

# California SPP Results

## Initiative on Demand Pricing and Critical Peak Pricing

July 2004

**USCL**  
Corporation  


Prepared by:  
Roger Levy; Levy Associates



## **Results From the California State Pricing Pilot (SPP) Generally Show:**

- Residential and Commercial / Industrial customers don't understand their current rates.**
- Both groups overwhelmingly prefer the Critical Peak rates to their existing rates.**
- Both groups respond to these rates with substantial peak load reductions**
- Both groups respond to these rates with reduced overall energy use.**
- A majority (roughly 80%) of all customers will see reduced monthly energy bills on the Critical Peak rates. Those that don't are being charged for their peak load.**

# California Vision

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## Rule Making

**CPUC, CEC, CPA joint proceeding June 2002**  
[CPUC R.02-06-001, CEC 02-Demand Response-01]

## Objectives

1. **Improve system reliability and reduce energy costs by encouraging demand response.**
2. **Provide customers with options to manage costs.**

## How

1. **Install advanced [interval capable] meters with communication links on all customers.**
2. **Establish Critical Peak Pricing as the default tariff for all customers.**
3. **Provide customers with options to 'opt-out' to real-time pricing or risk adjusted time-of-use, non-time varying tiered or other rate forms.**

# Problems

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1. **California utilities concerned that prior 25 years of pricing and demand response research not applicable.**
2. **California utilities need up-to-date demand elasticities to estimate system resource and procurement impacts.**
3. **The cost to implement advanced metering system wide requires a complete and thorough business case evaluation.**

**Solution**

**Statewide Pricing Pilot (SPP)**

# SPP Conclusions

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1. Rates that reflect market price (Critical Peak Pricing), produce greater conservation and demand response impacts than TOU or inverted tier rate forms.
2. Residential and commercial/industrial customers with demands less than 200kW demonstrate substantial, statistically significant response to critical peak pricing.
3. Critical Peak rates will produce short-run residential peak demand reductions of 2,000 MW or more, energy conservation of up to 7% and even greater impacts in the long-term. At \$85 per kW-year, these savings equal \$3-\$4 per customer per month.
4. Customers understand and respond favorably to Critical Peak rates.
5. At least 50% of residential customers will receive a lower energy bill under Critical Peak Pricing without any change in usage. Another 20% to 30% of residential customers will receive a lower energy bill under Critical Peak Pricing with only minor changes in usage.
6. The net investment to implement the advanced metering infrastructure to support Critical Peak Pricing should result in incremental residential charges substantially less than \$1.00 per meter per month.

# California Vision – The Results

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## System Impacts

- System Wide - Procurement impacts
- Conservation / Peak Load Impacts
- Demand Elasticities

## Customer Response

- Customer Understanding
- Customer Preferences
- Bill Impacts

## Costs & Benefits

- Utility Business Case for Advanced Metering
- Major Issues

# System Impacts

# SPP Conclusions

**SPP Results** System Wide Procurement Impacts

CPP rates can, within five years of deployment reduce the California's residential peak load by 2,000 to 2,400 MW.

Confidence in Conclusion	Need for Further Tests
<input checked="" type="checkbox"/> High	<input checked="" type="checkbox"/> None
<input type="checkbox"/> Moderate	<input type="checkbox"/> Useful
<input type="checkbox"/> Low	<input type="checkbox"/> Essential

**SPP Results** Conservation and Peak Load Impacts

CPP-V rates encourage greater conservation and peak demand impacts than conventional inverted tier, TOU or CPP-F rates.

Confidence in Conclusion	Need for Further Tests
<input checked="" type="checkbox"/> High	<input checked="" type="checkbox"/> None
<input type="checkbox"/> Moderate	<input type="checkbox"/> Useful
<input type="checkbox"/> Low	<input type="checkbox"/> Essential

**SPP Results** Demand Elasticities

1. SPP short-run own-price demand elasticities are consistent with 25 years of historical findings in California and elsewhere.
2. Historical long-run own-price demand elasticities are typically about double short-run elasticities.

Confidence in Conclusion	Need for Further Tests
<input checked="" type="checkbox"/> High	<input checked="" type="checkbox"/> None
<input type="checkbox"/> Moderate	<input type="checkbox"/> Useful
<input type="checkbox"/> Low	<input type="checkbox"/> Essential
<input type="checkbox"/> High	<input type="checkbox"/> None
<input checked="" type="checkbox"/> Moderate	<input checked="" type="checkbox"/> Useful
<input type="checkbox"/> Low	<input type="checkbox"/> Essential

# California Vision – The Results

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**RESIDENTIAL CUSTOMERS**



# SPP Conclusions

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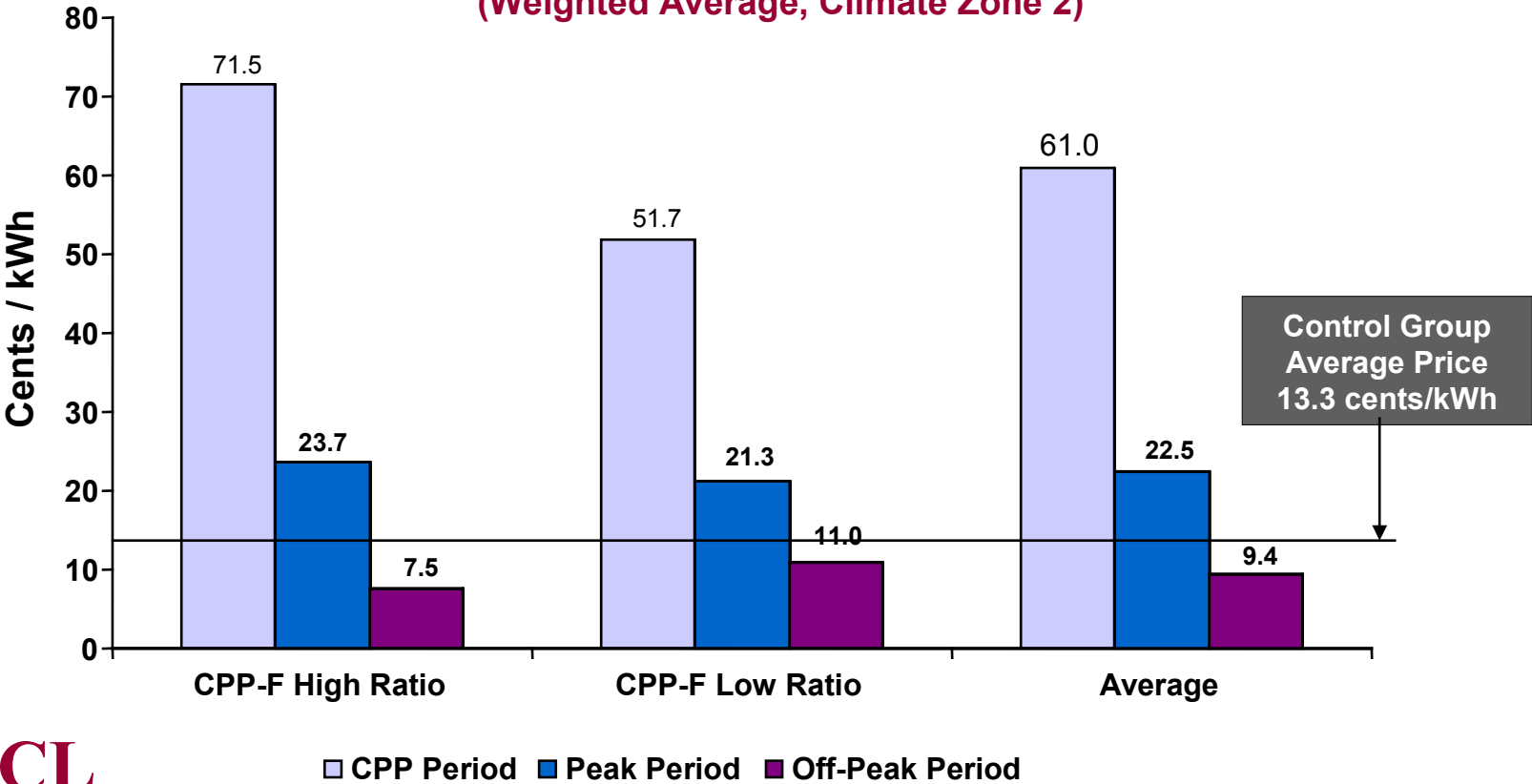
1. **Customers show significant response to both the CPP-F and CPP-V rates**
2. **Impacts are higher in the hotter zones for both CPP and non CPP days**
3. **Responses are substantially higher on CPP days than on non-CPP days**
4. **For all zones, the CPP day impact is -12% and the non-CPP day impact is -2.3%**
5. **CPP day impacts differ slightly between the two experimental rates within the CPP-F rate**
6. **Results are generally similar across the two functional forms tested in this study**
7. **Customers do not respond to TOU rates**

## Customer Response to Price What Have We Learned ?

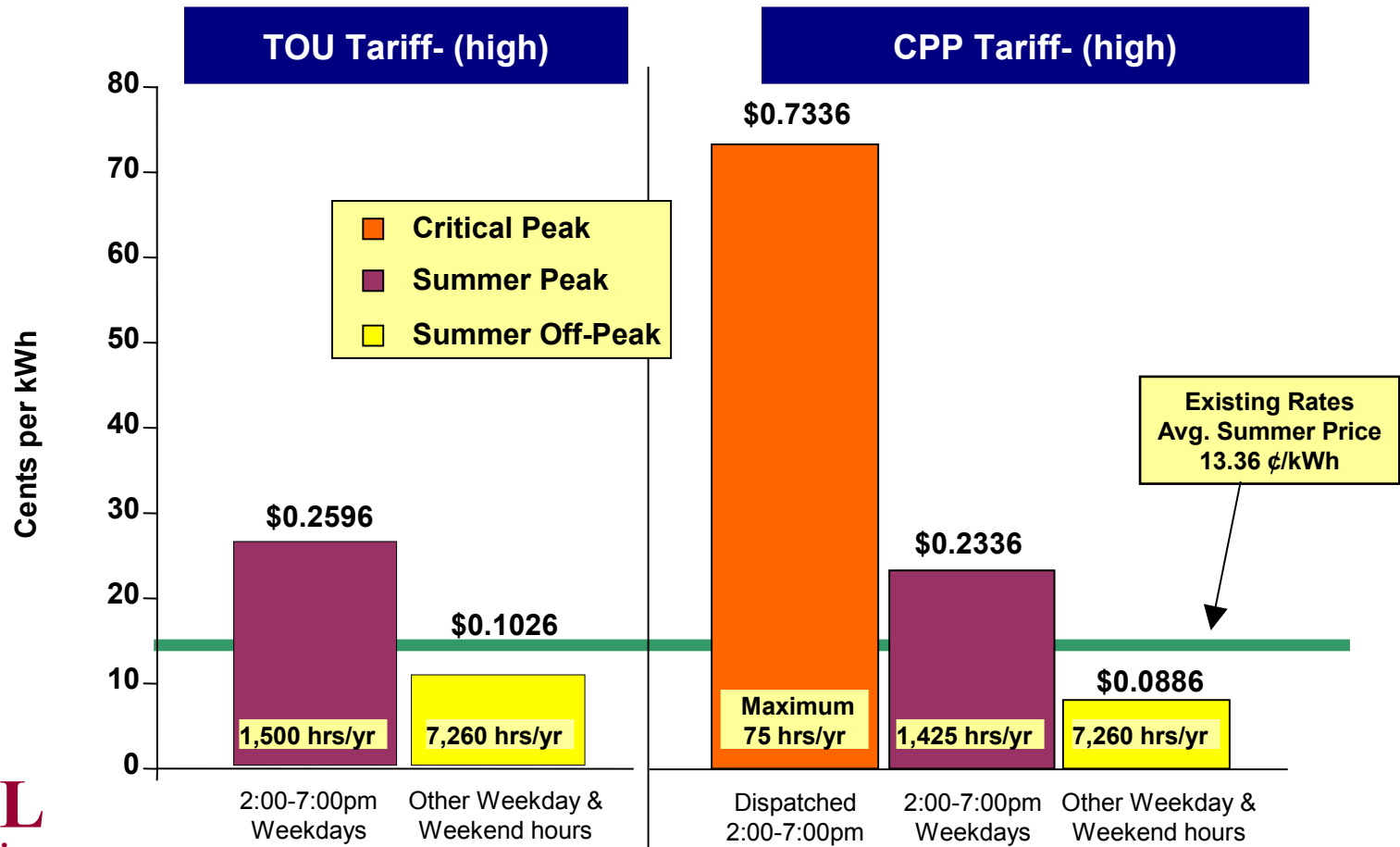
Historical Findings	SPP Findings
Residential customer elasticities were higher than those for commercial customers.	<b>Confirmed.</b>
Residential customer elasticities were typically higher for customers with higher usage, more appliances, and air conditioning load.	<b>Confirmed.</b>
Price response was typically significantly higher – approximately double – when automated control capability was available.	<b>Confirmed.</b>
Customers typically reduced total consumption by around three percent, with the range from zero percent to as high as 23 percent.	<b>Confirmed.</b>
Customers reduced peak demands by a four percent (low end of time-of-use range) to 59 percent (high end of critical peak pricing range).	<b>Confirmed.</b>
Commercial customer elasticities varied widely by business type.	<b>Confirmed.</b>

Source:  
*Proposed Pilot Projects and Market Research to Assess the Potential for Deployment of Dynamic Tariffs for Residential and Small Commercial Customers*, Report of Working Group 3 to Working Group 1, R.02-06-001, Final Version 5, December 10, 2002, p25.

