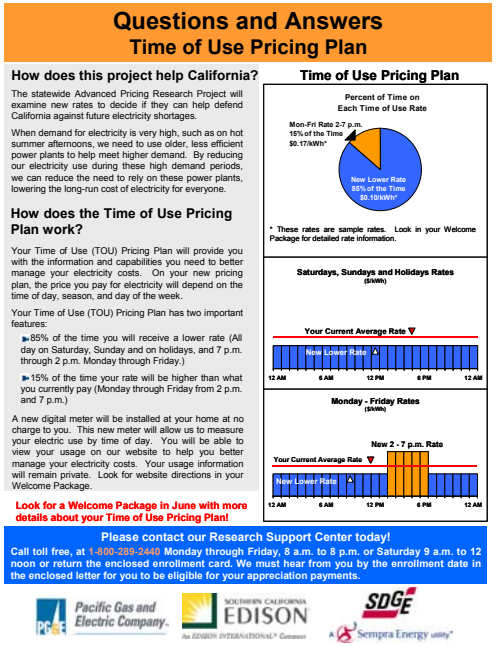
Current CPP Rate Materials & Feedback

- Enrollment marketing materials
- SPP Welcome Package explaining
  - Rates
  - Actions to take
- End of OAT billing statement
- Bill comparison statement (bi-annual)
- SPP monthly billing statement
- Outbound telephone calls (SPP events)
- Internet access to energy usage web site
- Refrigerator magnet



Questions and Answers
Time of Use Pricing Plan

How does this project help California?

The statewide Advanced Pricing Research Project will examine new rates to decide if they can help defend California against future electricity shortages.

When demand for electricity is very high, such as on hot summer afternoons, we need to use older, less efficient power plants to help meet higher demand. By reducing our electricity use during these high demand periods, we can reduce the need to rely on these power plants, lowering the long-run cost of electricity for everyone.

How does the Time of Use Pricing Plan work?

Your Time of Use (TOU) Pricing Plan will provide you with the information and capabilities you need to better manage your electricity costs. On your new pricing plan, the price you pay for electricity will depend on the time of day, season, and day of the week.

Your Time of Use (TOU) Pricing Plan has two important features:

- 85% of the time you will receive a lower rate (All day on Saturday, Sunday and on holidays, and 7 p.m. through 2 p.m. Monday through Friday.)
- 15% of the time your rate will be higher than what you currently pay (Monday through Friday from 2 p.m. and 7 p.m.)

A new digital meter will be installed at your home at no charge to you. This new meter will allow us to measure your electric use by time of day. You will be able to view your usage on our website to help you better manage your electricity costs. Your usage information will remain private. Look for website directions in your Welcome Package.

Look for a Welcome Package in June with more details about your Time of Use Pricing Plan!

Time of Use Pricing Plan

Percent of Time on Each Time of Use Rate

Mon-Fri Rate 2-7 p.m. 15% of the Time $0.17/kWh*

New Lower Rate 85% of the Time $0.10/kWh*

* These rates are sample rates. Look in your Welcome Package for detailed rate information.

Saturdays, Sundays and Holidays Rates
($/kWh)

Your Current Average Rate

New Lower Rate

12 AM 6 AM 12 PM 6 PM 12 AM

Monday - Friday Rates
($/kWh)

New 2 - 7 p.m. Rate

Your Current Average Rate

New Lower Rate

12 AM 6 AM 12 PM 6 PM 12 AM

Please contact our Research Support Center today!
Call toll free, at 1-800-289-2440 Monday through Friday, 8 a.m. to 8 p.m. or Saturday 9 a.m. to 12 noon or return the enclosed enrollment card. We must hear from you by the enrollment date in the enclosed letter for you to be eligible for your appreciation payments.

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Potential Enhanced CPP Treatments

- SPP specific web site (what to do when you want to "Smart Shift and Save")
- More timely inbound usage feedback
  - Post event notice (email and letter)
  - Monthly comparison bill or statement
- SPP "Report Card" or activity report
- Additional event or price notification
- In-home usage or energy display
- Additional enabling technologies

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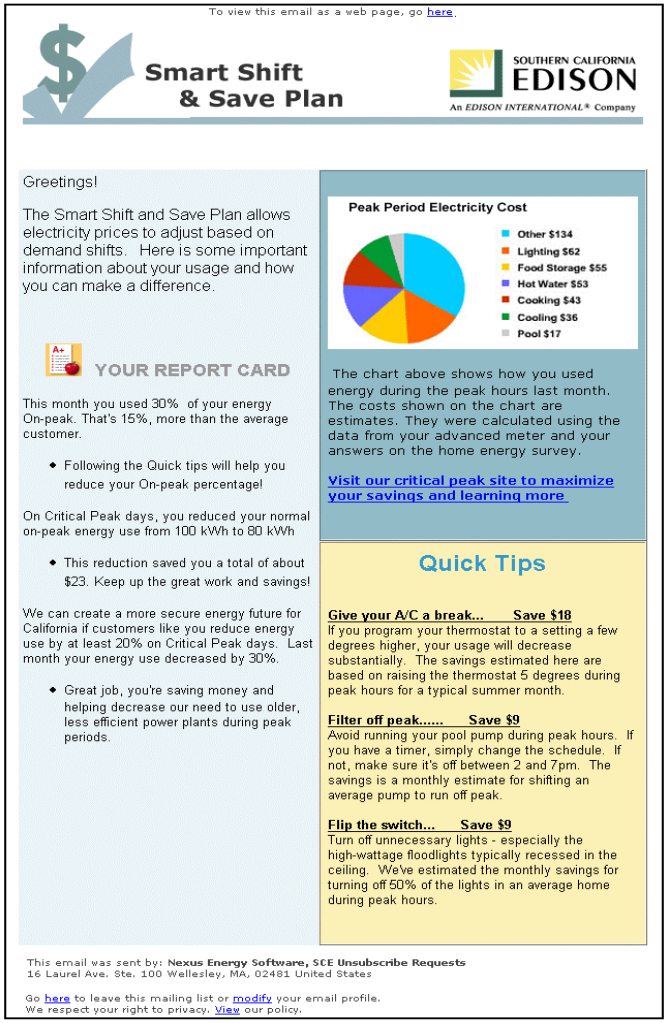

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Smart Shift & Save Plan

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Greetings!

