SD Wind Energy Competitive Advisory Task Force

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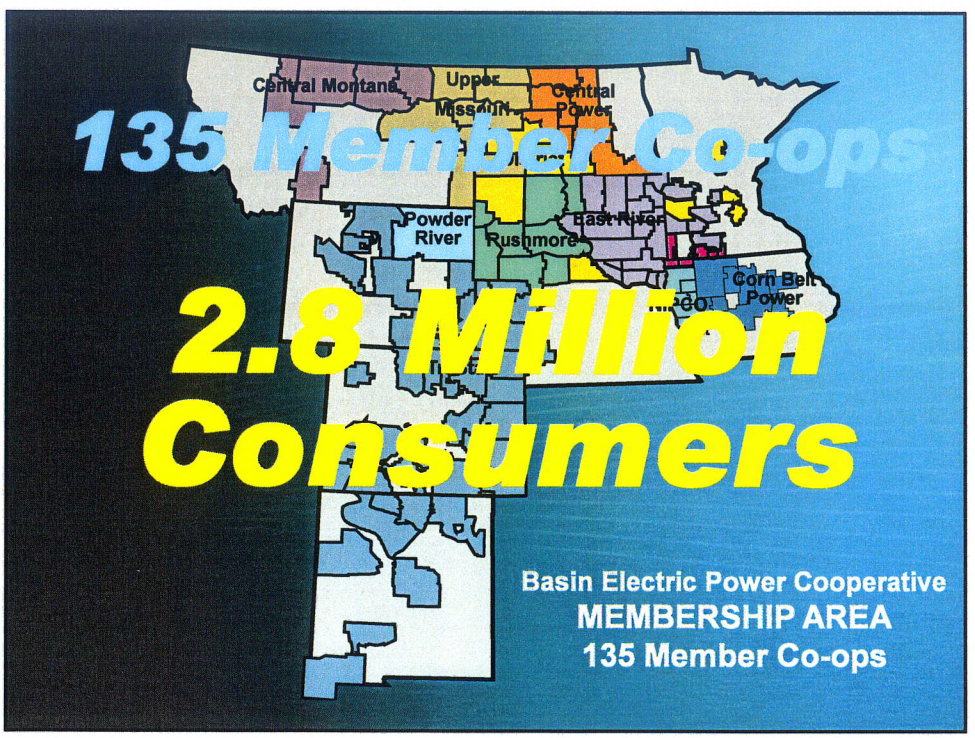
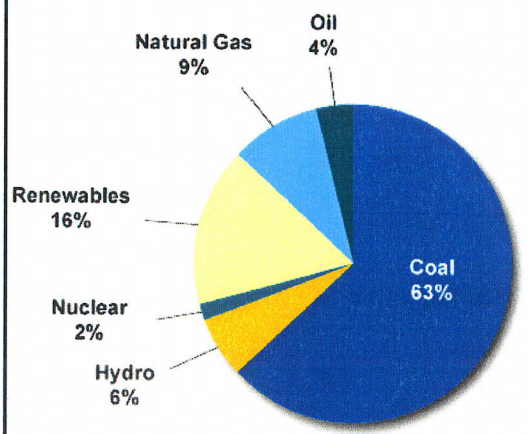
Mgr of Alternative Technologies

BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative



Generation to Meet Our Consumer's Needs



2011 EOY Generation Capacity

Maximum winter capability in MW

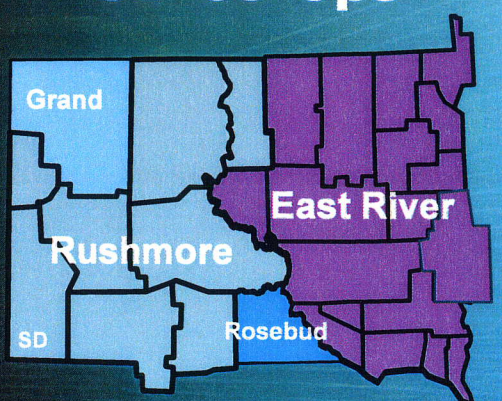
- Coal-based - 2,976
- Hydro - 279
- Nuclear - 77
- Renewables - 764
- Natural Gas - 426
- Oil - 182