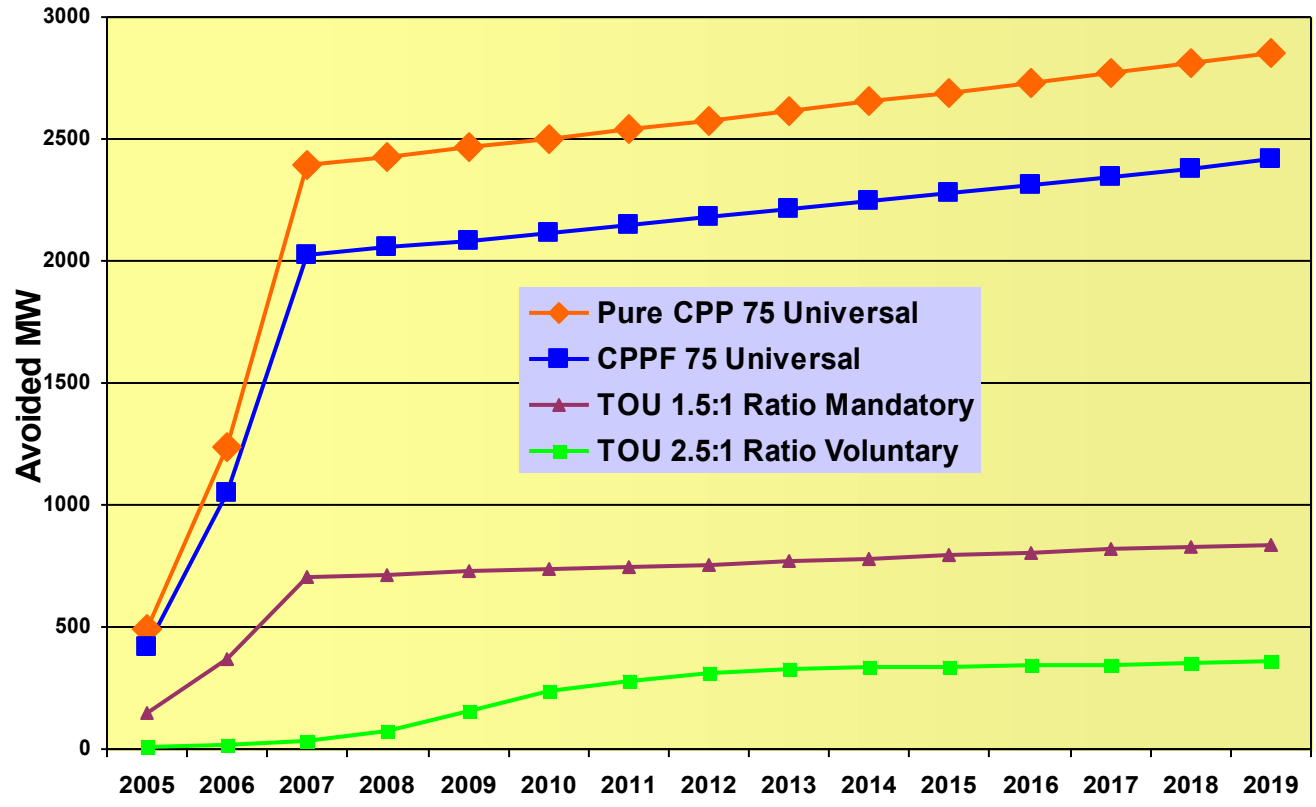
**Residential Price For Consumers At Midpoint of Tier 3**  
 (Weighted Average, Climate Zone 2)



**SPP Residential Rate Forms**  
 ( Example TOU & CPP High Options )



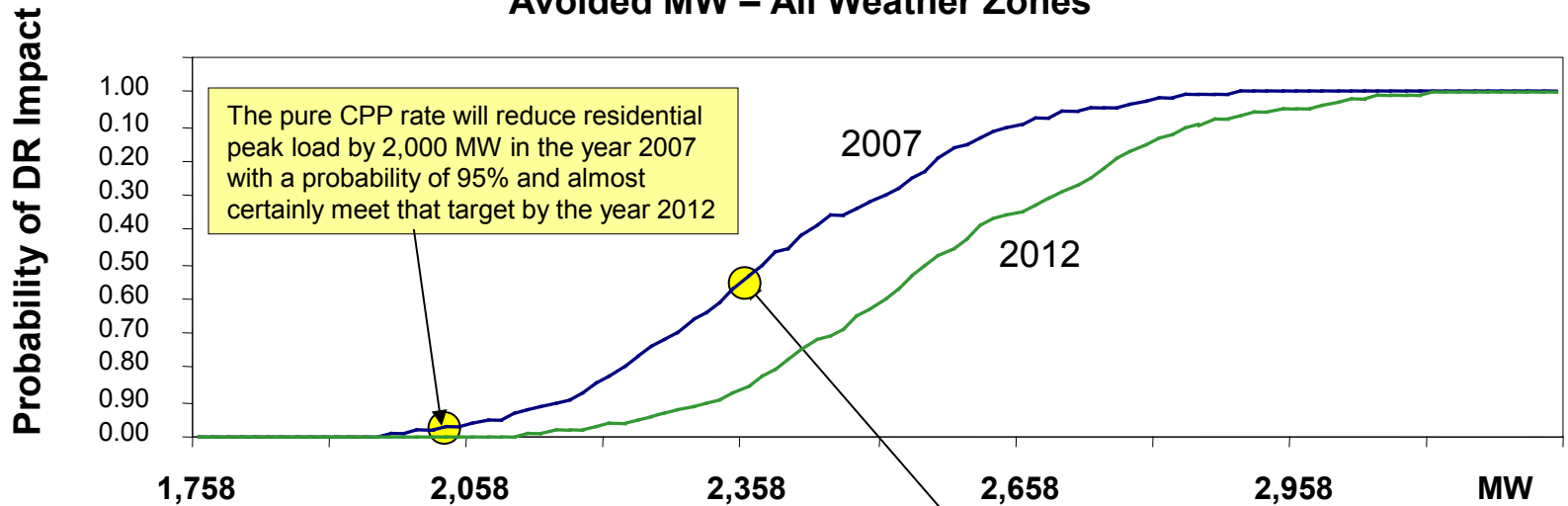
**SPP Residential Rate Options**  
**System Wide Potential Peak Demand Impacts**



Source: Charles Rivers Working Group 3 presentation, March 30, 2004.

## Probabilistic System Wide CPP Residential Potential Peak Demand Impacts

### Avoided MW – All Weather Zones



Assumptions:

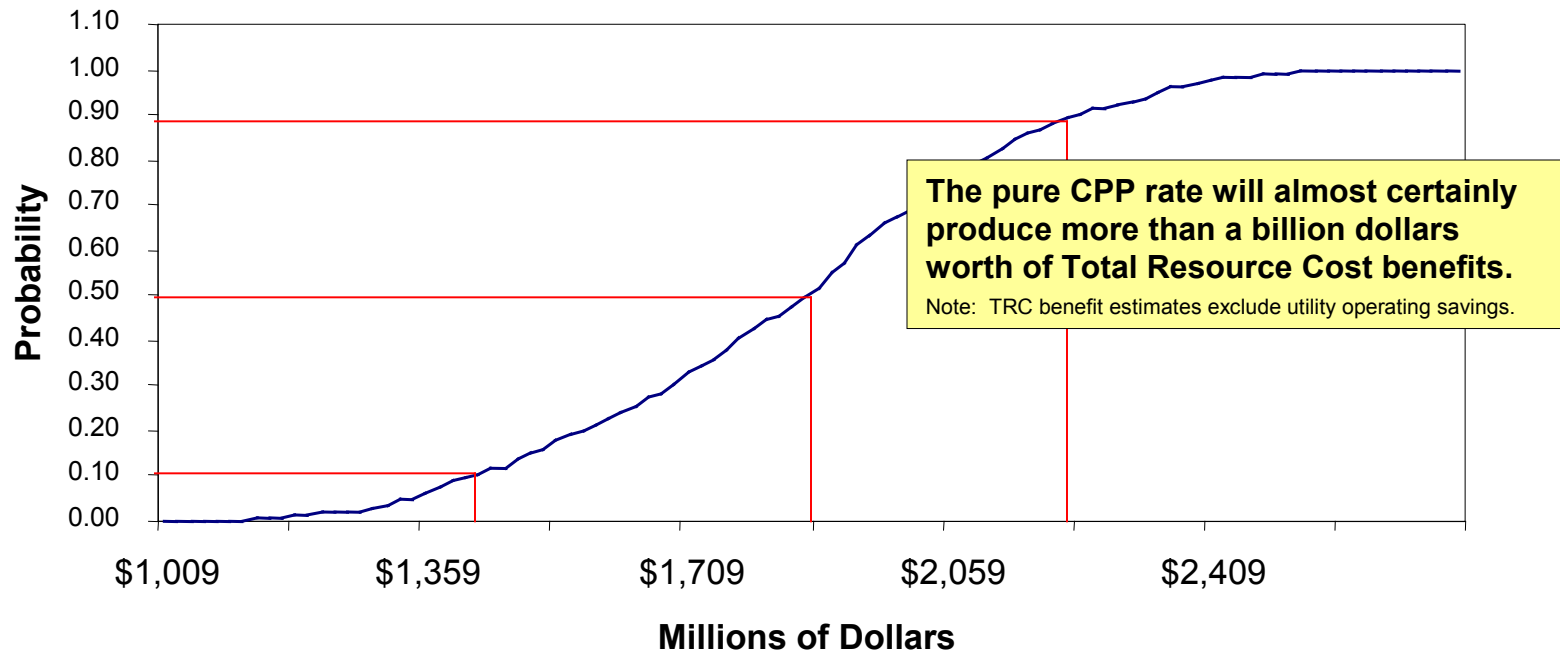
Illustrative CPP and TOU rates are constructed, building upon the rates used in the SPP; the rates are revenue neutral for the typical California investor-owned utility residence

Marginal capacity cost of \$85/kW-year are used in the analysis, along with energy costs of 15¢ /kWh in the CPP period, 4.7¢ /kWh in the peak period, and 4.0 ¢ /kWh in the off peak period.

The pure CPP rate will reduce the state's residential peak load by 2,400 MW in the year 2007 with a probability of 50% and almost certainly meet that target by the year 2012

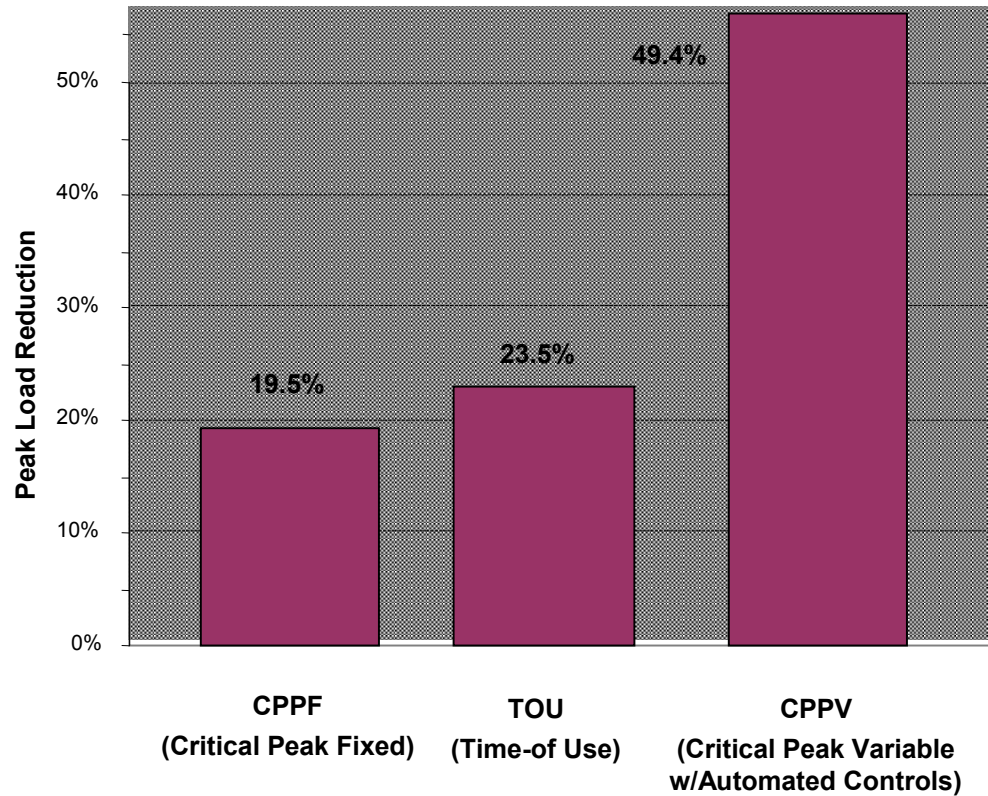
## System Wide Pricing Impacts Demand Response Dollar Value of Impacts

### TRC NPV Benefits – All Zones



Source: Charles Rivers Working Group 3 presentation, March 30, 2004.

