

Clean Energy



ENVIRONMENTAL LAW & POLICY CENTER

ILLINOIS INDIANA MICHIGAN MINNESOTA OHIO WISCONSIN

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Chicago, Illinois

The Future

- **The Good – Clean Energy**



The Future

- **The OK**
- Coal Gasification
- Natural Gas
- Redesigned Nuclear?



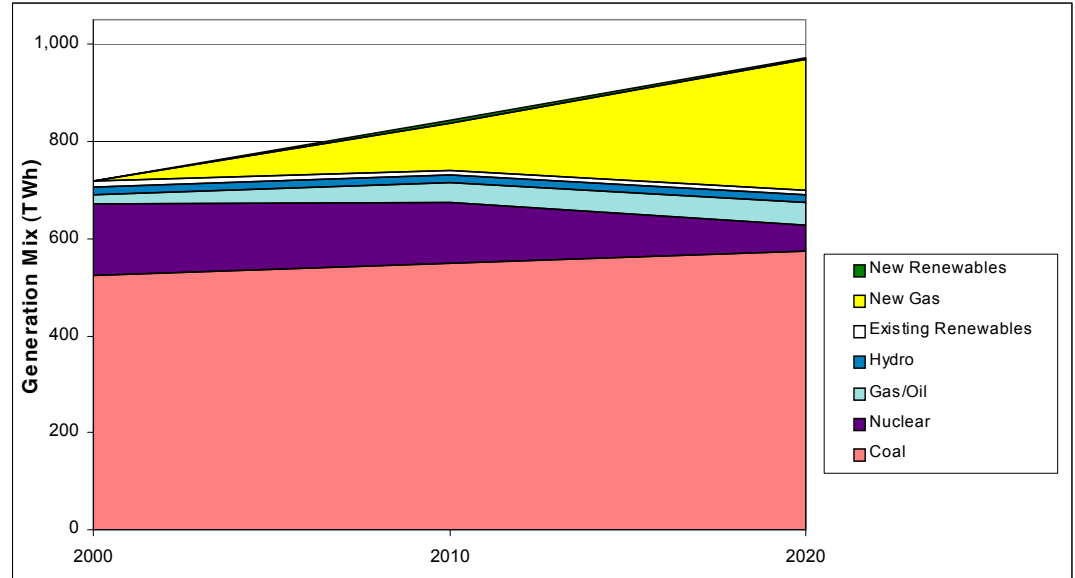
The Future

- **The Ugly -**

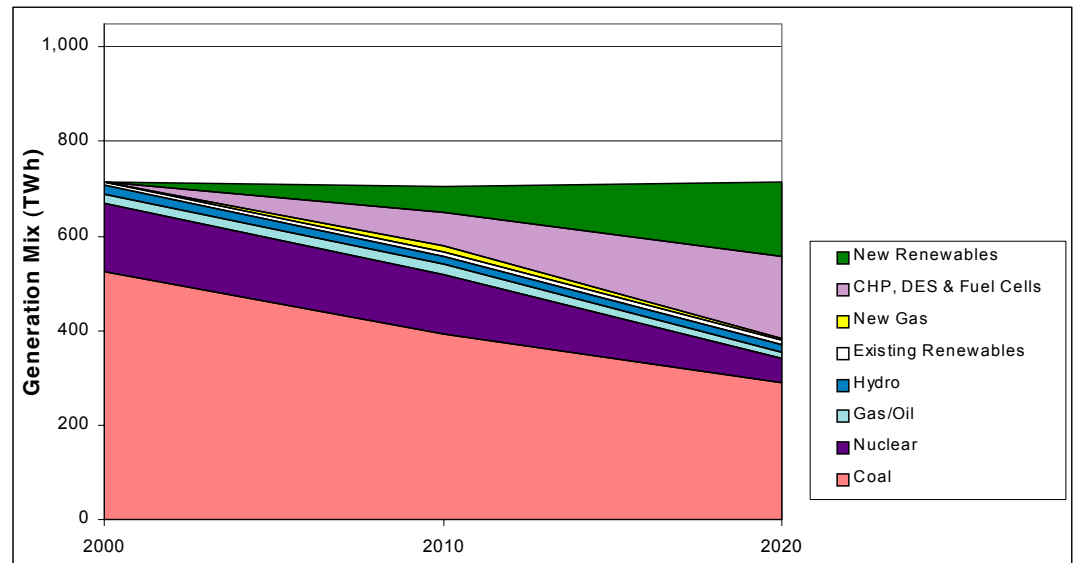


The Choice: Business as Usual or Renewable Energy?

Electricity demand increases annually
Large additions of natural gas capacity to meet demand
Coal plants increase output



Electricity demand decreases
New renewables increase -- 8% of generation by 2010 and 22% by 2020
Fewer new gas plants
Some high polluting coal plants retired





Electricity Generation in Illinois today

- Demand for electricity in Illinois continues to grow.
- 99% of the electricity generated in Illinois comes from coal (highly polluting), nuclear (highly dangerous), and natural gas (high price volatility).
- Development of Illinois' renewable energy resources is a quadruple win for the state as **good jobs** are created, the **economy** is stimulated, natural gas **price volatility** is mitigated and the **environment** becomes cleaner.

Effects of Burning Coal for Electricity

- Burning coal is a leading cause of smog, acid rain, global warming, and air toxics. In an average year, a typical coal plant generates:
- **3,700,000 tons of carbon dioxide (CO₂)**, the primary human cause of global warming--as much carbon dioxide as cutting down **161 million trees**.
- **170 pounds of mercury**, where just 1/70th of a teaspoon deposited on a 25-acre lake can make the fish unsafe to eat.

Effects of Burning Coal for Electricity

- 500 tons of small airborne particles, which cause chronic bronchitis, aggravated asthma, and premature death, as well as haze obstructing visibility
- 10,200 tons of nitrogen oxide (NO_x), as much as would be emitted by half a million late-model cars. NO_x leads to formation of ozone (smog) which inflames the lungs, burning through lung tissue making people more susceptible to respiratory illness.

