



A DEMAND RESPONSE ROADMAP

I. Introduction

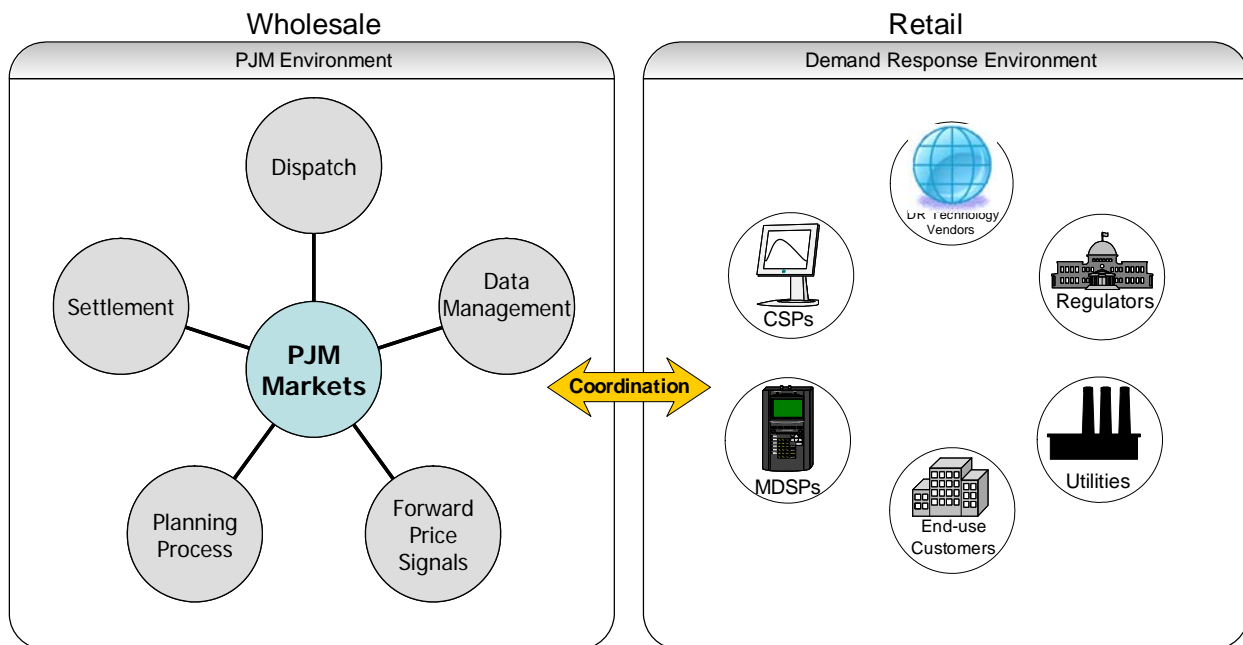
PJM held a symposium on demand response in May, 2007 that was attended by a broad mix of stakeholders and subject matter experts.¹ One of the most prominent themes to emerge from the symposium was the need for coordination between retail and wholesale markets in order to increase demand response participation in PJM's markets. The participants at the *PJM Symposium on Demand Response* identified nine "top priority opportunities." These are shown in Table 1 below.

Table 1. Priority Opportunities from the PJM Symposium on Demand Response

1	A regional approach to the development of standardized platforms, communication protocols, investments in enabling technologies, and wholesale-retail DR integration issues
2	New retail rate structures that better reflect wholesale market pricing strategies
3	Pricing that captures the full value of DR and mechanisms for customers and service providers to get access to all relevant revenue streams
4	Direct load control for all residences, perhaps through state legislation, and modification of building codes for new residences so that they include specifications for technologies that accept/address dynamic pricing signals
5	Advanced metering infrastructure (AMI) available to all customers who want it and price responsiveness with little or no manual intervention
6	Exposure for all customers to hourly wholesale prices
7	Establishment of quantitative (MW) regional goals for DR
8	Adjustment of the 25% cap that currently exists in PJM's synchronous reserves DR program
9	Full responsibility taken by PJM for metered data and calculations used in determining customer baseline loads (CBL)

The symposium participants also emphasized the need to properly allocate responsibility for addressing some of these opportunities. In essence, some are areas in which the retail market should take a leading role, some are areas in which the wholesale market must take the leading role and others required a joint retail/wholesale commitment. Figure 1 depicts the nature of the current demand response environment and the need for coordination between the various stakeholders and functional areas within these markets.

