P.O. Box 122
Columbus, ND. 58727

April 20, 2020

Dear Public Service Commission,

I wish to address this letter to the judge, commissioners and lawyers who are each part of the Public Service Commission, and present my opinion and testimony on the proposed wind farm project in Burke County. I listened to the entire meeting on April 17th and appreciate the dedication you all have towards making the best decision.

I, along with my husband, am a landowner in the Short Creek township (Section 31, along with several properties in the City of Columbus), residing within 7 miles of the nearest proposed wind turbine. While I do not own land within the project area, I do frequently enjoy Wildwood Park (Fay Township, Section 31), along with many other areas in the project area. I am also a taxpayer and have an interest in where my money is used and for what purpose.

I noted in the last PSC meeting that Mr. Clay Cameron did not recall specific reasons why people were opposed to the turbines, indicating just a general dislike. I would like to offer some clarity. My reasons to oppose the turbines include the following, in no specific order:

- Undue burdens placed on taxpayers for inefficient products
- Lack of documented financial & economic accountability by NextEra
- Irrevocable damage to the habitat for migratory birds
- Disturbance to all wildlife, including land animals, and the ecosystem

While I have other reasons as well, I will focus predominantly on the financial aspect, as I have not heard much in this regard. Before I begin, I will note that in the last meeting, Tammy Lucy had called to provide testimony. She stated that the original Game and Fish letter requested NextEra to move their project in its entirety, yet only 44 turbines were moved and 3 removed. I wish to reference an article from the US Fish and Wildlife Service on the effects wind turbines have on birds (https://www.fws.gov/birds/bird-enthusiasts/threats-to-

birds/collisions/wind-turbines.php See attached Appendix 1). According to their studies, we can expect to lose a minimum of 2.92 birds per turbine in our area per year, based on studies for the Great Plains, with a greater loss anticipated along migratory routes, including where the Northern Divide project is proposed. This estimate does not include bats. This would estimate upwards of 200 birds, many of which mate for life. That figure, along with the birds which will be displaced and those which have already been displaced by the Lindahl and potentially the Aurora wind farms in Tioga, makes for a devastating toll on our avian population. An article regarding the Altamont Pass Wind Farm in California, directly involving NextEra and the Audubon Society (https://www.santacruzsentinel.com/2011/08/29/altamont-pass-wind-farm-gets-major-upgrade/, Appendix 2) pointed out the money spent to replace the turbines due to the high mortality rate on birds. That estimate provided that approximately 10,000 birds were killed per year by 6,000 turbines, approximately 1.66 birds. This article was from 2011 and the Park District deemed the number of birds killed to be unacceptable, yet we should accept turbines which the ratio of bird deaths per turbine is higher? We have to consider that this is not the only wind farm in the area and while NextEra may not build additional facilities, other companies are also attempting construction. We can only displace so many birds before they run out of habitat and their numbers begin to decline in the area. They do not have the ability of constructing high density housing like humans and shopping online when their food sources run out because they are overcrowded. We have learned to adapt, but these animals are at our mercy.

I will now turn my focus on the financial aspect and begin with a short background of myself. I was born in Southwest Washington and lived in Oregon and Washington until I moved here 4 years ago. I joined the electrical union in Portland, Oregon and completed a 4 year apprenticeship as a Limited Energy Electrician. (There is no license for it in North Dakota but in Oregon and Washington, a license is mandatory.) During the next 15 years, I worked as a contractor and foreman at many substations associated with wind farms to provide fiber optic security and communications lines. Most projects were for PGE (Portland General Electric) and BPA (Bonneville Power Administration). I began learning about the wind turbines' steady draw of power from the grid. Blades need to be kept in constant motion so when there is a wind, they can accelerate.

The blades are too heavy to begin rotating from a dead stop. The substations built for the wind farms have heat, lighting, servers and other equipment which also require constant power. I would like to see documentation (not verbal statements) showing how much electricity a wind farm in the Midwest produces and how much it draws from the grid when it isn't producing enough to support itself. More than one example should be provided.

When I moved to Oregon in 2002, I had the option of signing up for Green Mountain energy, a "clean and green" way of utilizing wind as part of my residential electricity usage. A native from one of the most progressive areas of the country for alternative energy, recycling, and environmental awareness, I was convinced this was forward thinking. I paid slightly more for my electricity to utilize this power source but that didn't bother me as I believed I was doing my part to make our world better; however, after I worked at the substations and wind farms, my perspective began to change. What I believed was the future for less pollution turned out to be grimly disappointing. Many environments are disturbed; habitats destroyed; plastics, metals, toxins and chemicals used in the creation of wind systems; pollution created with fuel for transportation and backup power systems (which are sometimes gas plants). All this and more create adverse effects in return for an inconsistent power supply. I was paying extra for this fickle source of power with my monthly utility bill, not to mention what I paid in taxes.

Which brings us to the epitome of my focus—subsidies. Many companies like NextEra are given thousands, millions, even billions of dollars in subsidies and bailouts from the federal, state and local governments. When I refer to NextEra, I will be referring to them as a parent company and intending to include all their subsidiary companies. According to Good Jobs First Subsidy Tracker (https://subsidytracker.goodjobsfirst.org/prog.php?parent=nextera-energy, Appendix 3), NextEra received over 2.6 billion dollars in subsidies and 3.1 billion dollars in federal loans or guarantees between 2007 and 2012, a five year period. Good Jobs First references its information from several government websites including the US Department of the Treasury (https://www.treasury.gov/initiatives/recovery/Pages/1603.aspx), usaspending.gov, and US Government Accountability Office (gao.gov). The link on the Treasury Department site provides a 324 page spreadsheet of awards to

alternative energy companies totaling over $26 billion, predominantly in a 6 year period. These figures are for payments made by the Treasury Department alone and do not include those awards given directly by the Department of Energy, Department of Commerce, state and local governments, etc. These sites provide the taxpayers with accounts of where our money is being spent.

I also worked with the Energy Trust in Oregon, submitting LEED certification documentation for buildings which were renovated with high efficiency lighting. This provided our customers with kickbacks for upgrading to "cleaner and greener" systems. The kickbacks were the driving force behind the projects, as upgrades would not likely have been done without a financial incentive. The new projects meant limited selections of qualifying lighting options and much waste generated for the landfill. The Treasury Department, Department of Energy, Department of Commerce, and many other government agencies provide subsidies and kickbacks which would otherwise make these projects undesirable to companies or individuals.

I also understand wind turbines rarely live out a 30 year lifespan (NextEra's current projection for the Northern Divide Wind project), and require added cost for replacing (https://www.americanexperiment.org/2018/06/limited-lifespans-wind-turbines-result-higher-costs-energy/, Appendix 4). According to the Institute for Energy Research (https://www.instituteforenergyresearch.org/ptccost/, Appendix 5), a full study report which is downloadable at this link, the actual cost of the turbine is significantly higher than the projected cost. Again, documentation (not verbal projections) is necessary for a couple wind farms showing similar wind turbine life spans, number of replacements and associated costs. We spend money for this as taxpayers and need accountability.

Randy Simmons, Professor of Political Economy, Utah State University, wrote an article referencing NextEra among many other big companies who are the true beneficiaries of these turbines (https://theconversation.com/wind-costs-more-than-you-think-due-to-massive-federal-subsidies-38804, Appendix 6). I concur with his studies in regards to companies receiving subsidies or loan guarantees. The majority of individuals in support of these projects are those who will be receiving payments for turbines on their properties, or are unaware of how these are funded.

Let's talk about jobs. I also understood Mr. Cameron to say that this would only provide 5-7 full time new positions, to be allocated between onsite and remote operations. He said some monitoring could be done utilizing SCADA software from their remote facility in Florida and that these new positions would be dedicated to this project, not shared with others. That being the case, there would be fewer than 5-7 onsite personnel. He also estimated 200-300 jobs lasting for a 6 month duration, with Mr. Lucas Franco estimating less than 10% local labor (which he defined as a 150 mile radius) being used. Mr. Steve Cortina estimated only 6-7% of local workforce had been used at the Emmons Logan facility in North Dakota. With that being understood, this would have no significant benefit to our job economy. The oil booms in North Dakota brought in thousands of people from all over the country and benefited many areas, but when they subsided, many towns (including those surrounding the Northern Divide Wind project area) suffered, returning to pre-boom conditions, and are surviving only on the oil and gas lease revenue.

