



**Strategic Consulting**

## **Residential Pricing Pilots**

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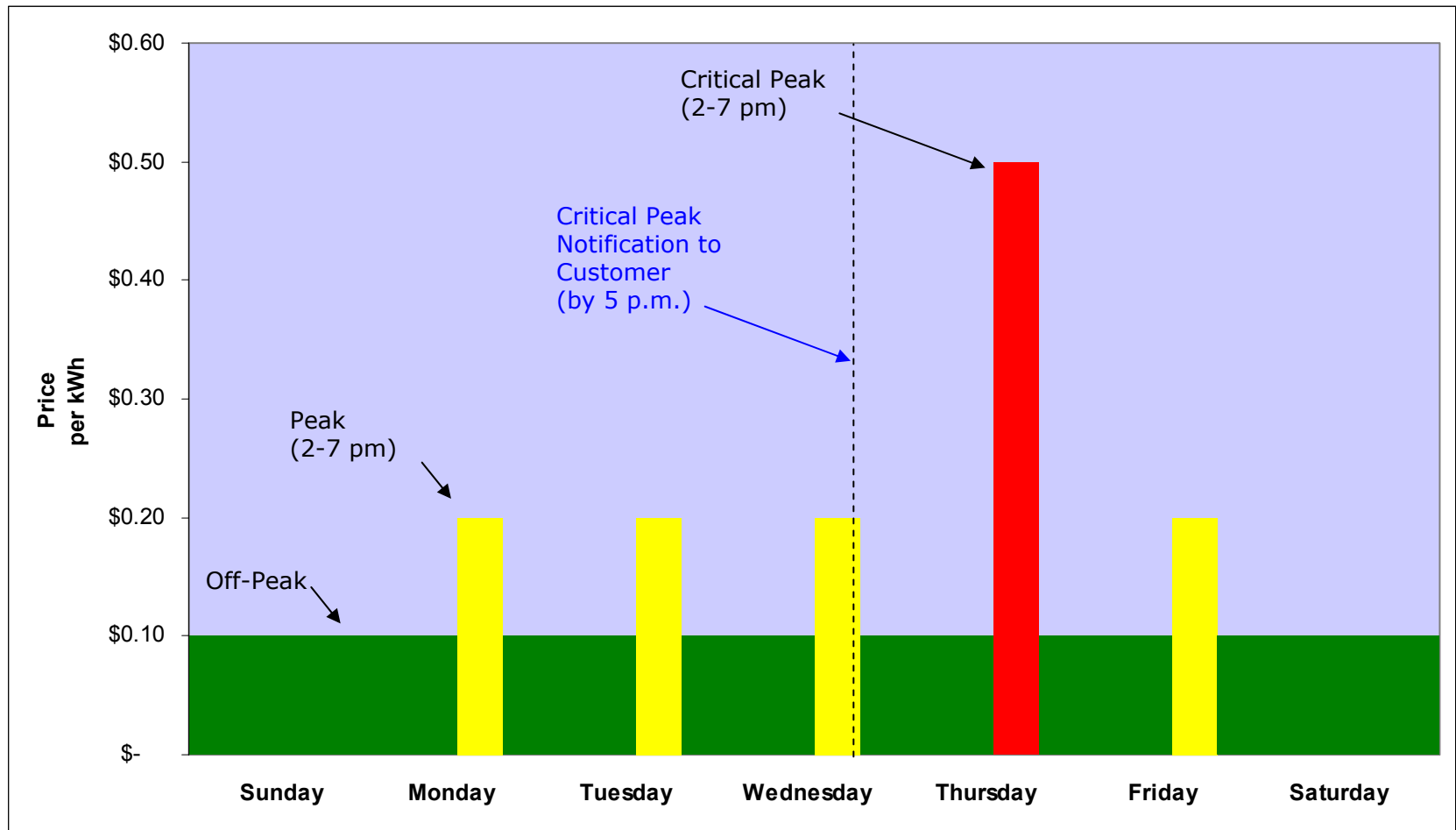
- Originally based on end uses (e.g. number of lamps)
- Invention of electric meter in 1890s led to per kWh pricing
- Time-of-use pricing (TOU)
  - Time-varying cost of electricity first noted in 1950s
  - Technology driven
    - “Two-Meter” TOU
      - Widespread in Europe/Oceania beginning in 1960s
      - Second meter on electric water heater
    - Manual Single-Meter TOU
      - Scores of pilots in 1970s and 1980s
      - Generally deemed not cost-effective
      - A few exceptions with over 100,000 customers (PG&E, APS, SRP)
    - Smart Meter TOU
      - Measure data hourly
      - Remote communications
      - Enables other options

