



August 13, 2019

Dear Dr. Thompson,

Thank you for allowing us to present information on our wind energy project at the August 19 Era ISD School Board Meeting. In advance of the meeting and presentation, I wanted to share some materials about the Wildcat Creek Wind Farm and wind energy development. When a new project is being developed, it is not uncommon for concerns and misinformation about wind energy to be spread throughout a community. Our goal is to ensure that everyone is receiving accurate information on what a wind farm entails. I hope you will find this information useful in answering questions that you have and when speaking with others about the project. Enclosed you will find the following:

- **Wildcat Creek Wind Farm Fact Sheet** – Explains project highlights and benefits.
- **Wind Energy Fact Sheets** – Findings from credible, peer-reviewed studies on the following topics:
 - **Property Values** – Wind turbines have no statistical impact on property values.
 - **Jobs & Economic Benefits** – Wind invests in rural communities, bringing jobs, significant payments to local landowners, tax revenue, among other benefits.
 - **Health & Safety** – Important information supporting the fact that wind energy poses no substantiated negative impacts to human health, and that the benefits are overwhelmingly positive.
 - **Wildlife & Environment** – Wind uses minimal land, no water, and prevents pollution.
- **EDPR NA in Texas Fact Sheet** - Explains EDPR NA's footprint and economic benefits delivered in Texas.
- **Sources and Facts Regarding Noise and Health** – Independent sources of information regarding noise and health related to wind turbines. This is included to correct some of the misinformation spread on these topics.

We also include for your consideration over 60 signed letters of support for the wind farm from members of the local community. Many of these supportive community members will be speaking in support of the wind farm at Monday's meeting.

As you look through these resources, please feel free to reach out with any questions. Thank you for your time and consideration and we look forward to speaking with you further on Monday.

Respectfully,

A handwritten signature in blue ink that reads "Josh Coon".

Josh Coon
Project Manager, EDP Renewables
713-806-0624
Joshua.Coon@edpr.com



TEXAS: Wildcat Creek



Wildcat Creek Wind Farm will be located approximately 50 miles north of Dallas-Fort Worth in southwest Cooke County, between the towns of Era and Muenster. The project is sited on land primarily used for ranching and agriculture. Wildcat Creek has strong support from local landowners and will have minimal impact on current land use.



180 MW

COMMERCIAL OPERATION DATE

2020



Wildcat Creek Wind Farm will produce enough clean electricity to power more than **41,000** Texas homes.¹

Economic Benefits



Wildcat Creek represents a capital investment of approximately **\$250 million**.²



More than **\$44 million** in local tax revenues through the project's life, including **\$27 million** to Era ISD and **\$9 million** to Muenster ISD.



Approximately **\$72 million** will be paid to local landowners through the life of the project.



Creation of up to **250** full-time equivalent jobs during construction and **10-12** permanent jobs during the life of the project.³



Millions of dollars will be spent within 50 miles of the wind farm through the life of the project.⁴



9,100 acres currently leased with **44** participating landowners. **5,700** more acres committed.

Turbine Technology

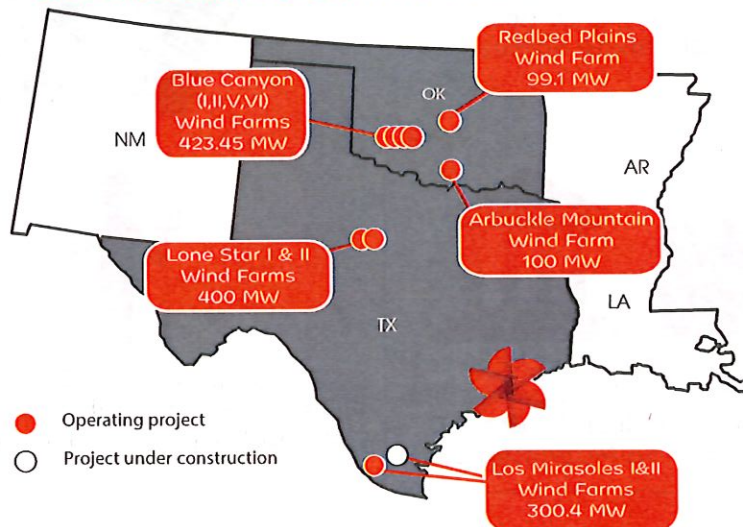


Wildcat Creek Wind Farm will consist of **52** wind turbines spanning a project area of nearly **15,000** acres. The largest turbines will have a hub height of approximately **354** feet and **238-foot** blades.

About Us

EDP Renewables North America LLC ("EDPR NA") and its subsidiaries develop, construct, own, and operate wind farms and solar parks throughout North America. Headquartered in Houston, Texas, with 48 wind farms, five solar parks, and 13 regional and development offices across North America, EDPR NA has developed more than 6,700 megawatts (MW) and operates more than 6,100 MW of renewable energy projects. With approximately 650 employees, EDPR NA's highly qualified team has a proven capacity to execute projects across the continent.

EDPR NA has **16** years of operational experience in the region, with more than **1.3 GW** in Texas and Oklahoma.



For more information, visit

www.edprnorthamerica.com or www.wildcatcreekwindfarm.com

¹Power generation calculated using a 35% capacity factor. Household consumption based on 2017 EIA Household Data monthly average consumption by state.

²Assumes the average cost of an installed wind farm is \$16 million/MW for projects built after 2017, based on U.S. DOE 2017 Wind Technologies Market Report https://emp.lbl.gov/sites/default/files/2017_wind_technologies_market_report.pdf.

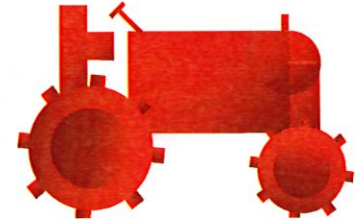
³Full-time equivalent jobs calculated by dividing number of contractor hours worked during construction by 2080.

