

Offshore & Onshore Wind Energy in the USA



Randall Swisher **3rd German-American Wind Energy Conference**
Senior Executive Advisor **June 28, 2011**
American Wind Energy Association

American Wind Energy Association

AWEA is the trade association for the wind energy industry

- **2,500 business members including manufacturers, developers, transportation, utilities, construction, insurers, financial community and technical support representing 75,000 wind jobs**
- **Develops policies and conducts analysis to support wind industry growth**
- **Execute wind industry's legislative agenda**
- **Promotes wind energy through advocacy, advertising and media relations**
- **Convenes conferences and workshops to educate the public and bring industry members together.**

www.PowerofWind.com

www.awea.org

The Wind Market in the U.S. – Setting the Context

- The Numbers
- Leading States
- Market Drivers
- Challenges & Strategies
- Moving Offshore

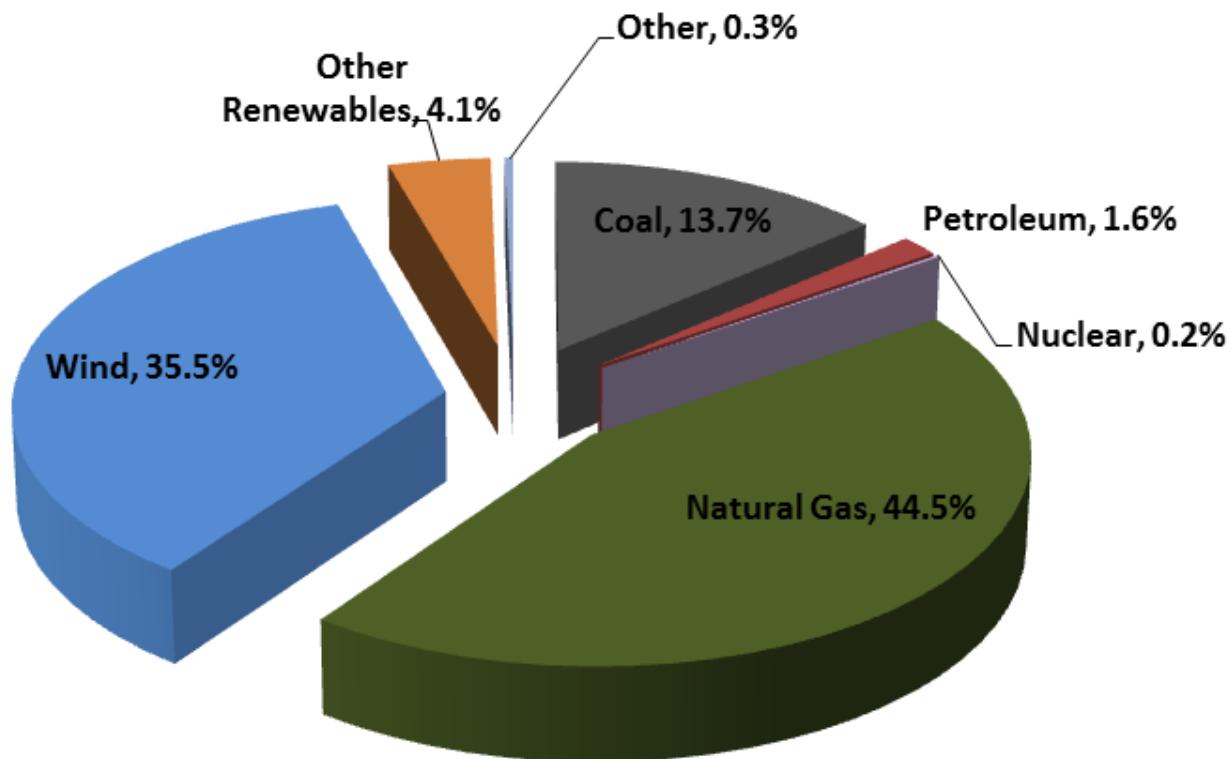


Wind has captured 35% of all new generating capacity in America since 2007

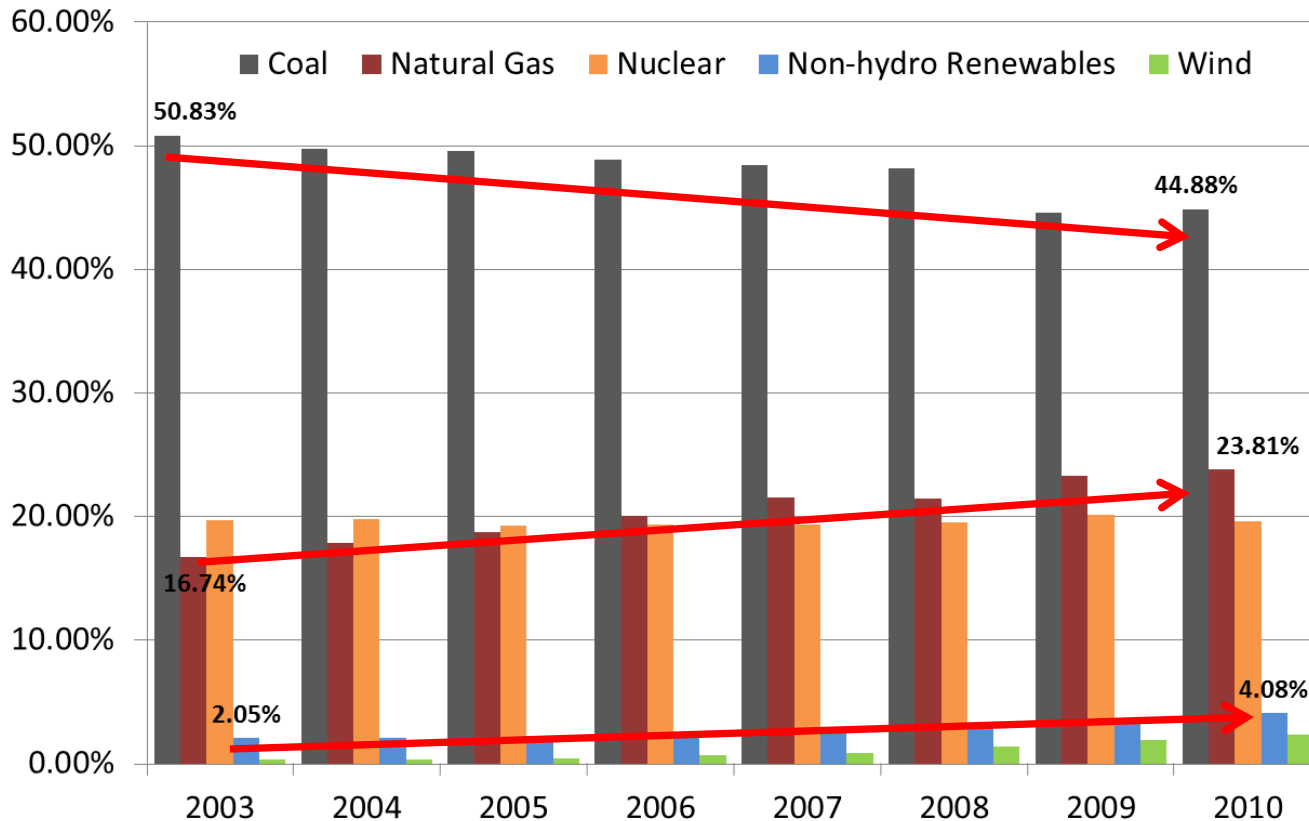
Percent of New Installed Capacity, 2007-2010

