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# Demand Response Program Design Preferences of Large Customers: Focus Group Results from Four States

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**June 19, 2006**

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## Acronyms and Abbreviations

ACC	Arizona Commerce Commission
ACE	Atlantic City Electric Company
APS	Arizona Public Service
CPP	Critical Peak Pricing
DG	Distributed Generation
DOE	Department of Energy
DR	Demand Response
EMS	Energy Management System
ESCO	Energy Services Company
ISO	Independent System Operator
LBNL	Lawrence Berkeley National Laboratory
LSE	Load Serving Entity
OAT	Otherwise Applicable Tariff
PJM	Pennsylvania Jersey Maryland (a Regional Transmission Operator)
RTO	Regional Transmission Operator
SCADA	System Control and Data Acquisition
SRP	Salt River Project
TEP	Tucson Electric Power

## 1. Introduction and Executive Summary

This report presents findings from focus groups conducted with customers from six electric utilities on how to make demand response (DR) programs more “customer-friendly” and accessible for large commercial and industrial electricity users. Participants were asked how to make demand response programs easier and more appealing for customers to participate in and moderate their electricity use and to provide their suggestions on program designs or features that would be attractive.

In 2004, demand response potential was about 20,500 MW or 3% of total U.S. peak demand (DOE 2006). Federal and state policymakers, utilities, and ISO/RTO, and customer representatives have recognized that increased load participation and response is a crucial element of well-functioning and efficient wholesale and retail electricity markets. To facilitate that objective, this research was undertaken to ask target participants in the large commercial/industrial market whether, and what, changes in the design of current demand response programs might improve customer participation. To that end, this research effort gave target customers an open forum to discuss their perceptions about the core elements of demand response programs that were more likely to attract their participation.

The Nexant team conducted six focus groups with 45 customer representatives from 41 different commercial and industrial customers in Arizona, Delaware, New Jersey and Illinois during a twelve month period (November 2004 – November 2005). These customers offered a number of important insights and suggestions, including:

- Many aspects of current DR program design make it difficult for customers to participate successfully. While the relative importance varies by customer segment, some of the most notable program features that discourage program participation are:
  - Program designs with fixed load reduction requirements (with penalties for inadequate load reduction) that are difficult to comply with over a sustained period;
  - Tariff elements such as power factor correction penalties and non-time-differentiated demand charges that penalize the customer for effective demand response;
  - Limited information about the expected duration of the demand response need, which would help the customer plan facility or enterprise operations more effectively;
  - For multiple facility and public sector customers, participation rewards such as electricity bill credits offer little value to the individual site or operation reducing its load;
  - Insufficient financial incentives to justify the customers’ DR capital investments that would enable program participation; and
  - Lack of technical assistance offerings (e.g., engineering analysis, metering technology, or more timely metering data availability) that would help to increase the customers’ ability to analyze their DR capability and increase their “comfort level” in participating in programs.
- Most current DR programs are regimented, with set parameters and incentives that offer limited flexibility or options for customers. DR programs designed to meet customers’ needs would have more flexibility, with a menu of DR payment options and incentives related to a menu of DR contributions (and desired attributes/operations parameters) by the customer.

To make this happen, customers need the entity trying to acquire DR resources (e.g., a utility, grid operator, retailer, DR aggregator) to quantify the value associated with different levels of DR response (e.g., level of reduction, speed of response, advance warning,). The entity acquiring DR resources should also include a matrix of program features, operational requirements (e.g., DR event parameters), enablers (e.g., advanced meters and timely load data) and incentives, so each customer can pick the mix that best suits its abilities and needs while also meeting the sponsor's DR requirements.

- There are non-traditional benefits associated with DR program participation that customers would value, which tend to vary somewhat by market sector. Some that would entice customers to participate include:
  - Good corporate citizenry recognition
  - Technical assistance
  - Technology-related incentives, that are flexible and reflect potential needs to supplement the participant's in-house DR engineering expertise; this could include assistance in procuring and creating useful energy information systems
  - More timely meter read data availability
  - Group purchasing involvement to gain increased economies of scale with certain types of common utility-oriented commodity purchases. Several larger customers (e.g., industrial and educational campus facilities, military bases, etc) have electric switchgear and other grid components on their side of the meter. They could benefit by participating in the utility industry's in-house equipment procurement clearinghouses, whereby common items (i.e., transformers, fuses, trucks, and the like) are purchased in bulk.

The focus group findings indicate that industrial and commercial electric customers want to tailor their participation in DR programs in ways that better reflect the technical and operational needs of their businesses. If DR sponsors offer customers more flexible DR programs, this could expand participation within these customer segments and increase the benefits of DR for the sponsoring organization, the power grid, and wholesale electric markets. However, to effectively design this new breed of DR programs, DR sponsors and policy-makers will have to better understand the costs and benefits of DR in three specific ways: 1) quantifying the value of differing DR options, 2) building and managing DR portfolios, and 3) expanding technical and customer service offerings.

### Organization

The balance of this paper is organized as follows:

- Section 2 describes the research approach;
- Section 3 reviews the focus group results and key findings;
- Section 4 offers recommendations for policy-makers and aggregators of demand response resources;
- Appendix A includes summaries of the six focus groups that were completed at Arizona Public Service, Salt River Project, Tucson Electric Power, Delmarva Power, Atlantic City Electric, and Ameren.

- Appendix B includes materials utilized for the focus groups (i.e., a DR primer and project description sheets provided to participants and the focus group facilitators' guide).

## 2. Research Approach

Several approaches were considered to study DR program design features that would be attractive to customers: literature reviews, customer surveys, focus groups, and workshops. Based on input from a Project Advisory Team composed of representatives from the U.S. Department of Energy, Federal Energy Regulatory Commission, and LBNL, it was decided to conduct a series of focus groups with large, non-residential customers in several states/regions.<sup>1</sup> The Nexant team conducted outreach to utilities and state regulatory commissions in selected states that met criteria established by the Project Advisory Team in order to ascertain their interest and willingness to collaborate in the research project and provide customer contacts for focus groups.<sup>2</sup>

Arizona was selected as the locale for conducting the initial set of focus groups, in light of established relationships with Arizona industry stakeholders, on-going demand-side management proceedings before the Arizona Commerce Commission, and heightened customer awareness of DR concepts due to transmission substation fires that occurred in summer 2004 and the resulting infrastructure constraints.

After the completion of three focus groups in Arizona, three additional focus groups were conducted in Delaware, New Jersey, and Illinois. This group of four states gave the research a more diverse mix of customer participants and experience – states with and without Independent System Operators (or Regional Transmission Organizations) operating wholesale markets and DR programs, with and without retail competition, with varying levels of DR penetration. Figure 1 illustrates the relationship of the four states along two of these dimensions. The focus groups in several other selected states also allowed us to expand representation and obtain additional inputs from a wider array of C/I market sectors (e.g., chemicals, automotive industry, metals, hospital and healthcare, petrochemicals).

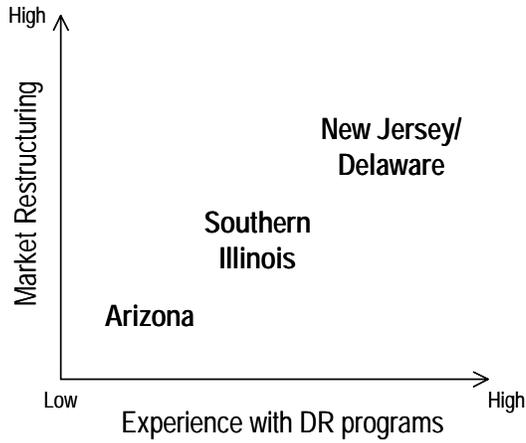
The research team received assistance from electric utilities, regulatory commissions, and stakeholder groups to identify and recruit appropriate focus group participants.<sup>3</sup> We worked with utility staff to identify candidate end-use customers and the appropriate customer representative to invite to the focus group (e.g. their influential decision-shaper in terms of energy matters). Customers were targeted with peak demands of at least 1 MW demand and likely to have some capability to shift or curtail load based on their type of business. Focus group participation included a variety of end-use segments, including chemicals, automotive industry, metals, university academics, healthcare, petrochemicals, and municipal water pumping.

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<sup>1</sup> Focus groups were attractive for several reasons: 1) it allowed for direct interaction with end-users, 2) moderate costs, and 3) the focus group process is highly replicable with reduced ongoing costs per group based upon the established structure, facilitator's guide, and support materials.

<sup>2</sup> Selection criteria included: 1) the sample of electric utilities and states should reflect the range of U.S. regulatory and market structures, 2) geographic balance, 3) focus on states and utilities that have not conducted large-scale or recent DR market research efforts, 4) where possible, work with utilities and state PUCs where market research can assist an ongoing or planned regulatory proceeding or utility planning process in the DR area.

<sup>3</sup> The utilities were assured that the focus group ground rules for participants would indicate that the DR program designs discussed or proposed would not be binding upon the host utilities.



**Figure 1 – Customer Experience with DR Programs, By State**

Table 1 shows the types of customers that participated in each of the focus groups. Forty-five customer representatives (primarily relative senior “decision influencing” plant, facility, or corporate Energy Managers) participated in the events, representing 41 different companies.

**Table 1 – Focus Group participants**

<b>Focus Group</b>	<b>Date</b>	<b>Attendees</b>
Arizona Public Service (APS)	November 30, 2004	<ul style="list-style-type: none"> <li>▪ High school district</li> <li>▪ University</li> <li>▪ Commercial property management firm</li> <li>▪ Hi-tech manufacturing firm</li> <li>▪ Building materials company</li> <li>▪ Water utility</li> <li>▪ Industrial manufacturing firm</li> </ul>
Salt River Project (SRP)	December 1, 2004	<ul style="list-style-type: none"> <li>▪ School district</li> <li>▪ Mining company</li> <li>▪ Grocery store chain</li> <li>▪ Industrial manufacturing firm</li> <li>▪ Transportation equipment firm</li> <li>▪ Insurance agency data center</li> </ul>
Tucson Electric Power (TEP)	December 10, 2004	<ul style="list-style-type: none"> <li>▪ City government facility</li> <li>▪ Water utility</li> <li>▪ Regional water agency</li> <li>▪ Federal government facility</li> <li>▪ Mining company</li> <li>▪ Building materials firm</li> <li>▪ Large federal facility</li> <li>▪ Hi-tech manufacturing firm</li> <li>▪ Manufacturing (controls) firm</li> <li>▪ Copper mining company</li> </ul>
Delmarva	November 15, 2005	<ul style="list-style-type: none"> <li>▪ Financial service firms</li> <li>▪ Automotive manufacturing firm</li> <li>▪ Industrial real estate firm</li> <li>▪ Pharmaceuticals company</li> <li>▪ Food manufacturing</li> <li>▪ Chemicals/consumer products</li> <li>▪ Chemicals</li> </ul>
Atlantic City Electric	November 16, 2005	<ul style="list-style-type: none"> <li>▪ Entertainment &amp; consumer electronics company</li> <li>▪ Aluminum packaging company</li> <li>▪ Food processing</li> <li>▪ Government research center</li> </ul>
Ameren	November 29, 2005	<ul style="list-style-type: none"> <li>▪ Equipment manufacturing firm</li> <li>▪ Insurance company</li> <li>▪ Building materials firm</li> <li>▪ Steel manufacturing company</li> <li>▪ University</li> <li>▪ Healthcare services firm</li> <li>▪ Industrial gas production company</li> </ul>

### 3. Key Findings

Most of the customers who participated in the focus groups had either some knowledge of DR concepts or direct experience in DR programs. The same process and questions were used to conduct the focus groups in Arizona (APS, SRP, and TEP customers), Delaware (Delmarva customers), New Jersey (Atlantic City Electric customers), and Illinois (Ameren companies: Central Illinois Light Company, Central Illinois Public Service, and Illinois Power customers). This created a common structure across all the focus groups, while allowing spontaneous discussions to arise in each group.

This section first reviews the dominant conclusions voiced by customers across all six focus groups, next looks at focus group-specific comments, and last outlines the suggestions that customers offered for how to design demand response programs that would better meet their needs and concerns.

#### 3.1 Customers' Primary Concerns about Demand Response Program Design

DR program attributes were identified based on the key topics and areas of customer interest raised during the general discussion portion of each focus group. At the end of each focus group, the participants were asked to vote for the two most important, and the one least important, factors affecting their willingness to participate in a demand response program. The specific DR program attributes voted on by each focus group varied slightly among the focus groups. Although each group voted on a somewhat different (albeit similar) slate of issues, they all voted on seven common program attributes, as shown in Figure 2.<sup>4</sup> These are the integrated results of customer voting across the six focus groups, representing 45 customers from 41 different companies.<sup>5</sup>

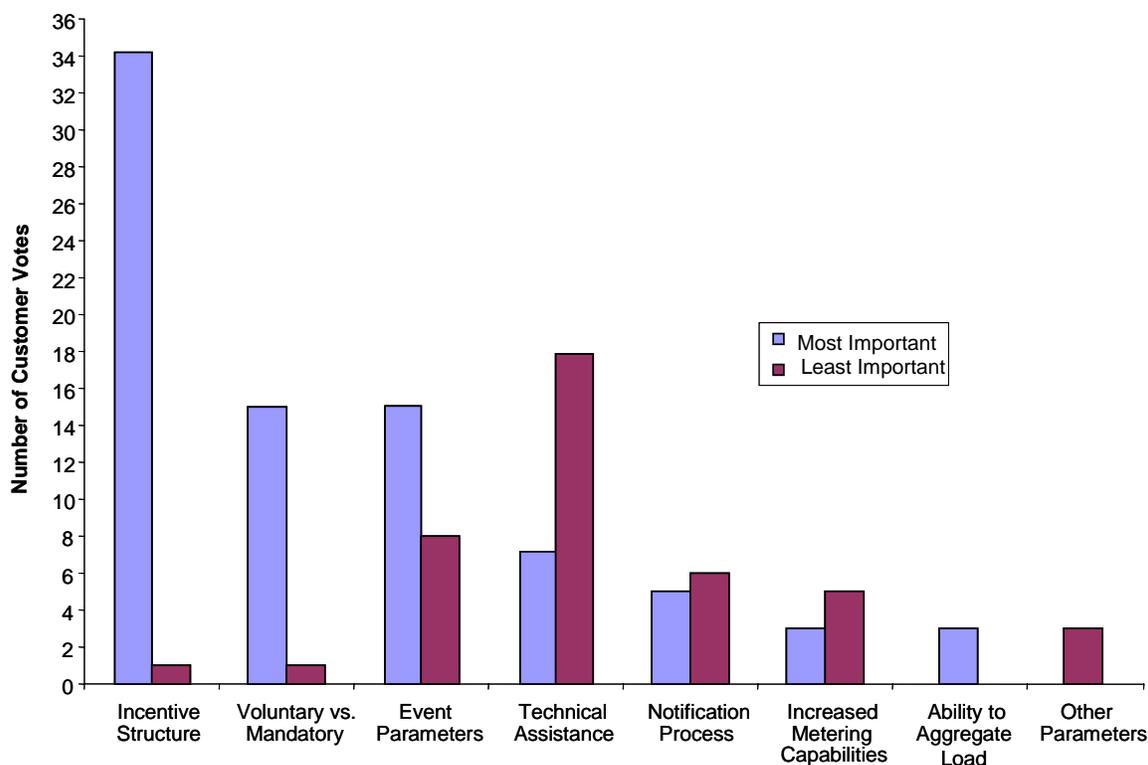
The various attributes, and customers' concerns about them, are discussed below.

Incentive Structure: The manner in which a DR program offers incentives is a key issue for customers, and was ranked as one of the most important factors by approximately 80% of focus group participants. High customer voting for incentive structure was driven by two factors: 1) customers want compensation for their DR participation that is commensurate with their effort and risk levels, and 2) customers want a menu of options for payment. This includes direct payment methods such as receiving bill credits or checks from utilities/program sponsors (preferred by some private sector firms) or more indirect options, such as creating specialized rebate programs or revolving fund mechanisms that help customers finance investments in DR systems (preferred by some governmental or non-profit customers). Some customers also expressed an interest in receiving benefits in the form of lower year-round electricity tariffs.

