



## **SECTION 3: DR RESOURCE BASE**

After you have established what you hope DR will do for your market, by way of the project goals and work plans, it would be a good idea to understand how others have utilized DR as resource. There are many different ways to design DR projects. It's even possible that no two projects are exactly the same because of unique differences in market designs and project rules. But we can make a reasonable attempt to group the efforts into three broad categories: Reliability/Emergency Products, Economic/Voluntary Products, and Time of Use/ Real Time Pricing Products.

### **Reliability/Emergency Products**

These products are designed towards providing operational reserve capacity. They tend to be utilized when the power grid, or specific grid zones, face emergencies such as serious congestion problems or pending brown/ blackout.

In many cases, consumers that provide DR through these products are generally provided with some sort of reservation payment. The type of payment can take a number of forms depending on the market and the goals of the DR aggregation firm (e.g. LDC, retailer, demand response provider). For example, some places offer standby capacity payments and/or operating reserve payments because their market structures allow for these, where other places may offer consumers a reduced energy rate throughout the year because they don't have visible markets.

The reservation payment provides the consumer with an incentive to enroll because they can quickly begin to receive benefits for enrolling. Depending on local market conditions, these reservations payments have sometimes exceeded \$100,000 USD / MW-Year at the high end and in other markets \$60,000 USD / MW-Year at the low end. In exchange for the reservation payment, the participating consumer generally gives someone the ability to call/dispatch the reliability/emergency products when needed. If the consumer does not perform as expected/ contracted when called, they tend to be subject to penalties ranging from a forfeiture of the reservation payment to liquidated damages based on market conditions during the event. If these products are designed well, they can be liquid and tradable financial products.

### **Economic/Voluntary Products**

These products are designed to impact demand elasticity and therefore, hourly energy prices. With these products, consumers make decisions on whether to sell their demand response capability based on hourly energy price signals.

These products are being used in day-ahead markets and intra-day markets. The consumer tend to have fixed energy consumption rates throughout the year, but when

market price signals are deemed economic, they can opt to sell their DR capability during those specific hours. Participating consumers tend to be compensated by receiving some percentage of the market value for the hour(s) they provide the service. These products also tend to put the decision making for whether to participate or not in the hands of the consumer. If the consumer deems that the incentive to participate in a given hour relative to their implementation and opportunity costs is great enough, they participate. If otherwise, they do not.

With these products, consumers generally either bid their capability, either directly or through an aggregator/service provider, into the energy market or they operate as a price taker (i.e. accept the prevailing price at the time). There are pros and cons to both options that will need to be considered when designing these products.

### Time of Use / Real-Time Pricing

These products are designed to impact demand elasticity and hourly energy prices like the economic products described above. The main difference is that above products tend to allow the consumers to sell DR services into the market and these products tend to subject consumers to the market (or some proxy to it) every hour of the year. The consumer then decides whether it wants to use power, versus sell a reduction, based on the price signal.

Task XIII is creating a database of DR programs and some performance characteristics. The database will provide a quick reference resource to project participants. It will describe key product characteristics such as participant eligibility requirements, compensation structures, and operating characteristics. The database will also provide performance information such as the number of participants, available capacity and program expenditures (all subject to availability). This database will evolve and grow as more information is gathered from markets around the world.

This table illustrates the performance of a few selected projects. It should be noted that many markets, including the ones noted above, offer multiple DR products to its customer base. For example, the New York ISO had another 226 participants enrolled in its voluntary program with an available capacity of approximately 800 MW. By developing multiple products, the market increases its ability to attract more participants.

| Market                       | New York ISO (USA)                    | Cinergy (Ohio, USA)              | ISO New England (USA)             |
|------------------------------|---------------------------------------|----------------------------------|-----------------------------------|
| Product                      | Emergency Demand Response - 2003      | PowerShare -2003                 | Price Response -2003              |
| Product Category             | Emergency/Reliability                 | Economic/Voluntary               | Economic/Voluntary                |
| Number of Participating      | 1111<br>(311 DG, 800 load shedding)   | 531<br>(1 DG, 530 load shedding) | 330<br>(34 DG, 296 load shedding) |
| Available Capacity           | 579 MW<br>(278 DG, 301 load shedding) |                                  | 116<br>(55 DG, 61 load shedding)  |
| Market Peak Demand           | 30,983                                | 12,336                           | 25,384                            |
| DR percentage of Peak Demand | 2%                                    | 1.40%                            | 0.45%                             |

### Participating Consumers

One of the things a good business case must consider is what a good target participating

consumer might look like. When evaluating this issue, we assumed we were the sales manager at a service provider and we needed to send out our sales team into the market with the objective of achieving the best possible “return on investment” (ROI). We needed to identify where our sales staff: (1) meets with the most likely customer candidates to say “yes” and (2.) meets with candidates who are most likely to be able and willing to participate at a substantial demand reduction level.