¹ Information regarding the *PJM Symposium on Demand Response*, including a link to the conference proceedings, is available on PJM's Web site at <http://www.pjm.com/committees/stakeholders/drs/drs.html>.



The combination of priority opportunities overlaid by the mix of retail and wholesale market responsibilities lead to suggestions for the development of a coordinated plan, a *Demand Response Roadmap*, to guide the way.

Figure 1. Nature of the Retail and Wholesale Environment – *Building a DR Roadmap*

This paper is organized into a series of functional areas which collectively form the basis for creating a DR Roadmap. These areas are:

- Dispatch of Demand Resources
- Data Management
- Settlement of Demand Response Activity
- Demand Response in the Planning Process
- Forward Price Signals for Demand Response

Each section includes a table that identifies items and actions for the retail environment and for the wholesale environment. This material was assembled from a variety of sources. These include MADRI's initiatives, recommendations from PJM Symposium on Demand Response, state commission demand response working groups, PJM's Demand Side Response Working Group, and the NARUC/FERC demand response collaborative.

We propose that the MADRI Steering Committee endorse this *Demand Response Roadmap* as the starting point for coordinated retail/wholesale efforts to grow demand response market participation.

II. Dispatch of Demand Resources

Dispatchable demand response resources based on location or price have significant value in reducing peak demand and the overall cost of serving load. Market design discussions at the PJM Demand Side Response Working Group recognize the value of dispatchable demand resources. Retail markets are recognizing the value of deploying technology that automates response for the customer and enables more granular deployment of demand resources that impact congestion, costs, and reliability.