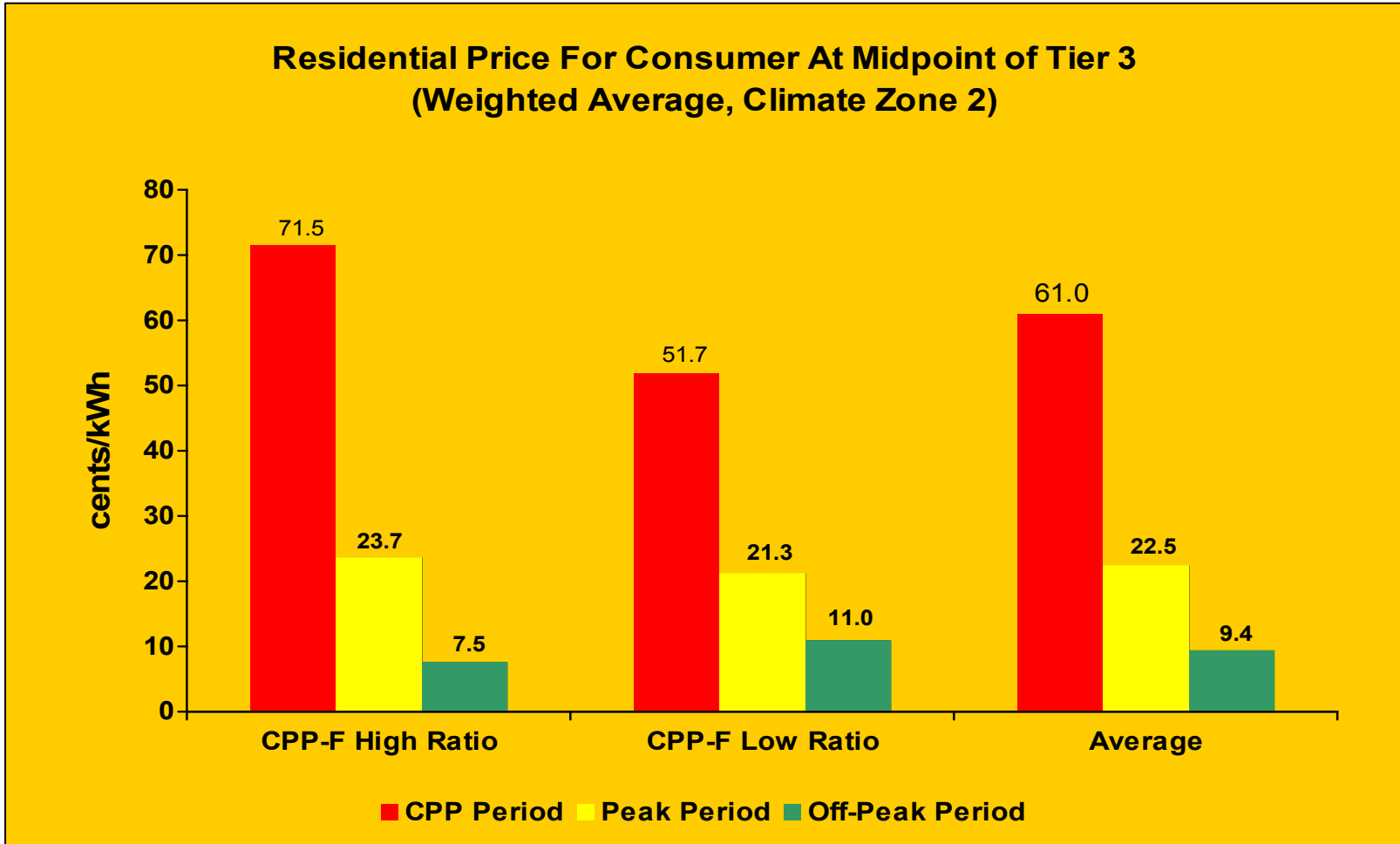
- Critical peak pricing (CPP)
  - Critical peak days dispatched 10-15 days per year
  - Prices 5x average for a few hours on these days
  - Base rate
    - TOU
    - Flat (called "Pure CPP")
  - About a dozen pilots, mostly since 2003
  - Being rolled out by PG&E
- Critical peak rebate (CPR)
  - "Carrot" instead of "stick"
  - Customer earns rebates during critical peak hours by reducing usage below baseline
  - First pilot in 2004
  - Being rolled out by SDG&E
- Hourly pricing
  - Day ahead
  - First pilot in 2004
  - Being rolled out in Illinois (ComEd and Ameren)

# California Pricing Pilot Overview

- Statewide
  - Pacific Gas & Electric, San Diego Gas & Electric, and Southern California Edison
  - Sample of 2,500 customers representative of the entire state
  - Residential and small commercial (<200 kW) customers
- Goals
  - Measure peak demand reductions
  - Measure total consumption reductions
  - Assess customer preferences via participant experiences and market surveys
- Two rate types
  - TOU
  - CPP

