



Impact Analysis of the Cape Wind Off-Shore Renewable Energy Project on Local, State, and Regional Economies

A Report Prepared for:

Cape Wind Associates
75 Arlington Street
Boston, MA 02116

Prepared by:

Global Insight
24 Hartwell Avenue
Lexington MA, 02421-3158

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Executive Summary

Based on our analysis, the construction and operation of the proposed Wind Park by Cape Wind Associates would have a positive economic and fiscal impact on the mainland cities and towns located in Barnstable County, especially Barnstable and Yarmouth, and also on the Commonwealth of Massachusetts.

Manufacturing/Assembly (M/A) & Construction/Installation (C/I) Phase Impacts

There will be a number of positive economic and fiscal impacts during the M/A and C/I phase of the project:

- Between 597 and 1,013 direct, indirect, and induced full-time jobs will be created.
- Total State economic output will increase by between \$85 million and \$137 million annually.
- Value added will increase by between \$44 million and \$71 million annually.
- Labor income will increase by between \$32 million and \$52 million annually.
- Personal income tax revenues will increase by between \$4.8 million and \$7.8 million during the M/A and C/I phase.
- Other property income, comprised of rent, dividends and interest, and corporate profits, will increase by between \$9.2 million and \$14.8 million annually.
- Corporate income tax revenues will increase by between \$1.3 million and \$2.1 million during the M/A and C/I phase.
- Employment in Barnstable County will increase by 75 construction jobs.
- Very few construction workers will need to relocate to either Barnstable or Yarmouth.
- In the long run, there should be no appreciable increase in the demand for locally or state provided government services.
- Barnstable and Yarmouth will receive one-time building permit fees during the M/A and C/I phase.

Operation Phase Impacts

The positive economic and fiscal impacts associated with the project will extend beyond the M/A and C/I phase. During the operation phase, the following economic and fiscal impacts will accrue:

- There will be an annual permanent employment increase of 154 jobs beginning in 2007.
- Total State economic output will increase by \$22 million annually.

- Personal income tax revenues will increase by \$346,500 annually.
- Corporate income tax revenues will increase by \$113,900 annually.
- Barnstable will initially receive \$62,500 in annual property tax revenues.
- Yarmouth will initially receive \$217,200 in annual property tax revenues.
- Based upon a study by La Capra Associates, the Cape Wind project will generate annual savings in wholesale power costs in Massachusetts of \$25 million, which would result in an annual increase in State economic output of between \$5.1 million and \$6.1 million and a permanent increase in employment of between 142 and 215 jobs.

1.0 Introduction

The purpose of this analysis is to estimate, quantitatively where possible, the economic and fiscal impacts that would occur in the mainland cities and towns located in Barnstable County, especially Barnstable and Yarmouth, and also in the Commonwealth of Massachusetts during the M/A and C/I and operation phases of the proposed project. The characteristics of the local and state economies that will determine the magnitude and composition of the economic impacts generated by the proposed project are described in Section 2.0. Corresponding economic impacts are presented in Section 3.0.

The applicant has estimated the total capital costs, including engineering and design fees, contingency, etc. of the proposed project to be approximately \$700 million, or about \$1,666 per kilowatt (KW) of gross generating capacity. Total labor cost is estimated at \$135.2 million, while total non-labor cost is estimated at \$564.8 million. The output from each wind turbine generator (WTG) will be conveyed to a centrally located electric service platform, from which a submarine 115 kV transmission line will convey the power to the mainland, coming ashore near Yarmouth. From that point, an underground 115 kV transmission will go 4 miles to an existing transmission right of way (ROW), and then another 1.9 miles underground to the existing Barnstable switching station.

The proposed project would be constructed in 27 months and require a total of 10,558 person-months of M/A and C/I labor as shown in Table 1.1. This is equivalent to 391 full-time jobs during the 2-¼ year M/A and C/I phase. The manpower requirements for the M/A and C/I phases of the project are shown in Table 1.1.