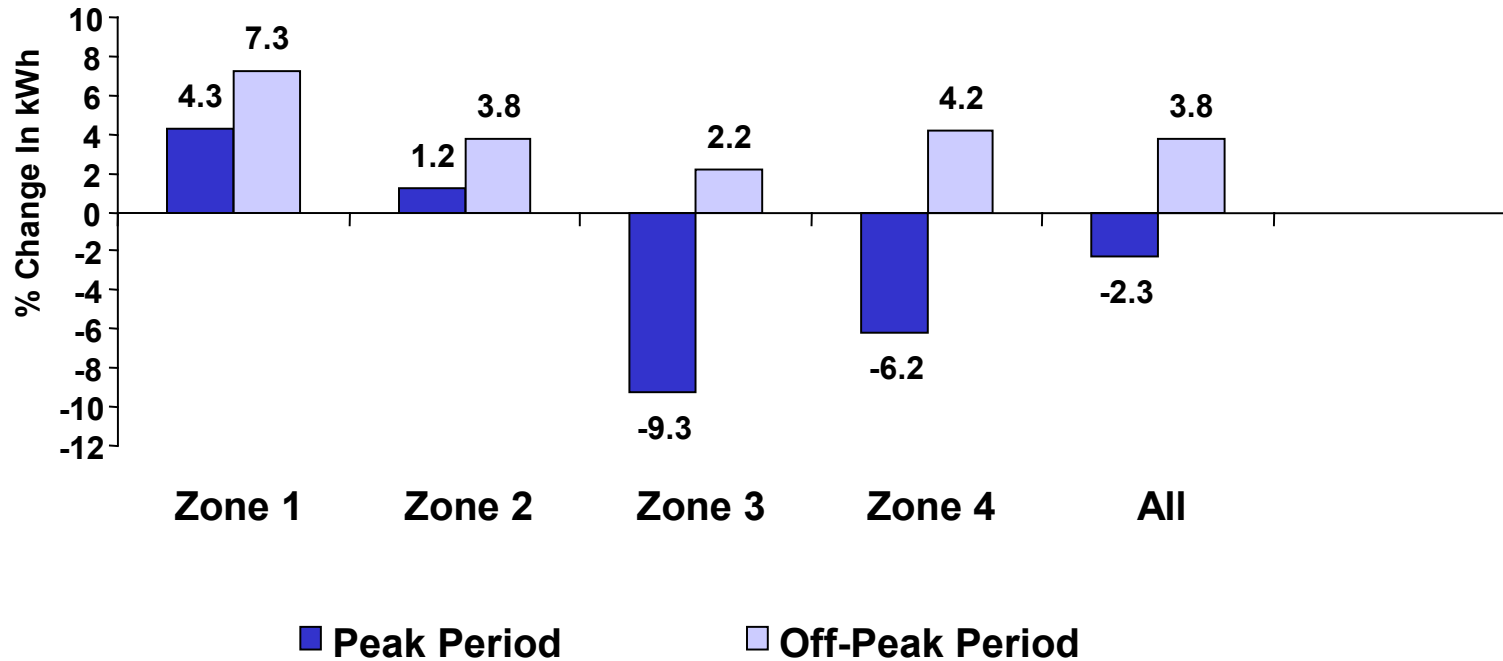
## Residential Coincident Critical Peak Demand Impacts By SPP Rate Treatment



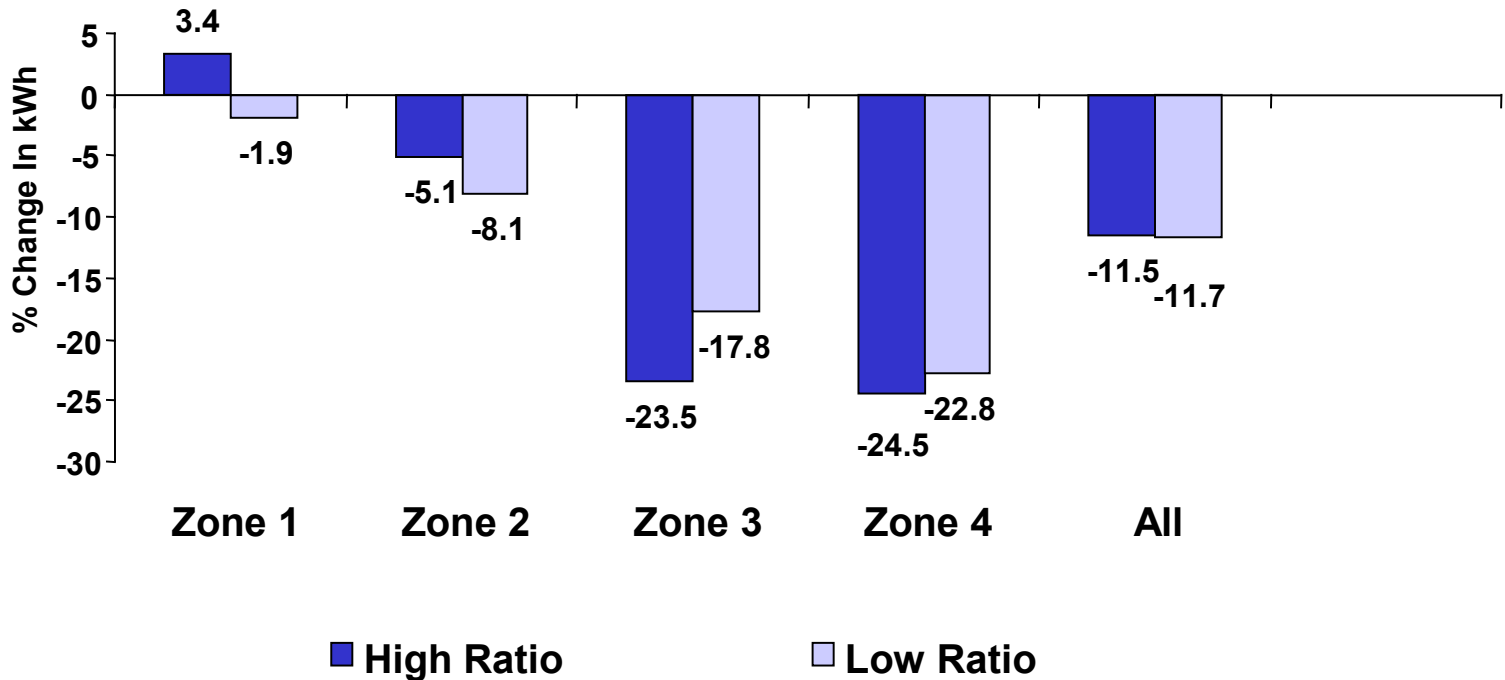
Source: Statewide Pricing Pilot Summer 2003 Impact Analysis, Charles Rivers Associates, March 9, 2004.



**Percent Change In Energy Use By Rate Period  
 For Average Experimental Prices On Non-CPP Days**

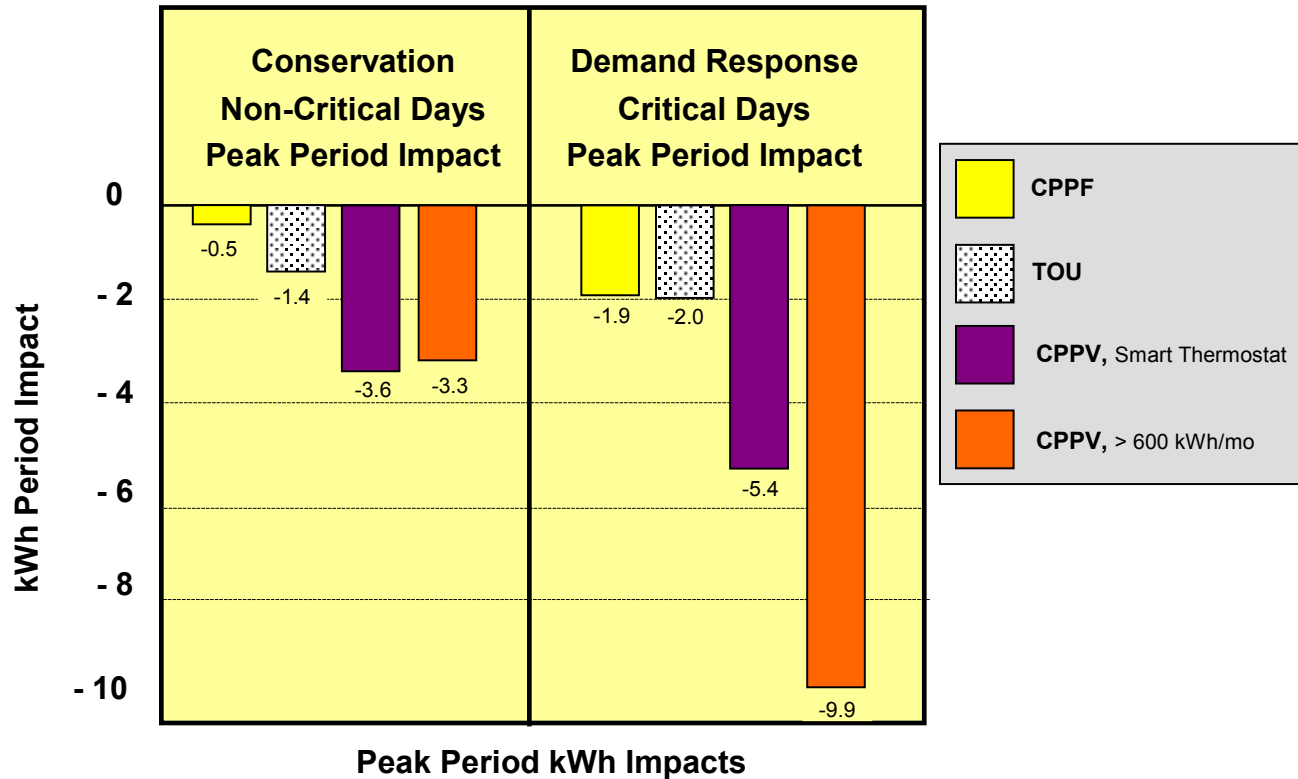


## Percent Change In Energy Use During The Peak Period On CPP Days By Price Ratio



Source: SPP Summer 2003 Update Analysis, Charles Rivers Associates, June 9, 2004.

## Conservation vs. Peak Period Impacts By SPP Rate Form



( Example: Weather Zone 3 )

Source: Statewide Pricing Pilot Summer 2003 Impact Analysis, Charles Rivers Associates, March 9, 2004.

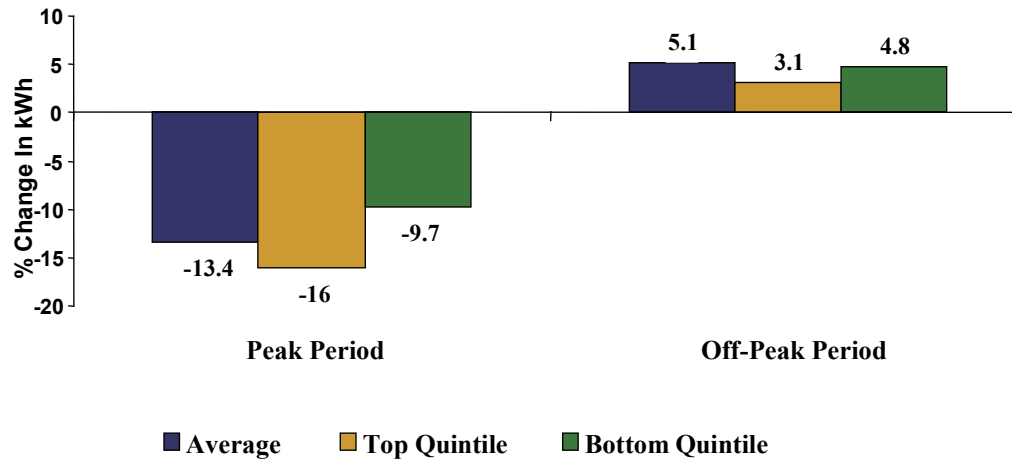


## SPP Impacts on Peak Consumption and Coincident Peak Demand

Rate Form	Percent Change in Peak Consumption		Change in Coincident Peak Demand	
	Non-CPP Days	CPP Days	kWh	Percent
Time-of-Use	-16.0	-16.0	-0.3	-23.5
CPP – Fixed	-9.4	-22.0	-0.2	-19.5
CPP - Variable	-28.0	-38.8	-1.4	-49.4

Source: Statewide Pricing Pilot, Summer 2003 Impact Analysis, Charles Rivers Associates, January 16, 2004, Tables 1-1 and 1-2.

## Weather Related Impacts Load Impacts CPP Days (Percentage Change in Usage)

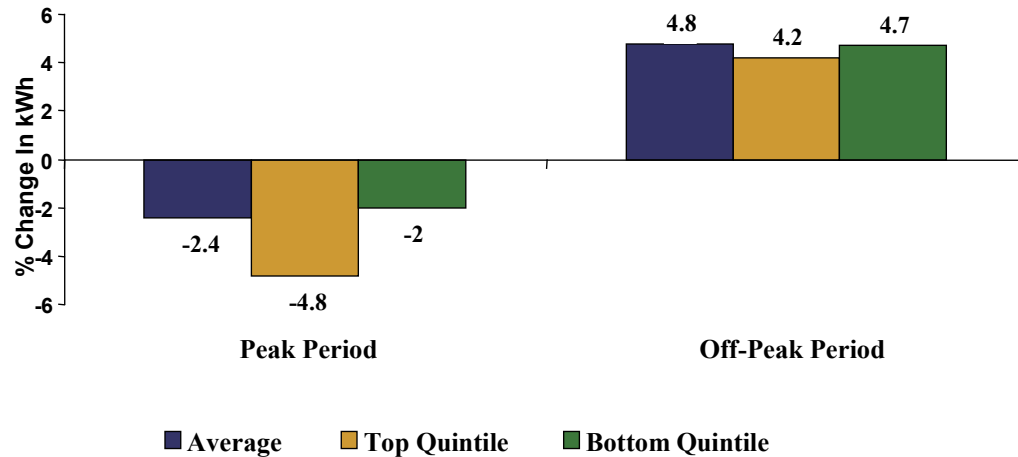


Interpreting This graph:

As seen, the percent reduction in peak-period energy use on CPP days based on average weather for the treatment period is 13.4 percent. Based on weather conditions representing the top 20 percent of CPP days (as measured by system load conditions), the percent reduction is -16 percent, whereas the reduction falls to 9.7 percent on the cooler, lowest system-load days.

Source: Charles Rivers Associates Analysis memo, June 24, 2004.

