

Horizon Wind Energy – WIndiana 2009 Conference



The Basics of Wind Development
Ryan Brown, Project Manager
21 July 2009

The Goal



Horizon Wind Energy Overview

Who We Are

- Horizon Wind Energy develops, constructs, owns and operates wind farms throughout North America
- Owned by EDP Renewables, a leading renewable energy company that designs, develops, manages and operates power plants that generate electricity using renewable energy sources
- Headquartered in Houston with over 20 offices across the country
- Employs over 250 people
- Has developed over 2,800 MW of wind farms and currently operates over 2,000 MW
- Ranked third in the U.S. in terms of installed capacity; 4th in the World.



Wind Farm Experience



Wheat Field
Oregon, 97 MW



Pioneer Prairie I
Iowa, 198 MW



Pioneer Prairie II
Iowa, 102 MW



Meridian Way I
Kansas, 105 MW



Meridian Way II
Kansas, 96 MW



Rattlesnake Road
Oregon, 103 MW



Prairie Star
Minnesota, 101
MW



Elkhorn Valley
Oregon, 101 MW



Twin Groves I
Illinois, 198 MW



Twin Groves II
Illinois, 198 MW



Maple Ridge I
New York, 231 MW



Maple Ridge II
New York, 91 MW

Wind Farm Experience



Lone Star I
Texas, 200 MW



Lone Star II
Texas, 200 MW



Blue Canyon I
Oklahoma, 74 MW

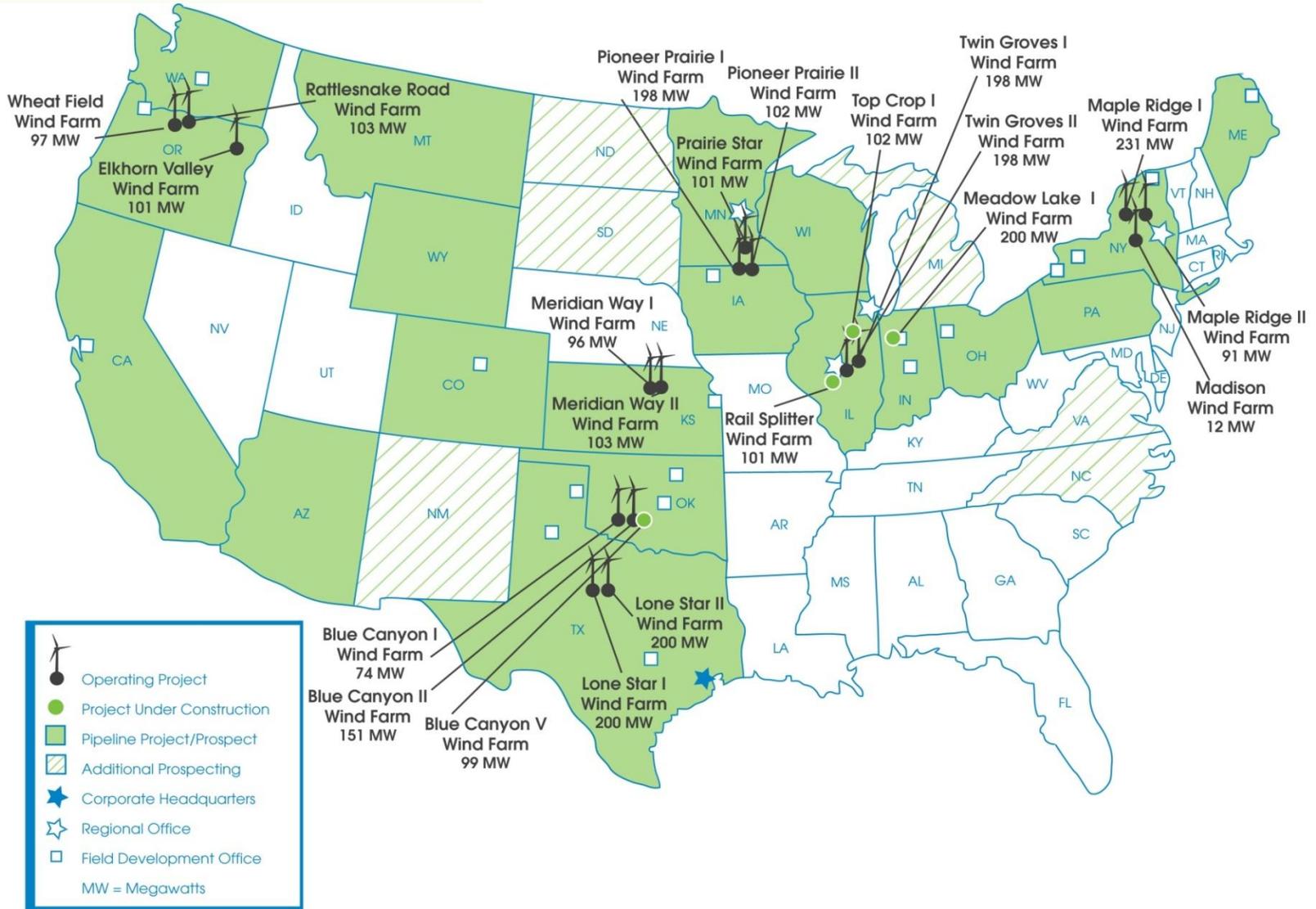


Blue Canyon II
Oklahoma, 151
MW



Madison
New York, 12 MW

Horizon Wind Energy Geographical Presence



EDP Renovavies: Where Horizon Fits In



North America

Europe

South America



● Headquarters ■ Main Offices ▲ Regional Site Offices

Recent Indiana Activity

Indiana



Meadow Lake Wind Farm – 200 MW

- White County, Indiana
- Construction began in March, on line October 2009
- 121 Vestas V82 (1.65 MW) Turbines

