Understanding Customer Decisions Associated with Default Dynamic Pricing

Dr. Stephen S. George
Mr. Josh Bode
Freeman, Sullivan & Co.

AESP's 20th National Conference & Expo

February, 2010

FSC
FREEMAN, SULLIVAN & CO.
A MEMBER OF THE FSC GROUP

Background

- **The California Public Utilities Commission (CPUC) has approved the advanced metering applications of all three major investor owned utilities in CA**
  - Approximately 10 million advanced electric meters will be installed in CA in the next few years
- **The CPUC has made it clear that smart meters and dumb prices are a bad combination**
- **PG&E has been ordered to implement default dynamic pricing for all non-residential customers over the next three years, with the opt-out rate being a static TOU tariff**
  - After 2012, all non-residential customers will be on some form of time-varying rate
- **On its own accord, in May 2008, SDG&E implemented default dynamic pricing for all customers with interval metering**
- **This presentation summarizes the decisions made by SDG&E's non-residential customers in response to this fundamental change in pricing policy**

What Types of Customers Were Moved to CPP?

- All customers with peak demands <20kW who had interval meters were defaulted onto CPP in 2008 and 2009
- Roughly 1/3 of the defaulted customers had demands below 200 kW
- In the last two years, almost 2,400 customers were move to the dynamic tariff

	Customers defaulted onto CPP in 2008			New Customers defaulted onto CPP in 2009			All Customers defaulted onto CPP 2008 - 2009		
Size Category	Number of Customers	%	Avg Max Summer Peak	Number of Customers	%	Avg Max Summer Peak	Number of Customers	%	Avg Max Summer Peak
<100 kW	175	9.9%	48.2	197	31.4%	50.5	372	15.5%	49.4
100-200 k	225	12.7%	157.3	108	17.2%	147.2	333	13.9%	154.0
200-500 k	871	49.3%	315.3	191	30.5%	317.1	1062	44.4%	315.6
>500 kW	386	21.8%	1003.3	100	15.9%	1128.6	486	20.3%	1029.1
Unclassified	110	6.2%	NA	31	4.9%	NA	141	5.9%	NA
Total	1767	100.0%	425.9	627	100.0%	334.3	2394	100.0%	401.9

The SDG&E Default Process

- Bill protection is offered for the first year that a customer is on the tariff
- Customers were offered the ability to insure against CPP events through capacity reservation charges – they could hedge part or all of their load and avoid higher CPP event day charges
- By default, customers who did not opt out of the CPP tariff were assigned a capacity reservation (insurance) equal to 50% of their summer maximum demand
- Customers were given 45 days from the default date to opt out (default dates varied depending on a customer's billing cycle)
- Those who were defaulted onto the rate in 2008 were given a shadow bill around the time of their one-year anniversary and given another 45 day window to opt out in 2009 before being locked onto the tariff for another year

The SDG&E Default Process

- **Customers were told to expect an average of 9 events per year with a maximum of 18 events during a season—in reality, no events were called the first year**
- **The event period is from 11 to 6 p.m. in the summer and 5 to 8 p.m. in the winter and events can be called any day of the week**
- **Customers are to be notified of an event by 3:00 p.m. the day before**
- **Customers were given the opportunity to view their energy usage data in 15-minute intervals and generate detailed reports on their energy usage**
- **In addition, SDG&E made a CPP Analysis Tool available to customers who registered online**
  - The tool allowed customers to select numerous combinations of the number of events, capacity reservation level, and the amount of load reduction
  - Customers could elect to do the analysis themselves or ask an Account Rep to conduct some analysis for them