TOTAL = 4,704 MW

Basin Electric's Resource Portfolio (above) consists of generation in megawatts (winter ratings) from owned facilities and purchased power contracts longer than 3 years. The renewables percentage includes wind, recovered energy generation, and biogas totals. (Biogas/flare gas is 1

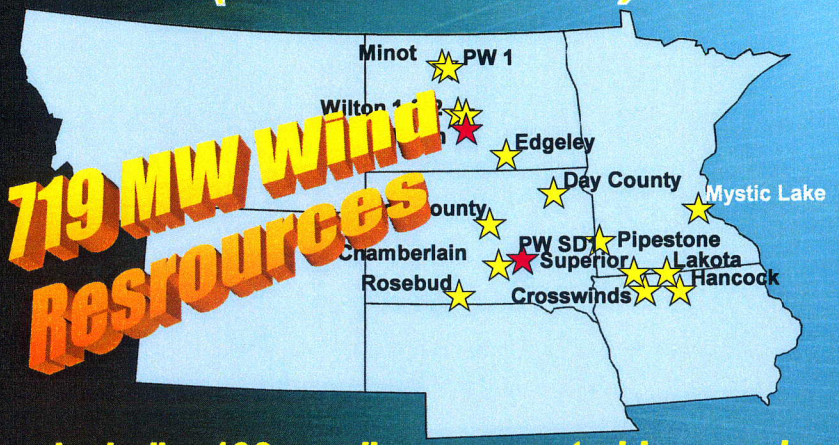
- Does not include 300 MW Deer Creek Gas Combined Cycle (Next Year)
- The renewable attributes from wind are sold to others

SD Co-ops



~100,000 SD Coop Consumers

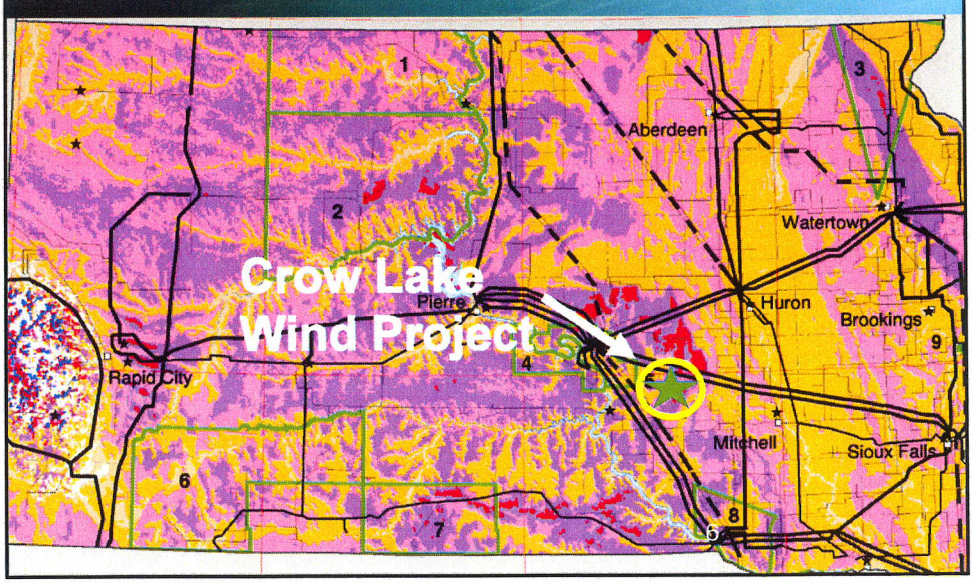
Basin's Wind Generation Sites (Owned & PPAs)