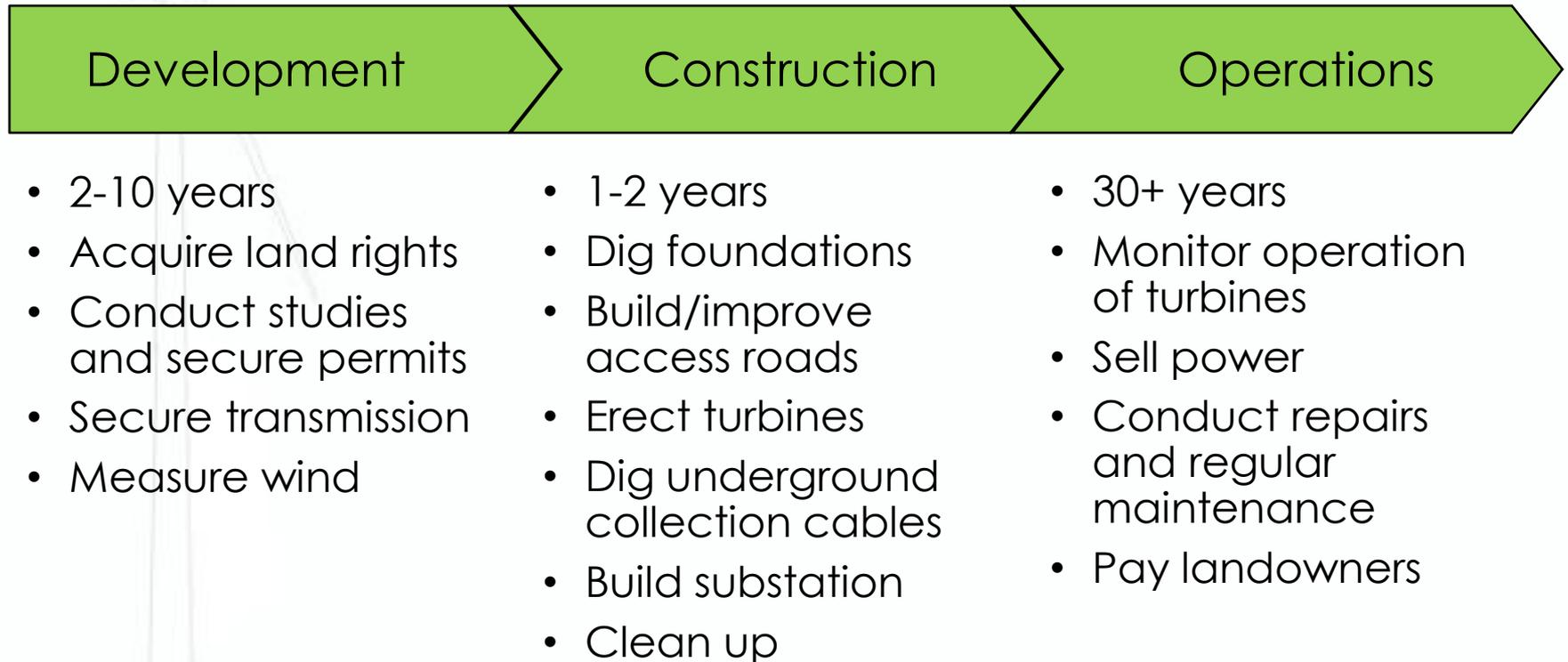
Meadow Lake Wind Farm II– 99 MW

- Construction expected to begin 2H 2009, on line in 2010



What is the timeline for a project?

Every wind farm goes through three phases:

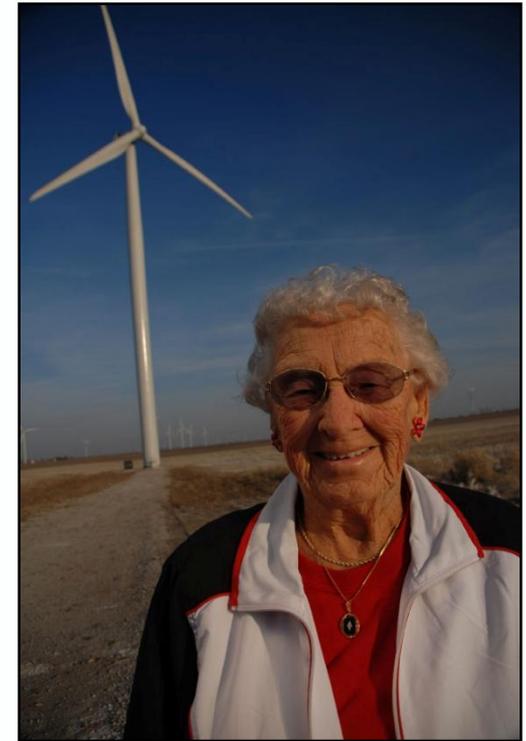


The Development Process

The length of the development process depends on site complexity, local requirements, and market conditions

Development

- 2-10 years
- Acquire land rights
- Conduct studies and secure permits
- Secure transmission
- Measure wind



Developers look for a combination of...

1

Wind Resource

2

Transmission

3

Terrain

4

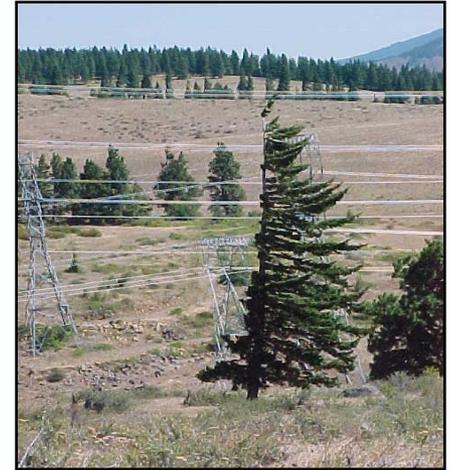
Existing Land Use

5

Community
Acceptance

6

Market Attractiveness



Land Agreements

Horizon signs land agreements (met tower agreements, land options, and land leases) with our landowners

- Identify potential project area
- Engage community and potential project participants
- Sign agreements
- Typical projects impact 2-4% of your land



