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The Role of Demand Response in Default Service Pricing

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Table of Contents

I. Overview of Default RTP Service in the U.S.	1
II. Default RTP Tariff Design and Implementation	2
III. Customer Exposure to Hourly Spot Market Prices in Competitive Retail Markets.....	3
IV. Price Response from Customers Facing Hourly Prices.....	7
V. A Comparison to Utility and ISO/RTO Demand Response Programs	8
VI. Policy Implications and Recommendations Related to Developing Price Responsive Demand in Competitive Retail Markets	9
Figure 1- Enrollment in Default RTP Service, (2004/2005).....	4
Figure 2- Block-and-Index Pricing Arrangement	5
Figure 3- Total Load Facing Hourly Spot Market Prices on the Margin.....	7
Figure 4- 2004 DR Program Enrollment	9
Table 1- Default Service RTP in the U.S.....	2
Table 2- Default RTP Tariff Design and Implementation Details.....	3
Table 3- Market Penetration of Hourly Spot Market Indexed Pricing Arrangements.....	6
Acknowledgements.....	11
Endnotes.....	12

The Role of Demand Response in Default Service Pricing

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Dynamic retail pricing, especially real-time pricing (RTP), has been widely heralded as a panacea for providing much-needed demand response in electricity markets. However, in designing default service for competitive retail markets, demand response has been an afterthought, and in some cases not given any weight at all. But that may be changing, as states that initiated customer choice in the past 5-7 years reach an important juncture in retail market design.

Most states with retail choice established an initial transitional period during which utilities were required to offer a default or standard offer generation service, often at a capped or otherwise administratively-determined rate. Many retail choice states have reached the end of their transitional period, and several have adopted or are actively considering an RTP-type default service for large commercial and industrial (C&I) customers. In most cases, the primary reason for adopting RTP as the default service has been to advance policy objectives related to the development of competitive retail markets. However, if attention is paid in its design and implementation, default RTP service can also provide a solid foundation for developing price responsive demand, creating an important link between wholesale and retail market transactions.

This article, which draws from a lengthier report, describes experience to date with RTP as a default service, focusing on its role as an instrument for cultivating price responsive demand.¹ As of summer 2005, default service RTP was in place or approved for future implementation in five U.S. states: New Jersey, Maryland, Pennsylvania, New York, and Illinois. For each of these states, we conducted a detailed review of the regulatory proceedings leading to adoption of default RTP and interviewed regulatory staff and utilities in these states, as well as eight competitive retail suppliers active in these markets.

I. Overview of Default RTP Service in the U.S.

RTP is currently the default service for the largest C&I customers of ten investor-owned utilities (IOU) and is planned or proposed for sixteen others (see Table 1). In most cases, it has been implemented through a regulatory process, the central purpose of which was to establish the post-transition supply service for an individual utility or all utilities in the state. These regulatory processes have typically been guided by a set of broad statutory mandates (e.g., that default service be market-based) and involved a large number of stakeholders attempting to address and resolve a wide range of issues.

Based on interviews with selected stakeholders and our review of the regulatory record, it is evident that adoption of RTP as the default service has been motivated largely to foster the development of competitive retail markets. RTP has several features that make it an attractive candidate for default service from the perspective of retail market development. First, it encourages switching by motivating customers that do not want to face hourly prices to seek out hedged supply contracts with competitive suppliers. Second, it avoids the use of class average load profiles for commodity pricing, and with it, intra-class cross-subsidies that distort the retail market. Third, because RTP prices reflect current market conditions, there is no need to impose switching restrictions to prevent customers and/or suppliers from taking advantage of seasonal arbitrage opportunities between default and competitive service.

Table 1. Default service RTP in the U.S.

State	Status of Default Service RTP Implementation
New Jersey	Implemented by all four IOUs in August 2003
Maryland	Implemented by BGE from June 2002-June 2003 (superseded by statewide default service) Implemented by BGE, PEPCO, and Delmarva in June 2005 Scheduled for implementation by Allegheny Power in January 2006
Pennsylvania	Implemented by Duquesne in January 2005 Proposal currently under consideration for the other 10 IOUs in the state
Delaware	Scheduled for implementation by Delmarva in May 2006.
New York	Implemented by Niagara Mohawk in November 1998 Implemented by CHG&E in May 2005 Other four NY IOUs directed to file default RTP tariffs
Illinois	Scheduled for implementation by Commonwealth Edison (ComEd) in January 2007. RTP offered as an optional (opt-in) service by all Illinois IOUs since 1998.