Comparison of CPP-D, Opt Out, and Pre-default Tariffs

Illustrative Secondary Service Voltage Level Rates

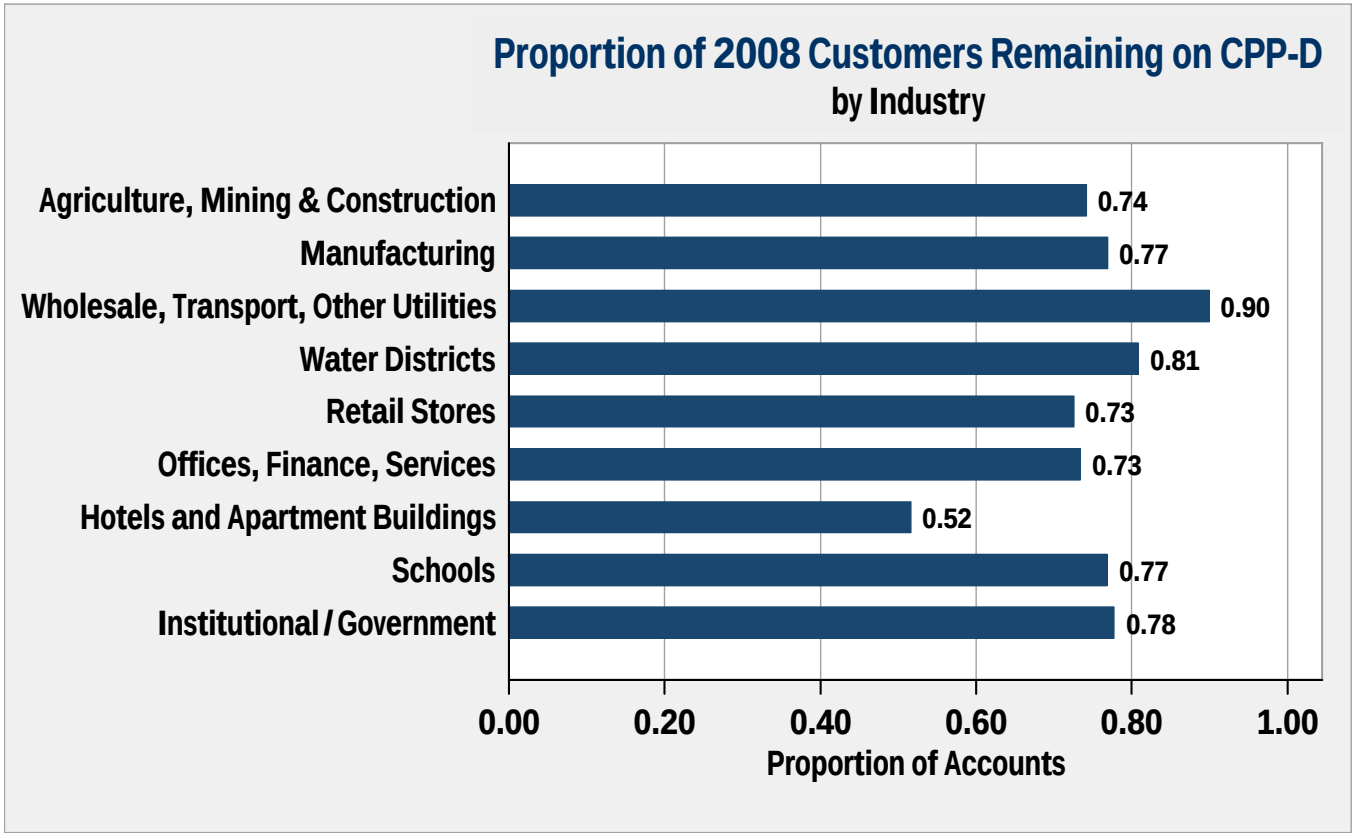
Pre-default

Charge Description	DEFAULT Critical Peak Pricing	OPT-OUT Commodity Pricing	~~CURRENT~~ Commodity Pricing
New Summer Energy Rates ($ per kWh)			
CPP Event Period — Above Capacity Reservation	$1.06781	NA	NA
On-Peak	$0.10360	$0.10821	$0.14033
Semi-Peak	$0.08307	$0.08768	$0.08283
Off-Peak	$0.06139	$0.06600	$0.05807
Winter Energy Rates ($ per kWh)			
On-Peak	$0.10170	$0.10631	$0.14033
Semi-Peak	$0.09313	$0.09774	$0.08283
Off-Peak	$0.06822	$0.07283	$0.05807
New/ Optional Capacity Reservation Charge ($ per kW/Month — Year Round) Self-Selected kW	$ 6.20	NA	NA
New On-Peak Demand Charge ($ per kW) Maximum Summer On-Peak Demand	NA	$ 6.43	NA
On-Peak Demand ($ per kW) Maximum Winter On-Peak Demand	NA	$ .21	NA

