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# Rounding Up a Wind Farm

## Jeff Cook-Coyle – Sain Engineering

# Vestas V-82 1,650 kW Wind Turbine

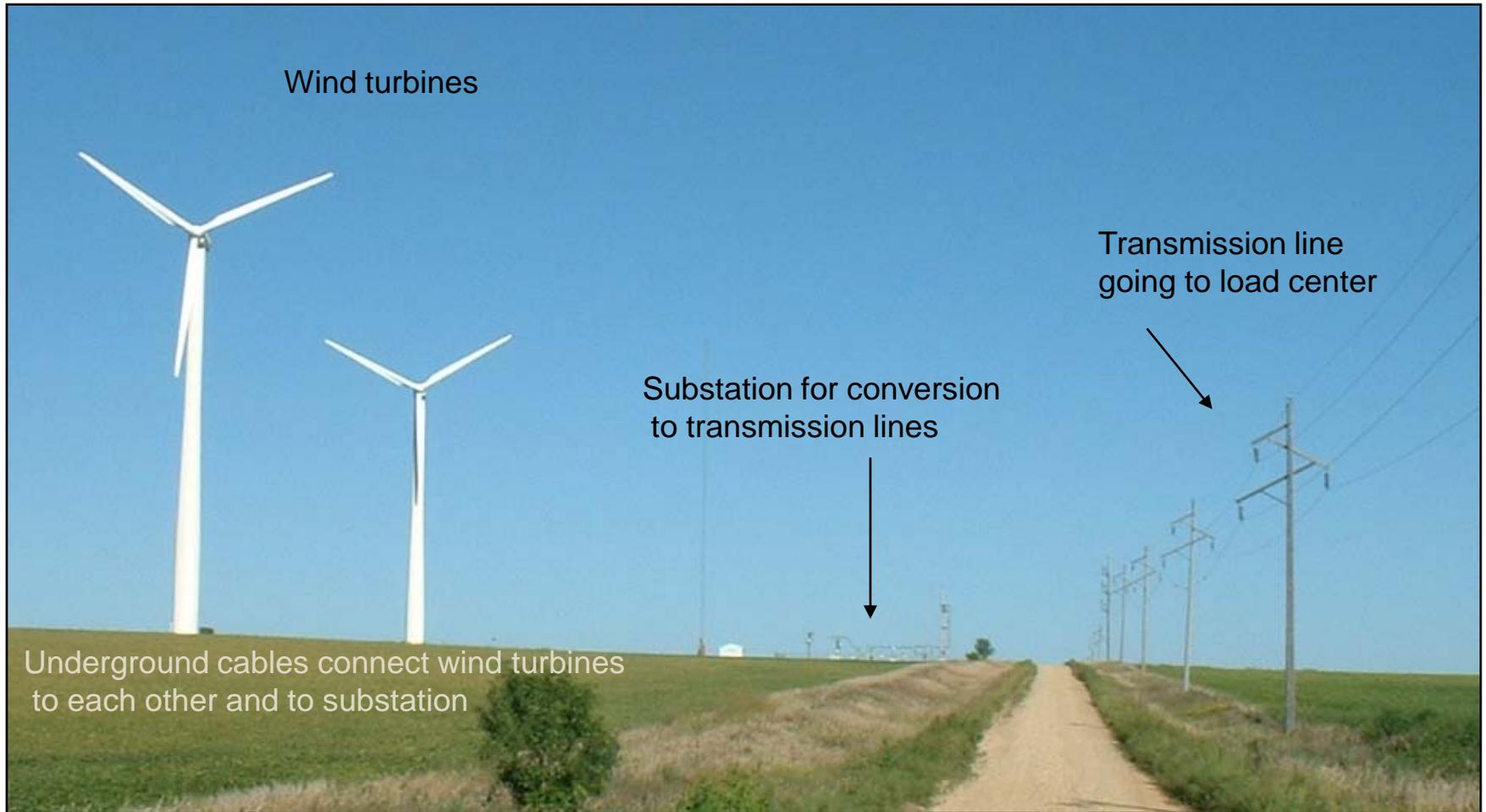
130 Foot  
Blades

257 Foot  
Tower



Photo courtesy NEG Micon

# Elements of a Wind Farm



# Why Wind Energy Now?

- Long-term executive and legislative branch commitments to renewable energy
- Wind energy is still the most cost-effective form of renewable energy
- Wind energy is the form of renewable energy most readily deployed on a large scale
- Wind energy has proven itself to be reliable and cost-competitive

# What Makes a Successful Project

- Recognizing that you can't hide a 400 foot tall wind turbine – it is a high profile project.
- Planning the project thoroughly.
- Involving people affected by project, even though it is beyond their control.
- Staying focused on the big picture; America needs clean energy.
- Supporting project champions.

# Threats to a Successful Project

**NO TO**



**WINDFARM**

- How dare you do this without my permission!
- Not doing homework



# Project Considerations

Is the wind strong enough?

Can you transmit the power?

Is it a good investment?

Will a utility purchase the output?

Can you get wind turbines?

Project design and engineering

Do you have a land easement?

Contracts for wind turbine, roads, electrical infrastructure, construction, insurance

Do you have all the necessary permits?

Have you worked with the project's neighbors?  
How will it affect them?

# Siting

- Energy in the wind increases with the cube of the wind speed
  - Doubling wind speed  $2 \times 2 \times 2 = 8$  times power
- Smoother wind flows are faster wind flows
- Rules of thumb
  - 6 x rotor diameter setback from homes
  - 2 x total height from commercial/industrial

# Wind Resource Assessment



# “Off-Taker”

- The energy generated is either purchased (typically by a utility) in a Power Purchase Agreement
- Or is used “behind the meter” to off-set electricity purchases (on a net metering basis)
- Every state has different regulations for net metering; don’t just assume you can do it
- Net metering approaches may leave RECs in a gray area
- The old Production Tax Credits required the energy be sold to receive the tax credit; this put net metering (and non-profit ownership of wind turbines) at a cost disadvantage

# Interconnection

- Electricity can't be stored; it must be used instantaneously once generated.
- Delivering electricity to consumers can be one of the hardest parts of developing wind energy.
- Whether selling under PPA or consuming the energy “behind the meter,” the effects of delivering the energy must be studied carefully, understood, and accommodated.

# Permitting/Approvals

- NEPA – full blown Environmental Impact Statements are rare for wind projects
- State/local – understand these requirements!
- FAA – Fairly straight-forward process involving FAA Form 7460
- Radar – DoD preliminary radar screening through same FAA OEAAA web site as 7460

# Is It a Good Investment?

- Just because you want it doesn't mean you should have it.
- Excellent on-line Wind Energy Finance tool from NREL: (<http://analysis.nrel.gov/windfinance/>)

# Project Timeline

	2010			2011												2012												
	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Site Control		■	■	■	■																							
Wind Study				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■										
PPA		■	■	■	■	■	■	■	■	■	■	■																
Design				■	■	■	■	■	■	■	■	■																
Permitting				■	■	■	■	■	■	■	■	■																
Interconnect		■	■	■	■	■	■	■																				
Financing										■	■	■	■	■	■	■	■											
Construction																					■	■	■	■	■	■	■	■

# Protecting Your Investment

- Major Risk Factors
  - Wind Assessment
  - Wind turbine make & model
  - Construction
  - Operations

# Thank You!

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"Making Energy a Consideration in All WE Do."



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