The Massachusetts-NREL Wind Technology Testing Center

Developments and Opportunities

2008 Wind Turbine Blade Workshop
Sandia National Laboratory
Albuquerque, NM

May 12, 2008

Overview of MTC

- The Massachusetts Technology Collaborative is a state economic development agency focused on renewable energy and the state's knowledge-based economy
- MTC administers the Renewable Energy Trust, created via the Electricity Restructuring Act of 1997
  - Supports RE projects and installations
  - Supports RE companies and cluster growth
  - Supports green buildings and infrastructure development
- The WTTC is a new activity of MTC, and will be an initiative funded from the RET, user-based revenues, federal funds and partners

Overview of WTTC Partnership

- MTC partnering with NREL, UMass and Massport
  - MTC will own and operate facility
  - NREL will provide most testing equipment, support and some staff
  - UMass RERL provides wind expertise and research capabilities
  - Massport to provide design & construction project management, plus land owner

Photos courtesy of the New and Renewable Energy Centre, Blyth, UK

A Major Win for Massachusetts

- Summer 2006: NREL released request for submissions to CRADA opportunity
- Nov. 2006: Eight state partnerships applied for the $2M CRADA
- March 2007: DOE and NREL selected Texas and Mass. as finalists, request more detailed applications
- June 2007: Both Mass. and Texas selected as recipients of CRADA awards
- *This CRADA was a new approach for DOE and NREL, and sought support from state and industry partners in a significant way*

MTC Funding for WTTC Development

- MTC's independent board of directors approved the following reservations in April 2007 for WTTC activities:
  - $7 million grant for construction
  - Up to $5 million loan for construction
  - $1.2 million in working capital loan
  - $5 million for a grant program to fund both testing and blade design related R&D to be conducted primarily in Mass.

Current Efforts On WTTC Plan

- Project management agreement with Massport final, signed
- Contract negotiations with Architerra design team final, contract signed
- Design team commenced program definition, now working through site and structural issues at present
- MTC reaching out to industry in U.S. and Europe on testing needs, business directions, manufacturing potential and other opportunities

Overview of Near-term Milestones

- Program Definition – Now–July/Aug.
- Hire Director of WTTC (MTC) ~ May 2008
- Completion of preliminary design ~ Oct/Nov 2008
- Put design out to bid with construction firms with final design ~ Jan 2009
- Begin construction~ April 2009
- Commissioning of facility (first blade test) ~ 1Q 2010

Core Capabilities at WTTC

- Two, potentially three, wind turbine blade test stands for static and fatigue
  - minimum 70 meter, potential 100 meter capacity of test stands
- Full suite of blade certification tests
- R&D testing for iterative design
- Manufacturing/QA testing (audit) prior to deployment or after repairs

Potential Capabilities at WTTC

- Subcomponent and component group testing (e.g., hub and blade)
- Additional blade inspection and design analysis services
  - Non-Destructive Tests
  - Fluid-dynamics modeling, analysis
- Repair verification and test services
- Potential for sub-lease to wind or other renewable/marine companies for on-site fabrication of prototypes
- Materials research/coupon testing lab

Building Design Considerations
-- Core Principles --

- Work flow plan to maximize WTTC utilization & minimize blade handling
- Safety a critical concern
- Protection of IP for users
- Flexible load application technologies
- Cost is critical, both cap ex and operations
- Future expansion and evolution
- Transportation access by road, sea and rail

Basic Building Components

- Offices
- Test preparation area
- Test stands – multiple options
- Test control room
- Equipment storage / machine shop
- Outdoor storage of blades
- Hydraulic pump room
- Potential for drive-in access

The Autoport / Massport Site

Program Definition
Phase 1 – May-July '08

- Determine optimal testing processes, configurations & clearances
- Lay out best parcel shape and size at Autoport, plus orientation of building
- Determine major cost drivers in design and value-engineer solutions
- Accommodate foreseeable evolution of testing methods & standards
- Need to consider alternative uses for facility over facility life
  - Other structural testing, marine industry uses

Collaboration on WTTC

MTC seeks broad industry input on test facility specifics:

- Blade shipping, handling and testing preferences and equipment
  - Equipment must accommodate desired handling protocols and future blade chords
- Reservation process and IP protection interests
  - Pursuing LOIs, early bookings by year-end
- Future trends: blade sizes and properties, shapes, testing advances, current gaps
  - Swept blades, broader blades, etc.

Opportunities for Industry Partnership and Development

- MTC/Mass. offering siting and financial assistance for new manufacturing operations
- Interested in supply chain partner development or relocation opportunities
- Ongoing cluster support to enhance business opportunities and JV potential
  - *getting more specific to wind/materials industry*
- MTC R&D funding support for blade design, testing and materials/manufacturing techniques undertaken in MA
  - *$5 million total grant fund, disbursed over 5 years*
  - *Aim is joint research with MA-based universities & companies*

Thank you
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We welcome your collaboration on the development of the Massachusetts-NREL WTTC

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