II. Default RTP Tariff Design and Implementation

The default RTP tariffs currently in place have several features that are important for understanding their potential role as a source of price responsive demand. First, all employ an unbundled and unhedged commodity (energy) charge. Energy costs are calculated for each customer on an hourly basis by multiplying its usage in that hour by the prevailing hourly market price. The two New York utilities with default RTP – Niagara Mohawk, a National Grid Company, and Central Hudson Gas & Electric (CHG&E) – index their default RTP rates to the New York Independent System Operator (NYISO)’s day-ahead energy market, which publishes hourly prices by 4:00 p.m. on the prior day. In contrast, utilities in New Jersey, Maryland, and Pennsylvania use the PJM real-time market as the basis for the hourly prices of their default RTP rates. Because hourly prices in PJM’s real-time market are not determined until after the applicable hour has elapsed, customers on these default RTP rates do not know the exact prices they will be charged until after-the-fact.²

The customer size threshold for defining the default RTP class is a second major implementation issue. The first utilities to implement default RTP did so only for the very largest customers (e.g., >1.5 MW billing demand). However, over time, default RTP has been adopted for progressively smaller groups of C&I customers, down to 300 kW (see Table 2). Several factors have driven the choice of a particular customer size threshold. In many cases, it has reflected some consideration (usually informal) of customers’ ability to either manage hourly pricing risks or find a less risky alternative. The capabilities of the existing metering and billing

infrastructure has also often been a factor, although regulators in New Jersey and Maryland decided to significantly expand interval metering deployment in conjunction with default RTP.³

Another important design issue is whether the utility offers any hedging options for customers in the default RTP class and, if so, for how long (see Table 2). In Pennsylvania, Duquesne Light Company (Duquesne) was required to offer an alternative fixed price, full requirements service for two-and-a-half years following default RTP implementation, which customers in the default RTP class can elect during specified enrollment windows. In Maryland, large customers were provided with a fixed price, full requirements default service for an 11-month period (July 2004-May 2005), during which RTP was an optional alternative.

Table 2. Default RTP Tariff Design and Implementation Details

State or Utility	Commodity Charge ^a	Applicable Customer Class	Other Utility Supply Options for Customers in the Default RTP Class
New Jersey	RT	>1,250 kW	None
Maryland	RT	>600 kW	None currently. A fixed-price default service was offered from July 2004-May 2005, during which time RTP was optional.
Duquesne	RT	>300 kW	A fixed-price optional service is offered until mid-2007
Niagara Mohawk	DA	>2,000 kW	None currently. Customers were offered a one-time opportunity in 1998 to contract for fixed-price, peak and off-peak load blocks, for up to five years.
CHG&E	DA	>500 kW	None

^a RT = hourly usage charged at real-time spot market price; DA = hourly usage charged at day-ahead market price.

III. Customer Exposure to Hourly Spot Market Prices in Competitive Retail Markets

A. Customer Enrollment in Default RTP

A relatively small percentage of customers have chosen to remain on default RTP. For most utilities in Maryland, New Jersey and Pennsylvania, less than 15% of the applicable load has remained on default RTP, while the two New York utilities report that 25-35% of the applicable load has remained (see Figure 1). Other customers in the default RTP classes have either switched to a competitive supplier or, in the case of Duquesne, opted onto the temporary fixed-price utility service. Yet, despite the small percentage of customers remaining on default RTP, the magnitude of load exposed to spot market prices, is not inconsequential. The total enrollment in default RTP among these ten utilities is almost 1,000 MW. However, because these tariffs have been implemented for only several years, it remains to be seen how enrollment changes over time as wholesale market conditions evolve and as customers have more time to shop for alternative arrangements with competitive suppliers.

What do participation rates in default RTP tell us about customers' willingness to face hourly pricing? Certainly, some customers have responded to the prospect of being placed on default RTP by seeking out fixed price supply arrangements with competitive providers. This, of course, was an intended result. However, not all switching can be attributed to a rejection of hourly pricing. First, in several cases (e.g., Duquesne and Maryland), much of the switching occurred prior to implementing default RTP. Second, many customers have left default RTP to sign competitive supply contracts that incorporate hourly pricing, as discussed further in Section III.C. At the same time, it would be erroneous to assume that all customers remaining on default RTP are interested in paying hourly prices, as some customers have no doubt remained only out of inattention or for want of acceptable fixed price offers.⁴

We can identify several factors that contribute to the differences in default RTP participation rates observed among the ten utilities in Figure 1. First, retail market development varies across the utility service territories, and customers may have uneven access to attractive competitive alternatives. Second, details of the default service implementation and tariff design are also important. For example, Duquesne is the only utility that currently offers a fixed price service to customers in the default RTP class; not unexpectedly, enrollment in its default RTP rate is the lowest among the ten utilities (3%), as ~25% of its large C&I load has switched to the fixed-price utility service. Another key tariff design feature is the advance notice with which customers receive hourly prices. The relatively high default RTP enrollment rates for Niagara Mohawk and CHG&E may be attributed, at least in part, to the fact that their customers receive prices a day in advance, while their counterparts in New Jersey, Maryland, and Pennsylvania have no advance notice.