⁴Includes vendor spending, property taxes, landowner payments, and wages from site jobs. Actual payments may vary.

⁵Assumes 0.58 gallons of water consumed per kWh of conventional electricity from "Water Consumption Factors for Electricity Generation in the United States" Lee, Han, & Elgowainy, 2016. <https://great.es.anl.gov/publication-wcf-2016>.



Wildcat Creek Wind Farm will save more than **320 million** gallons of water each year.⁵



Wildcat Creek Wind Farm is compatible with existing land uses, occupying less than **2 percent** of land.



More than **500** U.S. manufacturing facilities specialize in wind energy components such as blades, towers, and generators.



Wildcat Creek Wind Farm will provide energy security and help diversify supply.



EDP Renewables Corporate Headquarters

808 Travis Street, Suite 700 • Houston, TX 77002

P: 713-265-0350 • F: 713-265-0365

The research is clear:

Wind turbines make good neighbors



Your home is one of your biggest investments, and it's smart to consider possible impacts on its value.

A variety of studies have shown there is no statistical impact on property value by the presence of wind turbines.

In fact, wind farms are supporting thousands of communities by bringing jobs and economic growth to rural areas.



I think the wind farm is great for the community.

The schools, the town, the county, they all benefit from the money they get.

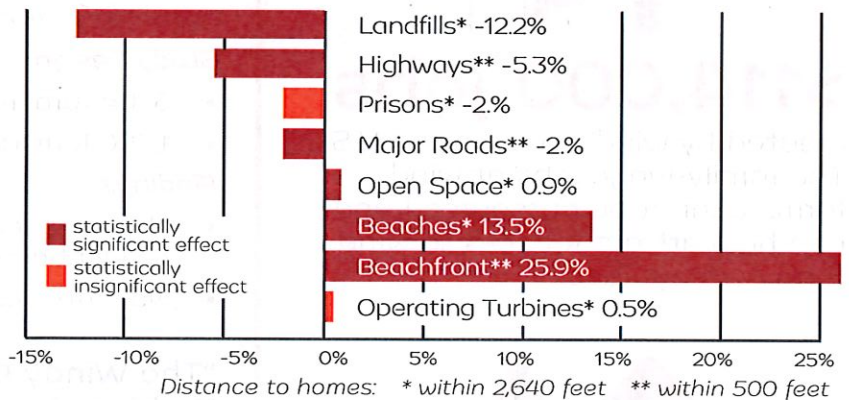
-Joyce K., New York landowner

\$3.2 billion

annually will be paid by wind farms to local governments by 2050.³

This additional tax revenue from wind farms funds schools, roads, libraries, law enforcement, and more, improving the quality of life in communities that host wind farms.

Research shows that wind farms do not reduce property values¹



"A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States"

Published in the *Journal of Real Estate Finance and Economics*, 2013²

Study Design:

- More than 50,000 home sales within 10 miles of a wind farm
- 27 counties across 9 states

Findings:

- No statistical evidence that home prices were affected after the announcement or construction of a wind farm
- No statistical evidence of homes within 1 mile of a turbine selling for less than homes between 3 and 10 miles from turbines

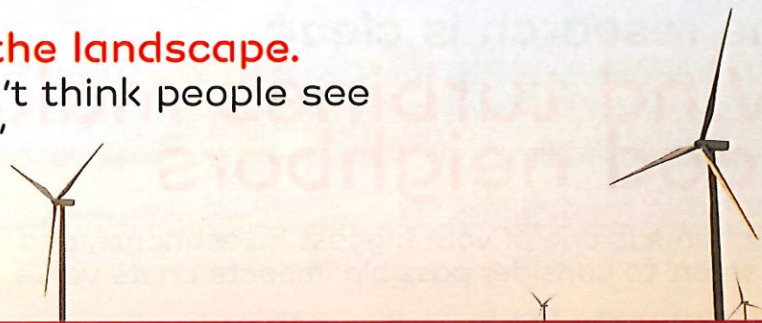
¹ Atkinson-Palombo, C., & Hoen, B. (2014). Relationship Between Wind Turbines and Residential Property Values in Massachusetts. Lawrence Berkeley National Laboratory.

² Hoen, B., Wiser, R., Cappers, P., Brown, J. P., Jackson, T., & Thayer, M. A. (2013). A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States. *Journal of Real Estate Finance and Economics*, 51(1).

³ U.S. Department of Energy, Wind Vision. Retrieved from <https://www.energy.gov/eere/wind/wind-vision>.

"The turbines are just part of the landscape.
They don't bother me a bit. I don't think people see them anymore. It's a non-factor."

-Mike B., Ohio landowner



"Wind Energy Facilities and Residential Properties: The Effect of Proximity and View on Sales Prices"

Published in the *Journal of Real Estate Research*, 2009⁴

Study Design:

- 7,459 sales of single-family homes within 10 miles of a wind facility
- 24 wind facilities across 9 states

Findings:

- No evidence of widespread property value impacts
- View of turbines had no statistically significant impact on home sales prices
- Distance from turbines had no statistically significant impact on home sales prices



>114,000 jobs

created by wind power in the U.S.⁷ The family-wage jobs at wind farms cannot be outsourced and can help attract families to wind farm communities.



\$289 million

paid in lease payments to families by wind farm operators in 2018.⁷ Wind farm lease and easement payments are a stable source of income that can make land more valuable.

"The Effects of Wind Turbines on Property Values in Ontario: Does Public Perception Match Empirical Evidence?"