An on-peak demand charge made the opt out tariff less appealing

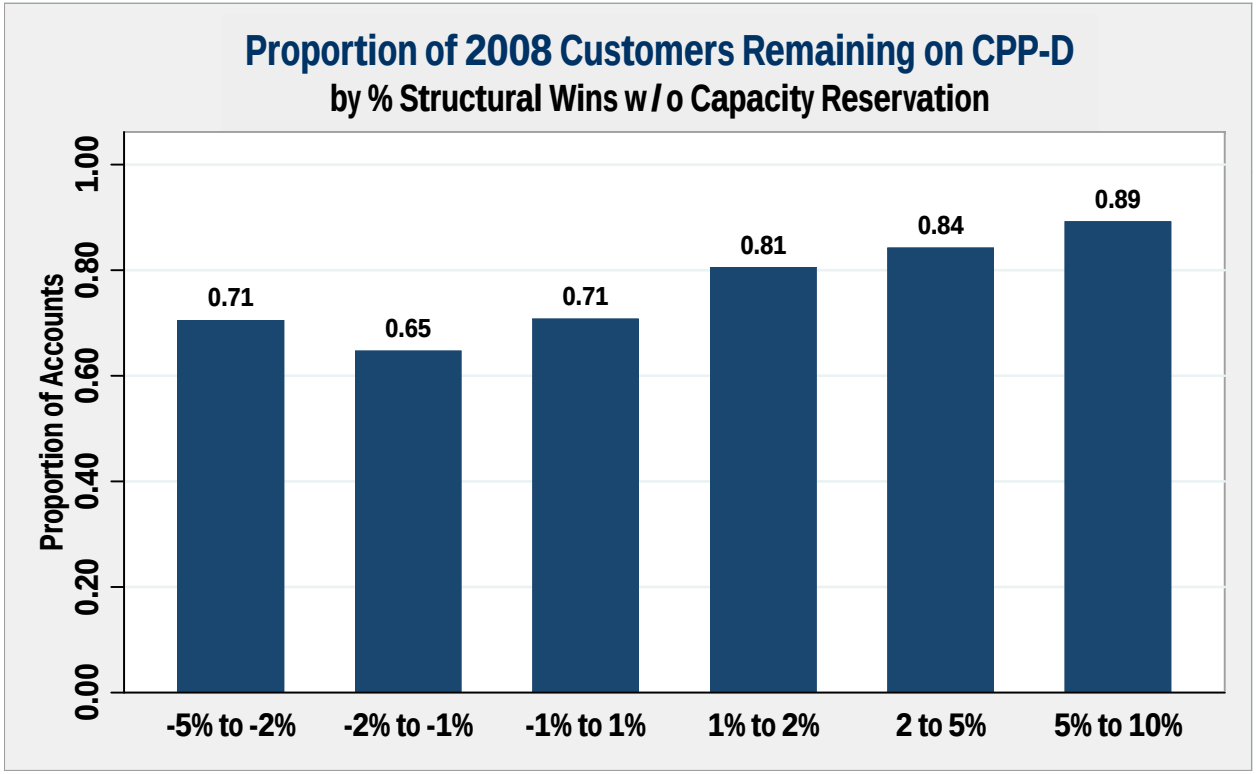
T&D charges were the same for CPP-D and the opt out tariff

In 2008 and 2009, More Than 70% of Defaulted Customers Remained on the CPP Tariff



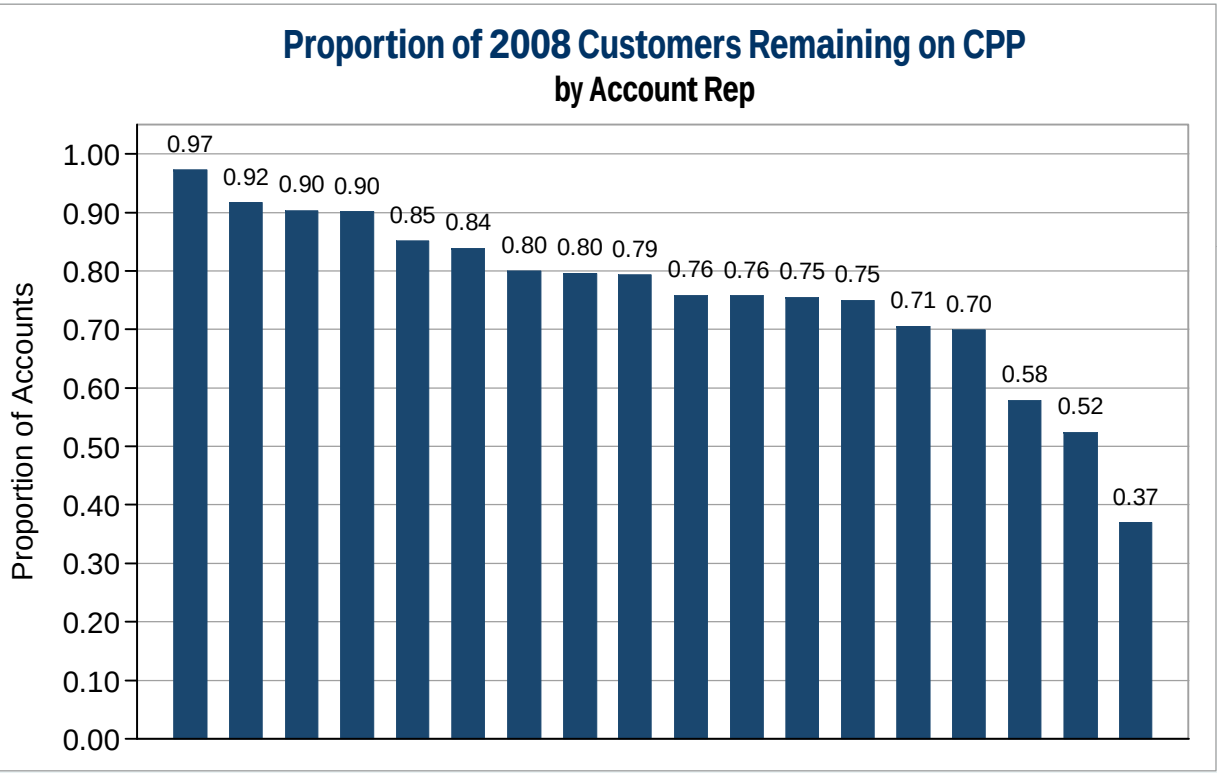
- Except for hotels, acceptance rates exceeded 70% across industries
- When given a choice to opt-out after a year on the CPP tariff, 93% of customers who stayed on the rate in 2008 decided to continue on the tariff for another year