With the amount of improved technology we have seen in the last 20 years (e.g., cell phones, TVs, drones, etc.), wind turbines should have also advanced considerably. It's not a lack of money, as billions of dollars are being spent. Yet according to a 2017 study by the US Energy Information Administration (https://www.eia.gov/todayinenergy/detail.php?id=31032, Appendix 7), only approximately 8% of our energy used is from wind. If wind farm technology cannot advance to be more beneficial to our society and less destructive financially, though greenhouse gases produced in its manufacture and shipping, and by shrinking our ecosystem, it's time to stop putting money towards a bad product. In the same way I would not pay my neighbor to set garbage on his lawn, I would not willingly pay to support another wind farm.

I respectfully ask each of you to decline this wind farm, and any others which would do more harm than good. I also thank you for your dedication, hard work, and for reading my testimony.

Respectfully yours,

Valerie Post

Wind Turbines

What is the issue?

Renewable energy sources such as wind energy are increasingly being relied upon to help meet nationwide energy demands. The Department of Energy (DOE) has a stated goal of wind energy sources contributing 20 percent of the nation's total energy need by 2030. In 2015, some 49,000 wind turbines located in 39 states supplied about 5 percent of the nation's electricity demand. It is projected that with new technology, wind energy development will expand into areas not currently being explored, and that by 2030 nearly all 50 states will have wind energy facilities.

Estimates of bird/turbine collision range widely and all of the studies attempting to quantify this contain some level of bias and uncertainty. The most comprehensive and statistically sound estimates show that bird deaths from turbine collisions are between 140,000 and 500,000 birds per year. As wind energy capacity increases under the DOE's mandate (a six-fold increase from current levels), statistical models predict that mean bird deaths resulting in collisions with turbines could reach 1.4 million birds/year.

Why does this happen?

The risk of a bird collision with a wind turbine is influenced based on facility location (including turbine placement), turbine design, and how birds move across the landscape.

Turbine Location

Siting of wind energy facilities at both the landscape-level and project-level scales is deemed a critical element in reducing bird/turbine collision risk. Available data indicate that some regions are higher risk than others. Bird/turbine collisions in California are estimated to be an average 7.85 birds/turbine/year, higher than in the East (6.86 birds/turbines/year), the West (4.72 birds/turbine/year), and the Great Plains (2.92 birds/turbine/year).

At the landscape scale, mortality risk may increase near migratory routes, in areas with high concentrations of birds, along rivers and ridgelines, or near coastlines. How birds use the landscape also influences the level of exposure to turbine collision risk. For example:

- Birds in soaring flight are unable to maneuver well and may be unable to avoid the turbine if soaring within the rotor swept zone.
- Birds that move during the daytime fly at lower heights and may be at higher risk of flying into the rotor swept zone than birds flying at night.
- Birds have lower flight heights and can congregate near summits and steep slopes or open habitats (areas where turbine placement is common) while searching for food, increasing their risk of collision with turbines.

Over 200 species of bird have been documented as killed by collision with wind turbines. Passerines (i.e., songbirds) (https://en.wikipedia.org/wiki/Songbird) are most commonly reported, followed by raptors that hunt by day such as hawks (https://en.wikipedia.org/wiki/Hawk), eagles (https://en.wikipedia.org/wiki/Eagle)and falcons (https://en.wikipedia.org/wiki/Falcon). Although fatality rates for raptors may be lower compared to passerines, raptors are especially vulnerable to collisions due to their flight behaviors. Given the life history traits of raptors (i.e., long-lived and low reproductive rates) their populations are more at risk of decline from the number of different sources of impacts that affect these species on a daily basis.

Habitat impacts are also a major concern with wind energy facilities as they are often large developments that, if improperly placed, may cause a loss or fragmentation of habitat that species frequently use or depend on for survival. Knowing where certain birds are and when, and siting facilities to avoid high movement or occurrence areas can make a big difference in avoiding and reducing bird impacts.

Turbine Design

Collision risk is primarily influenced by turbine and blade tip height, but also tower type. Current turbine heights (i.e., the combination of the tower and the blades at maximum height) range from 475 to 639 feet. Bird collisions increase with turbine height because as turbines increase in size, the blades reach higher into the average "flight zone" of nocturnal migrating birds. Therefore, with the expected development of taller turbines, increased bird collisions are likely. Additionally, data suggest that bird collisions may increase with tall structures that are greater than 350 feet above ground level.

Additional studies have found that raptors that migrate by day and some landbirds fly at much lower altitudes than previously thought. Based on data from other structures, shorter structures (e.g., turbines compared to communication towers) pose a greater risk to birds moving around locally or migrating during the day compared to taller structures that take more bird species moving during the night. Older style turbines were made with lattice towers, which compared to monopole designs have an increased risk of causing bird/turbine collisions.

What are some solutions?

At present, once wind turbines are built, there are very few measures that can be implemented to avoid or minimize the collision risk. Turbine lighting may reduce attraction, however one study found no difference in bird impacts between lit and unlit turbines, suggesting that lighting may not be the driving factor behind bird/turbine collisions.

Reducing the quality of habitat and removing carrion may reduce the attraction of local individuals from the wind facility and lower exposure risk, but this may not reduce the risk to birds migrating during the day and night.

Ensuring proper siting of wind facilities is the first step in minimizing bird/turbine collision risk. The Service is exploring a standard, scientifically supported method for proper siting.

For more information about the impact of energy development on wildlife, the Service's role in reviewing energy development projects, and recommendations for avoiding and minimizing impacts to birds and bats from wind development, visit the Service's Ecological Service's Energy Development website (https://www.fws.gov/ecological-services/energy-development/energy.html) and the Service's Midwest Wind Energy Development (https://www.fws.gov/midwest/wind/wildlifeimpacts/index.html) website.

For more information about measures and guidance for avoiding and minimizing impacts to migratory birds, visit the Conservation Measures (https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php) and Guidance Documents (https://www.fws.gov/birds/management/project-assessment-tools-and-guidance/guidance-documents.php) webpages.

Materials on this webpage sourced from

AWWI 2015, Diffendorfer et al. 2015, EIA 2015, Erickson et al. 2001, Erickson et al. 2014, Gehring pers com., Katzner et al. 2012, Kerlinger et al. 2010, Loss et al. 2013 (447.7KB) (../../../../migratorybirds/pdf/management/lossetal2013windfacilities.pdf), Manville 2009 (112.7KB) (../../../../migratorybirds/pdf/management/manville2009.pdf), May et al. 2015, Peterson et al. 2015, Schuster et al. 2015, Singh et al. 2015, Smallwood 2013, Smallwood and Thelander 2008, USDoE 2015, U.S. vs PacifiCorp 2014

Last Updated: April 18, 2018

NEWS

Altamont Pass wind farm gets major upgrade

By DANA HULL and SAN JOSE MERCURY NEWS |
PUBLISHED: August 29, 2011 at 12:00 a.m. | UPDATED: September 11, 2018 at 12:00 a.m.

For years, environmentalists have raised alarms about the slaughter of red-tailed hawks, golden eagles and other raptors that have fallen victim to the whirling blades of thousands of wind turbines along the Altamont Pass in eastern Alameda and Contra Costa counties.

Now the most iconic wind farm in California is getting a major upgrade that promises to drastically reduce the number of bird deaths.

Nearly 2,000 of the 4,000 wind turbines in operation, many of which are nearly 30 years old, will be replaced over the next four years with about 100 huge state-of-the-art turbines that — at 430 feet — stand taller than the tallest coastal redwood trees. For every new turbine installed, 23 of the old ones will be removed — a dramatic drop expected to significantly reduce the number of birds killed each year.