Published in *Canadian Journal of Agricultural Economics*, 2014⁵

Study Design:

- 5,414 rural residential sales
- 1,590 farmland sales

Findings:

- No statistically significant impact on rural residential sales
- No statistically significant impact on farmland sales

"The Windy City: Property Value Impacts of Wind Turbines in an Urban Setting"

Published in *Energy Economics* 2014⁶

Study Design:

- 48,554 single-family, owner-occupied Rhode Island home sales within 5 miles of a turbine site
- 3,254 single-family, owner-occupied Rhode Island home sales within 1 mile of a turbine site

Findings:

- No statistically significant impacts on house prices near turbines
- No statistically significant impacts on house prices with substantial views of turbines

⁴ Hoen, B., Wisser, R., Coppers, P., Thayer, M.A., & Sethi, G. (2009). Wind Energy Facilities and Residential Properties: The Effect of Proximity and View on Sales Prices. *Journal of Real Estate Research*, 33(3), 276-316.

⁵ Vyn, R., & McCullough, R. (2014). The Effects of Wind Turbines on Property Values in Ontario: Does Public Perception Match Empirical Evidence? *Canadian Journal of Agricultural Economics*, 62(3).

⁶ Lang, Opoluch, & Sfinaralakis. (2014). The windy city: Property value impacts of wind turbines in an urban setting. *Energy Economics*, 44(C), 413-421.

⁷ American Wind Energy Association, U.S. Wind Industry Annual Market Report, 2018. Retrieved from: <https://www.owea.org/resources/publications-and-reports/market-reports/2018-u-s-wind-industry-market-reports>.

Wind Energy: Powering local economies



Wind energy projects create family-wage jobs, expand the local tax base, and invest billions of dollars in rural communities.



Wind power creates jobs in all 50 states and around the world.



>500 U.S. factories

across 43 states manufacture wind turbine parts and materials.¹

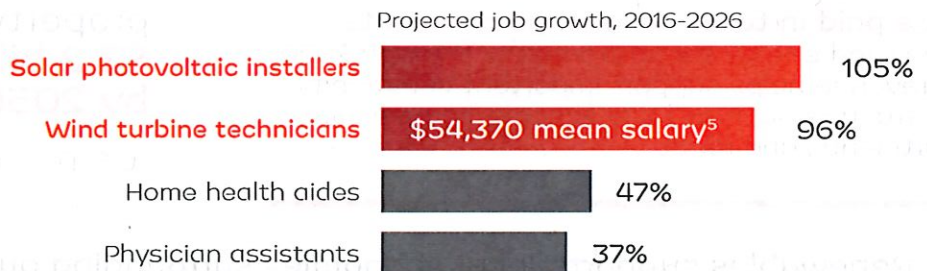
>114,000 workers

in all 50 states are employed by the U.S. wind industry.²

1.15 million workers

employed by the wind energy sector worldwide.³

Creating good jobs in rural communities: Wind turbine technician is the second fastest growing job in the United States.⁵



The U.S. wind industry hires military veterans at a rate 64% higher than the average industry.⁴



1 in every 9 U.S. wind workers is a military veteran.⁴

We are making a difference every single day in helping solve the current energy challenges we face.

It is the same principle as the military—doing something that is **bigger than myself** or even the organization.

–Justin V., U.S. Army and Senior Operations Manager Pioneer Prairie Wind Farm, Prairie Star Wind Farm, and Turtle Creek Wind Farm.

¹American Wind Energy Association, U.S. Wind Industry Annual Market Report, 2018. Retrieved from: <https://www.aweo.org/resources/publications-and-reports/market-reports/2018-u-s-wind-industry-market-reports>.

²Wind Powers Job Growth. American Wind Energy Association, 2019. Retrieved from: <https://www.aweo.org/wind-101/benefits-of-wind/powering-job-growth>

³Renewable Energy & Jobs Annual Review 2018. International Renewable Energy Agency, 2018. Retrieved from <http://ireno.org/publications/2018/May/Renewable-Energy-and-Jobs-Annual-Review-2018>.

⁴U.S. Energy & Employment Report. U.S. Department of Energy, January 2017. Retrieved from <https://www.energy.gov/downloads/2017-us-energy-and-employment-report>.

⁵Ten Fastest Growing Occupations, Projected 2016–2026 U.S. Department of Labor Bureau of Labor Statistics, 2019.

"The wind farm brings a lot of revenue to the local area. Puts a lot of truck drivers to work. Restaurants and stores do very well. **Everybody wins with wind.**"

-Gilbert & Connie M., New York landowners



Wind farms generate millions of dollars for local governments and landowners each year.

\$289 million

paid to U.S. landowners in 2018

in lease payments by wind farm operators.⁷

Wind farm lease and easement payments are a stable source of income that can diversify farming revenue and boost local economies.

\$8 billion

will be paid in taxes to local governments

by the wind energy sector from 2017 through 2020.⁸

This revenue helps support important community infrastructure such as local schools, libraries, fire departments, and roads.

Wind energy deployment increases community revenues.

Local communities will be able to collect additional tax revenue from land lease payments and property taxes, reaching **\$3.2 billion annually by 2050.**⁹

-U.S. Department of Energy, 2015

EDP Renewables supports local economies surrounding our wind farms. Here's a summary of our impact so far:¹⁰



\$346 million paid to local landowners



6,700 full-time equivalent construction jobs and **600** permanent jobs created

The economic part of the wind farm for the county is good. Most of the money goes to the school district.



\$15 billion invested in North America



more than \$270 million raised in local government revenue

The wind farms have helped the school districts tremendously.

-Windle H., County Commissioner Grady County, Oklahoma

⁷ American Wind Energy Association, U.S. Wind Industry Annual Market Report, 2018. Retrieved from: <https://www.oweo.org/resources/publications-and-reports/market-reports/2018-u-s-wind-industry-market-reports>.

⁸ "Economic Development Impacts of Wind Projects. March 2017. Navigant Consulting. Retrieved from <http://aweo.files.cms-plus.com/Economic%20Development%20Impacts%20of%20Wind%20Projects%202017%20FINAL.pdf>.

⁹ "Wind Vision: A New Era for Wind Power in the United States." U.S. Department of Energy. March 2015.