The Smart Shift and Save Plan allows electricity prices to adjust based on demand shifts. Here is some important information about your usage and how you can make a difference.

YOUR REPORT CARD

This month you used 30% of your energy On-peak. That's 15%, more than the average customer.

- Following the Quick tips will help you reduce your On-peak percentage!

On Critical Peak days, you reduced your normal on-peak energy use from 100 kWh to 80 kWh

- This reduction saved you a total of about $23. Keep up the great work and savings!

We can create a more secure energy future for California if customers like you reduce energy use by at least 20% on Critical Peak days. Last month your energy use decreased by 30%.

- Great job, you're saving money and helping decrease our need to use older, less efficient power plants during peak periods.

Peak Period Electricity Cost

The chart above shows how you used energy during the peak hours last month. The costs shown on the chart are estimates. They were calculated using the data from your advanced meter and your answers on the home energy survey.

Visit our critical peak site to maximize your savings and learning more

Quick Tips

Give your A/C a break... Save $18
If you program your thermostat to a setting a few degrees higher, your usage will decrease substantially. The savings estimated here are based on raising the thermostat 5 degrees during peak hours for a typical summer month.

Filter off peak..... Save $9
Avoid running your pool pump during peak hours. If you have a timer, simply change the schedule. If not, make sure it's off between 2 and 7pm. The savings is a monthly estimate for shifting an average pump to run off peak.

Flip the switch... Save $9
Turn off unnecessary lights - especially the high-wattage floodlights typically recessed in the ceiling. We've estimated the monthly savings for turning off 50% of the lights in an average home during peak hours.

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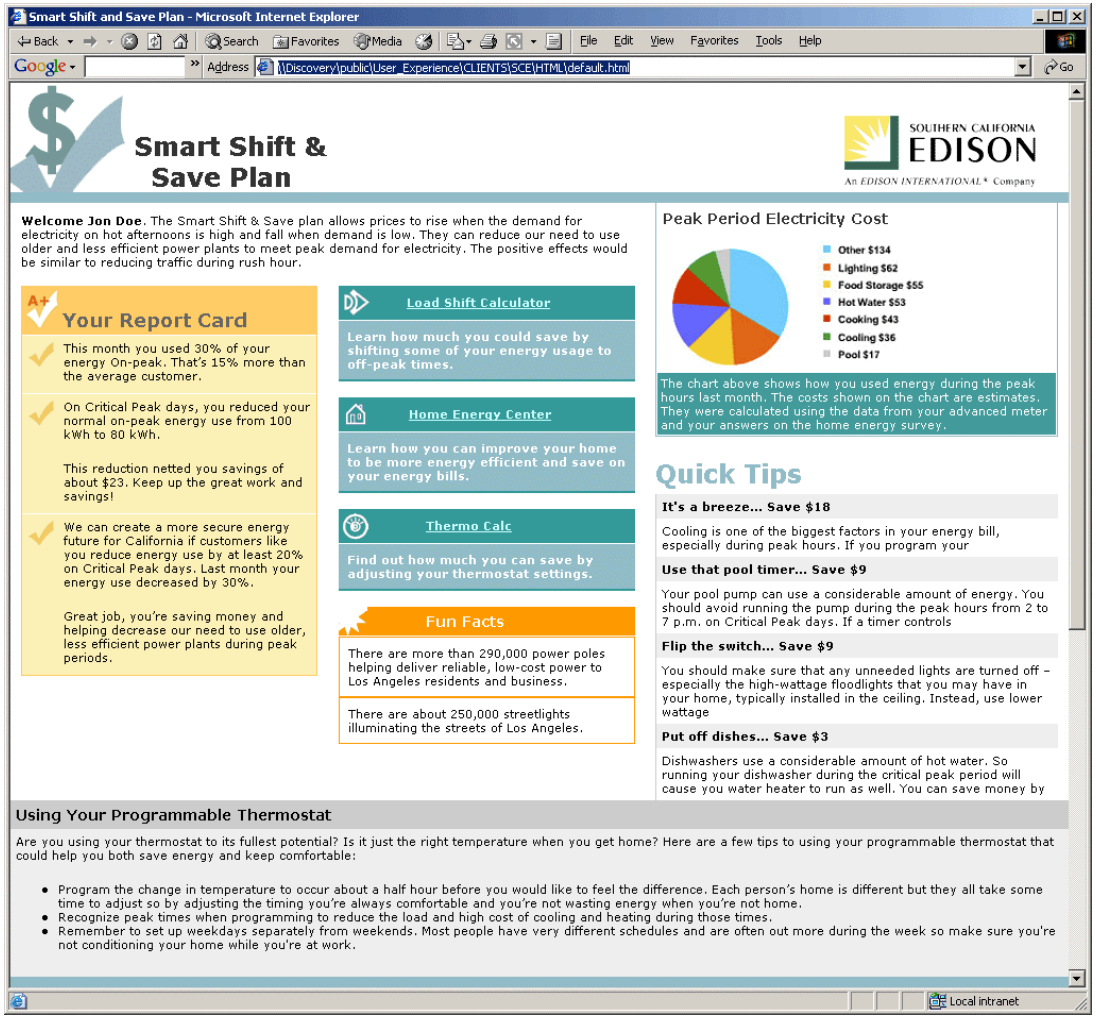

