

# focus:Project

Renewable energy projects worldwide



Since it was opened in May 2011 (pictured), the facility has been functional, with projects booked for the next 18 months

## National support to face testing times

**A**MERICA'S FIRST commercial large wind turbine blade test facility opened in May, its aim being to help the US industry remain competitive with its overseas counterparts.

With most global blade testing occurring in Europe or Brazil, the United States **Department of Energy (DoE)** recognised the need to build a blade testing facility in the U.S.

Due to the high cost of shipping blades abroad, as well as the logistics of scheduling delays and size restrictions, the DoE has collaborated with the **Massachusetts Clean Energy Center** to construct the first commercial large wind turbine blade test facility in the U.S., theoretically removing the need for testing to take place overseas.

Industry proponents hope that such domestic testing of large commercial-sized wind turbine blades will help reduce costs, improve technical advancements and expedite the deployment of the next generation of wind turbine blades in the market place.

The other aim is to position the U.S. so that it remains competitive during the global promotion of wind (on- and offshore), in the near to mid term.

The *Wind Technology Testing Center (WTTC)* is positioned on an existing deep-water port and near interstate

highways, close to a number of clean energy research and academic centres in the Boston area.

The blades will be shipped to the facility primarily by water, with shorter blades shipped by road, if required.

As part of its effort to help the wind industry deploy the next generation of onshore and offshore wind turbine technologies, the WTTC will offer the latest wind turbine blade testing and prototype development methodologies; research and development partnerships; blade repair capabilities; and hands-on workforce training. Due to the ability to increase production and testing within the U.S., many hope that this facility could change the wind turbine manufacturing industry in America.

### Funding

Like any other product manufactured in the U.S., the decisions of banks and insurance companies greatly contribute to success. In order to receive the necessary coverage to enter the market place, these banks and insurance companies require independent testing to ensure safety and reliability.

### Project team:

- **Massachusetts Clean Energy Center (MassCEC)**
- **United States Department of Energy (DOE)**
- **National Renewable Energy Laboratory's (NREL) National Wind Technology Center (NWTC)**
- **Owner's agent: Massachusetts Port Authority**
- **Construction Manager: Turner Construction Company**
- **Environmental Consultant: GEI Consultants, Inc.**

Therefore, funding was a crucial step in the construction of this facility.

Significantly, with the creation of nearly 300 construction and engineering jobs over the course of two years, the project satisfied the requirements necessary to be eligible for stimulus funds.

So the design and construction of the facility was financed with US\$24.7 million in federal stimulus funds, made available under the **American Recovery and Reinvestment Act (ARRA)**, a US\$2 million federal **National Renewable Energy Laboratory (NREL)** grant, and US\$13.2 million in grants and loans from the state's **Clean Energy Center (CEC)**.

### Testing

Structural testing is a crucial component of wind development due to the potential impacts on the surrounding community should something fail. Testing ensures blade reliability and safety, and guarantees that the latest designs are in compliance with national standards.

The WTTC can test up to three blades at a time and is capable of testing in both horizontal and vertical directions – a capability no other laboratory in the U.S. can accomplish.

In order for the U.S. to remain competitive in the wind market, it must produce a similar product to its global competitors. However, it is difficult to support cutting edge technology without an adequate testing



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## Project

facility. In the past, many engineers would develop a prototype without the infrastructure to test it; or would ship it overseas, transferring guardianship to an off-site coworker.

The WTTC potentially solves this problem by enabling engineers to remain with the prototype during testing, and to shorten the gap in global competition.

petroleum, metals and volatile organic compounds (VOCs). It is a state-listed disposal site regulated under the *Massachusetts Contingency Plan (MCP)* and federally regulated under the *Toxic Substance Control Act (TSCA)*.

The site was previously a scrap metal yard, which was dismantled and capped with a 15-inch concrete slab

with ARRA stimulus funding. Moderately contaminated soil was reused on-site and encapsulated beneath the new building, significantly reducing the amount of PCB-contaminated soil, which was disposed off-site at a TSCA approved facility. Soil that was PCB contaminated and characteristically hazardous due to lead contamination was stabilised on-site.

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### Building

The WTTC comprises a large-scale industrial building in which wind turbine blades are tested for structural integrity and durability. The building is approximately 110 by 330 feet and approximately 80 feet in height. It offers a full suite of certification tests for turbine blades up to 90 metres in length.

It also offers the latest wind turbine blade testing and prototype development methodologies in order to help the wind industry deploy the next generation of onshore and offshore wind turbine technologies. This is critical to ensure the competitiveness of U.S. wind turbine and blade manufacturers.

The only blade testing facility to be temperature controlled, it also meets the *LEED Plus* requirements of the Commonwealth of Massachusetts. Through its sustainable construction, it is a working example of the environmental stewardship that is being fostered by encouraging wind technology development.

### Brownfield redevelopment

The one-acre building footprint spans a site contaminated with polychlorinated biphenyls (PCBs),

to eliminate human contact with the PCB-contaminated soil that remained on the site. The site had been closed under the State programme and a deed restriction was placed on the property, which required maintenance of the cap, but also allowed the construction of commercial and industrial buildings.

In June 2007, Massachusetts won a national NREL grant competition to locate a wind turbine test facility. The selected project site, owned by the **Massachusetts Port Authority (Massport)**, remained dormant and under utilised for years. The existing concrete cap was incorporated into the proposed building design, servicing as a portion of the building slab.

Remediation of the site was conducted under both state and federal jurisdiction, consistent with requirements in the MCP deed restriction and a *Risk Based Cleanup Plan (RBC)* negotiated with the US **Environmental Protection Agency (EPA)** under TSCA for characterisation and off-site disposal of PCB-contaminated soils.

Site characterisation was fast-tracked in order to meet the accelerated time line for design and construction requirements associated

### Permitting

Due to the multitude of stakeholders involved, as well as the fact that this facility was built on a former brownfield site, the extent of permitting was vast and complicated. Since the site was a former scrap metal yard contaminated with PCBs, extensive environmental permitting was coordinated with the DoE and the **Massachusetts Department of Environmental Protection**. In addition, the site is ADA compliant and complies with all fire and safety codes. The project owner and manager took great care to ensure compliance with all requirements, including federal, state and city permitting.

The goal for the WTTC is to attract new wind technology and other renewable energy companies to Massachusetts. To a greater extent it aims to create more energy independence; economic growth through job creation and revenue; drive environmentalism; and bring innovative researchers to the facility to design and test new technologies.

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