Effects of Burning Coal for Electricity

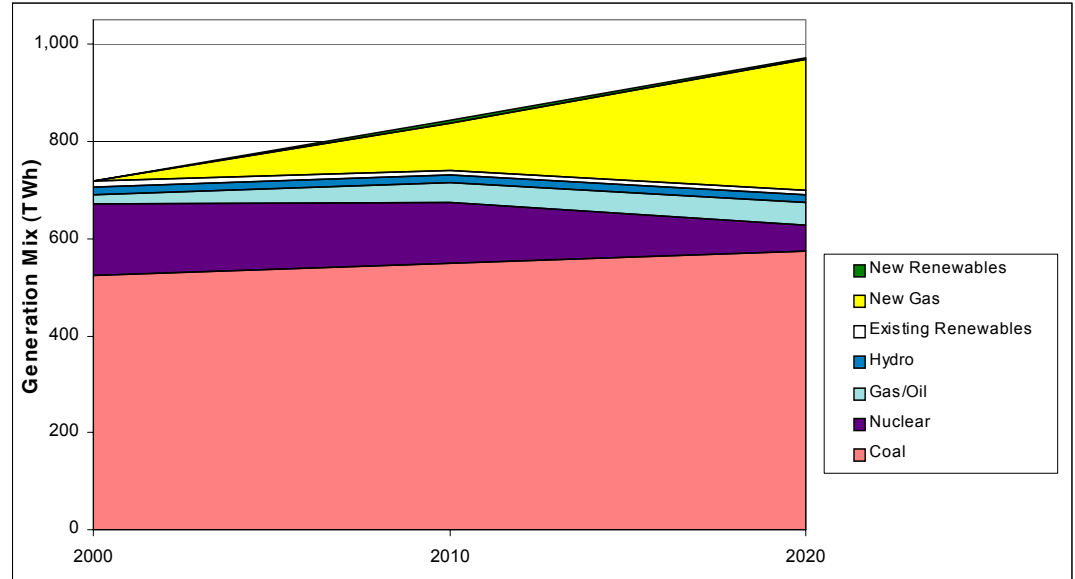
- 720 tons of carbon monoxide (CO), which causes headaches and place additional stress on people with heart disease.
- 220 tons of hydrocarbons, volatile organic compounds (VOC), which form ozone.
- 10,000 tons of sulfur dioxide (SO₂), which causes acid rain that damages forests, lakes, and buildings, and forms small airborne particles that can penetrate deep into lungs.

Global Warming

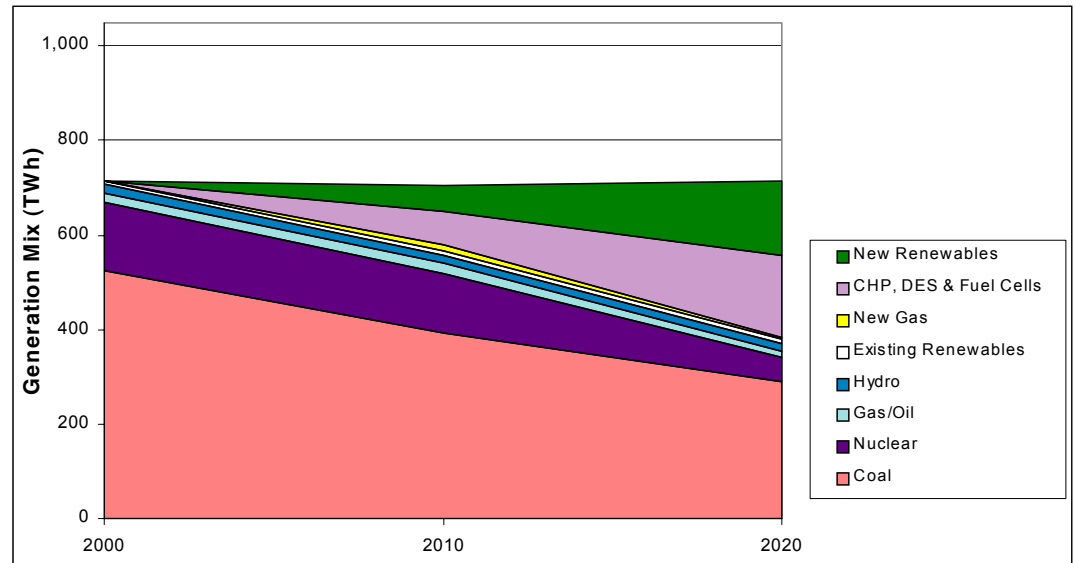


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Pollution Reduction in Clean Energy Plan

Regional Reductions relative to Business As Usual Scenario:

- NO_x reduced 71%
- SO_x reduced 56%
- Mercury reduced 50%
- CO₂ reduced 51% (and on target for Kyoto)

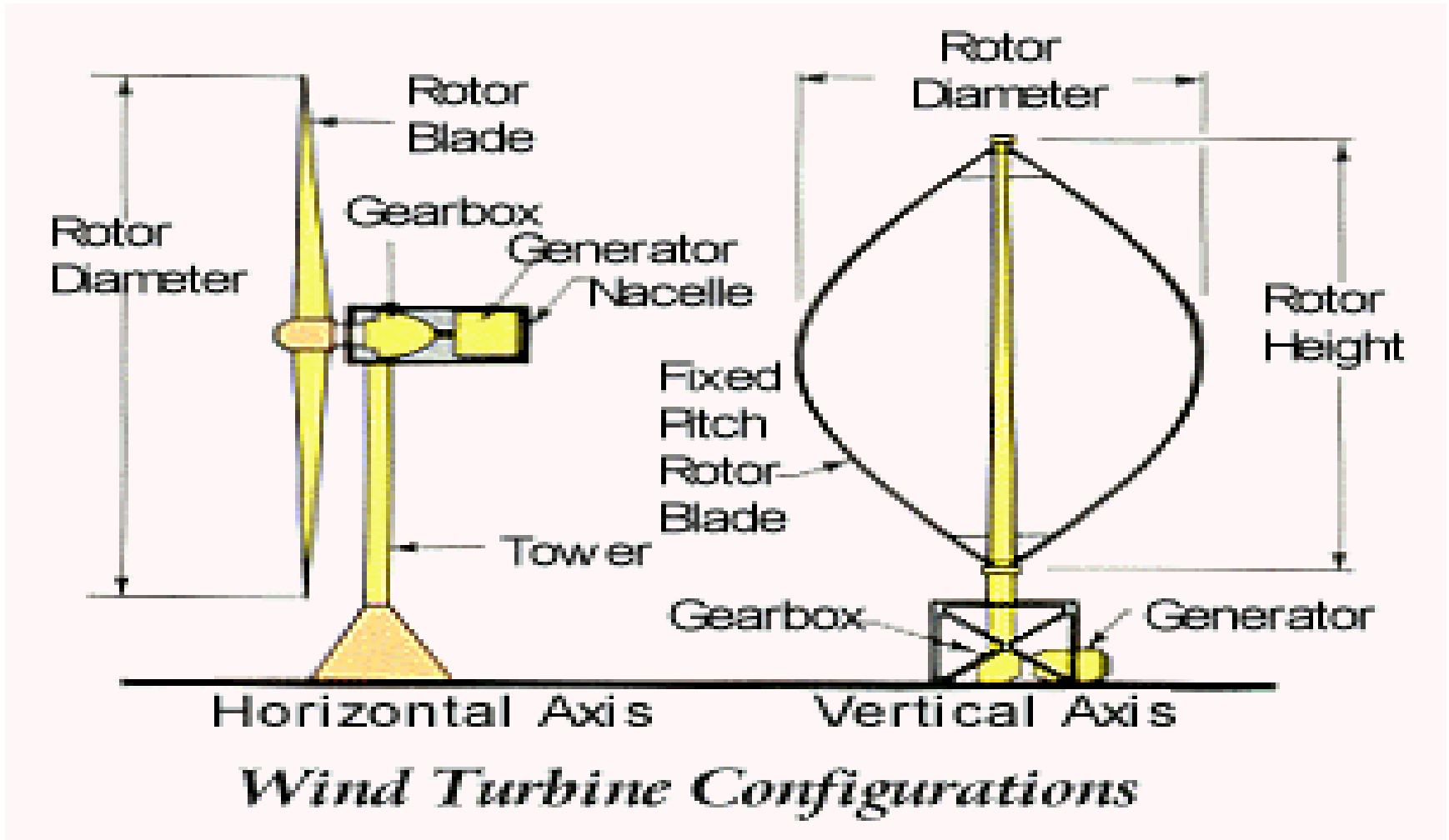
Implement Job Jolt: Midwest Net New Jobs and Economic Gains

