



AWEA U.S. Wind Industry Annual Market Report

Year Ending 2012

Executive Summary



AWEA Data Services



From the AWEA Department of Industry Data & Analysis:

Emily Williams, Senior Policy Analyst

John Hensley, Policy Analyst

Elizabeth Salerno, Director of Industry Data & Analysis

Data Contributions from AWEA Staff:

Larry Flowers, Paul Holshouser, Michael Goggin, Christopher Long

Carl Levesque, clean energy communications consultant (editorial)

AWEA sincerely thanks its member companies and other organizations for their contribution to the industry data provided in this report. AWEA strives to provide the best information on the wind industry—for the industry and by the industry—and therefore welcomes your comments.

Graphics and text in this report can be used with proper citation of “AWEA U.S. Wind Industry Annual Market Report Year Ending 2012.”

Creation of new graphics based on data in the report must receive written approval from AWEA.

When other data sources are used, they are noted. Data should not be used without permission from AWEA.

Copyright © 2013

◀ **Fire Island Wind Project, Alaska**

11 GE 1.6 MW turbines

Owner: Cook Inlet Region, Inc.

Photo: Oscar Edwin Avellandeda and Cook Inlet Region, Inc.



Power County Wind Farm, Idaho

18 Nordex N100 / 2.5 MW turbines

Owner: CG Power/D.E. Shaw ♦ Operated by: First Wind

Photo: Douglas Barnes Photography

The American Wind Energy Association (AWEA) was established in 1974 and is the national trade association of America's wind industry, with more than 1,200 member companies, including global leaders in wind power and energy development, wind turbine manufacturing, component suppliers and service companies. AWEA supports the wind industry's policy, regulatory, and business development objectives. AWEA hosts the nation's largest wind energy trade show, WINDPOWER® Conference & Exhibition, and creates and delivers educational events that capture the energy of the rapidly expanding wind market and offer necessary opportunities for organizations to learn and network with fellow wind professionals. AWEA is the voice of the U.S. wind industry, promoting clean, homegrown, and affordable wind energy to power a cleaner, stronger America.

More information about AWEA can be found at www.awea.org.



AWEA Data Services

Table of Contents

Wind Power Capacity & Projects	6
U.S. Wind Power Capacity Growth	
Global Wind Power Capacity Growth	
U.S. Wind Power Project Activity, by State & Region	
Owners & Developers of U.S. Wind Power Capacity	
Electric Utilities with Wind Power Capacity on System	
Characteristics of U.S. Wind Power Projects	
U.S. Wind Power Project Investment	
Wind Turbine Manufacturing	37
Wind Turbine Manufacturers	
Characteristics of Utility-Scale Wind Turbines	
U.S. Wind Related Manufacturing Facilities	
Regional & State Impacts of U.S. Wind Industry Activity	51
Transmission, Offshore Wind Projects and Distributed Wind Energy	63
U.S. Wind Power & Transmission	
U.S. Offshore Wind Energy Project Activity	
U.S. Distributed Wind Energy Activity	
Appendices:	
All Utility-Scale U.S. Wind Projects Completed during 2012	75
Power Purchase Agreements Signed during 2012	81
U.S. Wind Industry Manufacturing Facilities 2012	82
Glossary	97



Groton Wind Farm
24 Gamesa G87 2 MW turbines
Iberdrola Renewables ♦ **Photo: Iberdrola**
Renewables, by Mike McPheeters

List of Figures



High Sheldon Wind Energy Project, New York
75 GE 1.5 MW turbines
Invenergy
Photo: Dennis Schwartz

Figure 1	U.S. Annual and Cumulative Wind Power Capacity Growth (Utility-Scale Wind)	page 6
Figure 2	U.S. Wind Power Capacity Installations over Time, by Quarter	page 7
Figure 3	U.S. Annual Power Capacity Additions over Time, by Percentage	page 8
Figure 4	U.S. Annual Power Capacity Additions during 2012	page 8
Figure 5	U.S. Electricity Generation Mix during 2012	page 9
Figure 6	U.S. Electricity Generation Mix over Time	page 9
Figure 7	U.S. Annual Wind Energy Generation and Cumulative Installed Wind Capacity over Time	page 10
Figure 8	Global Wind Power Capacity Growth	page 11
Figure 9	Global Wind Power Capacity Installations over Time, Top Countries	page 12
Figure 10	U.S. Wind Power Capacity Installations, Top States	page 13
Figure 11	Wind Power Capacity Additions during 2012, Top 10 States	page 13
Figure 12	Wind Power Capacity Additions during 2012, Top 10 Fastest Growing States	page 13
Figure 13	U.S. Wind Power Capacity Installations, by State	page 14
Figure 14	U.S. Wind Energy Share of Electricity Generation, by State	page 15
Figure 15	Increasing Penetration of U.S. Wind Energy Generation, over Time	page 16
Figure 16	Wind Energy Share of Electricity Generation, Top 10 States	page 16
Figure 17	Increasing Deployment of U.S. Wind Power Capacity Installations, over Time	page 17
Figure 18	U.S. Wind Power Capacity Installations, by Quarter, by State, MW	page 18
Figure 19	U.S. Wind Power Capacity under Construction	page 19
Figure 20	Map of Wind Power Projects	page 20
Figure 21	Wind Power Capacity Activity, by Region	page 21
Figure 22	Market Share for New U.S. Wind Capacity Installed during 2012, by Owner	page 23
Figure 23	Top 10 Developers of New U.S. Wind Power Capacity Installed during 2012	page 24
Figure 24	Market Share of U.S. Wind Power Capacity, by Owner	page 25
Figure 25	Top 10 Owners of U.S. Wind Power Capacity, over Time	page 26
Figure 26	Ownership Status for New U.S. Wind Power Capacity Installed over Time	page 26
Figure 27	Power Offtake Status for New U.S. Wind Power Capacity Installed during 2012	page 27
Figure 28	Top 10 Electric Utilities with Wind Power Capacity On System	page 29
Figure 29	Top 10 Electric Utilities with Ownership of Wind Power Capacity	page 29
Figure 30	Top 20 Investor-Owned Utilities with Wind Power Capacity on System	page 30
Figure 31	Top 10 Rural Electric Cooperative Utilities with Wind Capacity on System	page 31
Figure 32	Top 10 Municipally-Owned Utilities and Public Utility Districts with Wind Capacity on System	page 31
Figure 33	Electric Utilities with U.S. Wind Power Capacity on System	page 32
Figure 34	Top 10 Largest U.S. Wind Power Projects	page 33
Figure 35	Average Size of U.S. Wind Power Projects over Time	page 34