¹⁰ Data last updated April 2019.

Wind Energy:

The safe choice for your family's health

The World Health Organization considers wind power to be one of the **healthiest** forms of energy generation available.¹



"Wind Turbine Noise & Health Study: Summary of Key Findings"

2014 study conducted by the Canadian Government's Health and Statistics divisions²

Study Design:

- Three-part study of 1,238 households
- Sent questionnaires to randomly selected participants living at various distances from wind turbines
- Looked at physical health measures to assess stress levels including hair cortisol, blood pressure, resting heart rate, and sleep quality
- Reviewed more than 4,000 hours of wind turbine sound measurements conducted by Health Canada

Findings:

- No evidence to support a link between wind turbine sounds and self-reported illnesses
- No association found between physical measures of stress and wind turbine sound exposure
- No support of an association between wind turbine sound and self-reported or measured sleep disturbance
- No significant changes in reported quality of life and satisfaction with health
- Sound levels were below rates that could directly impact health according to the World Health Organization

Comparing Common Sound Levels^{3,4}

Sound	Decibel Level
Vacuum Cleaner	75 dB(A)
Normal Conversation	60-70 dB(A)
Noise in a Busy Office	60 dB(A)
Household Refrigerator	55 dB(A)
10 Turbines 1,148 Feet Away	35-45 dB(A)
Quiet Bedroom	35 dB(A)
Background Noise in a Rural Area at Night	20-40 dB(A)

This chart is provided for comparison purposes only. Actual recorded sound levels may vary.

Everyone is surrounded by infrasound every day.

It's emitted by natural sources like the surf, storms, wind itself, our own heartbeat, and respiration.

We also are exposed to it in cars, from ceiling fans, motors, and urban noise.⁵

-Simon Chapman
Professor Emeritus, University of Sydney

¹ World Health Organization. (2017, November 07). Interventions: Power generation. Retrieved from <http://www.who.int/airpollution/ambient/interventions/power-generation/en/>.

² Government of Canada. "Wind Turbine Noise & Health Study: Summary of Key Findings." (2014). Retrieved from <https://www.sustainabledevelopment.ca/wp-content/uploads/2015/07/Phase-VII-Health-Canada-Wind-Turbine-Study-Results-2014.pdf>.

³ Australian National Health and Medical Research Council. (2010). Wind Turbines and Health: A Rapid Review of the Evidence.

⁴ Yale Environmental Health & Safety. (n.d.). Decibel Level Comparison Chart. Retrieved from <https://ehs.yale.edu/noise-hearing-conservation>.

⁵ Jaekel, P. (2017, June 19). Why People Believe Low-Frequency Sound Is Dangerous. The Atlantic. Retrieved from <https://www.theatlantic.com/science/archive/2017/06/wind-turbine-syndrome/530694/>.

"It's a clean fuel source. Wind energy doesn't pollute the air like power plants that rely on combustion of fossil fuels, such as coal or natural gas, which emit particulate matter, nitrogen oxides, and sulfur dioxide—causing human health problems and economic damages."

—U.S. Department of Energy⁶

"Wind Turbine Health Impact Study: Report of Independent Expert Panel"

Prepared for Massachusetts Department of Environmental Protection, 2012⁷

- Turbines as close as 223 feet are well below required levels of infrasound to cause feelings of non-auditory perception, such as bodily vibrations and chest pressure
- There is no evidence of a set of health effects from wind turbine exposure that could be characterized as Wind Turbine Syndrome
- Shadow flicker from turbines does not pose a risk for causing seizures

"Health Effects and Wind Turbines: A Review of the Literature"

Published in *Environmental Health*, 2011⁸

- No peer reviewed scientific journal article demonstrates a causal link between people living near wind turbines, turbine sounds, and physiological health effects
- Turbine infrasound cannot impact health due to the low sound pressure levels and the common presence of infrasound in nature
- Shadow flicker typically occurs for less than 30 hours a year
- Wind turbines do not spin nearly fast enough to trigger strobing-light induced seizures

NOCEBO EFFECT: occurs when expectations of poor health outcomes result in negative health symptoms. It is the flipside of the placebo effect.⁹

Research into the perceived health impacts of wind energy has found that the "nocebo effect" best explains why people report symptoms despite the lack of scientific evidence.

- **25 scientific reviews** since 2003 have found that there is **very poor evidence** that wind turbines are the direct cause of any disease.¹⁰
- Wind farms targeted by opposition groups attract more complaints. In Australia, **90% of all complaints came after wind farm opponents spread misinformation** about the supposed health impacts of wind farms, **despite numerous wind farms operating in Australia for many years.**⁹
- In a double-blind study, subjects shown Internet content about wind farm health risks then **reported symptoms matching the Internet content when exposed to sham infrasound.**¹⁰

Health Benefits of Wind Energy

When wind energy increases, harmful pollution decreases.



Wind energy provides power without releasing any toxic chemicals into the air or water.⁶



**Heart Disease
Chronic Asthma
Stroke
Cancer**

When wind power decreases air pollution, the rates of many illnesses decrease.¹¹



**\$9.4
billion**

avoided by wind power in public health impacts in 2018.¹²

⁶ U.S. Department of Energy. Advantages and Challenges of Wind Energy. Retrieved from <https://www.energy.gov/eere/wind/advantages-and-challenges-wind-energy>.

⁷ Wind turbine health impact study: Report of independent expert panel. (2012). Boston, MA: Commonwealth of Massachusetts, Dept. of Environmental Protection.

⁸ Knopper, L. D., & Ollson, C. A. (2011). Health effects and wind turbines: A review of the literature. *Environmental Health*, 10(1)

⁹ Chapman, S. (2017, November 29). How to catch 'wind turbine syndrome': By hearing about it and then worrying. *The Guardian*. Retrieved from <https://www.theguardian.com/commentisfree/2017/nov/29/how-to-catch-wind-turbine-syndrome-by-hearing-about-it-and-then-worrying>.