The regional distribution of the on-shore support facilities needed to support the M/A and C/I and operation activities is described briefly below because it shows that local economic impacts produced by the hiring of new workers and purchases of goods and services will occur in several communities located well away from the M/A and C/I sites. The fabrication and assembly of WTG components will likely be performed at an onshore facility in Quonset, Rhode Island (RI) located about 55 nautical miles west of the Wind Park. Workers engaged in offshore construction work will likely assemble each day at the support facility in Falmouth and then be taken by boat to the Horseshoe Shoals site. The maintenance and parts operations will be conducted out of a support facility in New Bedford, while the crew boats would likely depart from a smaller support base in Falmouth. The applicant estimates up to 3 maintenance teams will be required each day, 252 days per year, with each team comprised of 9 maintenance personnel and 2 crew members. With the other maintenance jobs that are created, there will be a total of 50 full time maintenance jobs. Annual operating costs would be approximately \$16.0 million, including annual payments in wages & salaries of \$2.64 million. The total annual non-labor operation and maintenance (O&M) expenditures would be about \$10.45 million.

Table 1.1 : M/A and C/I Phase Labor Requirements by Activity and Year

| Labor Category | Year 1 | Year 2 | Year 3 | Total |
|---|---------------|---------------|---------------|--------------|
| WTG Facility Work | 297 | 0 | 0 | 297 |
| Manufacturing-Blades | 1232 | 1078 | 0 | 2310 |
| Assembly-Nacellas | 420 | 540 | 0 | 960 |
| Monopile Fabrication | 306 | 282 | 0 | 588 |
| Transition Piece Fabrication | 282 | 261 | 0 | 543 |
| Tower Fabrication | 282 | 261 | 0 | 543 |
| Re-Fitting of Vessels | 1234 | 10 | 0 | 1244 |
| Vessel's Crew | 102 | 598 | 0 | 700 |
| Staging Area Operations | 56 | 516 | 0 | 572 |
| Installation of Monopiles and Transition Pieces | 0 | 192 | 0 | 192 |
| Installation of Towers and Turbines | 0 | 198 | 18 | 216 |
| Scour Protection | 0 | 144 | 0 | 144 |
| Commissioning | 0 | 550 | 50 | 600 |
| 115 kV Cable Installation ((land) | 389 | 0 | 0 | 389 |
| 115 kV Cable Installation (offshore) | 20 | 40 | 0 | 60 |
| 33 kV Cable Installation | 0 | 200 | 40 | 240 |
| Total Labor | 4620 | 4870 | 108 | 9598 |
| Contingency | 462 | 487 | 11 | 960 |
| Man-months | 5082 | 5357 | 119 | 10558 |
| Man-years | 424 | 446 | 10 | 880 |
| Full-time jobs | 188 | 198 | 4 | 391 |

In order to calculate the economic impacts generated by the newly hired M/A and C/I workers, the labor rates presented in Table 1.2 were used. These labor rates were obtained from Global Insight's Pricing and Purchasing Service.

Table 1.2: Annual Labor Rates

| Labor Category | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Ironworkers | 37.003 | 37.877 | 38.700 | 39.870 | 41.030 | 42.290 | 43.514 | 44.725 | 45.924 | 47.189 | 48.492 | 49.806 |
| Operating Engineers | 34 | 34.975 | 36.052 | 37.23 | 38.46 | 39.72 | 40.991 | 42.292 | 43.624 | 44.997 | 46.441 | 47.987 |
| Millwrights | 34.06 | 34.864 | 35.621 | 36.7 | 37.82 | 38.98 | 40.062 | 41.167 | 42.271 | 43.435 | 44.634 | 45.844 |
| Electricians | 39.798 | 40.737 | 41.622 | 42.89 | 44.2 | 45.49 | 46.8 | 48.102 | 49.392 | 50.753 | 52.154 | 53.567 |
| Painters | 30.818 | 31.545 | 32.231 | 33.21 | 34.22 | 35.22 | 36.24 | 37.249 | 38.247 | 39.301 | 40.366 | 41.48 |
| Carpenters | 33.246 | 34.028 | 34.860 | 35.88 | 36.99 | 38.11 | 39.19 | 40.26 | 41.33 | 42.45 | 43.61 | 44.78 |
| Laborers | 26.495 | 27.118 | 27.783 | 28.59 | 29.48 | 30.37 | 31.235 | 32.088 | 32.94 | 33.832 | 34.755 | 35.698 |
| Miscellaneous Supervision | 43.74 | 44.769 | 45.866 | 47.200 | 48.67 | 50.14 | 51.566 | 52.974 | 54.379 | 56.853 | 57.376 | 58.925 |