The Higher the Structural Wins, the Higher the Likelihood of Customers Remaining on Default CPP



- Structural wins vary by industry because of differences in load shapes
- The percent of total consumption during CPP hours is closely related to structural wins

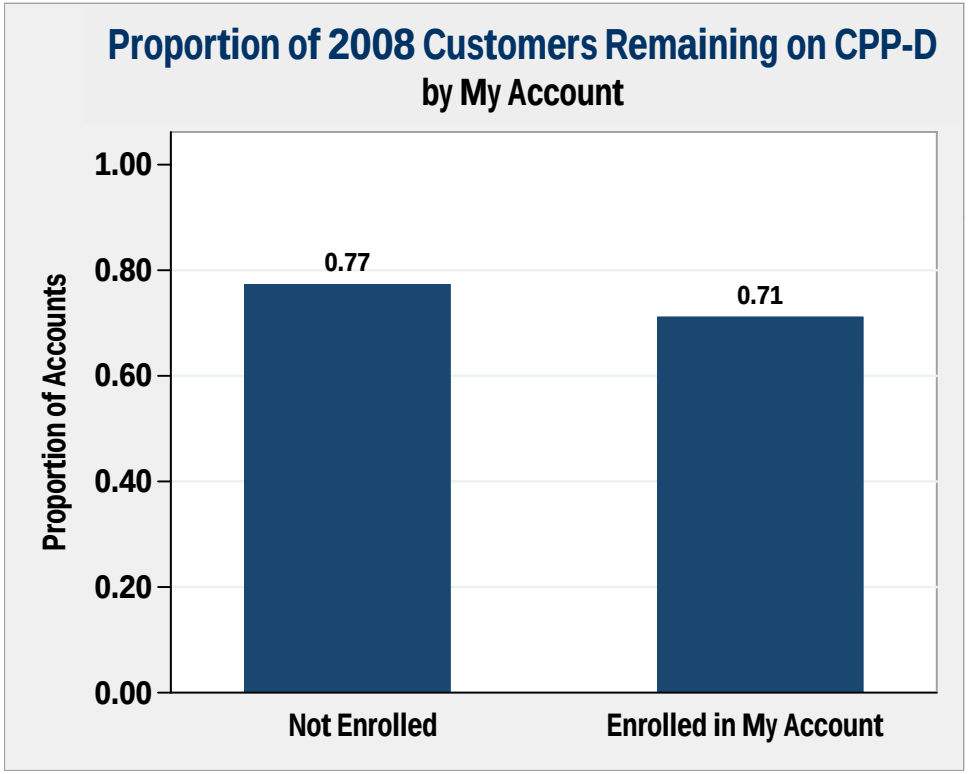
The Decision to Remain on the CPP Tariff Varied Widely Across Account Reps



Includes account reps with more than 20 assigned accounts. Most have over 100 assigned accounts.