Nearly 81,000 MW of new generating capacity installed between 2007 and 2010

Wind installed over 35% of all new generating capacity between 2007 and 2010, or 28,740 MW.



U.S. Electric Power Markets are Getting Cleaner



Coal Market Share,
Drop Since 2003
- 6.0 percentage pts

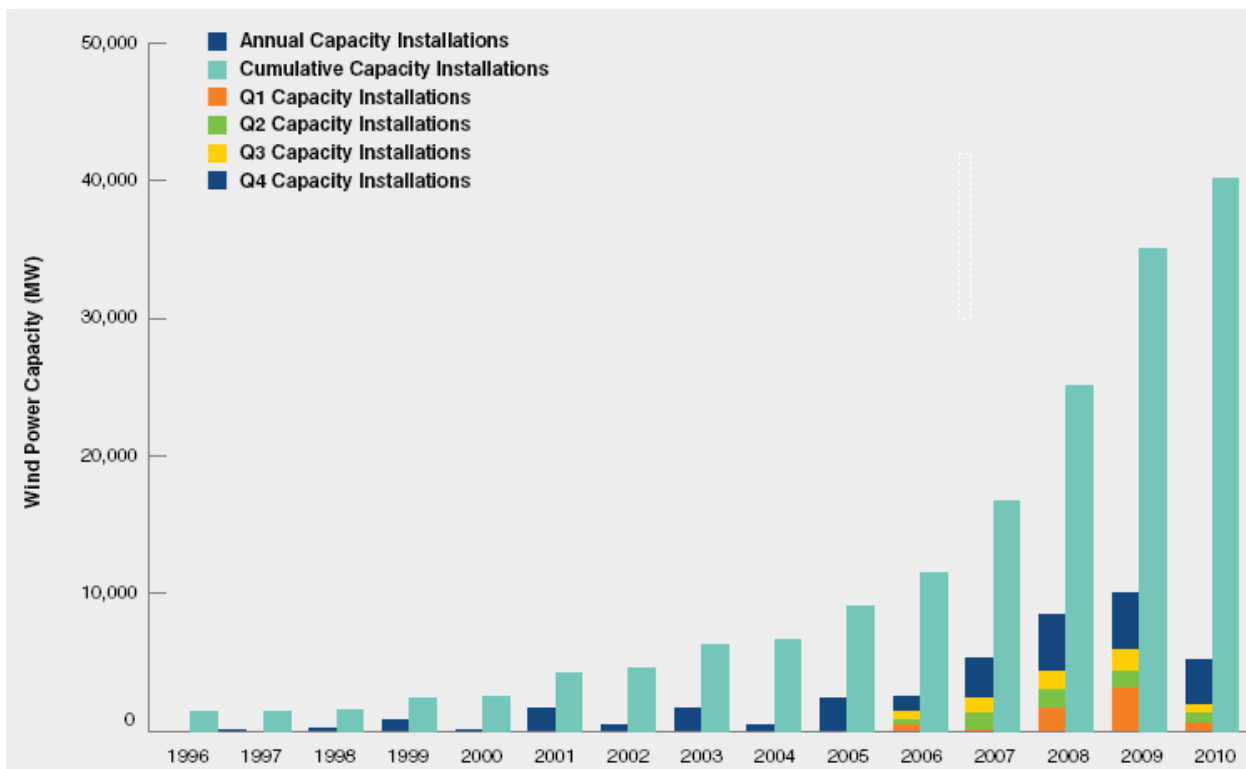
Natural Gas Market
Share Increase Since 2003
+ 7.0 percentage pts

Renewable Market Share,
Increase Since 2003
+ 2.0 percentage pts

Wind today provides about 2.3% of the nation's electricity

U.S. Annual and Cumulative Wind Power Capacity Growth

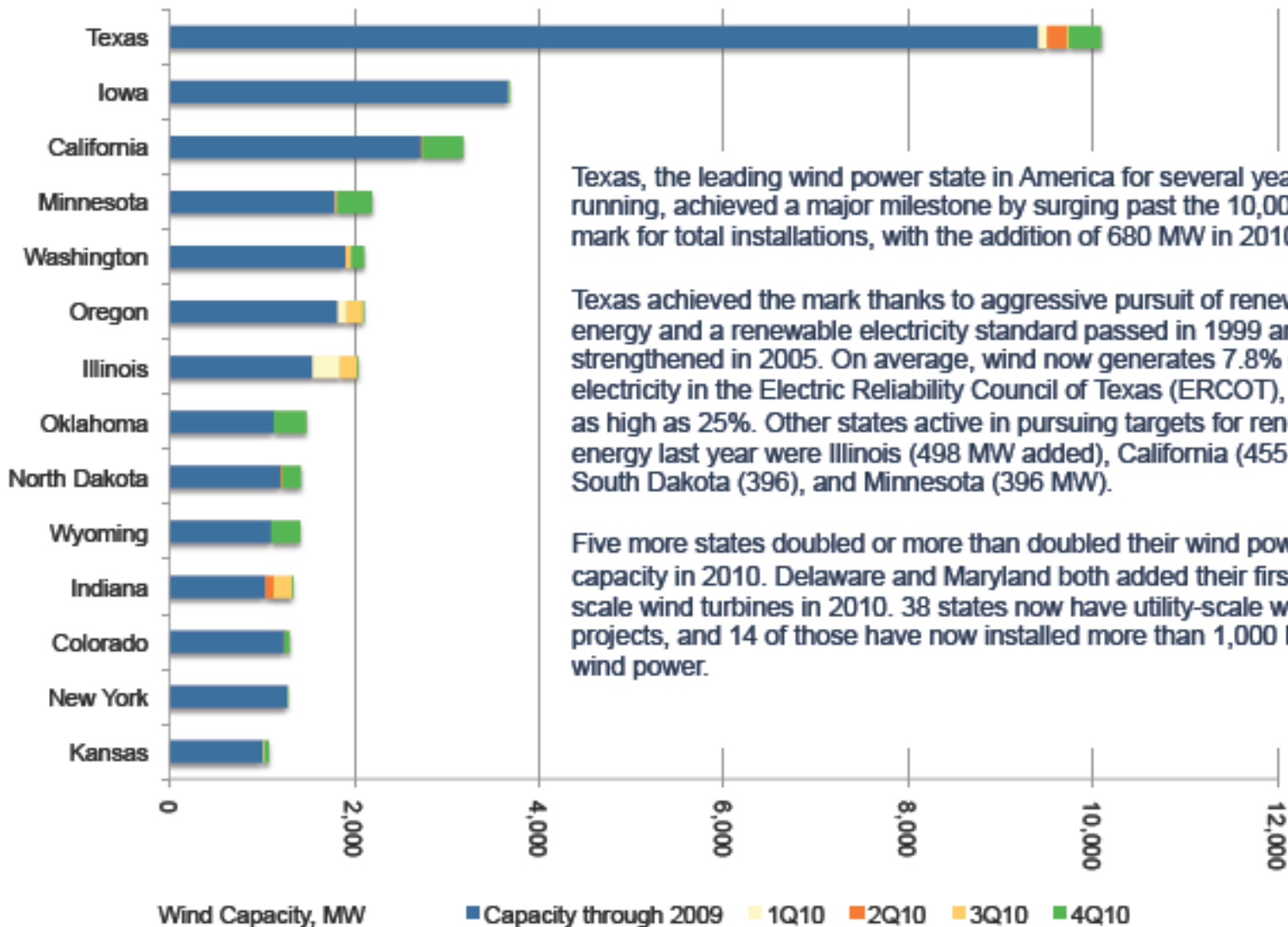
- The wind industry installed 5,116 MW in the U.S. in 2010
- 15% growth in 2010
- Total U.S. wind installations stand at 40,181 MW
- Average annual growth for the past five years was 35 %
- U.S. wind installations represent over 21% of global wind capacity