2.0 Local Economy

2.1 Region of Impact

Global Insight defined the region of impact (ROI) as Barnstable County, Massachusetts, which contains a total of 15 cities and towns. Most of Barnstable County is located in the Barnstable-Yarmouth Primary Metropolitan Statistical Area (PMSA), which consists of Barnstable and the following towns: Brewster, Chatham, Dennis, Eastham, Harwich, Mashpee, Orleans, Sandwich, and Yarmouth. The other towns in Barnstable County outside the PMSA are: Bourne, Falmouth, Provincetown, Truro, and Wellfleet. However, the Barnstable New England

County Metropolitan Area (NECMA) is the same as Barnstable County, so the Barnstable NECMA also comprises the ROI. The remainder of this analysis uses the term Barnstable County.

Barnstable County was selected as the ROI because the majority of the direct M/A and C/I and operation impacts will be concentrated there, including: the hiring of M/A and C/I workers, purchase of non-labor goods and services during M/A and C/I and operation phases, presence of an on-shore support base to support offshore construction and annual operation (O&M) maintenance activities, and the presence of on-shore infrastructure such as the 115 kV transmission line that would convey power from the project to the existing regional transmission and distribution (T&D) system. Southeastern Massachusetts and Rhode Island would also benefit from on-shore facilities that may be established there during M/A and C/I, including the fabrication of blades and other components in southeastern Massachusetts, and the assembly of the WTGs, and the stockpiling of M/A and C/I materials at Quonset Point. Barnstable County is located within easy daily commuting distance of both the Boston and Providence PMSAs, so any skilled M/A and C/I workers not available from the ROI would be obtainable from these two PMSAs, suggesting that no in-migration of M/A and C/I workers would occur.

The purchases of construction labor, and non-labor goods and services such as concrete and aggregates, steel, and support services such as the crew boats and barges used to support the offshore construction activities, will be concentrated in Barnstable County. However, according to the applicant, the purchase of much of the specialized equipment that will comprise the WTGs such as the rotors, generators, and nacelles etc. will occur outside the ROI, and likely outside Massachusetts. In addition, the fabrication and assembly of the WTG components will likely occur at Quonset Point, RI, and other support or assembly activities may be located in southeastern Massachusetts. Assembly and fabrication activities at these locations, along with spending by C/I workers, would generate significant temporary increases in employment and income in their host counties during the M/A and C/I phase.

2.2 The Structure of the Local Economy

Table 2.1 presents recent economic data for Barnstable County from Global Insight's Spring 2003 forecast. Since our forecasts for New England's metropolitan areas are based on the New England County Metropolitan Areas (NECMAs), the data in this table is for all of Barnstable County. Barnstable County's total population on April 1, 2000 according to the 2000 Census was 222,230 persons; the most recent estimate as of July 1, 2002 places the County's total population at 228,577, a slight upward revision from the previous estimate of 227,600 persons shown in Table 2.1. Barnstable County's population grew at an annual rate of 1.71% between 1990 and 2002, well above the statewide growth rate of 0.5%.

