NEW YORK STATE Public Service Commission

Demand Side Management and Peak Load Reduction

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What is Demand Response?

- Demand Response (DR) → When customers respond to signals about the scarcity of electricity by temporarily reducing their consumption
- DR measures are used to reduce peak loads (the amount of electricity being demanded)
- Reducing peak loads offers numerous potential benefits, including
  - Reducing the need to operate the older and/or most expensive marginal peaking generation facilities, thus improving overall generator efficiency and reducing emissions
  - Deferring the need for new generating capacity
  - Deferring the need for new delivery infrastructure (e.g., transmission lines)
  - Reducing energy and capacity costs for consumers
- DR benefits not only the person reducing consumption, but also all other ratepayers and the grid as a whole
- Key component of our transition to the use of a smart grid technology

Demand Response in New York State

- Several DR programs are already in place in the New York Independent System Operator (NYISO) Zone J
- NYISO Zone J, served by Consolidated Edison Company of New York, Inc. (Con Edison)
  - Experiences the greatest rate of peak load growth and the highest wholesale energy and capacity costs
  - The area relies on numerous peaking generation units, some of which are relatively inefficient and produce high emissions
- DR programs already in place in Zone J include
  - Programs administered by the NYISO and approved by the Federal Energy Regulatory Commission
  - Programs administered by the New York Power Authority
  - NYSPSC has approved utility-specific programs to reduce peak demand and help meet reliability needs (e.g., Con Edison has specific demand response programs and a Distribution Load Relief Program)

NYISO DR Programs

- The NYISO has four Demand Response programs
  - Emergency Demand Response Program (EDRP)
  - ICAP Special Case Resources (SCR) program
  - Day Ahead Demand Response Program (DADRP)
  - Demand Side Ancillary Services Program (DSASP).

NYISO DR Programs

- Both the Emergency Demand Response Program (EDRP) and the ICAP Special Case Resources (SCR) program can be deployed in energy shortage situations to maintain the reliability of the bulk power grid
  - Both programs are designed to reduce power usage through shutting down of businesses and large power users
  - Companies, mostly industrial and commercial, sign up to take part in the programs
  - The companies are paid by the NYISO for reducing energy consumption when asked to do so by the NYISO
  - Reductions are **voluntary** for **EDRP** participants
  - **SCR** participants are **required** to reduce power usage and as part of their agreement are paid in advance for agreeing to cut power usage upon request
  - Over 2,400 MW EDRP/SCR resources statewide through NYISO programs
    - About 450 MW of peak reduction in New York City from DR during 2010 summer peak

NYISO DR Programs

- The Day-Ahead Demand Response Program (DADRP) allows energy users to bid their load reductions, or "negawatts", into the Day-Ahead energy market as generators do
  - Offers determined to be economic are paid at the market clearing price
  - DADRP allows flexible loads to effectively increase the amount of supply in the market and moderate prices
- The Demand Side Ancillary Services Program (DSASP) provides retail customers that can meet telemetry and other qualification requirements with an opportunity to bid their load curtailment capability into the DAM and/or Real-Time Market to provide Operating Reserves and regulation service
  - Scheduled offers are paid the appropriate marketing clearing price for reserves and/or regulation

Demand Response Initiatives in New York State

- The NYSPSC is actively pursuing cost effective DR programs to provide benefits such as
  - Deferring the need to build new infrastructure
  - Reducing the reliance on very expensive and inefficient electric generating units which would only be needed for those relatively few hours when the electric demands are high (thereby reducing costs for consumers and reducing emissions)
- June 2008: The NYSPSC instituted the Energy Efficiency Portfolio Standard (EEPS) proceeding, and required consideration of "demand response technology and utility rate incentives to encourage customers to shift usage and reduce peak loads"
- February 2009: The NYSPSC instituted a new proceeding, to focus more precisely on the issue of examining potential initiatives to promote DR in parts of the state where peak load reduction would provide the greatest benefits to consumers in the form of reduced infrastructure investments and reduced emissions (the metropolitan New York City area)

Demand Response Initiatives Proceeding

- Scope is to examine
  - The possibility of enhancing existing utility-administered programs
  - The possibility initiating new peak load reduction programs
  - The potential use of competitive providers within the context of utility-administered programs
- The NYSPSC noted that to the extent that it is cost-effective, DR programs should be designed to integrate the program delivery functions with the program delivery functions of energy efficiency programs
- Initial focus was on DR efforts in the NYISO Zone J where it is expected to be the most cost effective
  - The system experiences peak demand for only a small number of hours per year and only during the summer months
  - By decreasing the highest peaks, the infrastructure needed and therefore, the expense of meeting peak demand could be significantly reduced

Demand Response Initiatives Proceeding

- January 2011: The NYSPSC approved changes in Con Edison's demand response programs to
  - Increase enrollment
  - Improve response to events
  - Leverage enrollment from NYISO demand response program participants
  - Make it easier for customers to participate in the programs

