

Demand Response: Its Impact on Energy and Reliability

A presentation by:

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What Is ELCON?

- The national association for large industrial users of electricity in the U.S.
 - Founded in 1976
 - Members from a wide range of industries from traditional manufacturing to high-tech
- The views today are mine alone



What I Plan To Do Today

- Briefly describe Demand Response (DR) from an industrial perspective
 - Emphasize that ELCON has supported and advocated DR for a long time
 - Residential DR is slightly different situation
- Outline some DR basics
- Review some of the difficulties and costs of participating in DR
- Talk about some impediments to DR
- Present an overview of Federal efforts to remove impediments to DR – especially FERC's Order 745
- Offer a few conclusions

DR Certainly Is Not New

- Large Industrials have a long history of providing Demand Response for reliability and economic purposes. But these were generally niche opportunities under utility control
- Examples:
 - Provide operating reserves or emergency service to local control areas (now called Balancing Authorities)
 - Interruptible rates (often a disguised form of cogeneration deferral rate or an attempt to align industrial rates with costs)
- In recent years the DR tariffs/markets of some ISOs and RTOs get high participation rates. ERCOT is one example.

DR Markets – NOT “Programs”

- ❑ The development of markets by ISOs and RTOs that allow participation by DR resources has generally not kept pace with the opportunities given to traditional supply-side resources.
- ❑ Most ISOs and RTOs, and almost all traditional utilities in regulated states, sponsor “demand response programs” that are an artificial construct, independent of actual market operation.
- ❑ For example, ISO/RTO DR programs usually do not fully integrate DR resources in SCADA systems. The resource has to be modeled as a generator, which does not capture DR’s unique characteristics.
- ❑ And, of course the integration of DR in “markets” in non-ISO/RTO areas potentially is more difficult

DR & Legacy Utilities

- ❑ Only about half the country is in the footprint of an ISO or RTO, and not all utilities subject to ISOs or RTOs were unbundled and restructured. Legacy utilities abound.
- ❑ Large industrials typically are forced to negotiate the terms, conditions and compensation for DR with their local legacy utility. There is no DR market with set rules and procedures.
- ❑ Such negotiations may put a wide range of issues on the table, including the level of base rates, cross-class subsidies and other features of retail ratemaking. The contract terms become a package deal that may include resolution on issues not directly germane to DR. But they work, and can be advantageous to both parties.
- ❑ Compliance is assured with liquidated damages clauses or non-compliance penalties.



Characteristics of DR-Capable Industrial Loads

- ❑ Electricity costs are “significant”
- ❑ Long experience with load optimization vis-à-vis two-part tariffs, TOU, interruptible, & RTP
- ❑ Long experience evaluating costs in real-time
- ❑ Active in physical and financial wholesale markets for electricity and natural gas
- ❑ Behind-the-meter generation is common for many industrials, but not necessary
- ❑ Flexible operating practices (*e.g.*, multiple shifts)
- ❑ Adept at co-optimizing on-site generation, energy efficiency and energy management decisions. DR is another tool.