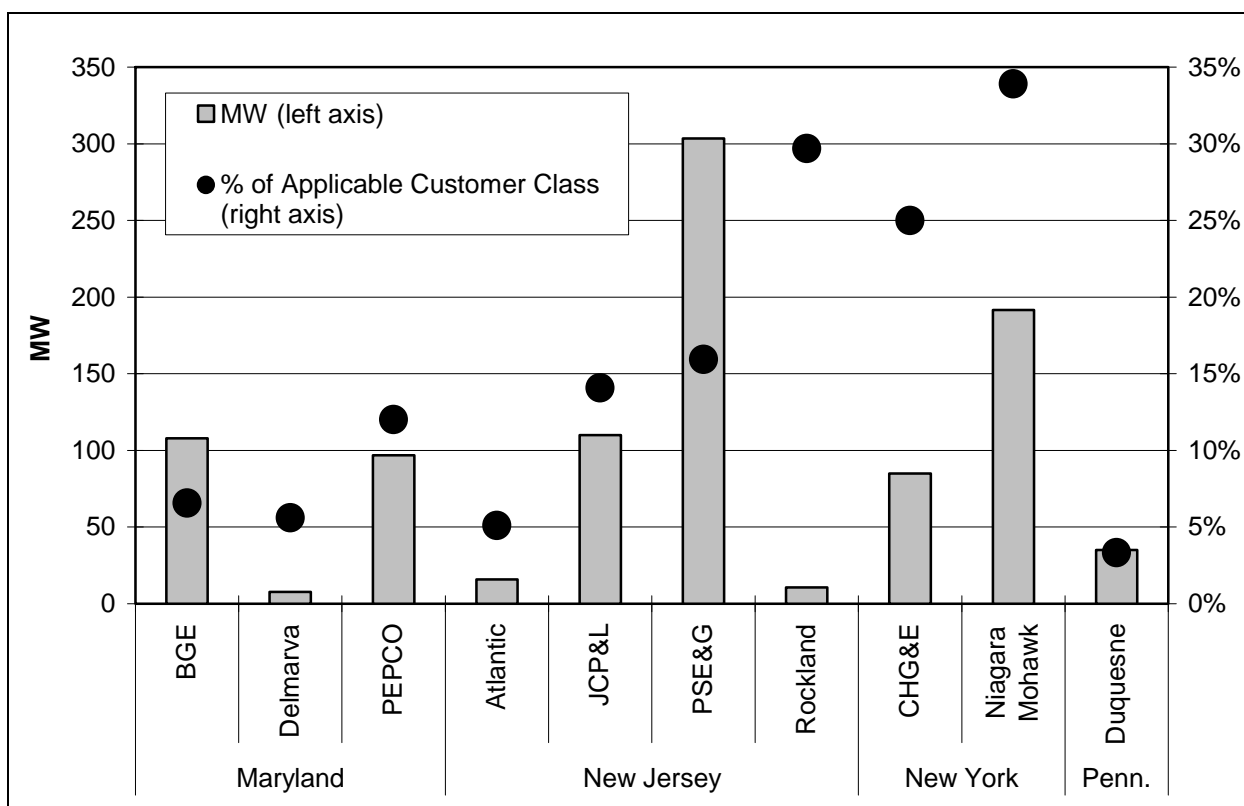


Figure 1. Enrollment in Default RTP Service (2004/2005).

B. Hourly Pricing Products Offered by Competitive Retail Suppliers

We asked each of the competitive retailers that were interviewed to describe the types of pricing arrangements offered to large C&I customers. All indicated that, at least in some regions, they offer customers the option to purchase all of their commodity (energy) requirements at hourly prices indexed to the real-time or day-ahead spot market. Several retailers market these pricing arrangements as providing a “guaranteed savings” off of the default RTP service, accomplished by beating the retail adder and/or fixed-price charges (e.g., for installed capacity or ancillary services) in the default RTP rate.⁵

All suppliers also offer hedging options to their customers on hourly pricing, although none offer hedges to customers remaining on default RTP. The most common arrangement, offered by all suppliers, is a “block-and-index” product, whereby customers willing to expose a portion of their load to hour hourly market prices contract for blocks of load at a fixed \$/kWh price and pay hourly spot market prices for usage in each hour above their block level (see Figure 2). Suppliers typically offer customers some degree of flexibility in customizing the shape of the load block (i.e., the hours and days of the week covered by the block) as well as the size of the load block relative to their total load.⁶ Some suppliers treat the load block as a take-or-pay obligation. Others credit customers for load reductions below the block level hour-by-hour at the prevailing spot market price, the same way they settle load above that level.