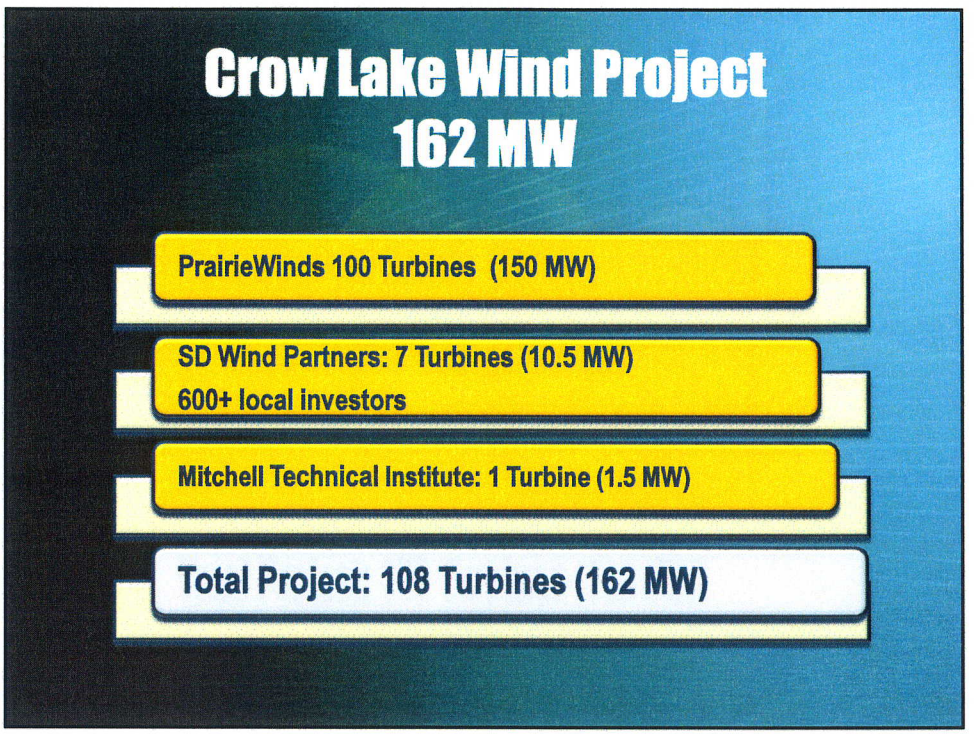


Including132 small consumer turbines under 150 kW size (2.8 MW)

5

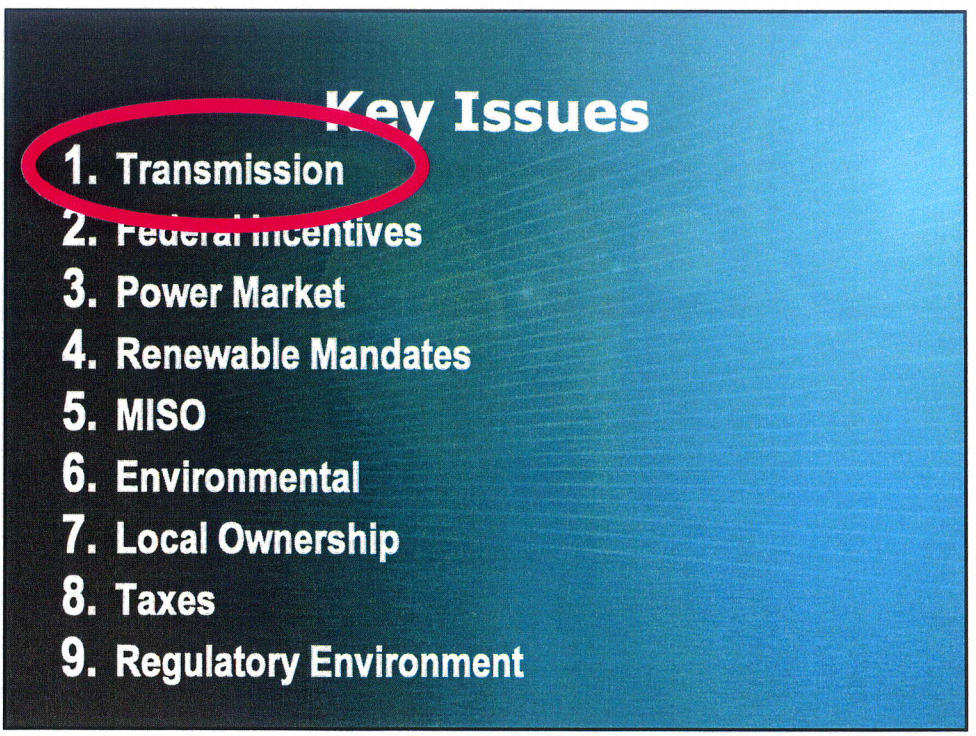
Crow Lake Wind Project




Crow Lake Wind Project
162 MW
PrairieWinds 100 Turbines (150 MW)
SD Wind Partners: 7 Turbines (10.5 MW)
600+ local investors
Mitchell Technical Institute: 1 Turbine (1.5 MW)
Total Project: 108 Turbines (162 MW)