The 50,000-acre Altamont Wind Resource Area, one of the nation"s oldest wind farms, serves as a functioning museum of wind technology. Many of the older 100-foot-tall turbines are clustered closely together on ridges, each generating anywhere from 50 kilowatts to 750 kilowatts of power at peak production. Each of the new turbines, manufactured by Siemens, generates 2.3 megawatts of electricity — enough to power 600 to 700 homes per year.

"It"s almost a complete revolution in the way that you capture the wind," said Anthony Pedroni of NextEra Energy Resources, which owns about half of the wind turbines in the Altamont Wind Resource Area and is doing the upgrade. "The new turbines are 430 feet tall from the base to the tip of the blade, and the higher you go the faster the wind speeds are."

The Altamont Pass was first developed for wind power in the late 1970s, and at one point had nearly 6,000 turbines in operation. Much of the hilly land is owned by cattle ranchers who lease wind rights.

But the Altamont, which captures strong winds off the Pacific Ocean, is also a key migratory corridor and wintering spot for raptors. Studies have tried to quantify how many bats and birds are killed by turbines in the Altamont each year, but the task is difficult because scavengers often eat the corpses.

Shawn Smallwood, a renowned expert on birds and wind turbines, estimated that about 2,000 raptors are killed each year, along with as many as 8,000 other birds and bats. Young birds learning to fly are particularly vulnerable.

"Any way you look at the mortality data, there"s been a tremendous impact on birds," said biologist Doug Bell, manager of the East Bay Regional Park District"s wildlife program. "I"ve found birds sliced in half. You see all kinds of blunt force trauma."

For more than a decade, wind companies and local chapters of the Audubon Society have struggled to find a compromise that maintains wind generation while reducing bird deaths. In December, Californians for Renewable Energy, five Bay Area chapters of the Audubon Society and the California Attorney General"s Office reached an agreement with NextEra to "repower" the Altamont area with taller mega-turbines that some say could reduce the bird mortality rate by 80 percent.

NextEra has hired Smallwood as a consultant, and he is helping place the turbines to minimize bird deaths. Discussions with other wind developers in the area are ongoing.

"Birds and turbines are always an issue," said Michael Lynes, conservation director of the Golden Gate Audubon Society. "The best way to reduce avian mortality while keeping wind power in the Altamont is repowering with fewer turbines, and this is a step in the right direction. But we"re always sober about it, because there will still be impacts to birds and bats."

The older turbines were built with a lattice structure that created many perching areas for raptors to hunt from, putting them in proximity to the blades. The new turbines are mounted on monopole towers that don"t have perching areas, which should help keep birds safely away from the turbines.

"When they are diving and swooping down on their prey, they"re not focused on turbines," Lynes said.

NextEra"s repowering project will be done in three phases and is scheduled to be completed by 2015. The first phase is near Vasco Road and the Los Vaqueros Reservoir in Brentwood.

The sleek new turbines are majestic giants towering over the aging relics they are replacing. On a recent morning, a construction crew used a 315-foot-tall crane to lift a 180,000-pound unit that contains the gear box and generator to the top of the tower. Each of the three blades on a turbine is 150 feet long, nearly the width of a football field. In high winds, the tips of the blades spin at 180 miles per hour.

Besides replacing turbines, NextEra will remove 6.5 miles of overhead electrical lines and about eight miles of road, allowing the land to return to a more natural state. The project also is creating union construction jobs: About 135 people have been hired.

Wind energy advocates say the collaboration between NextEra and environmental groups to reduce bird mortality marks an important milestone.

"Wind energy on a commercial scale was born in the Altamont," said Nancy Rader, executive director of CalWEA, the California Wind Energy Association. "Our understanding of its environmental impacts has evolved just as much as the technology has."

Dana Hull

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Subsidy Tracker Parent Company Summary

Parent Company Name: NextEra Energy

Ownership Structure: publicly traded (ticker symbol NEE)

Headquartered in: Florida

Major Industry: utilities and power generation

Specific Industry: utilities

Subsidy Summary	Subsidy Value	Number of Awards
State/Local	$396,878,669	20
Federal (grants and allocated tax credits)	$2,300,390,683	31
TOTAL	**$2,697,269,352**	**51**

Loan / Bailout Summary	Total Face Value	Number of Awards
State/Local loans, bond financing and venture capital	**$0**	**0**
Federal loans, loan guarantees and bailout assistance (not including repayments)	**$3,113,600,000**	**4**
TOTAL	**$3,113,600,000**	**4**

Time Period for State and Local Awards:

Earliest year of data: 2007. Availability of data for earlier years varies greatly from program to program. The majority of the listings for this parent company are for the period since 2012.

Time Period for Federal Awards:

FY2000 to the present

Notes:

Dollar totals do not include awards for which no subsidy value is disclosed.

Associated Names:

ASHTABULA WIND; BALDWIN WIND; CRYSTAL LAKE WIND; DAY COUNTY WIND; DESERT SUNLIGHT; ELK CITY WIND; FLORIDA POWER AND LIGHT; FPL; GARDEN WIND; GENESIS SOLAR; MINCO WIND; NEXTERA ENERGY; NEXTERA ENERGY AND SUBS; NEXTERA ENERGY EQUITY PARTNERS LP; NEXTERA ENERGY OPERATING PARTNERS LP; NORTH SKY RIVER ENERGY; NORTHERN COLORADO WIND; PERRIN RANCH WIND; RED MESA WIND; SEC BESD Solar One, LLC; TUSCOLA BAY WIND; VASCO WINDS; WHITE OAK ENERGY

Links:

For a summary of this company's regulatory violations see its Violation Tracker summary page here.

For an overview of political contributions associated with this company, see its Follow the Money page.

Top 5 States for state/local awards	Total Subsidy $	Number of Awards
Oklahoma	$294,222,430	7
Texas	$47,623,180	2

Top 5 States for state/local awards	Total Subsidy $	Number of Awards
Colorado	$41,544,654	5
Oregon	$11,356,382	2
Illinois	$1,614,890	2
All other	$517,133	2

Individual Subsidy Records:

Click on the company name for more information on each subsidy award.
Download results as CSV or XML

Company	Location	Subsidy Source	Year	Subsidy Value	Loan/Bailout Value	Type of Subsidy
Genesis Solar, LLC	United States	federal	2014	$306,240,000		federal grant
FLORIDA POWER & LIGHT COMPANY	United States	federal	2010	$200,000,000		federal grant
Desert Sunlight 300	United States	federal	2015	$198,104,953		federal grant
Desert Sunlight 250	United States	federal	2015	$162,363,054		federal grant
FPL Energy Illinois Wind, LLC	United States	federal	2010	$137,256,969		federal grant
Florida Power & Light Company	United States	federal	2011	$123,767,270		federal grant
NEXTERA ENERGY CAPITAL HOLDINGS INC	Oklahoma	state	2015	$119,334,074		tax credit/rebate
NEXTERA ENERGY CAPITAL HOLDINGS INC	Oklahoma	state	2014	$103,237,835		tax credit/rebate
North Sky River Energy, LLC	United States	federal	2013	$100,923,890		federal grant
Northern Colorado Wind Energy, LLC	United States	federal	2009	$99,900,326		federal grant
White Oak Energy, LLC	United States	federal	2011	$98,706,750		federal grant
Garden Wind, LLC	United States	federal	2010	$82,016,590		federal grant
Tuscola Bay Wind, LLC	United States	federal	2013	$68,668,791		federal grant
Florida Power & Light Company	United States	federal	2010	$62,371,777		federal grant
Elk City II Wind, LLC	United States	federal	2011	$61,880,803		federal grant
NEXTERA ENERGY CAPITAL HOLDINGS INC	Oklahoma	state	2016	$60,849,970		tax credit/rebate
Red Mesa Wind, LLC	United States	federal	2011	$58,412,982		federal grant
Baldwin Wind, LLC	United States	federal	2011	$55,979,118		federal grant
Vasco Winds, LLC	United States	federal	2012	$54,969,957		federal grant
FPL Energy Stateline II, Inc	United States	federal	2010	$54,857,251		federal grant