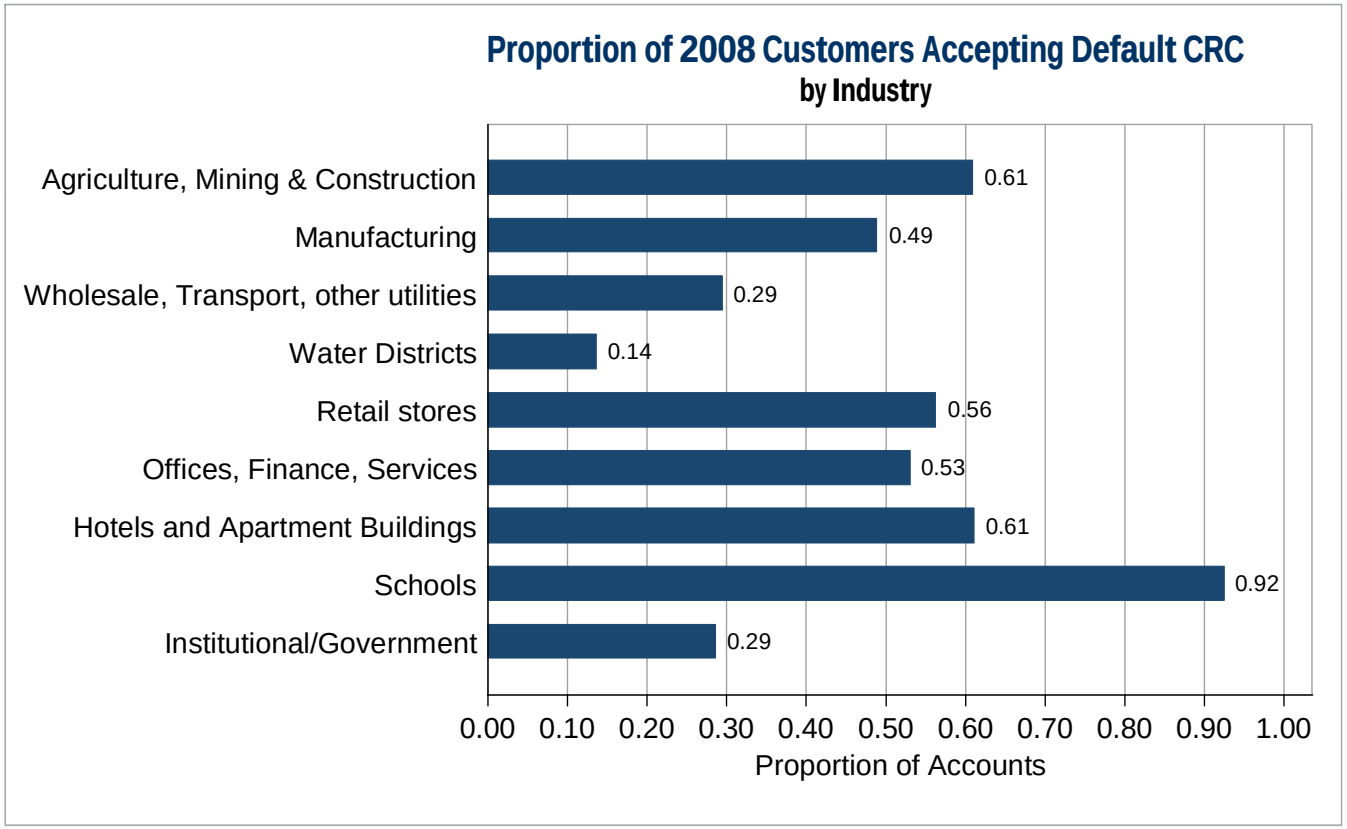
- Some, but not all, of the variation is due to differences in account rep assignments
- Account reps influence the decision even after controlling for industry, size and customer load shapes
- A very similar distribution of opt-out rates across account representatives is seen for the new customers defaulted in 2009 and for second year decisions by 2008 customers

