Massachusetts Military Reservation (MMR)
Air Force Center for Engineering and the Environment (AFCEE)
Wind I

Q/A FACT SHEET
October 2011

AFCEE:

- Manages the Installation Restoration Program at the MMR.
- Constructed nine pump and treat plants to remediate groundwater contamination
- Has implemented a robust optimization program to reduce the carbon footprint and utility cost associated with the treatment systems

FOR MORE INFORMATION:

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WWW.MMR.ORG

ACRONYMS

DOD – Department of Defense

EA – environmental assessment

FAA – Federal Aviation Admin

FONSI – Finding of No Significant Impact

ft - feet

GE - General Electric

M - million

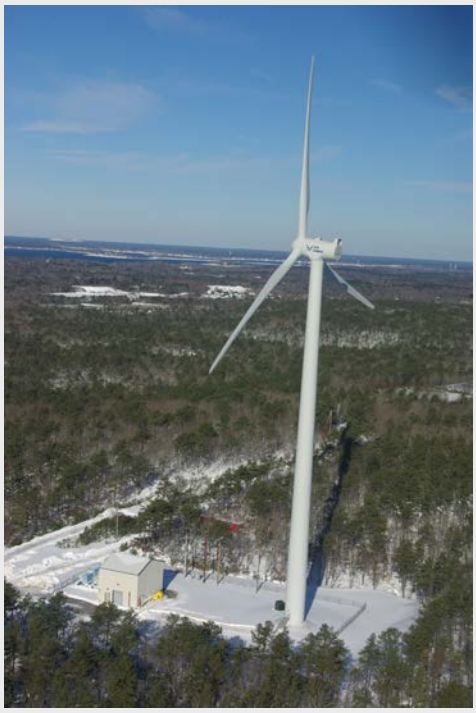
MW – Megawatt

MWhr – Megawatt-hour

O&M - Operations and Maintenance

WHAT IS WIND I AND WHERE IS IT LOCATED?

Wind I is a Fuhrlaender 1.5 MW wind turbine. It is located in the southwestern area of the MMR, 1140 feet (ft) from the nearest base housing unit. The wind turbine is approximately 390 ft tall. The project is jointly funded by the Air Force and the Army.



WHY DID AFCEE BUILD WIND I AND HOW MUCH DID IT COST?

The wind turbine was built to reduce the electricity costs and environmental impacts associated with the pump and treat systems, constructed by AFCEE to remediate the contaminated groundwater at MMR. Electrical costs for the AFCEE program ranged from $2 million in 2009 to $1.7 million in 2011. The 1.5 MW wind turbine was projected to generated 3810 MWhr annually (29% capacity factor) and offset the utility costs by 25%-30%. In addition, the wind turbine was expected to reduce the air emissions associated with the fossil fuel power supply for the treatment systems by the same range of 25%-30%.

Based on the following costs, the return on investment is anticipated in eight to nine years:

- $400,000 for a constructability assessment
- $4.87M for construction and two years of operations and maintenance (O&M)
- $150,000 for Title II/Oversight
- $53,858 for interconnection/ witness test

WHAT WAS INVOLVED IN THE APPROVAL PROCESS?

The wind turbine idea was envisioned in early 2005. AFCEE first consulted with the base agencies to ensure the wind turbine project would be compatible with the other missions. After receiving the base approvals, AFCEE began communicating the project with the public through the previously established cleanup team meetings. The project was submitted to the FAA and received a determination of no hazard. Other local, state, and federal agencies were consulted on the proposed project (See page 2). A constructability contract was awarded in Jun 2006 to CH2M Hill and included a basis of design, wind resource assessment, and an economic analyses. An environmental assessment (EA) was also prepared and provided for public comment; a public meeting was held during the comment period. The EA process resulted in a Finding of No Significant Impact (FONSI).

WHAT WAS INVOLVED IN THE CONSTRUCTION PROCESS AND HOW LONG DID IT TAKE?

The construction contract was awarded to Environmental Chemical Corporation in Sep 2007. The wind turbine started operating on 02 Dec 2009. Overall, from concept to operation, the project took close to five years.

HOW MUCH ENERGY HAS BEEN GENERATED BY WIND I TO DATE?

Since startup through Sep 2011, the wind turbine has generated 4434 MWhrs. Through net metering, NSTAR has credited AFCEE with $588,888 as of 24 Aug 2011. In addition, AFCEE received $54,394 from an availability guarantee on the wind turbine performance.

2005	Planning began for project
May 2005-Feb 2006	Coordination with MMR base agencies
2006-2007	Constructability assessment, EA, public notification
2007-2009	Design, construction, public meetings
02 Dec 2009	Wind Turbine startup
2009-Present	Operations and Maintenance
AFCEE/MMR Website (WWW.MMR.ORG)	Will maintain wind turbine information and updates

SPECIFICATIONS:

Hub Height – 80 m (262 ft)
Total Height – 119 m (390 ft)
Rotor Diameter – 77 m (253 ft)
Speeds:

- Rotational speed: 9.7-19 rpm
- Avg site wind speed ~ 6.5-7.0 m/s (14.5 – 15.7 mph) at 80 m hub height
- Rated output @ 11 m/s (~25 mph)
- Start wind @ 3 m/s (6.7 mph)
- Stop wind @ 20 m/s (~45 mph)
- Survival speed @ 59.5 m/s (134 mph)

Foundation:

- Spread form type: ~ 600 yd^3 5000 psi concrete
- 57 ft diameter
- 8 ft high in center tapering to 3 ft high at edges

Blades:

- Manufactured by LM Glasfiber in Grand Forks, ND
- Length - ~37 m (122 ft)
- Weight – 6200 kg (6.8 tons)
- Material – fiberglass/epoxy

Nacelle/Generator:

- Manufactured by Fuhrlaender in Germany
- Width – 3.9 m (12.8 ft)
- Height – 3.9 m (12.8 ft)
- Length – 8.1 m (26.6 ft)
- Weight – 65 metric tons (71.6 tons)

Tower:

- Manufactured by SMI Hydraulics in Porter, MN
- Section lengths varied from 12.5-24.1m (41-79 ft)
- Section weights varied from 32.5-53 tons

Crane:

- Manitowoc 16000
- 440 ton crane
- 315 ft mast height
- Delivered to site on 18 flatbed trailers
- Required 4 days to assemble

COORDINATION/CONSULATION:

- Base Agencies, MMR Energy Committee, Joint Oversight Group (MMR)
- Bourne Historical Commission
- Environmental Management Commission, Community Advisory Council, Science Advisory Council
- Environmental Protection Agency/MassDEP (program regulators)
- FAA
- Mashpee Wampanoag Indian Tribal Council Board
- Massachusetts Aeronautics Commission
- Massachusetts Historical Commission
- Massachusetts State Division of Fisheries and Wildlife
- Massachusetts Clean Energy Center - Grant
- Media
- Natural Heritage and Endangered Species Program (NHESP)
- NSTAR
- MMR Plume Cleanup Team
- Sandwich Historical Commission
- Senior Management Board
- US Fisheries and Wildlife Service
- Wampanoag Tribe of Gay Head (Aquinnah), Tribal Historic Preservation Officer