Company	Location	Subsidy Source	Year	Subsidy Value	Loan/Bailout Value	Type of Subsidy
Day County Wind, LLC	United States	federal	2010	$54,518,743		federal grant
Minco Wind, LLC	United States	federal	2011	$54,066,194		federal grant
Perrin Ranch Wind, LLC	United States	federal	2012	$51,684,962		federal grant
Elk City Wind	United States	federal	2010	$50,248,277		federal grant
NextEra Energy Montezuma II Wind, LLC	United States	federal	2012	$50,101,558		federal grant
Crystal Lake Wind III, LLC	United States	federal	2010	$36,072,814		federal grant
FPL Energy Horse Hollow Wind GP LLC	Texas	local	2007	$35,334,670		property tax abatement
Ashtabula Wind III, LLC	United States	federal	2011	$31,437,330		federal grant
FPL Energy Montezuma Wind, LLC	United States	federal	2011	$22,743,824		federal grant
Northern Colorado Wind Holdings, LLC	Colorado	state		$14,753,704		tax credit/rebate
FPL Energy Horse Hollow Wind GP LLC	Texas	local	2007	$12,288,510		property tax abatement
FPL Energy Maine Hydro, LLC	United States	federal	2012	$11,566,467		federal grant
Northern Colorado Wind Holdings, LLC	Colorado	state	2016	$10,569,359		tax credit/rebate
FPL ENERGY STATELINE II, INC	Oregon	state	2012	$10,000,000		tax credit/rebate
Northern Colorado Wind Holdings, LLC	Colorado	state	2015	$8,766,907		tax credit/rebate
Northern Colorado Wind Holdings, LLC	Colorado	state	2016	$6,848,225		tax credit/rebate
FLORIDA POWER & LIGHT COMPANY	United States	federal	2010	$5,000,000		federal grant
Crystal Lake Wind II, LLC	United States	federal	2010	$4,195,533		federal grant
NEXTERA ENERGY EQUITY PARTNERS LP	Oklahoma	local	2015	$3,241,423		tax credit/rebate
NEXTERA ENERGY EQUITY PARTNERS, LP	Oklahoma	local	2015	$3,241,422		tax credit/rebate
NEXTERA ENERGY OPERATING PARTNERS, LP	Oklahoma	local	2015	$3,241,422		tax credit/rebate
NextEra Energy Resources LLC	Oregon	state	2012	$1,356,382		property tax abatement
SEC BESD Solar One, LLC	United States	federal	2012	$1,110,727		federal grant
Nextera Energy	Oklahoma	state	2016	$1,076,284		property tax abatement
FPL Energy Illinois Wind, LLC	Illinois	state	2013	$823,085		tax credit/rebate
FPL Energy Illinois Wind, LLC	Illinois	state	2010	$791,805		tax credit/rebate
FPL Energy Green Power Wind, LLC	United States	federal	2011	$777,827		federal grant
NextEra Energy Capital Holdings, Inc.	Colorado	state	2017	$606,459		tax credit/rebate
FPL Energy Cabazon Wind, LLC	United States	federal	2012	$445,946		federal grant
FPL Energy LLC (via city of Story City)	Iowa	state	2008	$300,000		infrastructure assistance

Company	Location	Subsidy Source	Year	Subsidy Value	Loan/Bailout Value	Type of Subsidy
FPL Energy Operating Services, Inc.	Iowa	state	2009	$217,133		training reimbursement
Genesis Solar, LLC	United States	federal	2011		$852,000,000	federal loan or loan guarantee
DESERT SUNLIGHT 300, LLC	United States	federal	2011		$800,600,000	federal loan or loan guarantee
DESERT SUNLIGHT 300, LLC	United States	federal	2015		$800,600,000	federal loan or loan guarantee
DESERT SUNLIGHT 250, LLC	United States	federal	2011		$660,400,000	federal loan or loan guarantee
FPL Energy Illinois Wind, LLC	Illinois	state	2009	undisclosed		tax credit/rebate
FPL Energy Upton Wind I LLC	Texas	state	2008	undisclosed		property tax abatement
NextEra Energy Resource	Texas	state	2010	undisclosed		training reimbursement
FPL Energy Upton Wind I, LP (ASSIGNED on 12/22/00 from Upton Wind LP)	Texas	local	2009	undisclosed		tax credit/rebate
FPL Energy Callahan Wind LP & Boulevard Associates LLC (No RZ Info on File)	Texas	local	2009	undisclosed		tax credit/rebate
Nextera Energy Inc & Subs	West Virginia	state	2010	undisclosed		tax credit/rebate

Download results as CSV or XML

Limited Lifespans of Wind Turbines Result in Higher Costs of Energy

Written by Mitchell Rolling

in Energy, Environment

on June 26, 2018

Have you ever read that wind energy "is the cheapest energy source available?"

These claims are based on cost-estimates that assume the lifespan of wind turbines to be 30 years. However, according to the U.S. Energy Information Administration (EIA), the lifespan of wind turbines is about 20 to 25 years.

In Iowa, wind turbines are reaching the end of their lives even faster as MidAmerican Energy plans to repower turbines constructed in 2004, merely 14 years after they were installed.

To make matters worse, these cost-estimates attribute 30-year lifespans to every power plant – not just wind turbines – even though coal, nuclear, natural gas, and hydroelectric plants can generate electricity for more than 50 years.

Because these reports only look at a 30-year window, they fail to account for the additional spending necessary to repower a wind turbine and extend its life. According to a report conducted last year, investments in repowering these turbines will exceed $25 billion by 2030 in the United States.

By not factoring in this additional spending, these reports not only underestimate the true cost of wind energy, but overestimate the cost of power plants capable of generating electricity for more than 30 years.

In other words, these cost-estimates tell us is that *wind energy would be the cheapest source of energy if all power sources produced electricity for a similar period of time*... but they don't.

Additionally, because wind turbines can only produce energy when the wind is blowing, they generate electricity less frequently than other generation sources. In Minnesota, wind farms produced electricity only 34.67 percent of the time in 2016.

This is far lower than coal at 56.9 percent, hydropower at 64 percent, and nuclear at 84.6 percent. Natural gas plants are utilized at a lower rate of 17.6 percent in Minnesota, but this is because natural gas is used often used as a "backup" source of electricity when the wind isn't blowing.

As wind turbines grow older, their utilization rates become even worse, dropping at a rate of 1.6 percent each year – which eventually requires the turbine to be repowered.

This means that we get less bang for our buck from wind turbines as time goes on. Although other power plants become less efficient over time as well, upgrades to improve the efficiencies of these facilities happen much later in their lives. Repowering wind turbines increases efficiency, but only for another 20 to 25 years until they need to be repowered once again.

Minnesota has invested more than $15 billion on wind energy, and the limited lifespan of wind turbines means the state will soon have to spend even more money just to update the wind turbines we already have.

This is exactly what Xcel Energy has planned to do, recently requesting for another Power Purchase Agreement that will cover repowering wind farms in northwest Minnesota. This is part of Xcel Energy's plan to spend an additional $7 billion by 2022 implementing renewable energy sources in the state.

The short lifespan of wind turbines is rarely discussed, yet it has a massive impact on the cost of electricity for Minnesota families and businesses. Worse yet, wind energy investments were and still are completely unnecessary to meet our energy needs because energy consumption in Minnesota has been essentially flat since 2006, and existing energy sources were capable of meeting the entirety of those demands.

Wind energy is indeed very costly; even without fuel expenses. This is because wind facilities require more frequent upgrades than other power plants and produce energy at far lower rates.

If cost-estimates are going to be calculated correctly, accurate lifespans and capacity factors of different power plants need to be accounted for.

Mitchell Rolling (marolling20@gmail.com) is an intern for Center of the American Experiment.