U.S. Market Stronger in 2011

- 1Q 2011 – more than 1,100 MW installed, more than double the capacity brought online in 1Q 2010
- At the end of 1Q 2011, more than 5,600 MW remains under construction

Wind Installations by State



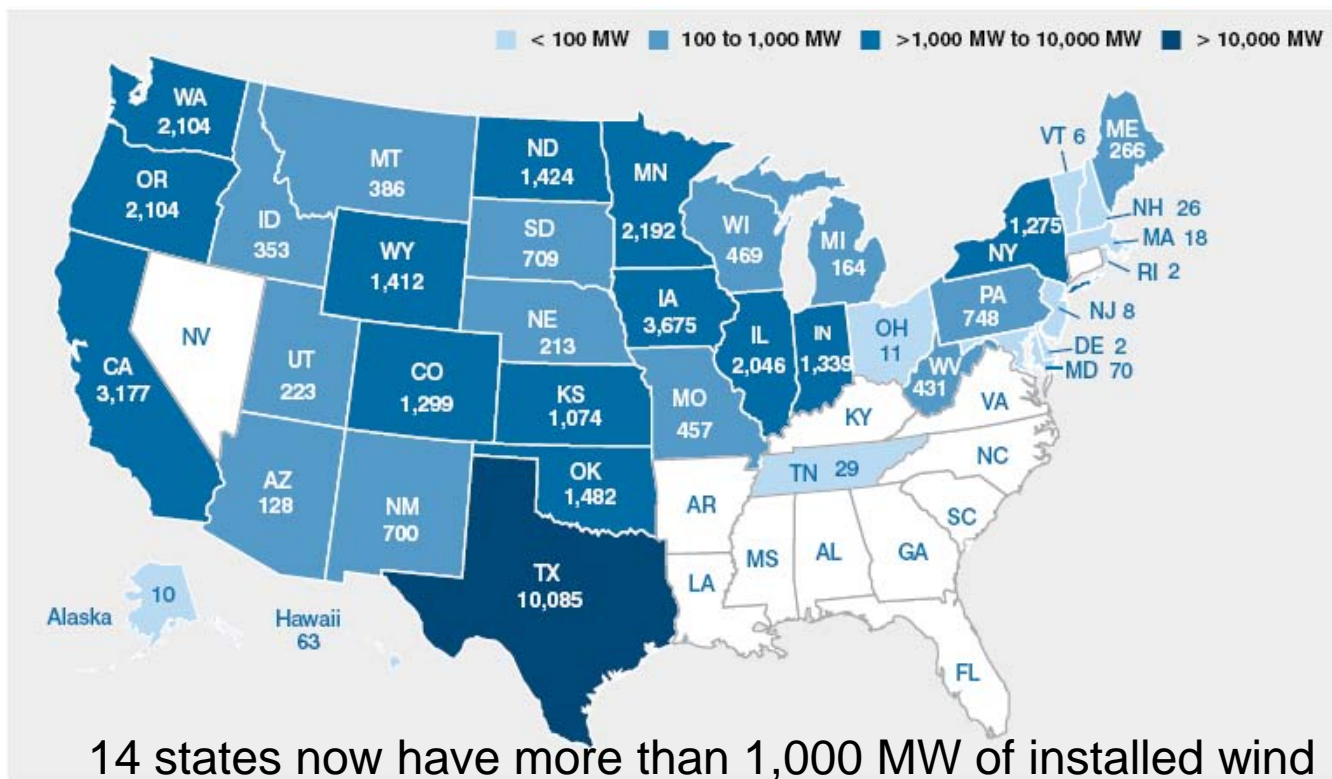
Texas, the leading wind power state in America for several years running, achieved a major milestone by surging past the 10,000-MW mark for total installations, with the addition of 680 MW in 2010.

Texas achieved the mark thanks to aggressive pursuit of renewable energy and a renewable electricity standard passed in 1999 and strengthened in 2005. On average, wind now generates 7.8% of the electricity in the Electric Reliability Council of Texas (ERCOT), peaking as high as 25%. Other states active in pursuing targets for renewable energy last year were Illinois (498 MW added), California (455 MW), South Dakota (396), and Minnesota (396 MW).

Five more states doubled or more than doubled their wind power capacity in 2010. Delaware and Maryland both added their first utility-scale wind turbines in 2010. 38 states now have utility-scale wind projects, and 14 of those have now installed more than 1,000 MW of wind power.

