

Real-time Pricing is the Real Deal



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Energy-Smart Pricing Plan

- Since 2003, the Community Energy Cooperative and ComEd have operated the Energy-Smart Pricing PlanSM (ESPP), a real-time electricity pricing program for residential consumers
- Presentation Overview
 - Background on program
 - Results of three years of evaluation
 - What does the future hold?





Community Energy Cooperative

- Founded in 2000 by the Chicago-based Center for Neighborhood Technology
- The Cooperative helps consumers and communities obtain the information and services they need to control energy costs
- We have worked closely with ComEd, the state and communities on programs ranging from air conditioner exchanges to C&I curtailment to pricing programs.





The Potential Value of Real-Time Pricing

- Benefits to individuals
 - Access to low-cost market based prices most hours and most days
 - Choice, control
- Benefits to the system
 - Residential customers are numerous and disproportionately contribute to peak demand
 - Lower peak demand lowers prices for everybody
 - Lower peak demand improves reliability





Real-Time Pricing vs. Critical Peak Pricing

- RTP and CPP have roughly similar impacts in reducing peak demand
 - In 2003, the Cooperative found participants cut peak demand by about 20 percent
 - 2004 California CPP estimates ranged from 13 to 27 percent depending upon the rate structure and enabling technologies
 - DOE report to Congress concluded that,
“The Residential RTP study (Illinois) reported similar price elasticities as the California residential CPP study (i.e., 0.08 to 0.09); both studies were conducted during a comparable time period (2004) but in different markets.”
- Both require new metering





The Added Value of RTP

- CPP is arguably simpler for the consumer.
 - There is price variability, but prices are set for a period of many months or even a year and therefore cannot fully connect retail prices to the wholesale markets
- RTP passes on the hourly wholesale prices
 - Only adders are the standard costs for distribution, transmission and ancillary services
- RTP blends
 - The value of providing price signals to cut peak demand (as also seen in CPP)
 - The connection between wholesale and retail markets that economists advocate
- Additional cost saving value by avoiding the risk premium that suppliers need to add to cover their own price and volume uncertainty





Initial Questions

Can real-time pricing work for residential market?

- Will customers sign up?
- Will they accept the program?
- Will they change their behavior?





Energy-Smart Pricing Plan Rate Details

- Consumers pay hourly, market based prices (pass through of PJM hourly price)
- Interval meters, read by traditional meter readers
- Cooperative provides consumer education and high price notifications
- ComEd remains the supplier and bills the participant





Will They Sign Up? Participant Demographics

- Over 1,500 enrollments (1,127 in 2006)
- Diversity across race and income

Housing Type	Central Air Conditioning	Window Air Conditioning	Location
Single Family 85%	Yes 52%	Yes 40%	Chicago 38%
Multi Family 15%	No 48%	No 60%	Suburban 62%





Cooperative's Added Value

- Information about hourly energy prices
 - Education about general price shapes by season,
 - Access to each day's prices via a website or phone call-in number.
- Notification of high price days of over 13 cents/kWh
 - By telephone or email, issued the previous evening
- Access to web-based tools to view charts and graphs of energy use, price and cost down to the hourly level
- Online and printed summaries of energy use, costs and comparable flat rate bills





Cooperative's Added Value

- Educational materials on energy efficiency and how to reduce usage during peak times
- A hedged price cap of 50 cents/kWh to protect against the most extreme price spikes such as seen in 1999
- 60 participants have received central air conditioning cycling switches that are cycled for economic reasons to correlate with the high price notifications





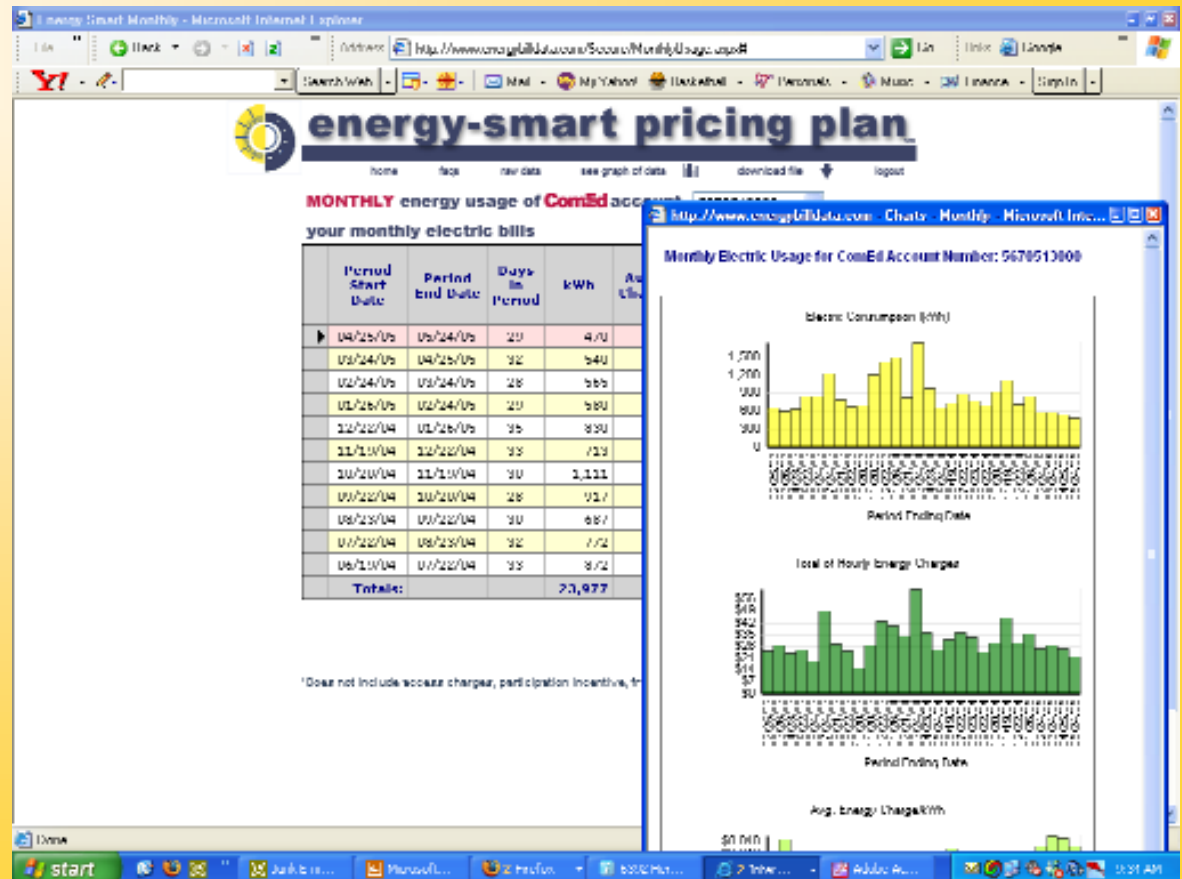
Viewing Energy Use Online

Try it:

