WIND

Repowering

Wind turbines have an operating lifespan of approximately 20–30 years. Throughout operations, EDP Renewables North America (EDPR NA) continuously monitors turbine performance, conducts maintenance, and identifies opportunities for improvement.

As turbines age, EDPR NA may consider replacing major components or rebuilding the turbine completely anew before a turbine reaches the end of its original operational life span. This process is called "repowering."

Why repower?

Like any technology, wind power technology is constantly improving. With age, older technologies can become more expensive or challenging to repair. Repowering allows EDPR NA to harness technological advancements that were unavailable when the site was initially developed; **repowering increases project efficiency and maximizes power generation** in some of the nation's windiest locations—all while working with the same landowners and using existing infrastructure.

Types of repowering

Refurbishment

- Replace key parts within the nacelle
- Use original towers and foundations
- Keep existing turbine locations and infrastructure
- Turbine size does not change

Partial repower

- Replace blades and nacelles
- Use original towers and foundations
- Keep existing turbine locations and infrastructure
- Increases turbine size

Full repower

- Remove all existing turbines
- Install new turbines in new locations
- Decrease amount of turbines and increase turbine size

HOW DOES A WIND TURBINE WORK?

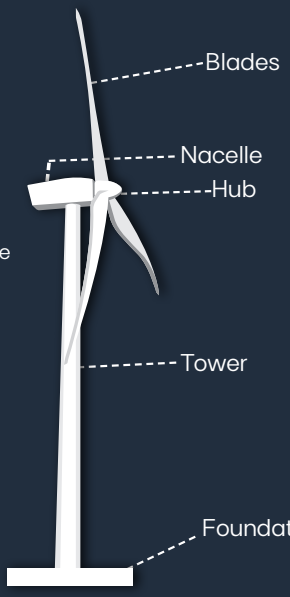
Modern wind turbines are sophisticated, high-tech machines designed to harness the kinetic wind energy and convert it into electricity. Electricity must be produced at just the right frequency and voltage to be compatible with the utility grid.

Anatomy of a wind turbine:

Blades
A turbine's blades capture wind and rotate an internal shaft connected to a gearbox spinning a generator to produce electricity.

Tower
A tubular steel tower supports a hub with three attached blades and a nacelle, which houses the shaft, gearbox, generator, and controls.

Pitch
Wind measurements are collected to automatically rotate the turbine to face the strongest wind and angle, or "pitch," its blades to optimize the energy captured.



“Small, rural towns need revenue. The income from these projects provides benefit to everyone that lives in our town.

I think renewable energy is a ticket to a stable financial future for rural communities.”

Town Supervisor | Jericho Rise Wind Farm, NY
Bill W.

Harnessing America’s natural resources helps build a resilient and affordable American energy portfolio.

Wind power remains one of the most affordable forms of energy generation–cheaper than all traditional forms.[1] By keeping renewables on the grid, consumers benefit from a free energy source–the wind–which provides power at a stable cost.

Repowers are evidence that EDPR NA’s project landowners and communities want to continue their relationship with EDPR NA for an additional 20–30 years.

Throughout the lifespan of a wind farm, the project will pay millions of dollars to the local tax base, landowners, and businesses. Extending the lifespan of wind farms extends support to the project community.

What happens to the old blades and other repower waste?

80–94% of a wind turbine’s mass is made of easily recycled materials like steel, iron, aluminum, and copper. The rest (blades, nacelle cover, etc.), is mostly fiberglass and carbon fiber. These components can be recycled, though the processes are more complicated. Recycling technologies are increasingly improving.

Globally, EDP Renewables (EDPR) has set a target to recover and reuse 85% of all waste by 2026. This includes waste at every stage of a project’s lifecycle, from construction through decommissioning. We aim to reach 90% waste recovery by 2030.

EDPR has already made significant strides toward achieving this goal—including **recycling all 205 blades from a repowered wind farm in Oklahoma in 2023.**

EDPR NA recycles as much as possible, which is almost everything. Our circular economy efforts include:

87%
Recovered from materials of EDPR’s global operations

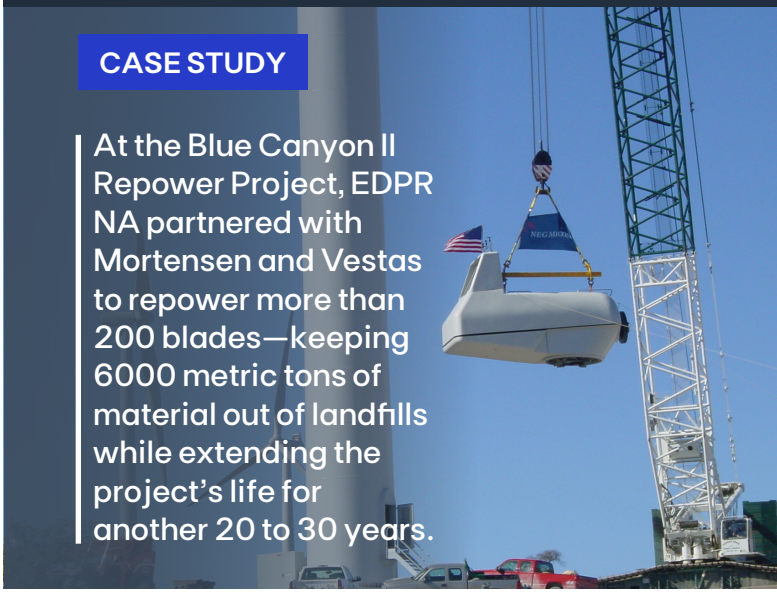
14+ million lbs
EDPR NA’s renewable energy project materials recycled in 2024

90%
Targeted waste recovery from all renewable energy assets by 2030

20+
Recycling partnerships to achieve the reality of a circular economy

CASE STUDY

At the Blue Canyon II Repower Project, EDPR NA partnered with Mortensen and Vestas to repower more than 200 blades—keeping 6000 metric tons of material out of landfills while extending the project’s life for another 20 to 30 years.



1. Lazard’s Levelized Cost of Energy Analysis, 2025.

www.edprnorthamerica.com