The Massachusetts Division of Employment and Training (MDET) estimates that the total non-seasonally adjusted (NSA) labor force in Barnstable County during the 2nd quarter of 2002 was 115,752 workers, while the total resident labor force in the Cape Cod and Islands Workforce Area, which also includes Nantucket and Martha's Vineyard, was 129,043 workers. The NSA unemployment rate in the Cape Cod and Islands Workforce Area in June 2003 was 3.7% up from 3.4% a year ago, but still below the statewide and US NSA unemployment rates of 5.7% and 6.5%. By comparison, the non-seasonally adjusted unemployment rate in Barnstable County in June 2003 was 4%. Finally, the June 2003 NSA unemployment rates in the City of Barnstable and the Town of Yarmouth were 3.7% and 4.2% respectively.

As shown in Table 2.1, Barnstable County's real Personal Income (in 1996 dollars) was estimated at \$7.691 billion in 2002, representing a 1.99% increase over the previous year. Growth in Real Per Capita Income (in 1996 dollars) was slightly lower, reaching an estimated

\$33,796 in 2002, a 0.76% increase over 2001. By comparison, real per capita personal income in Massachusetts in 2002 was \$35,316, down 0.4% from the 2001 figure of \$35,461.

In 2002, Global Insight estimates that total non-agricultural employment in Barnstable County, on a place of work basis, was 91,997 jobs, with the non-manufacturing sector accounting for 89,045 jobs. The remaining 2,952 jobs were in the manufacturing sector. Retail Trade and Services had the largest shares of non-manufacturing employment, accounting for 27,623 and 31,562 jobs respectively.

According to the Bureau of Labor Statistics, the average annual pay per covered worker in Barnstable County during 2001 was \$31,020, up 4.4% from the year before. Barnstable County's average pay per worker ranked 144th out of 317 MSAs. By comparison, the average pay per covered worker in the Boston and Providence PMSAs were \$45,768 and \$33,390 respectively. Global Insight estimates that the average wage per job in Barnstable County in 2003 is \$34,600, well below the Massachusetts figure of \$47,400. The lower figure for Barnstable County reflects its dependence on the tourism sector, with a resulting concentration of lower paying jobs in the retail and services sectors.

According to the MDET, there were a total of 5,634 construction related workers employed in the Cape and Islands Workforce area in the 4th quarter of 2001. More recent data from the Bureau of Labor Statistics indicates that the total seasonally adjusted (SA) employment of construction and mining workers in Barnstable County in November 2002 was approximately 6,200 workers. Global Insight estimates that total M/A and C/I employment in the ROI in 2002 was distributed as follows: 34.4% in general building contractors (SIC 15); 9.7% in Heavy M/A and C/I, excluding Building (SIC 16), and 55.9% in Special Trade Contractors (SIC 17). Given the relatively small size of the M/A and C/I labor pool located in Barnstable County, the relatively low unemployment rate, and the specialized, high-skill M/A and C/I trades that will be needed to construct the proposed Wind Park, a significant share of the M/A and C/I workers will likely come from the Boston and Providence PMSAs.

Table 2.2 presents the economic structure and growth rates for the ROI and the Commonwealth of Massachusetts for 2002 for employment, nominal output, and number of establishments. The data was obtained from Global Insight's Business Demographics Navigator database, which in turn is based on a number of published sources, such as detailed ES202 employment data, databases of companies by zip code, and input-output tables. The table confirms that Barnstable County's employment is concentrated in the retail sector – 28.8% and services – 31.6%, with the retail trade employment share much higher than for Massachusetts, while the service sector share is slightly lower. The table also shows that the construction sector accounted for 7.1% of total MSA employment in 2002, well above of the statewide share of 4.2%. The table also shows that the annual growth rates in employment, nominal output (i.e., gross output on a sales basis compared to the value added basis which is used for gross domestic product and gross state product), and the number of establishments in Barnstable County between 1990 and 2002 was greater than in the Commonwealth of Massachusetts. Finally, confirming the difference in economic growth, the annual growth rate in nominal personal income in Barnstable County between 1990 and 2002 was 5.7%; again well above the statewide growth rate of 5.0% over the same period.