Initiative	Net Job Growth		Economic Output	
	2010	2020	2010	2020
Efficiency	84,000	141,000	\$7.0 Billion	\$12.6 Billion
Renewables	37,000	68,000	\$3.6 Billion	\$6.7 Billion
TOTAL	121,000	209,000	\$10.6 Billion	\$19.4 Billion

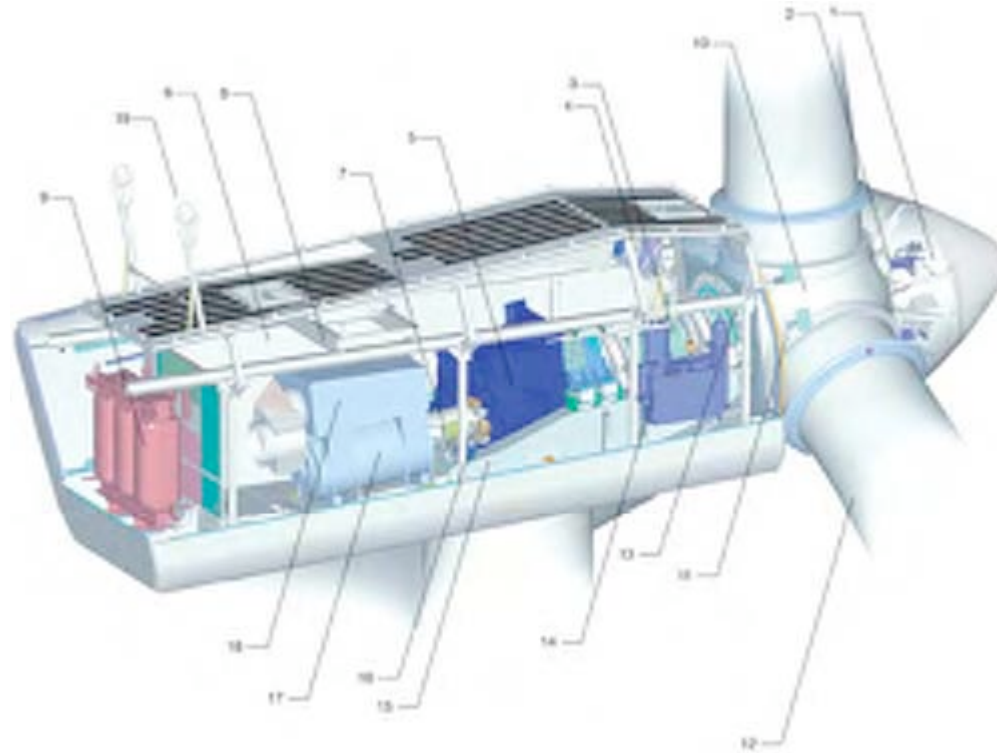
The Possibility of Wind

- Wind can be used to generate electricity which can be used directly or in other applications like hydrogen formation.
- Wind energy could supply about 20% of the nation's electricity
- North Dakota alone is theoretically capable (if there were enough transmission capacity) of producing enough wind-generated power to meet more than one-third of U.S. electricity demand.

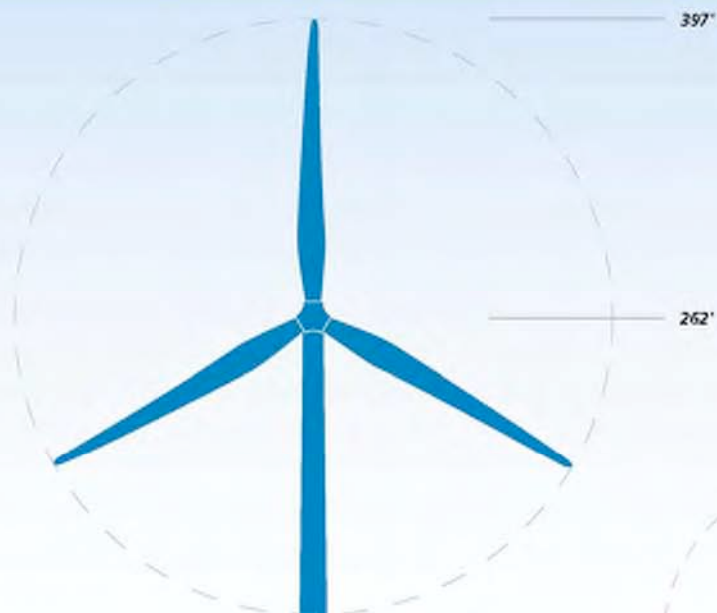
Wind Turbine



Wind Turbine – How it works



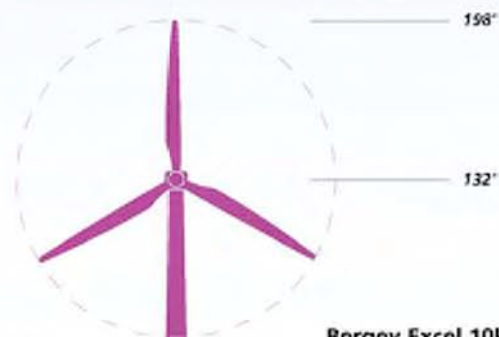
THE SCALE OF WIND POWER

**Vestas NM82**
1,650 kW

This turbine could generate power for about 475 homes at a good wind site. It is among the largest turbines available today. Installed cost is about \$1,500,000.

