



SMART METERS, DEMAND RESPONSE AND “REAL TIME” PRICING: IMPLICATIONS FOR LOW INCOME CUSTOMERS

Barbara R. Alexander
Consumer Affairs Consultant
83 Wedgewood Dr.
Winthrop, ME 04364
(207) 395-4143
E-mail: barbalex@ctel.net

ENERGY POLICY ACT OF 2005

- Requires all electric utilities to offer time of use and smart metering for all customer classes
- PURPA amendment: requires state investigation and consideration of federal standard within 18 mos.
- Has your state started a proceeding to consider installation and use of TOU meters?

METERS AND PRICING

RESIDENTIAL ELECTRIC SERVICE

- “ADVANCED METERS”: THE GATEWAY TO PRICING ELECTRICITY TO REFLECT TIME OF YEAR, TIME OF DAY, CRITICAL HOURLY PRICING
- “ADVANCED METERS” ALLOW KILOWATT HOUR USAGE TRACKING AT VARIOUS TIMES AND USUALLY COUPLED WITH COMMUNICATION SYSTEM TO READ METER OR PROGRAM METER
- MOST CURRENT METERS ARE MECHANICAL AND ANALOG; REQUIRE MANUAL READING OR AN ADD-ON DEVICE TO READ REMOTELY
- LINKAGE TO DEMAND RESPONSE PROGRAMS— INTERRUPTION OF PARTICULAR APPLIANCE AT PEAK HOURS OR SEEK CUSTOMER CHANGE IN USAGE IN RESPONSE TO CRITICAL HOUR PRICES

REAL TIME PRICING: WHAT IS IT?

- Dynamic retail pricing varies the price of electricity as wholesale prices fluctuate over the course of the day
- Customers can shift usage or reduce usage according to their “sensitivity to price”
- Sends the signal to create incentive to build new capacity or reduce need for capacity with demand response
- CAN LOW INCOME OR LOW USE ELDERLY RESIDENTIAL CUSTOMERS REDUCE OR SHIFT CONSUMPTION BASED ON THESE PRICE SIGNALS? SHOULD THEY BE REQUIRED TO DO SO?

LINK TO DEMAND RESPONSE

- In order to provide a “response” in the form of lowering usage or demand, it is typically necessary to have an “advanced” metering and communication system AND
- A pricing system that flows through “real” wholesale market prices OR
- Incentive system, such as direct load control or interruption method at certain peak price periods

SMART METERS AND REAL TIME PRICING PROMOTED AS NEXT STAGE OF RESTRUCTURING

- “We can get rid of every bit of that [wholesale power price caps, regional capacity market auctions] tomorrow, if every state will allow the full floating price every five minutes to be reflected in the customer’s bill.”

Philip G. Harris, President of PJM Interconnection, interview in [Public Utilities Fortnightly](#), October 2006, page 41.

OTHER PROponents OF SMART METERS AND REAL TIME PRICING

- Proponents emphasize the “paradigm shift in thinking over the benefits that smart meters can bring.”
- Environmental advocates promote smart meters to enhance demand response (conservation) programs to substitute for polluting generation.
- Some utilities see benefits from greater efficiency (reduced labor), increase reliability planning options, and customer service “reforms” (prepayment, automatic disconnect, reduced billing errors) BUT others more concerned with reduced revenue with lower sales and guaranteed cost recovery

PROPONENTS EMPHASIZE CUSTOMER CONTROL

- The Demand Response and Advanced Metering Coalition (meter manufacturers, energy service providers, some utilities) emphasize, among other benefits, “customer control over their energy bill.”
- DRAM states that residential customers “are better at managing their energy budgets; they have what economists call a higher price elasticity of demand” and such customers “deserve the same chance to lower their bills as businesses.”

DRAM , “Demand Response and Advanced Metering Fact Sheet” (2002)

ECONOMISTS EMPHASIZE EFFICIENT ALLOCATION OF RESOURCES

- The same folks that brought us the theories for electric competition now tell us why Time Based Rates are beneficial:
 - Average rates result in inefficient allocation of resources and “deadweight loss”
 - Reduce cost of socialized reliability solutions through demand response
 - Reduce subsidies and cross-subsidies

Gordon, Kenneth, et.al., Responding to EAct 2005: Looking at Smart Meters for Electricity, Time-Based rate Structures, and Net Metering, prepared for EEI (May 2006).