Figure 2. Coordination of Dispatch Activities

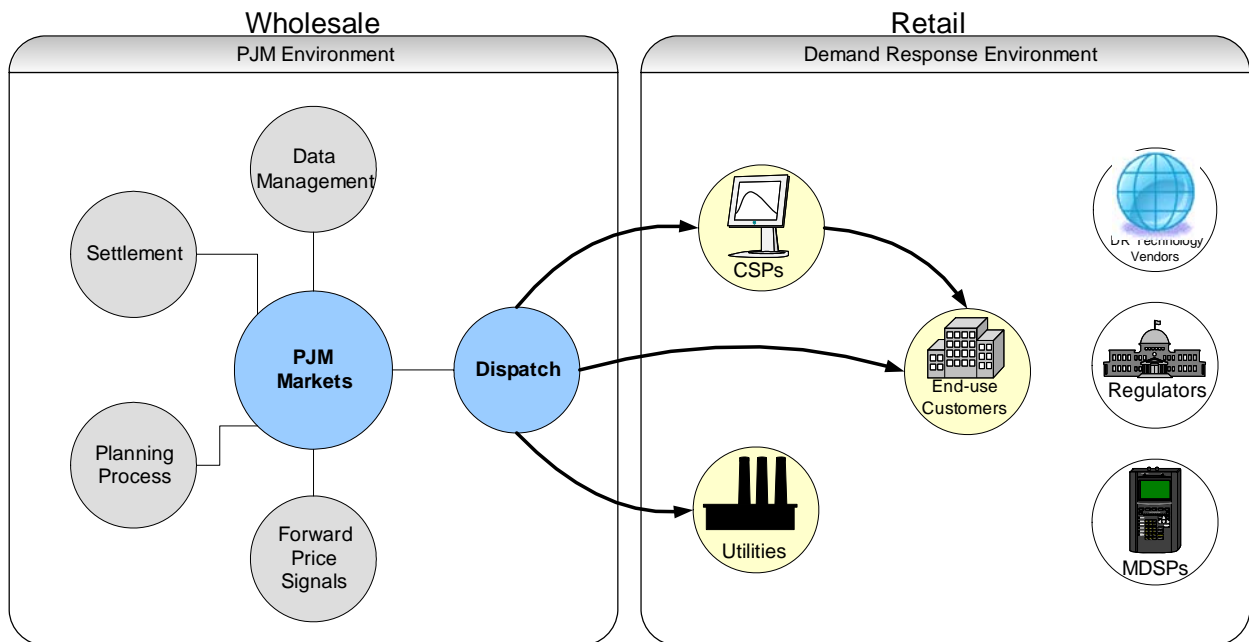


Table 2. Dispatch Considerations by Market

WHOLESALE	RETAIL
<ol style="list-style-type: none"> 1. Enable Real Time availability for both economic and emergency Demand Resources 2. More reliable economic demand resources in Real Time 3. Real time Unit Dispatch System dispatch of DR 4. Implement nodal dispatch of Demand Resources in Real Time and for emergencies by identifying nearest 115kv and above node name 5. Maintain a voluntary, self-schedule Real Time Energy market option for Demand Resources 	<ol style="list-style-type: none"> 1. DR that is dispatchable based on price and location 2. Region wide measurement and verification protocols 3. Decoupled distribution rates or alternative for distributor to recover revenues lost as the result of demand response 4. Critical Peak Pricing/other retail rates more aligned with LMPs 5. Retail rate design that provides customers with real savings opportunities (not revenue neutral) 6. AMI deployed 7. Standard interconnection standards and rules for distributed generation

III. Data Management

Better management of customer data including usage data will be key to speeding up wholesale payments for demand reduction activity. The unambiguous right of customers to their own usage, demand and related data as well as the ability to give access to the data to designated entities at a reasonable cost must get immediate retail market focus.