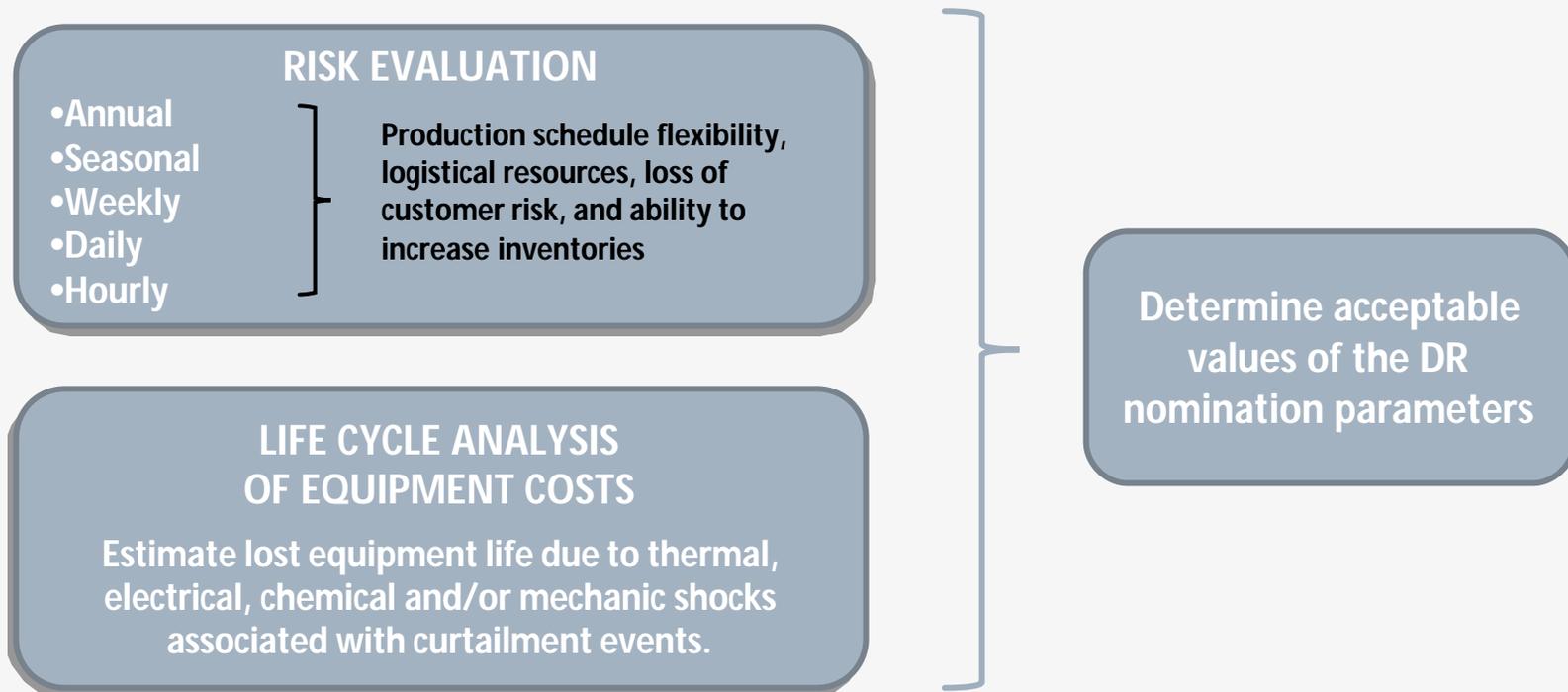
Corporate/Facility-Level Effort Required for DR Market Participation



At the corporate level, senior management must authorize any recommendation to commit to a program to shift or curtail production in response to electricity prices in the energy or ancillary services markets. This process must begin months or a year (often tied to the budget cycle) in advance. The approval is contingent on many factors.

Corporate/Facility-Level Effort Required for DR Market Participation

Requirements for DR Participation



Corporate/Facility-Level Effort Required for DR Market Participation

Requirements for DR Participation

MARKET PARTICIPATION

- ISO/RTO Membership
- LSE Certification
- State PUC Approval
- Credit Requirements
- Other