# Critical Peak Pricing Structure

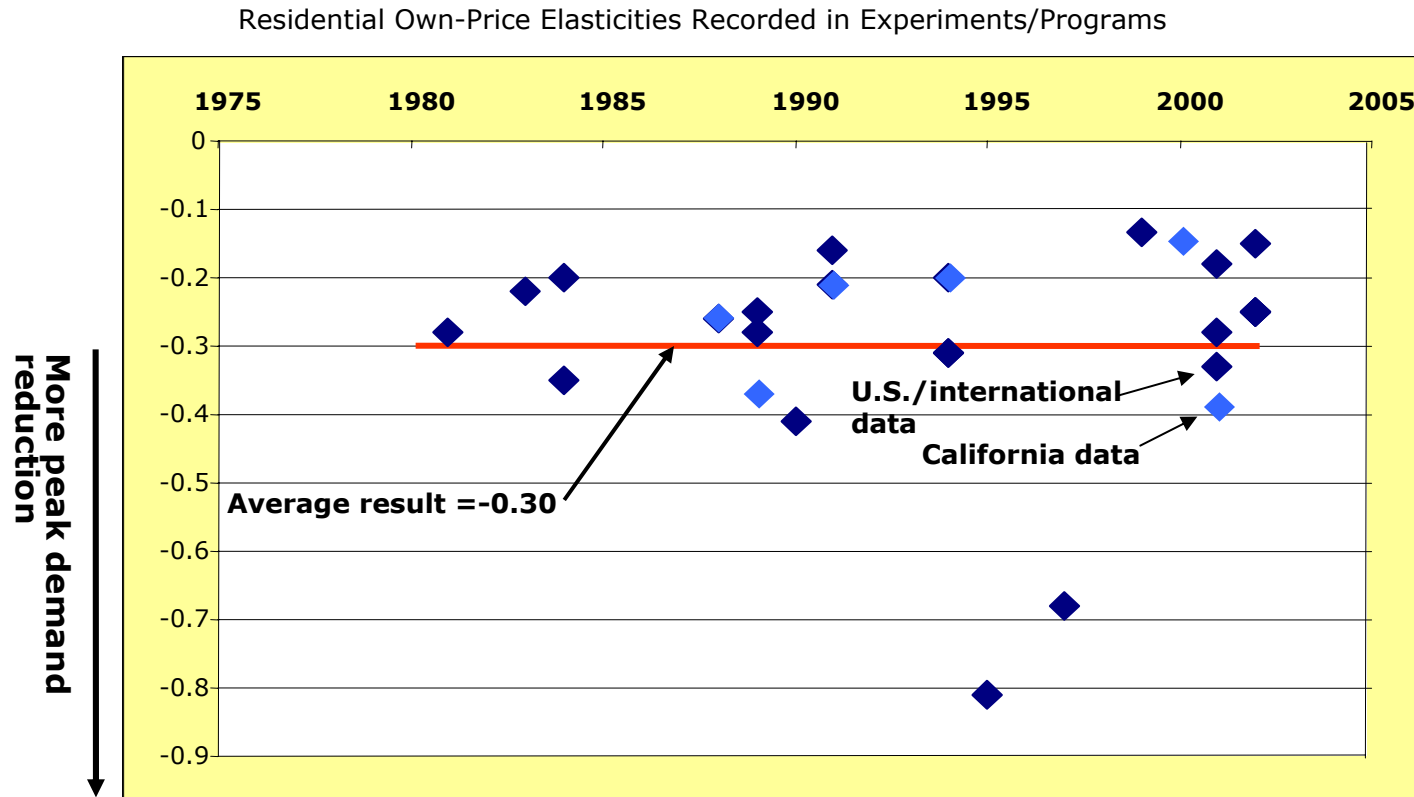




Source: Charles River Associates

# Historical Results: Price Elasticity

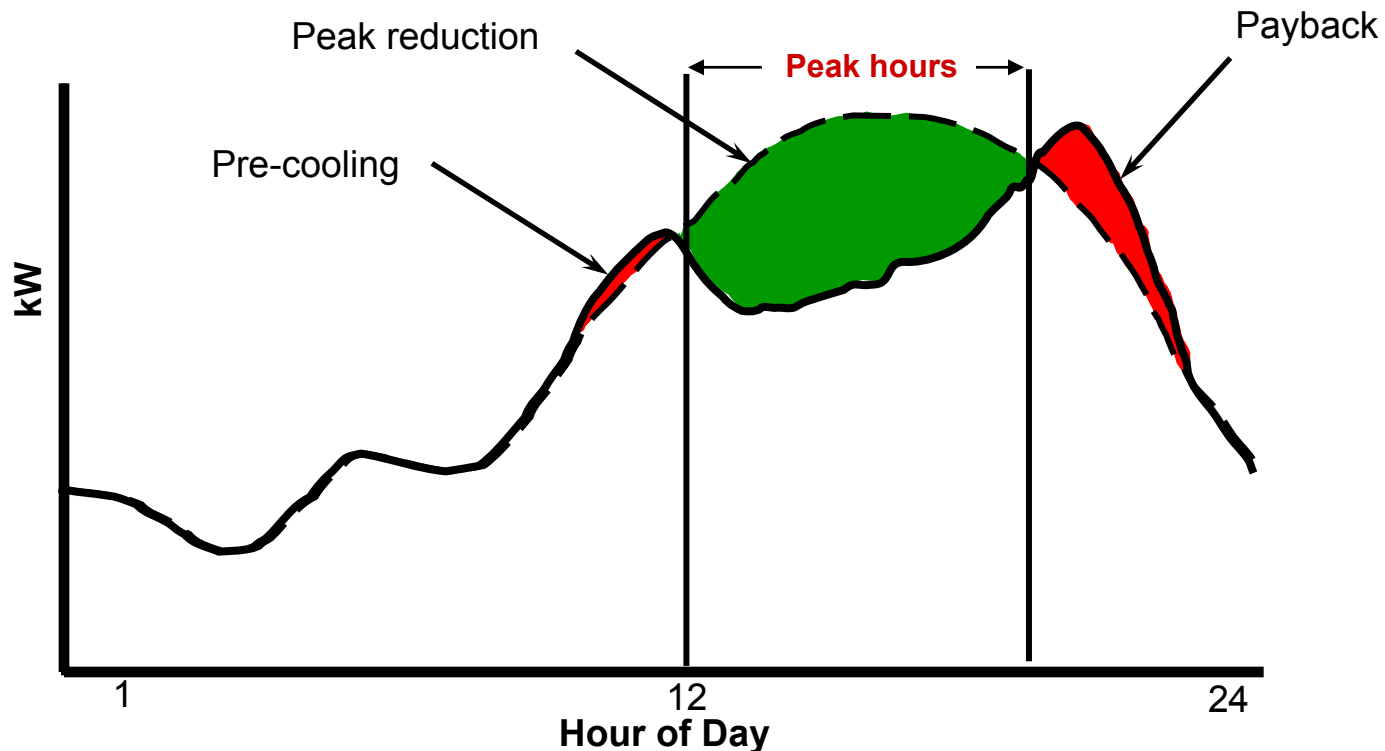
- Fifty-six analyses and projects in the past 25 years



Source: King and Chatterjee, *Public Utilities Fortnightly*, July 1, 2003

# Conservation Effect of Dynamic Rates

- Payback or pre-cooling occurs for some end uses, such as air conditioning
- No payback for other end uses, such as turning off lights
- On average, there is net conservation averaging **4%**