Smart Shift and Save Plan - Microsoft Internet Explorer

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Smart Shift & Save Plan

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Welcome Jon Doe. The Smart Shift & Save plan allows prices to rise when the demand for electricity on hot afternoons is high and fall when demand is low. They can reduce our need to use older and less efficient power plants to meet peak demand for electricity. The positive effects would be similar to reducing traffic during rush hour.

Your Report Card

This month you used 30% of your energy On-peak. That's 15% more than the average customer.

On Critical Peak days, you reduced your normal on-peak energy use from 100 kWh to 80 kWh.

This reduction netted you savings of about $23. Keep up the great work and savings!

We can create a more secure energy future for California if customers like you reduce energy use by at least 20% on Critical Peak days. Last month your energy use decreased by 30%.

Great job, you're saving money and helping decrease our need to use older, less efficient power plants during peak periods.

Load Shift Calculator

Learn how much you could save by shifting some of your energy usage to off-peak times.

Home Energy Center

Learn how you can improve your home to be more energy efficient and save on your energy bills.

Thermo Calc

Find out how much you can save by adjusting your thermostat settings.

Fun Facts

There are more than 290,000 power poles helping deliver reliable, low-cost power to Los Angeles residents and business.

There are about 250,000 streetlights illuminating the streets of Los Angeles.

Peak Period Electricity Cost

The chart above shows how you used energy during the peak hours last month. The costs shown on the chart are estimates. They were calculated using the data from your advanced meter and your answers on the home energy survey.

Quick Tips

It's a breeze... Save $18
Cooling is one of the biggest factors in your energy bill, especially during peak hours. If you program your

Use that pool timer... Save $9
Your pool pump can use a considerable amount of energy. You should avoid running the pump during the peak hours from 2 to 7 p.m. on Critical Peak days. If a timer controls

Flip the switch... Save $9
You should make sure that any unneeded lights are turned off – especially the high-wattage floodlights that you may have in your home, typically installed in the ceiling. Instead, use lower wattage

Put off dishes... Save $3
Dishwashers use a considerable amount of hot water. So running your dishwasher during the critical peak period will cause you water heater to run as well. You can save money by

Using Your Programmable Thermostat

Are you using your thermostat to its fullest potential? Is it just the right temperature when you get home? Here are a few tips to using your programmable thermostat that could help you both save energy and keep comfortable:

- Program the change in temperature to occur about a half hour before you would like to feel the difference. Each person's home is different but they all take some time to adjust so by adjusting the timing you're always comfortable and you're not wasting energy when you're not home.
- Recognize peak times when programming to reduce the load and high cost of cooling and heating during those times.
- Remember to set up weekdays separately from weekends. Most people have very different schedules and are often out more during the week so make sure you're not conditioning your home while you're at work.

Local intranet

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Direct Feedback Methodology

"Push" approach that is scheduled (mailers) or polled on demand (observe) – Options:

1. Provide more frequent information on consequences of customer behavior with energy usage – "Who left all the lights on?"
2. Make price signal and events more obvious to consumer – "in their face"
3. Provide direct usage information on a near real-time basis – behavior modification based on feedback

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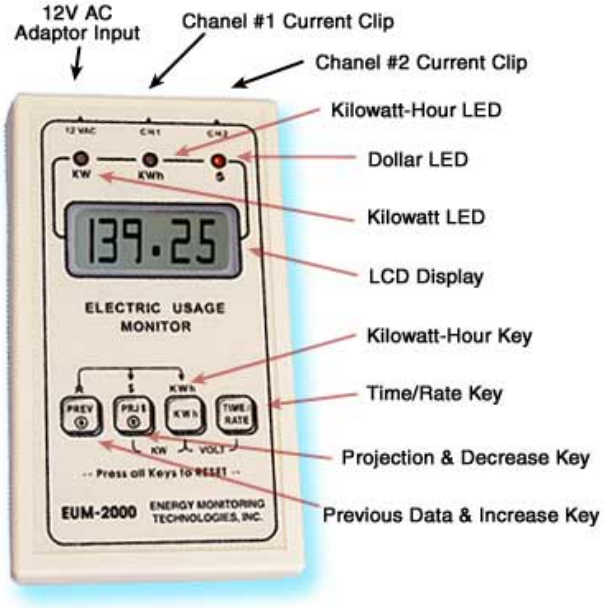
Examples of Direct Feedback Meters



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Display Treatments – Focus Group

- Participants like the idea of a device that
  - Can display energy usage *and* costs
  - Has simpler features
  - Mounts on wall
  - Doesn't have budget feature
- Most think that any notification or display device should be provided by utility to CPP-V customers
- Some participants are willing to pay $25 to $50 for device that notifies them of price and energy usage

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Price & Peak Event Signaling Device

- Using “Energy Orb” from Ambient Devices
- Provides an alternative and non-intrusive information display system for price
- Displays all prices for CPP-V schedule
  - Off-peak (blue)
  - On-peak (green)
  - Warning for super peak (flashing red)
  - Super peak (solid red)
- Also looked into Customer Alert Device by Comverge – adds audible notification
  - green, yellow, and red lights