LABOR CONSIDERATION

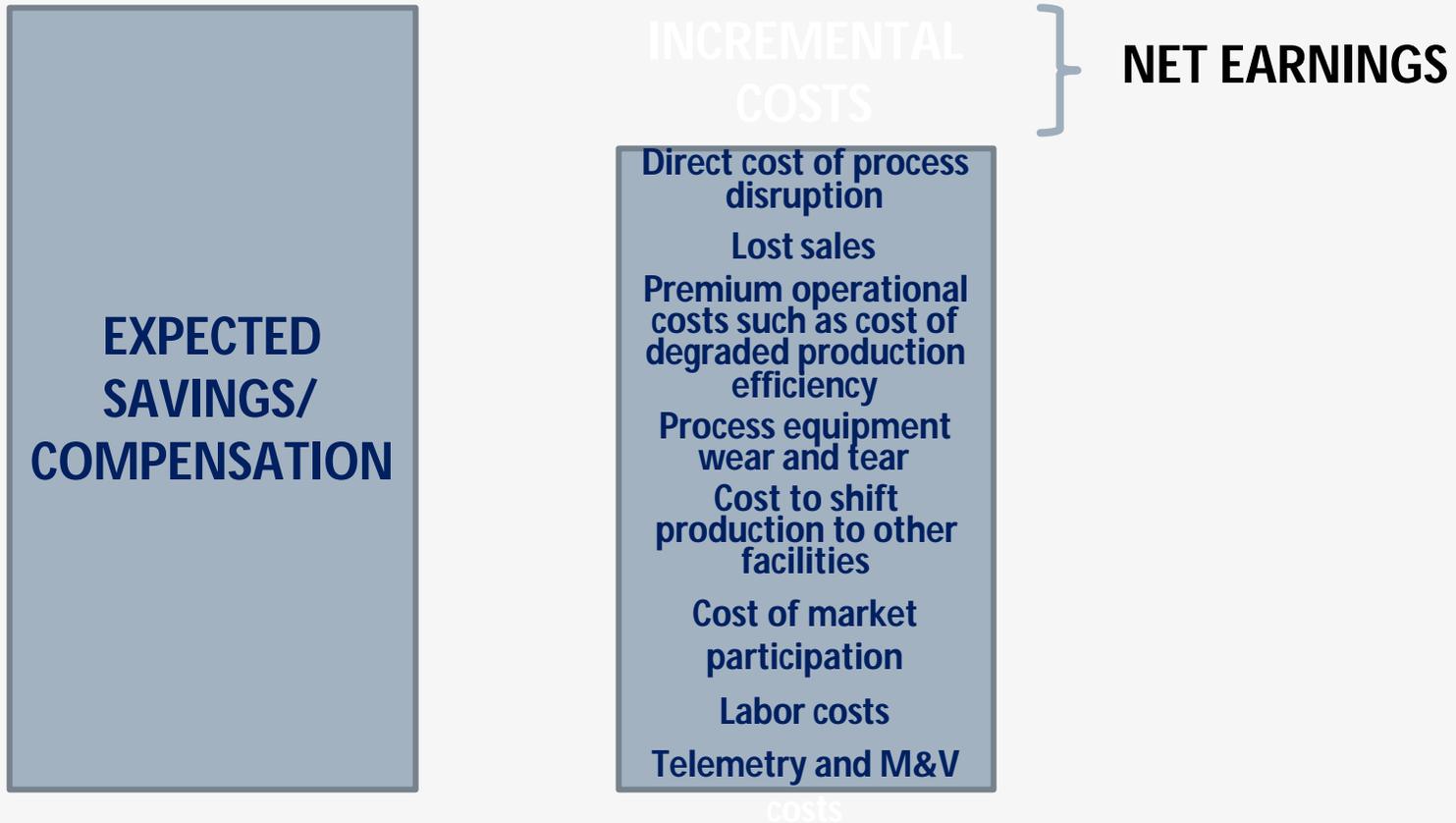
- Work Rule Changes (e.g., shift changes)
- Overtime budget planning

ADDITIONAL RESOURCES

- Dedicated Personnel
- Dedicated Phone "hot line"
- Advanced Metering
- Measurement & Verification (M&V)



Cost Analysis



Impediments to Industrial DR

- Non-market compensation
- Split federal/state jurisdiction
- Ill-suited market/tariff rules – or a lack of “rules”
- Political/financial opposition