www.energybilldata.com

Login: guest1

Password: guest



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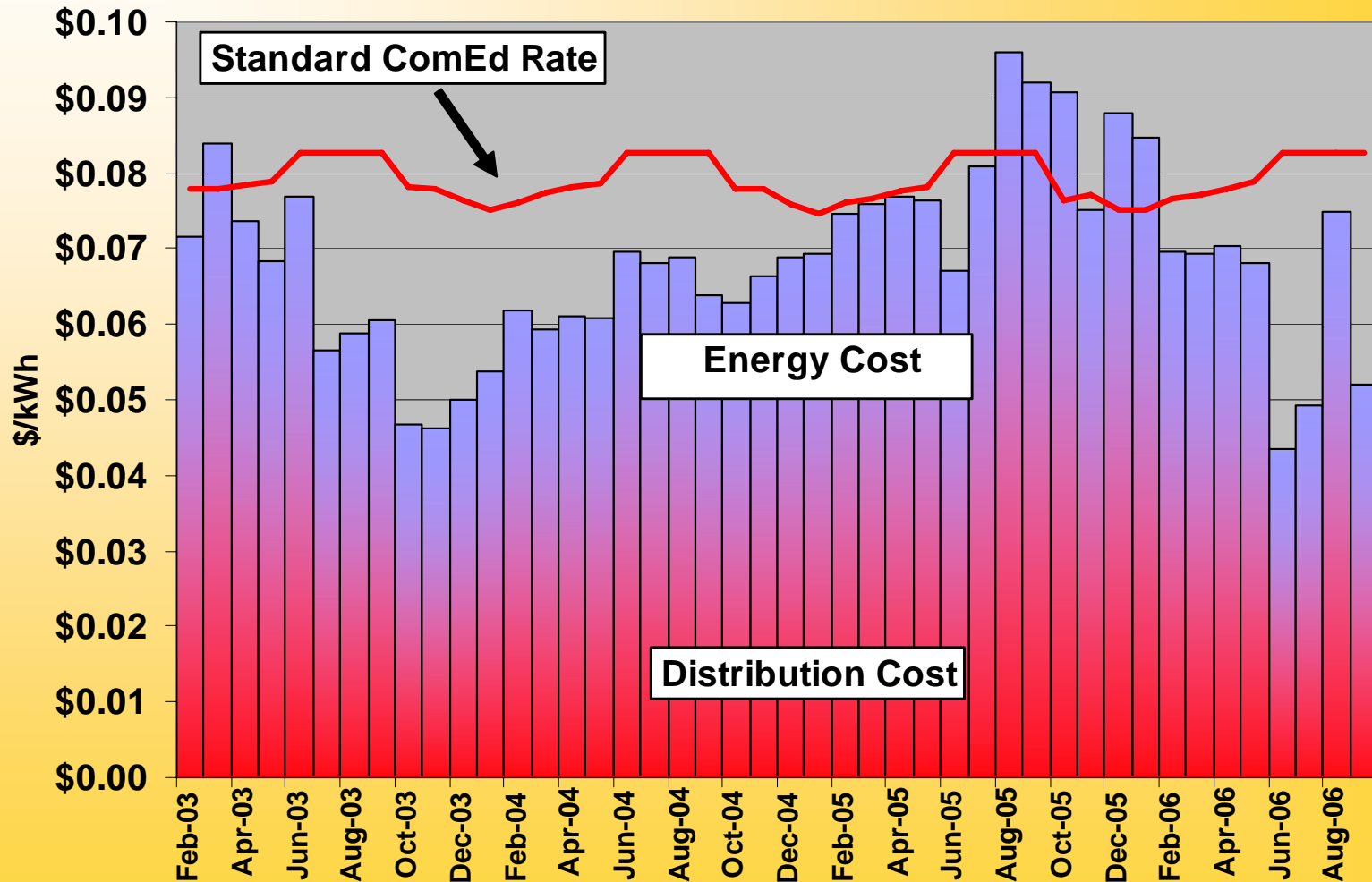
ESPP Has Seen A Variety of Prices and Weather

	Average Energy Price (¢/kWh)	Summer Maximum Price (¢/kWh)	Cooling Degree Days (Avg. is 799)	Summer Days with High Price Notifications
2003	3.2	12.4	659	9
2004	3.8	12.5	574	7
2005	5.7	19.1	1,087	57
2006 <i>(to date)</i>	5.2	35.2	898 <i>(avg. 758 to date)</i>	10





Average Energy Prices Paid 2003-2006





Will They Accept The Program? Bill Impacts

Year	Average Bill	Average Monthly kWh	Savings/ Loss
2003	\$51.10	630	20.1%
2004	\$56.99	648	11.3%
2005	\$77.82	758	-6.3%
2006 (to date)	\$62.01	700	9.4%





People Like The Program

- In 2005, despite a very hot summer, and high power prices driven by natural gas costs, still a high retention rate

Year	Percent Renewing
2003	99%
2004	99%
2005	87%

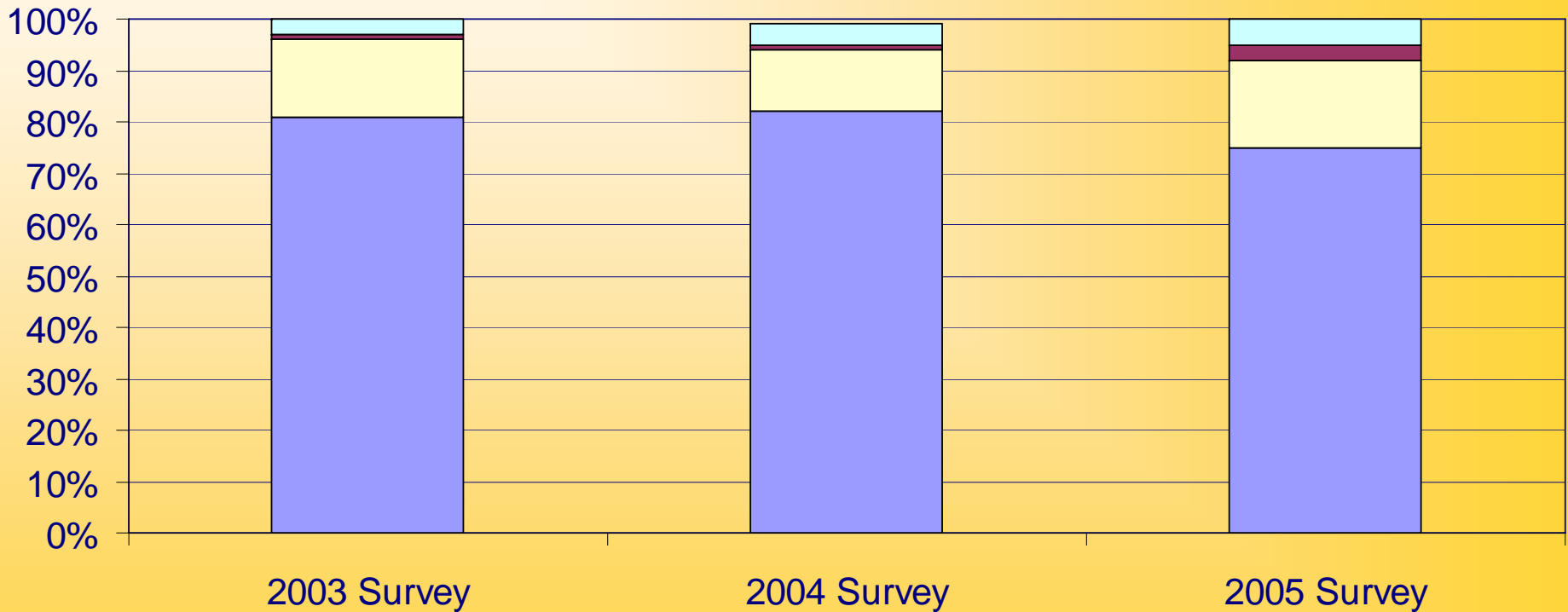
Does not include participants who moved during the year