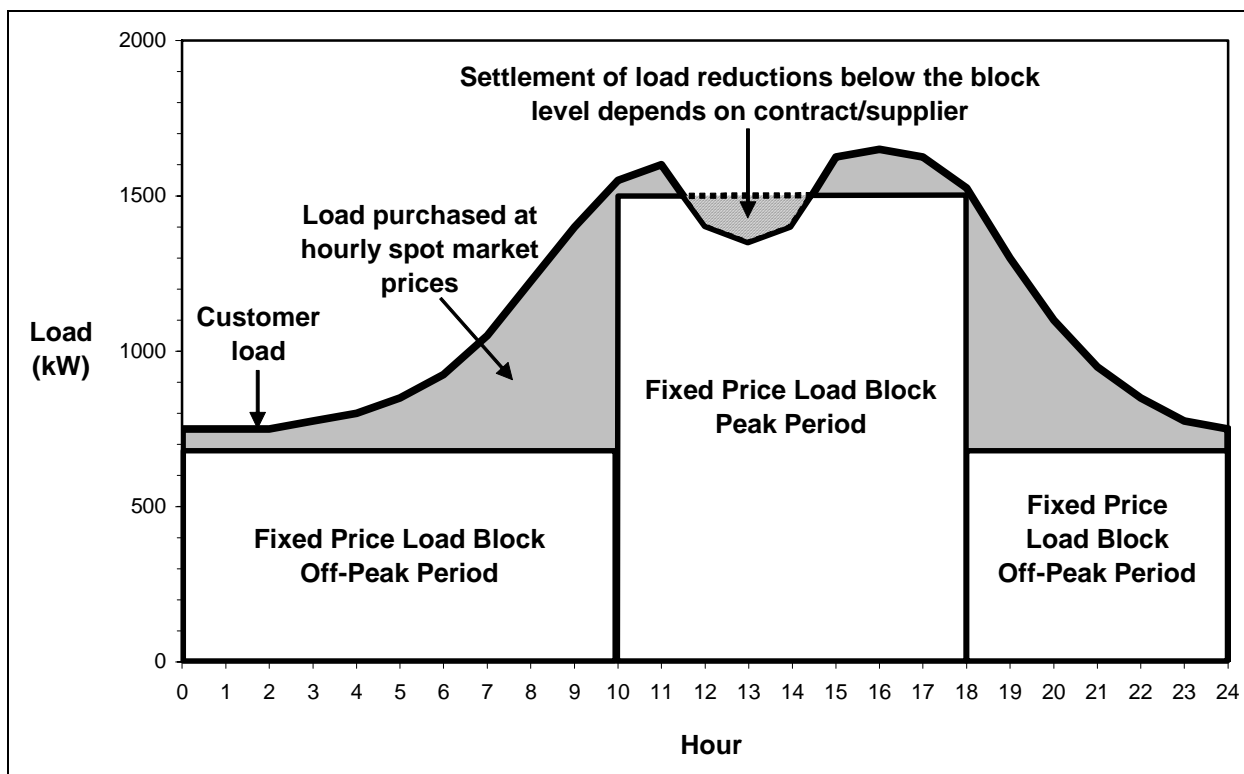


Figure 2. Block-and-Index Pricing Arrangement

C. Market Penetration of Hourly Pricing with Competitive Suppliers

We asked retail suppliers to estimate the percentage of their large C&I load either on a block-and-index arrangement or fully exposed to hourly spot market prices (see Table 3). Reported market penetration rates ranged from 50-75% in New Jersey, while values reported for most other markets were lower, typically in the range of 5-25%.⁷

When asked about factors driving customer demand for hourly-priced supply contracts, retail suppliers indicated that customers' ability and willingness to respond to hourly prices was typically not a significant driver. Suppliers offered several alternative explanations: (1) some customers are looking for a guaranteed savings off of the default RTP rate; (2) some are simply riding the market, waiting until the time is right to lock in a fixed price contract; and (3) some

have decided that the premium for a fixed price, full-requirements service is greater than the value they place on the price certainty such contracts provide. Finally, almost all suppliers suggested that much of the current demand for spot market indexed arrangements was temporary, due to low spot market volatility and relatively mild weather, and would probably wane over the long run.

Differences in the penetration of hourly spot market indexed pricing arrangements can be attributed to several factors. First, when the interviews were conducted in late 2004, default RTP service was in place only in New Jersey and in Niagara Mohawk’s service territory. If, as many suppliers suggested, some customers seek out competitive supply contracts that offer a guaranteed savings off the default rate, we would expect that demand for hourly pricing with competitive suppliers would be greater in regions with default RTP. Second, the definition of the large C&I class, which is based on the customer size threshold for default RTP, differs significantly among states. If, as many suppose, larger customers are more predisposed to hourly pricing, then we would expect higher market penetration rates for hourly pricing products in Niagara Mohawk’s territory and New Jersey, where the customer size threshold is relatively high. Finally, the composition of business types may vary across regions in ways that are correlated with customers’ willingness to face hourly prices (e.g., certain types of large industrial customers).

Table 3. Market penetration of hourly spot market indexed pricing arrangements

Large C&I Market	Supplier	Percent of Large C&I Load Facing Hourly Spot Market Prices on the Margin
Niagara Mohawk SC-3A class	2	>90%
New Jersey CIEP class	2	75%
	5	50-60%
Maryland Type III class	6	50%
	5	5%
PJM region	6	20%
	3	10%
NYISO region	4	<25%
	6	10-15%
ISO-NE region	1	10%

Notes: The Niagara Mohawk SC-3A class, New Jersey CIEP class, and Maryland Type III class refer to the default RTP service classes in each respective region.

D. Customer Load Facing Hourly Prices

In states with default RTP and retail choice, two groups of customers face hourly prices: those that have remained on default RTP and those that are purchasing their supply from a competitive provider through some type of hourly pricing arrangement. State regulatory commissions typically publish information on the number of customers and amount of load remaining on default RTP, as part of their efforts to track switching rates. However, very little information is currently available in the public domain regarding the amount of load facing hourly prices through competitive retail supply contracts.

To fill this void, we estimated the amount of load facing hourly spot market prices through competitive retail supply contracts within three large C&I customer populations: the New Jersey CIEP class, the Maryland Type III class, and Niagara Mohawk’s SC-3A class. We

derived these estimates from individual suppliers' statements about the portion of their large C&I load exposed to hourly pricing, from our surveys of customers in Niagara Mohawk's service territory, and from public data on suppliers' market share.⁸ We then combined these estimates with data on default RTP enrollment, to estimate the total load facing hourly prices in these three markets.