Figure 3. Coordination of Data Management

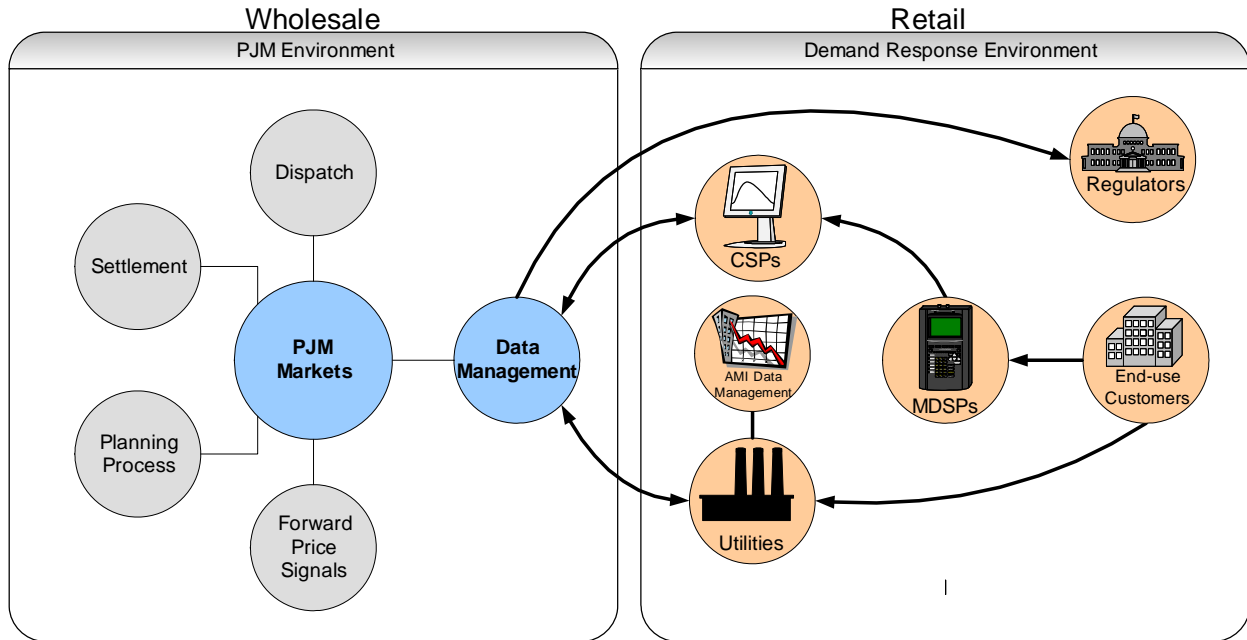


Table 3. Data Management Considerations by Market

WHOLESALE	RETAIL
<ol style="list-style-type: none"> 1. Direct data management by PJM <ol style="list-style-type: none"> a) Enable the aggregation of Demand Resources b) Consider proper interface between eLoad Response and eMarket c) Load Response application enhancements including hourly availability of DR and speedier settlements d) EDC provide directly key customer information 2. Management of data provided directly to PJM electronically <ol style="list-style-type: none"> a) Develop Meter Data Service Provider (MDSP) certification standards b) Determine the appropriate communication technologies for meeting the business need to obtain real market data 3. Status quo provision of data to PJM by CSPs for subsequent review by utilities (EDCs and LSEs) 	<ol style="list-style-type: none"> 1. End-use customer and authorized agents unambiguous right to meter data at reasonable cost 2. Metering devices requested by CSP on behalf of customers installed within 10 business days 3. Meter data directly accessible by PJM and CSP at least daily 4. Standard EDI transactions developed to accommodate full market participation by Demand Resources 5. Minimize stranded cost of AMI deployment 6. Shorter more appropriate depreciation rates for meter data management software

IV. Settlement of Demand Response Activity

Better coordination of customer usage data between the retail and wholesale markets will speed up the payment to and ensure the accuracy of payments made to CSPs for the demand reduction activity of customers. Adopting region wide measurement and verification standards including customer baseline calculation standards for price responsive customers will significantly reduce the capital and operating costs of CSPs competing to serve customers.