Table 2.1: Barnstable County Historic and Forecast Economic Conditions:

| Outlook for Barnstable-Yarmouth, MA Metropolitan Statistical Area Spring 2003 (Based on US Macroeconomic Forecast of March 2003) | | | | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| Personal Income (\$Billion) | | | | | | | | | | | |
| Total Personal Income | 6.9 | 7.3 | 7.9 | 8.3 | 8.5 | 8.8 | 9.3 | 9.7 | 10.2 | 10.7 | 11.2 |
| Ann. Pct. Change | 9.8 | 6.2 | 7.1 | 5.1 | 3.4 | 3.2 | 5.0 | 4.7 | 5.0 | 5.1 | 4.9 |
| Wages and Salaries | 2.4 | 2.7 | 2.8 | 3.1 | 3.1 | 3.2 | 3.4 | 3.6 | 3.7 | 3.9 | 4.1 |
| Non-wage Income | 4.6 | 4.6 | 5.0 | 5.2 | 5.4 | 5.6 | 5.8 | 6.1 | 6.4 | 6.8 | 7.2 |
| Real Personal Income (96\$) | 6.7 | 7.0 | 7.3 | 7.5 | 7.7 | 7.8 | 8.0 | 8.2 | 8.5 | 8.7 | 8.9 |
| Ann. Pct. Change | 8.6 | 4.5 | 4.4 | 3.0 | 2.0 | 1.2 | 3.2 | 2.7 | 2.9 | 2.7 | 2.3 |
| Per Capita Income (Thous.) | 32.5 | 33.8 | 35.6 | 36.7 | 37.5 | 38.3 | 39.8 | 41.3 | 43.1 | 44.9 | 46.8 |
| Real Per Capita Income (96\$) | 31.6 | 32.3 | 33.1 | 33.5 | 33.8 | 33.8 | 34.5 | 35.2 | 35.9 | 36.6 | 37.1 |
| Average Annual Wage (Ths.) | 27.8 | 30.7 | 31.0 | 32.8 | 33.8 | 34.6 | 35.6 | 36.8 | 38.0 | 39.3 | 40.5 |
| Ann. Pct. Change | 6.6 | 10.5 | 0.9 | 6.0 | 2.7 | 2.4 | 3.1 | 3.2 | 3.3 | 3.4 | 3.1 |
| Establishment Employment (Place of Work, Thousands) | | | | | | | | | | | |
| Total non-Agricultural | 83.3 | 86.6 | 89.4 | 91.6 | 92.0 | 92.3 | 94.3 | 95.7 | 97.0 | 98.2 | 99.4 |
| Ann. Pct. Change | 2.5 | 4.0 | 3.3 | 2.5 | 0.4 | 0.3 | 2.2 | 1.5 | 1.3 | 1.3 | 1.2 |
| Manufacturing | 3.5 | 3.8 | 3.6 | 3.3 | 3.0 | 2.9 | 2.8 | 2.9 | 2.9 | 2.9 | 2.8 |
| Ann. Pct. Change | 5.3 | 6.3 | -5.6 | -7.3 | -10.5 | -3.3 | -0.4 | 0.3 | 0.2 | -0.1 | -0.1 |
| Durables | 2.5 | 2.7 | 2.5 | 2.4 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| Nondurables | 1.0 | 1.1 | 1.0 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.9 | 0.8 | 0.8 |
| Nonmanufacturing | 79.7 | 82.8 | 85.9 | 88.3 | 89.0 | 89.4 | 91.5 | 92.9 | 94.1 | 95.4 | 96.5 |
| Ann. Pct. Change | 2.4 | 3.9 | 3.7 | 2.9 | 0.8 | 0.4 | 2.2 | 1.6 | 1.3 | 1.3 | 1.2 |
| Trade | 27.5 | 28.6 | 29.6 | 30.0 | 29.9 | 29.8 | 30.2 | 30.5 | 30.6 | 30.8 | 30.9 |
