



# **Blowing in the Wind: Offshore Wind and the Cape Cod Economy**

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## Executive Summary

Cape Wind Associates has proposed to build 130 large wind turbines on a 24 square mile area of Horseshoe Shoal, in Nantucket Sound. The project is controversial. Cape Wind argues that the project will lower electricity costs to consumers, reduce emissions from power plants in the New England region, create more jobs on Cape Cod, and contribute to greater energy diversity and independence. Critics of the project are concerned about the high cost of wind-generated electricity, about environmental impacts and about the esthetic effects of 130 windmills on the horizon, which they fear will deter tourists and depress land values.

The Beacon Hill Institute (BHI) is in the process of undertaking a complete and systematic cost-benefit analysis of the siting of the proposed wind farm in the Sound. The current report summarizes the first phase of this work, and presents and analyzes the results of a major survey conducted on the Cape and on Martha's Vineyard in the summer of 2003.

In July-August, 497 tourists and 501 homeowners were surveyed in the six communities most affected by the windmill project (Barnstable, Mashpee, Falmouth, Edgartown, Oak Bluffs, and Yarmouth). The fieldwork for these two surveys was done under contract with, and under the supervision of, David Paleologos, President, DAPA Research, Inc., an experienced pollster. For either of the surveys, the maximum error rate is +/-4.38% at a 95% confidence level.

Respondents were shown three pairs of photographs with different views of Nantucket Sound, first without, and then with, windmills on the horizon, and were given a brief verbal explanation of the windmill project. Once respondents had grasped the nature of the visual implications of the windmill project, they were asked a series of questions about their willingness to visit the Cape or, in the instance of the home owners, their expectations about effects on property values. The analysis reported in this study is largely based on the results of the two surveys.

### *Tourism*

Official statistics show that 21% of the 98,000 jobs on Cape Code were in tourism-related industries (in 2000). If the indirect and induced effects of tourism spending are included, tourism accounts for 40% of the region's employment. The tourist survey found that:

- 3.2% of tourists said they would spend an average of 2.9 fewer days on the Cape if the windmills were built;

- a further 1.8% said they would not visit at all; and
- 1.0% of tourists said they would stay longer on the Cape, remaining an extra 13 days on average.

In addition, if the windmills were built, 11% said that they would pay less, and 1% said they would pay more, on lodging while visiting the Cape. The net effect of all these factors is that the presence of the wind farm would lead to \$75.15 less spending on average per respondent per year. Grossed up to represent all tourists, this represents a reduction in spending of between \$57 million and \$123 million.

Using the Regional Input-Output Modeling System (RIMS II) model of the Bureau of Economic Analysis, it was possible to measure both the direct and indirect effects of this reduction in tourist spending. The main effects are:

- a reduction in permanent employment of between 1,173 to 2,533, a significant amount in the context of the local economy;
- a fall in earnings of \$28 to \$61 million annually; and
- a reduction in local output of \$94 to \$203 million per year.

### *Land Values*

Two thirds of home owners say that the windmills would worsen the view over Nantucket Sound “slightly” or “a lot”. This raises the distinct possibility that the presence of the windmills might reduce property values on Cape Cod, especially as the main reasons for visiting or living in the area, according to both surveys, are the “beauty of the region,” “the beaches” and “the ocean views”.

On average, home owners believe that the windmill project will reduce property values by 4.0%. Households with waterfront property believe that it will lose 10.9% of its value. These numbers are consistent with the findings of a separate survey of 45 realtors, who estimated that property values would fall by an average of 4.6% as a result of the windmills.

Based on the loss of property value expected by home owners, the total loss in property values resulting from the construction of an offshore wind farm would be \$1.35 billion, a sum that is substantially larger than the approximately \$800 million cost of the windmill project itself.

Any reduction in property values would in turn lead to a fall in property tax collections in the affected towns; the drop in these tax collections would be \$8 million annually. If the tax rates were raised to

maintain revenue, this would shift some of the property tax burden off waterfront residents (whose property values would fall the most) and on to the (less affluent) inland residents.

### *Rents and Royalties*

The tourist and home owner surveys asked whether Cape Wind should be required to pay a rent or royalty, if permitted to operate the wind farm. Fully 89% of home owners and 84% of tourists said “yes,” and overall, respondents indicated that the royalty/rent should be about 8% of revenue. Given annual revenues for the windmill project of about \$105 million, this would imply a royalty payment of roughly \$8 million per year.

### *Willingness-To-Pay*

Both surveys asked how much respondents would be willing to pay to keep the windmills away (or to attract them). Home owners are firmly opposed to the windmill project: 22% would pay an average of \$286 each to keep the windmills away, while 9% would pay an average of \$112 to encourage them to come. The net effect, grossed up by the number of households (or adults) is a willingness to pay of between \$5 and \$12 million. Tourists, on balance, favor the windmills; almost one in seven would be willing to pay for the windmills to locate in the Sound, compared with one in twenty who would pay for them not to be built. The net effect is a positive willingness to pay to keep the windmills away. The total is somewhere in the range of \$1.3 and \$4.0 million, by our estimates.

## 1. Introduction

In November 2001, a private developer, Cape Wind Associates, filed an application with the U.S. Army Corps of Engineers for permission to construct the nation's first offshore wind farm in Nantucket Sound. The project would consist of 130 wind turbines, each approximately 426 feet tall, arrayed over a 24 square mile area of the Sound known as Horseshoe Shoal. The wind farm would be sited five miles off the coast, in federal Outer Continental Shelf (OCS) waters. From there, undersea cables would transmit power through state waters to an onshore distribution grid. The project, according to Cape Wind, would have an installed capacity of approximately 420 megawatts (MW) of electricity.

The project is controversial. Cape Wind argues that the project will lower electricity costs to consumers, reduce emissions from power plants in the New England region, create more jobs on Cape Cod, and contribute to greater energy diversity and independence. Critics of the project are concerned about the high cost of wind-generated electricity, about environmental impacts and about the esthetic effects of 130 windmills on the horizon, which they fear will deter tourists and depress land values.

The project is subject to an extensive regulatory review process, involving a number of federal, state and local regulatory authorities. Because the project would be sited in federal coastal waters, the Army Corps of Engineers, through its permitting authority, has a key role in this process. The Army Corps' guidelines recognize the importance of considering the "reasonable use expectations of the general public and waterfront landowners" in deciding whether to issue a permit for projects of this kind.<sup>1</sup>

Whether use of a public asset such as Nantucket Sound is "reasonable" or not depends in part on how, from a societal point of view, the benefits it would confer compare to the costs it would impose. To date, there has been no systematic and complete effort to assess the costs and benefits of siting a wind farm in Nantucket Sound, although there have been a number of partial assessments, including the following:

- An economic impact study of the project that claims it will generate "an estimated 600 to 1,000 jobs in the region".<sup>2</sup>
- A discussion of the legal issues related to permitting the windmills.<sup>3</sup>
- An assessment of the cost of wind-generated electricity.<sup>4</sup>
- A review of the ecological resources of the area.<sup>5</sup>

All of these studies are useful, but none is complete enough to make a convincing case, one way or the other, for whether the wind farm should be sited in Nantucket Sound.

The Beacon Hill Institute (BHI) is in the process of undertaking a complete and systematic cost-benefit analysis of the siting of the proposed wind farm in the Sound. The current report summarizes the first phase of this work, and presents and analyzes the results of a major survey conducted on the Cape and on Martha's Vineyard in the summer of 2003.<sup>6</sup> The second phase of the report will weigh the pros and cons of the Cape Wind proposal in the context of a more complete and formal cost-benefit analysis.

This first report addresses four major questions:

1. What effect would the windmill project have on tourist spending on Cape Cod, and hence on employment, incomes and output?
2. How would the windmill project affect land values and therefore property taxes?
3. What rent or royalty payments do people believe Cape Wind should pay for the use of Horseshoe Shoal?
4. To what extent is the public willing to pay for the windmills to be built (or not to be built)?

To answer these questions we surveyed 998 home owners and tourists in July and August of 2003 in those towns most likely to be affected by the windmill project. In the next section we discuss the survey itself, and how it was designed to answer the four questions. We then consider each of the four issues – tourist spending, land values, rents and royalties, and willingness to pay, in turn.

## 2. The Survey

Most of the findings of this report are based on the results of separate surveys of 497 tourists and 501 home owners that were undertaken over a period of eight weeks in July/August 2003. In this section we describe how the surveying was done and assess its accuracy. Copies of the questionnaires, along with the full results, are appended to this report.

The fieldwork was done under contract with, and under the supervision of, David Paleologos, President, DAPA Research, Inc., an experienced pollster and author who also serves as the Director of the Suffolk University Political Research Center. The six-member field team was trained for two weeks prior to the survey itself, and worked seven days per week, at all times of the day and evening. All of the data were collected using in-person interviews, which is the recommended approach for work of this kind.<sup>7</sup>

The 11-page DAPA Research Home Owner Survey questionnaire and the 10-page DAPA Research Tourist Survey questionnaire were pre-tested in Boston and Mashpee, and fine-tuned before being administered in the field. Each questionnaire took about 15 minutes to complete; as a reward for participating, respondents were offered a pair of movie tickets or a \$10 voucher for Dunkin' Donuts.

### Sampling

Responses were obtained from 501 home owners. Having identified the communities of Barnstable, Mashpee, Falmouth, Edgartown, Oak Bluffs, and Yarmouth as the ones most likely to be affected by the windmill project – mainly because the windmills would be clearly visible from the shorelines of these towns – home owner population trends were used to calculate each town's quota from the targeted sample. Once the town-level quotas were established, each town was further broken into sub quotas for each precinct, using Census 2000 block data. Within each precinct, starting points were randomly selected from a most recent residents list sorted in ascending order alphabetically. Total households per precinct were divided by each precinct's quota to determine an individualized skip pattern. The field teams would comb through each precinct door-to-door, census style, to provide an even distribution of households. They would attempt each starting point address and increment to the next highest street address listing until a complete was received. Once a completed survey was received, the field team would proceed to the next starting point number within each precinct and repeat the process until the entire precinct was completed. If no completes were received from an entire street (which rarely

occurred), the field team would proceed to the next street in that precinct alphabetically and continue the process until a complete had been received from that block. At the end of the exercise, each precinct's quota would be exactly filled for that town and represent an even distribution of households from streets A-Z.

A total of 497 responses were obtained as a result of interviewing tourists in the same towns as the Home Owner Survey. The approach taken was to determine locations of interest that would attract the best demographic mix of tourists at all levels including gender, age, income, and recreational interest. These "prime locations" were identified after extensive contacts with Cape Cod Tourism, town officials, business owners, and tourists. If, in the field, tourist field team members encountered a home owner on-site, then the appropriate survey was immediately given with the stipulation that street address and precinct would be recorded. These home owner surveys were used to randomly select starting points in the respective precincts.

To protect the integrity of the study, no field locations for tourist or home owner assignments were disclosed to team members until the morning of the workday. This protected the survey work from being infiltrated by organized parties on the pro or con side of the windmill siting issue who might casually ascertain the next day's location from a field member. We successfully implemented a "stick and move" field philosophy so that no group could "stack" their supporters into the survey count. All location time durations lasted only several hours and were not corrupted by the work of special interests attempting to lobby their cause throughout the polling process.

In sum, the sampling was done carefully. For either of the surveys, the maximum error rate is +/-4.38% at a 95% confidence level.

Both of the surveys are "contingent valuation" surveys.<sup>8</sup> Respondents were shown three photographs with different views over Nantucket Sound, first without, and then with, windmills on the horizon, and were given a brief verbal explanation of the windmill project. One pair of with-and-without photos is shown in Annex 5. Once respondents had grasped the nature of the visual implications of the windmill project, they were asked a series of questions about their willingness to visit the Cape or, in the instance of the home owners, their expectations about effects on property values. The survey further queried respondents about their willingness to pay to have (or not have) the windmills; these valuations, contingent on the building of the windmills, are an important part of the exercise, and are discussed more fully below.

### 3. Tourist Spending

Tourism was the principal driver of Cape Cod's impressive economic growth over the last decade, and the area now attracts 6,000,000 visitors annually.<sup>9</sup> Employment in the region expanded from 78,792 jobs in 1993 to 98,098 in 1999, far outpacing the rest of Massachusetts during this period.<sup>10</sup> By 2000, tourism-related industries accounted for 21% of the region's employment. If the indirect and induced effects of tourism spending are included, tourism accounts for 40% of the region's employment.<sup>11</sup> The tourism sector on Cape Cod and the Islands generates approximately \$84 million in state and local tax receipts.<sup>12</sup> Thus the first question asked of any large project on the Cape is, "how it will impact tourism?" In this section we estimate the likely effects of the Cape Wind project on the area's tourism industry.