GAO Report (2004) on Demand Response Initiatives

- Report identified barriers to demand response including:
 - State regulation that “shield” consumers from price fluctuations;
 - Lack of meters/equipment at customer locations
 - Customers’ “limited awareness” about programs and their benefits

FERC REPORT (2006) ON DEMAND RESPONSE AND ADVANCED METERING

- Advanced metering has a penetration of about 6% of total installed electric meters
- 13% at rural electric cooperatives
- Highest level in PA, WI, CT, KN, ID, ME, MO, AR.
- 5% of customers on some form of time-based rates or incentive-based programs
- UNDERLYING MESSAGE: WE NEED MORE ADVANCED METERING AND DR PROGRAMS

FERC REPORT (CON'T)

- REGULATORY BARRIERS TO INCREASE DEMAND RESPONSE AND PEAK PRICING PROGRAMS
 - Disconnect between retail prices and wholesale markets
 - Utility disincentives: DR reduces utility revenues based on sales—rate decoupling?
 - Cost recovery and incentives for new technologies—pre-approved cost recovery?
 - More research on cost-effectiveness
 - State-level barriers to DR: state laws and policies about exposing customers to real time prices
 - Retail and wholesale market rules that limit DR: hard to link retail actions with wholesale market payments
 - Barriers re role of third parties: providers need long term regulatory assurance or long term contracts
 - Insufficient market transparency and access to data
 - Better coordination of federal-state jurisdiction: retail and wholesale market coordination

CALIFORNIA DECISION: BILLION DOLLAR SMART METER PROGRAM APPROVED

- In July 2006, California PUC approved PG&E's proposal to replace all electric and gas meters with "smart meter" technology over five years
- Price tag of \$1.7 billion (20-year pay back)
- Statewide policy to rely on smart meters and DR to reduce peak load
- HOWEVER, other benefits were major source of "benefits" in analysis: remote meter reading; remote connection/disconnection; outage management
- Existing TOU rates will be promoted and remain voluntary for time being
- State law prohibits imposition of Critical Peak Pricing on residential customers, but new voluntary CPP option will be implemented for certain hours in summer (1 cent/kWh discount)
- PUC rejected TURN's evidence that investment not cost effective for all customers and that more modest and targeted investment should be approved at this time

CALIFORNIA RESIDENTIAL TOU AND CRITICAL PEAK PRICING PILOTS

The California statewide pilot programs for residential customers in 2002-2004 tested a variety of options (with constraints on bill and revenue impacts) and found:

- Regular TOU prices only reduced consumption by 6%
- Critical peak pricing reduced uses on Critical Peak days by 13-16%
- Usage reduction significantly improved with installation of “smart thermostat” (27%)
- Most usage reduction by higher use customers with central air condition systems
- Lower income customers had lowest level of impact on usage reduction; elasticity of essentially zero.

ILLINOIS HOURLY PRICING PILOTS AND NEW PROGRAMS

- Community Energy Cooperative operated an hourly price program with 1,500 residential ComEd customers in 2003-2006
- Used day ahead price notifications (e-mail, website, phone)
- Compared to flat rates in effect at that time, most customers had lower bills
- Usage reductions occurred during peak price hours (summer)
- No analysis of new metering or communication system costs (used older technology)
- Illinois legislation requires utilities to offer “real time” or hourly pricing to all residential customers
- ICC approved statewide voluntary hourly pricing programs for residential customers in early 2007 with onset of auction-based default service prices (100,000-200,00 customers)
- All customers will pay small fee for new programs and participating customers will pay \$2.25/month
- Analysis of costs and benefits will occur by 2008

PREVIOUS EXPERIENCE WITH TOU FOR RESIDENTIAL CUSTOMERS

- PUGET SOUND ENERGY: Mandatory TOU prices for all residential customers abandoned in 2002 when analysis showed negative cost benefit and higher, not lower, customer bills
 - Customers with most adverse bill impacts: multi-family and mobile homes
- MAINE: Mandatory TOU prices for high use electricity customers made voluntary with onset of restructuring and widespread customer dissatisfaction in face of higher electricity prices
 - Elderly customers in newly built multi-unit condos and senior and low income housing complexes most adversely affected and without alternative options

NEW VERSION OF DYNAMIC PRICING PILOTS

- New Jersey (PSE&G) TOU pilots approved in 2005, but not implemented: high peak energy prices in PJM would result in higher customer bills regardless of whether usage was shifted (NJ BPU Order 4/27/06)
- District of Columbia (Pepco) Smart Power Pilot: critical peak pricing with customer notification and “smart” thermostats; under development for 2007 billing

RELATIONSHIP TO METER READING AND FIELD OPERATIONS

- PPL AND PECO ENERGY IN PA HAVE INSTALLED "AUTOMATED METER READING" FOR ALL CUSTOMER METERS
- BUT THESE METERS HAVE FUTURE TOU PRICING AND MORE VOLATILE PRICING OPTIONS BUILT INTO THE NEW SYSTEMS
- TEXAS: TXU DELIVERY INSTALLING "SMART METERS", EMPHASIZING COST SAVINGS (REDUCED LABOR) AND QUICKER DISCONNECTIONS

FORGET THE PILOTS, JUST INSTALL THE METERS!

