

MID-ATLANTIC DEMAND RESPONSE INITIATIVE

ACTION ITEMS: PRICING TO INDUCE CUSTOMER DEMAND RESPONSE

Draft: 21 March 2006

Decades of experience and, recently, pilot programs in several states that have tested innovative rate structures demonstrate that there is a significant amount of demand response that time- and location-sensitive retail prices can inspire. MADRI's therefore urges policymakers to evaluate and adopt pricing structures (and their associated metering technologies) and other policies that will most cost-effectively capture that demand response, and do so in ways that are consistent with other stated objectives, such as consumer protection, economic efficiency, equity, and environmental protection.¹ Retail pricing that better reflects the wholesale market price of power seeks to allow price-induced customer demand response to compete with new and existing generation.

Specifically, MADRI has identified several action steps that state regulators should consider in order to more closely relate retail prices (of default service, which effectively remains a monopoly service) to the underlying, market costs of power, and in this way to induce economic demand response.

Recommendation 1. Adopt Critical Peak Pricing for Residential and Commercial Default Service Customers Who Do Not Receive Service under Real-Time Prices

Critical peak pricing (CPP) refers generically to rate designs that overlay on the usual predefined (e.g., tariffed) prices a real-time rate that is effective during periods of significant system stress (i.e., "critical peaks"), when short-run market prices significantly exceed average retail rates. CPP gives customers a predictable price (flat or TOU) during all but a limited number of hours per year, when (much higher) rates are charged. The rates for the critical peak periods can be set in advance or be based on short-run market conditions. Customers receive advance notice of the times of higher prices, typically by means of advanced metering and communications infrastructure (AMI) installed on their premises.

An integral component of CPP, and upon which its efficacy in evoking significant and persistent demand reductions depends, is a device linked to the AMI that enables customers to manage their energy usage by pre-programming the operation of particular end-uses or circuits (e.g., cooling and heating systems, water heating, and pool pumps) according to the prices that the customer is willing to pay for those services. Beyond programming, the customer's direct involvement is unneeded; response is automatic (but can be overridden manually, if the customer so chooses). Discretion belongs entirely to

¹ We note that the object of encouraging price-induced demand response is not intended to substitute for other means of achieving cost-effective reductions in demand, such as energy efficiency and ISO/RTO-managed demand response programs. Retail rate structures that send customers efficient price signals are simply one in a set of complementary strategies intended to improve the overall efficiency of the electric sector.

the customer: not only can he or she program usage in response to critical peaks, but also in response to the predefined time-of-use prices (periods) as well.

There are several approaches to critical peak pricing, and then variations upon them. Mainly they go to the question of the underlying rate design and the pricing for the critical peak period. One option is non-TOU pricing with a fixed critical peak price. It would give customers a flat rate during all hours, except for the critical peak period, and a fixed rate during the Critical Peak hours that is three to five times higher than the “normal” rate. The advantage of this is that it allows customers to focus their efforts exclusively on the critical peak periods, when demand-response is most valuable. The disadvantage is that it “loses” some of the off-peak load-shifting incentive that TOU rates create.

Another approach is TOU pricing with fixed critical peak price, which would provide customers with a fixed TOU rates, and a fixed critical peak period price, set at a level that is three to five times the “normal” on-peak price. The advantage of this is that customers know what the price of electricity will be well in advance and can plan a response so that when a critical peak is called, they can implement a planned response. The disadvantage is that the fixed price may be above or below the market price at the time it is invoked.

A third option is TOU pricing with a real-time critical peak price, which would provide customers with TOU rates that would be fixed except during critical peak periods. (A real-time CP price could also be used with an underlying flat-rate price structure. The benefit of this is that it provides the greatest certainty of cost recovery during the critical peak hours for the power supplier, leading to expected lower bid prices for all other hours. The disadvantage is that customers have more difficulty planning their responses in advance, insofar as they do not know what the critical peak price will be.²

The following table illustrates several critical peak pricing alternatives. State commissions should consider these and other options.

| <i>Element</i> | <i>Example 1: Flat Rate With Defined CPP</i> | <i>Example 2: TOU Critical Peak Rate with Defined CPP (preferred)</i> | <i>Example 3: TOU Critical Peak Rate With Market CPP</i> |
|--|---|--|---|
| Sum of Delivery and Power Supply Rate Design Elements (\$/kWh) | All kWh @ \$.09 except CP kWh @ \$.60 | 7 A.M. to 7 P.M. @ \$.117 7 P.M. to 7 A.M. @ \$.05 except CP kWh @ \$.60 | 7 A.M. to 7 P.M. @ \$.117 7 P.M. to 7 A.M. @ \$.05 except CP kWh @ Market + margin (~2 mills/kWh) |
| Maximum Number of Critical Peak Hours | 40 - 100 per year 10 - 25 per month June - Sept. Only | 40 - 100 per year 10 - 25 per month June - Sept. Only | 40 - 100 per year 10 - 25 per month June - Sept. Only |

² They can, however, program certain end-uses to cease drawing power when the price exceeds a specified threshold. This requires additional micro-processing functionality on premises.

| Trigger Event for Critical Peak Price | ISO Calls on Day-Ahead Demand Response Resources | ISO Calls on Day-Ahead Demand Response Resources | ISO Calls on Day-Ahead Demand Response Resources |
|---------------------------------------|--|--|--|
| Advance Notice of Critical Peak Hours | Day Ahead (24 hours) | Day Ahead (24 hours) | Day Ahead (24 hours) |

The critical peak rate program would constitute the basic service provided by the default supplier.