The Tourist Survey asked visitors about their current travel behavior – trip spending, length of stay – as well as their motivation for visiting Cape Cod. After showing the photo simulations and providing background information on the project, respondents were asked if their travel habits might change as a result of the presence of the windmills, and specifically whether they would visit less (or more) and spend less (or more).

The key results are given in Table 1, and show that:

- 3.2% of tourists said they would spend an average of 2.9 fewer days on the Cape if the windmills were built;
- a further 1.8% said they would not visit at all; and
- 1.0% of tourists said they would stay longer on the Cape, remaining an extra 13 days on average.

We also estimate that a number of tourists would visit the Cape because of the windmills, and that this would boost visits by about 0.6%.<sup>13</sup>

For each of these groups we use the survey information on daily spending, apply it to the change in days and visits, and estimate that the net effect would be an average reduction in spending of \$44.67 per respondent per year.

<b>Table 1. Changes in Tourism Spending per Respondent, from Tourist Survey Results</b>				
<b>Tourist spending</b>	<b>Percent of Respondents</b>	<b>Number of Days</b>	<b>Spending/day, \$</b>	<b>Spending p.a., \$</b>
<b>Longer/shorter visits</b>				
Stay longer	1.02	+13.1	183.93	24.52
Stay less time	3.20	-2.9	389.63	-35.85
Would now visit	0.58	+6.0	251.66	8.82
Would no longer visit	1.82	-9.2	251.66	-42.16
			<i>Net, \$ p.a.:</i>	<i>-\$44.67</i>
			<b>Change, lodging spending/day, \$</b>	
<b>Pay more/less for lodging</b>				
Tourists pay less, visit for as many days	9.64	5.47	-48.38	-25.51
Tourists pay less, visit for fewer days	1.40	4.30	-100.28	-6.03
Tourists pay more, visit for as many days	1.06	9.69	+10.27	1.05
			<i>Net., \$ p.a.:</i>	<i>-30.48</i>
<b>Net cost per respondent p.a.</b>				<b>-75.15</b>
<i>Note:</i> The results of the Tourist Survey are weighted to correct for the oversampling of long-stay visitors.				
<i>Source:</i> Tourist Survey, July/August 2003.				

Respondents were also asked whether the Cape Wind project would affect the amount they would be willing to pay for lodging while visiting the Cape. The results, also shown in Table 1, are as follows:

- 9.6% of respondents said they would visit just as often, but would be willing to pay, on average, \$48 less per night; this group stays on the Cape for an average of five and a half days per visit.
- 1.4% of respondents would come less often and would pay \$100 less per night when they do visit.
- 1.1% of visitors would be willing to pay an additional \$10 per night, on average.

The net result of these effects would be to reduce spending on lodging by \$30.48 per respondent per year.

***Combining these two effects, we estimate that tourist spending would fall by a total of \$75.15 per respondent per year.***

The next step is to gross up these figures to arrive at a measure of the total impact on tourist spending in the area. The computations are shown in Table 2. We use Census estimates on summer rental housing and population, along with Massachusetts Room Occupancy Tax revenue data to allocate the 6,000,000 annual trips to the Cape. We estimate that 3.6 million of these trips are destined to the six towns that are the study's area of interest.

<b>Table 2. Total Spending Effects of the Change in Tourism Spending</b>	
Person trips to six-town survey area p.a.	3,594,136
Number of trips per household per year	1.675
Therefore number of visitors per year	2,145,409
<b>Lower bound estimate:</b>	
Divide by household size	2.824
To get number of households	759,794
Multiply by spending reduction/respondent (from Table 1), \$	\$75.15
To get total cut in spending, \$	<b>(57,098,626)</b>
<b>Upper bound estimate</b>	
Number of adult visitors is	1,640,850
Multiply by spending reduction/respondent (from Table 1), \$	\$75.15
To get total cut in spending, \$	<b>(123,310,055)</b>
<i>Sources:</i> See text.	

Based on the results of our survey, the average tourist makes 1.68 trips to the Cape annually; starting with 3.6 million person trips, we thus estimate that 2.1 million tourists visit the six-town area annually. This represents 760,000 households, based on an average household size (from our survey) of 2.8 persons. Applying the \$75.15 reduction in spending per respondent we estimate that total tourist spending would fall by \$57 million as a result of the construction of the windmills.

This is a lower bound, as some of those who responded to the Tourist Survey were not visiting with their entire families. Of the 2.1 million tourists to the six-town area, 1.6 million were adults; if spending fell by \$75.15 for each of these the reduction in tourist spending would be as much as \$123 million, which is likely to be an upper bound to the effect.

### ***Multiplier Effects***

Tourist spending is a form of “primary spending.” If it were to drop there would be an associated contraction in the non-tourist sector, as local suppliers find themselves with less business, and workers in the tourism sector end up with less to spend.

To quantify these secondary effects, we apply the Regional Input-Output Modeling System (RIMS II) model of the Bureau of Economic Analysis, which enables the user to provide detailed analyses of the direct and indirect economic impacts of different shocks to a local economy.<sup>14</sup> RIMS II, which accounts for interindustry relationships through the use of output, earnings, and employment multipliers, is a widely-used tool for conducting regional economic impact analysis. The data for the RIMS II tables are derived from BEA’s national I-O table, consisting of nearly 500 industries and BEA’s regional economic accounts, which through the use of location quotients (LQ’s) are used to adjust the national I-O table. The combination of these two sources of data results in a regionalized table capturing its industrial

structure and trading pattern.<sup>15</sup> RIMS II is available at the county level and can be used for a multiple county region as long as the counties are contiguous. In this case RIMS II multipliers were obtained for the Cape region, which includes Barnstable, Dukes and Nantucket counties.

The change in tourism spending, computed in Table 2, is used to derive changes in final demand by industry. We are able to use data from our survey to allocate the cut in spending to reductions in spending on lodging, food/dining, and recreation. These changes are entered into RIMS II and the results are the impact on output, earnings and employment by industry in the Cape economy.

Table 3 indicates the spending changes by industry entered into the RIMS II model and the resulting loss in employment, earnings and output for the Cape economy as a result of the tourism effects. Among the highlights:

- Permanent employment would fall by 1,200 to 2,500, a significant amount in the context of the local economy;
- Earnings would fall by \$28 to \$61 million annually; and
- Local output would be reduced by \$94 to \$203 million per year.

	Changes in Spending	
	Lower bound (\$m)	Upper bound (\$m)
<b>Initial change in spending:</b>		
Hotels and Lodging Places	-36.4	-78.6
Eating and Drinking Places	-11.9	-25.7
Assorted Recreation	-6.8	-14.7
Other (including retail trade)	-2.0	-4.4
<b>Total (from Table 2)</b>	<b>-57.1</b>	<b>-123.3</b>
<b>Total effect, direct + indirect</b>		
Output	-93.9	-202.7
Earnings	-28.2	-60.8
Employment (jobs)	-1,173	-2,533
<i>Sources:</i> Based on Table 2 and Tourist Survey, July/August 2003; last three lines are output from using the three-county RIMS II model.		

#### 4. Land Values

Economic theory suggests that the value of regional environmental amenities will be capitalized into current land prices,<sup>16</sup> and this prediction appears to be borne out in practice.<sup>17</sup> Observed changes in these amenities will ultimately lead to a change in local property values. It follows that if the windmill project is widely perceived to reduce the beauty of Cape Cod, then it is likely to be associated with a fall in property values there.

Both the Tourist Survey and the Home Owner Survey presented respondents with photographs of the view of Nantucket Sound with, and without, the wind farm. Respondents were then asked for their immediate reaction; 62% of tourists, and 68% of home owners said that the windmills worsen the view “slightly” or “a lot”; the full results are shown in Table 4. This raises the distinct possibility that the presence of the windmills might reduce property values on Cape Cod.

<b>Table 4. Opinions on the Effect of Windmills on the View Over Nantucket Sound</b>		
	Percent of responders	
	Tourist survey	Home Owner Survey
The windmills		
“improve the view a lot”	2.5	0.6
“improve the view slightly”	3.5	1.8
“neither improve nor worsen the view”	32.3	27.5
“worsen the view slightly”	43.0	32.3
“worsen the view a lot”	18.7	37.7
Number of usable responses	497	501
<i>Source: Tourist and Home Owner Surveys, July/August 2003.</i>		

Using the estimated change in property values provided by home owners, a projection of the total change in property value for each municipality is possible. This may be done by applying the net change in property value to the total assessed value of residential property in each town.<sup>18</sup>

##### *Home Owner Survey*

Each home owner interviewed was asked to estimate the price he or she would get if the home were sold, and then to estimate the effect, if any, on this value of the windmill project. Since some valuation of the natural beauty of the region is assumed to be embedded in the property value of Cape Cod homes, the loss of property value can serve as an estimate of the value of an uninterrupted view of the Sound.

***On average, home owners believe that the windmill project will reduce property values by 4.0%. Households with waterfront property believe that it will lose 10.9% of its value.***

To measure the total effect, we determined the expected change in property value for each of the six towns covered. We applied this to the assessed value of the total residential property in each town, and then adjusted for the fact that assessed values are on average 29% lower than market values (as determined by comparing reported and assessed values for the households in our sample). The details are set out in Table 5.

***The important result is that property owners in the six towns surveyed believe that the total loss in property values resulting from the construction of an offshore wind farm to be over \$1.3 billion, a sum that is substantially larger than the approximately \$800 million cost of the windmill project itself.***

If property values decline as anticipated, with the windmill project, then property tax revenues would fall too. The effects are computed in Table 5, by applying the tax rates to the anticipated decline in assessed property values. Collectively the six towns stand to lose \$8.0 million in property tax revenue.

It is plausible that the towns, rather than cutting services and spending, would raise the property tax rate to make up for the revenue shortfall. The net effect would be to shift some of the burden of property tax from high-income households (in waterfront properties) to lower-income households (who lack a view of the Sound). This is because the value of waterfront property is expected to fall substantially more than “inland” property.

<b>Table 5. Estimated Losses in Property Values and Property Tax</b>							
	Barnstable	Yarmouth	Mashpee	Falmouth	Oak Bluffs	Edgartown	Total
2003 Total Value of Residential Property, \$m	6,497	2,494	2,469	6,265	3,348	1,605	<b>22,678</b>
Property Value Loss (from survey)	4.93%	2.89%	5.47%	3.76%	3.54%	2.85%	<b>3.98%</b>
=Loss in Assessed Residential Property Value, \$m	320	72	135	235	119	46	<b>927</b>
Assessed value/selling price	84%	87%	65%	58%	62%	56%	
<b>So Loss in reported selling value</b>	<b>381</b>	<b>83</b>	<b>207</b>	<b>407</b>	<b>191</b>	<b>81</b>	<b>1,351</b>
Residential Tax Rate (mills)	9.4	11.08	9.51	7.96	6.98	3.68	
Loss in Property Tax Revenue (\$m)	3.01	0.80	1.28	1.87	0.83	0.17	<b>7.96</b>
<i>Memo:</i>							
mean selling price/house, \$000	379	342	370	527	650	1,402	<b>466</b>
<i>Source:</i> From Home Owner Survey, July/August 2003.							

The above figures suggest that an uninterrupted view of Nantucket Sound has a significant impact on property values throughout the region. The fact that the expected drop in values is greater for waterfront than for inland properties suggests that much of the loss in property value may be interpreted as an estimate of the value of preserving this uninterrupted view. Certainly, the main attractions of the area are “the beauty of the region” and “the ocean views” according to both tourists and home owners, as the survey results summarized in Table 6 show clearly.

<b>Table 6. Reported Reasons for Visiting or Living on the Cape</b>		
	Mean Response	
	Tourist survey	Home Owner Survey
<i>“Please rate each of the following reasons for living on or visiting the Cape, on a scale of 1 (very important) through 5 (not important at all)”</i>		
The peace and quiet	2.21	1.85
I grew up living/vacationing on the Cape	3.82	2.64
The shopping	3.66	3.91
The beauty of the region	1.64	1.30
The great restaurants	2.74	3.01
To provide a place for family to visit	4.08	2.29
The beaches	1.79	1.52
The ocean views	1.56	1.37
Recreation (golf, sailing, fishing, etc.)	2.67	1.94
My job is on the Cape	n.a	3.15
The public services (hospitals, libraries, etc.)	n.a	1.39
Sample size	497	501
<i>Source: Tourist and Home Owner Surveys, July/August 2003.</i>		

On the other hand, many home owners without a direct view also believe the value of their property will fall. Part of this may reflect a concern about the more general economic effects of the windmill proposal. In this context it should be noted that the value of the loss of property values is, in principle at least, not additional to the losses derived from the tourist survey. It is plausible to assume that the effects of a reduction in tourism due to the wind farm have been capitalized into the property value loss. However, using both estimates may help to calibrate the true cost of altering the aspect of Nantucket Sound.