Figure 4. Coordination during the Settlement Process

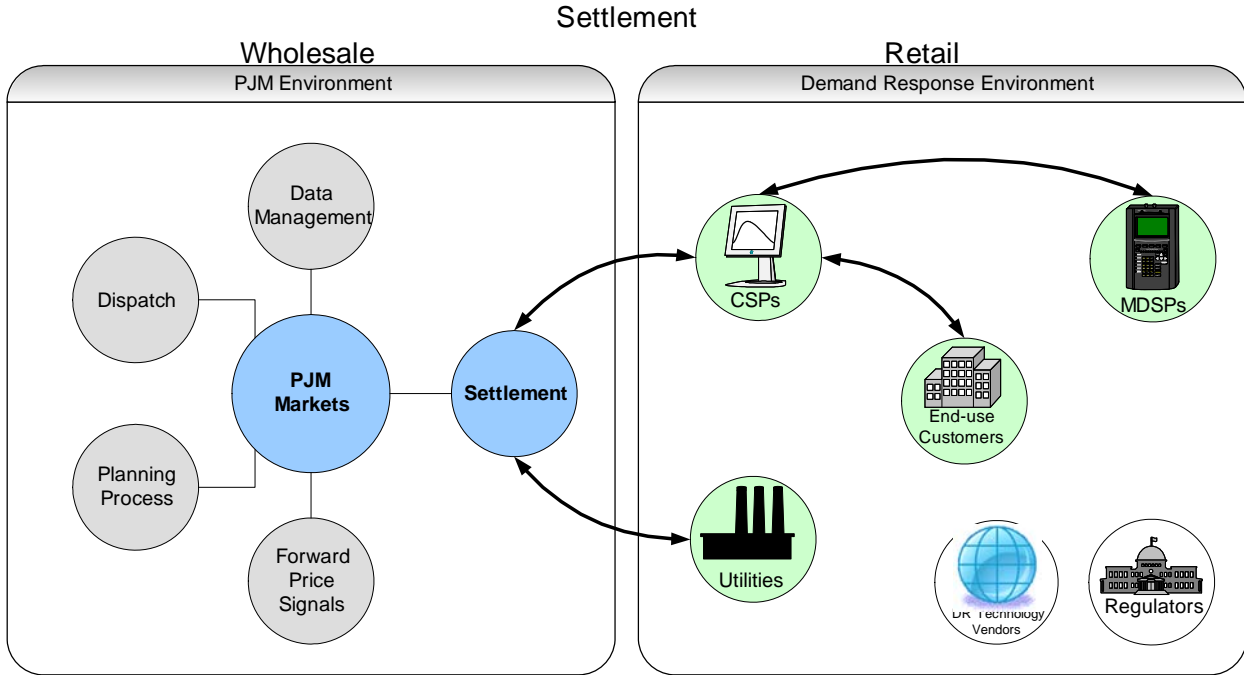


Table 4. Settlement Considerations by Market

WHOLESALE	RETAIL
<ol style="list-style-type: none"> 1. Speed up settlement for demand reduction 2. Automate the settlement adjustment process 3. PJM calculates the CBL 4. PJM direct access to meter data based on regional standards for communications protocols 	<ol style="list-style-type: none"> 1. Codification of end-use customer's right to sell unused electricity 2. Codification of customer baseline (CBL) calculation and rules 3. Cost effective and timely (daily) access to meter data 4. No longer need to routinely review CBL and settlement (spot checks to verify MDSP standards maintained)

V. Demand Response in the Planning Process

Transmission planning must communicate effectively to the market the quantity and location of demand response and generation resources that could replace or delay the need for transmission enhancements. Conversely transmission plans and regional load forecasts must include the impacts of existing and planned Demand Resources in a timely and accurate manner.

Figure 5. Coordination during the Planning Process

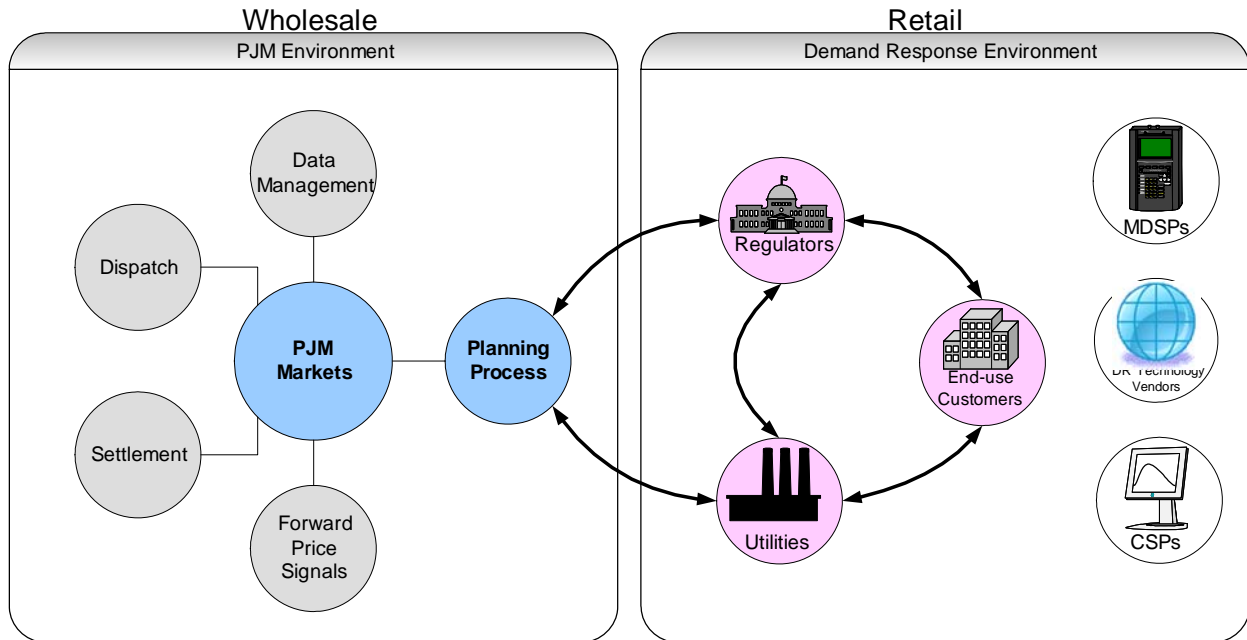


Table 5. Planning Process Considerations by Market

WHOLESALE	RETAIL
Integrate DR into RTEP and Economic Transmission processes by: <ol style="list-style-type: none"> 1. Publishing DR needed as temporary/permanent substitute for transmission enhancements 2. Developing queue for Planned DR 3. Including planned DR in annual update of the Load Forecasts 	<ol style="list-style-type: none"> 1. Product tests to measure system impact value, and customer acceptance before broad deployment 2. Update load data that reflects the impact of Demand Resources including planned DR 3. Implement resource procurement strategy that includes economically viable DR 4. Build infrastructure for quick to market DR