Con Edison DR Programs

- Commercial System Relief Program (CSRP)
  - For large commercial or industrial customers that can curtail load or bring emergency generation to reduce demand by a minimum of 50 kW on an individual customer basis, or 100 kW through aggregation
  - Customers able to curtail load when called upon will receive capacity reserve payment, and conversely if a customer is called and does not respond, the customer will be assessed a penalty
  - The program will target at least 50 megawatts in the Greenwood load packet, with a total program cap of 200 megawatts in the company's service territory
  - Outside of environmental justice communities, caps on how much distributed generation can participate in the program will depend on the specific distributed generation technology employed

Con Edison DR Programs

- Critical Peak Rebate Program (CPRP)
  - Targets all customer classes
  - Available to aggregators who contract to provide at least 100 kW of load relief in one or more networks
  - Participants who reduce their usage by at least 1 kW and up to 24 kW will receive a monthly payment of $1/kW-hr for reductions made during events
    - Customers with loads greater than 250 kW are required to provide a minimum of 10 kW of load relief
  - Participants who reduce 25 kW or more will receive an end of year payment of $1.50/kW-hr for reductions during events

Con Edison DR Programs

- Network Relief Program (NRP)
  - Targeted specific networks that are in need of system relief
  - Requests for proposals are used to organize DR resources to provide relief in specific networks, at certain hours, over a specific number of years, in an attempt to defer the need to build additional transmission and distribution infrastructure in particular networks
  - Con Edison proposes to initially enroll 5 megawatts in this program

Con Edison DR Programs

- Residential Smart Appliance Program (RSAP)
  - Targets DR from residential customers by allowing Con Edison to control a participating customer's electric appliances (if equipped with curtailable technology) through the use of open communication devices
  - Customers will have the ability to override the company's control of their appliances when events are called
  - The program is aimed at reducing load by 240 kW
  - Customers will receive a $200 rebate for each Smart Appliance or Home Area Network and may receive additional payments of $10-$25 based on their response to tests and actual events

Con Edison DR Programs

- Distribution Load Relief Program(DLRP)
  - DLRP participants provide DR through load reductions or operation of on-site generation when Con Edison determines that the next system contingency would result in a Condition Yellow, or if a voltage reduction of 5% or greater has been ordered
    - Condition Yellow exists when the next contingency (excluding breaker failure) either will result in an outage to more than 15,000 customers or will result in some equipment being loaded above emergency ratings
  - Two enrollment options are available
    - Voluntary option – participants are provided with an energy payment ($ per kWh) when load relief is provided
    - Mandatory option – participants receive an up-front reservation payment ($ per kW-month) for each month of the Summer Capability period for agreeing to provide the pledged load relief if an event is called

Recent Federal DR Policy Updates

- March 2011: Federal Energy Regulatory Commission issued a ruling on how people should be compensated for demand response participation (Order No. 745)
  - FERC ruled that organized wholesale energy market operators must pay demand response resources the market price for energy, known as the locational marginal price (LMP), when those resources have the capability to balance supply and demand as an alternative to a generation resource and when dispatch of those resources is cost-effective
  - FERC noted that doing so is necessary to preserve and enhance the competitiveness of wholesale electricity markets, something FERC and Congress have promoted across the board
    - For example, in the Energy Policy Act of 2005, Congress established a national policy of eliminating unnecessary barriers to demand response participation. FERC has long held that active participation by customers in organized wholesale energy markets through demand response helps to increase competition in those markets, but had not previously required all organized wholesale markets to compensate demand response resources in the same manner. For example, PJM has been paying the LMP minus the generation and transmission portions of the retail rate, while ISO New England has paid LMP only when prices exceeded a threshold level. Even within a given market, the continual threat of policy changes resulted in a chilling effect on the full implementation and deployment of demand response.
  - Removes uncertainty -- FERC held that demand resources should be paid at market-based prices when two criteria are met: capability and cost-effectiveness
    - The DR must have the capability to balance supply and demand as an alternative to a generation resource. To be paid at market prices, demand resources must be effective at displacing the need for bringing additional generation online
    - The demand resources must be cost-effective alternatives to generation, based on a "net benefits test". In essence, this test is satisfied when the overall benefit of the reduced energy price resulting from dispatching demand response resources exceeds the cost of dispatching and paying LMP to those resources. If both of these criteria are satisfied, organized wholesale energy market operators must pay demand response resources the market price for their energy value.
  - FERC supports position that, for DR to reach its full potential, people must be compensated fairly for the value they provide through interrupting their consumption of electricity

Need Effective Electric Policy Coordination

- Demand Response, Energy Efficiency and Smart Grid/Smart Metering initiatives are not three distinct opportunities
  - Together they compound to offer new and expanded opportunities for managing the electricity consumption in New York State
  - Together they can mitigate market volatility, eliminate price spikes, improve resource adequacy, alleviate congestion, and improve reliability