We anticipated that the “best candidates” might have somewhat different characteristics for economic/voluntary products vs. emergency/reliability products however we wanted to determine specifically what some of those differences are and attempt to document/ quantify them to the degree possible. Bottom line we are attempting to answer the dual questions of who should our sales force focus on (who are the most likely candidates to say yes) and who are the candidates that will participate in both price response and demand response based DR programs at the highest levels.

We see an iterative process – once we have better identified who the “best candidates” are and we understand more about their characteristics, we can begin to better determine how they respond to price or other types of incentives and thereby hopefully achieve greater DR program cost effectiveness in the future.

Unfortunately, customer participation and other related demographics information is both limited and scattered. There also is a lack of standardization as regards the ways that DR program information is collected and reported. Furthermore, the vast majority of published DR program studies that we reviewed focused on program features and benefits versus bottom line results (kW signed up, kW interrupted and how much was paid out on a \$/Kw basis – e.g., program cost effectiveness).

Because many, if not most, commodity supplier DR programs have not been assessed or evaluated, we have drawn our preliminary conclusions as to “best DR customer candidates” based on relatively limited but fairly well documented information. We did find a relatively high degree of correlation between the findings of the various published evaluations that we reviewed which leads us to feel comfortable that our preliminary findings are on target.

The below “Best DR Candidate” information is drawn from several sources with particular credit being given to two published studies:

1. Do “Enabling Technologies” affect Customer Performance in Price Response Programs of May 15, 2002 by Lawrence Berkeley National Laboratory (LBNL) and Pacific Northwest National Laboratory (PNNL) which surveyed customers who participated in the CEC (California) and NYSERDA (New York) demand response programs.
2. A customer survey done by ISO New England regarding their 2003 demand response programs as reported in a presentation by Henry Yoshimura, Manager Demand Response.

**I. “Best DR Candidate” Characteristics – for both price response and demand response**

## **DR programs:**

- A majority have fewer than 1,000 employees; and a substantial number have less than 100 employees.
- Electricity costs represent greater than 5% of their total operating costs.
- A majority have made investments in energy efficiency in the past five years and have prior experience with time-of-use, interruptible or real-time rate structures.
- Approximately half have energy management systems in place.
- A majority employ a variety of conservation and operational strategies with their pledged curtailments as a fraction of facility peak demand being relatively low – under 5%.
- Almost all customers rely on manual approaches to curtailment events, rather than automated responses.
- Having an installed base of back-up generation provides an important load curtailment resource – which is somewhat restricted for DR program purposes due to environment constraints.
- The most commonly reported load reduction measures were: reducing lighting load by turning off banks of lights, and reducing cooling load by resetting thermostats. Other common load reduction strategies focused on facility specific large individual loads, such as air compressors and large pumps.
- A majority spend less than 10% of their time buying and managing energy.

## **II. Load response vs. Price response and “Best DR Candidate” Considerations**

Note: The following findings are from the ISO New England Customer Survey concerning their 2003 load response and price response programs.

- Price program: 30% of the MWs, 70% of the customers.
- Demand programs: 70% of the MWs, 30% of the customers.
- Have back-up generation capability\*: 70% of demand response customers, 45% of price response customers. \*Environmental permitting issues limit the use of many if not most generators to use for “emergency conditions” only.

## **III. “Best DR Candidate” Major Motivators:**

- Financial incentives/saving money
- Help avoid blackouts
- Energy software/advanced meters/better access to electricity use information
- Programs are voluntary

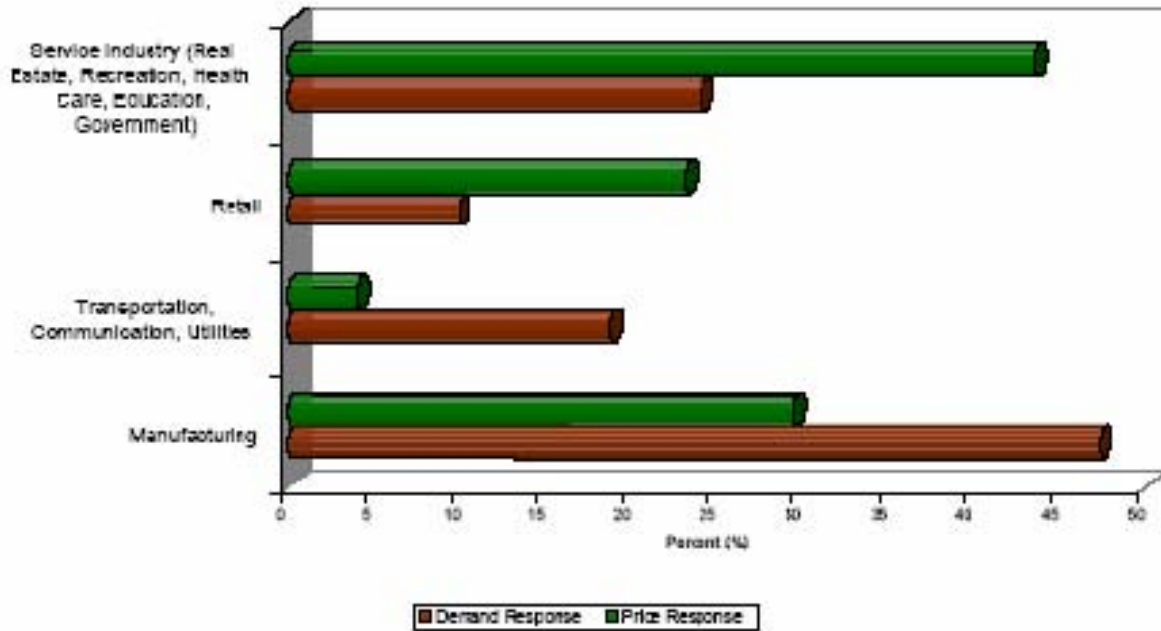
## **IV. “Best DR Candidates” by Industry Type & Changes Made to Reduce Electricity Use**

