Overview of the Wind Energy Industry

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Overview

Current Statistics
US Wind Potential
Market Drivers and Policy
Current Statistics
The wind industry installed 5,116 MW in the U.S. in 2010.

Total U.S. wind installations stand at 40,181 MW.

U.S. wind installations represent over 21% of global wind capacity.

New wind capacity represented 26% of all new capacity installed in 2010.

Wind remained the second largest source of new installed capacity, second to natural gas.

All renewable capacity combined represented nearly 33% of new capacity.
Wind installed over 35% of all new generating capacity between 2007 and 2010 with 28,740 MW
Wind provided 2.3% of U.S. electricity in 2010.

Electricity from wind power capacity in the U.S. will supply the equivalent of:

- Over 10 million American homes
- Nearly 10 nuclear power plants
U.S. Wind Power Capacity Installations by State in 2010 (MW)

- 38 states have utility-scale wind installations
- 14 states have more than 1,000 MW installed and Texas has more than 10,000

There are roughly 275,000 MW of wind projects lined up in the interconnection queues for transmission access.
The top 20 owners of U.S. wind project assets captured just over 49% of the 2010 capacity installations.

85% of 2010 project capacity was owned by Independent Power Producers (IPPs), and 15% was owned by utilities.

Community wind, which has a component of local ownership represented 5.6% of capacity installed in 2010.

Ownership is on a net basis, so if two owners have a half share of a 100-MW wind farm, each company is credited with 50 MW. Ownership does not include structural investors, which may have a share of equity.

Wind Turbine Manufacturers’ Share of 2010 U.S. Wind Power Installations

Over 400 facilities manufacture for the wind industry
Overall, the U.S. wind industry supported 75,000 direct and indirect jobs in 2010.
Of the 75,000 jobs across the wind industry, Texas ranked No.1 for total jobs, followed by Illinois and Colorado.
US Wind Potential
The on-shore American wind resource alone could electrify the nation nearly 10 times over.
The 20% Wind Vision

“20% Wind Energy by 2030”


» What would it take for the U.S. to get 20% of its electricity by the year 2030?

» Report analyzed barriers and areas to focus on to achieve this target
20% Wind: Cumulative Installed Capacity

Would require an installation rate over 16 GW per year after 2018
After ramping up manufacturing capacity, the 20% scenario calls for over 16 GW to be installed annually.
20% Wind: Installations by State

Installed Wind Nameplate Capacity by State (2030)

- Includes offshore wind.
- The black open square in the center of a state represents the land area needed for a single wind farm to produce the projected installed capacity in that state. The brown square represents the actual land area that would be dedicated to the wind turbines (2% of the black open square).

Wind Capacity
Total Installed (2030) (GW)
- 0.0 - 0.1
- 0.1 - 1
- 1 - 5
- 5 - 10
- > 10

20% Wind 06-19-2007
20% Wind: CO₂ Reductions

Cumulative Reductions (Left Axis)
Annual Reductions (Right Axis)

Cumulative Reduction in CO₂ Emissions (million tons)
Annual Reduction in CO₂ Emissions (million tons)

Yearly cumulative and annual reductions of CO₂ emissions from 2008 to 2030, showing a significant increase in cumulative reductions over time.
20% Wind: Flattens Electric Industry CO₂ Emissions

- No-Wind Reference Case
- 20% Wind Vision
- Path to 60% below today’s Levels by 2050
20% Wind: Wind Electricity Generation Mix

No New Wind

20% Wind

- Natural Gas
- Coal
- Nuclear
- Hydro
- Wind
Market Drivers and Policy
History of Boom & Bust Tax Credit

Annual Wind Installed (MW)

- 1999
- 2000: 93% Drop
- 2001
- 2002: 73% Drop
- 2003
- 2004: 77% Drop
- 2005
- 2006
- 2007
- 2008
- 2009: significant increase

Source: AWEA
Demand Drivers

1. State RPS: 3-4 Gigawatts/year
   - CA and Mid-Atlantic each 1-2 GW/year 2011-13

2. Power Demand: 2.5 GW/year if wind supplies 25% of demand growth

3. Retirements due to environmental regs: 450 MW/year if wind supplies 25% of this market

4. Other policies...
Market-Driven Growth Possible

Data Source: Lazard, Levelized Cost of Energy, June 2009

Graph showing the levelized cost of energy (cents per kWh) for different energy sources: Wind, Natural Gas CC, Coal, Nuclear. The costs are in the range of 0 to 15 cents per kWh, with Wind having the lowest cost and Nuclear having the highest.
Coal Market Share, Drop Since 2003 - 6.0 percentage pts

Renewable Market Share, Increase Since 2003 + 2.0 percentage pts

Natural Gas Market Share Increase Since 2003 + 7.0 percentage pts

Source: EIA, Net Generation All sectors
*All Renewables does not include hydro
Tax Credits: PTC/ITC

• Production tax credit (PTC) of 2.2 cents/kWh for large wind available through 2012
  • Or 30% investment tax credit (ITC), and receive cash grant in its place through 2011

» Prospects for extension:
  • Grant option not favored
  • PTC/ITC extension prospects as good as ever. Need a tax vehicle to move.
    • Severe budget constraints, apply more to spending than tax credits
With new Congress, proponents of clean energy have broadened Renewable Electricity Standard (RES) to include low carbon sources in a Clean Energy Standard (CES).

Republicans not clear on what they will push yet.

Gasoline prices, EPA regulations, and challenges with natural gas, nuclear, and coal drive interest in acting on energy.
Call to Action: National Renewable Electricity Standard

✓ Short-term policy does not drive projects of manufacturing

✓ U.S. is competing the countries around the world

✓ U.S. has infrastructure, workforce, skill-set and power demand making us the perfect candidate for building a new manufacturing sector.

The wind industry simply needs a long-term and stable market signal to make the investment in renewables.
Call to Action: National Renewable Electricity Standard

- Nations with hard renewable commitments

China:
- ✔ 100 GW of wind by 2020
- ✔ CAP on GHG Emissions
- ✔ Feed-in Tariffs

United States: ??????

European Union:
- ✔ 20% Renewable Energy by 2020
- ✔ CAP on GHG Emissions
- ✔ Feed-in Tariffs
Wind cost-competitiveness shows great promise, both in unregulated markets and in the estimated cost of RPS.

Predictable policy is now a widely supported goal in Washington...but the budget “scoring” of long term tax credits remains a barrier.

Promoting clean energy is more popular than regulating pollution.

Water will be an increasingly important policy and market driver.

Obama’s challenger likely to have a clean energy plan.
AEP’s Conceptual Plan to Accommodate 400 GW of Wind Energy

This map shows the wind resource data used by the WinDS model for the 20% Wind Scenario. It is a combination of high resolution and low resolution datasets produced by NREL and other organizations. The data was screened to eliminate areas unlikely to be developed onshore due to land use or environmental issues. In many states, the wind resource on this map is visually enhanced to better show the distribution on ridge crests and other features.
Questions?

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