

# LOCUST RIDGE

## Wind Power Projects



### Project Overview

The Locust Ridge Wind Power Projects encompass two distinct wind farms: Locust Ridge I and Locust Ridge II. The string of 64 total modern wind turbines stretches along a ridge in eastern central Pennsylvania on a mix of private and municipal lands, just two hours northwest of Philadelphia. Together, these wind energy projects generate a total of 128 megawatts (MW), which is enough clean, homegrown energy to power over 38,000 typical American households each year.

Built in a part of Pennsylvania where the coal industry once dominated the landscape, this new energy source was the brainchild of lifelong area residents Joe and Angel Green, who, despite no experience in wind power or electricity production, threw their personal savings into developing a wind farm. The project contributes jobs and revenue to the local community, and continues the area's long history of energy production.

### Locust Ridge I ("LR I") Project Details

**Project Capacity:** 26 MW

**Online:** February 28, 2007

**Wind Turbines:** 13 Gamesa G87 2.0 MW turbines

**Customer:** PPL EnergyPlus

### Locust Ridge II ("LR II") Project Details

**Project Capacity:** 102 MW

**Online:** May 1, 2009

**Wind Turbines:** 51 Gamesa G83 2.0 MW turbines

**Customers:** Thomas Jefferson University and Thomas Jefferson University Hospital

### Project Location

LR I is near Mahanoy City, Pennsylvania, in Schuylkill County. The project spans 1,038 acres, approximately 3% of which is taken up by the project footprint. LR II is near Shenandoah, Pennsylvania, and straddles Schuylkill and Columbia Counties. The project spans about 5,700 acres of land leased from two private landowners and two local municipal water authorities, but less than 3% of that land is taken up by the project footprint.

### Developer and Owner

Avangrid Renewables, LLC is a subsidiary of AVANGRID, Inc. (NYSE: AGR) and part of the IBERDROLA Group. IBERDROLA, S.A., an energy pioneer with the largest renewable asset base of any company in the world, owns 81.5% of the outstanding shares of AVANGRID common stock. Avangrid Renewables, LLC is headquartered in Portland, Ore., and has more than \$10 billion of operating assets totaling more than 6,000 MW of owned and controlled wind and solar generation in 22 U.S. states. Avangrid Renewables recently changed its legal name from Iberdrola Renewables, LLC.





## Technology

**Wind Turbine Type (LR I):** Gamesa G87

**Wind Turbine Type (LR II):** Gamesa G83

**Rated Output:** 2.0 MW (2,000 kW)

**Turbine Height:** 389-396 feet (120

meters) as measured from the bottom of the tower to the tip of the highest blade.

**Nacelle Weight:** Approximately 70 tons (140,000 lbs.)

## Tower Facts:

**Tower Type:** Four-section tubular steel

**Tower Height:** 256 feet (78 meters)

**Tower Weight:** 203 tons (406,000 lbs.)

## Blade Facts:

**Swept Area (LR I):** 63,957 square feet (5,944 square meters) per turbine

**Swept Area (LR II):** 58,244 square feet (5,411 square meters) per turbine

**Blade Length (LR I):** 138 feet (42 meters)

**Blade Length (LR II):** 133 feet (40.5 meters)

**Rotor Diameter (LR I):** 285 feet (87 meters)

**Rotor Diameter (LR II):** 272 feet (83 meters)

**Revolutions per Minute:** 9 to 19

(one revolution every 3 to 7 seconds)

## Foundations:

Each individual wind turbine foundation consists of a cylindrical rock-anchor footing 24 feet in diameter, five feet deep. Eighteen threaded bolts 2½ inches in diameter and 50 feet in length penetrate through the footing and into solid bedrock, firmly securing the turbine to the mountain. Concrete volume is 85 cubic yards per turbine or 5,440 total cubic yards – that's 544 truckloads.

## Balance of Plant Infrastructure :

### Turbine Access:

Provided fifteen miles of gravel-surfaced roads.

**Transmission Interconnection:** To Pennsylvania Power & Light Corporation's 69kV system.



Photo: Don Giles, The State Museum of Pennsylvania

## Locust Ridge Construction

**Total project man-hours worked (LR I):** 116,000

**Total project man-hours worked (LR II):** 266,574

## Project Site Workforce:

**LR I:** Averaged 82 workers on site with a peak of approximately 125. Construction began in April of 2006 and substantially completed in February of 2007.

**LR II:** Averaged 85 workers on site with a peak of approximately 135. Construction began in January 2008 and substantially completed in May of 2009.

## Economic Benefits

Taxes paid by Locust Ridge Wind Projects:

Approximately \$400,000 annually

Local landowner payments by the Locust

Ridge Wind Projects:

Over \$750,000 annually