TAGS: WIND | TURBINES | LIFESPAN | SHORT | REPOWERED

Assessing Wind Power Cost Estimates

The Institute for Energy Research released a study titled *Assessing Wind Power Cost Estimates* (http://americanenergyalliance.us2.list-manage1.com/track/click?u=7cbc7dd79831a84c870f9842e&id=6e207e0f44&e=201ef0d61b). The study, written by Dr. Michael Giberson, an economics professor at Texas Tech University, details the costs of wind power that commonly go unreported in studies performed by government-funded groups such as the National Renewable Energy Laboratory (NREL). The study is published as the federal wind Production Tax Credit (PTC), a massive subsidy to the wind power industry, is set to expire at the end of the year. Last year, the PTC received another one-year extension that government analysts project will cost taxpayers $12 billion.

"As Big Wind's lobbyists fight tooth and nail to extend the wind Production Tax Credit, it is important that we look at the true costs of wind power to taxpayers and ratepayers," IER President Thomas Pyle said upon release of the study.

"Despite being propped up by government mandates and billion dollar subsidies for decades, wind power continues to be an expensive and boutique energy source that the American people cannot rely on for power when they need it. Although lobbyists for the wind industry prefer to downplay the real costs of wind power, Dr. Giberson has produced a fact-based study that demonstrates just how expensive it really is."

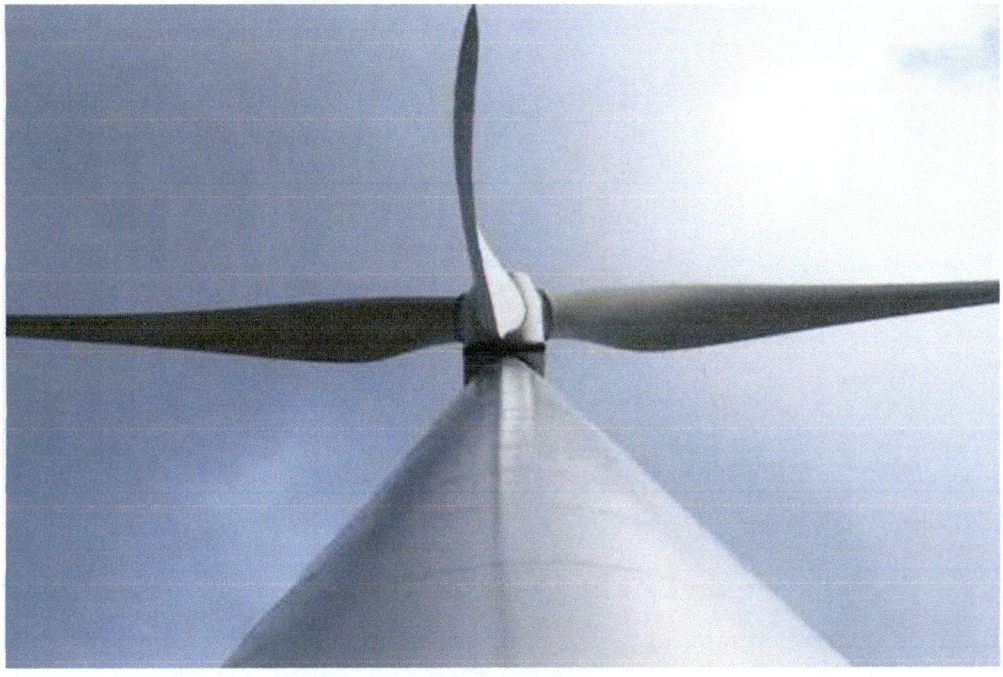
The study highlights several categories of costs that NREL and others fail to recognize in their studies on the Levelized Cost of Energy (LCOE). Rather than approaching the cost of wind power from the point of view of the wind project developer, Dr. Giberson takes a broader view of the cost of wind power to all Americans, including electricity consumers and taxpayers.

As Giberson states in the study, "While expenses faced by wind project developers are an important element of the overall cost of wind power, the addition of wind power to the power grid involves a number of other costs … Such costs include the expense of transmission expansions needed to develop wind power, other grid integration expenses, and added grid reliability expenses."

The study finds:

- Under more accurate assumptions, the LCOE for wind power is $109 per MWh rather than NREL's estimate of $72 — a more than 50 percent increase.
- NREL's cost estimates exclude key categories of costs such as the cost of transmission and grid balancing for far-away, intermittent wind sources.
- PTC-subsidized wind power projects distort electricity markets because they can bid as low as negative $35 per MWh and still profit through the PTC.
- Adding wind power via the PTC cannot reduce the overall cost of power to the economy — it merely shifts costs to taxpayers.

THE CONVERSATION
Academic rigor, journalistic flair



One problem with wind power: the wind doesn't always blow. Wind turbine via www.shutterstock.com

Wind costs more than you think due to massive federal subsidies

April 8, 2015 6.05am EDT

Author

Randy Simmons
Professor of Political Economy, Utah State University

As consumers, we pay for electricity twice: once through our monthly electricity bill and a second time through taxes that finance massive subsidies for inefficient wind and other energy producers.

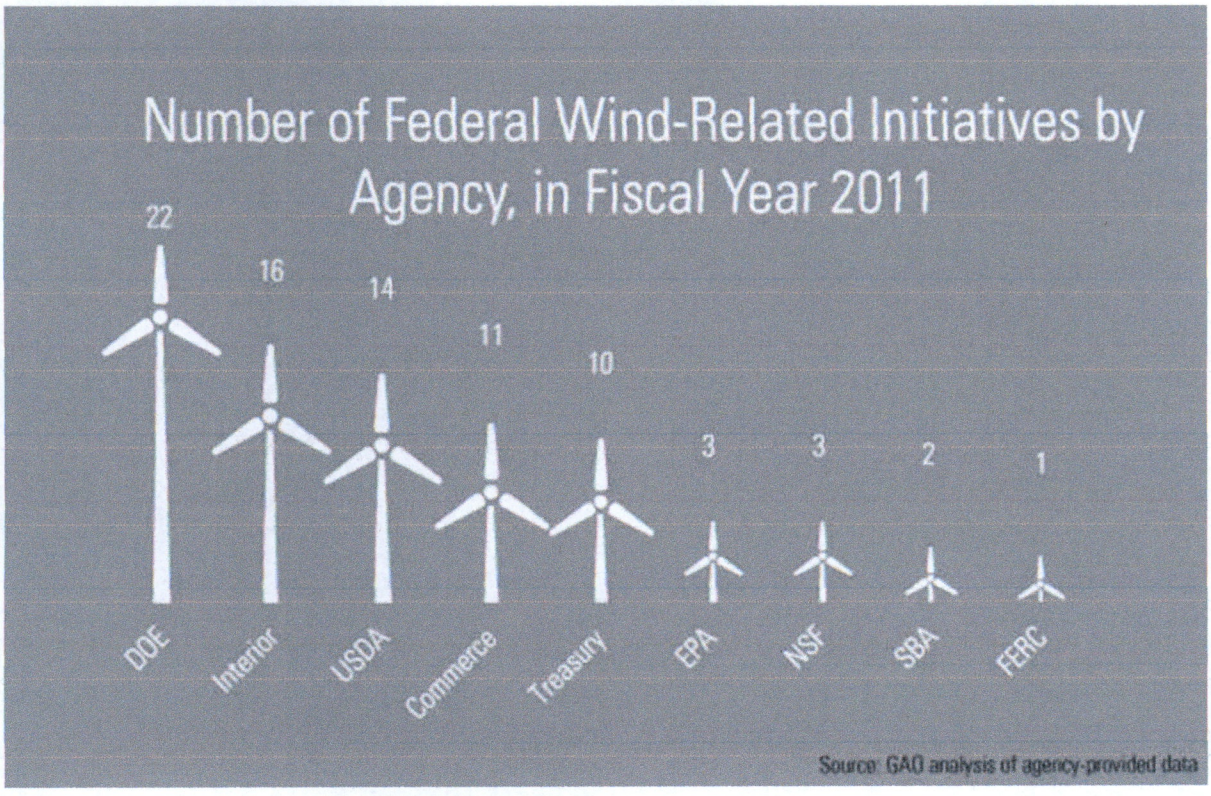
Most cost estimates for wind power disregard the heavy burden of these subsidies on US taxpayers. But if Americans realized the full cost of generating energy from wind power, they would be less willing to foot the bill – because it's more than most people think.