Zond Z-40-FS
500 kW

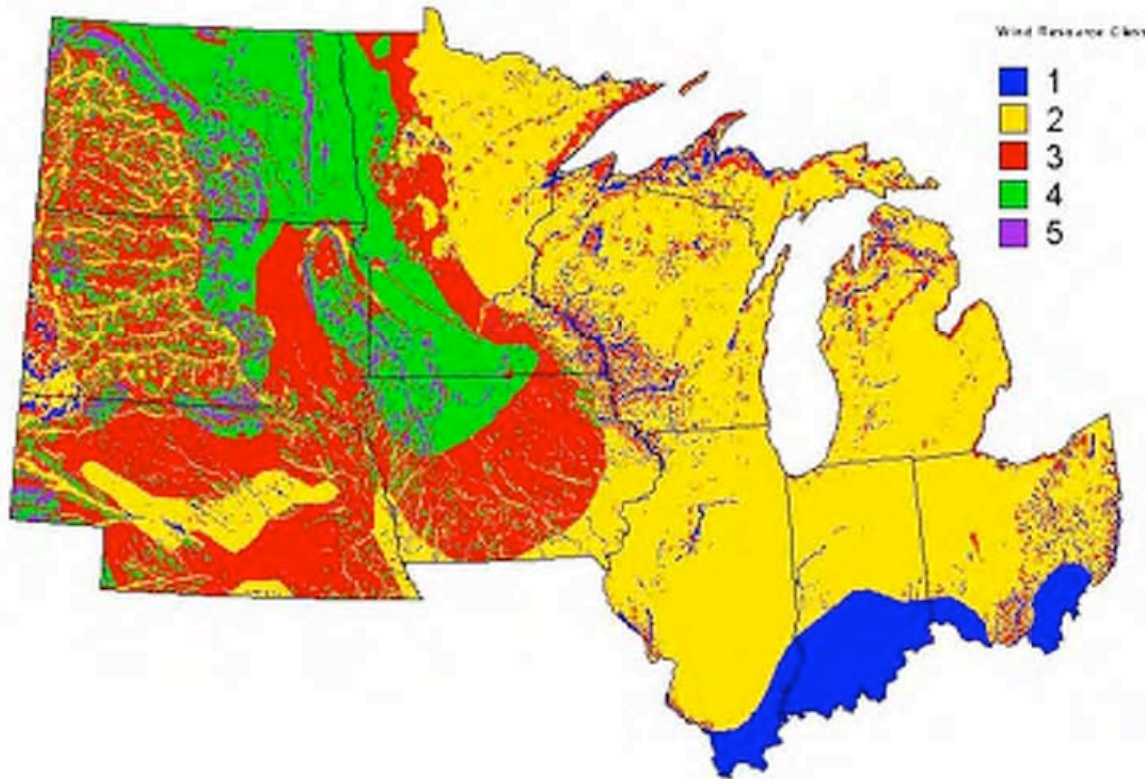
This turbine could produce electricity for about 150 homes at a good wind site. Turbines in this size range were cutting edge technology in the mid-1990s. Installed cost is about \$500,000.

**Bergey Excel 10kW**

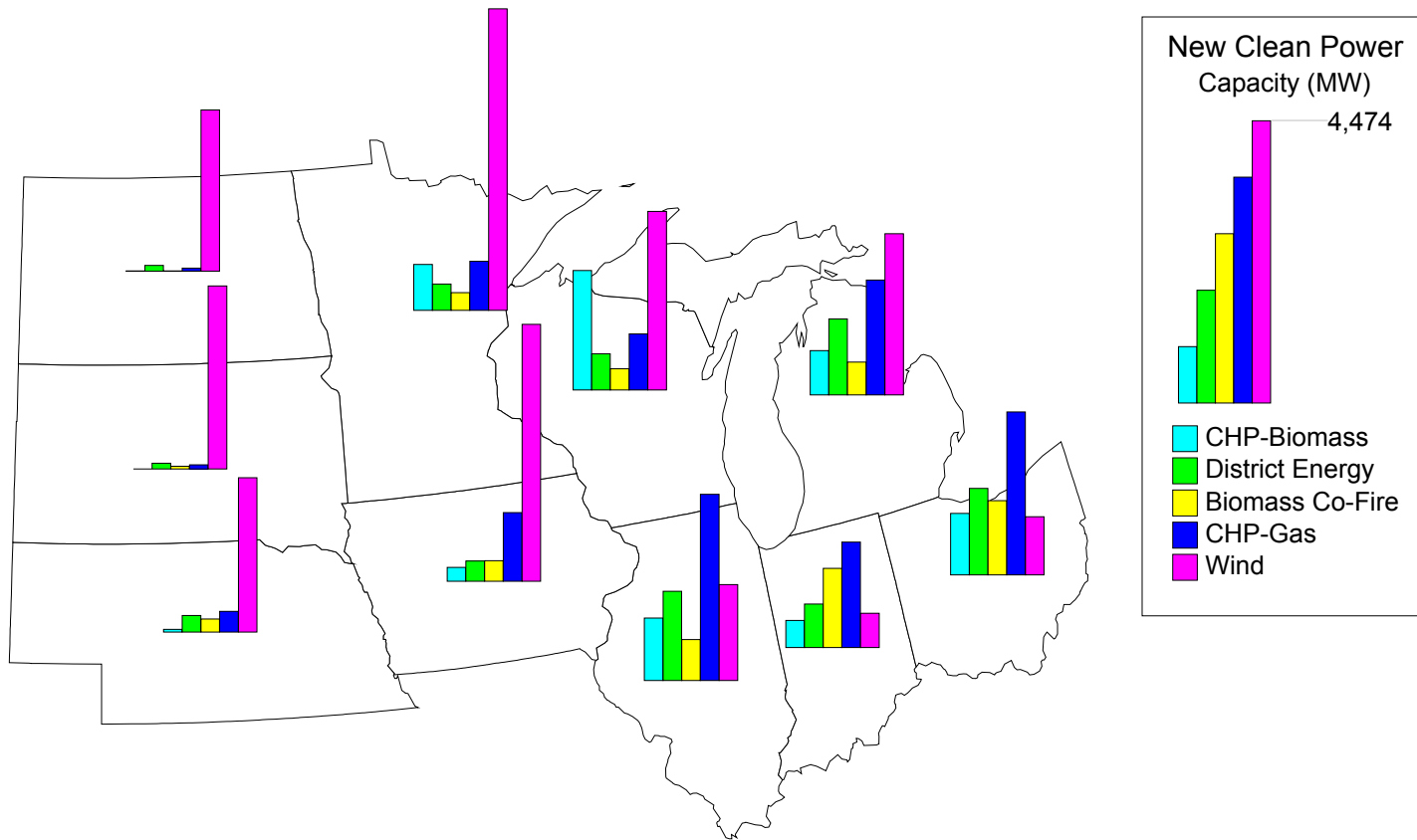
At a good wind site, this turbine could generate enough electricity for one average household. Installed cost is about \$35,000.

