Demand Response – Industrial Customer Perspective

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September 19, 2014

Demand Response

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- Definition
  - Purposely shutting down installed manufacturing capacity (load) that otherwise would operate and consume electricity to limit the total grid electrical load for some time period
- Purpose
  - To avoid the construction of a power plant that would only operate a small number of hours per year for a number of projected years yet be a costly additional year round expense to the rate base
- Areas of Contention
  - How much DR capacity exists?
  - How much of the resource capacity should DR be?
  - DR load drop response characteristics?
  - How DR should be dispatched?
  - How DR should be compensated?

Background

- Prior periods
  - 100% regulated markets with electricity rates below $40 per MWh everywhere
  - Planning and rate setting was based on relatively small geographical territories
  - Significant seams existed in the grid
  - Industrial customers could achieve rates below $30 per MWh by agreeing to be “Interruptible”
    - » Limited number of summer/winter periods of interruption
    - » Limited duration of interruptions (typically 2 to 4 hours per event)
- Current
  - Electricity rates vary widely from $40 to $80 per MWh
  - Minnesota Power industrial rates have increased 35% since 2007 and are projected to increase another 20% by 2018
  - Deregulated markets in some states
  - Capacity planning is largely on a regional scale
  - Ratemaking in regulated markets remains based on relatively small geographical territories
  - Some states have mandatory renewable portfolio standards (RESs)
  - EPA regulations have become quite wide ranging
  - DR and Demand management have replaced “Interruptible” service credits in deregulated markets

Determining DR Participation: Physical Aspects

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- Physical load reduction
  - "How many" MW's of load reduction?
  - Is load reduction measured from operating point just prior to reduction or from the site PLC (Peak Load Contribution) Demand for the delivery year?
  - "How load reduction" occurs ?
  - "How long" to reduce load?
- Order fulfillment impact
  - Will a shutdown impact order delivery? If yes, needs to be resolved.
  - Can those orders be shifted to a second plant?
  - Can intermediate product be staged to cover an upstream unit shutdown?
- Production Delay Impacts
  - Quantify extra reject product due to shutdown and start-up (i.e. product cannot be reworked)
  - Quantify any additional process steps to correct out-of-specification product

Determining DR Participation: Financial Aspects

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- Determine fixed costs associated with DR curtailment period
- Calculate the cost premium associated with additional rejected product and/or changed product manufacturing sequence option identified in the previous steps
- Calculate the net lost margin a DR reduction causes – this becomes the break even DR revenue that must be received
- Calculate what DR revenue the defined program will yield
  - Program specific – can be a combination of monthly DR capacity payments based on registration MW's and energy payments per each DR event
  - Does potential DR revenue exceed the estimated cost of DR performance? If, no than DR performance is not viable.
  - If yes, will net gain from DR performance sufficiently reduce the cost of power to warrant acceptance of all DR participation T's & C's?
- Quantify what the financial penalties are for failing to deliver DR performance to fully understand the DR risk/reward picture

Determining DR Participation: Performance Management

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- Review DR response notification and event performance confirmation requirements
- Determine whether in-house staffing and load metering/data retention is adequate to meet the ongoing DR program requirements
- Determine potential systems issues and whether or not they can cause DR performance issues (company by company review and decision process due to wide range of practices)
- In-house staffing is adequate DR program management
  - Delineate roles and responsibilities between corporate and plant staffs
  - Determine performance tracking metrics
- In-house staffing is not adequate to handle DR program management
  - Evaluate cost/benefit of increasing internal staff
  - Evaluate using a 3rd party CSP (Curtailment Service Provider)
  - Determine what cut of the DR revenue must be shared and whether participation still makes financial sense

ArcelorMittal USA's DR Experience

- DR has only been done in deregulated markets thus far
  - Select regulated markets have tariffs but they provide insufficient value
  - Where applicable in regulated markets we continue to use traditional Interruptible Demand credit tariff structures (larger benefit)
- Straight DR participation is becoming less valuable than maximum PLC demand reduction as programs now typically require year round DR response or pay significantly less for "Summer Only" response classification
- Rule changes in DR load drop measurement from PLC Demand value instead of from Operating Demand level just prior to reduction reduced DR participation value
- EAFs provide synchronous reserve services – load can be reduced quite rapidly and most events only last a few minutes so any steelmaking heat in process can be resumed without detrimental effects
- Higher order book levels reduce mill willingness to take extra DR curtailments
- Internal company structures can simplify or complicate participation (ours mostly simplifies)
- Participation does not require a lot of people or special software → does require that you understand what drives the costs both for the electric grid and the DR participating mill
- For the most part we operate as our own LSE, RES, and CSP instead of sharing the revenue in Pennsylvania and Ohio with 3rd party providers
- 3rd party CSP's were used for the Pennsylvania state program that mandated each EDC to reduce its peak demand value → EDC's contracted with CSP's and CSP's contracted with DR participants

Determining DR Participation: Ongoing DR Rulemaking Aspects

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- DR Rulemaking never ends
- Generators continually challenge every aspect of every DR program
- DR is many times viewed as a “take away” by Utilities
- There is continuous interplay between FERC, RTOs and PUCs regarding jurisdiction aspects (example being FERC Rule 745 which was challenged in the courts and now is being revised)
- CSPs and Industrial Customers are not necessarily aligned on all aspects of DR
  - CSPs are in the business of selling DR services → “more is better”
  - CSPs are better positioned to aggregate incremental DR response capabilities from many customers to achieve a larger total DR load reduction obligation
  - Industrials are in the business of making and selling a physical product and use DR as a tool to help manage power costs → “higher value impact per DR event is better”

Closing Remarks

- All industrial customers should fully evaluate whether DR participation can help to contain power cost escalation
- DR programs should be designed to attract as many industrial customer participants as possible
- Regulators should use DR programs to smooth out power cost peaks caused by building generation capacity too quickly before projected, sustained, load growth materializes
- DR reimbursement rates need to be high enough to reward industrial customers for the operational uncertainty risk that they take on
- Effective DR programs need to be just one part of an effective State plan to achieve sustained reasonable industrial power rates
- Achieving reasonable industrial power rates needs to be just one part of a State plan for sustained economic development

Thank you for the opportunity to provide this input.

ArcelorMittal Operations in the USA

- 4 integrated steel mills each with internal steam and power generation
- 1 BOF and Continuous Strip Caster steel mill
- 7 EAF steel mills
- 6 stand alone finishing mills
- 3 stand alone plate mills
- 2 tubular/pipe mills
- 6 tailored blanks plants
- 2 iron ore mines
- 1 coal mine
- 2 stand alone coke batteries

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