The Lawrence Berkeley National Laboratory, the Northwest National Laboratory and the ISO New England studies credited above, found heavy participation in DR enabling technology

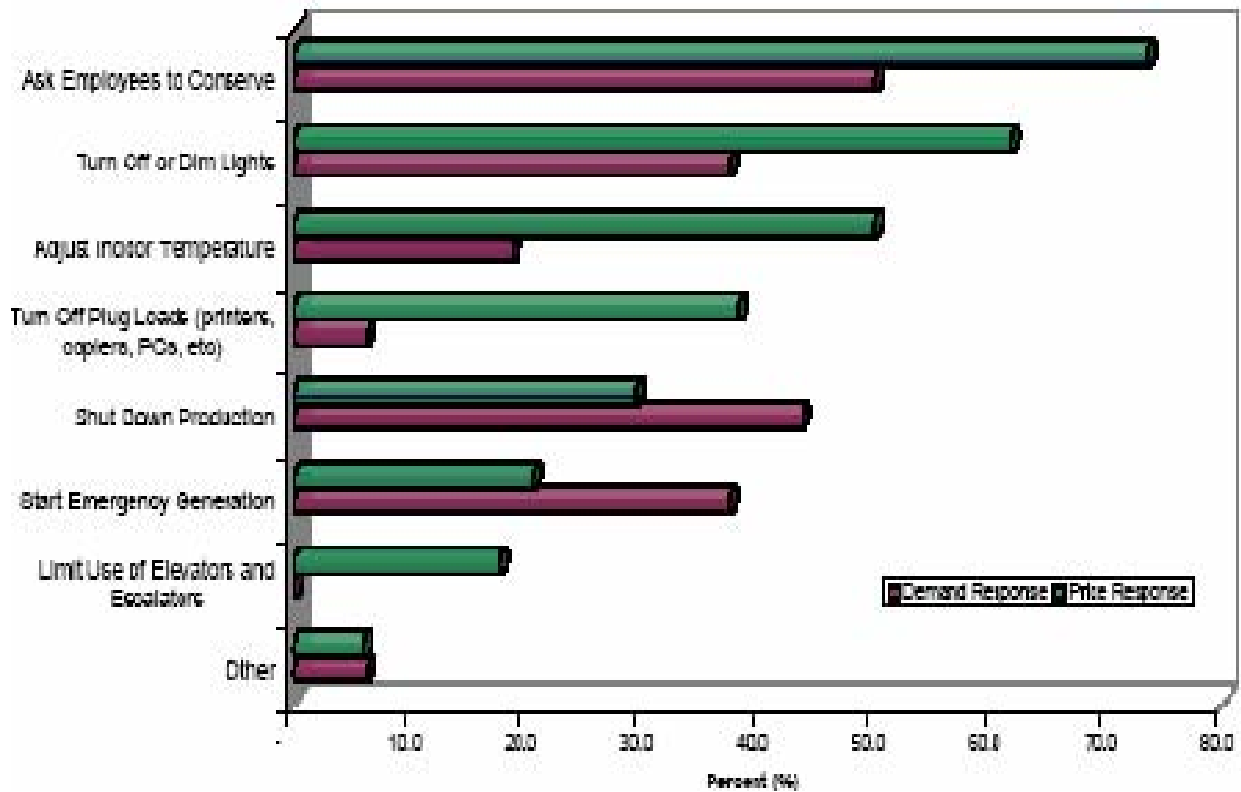
programs from industrial and governmental customers.

The tables on the following page are from the ISO New England customer survey results. The first table compares the percentages of demand response participants to price response participants for each industry type, and the second table indicates what changes customers made to reduce electricity use.

### Customers by Industry Type



### Changes Customer Made to Reduce Electricity Use





## **V. DR program enhancements needed to attract more “Best DR Candidates”**

Various studies and program experiences have shown that customers typically require compensation which significantly exceeds their electricity bill savings realized from curtailing electricity. DR program incentive structures need additional examination and possible restructuring to encourage more customers to participate. Additional study is also needed to determine additional new and/or modified incentive forms.