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SCE Energy Orb™ and Customer Alert Device

Residential Orb

Customer Alert Device (CAD)

Commercial Orb

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Price Notification – Focus Group

- Participants have mixed feelings about orb and CAD (opinions split between PG&E and SCE territory and those in SDG&E area).
- Participant feedback:
  - A few describe orb as “mood light” for energy
  - Some say that while interesting, may be intrusive
  - Most feel it would be a fun concept
  - CAD also useful, especially with beep
- Overall, participants like having large visible display (of some type) to inform them of price changes

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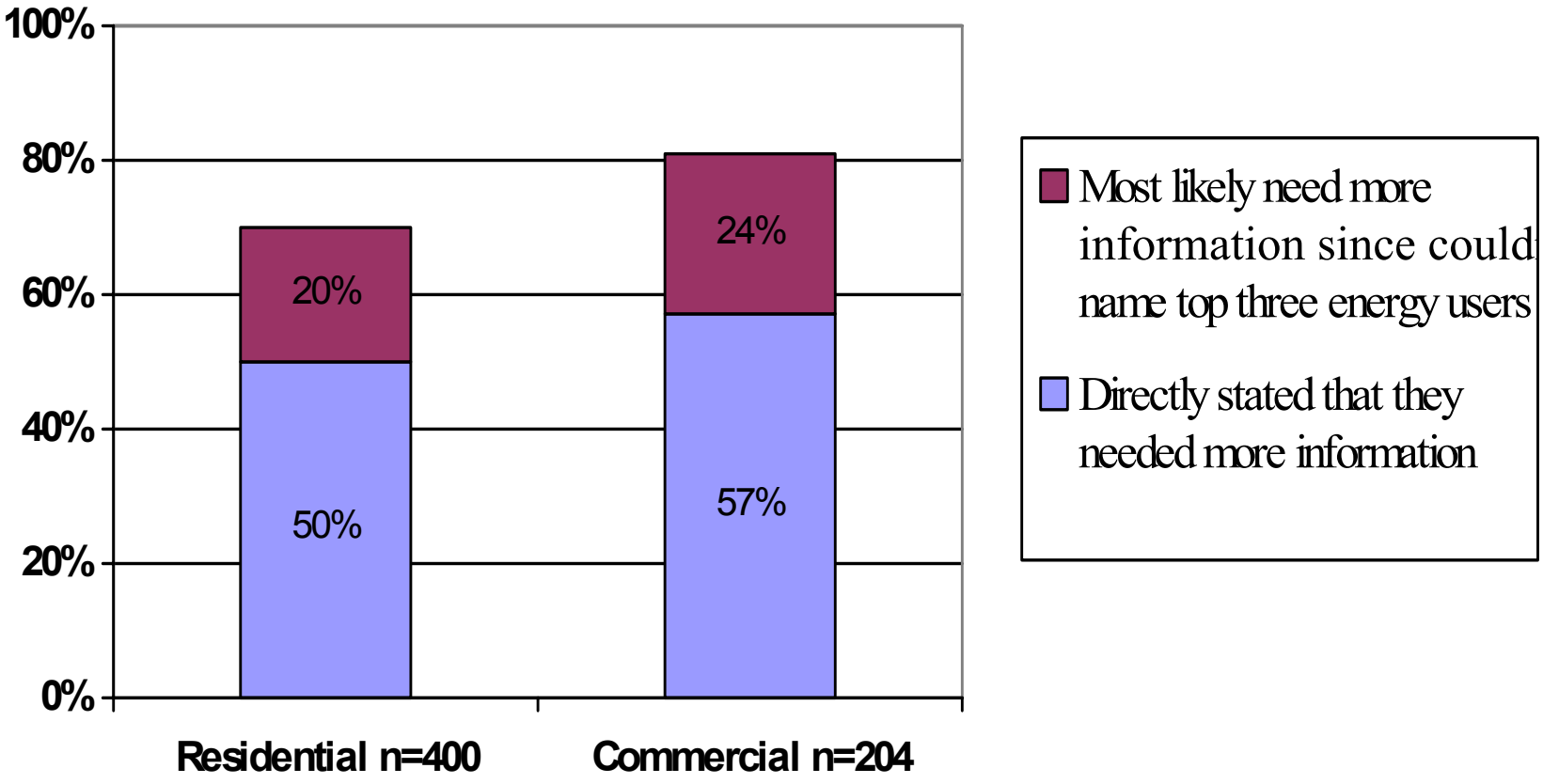
Quantitative Statewide Survey