## Weather Related Impacts Load Impacts Non-CPP Days (Percentage Change in Usage)

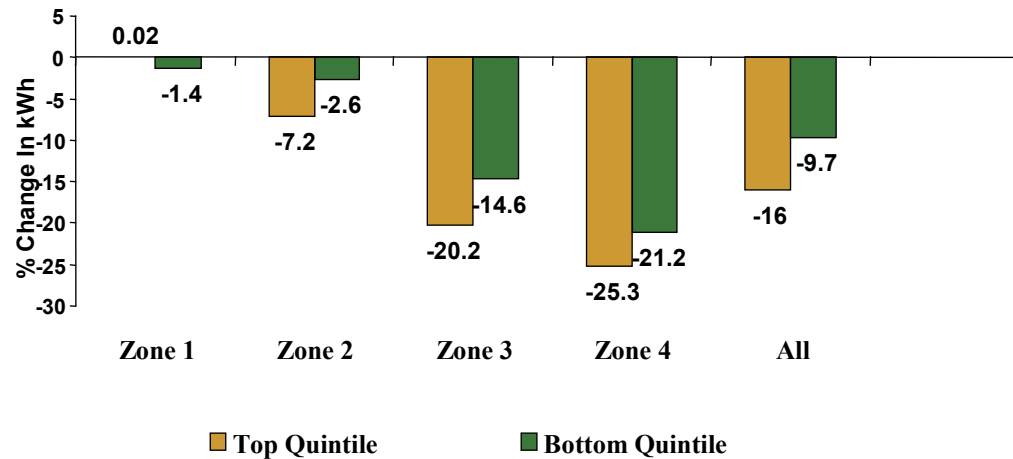


Interpreting This graph:

On non-CPP days, the percent reduction in peak-period energy use is 4.8 percent based on weather conditions representing high-load days and 2 percent on low-load days.

Source: Charles Rivers Associates Analysis memo, June 24, 2004.

## Weather Related Impacts Load Impacts By Weather Zone on CPP Days (Percentage Change in Usage)

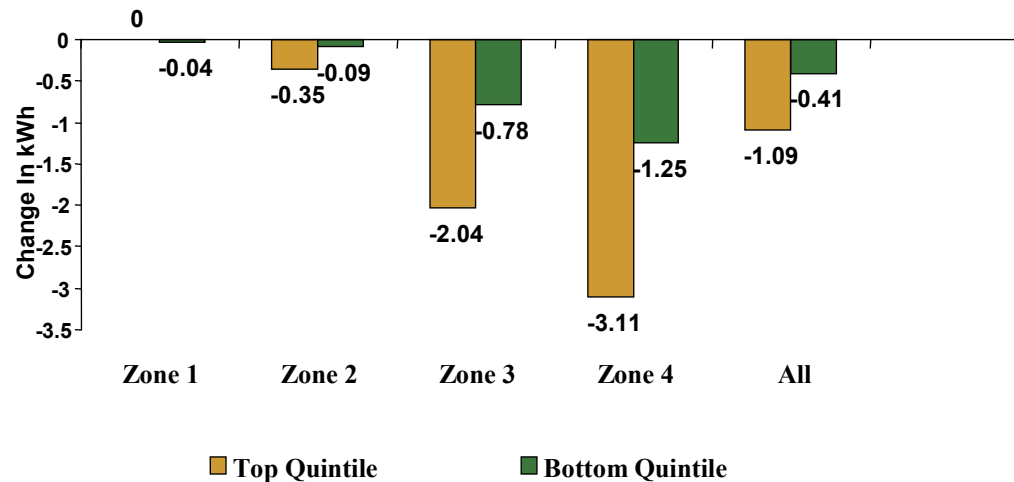


Interpreting This graph:

This graph shows the variation in percentage impacts across climate zones for peak-period energy use on CPP days. The percent impact is clearly much larger in the hotter climate zones than in the cooler zones. However, the change in the percentage impact between the top and bottom quintile load days is greater in zone 2 than it is in zones 3 and 4.

Source: Charles Rivers Associates Analysis memo, June 24, 2004.

## Weather Related Impacts Load Impacts By Weather Zone on CPP Days (Change in Actual kWh)



Interpreting This graph:

This graph shows the absolute impact, in kilowatt-hours, resulting from the SPP prices by climate zone and for the state as a whole. Clearly, the difference in the absolute impact on high-load and low-load days is much larger than the difference in percentage impacts, as customers in the hotter zones are both more responsive high-load days and larger energy users. When these two factors are combined, the impact on high load days in zone 2 is nearly four times higher than on low-load days. In zones 3 and 4, the impact is roughly 2½ times higher on high-load days than on low-load days. Statewide, the impact is roughly 2.7 times higher on high-load days than on low-load days. It is also worth noting that the absolute impact on high-load days in the hottest zone 4 is almost nine times greater than the impact in the moderate zone 2.



# California Vision – The Results

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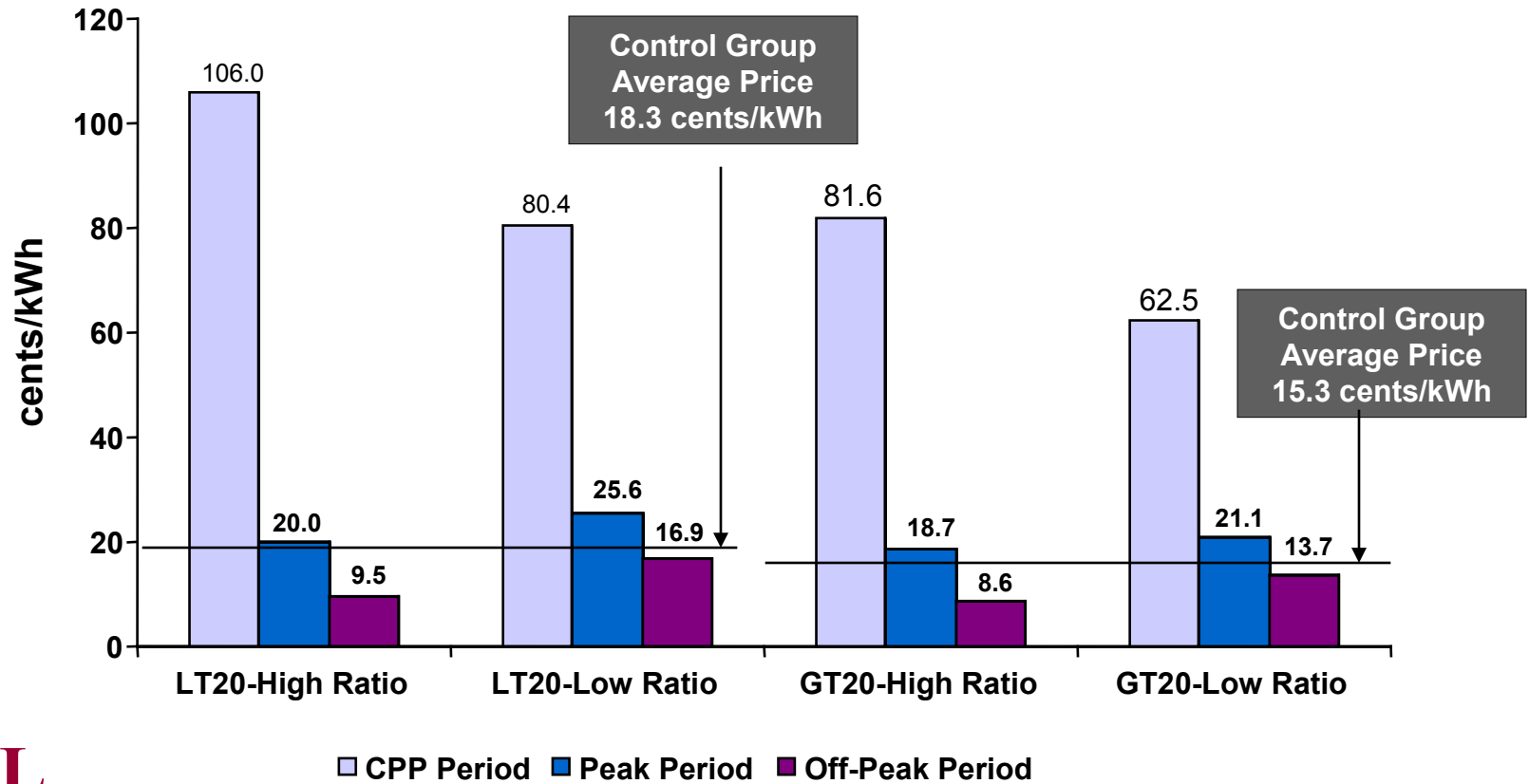
**COMMERCIAL / INDUSTRIAL  
CUSTOMERS**

**SPP Commercial / Industrial Rate Forms**  
**( TOU & CPP High Options )**

Average Prices For C&I Customers During Treatment Period (\$/kWh)						
Customer Segment	Rate Treatment	Price Ratio	Non-CPP Day		CPP-Day	
			Peak Period	Off-Peak Period	Peak Period	Off-Peak Period
LT20	Control	n/a	0.186		0.186	
	TOU	High	0.272	0.094	0.272	0.094
		Low	0.325	0.159	0.325	0.159
	CPP-V	High	0.200	0.095	1.07	0.091
		Low	0.256	0.169	0.813	0.166
GT20	Control	n/a	0.154		0.154	
	TOU	High	0.224	0.100	0.224	0.100
		Low	0.254	0.144	0.254	0.144
	CPP-V	High	0.187	0.086	0.820	0.084
		Low	0.212	0.137	0.629	0.136

Source: SPP Summer 2003 Update Analysis, Charles Rivers Associates, June 9, 2004.

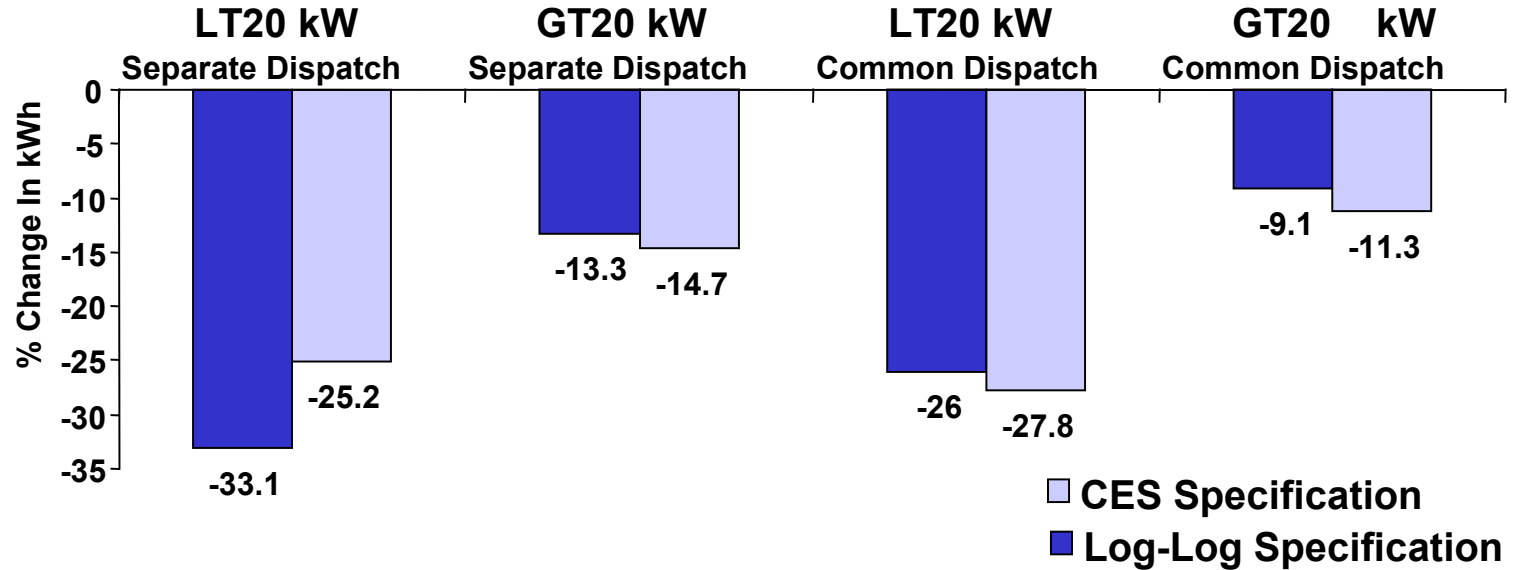
**Price For Typical C&I Customer On CPP-V Rate**  
 (Weighted Average For Treatment Customers)



Source: SPP Summer 2003 Update Analysis, Charles Rivers Associates, June 9, 2004.