Wind Power Capacity by State

If Texas were a country, it would be ranked No. 6 with 10,085 MW of installed capacity at the end of 2010



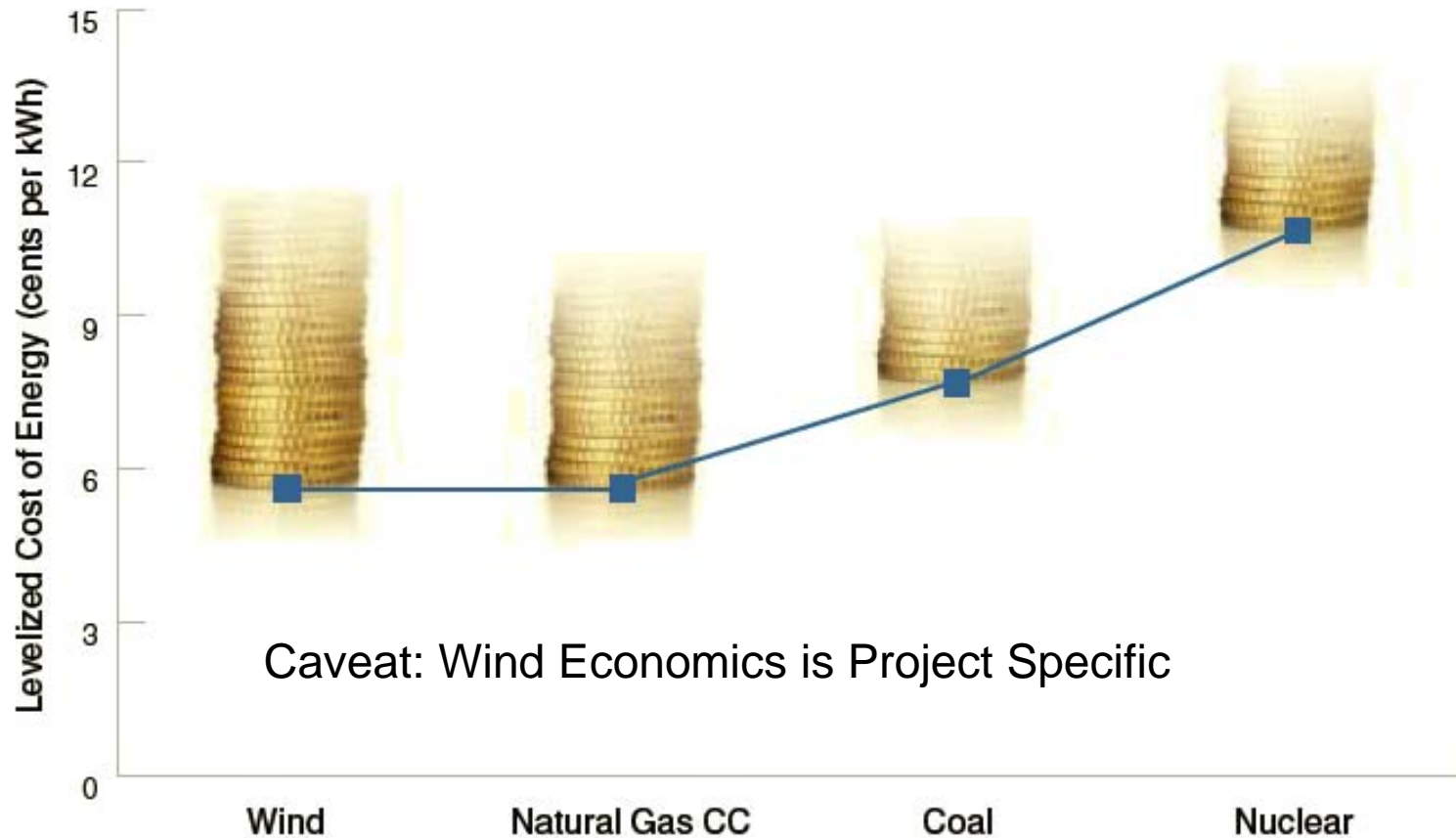
14 states now have more than 1,000 MW of installed wind

What are the Market Drivers for Wind?

- Competitive Economics
- Popular Support
- Supportive Policy
- The New Energy Economy – Jobs!
- Carbon Risk
- Constraints on Coal and Nuclear
 - 50 GW of coal retirements in next decade (ICF)

Let's look more closely at a few of the key drivers . . .

American wind is affordable and cost competitive with all other new electric generation sources



Recent Wind Pricing: Examples

- Illinois: Contracts signed with 2 wind projects in early 2011

Weighted Average

	Total Quantity (MWH)	Average Price (\$/MWH)
Ameren	600,000	\$50.44
ComEd	1,261,725	\$55.18

Wind Power: America's Choice



89% of
American voters

84% of Republicans | 88% of Independents | 93% of Democrats
believe increasing the amount of energy
the nation gets from wind is a good idea