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<sup>4</sup> Voting procedures varied slightly by focus group and individual customer. For example, although the majority of customers voted for two "most important" program attributes, some opted to select only one attribute. In general, this reflects that the main intent of asking customers to vote on various program related items was to help them determine their top program attributes and priorities.

<sup>5</sup> One company arrived late for a focus group session and was interviewed at a later date on the phone. This company was not included in the tally of customer voting results.



**Figure 2 – Integrated Focus Group Voting Results on DR Program Attributes**

As Delmarva participants expressed it, monetary savings are the primary driver of their potential participation in a DR program—both at the corporate level and the facility level. Many of the participants stated that competition among corporate facilities is often more fierce than with outside competitors. The competition is based on cost and profit margin and centers on which plants are higher in the queue for capital investment upgrades, or for avoiding plant closure notices. For several Ameren customers with energy costs at 30-40% of their total operating costs, reducing their energy bill is the single largest motivator to participating in a DR program.

In terms of the level of incentives, several private sector participants indicated that they would want to see benefits that represent at least 10-15% of their annualized bill to warrant management’s attention at the corporate level and in exchange for the DR program’s impact on their business and the associated workload and hassle factor.<sup>6</sup> Governmental entities indicated that incentives equating to something less than 5% of their annualized bills would still warrant consideration. These customers’ self-report of their desired financial savings from participation in DR programs seems to be higher than actual bill savings reported from most DR programs.

A number of customers stressed that the provision of an adequate level of monetary savings needs to be combined with a flexible structure of payments that directly benefit the load-reducing facility (rather than some distant corporate parent). In their opinion, too often while the local

<sup>6</sup> This is based on comments from six focus group participants that work for private sector firms. In general, it is indicative of their desire for programs to offer complementary economic incentives, either for DR incentives only or DR in conjunction with energy efficiency incentives.

facility staff take on the responsibility and hassle of complying with a DR program's event parameters, it is the corporate (or non-profit) mother ship that gains the reward for their efforts, with little to no trickle-down of the benefits. This led one group to suggest a creative idea, somewhat analogous to the "S&H Green Stamp" program, whereby the involved facility staff earn "credits" redeemable and funded by the DR program sponsor for approved DR investments in the local plant.<sup>7</sup>

Voluntary vs. Mandatory: Fifteen customers (or ~35% of focus group participants) indicated that the voluntary versus mandatory distinction is very important – but customers attach different meanings to the distinction. Some customers feel strongly that all programs should be voluntary—specifically, that they don't want to be forced to participate in demand response through a mandatory (default service) program (e.g. as discussed in the TEP, Delmarva, Atlantic City Electric and Ameren focus group summaries). But others voted for this attribute because they want to have some voluntary elements mixed into traditional mandatory programs, including flexibility in terms of how to reduce load (e.g., demand bidding type programs) and no front-end enrollment cost.

Customers also drew a distinction between the specific types of voluntary programs in which they would be willing to enroll. Most customers would be willing to voluntarily enter into a contract with a utility to shed a certain amount of demand during a designated number of annual program events. However, some customers preferred a more flexible type of voluntary program that lets end-users opt in for a given amount of load shedding that is determined on the day of an actual event. Both preferences reflect customers' preferences for DR programs that offer increased flexibility.

Event/Program Parameters: This item received a lot of attention from voters in all six focus groups, in part because it covers an umbrella of issues relating to event duration and timing of required load reductions—event frequency, event duration, amount of advance notification, notification process, and how many consecutive events may occur. Although the facilitators initially assumed that all of these parameters were closely related, every focus group discussion revealed that specific parameters were so important that they should be treated as independent program design attributes (as evidenced below by the fact that "notification process" became an attribute voted on, and by the comments summarized in Table 2, section 3.2). Thus, by the time voting occurred in each focus group, the "event parameters" category had been narrowed down to two main areas of customer interest: 1) the duration of DR program events, and 2) the customer's ability to have some degree of flexibility regarding the exact block of time in which they might be asked to shed load.

With respect to the duration of a single event (how long an end-user would be required to shed load), blocks up to six hours long were acceptable to most customers.<sup>8</sup> In terms of events on

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<sup>7</sup> This concept is somewhat akin to Utah Power's Self-Direct Program, where large individual industrial customers "self-direct" how their substantive Systems Benefit Charge contributions are spent on energy efficiency projects within their own facilities.

<sup>8</sup> In one case, a high tech customer indicated that they would comply with an ISO/utility request to curtail load for any length of time in the same manner, which would be to switch over service to their back-up generators for a full 24 hours. This would be to take advantage of their pre-established system "tweak" opportunity that is scheduled for 7:00 pm each day. From that point on, their systems run full-on for the next 24 hours.

consecutive days, most participants were comfortable with two to three days, while some indicated four days as possible. However, some focus group participants (building materials and steel manufacturing firms) indicated that holding events on consecutive days could be problematic since they operate their production lines on a “just-in-time” delivery basis, which would be compromised by prolonged outages.

Many customers expressed a desire to have more discretion over the exact block of time when they will be called to shed load. For example, rather than being “on call” during the entire peak demand season, some customers want to be able to select a limited number of “confirmed service” weeks in which they would not be asked to shed load, knowing that doing so could increase the likelihood of being called in other weeks and potentially lower incentive payments. A facility manager at a large university wants to avoid being called to shed load during class registration week in late August (when parents are on campus), while a corporate energy manager at a financial services firm would be unable to reduce demand during the holiday season of November through December (due to the holiday season credit card crunch). This option was referred to as an “opt-in and opt-out windows” for required periods of load reduction.

Customers also want the flexibility to either scale up or scale down load reductions. For example, one industrial customer representative would like to be able to offer utilities a minimum and maximum range of load reduction (e.g., commit to a minimum reduction of 500 kW and a maximum of 1,000 kW) and be paid on a \$/avoided kW. This would let customers better manage making load reductions on consecutive days.

Of the eight customers who voted that event parameters were least important, most had not previously participated in a demand response program (and thus may not appreciate the impact of event parameters upon business operations).

Technical Assistance: There was a sharp distinction between private sector and government/institutional customers regarding the importance of technical assistance. Most of the private sector voters feel that technical assistance is one of the least important elements in a DR program, but many government and institutional customers voted technical assistance as a very important element. However, even though few participants voted for technical assistance as an important item, many of the focus group comments (including from private sector participants) indicated that technical assistance could be a potential motivator to participate in a DR program. During the open discussion portion of several focus groups, many customers expressed an interest in receiving assistance in evaluating DR investment options, equipment, event strategy, and capital budgeting analyses (from an advisor that understands the customer’s specific business and operational processes). This divergence suggests that technical assistance (and education) is likely a more important item than voting results would otherwise indicate.

Notification Process: Focus group participants understood notification process to represent the manner in which they would be notified of a program event. In general, this was not an area of major concern for customers because many modes of notification are acceptable. Focus group participants concurred that, at a minimum, they would need day-ahead notification of a program event. The five votes indicating that notification was a key issue reflect in large part a desire by customers to have as much advanced warning of a program event as possible, delivered directly

to the people in the participating plant. Participants also want the notification system to be tested annually to assure that it is functioning properly.<sup>9</sup>

Increased Metering and Usage Feedback Capabilities: Focus group participants in Delaware and New Jersey stated that having enhanced metering and energy information system data that could provide “near real-time” feedback on electricity usage patterns (i.e., up through the prior day rather than once every billing cycle) would help facilitate their participation in a DR program. In addition, several customers in these two focus groups stated that their facility does not have adequate metering capabilities and that they would be interested in program incentives that facilitated the installation of sub-metering equipment. Customers did not cite this item as a key issue in Arizona or Illinois.

Ability to Aggregate Load: Several focus group participants, in particular Delmarva customers, want to be able to aggregate their DR program load shedding response across multiple plant facilities. Since many customers operate facilities that span multiple utility service territories, this points to potential benefits if ISO-level programs can be offered with better coordination across LSEs.

Other parameters: In the Ameren (Illinois) focus group, participants stated that other program parameters, including receiving high quality customer service from their utility account representative, would be an important factor in their decision to participate in a DR program. One healthcare services firm representative stated that there were several programs in the past that they would not have participated in if their account representative had not provided them with such a high level of customer service and overall support. Participants also emphasized that account representatives should understand *the customers’* business model, not just the utility’s business model.

Although it did not show up in the voting, many focus group members commented on the civic/good corporate citizenry attributes associated with DR program participation.

### **3.2 Specific Findings by Focus Group**

Table 2 (at the end of this section) outlines selected key findings from each focus group. A more detailed summary of customer comments and discussion in the six focus groups are included in Appendix A.

### **3.3 Customer Proposals for more User-Friendly DR Programs**

The open nature of focus group discussions led to the identification of several customer-generated ideas on DR program design:

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<sup>9</sup> The importance of this was highlighted in an anecdote shared by one participant. During their participation in an earlier load management program, the notification was not tested for a number of years. During that period, they updated the telephone system. Following a subsequent LM operation, they were approached by their utility perplexed about why they had not curtailed load, and discovered that the LM operation notification extension on record with the utility now rang in the facility’s parking lot guard shack, which did not respond to or pass on the utility’s recorded message.

- **Creating hybrid initiatives that include voluntary & mandatory DR program elements.** Participants in each of the six focus groups would like DR program alternatives with a mix of mandatory and voluntary options. Many participants see current DR as an “all-in” or “all-out” program, and they don’t immediately think about their discretionary loads. More flexible DR programs that are attractive to particular types of customers might include:
  - Opt-out and opt-in windows: Allow customers to designate a specific block of time (e.g. one or two week period) during the peak demand season in which they *will not be called* to shed load. This type of “opt-out” window was important for customers that have key periods of activity that regularly fall during the peak demand season (e.g., orientation week at colleges and universities). Other focus group participants discussed the inverse of this option, namely allowing customers to designate blocks of time in which they *would be willing* to shed load. The APS focus group discussed this type of “opt-in” program whereby each customer would select a window (e.g., rotating two-week blocks) in which they would be willing to shed a pre-determined amount of load if called on by the utility. Outside of this window, however, the customer would not be required to reduce demand.
  - Tiered incentives tied to the flexibility to scale up or scale down load reductions: Customers would like DR programs to offer the flexibility to either scale-up or scale-down their level of load reduction. This type of program would have an underlying incentive structure with different tiers of payment for different levels of load reduction. Some customers also proposed that incentive payments include a step function that considers both a customer’s level of response (demand reduction) and the number of consecutive days that they are called on (this arose in both the Arizona and Delaware focus groups). This last element could help address problems that some DR programs encounter in securing persistent load reductions during extended stretches of high peak demand.
  - Varying value for DR options: To some extent, customers understand that the value to the grid for these various alternatives would vary. Some customers were aware of the basic premises of the value equation from the grid system perspective relative to timing of availability, commitment to curtail versus opportunity to curtail, repetitive calls to operate, etc.
  - Defining minimum and maximum levels of load reduction: Customers would commit to a designated level of load reduction that ranges between a minimum and a maximum level. For any level of load reduction that customers make within this range, they would be paid on a \$/avoided kW basis. Several customers noted that this feature would enable them to better manage load reductions on consecutive days by trimming back on the load reduction while not falling below the minimum.
- **Designing DR programs that are better aligned with existing tariff schedules.** A number of customers stressed the importance of ensuring that DR programs be designed to acknowledge and complement the participants’ existing end-user tariff structures. In many cases, the current DR programs are offered as optional “riders” to existing tariffs designed for large commercial and industrial customers. As such, DR participants have to comply with all the “host” tariff provisions as well as the DR “rider.” For example, some customers expressed the concern that by participating in DR programs, and then readjusting their loads after a DR event, they could incur added power factor correction penalties. Other customers

noted a similar concern regarding peak period demand charges “backslapping” them when they come off a DR event. SRP customers suggested that participating end-users be exempt from power factor correction penalties during DR program events. Other tariff-related elements that customers recommended be incorporated into DR programs include the use of differentiated as well as discounted demand charges relative to DR program operations.

- **Allowing customers to make better use of distributed/back-up generation units.** A common theme across all six focus groups was that more customers would participate in a DR program if current restrictions on running back-up power generation units were eased. In particular, customers cited environmental regulations that limit the number of hours per year that they can operate their back-up generators. For example, Delmarva customers stated that air regulators’ recent reduction (from 200 to 100 hours) in the number of annual hours for back-up generation use is a major barrier to DR participation.<sup>10</sup> Some customers expressed an interest in DR programs that would exempt the hours that they run their back-up units during emergency periods from counting against their annual allotment.
- **Offering customers a menu of payment options and incentives.** Focus group participants stated that DR programs should give customers the option to be compensated for their participation in a DR program in different ways. Key customer ideas that extend beyond direct payments or bill credits include:
  - Technical Assistance: Some public sector customers were very interested in accessing DR-proficient engineering resources as a portion of their program participation value equation. Several customers also asked for assistance in packaging economic project justification materials to allow the energy manager to better compete in-house for limited corporate capital resources.
  - Rebate programs/discounts on equipment purchases: Several participants in the Arizona focus groups expressed an interest in receiving equipment-specific rebates or vouchers that they could use to purchase equipment that would be of use both in their everyday operations as well as in responding to DR events (e.g., an energy management system, metering systems, or cross-facility energy management systems (or upgrades)).
  - Revolving fund: Focus group participants in Arizona discussed the possibility of having their utility set up a revolving fund mechanism in which customers could accrue savings in relation to their performance in DR program operations. These savings would be held in an account for each participating customer and could then be used to offset (lower) the capital cost of DR-enabling technologies. This would bring direct benefit and value to the specific participating facility rather than some distant corporate account.
  - On-bill financing: Ameren customers expressed an interest in financing DR investments through an on-bill financing scheme. Customers indicated that it would be easier to justify DR investments if they could be rolled into their monthly bill.
  - Incentives for sub-metering: Many of the focus group participants in Delaware and New Jersey stated that without sub-metering, their facility does not have adequate data and consumption tracking resources to analyze potential end-use specific strategies. Several participants would be interested in program incentives that facilitate the installation of

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<sup>10</sup> Similar comments were made by customers in Arizona, New Jersey, and Illinois.

sub-metering equipment, or at a minimum more timely access to their meter data, which currently they only receive at the close of each monthly billing cycle. Customers in this case were sympathetic to the cost associated with actual real-time metering, but would like to have their consumption and demand data accessible within 24 hours of any given day's usage so that they might better assess end-use control opportunities.

- Assistance in procuring equipment or provision of in-kind services: An Atlantic City Electric focus group participant stated that in return for participating in a DR program they would like to have their utility help them procure electric utility-related equipment (transformers, breakers, fuses, etc.). Other focus group participants were intrigued by this idea and talked about options whereby utilities could indirectly allow participating customers to pay the same wholesale/bulk price that utilities pay for equipment, or improving customers' "buying power" of commodity type equipment through inclusion in utility buying pools. A few customers would value utility-provided substation maintenance services for customer-owned electric facilities.
- **Aggregation across service territories but within one ISO.** The focus groups, in particular those conducted in Delaware and New Jersey, contained representatives from companies that operate facilities in multiple states (e.g., one representative from a food manufacturing firm oversees operations at numerous plants and works with over three dozen different energy suppliers). Since many companies operate across different states and utility service areas, they were very interested in receiving credit for the aggregation of load reductions from multiple facilities, particularly aggregating the value of load reductions across utility service territories within a single ISO. This result suggests that ISO programs could be more constructively coordinated across different utilities and load-serving entities within a given ISO.
- **Assign probabilities that customers will need to shed load on consecutive days.** Focus group participants with direct DR program experience expressed frustration with what they perceive as a "nickel and dime" approach that utilities often take to asking customers for load reductions on consecutive days (i.e., rather than being notified of potentially consecutive load reductions in advance, customers often receive no more information than "day-of" requests to shed load). One focus group participant suggested that to avoid this situation, a utility could call participating customers on a day-ahead basis, asking for load on Day 1 and assigning a high, medium, or low probability for needing demand reductions on Days 2 and 3, so the customer can make a more informed decision about the potential impact of consecutive day reductions upon its operations.