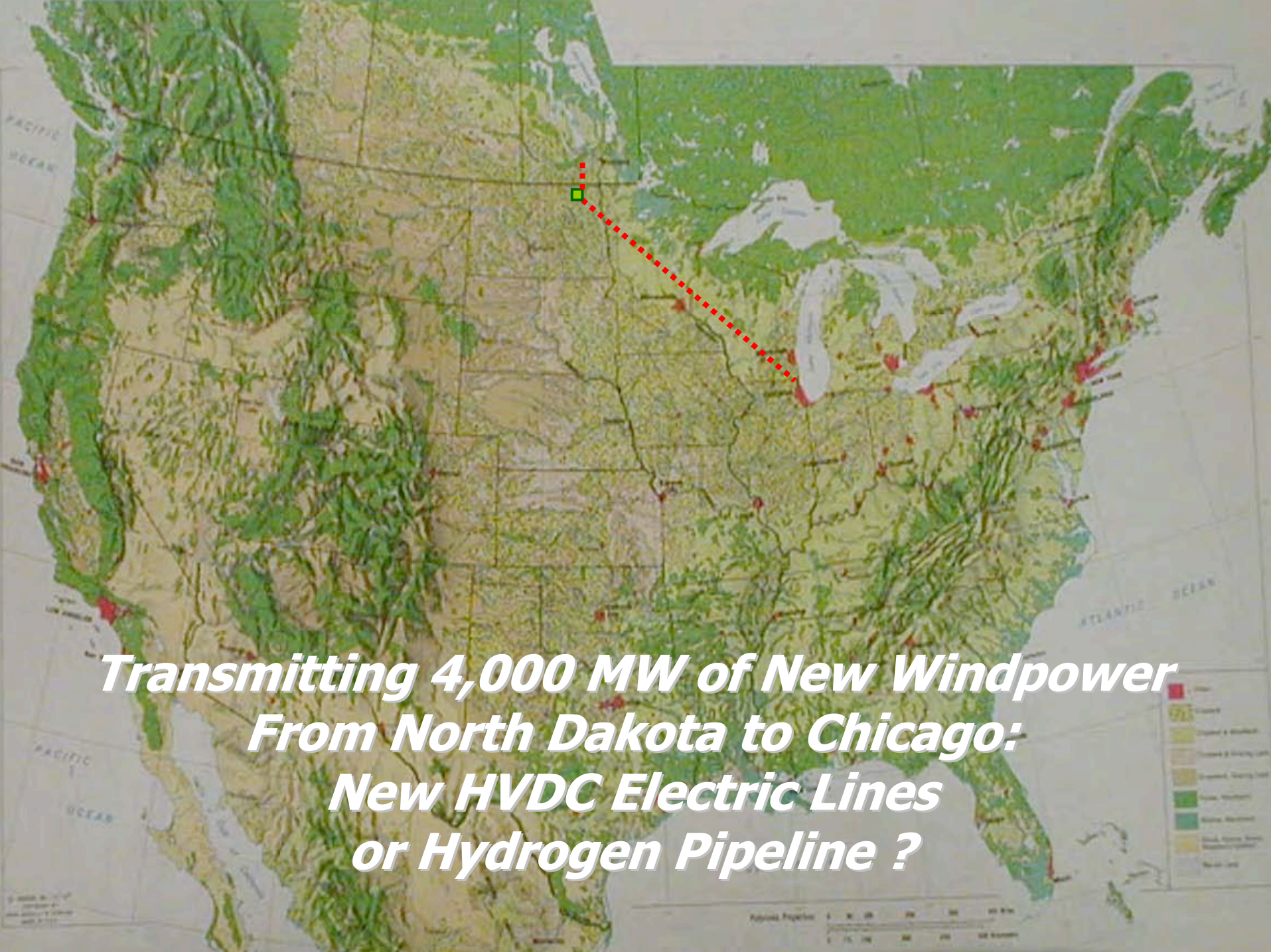


Midwestern Wind Resources



Potential New Renewables





***Transmitting 4,000 MW of New Windpower
From North Dakota to Chicago:
New HVDC Electric Lines
or Hydrogen Pipeline ?***



Proposed wind farm development in Illinois



Where: 12 major projects proposed in Adams, Pike, Bureau, Lee, Stephenson, DeKalb, McLean, LaSalle and Carroll counties