Non-market Compensation

- Some claim that the bill savings is adequate compensation
- Others claim DR should be paid full LMP
 - Making DR comparable with generation
 - And FERC Chairman Wellinghoff recently stated that DR should be paid a HIGHER capacity component than generators (i.e., 1.2 to 1.4 multiplier) to reflect the ability to respond more rapidly and at specific locations
- But still others advocate LMP-G
 - Where G is the bill savings “received” for not purchasing the power
- The compensation debate is unsettled
 - There is even disagreement within the industrial community



Split Federal/State Jurisdiction

- DR generally is championed by federal “wholesale” regulators (FERC & DOE)
- Large industrials are “retail” customers subject to retail (usually state) regulatory oversight
 - Retail regulators have had authority over DR transactions (interruptible rates, etc.)
- In some “restructured” states:
 - Some large industrials can participate in ISO/RTO markets
 - But others must become “Load Serving Entities” (LSEs) or “Load Modifying Resources” (LMRs) operating under “Electric Distribution Utilities” (EDUs)

Ill-Suited Market/Tariff Rules

- Market rules and tariffs often tend to be generator centric
 - They are neither comparable nor equitable
 - Industrial DR often does not get full credit for providing a superior product – generators establish a low bar that results in less efficient market operation

Political/Financial Opposition

- ❑ Merchant generators do not want the competition
 - They know the impact that DR will have on electricity prices – especially in the “organized” markets
- ❑ Traditional utilities are stuck in a dated mindset
- ❑ Residential consumer advocates fear industrials will monopolize the DR market and reap all the benefits
- ❑ The ISO/RTO stakeholder processes are ill-suited for mediating market design problems

Federal Initiatives Intended to Remove Impediments to DR

- ❑ Section 1252, Energy Policy Act of 2005 (EPAct2005): Various State and Federal Mandates Related to Demand Response
- ❑ DOE Issues Report to Congress: Benefits of Demand Response in Electricity Markets and Recommendations for Achieving Them (2006)
- ❑ FERC Issues Assessment of Demand Response & Advanced Metering, September 2006 (Updated annually)
- ❑ Section 571, Energy Independence and Security Act of 2007 (EISA): National Action Plan for Demand Response
- ❑ FERC Order No. 719 (2008): Comparability of DR Resources in Organized Wholesale Electric Markets
- ❑ FERC Publishes National Action Plan on Demand Response (2010)
- ❑ FERC Order No. 745 (2011): DR Compensation
- ❑ FERC Order No. 755 (2011): Frequency Regulation Compensation



FERC's Order 745 – Some History

- On March 18, 2010 FERC:
 - Issued a landmark NOPR on DR compensation
 - The FERC Chairman called ELCON prior to the NOPR
- This NOPR:
 - Required each ISO/RTO to “pay to demand response providers, in all hours, the market price for [their] reductions.”
 - FERC said that paying the full LMP should assure that DR resources will be paid on a nondiscriminatory basis for the services they provide to all other customers including:
 - Lowering clearing prices
 - Increased reliability
 - Mitigation of market power
 - Increased consumer choice
 - Lowering risk premiums
 - Reducing needs for long term investments in infrastructure
 - Enabling renewable (but intermittent) resources and
 - Improving overall efficiency



FERC's Order 745 – Some History

- The NOPR specifically asked for comment on the following:
 - The need to compensate DR acting as a resource
 - Whether current compensation is adequate
 - Alternative approaches to compensating DR
 - Whether a reduction in compensation is comparable to an increase in electricity production
 - Whether paying LMP to DR is comparable compensation or is more or less comparable to G
 - Whether payment of LMP should apply to all hours
 - Whether requiring LMP is appropriate across all RTOs
 - Whether FERC should allow regional variations
 - What reviews should FERC conduct
 - Whether specific terms are sufficiently defined



FERC's Order 745 – Some History

- Commissioner Moeller dissented:
 - He questioned whether one size fits all would result in uneconomic outcomes
 - And might not be supportable, esp. in view of FERC's recent approval of PJM's approach to DR compensation
- Over 100 public comments were filed
 - With over 3,800 pages of comments
- A Technical Conference was held