To implement these innovative DR program concepts that have appeal to certain customers, the utilities, ISOs, and regulators will have to refine the quantification of value associated with various DR program features and outcomes, to develop a better understanding of the value of load reductions as a continuum rather than an absolute. Such a continuum of values would allow program designers (or load aggregators) to craft a menu of DR options and payments that might include variations along the following parameters:

- Duration of advanced notification
- Voluntary versus mandatory

- Opt-in and opt-out design variations, with minimum and maximum load reduction levels
- Incentive step function for exceeding minimum contractual threshold
- Repetitive set window (first two weeks of alternate months)
- Consecutive days treatment
- Aggregation of load reductions from customers that operate several facilities across multiple service territories but within one ISO.

Given the level of customization desired by customers, it appears that these design parameters (and the value associated with each) would need to be developed by load serving entities and/or third-party curtailment service providers that can aggregate blocks of DR from customers located in multiple utility service territories.

**Table 2 – Customer Comments on DR Program Considerations from the Focus Groups**

	Arizona Public Service	Salt River Project	Tucson Electric Power	Delmarva	Atlantic City Electric	Ameren
<b>Motivators</b>	1) financial incentives, 2) civic duty and public relations benefits, and 3) technical assistance.	1) civic duty & public relations benefits, 2) financial incentives, and 3) technical assistance.	1) civic duty, 2) technical assistance, 3) support in distributed generation permitting, and 4) financial incentives.	1) monetary savings, 2) technical assistance, 3) increased reliability, 4) civic duty, and 5) availability of interval metering data.	1) monetary savings, 2) technical assistance, and 3) assistance in procuring utility-oriented equipment at wholesale (reduced) prices.	1) monetary savings, 2) ease of participation, 3) technical assistance 4) aggregate load across facilities, and 5) highly responsive customer service.
<b>Mandatory vs. Voluntary</b>	End-users understand programs need to have mandatory load reduction elements if they are to be valued to system planners. However, they noted some flexibility is needed at the customer level. Participants identified the following two main ways to increase flexibility for customers: 1) the “opt-in/opt-out” concept and 2) scaling-up or down of load reductions (with concurrent realignment of incentive levels)	End-users acknowledged the need for mandatory load curtailment aspects but noted that voluntary programs that hit on civic duty could be quite successful. Participants discussed the hybrid concept of contractual mandatory programs that include a “rotating window” during which a customer could be called on to shed load. The trade-off would be that customers would carry more of the MW reduction when called upon during those windows, and in exchange not be required to drop load during the balance of the season when it would be someone else’s turn.	There was a 50-50 split among participants as to whether or not it was better to have a voluntary or mandatory DR program. Private sector firms preferred voluntary programs while government entities noted that mandatory programs would be okay given proper incentives.	Participants favored voluntary programs over programs that are based on mandatory (default service) structures. Customers expressed an interest in programs that include: 1) no front-end enrollment costs, 2) voluntary agreements to shed a designated amount of demand, 3) an adequate balance between risk and reward that doesn’t penalize customers too harshly for non-compliance, 4) ability to scale-up or down load reductions, and 5) ability to offer utilities a minimum/maximum level of load reduction.	Given the round-the-clock necessities of their business operations, focus group participants favored voluntary programs and stated that it would be difficult to commit to firm load reductions well in advance of a DR program event.	Majority of customers stated that they would prefer a voluntary type program. General sentiment was that it would be difficult to commit to specific levels of load shedding in advance. Only two customers advocated the use of mandatory programs. Some participants raised the possibility of adopting a hybrid approach that allows customers to sign up for a designated (minimum) level of firm load reductions but have an option for making supplemental reductions that are above and beyond what is promised.
<b>Event Trigger</b>	Customers are not concerned with what triggers an event (i.e., temperature, system load forecast, prior day’s loadings, etc.).	All participants stated that they were not concerned with the actual trigger for a program. However, it was noted that having sufficient advanced notice was key.	Customers were not concerned with the exact trigger that would be used in a program. However, customers are more comfortable with reliability driven triggers.	Duplicative of other comments	Duplicative of other comments	Duplicative of other comments
<b>Event Duration and Frequency</b>	With advance warning sufficient to allow for rescheduling shifts, some customers could be down for longer blocks of time than the typical three to four hours that utilities call for.	Two to four hour blocks of event duration is acceptable. In terms of events on consecutive days, participants felt two to three days would be okay.	Customers stated that participating in events for consecutive days would be challenging but doable. Up to four consecutive days would be okay, provided program requirements were flexible.	Consensus that DR events should be no longer than six hours. Related points: 1) having day-ahead notice of events is key, 2) some customers would rather be off for a whole day rather than a block of time, 3) event notifications should go to the plant, 4) conducting annual program tests is valuable, 5) having events on	Participants noted that, at a minimum, they would need day-ahead notification of an event. Most participants felt that it would be difficult to participate in a program that held events on consecutive days (i.e., hesitancy due to challenges in predicting scheduling and production	Customers stated that, in an emergency, they could shed some load with only a one to two hour notice (or less) but, in general, they would expect to have day-ahead notice prior to program events.

	Arizona Public Service	Salt River Project	Tucson Electric Power	Delmarva	Atlantic City Electric	Ameren
			Customers with large pumping loads said that the maximum time they could shed pumping load was 1-2 hours. Other load segments could be curtailed for longer periods. Water agency customers noted that they might be able to contribute to DR programs if programs capitalize on the different timing of water facility electricity demands	consecutive days is acceptable, but utilities should assign probabilities to the need to call customers, 6) DR programs should have no more than 10 events/year, 7) ability to aggregate load reductions across multiple sites would be beneficial.	needs). Some participants (in particular the government research center) noted that participation on consecutive days might be more feasible if they had better control of specific pieces of energy-consuming equipment.	Participants did not state a specific preferred duration of DR program events. However, they agreed that six to eight hours is a maximum feasible period. Most participants indicated that holding events on consecutive days is possible but challenging.
<b>Program Duration</b>	Participants would like to have programs with a life of 3-5 years with customer commitments renewable on an annual basis.	Duplicative of other comments	Duplicative of other comments	Customers felt that the minimum duration for a program should be three years. It was noted that this amount of time is needed for staff to get up the learning curve on DR as well as to give companies time to earn sufficient savings to payback any DR related investments that they make.	Customers noted that they want certainty across their planning horizon relative to the program incentives being available and paid out so that they could estimate what the incentives impact would be relative to making capital investments in DR technologies. If a third-party aggregator is involved, customers stated that the program length should match the length of the contract that a customer has with a third-party provider.	Customers stated that they would like to see DR programs with a base life of three to five years with options for added duration and a one-year cancellation clause.
<b>Incentive Payments</b>	Suggestions varied by customer type with private sector firms preferring a check or bill credit, while public/government entities noted that bill credits could have the perverse effect of lowering their subsequent year's operating budget.	Government/institutional customers said bill reductions would be problematic and would prefer rebates on the purchase of DR enabling equipment. Private firms were more accepting of bills reductions or checks. A consensus emerged that programs should offer a menu of incentive structures and payment options.	Participants discussed payment structures mainly in the context of financial incentives that could be used to support equipment purchases.	Almost all of the participants wanted to see payments for participating in a DR program as a specified line item credit on their bill. The only exceptions were the financial services firm (who preferred payments by check) and a chemicals firm (who preferred to see benefits in the form of lower tariffs). The majority of customers felt that savings should be quantified on a \$/avoided kW basis.	Participants would prefer payments as a specific identified line item credit on their bill. They felt this would increase the visibility of their participation and financial compensation with internal senior management, and this was viewed as very positive.	Majority of participants stated that they would like to see payments for participating in a DR program in the form of a specific line item credit on their utility bill. Two participants (the building materials firm and the industrial gas production firm representatives) expressed a preference for receiving a check.

**Other Suggestions/Items of Note:**

Revise Host Tariffs: As many DR programs are implemented as riders to tariff schedules, the programs should be in sync with the requirements of the “host” tariffs. For example, customers noted that it would be helpful to incorporate the use of differentiated demand charges into the voluntary DR programs, vis a vis the demand charge structure of the “otherwise applicable tariffs” or baseline tariff. For example, if the otherwise applicable tariff (OAT) has a non-time differentiated demand charge component, and a DR program participant’s demand spikes sometime within four to eight hours after cancellation of the DR event, then the participant can get penalized for participating. If instead, there was a reduced demand charge for say 12 hours following the DR event, then the participant could feel more comfortable in coming back up to full service.

Similarly, some host tariffs have a power factor correction clause. The involved customers were interested in seeing some waiving of power factor correction penalties for participants during program events. They see their power factor correction penalties are relatively high, and foresee the potential of being hit with penalties as a result of their response to a DR program event.

Increase Applicability of Back-up Generation: Many participants noted that they were restricted under their applicable air quality permitting rules in the number of hours and circumstances during which they can run their back-up generation. The participants saw an opportunity to work with the utility to identify strategies whereby they could run the distributed generation units for extended time periods in compliance with a reliability-driven DR program. They also saw this as an area where the utility may be able to work with the participants to influence the air quality management districts to reconsider their position.

Different Perspectives on Capital Investment “hurdle rates”: In a few of the focus groups where both private sector and public sector representatives were present, we identified an interesting parameter in their DR program participation interest level, based on discussion about the range of corporate-level simple payback “hurdle rates” that each of the participants experienced when proposing new capital projects to senior management. For some private sector firms, the simple payback had to be less than two years to warrant management’s attention. On the high end, some governmental participants referenced projects of eight to ten years’ simple payback as within the realm of possibility. This has clear ramifications on how attractive a DR incentive package needs to be to warrant significant attention among senior managers.

#### 4. Implications for Load Serving Entities, System Operators, and Policy-makers

As evidenced by the key findings of the focus groups, customers want the ability to tailor their participation in demand response programs in a manner that reflects the technical and operational needs of their business. Providing customers with an enhanced level of flexibility will help expand program participation levels and maximize the benefits of DR. However, to effectively design this new breed of DR programs and evaluate the associated costs and benefits, load serving entities (LSEs), curtailment service providers, system operators and policy-makers will need to take actions in the main areas listed in Table 3:

**Table 3 – Enhancing the Design of DR Programs: Action Areas**

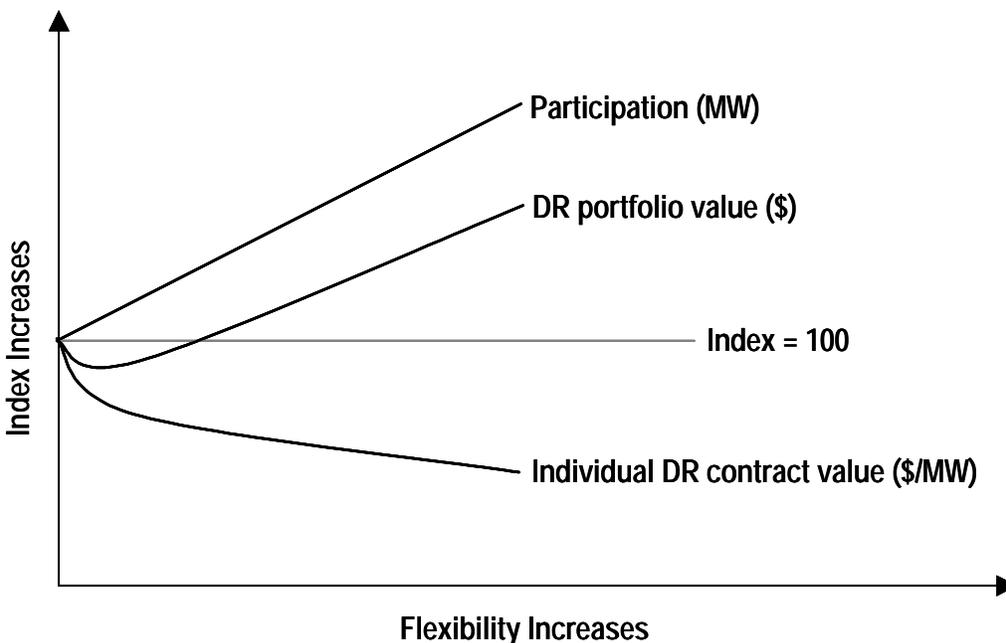
Action Areas	Key Elements
Quantify the value of DR options	<ul style="list-style-type: none"> <li>▪ Valuing customer-defined DR options/offerings</li> <li>▪ Pricing of stand-alone and portfolio-based load reductions</li> </ul>
Construct and manage DR portfolios	<ul style="list-style-type: none"> <li>▪ Mix of voluntary and mandatory contracts</li> <li>▪ Differing size of contracted load reductions</li> <li>▪ “Firmness” of contracts</li> <li>▪ Aggregation of customer load reductions from multiple facilities</li> <li>▪ Variations in season, day, and time period</li> <li>▪ Price levels/tiers</li> <li>▪ Consecutive days of participation</li> </ul>
Expand technical and customer service offerings	<ul style="list-style-type: none"> <li>▪ Flexible mode of payments for participation (e.g., bill credits, direct payment, etc.)</li> <li>▪ Offering expanded set of incentives (e.g., discounts on DR enabling equipment, public relations benefits for customers)</li> <li>▪ Technical assistance</li> <li>▪ Customer access to program data/information</li> <li>▪ Packaging of DR response across different utility service territories</li> </ul>

*Quantify the value of DR options:* The development of more attractive and innovative DR programs will require that probabilistic values be developed to express the benefits of a wide range of potential DR options that a customer might offer. Program incentives should ultimately reflect the marginal system benefit associated with various levels of load reductions under different contractual arrangements (e.g., voluntary versus mandatory, opt-in or opt-out windows, etc.), seasons, time of day, and duration of curtailment. In some instances, location-specific value considerations will also need to be incorporated. Further, analyses will be needed to assess how best to structure incentive payments for DR options. This includes the potential use of fixed and variable payments as well as allowing end-users to bid their own price for various DR options (e.g., demand bidding programs). It is likely that a combination of these options will be required. To enable program administrators or third-party aggregators to leverage flexibility into a more robust DR portfolio (see below), the determination of appropriate incentives will require the use

of more dynamic system models that can assess the probable value of a DR portfolio of individually flexible customer options.

*Construct and manage DR portfolios:* When a utility or system operator faces a reliability situation, they have to decide whether to ask specific customers to shed load while assessing how much each individual customer can help stabilize the system or improve its overall reliability. The challenge is to assemble a portfolio of participants that offers the best opportunity to achieve sustained demand reductions that deliver reliability improvements at the least cost. It may be less effective – in terms of both reliability and cost -- to procure firm commitments from a smaller segment of DR participants, than to build a larger portfolio of participants who face both firm (mandatory) and non-firm (voluntary) elements. Although it is more complex to design and implement a portfolio of DR options, giving customers more flexible DR program elements (including variable incentive levels and opt-in/out windows) should increase program participation and increase the cost-effectiveness of DR offerings.

The example curves depicted in Figure 3 illustrate how the integration of a broader range of DR options (via increased levels of program flexibility) can help maximize the aggregate portfolio value of demand-responsive customer load reductions. Figure 3 illustrates that the value to a DR portfolio manager (e.g., demand-response aggregator, curtailment service provider, or LSE) of an *individual* customer's DR contract (in \$/MW) falls as the level of flexibility is increased. However, the increased flexibility will, in concept, raise overall participation levels, which will in turn drive up the total level of demand responsiveness and the aggregate system-level value of portfolio load reductions.