How Much: 1,700 MW in development today

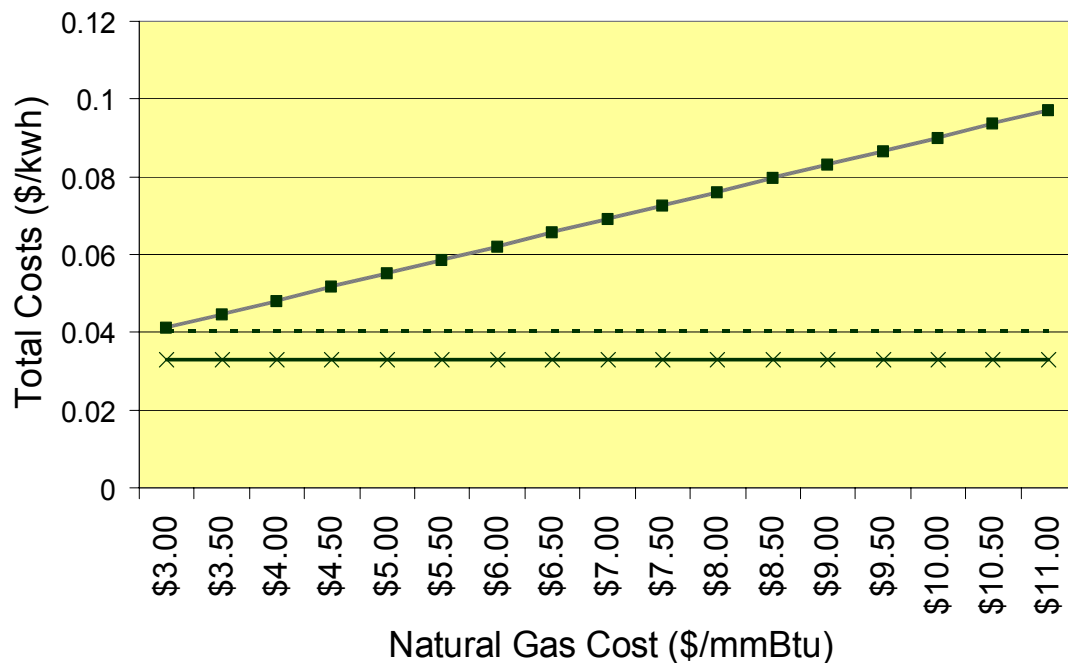
New State Revenue: \$7.5 million - \$11.3 million in new property and sales taxes.

Cash Payments: These projects would provide millions of dollars to local property owners.



Wind hedges against natural gas prices

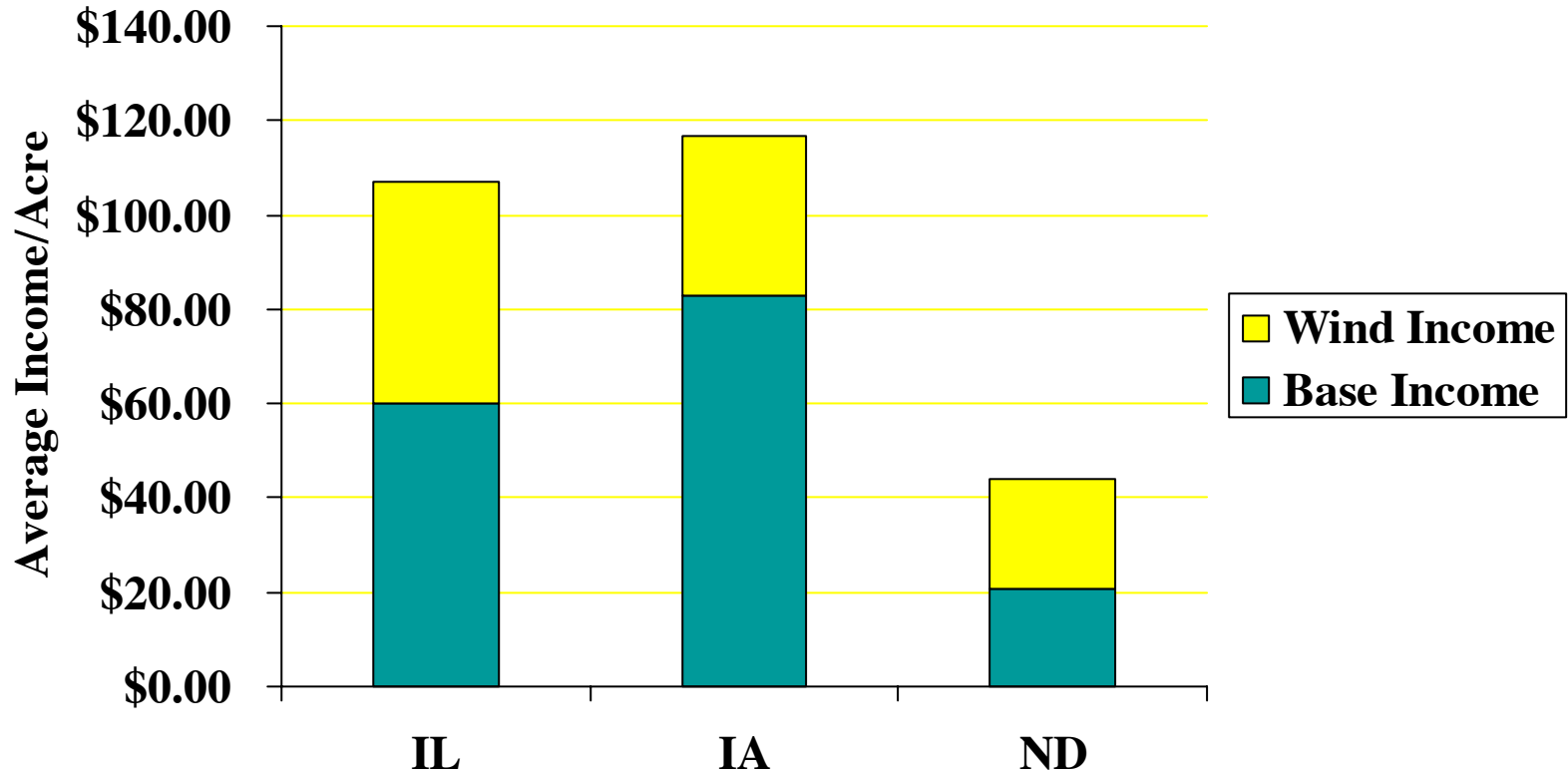
Combined Cycle Gas vs. Wind Generation



Gas prices (slanted line) are rising and are predicted to remain above historical highs for the next several years.

The cost of wind generated electricity (flat line with stars) remains fixed once the system is built.