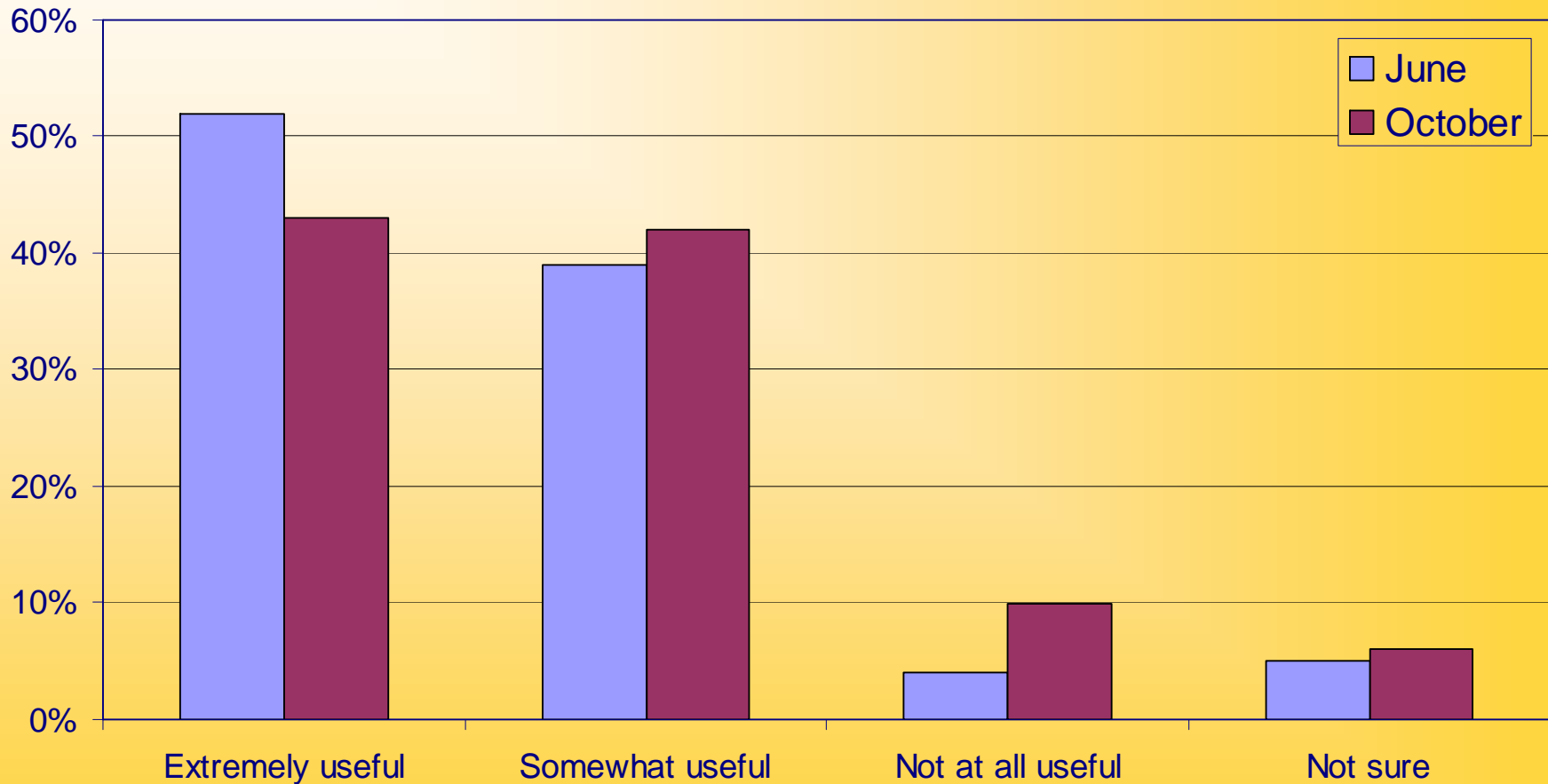
Participating In ESPP Has Been

- Quick and easy
- Time consuming and difficult
- Somewhere between quick & easy & ...
- Don't know





High Price Notification Remained Useful All Summer





Will They Change Their Behavior?

- Will they reduce peak demand?
- Will they become more energy efficient?
- What else will they do?