Using this approach, we estimate that, as of Summer 2005, 35-60% of the large C&I load in New Jersey, 15-25% in Maryland, and approximately 65% in Niagara Mohawk's service territory is facing hourly prices, either through the default RTP service or a competitive retail supply contract. Based on the mid-points of these ranges, approximately 8% of the system peak load in New Jersey, 4% in Maryland, and 6% in Niagara Mohawk's service territory is facing hourly spot market prices (see Figure 3).

Given this information, the key question from the perspective of characterizing the associated price responsive demand is: How responsive are these customers to changes in hourly spot market prices?

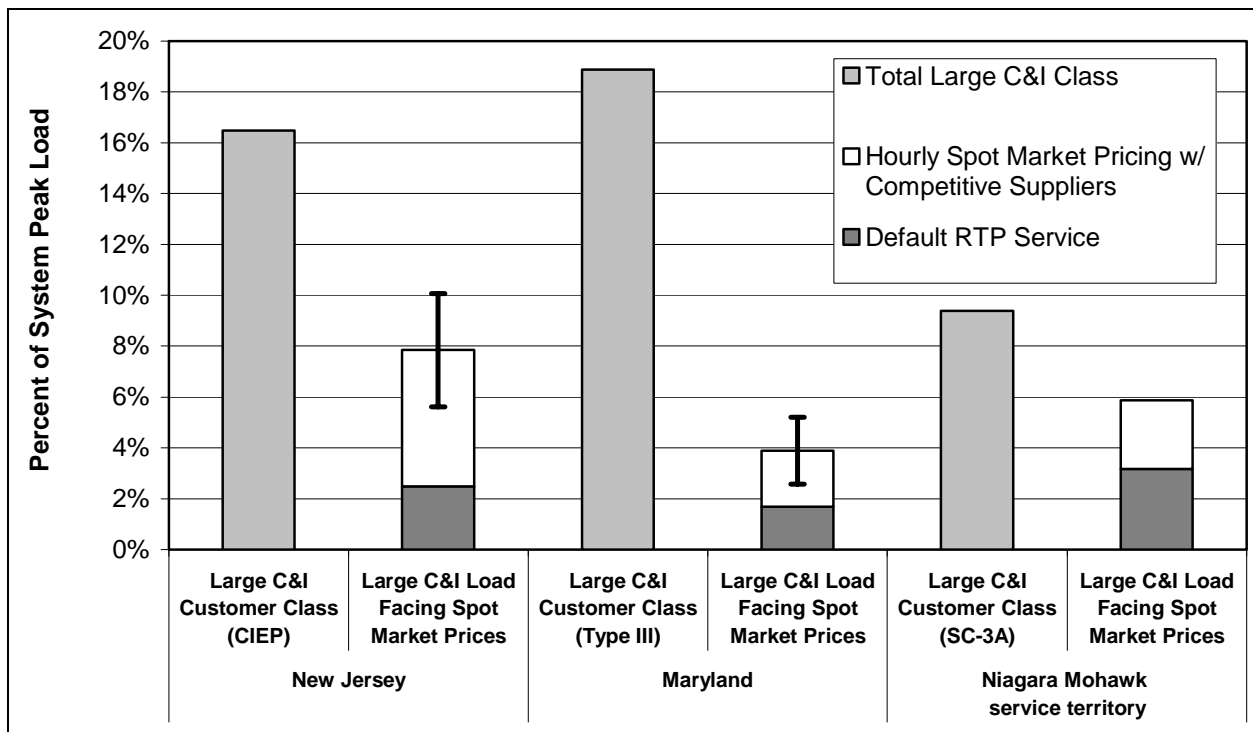


Figure 3. Total Load Facing Hourly Spot Market Prices on the Margin. The error bars reflect our high and low estimates for the amount of load facing hourly prices through competitive supply contracts.

IV. Price Response from Customers Facing Hourly Prices

Of the utilities currently offering default RTP, only Niagara Mohawk has conducted a formal evaluation of customers' price response. The most recent analysis found that, in aggregate, Niagara Mohawk customers exposed to day-ahead hourly prices, through either the default RTP tariff or a similar pricing arrangement with a competitive retailer, reduced their load by an amount equal to approximately 10% of their combined demand, when day-ahead peak period prices exceeded \$500/MWh.⁹ Based on the total load currently facing hourly prices, a

load reduction of this magnitude corresponds to about 0.6% of Niagara Mohawk's total system peak.

The default RTP tariffs currently offered in Maryland, New Jersey, and Pennsylvania are indexed to the real time market. The utility and regulatory staff interviewed from these jurisdictions offered their view that customers currently on default RTP service are probably not actively monitoring or responding to hourly prices, but they also noted that no formal study of customers' price responsiveness has yet been performed. Thus, no firm conclusions can be drawn at this time about whether, or to what extent, customers remaining on the default RTP service in these states respond to hourly prices.

