NEXTera ENERGY RESOURCES

# Our **Energy Storage** Business

# A **Promising Future** For Energy Storage

## Technology offers flexibility, value in today's energy market

Meeting today's energy challenges is complicated. The power infrastructure must be able to balance supply and demand instantaneously while taking into account the impacts of intermittent renewable energy. Consumers are also looking for energy services and products that provide flexibility and value in the areas of renewable energy, grid reliability and peaking power.

NextEra Energy Resources is helping meet these needs through battery energy storage technology, which is providing a promising way to store electrical energy so it can be available to meet demand whenever needed. While there are many energy storage technologies, NextEra Energy Resources has focused on the use of batteries as costs have declined, but is continuing to evaluate other storage technologies.

> **"(Our) company expects to invest more than $1 billion in storage in 2021, which would be the largest-ever annual battery storage investment by any power company in history."**
>
> *Jim Robo, Chairman and CEO, NextEra Energy, April 22, 2020*

## Energy storage delivers advantages to the power grid and our customers

What makes energy storage attractive is that it allows energy to be delivered instantly, in the required amount. By doing this, energy storage provides many advantages, such as improving the operation of the electrical grid, integrating renewable resources and helping investment decisions.

- **Grid enhancement.** Energy storage can balance load on the power system grid by moving energy when demands are low to times when demands are high. The technology also allows for a seamless switch between power sources and protects equipment by controlling voltage and frequency.
- **Renewable resources.** Energy storage fills in the gaps resulting from intermittent resources like wind and solar generation. That means operators can more easily bring on and off renewable energy, reducing the need for load balancing services and rapid generation ramping.
- **Electrical system investments.** By reducing the load on congested transmission and distribution systems, energy storage may defer expensive upgrades. In some cases, storage may also reduce new investment in conventional resources, such as adding generating plants to meet systemwide peak load.

In 2018, NextEra Energy Resources' 20-megawatt (MW) Pinal Central Solar Energy Center in Arizona became the company's first project to pair solar energy with an on-site, state-of-the-art 10-MW battery storage system (shown in cover photo, lower right, February 2020). More than 50% of the company's new solar projects in 2019 also included a storage component. Renewable energy projects, coupled with battery storage, provide power to customers long after the sun goes down and demand for electricity goes up.

NextEra Energy Resources employees at the 16.2-MW Casco Bay Energy Storage Facility in Maine (April 2017). The company is developing additional energy storage facilities across North America.

## Projects require little land, provide many benefits

Energy storage projects do not require a large area for development, are scalable in size and can be located in many places. NextEra Energy Resources generally seeks to site a project as close as possible to existing electrical transmission or distribution infrastructure and often, close to an existing renewable project.

Other benefits of energy storage include no greenhouse gases or other air pollutants, no use of water to generate electricity, and a renewable supply of energy.

## Interest in energy storage is growing

The growing interest in energy storage is being driven by a number of factors, including:

- Reductions in technology costs.
- The rapid development of intermittent renewable energy resources.
- The evaluation of new policy initiatives by states.
- Regulatory changes.

For example, the Federal Energy Regulatory Commission has mandated policy changes in the frequency regulation market that have helped spur the use of energy storage for this purpose. Certain markets are now encouraging utilities to use energy storage to manage the intermittent energy that flows into the grid and to supply the grid with energy during times of peak use.

## Costs are expected to decline

While emerging technology costs tend to be higher and therefore less competitive during the early evolution phase, technological efficiencies, improved manufacturing productivity and economies of scale help lower cost over time. As batteries gain wider industry adoption, prices are expected to decrease further.

## Energy storage is safe, reliable

Safety is always a top priority in NextEra Energy Resources' operations, and energy storage systems are no exception.

Our energy storage systems are safe and reliable. Overall, energy storage has been a part of the U.S. electric system since the 1930s. Today, it makes up approximately 2% of the nation's generation capacity, according to the Energy Storage Association. The safety record of the industry is similar to or better than other forms of power generation or distribution.