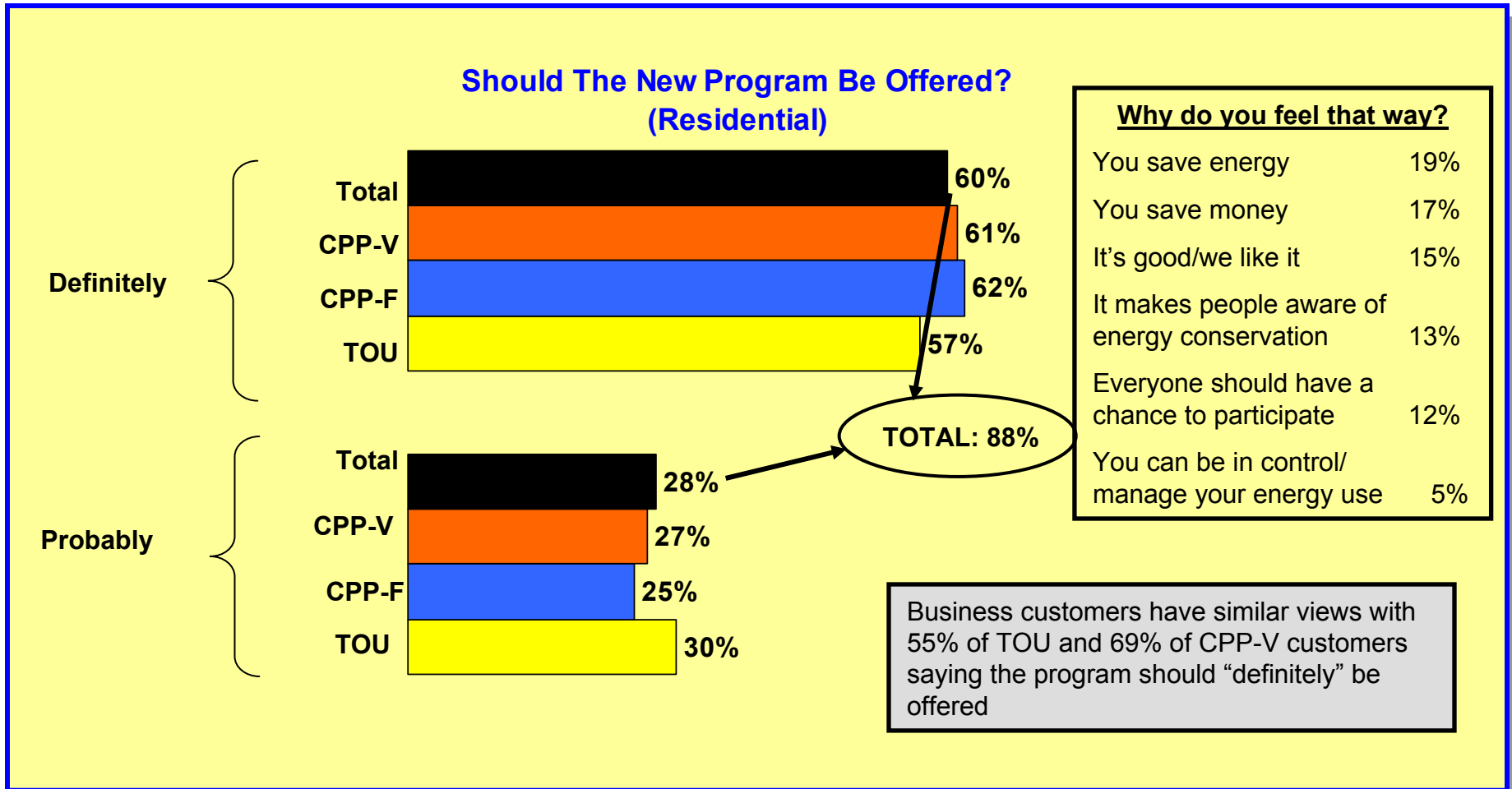
# Statewide Pricing Pilot Results

- Rates went into effect July 1, 2003
- 12 events called during each of summer 2003 and summer 2004

Performance Measure	Average from the Literature	California SPP Result
Price elasticity (mean own price)	-0.30	CPP-F: -0.15 CPP-V: -0.22
Peak demand reduction – CPP <u>without</u> automated response	24%	13%
Peak demand reduction – CPP <u>with</u> automated response	44%	35%
Total usage reduction (conservation effect)	4%	0%