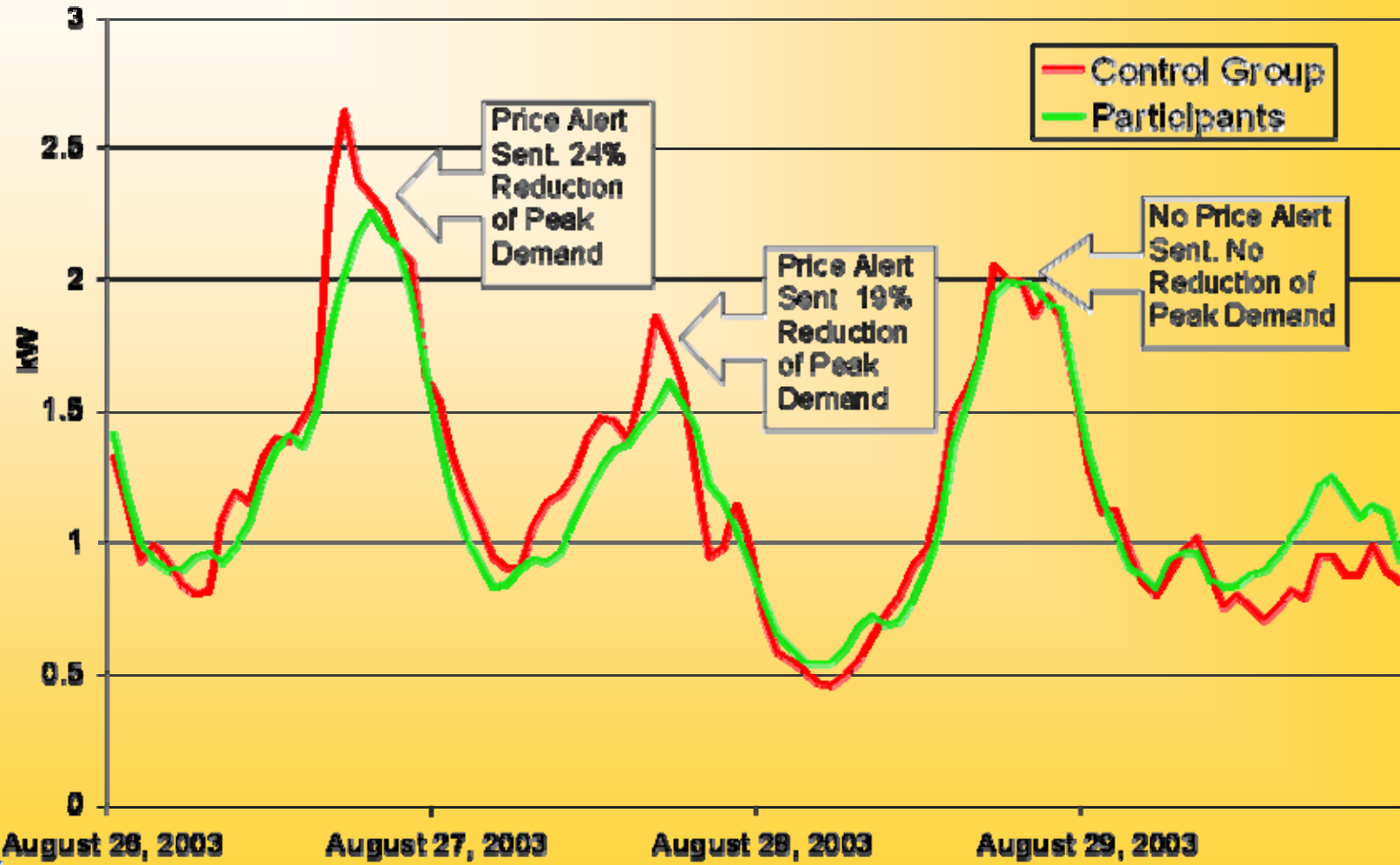
2003 Results

- Price elasticity of -4.2%
 - Response tapered off
 - Over the length of the high price period
 - As the number of successive days of notifications increased
 - Single-family homes with central air conditioning tended to ‘snap back’ the fastest
- Participants were more likely than non-participants to
 - Have a higher income
 - Have recently added insulation to keep cool
 - More likely not to have changed any major appliances in the last year
- High responders tended to
 - Turn down their air conditioners
 - Turn off lights
 - Turn up the air conditioner thermostat





2003 Results





2004 Results

- Price elasticity of -8.0%.
- Extreme mildness of the 2004 summer resulted in limited responses to high-price periods
- Year of joining program did not impact price, suggesting that participants do not become unresponsive over time due to the effort involved





2005 Results

- Key Findings
 - ESPP participants continue to respond to hourly electricity prices in a manner similar to prior years, with an overall price elasticity of -4.7%.
 - Participants' response to hourly electricity prices varies by the time of day, with lower responses during the day, and higher responses during the late afternoon/evening.
 - ESPP participants' overall monthly summer energy (kWh) usage suggests a conservation effect, a reduction in usage of 3% to 4%, relative to what their usage was estimated to be had they not received hourly electricity prices.





2005 Results

- Additional Findings

- Participants continue to show a significant response to the high-price notifications. Participants reporting successful notifications essentially double their average response to changes in electricity prices.
- Automatic cycling of the central-air conditioners during high-price periods added to a participant's response to electricity prices by as much as 2.2% for a total price response of 6.9%.
- Customers' response to high-price notifications declines as the number of consecutive notification days during the summer increases and as the length of a given high-price period increases. There is a "recharge" effect as the number of days between high-price notifications increases, where customers' response recovers to initial levels





2005 Elasticities

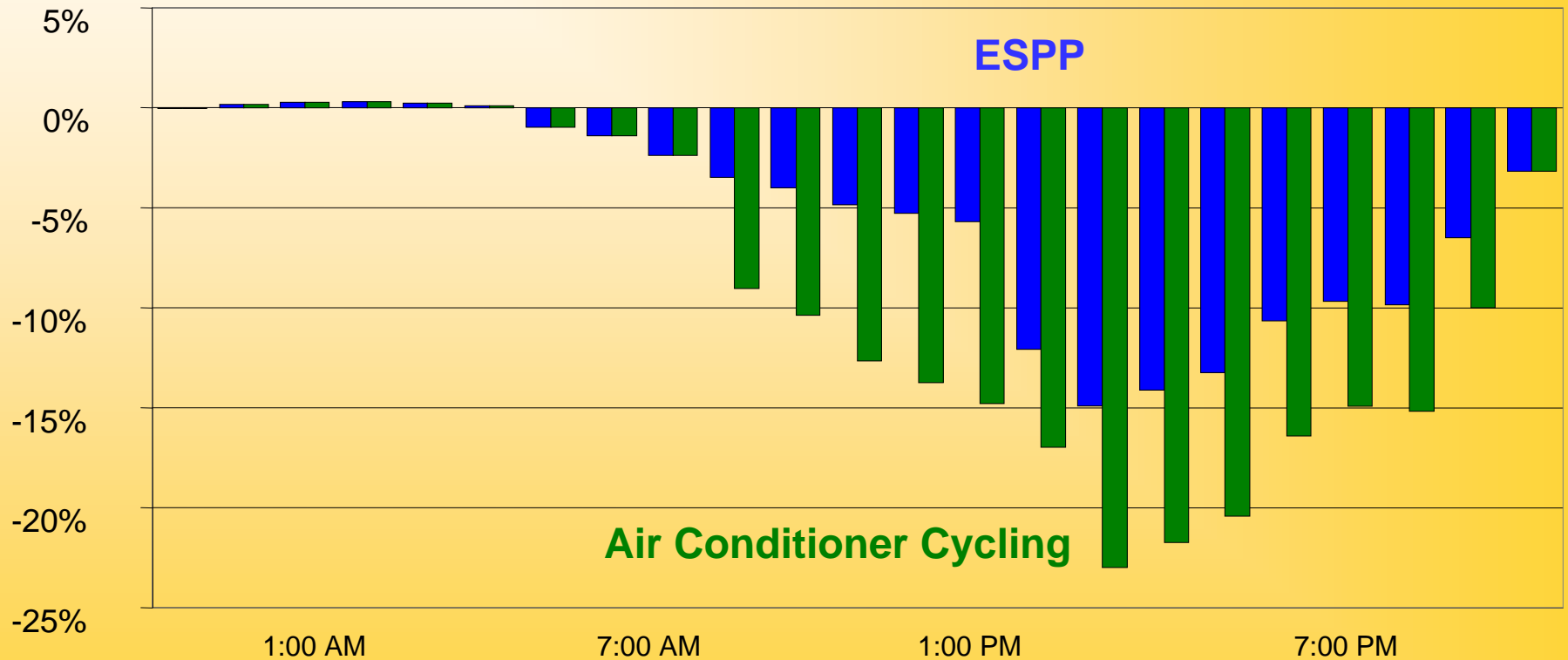
Period	Elasticity
Daytime (before 4 PM)	-1.5%
Late Afternoon/Evening (4 PM or later)	-2.6%
<i>Response on High Price Alert Days</i>	
Daytime (before 4 PM)	-2.0% (33% increase)
Late Afternoon/ Evening (4 PM or later)	-4.8% (84% increase)