### ***Realtor Survey***

To provide a check on the validity of the Home Owner Survey, we contacted 45 real estate professionals operating in towns abutting Nantucket Sound and asked a few straightforward questions about the actual and anticipated effects of the windmill project on property values.

Forty-nine percent of realtors expect property values within the region to fall if the wind farm were to be built. The mean response of the 45 realtors is a loss of 4.6%. This is close to the 4.0% loss that is expected by home owners themselves. Fuller details are provided in Appendix 1.

The realtors surveyed estimate that 44% of prospective buyers are unaware of the windmill proposal, which helps explain why the windmill project has had little concrete effect on the real estate market so far. The lack of knowledge about the project might seem surprising given the amount of media coverage and controversy that has surrounded it in the past six months, but it is similar to the Tourist Survey results (in which 46% of respondents replied that they had not heard of the proposal). This stands in stark contrast to the results of our Home Owner Survey, in which only 3% of the respondents said that they had not heard of the proposal.

## 5. Rents and Royalties

One of the highly contentious issues surrounding the Cape Wind proposal involves the issue of property rights. While surrounded on all sides by Massachusetts, the wind farm would be sited more than three nautical miles off the Massachusetts shore, on federal Outer Continental Shelf (OCS) land, beyond the regulatory jurisdiction of the Commonwealth. At this point, however, no federal framework exists for governing offshore wind projects. As stated by the Conservation Law Foundation, “What does not exist for the OCS is an administrative economic framework for managing non-mineral assets on the OCS. This absence leaves various aspects of an alternative energy developer’s relationship with the federal government (e.g., leases, royalties, rights of way) undefined...”<sup>19</sup> In light of this absence, legislation has been introduced to establish a regulatory framework, but at this time there has been no resolution.<sup>20</sup>

This lack of regulatory oversight has become the focal point of local opposition to the project. Opposition groups contend that Cape Wind is attempting a lucrative land grab and stands to profit from the use of public lands. Cape Wind has, quite correctly, pointed out that federal and state governments have often allowed private industry to operate (and generate profits) on public lands. Indeed, Cape Wind president Jim Gordon, in a recent editorial, points out that even traditional energy sources (coal, oil and natural gas) are sometimes produced on public lands, when it is deemed to be in the public interest.<sup>21</sup>

Whether the Cape Wind project is indeed ‘in the public interest’ is an ongoing debate. If, however, Cape Wind is allowed to proceed with development of an offshore wind farm in Nantucket Sound, will the public be reimbursed for leasing the land to a private developer?

The OCS Lands Act requires the Department of the Interior to “ensure that the U.S. government receives fair market value for acreage made available for leasing.”<sup>22</sup> Assuming, then, that we can determine the “fair market value” for the area to be occupied by the wind farm, should Cape Wind, if permitted to operate there, be forced to pay a rent or royalty?

According to our survey of 998 tourists and home owners, the answer is a definitive yes. Fully 89% of home owners and 84% of tourists believe that Cape Wind should be required to pay rent or royalties for using public lands. Overall, respondents believe the royalty should be around 8% of revenue (home owners believe the royalty/rent should be 8.1% of revenue while tourists put the figure at around 7.7%; the details are set out in Table 7).<sup>23</sup>

Using numbers provided by Cape Wind in an Environmental Notification Form submitted to the U.S. Army Corps of Engineers in November 2001, Cape Wind’s annual revenues are expected to be about \$105 million per year, which would yield a royalty payment of roughly \$8 million per year.<sup>24</sup> Coincidentally, this is close to the loss in tax revenue that is expected as a result of the fall in property values.

It may be possible to interpret the public’s desire for Cape Wind to pay royalties as a measure of their “willingness to accept” the project. We now turn to this issue in more detail.

<b>Table 7. Estimating the Favored Royalty Rate</b>			
Royalty Rate:	Midpoint	<b>Home Owners</b> Percent	<b>Tourists</b> Percent
Less than 1%	0.5%	0.8%	0.9%
1-3%	2.0%	5.1%	8.4%
4-7%	5.5%	8.3%	9.9%
8-10%	9.0%	8.7%	7.7%
Greater than 10%	12.5%	19.2%	13.5%
Same as oil & gas	14.0%	30.8%	32.6%
Not sure		17.4%	10.8%
No Royalty		9.7%	16.1%
<b>Estimated Average</b>		<b>8.1%</b>	<b>7.7%</b>
<i>Source:</i> Based on a usable sample of 494 home owners and 497 tourists.			
<i>Note:</i> Respondents were asked to choose one of the categories in column 1; we have chosen the point estimates corresponding to these categories, which appear in column 2; columns 3 and 4 show the percentage of respondents who chose each category.			

## 6. Estimating Willingness-to-Pay

We showed above (Table 4) that most respondents, both tourists and home owners, believe that the windmills would not improve the view of Nantucket Sound. One might ask what money value they would then put on not having the windmills in the Sound.

Two possible measures come to mind. One could ask respondents about their willingness-to-pay (WTP) to keep the windmills away (or to attract them). Alternatively one could try to measure respondents' willingness-to-accept (WTA) compensation – essentially the payment they would require in order to give a green light to the project.

It might appear that these are similar measures. In practice, however, willingness-to-accept values typically exceed willingness-to-pay (sometimes quite significantly).<sup>25</sup> Hanemann (1991) argues,

...if the public good has no substitutes (e.g. Yosemite National Park, or in a different context, your own life), there is no reason why WTP and WTA could not differ vastly; in the limit, WTP could equal the individual's entire (finite) income, while WTA could be infinite (p. 635-636).

For these reasons, WTP has become the generally accepted measure of value, and it is the one we use, even though it has been argued that the appropriate measure of value depends on the applicable property rights.<sup>26</sup>

We measure willingness to pay in one of two ways. In the "direct" approach we first determine whether the respondent would pay anything at all to discourage (or encourage) the siting of windmills in Nantucket Sound, and then ask how much they would pay. The main disadvantage of this approach is that there is a risk of a free rider problem; people may not reveal the true value that they put on something because they fear that they may then be asked to pay for it, and they hope that others will pick up the bill anyway.

The results of estimating WTP using the direct approach are shown in Table 8. They show three things:

- Home owners are firmly opposed to the windmill project; 22% would pay an average of \$286 each to keep the windmills away, while 9% would pay an average of \$112 to encourage them to come. The net effect, grossed up by the number of households (or population) is a willingness to pay of between \$5 and \$12 million.
- Tourists, on balance, favor the windmills; almost one in seven would be willing to pay for the windmills to locate in the Sound, compared with one in twenty who would pay for them not to be built.

- The net effect is a positive willingness to pay to keep the windmills away. The total is modest, somewhere in the range of \$1.3 and \$4.0 million, by our estimates.

<b>Table 8. Willingness to Pay for Windmills Not to be Built, “Direct” Approach</b>		
	Proportion of sample	Average willingness to pay, \$
<b>Home Owners</b>		
Would pay to keep windmills away	21.6	286.45
Would pay to encourage windmills to locate in the Sound	9.0	112.89
Would not pay, for legitimate reasons	37.9	0.00
Would not pay, for reasons unrelated to willingness to pay	31.5	
Memo: sample size	501	
<b>Net willingness to pay/person (\$)</b>		<b>75.38</b>
Lower bound estimate		
Multiply by number of households to get: (\$)		5,120,913
Upper bound estimate		
Multiply by population to get: (\$)		12,194,608
<b>Tourists</b>		
Would pay to keep windmills away	5.1	87.54
Would pay to encourage windmills to locate in the Sound	13.5	70.33
Memo: sample size	497	
<b>Net willingness to pay/person (\$)</b>		<b>(5.02)</b>
Lower bound estimate		
Multiply by number of visiting households to get: (\$)		(3,815,240)
Upper bound estimate		
Multiply by adult visitors		(8,239,384)
<b>Net effect</b>		
Lower bound estimate		<b>1,305,672</b>
Upper bound estimate		<b>3,955,224</b>
<i>Source: Tourist Survey and Home Owner Survey, July/August 2003.</i>		

A second, and increasingly popular, way to measure willingness to pay is by using the “referendum” approach. A respondent is given a price (which varies somewhat from questionnaire to questionnaire) and is asked whether he or she would vote in favor of a referendum that would collect this sum from everyone and use it to keep the windmills away (or encourage them to come). From the responses it is possible to infer the value of the willingness to pay.<sup>27</sup>

The results are set out in Table 9. The story that emerges is very similar to the one that comes out of the direct approach. Home owners are willing to pay to avoid the windmills, tourists on balance like them (and since there are so many tourists, this carries substantial weight), and on balance society (in the six towns on Cape Cod where the survey was undertaken) would be willing to pay in order not to have the windmills.

<b>Table 9. Estimate of Willingness to Pay Using Referendum Question</b>		
<b>Home Owners</b>		
Net willingness/person, \$		<b>245.55</b>
Households in the six towns	53,433	
Willingness * households (lower bound)		<b>13,120,336</b>
<b>Tourists</b>		
Net willingness per "tourist", \$		<b>(14.26)</b>
Number of households (Table 2)	759,794	
Willingness * households (lower bound)		<b>(10,835,685)</b>
Net WTP		<b>2,284,651</b>
<i>Source: Tourist Survey and Home Owner Survey, July/August 2003.</i>		

## 7. Conclusions

In the absence of a complete cost-benefit analysis, it is not yet possible to determine whether 130 windmills should be sited on Horseshoe Shoal. There are, however, a number of findings from our survey that suggest that caution is in order. We summarize them here.

### *Esthetics*

Based on photographs of Nantucket Sound, with and without windmills, about two thirds of respondents, tourists and home owners alike, say that the windmills would worsen the view “slightly” or “a lot”. This may be due to the large scale of the windmill project; where twenty windmills might be considered a pleasant curiosity, a field of 130 machines would fill much of the horizon and undermine the sense of wide open ocean that currently characterizes the Cape. Both tourists and residents say that the ocean views, beaches and “beauty of the region” are its main attractions.

### *Tourism.*

A significant number of tourists say they would spend less time on the Cape, stop visiting altogether, or spend less on lodging, if the wind farm were built. This would not be offset by the increase in tourists curious about the windmills themselves.

- The net effect is a \$75 per year reduction in spending for every tourist that visits the Cape.
- The total annual reduction in tourist spending would be between \$57 million and \$123 million.
- Once multiplier effects are included, output on the Cape would fall by \$94-\$203 million and between 1,173 and 2,533 jobs would be lost.

### ***Land Values***

Home owners believe that the windmill project would depress property values, a view that is corroborated by realtors in the area. Specifically:

- It is estimated that property values in the six affected towns would fall by 4%;
- This represents a loss of \$1.35 billion in property values, or almost twice the cost of the windmill project.
- Waterfront property with a view of the ocean is expected to be hit hardest; owners anticipate a 10.9% fall in value.
- The lower property values would reduce property tax collections; if the tax rate is raised, it will shift some of the burden from richer to less affluent households.

### ***Rent and Royalties***

The Cape Wind project would be located in Federal OCS waters, in the eye of a “donut” that is surrounded by Massachusetts waters. It would not be required to pay rent or royalties for the use of Horseshoe Shoal.

- Over 80% of home owners and tourists believe that Cape Wind should have to pay royalties or rent for the use of OCS facilities.
- On average, respondents believe the royalty should be about 8% of sales; this would yield about \$8 million annually.

### ***Willingness To Pay***

One can ask respondents to put a price on clean air or an uninterrupted ocean view. Our “contingent valuation” survey is designed to do this, using both a direct approach (which asks how much someone would be willing to pay to have, or not have, windmills in the Sound) and a “referendum” approach (which asks respondents to “vote” up or down some spending on the public good.

- 22% of home owners would be willing to pay to not have the windmills, compared to 9% who would pay to encourage them to locate in the Sound.
- On balance, home owners would pay handsomely – between \$5 and \$12 million – to keep the windmills out.
- Tourists, on balance, would be willing to pay to encourage windmills to locate in Nantucket Sound. Although the sums are low (an average of \$5-14 per visiting family, net), the large number of tourists means that this grosses to between \$3 and \$8 million.

The full and rich results of the surveys are contained in Appendixes 2 and 3. A more detailed technical report will appear by the end of 2003. Meanwhile, we are moving on to phase two of this study, which will draw on the survey results and other information to create a full cost-benefit study that addresses more comprehensively the question of whether Cape Wind's project to site 130 windmills in Nantucket Sound should go ahead.

## Appendix 1. Home Owner Survey

### WINDMILL SITING SURVEY

#### Home Owner Survey

Hello, I'm \_\_\_\_\_ from Suffolk University in Boston, Massachusetts. We are conducting a survey on the siting of windmills in Nantucket Sound. Do you have a few minutes to answer some questions for us?