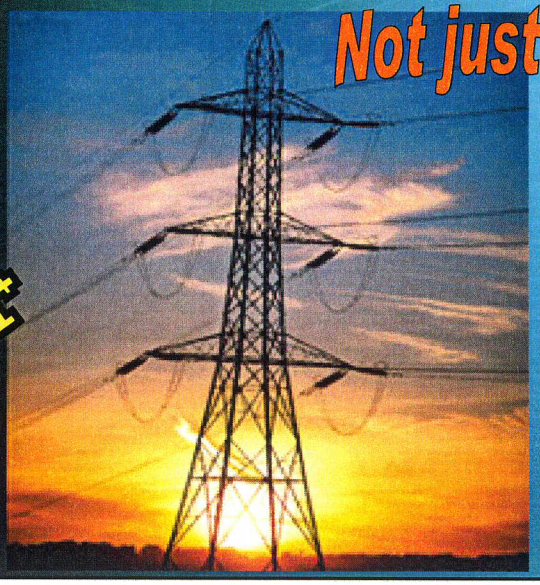

Crow Lake Wind Project
162 MW
450 Construction Jobs at Peak
11 Permanent Jobs
Taxes: $25 Million over 25 years
Landowner Payments: >$400,000/yr

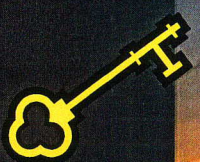

SD Wind Partners
Sponsoring Organizations
E. River &
Other Rural
Electric
Cooperati
Corn
Growers
Management:
Val-Add Service Corporation
Each contributed $20,000 start-up seed money


Key Issues
1. Transmission
2. Federal Incentives
3. Power Market
4. Renewable Mandates
5. MISO
6. Environmental
7. Local Ownership
8. Taxes
9. Regulatory Environment

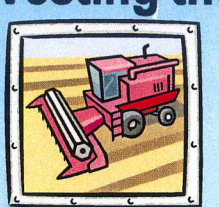
Transmission is key to *any* generation...

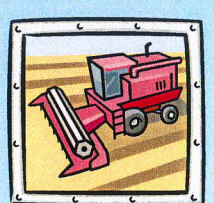
Not just wind!





Harvesting the wind is feasible, but...

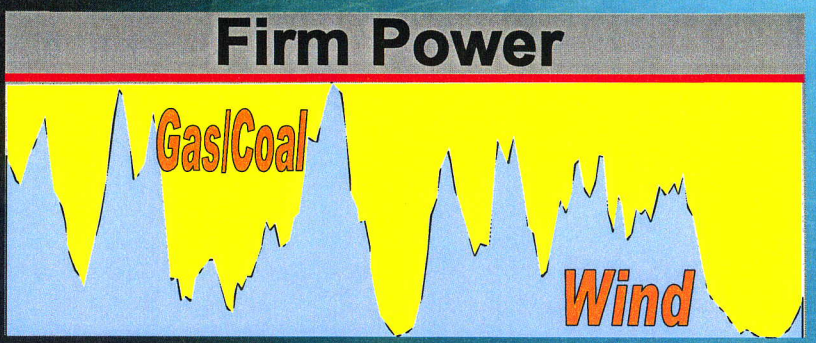




Economics drives decisions & the economy is driving economics

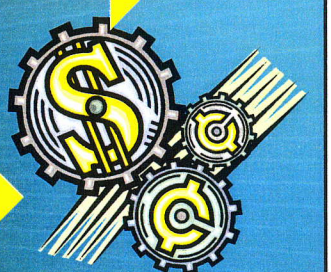
Utility Perspective:

700 MW Wind + 700 MW Gas equals 700 MW of firm power



Tax/Grant Incentives Major Drivers for "Green" Generation

- 2.2¢/kWh Production Tax Credits
- 30% "1603" Grant
- 5 Yr Accel. Depr.



Future Extensions???

Wind is non-dispatchable.
Its primary value is based on….