Over the past 35 years, wind energy – which **supplied** just 4.4% of US electricity in 2014 – has received **US$30 billion** in federal subsidies and grants. These subsidies shield people from the uncomfortable truth of just how much wind power actually costs and transfer money from average taxpayers to wealthy wind farm owners, many of which are units of foreign companies.

Financial advisory firm **Lazard** puts the cost of generating a megawatt-hour of electricity from wind at a range of $37 to $81. In reality, the **true price tag** is significantly higher.

This represents a waste of resources that could be better spent by taxpayers themselves. Even the supposed environmental gains of relying more on wind power are dubious because of its unreliability – it doesn't always blow – meaning a **stable backup power source** must always be online to take over during periods of calm.

But at the same time, the subsidies make the US energy infrastructure more tenuous because the artificially cheap electricity prices push more reliable producers – including those needed as backup – out of the market. As we rely more on wind for our power and its inherent unreliability, the risk of blackouts grows. If that happens, the costs will really soar.



Many government agencies are in the wind business these days. GAO

Where the subsidies go

Many people may be familiar with **Warren Buffet's claim** that federal policies are the only reason to build wind farms in the US, but few realize how many of the companies that benefit most are foreign. The Investigative Reporting Workshop at American University **found** that, as of 2010, 84% of total clean-energy grants awarded by the federal government went to foreign-owned wind companies.

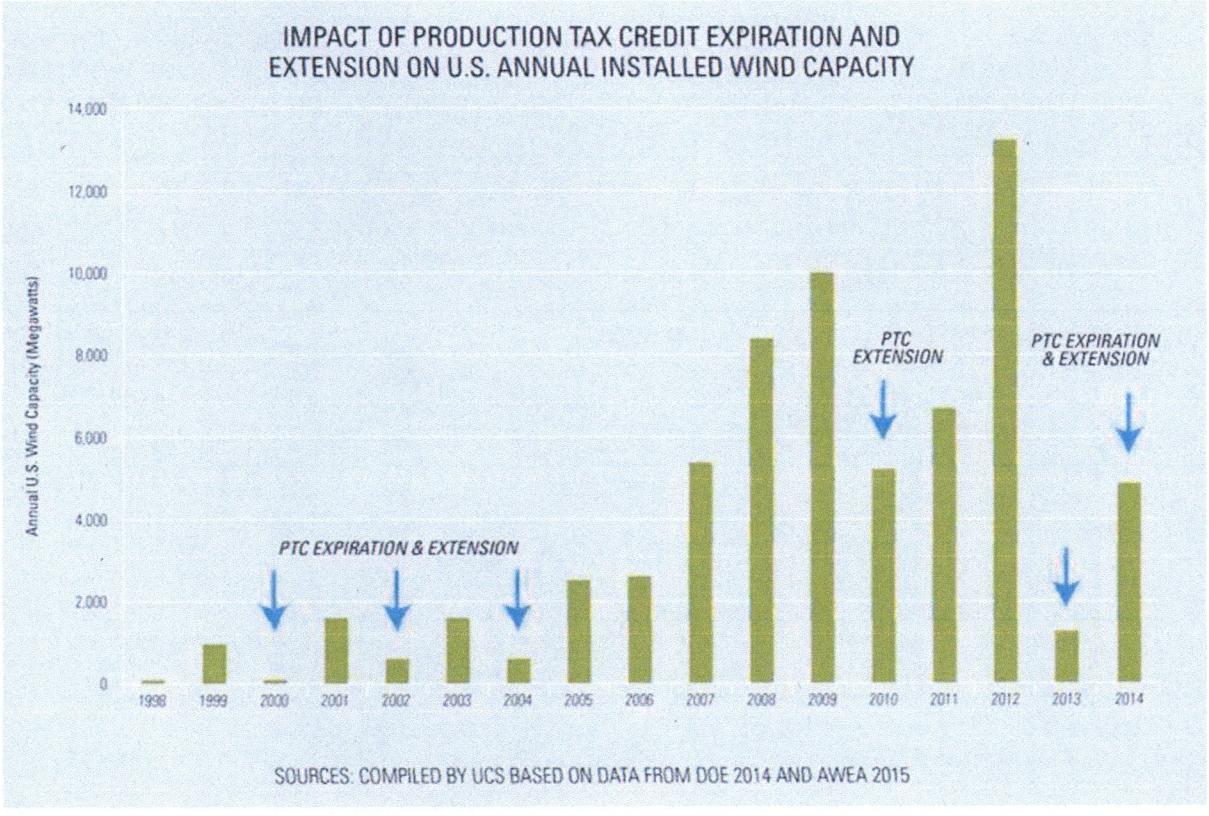
More generally, the beneficiaries of federal renewable energy policies tend to be large companies, not individual taxpayers or small businesses. The top five recipients of federal grants and tax credits since 2000 are: Iberdrola, NextEra Energy, NRG Energy, Southern Company and Summit Power, all of which **have received** more than $1 billion in federal benefits.

Iberdrola Renewables alone, a unit of a Spanish utility, has collected $2.2 billion in federal grants and allocated tax credits over the past 15 years. That's equivalent to **about 6.7%** of the parent company's 2014 revenue of $33 billion (in current US dollars).

President Obama's **proposed 2016 budget** would permanently extend the biggest federal subsidy for wind power, the Production Tax Credit (PTC), ensuring that large foreign companies continue to reap most of the taxpayer-funded benefits for wind. The PTC is a federal subsidy that pays wind farm owners $23 per megawatt-hour through the first ten years of a turbine's operation. The credit expired at the end of 2013, but Congress extended it so that all projects under construction by the end of 2014 are eligible.

In all, Congress has enacted 82 policies, overseen by nine different agencies, to support wind power.

I explained in December why Congress shouldn't revive the PTC, which expired at the end of 2014. In this article, I'm adding up the true cost of wind power in the US, including the impact of the PTC and other subsidies and mandates. It's part of a study I'm doing of other energy sources including solar, natural gas, and coal to determine how much each one actually cost us when all factors are considered.



As Warren Buffett has said, there wouldn't be a wind industry without the PTC. UCS, DOE, AWEA

Tallying the true costs of wind

Depending on which factors are included, estimates for the cost of wind power vary wildly. Lazard claims the cost of wind power ranges from $37 to $81 per megawatt-hour, while Michael Giberson at the Center for Energy Commerce at Texas Tech University suggests it's closer to $149. Our analysis in an upcoming report explores this wide gap in cost estimates, finding that most studies underestimate the genuine cost of wind because they overlook key factors.

All estimates for wind power include the cost of purchasing capital and paying for operations and maintenance (O&M) of wind turbines. For the studies we examined, capital costs ranged from $48 to $88 per megawatt-hour, while O&M costs ranged from $9.8 to $21 per megawatt-hour.

Many estimates, however, don't include costs related to the inherent unreliability of wind power and government subsidies and mandates. Since we can't ensure the wind always blows, or how strongly, coal and natural gas plants must be kept on as backup to compensate when it's calm. This is known as baseload cycling, and its cost ranges from $2 to $23 per megawatt-hour.

This also reduces the environmental friendliness of wind power. Because a coal-fired or natural gas power plant must be kept online in case there's no wind, two plants are running to do the job of one.

These plants create carbon emissions, reducing the environmental benefits of wind. The amount by which emissions reductions are offset by baseload cycling ranges from 20% to 50%, according to a modeling study by two professors at Carnegie Mellon University.

While the backup plants are necessary to ensure the grid's reliability, their ability to operate is threatened by wind subsidies. The federal dollars encourage wind farm owners to produce power even when prices are low, flooding the market with cheap electricity. That pushes prices down even further and makes it harder for more reliable producers, such as nuclear plants, that don't get hefty subsidies to stay in business.

