

Commercial Blade Testing

Overview of the NREL Large Blade Test Facility Partnerships



Sandia Blade Workshop

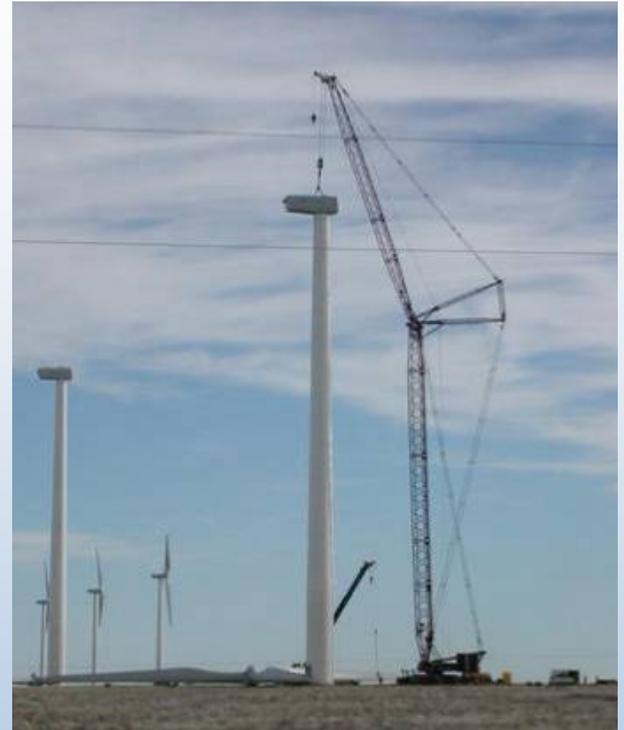
5/12/08

Who NREL Is

- The National Renewable Energy Laboratory (NREL) is DOE's primary laboratory for renewable energy and energy efficiency R&D (Wind, Solar, Biomass, Hydrogen, Geothermal,)
- The DOE Wind Program's mission is to **lead the nation's efforts to improve wind energy technology through partnerships** that enhance domestic economic benefit from wind power development and coordinate with stakeholders on activities **that address barriers to wind energy use.**

NREL Testing Capabilities & Activities

- Wind Program testing capabilities:
 - Structural Test of Blades
 - Blades and bolts
 - Drivetrains
 - Gearboxes, generators, power electronics
 - Whole turbines (field testing)
 - Full-scale turbine systems, prototype hardware, farm monitoring, hybrid systems, R&D



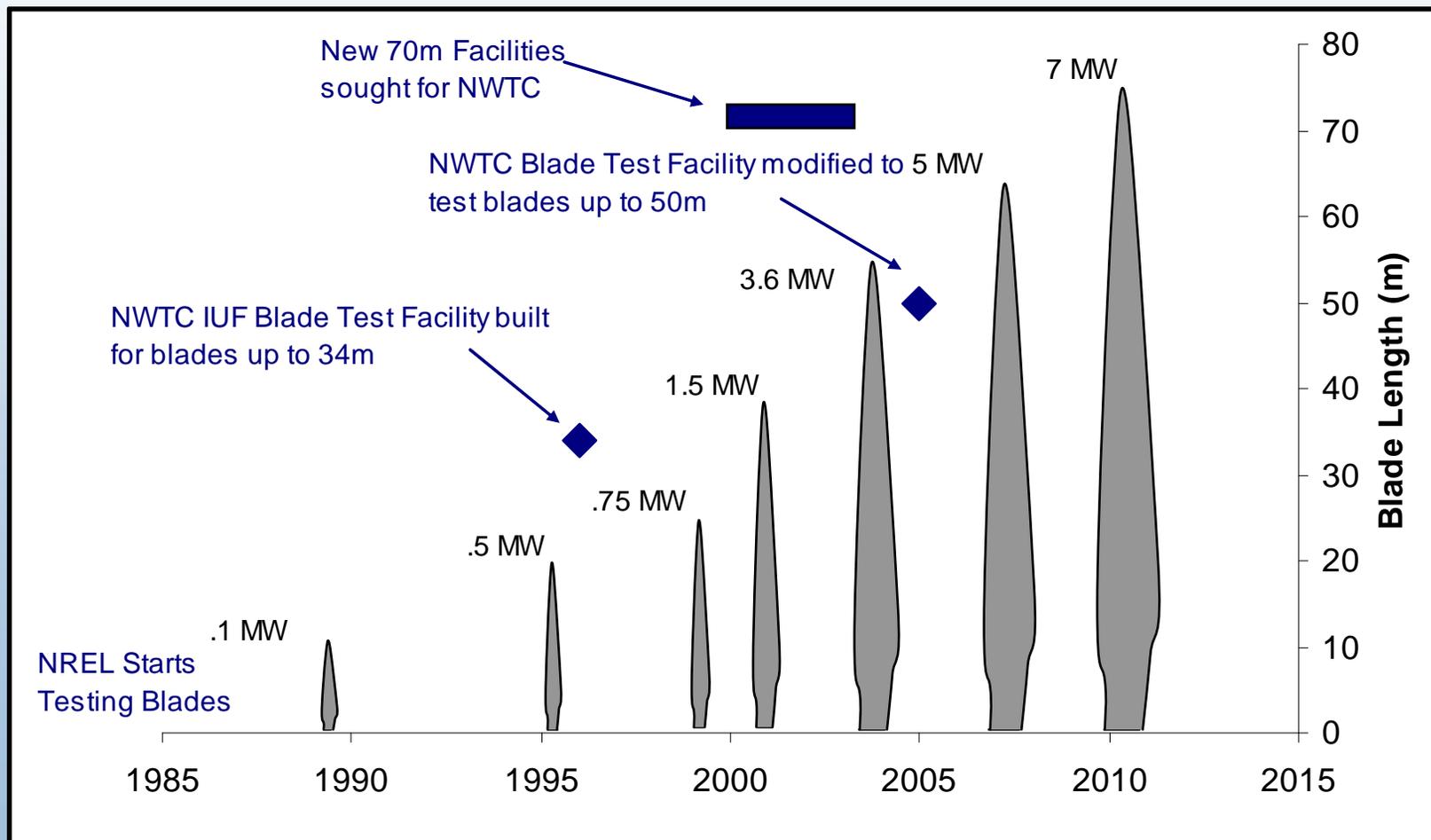
The Importance of Testing Wind Turbine Components