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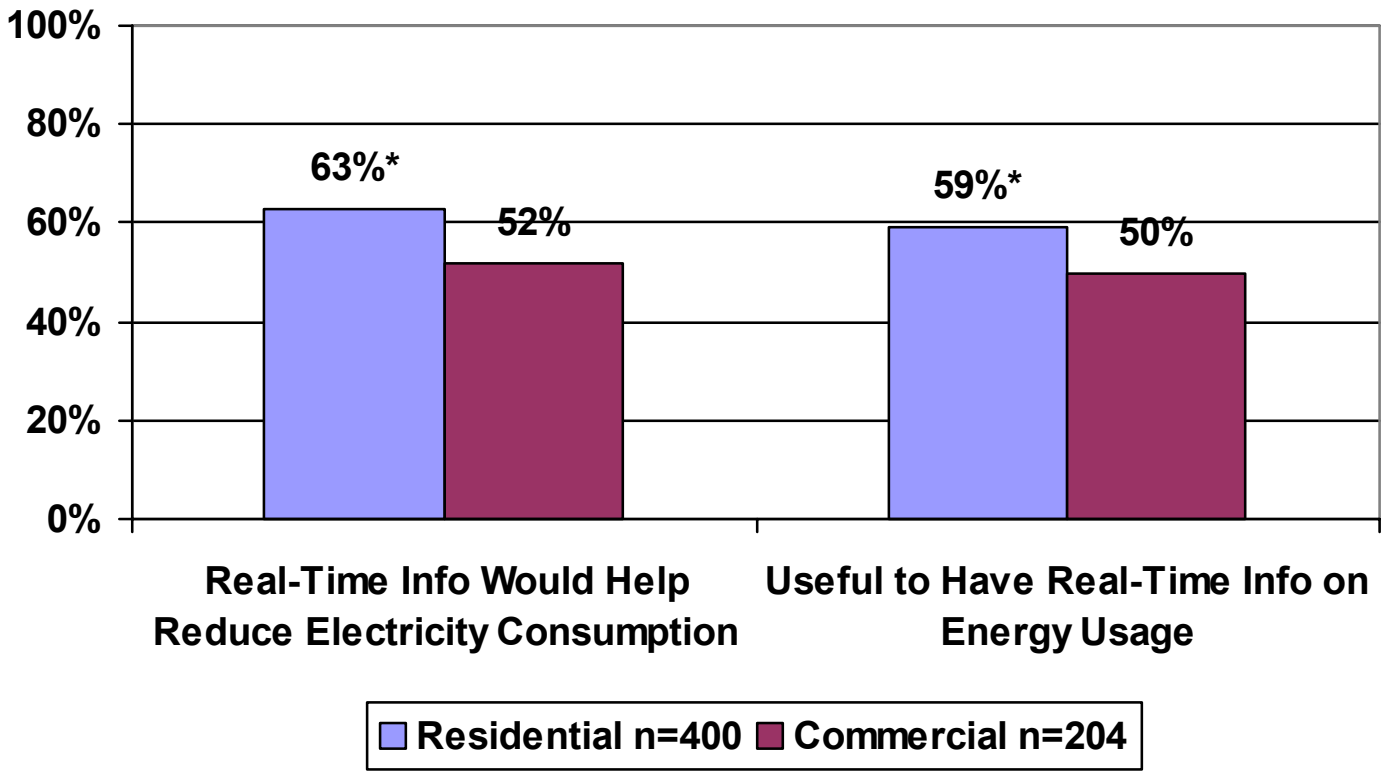
Quantitative Survey Results



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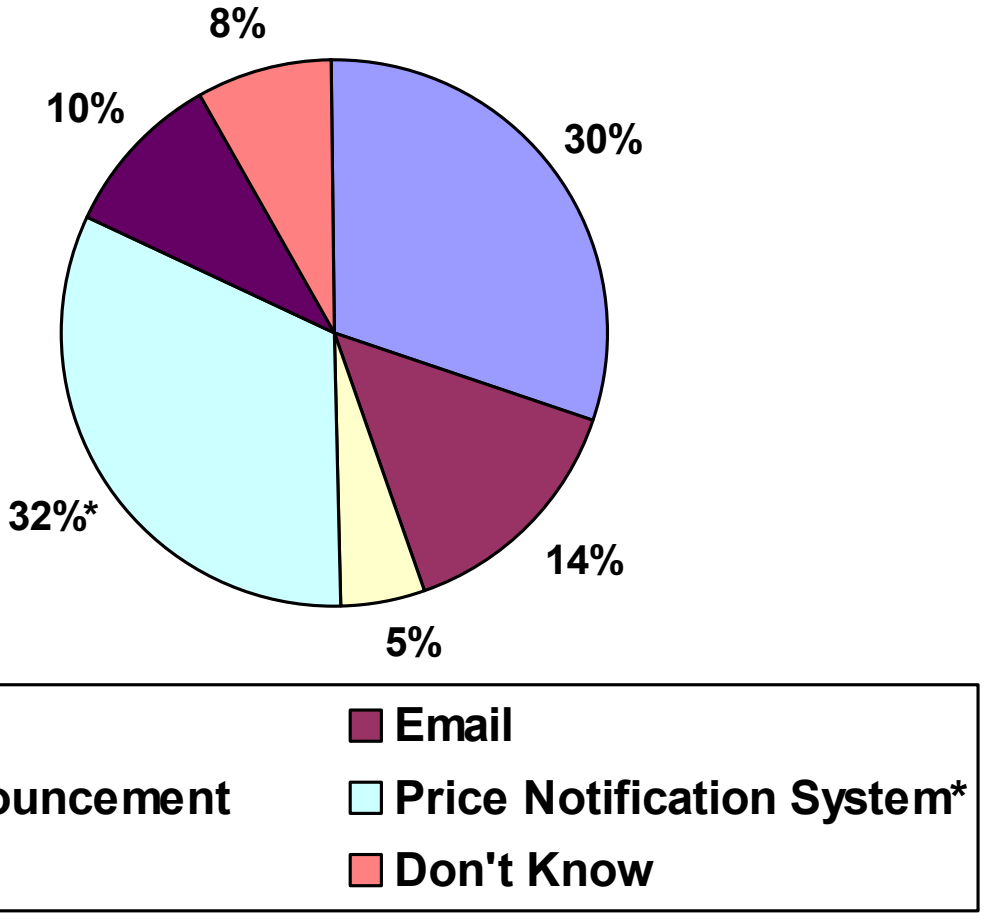
Preferred Method of Event Notification (Residential)



