Wind energy helps our nation

Clean, reliable and affordable wind energy

For nations and communities to thrive, we must have an affordable, reliable, clean supply of energy. NextEra Energy Resources, LLC, is helping to address this issue as the world’s largest operator of renewable energy from the wind and sun. We believe wind and other clean energy sources can help reduce our use of fossil fuels while at the same time empowering a new era of economic growth.

Wind energy is clean, relying solely on the wind to generate electricity.

Wind energy provides diversified income to farmers and ranchers, enabling them to continue using their land as they always have to help feed the world. With wind energy, they’re also helping power North America with clean, renewable electricity.

Wind energy provides much-needed income to rural communities – to schools, libraries and other public services, benefiting the entire community.

Clean energy from the wind is homegrown. It doesn’t get much more homegrown than electricity generated in your own community to benefit your own community.

Leading the wind industry

Commercial wind generation has existed in the United States for more than 30 years. NextEra Energy Resources entered the wind generation business in 1989 with the acquisition of several existing wind projects in Southern California. In 1998, the company built its first wind project in Oregon. The next 10 years were marked by significant growth, including the development or acquisition of wind projects in Canada.

Today, NextEra Energy Resources operates approximately 120 wind projects.
**Why wind?**

The benefits of NextEra Energy Resources’ focus on wind are considerable. Wind energy:

- Creates no greenhouse gases or other air pollutants;
- Uses no water resources to generate electricity;
- Allows landowners to use their land as before;
- Provides a renewable fuel supply;
- Creates no waste byproducts for disposal; and
- Results in no hazardous cleanup at the end of a project’s productive life.

**Repowering**

NextEra Energy Resources is working to upgrade the performance of older turbine technology at select sites, adding longer blades and updated gear boxes to improve their operation and generate more electricity for customers.

Wind turbine technology is more efficient than ever before. At Golden Hills North Wind Energy Center, we replaced 283 older turbines with just 20 new, high-efficiency ones.

**Partnerships** are forged with landowners

**Helping their communities**

NextEra Energy Resources’ wind generation projects are built on land owned by other people. We don’t buy the land where our turbines sit; we enter into lease agreements with landowners who volunteer to participate in a project.

We want landowners to continue using their land as they always have – for farming, ranching, logging, mining, hunting and recreation – and we work closely with landowners in positioning turbines on their property.

Landowners who host wind turbines on their land are making a commitment to their families, their communities and the future. Our commitment is to be a caring co-steward of the land with our hosts to help preserve and maintain it for future generations.

**Vital landowner relationships**

Most landowners at our wind projects are individuals or families. Some are businesses or government agencies. All are committed to preserving the quality and value of their land and continuing to use the land as they always have. Each turbine and access road takes about an acre of land out of production.

In an area we think would support a wind project, our relationship with landowners begins with a call or visit from a land services representative, who will introduce the landowner to the company and the idea of a wind project.

Often, landowners contact us, offering their land for a wind project.

If an area is promising after our initial assessment, NextEra Energy Resources will enter into a land use option agreement with landowners, which may provide additional time for further evaluation of the property for the possibility of wind development. It can be several years from our first conversation to the point that the company is ready to begin construction on a wind project. Before work begins, landowners sign a contract.

Landowners receive easement payments for each wind turbine on their land, but landowners are not the only beneficiaries. Their decision to host wind turbines brings additional jobs to the area, increased tax revenue, the company’s support of local community activities and our purchases of local goods and services.

Easement payments are based on the number of wind turbines on their land. The payments are established in a contract between the company and the landowner. Payments per turbine vary from site to site, based on the quality of the wind resource, proximity to existing transmission lines and current market conditions in the area for electricity.

NextEra Energy Resources pays all project-related taxes required by state and local governments. The amount of tax payments depends upon taxation laws in the host state or county. The company pays any taxes assessed against the wind turbines on the landowner’s property.
Environmental Stewardship

» NextEra Energy Resources works closely with federal, state and local environmental organizations.
» Environmental assessments determine suitability of prospective wind sites.
» Land and wildlife are respected and protected during construction and operations.
» Land is restored after construction.