**Figure 3 – Increasing Flexibility to Increase DR Portfolio Value**

*Expand technical and customer service offerings:* To spur participation in DR programs, focus group participants stated that load serving entities/system operators will need to offer a more

expansive set of service offerings that cut across technical, financial, and operational support related elements. This includes providing customers with a menu of payment options, such as on-bill credits for participating in a DR program or the receipt of an incentive payment in the form of a check. Further, many customers expressed an interest in receiving customized technical assistance by service providers with direct experience in their specific business/industry. Assistance might include technical support as well as guidance on how to promote DR within the context of internal capital budgeting efforts. Other customers indicated that they would be interested in DR programs that provided them with incentives for the installation of sub-metering equipment at their facility. Broadening the offering of services for program participants will also include having utilities and system operators work in a more collaborative manner. Specifically, customers that operate facilities in different utility services territories within a single ISO would like to have the ability to aggregate their load response across all of their facilities.

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## Appendix A. Focus Group Summaries

This appendix contains summaries of the six focus groups that were completed at Arizona Public Service, Salt River Project, Tucson Electric Power, Delmarva Power, Atlantic City Electric, and Ameren.

### A.1 Summary of the Arizona Public Service Focus Group

This summarizes the key results generated through the focus group conducted on November 30, 2004 in Phoenix, Arizona, with selected customers from APS.

#### A.1.1 Focus Group Composition

The focus group had a total seven actual attendees (out of an original list of 26 customers, that had been screened down to 12 who had committed to show up) that included plant and facility managers representing a diverse group of APS customers. The table shown below lists the different type of companies that participated in the focus group.

**Table A-1 Overview of APS Participants**

Type of Company/Entity
High School
University
Water Utility
Commercial Property Management Firm
Hi-tech Manufacturing Company
Industrial Manufacturing Company
Building Materials Company

At the outset, participants were asked to state their initial impression of DR. Listed below is a summary of customer first thoughts when considering DR:

- “Way to achieve energy savings/demand reductions”
- “Untimely interruptions of power”
- “Opportunity to make money...and an opportunity to lose money”
- “Introduction of real-time pricing programs”
- “Crisis management initiatives”
- “Risk management issues”
- “Load-leveling tool for utilities”

Initial impressions of DR for the vast majority of these customers have been shaped by recent experiences relating to emergency events in AZ, including the July 2004 transformer fires. Almost all of the customers had participated in the APS Power Partners program, which is a voluntary peak demand management program for commercial customers. The program asks

customers to voluntarily reduce load on peak power days when temperatures exceed 100 degrees. This program was initiated in the summer of 2001 and has experienced a good level of success with about 75 large commercial customers participating on average per year.

In general, the experience of focus group participants with the Power Partners program was positive. However, one customer noted that they had difficulties in re-starting their chiller systems after making a load curtailment during one of the program events (it took 2-3 days to solve these problems). In terms of other DR program experiences, one customer stated that they had participated in DR programs outside of AZ (in Texas). This customer commented that the Texas program was financially beneficial for his firm.

### **A.1.2 Likely Motivators to Participate in DR Programs**

Participant responses regarding what would motivate them to participate in a DR program can be categorized into three main areas: 1) financial incentives, 2) technical assistance, and 3) civic duty & public relation benefits.

*Financial Incentives:* In general, all of the APS participants placed financial incentives at the top of their list of reasons for enrolling in a future DR program. However, there was some differentiation in both the type of desired financial incentive and the mode of payment. Some of the differentiation was between private and government/public sector entities. For example, private customers seemed to prefer receiving savings via reductions on their utility bill while public/government entities indicated that direct bill reductions would be problematic since they would likely translate into lower operating budgets for the following year. One industrial customer stated that they would rather receive assistance in financing the front-end cost of installing DR equipment/projects than bill savings.

On a related topic, there was a sharp contrast in the acceptable simple payback period that end-users utilize to assess the attractiveness of capital investments. Not surprisingly, private sector firms had a very short payback horizon (1 to 2 years maximum) while government/public sector entities considered investments with simple payback periods stretching out 10 years and beyond.

*Technical Assistance:* Several firms said that the receipt of technical assistance would be helpful in supporting their participation in a DR program. Potential areas of technical assistance that were mentioned include:

- Assessing the economic & technical feasibility of DR options;
- Conducting analysis that helps plant managers make the case/argument for participating in DR programs to management; and
- Identifying potential DR technologies/systems.

*Civic Duty:* Civic duty related elements were also cited as potential drivers for participation in a DR program. One end-user noted that appealing to public good related causes helps convince building occupants to deal with the discomfort of higher room temperatures, etc. Several participants stated that in general, people are willing to help out and shed load where they can in times of crisis.

### **A.1.3 Mandatory vs. Voluntary Programs**

The discussion of whether customers were interested more in mandatory or voluntary programs generated some interesting discussion about hybrid types of DR program design options. In particular, the APS focus group participants talked about the creation of a DR program that would have mandatory load reductions during selected periods, or windows of time, during the peak demand season.

Under this plan, each customer would select a window of time (e.g., 2 week block) in which they would be willing to shed a designated amount of load if called by the utility. Outside of this window, however, the customer would not be required (or asked) to reduce their demand. This was appealing to the facility manager at a university who said that they would not be able to shed load during the enrollment period for classes (late August/early September) but could in other portions of the summer peak demand period.

In general, focus group participants recognized that DR programs need to have mandatory elements if they are to be of value to the utility system planners. However, they all felt that some type of flexibility is needed at the end-user/customer level. The window of time concept during which a facility would be “on the hook” for reducing load was attractive to all of the participants (it would help them plan/adjust for required cut-backs).

### **A.1.4 Scaling-up or Scaling-down Load Reductions**

Another DR program element that grew out of the mandatory/voluntary discussion was that customers would like to have the ability to either scale-up or down their level of potential load reduction. This would likely involve some type of step function in the incentive payment mechanism that takes into account a customer’s level of response as well as the number of (consecutive) days that they are called on. The pricing/incentive structure for programs could address this type of element by having different tiers of prices for different levels of load reduction.

### **A.1.5 Event Trigger**

Customers did not seem to be too concerned with what the trigger was for a program event. The only requirements relating to triggers were that the commencement/calling of an event should be transparent and communicated well in advance (notification is key for planning purposes).

### **A.1.6 Event Duration**

Two industrial customers noted that with advance warning and planning, they could be down for longer blocks of time than the typical 3 to 4 hour block that utilities call for. For example, one industrial firm said they could be down for up to 48 hours. Another industrial firm said they could stay down for 12 hours.

### **A.1.7 Event Frequency**

Focus group participants were asked if being called on for load reductions for consecutive days was a problem. For the most part, all of the participants said that they could respond on consecutive days. However, four days of consecutive load shedding was about the maximum number that end-users felt they could sustain.

Discussions regarding the frequency of events led participants back into talk of compensation. It was noted that if the number of events is high, so should the level of compensation (“need to balance compensation and frequency of events”). The commercial property management firm representative said that he would need to be able to convince the owners (and occupants) of the different buildings that the value of the savings was worth the inconvenience.

### **A.1.8 Monitoring and Verification of Compliance**

Focus group participants said that they would not have a problem if utility officials wanted to have access to their facility to verify a load reduction, providing that there was some advance notice in terms of the site visit. It was also noted that this would not be a big issue if participants have interval meters.

### **A.1.9 Payment Structures**

Customers said that the receipt of a bill credit or a check would be two likely options for payment. Private sector firms preferred a check. Public/government entities noted again that the lowering of utility bills can have the perverse effect of lowering the facility’s operating budget. Specifically, the drop in utility bills could be used by senior corporate management as the new baseline from which to set goals for trimming the upcoming year’s operating budget. One facility manager said that he would like to see if the utility/DR program could set-up some type of revolving fund where a customer could accrue savings over time. These savings, which would be held in an account for each participating customer, could then be utilized to lower the cost of DR-related equipment purchases.

### **A.1.10 Program Duration**

Focus group participants said that they would like to have DR programs that have a life to 3 to 5 years. However, customer commitments, or “opt-out”, should be on an annual (renewable) basis.

### **A.1.11 DR Program Marketing Suggestions**

Customers said that it was critical that utilities illustrate the monetary savings of participating in a DR program. Marketing efforts should include some form of forecasting the savings that an individual customer could achieve. Spreadsheet/interactive types of tools would be of use (e.g., plug in numbers specific to an individual customer to show the level of savings over time). It was also noted that utilities should emphasize that DR programs can save end-users money today but that they will also have a dampening effect of future rates (i.e., more DR today might mean less need to build new power plants in the future).

### A.1.12 Other Items

Additional items that came up during the course of discussions include:

- The importance of linking DR programs to the ability of customers to run distributed generation units for extended periods of time; and
- The ability to incorporate differentiated demand charges into DR programs.

### A.1.13 Customer Thoughts on Key DR Program Attributes

To close out the focus group, each participant was asked to review a list of DR program attributes that were identified earlier during the session. Each participant was asked to vote for 2 items (attributes) that they felt would be most important in their decision to enroll in a DR program. Participants were also asked to vote for 1 item that would be least important in their decision to enroll in a program. Listed below is a summary table breaks out voting results along key end-user segments.

**Table A-2 DR Attribute Voting Results – APS End-user Segmentation**

Program Attribute	Institutional & Public		Commercial & Retail		Industrial		Water Agencies	
	Most Important	Least Important	Most Important	Least Important	Most Important	Least Important	Most Important	Least Important
Voluntary vs. Mandat.	1							
Incentive Structure	2		2		2		1	
Performance Motivation								
Program Duration								
Event Parameters			2		1			
Notification Process		1				1		1
Contract Period								
Minimum Curtailment								
Technical Assistance	1	1		2	1	1	1	

## A.2 Summary of Salt River Project Focus Group

This appendix section summarizes the key results generated through the focus group that was conducted on December 1, 2004 with selected customers from SRP.

### A.2.1 Focus Group Composition

The focus group had a total of seven attendees that included plant and facility managers representing six SRP customers (out of an initial customer contact list of 31 customers; of these, about 10 had indicated that they would attend). The table below illustrates the mix of companies that participated in the focus group.

**Table A-3 Overview of SRP Participants**

Type of Company/Entity
School District
Mining Company
Grocery Stores Chain
Industrial Manufacturing Firm
Transportation Equipment Manufacturing Firm
Insurance Agency Data Center

### A.2.2 Initial Impression of DR

To begin the focus group session, the participating SRP customers were asked to state their initial impression and comments on the concept of DR. Listed below is a summary of SRP customer first thoughts when considering the topic of DR:

- “Short-term responses including shifting load”
- “Concept of trying to optimize energy use without impacting users”
- “Ability to shed load”
- “Logistical difficulties regarding scheduling load sheds”
- “Great concept but hard to justify economically”
- “Needs significant cost incentive to warrant effort”
- “Linkage to distributed generation and limits on run-time”
- “Civic duty during crises”
- “Concerns about timing of load reductions and potential penalties”

All customers had some knowledge of the concept of DR. Their opinions have been shaped in part by recent experiences relating to emergency events in Arizona as well as some experience with DR in other states (e.g., one large commercial customer works for a firm with stores in other parts of the country that have participated in DR initiatives). In terms of emergency events in AZ, the substation fires of July 2004 were still very fresh in the minds of the focus group participants. During this emergency period SRP (and APS) called on its customers to reduce energy use during peak demand periods (between 4 and 6 PM). Customers were given the

following suggestions for curtailing their load: raising thermostat settings one or two degrees; turning off extra lights and all other major appliances that are they absolutely do not need; avoiding operation of pool pumps during afternoon hours; and avoiding the use of certain appliances such as clothes dryers, washers and dishwashers during afternoon hours.

### **A.2.3 Likely Motivators to Participate in DR Programs**

Participant responses regarding what would motivate them to participate in a DR program can be categorized into three main areas in order of importance to the group: 1) civic duty & public relation benefits, 2) financial incentives, and 3) technical assistance.

*Civic Duty:* Civic duty themes were at the top of the list of motivators for virtually all of the SRP focus group participants. Several participants noted that they felt it was very important for their companies to help the local community avoid blackouts by shedding load during emergency events. The grocery store chain representative noted that his firm really valued the PR related benefits of helping out during time of crisis.

*Financial Incentives:* In general, all of the participants stated that financial incentives would be a critical component in their decision to participate in a DR program (value of incentives has to clearly outweigh potential inconvenience). However, financial incentives were not as critical for this group compared to the other focus group sessions. The discussion on financial incentives also included the following elements:

- *Amount of Payment:* To get the attention of customers (i.e., raise their level of interest), focus group participants said that DR financial incentives should equate to roughly 5% to 10% of their annual electricity bill. (one of the larger industrial customers said their cut-off would be 10%). Private sector firms felt that anything below 5% would not be worthwhile. Government/public entities noted that they would be willing to consider participating for less than 5%.
- *Mode of Payment:* There was also some discussion about the mode of payment. Different options that were mentioned include direct savings on utility bills, separate checks, and rebates. Government/institutional customers noted that bill reductions would be problematic (i.e., they might result in lowering allowable operating budgets for the following year). Private companies were more accepting of bills reductions or checks. There was consensus that programs should offer a menu of potential payment options.
- *Payback Period on Investments:* There was a significant difference in the payback period hurdle rate used by different types of end-users. Specifically, private sector firms stated that their payback period hurdle rate is between 1 to 3 years while institutional/public sector entities said they could stretch out to 10 years.

Some additional financial incentive related topics were brought up at a later stage in the focus group (see summary of this discussion on the following page).

*Technical Assistance:* Virtually all of the focus group participants said that technical assistance would not be a key driver of their future participation in a DR program. The only differing

opinion in the group was given by a representative from a school that noted that they always welcome outside support and advice.

#### **A.2.4 Event Trigger**

All of the focus group participants stated that they were not concerned with the actual trigger for a program (e.g., price, system conditions, etc.). However, there was broad-based consensus that the amount of notice provided is a key item. Some of the industrial customers said that they would like to have 24-hours notice prior to an event in order to have time to adjust schedules, etc. Representatives from schools and universities said that they could act on shorter notice, particularly during the summer session. The grocery store chain representative also said that they could act quickly by shedding lighting load.

#### **A.2.5 Event Frequency and Duration**

Focus group participants stated that they would find 2 to 4 hour blocks of event duration as acceptable. In terms of events on consecutive days, participants felt that 2 to 3 days is something that they could manage. The discussion shifted to the possibility of each customer having a “rotating window” during which they could potentially be called to shed load during the peak demand season. For example, a customer could be given a specific one-week window during a month in which they would pledge to shed load as needed.

In general, this concept was attractive to the participants. However, several customers said that under this type of arrangement, they would prefer to have a set day during the week in which they could be called on to reduce their load (rather than a one-week block as described above). This would help them plan ahead for the potential need to cut back on their energy usage (e.g., during the Summer they might always plan on operating less shifts on the day of the week that they are on the hook to reduce load, etc.). Representatives from schools felt that distinct days or blocks of time would be easier to manage rather than being on call during an entire peak demand season.

Some participants also brought up the opposite (but related) idea of allowing customers to block out specific days or blocks of time in which they would not be able to participate (e.g., a school might block out the registration week/first week of classes).

#### **A.2.6 Notification of Events**

In general, customers commented that there were several acceptable forms of communication (email, phone, and pager). The only concern people had was that if the notice of an event was short-fused, they might not receive the notice and then be penalized for non-compliance. People talked about options for a “confirmed handshake.” One customer idea that received positive response was giving participating DR customers a dedicated pager to signal an event.

#### **A.2.7 Monitoring and Verification of Compliance**

Customers stated that they would not have a problem if utility officials wanted to have access to their facility to verify load reductions provided that there was a reasonable period of advance

notice. Also, as part of the discussion of verification, there was some concern about how a customer's baseline demand would be measured. The grocery store representative said that his company's load starts to fall after 1 PM. This is a problem if the utility wants them to shed at 3 PM (i.e., they might not be able to drop much further).