Figure 36	Land Ownership Characteristics of U.S. Wind Power Projects	page 34
Figure 37	Community Wind Ownership of U.S. New Wind Power Projects Installed during 2012	page 34
Figure 38	U.S. Wind Power Project Annual Investment over Time	page 35
Figure 39	U.S. Wind Project Debt and Tax Equity Deals Closed over Time	page 36
Figure 40	U.S. Wind Capacity Using Debt and Tax Equity over Time	page 36
Figure 41	Wind Project Use of the Production Tax Credit versus Treasury 1603 Program over Time	page 36
Figure 42	Market Share for Wind Turbine Manufacturers of U.S. Wind Power Capacity Installed during 2012	page 38
Figure 43	Market Share for Wind Turbine Manufacturers of U.S. Wind Power Capacity over Time	page 39
Figure 44	Market Share for Wind Turbine Manufacturers of U.S. Wind Power Fleet	page 39
Figure 45	Wind Turbine Manufacturers Installing Utility-Scale Turbines in the U.S., by Year	page 40
Figure 46	Average Rating of Turbines and Number of Turbines in the U.S., over Time	page 41
Figure 47	Number of Wind Turbines Installed in 2012, by Rating	page 42
Figure 48	Increase in Output of Typical Wind Turbine over Time	page 42
Figure 49	Wind Turbines Installed during 2012, by Model	page 43
Figure 50	Rotor Diameter and Hub Height of Wind Turbines Installed during 2012	page 44
Figure 51	Active Wind-related Manufacturing Facilities during 2012	page 46
Figure 52	Manufacturing Capacity for Major Components of Towers, Blades and Nacelles	page 47
Figure 53	Major Wind-related Manufacturing Facility Locations Operational Year End 2012	page 48
Figure 54	New Wind-Related Manufacturing Facility Activity over time	page 49
Figure 55	New Online Wind-related Manufacturing Facilities during 2012	page 50
Figure 56	U.S. Wind Power Projects and Manufacturing	page 52
Figure 57	Top 20 U.S. Wind Power State Rankings	page 53
Figure 58	U.S. Congressional Districts with Wind Power Capacity, Top 10 Districts	page 55
Figure 59	U.S. Wind Power Capacity Installations, by Congressional District	page 55
Figure 60	All Online Wind-related Manufacturing Facilities & Wind Projects, by Congressional District	page 56
Figure 61	U.S. Wind Energy Industry Total Employment over Time	page 57
Figure 62	U.S. Wind Energy Industry Employment by State	page 59
Figure 63	Types of Educational Institutions Offering Wind Energy Programs	page 60
Figure 64	Wind Energy Impact on Avoiding Carbon Dioxide Emissions	page 61
Figure 65	Wind Energy Impact on Avoiding Water Consumption From Thermal Power Plants	page 62
Figure 66	U.S. Wind Power Capacity Installed by RTO/ISO	page 64
Figure 67	Characteristics of RTO/ISO Regions	page 66
Figure 68	Wind Power Capacity in the Interconnection Queue	page 67
Figure 69	Transmission Line Activity	page 68
Figure 70	Offshore Wind Energy Projects Underway in U.S.	page 70
Figure 71	Proposed Offshore Wind Energy Projects	page 72



Bishop Hill 1 Wind Farm, Illinois
133 GE 1.5 and 1.6 MW turbines
Invenergy
Photo: Tina Kanaby, MFG Wind

Introduction



Goodnoe Hills Wind Project, Washington

47 REpower MM92 2 MW turbines

EDF Renewables

Photo: Dennis Schwartz, DESPhotography.com

Dear AWEA Members,

First off, congratulations!

By now you probably know that the U.S. wind energy industry forged through its best year ever in 2012, installing 13,131 megawatts (MW) of capacity and surging past the 60 gigawatt (GW) milestone for total installed wind power capacity.

As this in-depth *AWEA U.S. Wind Industry Annual Market Report* shares, those are just a couple of the dozens of achievements for which 2012 will be remembered and that the industry can be proud of. In 2012 our industry invested over \$25 billion in private capital to build new wind projects in the U.S., pushing the five-year average annual investment level to \$18 billion between 2008 and 2012.

In other words, our industry is investing in America. Now that's something to be proud of.

Here are just a few other data highlights that are nothing short of head turning. For the first year ever, wind energy was the number one source of new electricity generating capacity, contributing 42 percent of all the megawatts the power sector installed. In getting there, the industry built more than 180 wind projects, with Nevada and Puerto Rico getting their first utility-scale facilities.

And there's more to the 60-GW milestone story. Also in 2012, American wind power blazed past the 50 GW milestone—just five months earlier.

Ten gigawatts installed in just a few months. Let's put that into perspective. To start, it took the industry 25 years to reach 10 GW of total installed capacity, a milestone that came in 2006. That's when the industry's performance started becoming nothing short of phenomenal. Just two years later in 2008, the industry doubled its capacity, hitting the 20 GW milestone, and then it took only one year a piece to reach the 30 GW and 40 GW milestones in 2009 and 2010, respectively.

Today's 60 GW of wind power capacity represents both tens of thousands of American jobs and enough electricity to power the equivalent of 15.2 million American homes. That's equal to all the households in Colorado, Iowa, Maryland, Michigan, Nevada and Ohio combined. The 60 GW of wind power now deployed can avoid nearly 100 million metric tons of carbon dioxide (CO₂) annually—equivalent to avoiding over 4 percent of power-sector CO₂ emissions.

The industry can also be proud that it continues to be a catalyst of American manufacturing rejuvenation by supporting over 550 manufacturing facilities and over 25,000 manufacturing jobs. In total, the U.S. wind energy industry provided 80,700 full-time equivalent jobs in the U.S. during 2012.

Of course, U.S. wind energy's outstanding performance is only part of the story. Challenges lie ahead. Market dynamics for wind energy start with the overall power sector, where market size will be dictated (and limited) by power prices and energy demand. Playing important roles in the level of continued wind power capacity build out will be the nation's rate of

progress on the economic recovery, the resulting load growth, and the price of natural gas.

Further, as we know all too well, U.S. wind energy continues to operate in an environment characterized by unstable, short-term Federal policy. In this introduction, I'll try and shed some light on more of the market dynamics, both those that are having an exciting impact on the industry as well as those that will undoubtedly present some challenges.

Market drivers

To get a clear picture of the industry, let's get into some specifics, as the pages ahead will do in even greater detail. On the technology front, taller towers that reach stronger wind resources, along with longer blades that capture more energy, translate into lower overall cost of wind-generated electricity. Hub heights now average over 80 meters, with 1,071 turbines installed during 2012 on towers of 100 meters.

Meanwhile, transmission, a much-needed wind energy enabler, is being built at a robust pace. The 3 new transmission lines completed in 2012 allow for 1,000 more megawatts of wind to be brought onto the system.

Wind power penetration levels also continue to impress, with Iowa and South Dakota now producing more than 20 percent of their electricity from wind energy and the operating system in Texas, ERCOT, reaching 10 percent wind energy on its system. Nine states across the country now receive more than 10 percent of their electricity generation from wind energy.

Record levels of electricity production, meanwhile, underscore both wind power's reliability and its ability to be integrated in large amounts. The Electric Reliability Council of Texas (ERCOT) set a record of 26% wind generation on December 25, 2012, while the Southwest Power Pool (SPP) set a record of 30.2% wind generation on December 2, 2012.

What's still more exciting is that more than ever, utilities and public utility commissions across the country are discovering wind energy to be a great deal for their consumers. Just a couple of examples from different parts of the country:

Michigan: In the Wolverine State, renewable energy contracts submitted to the state Public Service Commission show a downward trend. "Almost all actual renewable energy contract prices are lower than the coal guidepost rate..." the Michigan Public Service Commission noted in a February 2012 report.

Louisiana: Meanwhile, at the opposite end of the country (in the South, where electric rates are generally known to be low, mind you), American Electric Power subsidiary Southwestern Electric Power Co., signed power purchase agreements totaling 358.65 MW of wind power from projects in Texas, Oklahoma, and Kansas. The result: an average decrease in cost to the utility's customers of 0.1 cents per kilowatt-hour over a 10-year period starting in 2013.

