

Tilting at Windmills

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A project to put 130 wind turbines on 26 square miles off Nantucket Sound has generated a lot of hot air in Massachusetts—and Washington. Contained in the arguments pro and con are partial facts, misconceptions, outright lies and hysteria. What we're not getting is a rational analysis of the Cape Wind project's effects on the supply of and demand for electricity in New England.

In the interest of full disclosure, my company has spent more than 23 years in the energy business owning and operating a number of alternative power plants. We are the world's largest seller of "petroleum coke," an alternative fuel, and produce a super-compliance coal and coal-bed methane, an alternative for natural gas. We have also explored wind farming in Kansas and California. Oh, and I own a summer house that overlooks Nantucket Sound.

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Nearly four years ago, Jim Gordon, founder of Cape Wind, approached me about investing in an offshore wind farm he wanted to build in Nantucket Sound. I was intrigued and decided to examine the economics and risks of the project.

Jim wouldn't share his economic model with us. So we made our own, to determine if the project was viable. At the time, we estimated that it would require \$825 million to construct a 420 megawatt offshore wind farm. Our model assumed that the turbines would operate 40% of the time and Cape Wind would produce 1.5 billion kilowatt-hours of electricity per year. The

operating costs were estimated at \$27.5 million per year or 1.8 cents per kwh; at an estimated price of 6.6 cents per kwh, the project would generate an average after-tax cash flow of \$53.6 million per year, or \$1.1 billion over 20 years, at an internal rate of return of 20.1%. Jim confirmed with me the same numbers.

These calculations included a federal tax credit of 2.3 cents per kwh for the life of the project, totaling \$37 million per year; an estimated 2.2 cents per kwh state credit of \$35 million per year for alternative energy, and five years of accelerated depreciation. Altogether, taxpayers would subsidize Cape Wind to the tune of \$72 million a year, passed on to the consumer as higher electricity rates. If it happened, Cape Cod residents' electricity bills would go up by \$440 per year. Cape Wind needs the tax and energy subsidies in order to achieve a 20% rate of return, a requirement to secure financing for a high risk, new-technology offshore wind farm.

The more we examined Cape Wind's economic assumptions, the more the risks concerned us. If the political climate changed, the government could abolish tax and energy credits. Cape Wind's rate of return would drop to 7%. Moreover, the analysis did not include the estimated \$50 million it would cost to upgrade the transmission lines from Mid-Cape to the Cape Cod Canal—improvements needed to handle the expected increase of electricity. Furthermore, through skillful lobbying, Cape Wind managed to avoid federal lease bonus payments, royalties and deposits for demolition upon abandonment of the project, required by the Department of Interior for all offshore oil and gas projects to operate in federal waters. This loophole is worth hundreds of millions of dollars.

As I thought the project too risky, I declined Jim's offer to invest.

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That forecast was four years ago and much has changed. Current estimates show that an offshore wind power plant producing 420 megawatts of electricity will cost roughly \$1.6 billion instead of \$825 million to build; it will operate only 30% of the time, delivering only 126

megawatts. It will have an operating cost of 9.3 cents per kwh instead of 1.8 cents per kwh. To earn the 20% return needed for financing, Cape Wind would have to sell electricity at 18 cents per kwh instead of 6.6 cents per kwh.

This is twice the current market rate of eight to nine cents per kwh. Such a cost would increase the price of electricity by \$105 million per year over the current market. Under this scenario, Cape Cod residents would have to pay \$1,300 more per year for their electricity if all incremental costs were charged and isolated to the Cape and nearby islands. Let's assume that Jim Gordon does not want to make a 20% rate of return and that he decides to charge the current market rate of 8.5 cents per kwh. Cape Wind would only earn about a 3% rate of return. Take away the tax credits and the return is negative. For Cape Wind to be an attractive investment, it needs a subsidy of at least \$100 million per year, or 10 cents per kwh.

What's driving this dramatic increase? Steel and construction costs have gone up rapidly over the last four years. Wind turbines must be built with steel not only to withstand a harsh, corrosive maritime environment but hurricane winds as well. Nantucket Sound has a construction window of only three to four months a year due to weather. Maintaining the windmills offshore will be expensive, requiring special equipment and crews. Windmills offshore break down more than those onshore. The technology also has not been fully developed for U.S. offshore wind turbines. It is estimated to cost \$10 million to \$15 million in R&D to build offshore wind turbines that are non-corrosive and produce 110 volt cycle power.

The capacity factor of 40%—the amount the wind needs to blow to generate electricity—is another uncertainty. The wind would have to blow 25 miles per hour 40% of the year; scientific data suggests that Cape Wind will be lucky to get 30%. The wind on the Sound is fickle. And there is one cardinal rule in the power business: Customers want reliable electricity on demand. Cape Wind will not supply consistent electricity without constructing a second "peaking plant." All of these uncertainties mean the final cost of the project will be greater than even the current estimates.

And don't believe the argument that offshore windmills will reduce the country's need for foreign oil. Nearly 90% of the country's oil goes to make motor gasoline, aviation fuel and related products. Only 1.9% goes into electrical generation, mainly peaking plants, and they produce only 3% of U.S. electricity. A wind farm the size of Cape Wind would still need a gas- or oil-fired peaking plant to ensure consistent electricity and result in some pollution.

Finally, any power plant developer needs a willing market to sell electricity. We checked the New England power grid to determine if there was a market for Cape Wind's electricity. Southeastern Massachusetts has a 50% excess power capacity and won't need more for perhaps the next decade. New England has a capacity of 33,000 megawatts and a peak demand of 27,000 megawatts. Even without the excess capacity, it would be a struggle to sell such expensive electricity.

If more electricity is needed in New England, there are other types of power plants that can meet the need without greatly increasing consumers' electric bill. A 420 megawatts coal-fired power plant that would supply 381 megawatts would cost about \$714 million, and deliver electricity at 8.6 cents per kwh. It would have fuel costs of 2.8 cents per kwh and a 1.8 cents per kwh operating cost. A 420 megawatt gas-fired plant that delivered 400 megawatts would cost \$261 million, supply electricity at 6.9 cents per kwh, have fuel costs of five cents per kwh and operating costs of 0.7 cents per kwh. An onshore wind farm of 420 megawatts would cost \$600 million and deliver 126 megawatts at a price of 10 cents to 12 cents per kwh. It would have no fuel cost and an operating cost of about 0.5 cents per kwh.

When you do the math, it is clear that every other form of power generation would be cheaper to build, produce more electricity at a consistent rate and save consumers more money. When you consider the costs and risks of an offshore wind farm, and the fact that New England does not need more power, the project becomes nonsensical, a giant boondoggle for the benefit of one developer.

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