### A.2.8 Other Financial Incentive Considerations

A discussion on financial incentive considerations emerged at a later stage of the focus group. Ideas that were generated in this discussion include:

- Waiving power factor correction penalties for customers during program events (this fits into a larger overall point that was raised by focus group participants; namely that the design of DR programs needs to take into account a customer's existing tariff schedule. Power factor correction penalties are relatively high for SRP customers, so that in this instance, customer concerns centered on the potential of being hit with power factor penalties as part of their response to a DR program event.);
- Exempting customers from emission requirements during events (related to extended use of back-up generators and other DG equipment);
- Providing incentives to participating customers to purchase EMS and other DR-supporting equipment; and
- A DR grant mechanism or revolving fund could be created that utilizes a portion (or all) of available DR related financial incentives to provide support to participating customers in implementing DR equipment/projects.

### A.2.9 Customer Thoughts on Key DR Program Attributes

To close out the focus group, each SRP customer participant was asked to review a list of DR program attributes that were identified earlier during the session. Each participant was asked to vote for 2 items (attributes) that they felt would be most important in their decision to enroll in a DR program. Participants were also asked to vote for 1 item that would be least important in their decision to enroll in a program (please note that not all participants voted for a least important item. Listed below is a summary table breaks out voting results along key end-user segments.

**Table A-4 DR Attribute Voting Results – SRP End-user Segmentation**

Program Attribute	Institutional & Public		Commercial & Retail		Industrial	
	Most Important	Least Important	Most Important	Least Important	Most Important	Least Important
Reliability Programs			2		1	
Program limits	1				2	
Incentives		1	2		1	
Program Parameters	2				1	
Notification						
Minimum Curtailment	1				1	
Technical Assistance				2		2

### A.3 Summary of Tucson Electric Power Focus Group

This section summarizes the key results generated through the focus group that was conducted on December 10, 2004 in Tucson, Arizona with selected customers from TEP.

#### A.3.1 Focus Group Composition

The focus group had a total of eleven attendees that included plant and facility managers representing a diverse group of 10 TEP customers (out of an initial customer contact list of 18 customers). It is important to note that TEP customer representatives called everyone on the original list of 18 customers. The direct contact from TEP customer representatives played a key role in the relatively large turnout for this focus group. The table shown below illustrates the range of companies that participated in the TEP focus group.

**Table A-5 Overview of TEP Participants**

Type of Company/Entity
City Government Agency
Water Utility
Regional Water Agency
Government (federal) Facility
Mining Company
Building Materials Company
Hi-Tech Manufacturing Firm
Large Federal Facility
Hi-Tech Manufacturing (control systems) Company
Copper Mining Company

#### A.3.2 Initial Impression of DR

At the outset of the TEP focus group, participants were asked to state their initial impression on the concept of DR. Listed below is a summary of customer first thoughts that come to mind when considering DR:

- “I don’t have much information on what DR is all about”
- “Not sure if DR can save my company money”
- “Why do I have to suffer (shed load) to allow for residential A/C usage?”
- “Cogeneration or self-generation should be part of DR options”
- “Way to perhaps save money”
- “Turn it off!”
- “Load shedding during crises”

- “Déjà vu”
- “Is energy conservation valued in DR?”
- “Load shedding and going on TOU rates”
- “Making timely reductions in demand”

### **A.3.3 Likely Motivators to Participate in DR Programs**

Participants were then asked what would help motivate them to participate in a future DR program. The TEP focus group was unique among the Arizona customers in that there was little discussion of financial incentives. In general, the motivating factors listed by TEP customers include: 1) civic duty (gentlemen agreements to reduce power) 2) technical assistance, 3) support in distributed generation permitting, and 4) financial incentives.

*Civic Duty:* Civic duty and public good related items were mentioned as key motivators. The government and water agency customers in particular mentioned the importance of shedding load for the public good. Other customers also mentioned civic duty related themes into the need/desire to ensure grid reliability.

*Technical Assistance:* Several firms said that technical assistance would be helpful in supporting their participation in a DR program, in particular government/institutional customers. A government agency said that their staff could benefit greatly from training and awareness building regarding DR and energy efficiency concepts.

*Support in Using DGs and Permitting DGs:* Several firms saw a connection between being able to participate in DR programs and running diesel back-up generators. Some customers said that they are currently capped at operating their distributed generation units for 250 hours per year. Removing this cap could increase the likelihood of their participation. Also, support in permitting distributed generation units would be of use.

*Financial Incentives:* Focus group participants raised the issue of financial incentives in the context of support in purchasing equipment. A water agency noted that they would value help in offsetting the cost of SCADA systems that could be used for DR but also in their daily operations. Some participants also stated that they would like to receive incentives that could be used to purchase EMS equipment in return for participating in a DR program. A government entity noted that financial incentives, even if at a low level, are still an important factor given budget constraints.

On a related note, a discussion took place regarding acceptable hurdle rates for simple payback period. In general, private firms cited numbers of 2 years or less. Some institutional/government entities said that 6 to 12 years is still okay.

### **A.3.4 Mandatory vs. Voluntary Programs**

The focus group seemed to be split 50-50 as to whether or not it was better to have a voluntary or mandatory DR program. Industrial firms were among those customers who more vocally

preferred voluntary programs. Some government entities mentioned that mandatory programs would be okay providing that the proper level of incentives were in place.

### **A.3.5 Event Duration**

Focus group participants stated that participating in events for consecutive days could be challenging but was doable. When probed to state a maximum number of days, the participants all seemed to agree that 5 days would be too much. In the 4 day or less range, the participants could participate providing that the program requirements were flexible.

Customers with large pumping loads said that the maximum time they could shed pumping load was 1-2 hours. For other load segments, they could stay-down longer.

The discussion regarding the duration of DR events led to some exchange of thoughts on opt-in and opt-out windows. This idea was attractive to customers. They liked the idea of having some flexibility about when they could potentially be called on during the peak demand season. This type of arrangement would help customers coordinate their maintenance schedules.

In terms of notice of program events, some industrial process firms said that they would prefer to have a one-week notice (however they realize that utilities value being able to call on customers on shorter notice).

### **A.3.6 Mode of Payment**

Similar to earlier focus groups, government/public entities were not overly enthusiastic about the idea of receiving bill credits (i.e., it would lower their budget for the following year). One government facility manager brought up the idea of a revolving fund type of mechanism that could be accessed to help purchase DR related equipment. A representative of an industrial company said that he competes internally with managers of other facilities that his firm owns in the US. He was interested in finding a way to highlight the visibility of savings that his facility might achieve by participating in a DR program. In general, customers thought that payments or credits should be disbursed by utilities within 30 days of an event.

### **A.3.7 Event Trigger**

The customers were not very concerned with the exact trigger that would be used in a DR program. However, they said that they would be more comfortable with reliability driven triggers. There seemed to be some concerns that a utility might try to use DR to shed load that could be sold for a higher profit on the wholesale market. Offering reliability related programs seemed to lessen this concern.

### **A.3.8 DR Program Marketing Suggestions**

Focus group participants had the following thoughts regarding ways that utilities should market DR programs to customers:

- Highlight cost savings

- Stress civic duty related elements
- Provide education and training to tenants of buildings
- Develop program that gives kudos (PR) for being a good corporate citizen
- Utilities should show their daily peak demand on a web site

### A.3.9 Other Items

Two key items that came up relating specifically to water agencies are:

1. There is a two-week lag between the water and electricity peak demand (the water peak demand period starting in the 2<sup>nd</sup> week in June and runs to the 2<sup>nd</sup> week in July)
2. The timing of peak demand for water agencies varies depending on where they are in the “water chain.” For example, agencies located further south will experience their peak demand (i.e., for pumping) one to two hours later than an agency to the north.

It was mentioned by water agency representatives that these two items might be areas to further explore and perhaps incorporate into a future DR program. Specifically, it was noted there might be opportunities for DR programs to link-up with (and take advantage of) these potentially complementary load shapes.

In addition, all of the focus group participants said that it was very beneficial to meet and exchange ideas about energy related issues. They requested that they receive a contact list of attendees so that they could remain in touch going forward.

### A.3.10 Customer Thoughts on Key DR Program Attributes

To close out the focus group, each TEP customer was asked to review a list of DR program attributes that were identified earlier during the session. Each participant was asked to vote for 2 items (attributes) that they felt would be most important in their decision to enroll in a DR program. Participants were also asked to vote for 2 items that would be least important in their decision to enroll in a program (other focus groups only voted for 1 least important item). Listed below is a summary table breaks out voting results along key end-user segments.

**Table A-6 DR Attribute Voting Results – TEP End-user Segmentation**

Program Attribute	Institutional & Public		Industrial		Water Agencies	
	Most Important	Least Important	Most Important	Least Important	Most Important	Least Important
Voluntary vs. Mandat.	2	1	2		1	
Incentive Structure	2		2		1	
Program Duration		1	1		1	1
Event Parameter	1	1	2		1	
Notification		1	1			

Back-up Generation	1	1		4		1
Technical Assistance	3	1		4	1	
Operational Information		1				3

#### A.4 Summary of the Delmarva Focus Group

These are the key results from the November 15, 2005 focus group held in Wilmington, Delaware, with selected customers from Delmarva Power.

##### A.4.1 Focus Group Composition

The focus group consisted of eight attendees out of an original list of 30 customers that were contacted by Nexant.<sup>11</sup> The eight included corporate energy managers, energy engineers, and facility managers representing a diverse group of Delmarva customers. The table shown below lists the different types of companies that participated in the focus group and the title of the attending representative.

**Table A-7. Overview of Delmarva Participants**

Type of Company/Entity	Title of Representative
Financial Services	Corporate Energy Manager
Automotive Manufacturing Firm	1): Site Utilities Manager, N. American Operations; 2) Managing Energy Engineer, N. American Operations
Industrial Real Estate Firm	Energy Management Engineer
Pharmaceuticals	Facility Planning and Management
Food Manufacturing	Corporate Energy Manager
Chemicals/Consumer Products	Corporate Facilities Team Representative
Chemicals	Facility Manager

At the outset, participants were asked to capture their first two initial impressions of DR. Listed below is a summary of customer first thoughts when considering DR:

- “Creating benefits for my company and the local utility”
- “Load curtailment and penalties if you don’t comply”
- “Opportunity to enter into voluntary programs that can save money on energy bills”
- “Deferred generation capacity for the utility”
- “Something that can lower your overall energy costs”

<sup>11</sup> PHI representatives provided Nexant with an original list of 70 customers. This list was screened and a call list of 30 customers was utilized to recruit focus group participants.

- “Load shedding and shifting”
- “A way to increase our reliability of supply”
- “Being a good corporate citizen”
- “Leads to the implementation of new projects and innovations”

Initial impressions of DR for some of these customers have been shaped in part by their recent participation in DR programs. Specifically, three of the seven companies in the focus group have direct experience in DR programs, either in terms of the historic interruptible options provided by the local utility (or those serving other corporate facilities) or via PJM.

#### **A.4.2 Likely Motivators to Participate in DR Programs**

The participants cited the following main elements as items that would motivate them to participate in a DR program:

*Monetary Savings:* Virtually all of the focus group participants cited monetary savings as the primary driver of their potential participation in a DR program. Monetary savings from DR were also discussed in the context of outperforming other facilities/plants within a given corporation. Many participants stated that competition among corporate facilities is often more fierce than with outside competitors. The competition is based on cost and profit margin and centers on which plants are higher in the queue for capital investment upgrades, or for avoiding plant closure notices.

*Technical Assistance:* A vast majority of the customers said that technical assistance would be helpful in supporting their participation in a DR program. In particular, customers expressed an interest in having technical assistance provided from a third party firm that can offer guidance on both DR equipment and strategy. The participants also made it clear that they were looking for knowledgeable, experienced technical assistance providers, not an audit centered on counting light fixtures.

*Increased Reliability of Supply:* Some of the participants, in particular the pharmaceutical company representative, noted that outages of even two to five seconds can have a severe impact on his company’s operations. For these types of customers, DR is viewed in part as a means to help increase the reliability and overall stability of the utility power grid.

*Civic Duty:* Several focus group participants stated that DR’s civic duty related elements were a potential driver for participation. The representative from the financial services firm stated that they are always prepared to shed load in times of emergency (recent example of voluntary load curtailments in April 2005 when several power generation units were down for maintenance). Other participants agreed with this sentiment and indicated that voluntary load shedding (on a verbal handshake basis) is something that they make every effort to do. All participants agreed that receiving PR (e.g., acknowledgements in newspaper and radio ads, etc.) in return for reducing demand during emergency periods would help in the sense of feeling appreciated, both at their level as well as with the company’s senior management team.

*Availability of Interval Metering Data:* The representative from the financial services firm stated that having interval metering data readily available in a more real time way (i.e., up through the prior day rather than once every billing cycle) would be a major incentive to participating in a DR program.

### **A.4.3 Barriers to Participating in DR Events and Programs**

The identification of what would motivate customers to participate in a DR program also stimulated some discussion on current barriers/challenges to DR. This includes:

*Distributed Generation Restrictions:* Almost all of the focus group participants stated that the recent tightening by the EPA on the number of annual hours (drop from 200 to 100 hours) in which end-users can run their back-up generation units is a major barrier to participating in a DR program. Customers expressed an interest in programs that would exempt the hours that they run their back-up units during emergency periods from counting against their annual allotted 100 hours.

*Baseline Setting Method:* Customers also expressed concern regarding the way in which some programs set their baseline for measuring load-shedding during DR events. Several focus group participants commented that previous programs did not give them full credit for their action because their load shed occurred at specific times when other parts of their plant/facility were starting up operations. A discussion ensued about potential remedies for this situation, including using 10 common days of historical data as a baseline as well as installing interval meters on some of the larger processes at a given plant.

### **A.4.3 Mandatory vs. Voluntary Programs**

Focus group participants overwhelmingly favored voluntary programs over programs that are based on mandatory (default service) type structures. Specific comments relating to the characteristics of voluntary programs that customers would like to see are summarized below:

- All of the participants want voluntary programs with no front-end enrollment cost;
- All but one of the customers (i.e., the representative of the financial services firm) would be willing to voluntarily enter into a contract with a utility to shed a certain amount of demand during a designated number of annual program events;
- The financial services firm representative is an advocate of a more flexible type of voluntary program that allows end-users to opt in for a given amount of load shedding that is determined on the day of an actual event. He realizes that this type of program would carry a lower financial incentive since utilities would have a greater uncertainty over actual load reductions. A discussion of demand bidding type programs ensued.
- Focus group participants also expressed some concern over penalties for non-compliance. It was noted that some of the past programs that customers participated in did not have an adequate balance of risk versus reward.
- The participants also discussed the desirability of “stacking” mandatory and voluntary DR levels such that they would set a relatively achievable mandatory kW impact level (that would require little risk on their part) and then, on those days when possible, augment their reduction through a voluntary bidding type arrangement. They understood that this two program options would have differing value propositions and would be paid out at differing incentive levels.

Another interesting revelation that sprang from the discussion was the coming to clarity about what was meant when we said “mandatory” programs. The facilitators were thinking of contractual program design where the participant is required to meet the curtailment obligations or face a penalty. The participants thought our use of “mandatory” referred to the creation of a default, no opt out type of program/rate design.