Price appeal is, at least in part, behind another trend: an increase in non-traditional entities buying wind power. In addition to the 74 utilities purchasing or owning new wind energy in 2012, purchasers last



**Wind project in Kansas
Siemens turbines
Photo: Siemens Energy, Inc.**

year included at least 18 industrial buyers, 11 schools and universities, and eight towns and cities. Wind power users include manufacturing plants, data centers, farms, medical centers and other entities.

The road ahead: market trends and dynamics

Now, I'm pleased to say that with the Production Tax Credit (PTC) extension and its new start-construction language in place, the industry is getting back to doing what it does best: building wind turbines and building wind energy projects.

Starting with project requests for proposals coming from utilities, we expect the "back-to-work" effect to reach through the industry supply chain, and in fact we know that this is already happening, with projects being announced and orders being placed.

The PTC should offer opportunity for wind power growth in almost every region of the country, while various regions will get additional boosts from such market drivers as renewable portfolio standards (New England, the Mid-Atlantic, California, and the Pacific Northwest) and the build out of new transmission (the Upper Midwest and Texas). Driving project development activity in such regions as the Southwest Power Pool and the Southeast, meanwhile, will be load growth and increasingly competitive wind energy costs.

Of course, as previously mentioned, those drivers are expected to be tempered by such factors as limitations within the broader power market (i.e., power prices and power demand), the robustness of the economic recovery and accompanying load growth, and natural gas prices.

But we also know that in the end, policymakers know what wind energy is doing for America. That's why the extension of the PTC, wind energy's primary policy driver, made its way into the high-profile, end-of-year legislation to avert the so-called "fiscal cliff." And that's why lawmakers, knowing that the industry had been unable to plan for the coming months as a result of the 11th-hour extension, included the all-important language stipulating that projects must start construction, rather than be online, by the end of the year in order to qualify for the credit.

Concrete signs that policymakers understand wind power's value to the nation continued as 2013 got under way. In his State of the Union Address, President Obama called for a doubling of renewable energy by 2020 as a means of creating good manufacturing and construction jobs, and reducing harmful greenhouse gas emissions. He, like many policymakers, knows that if those are the goals, there's no way around using wind energy as a key solution. Whether it's through tax credits or something else, our industry—that is, you, our members—will be called upon to achieve these goals and meet the inevitable challenges along the way.

Market drivers promise to be at play in the regulatory and other arenas as well. Renewed interest in climate issues will surely drive wind energy, as it is one of the most cost-effective ways to reduce greenhouse gases. Implementation of Environmental Protection Agency and other environmental regulations will continue to play a role in the relative cost of new energy sources. (Wind energy, of course, wins against other sources on that front.) In addition, water consumption by other

forms of electricity generation cannot be ignored when assessing the market landscape. Wind energy uses virtually no water during generation—an extremely valuable attribute in these times of water shortages. Moreover, regions of the country with the best wind resources overlap to a great extent with areas most susceptible to drought.

Another fundamental that works in the industry's favor is that the cost of producing wind energy is continuing on its downward trajectory, driven by the kind of technology innovation for which the industry has come to be known. Wind energy is delivering affordable electricity, protecting consumers from price uncertainty and fuel price volatility.

Thanks to that innovation and hard work, our industry is ahead of schedule for achieving the milestone of producing 20 percent of America's electricity by 2030. Six years ago I helped define that vision in order to help America learn that wind energy is real. But even back then, our industry knew it could and would continue to grow from there. The President's goal of doubling renewable energy by 2020 is certainly achievable as long as we continue on a pace close to what we have recently set, but it will take some analysis and planning, particularly given the previously mentioned market challenges.

Such variables—from positive forces (e.g., the industry's relentless drive to innovate) to countering forces (e.g., depressed natural gas prices and load growth)—suggest the need for a new vision. That's where you come in.

Top Facts:

We have worked hard to produce business solutions helping our Member companies and broader industry assess the market opportunities. Industry market reports, like this one, along with events and networking opportunities such as the WINDPOWER® Conference & Exhibition, are intended to provide the analysis, connections, business solutions, and insights into the future that are critical to be successful in this industry. Speaking of future and success, we've been begun to discuss new policy ideas that would fit the changing environment and create a mode of certainty and stability. We'd like to share those ideas with you, and hear what ideas you might have. And when we all gather in Chicago for the WINDPOWER 2013 Conference & Exhibition, we'll bring those ideas with us to create a powerful event that will do what WINDPOWER always does: propel the industry forward.

And now, presenting: the data that drives your business

AWEA produces quarterly and annual market reports for you, the members of our industry, as guideposts along the way to help inform your business plans on the path to success. This AWEA U.S. Wind Industry Annual Market Report provides an invaluable snapshot of the dynamic, fluid environment in which you operate. The report has a new design for quick and easy reference of industry trends and major players, intended to help you make sound, fact-based business decisions and plan effectively.

With those purposes in mind, the AWEA U.S. Wind Industry Annual Market Report features a wealth of invaluable data. Industry trends across projects, utilities, turbines, financing and manufacturing are provided alongside a breakdown of activity by regional markets. Market shares and major players across project owners, developers, utilities, turbine manufacturing are included, as well as the role of wind energy compared to other energy sources within each region. Information on wind energy activity in the project and manufacturing arena drills down deep, straight to the state and even congressional district levels.

A special thanks to you, the members of our industry, who have contributed much of the raw data behind this report. We hope that you find it valuable in helping to move our great industry forward. Finally, we look forward to hearing from you as we define a new vision for our future.

Bring your vision to WINDPOWER 2013.
See you in Chicago.



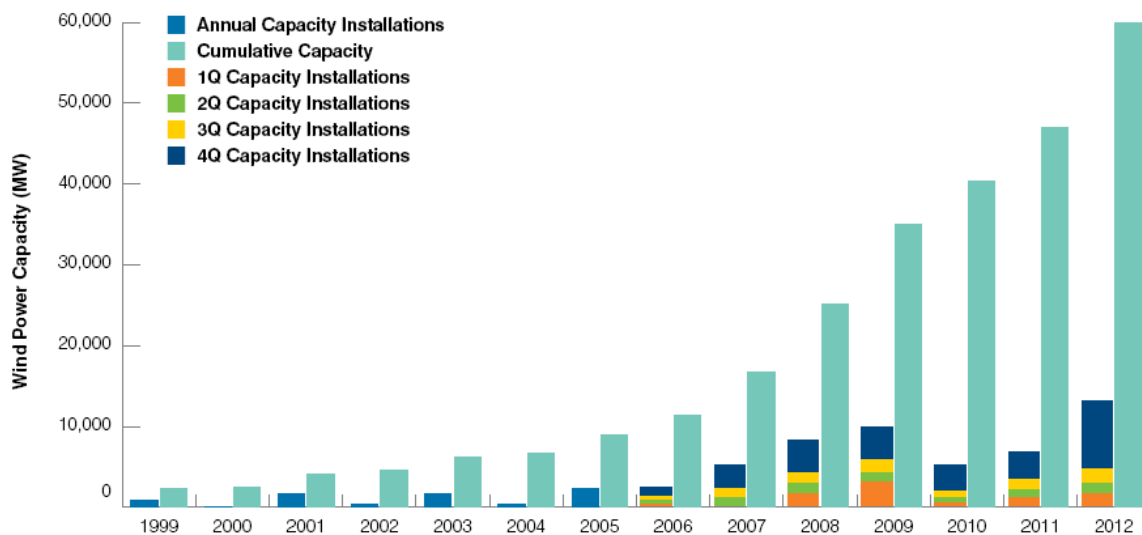
Rob Gramlich
Interim CEO, American Wind Energy Association