Policy status & path forward

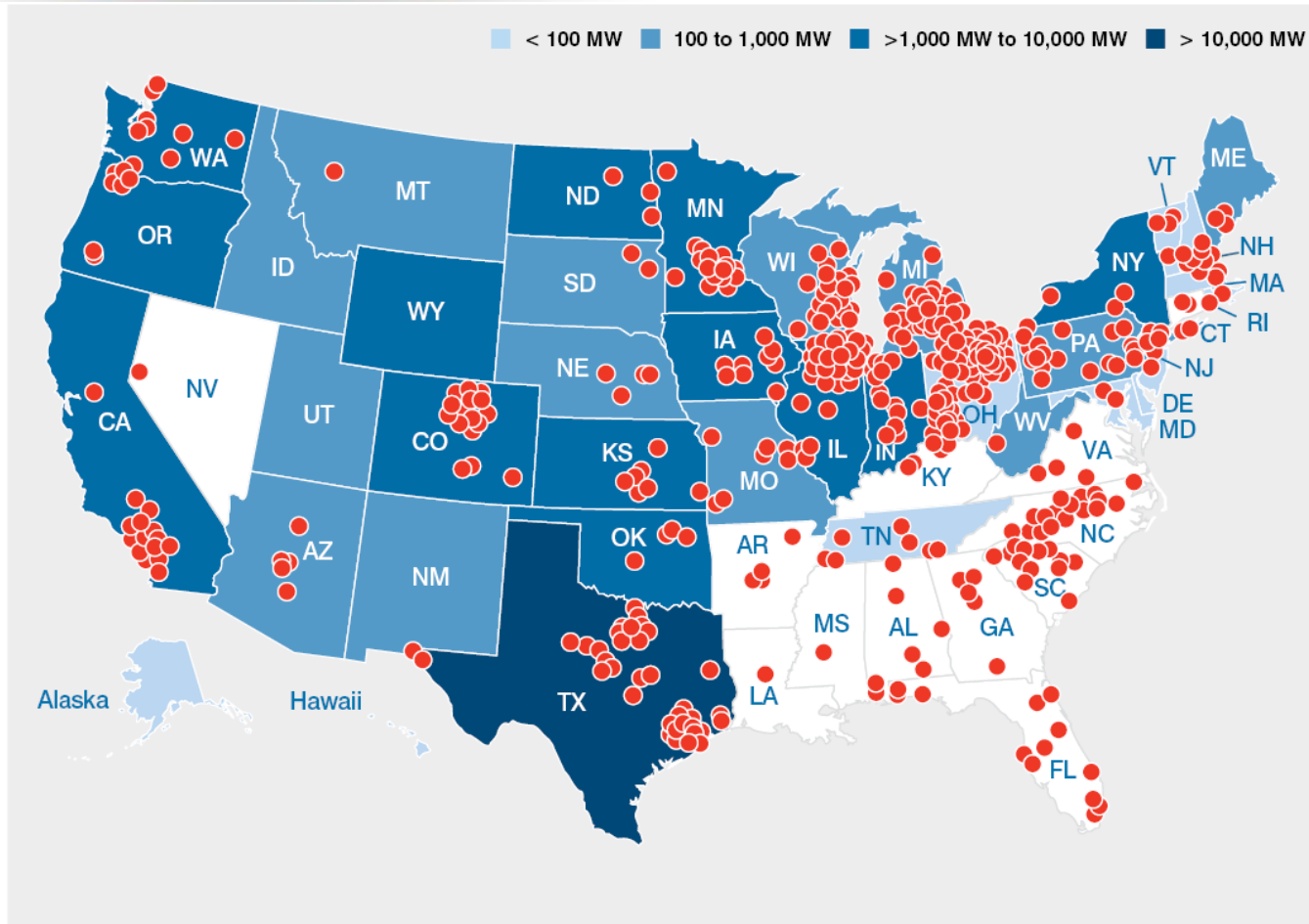
U.S. “Portfolio Approach” to policy

- U.S. approach to energy policy involves a portfolio of policies at the state and national level:
- AWEA’s continued national focus:
 - to pass a long term renewable energy policy
 - Long-term tax policy that encourages investment
 - *1603 tax credit refundability was extended for another year complementing the option to use the PTC through 2012.*
 - provisions that expedite transmission build.
- Greater focus by AWEA on state jurisdiction over power generation through state regulatory process. States like California, Colorado increasing targets so new opportunities. Look for tweaks in state RES and tax policy to drive demand.

Growth of OEMs in US Market

2005	2006	2007	2008	2009
GE Energy	GE Energy	GE Energy	GE Energy	GE Energy
Vestas	Siemens	Vestas	Vestas	Vestas
Mitsubishi	Vestas	Siemens	Siemens	Siemens
Gamesa	Mitsubishi	Gamesa	Suzlon*	Mitsubishi
Suzlon	Suzlon	Mitsubishi	Gamesa	Suzlon*
	Gamesa	Suzlon	Mitsubishi	Clipper
		Clipper	Clipper	Gamesa
		Nordex	Acciona Windpower	REpower
			REpower	Acciona Windpower
			Fuhrlander	Nordex
			DeWind	AAER
			EWT	DeWind
		Northern Power Systems		Goldwind
				Northern Power Systems
				Fuhrlander

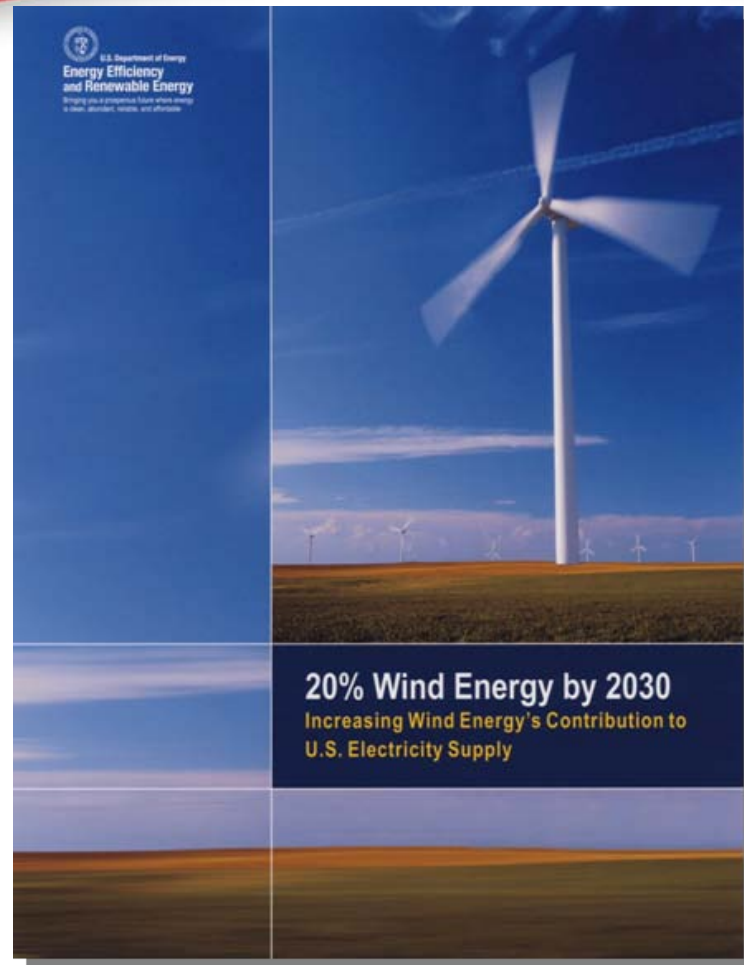
With 400 facilities, wind is one of the fastest-growing sources of U.S. manufacturing jobs



20% Wind Energy by 2030

DOE Report Identifies the Path

- **U.S. Department of Energy:**
“The U.S. possesses sufficient and affordable wind resources to obtain at least 20% of its electricity from wind by the year 2030.”