- **Pepco** in District of Columbia recently filed a proposal to install advanced meters with two-way communication throughout its system at a cost of \$60 M; no analysis of costs and benefits
- **Central Maine Power Co.** in Maine recently filed for system-wide advanced metering with a 15-year NPV analysis showing a \$108 M increase in revenue requirement with half recovered in “net operating benefits”, which requires that there is no net overall benefit to customers without heavy emphasis on demand response/real time pricing programs.

LINK TO PRE-PAID SERVICE?

- Salt River Project has enrolled 40,000 customers in pre-paid electricity service (M-Power);
- “Real time” customer usage information; marketing theme is that customer is in control
- Key Advantage according to SRP is that there are no new delinquencies among prepaid users: “It ends the wrestling match over who owes how much money.”

Quote from SRR official in [Public Utilities Fortnightly](#), April 2006, page 59

STATE PURPA PROCEEDINGS ONGOING NOW

- State commissions have opened dockets and created working groups in response to Energy Policy Act requirement to consider time based rates and meters for all customers
- Consider not only meters but new methods of pricing electricity
- How determine costs and benefits?
- Optional or mandatory?
- Who pays for new technology and billing systems?
- Retail versus wholesale demand response programs?
- Who is speaking for low income customers?

ISSUES FOR LOW INCOME ADVODATES

- Has anyone evaluated the impact of the new metering technology or the new volatile pricing systems on low income customers? No evidence of such analysis to date.
- Should those who do not participate help pay for these new systems? Increased costs to install meters and alter billing systems: who pays for these new systems?
 - Mandatory versus optional
- Move to more volatile and “real time” pricing of essential electric service
 - Impact on lower use customers
 - Impact on payment troubled customers
 - Impact on structure of current low income bill assistance programs: benefit levels and participation rate
- Most new metering and communications technology allow disconnection or reconnection without premise visit with significant implications for customer contact and premise visit requirements in many state rules.



KEY POLICY ISSUE: LINK TO DEFAULT SERVICE POLICIES

- IF WE ARE TRYING TO IMPLEMENT LESS VOLATILE AND MORE LONGER TERM DEFAULT SERVICE POLICIES, HOW CAN WE JUSTIFY THE USE OF EXPENSIVE ADVANCED METERING AND HOURLY PRICING PROGRAMS AS THE MEANS TO LOWER RESIDENTIAL CUSTOMER BILLS?
- CAN THESE TWO GOALS CO-EXIST?

DOES THIS MEAN THAT ALL DEMAND RESPONSE PROGRAMS SHOULD BE OPPOSED?

- CRITERIA FOR ACCEPTABLE DEMAND RESPONSE PROGRAMS
 - Voluntary
 - Aimed at customers with options to shift usage: larger R users; commercial and industrial
 - Rewards not penalties
 - **Focus on Incentive Programs targeted to specific appliance interruptions (air conditioning) for short time periods and customer credits**
 - Require modest investment in new communication and metering systems
 - Emphasize energy efficiency programs
 - Support new building standards; mandatory appliance efficiency standards

POTENTIAL STATUTORY “REFORM”

- Should the state Legislature step in to protect consumers?
- ILLINOIS: New law requires utilities to allow residential customers to choose “real time pricing” in 2007 [Just in time for higher electricity prices!]
- CALIFORNIA: State law prohibits the imposition of Critical Peak Pricing on residential customers

SUGGESTIONS FOR LOW INCOME ADVOCACY

- FIND OUT WHAT YOUR STATE COMMISSION IS DOING TO IMPLEMENT ENERGY POLICY ACT
- PARTICIPATE IN OR MONITOR PROCEEDINGS
- ASK FOR COSTS AND DOCUMENTED BENEFITS; HOW EVALUATE "PILOTS"? WHO PAYS?
- DEMAND BILL ANALYSIS FOR WIDE RANGE OF USAGE AND INCOME PROFILES
- WHAT IMPLICATIONS FOR CUSTOMER SERVICE AND INCREASED DISCONNECTION RATES?
- THE INSTALLATION OF "SMART METERS" WILL INEVITABLY RESULT IN NEW PRICING OPTIONS THAT CREEP TOWARD REAL TIME PRICING: POINT OUT THE ADVERSE IMPLICATIONS FOR LOW INCOME CUSTOMERS