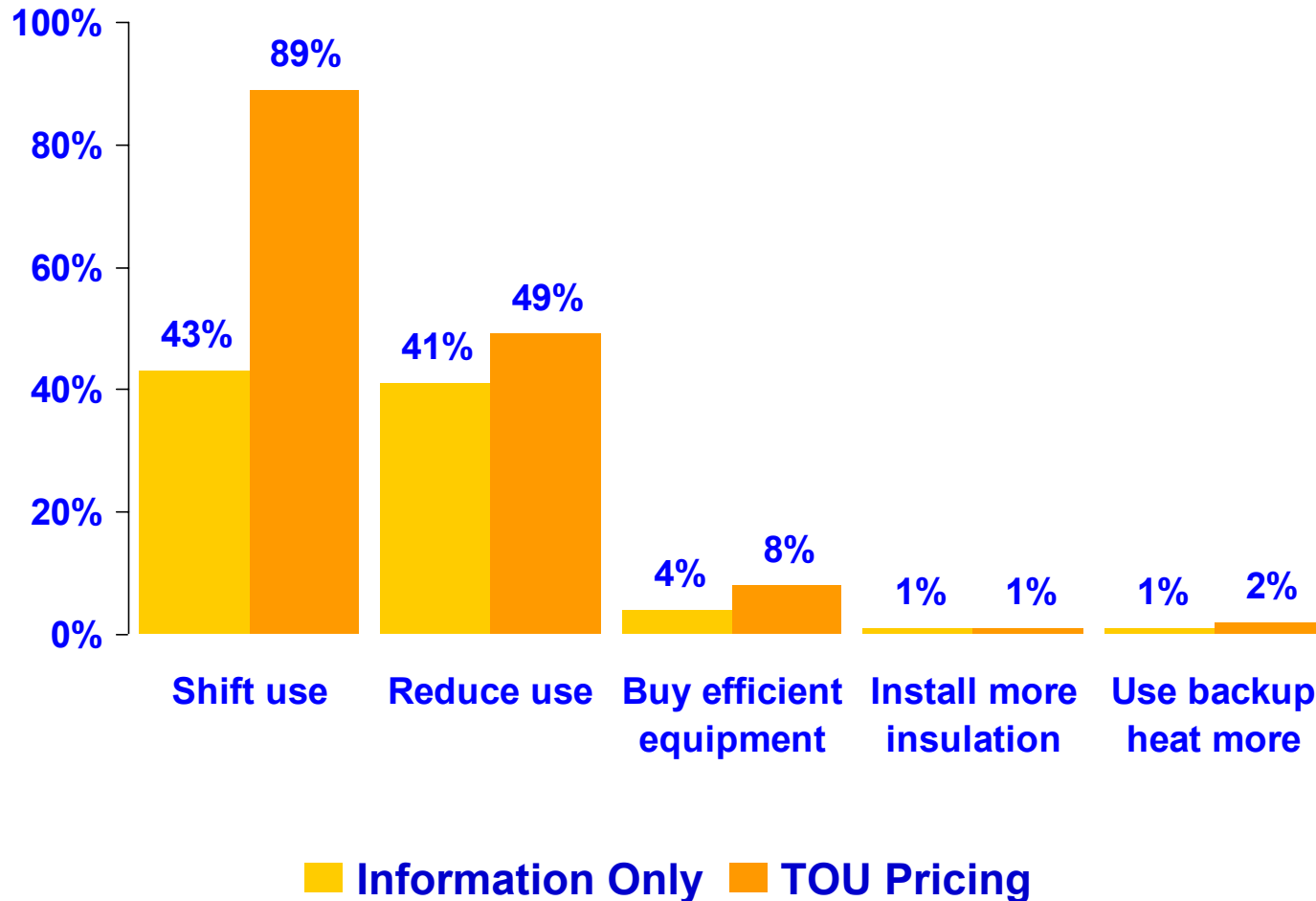
# SPP Market Research Results

- 88% of participants say dynamic pricing should be offered to other customers

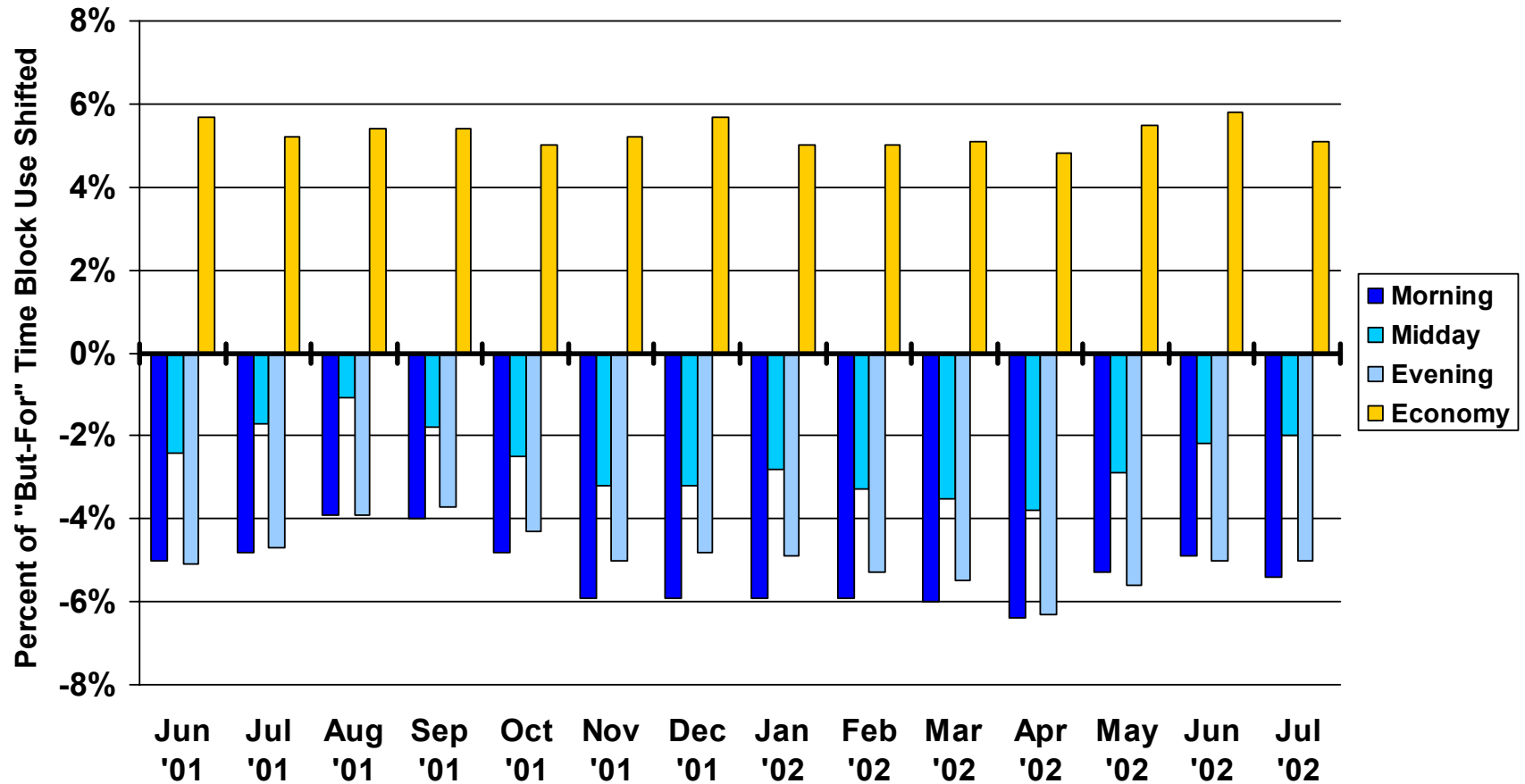


- AMI deployed to 1.7 million electric and gas customers
- PSE used time-of-use in Energy Crisis
  - Phase 1: Information Only
  - Phase 2: time-of-use pricing
  - 300,000 residential customers
  - 20,000 small commercial customers
  - Opt-out program
- Conducted extensive market research and load analysis

# Actions Taken by PSE Customers



# PSE Residential Load Shift



Graph represents TOU Res. Pricing group actual energy use compared to "But-For" usage based on Information-only comparison group.