Potential Farm Income Adding Wind



- Farm Income Source: USDA ERS, NASS
- Excludes farms with gross revenues <\$10,000/year
- Assumes conservative wind income of \$3000/tower @10 towers/section for IL; \$2200/tower for IA, and \$1500/tower for ND

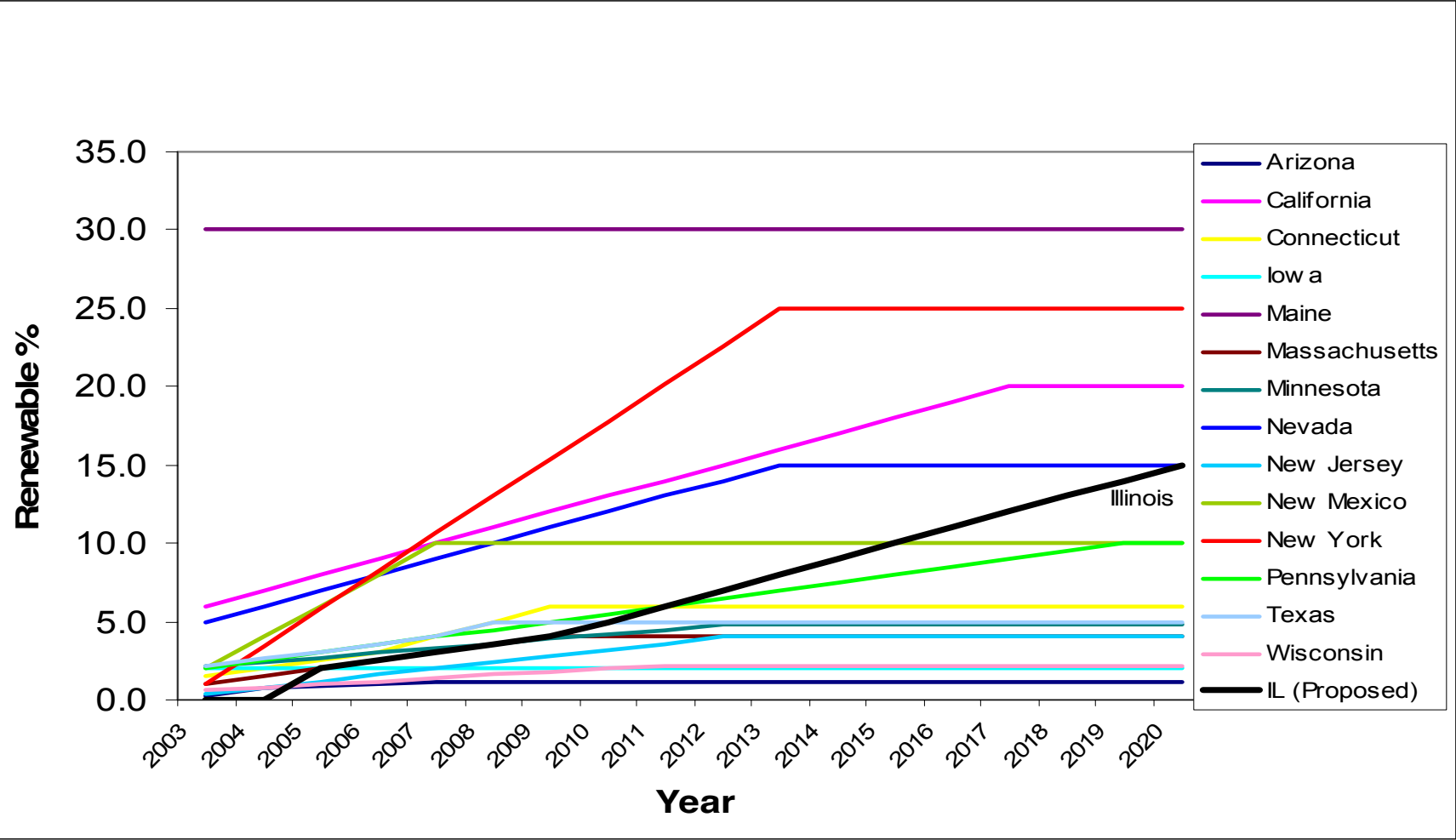
Why aren't we using more wind?

- Economic and political decisions of the utilities.
- Wind vs. Old Coal Plant
- Wind vs. Nuclear Plant
- Wind vs. Natural Gas
- Generators own the Utilities – disincentive to bring wind, solar or other renewables to market.
- Transmission problems
- Not able to be dispatched easily