- Testing is crucial to wind turbine and component manufacturers and researchers in order to
 - Meet certification requirements
 - Minimize risk of design and manufacturing flaws resulting in costly fleet-wide retrofits
 - Validate tools, tune models, & evolve codes



The Longstanding Need for New Large Blade Test Facilities in the U.S.

- Blades continue to grow longer and have exceeded the length capacity of the NWTC
- Transportation of very long blades will likely require water transport not available at NWTC

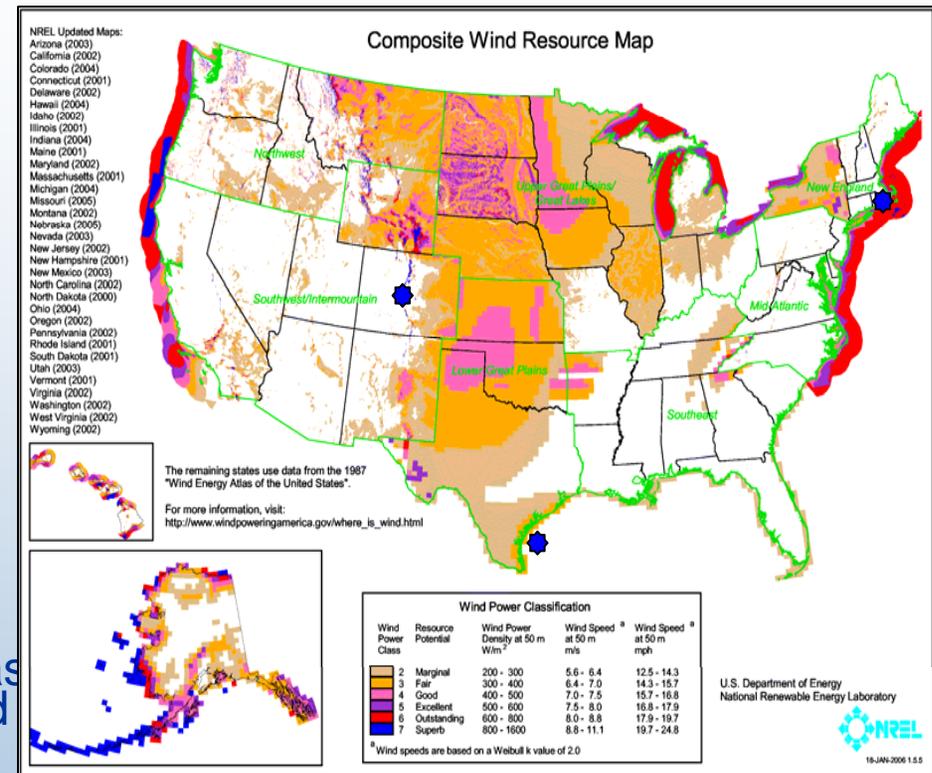


Public/Private CRADA Opportunity to Develop New Blade Test Facilities

- In 2006, NREL issued an announcement for a blade test facility CRADA opportunity for a public/private partnership to build a facility with
 - 70+ meter blade test capacity
 - 2 or more test stands
 - Located near a water port for transportation access
 - Operating expenses recovered through user fees
- Partners' contributions
 - Building and land
 - Capital funding
 - Staff for operation
- DOE/NREL Contributions
 - Up to \$2M capital funding
 - Facility-design advice and specifications
 - Staff for training and operation
 - NREL fatigue test IP design/license
 - Development of new blade testing technologies

Blade Test Facility Partnership Recent History

- In 2006 Six applicants from MA, TX, IA, OH, VA, and ME proposed
- In 2007
 - TX and MA were chose to refine proposals
 - Secretary Bodman announced selection of MA and TX
 - MA provides access to East Coast manufacturers and offshore wind resources
 - TX provides access to primary shipping routes used by manufacturers, and extensive land and offshore wind resources



Status of the Facilities

- CRADAs expected to be signed this month
 - New type of endeavor for NREL

- Facility Construction
 - A&E firms have been or will soon be selected
 - NREL NEPA Environmental Analyses have begun
 - NREL, MA, and Texas are seeking to hire staff for the facilities
 - Commissioning expected as early as 2010

TX CRADA Summary

“Texas-NREL National Wind Test Center”

- Partners (the Lone Star Wind Alliance)
 - Universities: U of Houston, UT Austin, Texas A&M, Texas Tech, West Texas A&M, NM State, Old Dominion U, Montana State, Stanford
 - Industry: BP, Shell, Dow, Huntsman
 - State: GLO, Energy Conservation Office, Emerging Tech. Fund, Workforce Commission
- Facility Details
 - Location: Ingleside, Texas
 - Two 70m test stands, one 100m stand
 - U of H operated
- NREL/DOE Role:
 - Provide NREL insight, experience, and know-how gained from 25 years of testing activities
 - Design & procure \$2M of equipment
 - Train staff
 - Commission the facilities
 - Provide technical and operational support (~3 staff)
 - License essential fatigue testing NREL IP
 - Provide A2LA laboratory accreditation assistance