2005 Results

Demand Reductions Increases with Air Conditioner Cycling





2006 Initial Results

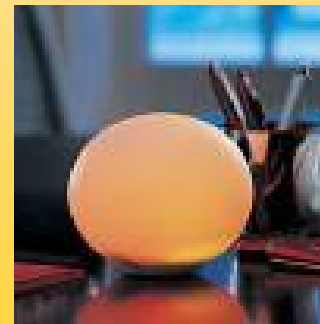
- August heatwave leads to highest prices of program: 35¢/kWh
 - How will participants respond to extended extreme weather?
- PriceLight pilot program tests new notification method





Future Opportunities

- Grid friendly appliances
- New homes with enabling technology built-in
- Innovative information communications systems





Conclusions Thus Far

- RTP can be successfully implemented with relatively inexpensive incremental technology
- Useful, reliable pricing information is critical component
- Creates a real opportunity for energy awareness messages
- Consumer education is needed (people want and use energy information that's relevant to their situation)
- High price notifications focus people's attention
- An automatic curtailment option such as an air conditioner cycling switch or a smart thermostat produces added benefits





The Latest From Illinois

- SB1705 passed unanimously and recently enacted will mandate real-time pricing as an option for residential customers starting in January, 2007
- Provides for the inclusion of some meter and program costs in the overall residential rate base if the Illinois Commerce Commission finds there would be net benefits to all residential consumers from a large-scale program





How Would This Work In The Illinois Post-2006 Structure?

- Procurement
 - Already includes a provision for utility supplied hourly pricing for all customer classes
- Distribution
 - Current rate cases include unbundled charges that are level between supply options (except metering)
- Political Climate
 - Support from consumer advocates and from legislators
- Gives residential customers same rate choices as commercial/industrial customers





Current Activities

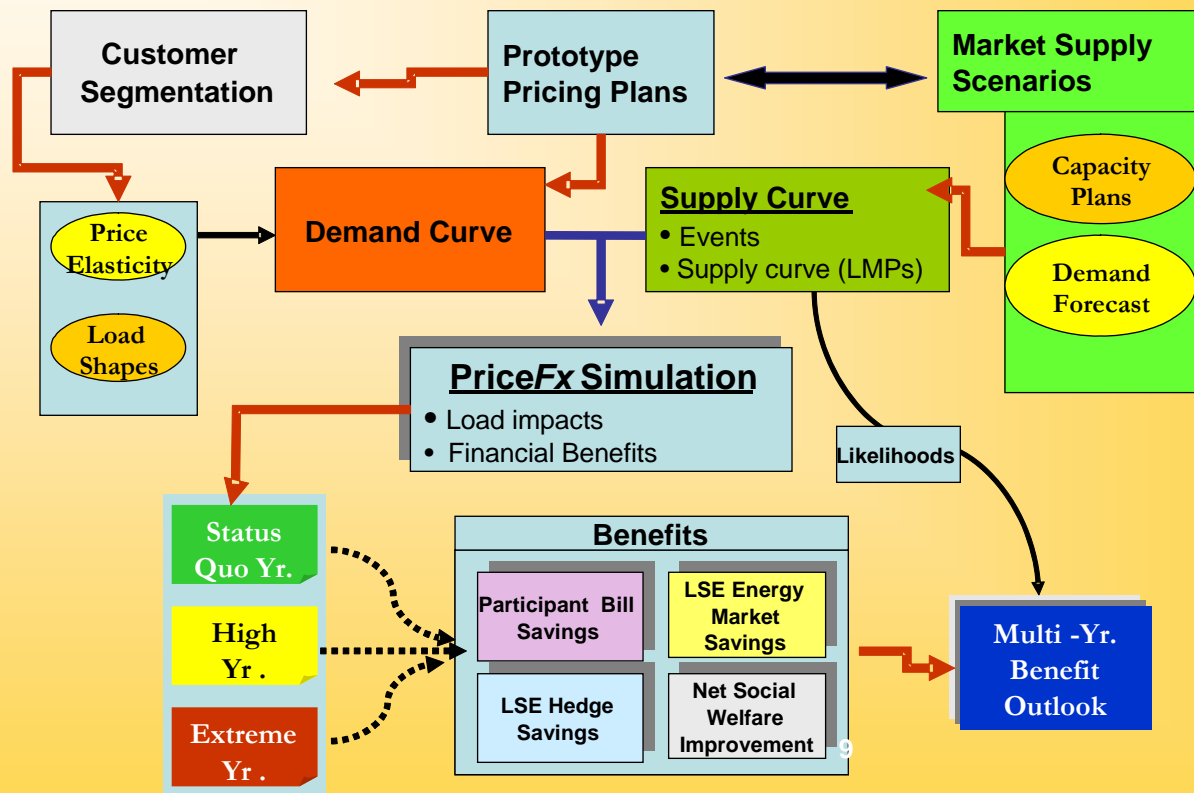
- ComEd has filed new rate to comply with law
- Ameren will soon
- Working with Utilities, Citizens Utility Board and Commission staff on details of proceedings
- Somehow needs to be done by the end of the year!





