Utility-Scale Wind Turbine for Mass. Maritime Academy

The newly installed commercial-scale wind turbine at the Massachusetts Maritime Academy. Photo: Solar Design Associates

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With its campus at the western mouth of the Cape Cod Canal, the Massachusetts Maritime Academy (MMA) enjoys the abundant endowment of wind resources available along the southeastern Massachusetts coast. Last year, Admiral Richard Gurnon, Commandant and President of the Academy, decided to take maximum advantage of that resource and signed a contract to power his campus with a utility-scale grid-interconnected wind turbine.

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-- Steven Strong, President of Solar Design Associates

Solar Design Associates of Harvard, Massachusetts teamed with Cape Wind's Jim Gordon and his Boston firm, Energy Management, and Massachusetts general contractor Jay Cashman to design, engineer and install the first state-owned wind turbine in Massachusetts.

Steven Strong, President of Solar Design Associates, said the team specified and installed a 248-foot-tall, 660-kilowatt (kW) turbine from the Danish manufacturer Vestas. This turbine was selected because it nicely fit the project requirements and is a sister to the turbine installed in Hull, Massachusetts, in 2001 on the beachfront next to the high school. Results have been so favorable with the performance of the Hull turbine that townspeople voted to install a second, larger wind turbine and the town is now planning for turbines three and four.

The overall project at Mass Maritime cost $1.34 million with cost shared funding coming from the Massachusetts Renewable Energy Trust (MRET) and the state's Department of Capital Asset Management (DCAM). The turbine is estimated to produce about a third of the academy's annual power needs and save some $300,000 each year with an overall payback of less than five years. Over its lifetime, the turbine will produce more than $7 million worth of electricity for the academy. This is a very conservative estimate using today's utility rates -- as rates will surely go much higher in the years to come.

"This turbine is a money machine," said Admiral Gurnon. "Every time the wind blows, we can invest that savings in more renewable energy."

Admiral Gurnon plans to invest in solar power on campus as well as geothermal energy and a biofuel program. In addition to its significant cash contribution, the turbine will also make an important contribution to the academy's curriculum by serving as a real-time teaching tool for the school's engineering cadets who make up more than 50% of the school's student body.

"Wind resources are, by nature, localized and very site specific. You have to harness them where they occur or they are simply wasted," said Solar Design's Strong. "Mass Maritime is an ideal wind site. Their 52-acre campus on Taylors Point is bounded on three sides by the ocean. They have some half million square feet in 25 buildings on campus so there is sufficient onsite load to directly utilize the turbine output. In addition, the academy's investment in wind power has direct benefits for the students by helping prepare them with the knowledge and skills for their future careers in renewable energy," Strong added.

The development of wind energy sites has rapidly increased in recent years as conventional energy prices have steeply escalated along with concerns about global warming, oil supply and national security. "Many of the major wind turbine manufacturers are now backordered 12 months or more due to high demand for turbines worldwide," said Strong. "Many countries have made significant commitments to wind power and are constructing utility-scale wind farms to harness their endowment of wind resources."

Officials at Cape Wind, developer of the offshore wind farm proposed for federal waters off the south coast of Cape Cod, are thrilled to see smaller wind projects advance, in hopes they will lessen fear of the unknown. "From our standpoint, it's always helpful whenever wind turbines are erected," said spokesman Mark Rodgers. "Familiarity typically leads to greater acceptance."

"Folks who are looking at the future through a rearview mirror are resistant to change," said Solar Design's Strong -- who is a strong proponent of the Cape Wind proposal. "They feel if they can stall progress, the status quo will simply continue forever. The truth is, our state, our region and our country are steadily demanding more energy and we will have to get that energy from somewhere. It

is not, stall the Cape Wind project and then do nothing. It is: shall we begin to harness our native, clean and renewable resources or shall we build more coal plants?"

"Philosophically, although fossil fuels will be with us, I believe the future ought to be renewable energy," said Admiral Gurnon.

Mass Maritime certainly knows the downside of fossil fuels. Their campus sits a short distance from the Mirant power plant at the canal's east end in Sandwich, one of the state's "filthy five" electric plants.

The school is also at the northern end of Buzzards Bay, a body of water that has been battered over the years by major oil spills -- the latest in April 2003 when a Bouchard Transportation Co. barge spilled about 100,000 gallons of oil bound for the Mirant plant into the bay, killing birds and sea life while damaging more than 90 miles of coastline.

The installation of the Mass Maritime turbine was completed by electricians from the Massachusetts local of the International Brotherhood of Electrical Workers (IBEW). The IBEW is also a strong proponent of wind energy and the Cape Wind project and installed their own wind turbine to power their regional training center on the Boston waterfront adjacent to Interstate 93 last summer.

"IBEW Local 103 has recognized the inevitability of the energy market shift away from fossil fuels and toward nonpolluting renewable energy," said Michael Monahan, Local 103 Business Manager. "That presents our members with opportunities for jobs in emerging technologies."

The turbine at Mass Maritime should be operational in May once the utility approves the interconnection.

The Academy grants degrees in Marine Engineering and Marine Transportation, Marine Safety and Environmental Protection and Facilities and Plant Engineering. In addition, MMA conducts certificate programs and continuing education programs for industry professionals.

For further Information

- Solar Design Associates
- Massachusetts Maritime Academy