Wind Turbine Basics: Foundations for Course Development
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— Six areas are identified as topics in a wind power course or as sections of a broader
course on renewable energy: (1)History, (2)Wind Resources, (3)Lift Driven Wind
Turbines, (4)Wind Turbine Design, (5)Wind Turbine Siting, and (6)Economics. The
first three of these will be discussed with some comments on the others as time
permits. Analytical results on the bending of wind turbine blades point to some
of the contributions to harmonic vibrations. These will be added to the discussion on Lift Driven Wind Turbines in terms of a nondimensional bending frequency,
omega*, analogous to the nondimensional flapping frequency of Eggleston and Stoddard (Wind Turbine Engineering Design, Van Nostrand Reinhold Company, NY,
1987). For a rotor rotation frequency of omega, harmonics with frequencies of N
omega*omega, (omega*+1)omega, and (omega*-1)omega where N=1,2,3,etc. are
involved with the coupling between azimuth and bending motion [Kendall, Hinged
Blade Model Dynamics for a Horizontal Axis Wind Turbine, PhD Dissertation, University of Massachusetts, Amherst, 2003].

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