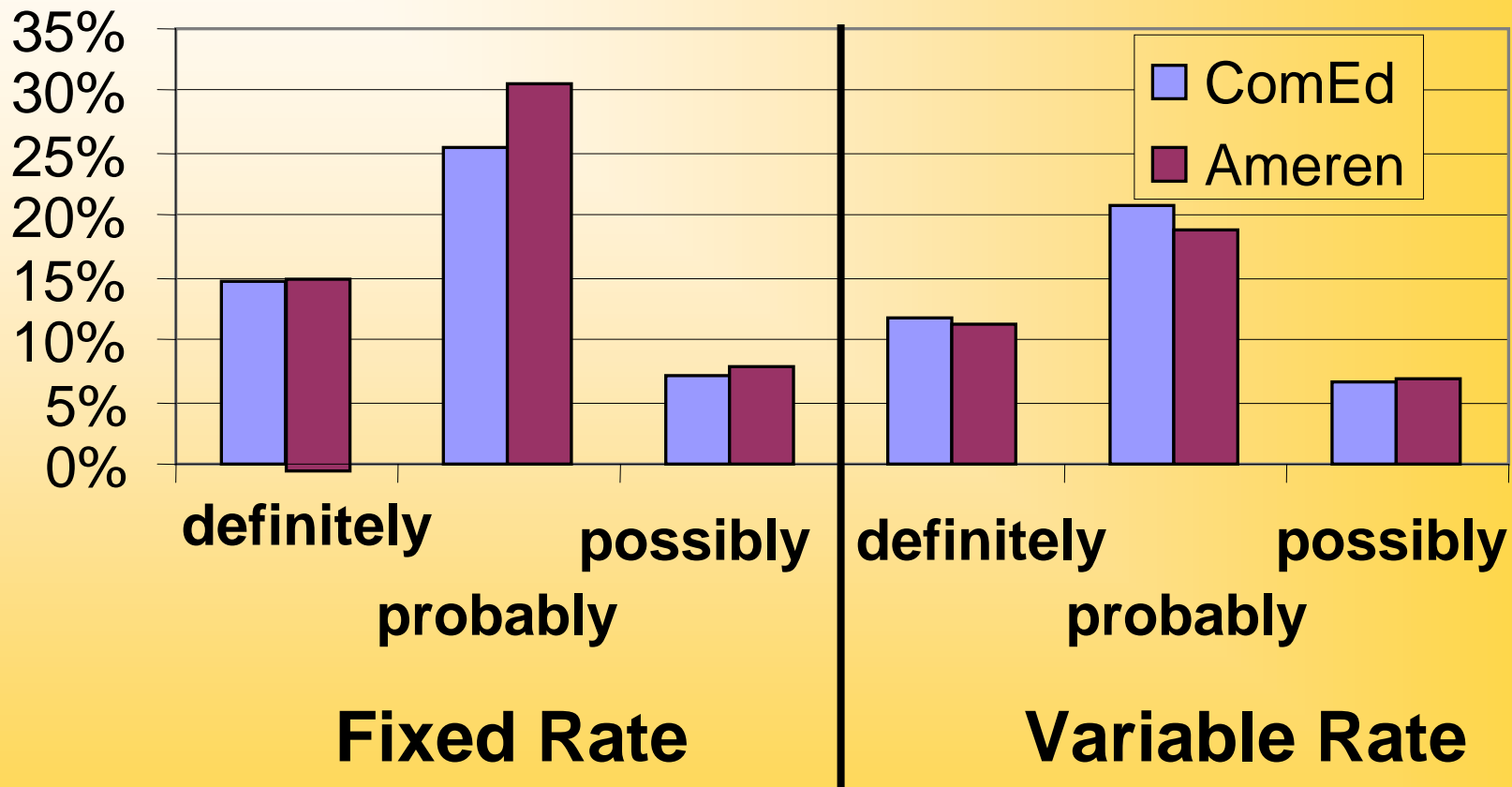
Modeling Benefits

UPI Price Response Evaluation Processes





Would You Be Interested In A Fixed Or Variable Rate Plan?



[Summer 2006 Survey. 282 ComEd, 399 Ameren households]





Can This Be Adapted To Other Locations With Wholesale Markets?

- RTP mostly likely to be successful when:
 - Functioning wholesale market produces prices that are transparent, market-based and passed through without unreasonable adders
 - Load and price profiles are such that there is the ability to change use in response to price (e.g., manage air conditioning use)
 - The retail market has not produced alternative pricing offers for consumers





Overcoming Barriers

- Regulators and others used to flat rates and captive, passive customers need to see beyond traditional regulatory paradigms and see how RTP can combine system benefits, customer choice and increased energy efficiency
- Education and notification are relatively inexpensive to implement
- Metering is getting less expensive





For More Information

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Back up and Additional Slides



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Real Time Pricing for Generation

- Currently PV can sell back to the grid using ComEd Rider 4
- Rider 4 is a fixed price calculated once per year, and reflects the “avoided cost of generation”

	Peak	Off-Peak
Summer	4.55¢	2.97¢
Non-Summer	3.64¢	2.67¢

Or

3.57¢ for summer

3.02 ¢ for non-summer

- ComEd’s Net Metering experiment provided an additional incentive to bring these amounts up to the equivalent of the residential price paid for consumption