- 67% - TOU is a good idea
- 66% - reduces need for power plants
- 64% - TOU pricing is fair
- 72% - concept is easy to understand
- 37% - should pay the same price no matter what time of day they use power

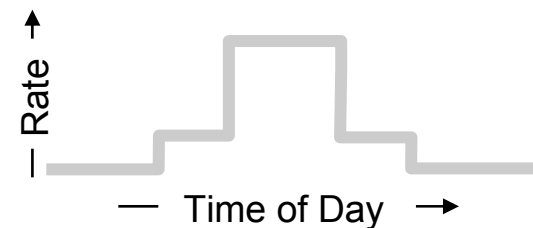
## ● Supply Side

- Establish Ontario Power Authority to procure generation
- Encourage renewables and distributed generation
- Public consultations on nuclear
- Explore new transmission lines to bring new supply to load centers and connect new wind

## ● Demand Side

- Create “culture of conservation”
- Make Ontario a North American leader in energy efficiency
  - Put a smart meter into every home and small business by 2010 (~4.5 million)
  - 800,000 meters in place by 2007 by (“8 by 7”)
- Mandatory TOU rate program where the opt-out is a contract with a competitive retailer
- Collected at least nightly, and presented on the web by 8:00 a.m. next morning
- Implementation dates for TOU to be determined by Ontario Energy Board

## Ontario Regulator’s Proposed Time-of-Use Rate/Tariff Profile



Summer



Winter

- Determine how RPP TOU price design (3:2:1 ratio) encourages load shifting
- Test critical peak pricing (CPP) and critical peak rebate (CPR)
- Assess degree of demand response (shifting of consumption) and conservation
- Obtain direct consumer feedback on understanding of TOU pricing
- Determine how TOU pricing communications can be refined to increase understanding

- Jun-Jul 2006: Start-up
  - Pilot Design
  - Operational Setup
  - Recruitment
    - Single letter elicits nearly 30% signup
- Aug 2006-Feb 2007: Operations
  - First statements sent in early September
  - First critical peak event August
  - Electricity Usage Statements issued each month
  - Focus Groups
  - Survey
- Mar 2007-May 2007: Final Report
  - Customer feedback
    - Survey
    - Focus groups
  - Electricity usage evaluation
    - Demand response
    - Conservation
  - Response for each TOU group being estimated based on consumption vs “control group” (on tiered prices)

- 375 Hydro Ottawa *residential* customers with smart meters
  - Planned 225 but expanded to accommodate high level of customer interest
- Placed into 3 groups of 125 each:
  1. RPP Time-of-Use (TOU) prices only
  2. RPP TOU prices + critical peak “pricing” (CPP)
  3. RPP TOU prices + critical peak “rebates” (CPR)
- Also 4. “Control Group” (RPP Tiered Prices)



ONTARIO SMART PRICE PILOT /  
CRITICAL PEAK REBATE PERIODS AND RATES

PROJET PILOTE DE PRIX INTELLIGENT  
PÉRIODES D'UTILISATION ET PRIX

Day of the Week Jours de la semaine	Time Heures	Period Périodes d'utilisation	Price/Prix* (¢/kWh)
Weekends & Holidays Fins de semaine et fériés	All Day / Toute la journée	Off-peak / Période creuse	3.1 ¢
Summer Weekdays (May 1 <sup>st</sup> - Oct 31 <sup>st</sup> ) Jours de semaine l'été (du 1 <sup>er</sup> mai au 31 octobre)	7 am to 11 am / 7 h à 11 h	Mid-peak / Période moyenne	7.5 ¢
	11 am to 5 pm / 11 h à 17 h	On-peak / Période de pointe	10.5 ¢
	5 pm to 10 pm / 17 h à 22 h	Mid-peak / Période moyenne	7.5 ¢
	10 pm to 7 am / 22 h à 7 h	Off-peak / Période creuse	3.1 ¢
Winter Weekdays (Nov 1 <sup>st</sup> - Apr 30 <sup>th</sup> ) Jours de semaine l'hiver (du 1 <sup>er</sup> novembre au 30 avril)	Upon notification / Sur la notification	Critical peak / Pointe critique	30.0 ¢ per kWh reduced / réduit
	7 am to 11 am / 7 h à 11 h	On-peak / Période de pointe	10.5 ¢
	11 am to 5 pm / 11 h à 17 h	Mid-peak / Période moyenne	7.5 ¢
	5 pm to 8 pm / 17 h à 20 h	On-peak / Période de pointe	10.5 ¢
	8 pm to 10 pm / 20 h à 22 h	Mid-peak / Période moyenne	7.5 ¢
10 pm to 7 am / 22 h à 7 h	Off-peak / Période creuse	3.1 ¢	
Upon notification / Sur la notification	Critical peak / Pointe critique	30.0 ¢ per kWh reduced / réduit	

\* Critical peak occurs for 3 or 4 hours during the on-peak period, on critical peak days only. The maximum number of such days in the pilot will be 9.