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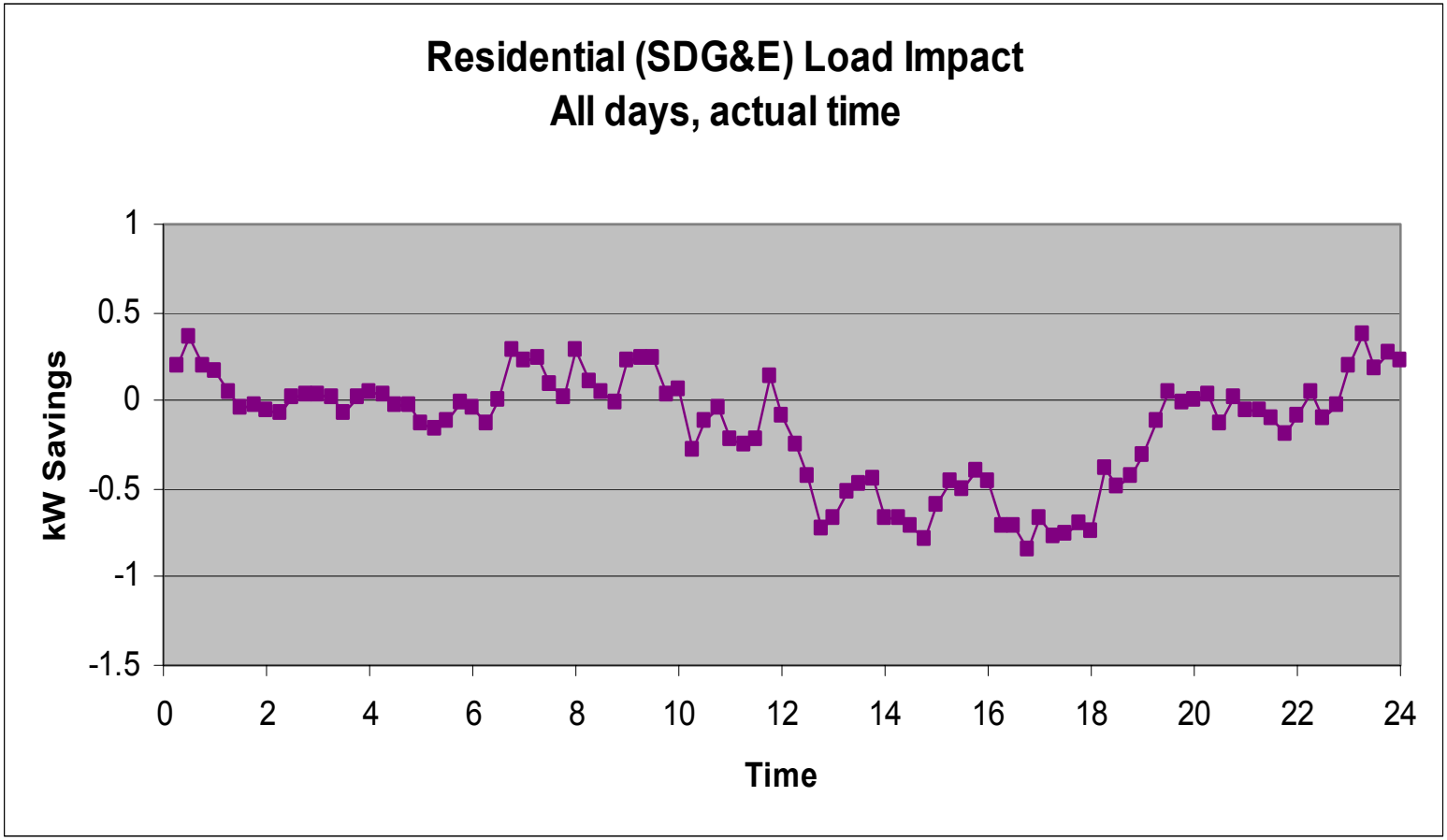
Effect of Local Price and Event Notification