- ◆ **13,131** Amount of new wind capacity, in megawatts, installed during 2012, a 28% annual growth rate.
- ◆ **60,007** Total installed wind capacity in the U.S. at the end of 2012, able to power the equivalent of roughly 15 million American homes.
- ◆ **#1** Rank of wind energy as source of new generating capacity in 2012, installing 42% of all new generating capacity.
- ◆ **\$25** Amount, in billions, of new investment in wind energy projects installed during 2012.
- ◆ **>20%** Percent of wind energy generation produced in Iowa and South Dakota; with nine states in total producing more than 10% of their generation from wind energy.
- ◆ **74** Number of electric utilities receiving power from new wind energy projects installed during 2012, up from 52 during 2011.
- ◆ **>45,100** Number of operating wind turbines in the U.S. across 890 wind projects.
- ◆ **>95** Amount of CO₂ emissions avoided, in millions of tons, that will be avoided by wind energy generation, equivalent to 4.4% of power sector emissions.
- ◆ **559** Number of wind-related manufacturing facilities producing a product for the U.S. wind energy industry across 44 states.
- ◆ **70%** Percent of all U.S. Congressional Districts that have an operating wind project, a wind-related manufacturing facility, or both.

U.S. Wind Power Capacity

- » The 13,131 megawatts (MW) of new wind project capacity for 2012 is the result of the deployment of 6,751 wind turbines.
- » To achieve the 60,007 MW of cumulative installed capacity in the U.S. at the end of 2012, the industry had a total of 45,125 operational utility-scale wind turbines.
- » In 2012 the wind energy industry turned in an annual growth rate of 28%, up from 16.9% in 2011.
- » The year's performance helped contribute to a five-year average annual growth rate of 29.1% for the U.S. wind energy industry.

Figure 1 **U.S. Annual and Cumulative Wind Power Capacity Growth (Utility-Scale Wind)**



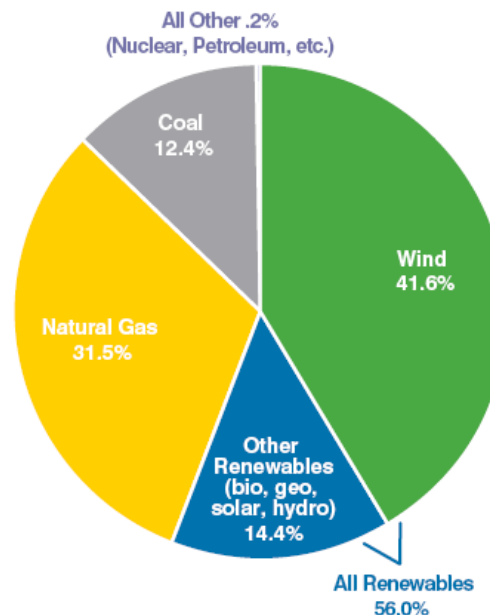
Find More Information in the Report:

- MW figures for annual and total wind capacity by year;
- Quarterly wind capacity installations;
- Wind percent of new power capacity additions over time;
- Wind percent of U.S. electric generation over time;
- Growth rate in wind generation and capacity over time;
- Global wind power installations.

Comparative Look at U.S. Wind Power Activity

- » For the first year, in 2012 wind power came in as the largest single source of new electric generating resources in the U.S., installing 42% of all new capacity.
- » Over the past five years, between 2008 and 2012, wind power has provided 36.5% of all new generating capacity in the U.S.
- » All renewables combined contributed over half of all new generating capacity during 2012, at 56.0% market share.

Figure 4 **U.S. Annual Power Capacity Additions during 2012**



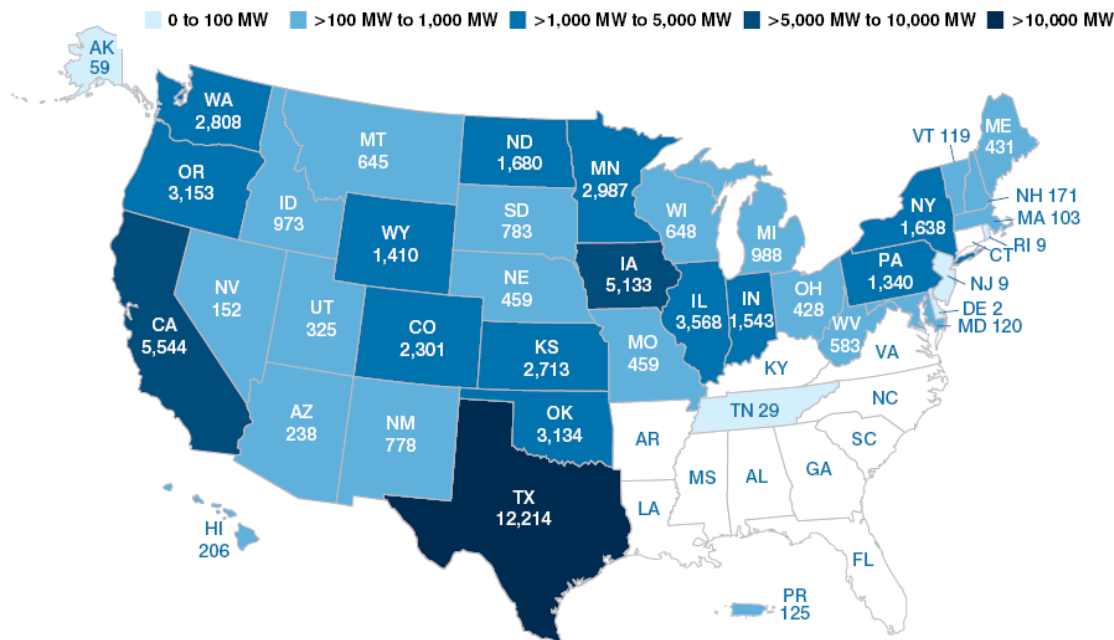
Data Source: AWEA, EIA, SEIA, SNL

Find More Information in the Report:

- MW figures for annual and total wind capacity by year;
- Quarterly wind capacity installations;
- Wind percent of new power capacity additions over time;
- Wind percent of U.S. electric generation over time;
- Growth rate in wind generation and capacity over time;
- Global wind power installations.

Snapshot View of Wind Energy Activity across the Regions

Figure 13 U.S. Wind Power Capacity Installations, by State



» The top 5 states for new wind power capacity installations in 2012 were Texas, California, Kansas, Oklahoma and Illinois.

» There are now 15 states in the “Gigawatt Club” of states with more than 1,000 MW of installed wind project capacity. Pennsylvania became the 15th state to surpass 1,000 MW.

» Both Nevada and Puerto Rico added their first utility-scale projects during 2012.

