TEXAS TECH UNIVERSITY™

UWIG/NREL Workshop

May 2008

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Wind Science & Engineering Research Center

www.wind.ttu.edu

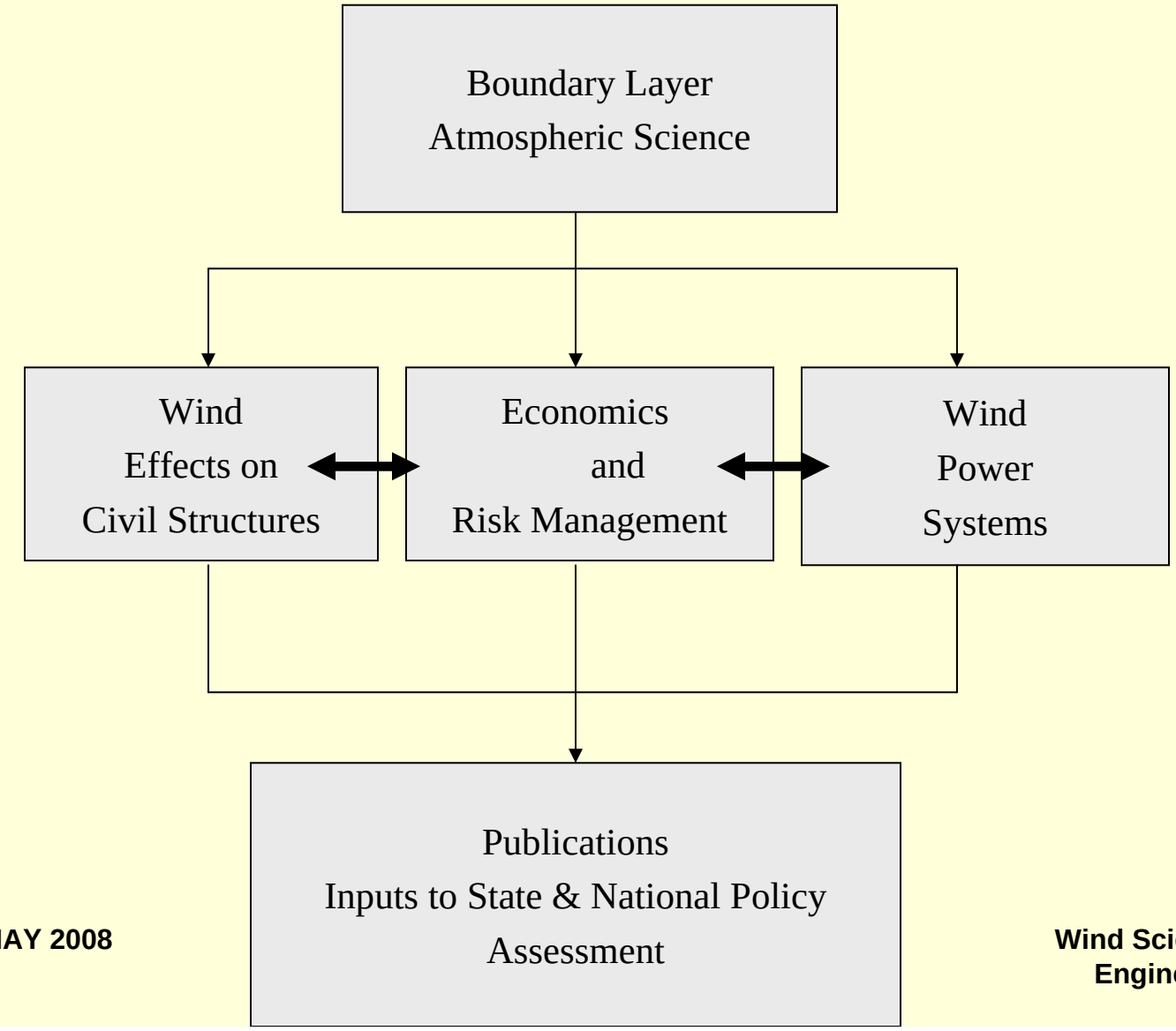
Overview

- Program Background
- Current Status
- PhD in Wind Science and Engineering
  - Power Systems Engineering at TTU
- Future Planning
- NSF Multidisciplinary Degree Program Development Experience