Fuel Displacement

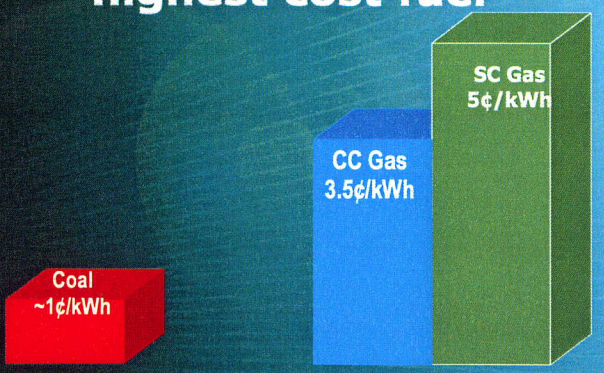
What Kind of Fuel Is Wind Displacing???

Coal: $16.00/Ton (~$1.00/mmbtu)

1 ton of Wyo. Coal will produce over 1600 kWhs

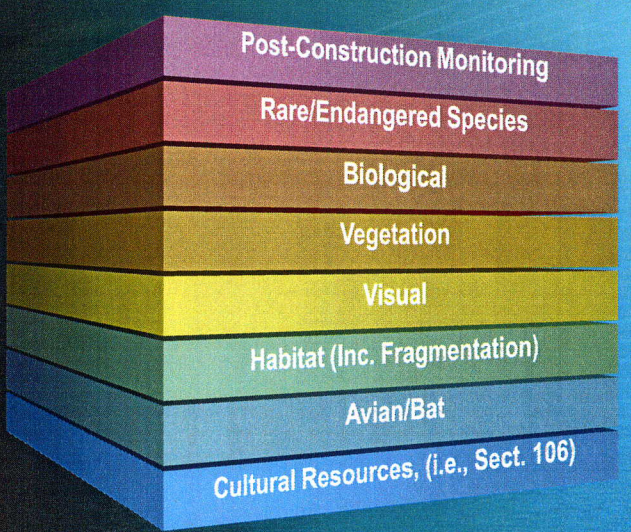
Gas: $5.00/mmbtu

Wind will displace the system's highest cost fuel