\* Le pointe critique arrive pour 3 ou 4 heures pendant le sur les heures de pointe, sur les jours de pointe critiques seulement. Le nombre maximum de tels jours dans le pilote sera 9.

Effective August 2006  
Efficace le 2006 août



## Projet pilote prix intelligents de l'Ontario Relevé selon l'heure de la consommation d'électricité

Remarque : Ce relevé n'est pas une facture

### Compte

John Doe  
123, rue Main  
Ottawa

Numéro de compte  
ABC-12344567

Service à la clientèle 24 h sur 24  
1 800 xxx-xxxx

Saison tarifaire :  
Été

### Définition des prix

#### Période creuse

Prix appliqué à la consommation de 22 h à 7 h les jours de semaine et toute la journée les fins de semaine et les jours fériés.

#### Période médiane

Prix appliqué à la consommation de 7 h à 11 h et de 17 h à 22 h les jours de semaine.

#### Période de pointe

Prix appliqué à la consommation de 11 h à 17 h les jours de semaine.

#### Période critique

Prix appliqué à la consommation de 11 h à 17 h durant les périodes critiques.

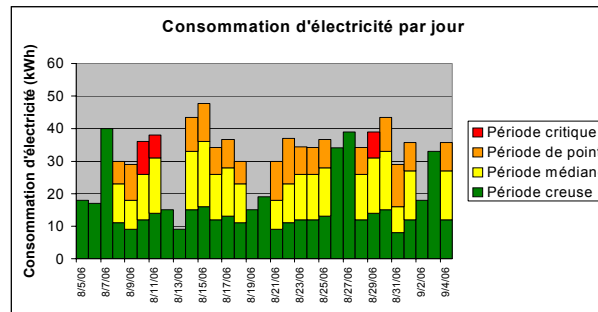
### Journées critiques durant ce mois

10 août 2006  
11 août 2006  
29 août 2006

### VOTRE CONSOMMATION

Frais d'électricité	Date du service	Consommation
● Période critique	8/05/2006 au 9/04/2006	25 kWh
● Période de pointe	8/05/2006 au 9/04/2006	175 kWh
● Période médiane	8/05/2006 au 9/04/2006	300 kWh
● Période creuse	8/05/2006 au 9/04/2006	500 kWh

Votre consommation totale **1 000 kWh**

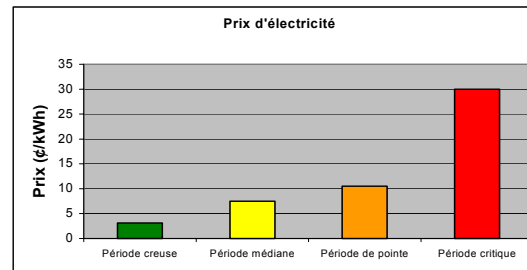


### FRAIS SELON L'HEURE DE LA CONSOMMATION

(Frais d'électricité seulement, taxes et autres frais en sus)


Frais d'électricité	Prix	Consommation en kWh	Montant
● Période critique	30,0 cents le kWh	25	7,50 \$
● Période de pointe	10,5 cents le kWh	175	18,38 \$
● Période médiane	7,5 cents le kWh	300	22,50 \$
● Période creuse	3,1 cents le kWh	500	15,50 \$

Total des frais selon l'heure de la consommation (*Ne pas payer*) **63,88 \$**



# Incentive Payments and Billing

- Thank You payment of \$75
  - \$50 for participation, \$25 for returning survey
- TOU pricing – real economic incentive
  - TOU pricing savings/losses vs. commodity tiered charges added/subtracted
- Billing
  - Participants continue to receive “normal” bill from Hydro Ottawa on tiered prices
  - Monthly Electricity Usage Statement
- Final statement



## Ontario Smart Price Pilot Program Final Statement

Billing Period	Bill on Time of Use Prices	Bill on Current Electricity Prices	Savings or (Loss)
August 2006	\$45.19	\$49.20	\$4.01
September 2006	\$29.75	\$31.99	\$2.24
October 2006	\$27.84	\$30.12	\$2.28
November 2006	\$28.26	\$29.70	\$1.44
December 2006	\$28.26	\$29.70	<u>\$1.44</u>
<b>TOTAL SAVINGS (OR LOSS)</b>			\$11.41
Thank You Payment			<u>\$75.00</u>
<b>TOTAL FINAL CHEQUE AMOUNT</b>			<b>\$86.41</b>

- Final statements and cheques sent out
- Final analysis underway
- OEB to present results in late May/early June

# Questions?

- Contact
  - Chris King
  - [chris@emeter.com](mailto:chris@emeter.com)
  - (510) 435-5189
  
- Thank you for your interest!