Q-a. Am I speaking with the owner of this house?

Yes [Skip to Q-d]  
No [Continue]

Q-b. Does someone else living in this household own this house?

Yes [Continue]  
No [Terminate]

Q-c. May I speak to the owner of the house?

Yes [Continue]  
No [Terminate]

Q-d. In what town and precinct do you live? (*Ask for street address is precinct is unknown.*)

\_\_\_\_\_ (*Falmouth, Mashpee, Barnstable, Yarmouth, Edgartown, and Oak Bluffs are acceptable. NOTE: Hyannis, Osterville, Centerville, Cotuit, Marstons Mills and West Barnstable are all towns in Barnstable.*)

We would like to talk with you for about fifteen minutes, in order to obtain your honest opinions on the subject.

- We are not soliciting donations and do not represent the government, the potential developer or any interest group.
- If you complete the survey we will provide you with a free gift: you may choose a pair of movie passes or a \$15 voucher for Dunkin' Donuts.
- Your answers will be kept strictly confidential.

#### Section 1 On Wind Power

Most of the electricity produced in the U.S. is generated by coal and nuclear facilities, with smaller contributions coming from natural gas and hydroelectric power. Wind power currently contributes less than 1% to the total, although this segment is growing rapidly.

Q-1 Which of the following statements most closely reflects your opinion of the emphasis that should be placed on developing wind power?

1. Wind power is clean and abundant and should be developed at almost any cost.
2. Wind power should be encouraged, but with moderation since it may not be appropriate everywhere.
3. Wind power should be neither encouraged nor discouraged; if it is cheaper than other ways to generate power, then it will develop on its own.
4. Wind power is a passing fad; it has significant disadvantages and so should be discouraged.

***Sample size***

16%
70%
11%
3%
501

A company called Cape Wind proposes to build 130 electricity-generating windmills in Nantucket Sound.

Q-2 Are you aware of this proposal?

1. No.	<b>3%</b>
2. I have heard some mention of it, but don't know many details.	<b>36%</b>
3. I am fairly well informed about it.	<b>61%</b>
<b>Sample size</b>	<b>501</b>

Specifically, the proposal would build 130 windmills in a twenty-four square mile grid of Nantucket Sound, approximately six miles off the southern coast of Cape Cod. [*Show map of Nantucket Sound.*]

Each windmill would consist of a three-bladed rotor attached to the top of a 260-foot tower. The maximum distance from the sea level to the top of the rotor would be 426 feet. For comparison, the Statue of Liberty is 305 feet tall. Atop each tower there would be a red light, as required by Federal rules for all tall buildings. [*Show photo 1*]

Q-3 Have you ever seen a modern electricity-generating windmill in person?

Yes	1	<b>47%</b>	[Go to Q-4]
No	2	<b>53%</b>	[Skip to Q-5]
<b>Sample size</b>		<b>501</b>	

Q-4 Where did you last see a modern electricity-generating windmill? [*Record comments exactly as stated by respondent*] \_\_\_\_\_

## Section II Visibility of Windmills

Q-5 I am going to show you a series of photos taken from points along the coast of Cape Cod and Martha's Vineyard. Each series will depict the view as seen today, and also as the view would appear with one-hundred and thirty windmills.

- The first series depicts the view as seen from Cotuit. [*Show photos 2 & 3.*]
- The next series depicts the view from Martha's Vineyard. [*Show photos 3 & 4.*]
- The final series depicts the view from Hyannis. [*Show photos 5 & 6.*]

Which of the following statements comes closest to your reaction?

1. The windmills improve the view a lot.	<b>1%</b>	[Go to Q-6]
2. The windmills improve the view slightly.	<b>2%</b>	[Go to Q-6]
3. The windmills neither improve nor worsen the view.	<b>28%</b>	[Skip to Q-7]
4. The windmills worsen the view slightly.	<b>32%</b>	[Skip to Q-8]
5. The windmills worsen the view a lot.	<b>38%</b>	[Skip to Q-9]
<b>Sample size</b>	<b>501</b>	

Q-6 Even if windmills improve the view, some people might prefer not to have windmills in Nantucket Sound. Which of the following applies to you?

- |   |             |                |
|---|-------------|----------------|
| 1. I would prefer to see these windmills built.                       | <b>2%</b>   | [Skip to Q-12] |
| 2. I would neither favour nor oppose the building of these windmills. | <b>1%</b>   | [Skip to Q-16] |
| 3. I would prefer <i>not</i> to see these windmills built.            | <b>n.a.</b> | [Skip to Q-9]  |
| Skip  | <b>97%</b>  |                |
| <b><i>Sample size</i></b>   | <b>501</b>  |                |

Q-7 Even if the windmills have little or no impact on the view, some people might still have an opinion on whether or not windmills should be built in Nantucket Sound. Which of the following applies to you?

- |   |            |                |
|---|------------|----------------|
| 1. I would prefer to see these windmills built.                       | <b>15%</b> | [Skip to Q-12] |
| 2. I would neither favour nor oppose the building of these windmills. | <b>11%</b> | [Skip to Q-16] |
| 3. I would prefer not to see these windmills built.                   | <b>1%</b>  | [Skip to Q-9]  |
| Skip  | <b>73%</b> |                |
| <b><i>Sample size</i></b>   | <b>501</b> |                |

Q-8 Even if windmills worsen the view, some people might prefer to have windmills in Nantucket Sound. Which of the following applies to you?

- |   |            |                |
|---|------------|----------------|
| 1. I would prefer to see these windmills built.                       | <b>11%</b> | [Skip to Q-12] |
| 2. I would neither favour nor oppose the building of these windmills. | <b>17%</b> | [Skip to Q-16] |
| 3. I would prefer not to see these windmills built.                   | <b>42%</b> | [Skip to Q-9]  |
| Skip  | <b>30%</b> |                |
| <b><i>Sample size</i></b>   | <b>501</b> |                |

Q-9 There is a long history of concerned citizens organizing into ‘land trusts’ in order to raise funds to protect undeveloped land. For instance, a group in Wyoming recently acquired the rights to 11,000 acres of woodlands to protect an area known for its wildlife habitat and ‘breathtaking scenery’.

It has been suggested that those who do not want the 130 windmills to be built in Nantucket Sound could form a trust and buy the rights to the area. This would give them the right to prevent the windmills from being built.

Would you be willing to make a one-time contribution to a fund that would ensure that the windmills are not built in Nantucket Sound?

Before answering, please remember that we are not soliciting donations and your answers will be kept strictly confidential.

- |                           |                |    |            |
|---------------------------|----------------|----|------------|
| Yes                       | [Go to Q-10]   | 1. | <b>22%</b> |
| No                        | [Skip to Q-15] | 2. | <b>21%</b> |
| Skip                      |                |    | <b>57%</b> |
| <b><i>Sample size</i></b> |                |    | <b>501</b> |

Q-10 How much would you be willing to contribute to ensure that windmills are not built in Nantucket Sound?

Before answering, we would like you to keep in mind that this would not prevent windmills from being built elsewhere off the coast (out of view of this part of the Cape). Money you contribute to this fund would reduce the amount of money your household would have available to spend on other environmental causes as well as on the everyday products you buy.

Bearing this in mind, how much would you be willing to contribute?

\$ _____	<b>Sample mean</b>	<b>Sample size</b>
	<b>\$286.45*</b>	108
	<i>* Equivalent to \$61.75 when averaged over the full sample of 501.</i>	

Q-11 Please let us know how strongly you agree or disagree with each of the following statements. Please circle one number for each statement.

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
a. It is important to protect an uninterrupted view of Nantucket Sound.	1	2	3	4	5
b. The benefits of the windmills would go elsewhere, and not to those who use or live on the Cape.	1	2	3	4	5
c. I am concerned about the impact that windmills might have on local wildlife.	1	2	3	4	5
d. I am concerned about the impact that windmills might have on recreational activities (fishing/boating) in Nantucket Sound.	1	2	3	4	5
e. A wind energy facility in Nantucket Sound will hurt the local tourism industry.	1	2	3	4	5
f. Other reasons. (Please specify.)					

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree	Sample mean	Sample size
a. It is important to protect an uninterrupted view of Nantucket Sound.	76%	18%	3%	2%	1%	<b>1.30</b>	108
b. The benefits of the windmills would go elsewhere, and not to those who use or live on the Cape.	39%	23%	23%	10%	6%	<b>2.22</b>	108
c. I am concerned about the impact that windmills might have on local wildlife.	72%	20%	5%	3%	1%	<b>1.42</b>	108
d. I am concerned about the impact that windmills might have on recreational activities (fishing/boating) in Nantucket Sound.	75%	18%	3%	2%	2%	<b>1.37</b>	108
e. A wind energy facility in Nantucket Sound will hurt the local tourism industry.	37%	27%	22%	8%	6%	<b>2.22</b>	108
<i>Note: Responses are only for those who answered "Yes" to question 9 – i.e. for those who would be willing to contribute to a fund that would prevent the windmills from being built.</i>							

[Skip to Q-16]

Q-12 It has been suggested that those who do want the 130 windmills to be built in Nantucket Sound could contribute to a fund to support their construction. This would help ensure that the windmills would be built.

Would you be willing to make a one-time payment to ensure that the windmills are built in Nantucket Sound?

Please remember that we are not soliciting donations and your answers will be kept strictly confidential.

Yes	[Go to Q-13]	1	<b>9%</b>
No	[Skip to Q-15]	2	<b>20%</b>
<b>Skip</b>			<b>71%</b>
	<b>Sample size</b>		501

Q-13 How much would you be willing to contribute to ensure that windmills are built in Nantucket Sound?

Before answering, we would like you to keep in mind that this would not necessarily encourage the building of windmills elsewhere off the coast (out of view of this part of the Cape). Money you contribute to this fund would reduce the amount of money your household would have available to spend on other environmental causes as well as on the everyday products you buy.

Bearing this in mind, how much would you be willing to contribute?

\$ _____	<b>Sample mean</b>	<b>Sample size</b>
	<b>\$112.89*</b>	45
	<i>* Equivalent to \$10.34 when averaged over the full sample of 501.</i>	

Q-14 Please let us know how strongly you agree or disagree with each of the following statements. Please circle one number for each statement.

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
a. The additional benefits of green energy are worth this much to me.	1	2	3	4	5
b. The gains from lower electricity rates will be worth this much.	1	2	3	4	5
c. Our country is too reliant on fossil fuels. Local, renewable energy sources should be encouraged.	1	2	3	4	5
d. The wind energy facility will lessen the emissions of the Canal power plant.	1	2	3	4	5
e. Windmills improve the view.	1	2	3	4	5
f. Other reasons. (Please specify.)					

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree	Sample mean	Sample size
a. The additional benefits of green energy are worth this much to me.	91%	7%	2%	0%	0%	<b>1.09</b>	45
b. The gains from lower electricity rates will be worth this much.	59%	24%	17%	0%	0%	<b>1.58</b>	45
c. Our country is too reliant on fossil fuels. Local, renewable energy sources should be encouraged.	94%	6%	0%	0%	0%	<b>1.04</b>	45
d. The wind energy facility will lessen the emissions of the Canal power plant.	56%	22%	20%	2%	0%	<b>1.87</b>	45
e. Windmills improve the view.	2%	15%	54%	13%	15%	<b>3.22</b>	45

*Note:* Responses are only for those who answered “Yes” to question 12 – i.e. for those who would be willing to contribute to a fund that would support the construction of the windmills.

[Skip to Q-16]

Q-15 You said that you are not willing to pay anything to encourage or discourage the building of windmills in Nantucket Sound. Please let us know how strongly you agree or disagree with each of the following statements. Please circle one number for each statement.

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Definitely disagree
a. The issue is not important to me.	1	2	3	4	5
b. I can't afford to pay anything at this time.	1	2	3	4	5
c. Even if I paid, it would not be enough to affect the outcome.	1	2	3	4	5
d. It is unfair for me to have to pay, when others will enjoy the benefits as well.	1	2	3	4	5
e. I should not have to pay to protect public land.	1	2	3	4	5
f. I need more information about the Cape Wind proposal.	1	2	3	4	5
g. I don't think the fund would work.	1	2	3	4	5

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree	Sample mean	Sample size
a. The issue is not important to me.	2%	5%	9%	28%	55%	<b>4.29</b>	202
b. I can't afford to pay anything at this time.	34%	14%	14%	10%	28%	<b>2.85</b>	201
c. Even if I paid, it would not be enough to affect the outcome.	41%	16%	22%	11%	10%	<b>2.33</b>	202
d. It is unfair for me to have to pay, when others will enjoy the benefits as well.	19%	15%	19%	17%	29%	<b>3.23</b>	202
e. I should not have to pay to protect public land.	46%	11%	17%	11%	14%	<b>2.37</b>	201
f. I need more information about the Cape Wind proposal.	21%	15%	12%	14%	37%	<b>3.30</b>	202
g. I don't think the fund would work.	33%	12%	29%	14%	11%	<b>2.59</b>	202
<i>Note:</i> Responses are only for those who earlier stated that they are not willing to pay to encourage or discourage the building of windmills in Nantucket Sound.							