Most DR programs require load curtailments of 100 kw and greater. These requirements limit participation by medium to smaller sized customers who represent a considerable portion of the market opportunity. It is anticipated that many mid to smaller sized customers perhaps closely fit the profile of our “Best DR Candidates” – just on a more limited scale. Many DR programs set forth a limited array of options for customers to participate. It would appear advantageous to consider offering a broader array of DR programs with customized options for very large customers - it is common for energy providers to design rates for individual large customers or small groups of large customers because of their unique load characteristics.

There is a need for additional customer education. Many customers need information on how the various DR program and pricing options work and how specifically they can benefit before they are willing to participate. Conducting “walk-thru” assessments with the “Best DR Candidates” is one proposed option to consider. As a further step, this Task XIII project will continue to search out and review various demand response program studies for use in further refining the preliminary “Best DR Candidate” proxy outlined in this document. As part of this study area, a particular focus will be given to trying to better understand the benefits, impacts and costs to customers (by industry type) from participating in DR programs.

Further more, it is anticipated that new software and technologies - especially in the areas of controls and metering equipment - currently on the drawing board or in preliminary states of commercialization will change both the current short-term and long-range dynamics. We intend to stay abreast of these areas and factor any relevant changes into our “Best DR Candidate” profile(s).

### **Country Comparison Data**

The following information is provided to give the reader a feel for basic market information from each country. This information will be helpful when we consider some benchmarking analysis later.

**Number of Customers**

|             | <b>Commercial</b> | <b>Industrial</b>        | <b>Residential</b> | <b>Other</b> |
|-------------|-------------------|--------------------------|--------------------|--------------|
| Australia   | 1,220,046         | (Included in Commercial) | 7,749,047          |              |
| Denmark     | 374,600           | 30,200                   | 2,569,900          |              |
| Italy       | 3,700,000         | 1,600,000                | 28,100,000         |              |
| Japan       | 450,000           | 300,000                  | 76,000,000         |              |
| Norway      | 260,000           | -                        | 2,000,000          |              |
| Netherlands | 300,000           | 20,000                   | 6,000,000          |              |
| USA         | 15,277,434        | 595,319                  | 116,448,459        | 1,041,821    |

**Peak Demands**

|             | <b>Commercial</b>     | <b>Industrial</b>      | <b>Residential</b>     | <b>Other</b>       | <b>Total</b>               |
|-------------|-----------------------|------------------------|------------------------|--------------------|----------------------------|
| Australia   |                       |                        |                        |                    | 62,848 (S)<br>55,167 (W)   |
| Denmark     | 1,949 (S)<br>2304 (W) | 2,675 (S)<br>2,694 (W) | 1,505 (S)<br>3,048 (W) | 452 (S)<br>457 (W) | 6,200 (W)                  |
| Italy       |                       |                        | 10,700 (W)             |                    | 53,105 (S)<br>53,403 (W)   |
| Japan       |                       |                        |                        |                    | 175,000 (S)<br>138,000 (W) |
| Norway      | 6,000 (W)             | 5750 (W)               | 6,700 (W)              | 4600 (W)           | 23,050 (W)                 |
| Netherlands | 4,166 (W)             | 4,166 (W)              | 4,166 (W)              |                    | 12,500 (W)                 |
| USA         |                       |                        |                        |                    | 729,013 (S)<br>611,478 (W) |

.(S) = Summer

.(W) = Winter

### Reserve Margins

|                    | <b>Target</b>                                       | <b>Current</b>  | <b>Future</b>   |
|--------------------|---|---|---|
| <b>Australia</b>   | Largest generation resource in the region           | Meets targets   | Most regions will see shortfall by 2005/2006  |
| <b>Denmark</b>     | 5500 MW   | Up to 620 MW in Western Denmark and 600 MW in Eastern Denmark | Positive national reserve margin still expected in 2007/08  |
| <b>Italy</b>       |   | 3000 MW (not counting interruptible customers)                | Currently short on reserves. There were 128 days listed above average critical levels during a four month period. |
| <b>Japan</b>       |   | 11.2% in 2002   | 11.1% in 2012   |
| <b>Norway</b>      | Largest generation resource in the region           | Instantaneous: 313MW<br>Slow Reserve: 2000MW                  | Expected to be in balance due to functioning option market for reserves.  |
| <b>Netherlands</b> | 5-10%   | 5-10%   | Expected to exceed required reserve margin  |
| <b>USA</b>         | Varies by region; set by local reliability councils | National average is 18.4% in 2004                             |   |