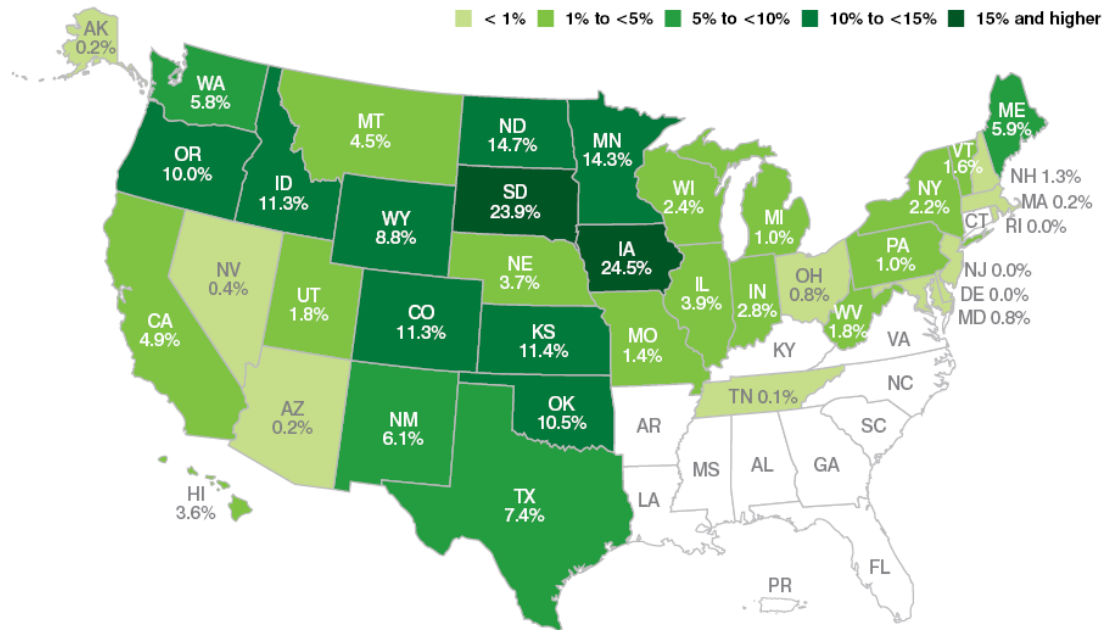
» In 2000, over 60% of the nation’s wind power capacity was installed in California alone, with 17 states hosting utility-scale wind turbines. Today, 39 states and Puerto Rico share 60,007 MW of utility-scale wind project development.

Find More Information in the Report:

- State rankings for total and new wind capacity;
- New wind capacity by state by quarter;
- Map of all wind power projects;
- Regional market share for new wind capacity;
- State ranking for wind energy generation;
- Wind power construction activity by quarter.

Snapshot View of Wind Energy Activity across the Regions

Figure 14 U.S. Wind Energy Share of Electricity Generation, by State



- » Iowa was ranked first in wind generation, with 24.5% generation from wind energy. South Dakota was a close second with 23.9% generation from wind energy.
- » In 2012 nine states in the U.S. produced more than 10% of their generation from wind energy, up from only 5 states in 2011 and only one state in 2007.
- » Construction activity during 2012 exceeded that of any prior year, with more projects completed in the fourth quarter than any other quarter in U.S. history.

Find More Information in the Report:

- State rankings for total and new wind capacity;
- New wind capacity by state by quarter;
- Map of all wind power projects;
- Regional market share for new wind capacity;
- State ranking for wind energy generation;
- Wind power construction activity by quarter.

Major Players in Development of Wind Energy Assets

Figure 22 **Market Share for New U.S. Wind Capacity Installed during 2012, by Owner**

Ranking	Company
1	NextEra Energy Resources
2	Iberdrola Renewables
3	EDF Renewable Energy
4	Caithness
5	Duke Energy
6	BP Wind Energy
7	Invenergy
8	E.ON Climate & Renewables
9	Pattern Energy
10	Atlantic Power Corp.

→ *Find the complete market share for new and cumulative wind capacity, by MW and %, in the report.*

Find More Information in the Report:

- Market share for top 25 wind power capacity owners for new and cumulative wind capacity, by MW and %;
- Ranking of top 10 wind project developers during 2012;
- Trends in wind capacity ownership over time;
- Power offtake status of new wind capacity;
- List of power offtakers for 2012 wind projects.

- » NextEra Energy Resources ranked No. 1 for new wind power projects installed during 2012.
- » Across all wind power assets in the U.S. NextEra Energy Resources ranked No. 1 followed by Iberdrola Renewables, MidAmerican Holdings, EDP Renewables North America and E.ON Climate & Renewables.
- » In 2012, more than 110 different owners of wind projects added new wind capacity.
- » In 2012, 91% of the new wind power capacity additions were owned by IPPs, an increase from nearly 75% during 2011.
- » At least 74 utilities and power marketers purchased new wind power installed during 2012. New wind power purchasers during 2012 included at least 18 industrial buyers and 11 schools and universities.

Electric Utilities Purchasing Wind Power

Figure 28 **Top 10 Electric Utilities with Wind Power Capacity On System**

Ranking	Utility
1	Xcel Energy
2	MidAmerican Energy (including PacifiCorp)
3	Southern California Edison
4	Pacific Gas & Electric
5	American Electric Power
6	Tennessee Valley Authority
7	San Diego Gas & Electric
8	CPS Energy
9	Los Angeles Department of Water & Power
10	Luminant Energy

Figure 29 **Top 10 Electric Utilities with Ownership of Wind Power Capacity**

Ranking	Utility
1	MidAmerican Energy (including PacifiCorp)
2	Puget Sound Energy
3	Alliant Energy
4	Portland General Electric
5	Oklahoma Gas & Electric
6	We Energies
7	Xcel Energy
8	Minnesota Power
9	Basin Electric Power Cooperative
10	Detroit Edison

Find More Information in the Report:

- Rankings and MW of owned and contracted wind capacity for IOUs, rural electric coop and municipally-owned utilities.
- Market share across electric utilities with wind power on system, by type and MW.

Trends in Wind Power Projects

Figure 34 **Top 10 Largest U.S. Wind Power Projects**

Ranking	Project Name	State	Installed Capacity, MW	Number of Turbines	Year Online	Owner
1	Shepherds Flat	OR	845	338	2011, 2012	Caithness
2	Roscoe	TX	782	627	2008, 2009	E.ON Climate & Renewables
3	Horse Hollow	TX	736	421	2005, 2006	NextEra Energy Resources
4	Alta Wind Project	CA	720	290	2010, 2011	Terra-Gen Power
5	Capricorn Ridge	TX	663	407	2007, 2008	NextEra Energy Resources
6	Sweetwater	TX	585	392	2003, 2005, 2007	Duke Energy and Infigen Energy
7	Buffalo Gap	TX	523	296	2005, 2007, 2008	AES
8	Meadow Lake Wind Farm	IN	501	303	2009, 2010	EDP Renewables North America LLC
9	Flat Ridge 2	KS	470	294	2012	BP Wind Energy and Sempra Generation
10	Panther Creek	TX	458	305	2008, 2009	E.ON Climate & Renewables

Find More Information in the Report:

- Trends in wind project size;
- Wind energy on public lands;
- Community wind ownership.

- » At least 183 projects were completed during 2012, up from 103 projects during 2011 and 104 projects completed during 2010.
- » The U.S. also saw a new record holder during 2012 for largest online wind project in the country. The Shepherds Flat project, completed during 2011 and 2012, has an installed capacity of 845 MW.

Wind Turbine Manufacturers

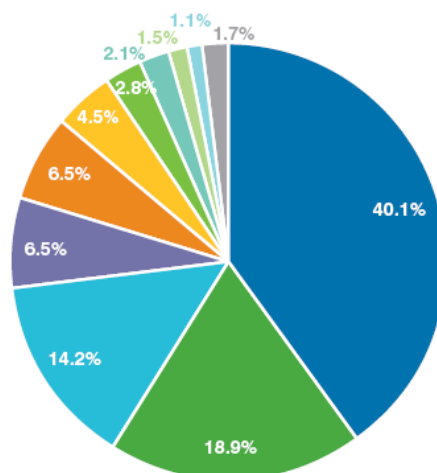
→ Find the complete OEM market share, by MW and %, for 2012 in the report

» Across the entire U.S. wind turbine fleet of 60,007 MW, more than 59 different wind turbine manufacturers are represented.