Center / Program Background

- 35+ year history
- 1970 Wind Effects on Civil Structures
- Accomplishments:
  - EF Scale development, NSSA, Full Scale Field testing, Hurricane deployment, NAE membership
- 2000 Planning to add wind power systems
- 2003 Multidisciplinary NSF Fellow Program
- 2007 PhD Approved by State of Texas

Program Areas



Current PhD Program Status

- Program Objective is to develop the next generation of leaders and decision makers in wind-related fields
- 20 Wind Science and Engineering PhD Students Enrolled – about 1/3 focused on Wind Energy
- 20+ Faculty Affiliates from 7 Academic Departments
- Faculty Advisor and Program Coordinator

PhD Program Highlights

- On Site Interview of all Applicants
- Stipend offered
- Multidisciplinary Focus; 6 Core Courses
  - Wind Science
  - Wind Engineering
  - Eco/BA Risk Management
  - Math Statistics and Stochastic Processes
  - Ethics and Leadership

Continued

- 18 hours in a Major Field, post Bachelors
- Required Internship
- Wind Related Research & Dissertation, e.g.
  - Wind-Storm Characteristics and Risk
  - Wind Power Systems
  - Wind Power Economics
  - Satellite Imaging and Damage Documentation
  - Structural Response to Wind

Power Engineering at TTU

- **Currently, within the Electrical and Computer Engineering Department**
- Courses offered in:
  - Introduction to Power Systems
  - Electrical Machines
  - Power Electronics
- The Department also houses a large Research Center in Power Electronics and Pulsed Power

Energy Systems Program Initiative

- Objective is to develop a program in "Electric Energy Systems"
- Workshop scheduled on Texas Tech Campus in early June
- A number of industry participants are expected:
  - Utilities, Consulting Engineers and Manufacturers
- Workshop goal is to consider the needs and develop a plan to put in place an Electric Energy Systems program within the department

Specific Objectives of Workshop

- Explore the State of Electrical Energy Systems
- Identify major Thrusts of Utility development
- Identify emerging Educational & Research needs
- Identify Job prospects for University graduates at all levels and HR needs
- Identify un-met challenges

NSF-WiSE Program Experience

- Took four years to develop the funding from NSF starting with a center with a 30 year history
- Program was one of approximately 100 NSF multidisciplinary PhD development programs funded across the nation at approx. $1 M/yr
- Accepted 5 NSF Fellows per year with $30,000 stipend/yr plus paid tuition and fees
- Program is now migrating to local funding

New Program Development

- Based on NSF Multidisciplinary Program Development Experience at TTU:
- Program development takes years and should be developed holistically vs. course by course
- Significant and long term Funding Levels are required;
  - In the order of $1 Million per year for 5 years or more
- Special incentives are needed to fund K-12 activities and attract underrepresented groups,

Final Thoughts

- **Attractive programs** require substantial funding for tuition support, scholarships, fellowships, paid internships, etc. >$25k/yr per student
  - -and long term support and commitment by the faculty and the university
- **Consider the competition** for good students and graduates at all levels: (2 yr, 4 yr, Graduate)
  - Bio Engineering, Nanotechnology, Bio-Fuels, Petroleum Engineering, Traditional Business Programs (MBA, etc)

Final Thoughts, Continued

- **Poor mathematics preparation** is a national problem and will impact this initiative
- There should be a clear path to employment
- Students want to “Make a Difference” – We may have an advantage here
- Collaboration between Industry, Academia, Government is required

Questions/Comments

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