Summary Remarks
Of
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Demand Response in Organized Electric Markets

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Linde Energy Services, Inc. (LESI) is a Load Serving Entity created in 2003. Part of The Linde Group, the world's leading gases and engineering company with around 50,000 employees working in about 100 countries and with over 500MW of industrial load in North America, LESI allows Linde to participate directly in wholesale energy markets and secure electric supply for its manufacturing facilities in electricity markets across the United States. LESI currently supplies affiliated load within the Midwest ISO, PJM and ISO New England. LESI is also a licensed Retail Electric Provider and Qualified Scheduling Entity in ERCOT, and is pursuing similar licensing with New York State and with the New York ISO. By the end of 2008, LESI will be a licensed Load Serving Entity in ten states and five Regional Transmission Organizations. LESI has taken extraordinary measures to procure the most cost-effective energy for its affiliated load in organized electricity markets where Linde has seen steep increases in its cost for electricity. LESI has taken these steps because electricity comprises about two-thirds of the production cost at a typical air separation facility.

Linde's Background in Demand Response Markets

Linde has a long history of providing demand response even well before Regional Transmission Organizations and retail electric competition were created.

In regulated states, Linde facilities have been served under interruptible and real-time pricing tariffs for decades. In fact, Linde and other industrial gases companies were often the catalyst that pushed utilities to create these types of rates which helped increase

system reliability for all customers and mitigate the need for utilities to build new generation and recover costs in base rates. These interruptible rates provided utilities with valuable load resources that could turn down quickly, in some cases immediately through automatic under-frequency relaying, during times in which the electric system was constrained.

In wholesale electricity markets, Linde facilities have participated in a wide variety of demand response initiatives and ancillary services markets, including the following:

- PJM's Day Ahead and Real Time Demand Response Programs
- PJM's Synchronized Reserve Market
- PJM's Active Load Management (now Interruptible Load Resource)
- New York ISO's Special Case Resources
- New York ISO's Emergency Demand Response Program
- ISO New England's Demand Response Programs
- ERCOT's Load Acting as Resource

In many cases, Linde plants have been among the first facilities to participate in new demand response opportunities. Why has Linde elected to participate in these demand response initiatives and ancillary services markets? The answer is simply one of economic necessity. These markets and programs afford Linde the opportunity to mitigate its cost of electricity, which continues to rise in organized markets. These programs and markets do not provide Linde with "free" money. Linde incurs many costs to serve as a demand response resource, including costs associated with controls and instrumentation, lost production, labor, and equipment wear. Each time Linde decides to participate as a demand response resource, it carefully evaluates the cost-benefit of participation and only participates when there is sufficient incentive and payback. Unfortunately, this is not a cut and dry determination. When an industrial customer curtails during a high-priced period, it typically makes up that production in another period. The customer bears the risk that the difference in price between the period of curtailment and the price when the production is "made up" justifies the cost of the curtailment. There is a further hurdle to overcome that few discuss. Some industrial

customers may need to consume additional MWhs in later periods, due to the loss of process efficiency that results from starting and stopping manufacturing equipment.

Guiding Principles in the Development of Demand Response Markets

Demand response markets that offer sufficient incentive to attract load participation are best developed in wholesale electricity markets that adhere to certain fundamental guiding principles.

1. Demand Response is Essential to a Well-Functioning Wholesale Energy Market

- Demand elasticity is integral to a well-functioning wholesale market, to discipline market-clearing prices, temper price volatility and check market power exercise.
- Although demand elasticity is critical to a functioning wholesale market, the current level of demand response in the organized markets is insufficient and inadequate.
- Further integration of demand response resources into organized markets is necessary to achieve effective demand elasticity.

2. Demand Response Needs to be Appropriately Compensated

- Demand resources must be properly valued by the market to reflect demand resources' impact on prices and the value of the foregone energy consumption to all customers.
- The value of demand response should recognize the costs incurred by customers to provide demand response, including lost production, labor, equipment wear, and technology. Also, as discussed above, customers bear the risk that the price of energy and the amount of energy consumed in later periods matches the customer's expectations at the time of the curtailment.

- The mere avoidance of electricity prices often provides insufficient value to offset these real costs.
- Demand response will not occur if customers do not have an economic incentive to reduce consumption.
- Those that benefit from the lower costs resulting from demand response should pay any associated costs.

3. Demand Response Requires Market Rules that Promote Development and Growth

- RTOs, not utilities, are best suited to take the lead in developing demand response in organized markets. The fewer the barriers between demand resources and the wholesale energy market, the better.
- Market rules should establish a level playing field that allows supply and demand resources to compete on a comparable basis.
- Market rules must be interpreted, applied, and enforced – if necessary – consistent with the goal of achieving parity between supply and demand resources. However, resource parity does not require demand resources to fit squarely within a market design created with supply resources in mind. To achieve resource parity, market rules must accommodate the inherent characteristics of demand resources.
- An efficient wholesale energy market requires a portfolio of demand response opportunities including day-ahead, real-time, capacity (if capacity markets exist), and ancillary service markets. It is not effective to simply expose customers to real-time pricing.
- FERC and RTOs should be equally vigilant against market misconduct in both the supply and demand sides of the market.
- FERC and RTOs should allocate the appropriate infrastructure and personnel to facilitate greater levels of demand response.