» GE Energy captured 40% market share of the entire installed wind fleet, by capacity, followed by Vestas with 19% market share, and Siemens with 14% market share.

» The top five wind turbine manufacturers for wind capacity installed during 2012—GE, Siemens, Vestas, Gamesa and REpower — captured 86.9% of the 2012 market. This compares to top-five OEM market shares of 86.0% in 2011, 90.0% in 2010 and 81.2% in 2009.

Figure 44 Market Share for Wind Turbine Manufacturers of U.S. Wind Power Fleet



Ranking	Company	Capacity through 2012, MW
1	GE Energy, Enron, Zond, Tacke	24,085
2	Vestas, NEG Micon, Micon, Nordtank, NedWind, Wind World	11,363
3	Siemens, Bonus	8,506
4	Gamesa	3,923
5	Mitsubishi	3,899
6	Suzlon	2,685
7	Clipper	1,700
8	REpower	1,259
9	Acciona	908
10	Nordex	674
	Others	1,005

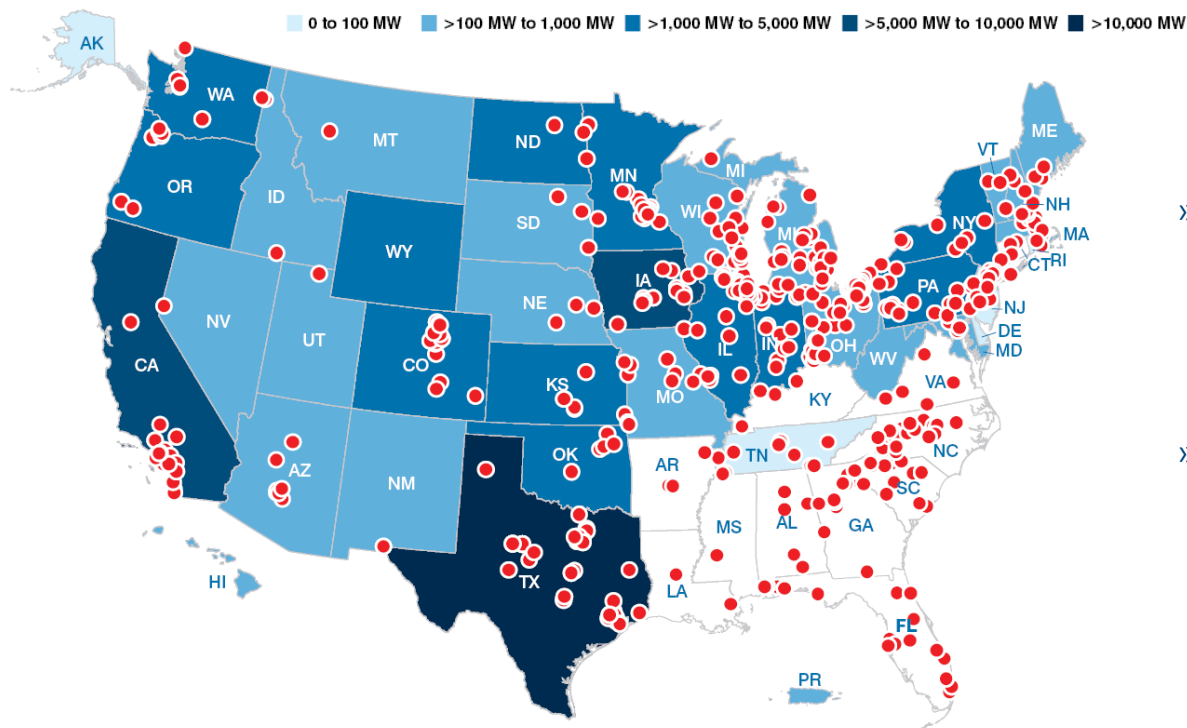
Others includes AAER, Alstom, CCWE, DeWind, Elecon, EWT, Fuhrlander, Goldwind, Guodian, Hyundai, HZ Windpower, Kenersys, Leitner-Poma, Nordic, Northern Power Systems, PowerWind, Samsung, Sany, Sinovel, Unison, VENSYS and more.

Find More Information in the Report:

- OEM market share for new 2012 wind capacity;
- OEM market share over time;
- Ranking and list of active OEMs by year;
- Trends in wind turbine size;
- List of wind turbine models installed during 2012;
- Rotor diameter and hub height for 2012 wind turbines.

Wind Turbine & Component Manufacturing in the U.S.

Figure 51 Active Wind-related Manufacturing Facilities during 2012



Find More Information in the Report:

- Map of major component manufacturing;
- New and closed wind-related manufacturing facilities during 2012;
- Production capacity of towers, blades and nacelle assembly.
- List of all wind-related manufacturing facilities, including component and location.

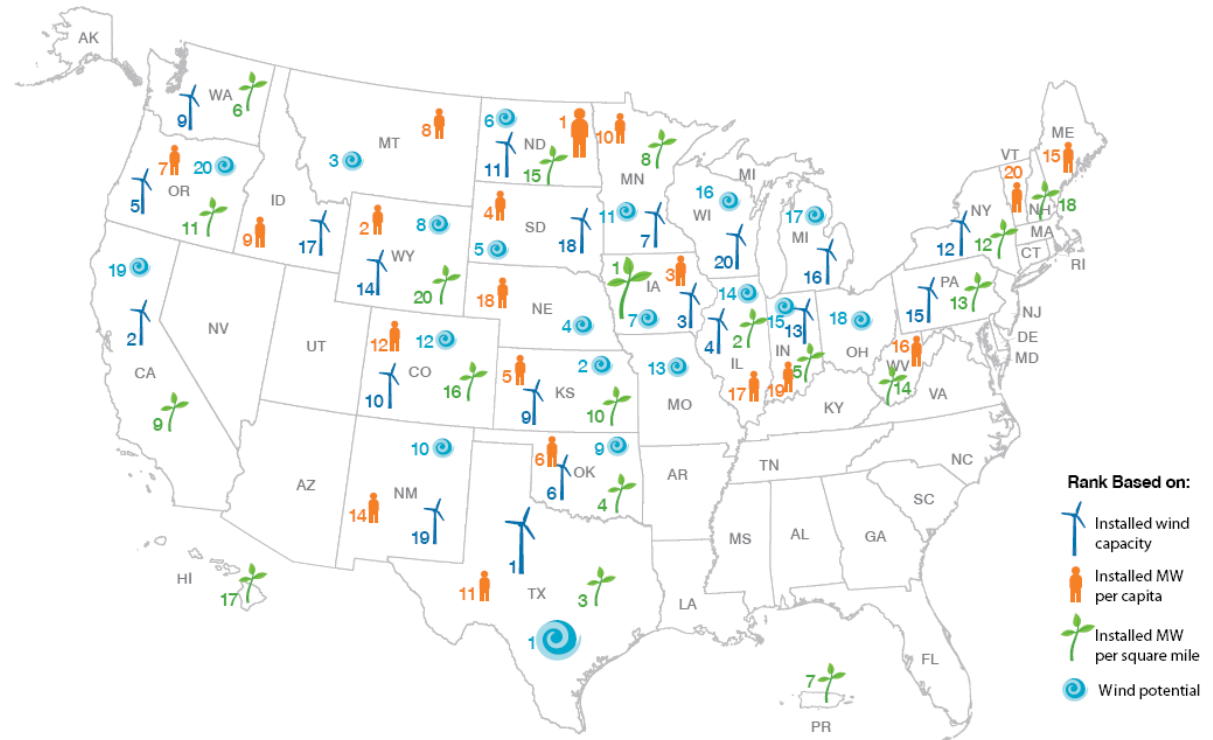
→ Find the complete list of wind turbine & component manufacturers in the report

- » During 2012 at least 559 wind-related manufacturing facilities produced a product for the U.S. wind energy industry across 44 states.
- » The U.S. wind energy supply chain contains 13 utility-scale blade facilities, 12 tower facilities, and 12 turbine nacelle assembly facilities, all spread across 18 states.
- » The domestic content of wind turbines has grown from less than 25% prior to 2005 to approximately 67% at the end of 2011, according to U.S. International Trade Commission data and analysis from the U.S. Department of Energy.