### Section III On the Cape

Q-16 What effect, if any, do you believe the wind power facility will have on local power plants?

1.	None at all.	<b>23%</b>
2.	Slightly reduce their electricity production.	<b>28%</b>
3.	Substantially reduce their electricity production.	<b>17%</b>
4.	Don't know.	<b>32%</b>
	<i>Sample size</i>	500

Q-17 If you knew that the Cape Wind facility would have little or no impact on the amount of electricity produced by local power plants, would it influence your view of the current proposal?

1.	Yes	[Go to Q-18]	<b>43%</b>
2.	No	[Skip to Q-19]	<b>57%</b>
	<i>Sample size</i>		500

Q-18 How might your opinion change?

1.	I would support the project more.	<b>3%</b>
2.	I would support the project less.	<b>20%</b>
3.	I would oppose the project more.	<b>19%</b>
4.	I would oppose the project less.	<b>&lt;1%</b>
	Skip	<b>58%</b>
	<b>Sample size</b>	<b>501</b>

Q-19 Over the past 12 months, how many months in total did you spend on Cape Cod?

_____ months	<b>Sample mean</b>	<b>Sample size</b>
	<b>20.79 months</b>	<b>501</b>

Q-20 Please rate each of the following reasons for living on or visiting the Cape, on a scale of 1 (very important) through 5 (not important at all). Please circle one number for each statement.

	V. imp		Neutral		Not imp
a. The peace and quiet.	1	2	3	4	5
b. I grew up living or vacationing on the Cape.	1	2	3	4	5
c. The shopping.	1	2	3	4	5
d. The beauty of the region.	1	2	3	4	5
e. The great restaurants.	1	2	3	4	5
f. To provide a place for family to visit.	1	2	3	4	5
g. The beaches.	1	2	3	4	5
h. The ocean views.	1	2	3	4	5
i. Recreation (golf, sailing, fishing, etc.)	1	2	3	4	5
j. My job is on the Cape.	1	2	3	4	5
k. The public services (hospitals, libraries, etc.)	1	2	3	4	5

	V. imp		Neutral		Not imp	Sample mean	Sample size
a. The peace and quiet.	54%	21%	15%	4%	6%	<b>1.85</b>	501
b. I grew up living or vacationing on the Cape.	48%	9%	6%	2%	34%	<b>2.64</b>	501
c. The shopping.	7%	10%	20%	9%	53%	<b>3.91</b>	501
d. The beauty of the region.	79%	15%	3%	1%	1%	<b>1.30</b>	501
e. The great restaurants.	12%	24%	32%	14%	17%	<b>3.01</b>	501
f. To provide a place for family to visit.	43%	23%	14%	4%	17%	<b>2.29</b>	501
g. The beaches.	68%	21%	4%	1%	5%	<b>1.52</b>	501
h. The ocean views.	77%	16%	4%	1%	2%	<b>1.37</b>	501
i. Recreation (golf, sailing, fishing, etc.)	51%	26%	11%	5%	8%	<b>1.94</b>	501
j. My job is on the Cape.	40%	5%	6%	1%	49%	<b>3.15</b>	501
k. The public services (hospitals, libraries, etc.)	29%	24%	25%	6%	16%	<b>2.58</b>	501

Q-21 When you are on the Cape, how often do you look out on Nantucket Sound?

1.	Every day.	<b>35%</b>
2.	Every couple of days.	<b>27%</b>
3.	Weekly.	<b>22%</b>
4.	Rarely.	<b>15%</b>
5.	Never.	<b>1%</b>

	<b>Sample size</b>	501
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Q-22 Is your home a:

1.	Single-family house (detached from other houses).	<b>93%</b>
2.	Duplex or triplex (two or three attached units, side by side or stacked).	<b>3%</b>
3.	Condominium.	<b>4%</b>
4.	Other (please specify)	<b>0%</b>
	<b>Sample size</b>	501

Q-23 How many bedrooms and bathrooms does your home have?

\_\_\_\_\_ bedrooms and \_\_\_\_\_ bathrooms.

	<i>Sample mean</i>	<i>Sample size</i>
Bedrooms	<b>3.18</b>	501
Bathrooms.	<b>2.10</b>	501

Q-24 Does your home have a view of Nantucket Sound?

1.	Yes	<b>6%</b>
2.	No	<b>94%</b>
	<b>Sample size</b>	499

Q-25 Approximately how many square feet of living area (including halls, entry ways, etc.) does your home have?

1.	Less than 1,000 square feet.	<b>6%</b>
2.	1,000 to 1,999 square feet.	<b>38%</b>
3.	2,000 – 2,999 square feet.	<b>24%</b>
4.	3,000 square feet or more	<b>11%</b>
5.	Not sure.	<b>21%</b>
	<b>Sample size</b>	501

Q-26 What is your best estimate of the current market value of your home?

\$ \_\_\_\_\_

<i>Sample mean</i>	<i>Sample size</i>
<b>\$452,959*</b>	494
<i>Note:</i> Sample mean is \$853,966 for the 29 homes with a view of Nantucket Sound that were included in the sample.	

Q-27 Considering that there are currently no windmills in Nantucket Sound, what price would you expect to get for your house if you were to sell it today?

\$ \_\_\_\_\_

<i>Sample mean</i>	<i>Sample size</i>
<b>\$463,486*</b>	492
<i>Note:</i> Sample mean is \$854,483 for the 29 homes with a view of Nantucket Sound that were included in the sample.	

Q-28 Do you think that the presence of 130 windmills in Nantucket Sound would affect the price you would get for your house?

1.	Yes	[Go to Q-29]	<b>21%</b>
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2.	No	[Skip to Q-30]	<b>79%</b>
		<b>Sample size</b>	500

Q-29 Assuming that there were currently 130 windmills in Nantucket Sound and that you were to sell your house today, how do you think the presence of the windmills would affect the price you would expect to get?

1. I would expect to get \_\_\_\_\_ dollars *less* for my house. [Skip to Q-32]
2. I would expect to get \_\_\_\_\_ dollars *more* for my house.

I would expect to get	<b>\$92,959</b>	dollars <i>less</i> for my house.	<b>20%</b>
I would expect to get	<b>\$21,250</b>	dollars <i>more</i> for my house.	<b>1%</b>
		<b>Sample size</b>	501

Q-30 Consider the possibility of a referendum or ballot initiative that would raise funds to keep the windmills away from Nantucket Sound (although not necessarily away from other coastal locations in Massachusetts). If the cost to your household was a one-time payment of \$XX, how would you vote in the referendum? [*Note: this price will be different depending on the questionnaires.*]

1.	For the referendum to raise the funds.	<b>22%</b>	[Skip to Q-32]
2.	Against the referendum to raise the funds.	<b>58%</b>	
3.	Not sure.	<b>20%</b>	
	<b>Sample size</b>	501	
<i>Note: These results cannot be interpreted without information on the corresponding bids. The analysis is undertaken in the report.</i>			

Q-31 Consider a similar referendum or ballot initiative that would instead raise funds to encourage the windmills to locate in Nantucket Sound. If the cost to your household was a one-time payment of \$XX, how would you vote in the referendum? [*Note: this price will be different depending on the questionnaires.*]

For the referendum to raise the funds.	<b>53%</b>
Against the referendum to raise the funds	<b>9%</b>
Not sure.	<b>16%</b>
<b>Skip</b>	<b>22%</b>
<b>Sample size</b>	501
<i>Note: These results cannot be interpreted without information on the corresponding bids. The analysis is undertaken in the report.</i>	

Q-32 Federal Common Law holds that national parks and other public lands are “owned” by the government on behalf of the public. It has been argued that a private company, like Cape Wind, should be required to pay rent or royalties for its use of public lands. Do you agree?

Yes	[Go to Q-33]	<b>90%</b>
No	[Skip to Q-34]	<b>10%</b>
	<b>Sample size</b>	501

Q-33 Currently, oil and gas facilities operating in federal waters pay royalties as a percentage of their revenue. What percentage do you feel would be appropriate for a wind energy facility operating in federal waters?

a.	Less than 1%	<b>1%</b>
b.	1% - 3%	<b>5%</b>
c.	4% - 7%	<b>8%</b>
d.	8% - 10%	<b>9%</b>
e.	Greater than 10%	<b>19%</b>
f.	Other _____	<b>31%</b>
g.	Not Sure	<b>17%</b>
	<b>Skip</b>	<b>10%</b>
	<b>Sample size</b>	501
<i>Note:</i> Respondents who chose this option specified "same as oil & gas."		

PERSONAL INFORMATION

These last few questions will help us understand how well our sample represents those who live on and visit the Cape. Let me stress again that this information will be kept strictly confidential.

Q-34 Are you?

Male	<b>48%</b>
Female	<b>52%</b>
<b>Sample size</b>	501

Q-35 In what year were you born?

Year _____	<b>Sample mean of age (years)</b>	<b>Sample size</b>
	<b>55</b>	499

Q-36 Are you currently a member of a conservation or environmental organization?

Yes \_\_\_\_\_ No \_\_\_\_\_ [Check one]

Yes	<b>24%</b>
No	<b>76%</b>
<b>Sample size</b>	501

Q-37 Did you make any financial donations or contributions for conservation or environmental protection in the past year?

Yes \_\_\_\_\_ No \_\_\_\_\_

Yes	<b>45%</b>
No	<b>55%</b>
<b>Sample size</b>	501

Q-38 What is the highest number of years of formal education that you have completed?

1 2 3 4 5 6      7 8 9      10 11 12      13 14 15 16      17 18 19 20 21+  
 Elementary      Junior High      High School      College or Trade      Graduate or Professional

<i>Sample mean (years)</i>	<i>Sample size</i>
<b>15.53</b>	501

Q-39 About how much was your household income (before taxes) in 2002? Please indicate by checking the appropriate option.

**Sample Mean: \$93,298.77**

↑ Under \$10,000	↑ \$50,000-59,999	↑ 100,000-124,999
↑ \$10,000-19,999	↑ \$60,000-69,999	↑ \$125,000-149,999
↑ \$20,000-29,999	↑ \$70,000-79,999	↑ \$150,000-174,999
↑ \$30,000-39,999	↑ \$80,000-89,999	↑ \$175,000-199,999
↑ \$40,000-49,999	↑ \$90,000-99,999	↑ \$200,000 and over

<i>Sample mean (\$p.a.)</i>	<i>Sample size</i>
<b>93,299</b>	405
<i>Note: Based on using mid-point values of income; and \$7,000 for the lowest group and \$250,000 for the highest group.</i>	

Q-40 Including yourself, how many members in your household are in each age group?

	<i>Sample mean per household</i>	
under 18 years of age	<b>0.55</b>	under 18 years of age
18-64	<b>1.56</b>	18-64
65 or over	<b>0.57</b>	65 or over
<b>Sample size</b>	501	

Q-41 In what city and state do you live? [i.e. legal residence] \_\_\_\_\_

Q-42 Which of the following most closely matches your views on the proposal to site the windmills in Nantucket Sound?

a.	I like the idea of windmills, but not in Nantucket Sound.	<b>30%</b>
b.	I like the idea of windmills, and it is reasonable to site them in Nantucket Sound.	<b>32%</b>
c.	I don't particularly favour windmills, but will tolerate them in Nantucket Sound provided I don't have to subsidize them.	<b>13%</b>
d.	I don't particularly favour windmills and I don't want to see them built in Nantucket Sound.	<b>17%</b>
e.	I'm indifferent towards windmills.	<b>8%</b>
	<b>Sample size</b>	501

Q-44 Below is a list of phrases that describe different kinds of interests and activities. Please indicate the degree that each one applies to you.