**Energy Market Snapshot**

|                    | <b>Central Exchange</b>  | <b>Products</b>  | <b>DR Opportunity</b>   |
|--------------------|--|--|---|
| <b>Australia</b>   | Yes (NEMMCO)   | Day ahead Ancillary services Spinning reserves No capacity markets   | Multiple attempts and product designs currently in place  |
| <b>Denmark</b>     | Yes (NordPool)   | Day ahead Forward & Futures Balancing Power by (Aug 2004)  | Several pilot efforts including residential load control and consumers with backup generation bidding into reserve markets  |
| <b>Italy</b>       | Yes (GME)  | Day ahead Balancing market for reserves and energy   | TOU rate structures for customers >500KW plus about 3500 MW of interruptible customers  |
| <b>Japan</b>       | No   | Bilateral exchange only  | Strong DSM promotion using TOU rates and energy efficiency equipment upgrades   |
| <b>Norway</b>      | Yes (NordPool)   | Day ahead Balancing market for reserves and energy   | Consumers can bid into the Reserve Option Markets   |
| <b>Netherlands</b> | Yes (APX)  | Day ahead 15-min spin reserve Long term bilateral OTC  | No formal market mechanism for DR to participate in the markets   |
| <b>USA</b>         | Yes and no (multiple markets, some have exchanges and some are bilateral only) | Depends on the particular market. Various places have the following:<br>Capacity Day ahead Hourly energy Several types of reserves Balancing markets | Many attempts particularly in the Northeast (ISO-NE, NYISO, PJM) and California. Other notable efforts include Southern Company's RTP, Cinergy, ComEd & Xcel Energy's interruptible programs. |

## Project Homework Assignment

Take a snapshot of your marketplace by collecting the following information:

Marketplace peak demand info:

1. Total peak demand for the marketplace
2. Peak demand for major customer classes—residential, commercial, and industrial. Commercial and industrial could be grouped together if necessary
3. Summer and winter peak demand by customer class if available

Rate and revenue info:

1. Standard rate structure and average rates for each class
2. Total revenue by class

Service area and customer information:

1. List areas served
2. Identify heating and cooling degree days for the major customer center(s)
3. Identify the number of customers by customer class by service area
4. Explain any defining characteristics of their customers and load characteristics, such as residential air conditioning saturations, key commercial market segments, and the nature of their industrial base. The latter would include key market segments, and whether the overall industrial load is mostly heavy industrial or light industry

DR program/rate info:

1. Describe DR programs/rates offered
2. Number of participating customers in each (segment load shedding and onsite generation)
3. Total DR MW enrolled in each, and how estimated, (segment load shedding and onsite generation)
4. Estimate the market saturation level of each program/rate is (best estimate)

## **TASK XIII: MARKETPLACE OVERVIEW**

### **Background:**

In October 2003, the Executive Committee of the International Energy Agency (IEA) Demand Side Management Program approved a new project, entitled Task XIII. Twelve countries agreed to participate in the project, with the USA (via the US Department of Energy) in a lead role.

The objective of the project is to deliver necessary methodology, business processes, infrastructure, tools and implementation plans that will facilitate robust demand side participation in participating country electricity markets. The project will produce a “State of the Practice” database, economic valuation tools, and methods to enable participating countries to implement demand response into their market structures.

The objectives of the IEA DRR Project are to:

1. Identify and develop the country-specific information needed to establish the potential for demand response.
2. Perform the market and institutional assessments within participating/member countries needed to set realistic goals for the contribution of DRR to sector objectives.
3. Mobilize technical and analytic resources needed to support the implementation of DRR programs within participating/member countries and track their performance.

### **Marketplace Overview Form Objective:**

The enclosed questionnaire will provide the Operating Agent (OA) with a brief overview of each participating county’s marketplace structure and demand response history. This will help the OA better understand the similarities and differences amongst the countries participating in Task XIII. This request is not intended to be an in depth research project. It is simply intended to be a brief overview to provide basic facts and understanding that can orient the project team and help share basic information across participants.

The OA will use the information develop thoughtful and thought provoking questions during the data gathering phase of the project.

***The following Marketplace Overview Form is organized utilizing a question and answer format. We have attempted to provide sample responses to each question so that you can see the type and depth of information desired.***

***There are three categories of questions:***

- 1. Electric Industry:** Basic overview of market structure and market actors.
- 2. Demand Response:** Basic overview of demand response efforts.
- 3. Market Transactions:** Basic overview of electricity market transactions.

We have provided a form with sample answers to guide you as complete the document.

### **Marketplace Overview Process:**

**Step 1:** Please complete the enclosed form and email it to [rmalme@retx.com](mailto:rmalme@retx.com) by May 31, 2004. We realize that some questions may ask for data that are not readily available, and that some questions may not apply to certain countries. In this step 1, we are requesting that you fill out the “market overview” as best as you can, then in Step 2 we will contact you by phone to discuss any missing elements or questions that were difficult to interpret.

**Step 2:** We will schedule a brief telephone call with each country expert to review your response to ensure understanding. These calls will take place during the first two weeks in June.