¹⁰ Crichton, F., Chapman, S., Cundy, T., & Patrie, K. J. (2014). The Link between Health Complaints and Wind Turbines: Support for the Nocebo Expectations Hypothesis. *Frontiers in Public Health*, 2. doi:10.3389/fpubh.2014.00220.

¹¹ World Health Organization. (n.d). Ambient (outdoor) air quality and health. Retrieved from [http://www.who.int/en/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](http://www.who.int/en/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health).

¹² American Wind Energy Association, U.S. Wind Industry Annual Market Report, 2018. Retrieved from: <https://www.awea.org/resources/publications-and-reports/market-reports/2018-u-s-wind-industry-market-reports>.

Environment & Wildlife

"Harnessing **power from the wind** is one of the **cleanest and most sustainable** ways to generate electricity as it produces **no toxic pollution** or global warming emissions."

- Union of Concerned Scientists¹

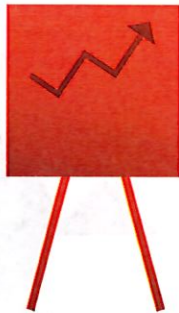
Wind Power Saves WATER

Wind-generated electricity saved **101 billion gallons** of water in 2018, the equivalent of

152,000

Olympic-sized swimming pools.²

Water savings in the U.S. power sector is projected to **increase by 23%** by 2050 as wind energy capacity grows.³



Water Consumption by Fuel Source



Traditional Fuels

1,000 gallons⁴
per MW



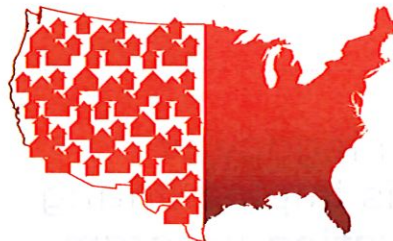
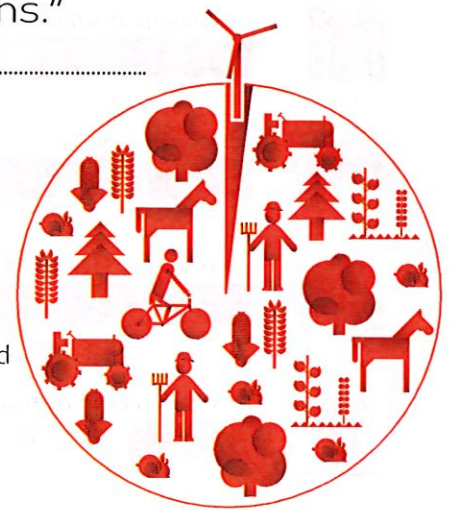
Clean Power

0 gallons
per MW

>98%

of land used for wind farms is untouched by turbines and other infrastructure.

The remainder of the land can be used for productive purposes, including **livestock grazing, agriculture, wildlife habitat, highways, and hiking trails.**⁵



Wind can power **half of all U.S. homes** using an area of land smaller than Anchorage, Alaska.⁹



Wind Power Reduces

POLLUTION

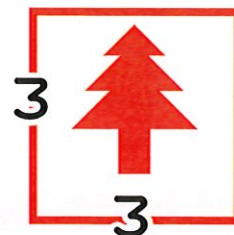
Fossil fuel power plants emit NO_x and SO₂ pollution, causing smog and acid rain.

In 2018, wind power abated more than 644 million pounds of air pollution.^{6,7}



Carbon pollution avoided by wind power in the U.S. is the equivalent of **planting a forest the size of Minnesota.**²

3 MW = 3 MI²



A 3 MW turbine avoids the same amount of carbon pollution as planting **3 square miles of forest.**⁸

Wind energy is **far less harmful to wildlife** than the energy sources it traditionally displaces, and the industry is **proactively addressing** the modest impacts on wildlife it does have.⁹ The **National Audubon Society strongly supports properly sited wind power** as a renewable energy source that helps **reduce the threats posed to birds.**¹⁰



Causes of Bird Mortality



Cats Loss et al. 2013

1.4B - 3.7B



Buildings & Windows Loss et al. 2014a

365 - 988M



Vehicles/Roads Loss et al. 2014b

89 - 340M



Pesticides Mineau 2004, 2005

17 - 91M



Communication Towers Langcore et al. 2012

6.6M

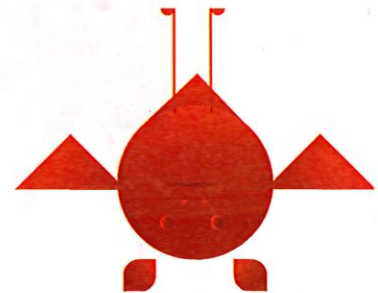


Wind Energy Loss et al. 2014a

100K - 320K

Bird fatalities at wind energy facilities represent a **very small fraction of total annual human-caused bird mortality**, approximately 2 to 4 orders of magnitude **lower** than other human sources of bird mortality.¹¹

The wind industry has a legacy of **protecting wildlife** and is implementing a voluntary bat conservation program designed to **reduce impacts to bats** by as much as **30%.**¹²



⁹Union of Concerned Scientists. 2017. Environmental Impacts of Wind Power. <http://www.ucsusa.org/clean-energy/renewable-energy/environmental-impacts-wind-power#.WYsp5FXfrct>.

¹⁰American Wind Energy Association. 2018. U.S. Wind Energy Annual Market Report, Year Ending 2018. www.awea.org/resources/publications-and-reports/market-reports/2018-u-s-wind-industry-market-reports.

¹¹U.S. Department of Energy. 2015. Wind Vision: A New Era for Wind Power in the United States. <https://energy.gov/eere/wind/maps/wind-vision>.