	Strongly Agree		Neutral		Strongly Disagree
a. I spend a lot of time out of doors in my free time	1	2	3	4	5

b. I am a birdwatcher	1	2	3	4	5
c. I enjoy swimming in the ocean off Cape Cod	1	2	3	4	5
d. I trust what experts say about science and technology	1	2	3	4	5
e. I am an environmentalist	1	2	3	4	5
f. I always vote in local elections	1	2	3	4	5
g. I enjoy fishing in Nantucket Sound.	1	2	3	4	5
h. I enjoy sailing in Nantucket Sound.	1	2	3	4	5

	Strongly agree		Neutral		Strongly disagree	Sample mean	Sample size
a. I spend a lot of time out of doors in my free time	71%	16%	10%	3%	1%	<b>1.48</b>	501
b. I am a birdwatcher	25%	17%	17%	8%	33%	<b>3.08</b>	501
c. I enjoy swimming in the ocean off Cape Cod	55%	15%	12%	5%	13%	<b>2.06</b>	501
d. I trust what experts say about science and technology	20%	26%	28%	13%	14%	<b>2.76</b>	501
e. I am an environmentalist	26%	33%	23%	7%	10%	<b>2.41</b>	501
f. I always vote in local elections	72%	14%	7%	3%	4%	<b>1.51</b>	501
g. I enjoy fishing in Nantucket Sound.	27%	9%	14%	5%	44%	<b>3.29</b>	501
h. I enjoy sailing in Nantucket Sound.	28%	17%	16%	4%	35%	<b>3.01</b>	501

That's it!  
Thank you for your help.

[Offer the choice of rewards.]

Survey # \_\_\_\_\_  
Interviewer # \_\_\_\_\_  
Time of Day \_\_\_\_\_  
Day of the Week \_\_\_\_\_

Town \_\_\_\_\_  
Date \_\_\_\_\_  
Weather \_\_\_\_\_

## Appendix 2. Tourist Survey

### WINDMILL SITING SURVEY

#### Tourist Survey

Hello, I'm \_\_\_\_\_ from Suffolk University in Boston, Massachusetts. We are conducting a survey on the siting of windmills in Nantucket Sound. Do you have a few minutes to answer some questions for us?

INTRO: We would like to talk with you about this for about fifteen minutes, in order to obtain your honest opinions on the subject.

- We are not soliciting donations and do not represent the government, the potential developer, or any interest group.
- If you complete the survey we would be glad to provide you with a free gift: you may choose a pair of movie passes or a \$15 voucher for Dunkin' Donuts.
- Your answers will be kept strictly confidential.

#### Section 1 On Wind Power

Most of the electricity produced in the U.S. is generated by coal and nuclear facilities, with smaller contributions coming from natural gas and hydroelectric power. Wind power currently contributes less than 1% to the total, although this segment is growing rapidly.

Q-1 Which of the following statements most closely reflects your opinion of the emphasis that should be placed on developing wind power?

1. Wind power is clean and abundant and should be developed at almost any cost.
2. Wind power should be encouraged, but with moderation since it may not be appropriate everywhere.
3. Wind power should be neither encouraged nor discouraged; if it is cheaper than other ways to generate power, then it will develop on its own.
4. Wind power is a passing fad; it has significant disadvantages and so should be discouraged.

<b>15%</b>
<b>74%</b>
<b>9%</b>
<b>2%</b>
497

***Sample size***

A company called Cape Wind proposes to build 130 electricity-generating windmills in Nantucket Sound.

Q-2 Are you aware of this proposal?

1. No.
2. I have heard some mention of it, but don't know many details.
3. I am fairly well informed about it.

<b>59%</b>
<b>30%</b>
<b>11%</b>
497

***Sample size***

Specifically, the proposal would build 130 windmills in a twenty-four square mile grid of Nantucket Sound, approximately six miles off the southern coast of Cape Cod. [*Show map of Nantucket Sound.*]

Each windmill would consist of a three-bladed rotor attached to the top of a 260-foot tower. The maximum distance from the sea level to the top of the rotor would be 426 feet. For comparison, the Statue of Liberty is 305 feet tall. Atop each tower there would be a red light, as required by Federal rules for all tall buildings. [Show photo 1]

Q-3 Have you ever seen a modern electricity-generating windmill in person?

Yes	1	38%	[Go to Q-4]
No	2	62%	[Skip to Q-5]
<b>Sample size</b>		497	

Q-4 Where did you last see a modern electricity-generating windmill? [Record comments exactly as stated by respondent] \_\_\_\_\_

## Section II Visibility of Windmills

Q-5 I am going to show you a series of photos taken from points along the coast of Cape Cod and Martha's Vineyard. Each series will depict the view as seen today, and also as the view would appear with one-hundred and thirty windmills.

- The first series depicts the view as seen from Cotuit. [Show photos 2 & 3.]
- The next series depicts the view from Martha's Vineyard. [Show photos 3 & 4.]
- The final series depicts the view from Hyannis. [Show photos 5 & 6.]

Which of the following statements comes closest to your reaction?

1. The windmills improve the view a lot.	3%	[Go to Q-6]
2. The windmills improve the view slightly.	4%	[Go to Q-6]
3. The windmills neither improve nor worsen the view.	32%	[Skip to Q-7]
4. The windmills worsen the view slightly.	43%	[Skip to Q-8]
5. The windmills worsen the view a lot.	19%	[Skip to Q-9]
<b>Sample size</b>		497

Q-6 Even if windmills improve the view, some people might prefer not to have windmills in Nantucket Sound. Which of the following applies to you?

1. I would prefer to see these windmills built.	3%	[Skip to Q-12]
2. I would neither favour nor oppose the building of these windmills.	3%	[Skip to Q-16]
3. I would prefer <i>not</i> to see these windmills built.	<1%	[Skip to Q-9]
<b>Skip</b>		
<b>Sample size</b>		497

Q-7 Even if the windmills have little or no impact on the view, some people might still have an opinion on whether or not windmills should be built in Nantucket Sound. Which of the following applies to you?

1. I would prefer to see these windmills built.	18%	[Skip to Q-12]
2. I would neither favour nor oppose the building of these windmills.	14%	[Skip to Q-16]
3. I would prefer not to see these windmills built.	<1%	[Skip to Q-9]
<b>Skip</b>		
<b>Sample size</b>		497

**Sample size**

497

Q-8 Even if windmills worsen the view, some people might prefer to have windmills in Nantucket Sound. Which of the following applies to you?

- 1. I would prefer to see these windmills built. 16% [Skip to Q-12]
  - 2. I would neither favour nor oppose the building of these windmills. 31% [Skip to Q-16]
  - 3. I would prefer not to see these windmills built. 15% [Skip to Q-9]
- Skip* 38%
- Sample size** 497

Q-9 There is a long history of concerned citizens organizing into ‘land trusts’ in order to raise funds to protect undeveloped land. For instance, a group in Wyoming recently acquired the rights to 11,000 acres of woodlands to protect an area known for its wildlife habitat and ‘breathtaking scenery’.

It has been suggested that those who do not want the 130 windmills to be built in Nantucket Sound could form a trust and buy the rights to the area. This would give them the right to prevent the windmills from being built.

Would you be willing to make a one-time contribution to a fund that would ensure that the windmills are not built in Nantucket Sound?

Before answering, please remember that we are not soliciting donations and your answers will be kept strictly confidential.

- Yes [Go to Q-10] 1. 10%
  - No [Skip to Q-15] 2. 10%
  - Skip* 80%
- Sample size** 497

Q-10 How much would you be willing to contribute to ensure that windmills are not built in Nantucket Sound?

Before answering, we would like you to keep in mind that this would not prevent windmills from being built elsewhere off the coast (out of view of this part of the Cape). Money you contribute to this fund would reduce the amount of money your household would have available to spend on other environmental causes as well as on the everyday products you buy.

Bearing this in mind, how much would you be willing to contribute?

\$ \_\_\_\_\_

<i>Sample mean</i>	<i>Sample size</i>
<b>\$87.53*</b>	49
<i>* Equivalent to \$4.44 when averaged over the full sample of 497.</i>	

Q-11 Please let us know how strongly you agree or disagree with each of the following statements. Please circle one number for each statement.

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
a. It is important to protect an uninterrupted view of Nantucket Sound.	1	2	3	4	5
b. The benefits of the windmills would go elsewhere, and not to those who use or live on the Cape.	1	2	3	4	5
c. I am concerned about the impact that windmills might have on local wildlife.	1	2	3	4	5
d. I am concerned about the impact that windmills might have on recreational activities (fishing/boating) in Nantucket Sound.	1	2	3	4	5
e. A wind energy facility in Nantucket Sound will hurt the local tourism industry.	1	2	3	4	5
f. Other reasons. (Please specify.)					

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree	Sample mean	Sample size
a. It is important to protect an uninterrupted view of Nantucket Sound.	84%	7%	6%	3%	0%	<b>1.27</b>	49
b. The benefits of the windmills would go elsewhere, and not to those who use or live on the Cape.	32%	19%	33%	10%	5%	<b>2.37</b>	49
c. I am concerned about the impact that windmills might have on local wildlife.	56%	25%	12%	6%	1%	<b>1.69</b>	49
d. I am concerned about the impact that windmills might have on recreational activities (fishing/boating) in Nantucket Sound.	49%	27%	23%	1%	0%	<b>1.75</b>	49
e. A wind energy facility in Nantucket Sound will hurt the local tourism industry.	34%	32%	24%	4%	5%	<b>2.14</b>	49
<i>Note:</i> Responses are only for those who answered “Yes” to question 9 – i.e. for those who would be willing to contribute to a fund that would prevent the windmills from being built.							

[Skip to Q-16]

Q-12 It has been suggested that those who do want the 130 windmills to be built in Nantucket Sound could contribute to a fund to support their construction. This would help ensure that the windmills would be built.

Would you be willing to make a one-time payment to ensure that the windmills are built in Nantucket Sound?

Please remember that we are not soliciting donations and your answers will be kept strictly confidential.

Yes	[Go to Q-13]	1	<b>14%</b>
No	[Skip to Q-15]	2	<b>26%</b>
<i>Skip</i>			<b>60%</b>
	<b>Sample size</b>		497

Q-13 How much would you be willing to contribute to ensure that windmills are built in Nantucket Sound?

Before answering, we would like you to keep in mind that this would not necessarily encourage the building of windmills elsewhere off the coast (out of view of this part of the Cape). Money you contribute to this fund would reduce the amount of money your household would have available to spend on other environmental causes as well as on the everyday products you buy.

Bearing this in mind, how much would you be willing to contribute?

\$ _____	<b>Sample mean</b>	<b>Sample size</b>
	<b>\$70.33*</b>	<b>70</b>
	<i>* Equivalent to \$9.46 when averaged over the full sample of 497.</i>	

Q-14 Please let us know how strongly you agree or disagree with each of the following statements. Please circle one number for each statement.

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
a. The additional benefits of green energy are worth this much to me.	1	2	3	4	5
b. The gains from lower electricity rates will be worth this much.	1	2	3	4	5
c. Our country is too reliant on fossil fuels. Local, renewable energy sources should be encouraged.	1	2	3	4	5
d. The wind energy facility will lessen the emissions of the Canal power plant.	1	2	3	4	5
e. Windmills improve the view.	1	2	3	4	5
f. Other reasons. (Please specify.)					

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree	Sample mean	Sample size
a. The additional benefits of green energy are worth this much to me.	74%	21%	3%	2%	0%	<b>1.33</b>	69
b. The gains from lower electricity rates will be worth this much.	76%	16%	6%	2%	0%	<b>1.35</b>	69
c. Our country is too reliant on fossil fuels. Local, renewable energy sources should be encouraged.	84%	14%	2%	0%	0%	<b>1.18</b>	69
d. The wind energy facility will lessen the emissions of the Canal power plant.	49%	30%	21%	<1%	0%	<b>1.72</b>	69
e. Windmills improve the view.	3%	8%	34%	47%	8%	<b>3.50</b>	69
<i>Note: Responses are only for those who answered "Yes" to question 12 – i.e. for those who would be willing to contribute to a fund that would support the construction of the windmills.</i>							

[Skip to Q-16]

Q-15 You said that you are not willing to pay anything to encourage or discourage the building of windmills in Nantucket Sound. Please let us know how strongly you agree or disagree with each of the following statements. Please circle one number for each statement.

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Definitely disagree
a. The issue is not important to me.	1	2	3	4	5
b. I can't afford to pay anything at this time.	1	2	3	4	5
c. Even if I paid, it would not be enough to affect the outcome.	1	2	3	4	5
d. It is unfair for me to have to pay, when others will enjoy the benefits as well.	1	2	3	4	5
e. I should not have to pay to protect public land.	1	2	3	4	5
f. I need more information about the Cape Wind proposal.	1	2	3	4	5
g. I don't think the fund would work.	1	2	3	4	5

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree	Sample mean	Sample size
a. The issue is not important to me.	7%	13%	32%	33%	14%	<b>3.31</b>	174
b. I can't afford to pay anything at this time.	25%	12%	30%	12%	22%	<b>2.97</b>	174
c. Even if I paid, it would not be enough to affect the outcome.	27%	20%	25%	20%	8%	<b>2.62</b>	174
d. It is unfair for me to have to pay, when others will enjoy the benefits as well.	18%	15%	24%	16%	27%	<b>3.19</b>	174
e. I should not have to pay to protect public land.	22%	12%	19%	27%	20%	<b>3.11</b>	174
f. I need more information about the Cape Wind proposal.	33%	33%	15%	10%	10%	<b>1.98</b>	174
g. I don't think the fund would work.	10%	10%	39%	27%	14%	<b>3.25</b>	174
<i>Note:</i> Responses are only for those who earlier stated that they are not willing to pay to encourage or discourage the building of windmills in Nantucket Sound.							

