Improving Reliability

A Demand Response ?

IE DSM Workshop in Graz
October 2nd, 2002

North American Electric Reliability Council (NERC) Definition of Reliability*

- Adequacy - The ability of the electric systems to supply the aggregate electrical demand and energy requirements of their customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements; and

- **Security** - The ability of the electric systems to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements.

- To be addressed by Linda Hull - EA Technology

*** Relative to planning standards**

Role of Adequacy

- Resource Adequacy (Market Functions)
  - Capability of (integrated) resource planning measures to ensure balancing of supply and demand resources
- Transmission Adequacy (Network Functions)
  - Capability of networks to deliver demand requirements
- *Fuel Supply Adequacy*
  - *Availability and access to primary fuel sources*

Resource Adequacy Measures
North American Market

Summer	*2001*	*2002*	*2003*	*2004*	*2005*
Internal Demand	776,448	793,033	808,175	823,557	840,085
Interruptible Demand & DCLM	30,303	28,007	27,651	27,729	27,894
Net Internal Demand	746,145	765,026	780,524	795,828	812,191
Generating Capacity	885,767	930,198	963,007	999,257	1,024,194
Margin	139,622	165,172	182,483	203,429	212,003
Capacity Margin	15.8%	17.8%	18.9%	20.4%	20.7%
% of Capacity Margin Derived from Demand Side	22%	17%	15%	14%	13%

*** NERC 2001 Summer Forecasts**

Resource Adequacy
Role of Demand Response

- Additional options for market retailers to participate in market balancing / planning
- New source of supply
- Flexible investment option
  - In principle can be increased quickly
  - Capital costs are not high
  - Approvals not a barrier

Transmission System Adequacy Measures

- Unplanned Supply Interruptions
  - Number of unplanned sustained outages
  - Repair time for unplanned sustained outages
  - Time-Off Supply due to unplanned outages
- Planned Supply Interruptions
  - Time-Off Supply due to planned outages
- Power Quality
  - Voltage and Frequency excursions
  - Momentary interruptions

Transmission System Adequacy
Role of Demand Response

- DR resources can be used to deal with local constraints
  - Regional level congestion services
- Ancillary services for spinning reserve, frequency control
- New tool for emergency management
- Introduction of inflexible (CHP) and variable (wind) resources into power (distribution) systems will drive a need to decentralise networks: decentralised network architecture using demand response may be needed to ensure reliable supplies in the most economical way

Common Adequacy Benefits

- Geographic sensitivity (Supply planning issue)
- Low regulatory risk
- Durable infrastructure
  - Even when prices don't justify its use, infrastructure remains in place

Organisation and Instruments

- **Where are the markets for reliability?**
  - **Integrated resource planners ?**
  - **Regulators / Governments ?**
  - **Transmission Companies / System Operators ?**
  - **End Users ?**
- Valuation of reliability – What are the prices?
  - Consumer awareness ?
  - (Minimum) Power Quality Standards ?
  - PQ price signal - Transmission to Retail ?
- Reliability Standards
  - Monitoring / compliance ?
  - International Standards ?