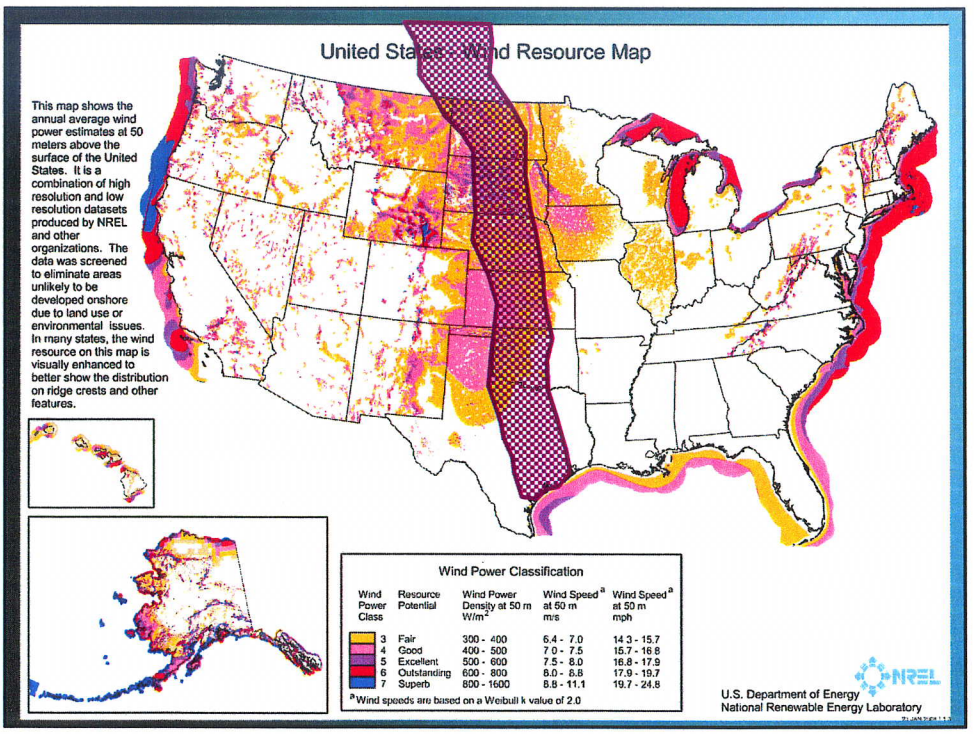


Fuel Cost of Electricity…

Environmental Challenges



Endangered Species Issues



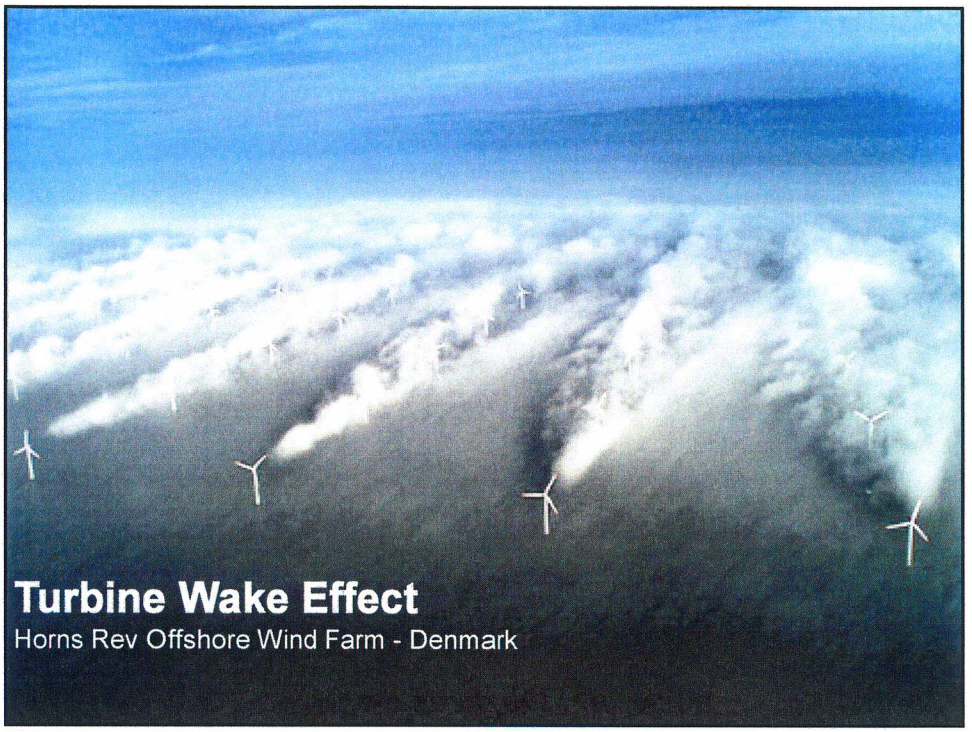
Setbacks & Wind Rights

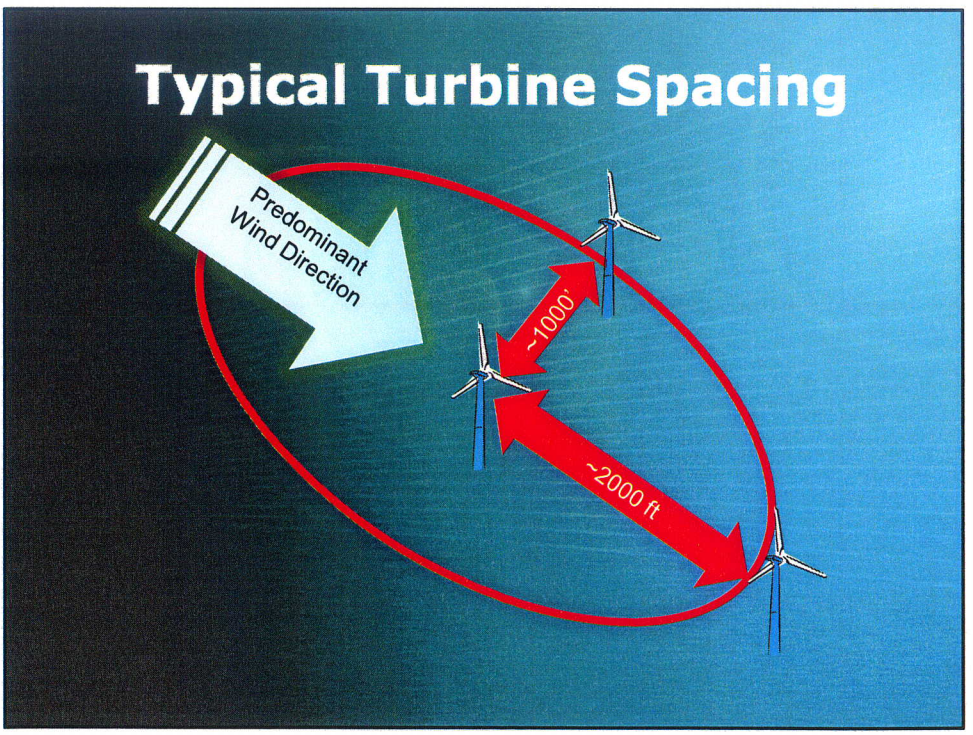
WHY THEY ARE IMPORTANT

Wind Rights Issue

- Downwind Landowners
- Setback Distances
- Value of Nearby Sites