### Section III On the Cape

Q-16 What effect, if any, do you believe the wind power facility will have on local power plants?

1.	None at all.	<b>10%</b>
2.	Slightly reduce their electricity production.	<b>34%</b>
3.	Substantially reduce their electricity production.	<b>13%</b>
4.	Don't know.	<b>43%</b>
	<i>Sample size</i>	497

Q-17 If you knew that the Cape Wind facility would have little or no impact on the amount of electricity produced by local power plants, would it influence your view of the current proposal?

1.	Yes	[Go to Q-18]	<b>60%</b>
2.	No	[Skip to Q-19]	<b>40%</b>
	<i>Sample size</i>		497

Q-18 How might your opinion change?

1.	I would support the project more.	10%
2.	I would support the project less.	27%
3.	I would oppose the project more.	22%
4.	I would oppose the project less.	1%
	Skip	40%
	<b>Sample size</b>	497

Q-19 Please rate each of the following reasons for living on or visiting the Cape, on a scale of 1 (very important) through 5 (not important at all). Please circle one number for each statement.

	V. imp		Neutral		Not imp
a. The peace and quiet.	1	2	3	4	5
b. I grew up living or vacationing on the Cape.	1	2	3	4	5
c. The shopping.	1	2	3	4	5
d. The beauty of the region.	1	2	3	4	5
e. The great restaurants.	1	2	3	4	5
f. To provide a place for family to visit.	1	2	3	4	5
g. The beaches.	1	2	3	4	5
h. The ocean views.	1	2	3	4	5
i. Recreation (golf, sailing, fishing, etc.)	1	2	3	4	5
j. My job is on the Cape.	1	2	3	4	5
k. The public services (hospitals, libraries, etc.)	1	2	3	4	5

	V. imp		Neutral		Not imp	Sample mean	Sample size
a. The peace and quiet.	36%	31%	17%	6%	10%	2.21	497
b. I grew up living/vacationing on the Cape.	14%	11%	11%	6%	58%	3.82	497
c. The shopping.	6%	13%	29%	12%	40%	3.66	497
d. The beauty of the region.	56%	33%	7%	<1%	4%	1.64	497
e. The great restaurants.	15%	31%	32%	11%	12%	2.74	497
f. To visit family.	13%	5%	9%	7%	66%	4.08	497
g. The beaches.	52%	31%	9%	4%	5%	1.79	497
h. The ocean views.	62%	26%	8%	<1%	3%	1.59	497
i. Recreation (golf, sailing, fishing, etc.)	23%	27%	28%	6%	17%	2.67	497
j. Other (please specify).	0%	0%	0%	0%	0%	n.a.	497

Q-20 When you are on the Cape, how often do you look out on Nantucket Sound?

1.	Every day.	53%
2.	Every couple of days.	12%
3.	Weekly.	4%
4.	Rarely.	26%
5.	Never.	6%
	<b>Sample size</b>	497

Q-21 How often do you visit Cape Cod?

1.	This is my first visit.	24%
2.	At least once a year.	32%
3.	Frequently. I generally visit 3.51 times a year.	14%
4.	Infrequently (i.e. less than once a year).	30%
	<b>Sample size</b>	497

Q-22 On a typical visit to Cape Cod, how long do you stay, on average?

<i>Sample Mean</i>	<i>Sample Size</i>
3.81	497

Q-23 On your most recent visit to the Cape (including this one), where did you stay?

1.	With friends.	14%
2.	With relatives.	19%
3.	In a hotel or motel.	35%
4.	In a rented house, apartment or cottage.	19%
5.	I did not stay overnight.	12%
6.	Other (please specify)	2%
	<b>Sample size</b>	497

Q-24 Excluding travel costs, how much do you typically spend on a trip to the Cape (including accommodations)?

\$ _____ [ <i>Press for a specific dollar amount.</i> ]	<i>Sample mean</i>	<i>Sample size</i>
	<b>\$743.88</b>	497

Q-25 During your stay on the Cape, about how much do you spend, per day, on each of the following?

1.	Accommodations.	<b>\$82.94</b>
2.	Food/Dining.	<b>\$73.74</b>
3.	Recreation.	<b>\$45.13</b>
4.	Other (please specify).	<b>\$14.42</b>
	<b>Sample size</b>	497

Q-26 What effect, if any, would the construction of 130 windmills in Nantucket Sound have on the frequency with which you visit the Cape?

		<i>Percent</i>	<i>Weighted Mean</i>
1.	I would come more often, an extra ____ days per year.	1%	13.1
2.	I would come less often, ____ fewer days per year.	3%	2.9
3.	I would no longer visit Cape Cod.	2%	n.a.
4.	No change in the frequency.	94%	n.a.

	<b>Sample size</b>	497	
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Q-27 If the windmills were built in Nantucket Sound, would it affect the price you would be willing to pay for lodging?

		<i>Percent</i>	<i>Weighted Mean</i>
1.	No..	<b>58%</b>	<b>n.a.</b>
2.	Probably Not.	<b>29%</b>	<b>n.a.</b>
3.	I would be willing to pay more – perhaps an extra \$___ per night.	<b>1%</b>	<b>\$10.27</b>
4.	I would pay less – perhaps \$___ less per night.	<b>12%</b>	<b>\$53.38</b>
	<b>Sample size</b>	497	

Q-28 Consider the possibility of a referendum or ballot initiative that would raise funds to keep the windmills away from Nantucket Sound (although not necessarily away from other coastal locations in Massachusetts). If the cost to your household was a one-time payment of \$XX, how would you vote in the referendum? [Note: this price will be different depending on the questionnaires.]

1.	For the referendum to raise the funds.	[Skip to Q-30]	<b>15%</b>
2.	Against the referendum to raise the funds.		<b>54%</b>
3.	Not sure.		<b>31%</b>
	<b>Sample size</b>		497

Q-29 Consider a similar referendum or ballot initiative that would instead raise funds to encourage the windmills to locate in Nantucket Sound. If the cost to your household was a one-time payment of \$XX, how would you vote in the referendum? [Note: this price will be different depending on the questionnaires.]

1.	For the referendum to raise the funds.	<b>21%</b>
2.	Against the referendum to raise the funds	<b>32%</b>
3.	Not sure.	<b>32%</b>
	<i>Skip</i>	<b>15%</b>
	<b>Sample size</b>	497

Q-30 Federal Common Law holds that national parks and other public lands are “owned” by the government on behalf of the public. It has been argued that a private company, like Cape Wind, should be required to pay rent or royalties for its use of public lands. Do you agree?

1.	Yes	<b>84%</b>
2.	No [Skip to Q-32]	<b>16%</b>
	<b>Sample size</b>	497

Q-31 Currently, oil and gas facilities operating in federal waters pay royalties as a percentage of their revenue. What percentage do you feel would be appropriate for a wind energy facility operating in federal waters?

Less than 1%	<b>1%</b>
1% - 3%	<b>8%</b>
4% - 7%	<b>10%</b>
8% - 10%	<b>8%</b>
Greater than 10%	<b>13%</b>
Same as oil & gas	<b>33%</b>
Not Sure	<b>11%</b>
Skip	<b>16%</b>
<b>Sample size</b>	497

PERSONAL INFORMATION

These last few questions will help us understand how well our sample represents those who live on and visit the Cape. Let me stress again that this information will be kept strictly confidential.

Q-32 Are you? [*by observation*]

Male	<b>50%</b>
Female	<b>50%</b>
<b>Sample size</b>	497

Q-33 In what year were you born?

<i>Sample Mean</i>	<i>Sample size</i>
<b>39 years old</b>	497

Q-34 Are you currently a member of a conservation or environmental organization?

Yes	<b>14%</b>
No	<b>86%</b>
<b>Sample size</b>	497

Q-35 Did you make any financial donations or contributions for conservation or environmental protection in the past year?

Yes	<b>24%</b>
No	<b>76%</b>
<b>Sample size</b>	497

Q-36 What is the highest number of years of formal education that you have completed?

<i>Survey Mean</i>	<i>Sample size</i>
<b>16.27 years</b>	497

1 2 3 4 5 6      7 8 9      10 11 12      13 14 15 16      17 18 19 20 21+

Elementary      Junior High      High School      College or Trade      Graduate or Professional

Q-37 About how much was your household income (before taxes) in 2002? Please indicate by checking the appropriate option.

<i>Survey Mean</i>	<i>Sample size</i>
<b>\$95,042</b>	452

† Under \$10,000	† \$50,000-59,999	† 100,000-124,999
† \$10,000-19,999	† \$60,000-69,999	† \$125,000-149,999
† \$20,000-29,999	† \$70,000-79,999	† \$150,000-174,999
† \$30,000-39,999	† \$80,000-89,999	† \$175,000-199,999
† \$40,000-49,999	† \$90,000-99,999	† \$200,000 and over

Q-38 Including yourself, how many members in your household are in each age group?

	<i>Sample mean</i>
Under 18 years of age	<b>.66</b>
18 to 64	<b>2.09</b>
65 or over	<b>.066</b>
Mean household size	<b>2.82</b>

Q-39 In what city and state do you live? [i.e. legal residence] \_\_\_\_\_

Q-40 Which of the following most closely matches your views on the proposal to site the windmills in Nantucket Sound?

I like the idea of windmills, but not in Nantucket Sound.	<b>20%</b>
I like the idea of windmills, and it is reasonable to site them in Nantucket Sound.	<b>51%</b>
I don't particularly favour windmills, but will tolerate them in Nantucket Sound provided I don't have to subsidize them.	<b>12%</b>
I don't particularly favour windmills and I don't want to see them built in Nantucket Sound.	<b>5%</b>
I'm indifferent towards windmills.	<b>13%</b>
<i>Sample size</i>	497

Q-41 Below is a list of phrases that describe different kinds of interests and activities. Please indicate the degree that each one applies to you.

	Strongly Agree		Neutral		Strongly Disagree
a. I spend a lot of time out of doors in my free time	1	2	3	4	5
b. I am a birdwatcher	1	2	3	4	5
c. I enjoy swimming in the ocean off Cape Cod	1	2	3	4	5
d. I trust what experts say about science and technology	1	2	3	4	5
e. I am an environmentalist	1	2	3	4	5
f. I always vote in local elections	1	2	3	4	5
g. I enjoy fishing in Nantucket Sound.	1	2	3	4	5
h. I enjoy sailing in Nantucket Sound.	1	2	3	4	5

	Strongly Agree		Neutral		Strongly Disagree	Sample mean	Sample size
a. I spend a lot of time out of doors in my free time	54%	25%	16%	4%	<1%	<b>1.72</b>	497
b. I am a birdwatcher	7%	9%	15%	14%	55%	<b>4.00</b>	497
c. I enjoy swimming in the ocean off Cape Cod	34%	24%	21%	10%	12%	<b>2.42</b>	497
d. I trust what experts say about science and technology	15%	36%	33%	10%	6%	<b>2.58</b>	497
e. I am an environmentalist	13%	30%	31%	15%	10%	<b>2.80</b>	497
f. I always vote in local elections	51%	21%	13%	9%	15%	<b>2.24</b>	497
g. I enjoy fishing in Nantucket Sound.	7%	8%	17%	14%	54%	<b>3.99</b>	497
h. I enjoy sailing in Nantucket Sound.	10%	12%	23%	9%	46%	<b>3.68</b>	497

That's it!  
Thank you for your help.