#### **A.4.4 Event Duration and Notification**

There was a consensus that DR events should be no longer than six hours. Discussion items raised by focus group participants regarding both event duration and notification related issues are detailed below:

- The representative from the chemicals company stated that his firm would be comfortable with a six-hour block. A key item, however, is that on a daily basis, their plants would still need to consume the same amount of energy (i.e., DR measures for this firm would consist primarily of shifting load/energy use to later periods).
- All focus group participants stated that having advanced notice (i.e., day-ahead) was a critical element. The representative from the food manufacturing firm expressed frustration with last minute calls that he often receives from the various utilities that he works with across the country to shed load.
- The representative from the financial services firm noted that in terms of advanced notice, he switches over to his backup power at 7:00 p.m. on the prior night and then switches back at 7:00 p.m. the day of the curtailment. This is because of a natural breakpoint in their processes at that time of day. He stressed the importance of avoiding any problems that might occur during a momentary transfer from utility power to self-generation (“I’d rather be off for a full day rather than make the transfers required to be off from just from 12 to 6 PM.”).
- Focus group participants felt that event notifications should go to the people in the plant. Conducting an annual test to ensure that the notification system is functioning properly is also important. One customer cited a past example at his company that illustrates the value of conducting program tests. His company was participating in a utility DSM program and had made some changes to their phone system. These changes resulted in the contact number that the utility had on file being the number of the guard shack rather than the facility manager. Since the utility was using a voice-activated system, it did not recognize that the wrong person was being contacted. The test that was conducted rectified this problem.

#### **A.4.5 Event Frequency**

There was consensus among the focus group participants that DR programs should have no more than 10 events per year. Some additional customer comments on event frequency are listed below:

- Programs should not utilize split sessions on a given day (i.e., program events should represent one continuous time block).

- Having events on consecutive days is okay. However, customers expressed an interest in having utilities assign probabilities to the need for calling on customers for consecutive days. For example, a utility could call customers on a day-ahead basis, asking for load on Day 1 but assigning a high, medium, or low probability for needing demand reductions on Day 2, as well as Day 3. This would avoid what one focus group participant referred to as the “nickel and dime” approach that utilities often take to asking customers for load reductions on consecutive days.

#### **A.4.6 Scaling-up or Scaling-down Load Reductions**

Having the flexibility to either scale-up or down load reductions was attractive to all of the customers in the focus group. The industrial real estate firm representative commented that they would like to be able to offer utilities a minimum/maximum level of load reduction (e.g., commit to a minimum reduction of 500 kW and a maximum of 1,000 kW and be paid on a \$/avoided kW). Having this type of feature would enable customers to better manage making load reductions on consecutive days.

#### **A.4.7 Aggregation of Load Reductions Across Multiple Sites**

The focus group contained several representatives from companies that operate facilities in multiple states (e.g., the food manufacturing firm representative works with over three dozen different energy suppliers, the industrial real estate firm representative oversees multiple plants in Delaware and New Jersey, etc.). Given that these companies operate across different states, utility service areas, and ISO regions, receiving credit for the aggregation of load reductions from multiple facilities was of interest. In particular, customers would be interested in participating in programs that aggregate the value of response across utility service territories within a single ISO. This seems like an intriguing selling point that could be brought to bear for some of the larger multi-facility companies.

#### **A.4.8 Monitoring and Verification of Compliance**

All of the focus group participants felt that site visits (by a utility representative or an authorized third-party firm) to verify load reductions are acceptable if they are scheduled in advance.

#### **A.4.9 Payment Structures**

Almost all of the focus group participants wanted to see payments for participating in a DR program as a line item credit on their bill. The only exceptions were the financial services firm (who preferred payments via a check) and the chemicals firm (who preferred to see benefits in the form of lower tariffs). The majority of customers felt that savings should be quantified on a \$/avoided kW basis. Unlike other focus groups, there was no customer concern regarding energy cost savings resulting in budgetary cuts for a plant/division in the following year. Specific comments on payment structure related items include:

- The financial services firm works with a curtailment service provider that cuts a check to the company’s general utility fund. This type of central distribution discourages behavioral

changes at individual facilities. A preferred payment scheme would be a check that is designated for use by a specific facility within a company.

- The representative from the food-manufacturing firm had a similar comment, albeit using a different payment mechanism, in that he would like to see a line item credit issued on an individual account basis. This would help him identify the plant that generated (earned) the cost savings.
- The industrial real estate representative also wants to see payments on the bill. Each plant that he oversees operates as an independent cost center and savings should ideally accrue directly to the facility that earns the credits/savings.
- The chemicals company would like to see savings from DR rolled into a new type of tariff with lower energy and capacity payments. Having savings codified in an established tariff would be easier for planning purposes.
- Focus group participants indicated that payment levels should vary according to differing levels of response. One customer indicated that programs should utilize an inverted block structure in which a customer receives higher payments for higher levels of response on a given day, while others understood the rationale behind lower per kWh payments for incremental increases above a pre-established amount.

#### **A.4.10 Program Duration and Consistency**

All focus group participants felt that the minimum duration for a program should be three years. It was noted that this amount of time is needed for staff to get up the learning curve on DR as well as to give companies time to earn sufficient savings to payback any DR related investments that they make.

#### **A.4.11 Customer Thoughts on Key DR Program Attributes**

Similar to other focus groups carried out under this project, each participant was asked to review a list of DR program attributes that were discussed earlier during the session. Each participant was asked to vote for 2 items (attributes) that they felt would be **most** important in their decision to enroll in a DR program. Participants were also asked to vote for 1 item that would be **least** important in their decision to enroll in a program. Shown below is a summary table listing the voting results for the participating Delmarva customers.

**Table A-8 DR Attribute Voting Results – Delmarva Focus Group**

<b>Program Attribute</b>	<b>Most Important</b>	<b>Least Important</b>
Voluntary vs. Mandatory	3	0
Financial Incentives	8	0
Event Parameters	1	1
Notification	3	1
Increased Metering Capabilities	0	4
Technical Assistance	1	2

## A.5 Summary of the Atlantic City Electric Focus Group

This appendix summarizes the results of the November 16, 2005 focus group held in Northfield, New Jersey with selected customers from Atlantic City Electric.

### A.5.1 Focus Group Composition

The focus group consisted of six attendees, out of the 9 firms who had confirmed that they were likely to attend. Nexant did aggressively pursue an original list of roughly 30 customers that were provided by Atlantic City Electric.<sup>12</sup> The attendees included facility managers and plant operation managers from private sector firms and government entities. Table E-1 lists the different types of customers that participated in the focus group and the title of the attending representatives.

**Table A-9 Overview of Atlantic Electric Participants**

Type of Company/Entity	Title of Representative
Entertainment & Consumer Electronics Company	Facility Manager
Aluminum Packaging	Facility Manager
Food Processing -	Plant Director (frozen foods division)
Government Research Center	Representatives (3) from Plant Operations and Engineering

At the start of the focus group, participants were asked to capture their first two impressions of DR. Listed below is a summary of the customers' first thoughts when considering DR:

- “Short notice cutbacks and power interruptions”
- “Energy conservation and reducing costs”
- “Production management and scheduling”
- “Peak electric consumption”
- “Timeliness of response”
- “Saving money”
- “Cost analysis of and equitability of savings”
- “Power interruptions”

Some of the focus group participants had participated in past DR programs in New Jersey. In particular, the government research center was part of a voluntary program that paid customers to shed load during a maximum of ten events during the summer peak demand period. None of the participants are (or have been) enrolled in a PJM DR program.

<sup>12</sup> This smaller than expected turn out can be attributed in part to the focus group facility selected in that it turned out to be somewhat difficult to locate. In addition, there appeared to be limited warm-up preparation prior to Nexant's customer contacts, which resulted in more frequent immediate rebuffs than are anticipated.

### A.5.2 Likely Motivators to Participate in DR Programs

Atlantic City Electric customers were asked what elements/items would motivate them to participate in a future DR program. Key customer responses include:

*Monetary Savings:* Cost savings were cited by all of the focus group participants as the top motivator for their potential participation in a DR program. However, it was noted that even with a high level of savings/incentives, it would still be a challenge to participate in a DR program given stringent facility operating/production schedules. For example, the government research center noted that they have a mandate to maintain 100% reliability at their facility (which includes several hi-tech laboratories, office buildings, and data control centers). The representative from the entertainment medium company indicated that equipment at his plant is highly sensitive to fluctuations in power—even momentary surges in power can necessitate shutting down his production equipment for twenty-minute blocks, which equates to a significant amount of production.

*Technical Assistance:* Many of the focus group participants stated that they would be interested in receiving some type of technical assistance. Some of the customers noted that they do not have sufficient and/or appropriately skilled engineering/technical staff to identify and evaluate more than the more rudimentary DR opportunities. One participant suggested an innovative technical assistance incentive option could be providing customers with “in-kind” services, in his case, tied to having the utility/ISO sponsoring the DR program providing maintenance and operations support for his onsite higher voltage substation equipment.<sup>13</sup>

*Incentives for Sub-metering:* Most of the customers stated that their facility does not have adequate sub-metering capabilities, neither their energy management perspective, nor from the viewpoint of enabling increased DR capabilities. All of the participants felt this was a barrier to their participation in a DR program. Several participants stated they would be interested in program incentives that facilitated the installation of sub-metering equipment.

*Procurement Assistance:* One focus group participant stated that in return for participating in a DR program they would like to have their utility help them procure equipment/spare parts (breakers, fuses, etc.). A discussion then ensued about options whereby utilities could indirectly allow participating customers to pay the same wholesale/bulk purchasing price that utilities pay for equipment. To help flesh out this concept, the facilitators talked about a web-based equipment procurement system (i.e., Pantellos) whereby utilities aggregate their equipment purchasing requests along common specifications and then work with manufacturers to supply the commodity at bulk prices.

*Civic Duty:* In general, customers did not see civic duty as a key driver. Given tight operations margins and/or 24/7 production needs, the focus group participants felt that it would take a high level (national) policy directive to help override business related concerns. However, the entertainment medium company representative, mentioned that there is a corporate level initiative to reduce current electricity use by 15% compared to 2000 levels. He said that it might be possible to weave DR into the mix of solutions they are considering to lower electricity use.

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<sup>13</sup> Clearly, the “in-kind services” incentive theme could be expanded to include other areas where the local utility has skilled resources at hand that are more familiar with certain operations functions than their customers.

### A.5.3 Mandatory vs. Voluntary Programs

Focus group participants indicated that given the necessities of their business operations, it would be difficult to commit to firm load reductions well in advance of a DR program event. Therefore, the majority of participants favored voluntary DR bidding style programs. The customers realize that voluntary programs (which involve non-firm load reduction commitments) would carry lower levels of incentives.

### A.5.4 Event Duration and Notification

Listed below is a summary of comments made by focus group participants regarding their thoughts or preferences relating to DR program event duration and notification issues:

- *Event Duration:* When probed about what would be an appropriate/tolerable length for a given program event, participants did not state a specific number of hours. In general, the customers felt that the duration of a program event should be linked in some manner to the level of incentive offered by the utility (i.e., the higher level of incentive that is offered, the longer the acceptable duration of a program event). However, the representative from the aluminum packaging firm, stated that shedding load even for periods of one hour or less would be problematic (regardless of incentive levels).
- *Time of Year/Season:* Many of the focus group participants oversee facilities that operate on a year round basis and schedule downtimes only during holiday periods. However, there was some variation of response in terms of potential windows of time that would be more conducive to participating in a DR program. For example, the food processing firm said that they would have more flexibility in the winter. The entertainment medium company representative indicated that their peak production period runs from the middle of August through the end of November. Therefore, they might have some increased ability to participate in a DR program during June and July.
- *Program Events on Consecutive Days:* Most of the focus group participants felt that it would be difficult to participate in a DR program that held events on consecutive days. In general, this hesitancy reflects the challenges these customers face in predicting scheduling and production needs at their various facilities. The representatives of the government research center noted that participation on consecutive days might be more feasible if they had better control and segregation of specific pieces of energy-consuming equipment. A discussion of options for sub-metering then ensued. Other participants raised the possibility of offering higher levels of incentives for the second consecutive day in which a program event is called.
- *Advanced Notice:* There was consensus among the focus group participants that, at a minimum, they would need day-ahead notification of a program event.

### A.5.5 Duration of DR Programs

Focus group participants did not specify a desired program length. However, customers indicated that the appropriate length would depend on the specific characteristics of a program and whether or not a third-party aggregator is involved. If a third-party aggregator is involved, the customers stated that the program length should match the length of the contract that a customer

has with a third-party provider. The additional rationale is that the customers noted they wanted certainty across their planning horizon relative to the program incentives being available and paid out so that they could estimate what the incentives impact would be relative to buying down their capital investment payback vision.

### **A.5.6 Payment Structures**

All of the focus group participants want to see payments for their DR program participation as a specific identified line item credit on their bill. They felt this would increase the visibility of their participation and financial compensation with internal senior management, and this was viewed as very positive. There was no strong preference in terms of having DR program related payments structured as a capacity or energy payment. However, one of the focus group participants indicated that receiving a levelized payment over the course of an entire year would be beneficial for budgetary planning purposes.

### **A.5.7 Customer Thoughts on Key DR Program Attributes**

At the end of the Atlantic City Electric customer focus group session, each participant was asked to review a list of DR program attributes that were identified earlier during the session. Each participant was asked to vote for 2 items (attributes) that they felt would be **most** important in their decision to enroll in a DR program. Participants were also asked to vote for 1 item that would be **least** important in their decision to enroll in a program. Listed below is a summary table lists the voting results for each participating Delmarva customer.

**Table A-10 DR Attribute Voting Results – Atlantic Electric**

<b>Program Attribute</b>	<b>Most Important</b>	<b>Least Important</b>
Financial Incentives	6	0
Event Parameters	0	3
Notification	1	2
Increased Metering Capabilities	3	1
Technical Assistance	0	0

## **A.6 Summary of the Ameren Focus Group**

This appendix summarizes the results of a November 29, 2005 focus group in Springfield, Illinois with selected customers from Ameren—spanning the service territories of the following local Ameren companies: Central Illinois Lighting Company (CILCO), Central Illinois Power (CIPS), and Illinois Power (IP).

### **A.6.1 Focus Group Composition**

The focus group had a total of seven attendees (out of an original list of roughly 25 customers that were contacted by Nexant) that included facility managers and engineers from large

commercial and industrial firms.<sup>14</sup> Table F-1 lists the different types of customers that participated in the focus group and the title of the attending representative.

**Table A-11 Overview of Atlantic Electric Participants**

Type of Company/Entity	Title of Representative
Equipment manufacturing firm	Energy Coordinator, Global Facilities Services
Insurance company	Maintenance and Facilities Manager
Building materials firm	Maintenance Electrical Engineer
Steel manufacturing company	Operations Manager
University	Plant and Service Operations
Healthcare services firm	Corporate Facility Engineer
Industrial gas production company	Manager of Energy & Regulatory Affairs

At the start of the focus group session, participants were asked to state their first two impressions of DR. Listed below is a summary of customer responses when considering DR:

- “Interruptible programs”
- “Using self generation units to shed load”
- “Way to control costs and enhance level of market participation”
- “Having to shut down and start-up your generation set”
- “Shedding load and production losses”
- “Reducing energy costs”
- “Public service (helping get load off the grid fast)”
- “Load profiles”
- “Forward-looking pricing schemes”
- “Enhancing the stability of the grid”

Several of the focus group participants had previously participated in load management programs, either on a formal or informal (emergency request) basis. For example, the representative from the healthcare services firm indicated that two of the facilities (hospitals and clinics) that he oversees are currently participating in load reduction programs offered by CILCO and Commonwealth Edison. The representatives from the steel manufacturing firm noted that last summer they shut down their electric arc furnace after receiving an emergency request from CILCO when the utility was challenged in terms of meeting the overall peak demand. The representative of the industrial gas producer commented that they participate in DR and load reduction programs across the U.S. (including PJM and Texas) by shutting down their nitrogen liquification units (NLU) at their air separation facilities.