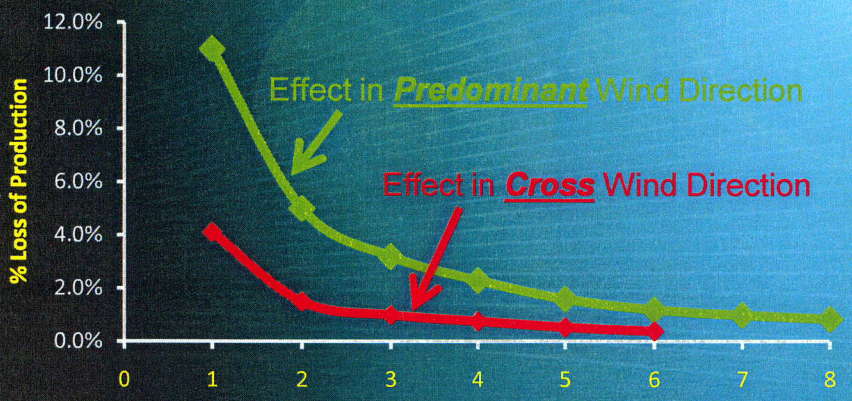
Litigation or Regulation?


Turbine Wake Effect
Horns Rev Offshore Wind Farm - Denmark


Typical Turbine Spacing
Predominant Wind Direction
~1000'
~2000 ft

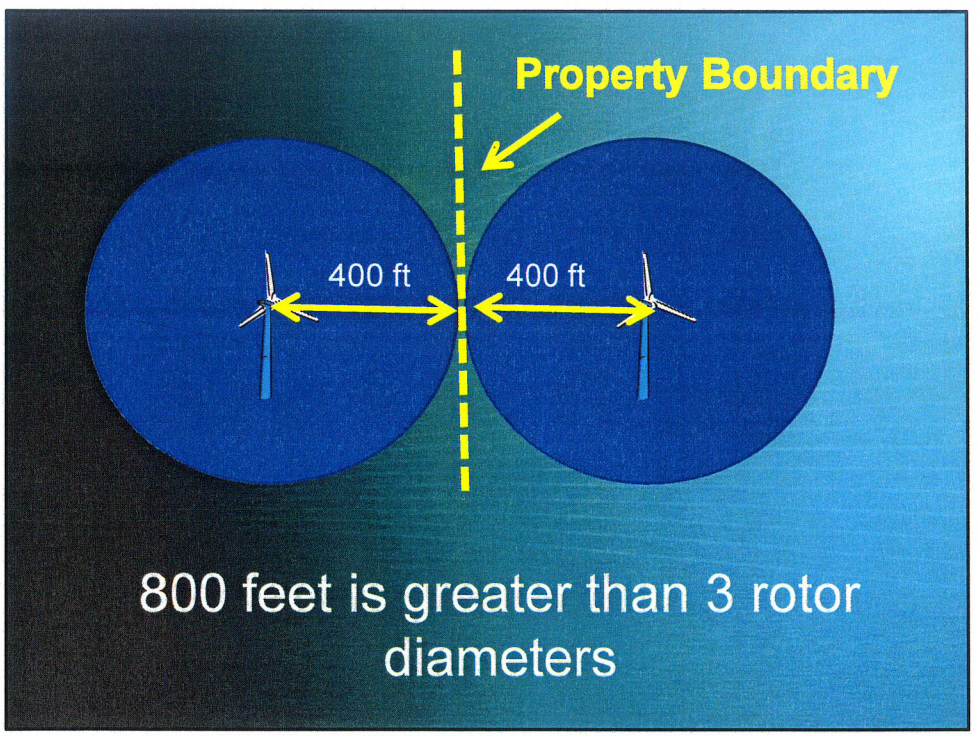
Effects of Adjacent Turbines
Sample runs on existing project