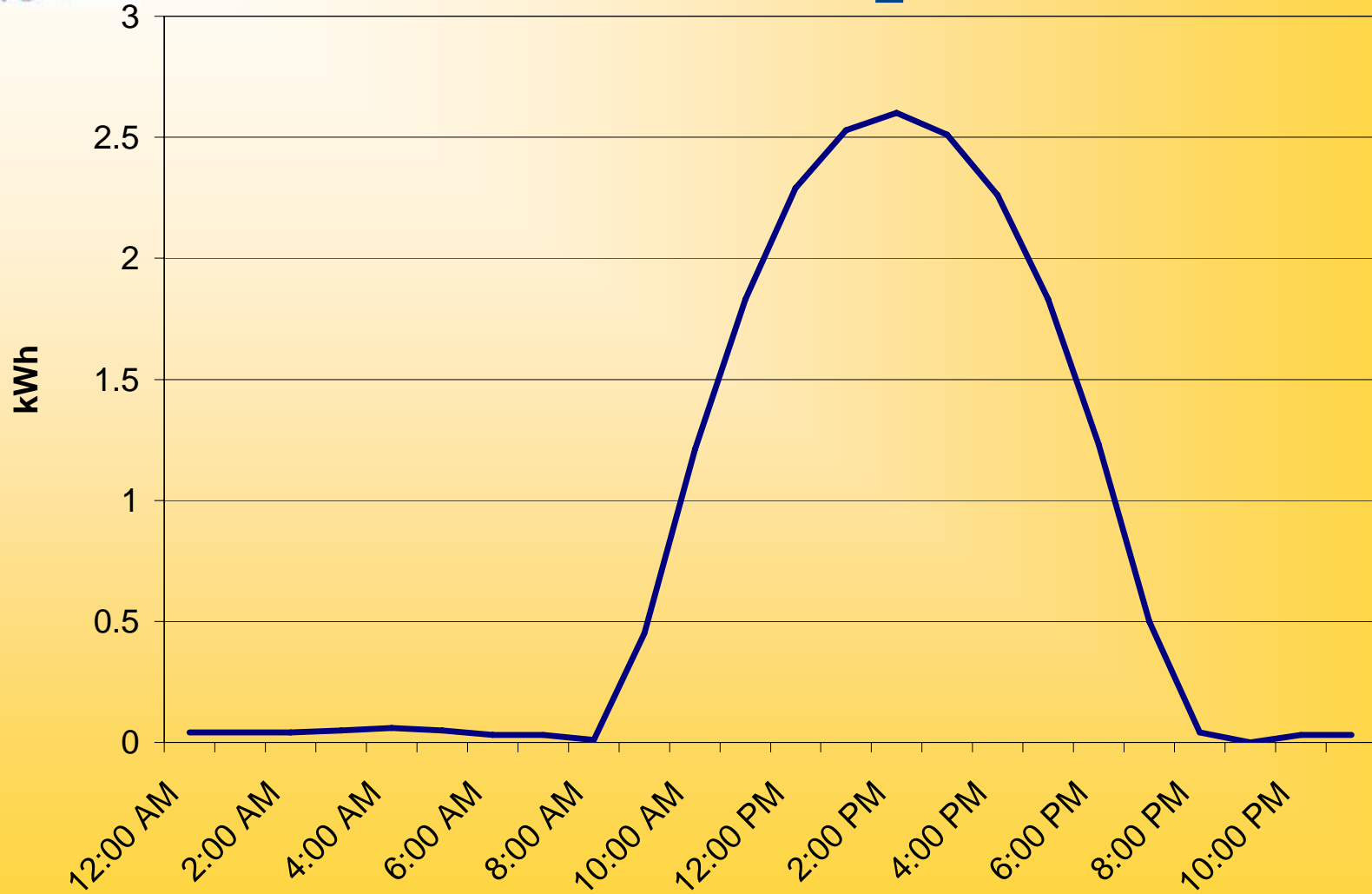
In 2007, Rider 4 will become Rider POG

- ComEd proposed to change to having all customers who sell power back to the grid to do so at the real time price
- Commission staff had several objections including having a rate that wasn't set ahead of time and visible to the customer
- Commission ruled that ComEd should make both options available