Attached as an appendix is an illustrative CPP tariff, based in large measure on PSE&G's Residential Service Pilot (Rate Schedule RSP) and which differs in certain material respects from the examples in the table above. It overlays a limited fixed-price CPP on a seasonally differentiated, TOU rate structure and does not necessarily rely on an advanced metering infrastructure with customer-automated demand response. It is "limited" in that critical periods can only occur in during the on-peak TOU periods.

Recommendation 2. Consider Whether and How Procurement and the Terms of Default Service Should Be Amended to Enable Implementation of Critical Peak Pricing

A critical peak pricing regime will affect both the costs of providing default service and the level of revenues collected. As part of their consideration of CPP (and other time-sensitive pricing structures) for default service, PUCs will need to evaluate, among other things, whether and how the procurement and terms of default service should be amended to allow such rates to be implemented.

[Rick Weston note: This discussion needs much thought and filling out. I've only just begun to dig into it, in response to points raised by Calvin Timmerman and Dan Cleverdon.]

Recommendation 3. Consider Whether and in What Amounts Regulated Electric Distribution Companies (EDCs) that Choose to Deliver PJM Demand Response Programs Should be Compensated for that Service

Currently, competitive firms and load-serving entities can act as Curtailment Service Providers (CSPs) to market and deliver PJM's demand-response programs. A CSP could be a regulated electric delivery utility, a default service provider (DSP), competitive electricity supplier, or a stand-alone CSP. For a non-regulated CSP, *i.e.*, the stand-alone CSP or competitive electric supplier, the terms of the agreement between the provider and customer can be negotiated or be part of a standard product or products. In the case of regulated CSPs (regulated utilities and DSPs), the terms of agreement should be subject to approval by the PUC and embodied in tariffs or special contracts. CSPs are notified by PJM when interruptions are needed, and it in turn notifies the customer. PJM makes payments directly to CSPs, who in turn pay consumers for load reductions provided when called upon.

The amount of the payment to the consumer will typically represent a share of the payment made by PJM for the reduction. The sharing between the CSP and the customer must be sufficient to induce the desired behavior by the customer and cover the costs (including profit) incurred by the CSP to provide the service. The product will not be offered if not enough money will be available to encourage participation and recover costs of the CSP.

There are policy and market implications to the question of how PJM payments are shared between customers and providers. In the case of non-regulated CSPs, sharing will be determined by the price negotiated or offered through a standard product (*i.e.*, the provider's share is the margin between the price paid to the customer and the price paid by the ISO). In the case of regulated CSPs, the sharing will be determined (approved) by the PUC, taking into account traditional regulatory concerns – equity, efficiency, cost-allocation, and revenue collection. The regulated CSP share should be set to cover at least the costs of marketing and providing the service. MADRI recommends that PUCs determine an appropriate split between the regulated entity and customer. Such a ratio would effectively set a ceiling on the margins available to competitive CSPs and others who wish to market the ISO programs.³

³ MADRI does not take a position on what would be the appropriate ratio. We note, however, that there are some examples that might inform a Commission's thinking. Delmarva, in a recent filing with the DE PSC, proposes a 70-30 customer-EDC sharing. The thirty percent would be used to offset the operational expenses that the utility would incur to deliver the programs. Delmarva proposes that, if actual costs exceed the 30 percent, the difference would be collected through a surcharge on distribution rates; if costs are less than the 30 percent, the savings would be shared between all customers and shareholders. The capital costs of the program (*i.e.*, setting up the internet platform by which the program is administered) would be recovered in rate base over a five-year term. Demarva, *Helping Delaware Residents Cope with the Rising Costs of Energy*, March 2006, at 42-44. Similarly, in its final report, the New England Demand Respond Initiative recommended a 70-30 split, partly in the knowledge (not cited in the report) that the Vermont Public Service Board had recently adopted that ratio for Central Vermont Public Service Corporation's participation in ISO-NE's programs. NEDRI, *Dimensions of Demand Response*, July 23, 2003, at 71-72.

Appendix

ILLUSTRATIVE CRITICAL PEAK PRICING TARIFF⁴
Fixed Price CPP; Constrained Time-of-Day CP Incidence

AVAILABILITY

For use by customers taking service under Default Service Tariffs other than the Real-Time Pricing Tariff and who are not taking service under any load response or curtailable load riders (including any direct load control programs, e.g., A/C Cycling). The Customer may commence service under this rider only as of service rendered beginning the date its meter is read and shall remain on this rider for a minimum of 12 monthly billing periods.