## Percent Change In Energy During Peak Period

(Average Experimental Prices On CPP Days)

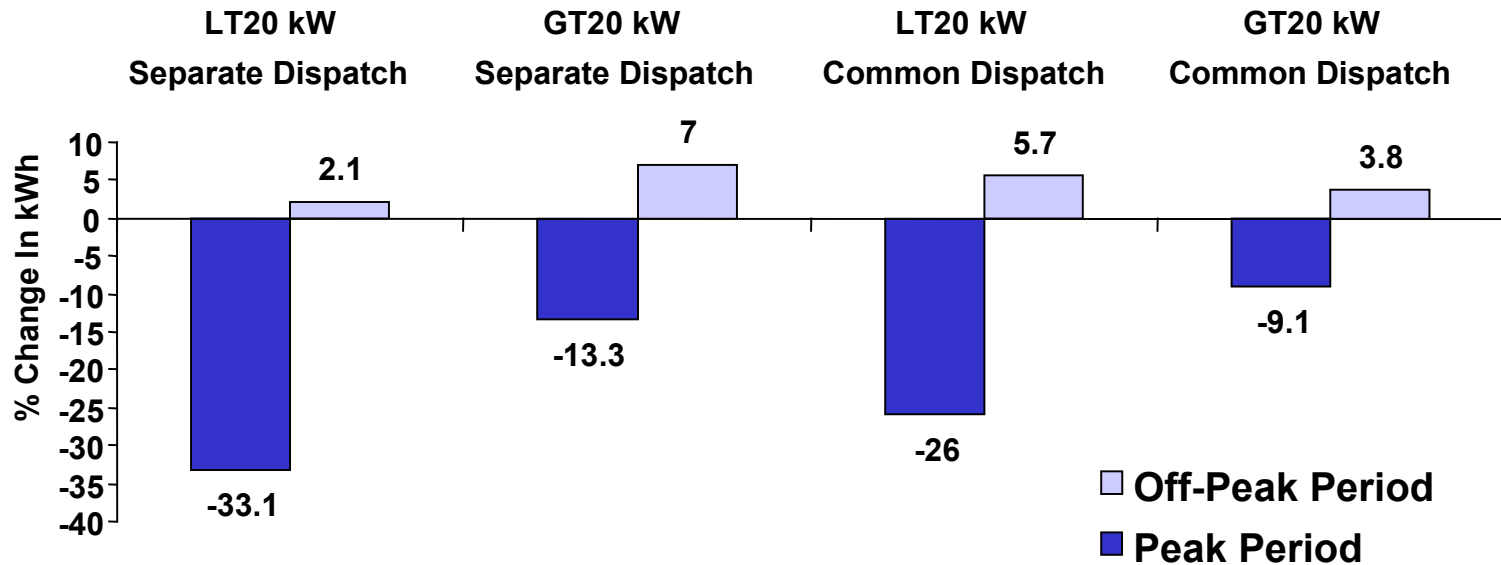


\* Estimates for the CPP-V tariff may not represent the impacts of the general population of customers

Source: SPP Summer 2003 Update Analysis, Charles Rivers Associates, June 9, 2004.

## Percent Change In Energy Use By Rate Period For Average Experimental Prices On CPP Days

(Based on Log-Log Model)

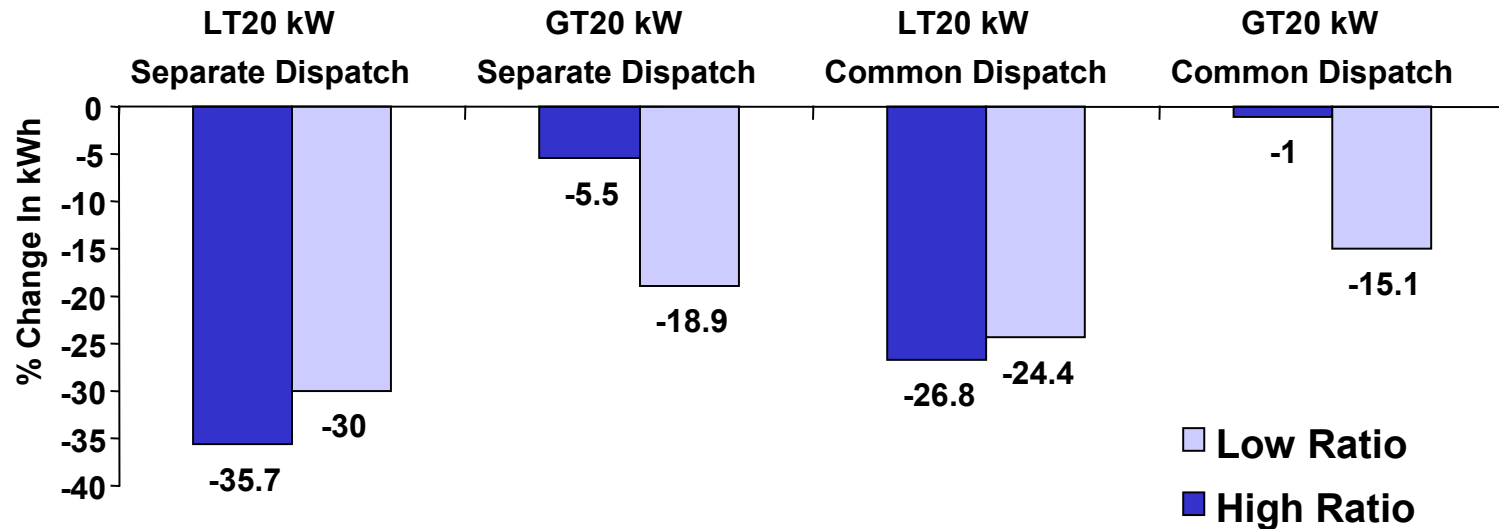


\* Estimates for the CPP-V tariff may not represent the impacts of the general population of customers

Source: SPP Summer 2003 Update Analysis, Charles Rivers Associates, June 9, 2004.

## Percent Change In Energy Use During Peak Periods On CPP Days By Price Ratio

(Based on Log-Log Model)



\* Estimates for the CPP-V tariff may not represent the impacts of the general population of customers

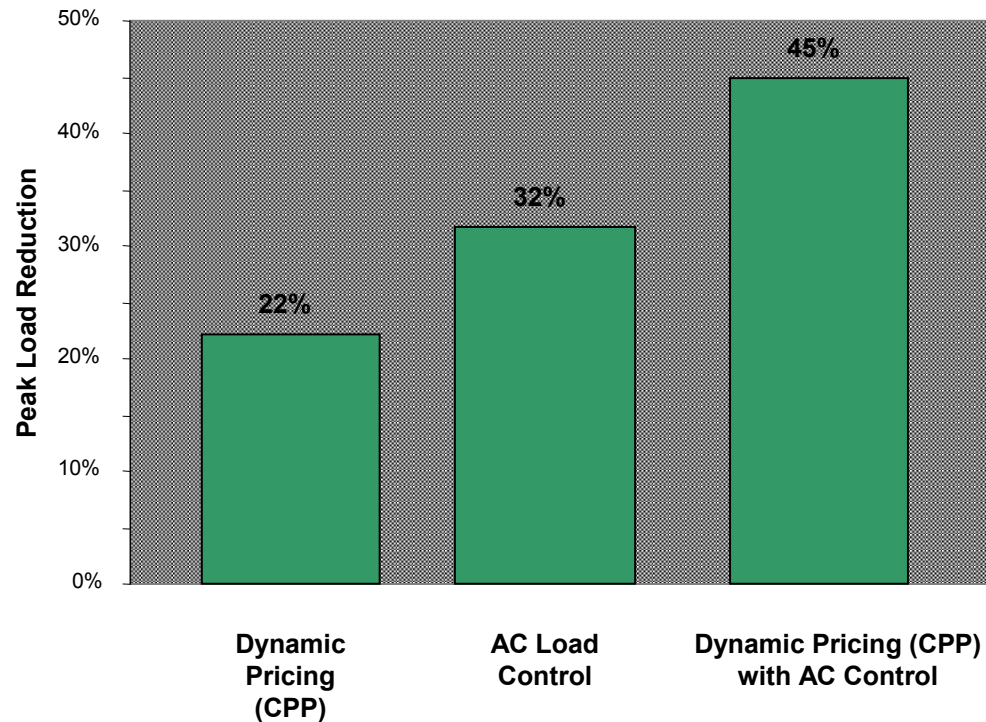
Source: SPP Summer 2003 Update Analysis, Charles Rivers Associates, June 9, 2004.

# California Vision – The Results

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**INDUSTRY WIDE EXPERIENCE**

## Comparison of Pricing Only, Load Control Only and Combined Programs

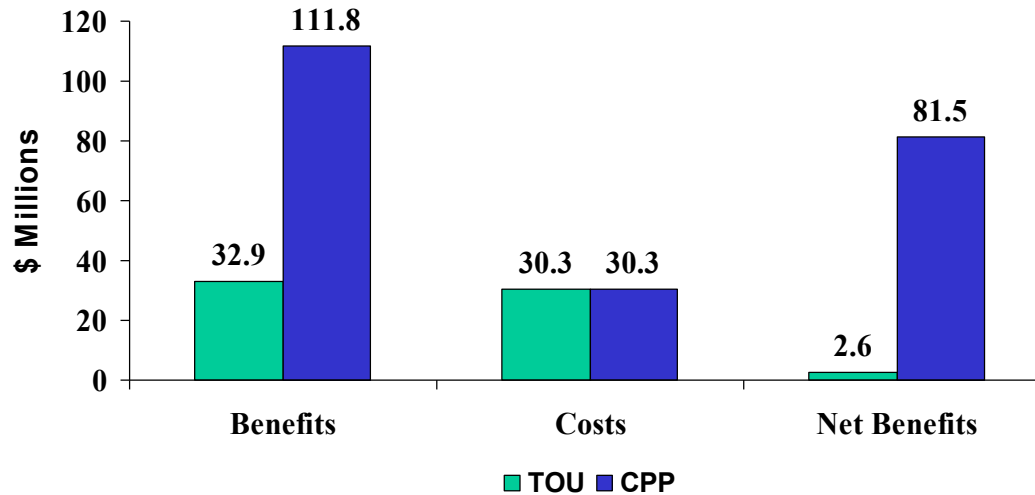


Source: *ISSUES IN DEMAND RESPONSE, Combining Residential Dynamic Pricing and Load Control: The Literature*  
Chris King, December 2003



## Cost Effectiveness CPP Rates Dominate TOU Rates

### Total Resource Cost - Net Present Value



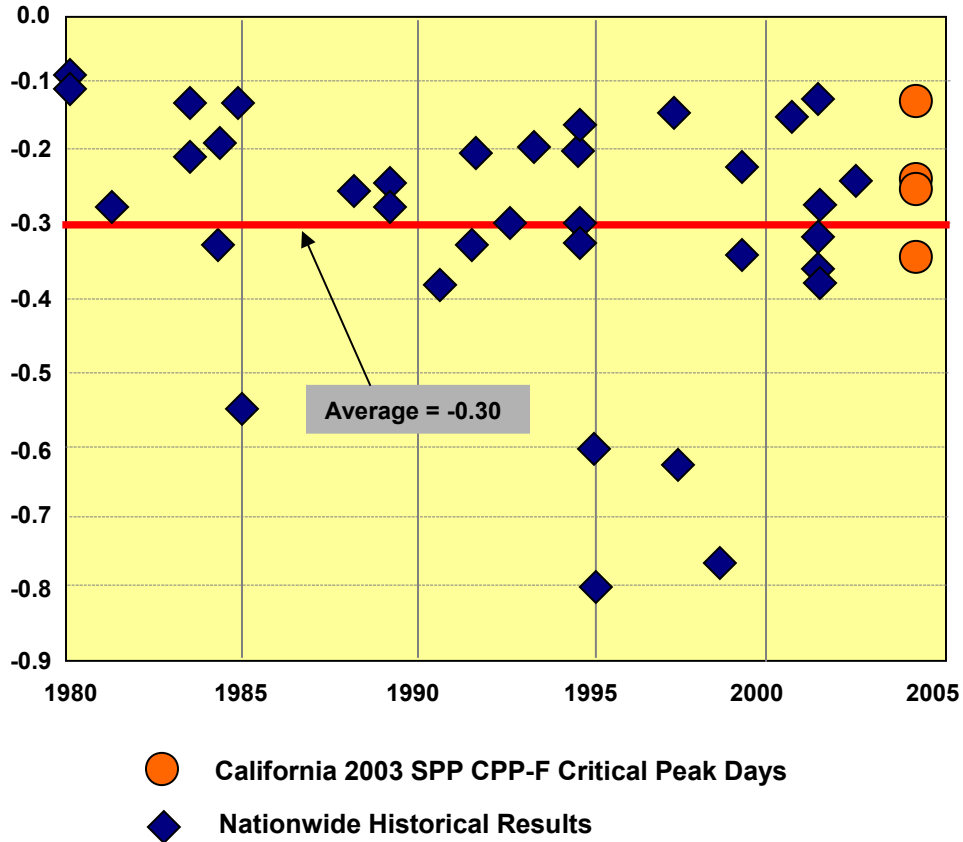
Source: [ Northern State Power Case Study ]

*Creating Value Through Dynamic Pricing in Mass Markets*, Peak Load Management Alliance Fall Conference, Annapolis, Maryland, Ahmad Faruqi and Steve George, Charles River Associates, October 8, 2002



## Own-Price Elasticities

### California SPP vs. Nationwide Historical Results





## Own-Price Elasticity of Demand SPP Compared to Historical Industry Results

### Statewide Pricing Pilot (SPP) Own-Price Elasticity Results

Climate Zone	CPP-F CPP Days*	CPP-F Non-CPP Days	TOU All Weekdays
Zone 1	-0.14	-0.21	+0.03
Zone 2	-0.24	-0.26	-0.13
Zone 3	-0.34	-0.50	-0.59
Zone 4	-0.25	-0.25	-0.27

Source: Charles Rivers Associates, SPP Summer 2003 Impact Analysis, January 27, 2004.

### Historical Studies Own-Price Elasticity Results

Climate Zone	Short-Run Elasticity <sup>1</sup>	Long-Run Elasticity
Low	-0.12	-0.60
Medium	-0.20	-0.90
High	-0.35	-1.20

1. Short-run – customers make no change in appliance holdings.

Source: Predicting California Demand Response, Chris King and Sanjoy Chatterjee, Public Utilities Fortnightly, July 1, 2003, p.27-32.

## There Is Ample Evidence That US Customers Respond To Dynamic Pricing Rates

- A variety of experiments, quasi-experiments and demonstration programs have been conducted during the past quarter century to assess customer response to innovative pricing options.
- On average, if the on-peak price is doubled, on-peak usage drops by 20%. The drop in usage varies based on factors such as appliance ownership and climate.
- Puget Sound Energy has shown that if the on-peak price is raised about 15%, on-peak usage drops by 5%.
- Salt River Project has shown that coincident peak demand drops by 28% if the on-peak energy price is doubled.
- GPU has shown that enabling technologies can double the magnitude of customer response.

