



TEXAS TECH UNIVERSITY  
National Wind Institute



# The National Wind Institute at Texas Tech University

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TEXAS TECH UNIVERSITY

National Wind Institute (NWI)



The Wind Science and Engineering (WiSE) Research Center had over four decades of multi-disciplinary research, education and outreach focused on wind.



**Texas Wind Energy Institute**

A Partnership between Texas State Technical College and Texas Tech University

The Texas Wind Energy Institute (TWEI) is a partnership between Texas Tech University and Texas State Technical College designed to develop education programs and career pathways to meet the workforce demand of the wind energy industry.



## NWI Establishment

- Purpose: The National Wind Institute (NWI) is intended to serve as an intellectual hub for interdisciplinary and transdisciplinary *research, commercialization and education* related to wind science, wind energy, wind engineering and wind hazard mitigation. The institute will serve faculty affiliates, students and external partners involved in these activities and other peripheral areas of interest.
- Commitment: NWI represents a significant university commitment to interdisciplinary wind research.
- Consolidation: A single campus wind organization provides one point of contact and reduces external confusion.



## Educational and Workforce Activities

- Multidisciplinary PhD in Wind Science and Engineering (2007); 19 Majors
- Multidisciplinary BS in Wind Energy (2011); 123 Undergraduate Majors
  - 120 credit hour degree
  - 9 graduates in first class, December 2012
  - 6 Wind Energy Program instructors
- Wind Energy Course Enrollments up 400% over the last three years
  - 35% of enrollments are by distance education students
- Wind Energy Graduate Program
  - Two tracks offered for the WE Graduate Certificates – Managerial and Technical
  - Graduate course enrollments are typically Graduate Certificate and PhD students
  - Wind Energy Master's program being developed
- Wind Energy Workforce Activities
  - Working with industry on tailored education/training programs
  - Professional development WE courses offered on-line for Continuing Education credits
  - Curriculum Licensing opportunities in development



## Scaled Wind Farm Technology (SWiFT) Facility



- Partnership with DOE, Sandia National Laboratories, Group NIRE and Vestas
- Planning started in early 2011, construction started December 2012
- Located at Reese Technology Center on the TTU 67-acres
- Research scale turbines - Vestas V-27 (300 kW)
  - Cost-efficient size/research can be directly scaled to larger sizes.
  - Variable speed/variable pitch
  - 13 m blade length, 30 m tower height



## NWI Next Generation

- Create a ***national center for wind turbine research, testing and certification***
  - Expand prototype wind turbine deployments at Reese Technology Center
- Continue to help in the effort to develop ***“smart” wind farms***
  - Complete and expand the SWiFT facility
  - Develop Reese Technology Center into the most observed volume of atmosphere in the world
- Expand ***grid integration*** related work
  - Integrate ensemble based numerical weather production, wind farm monitoring and controls, and monitoring of the electrical grid to move towards enhancing penetration of wind energy onto the grid
- Continue to add new technologies (generation, storage and even loads) and create a Reese Technology Center ***micro-grid*** to foster research and certification, provide a cyber security testing grounds
- Expand integrated ***wind-water desalination*** activities at Reese Technology Center
  - Build upon the Seminole demonstration project which is about to come online



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**Questions?**

**Thank you.**