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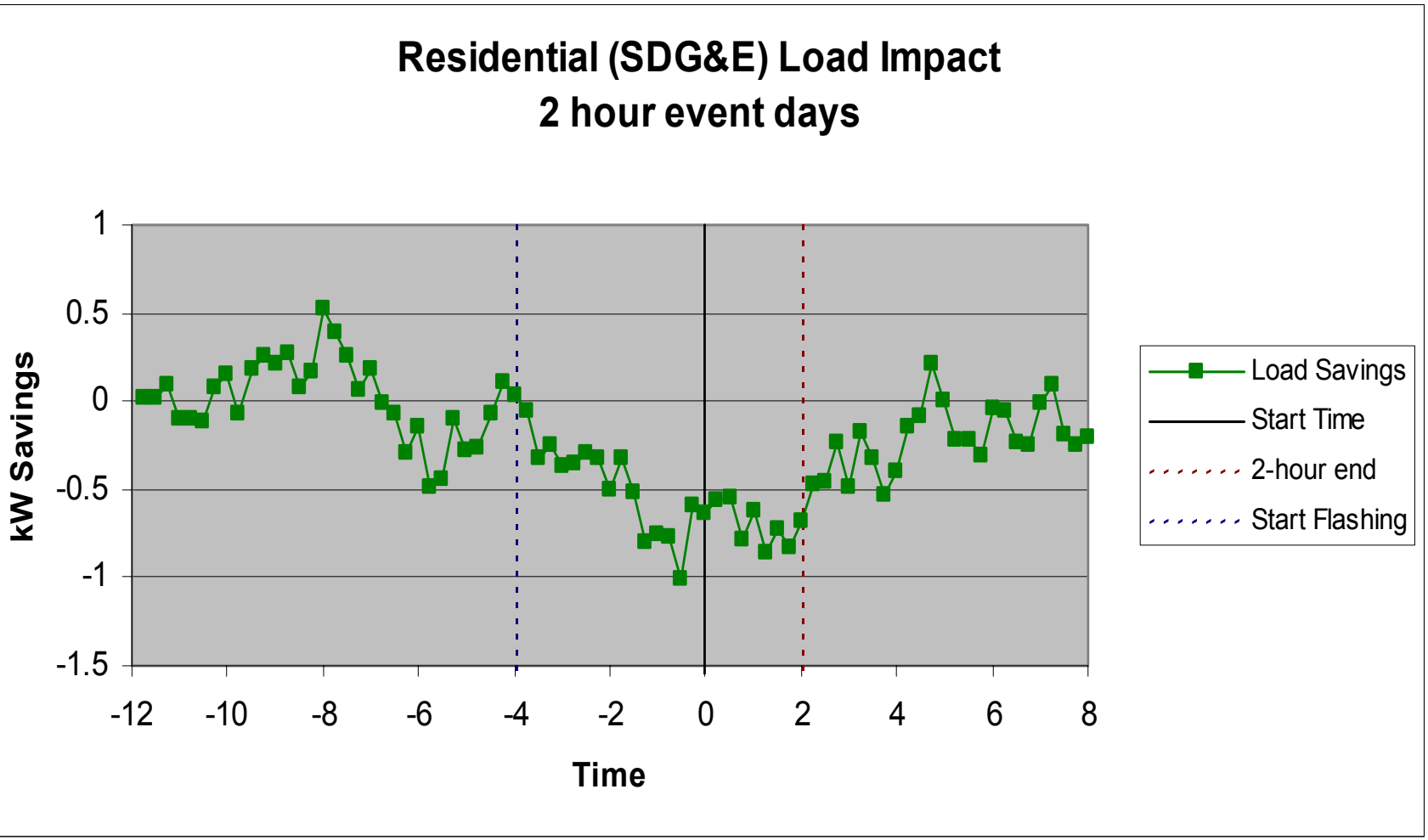
Treatment Effects for Residential Customers, 2-hour CPP event days



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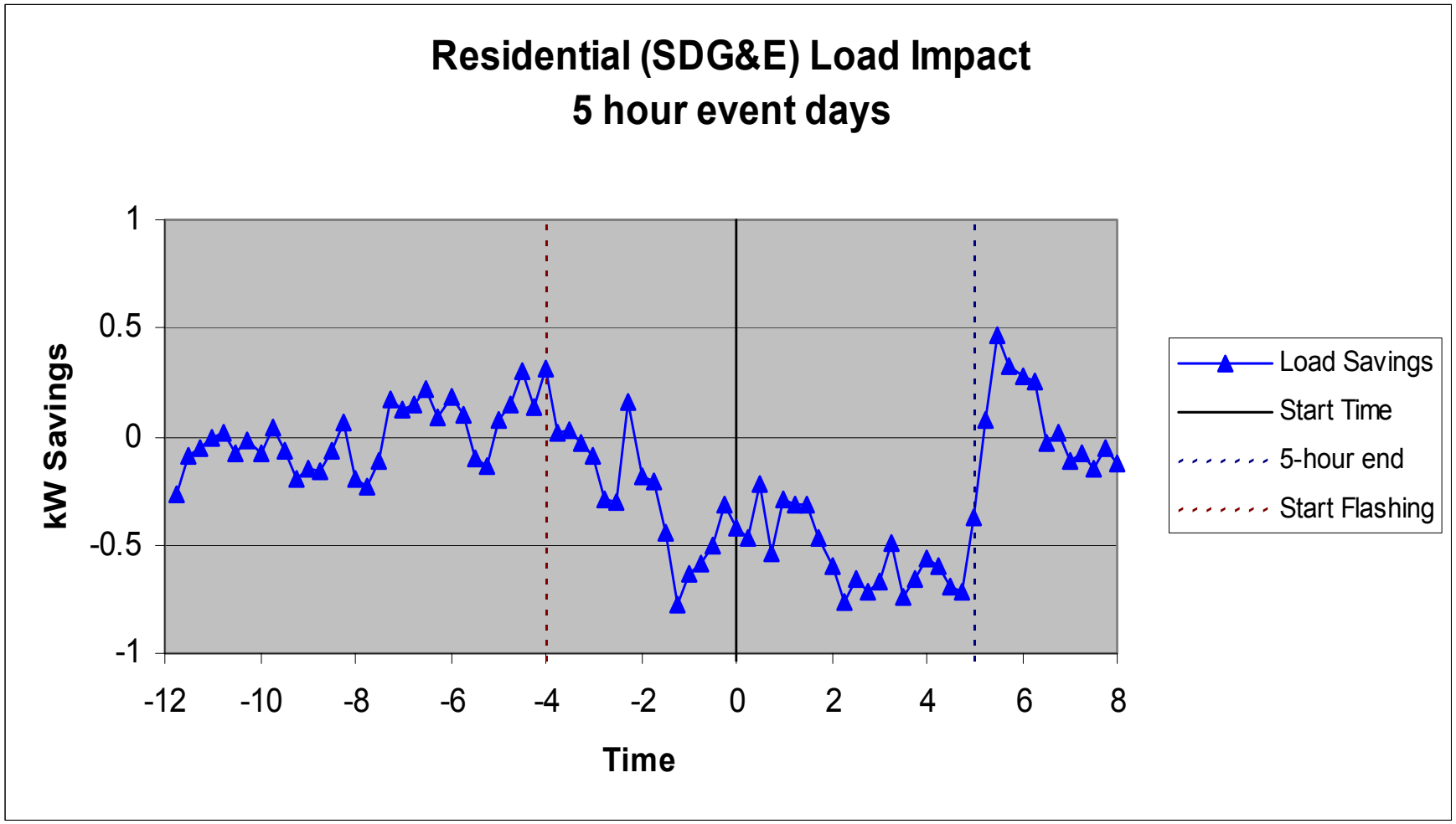
Treatment Effects for Residential Customers, 5-hour CPP event days