¹²Union of Concerned Scientists. 2011. Freshwater Use by U.S. Power Plants. http://www.ucsusa.org/clean_energy/our-energy-choices/energy-and-water-use/freshwater-use-by-us-power-plants.html#.WbhlZ7Lfppg.

¹³Denholm, P., M. Hand, M. Jackson, and S. Ong. 2009. Land-use requirements of modern wind power plants in the United States. Golden, CO: National Renewable Energy Laboratory.

¹⁴Daniel T. Kaffine, Brannin J. McBees, and Jozef Lieskovsky. 2010. Empirical estimates of emissions avoided from wind power generation. United States Association for Energy Economics <http://dialogue.usaee.org/index.php/volume-19-number-1-2011/72-empirical-estimates-of-emissions-avoided-from-wind-power-generation>.

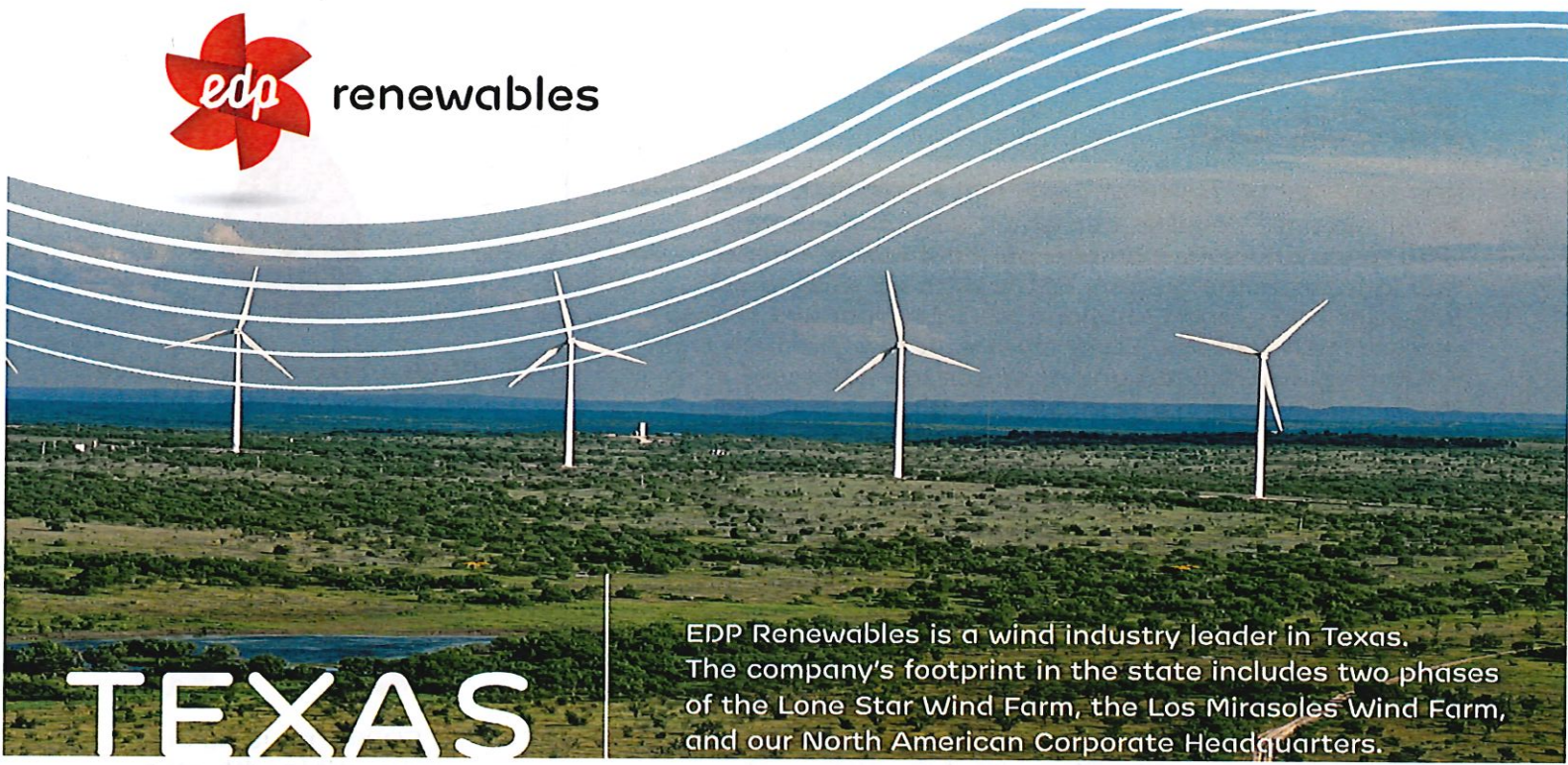
¹⁵NREL. 2008. 20 % Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply.

¹⁶American Wind Energy Association. 2017. Wildlife. <https://www.awea.org/wildlife>.

¹⁷National Audubon Society. 2017. Audubon's Position on Wind Power. <http://www.audubon.org/content/audubons-position-wind-power>.





¹⁸American Wind Wildlife Institute (AWWI). 2017. Wind turbine interactions with wildlife and their habitats: a summary of research results and priority questions. <https://awwi.org/resources/summary-of-wind-wildlife-interactions-2/>.

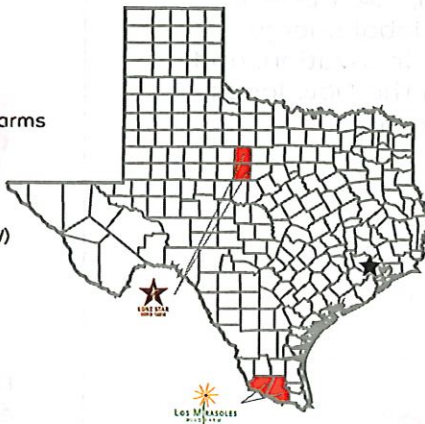
¹⁹National Geographic. 2015. Wind Industry Plans Serious Changes to Protect Bats. news.nationalgeographic.com/energy/2015/09/150902-wind-industry-feathering-to-help-protect-bats/.