Ease of Access to Interval Data and Analysis Tools Affected Customer Choices



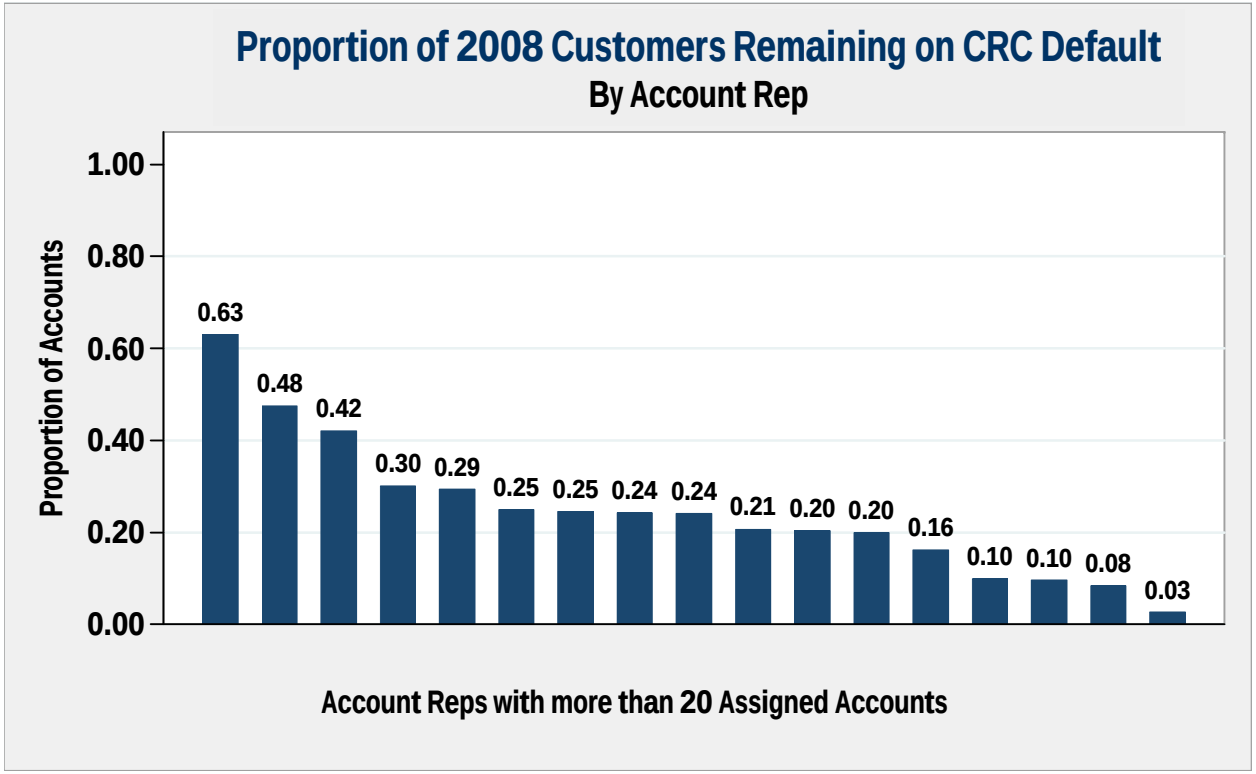
- Customers enrolled in My Account had direct access to interval data and SDG&E's CPP analysis tools
- Customers not enrolled in My Account had to contact their account rep
- There are no data on who used the tool or what scenarios customers ran
- Customers who were enrolled in My Account were more likely to opt out

Approximately 50% of Customers Accepted the Default Capacity Reservation in 2008, With Variation by Industry



- Almost all customers who declined the default capacity reservation value chose no capacity reservation
- Almost all schools accepted the 50% hedge
- Only 1/3 of new customers defaulted onto CPP in 2009 accepted the default capacity reservation amount

The Decision to Stay With the Default CRC Also Varied Widely Across Account Reps



- Some, but not all, of the variation is due to differences in account rep assignments
- Account reps influence the decision even after controlling for industry, size, and customer load shapes

Regression Models Were Developed to Predict Choices by Customers Defaulted in the Future

- Graphs and tables do not disentangle the relationships between potential drivers/predictors
- Regressions disentangle those relationships and assign weights to the factors affecting the decision

- Regressions can help guide policy decisions, particularly about expected enrollment and where to focus efforts in transitioning customers
  - What is the effect of structural wins and losses on decision to stay or opt out?
  - What share of customers will accept default CPP and provide load reduction potential?
  - How much do customers value insurance against the price spikes in CPP?
- Regressions can predict opt-out rates in other jurisdictions, with some limitations

The Regression Models Were Estimated Using Different Variables that Reflect Potential Bill Impacts

Regression for	Share of CPP Period Consumption	Consumption by TOU block	% Structural wins or losses
Acceptance of Default CPP	▪ Based on heuristic decision-making ▪ % of kWh subject to CPP charges is highly correlated with structural wins / losses ▪ Can draw conclusions w / o full bill analysis ▪ Designed to assess influence of account reps after controlling for other factors	▪ Allows calculation of opt out and capacity reservation decisions based on TOU billing data – does not require manipulating interval data ▪ Sacrifices some precision and accuracy for usability	▪ Predicts opt out and CRC decision as a function of wins / losses with CPP, both with and without a capacity reservation charge ▪ % of kWh subject to CPP dominates the structural win / loss variables when included
Acceptance of default Capacity Reservation (Given acceptance of default CPP)			

The Billing Analysis Based Model Can be Used to Predict Decisions for Rates That Differ from SDG&E's Tariffs

- The model can customize forecasts of default CPP acceptance for utilities with different tariff designs and / or customer mixes
- The model can be employed to predict default rates for different regions, with different load shapes (e.g. Local Capacity Regions)
- The model cannot, however, control for differences in the process employed in defaulting customers onto dynamic prices
- Because of the higher external validity of the billing analysis model, the remainder of the presentation focuses on those results
- The model findings and predictions contained in the rest of this presentation are based on the 2008 analysis—new models are currently being estimated using the 2009 data