### **Project Representative and Contact for this Overview:**

Name:

Country:

Phone:

Email:

Date Prepared:

### **Section I: Electric Industry**

1. Does your country operate as one national electricity marketplace or do you have multiple regional electricity marketplaces?
2. If you have multiple regional marketplaces, how many exist in your country? Please explain.
3. What market actors perform the following functions in your marketplace: (Please list and briefly describe)
  - a. Generation:
  - b. Transmission:
  - c. Distribution:
  - d. Retail customer services:
  - e. Reliability management:
  - f. Other (please describe):
4. What market actors’ work directly with the retail consumers (e.g. distribution company, competitive suppliers, energy service companies, etc.)? Please provide brief description of their roles.

5. Please list key regulatory players and their roles.
6. Please list key industry stakeholder groups (e.g. large customer associations, reliability organizations, trade associations, etc.)
7. How many commercial, industrial and residential customers exist in your marketplace (add additional customer classes, e.g. agricultural, as needed)?
8. How many distribution companies operate in your marketplace? Please list the top five largest distribution companies.

| <b>Customer Class</b> | <b>Number of Customers</b> | <b>Summer Peak Demand (MW)</b> | <b>Winter Peak Demand (MW)</b> | <b>Annual MWHs</b> |
|-----------------------|----------------------------|--------------------------------|--------------------------------|--------------------|
| Commercial            |                            |                                |                                |                    |
| Industrial            |                            |                                |                                |                    |
| Residential           |                            |                                |                                |                    |

**Number of Distribution Companies:** \_\_\_\_\_

| <b>Largest Distribution Companies</b> | <b>Number of Customers</b> | <b>Summer Peak Demand</b> | <b>Winter Peak Demand</b> |
|---------------------------------------|----------------------------|---------------------------|---------------------------|
|                                       |                            |                           |                           |
|                                       |                            |                           |                           |
|                                       |                            |                           |                           |
|                                       |                            |                           |                           |
|                                       |                            |                           |                           |

9. If you have retail competition, how many competitive suppliers exist in your marketplace?



10. If you have retail competition, what percentage of the summer and winter peak demands do competitive suppliers supply?

11. What is the forecasted peak demand growth rate in your marketplace?

12. What is the projected supply (capacity) growth rate in your marketplace?

## **Section II: Demand Response**

13. Has demand response been attempted in your market? If so, please provide brief description of relevant successes and challenges.

14. Which market actors might be most supportive of demand response in your marketplace? Please explain why.

15. Which market actors would be the most likely to offer demand response services to the consumer? Please explain why.

16. Can demand response resources participate in electric market transactions today? If so, how?

17. What are the most important objectives for demand response? Please explain.

18. Do energy consumers see different electricity prices at different times of the day? (Please explain in terms of how many and by class or size)

19. Have any energy efficiency and/or a demand response market potential studies been completed in your marketplace in the last ten years?

YES / NO

If yes, please provide a reference location or attach the report.

## **Section III: Market Transactions**

20. What type of electricity products traded in your marketplace (e.g. 5-minute spinning reserve, 30-minute non-spin, day ahead, capacity, hourly energy/spot, etc.)?

21. Do you have a central trading exchange in your marketplace?

22. How are reserve margin targets established in your marketplace? Please explain.

23. What is the current reserve margin target in your marketplace?

24. Does your market currently exceed or fall short of the current reserve margin target? Please

explain.

# TASK XIII: MARKETPLACE OVERVIEW

## SAMPLE ANSWERS

### Project Representative and Contact for this Overview:

Name: Pete Scarpelli  
Country: Task XIII Operating Agent Project Team  
Phone: (312) 559-0756  
Email: [pscarpelli@retx.com](mailto:pscarpelli@retx.com)  
Date: May 19, 2004

### Section I: Electric Industry

1. Does your country operate as one national electricity marketplace or do you have multiple regional electricity marketplaces?

*The USA might say: The USA has multiple marketplaces. Some have formal trading exchanges with centralized dispatch and some operate as traditional vertically integrated utilities with bilateral exchanges and regional reliability counsels.*

2. If you have multiple regional marketplaces, how many exist in your country? Please explain.

*The USA might say: It is a little difficult to give an exact number of marketplaces because all areas of the country are not formally grouped. Formal regional system operators exist (ISO-NE, MISO, NYISO, ERCOT, CA ISO). Other regions such as the Southeast, the Pacific Northwest, and the Southwest operate on a coordinated basis, but they do not have centralized electricity markets or centralized system operators. These regions tend to operate on bilateral exchange with each utility responsible for its own control area dispatch.*

3. What market actors perform the following functions in your marketplace:  
(Please list and briefly describe)

*The USA might say that these market actors play some roll in the following areas:*

*a. Generation:*

- i. There are vertically integrated utilities, municipal utilities, and cooperative utilities that own generation.*
- ii. There are independent power producers (IPP) that build generation plants "on spec".*
- iii. Some end use customers own co-generation plants*

*iv. Many end users have back up generators for emergency purposes*

*b. Transmission:*

*i. There are independent transmission companies that just own the transmission wires.*

*ii. There are vertically integrated utilities, municipal utilities, and cooperative utilities that own transmission lines.*