Source:

*Creating Value Through Dynamic Pricing in Mass Markets*, Peak Load Management Alliance Fall Conference, Annapolis, Maryland, Ahmad Faruqi and Steve George, Charles River Associates, October 8, 2002

## Customer Demand Response Estimates

Program Type	Range of Elasticities	Range of Peak Demand Reduction	Range of Total Usage Reduction
Residential time-of-use	<b>-0.05 to -1.3</b> <i>(SCE; North Carolina)</i>	<b>4% to 35%</b> <i>(Ontario; Duke)</i>	<b>0% to 23%</b> <i>(PG&amp;E; Connecticut)</i>
Residential critical peak pricing	<b>-0.35 to -0.82</b> <i>(GPU; EdF France)</i>	<b>42% to 59%</b> <i>(Gulf Power; AEP)</i>	<b>0% to 6.5%</b> <i>(AEP; Gulf Power)</i>
Small commercial time-of-use	<b>-0.03 to -0.04</b> <i>(SCE; PG&amp;E)</i>	<b>SPP Results in Process</b>	<b>2.1% to 5%</b> <i>(McKinsey multi-utility data; Finland)</i>
Small commercial dynamic pricing	<b>No studies</b>	<b>SPP Results in Process</b>	<b>SPP Results in Process</b>

Source:

Proposed Pilot Projects and Market Research to Assess the Potential for Deployment of Dynamic Tariffs for Residential and Small Commercial Customers, Report of Working Group 3 to Working Group 1, R.02-06-001, Final Version 5, December 10, 2002, Table 2-2.

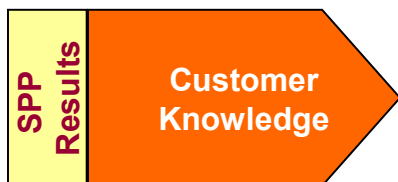
# California Vision – The Results

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**CUSTOMER KNOWLEDGE,  
PREFERENCES and BILL IMPACTS**

# SPP Conclusions

## Customer Response



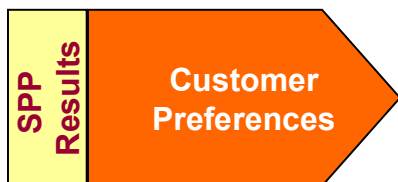
1. Customers do not understand the relationship between how they use energy and what they pay.
2. Customers understand and accept the concept of time-differentiated pricing.

### Confidence in Conclusion

- High  
 Moderate  
 Low

### Need for Further Tests

- None  
 Useful  
 Essential



1. Customers resist change due to uncertainty regarding their present usage and billing situation.
2. Residential and business customers support rates that match price with electricity demand.

- High  
 Moderate  
 Low

- None  
 Useful  
 Essential



1. Low and moderate use residential customers will receive reduced energy bills under a CPP rate without any change to their usage pattern because they already use less on-peak energy.
2. CPP rates will provide all customers with a clear option for managing their energy cost.

- High  
 Moderate  
 Low

- None  
 Useful  
 Essential



## Conventional vs. Time-Differentiated Pricing

1

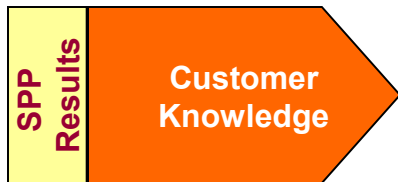
**“..most respondents could easily understand the logic of time-differentiated electricity prices,..”**

2

**“..customers understood time-differentiated pricing (at least the on-peak / off-peak variety) more easily than they understood the notion of inclining block [tiered] or declining block pricing.”**

Source: 1- Residential Customer Understanding of Electricity Usage and Billing, Momentum Market Intelligence, WG3 Report, January 29, 2004.p16.





## Customer Knowledge Findings

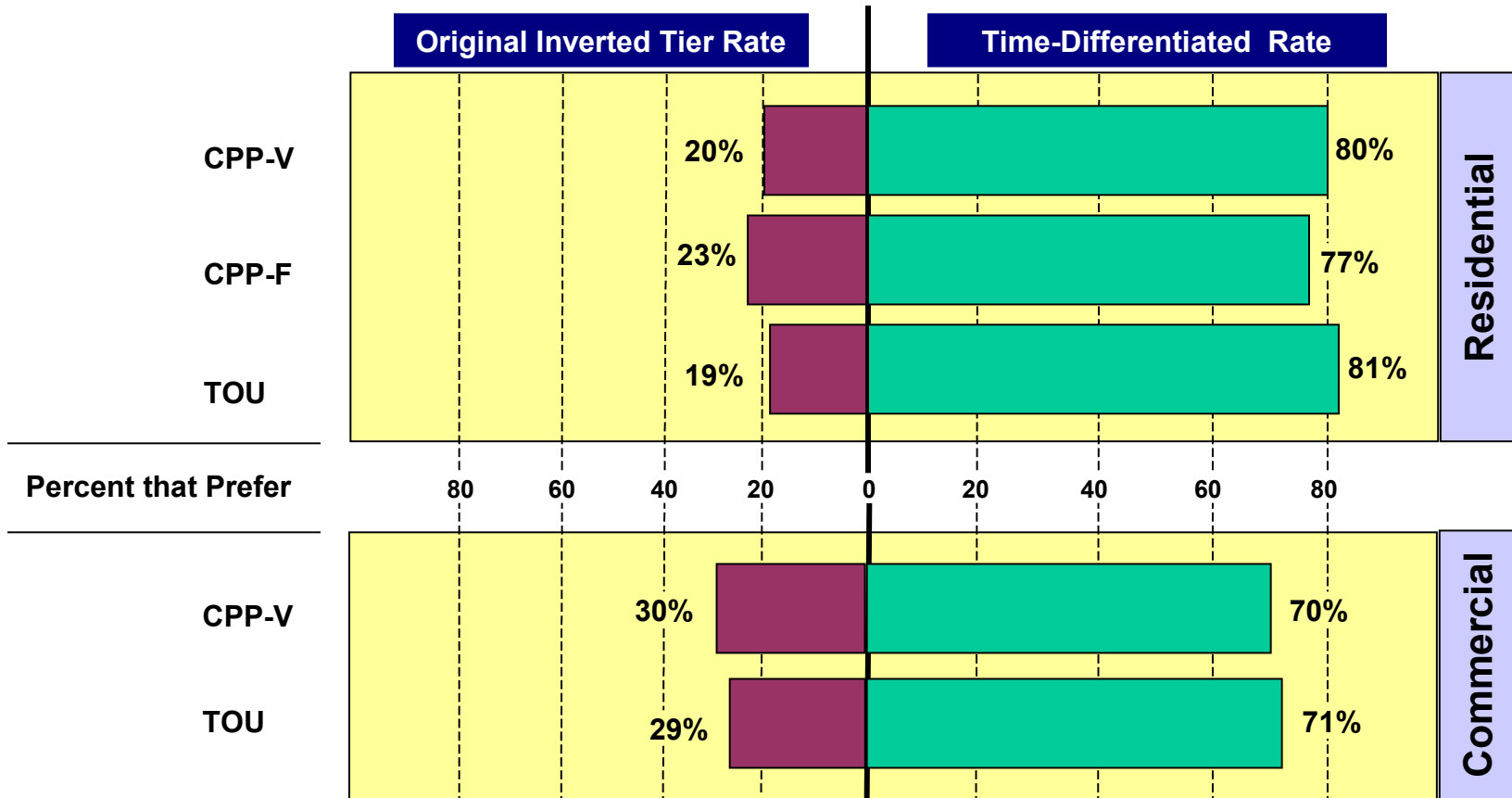
<i>Results from the SPP<sup>1</sup></i>	<i>What it means<sup>2</sup></i>
<ul style="list-style-type: none"> <li>Customers don't understand how electricity use is measured.</li> </ul>	Lack of meaningful feedback on usage and usage pattern.
<ul style="list-style-type: none"> <li>Customers don't understand how electricity is priced.</li> </ul>	Complicated rates mask the time and/or volume vs. cost relationship.
<ul style="list-style-type: none"> <li>There is an uncertain and inaccurate link between how customers use energy, what they pay and what they get in service value.</li> </ul>	The inability to clearly link cost with value contributes to improper / inefficient usage and impedes better investment decisions.
<ul style="list-style-type: none"> <li>Bill accuracy – customer's must trust their supplier. No other choice.</li> </ul>	Creates a fragile, tenuous relationship.

Source: 1- Residential Customer Understanding of Electricity Usage and Billing, Momentum Market Intelligence, WG3 Report, January 29, 2004.pviii-ix.

2 – CEC interpretation.



## SPP Customer Rate Preference





## Customer Resistance to Change

### Justification for a Revised Default Tariff

1

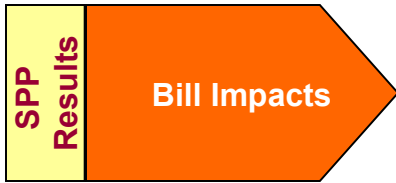
**“Having to change plans, however, is not viewed as a good thing but rather as a necessary step when a given plan turns out to not work as well as had been anticipated.”**

2

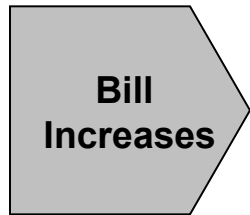
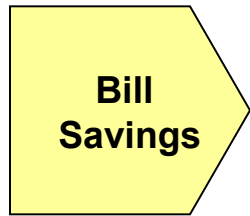
**“The implication for electricity pricing plans is to recognize that customers do not tend to adopt such plans with the notion that they are willing to ‘trial’ options and ‘see how they work out’.”**

3

**..several participants claimed to be on a TOU rate, derived from the “Flex Your Power” advertising campaign. They were delaying some electric usage until evenings and weekends – they believed they were paying less for electricity during those times.**



## Average Bill Impacts Residential and Commercial / Industrial Savings (summer / winter 2003)



	Residential				Commercial / Industrial	
	CPPV	CPPF	TOU	Info Only	CPPV	TOU
<b>Participants (%)</b>	71.1%	73.7%	70.0%	79.0%	80.3%	58.2%
<b>Average Monthly Savings (%)</b>	5.1%	5.5%	4.5%	5.4%	12.2%	9.6%
<b>Average Monthly Savings (\$)</b>	\$53	\$35	\$29	\$19	\$1,521	\$869
<b>Participants (%)</b>	28.9%	26.3%	30.0%	21.0%	19.7%	41.8%
<b>Average Monthly Increase (%)</b>	4.0%	6.2%	3.0%	10.0%	5.0%	10.0%
<b>Average Monthly Increase (\$)</b>	\$39	\$44	\$30	\$9	\$224	\$600

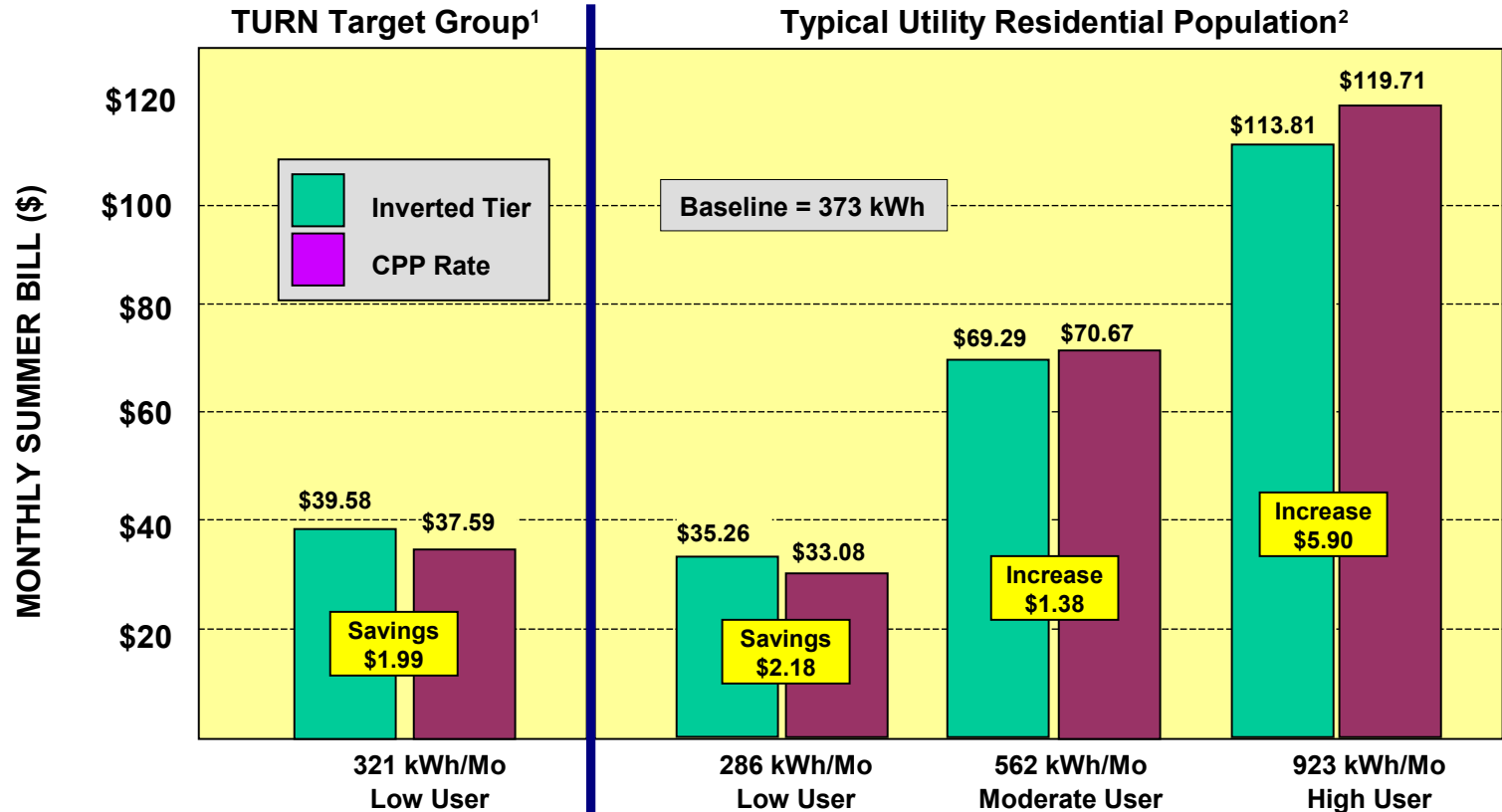
Source: Statewide Pricing Pilot, Shadow Bill Results, WG3 report, June 9, 2004.