VI. Forward Price Signals

Forward price signals for Demand Resources as well as generation resources are critical to entities making investments in DR infrastructure development and deployment. Establishing a region wide DR goal will also galvanize CSP activity and assure that no part of the region unfairly benefits from the DR growth in other parts of the region. The scale and scope benefits of a coordinated region wide DR goal will also reduce the unit costs incurred by CSPs to deploy modern, automated DR technology.

Figure 6. Coordination of Forward Price Signals

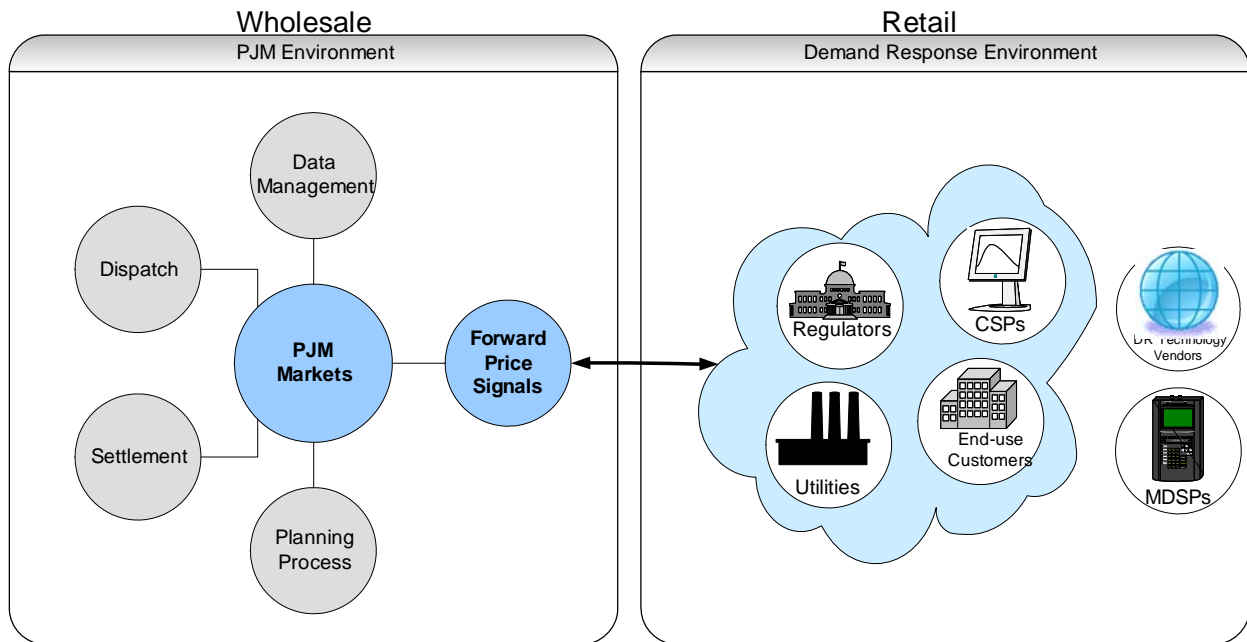


Table 6. Forward Price Signals Considerations by Market

WHOLESALE	RETAIL
<ol style="list-style-type: none"> 1. Reliability Pricing Model for emergency/reliability 2. Capture maximum forward capacity market value for energy efficiency 	<ol style="list-style-type: none"> 1. Establish a regional (MADRI) DR goal of 3% 2. RFP for "virtual peaking capacity" 3. Portfolio standards with a requirement for Demand Resources