*iii. In some areas, the system operator is responsible for managing power flow over the transmission lines.*

*c. Distribution:*

*i. There may be a few exceptions, but all distribution lines are owned and maintained by the local distribution company (whether vertically integrated or not), municipal utility, or cooperative utilities.*

*d. Retail customer services:*

*i. Retail competition exists in some states throughout the country. If so, customers receive commodity service from either the local utility or a competitive supplier.*

*ii. If retail competition does not exist, then the customer receives commodity service from the local utility.*

*e. Reliability management:*

*i. All market players have some roll to ensure a reliable grid, but some have more defined roles than others.*

*ii. If there is a regional system operator in the market, this entity is generally responsible for grid reliability.*

*iii. If there is not a system operator in the market, the local utility generally manages its own control area and regional standards are set by the regional North American Electric Reliability Council (NERC – [www.nerc.com](http://www.nerc.com)).*

*f. Other (please describe):*

4. What market actors' work directly with the retail consumers (e.g. distribution company, competitive suppliers, energy service companies, etc)? Please provide brief description of their roles.

***The USA might say:*** Retail consumers receive services from a number of different entities. If retail competition does not exist, then the customer receives commodity and distribution services from the local utility. If retail competition does exist, the consumer could receive commodity service from a competitive supplier and distribution services from the local distribution company. Billing services may be bundled with one of these two firms or it might be provided from both of them separately.

*There are hundreds (if not thousands) of various energy service companies. These firms*

*provide things like lighting, heating-ventilation-air conditioning (HVAC), etc. Some utilities and competitive suppliers offer these services as well. In some areas of the country, the USA also has private businesses that are designed to provide curtailment/demand response services directly to end users.*

5. Please list key regulatory players and their roles.

**The USA might say:** *Federal Energy Regulatory Commission (FERC): Responsible for all transmission system transactions.*

*US Department of Energy: Primary mission is to advance the national, economic and energy security of the United States; and promote scientific and technical innovation in support of those goals.*

*State Regulatory Commissions: Responsible for all distribution system transactions.*

*North American Electric Reliability Council: Responsible for setting reliability standards. National and local Environmental Protection Agencies: Responsible for establishing and enforcing environmental standards.*

6. Please list key industry stakeholder groups (e.g. large customer associations, reliability organizations, trade associations, etc.)

**The USA might say:** *Large energy users – They have associations at the Federal (ELCON), state and local levels.*

*Electric Utilities – The Edison Electric Institute represents utilities in many matters.*

*State Regulators – The National Association of Regulatory Utility Commissioners represents regulators on key issues.*

*Competitive Electric Providers – The Power Marketers Association represents competitive entities marketing electricity to retail customers.*

*Technology Companies – Metering, software and enabling technology companies are represented by a variety of associations including the American Metering and Recording Association (AMRA); controls companies are represented by ESCO organizations (NAESCO),*

*Environmental Interests – They are represented by the U.S. EPA and by various publicly funded organizations such as the Sierra Club.*

*Customer Groups – They are represented by the National Association of State Consumers Counsels.*

7. How many commercial, industrial and residential customers exist in your marketplace (add additional customer classes, e.g. agricultural, as needed)?

The following numbers are arbitrary, but indicative of the response we are seeking:

| Customer Class | Number of Customers | Summer Peak Demand (MW) | Winter Peak Demand (MW) | Annual MWHs |
|----------------|---------------------|-------------------------|-------------------------|-------------|
| Commercial     | 4,000               | 15,000                  | 14,000                  | 105,000,000 |
| Industrial     | 2,000               | 20,000                  | 20,000                  | 148,000,000 |
| Residential    | 1,000,000           | 18,000                  | 12,000                  | 90,000,000  |

8. How many distribution companies operate in your marketplace? Please list the top five largest distribution companies.

**The following numbers are arbitrary, but indicative of the response we are seeking:**

Number of Distribution Companies: 150

| Largest Distribution | Number of Customers | Summer Peak Demand | Winter Peak Demand |
|----------------------|---------------------|--------------------|--------------------|
| <i>Electric Co 1</i> | <i>10,000,000</i>   | <i>25,000</i>      | <i>18,000</i>      |
| <i>Electric Co 2</i> | <i>8,000,000</i>    | <i>20,000</i>      | <i>22,000</i>      |
| <i>Electric Co 3</i> | <i>7,000,000</i>    | <i>18,000</i>      | <i>18,000</i>      |
| <i>Electric Co 4</i> | <i>5,000,000</i>    | <i>16,000</i>      | <i>15,000</i>      |
| <i>Electric Co 5</i> | <i>4,000,000</i>    | <i>12,000</i>      | <i>10,000</i>      |

9. If you have retail competition, how many competitive suppliers exist in your marketplace?

*A sample answer: There are many competitive suppliers in various parts of the country. The exact number is unknown, but it is probably in the range of 75-200 different companies.*

10. If you have retail competition, what percentage of the summer and winter peak demands do competitive suppliers supply?