# Potential Impacts from Systemwide Implementation

Existing Inverted Tier vs. SPP CPP Rate (Summer)

( Assumes no customer response )

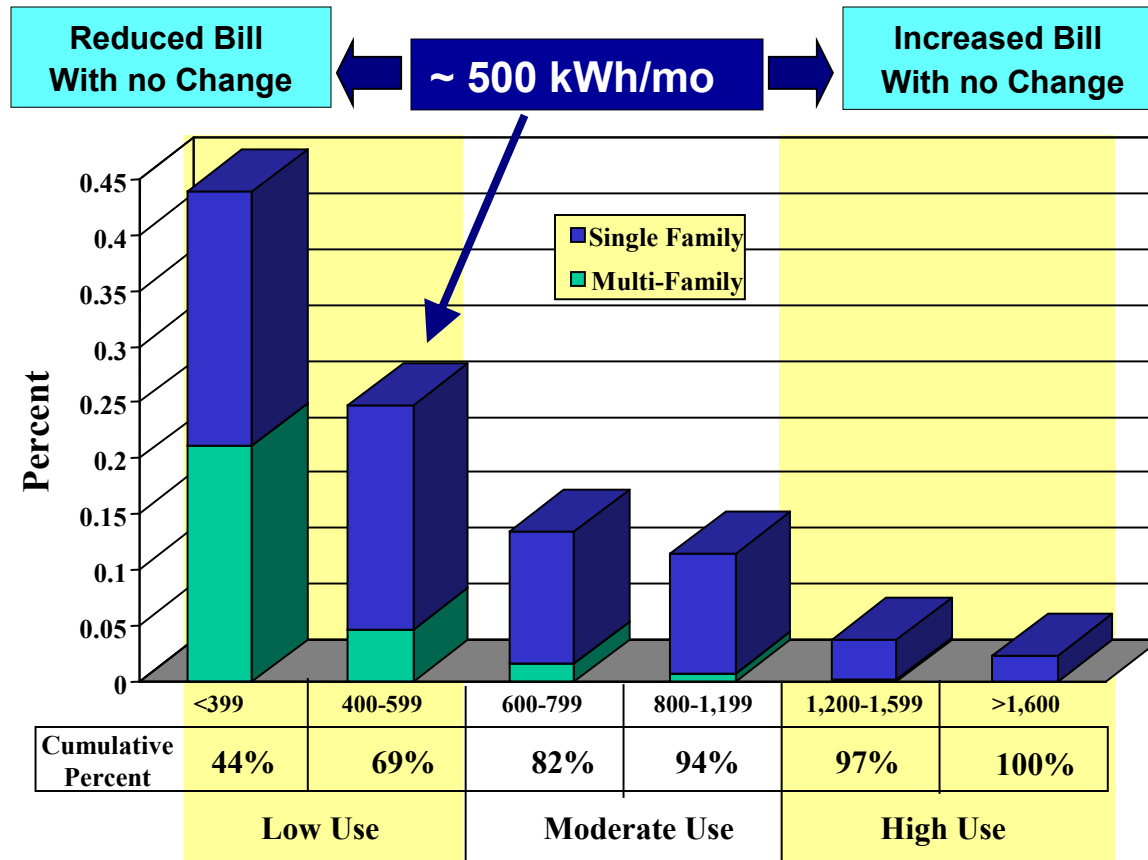


1. Target Population identified: Financial Externalities and “Peak Hogs”: New Consideration for Energy Efficiency and Rate Design Policy, by William B. Marcus, Principle Economist, JBS Energy, Inc., March 2001.

2. Target Population identified from PG&E SPP rate design exercise.

## Customer Bill Impacts

### Typical Utility Residential Population by Average Monthly Electric Usage

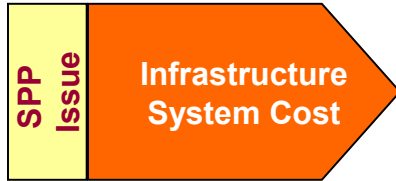


# California Vision – The Results

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## Cost Benefit Issues

# Advanced Metering

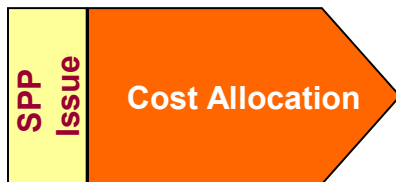


**Concern:**

Full system wide deployment is too expensive. Implementation should be targeted to select customers or programs.

**Response:**

U.S. utilities have deployed over 15 million units based on utility operating savings alone.



**Concern:**

Small customers will be adversely and disproportionately impacted by monthly fixed meter charges.

**Response:**

Allocating meter costs using kWh usage reduces monthly impacts to under \$0.50.



**Concern:**

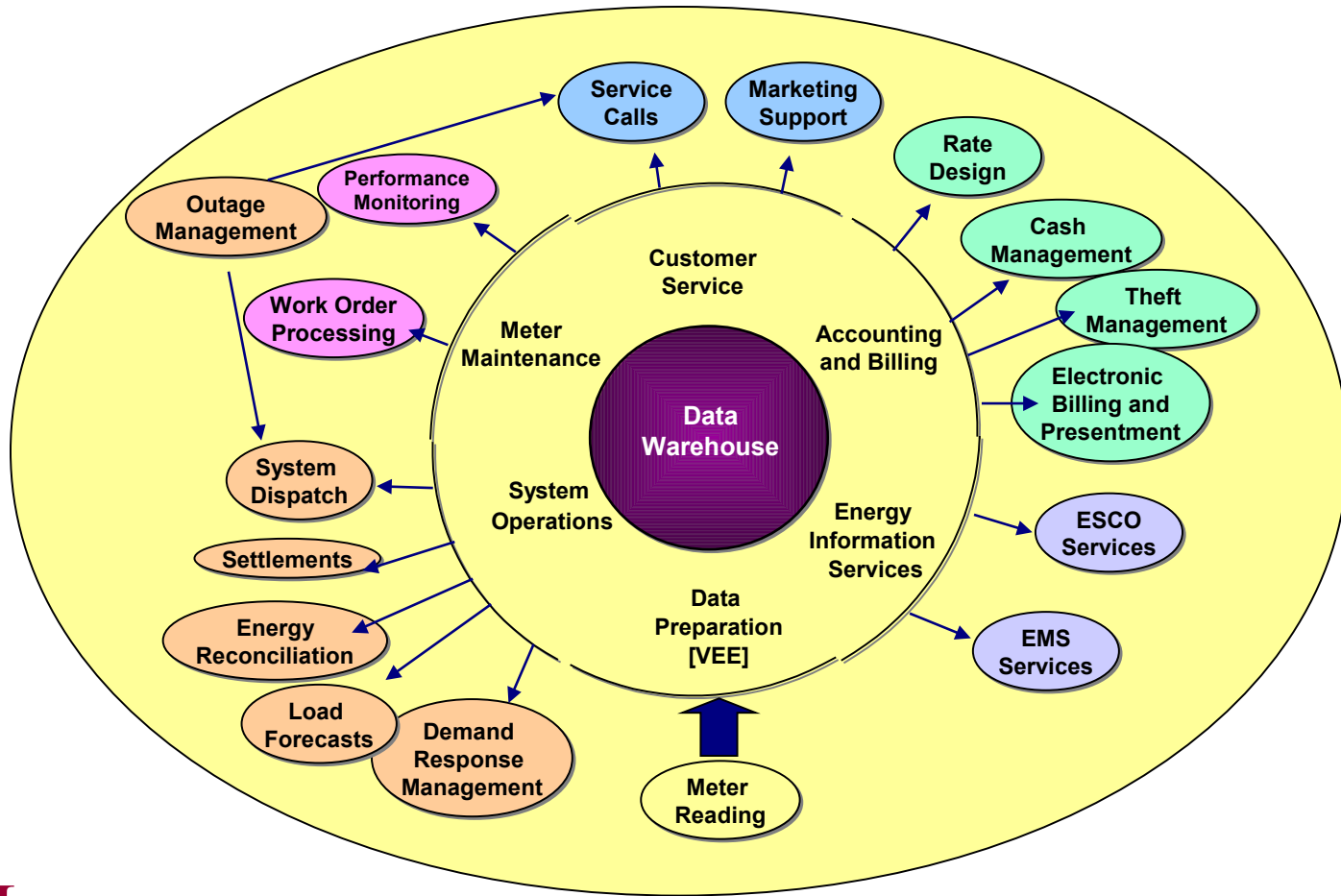
Outsourcing offers no benefits to utilities.

**Response:**

Two-thirds of U.S. deployments are outsourced at lower cost and risk to the utility.