Data on the price responsiveness of customers that face hourly prices in their competitive supply contracts is similarly sparse. Suppliers indicated that they have not formally analyzed the load response of customers on hourly pricing and do not account for their price response in scheduling or procurement activities. Most shared the view that the majority of customers do not modify their usage in response to changes in hourly prices, with the exception of a small number of customers with onsite generation or discrete production processes that can be shifted or curtailed. As noted previously, all suppliers suggested that the vast majority of customers electing to pay hourly prices have done so for reasons unrelated to price response. Perhaps, as a consequence of such views, retail suppliers reportedly do not highlight potential cost savings from load response in their marketing activities, nor do they offer many services that would enhance customer's capability to respond to hourly prices.¹⁰

V. A Comparison to Utility and ISO/RTO Demand Response Programs

Hourly electricity pricing is one mechanism for stimulating price responsive demand. Demand response (DR) programs, which offer explicit payments to customers for load reductions, represent a different, and potentially complementary, type of approach. DR programs can be classified according to whether they are used to elicit load reductions in response to reliability conditions ("emergency programs") or to economic conditions such as high spot market prices ("economic programs"), and also according to the type of commitment required of the customer and the form of payment offered. Using the latter approach, most DR programs fall into one of three general types:

- (1) *Call Option Load Reduction Programs* provide customers with an up-front payment in exchange for making a standing commitment over a designated time frame (e.g., the summer season) to reduce their load if requested. Customers that do not curtail when requested are assessed non-compliance penalties.
- (2) *Scheduled Load Reduction Programs* provide customers with payments based on their actual load reductions. To receive such payments, customers must commit to reducing their load by a specific amount during a designated time period (e.g., the following day from 2:00 - 6:00 PM).
- (3) *Voluntary Load Reduction Programs* require no prior customer commitment and provide payments based on customers' actual load reductions.

In each region with default RTP, large C&I customers have the opportunity to participate in a variety of DR programs offered by either the regional transmission organization or independent system operator (RTO/ISO) or by their local utility. When customers enroll in DR

programs, they nominate a load reduction quantity or firm load level, which represents either their firm commitment (in the case of call option programs) or a rough indication of their likely load reduction (for most other programs). In regions with default RTP, the combined load reduction nominated by large C&I customers participating in DR programs ranged from 1-5% of the corresponding utility's or state's system peak load in 2004 (see Figure 4).¹¹

But how have these DR programs actually performed? Emergency DR programs in these regions, which includes call option and voluntary programs, have demonstrated load reductions in the range of 1-3% of the system peak demand for the respective utility or state.¹² In general, call option programs have elicited load reductions at or near participants' contracted level, because of customers' incentive to avoid non-compliance penalties. Voluntary load reduction programs have also successfully elicited sizable reductions when sufficiently high incentive payments are offered (e.g., the \$500/MWh floor price in NYISO's EDRP and PJM's Emergency LRP).¹³