Developing a wind project

Siting a wind project is challenging work – finding the right combination of wind conditions, power transmission lines and land. While our land agents work with landowners to familiarize them with the process and what to expect, our developers are busy on a wide range of issues related to developing a wind site, including:

» Meeting with and providing information to local officials on project progress;
» Conducting environmental assessments;
» Completing historical and archaeological reviews;
» Arranging to connect to the local power grid;
» Securing customers for the site’s electricity;
» Attending public meetings to gain approval for building;
» Obtaining approval from the Federal Aviation Administration; and
» Procuring equipment.
Construction is carefully planned

NextEra Energy Resources’ construction team has built dozens of wind energy projects around the country, including one of the world’s largest wind farms in Texas. When all approvals are in place and landowners have signed their contracts, construction can begin. Our construction managers and engineers oversee and are responsible for all work and all contractors at a construction site. They, and often their families, live in the community during construction.

Approximately 200 contractors can be involved in a typical wind construction project. Our goal is to have our general contractor hire as many workers from the area as possible. We are looking for heavy equipment operators, electricians, laborers, security and others.

Construction typically takes between six and nine months. NextEra Energy Resources has a carefully designed plan for turbine placement, but works closely with landowners to ensure the turbine location is compatible with other land uses. Our construction manager and staff stay in close contact not only with landowners, but also local government. This keeps interested parties apprised of progress and ensures adherence to all local building code requirements.

» The first step in construction is to put in high-quality gravel roads to accommodate our heavy equipment.
» Underground electrical cabling is then laid beside the access roads.
» Wind turbine foundations are dug and poured.
» Work will begin on a substation, and an operations and maintenance building.
» Turbine equipment arrives.
» Cranes begin erecting the turbines.
» The completed turbines are tested and commissioned.
» When construction is complete, the land is reclaimed and deep tilled to return it to crop production or reseeded with native grasses.

We are committed to leaving the land in as good or better condition than we found it. When construction is complete and the plant has begun commercial operation, the site is turned over to our operations staff who will operate and maintain the wind plant.
Wind team focuses on operational excellence

Attention to safety and training

In 2008, NextEra Energy Resources’ Gray County Wind Energy Center in Montezuma, Kansas, became the first wind project in the nation to earn the Occupational Safety and Health Administration’s top safety award, the Voluntary Protection Program Star Status.

Gray County was just the first. Our operations team is engaged in an ongoing project as part of its overall safety program to achieve Star Status for our wind projects.

Right behind safety is training. NextEra Energy Resources’ wind technician training includes online learning, classroom training and field training. Our company also has working partnerships with two colleges in Texas to provide on-site training for our technicians. Additionally, through courses taught at the colleges and supported through our partnerships, the colleges serve as pipelines for future wind technicians. Support for other technical colleges is also provided.

Each wind turbine in the fleet is controlled by a computer that can automatically turn the blades into the prevailing wind, adjust the angle of the blades to compensate for changing wind speeds, and shut a turbine down or restart it again. The computer system can be remotely controlled by operators anywhere in the country.

Our state-of-the-art operations command center is one of a few in the U.S. wind industry and has a major role in remotely managing wind turbine operation. The Renewable Operations Control Center maintains continuous oversight of wind turbines at our sites. When our site personnel have gone home for the evening, the command center staff is monitoring their wind turbines and can run diagnostic tests on turbines or adjust operations as needed. The center collects data that enables NextEra Energy Resources to schedule predictive maintenance to help ensure efficient operation.

How a wind turbine works

1. A computer turns the nacelle (turbine outer housing) and the rotor (which consists of three blades and a hub) to face into the wind. The wind causes the turbine blades to turn a generator to produce electricity. For safety purposes, the turbine shuts down automatically if the wind speed exceeds 55 miles per hour.

2. The electricity travels down the inside of the tower through electrical cables to a transformer at the base of the wind tower.

3. From the transformer, the electricity flows through an underground collection cable to an on-site substation.

4. From the substation, overhead electrical cables take the electricity to an off-site substation and into high-voltage transmission lines.

5. The electricity goes from the high-voltage transmission lines into local distribution lines.

6. The electricity is then distributed to homes, schools, businesses and other consumers.
NextEra Energy Resources
Wind Portfolio
(As of 12/31/17)

Highlights of wind operations
» Approximately 120 wind projects in 21 states and Canada with more than 13,000 megawatts of wind generation in operation.
» More than 10,000 wind turbines

As of 12/31/17

Horse Hollow Wind Energy Center, Texas