### Appendix 3. Facsimile of Photographs Used in Survey



View of horizon from Cotuit

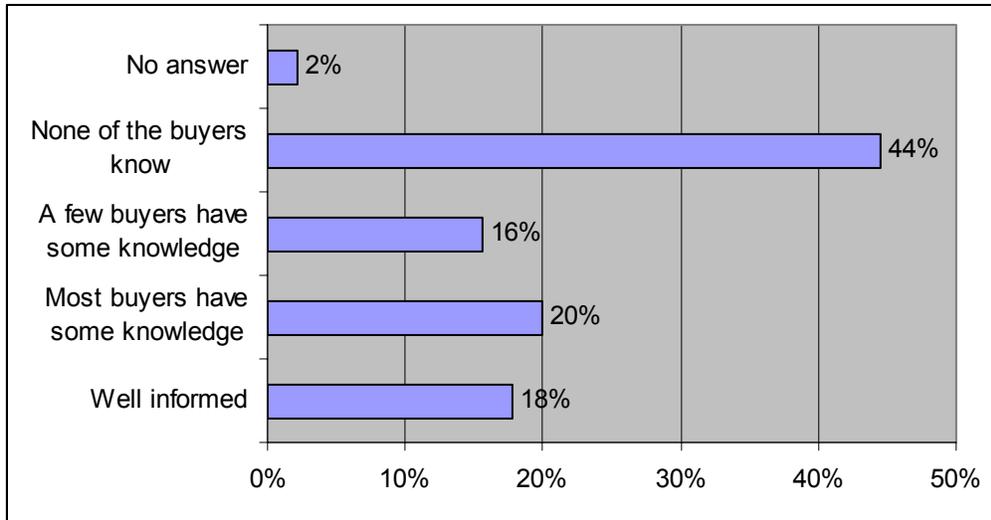


View of horizon from Cotuit with Windmills

## Appendix 4. Results of the Realtor Survey

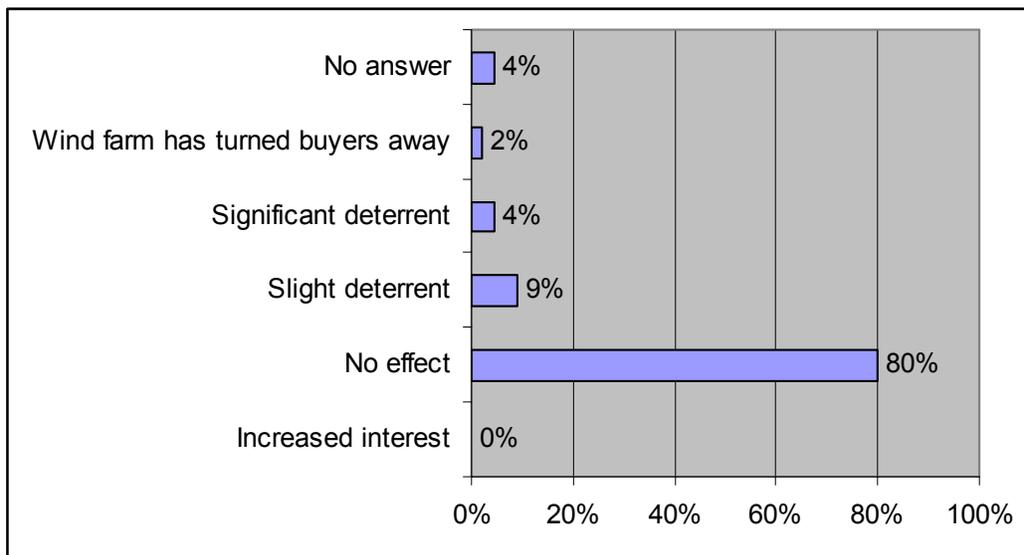
This survey polled 45 realtors on Cape Cod in the course of the summer of 2003.

*Question 1: In your opinion, how informed are prospective buyers (or sellers) about the current proposal?*



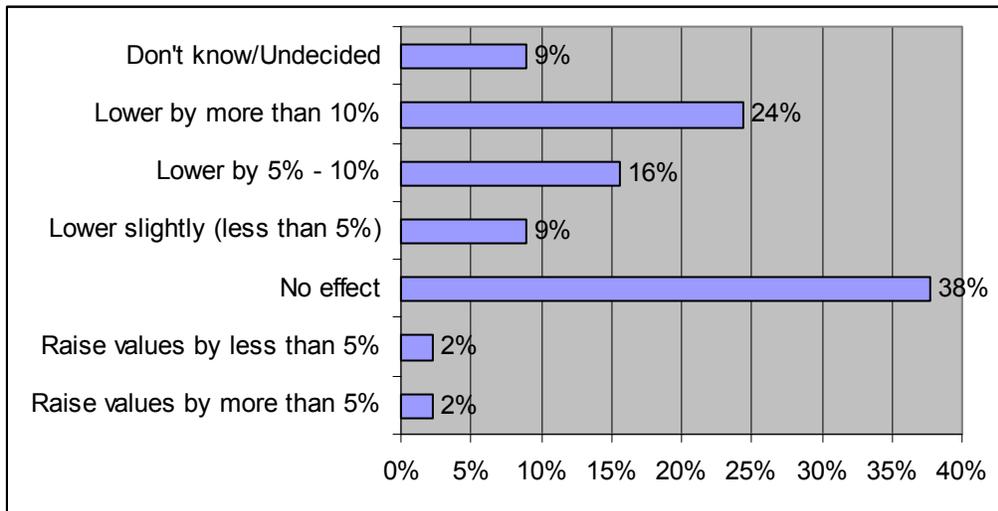
According to local realtors a high number of prospective buyers remain unaware of the windmill proposal. This is surprising given the amount of media coverage that has surrounded the controversial project in the past six months. However, when viewed in light of our tourist survey results (in which 46% of respondents replied that they had not heard of the proposal), the number seems reasonable. This stands in stark contrast to the results of our Home Owner Survey, in which only 3% of the respondents said that they had not heard of the proposal.

*Question 2: In your personal experience, how has the prospect of a wind farm affected buyer interest in the past six months?*



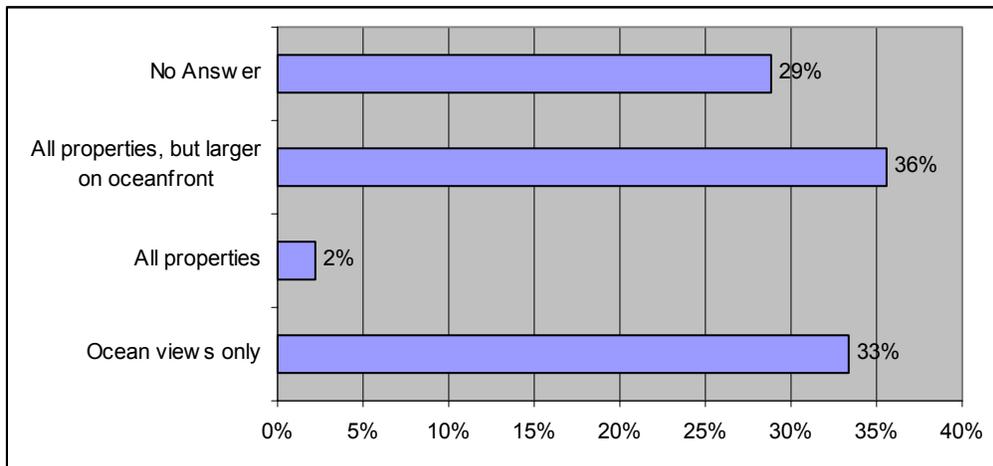
To this point, it is very clear that the prospect of a wind farm in Nantucket Sound has had little impact on buyer interest. However, it is unclear whether this is due to the fact that 44% of potential buyers are unaware of the wind farm or whether they simply aren't concerned. It would be interesting to continue this survey as the permitting process continues and observe any changes that might occur.

*Question 5: In your opinion, what effect might a wind power facility, once built, have on the local real estate market?*



Forty-nine percent of realtors believe that a wind farm in Nantucket Sound would cause property values in the surrounding communities to fall.

*Question 6: Do you believe the effects of the proposed wind farm would be felt on:*



## Endnotes

- <sup>1</sup> U.S. Army Corps of Engineers guidelines referenced at <http://www.nae.usace.army.mil/reg/reg2.htm>.
- <sup>2</sup> Businesswire, Cape Wind News Release, April 3, 2003. The study was done by Global Insight, of Lexington MA. Most of these jobs are not permanent.
- <sup>3</sup> Save Our Sound, from [www.saveoursound.org/legal.html](http://www.saveoursound.org/legal.html) [accessed March 18, 2003].
- <sup>4</sup> See, for instance, Byron Consulting Group, "Report for Phase 1 Certification of Economic Analyses for Alliance to Protect Nantucket Sound."
- <sup>5</sup> Center for Coastal Studies, "Review of State and Federal Marine Protection of the Ecological Resources of Nantucket Sound," Provincetown MA, January 28, 2003.
- <sup>6</sup> A more complete technical report on this first phase of the work will appear later in 2003.
- <sup>7</sup> Kenneth Arrow, Robert Solow, et al, "Report of the NOAA Panel on Contingent Valuation", *Federal Register*, Washington, D.C.: January 1993.
- <sup>8</sup> Contingent valuation surveys have become widely used for obtaining willingness-to-pay (WTP) estimates for public goods, see for instance, Robert C. Mitchell and Richard T. Carson, *Using Surveys to Value Public Goods: The Contingent Valuation Method*, Washington, C.C: Resources for the Future, 1989. The method has been recommended by various Federal agencies, including the U.S. Forest Service, U.S. Department of the Interior and the EPA, for use in cost-benefit analysis and natural resource damage assessments. Furthermore, its use has been upheld by Federal courts (U.S. District Court of Appeals 1989).
- <sup>9</sup> *Massachusetts Toward a New Prosperity: Building Regional Competitiveness Across the Commonwealth*, Massachusetts Department of Business and Technology, 2003, pg. 84.
- <sup>10</sup> *Ibid*, pg. 82.
- <sup>11</sup> *Ibid*, pg. 84.
- <sup>12</sup> Massachusetts Travel Industry Report: 2003, prepared by Massachusetts Office of Travel and Tourism.
- <sup>13</sup> Roughly, for every two tourists that say they would spend less time on the Cape, another one would not visit at all. Applying a similar proportion to those who say they would spend more time on the Cape, we estimate that there would be a 0.58% increase in visits to the Cape, attributable entirely to the presence of the windmills.
- <sup>14</sup> A similar approach was taken by the Global Insight study prepared for Cape Wind, which looked at the employment effects associated with the construction and operation of the wind farm. See footnote 1.
- <sup>15</sup> For details, see Bureau of Economic Analysis, US Department of Commerce, "Regional Multipliers: A User Handbook For the Regional Input-Output Modeling System (RIMS II)", Third Edition, 1997.
- <sup>16</sup> See for instance "Explaining the Pattern of Regional Unemployment: The Case of the Midi-Pyrénées Region," with Yves Aragon et al. *Papers in Regional Science*, 82:155-174, 2003.
- <sup>17</sup> See for instance, Brent L. Mahan and Stephen Polasky, "Valuing Urban Wetlands: A Property Price Approach", *Land Economics*, February 2000, Vol. 76, Issue 1.
- <sup>18</sup> Data on the assessed value of residential properties was obtained from Massachusetts Department of Revenue, Municipal Databank.
- <sup>19</sup> Conservation Law Foundation, January 15, 2003. Amicus brief submitted to the United States District Court for the District of Massachusetts.
- <sup>20</sup> For instance, HR 793, would grant jurisdiction over energy related activities on the OCS to the Department of the Interior.
- <sup>21</sup> Cape Wind Associates editorial referenced at <http://www.capewind.org/> [accessed on October 22, 2003].
- <sup>22</sup> Mineral Management Service referenced at <http://www.mms.gov/offshore/> [accessed on October 22, 2003].
- <sup>23</sup> For comparison, oil and gas developers operating in shallow OCS waters are required to pay 16.7% of "gross proceeds."
- <sup>24</sup> Cape Wind expects to produce approximately 1.5 million megawatt hours of electricity per year. Using average monthly energy spot market prices for 2002 (\$35.77) obtained from ISO-NE yields \$53 million. To this should be added the Federal production tax credit (\$19/MWh) and the estimated revenue from selling green credits in Massachusetts (\$25/MWh) for a total, if optimistic, revenue of \$105 million.
- <sup>25</sup> The divergence between WTP and WTA in contingent valuation surveys has been well documented. See for example, W.M. Hanemann, "Willingness to Pay and Willingness to Accept: How Much Can They Differ?", *American Economic Review*, Vol. 82, No.2, 635-649, 1991 or Mitchell and Carson, *Using Surveys to Value Public Goods: The Contingent Valuation Method*, Washington, C.C: Resources for the Future, 1989.
- <sup>26</sup> See for instance, Levy et al, *Conceptual and Statistical Issues in Contingent Valuation: Estimating the Value of Altered Visibility in the Grand Canyon*, RAND MR-344-RC, p. 6, 1995.
- <sup>27</sup> For a good treatment of how to measure willingness to pay using "referendum" questions, see Timothy Haab and Kenneth McConnell, *Valuing Environmental and Natural Resources*, Edward Elgar, Cheltenham, 2002.



## About the Beacon Hill Institute

Founded in 1991, BHI is an independent, nonpartisan economic research organization, located within Suffolk University in Boston, that applies a market-clearing approach to the analysis of tax, fiscal and regulatory issues. In addition to analyzing tax policy, we study issues including education spending, charitable tax incentives, universal health care, tort reform and economic competitiveness. BHI develops innovative solutions and applies economic analysis to public-policy issues affecting the states and the nation.

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