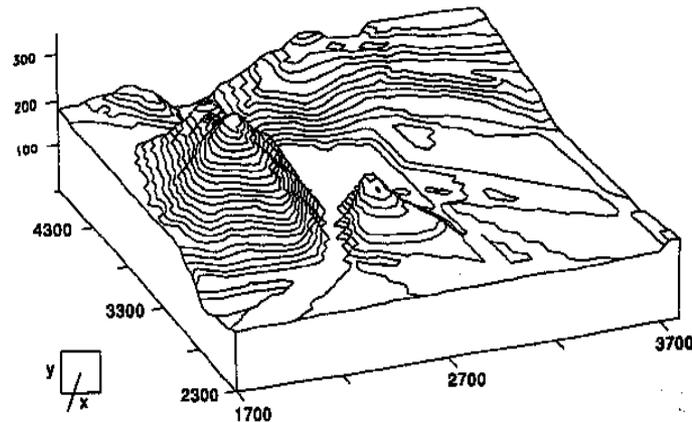
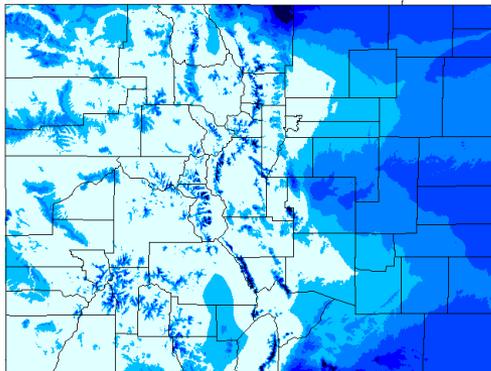
We need to verify our wind speed estimates



Meteorological Tower

Horizon spends 2+ years measuring the wind to find the windiest spots on your land and to predict generation

- Secure meteorological tower permits
- Erect towers
- Monitor the wind and quality control data
- Analyze data in-house and with outside meteorologists
- Verify the strength and characteristics of the wind resource



Horizon will spend the next few years on permitting and outreach

Horizon conducts a large number of costly studies and secures all the permits necessary to build a wind farm

- Determine permit requirements
- Conduct rigorous environmental studies
- Build community relationships



We will go through a transmission interconnection process



We need to get our power to the market, and tap into transmission lines to do that

- Conduct load flow studies to determine capacity
- Submit interconnection application to utility
- Perform transmission studies
- Ensure project transmission interconnection is safe and efficient