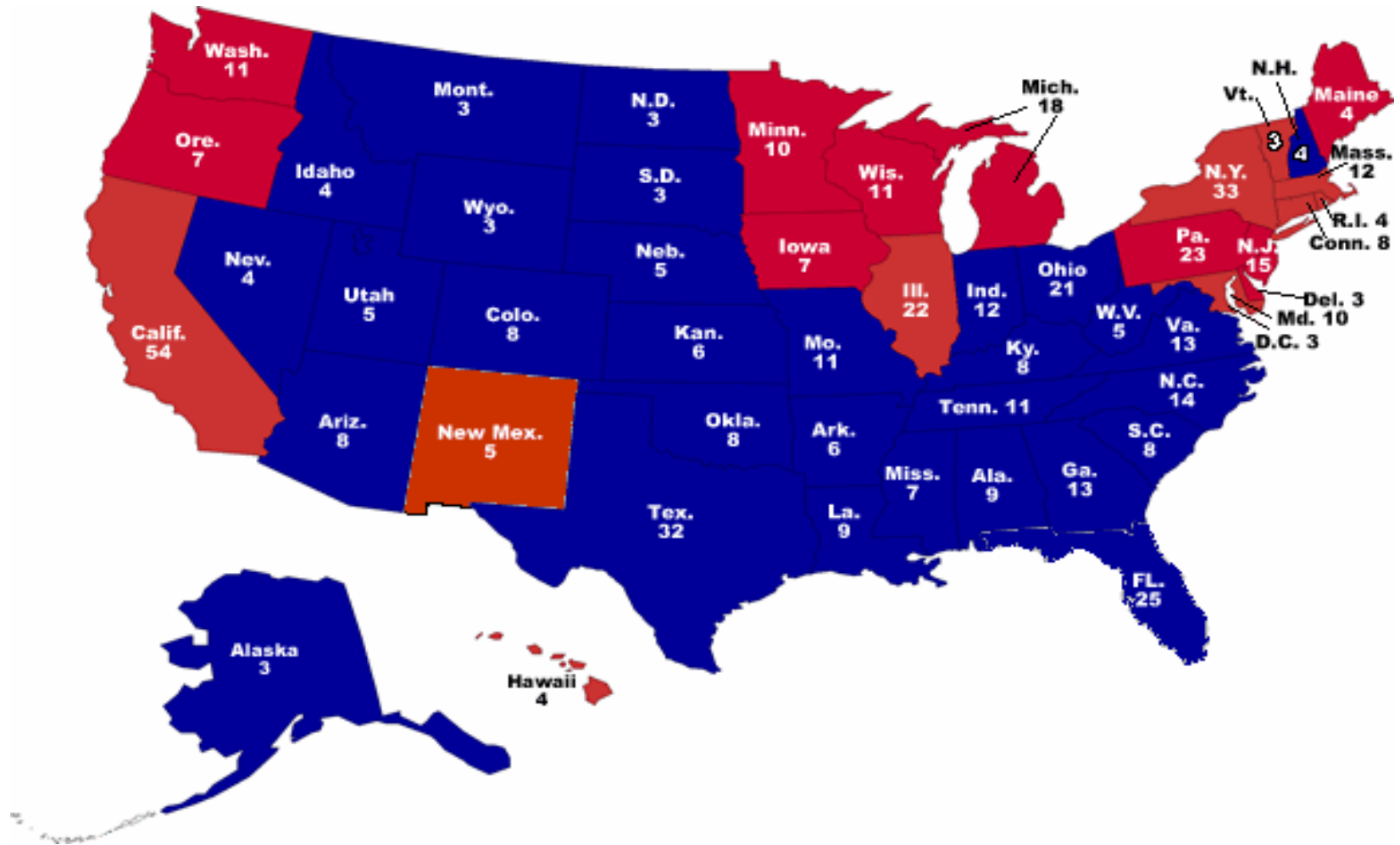
The Fix – Renewable Energy Standard

- Legislation which requires that all utilities use a certain percentage of renewable energy (wind, solar, biomass) as part of what they sell all customers.
- National Bill – defeated in a procedural vote
- Illinois Bill – stuck in committee

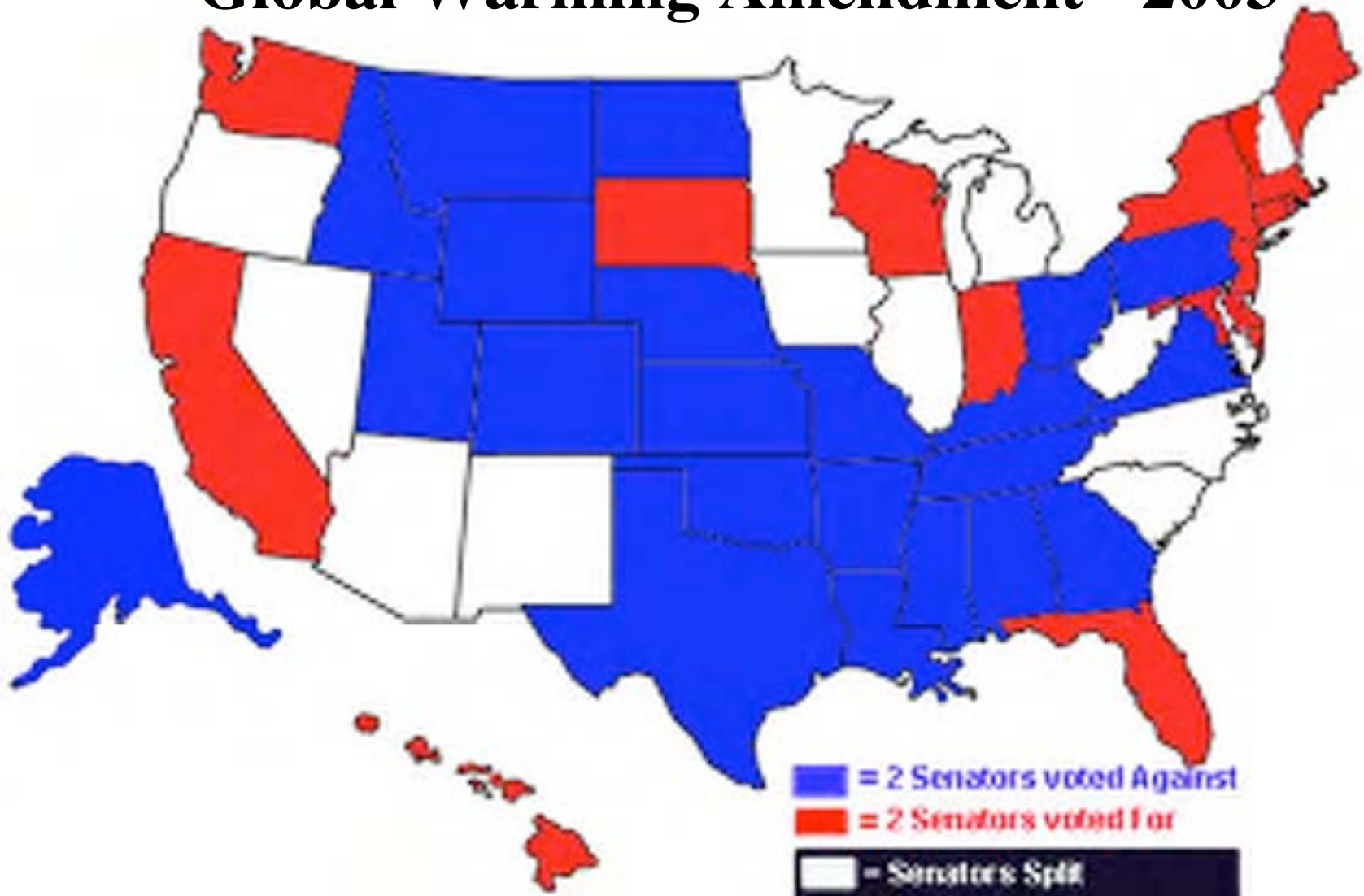
States with Renewable Energy Standards



The Blue-Red Map: Bush-Gore



Senate Vote on McCain/Lieberman Global Warming Amendment - 2003



What can you do?

- Contact your State Representative -
<http://www.legis.state.il.us>
- Contact your local Congressman -
<http://thomas.loc.gov>
- Get educated on the issue and VOTE!

The Future

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Web Sites for more information

- www.awea.org
- www.ucsus.org
- <http://www.nrel.gov>
- www.repowermidwest.org
- www.elpc.org



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