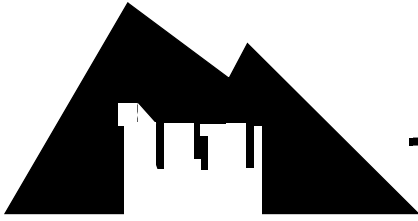


The RAL Seminar Series

NCAR



Meteorology and Wind Power

by

Sue Ellen Haupt
The Pennsylvania State University

Friday, April 23, 2010
Foothills Lab Building 2, Room 1001
2:30 p.m.

Although wind energy is quickly becoming a popular green resource, the implications of the variability of this meteorological resource has not been fully explored. The spatial and temporal variability impacts energy production and grid stability as well as turbine longevity. We describe how Penn State is currently studying such implications for two specific issues.

The first issue is micrositing wind farms and the individual turbines within them. We are developing new methods of assimilating mesoscale weather forecast data into high fidelity computational fluid dynamics (CFD) models to produce specific cases of turbulent flow in hilly terrain. We also show how adding a canopy model to the CFD produces more turbulent eddies.

The second issue involves building integrated wind turbines. Test turbines on buildings have produced disappointing loading factors. Not much consideration, however, has been made to details of integration of those turbines into the building in ways to optimize the energy output. We discuss issues relevant to more proper placement of such turbines that could greatly improve energy production, making such technology more feasible.