PJM Territory



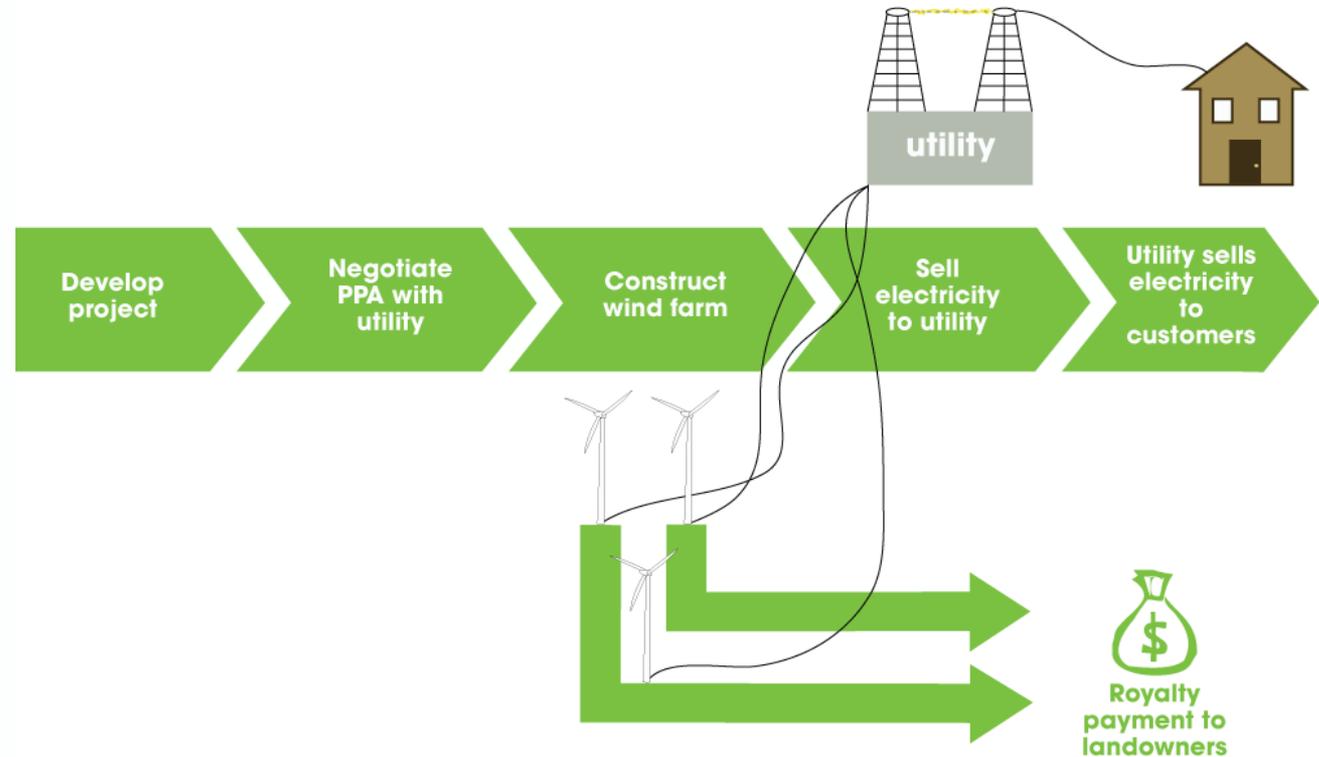
Credit: PJM Website

Development: Power Sales

Horizon Wind Energy Business Model

We determine how to sell our power before we start construction

- Power purchase agreement vs. merchant market
- Renewable Energy Credits



Development: Finance

- Wind projects are very capital intensive
 - Horizon typically funds its projects from development through construction
 - Once operational, Horizon enters into partnership structures with institutional investors
 - Horizon has invested over \$3 billion to date in developing, constructing and operating projects all over the U.S.
- 
- Horizon pays the \$2-3 million per turbine upfront, and receives revenue over the next 20-30 years

Construction

Every wind farm goes through three phases: **Development, Construction, and Operations**

Construction

- 1-2 years
- Dig foundations
- Build/improve access roads
- Erect turbines
- Dig underground collection cables
- Build substation
- Clean up



Construction: What to Expect



Foundations



Access Roads



Assembled Rotor



Trenching Cable

The Construction Process

As Horizon aims to be a long-term owner, we have a vested interest to do everything right

Civil Engineering

- Road improvements
- Turbine access roads

Structural Engineering

- Turbine foundations

Electrical Engineering

- Medium voltage collection from turbines
- Step-up transformers
- High voltage transmission lines to the grid

Wind Turbine Generators

- Installation and erection



Every wind farm goes through three phases: Development, Construction, and Operations

Operations

- 30+ years
- Monitor operation of turbines
- Sell power
- Conduct repairs and regular maintenance
- Pay landowners



Horizon believes in being a good community partner

Local impact of Twin Groves I and II

- 700,000 tons of aggregate (local)
- 42,000 cubic yards of concrete (local)
- 300 construction jobs for two years
- Millions of dollars annually in lease payments to landowners and annual property tax payments
- 40-45 full-time operations and maintenance jobs



Respect for Community (cont.)

Horizon believes in being a good community partner



- Equipment donations to local fire departments and EMS/ambulance
- Local fuel contracts
- Donated tornado warning siren to City of Saybrook
- Sponsored 4th of July fireworks for Arrowsmith and Saybrook
- Numerous other donations to local community organizations

Thank You