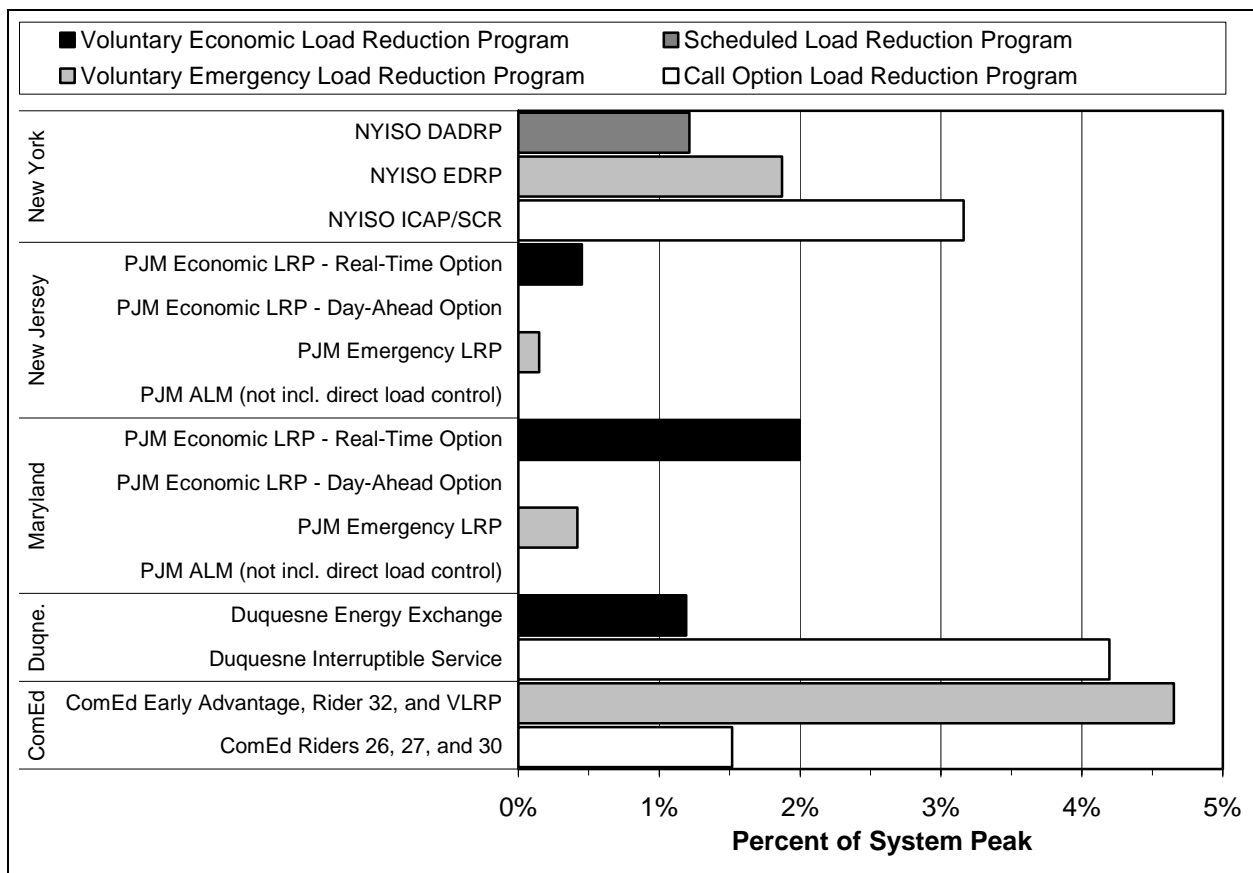


Figure 4. 2004 DR Program Enrollment (Participants' Nominated or Contracted Load Reduction)

VI. Policy Implications and Recommendations Related to Developing Price Responsive Demand in Competitive Retail Markets

- A. The indirect effects of default RTP on the development of price responsive demand may be just as important as the direct effects.

The direct impact of default RTP on the development of price responsive demand is a function of the amount of load remaining on the rate and the price responsiveness of those customers. Experience to date suggests that, over the long run, most customers will leave default RTP when implemented in states with retail choice – an outcome consistent with its intended purpose. As a result, the price responsive demand directly associated with default RTP may ultimately be rather limited.

However, our research highlights a number of potentially significant *indirect* impacts. Because some customers evidently use the default rate as a benchmark and seek out competitive contracts with a comparable pricing structure, designating RTP instead of a fixed price rate as the default service may create additional demand for hourly pricing options in the competitive market. Education and training conducted as part of default RTP implementation, as well as direct experience on the rate (even if unintended), may help to raise customers' awareness and comfort level with hourly pricing, further bolstering customer demand for hourly pricing products. Finally, the deployment of additional interval metering may stimulate greater interest in hourly pricing arrangements with competitive suppliers and DR programs.

B. Default RTP indexed to day-ahead market prices can be an effective strategy for simultaneously supporting retail market development and demand response.

Default RTP rates that are indexed to the day-ahead energy market provide customers with a more compelling incentive for price response than those that are indexed to the real time market, while retaining the essential features that make hourly pricing an attractive default service.¹⁴ Although the price response of customers exposed to real-time hourly pricing has yet to be formally documented, the response is likely to be greater if customers are provided firm hourly prices a day in advance, as customers then have more certainty about the financial consequences of load response. Furthermore, this effect not applies only to customers remaining on the default rate, but it also spills over into the competitive market, given that competitive retail contracts often mirror the pricing structure of the default service.

C. The desired level of price response may not spring forth naturally.

Our research reveals several encouraging signs regarding the development of price responsive demand in competitive retail markets, but also important barriers. Between default RTP service and hourly pricing arrangements offered by competitive suppliers, large C&I customers in many regions now have ample opportunity to purchase their electricity at hourly prices. Competitive suppliers further offer a variety of products that allow customers to customize their exposure to hourly price volatility, including block-and-index type arrangements. The limited evidence available to date suggests that, at least in several markets, a fairly sizable fraction (perhaps 20-60%) of the large C&I load is currently facing hourly prices through either the default RTP service or a competitive supply contract.

However, it is unclear whether an appreciable level of price response has, or is likely to, accompany this growth in the availability and adoption of hourly pricing. In most states with default RTP, few activities have been conducted to help customers identify, analyze, or implement load response strategies. Nor do retail suppliers generally offer such services to their customers on hourly pricing. Given consumers' entrenched habits and expectations, developed

over decades of paying for electricity at fixed prices, load response to hourly pricing will likely be quite limited in the near to mid-term in the absence of concerted efforts to nurture customers' price response capabilities.

In many customer choice states, the regulatory commission and utilities have conducted general customer education activities to provide basic information about restructuring and/or default service. Policymakers should consider using these forums as an opportunity to help customers better understand the potential cost savings and risk management benefits associated with load response to hourly spot market prices. Additional programmatic efforts, such as facility DR audits, customer training, and financial assistance with DR enabling technologies should also be considered, perhaps in conjunction with energy efficiency and load management initiatives.

D. Policymakers lack critical information about the price responsiveness of customers in retail choice states.

Several major policy and wholesale market design issues may hinge on the price responsiveness of retail electricity consumers, including continuation of wholesale market price caps, the need for an ICAP requirement, and whether ISOs should offer economic DR programs that provide additional financial inducements for customers to curtail. Yet, little information is currently being collected in competitive retail markets regarding either the amount of load facing hourly prices or the actual price responsiveness of those customers. To address this critical information void, federal and state regulators and ISO/RTOs should consider undertaking efforts to periodically collect and analyze data on retail customers' supply arrangements and quantify the extent of response to hourly pricing and other dynamic pricing options.

