Distributed Resources and Electric Reliability
Reliability: A Growing Challenge

- Outages, warnings, close calls in several regions
- Growing loads and wholesale markets:
  - Transmission overload (West-wide)
  - Generation adequacy (New England, New Orleans, Midwest, CA 2000-01)
  - Load pocket peak (SF 2000)
  - Distribution overload (Chicago, NY 1999 and 2000)
- Increasing needs for "high 9's" power quality
Load growth: Can Central Stations and Wires Do It?

- Sales up 31% last decade; --another 37% in this decade?
- Peak loads growing rapidly
  - Summer peak up 56,000 MW in 4 years
  - NERC predicts +160,000 MW, 1999-2010
  - We're adding the electrical demand equivalent of an entire New England every 14 to 18 months
- DOE forecast: adding the equivalent of Japan and Germany to the US grid by 2020
- Can we build and run over 300,000 MW of central station capacity? What are the transmission, emission and cost consequences?
Chasing High Loads: creating new weakest links

Natural Gas Supply: adding 20 to 25 BCF demand to a 60 BCF base
- Gas v. Electric competition;
- Gas Pipeline Capacity; new bottlenecks

Gas Pipeline Reliability
- Compressor failure - new 1st order contingency

E Transmission - New congestion points
Distribution and substation capacity
Environmental loading capacity
Who will promote DR in today's electric industry?

- Generators profit from high loads and thin markets
- Peakers REQUIRE high prices
- Franchises: getting lean for the future
- Wires companies with rate caps or freezes can be addicted to throughput
  - Lost profits math: a 5% increase in sales can increase profits by more than 50%!
- RTOs, Transcos, FERC: No tradition of support for efficiency or DG
DR Reliability
Case Studies

- Type 1: DR and distributed responses -- the robust regional network model
  - California ISO -- summer 2000
  - CA, NY, NE, PJM -- summer 2001
  - Ancillary service bidding

- Type 2: Distributed Utility Planning -- solving local problems
  - Chicago reliability initiative
  - Mad River Valley project
DR Reliability
Case Studies (con't)

- Type 3: Power quality and reliability protection for individual customers
  - Bank of Omaha
  - Hospitals and public safety facilities
  - Server farms and high-tech industries

- Which metaphor: Gated community or corporate jet?
Recommendations

- **Ask:** Could this reliability objective be met (at lower cost and/or risk) through distributed resources?
- **Create policies that allow DG, EE, and load response to participate evenly**
- **Statistical performance may be very valuable performance**
- **Promote DUP at the Disco level**
- **Screen socialized reliability and uplift proposals -- the Efficient Reliability Rule**
Questions

- How can DR policies treat EE, LM, and DG even-handedly?
- Does DG strengthen the local grid, or require costly upgrading?
- Is DG (a) a reliability (capacity) resource for the region, (b) back-up self generation, or (c) a substitute for local wires?
- Who plans for DR? Disco, RTO, a new portfolio manager, or the market?