Key Drivers of Default CPP Acceptance

Key Drivers of Default CPP Acceptance

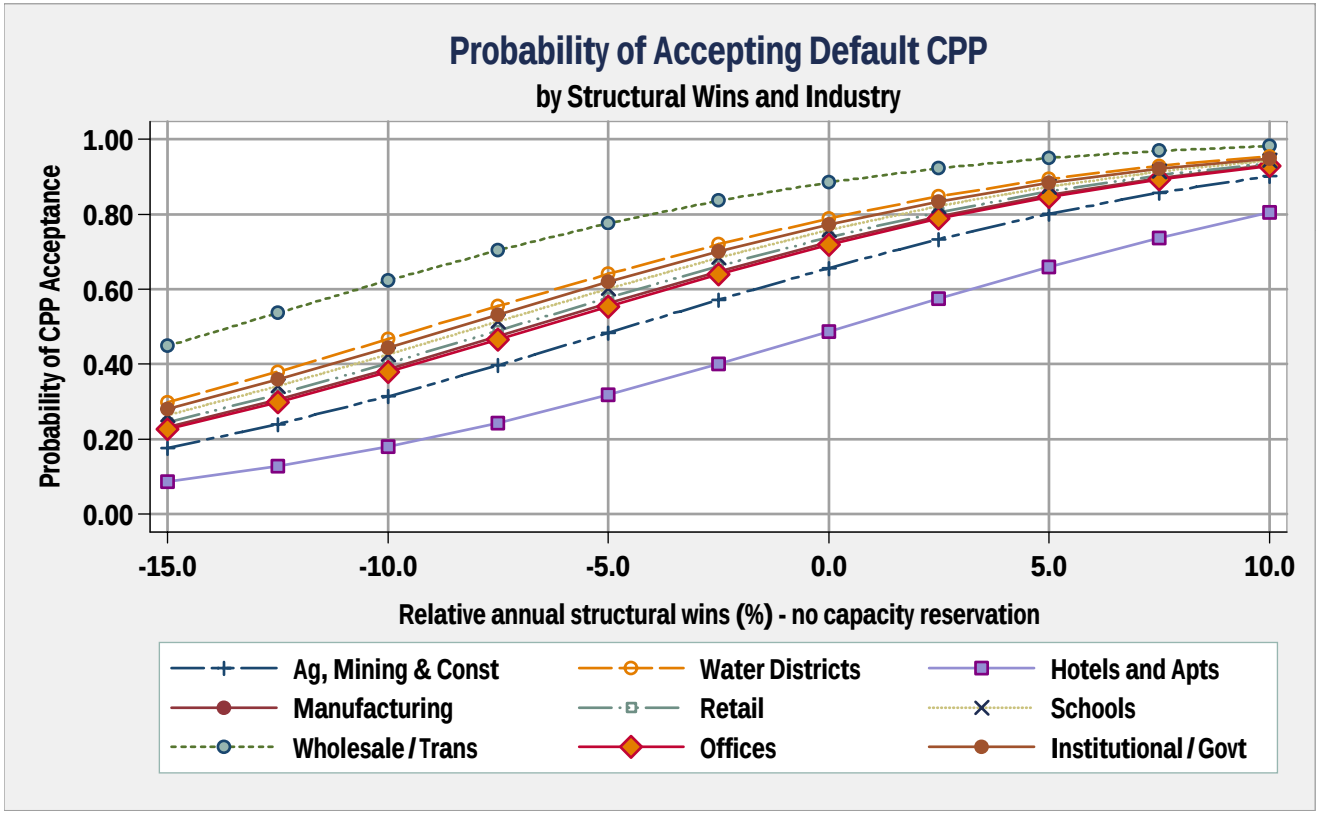
- Relative Structural Wins: For each 1% increase in relative structural wins, the probability of accepting default CPP changes by approximately 0.02 (3%)
- Industry Type: Hotels are more likely to reject default CPP and wholesale and transportation are more likely to accept it
- Ease of Access to Billing Analysis Tools: Providing direct access to tools decreases the probability of acceptance by approximately 0.056 (7.5%)