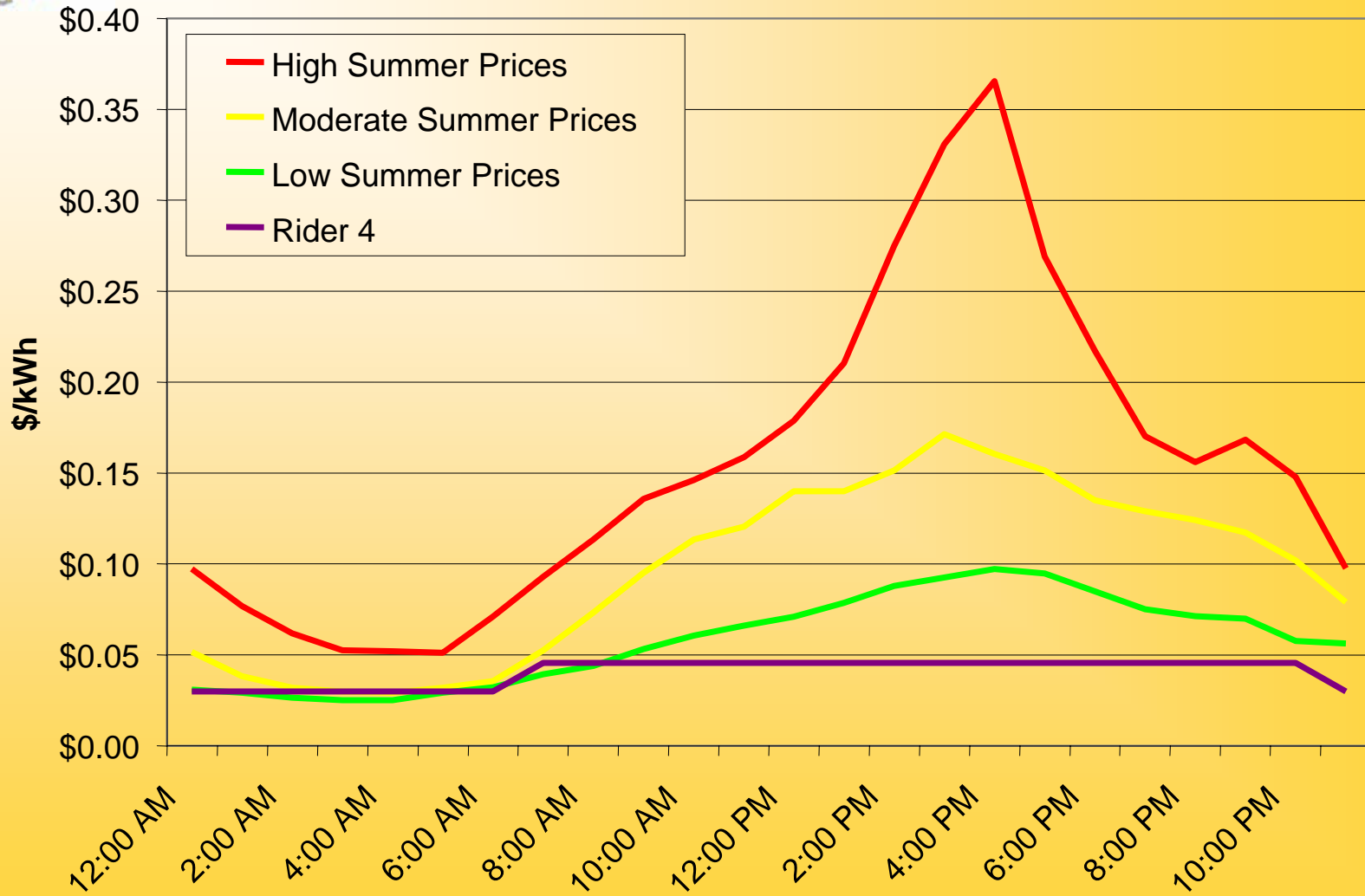
A Typical Summer PV Output



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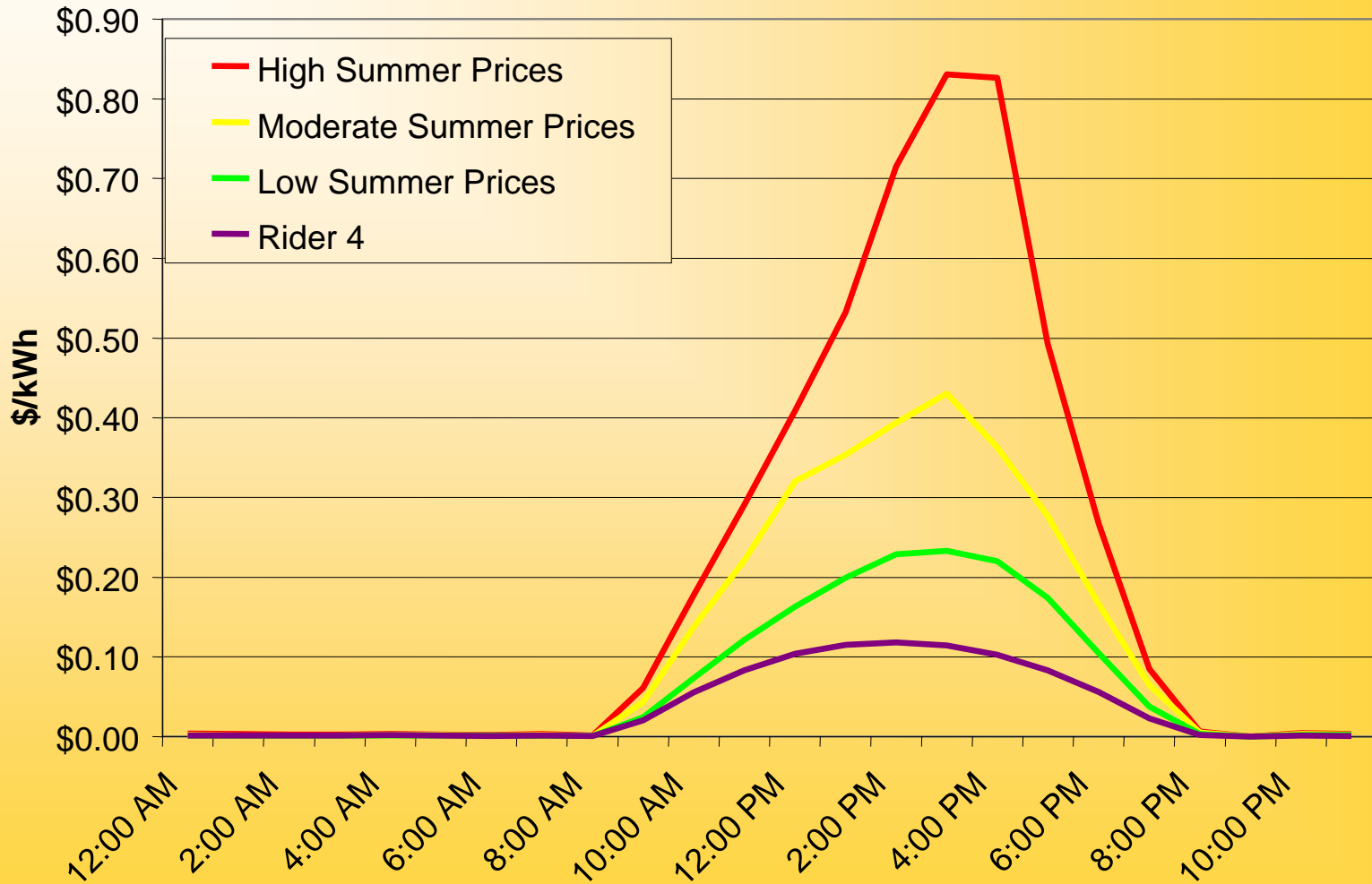


Ranges of Prices





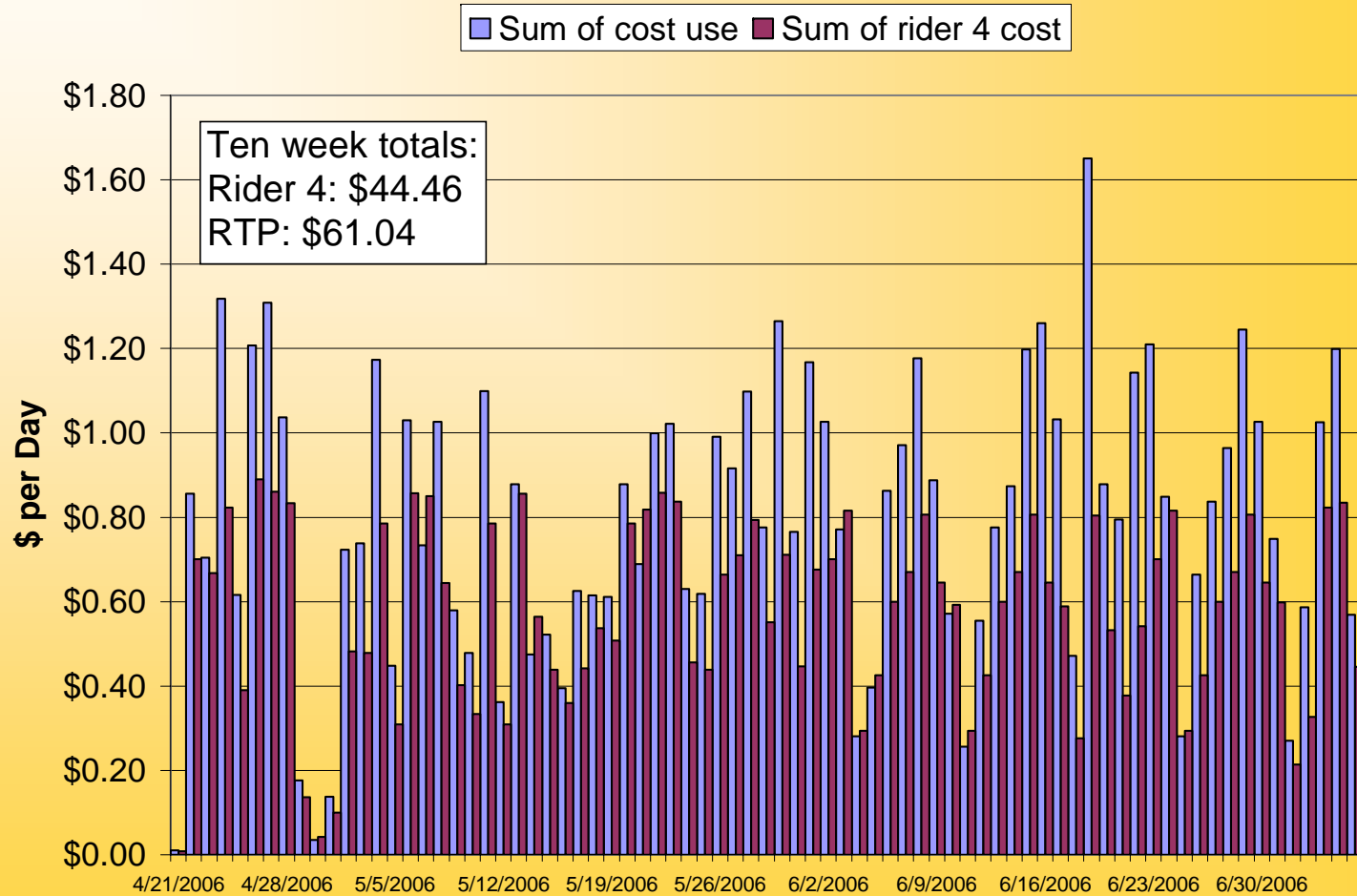
Impact of RTP on PV Production



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Ten Week Simulation of Rider 4 vs. RTP





Why RTP and PV Net Metering Mesh

- The time of maximum generation from PV corresponds well with the variability of prices in the market
- Other local generation may not have this profile and may be better off on another net metering rate structure
- Any distributed generation rate structure that is for all local generation will make PV suffer as a result