DELIVERY CHARGES

Service Charge: \$2.27 per month

Distribution Charges per Kilowatt-hour:

In each of the months of May through October 3.6234¢
 In each of the months of June through September 3.0090¢

Other Charges as Required by Law:

[System Benefits Charges, Transition Charges, etc.]

ELECTRIC SUPPLY CHARGES

While participating in this pilot program, the customer is precluded from using on-site generation equipment except when the on-site generation facility is used exclusively as an emergency source of power during Company electric delivery service interruptions.

Electric Supply Charges are as follows:

| Summer Months: June through September | Periods | Charges per kilowatt-hour |
|--|--|--------------------------------------|
| Base Price | All hours | 5.6933¢ |
| Night Discount | 10 PM to 9 AM Daily | (2.8302) ¢ |
| On-Peak Adder | 1 PM to 6 PM Weekdays | 8.4906¢ |
| Critical Peak Adder | 1 PM to 6 PM when called replaces On-Peak Adder | 79.2453¢ |

⁴ Based largely on the PSE&G Rate Schedule RSP (Residential Service Pilot).

| Non-Summer Months: October through May | Periods | Charges per kilowatt-hour |
|---|--|--------------------------------------|
| Base Price | All hours | 6.4303¢ |
| Night Discount | 10 PM to 6 AM Weekdays | (2.8302) ¢ |
| On-Peak Adder | 5 PM to 9 PM Weekdays, November through March | 2.8302¢ |
| Critical Peak Adder | 5 PM to 9 PM when called replaces On-Peak Adder, November through March 1 PM to 6 PM when called October, April, and May | 17.9245¢ |

The Critical Periods shall be invoked at the sole discretion of the Company. Critical Periods may be activated for any of the following reasons:

- The PJM day-ahead locational marginal price or the expected bilateral contract energy price exceeds 10¢/kWh;
- The occurrence of company-designated discretionary events, including but not limited to test purposes, program evaluation, etc.; or
- The occurrence of unexpected, generation plant outages, unusual transmission or substation loading, unexpected wholesale energy price increases, or other system emergency conditions.

The Company may invoke a maximum of eight (8) Critical Periods per year. A Critical Period may be only be called in the designated periods. Each customer will be notified by 6:00 P.M. the evening before a day with a Critical Period. Notification will be provided by either e-mail or telephone as elected by the customer at the time of their enrollment in the pilot program and, where installed, through direct communication with advanced metering and associated equipment configured to support this tariff.

The above Energy Supply Charges reflect costs for Energy, Generation Capacity, Transmission, and Ancillary Services (including PJM Interconnection, L.L.C. (PJM) Administrative Charges). The portion of these charges related to Network Integration Transmission Service, including the PJM Seams Elimination Cost Assignment Charges and the PJM Reliability Must-Run Charge, may be changed from time to time on the effective date of such change to the PJM rate for these charges as approved by the Federal Energy Regulatory Commission (FERC).

TERMS OF PAYMENT:

Bills are due on presentation.

TERM [If CPP is voluntary or provided under a pilot program]

Customer may discontinue delivery service upon notice. The Company may terminate the availability of this Rate Schedule at its discretion and upon proper notice to the customer.

SPECIAL PROVISIONS [(a) and (b) apply if CPP is voluntary or provided under a pilot program]

- (a) **Installation and Removal:** Metering and Energy Management Equipment will be owned, installed and maintained by the Company at the customer's residence upon customer's initial acceptance of service under the tariff at no charge to the customer. The customer shall provide a suitable location approved by the Company for such facilities. Energy Management Equipment may be removed by the Company [at the conclusion of the pilot or at] any time that the customer decides to withdraw [from the pilot/from the tariff]. Customers completing the pilot may keep the pilot thermostat at no cost.
- (b) **Voluntary Withdrawal:** Customers who voluntarily withdraw from this [pilot program/tariff] can return to the otherwise applicable rate schedule. If customer notification is received at least three days prior to the end of the customer's billing month the customer will be billed for the full billing month under the otherwise applicable rate schedule (the billing month normally ends with the customer's scheduled meter reading date). Customers voluntarily withdrawing from this [pilot program/tariff] are not eligible to reenter the pilot program.
- (c) **Resale:** Service under this rate schedule is not available for resale.
- (d) **Budget Plan (Equal Payment Plan):** Participation in the Budget Plan (Equal Payment Plan) will be suspended for the time the customer takes service under this tariff.
- (e) **Billing Information:** Upon customer request, historical pilot program billing information will be provided to the customer at no charge.

STANDARD TERMS AND CONDITIONS

This rate schedule is subject to the Standard Terms and Conditions of this Tariff.