NOTE: For choice models, impacts are not linear

Factors that Did Not Influence Acceptance

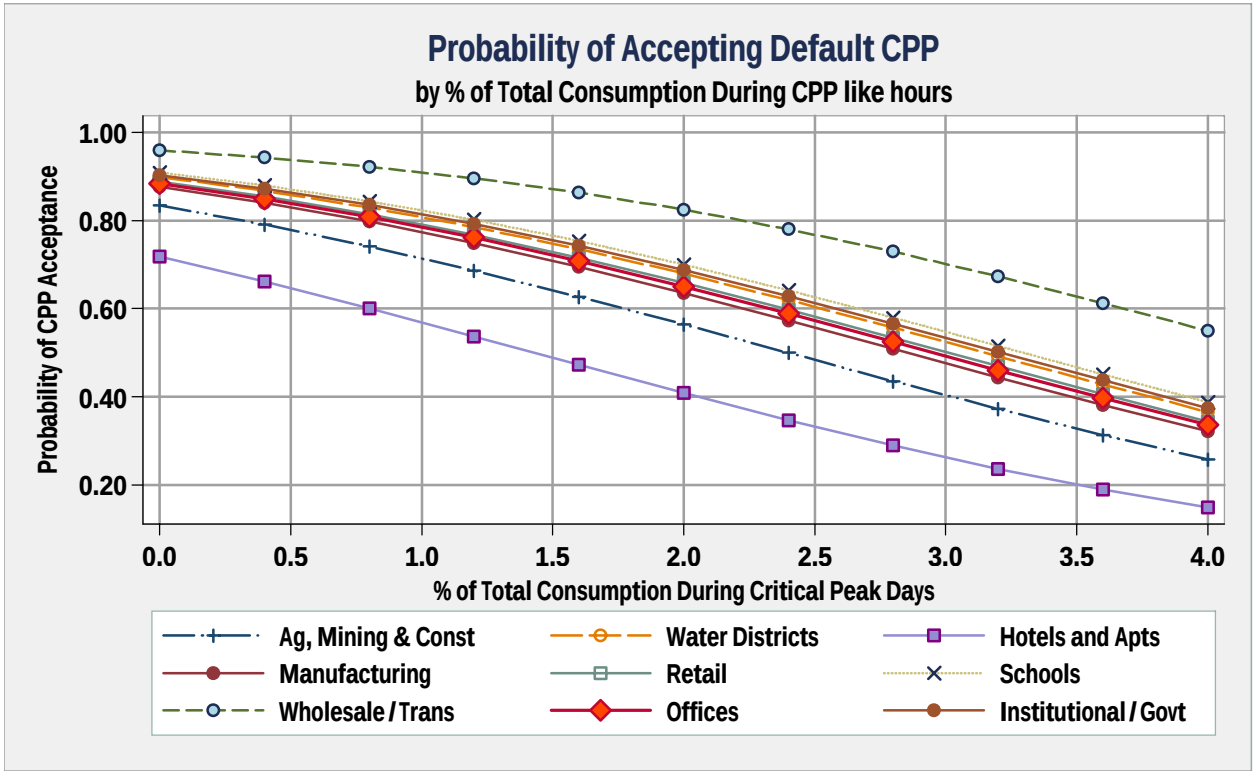
- Customer Size: There were differences, but they were explained by other factors (e.g. load shape)
- Load Factor: There were differences, but they are explained by other factors
  - The load factor does not necessarily reflect the coincidence of high customer load with high system load
- Climate Zone: There were no statistically significant differences based on SDG&E climate zone
  - There is also little variation within SDG&E and much of the climate zone differences are captured in the structural wins or loses.

The Higher the Structural Wins, the Higher the Probability of Default CPP Acceptance – But It Varies by Industry



- The graph shows the probability of default CPP acceptance holding all other factors constant
- Hotels are less likely to accept default CPP and wholesale and transportation firms are more likely to accept it

The Higher the Share of Total Consumption During CPP Hours, the Lower the Probability of Default CPP Acceptance



- The graph shows the probability of default CPP acceptance holding all other factors constant
- The % of total consumption during CPP hours is closely related to structural wins, but it is a better predictor for SDG&E customers

Key Drivers of Default Capacity Reservation Level Acceptance (Given CPP Acceptance)

Key Drivers of Acceptance

- Ease of access to billing analysis tools and structural wins w/o CR
- % of CPP hours where demand exceeds the default capacity reservation
- Volatility of load during CPP-like periods
- Customer size
- Industry type

Factors that Did Not Influence Acceptance

- Peak to off-peak average demand ratio: Most of the effect is already captured by structural wins
- Load Factor: Again, there are differences, but they are explained by other factors
- Climate Zone: The conclusion applies to SDG&E, but may not apply to IOU's because of SDG&E's limited variation in weather
  - However, weather is related to load shapes and structural wins.

NOTE: For choice models, impacts are not linear

Key Takeaways

- When given a choice between default CPP/TOU and TOU, with first year bill protection, 75% of customers initially stayed on the default rate
- 93% of those who stayed on the CPP tariff in the first year, continued in the second year (keeping in mind that no CPP events were called in the first year)
- More hotels decided to opt out of the default CPP tariff than any other business type
- Schools are more risk averse than any other business type—92% of schools accepted the default capacity reservation amount
- SDG&E called 8 events in 2009, so next year's analysis will reflect the influence of those events on customer decisions

For questions, please contact

Stephen S. George
Principal Consultant, Director Energy Practice

Josh Bode
Senior Consultant

Freeman, Sullivan & Co.
101 Montgomery Street 15th Floor
San Francisco, CA 94104

stephengeorge@fscgroup.com
joshbode@fscgroup.com

415 777-0707

21st National Conference & Expo

January 17-20, 2011 · Hilton Walt Disney Resort