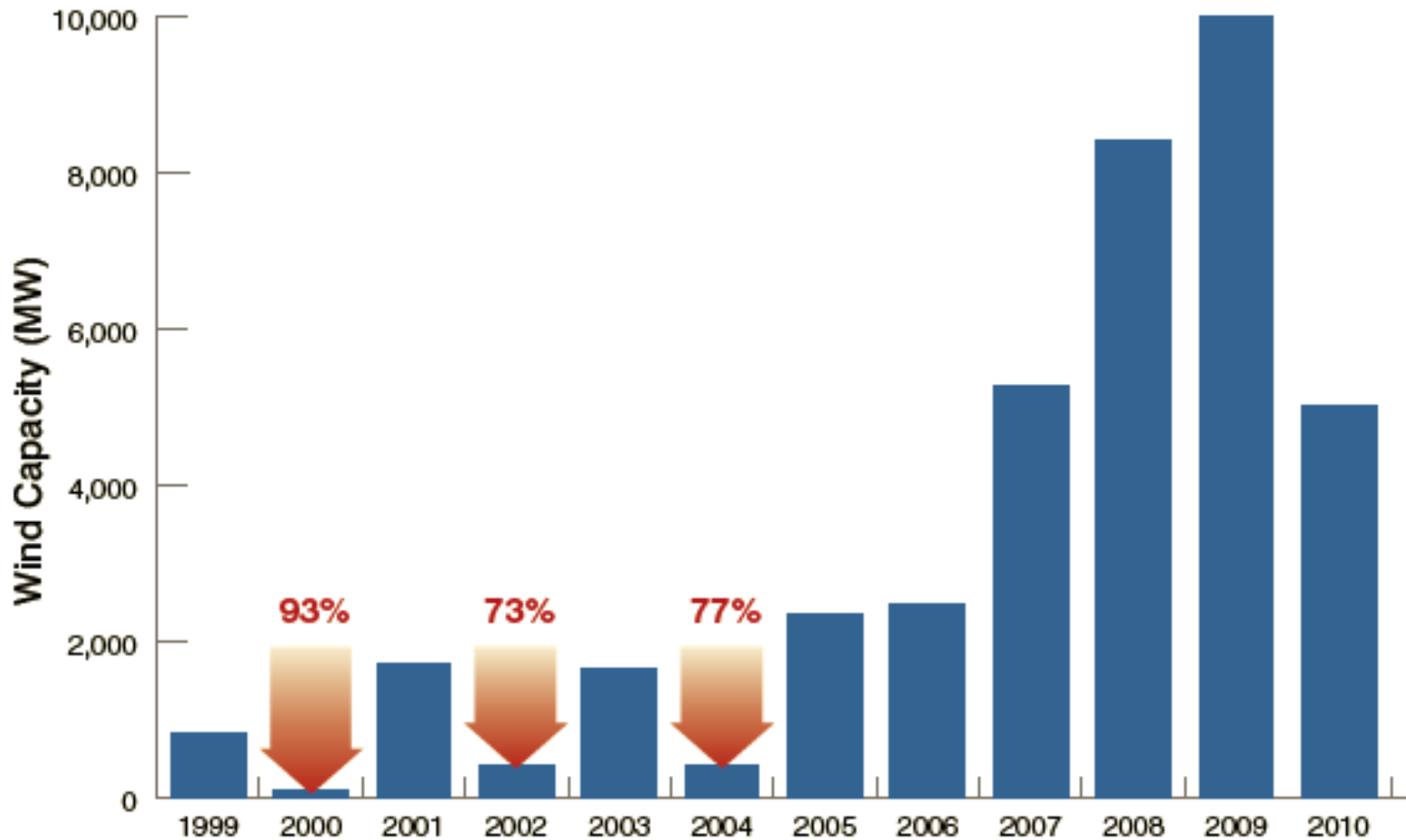


20% wind represents about 300 GW of capacity

The Challenges

- Near-term: Impact of Recession
- Need for Stable, Long-term Policy
- Low Gas Prices
- Need for Transmission Infrastructure

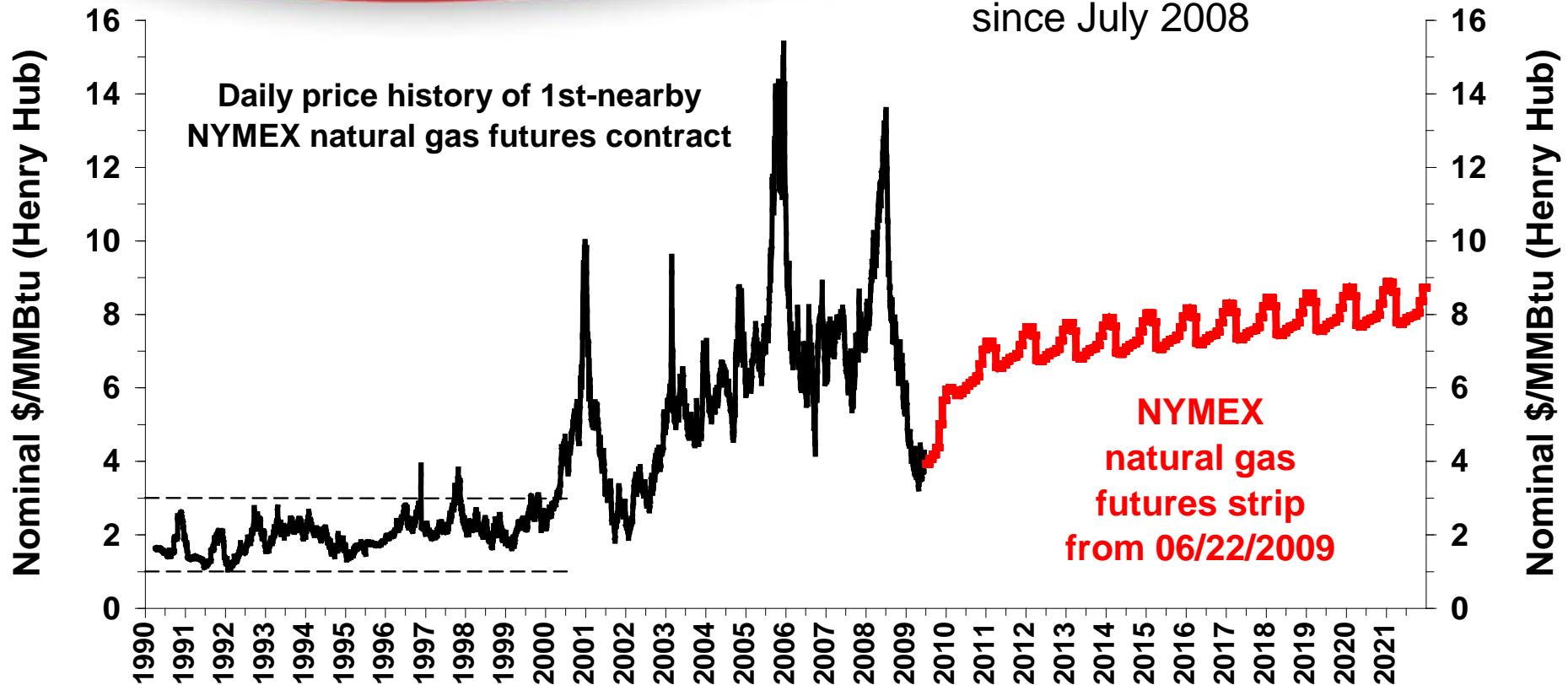
Lack of Stable Federal Policy Creates a Boom-Bust Cycle for Wind