E. Emergency DR programs complement dynamic retail pricing.

Emergency DR programs, including both voluntary and call option type programs, have a demonstrated track record of obtaining load reductions of 1-3% of the system peak, when events are called. These DR programs provide explicit payments to customers for load reductions and can serve as a backstop to mitigate various contingencies that threaten the reliability of the power system. Such DR programs can serve as an effective complement to dynamic pricing initiatives at the retail level by providing a training ground for customers to assess their load curtailment potential and obtain actual operational experience implementing load reduction strategies on short notice and by providing additional business opportunities for various types of DR service providers. They can also provide a revenue stream to customers on hourly pricing, to help justify the cost of enabling technologies for demand response that also bolster customers' responsiveness to hourly prices.

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Endnotes

¹ G. Barbose, C. Goldman, R. Bharvirkar, N. Hopper, M. Ting and B. Neenan, *Real Time Pricing as a Default or Optional Service for C&I Customers: A Comparative Analysis of Eight Case Studies*, report to the California Energy Commission, Lawrence Berkeley National Laboratory: LBNL-57661: August 2005.

² Real-time prices are set every five minutes. The hourly PJM real time market price is a weighted average of the composite five-minute prices. PJM also administers a day-ahead energy market, to which customers can refer to estimate real time market prices.

³ New Jersey utilities were directed to install interval meters for all customers >750 kW, even though the customers initially subject to default RTP (based on voltage level) were all much larger. In Maryland, all customers >600 kW, which was the threshold for the default RTP class, received interval meters.

⁴ In interviews with Niagara Mohawk customers that remained on default RTP, many indicated that the price premium for hedged contracts was too high given the risks.

⁵ Many default RTP rates include a retail adder to provide headroom for competitive suppliers who bear retailing costs (e.g., marketing) not borne by the default service provider. Alternatively, some states have opted to provide an explicit “shopping credit” for customers that switch to a competitive supplier, which fulfills the same function as a retail adder.

⁶ A typical configuration, according to one supplier, is for customers to purchase fixed price blocks for peak and off-peak periods, with the peak period block covering at least 75% of their peak usage. This is consistent with the observed hedging decisions by Niagara Mohawk’s large C&I customers, who, when offered a one-time choice to purchase fixed-price peak and off-peak load blocks, typically chose to hedge 60-80% of their peak period load. See C. Goldman, N. Hopper, R. Bharvirkar, B. Neenan, R. Boisvert, P. Cappers, D. Pratt and K. Butkins, *Customer Strategies for Responding to Day-Ahead Market Hourly Electricity Pricing*, report to the California Energy Commission, Lawrence Berkeley National Laboratory: LBNL-57128, August 2005.

⁷ In comparison, recent market research found that roughly 20% of C&I customers interviewed in Texas and in New England indicated a preference for spot market indexed contracts over fixed price contracts. See Suez Energy Resources North America, *Texas 2004 Energy Usage and Sourcing Trend Survey Analysis*, October 26, 2004 and Suez Energy Resources North America, *Northeast Trend Survey*, January 24, 2005. Note that surveys such as these reflect customers’ intentions rather than their actual behavior.

⁸ For New Jersey and Maryland, we estimated the amount of load on hourly pricing served by each supplier in our sample based on supplier interviews and EIA data on their share of the total large C&I load in each state. We then extrapolated to the remaining portion of the switched large C&I load served by suppliers that we did not interview (38% in NJ and 47% in MD) by stipulating lower and upper bounds for the market penetration of hourly pricing (20%-60% for

NJ, and 5%-20% for MD), based on the range of values reported by suppliers that were interviewed. For Niagara Mohawk, we used customer survey data collected by Goldman *et al.*, 2005, *supra* note 6. About 30% of the customers that were taking their supply from a competitive provider in 2004 identified the pricing structure of their supply contract. Of those customers, 43% opted for a supply contract with hourly, spot market indexed pricing. We extrapolated the same percentage to the remaining customers that did not identify the pricing structure of their supply contract.

⁹ See Goldman *et al.*, 2005, *supra* note 6.

¹⁰ Several retail suppliers reported that they do offer internet-based access to hourly load data or “price alert” services. However, none integrate technical assistance (e.g., facility audits or analyses of load response technologies/strategies) into their commodity service.

¹¹ Depending on program rules, the nominated load reduction across multiple programs offered by the same ISO or utility may be additive, as is the case for NYISO’s ICAP/SCR and EDRP programs.

¹² See Barbose *et al.*, 2005, *supra* note 1.

¹³ See B. Neenan, D. Pratt, P. Cappers, J. Doane, J. Anderson, R. Boisvert, C. Goldman, O. Sezgen, G. Barbose, R. Bharvirkar, M. Kintner-Meyer, S. Shankle, and D. Bates, *How and Why Customers Respond to Electricity Price Variability: A Study of NYISO and NYSEDA 2002 PRL Program Performance*, Lawrence Berkeley National Laboratory: LBNL-52209, January 2003.

¹⁴ If day-ahead default RTP service is adopted, regulators should fully account for the associated load forecasting risks and balancing costs born by the default supplier, to ensure that the default service does not interfere with competitive suppliers’ ability to offer day-ahead hourly pricing.