TEXAS

EDP Renewables is a wind industry leader in Texas. The company's footprint in the state includes two phases of the Lone Star Wind Farm, the Los Mirasoles Wind Farm, and our North American Corporate Headquarters.

-  Houston Corporate Headquarters
-  Counties with Operational Wind Farms
-  Lone Star I Wind Farm (200 MW)
Lone Star II Wind Farm (200 MW)
-  Los Mirasoles Wind Farm (250 MW)



650 MW in Texas



EDPR's Texas wind farms produce enough clean electricity to power more than **149,000** Texas homes.¹

Economic Benefits



Our Texas projects represent a capital investment of approximately **\$1.3 billion**.²



Approximately **\$41 million** in cumulative payments to local governments through 2018.



More than **\$29.5 million** paid to local landowners through 2018.



Supported **804** jobs during project construction and created **353** permanent jobs in Texas.



\$1.3 billion spent within the state of Texas through 2018.³



Median annual salary for a wind technician is **\$54,370**.⁴

About Us

EDP Renewables North America LLC ("EDPR NA") and its subsidiaries develop, construct, own, and operate wind farms and solar parks throughout North America. Headquartered in Houston, Texas, with 48 wind farms, five solar parks, and 13 regional and development offices across North America, EDPR NA has developed more than 6,700 megawatts (MW) and operates more than 6,100 MW of renewable energy projects. With approximately 650 employees, EDPR NA's highly qualified team has a proven capacity to execute projects across the continent.

EDPR NA is owned by EDP Renováveis, S.A. ("EDP Renewables" or "EDPR"), a global leader in the renewable energy sector and the world's fourth-largest wind energy producer. With a sound development pipeline, first-class assets, and market-leading operating capacity, EDPR has undergone exceptional development in recent years and is currently present in 14 markets (Belgium, Brazil, Canada, Colombia, France, Greece, Italy, Mexico, Poland, Portugal, Romania, Spain, the United Kingdom, and the United States). Energias de Portugal, S.A. ("EDP"), the principal shareholder of EDPR, is a global energy company and a leader in value creation, innovation, and sustainability. EDP has been included in the Dow Jones Sustainability Index for 12 consecutive years.

For more information, visit

www.edpr.com or www.edprnorthamerica.com

Wind Power In Texas⁶

Total Installed Wind Capacity: **24,895 MW**

State Ranking for Installed Capacity: **1st**

Wind Projects Online: **143**

Number of Wind Turbines: **13,358**

Percentage of In-State Energy Production: **15.9%**

Equivalent U.S. Homes Powered: **7.2 Million**

Wind Industry Employment: **25,001 to 26,000**

Wind Manufacturing Facilities: **46**

Total Project Investment: **\$46.5 Billion**

Annual Land Lease Payments: **>\$70 Million**

¹Power generation calculated using a 35% capacity factor for wind and 25% capacity factor for solar. Household consumption based on 2017 EIA Household Data monthly average consumption by state.

²Assumes the average cost of an installed wind farm is \$16 million/MW for projects built after 2017, \$17 million/MW for projects built between 2012 and 2017, and \$22 million/MW for projects built before 2012, based on U.S. DOE 2015 Wind Technologies Market Report <https://www.energy.gov/sites/prod/files/2016/08/13/2015-Wind-Technologies-Market-Report-08162016.pdf> and U.S. DOE 2017 Wind Technologies Market Report https://emp.lbl.gov/sites/default/files/2017_wind_technologies_market_report.pdf.

³Includes vendor spending, property taxes, landowner payments, and wages from site jobs. These numbers are presented for example purposes only, and actual payments may vary.

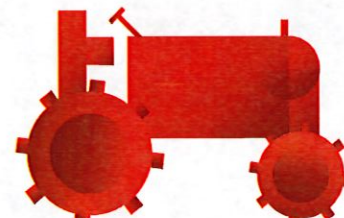
⁴Based on 2018 wages from Bureau of Labor Statistics <https://www.bls.gov/ooh/installation-maintenance-and-repair/wind-turbine-technicians.htm>.

⁵Assumes 0.58 gallons of water consumed per kWh of conventional electricity from "Water Consumption Factors for Electricity Generation in the United States" Lea, Hon, & Elgowainy, 2016. <https://greet.es.onlgov/publication-wcf-2016>.

⁶Statistics provided by AWEA State Wind Energy Fact Sheet: <http://www.awea.org/resources/statefactsheets.aspx>



EDPR's Texas projects save more than **1.1 billion** gallons of water each year.⁵



EDPR's projects are compatible with other land uses.



MADE IN THE USA

The vast majority of wind farm equipment is manufactured in the United States.



EDPR's clean energy projects provide energy security and help diversify supply.