Fuel Price Uncertainty

Natural Gas – Historic Prices

Gas prices have declined 66% since July 2008

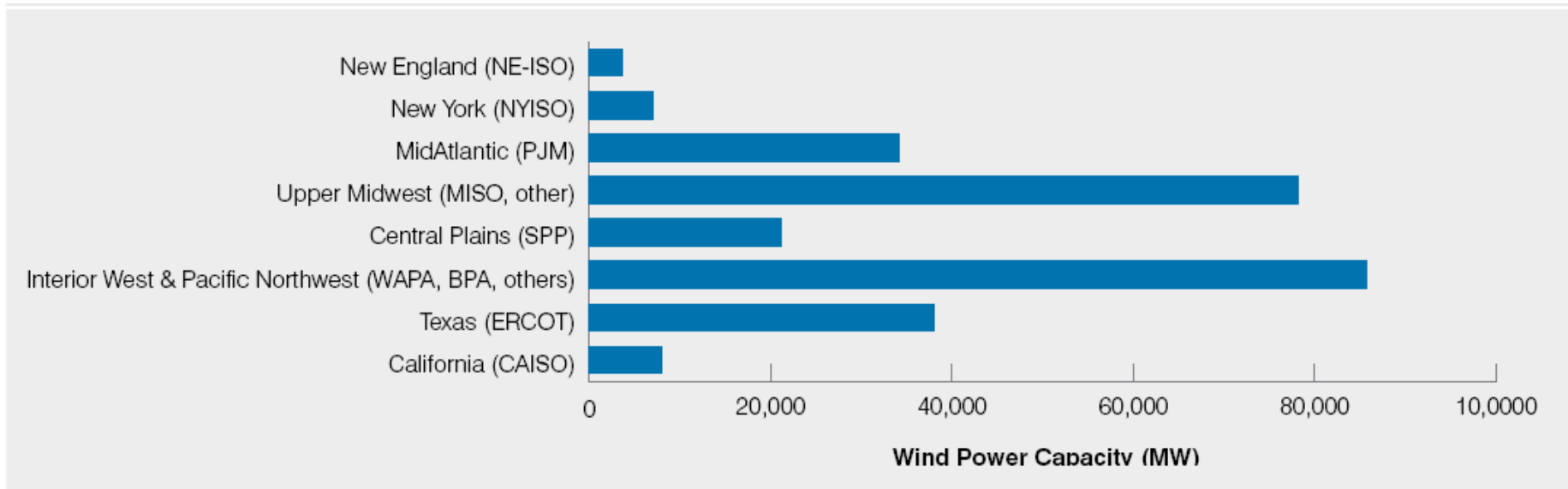


Source: LBNL

In 2010 the U.S. produced more natural gas than in any year since 1973

Lack of Transmission Infrastructure is a Major Strategic Constraint for Wind

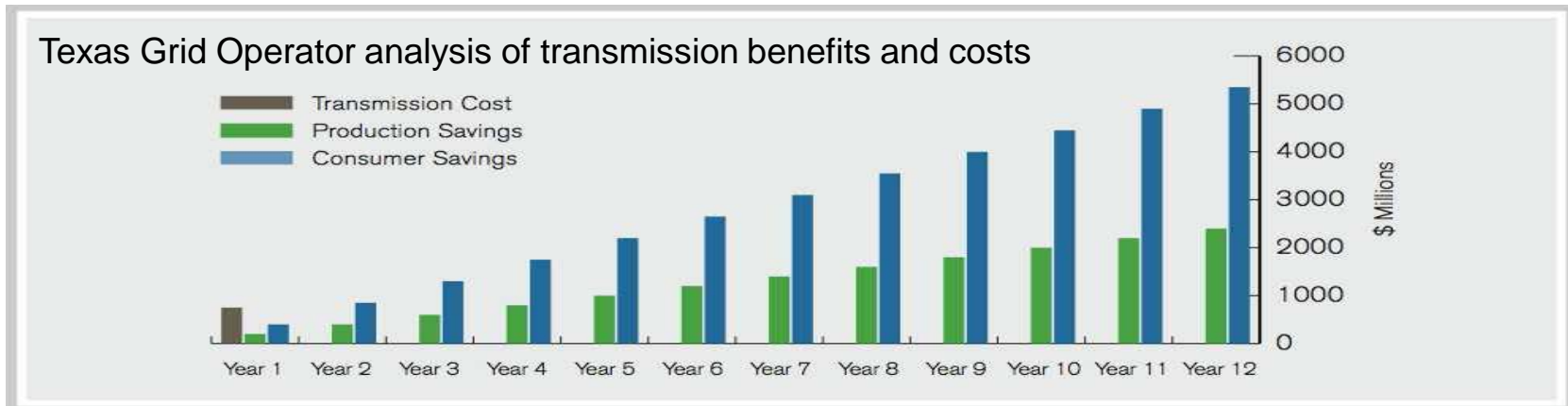
29,000 MW of near-term transmission capacity planned, but 275,000 MW of wind in the transmission interconnection queue



17% of wind output curtailed in ERCOT (Texas) in 2009, 8% in MISO in 2010

Transmission Investment Pays for Itself

- Transmission is essential for competition and economic growth.
 - The most competitive electricity market in the world is Texas, where all beneficiaries pay a share of the grid.
 - Transmission development has been a bipartisan initiative.
- The opponents of FERC's initiatives are trying to protect their generation market power through a congested inefficient grid.



The Vision: Green Power Superhighways

- Link areas with vast supplies of renewables to areas of high electricity demand - green power superhighways
- Improve grid operations



Example: Clean Line Energy

Transmission Policy Reform Needed: The Three P's

- Policy reforms needed to allow new transmission construction to proceed:
 - **Planning (pro-active planning)**
 - **Paying (broad regional cost allocation)**
 - **Permitting (streamlined siting)**
- AWEA-SEIA white paper at <http://www.awea.org/GreenPowerSuperhighways.pdf>

Offshore Wind: The New Frontier

Does Offshore Wind Have a Future in the U.S.?