For example, the Kewaunee Nuclear Plant in Wisconsin and the Yankee Nuclear Plant in Vermont both switched off their reactors in 2013. Dominion Energy, which owned both plants, blamed the artificially low prices caused by the PTC as one of the reasons for the shutdown.

As more reliable sources drop off and wind power takes their place, consumers are left with an electrical infrastructure that is less reliable and less capable of meeting demand.

Lost in transmission

Another factor often overlooked is the extra cost of transmission. Many of America's wind-rich areas are remote and the turbines are often planted in open fields, far from major cities. That means new transmission lines must be built to carry electricity to consumers. The cost of building new transmission lines ranges from $15 to $27 per megawatt-hour.

In 2013, Texas completed its Competitive Renewable Energy Zone project, adding over 3,600 miles of transmission lines to remote wind farms, costing state taxpayers $7 billion.

Although transmission infrastructure may be considered a fixed cost that will reduce future transmission costs for wind power, these costs will likely remain important. Today's wind farms are built in areas with prime wind resources. If we continue to subsidize wind power, producers will eventually expand to sub-prime locations that may be even further from population centers. This would feed demand for additional transmission projects to transport electricity from remote wind farms to cities.

The final bill comes to...

Finally, federal subsidies and state mandates also add significantly to the cost, even as many estimates claim these incentives actually reduce the cost of wind energy. In fact, they add to it as American taxpayers are forced to foot the bill. According to Giberson, federal and state policies add an average of $23 per megawatt-hour to the cost of wind power.

That includes the impact of state mandates, which end up increasing the cost of electricity on consumer power bills. California is one of the most aggressive in pushing so-called Renewable Portfolio Standards (RPS), requiring the state to consume 33% of its electricity from renewables by 2020. Overall electricity prices in states with RPS are 38% higher than those without, according to the Institute for Energy Research, a non-profit research group that promotes free markets.

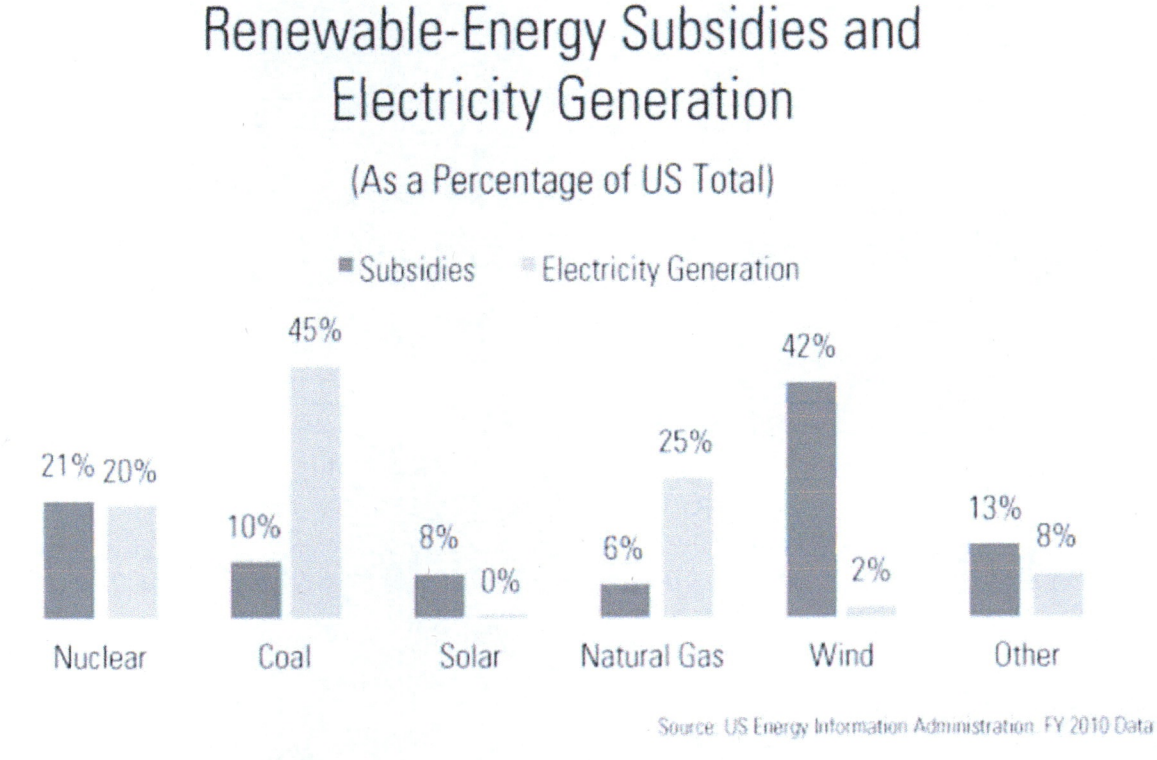
The best estimate available for the total cost of wind power is $149 per megawatt-hour, taken from Giberson's 2013 report.

It is difficult to quantify some factors of the cost of wind power, such as the cost of state policies. Giberson's estimate, however, includes the most relevant factors in attempting to measure the true cost of producing electricity from wind power. In future reports, Strata will explore the true cost of producing electricity from solar, coal, and natural gas. Until those reports are completed, it is difficult to accurately compare the true cost of wind to other technologies, as true cost studies have not yet been completed.

Blowing in the wind

The high costs of federal subsidies and state mandates for wind power have not paid off for the American public. According to the Mercatus Center at George Mason University, wind energy receives a higher percentage of federal subsidies than any other type of energy while generating a very small percentage of the nation's electricity.

In 2010 the wind energy sector received 42% of total federal subsidies while producing only 2% of the nation's total electricity. By comparison, coal receives 10% of all subsidies and generates 45% and nuclear is about even at about 20%.



Wind gobbles up the largest share of subsidies yet produces little power. EIA

But policymakers at the federal and state level, unfortunately, have decided that the American people will have renewable energy, no matter how high the costs. As a result, taxpayers will be stuck paying the cost of subsidies to wealthy wind producers.

Meanwhile, electricity consumers will be forced to purchase the more expensive power that results from state-level mandates for renewable energy production. Although such policies may be well

intended, the real results will be limited freedom, reduced prosperity and an increasingly unreliable power supply.

Megan Hansen, a Strata policy analyst, co-authored this article.

This article has been updated with a corrected figure for wind power's current share of US electricity generation. It also clarifies the range of cost estimates from Lazard.

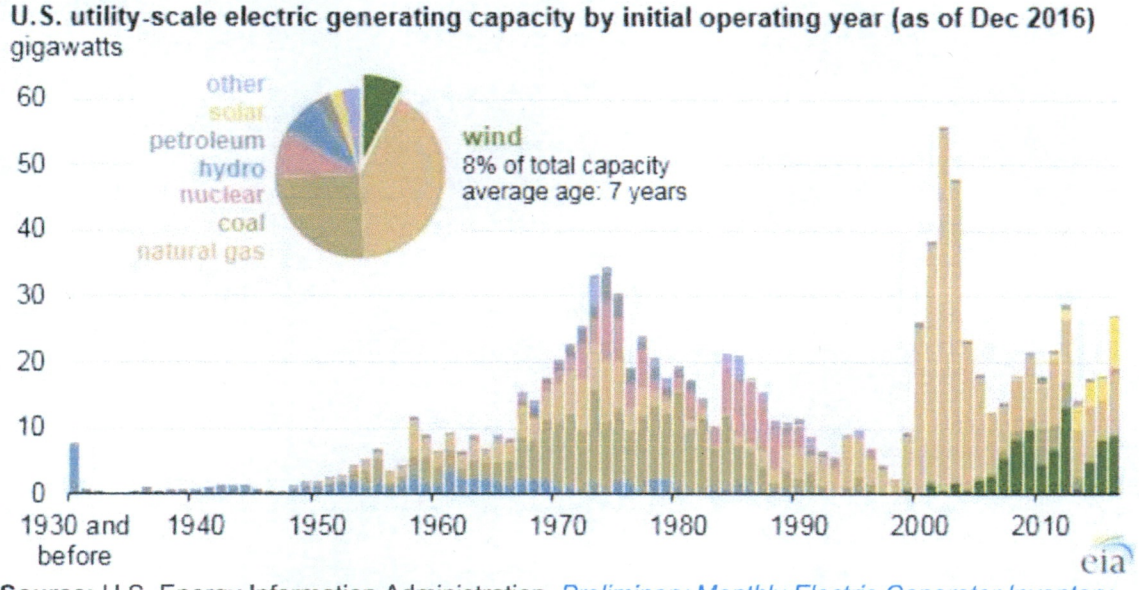
Renewable energy Wind power Wind farms cost of renewable energy Renewables Wind energy