Regional & State Impacts of U.S. Wind Energy Activity

Figure 57 **Top 20 U.S. Wind Power State Rankings**

- » While Texas ranked first in total wind capacity installed, and Iowa ranked first in wind generation during 2012, other states rise through the ranks in other metrics.
- » North Dakota ranked highest in wind power installed per capita, followed by Wyoming, Iowa, South Dakota and Kansas.
- » Iowa ranked first capacity per square mile, followed by Illinois, Texas, Oklahoma and Indiana.



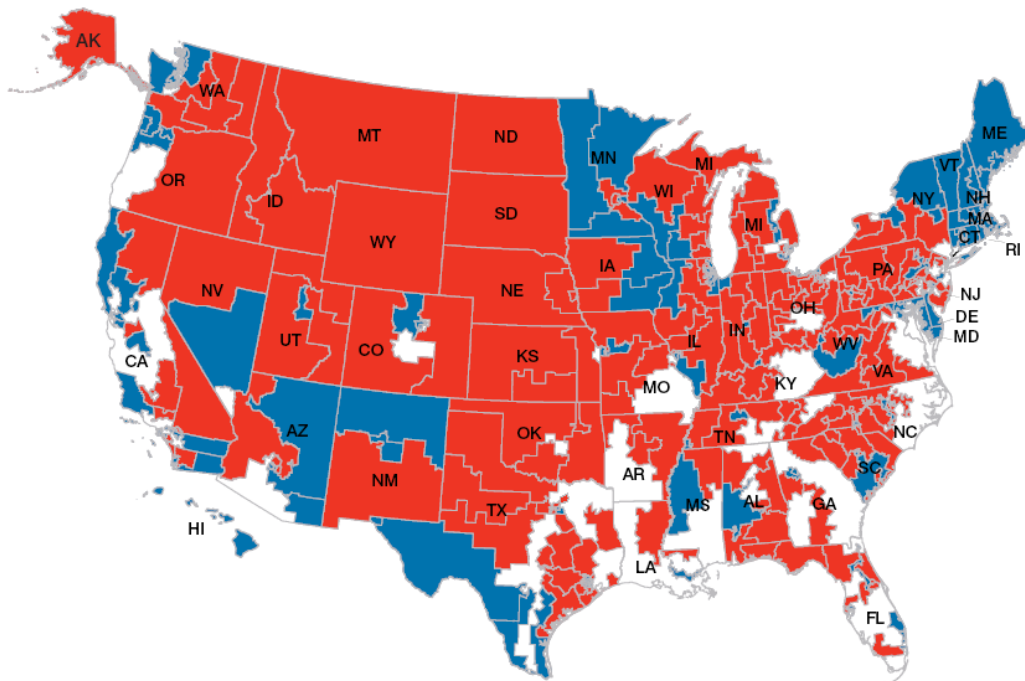
Find More Information in the Report:

- State rankings for total and new wind capacity;
- New wind capacity by state by quarter;
- Map of all wind power projects;
- Regional market share for new wind capacity;

Regional & State Impacts of U.S. Wind Energy Activity

Figure 60 All Online Wind-related Manufacturing Facilities & Wind Projects, by Congressional District

■ Congressional District held by Democrat in 113th Congress ■ Congressional District held by Republican in 113th Congress



Find More Information in the Report:

- Breakdown of wind capacity and manufacturing by Congressional District;
- Ranking of Congressional Districts for installed wind capacity.

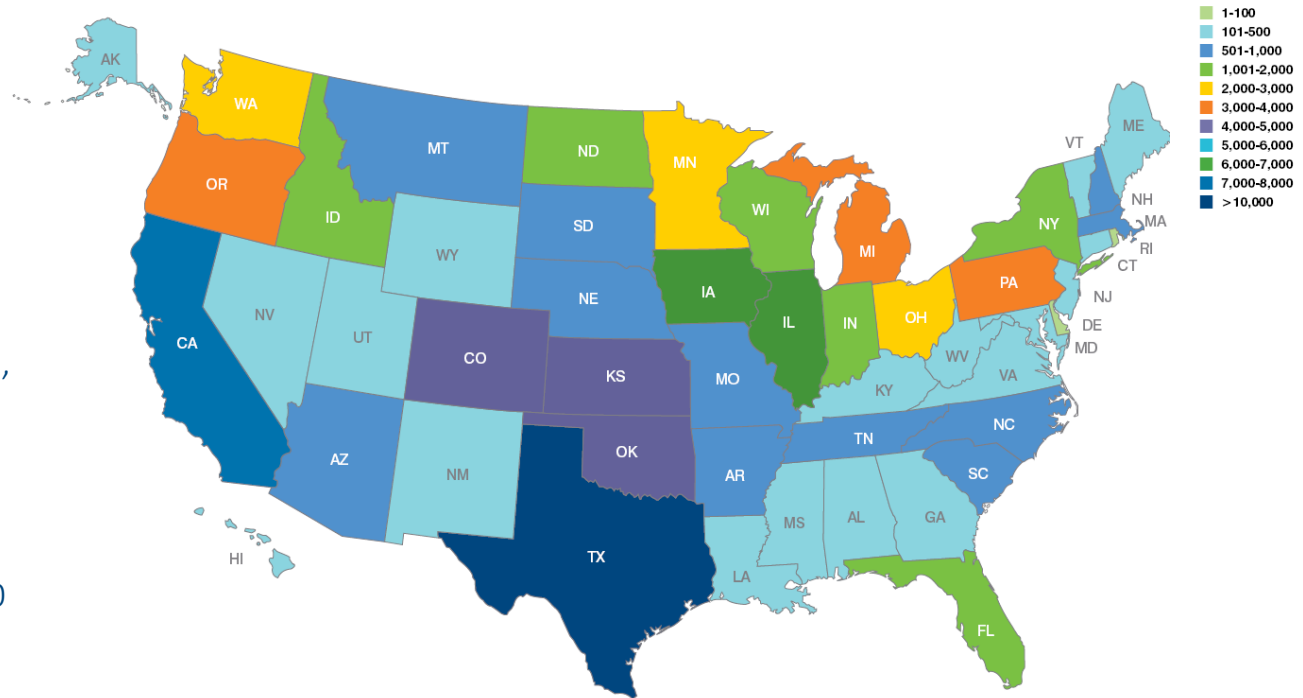
- » The top Congressional district with installed wind power capacity was Representative Randy Neugebauer's (TX-19).
- » Of the 435 U.S. Congressional Districts, over 32%, or 141, U.S. Congressional Districts have installed wind power capacity. There are 117 U.S. Congressional Districts that have more than 1 MW of installed wind power capacity.
- » All 50 states as well as 70% of U.S. Congressional districts currently have an operating wind project, a wind-related manufacturing facility, or both.