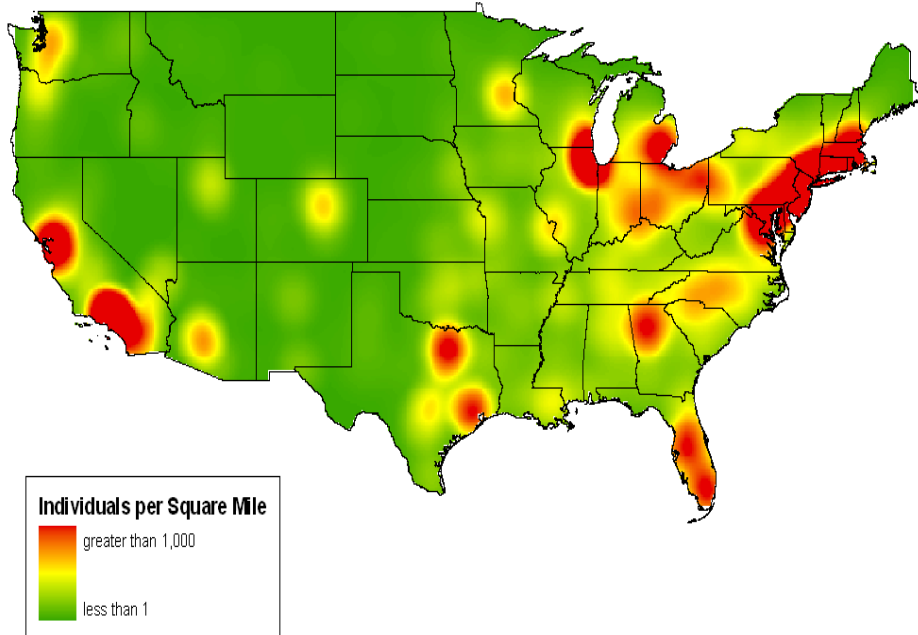


Why Offshore Power ?

28 coastal states use 78% of the electricity in US

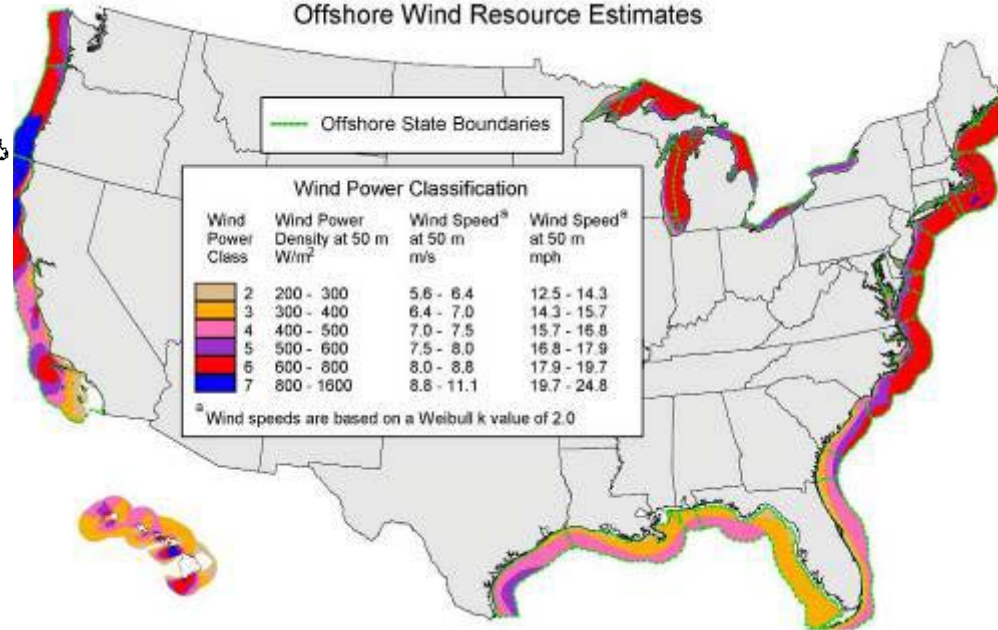
Population Density of the Conterminous United States

U.S. Population Density



U.S. Wind Resource

Offshore Wind Resource Estimates



Graphic Credit: Bruce Bailey AWS Truewind

Offshore Project Activity in U.S.

State	Developer	Project Name	Location	Distance from shore (highway miles)	Planned Capacity	Permitting Status	Power Purchase Agreement
Delaware	NRG Bluewater Wind	Mid-Atlantic Wind Park	Offshore from Rehoboth Beach	13.21 miles	300 - 450 MW	Met Tower Lease	Delmarva Power for 200 MW
Massachusetts	Cape Wind Associates	Cape Wind	Nantucket Sound	5.2 miles at closest point	468 MW	Complete	National Grid for 50%
	Town of Hull Municipal Light Plant	Hull III	Vicinity of Harding Ledge	1.5 miles	12 - 15 MW		
New Jersey	NRG Bluewater Wind		Offshore from Atlantic Beach	15.6 miles	348 MW	Met Tower Lease	
	Garden State Offshore Energy, LLC		Offshore from Avalon	20 miles	345 MW	In Process	
	Fishermen's Energy, LLC	Atlantic City WindFarm	Offshore from Atlantic City	2.8 miles	24 MW	State Permits	
	Fishermen's Energy, LLC	Offshore New Jersey Windfarm	Offshore from Atlantic City	10-12 miles	350 MW	Interim Lease	
	OffshoreMW		Offshore from Brigantine	16 miles	700 MW		
North Carolina	Duke Energy	NC Coastal Wind Demonstration Project	Eastern Pamlico Sound	7.3 + miles	3 - 15 MW	Cancelled	Approved Offshore Wind Rider for cost recovery.
	Apex Wind Energy	Outer Banks Ocean Energy	North Carolina	20 + miles	1,000 + MW		
Ohio	Lake Erie Energy Development Corporation	Cleveland Bay	Cleveland Bay	3.5 miles	20 MW		
Rhode Island	Deepwater Wind, LLC	Block Island Wind Farm	Offshore from Block Island	Just under 3 miles	30 MW		National Grid for 100%
	Deepwater Wind, LLC	Deepwater Wind Energy Center	Rhode Island Sound	20 miles	1,000 MW		
Texas	Wind Energy Systems Technology	Galveston Offshore Wind Farm	Offshore from Galveston	9-10 miles	150 MW		
Virginia	Seawind Renewable	Seawind-Virginia	Offshore from Virginia Beach	25 miles	480 MW	In Process	
	Apex Wind Energy	Hampton Roads Offshore Wind Energy	Virginia Beach	15 + miles	NA		

Offshore – How Big Could It Be?

- (NREL) estimates that U.S. offshore winds have a gross potential generating capacity four times greater than the nation's present electric capacity
- Under conservative assumptions about transmission, fossil fuel supply, and supply chain availability, the United States could feasibly build 54 GW of *offshore wind power* by 2030 - **20% Wind Energy by 2030, U.S. Department of Energy, July 2008**

A Few Offshore Wind Challenges

- Economics, economics, economics
- Long development / permitting cycle
 - Regulatory uncertainties
 - Obama Administration making progress
- Policy uncertainties – need long-term incentives in place
- Infrastructure bottle necks
- Transmission policy
- Industry “roadmap”

Questions?