U.S. Energy Information Administration

Today in Energy

May 2, 2017

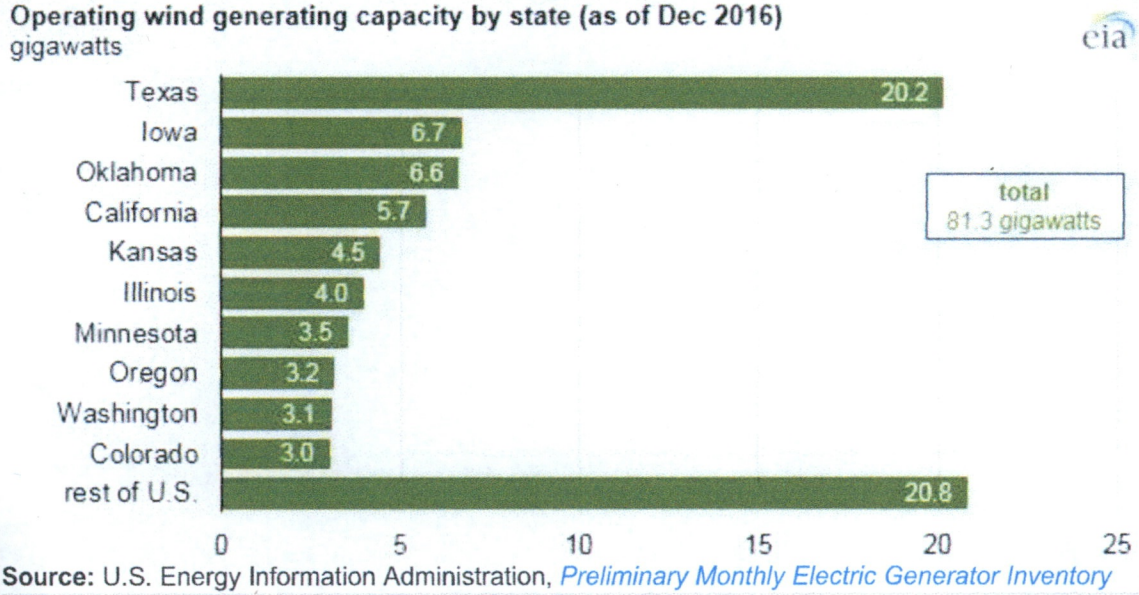
Wind turbines provide 8% of U.S. generating capacity, more than any other renewable source



Source: U.S. Energy Information Administration, *Preliminary Monthly Electric Generator Inventory*

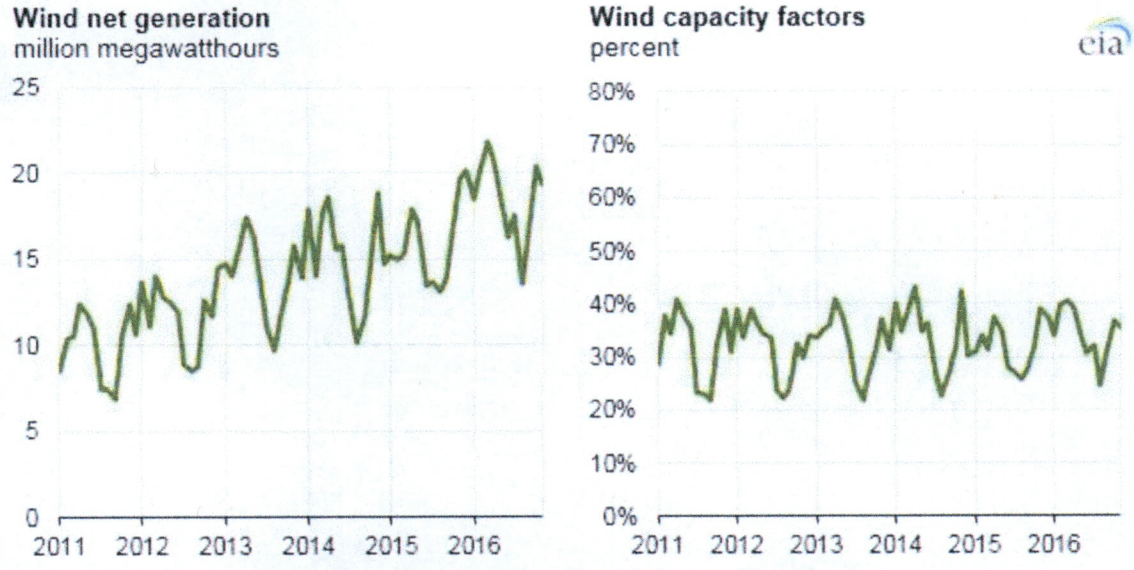
Wind generators accounted for 8% of the operating electric generating capacity in the United States in 2016, more than any other renewable technology, including hydroelectricity. Wind turbines have contributed more than one-third of the nearly 200 gigawatts (GW) of utility-scale electricity generating capacity added since 2007. The increase in wind development in the United States over the past decade reflects a combination of improved wind turbine technology, increased access to transmission capacity, state-level renewable portfolio standards, and federal production tax credits and grants.

More than half of U.S. wind capacity is located in five states: Texas, Iowa, Oklahoma, California, and Kansas. In three states—Iowa, Kansas, and Oklahoma—wind makes up at least 25% of in-state utility-scale generating capacity. Several states with the highest wind capacity are located in the Midwest, a region with favorable wind resources. As of December 2016, nine U.S. states had no operational utility-scale wind facilities: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, South Carolina, and Virginia.



Source: U.S. Energy Information Administration, *Preliminary Monthly Electric Generator Inventory*

Texas alone accounts for almost a quarter of total U.S. wind capacity, and electricity generated by these turbines made up 13% of Texas's total electricity output in 2016. At particularly windy times, wind can provide a much larger share of Texas's electricity generation. For instance, in the early hours of March 23, 2017, wind output on the Electric Reliability Council of Texas (ERCOT) grid in Texas accounted for up to 50% of the electricity generation mix, the highest wind penetration level seen in the ERCOT electric system to date.



Source: U.S. Energy Information Administration, *Electric Power Monthly*

Although wind makes up about 8% of total U.S. electricity generating capacity, wind generators provided a smaller share (5%) of total U.S. electricity generation in 2016 because wind turbines have relatively low capacity factors. Capacity factors, which measure actual output over a certain period as a percent of the total mechanical ability of the turbine to generate given sufficient wind, average between about 25% and 40% for wind generators and vary based on seasonal patterns and geographic location.

The average wind generating facility in the United States consists of about 50 turbines. However, the Alta Wind Energy Center in Kern County, California, is the largest wind power site in the United States with 586 turbines and a combined 1,548 megawatts (MW) of capacity across several separate projects.

Until late 2016, all U.S. wind capacity was on land. The first U.S. offshore wind project, Block Island Wind Farm, began commercial operation off the coast of Rhode Island in December 2016 with a generating capacity of 29.3 MW. Two other offshore wind projects off the coasts of Ohio and Virginia are not yet under construction but are seeking regulatory approvals.

Distribution of wind power plants in the Lower 48 states (as of December 2016)