Order 745 – Final Rule

- FERC issued the Final Rule on March 15, 2011
 - That is quite fast for a controversial FERC Order
- It requires:
 - Each ISO/RTO to pay full LMP for DR
 - A “net benefits” test
 - Costs associated with DR compensation be allocated proportionally to all entities that purchase from the relevant energy market
- FERC based, in part, its Order on the:
 - Energy Policy Act of 2005
 - That required the elimination of unnecessary barriers to DR

FERC's Order 745 Requires:

- Facilitating the balancing of supply and demand
- Reducing the dispatch of higher-priced resources
- Mitigating market power
- Supporting system reliability
- Addressing resource adequacy/management challenges surrounding unexpected loss of generation

Limitations on Order 745

- FERC imposed several threshold conditions:
 - **Capability:** The DR resource must be able to comply with the relevant performance standards for resources bidding into the market
 - **Net Benefits Test:** Each ISO/RTO must have a test to show that DR will be cost-effective
 - **Measurement & Verification:** ISOs & RTOs must ensure that their baselines remain accurate and that they can verify that DR resources have performed
 - **Cost Allocation:** Billing units fall with DR performance and the costs should be allocated proportionally

Commissioner Moeller Again Dissented

- He argued:
 - Order 745 gives DR unduly discriminatory or preferential treatment by allowing them full LMP – rather than LMP-G
 - But it also discriminates against DR by requiring the Net Benefits Test
- About 15 entities requested rehearing:
 - Some in support, but want clarification
 - Others oppose
 - E.g., several reiterated their arguments that FERC does not have jurisdictional authority over DR compensation

Current Status of Order 745

- On December 15, 2011 FERC denied rehearing
 - FERC made only very minor changes to the rule
 - Since that time, FERC has approved various ISO/RTO compliance filings
- ISO / RTO DR programs have high participation
 - As an example, demand-side resources in PJM's Capacity Market is nearly 10 GW in 2011
 - PJM's Load Management (LM) revenues exceeded \$500 million in 2010 and were \$487 million in 2011
 - Synchronized Reserve credits for DR were \$5.3 million in 2010 and \$9.4 million in 2011

Court Appeal of Order 745

- Several entities have appealed the Final Order
 - The primary concern regards the requirement to pay full LMP
 - Rather than LMP-G
 - These entities believe that full LMP results in “double paying” in that the DR entity already benefits by not paying for the consumption

Future of DR?

- There is a lot of speculation that the Court will uphold FERC
 - FERC has built a very significant record
 - FERC specifically considered and rejected LMP-G as the appropriate payment
 - FERC's Net-benefits Test may (will?) limit payments based on LMP
 - The Courts often give considerable deference to the expert regulatory body

Factors That Reduce Demand for DR

- An efficient electric system
 - Adequate low-cost generation during peak hours
 - Minimal transmission congestion
 - Regulatory policies that mitigate market power
- Low-cost natural gas (less than \$2?)
- The industrial's opportunity costs and diminishing returns
 - Industrial DR must compete with the core business
- Failure of DR resources to produce
- NERC requiring registration of DR resources
 - DR then has significant compliance costs
- Ongoing economic weakness (low demand) and waning regulatory support



Factors That Increase Demand for DR

- ❑ Declining efficiency of the electric industry
 - Planners do a poor job ensuring low cost resources during peak hours
- ❑ The transmission grid does not keep up with transmission needs
- ❑ Renewable resources (esp. wind) are intermittent and cause significant reliability concerns
- ❑ EPA (and other) regulations result in a loss of significant amounts of generation
- ❑ The movement away from “real” least cost planning

Conclusions

- ❑ DR is far from new, but still in many ways an unknown (or untrusted) resource
- ❑ There are many (and perhaps growing) impediments to DR
- ❑ A variety of strongly held opinions/positions (including within the industrial community) make resolution of problems difficult
- ❑ The future of DR is unclear – Stay tuned!

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