



SCSC Sustainable Technologies Conference

August 1, 2009



Lamar Wind Energy Project

- Project overview
 - Consists of four 1500 kW GE turbines
 - Three owned by Lamar Light and Power (LLP)
 - The fourth owned by the Arkansas River Power Authority (ARPA)
 - Site is located about five miles SE of Lamar
 - The turbines are connected directly to the LLP distribution system
 - LLP operates the turbines from their plant control room via wireless communications

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■ The Turbines

- Turbines have four tower sections
 - Foundations approximately 30 ft. deep by 16 ft. across
 - A little over 100 cu yds of concrete per foundation
 - Total height is 260 feet to the nacelle
 - Bottom section houses the converter, computer, and communications equipment









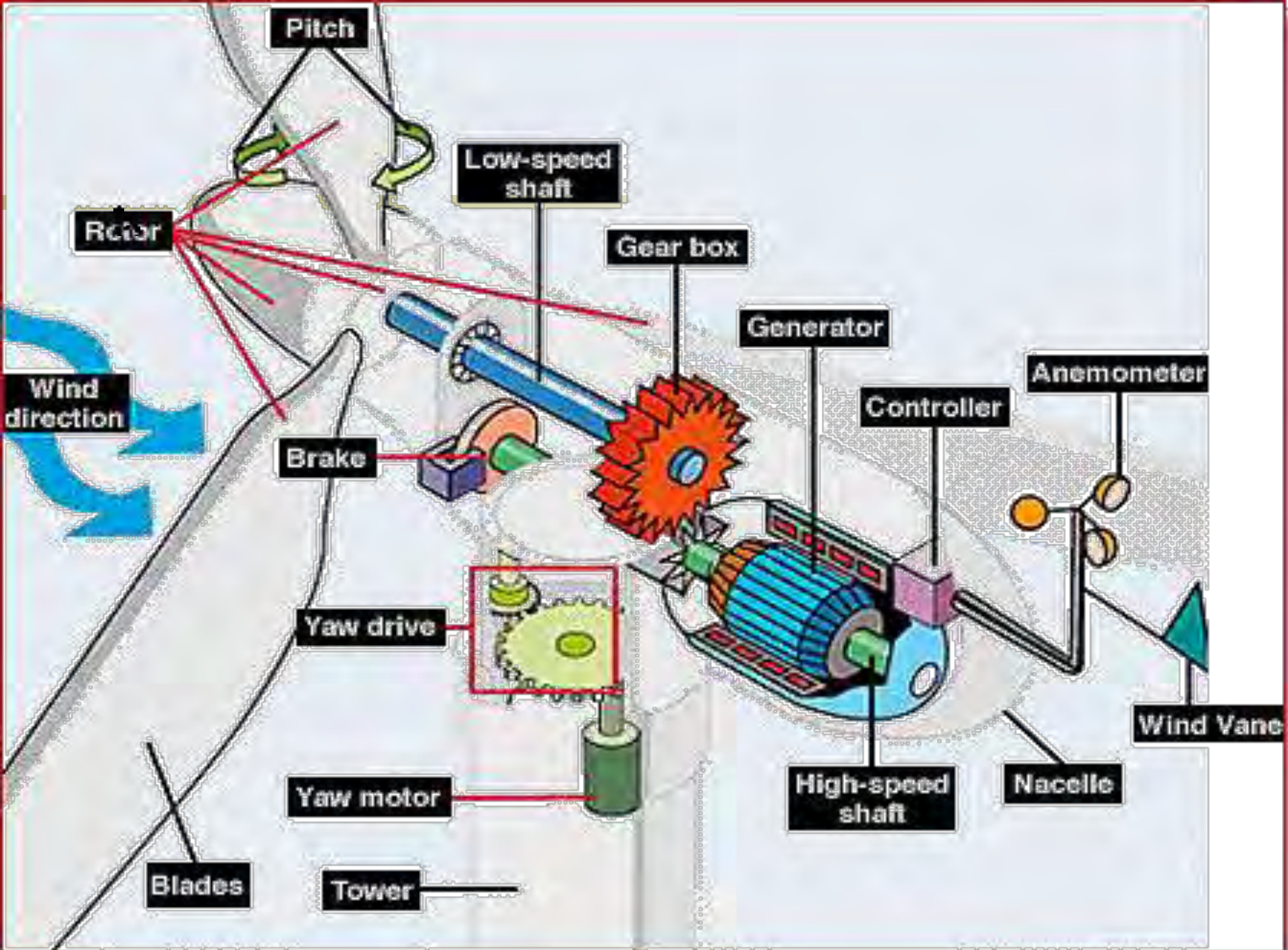
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- Nacelle sits atop the tower, housing the generator, yaw motors, and gear boxes
 - The yaw control automatically tracks wind direction
 - Yaw control brakes direction during gusts



GE Wind Energy 1.5s





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- Three blades each about 112 feet long
 - Each blade has independent pitch adjustment
 - In high winds blades pitch to braking angle
 - Blade tips are equipped with lightening strike sensors that are connected back to ground grid
 - Blade speed ranges from 11 to 22 RPM







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- Power Production
 - Capacity factor has been between 33% and 35%
 - In 2008, each turbine generated enough power to serve approximately 583 households
 - Approximately 15% of the energy for LLP
 - A base load coal or natural gas plant will usually have at least an 85% capacity factor

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■ Project Financing

- LLP issued a 20 year bond issue for \$6 million
- Reliability is key as costs are fixed
- Power cost has been between \$.045 and \$.050
- Certain green power payments have helped lower the cost
- Sale of REC's an option

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■ Project keys

- Communications with your power supplier/transmission provider
 - Who will provide your power when the wind isn't blowing
 - Who will purchase your power if your not consuming all that is produced
 - Ensure you have the correct metering equipment installed

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- Project keys
 - Proximity to a power line
 - Protective equipment for power grid/system
 - Protective equipment for the turbines
 - Careful review of insurance requirements and coverage

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- Maintenance and Operation
 - Who will provide your maintenance
 - What kind of emergency or after hours service is available
 - What type of routine preventive maintenance program is included
 - Scheduled gear box lubrication
 - Scheduled oil and filter changes
 - Critical equipment inspections

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■ Reliability

- What is the spare parts inventory you will need to keep on hand
 - What are critical spare parts
 - What are lead times for non-critical parts
- ## ■ How long can you afford to be off line

QUESTIONS??



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