% Loss in Production Due to Nearby Tower

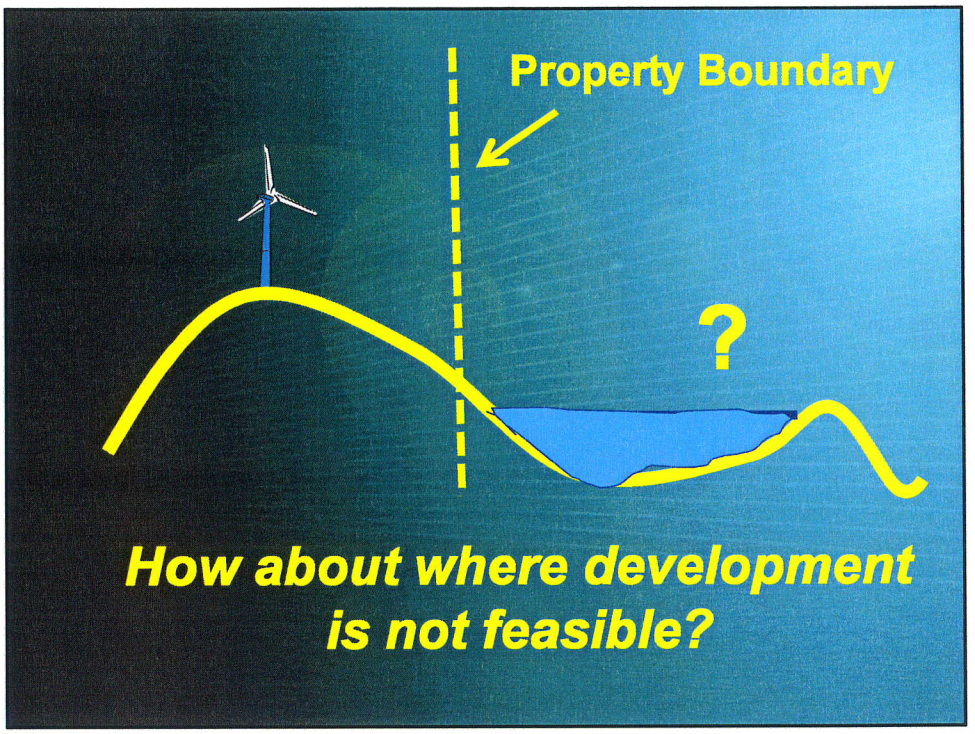


Source:
- WindPro Software
- 1.5 GE SLE turbines
- Rolling hill topography

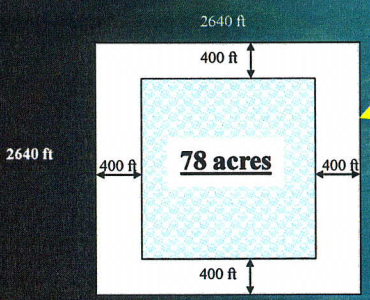
Overall net loss is between the lines



800 feet is greater than 3 rotor diameters



Impact of Setback from Property Lines



82 acres

Example: A setback of "Fall Distance" can sterilize over 50% of the site.

Typical Quarter Section: 160 ac

Then add real constraints, such as shadow flicker & noise…
Leaves limited area for wind

Typical Permanent Impact

Roughly 0.4 acres for each turbine, including road

Allocation of Wind $$$

- **The value of nearby wind sites is extremely variable**
- **The downwind effect diminishes rapidly**

Allocating wind rights in an equitable manner is not simple!

When Regulating, Consider...

Should nearby landowners have virtual veto rights over a neighbor's land?

Wind is not "produced" on the wind site & could be considered an interstate resource

How would existing projects be affected by establishing new rights?