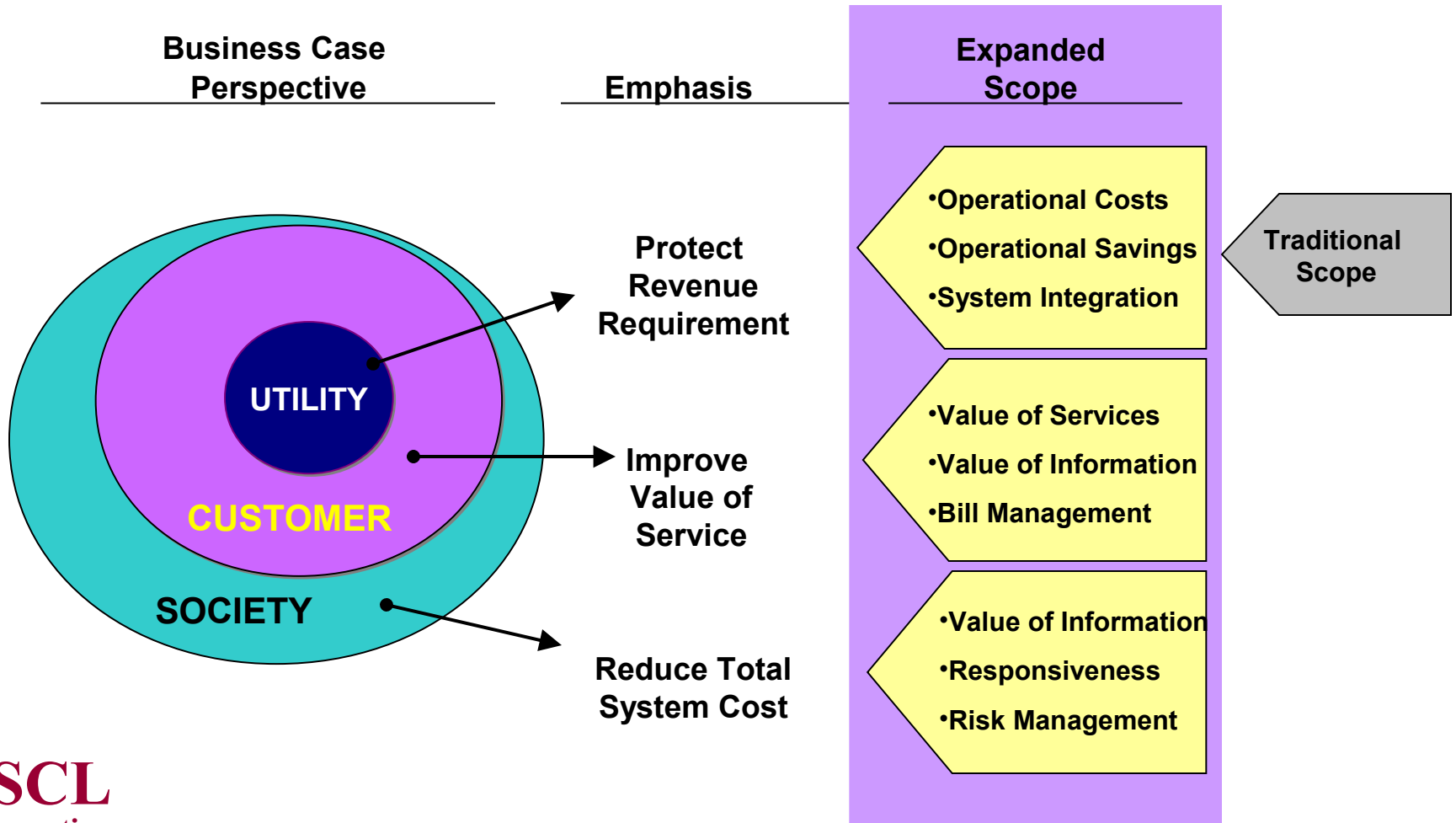


# Advanced Metering Improved Data Access Impacts all Utility Functions





# Advanced Metering Establishing the Business Case

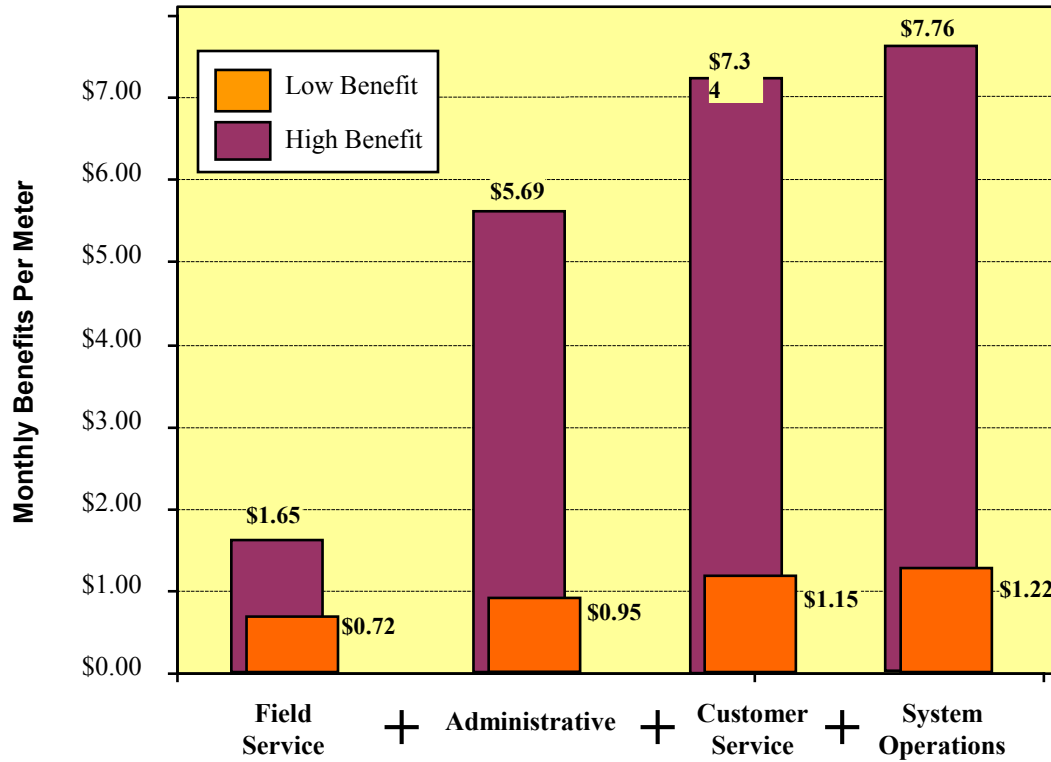


## Meter System Costs (Example)

	Residential	Commercial Industrial
<b>Solid State Meter and communication module</b>	\$45-\$75	\$50-\$800
<b>Installation Cost</b>	\$5-\$150	\$10-\$300
<b>Information and Communication Systems *</b>	\$10-\$40	\$10-\$40
<b>Total \$ Cost per Meter</b>	<b>\$85-\$265</b>	<b>\$90-\$1,000</b>
<b>Per Customer / Month Incremental Cost</b>	<b>\$1.00 to \$1.50 per meter</b>	
Today's Metering Cost	\$2.50 - \$3.50 / meter / month	

Source: WG3, industry presentation, 2003.

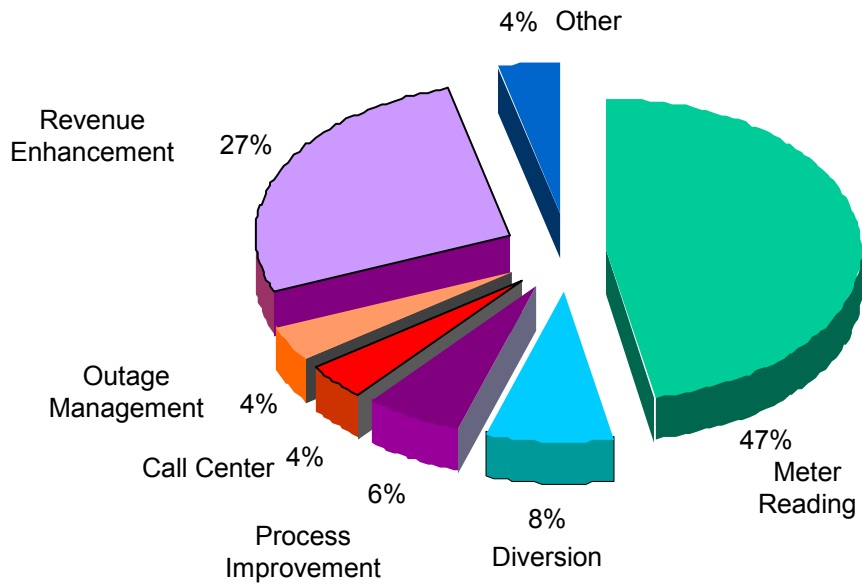
### Advanced Metering - Utility Benefits



### Cumulative Utility Benefits

Source: "Capturing the Value: The Future of Advanced Metering and Energy Information", Cambridge Energy Research Associates (CERA), Final Report, Spring 1999, Chapter VI, Figure VI-6 (Levy Associates Working papers).

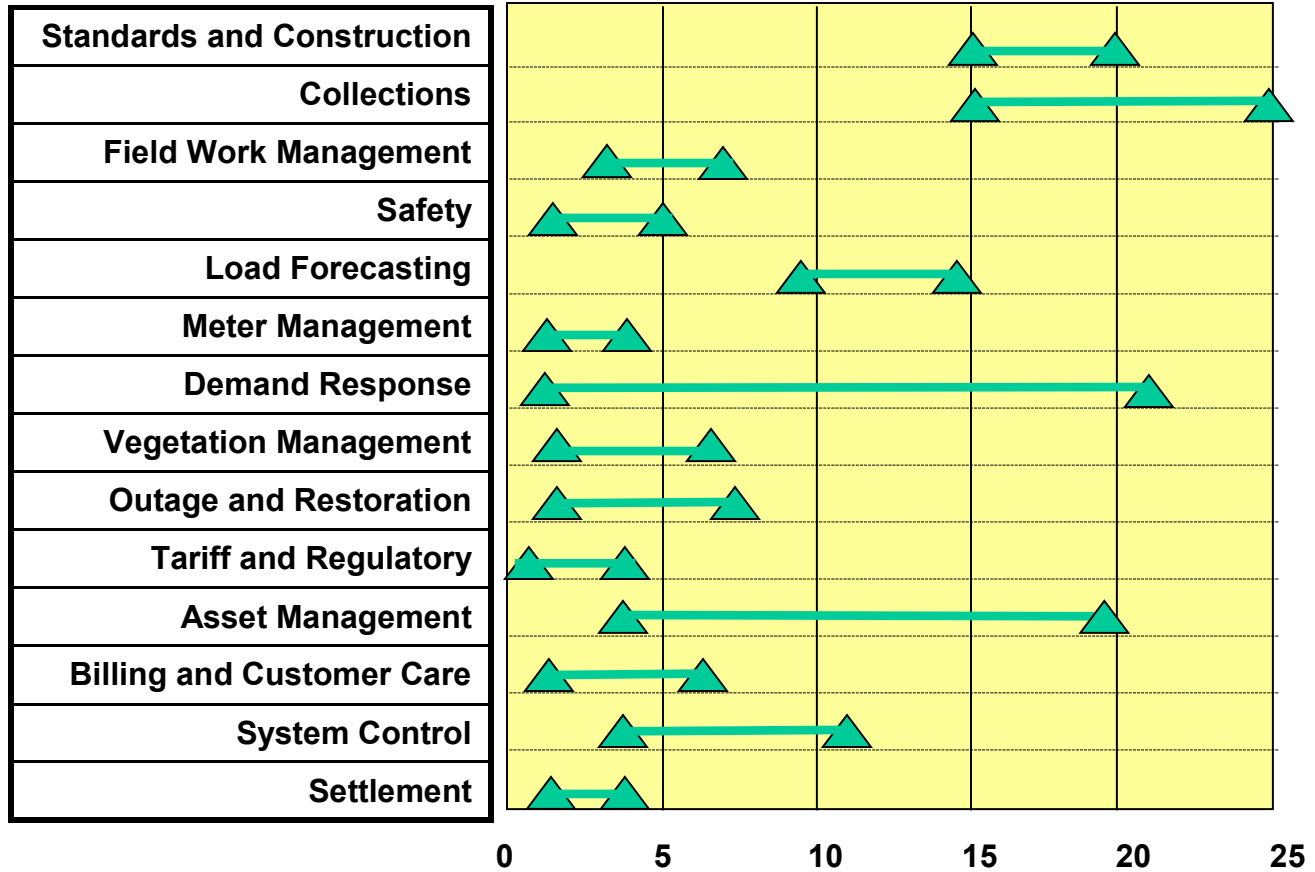
**Electric System Benefits**  
Puget Sound Energy



Source: California Experiential Workshop, Presentation by Puget Sound Energy, Brian Pollom and Todd Starnes, September 10, 2002.

**Advanced Metering - System Benefits**

**Reported Percentage Reduction in System Costs**



Source: "Distribution Technology Roadmap", Report for the Canadian Electrical Association & Consortium, by Cap Gemini Ernst & Young, U.S. LLC, 2003.

## Advanced Metering

### Full vs. Targeted Deployment – Impact on Benefits

(Example)

<b>B</b>	<b>Improved Utility Operations</b>	<b>Targeted Implementation</b>	<b>System-Wide Implementation</b>
<b>1</b>	Reduce System Meter Reading Costs	<b>NO</b>	<b>YES</b>
<b>2</b>	Improve Billing Information, Reduce Estimated Bills	<b>LIMITED</b>	<b>YES</b>
<b>3</b>	Improve Financial Management	<b>NO</b>	<b>YES</b>
<b>4</b>	Reduce / Improve Call Center Operation	<b>NO</b>	<b>YES</b>
<b>5</b>	Reduce Diversion and Theft	<b>LIMITED</b>	<b>YES</b>
<b>6</b>	Improve System Outage Response	<b>NO</b>	<b>YES</b>
<b>7</b>	Better Information for Planning, Forecasting & Evaluation	<b>LIMITED</b>	<b>YES</b>
<b>8</b>	Better Information for T&D Planning / Management	<b>LIMITED</b>	<b>YES</b>
<b>9</b>	Expanded Demand Response Planning and Evaluation	<b>LIMITED</b>	<b>YES</b>



## Advanced Metering - Cost Allocation

**PROBLEM**

Fixed meter charges disproportionately impact low use customer bills.

**SOLUTION**

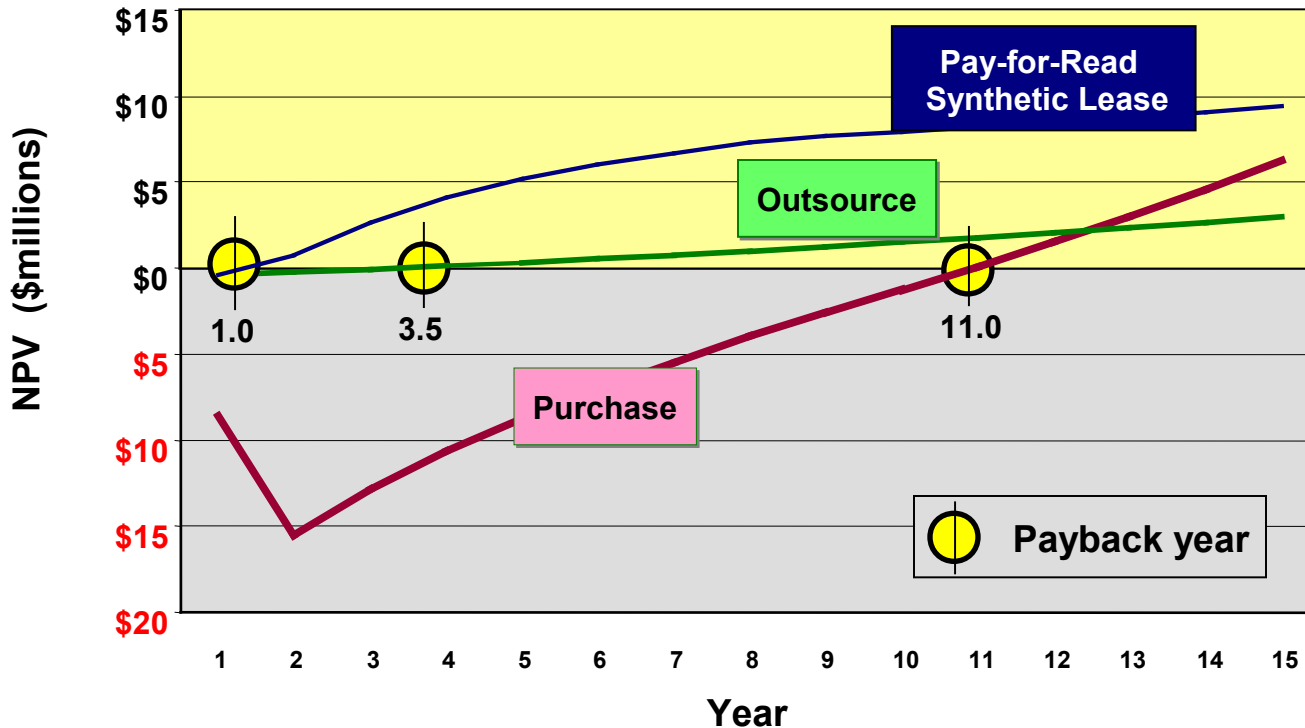
kWh based volumetric cost allocation method.

Total Cost Per Residential Meter	Option #1. Fixed Charge \$ / Meter / Month	Option #2. Volumetric Charge \$ / Meter / Month	
		Monthly Usage Charge	Monthly Charge
\$85 - \$265	\$1.05 - \$2.25	0 - 300 kWh	\$0.33
		301 - 500 kWh	\$0.56
		501 - 1,000 kWh	\$1.12
		> 1,000 kWh	\$1.67



# Meter System Economics

## Financing Impacts on NPV and Payback



Source: Private communication between Levy Associates and Invensys, background data for a utility highlighted at the Distributech 2001 Utility Conference.

# Options

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1. Regulatory Process
2. Legislation
3. Settlement
4. Policy Decision