Regional & State Impacts of U.S. Wind Energy Activity

➔ Find the breakdown of jobs by type across the U.S. in the report

- » At the end of 2012, the U.S. wind energy industry continued to support 80,700 full-time equivalent (FTE) jobs directly associated with wind energy project planning, siting, development, construction, manufacturing and supply chain, and operations.
- » Of the 80,700 jobs at the end of 2012, approximately 25,500 were in the manufacturing sector.
- » Texas led the nation in wind jobs with over 10,000 employed in the wind industry followed by California, Iowa, Illinois, Kansas.

Figure 62 U.S. Wind Energy Industry Employment by State

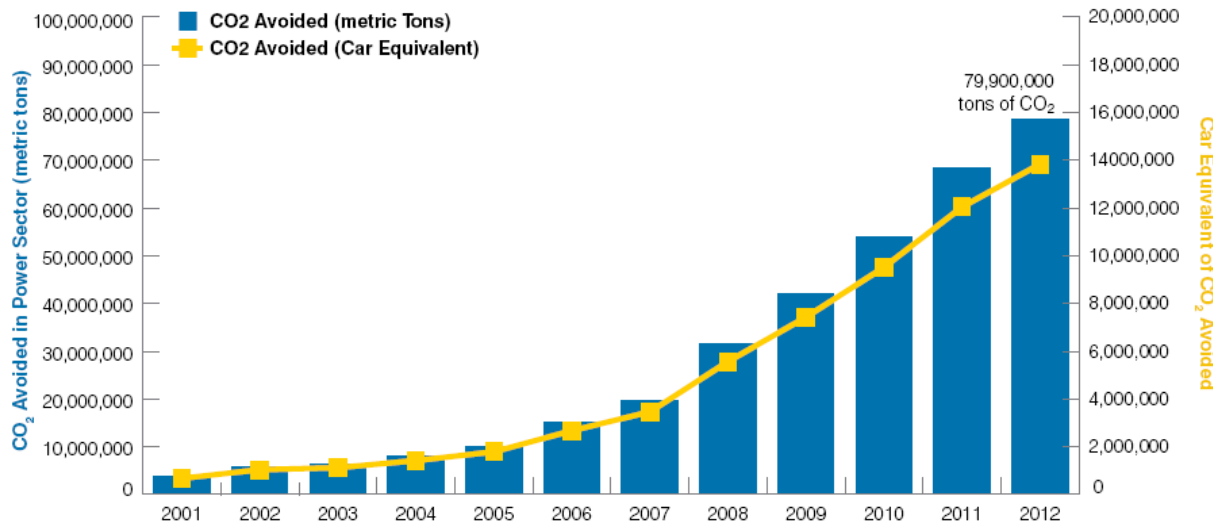


Find More Information in the Report:

- Wind employment by job type over time;
- Top 10 states for wind employment.

Regional & State Impacts of U.S. Wind Energy Activity

Figure 64 **Wind Energy Impact on Avoiding Carbon Dioxide Emissions**



Find More Information in the Report:

- Average CO₂ avoided per wind turbine;
- Displacement of SO₂ and NO_x;
- Water consumption avoided over time.

» In 2012, the roughly 140 million megawatt-hours (MWh) generated by wind energy avoided 79.9 million metric tons of carbon dioxide (CO₂)—the equivalent of reducing power-sector CO₂ emissions by 3.6%, or taking over 14 million cars off the road.

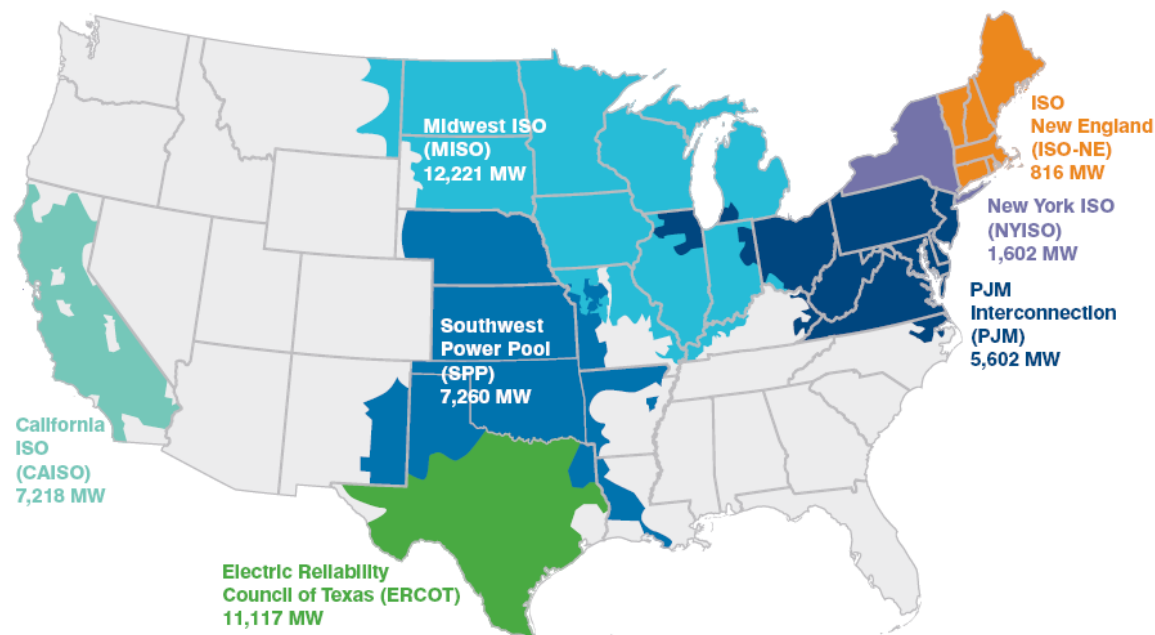
» When the new wind projects installed throughout 2012 produce power for a full year, the entire U.S. wind fleet will avoid nearly 98.9 million metric tons of CO₂ — the equivalent of reducing power sector emissions by 4.4%.

» When all new wind projects installed throughout the year of 2012 are operational for a full year, wind energy generation will avoid water consumption with a savings of over 37.7 billion gallons per year — equivalent of roughly 120 gallons per capita in the U.S. or conserving the equivalent of 285.9 billion bottles of water.

Transmission, Offshore Wind Energy, and Distributed Wind Activity

- » Over 76% of the installed wind power capacity in the U.S. is currently moving to consumers within ISO/RTO footprints.
- » Wind power projects totaling 127,071 MW were in the interconnection queue at the end of 2012.
- » Nineteen near-term transmission projects could carry enough new wind capacity to double current installations.
- » There are 13 offshore wind projects in various stages of development spanning 10 states.
- » In 2012, the U.S. market for small wind systems saw 18.4 MW of new capacity in sales and \$101 million in installed system revenue.

Figure 66 **U.S. Wind Power Capacity Installed by RTO/ISO**



Find More Information in the Report:

- List of near-term transmission projects and MW;
- Wind capacity in interconnection queue by RTO/ISO;
- Map and list of active offshore wind projects;
- Small wind market growth, revenue and sales.

How to Access the Report

» AWEA Members

- *Log on the AWEA [Member Center at www.awea.org](http://www.awea.org) to download the **AWEA U.S. Wind Industry Annual Market Report Year Ending 2012.***

» Non-Members

- *Purchase the complete report at www.awea.org/annualmarketreport*