

# Dynamics Transforming the Demand for Wind Power

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# Technology Improvement

- Gas turbines, 1980s-1990s:
  - More efficient, lower cost models every 3-5 years
  - 3.5 GW 1999 to 63 GW in 2002
- Wind technology like SCGT in 1980
  - Manufacturing volumes, experience
  - Relative cost reduction

# Renewables Mega-Projects

- 3,000 MW<sup>+</sup>; bring wind from best resources, unpopulated areas to load
- Economies in development, permitting, financing, sourcing, construction, power sales, operation
- Developers, manufacturers, investors, LSEs each take 300 MW-500 MW shares of consortium
  - Gives LSEs stake in renewables growth
- Projects need/can afford dedicated transmission
- Buys time for development of CCS

# Energy Security

- Real and growing concern, popular and bipartisan support
- Imports increasingly expensive; exchange rate risk if energy priced in euros
- Indigenous renewables keep dollars at home, build US economy
- Decentralized, inexhaustible sources most secure

# Community Wind

- Drives rural economic development; provides price stability; reduces environmental impacts of fossil-fueled generation; acts on local desire to control own destiny
- Growth of community wind in every state builds support for large-scale wind expansion

# Utility Ownership

- Most utilities acquire wind under PPAs
  - Negative effect on balance sheets; no financial stake in expanding wind generation
- Ownership builds utility ratebase
- Financing projects with lower cost utility capital reduces wind power cost
- Make wind a mainstream utility business

# Climate Change

- CO<sub>2</sub> price drives low-carbon generation
- Renewables, EE most effective reduction tools
- CA: 33% renewables reduce electric CO<sub>2</sub> to 1990 levels (25% reduction by 2020)
  - CA 20% coal; other states =>more renewables
- Larger reductions => more renewables
- Drives transport sector to electric sector, increasing demand for renewables

# Energy-First Planning

- CO<sub>2</sub>, gas prices => focus on energy
- Maximize low marginal cost, no-emissions generation; displace more expensive energy
  - Don't expect energy resources—wind and solar—to be capacity resources
  - Don't expect capacity resources to supply most energy; operate existing capacity to fill in around renewables;
  - Build capacity strategically, to support energy resources