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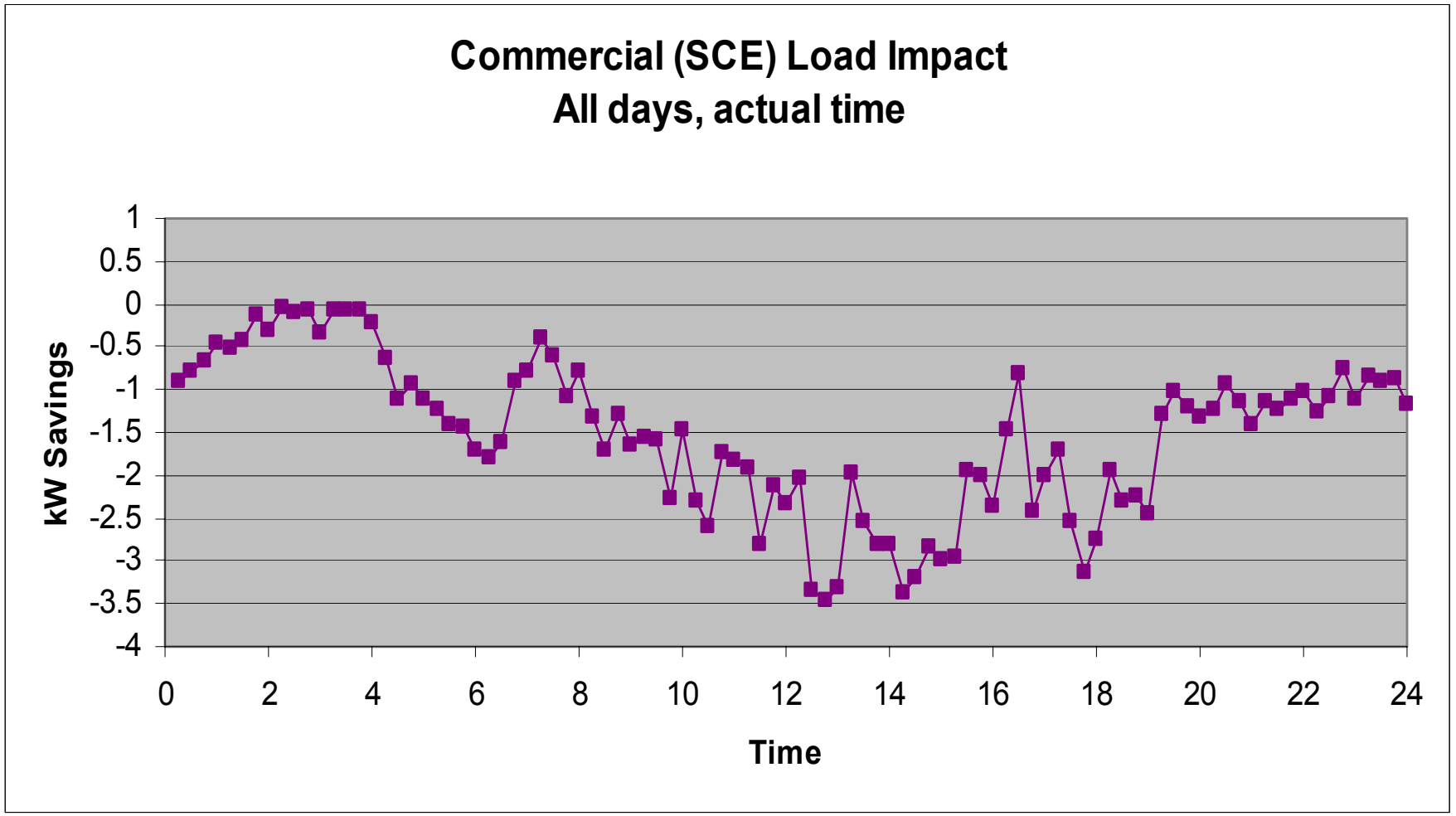
Treatment Effects for Commercial Customers,
averaged across all CPP Days



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Successful Energy Orb Deployment!

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Plans for 2005

- Statewide Pricing Pilot program will continue in 2005 to further test CPP-V rates for small commercial customers and the benefits of enhanced information
- Advanced metering business plans are being refined for March 2005 for future consideration
- CPP rates for large customers (over 200kW) will go into effect June 1 – triggered on ISO Alert
- Major $450M investment by the three utilities in 2005 for demand response programs (includes research!)
- Questions? Mark S. Martinez (626) 302-8643 mark.s.martinez@sce.com