## NextEra Energy Resources is experienced in energy storage

Our team of specialists has spent years researching energy storage technologies, applications and use cases, leading to two demonstration projects in 2012 and 2013.

Today, NextEra Energy Resources has more than 145 MW of operational energy storage, including the Lee DeKalb Energy Storage Facility in Illinois and the Blue Summit Energy Storage Facility in Texas. These facilities are being used for frequency regulation. Traditionally, fossil and hydroelectric power plants have been used for frequency regulation. Now, batteries can also accomplish this task more efficiently.

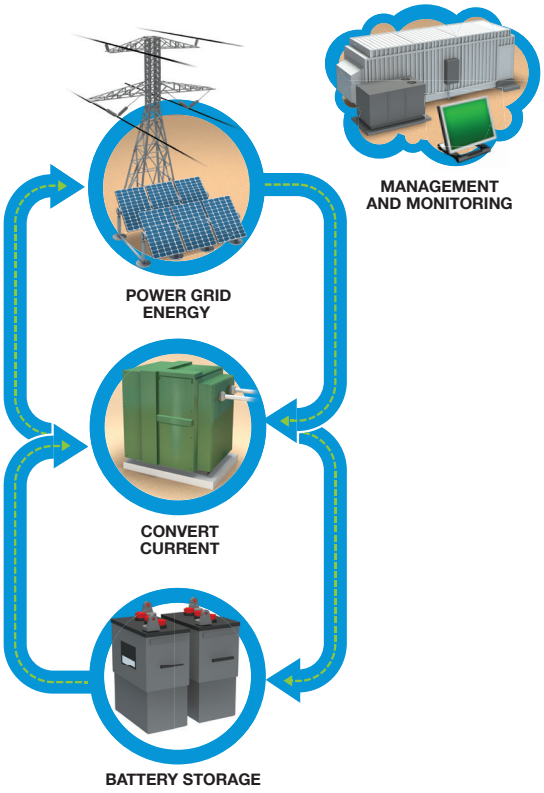
In addition to the growth of operational facilities, the company has a robust pipeline of development projects across the U.S. and Canada.

Batteries are placed into removable racks similar to a computer server. There are also monitoring, control and power conversion systems, as well as cooling and fire suppression systems.

NextEra Energy Resources' Minuteman Energy Storage Facility in Massachusetts went into service in 2019. It provides 5 MW of energy storage.

## How energy storage systems work

- A battery management system monitors the individual cells and controls the voltage, temperature and current for safe, reliable transfer of energy. The system automatically shuts off if the batteries are operating outside of predefined parameters.
- A computerized monitoring system provides up-to-date weather forecasts, power prices, historical electrical use, the amount of charge remaining in the batteries and when to use the energy storage system.
- Energy from the power grid or from renewable energy sources is delivered via a bidirectional inverter, which converts the energy from alternating current (AC) into direct current (DC). Today's batteries can only store DC. This energy goes into an array of batteries that is typically housed within a battery container or a building structure.
- When the energy is needed on the power system, the inverters are then used again, but this time to convert the DC from the batteries into AC. Once the power has been transformed, it is stepped up in voltage and subsequently sent to an on-site substation or directly to a distribution or transmission line.
- The electricity is then distributed to homes, schools, businesses and other consumers.




## NextEra Energy Resources has a proven reputation for excellence

As the world's largest generator of renewable energy from the wind and the sun, NextEra Energy Resources has earned a reputation for excellence. Our scale, size and scope of services allow us to offer innovative energy solutions to customers, and energy storage is a natural extension of our development business.

By working with NextEra Energy Resources, customers can realize the monetary benefits of energy storage while mitigating technology complexity and vendor risk. With our significant purchasing power, we can buy energy storage equipment at the lowest possible costs. With our best-in-class development skills, we can also build customized storage solutions to meet customers' unique requirements.

Energy storage has the potential to be a game changer for the energy industry, and NextEra Energy Resources is a leader in the market.

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