One overriding comment made by the focus groups participants was that it is difficult to discuss the specifics of future DR programs given the current uncertainty surrounding the structure of the

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<sup>14</sup> The representative from the industrial gas production firm was interviewed separately over the phone.

post-2006 electricity market in Illinois. Specifically, pending Illinois Commerce Commission decisions on the parameters of retail competition and the roles and responsibilities of electric utilities, load serving entities and the ISO, make it difficult for them to estimate their willingness and ability to participate in a DR program.<sup>15</sup> Many expressed that their current position was to “stand pat” in terms of their electric service and make no significant investment in time or capital resources until more is known about how the market will be structured. Some anticipate that this will not occur until mid-year 2006 or later, leaving them precious little time to effectively prepare for the new market structure. Regardless, all of the focus group participants felt that, going forward, DR would be a key driver of monetary savings for end-users and source of timely load reductions for the power system.

### **A.6.2 Likely Motivators to Participate in DR Programs**

Ameren customers were asked what items would spur their participation in a future DR program. Customer responses include:

*Monetary Savings:* Customers stated that reducing their energy bill is the single largest motivator to participate in a DR program. Several participants noted that energy costs represent a significant (roughly 30%-40%) portion of their total operating costs. There was a general consensus that a 15% savings (drop) in total energy costs would be sufficient to get corporate level attention for DR related projects and programs. However, several participants stated that they would still be interested in DR at lower levels of savings. Further, the representative from the steel manufacturing company said that he sees the following short- and long-run savings from DR: 1) DR programs can lower energy costs for customers in the near term via incentive payments, and 2) DR can help put downward pressure on future electricity tariffs by reducing the need to build new gas-fired power plants.

*Capital Budgeting Assistance:* The discussion of monetary benefits highlighted the challenges that some firms face in making an internal case for DR investments. The representative from the healthcare services firm stated that one of the dilemmas that he faces is that while utility (energy) bills account for 45% of total plant operating costs, they represent only 1% of total corporate costs. This low percentage of energy costs to total corporate costs makes it tough for DR (and energy investments in general) to compete with projects submitted by other business units that often have simple payback periods of two years or less. To combat this problem, the healthcare services firm representative stated that he would value receiving some assistance in making the internal case for DR investments (e.g., support in quantifying the economic benefits of DR to corporate management). Other focus group participants felt that this would be beneficial as well.

*Public Service:* All of the focus group participants indicated that public service-related elements would be a key driver of their DR program participation. The steel company representative recognizes that they are a large single load point on the utility grid and that they will do whatever they can to help avoid brownouts (he cited a recent example in which they shed load for CILCO). The representative from the equipment manufacturing firm agreed and stated that as part of a past CILCO emergency, they went off line and ran all of their self-generation units.

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<sup>15</sup>These items are being evaluated by Illinois Commerce Commission officials as well as by stakeholder working groups, including the Rates Working Group (RWG) and Competitive Issues Working Group (CIWG). See Final Report of the Illinois Commerce Commission's Post-2006 Initiative.

Further, they provided CILCO with some voltage support via the firm's capacitors.<sup>16</sup> Although the focus group participants were unanimous in stating that they would help out in times of emergency, it was noted that receiving public recognition of their efforts from the utility (e.g., public acknowledgement in the local press) would be appreciated and a motivator to participate in subsequent DR events/programs.

*Ease of Participation/Flexibility:* Several customers stated that they would be more likely to participate in a DR program if it had a flexible set of communication protocols (e.g., web access to program information and events) and a transparent pricing structure. The university representative discussed a past load management/demand bidding program in which he would get an email notifying him of a program event on a day-ahead basis. He could view the program price schedule on the web and enter in how much power he could off load (through on-site generation) on the following day. The representative from the healthcare firm agreed that having a simple platform for communications, that doesn't require a lot of time and effort to navigate, is a critical element for future DR programs.

*Account Representative/Client Management:* It was noted that one motivator/factor that had led focus group participants to enroll in past energy efficiency and load management programs is the relationship that they have with their utility account representative. The healthcare services firm representative stated that there were several programs in the past that they would not have participated in if their account representatives had not provided them with such a high level of customer service and overall support. The participants also noted that account representatives need to understand *their* business, not just the utility model.

*Ability to Aggregate:* Customers expressed an interest in being able to aggregate their load shedding response across multiple plant facilities for the purposes of DR programs. The representative from the healthcare services firm noted that they have done this as part of past utility programs, specifically in relation to Commonwealth Edison's service territory. The representative from the equipment manufacturer stated that he would like to explore this option but noted that his facilities span multiple utility service territories and ISOs. A discussion then ensued about curtailment service providers and the mechanics of shedding load under the umbrella of a third party aggregator. Some have tried working with curtailment service providers but found it difficult due to uncertainty about the proposed value propositions.

*Technical Assistance:* Several of the attendees felt that receiving technical assistance could be a potential motivator to participate in a DR program. However, the entity providing the technical assistance would need to be well versed in the specific business and operational processes of the customer's industry. For example, the steel company representative commented that there are only certain blocks of time in which their furnace can be shut down and that any technical assistance provider would need to fully understand these types of operational parameters. Other participants, including the equipment manufacturing firm representative, stated that they have adequate internal technical assistance resources and do not require outside support.

*On-bill Financing.* Focus group participants, in particular the healthcare services firm representative, expressed an interest in financing DR investments via a utility on-bill financing

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<sup>16</sup> This comment was unique in that it was the first time in all the six focus groups that customers discussed being called on to provide voltage support due to emergency conditions. This is another potential attribute/element of DR programs that could be more effectively utilized in subsequent program designs.

scheme. Customers indicated that it would be easier to justify DR investments if they could be rolled into their monthly bill.

### **A.6.3 Mandatory vs. Voluntary Programs**

The vast majority of focus group participants stated that they would prefer a purely voluntary type of DR program structure. This was critical for the building materials firm representative who stated that it is extremely difficult to commit to specific levels of load shedding in advance. In general, the customers recognized that voluntary programs would carry lower levels of incentives than mandatory programs. Some of the focus group participants raised the possibility of adopting a hybrid approach that allows customers to sign up for a designated (minimum) level of firm load reductions but have an option for making supplemental reductions that are above and beyond what is promised. The level of payment for supplemental reductions would be lower than the price paid for firm load reductions. The representative from the equipment-manufacturing firm indicated that they could do either a mandatory or voluntary program.

Only the healthcare services firm and the industrial gas production company representatives seemed to favor a stronger (mandatory type) contract. The healthcare services representative stated that their rationale for seeking a mandatory contract was that it would be easier to plan going forward if a certain price and level of load reduction were locked in. The industrial gas production company representative stated that they would be willing to enter into contracts for providing firm load reductions that would be analogous to what a utility would expect from a generator. Both representatives stated that they would expect to pay penalties for non-compliance.

### **A.6.4 Event Duration and Notification**

Listed below is a summary of comments made by focus group participants regarding their initial thoughts or preferences relating to DR program event duration and notification issues:

- *Advanced Notice:* Customers stated that, in an emergency, they could shed some load with only a one to two hour notice (one customer even indicated 10 minutes would be doable). In general, however, focus group participants stated that they would expect to have day-ahead notice prior to program events.
- *Event Duration:* When probed, focus group participants did not settle on a specific preferred duration of DR program events. In general, participants agreed that six to eight hours is a maximum feasible period (the representative from the steel company noted that they have curtailed load for this length of time in the past but that was extremely challenging). However, it is important to note that the representative from the industrial gas production firm indicated that they could participate in an event that was up to 14 hours in duration (this type of flexibility was unique among the focus group participants). Several participants noted that the event duration needed to take into account that the likely response from customers would involve the use of back-up power generation units. These units would need to be staffed for added hours and would therefore result in added costs (overtime pay as well as fuel and accelerated maintenance expenses).

- *Program Events on Consecutive Days*: Focus group participants indicated that holding events on consecutive days is possible but problematic for the following reasons: 1) many of these firms operate their production lines on a “just-in-time” delivery basis which is not conducive to prolonged periods of outage (in particular for the building materials firm), and 2) companies that would respond to an event by running self-generation units will eventually be constrained due to the need to change the units’ oil every 250 hours. Changing the oil on back-up power units can take up to a week or two to complete. Similar to comments on event duration, the representative from the industrial gas production firm indicated a higher level of flexibility/tolerance for participating in events on consecutive days. He noted that his firm could participate in events on up to four consecutive days.

#### **A.6.5 Duration of DR Programs**

Most focus group participants stated that they would like to see DR programs in place for a minimum of three-years. The representative from the steel manufacturing company said that they would like programs with a base life of three to five years with options for added duration and a one-year cancellation clause. The representative from the healthcare services firm concurred and indicated that they would be reluctant to enter into contracts that would need to be renegotiated every two years, due to the time, energy and cost associated with contract negotiations – relative to their other business priorities. The representative from the industrial gas production company stated a one-year program duration is acceptable so long as it generates a positive benefits stream.

#### **A.6.6 Payment Structures**

The majority of focus group participants stated that they would like to see payments for participating in a DR program in the form of a specific line item credit on their monthly utility bill. The only exception to this statement was the building materials firm and the industrial gas production company that both expressed a preference for receiving a check (the building materials representative felt that this would raise the visibility of the benefits from DR while the industrial gas production company representative wants to see DR payments and energy costs as separate line items). Other modes of payment that were raised by the participants included the creation of an off-balance sheet financing vehicle that customers could access to finance plant improvements and ongoing maintenance programs.

#### **A.6.7 Customer Thoughts on Key DR Program Attributes**

At the end of the focus group session, each participant was asked to review a list of DR program attributes that were identified earlier during the session. Each participant was asked to vote for 2 items (attributes) that they felt would be **most** important in their decision to enroll in a DR program. Participants were also asked to vote for 1 item that would be **least** important in their decision to enroll in a program. Below is a summary table listing the voting results for each participating Ameren customer.

**Table A-12 DR Attribute Voting Results – Ameren**

<b>Program Attribute</b>	<b>Most Important</b>	<b>Least Important</b>
Financial Incentives (magnitude)	5	0
Event Parameters	2	0
Other Program Parameters (customer service, transparency, etc.)	0	3
Technical Assistance	0	4
Ability to aggregate load	3	0
Voluntary vs. Mandatory	4 (flexible/voluntary)	0

## Appendix B. Focus Group Description and Background Material

This appendix provides background on customer recruitment, the focus group process, background materials sent to participants, and the focus group guide used by facilitators.

### B.1 Recruitment of Customers

A similar approach was utilized to recruit participants for each focus group.

- Step 1: Send an email with introductory project materials to utility and regulatory representatives, committing to follow-up to assess their interest in participating.
- Step 2: Conduct conference calls with utility (and, in some cases, regulatory) officials to discuss the objectives of the project and target types of end-users (i.e., medium and large non-residential customers in certain high potential DR lines of business), and address any concerns they have.
- Step 3: The utility customer account leads were asked to compile candidate customer contact lists of about 30 companies and made some initial contact with customers notifying them that Nexant would be asking them to participate in an upcoming focus group.
- Step 4: Once the utility “warm-up” calls were completed, Nexant sent email invitations to selected customers on the contact list that listed time, location and background materials (project description sheet and primer on DR concepts and definitions).<sup>17</sup> Follow-up calls to potential participants were made roughly two weeks prior to the focus group session. Participants were informed that the results of the focus group discussions would be “scrubbed” in order to maintain confidentiality.
- Step 5: Several follow-up phone calls were typically needed to secure candidate customer participation. As with most focus groups, this resulted in actual turn-outs numbering about 8-10 per group.

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<sup>17</sup> The project team followed the hosting utility’s lead in terms of how to handle focus group participation honoraria.

## B.2 Development of the Focus Group Process

An effort was made to conduct the focus groups in a manner that allowed for a targeted discussion of DR programs without unduly restricting or directing customer responses. To achieve this objective, Nexant developed a set of focus group materials and a facilitator discussion guide that were intended to solicit feedback from customers on what they see as the key parameters of customer-friendly DR programs; copies of Nexant's focus group materials are included below. Each focus group discussion was organized into the following three main parts:

- *Part A: Focus group kick-off* – introduction of focus group leaders and attendees, summary information on the project, brief discussion on defining what is DR, statement of the focus group objectives, collecting the participants first impressions of DR, review of participation guidelines<sup>18</sup>, logistics, etc. (approximate duration, 20 minutes)
- *Part B: Group discussion* – a moderator's guide was prepared to facilitate discussions with customers. This included prompts for discussing the following questions and suggested topic areas, all designed to trigger their thinking about improved innovations in these areas: customer motivation to participate in a DR program, event trigger/frequency/duration, notification process, payment schedule, contract terms, ability to be load responsive, and previous experience in DR programs (approximate duration, 90 minutes)
- *Part C: Closing session* – based on the results of the group discussion period (Part B), the facilitators called a 10 minute recess in order to compile a list of the top 8-10 topical areas raised by that focus group's participants. When the participants came back together, each customer was asked to vote for the two program attributes that they felt were the most important and the one that was least important in securing their potential participation in a DR program. Customer votes were then collected by the focus group facilitators and posted on a white board to elicit further discussion (approximate duration, 20 minutes).

The overall objective of this last element of the focus group process was to help participants hone the program areas that are most essential to them in light of the overall benefits and potential tradeoffs from participating in DR programs.

To ensure that customer comments were accurately captured, a video and audio copy of each focus group was made. Further, two representatives of Nexant led the focus groups to ensure that discussions were fluid and that key customer comments were factored into the ongoing meeting as well as the summary of the final results. Section 3 of this report provides a review of the key findings of each focus group. Detailed summaries of the focus groups conducted in with customers in Arizona (with APS, SRP, and TEP), Delaware (Delmarva), Illinois (Ameren), and New Jersey (Atlantic City Electric) are included in Appendix A.

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<sup>18</sup> It was in this initial portion of the discussion that we clearly stated the utilities' position that there was not necessarily a connection between the DR options being discussed and the offerings that the utilities may or may not be pursuing with their customers.

## **B.3 DR Materials Given to Customer Participants**

### **B.3.1 DR Primer**

#### **What is Demand Response?**

Demand Response (DR) refers to the capacity of electricity customers to reduce their consumption on relatively short notice in response to changes in hourly prices or to system emergencies. Reductions in end-user consumption are often achieved through the implementation of load shifting and/or conservation actions (including changes in behavior) such as the installation of energy management systems, on-site generation of power, and the use of load curtailment equipment (e.g., to control a given process line or end-use). In return for adjusting their energy use, customers receive economic benefits through direct payments for capacity reduction or through favorable electricity price schedules. DR programs currently in use throughout the U.S. seek to obtain demand response from customers through time sensitive interruptible tariffs and direct load control programs or through price responsive dynamic pricing, or demand bidding elements (see descriptive program examples below).

#### **What are the Potential Benefits of Demand Response Programs?**

Significant economic, environmental, and operational gains can be achieved through DR.<sup>19</sup> Recent experience in DR programs across the country indicate that DR can:

- Allow customers to better manage energy costs and use energy more efficiently;
- Improve the reliability of electric power systems;
- Reduce peaks in power market prices;
- Generate monetary savings for customers through tariffs that send strong signals that more accurately reflect the true economic cost of electricity use; and
- Improve the corporate image of participants by allowing customers to voluntarily make load curtailments that help increase the reliability of the power grid.

#### **What Type of Eligibility Requirements are Placed on DR Program Participants?**

While there is a lot of interest in some states for offering DR programs across all types of customers (e.g., residential through large industrial), many DR proponents focus on the benefits to be derived from offering DR programs to larger commercial/industrial customers. Therefore, often one sees participation restrictions based on the size of the customer's load, and/or the amount of demand that can be curtailed during the limited number of program events. In addition, although some DR programs are based solely on voluntary customer reductions in energy use, a majority of programs contain contractual provisions that help secure load curtailments for utilities during "day ahead" designated program events. This includes the use of program specific energy pricing schedules for DR participants (or other forms of monetary measures). In exchange for reduced rates during non-critical hours, customers are exposed to higher rates that penalize end-users for non-compliance during program events by charging tariffs that are well above a customer's otherwise applicable rates. Program participants will

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<sup>19</sup> *Dimensions of Demand Response: Capturing Customer Based Resources in New England's Power Systems and Markets Report and Recommendations of the New England Demand Response Initiative*. NEDRI. July 23, 2003.

typically sign formal contracts with their utility or DR service provider that codifies their commitments to curtail load during program events.