*A sample answer: The answer to this question will vary depending on the state in question. As a general rule, competitive suppliers serve between 30-60% of the peak demand. However, they more than likely do not serve the same proportion of customers given that most retail competition is focused on commercial and industrial users.*

11. What is the forecasted peak demand growth rate in your marketplace?

*A sample answer: This depends on the region in question, but the range is approximately between 2-4% per year.*

12. What is the projected supply (capacity) growth rate in your marketplace?

*A sample answer: This depends on the region in question. It is also difficult to be precise because not all planned generation is actually completed. The range is approximately 1-3% per year.*

## **Section II: Demand Response**

13. Has demand response been attempted in your market? If so, please provide brief description of relevant successes and challenges.

*A sample answer: Yes. Some commodity suppliers have offered time of use pricing products. In addition, some marketplaces have designed demand response solutions that allow demand response resources, by way of some market participant (e.g. utility, demand response aggregators, competitive retail supplier), offer the demand response to the market as a “supply” resource. When these programs are utilized they show direct benefits to the market and they have been growing on a year-by-year basis. However, they have not reached critical mass yet. Some have argued that this is because the compensation for participation is too variable thereby making it difficult to develop long-term business cases.*

14. Which market actors might be most supportive of demand response in your marketplace? Please explain why.

*A sample answer: Distribution companies and competitive suppliers have generally been supportive because they have direct relationship with consumers. Some distribution companies have even begun to use demand response for things like grid congestion and substation cost management. Both of these market actors also use demand response strategies to help mitigate supply portfolio risk.*

*Consumers, particularly large consumers, are in favor of demand response because they see it as a way to manage their total energy expenditures. Their interest tends to increase if they have clearly identified discretionary loads, properly permitted onsite/ back-up generation, or they interconnected grid is in an emergency mode.*

*Some areas of the country have even seen the creation of demand aggregators. These firms aggregate up demand response resources as a way of creating “virtual power plants”. They manage these resources in a similar way that an Independent Power Producer might manage their portfolio.*

15. Which market actors would be the most likely to offer demand response services to the consumer? Please explain why.

*A sample answer: For the reasons noted in number 14, utilities, competitive suppliers and demand aggregators would likely offer demand response services.*

16. Can demand response resources participate in electric market transactions today? If so,

how?

**A sample answer:** Yes. There are established market rules that allow a market participant (e.g. distribution company, competitive supplier, demand aggregator) to sell demand response into the electric market just like other generation resources. The market rules establish the requirements for selling into the capacity, operating reserve and energy transactions. The market rules spell out response requirements, usage data submissions, and settlement processes. The market rules can be located at ([www.website.com](http://www.website.com)).

17. What are the most important objectives for demand response? Please explain.

**A sample answer:** Our country is interested in demand response as way to balance supply prices. We also think demand response resources are relatively inexpensive generation sources if properly managed and integrated into the market.

18. Do energy consumers see different electricity prices at different times of the day? (Please explain in terms of how many and by class or size).

**A sample answer:** This does occur, but it depends on the market. Some markets publish hourly price signal that can be seen by all market participants while some other markets do not have the same capabilities. In areas that do not have published hourly prices, some distribution companies have established time of use rates that are offered to the consumer on a day ahead or intra-day basis.

19. Have any energy efficiency and/or a demand response market potential studies been completed in your marketplace in the last ten years? Yes/No

If yes, please provide a reference location or attach the report.

**A sample answer:** Our national research laboratory has published an energy efficiency study in recent years. It can be located at ([www.website.com](http://www.website.com)). Several utilities have performed private analyses, but these are not publicly available.

We are not aware of any demand response market potential studies for our country.

### **Section III: Market Transactions**

20. What type of electricity products traded in your marketplace (e.g. 5-minute spinning reserve, 30-minute non-spin, day ahead, capacity, hourly energy/spot, etc.)?

**A sample answer:** The actual product being traded has some variation depending on the marketplace in question. However, as a general rule our country trades spot energy, 5-minute spinning reserve, 5-minute non-spinning reserve, 30-minute operating reserve and day ahead hourly energy. We also have several derivations of capacity markets.

21. Do you have a central trading exchange in your marketplace?

**A sample answer:** We have several marketplaces in our country. Some marketplaces utilize central trading exchanges and some operate almost entirely on a bilateral basis.



22. How are reserve margin targets established in your marketplace? Please explain.

*A sample answer: The system operator, in cooperation with the government, set reserve margin requirements. These requirements are updated annually. The requirements are based on expected supply and demand growth, projected weather conditions and grid constraints.*

23. What is the current reserve margin target in your marketplace?

*A sample answer: The reserve margin target varies by region, but it generally runs between 16-22%.*

24. Does your market currently exceed or fall short of the current reserve margin target? Please explain.

*A sample answer: This depends on the region in question. Some areas are expected to have over capacity for the next five years, while other areas are will operate on very tight margins this summer.*

# NOTES