renewables

EDP Renewables

Corporate Headquarters

808 Travis Street, Suite 700 • Houston, TX 77002

P: 713-265-0350 • F: 713-265-0365

1. On January 31, 2019 the Iowa Policy Project released a report on wind turbines and health:
<http://www.iowapolicyproject.org/2019docs/190131-Wind-Health.pdf>
 - “Given the evidence and confounding factors, and the well-documented negative health and environmental impacts of power produced with fossil fuels, we conclude that development of electricity from wind is a benefit to the environment. **We have not seen evidence that wind turbines pose a threat to neighbors. We conclude that wind energy should result in a net positive benefit to human health.**”
 - “There is no authoritative evidence that sound from wind turbines represents a risk to human health among neighboring residents.”
 - “To date, no peer reviewed scientific journal articles demonstrate a causal link between people living in proximity to modern wind turbines, the noise (audible, low frequency noise, or infrasound) they emit and resulting physiological health effects ...”
2. “The Potential Health Impact of Wind Turbines,” report by Ontario’s Chief Medical Officer of Health (2010):
http://www.health.gov.on.ca/en/common/ministry/publications/reports/wind_turbine/wind_turbine.pdf
 - No scientific evidence to date indicates a direct causal link between wind turbine noise and adverse health effects
 - No scientific evidence indicates that low frequency sound created by wind turbines causes adverse health effects
 - No scientific evidence indicates that vibration from low frequency sound from wind turbines can cause adverse health effects
 - “Low frequency sound and infrasound are everywhere in the environment” and are generated by natural and artificial sources, such as rivers, the wind itself, traffic, and ventilation systems.
 - Low frequency sound from wind turbines typically cannot be distinguished from environmental background noise from the wind itself
3. “Before-after field study of effects of wind turbine noise on polysomnographic sleep parameters” published in *Noise & Health* (2016):
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5187661/>
 - Noise measurements combined with advanced sleep recording methodology across 640 hours on 32 nights found no major changes in the sleep of study participants who had new utility-scale wind turbines in their community
 - **The average inside noise levels did not significantly change after turbines began operating**
 - No significant changes in ambient sound pressure levels (decibels) in area surrounding wind farm

4. "The Effects of Infrasound and Negative Expectations to Adverse Pathological Symptoms from Wind Farms" published in the *Journal of Low Frequency Noise, Vibration, and Active Control* (2016)

- Academic studies conclude that there is no direct pathological link between wind turbine infrasound and health issues
- **Academic research concludes that "infrasound is everywhere in nature at a level similar to or greater than that produced by wind farms"**
- The perceived association is a manifestation of the "nocebo effect:" "A negative reaction from exposure to an innocuous substance do to expectations of harm"
- **Participants who believed infrasound was harmful were much more likely to feel infrasound symptoms when exposed to infrasound by the researchers, while those who believed it was harmless remained unaffected**

5. "Health Effects and Wind Turbines: A Review of the Literature" published in *Environmental Health* (2011):

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3179699/>

- "No peer reviewed scientific journal article demonstrates a causal link between people living in proximity to wind turbines, the noise they emit, and resulting physiological health effects."
- "Given the low sound pressure levels of infrasound emitted from wind turbines and the ubiquitous nature of these sounds, the hypothesis that infrasound is a causative agent of health effects does not appear to be supported"
- "Peer-reviewed and scientifically defensible studies suggest that annoyances and health effects are more strongly related to subjective factors like visual impact and attitude to wind turbines rather than noise itself (both audible and inaudible).

6. "The climate and air-quality benefits of wind and solar power in the United States" study funded by the Department of Energy published in *Nature Energy* in 2017

https://www.nature.com/articles/nenergy2017134.epdf?author_access_token=uYr0473RE7N8qJCivi6eKNRgN0jAjWel9jnR3ZoTv0O9NQQavv-igIBpgJVQy91sl6ZpWXil0zPIZ8H2tvWaSoZi9rrMjTx9l2FLlqAykV00GsKxOpkwjZM1RpGmND_BuVZCRc2dDL42qJnMAq4DGw%3D%3D

- "Wind and solar power can feasibly produce a large share of domestic generation and in doing so provide major air-quality and climate benefits."
- **Nationally, wind power was responsible for an central average of 7,700 avoided mortalities (estimated range of 4,000-12,000) between 2007 and 2015 that would have otherwise occurred from air pollution generated by traditional combustion energies**
- 1,100 avoided mortalities in 2015 alone
- **From 2007-2015, wind power generated approximately \$58 billion in air quality and public health benefits, and \$29 billion in in climate benefits (p 4)**

7. World Health Organization on the health impacts of ambient air pollution

<http://www.who.int/airpollution/ambient/health-impacts/en/>

- Renewable, combustion-free power sources such as wind power reduce air pollution. When air pollution is reduced, diseases caused by air pollution such as stroke, heart disease, lung cancer, chronic and acute respiratory diseases, and asthma are reduced.
8. Department of Energy on wind power sound/infrasound:
- <https://www.energy.gov/eere/wind/frequently-asked-questions-about-wind-energy#WindTurbineSound>
- **“Global peer-reviewed scientific data and independent studies consistently concluded that sound from wind plants has no direct impact on physical human health.”**
 - The sound level is not sufficient to cause hearing impairment or negative health impacts
 - **Low frequency sound and infrasound are well below the pressure sound levels for health effects to occur.**
9. “Wind Turbine Sound and Health Effects: An Expert Panel Review” prepared for/funded by AWEA
<https://www.transalta.com/sites/default/files/Wind%20turbine%20sound%20and%20health%20effects%20report.pdf>
- **“There is nothing unique about the sounds and vibrations emitted by wind turbines.”**
 - There is no evidence of wind turbine sounds, audible and subaudible, posing any risk to human health
 - **“‘Wind Turbine Syndrome’ is based on misrepresentation of physiologic data and that features of the so-called syndrome are merely a subset of annoyance reactions.”**
 - **“Some people may be annoyed at the presence of sound from wind turbines. Annoyance is not a pathological entity.”**
10. “Wind Turbine Noise and Health Study” conducted by Canadian government’s Health Canada department, 2014
- <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/noise/wind-turbine-noise/wind-turbine-noise-health-study-summary-results.html>
- 3-part study consisting of in-person questionnaire, physical health measures, and >4000 hours of wind turbine noise measurements
 - **“No evidence was found to support a link between exposure to wind turbine noise and any of the self-reported illnesses (such as dizziness, tinnitus, migraines) and chronic conditions (such as heart disease, high blood pressure, diabetes).”**
 - **“No association was found between the multiple measures of stress (such as hair cortisol, blood pressure, heart rate, self-reported stress) and exposure to wind turbine noise.”**
 - No supported association between wind turbine sound and sleep quality, both self-reported and measured
 - **“No association was found with any significant changes in reported quality of life, or with overall quality of life and satisfaction with health.”**