### **What are some Examples of Existing Demand Response Programs?**

The current landscape of the DR marketplace is made up of programs that are driven by economic conditions (e.g., price level in the wholesale power market), power system conditions (low reserve margin, surges in peak demand, and emergency events) or a combination of both. The actual sponsorship and delivery of DR initiatives can be directly from a local utility or via a third-party entity such as a system operator, state government agency, or private energy service provider/aggregators. In thinking about these different types of programs, they can simplistically be categorized into three buckets; a) pricing option programs, b) bidding option programs, and c) voluntary programs. The contractual requirements diminish as one moves from pricing options to bidding opportunities, on down to voluntary programs. To illustrate the differences, below please note examples of each.

Pricing Options - Critical Peak Pricing (CPP) Programs. CPP programs include increased prices for participating customers for a set number of hours during designated “critical peak pricing” days, capped at a pre-established number per year. Under a CPP program, a utility determines if the following (or current) day will involve broaching a “trigger” (i.e., sometimes determined by temperature, loading on the systems, or wholesale price forecast) thereby invoking a critical peak pricing event. When this occurs, the utility then notifies all participants. Existing CPP programs include specialized tariffs that are applied to a customer’s Otherwise Applicable Tariff (OAT). For example, during designated “high” CPP periods, rates will be set at several times higher than a customer’s OAT. However, at all other times of the year, rates for CPP participants will be set below their OAT (e.g. perhaps at a 10%, or greater, discount). Participants are often required to stay on the CPP tariff for twelve months.

Bidding Options - Demand Bidding Programs. Demand bidding programs encourage participating customers to restrict electricity use during designated critical periods (events), often by shifting their load to off-peak periods. Program events can be triggered by either economic or power system conditions. Although participating customers are often required to submit bids that exceed a minimum demand (kW), end-users typically maintain a high degree of choice about whether and how much to participate during a given event. Demand bidding programs enable utilities to send price signals to customers prior to the actual events (either on a day-ahead or day-of basis) which provides end-users with the needed time to plan for adjustments in their energy use.

Historical Load Management Options - Interruptible Programs. For several decades utilities across the country have offered customers various forms of interruptible rate programs in order to offset peak demand and thereby increase system reliability. The main elements of interruptible programs include: required reductions of load (frequently obtained through “switch”-oriented technologies installed on a given end-use or process, limited (if any) notification periods, penalties for non-performance, discounts on electricity bills, and a maximum number of annual interruptions.<sup>20</sup> Within the commercial/industrial sector, participating customers have typically

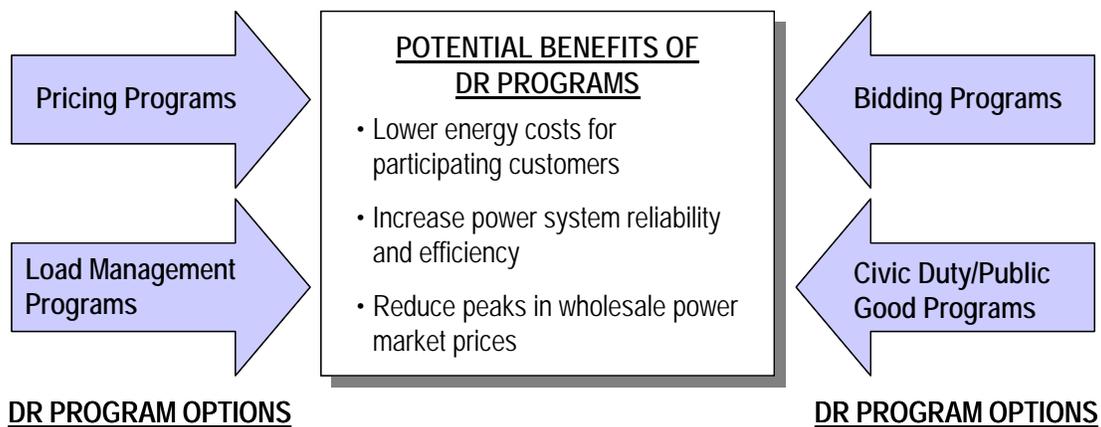
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<sup>20</sup> *Demand Response: Principles for Regulatory Guidance*. PLMA. February 2002.

been end-users that can shift large portions of their operations to off-peak periods and/or utilize back-up generators. Historically, utilities have been very judicious/cautious about interrupting customers, and the program’s viability suffered due to lack of testing the customer’s responsiveness. This has changed somewhat over the last few years given the visibility of power shortages in parts of the country.

Public Good/Civic Duty-related Programs. Existing DR initiatives also include purely voluntary programs in which customers pledge to reduce their load absent the receipt of any financial or technical incentives. These programs have enjoyed a high degree of success in large part by appealing to the civic duty instincts of a utility’s customer base during emergency events. This includes participation from residential and C&I customers as well as institutional end-users such as federal and state government facilities that agree to curb demand when notified. These types of voluntary programs have often remained popular even after a crisis event has passed and have proven to be effective tools in reducing peak demand. Utilities often publicly recognize participants to thank them for their support.

As illustrated in the figure below, each of the different types of program options described above will play an important role in helping stakeholders capture the significant potential economic, technical, and environmental benefits of DR.



### B.3.2 Project Description Sheet

Project Background: Lawrence Berkeley National Laboratory (LBNL) has received funding from the United States Department of Energy, Office of Electric Transmission and Distribution to conduct research that will help define and assess the parameters and features for more customer-friendly demand response (DR) programs. Nexant, Inc., a San Francisco-based energy consulting company, is a sub-contractor to LBNL on this initial phase of the project and is conducting a market research study.

Study Objectives: Previous market research suggests that many customers find it difficult to participate effectively in existing DR programs<sup>21</sup>. The main objective of this study is to elicit and provide cogent feedback directly from commercial/industrial customers in various locations and markets across the country on how best to structure effective and successful customer-friendly DR programs. Information from this study will be made available to interested policymakers and stakeholders involved in the demand response arena for their review and possible utilization. We also hope that the results of this study will provide benefits to other DR-related initiatives in which local utilities and/or state regulatory commissions may already be involved.

Research Approach: We will conduct a series of approximately two-hour focus groups with large commercial and industrial customers in a few targeted states in order to obtain their perspectives on the attributes and features of customer-friendly DR programs. Focus groups will be held in close proximity to the customers' locales and will provide end-users with an open forum in which they can state what they see as the core elements of customer friendly DR programs. This research approach was initially applied in Arizona and is now being replicated in Delaware, New Jersey, and Illinois. The selection of these states was based in part on the type of electricity market structure that is in place (e.g. to cover a range of market structures in states with and without ISOs as well as with and without retail competition) and in part on considerations for increasing industry and geographic representation.

Roles and Responsibilities: The successful completion of this study hinges on the cooperation of several key stakeholder groups. The anticipated roles and responsibilities of key stakeholders are as follows:

- LBNL and Nexant will carry out and coordinate the completion of the market research related activities. This includes overseeing all focus group logistics, inviting customer participants, and reporting on the key outcomes of the study.
- Representatives from electric utilities, state regulatory commissions, and local business associations will help identify and recruit commercial and industrial customers for the focus groups (representatives from the local stakeholder organizations that help recruit participants are welcome to attend the focus groups as observers).
- Participating customers will attend the focus groups and offer their opinions on what are the main components of customer friendly DR programs. Customers may also be asked by Nexant to review a proto-type DR program that is developed based on feedback received during the focus group proceedings.

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<sup>21</sup> 1) *California Energy Commission - Peak Load Reduction Reports (Demand Responsive Element)*. Nexant. Year-end reports for 2001 and 2002 (<http://www.nexant.com/services/cec/index.html>)

2) *Working Group 2 Demand Response Program Evaluation - Summary of Phase 1 Research*. Quantum Consulting. April 8, 2004.

3) *New Principles for Demand Response Planning*. Levy Associates. March 2002.

4) *The Financial and Physical Insurance Benefits of Price-Responsive Demand*. Hirst, Eric. January 2002.

5) *Demand Response: Principles for Regulatory Guidance*. PLMA. February 2002.

6) *Dimensions of Demand Response: Capturing Customer Based Resources in New England's Power Systems and Markets Report and Recommendations of the New England Demand Response Initiative*. NEDRI. July 23, 2003.

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## B.4 Focus Group Materials

These are the materials focus group facilitators used as a general guide for discussions with customers. Each focus group was organized into three sections: Part A, introduction; Part B, general discussion; and Part C, customer voting on key DR program attributes.

### Part A – Outline for Focus Group Introduction

1. Introduction of focus group leaders and customer attendees
2. *Summary information on the project*

Background: Lawrence Berkeley National Laboratory (LBNL) has received funding from the United States Department of Energy, Office of Electricity Delivery and Energy Reliability to conduct research that will help define and assess the parameters and features for more customer-friendly demand response (DR) programs. Nexant, Inc. is a sub-contractor to LBNL on this initial phase of the project and is conducting a market research study. Focus groups like the one being conducted today, in which feedback on customer-friendly DR programs is obtained directly through discussions with customers, are the cornerstone of our study. Additional focus groups are planned for large commercial/industrial customers in Illinois and New Jersey.

3. *Brief discussion on what is DR?*

Given the myriad of possible DR programs and drivers, a brief definition of DR will be given. The objective is to confirm that all participants have a general understanding of DR as well as lay the foundation for the main topics of the focus group.

Definition of Demand Response (DR): DR refers to the capacity of electricity customers to reduce their consumption on relatively short notice in response to changes in hourly prices or to system emergencies. Reductions in end-user consumption are often achieved through the implementation of load shifting and/or conservation actions (including changes in behavior) such as the installation of energy management systems, on-site generation of power, and the use of load curtailment equipment (e.g., to control a given process line or end-use). In return for adjusting their energy use, customers receive economic benefits through direct payments for capacity reduction or through favorable electricity price schedules. DR programs currently in use throughout the U.S. seek to obtain demand response from customers through time sensitive interruptible tariffs and direct load control programs or through price responsive dynamic pricing, or demand bidding elements.

4. *Statement of focus group objectives*

A short statement of the focus group objectives will be given in order to clarify expectations and help frame the subsequent group discussion.

Main Objectives: Previous market research suggests that customers find it difficult to participate in existing DR programs. The main objective of our study, and this focus group, is to elicit feedback directly from commercial/industrial customers on how best to structure effective and

successful customer-friendly DR programs. It is important to note that the results of this focus group will be shared with your utility, but it is independent of any program design initiatives they may have underway. Your feedback on customer friendly DR programs will serve as the basis of our recommendations on new paradigms to consider when designing DR programs.

### 5. *Logistics and guidelines*

Prior to starting the general focus group discussion, the following logistical information and focus group guidelines will be discussed.

- The focus group discussions will last approximately an hour and a half;
- The discussion will be recorded for the sole use of the project research team;
- Customer responses during the focus group will be kept confidential;
- There are no right answers to the questions posed by focus group facilitators (this meeting should be a wide-open discussion with all items open to consideration);
- A summary of our findings will be shared with your local utility;
- To ensure an open discussions, an effort was made to select a cross section of customers for different industry sectors (i.e., avoid limiting discussion due to competitive/proprietary information issues); and
- It is kindly requested that all cell phones and pagers be turned off during this focus group meeting.

## **Part B – Guide on Topics for Facilitators**

This document is intended to serve as a discussion guide for use by focus group facilitators. The items listed below serve as a general guide on topics to be covered. This guide is not meant to serve as a list of direct questions that will be asked to customers.

### *Motivation to Participate in a DR Program*

Probe for answers to the following questions/topics:

- What would be your major motivation for participating in a DR program? (monetary savings, help avoid blackouts, receipt of energy software/equipment)
- Would receiving technical assistance (e.g., energy audit and implementation support) spur your potential participation in a DR program?
- Would receiving financial support for the purchase of DR equipment (meters, load curtailment equipment, and software) foster your participation in a program?
- Would you be more inclined to participate in a program that allowed for voluntary reductions in demand (as opposed to only mandatory reductions)?
- What would be the preferred method of contacting you regarding your potential participation in a DR program? (call from utility representative, mailings, etc.)
- Probe to see whether or not customer participation might be driven in part by a realization that DR programs can help them better prepare for the future by taking part (gaining experience now) in sophisticated pricing schemes.

### *Event Trigger*

Probe for answers to the following questions/topics:

- What do customers think should be the trigger mechanism for a DR program event? Economic conditions (e.g., day-ahead price forecast, same day spot forecast, etc.) or emergency conditions (forecasted temperature, utility forecast, statewide forecast)?

### *Event Frequency*

Probe customers on the following:

- What is the average numbers of program events per year in which you would expect (likely be able) to participate?

### *Event Duration*

Probe customers on the following question area:

- What do you believe is the proper time duration for a program event? (i.e., amount of time that you believe your facility could shed load/alter consumption?)

### *Notification Process*

Probe customers on the following notification related items:

- What would be the preferred method of contacting you regarding program events? (email, phone call, pager)
- How much notification (advance warning) would you want before a program event is implemented?

### *Payment Schedule*

Probe for answers to the following questions/topics:

- Assuming that you have enrolled in a DR program, how would you like to receive payments/program incentives? (e.g., credits on your bill, periodic incentive check, or be put on a program rate structure that provides electricity price discounts)
- After a program event in which you have participated (curtailed load), how quickly would you expect to receive a payment?
- Probe customers on how they would handle non-compliance with load reduction projections.

### *Contract Terms*

Probe for customer thoughts on the following elements:

- What is the minimum amount of time that customers would want to see a program be in effect (i.e., probe for customer expectations on consistency of program offerings, desire to avoid frequent changes in programs, etc.)
- Probe for customer thoughts on the benefits of simplicity of programs versus all encompassing program offerings.
- Probe for customer thoughts on the use of riders versus stand-alone tariffs (offered by either a utility or a third-party supplier).

- Ask customers if they believe that program contracts should contain a requirement for minimum levels of load reduction?

### *Ability to be Load Responsive*

Probe for answers to the following items:

- How easily could your facility shift load to off-peak hours during program event periods? (try to determine the ease in which customers could shift load)
- What percent of their load do customers think that they would be able to shed.

### *Previous Experience in DR Programs*

Assess whether or not customers have taken part in DR programs in different jurisdictions/states (e.g. probe to see if focus group participants are national account customers with prior DR experience – if yes, discuss what they feel were successful/unsuccessful program elements).

## **Part C – Review of Key Attributes Identified by Customers**

The facilitator will lead a two-phased closing session that will focus on the key program attributes that were identified by the participating customers. In phase one, a table (example shown below) will be handed out to each of the participants, which will include a customized list of the attributes that were identified during the focus group.

	<b>Event Trigger</b>	<b>Contract</b>	<b>Event Frequency</b>	<b>Event Duration</b>	<b>Notification Process</b>	<b>Payment Scheme</b>
Economic						
Reliability						

Each customer will be asked to vote for the two attributes that they feel are the most important and the two that are least important in securing their potential participation in a DR program. Customer votes will be collected by the focus group facilitators and will then be posted on an overhead projector or white board to help elicit further discussion.

In phase two, the facilitators will highlight some of the likely tradeoffs that customers may face with each of the selected (i.e., “most important”) program attributes. For example, focus group participants will be informed of potential program requirements regarding the minimum size of load reductions, penalties for non-compliance, and upfront capacity/reservation payments. Once these potential tradeoffs are discussed, focus group participants will then be asked to re-cast their votes on program attributes. The overall objective of this last element will be to help participants hone in on the program areas that are most essential to them in light of the overall benefits and potential tradeoffs from participating in DR programs.