| Ann. Pct. Change | 3.2 | 3.8 | 3.7 | 1.2 | -0.3 | -0.4 | 1.6 | 0.8 | 0.6 | 0.5 | 0.3 |
| Retail | 25.6 | 26.3 | 27.3 | 27.7 | 27.6 | 27.6 | 28.0 | 28.2 | 28.4 | 28.5 | 28.6 |
| Wholesale | 1.9 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 |
| Trans., Comm., & Util. | 3.9 | 4.0 | 4.0 | 4.0 | 3.8 | 3.8 | 3.9 | 3.9 | 4.0 | 4.1 | 4.1 |
| Ann. Pct. Change | -1.6 | 3.1 | 0.7 | -0.7 | -4.6 | -0.4 | 2.4 | 2.0 | 2.0 | 1.6 | 1.2 |
| Fin., Ins., & Real Estate | 3.9 | 4.2 | 4.3 | 4.4 | 4.4 | 4.4 | 4.5 | 4.6 | 4.7 | 4.8 | 4.9 |
| Ann. Pct. Change | -4.9 | 10.0 | 1.9 | 0.7 | 0.0 | 1.1 | 2.9 | 2.5 | 2.0 | 1.7 | 1.8 |
| Services | 27.9 | 28.6 | 29.3 | 30.7 | 31.6 | 32.0 | 33.3 | 34.1 | 34.8 | 35.5 | 36.2 |
| Ann. Pct. Change | 2.9 | 2.6 | 2.6 | 4.6 | 2.9 | 1.5 | 3.9 | 2.5 | 2.1 | 2.0 | 2.1 |
| Federal Government | 1.9 | 1.8 | 2.0 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Ann. Pct. Change | 2.5 | -1.5 | 8.3 | -9.3 | -3.6 | 1.2 | 0.9 | 0.7 | 0.6 | 0.7 | 0.2 |
| State & Local Govt. | 10.9 | 11.2 | 11.7 | 12.1 | 12.3 | 12.3 | 12.3 | 12.5 | 12.6 | 12.7 | 12.8 |
| Ann. Pct. Change | 2.7 | 3.1 | 3.8 | 4.2 | 1.1 | 0.0 | 0.5 | 1.0 | 0.9 | 1.0 | 0.8 |
| Construction | 3.7 | 4.3 | 4.8 | 5.3 | 5.3 | 5.3 | 5.3 | 5.4 | 5.5 | 5.6 | 5.7 |
| Ann. Pct. Change | 5.0 | 15.0 | 13.4 | 9.2 | 0.6 | -0.2 | 0.4 | 0.9 | 1.5 | 1.9 | 1.7 |
| Mining | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Ann. Pct. Change | -15.5 | -8.5 | -14.4 | 9.1 | 3.8 | 0.6 | -6.1 | -4.6 | -3.1 | -1.4 | -2.2 |
| Other Economic Indicators | | | | | | | | | | | |
| Population (Ths) | 212.4 | 217.0 | 220.9 | 224.8 | 227.6 | 230.2 | 232.5 | 234.5 | 236.4 | 238.3 | 240.2 |
| Ann. Pct. Change | 2.1 | 2.2 | 1.8 | 1.8 | 1.2 | 1.2 | 1.0 | 0.9 | 0.8 | 0.8 | 0.8 |
| Total Housing Permits | 2,123 | 2,232 | 1,881 | 1,622 | 1,128 | 1,444 | 1,632 | 1,668 | 1,686 | 1,703 | 1,743 |
| Single-Family | 1,935 | 2,086 | 1,784 | 1,492 | 1,092 | 1,363 | 1,511 | 1,535 | 1,550 | 1,562 | 1,591 |

Table 2.2: Barnstable County and Massachusetts Economic Structures and Growth Rates

| Industry | % Distribution by Sector in 2002 | | | Annual Growth Rates 1990 to 2002 | | |
|-------------------------------------|----------------------------------|--------------------------|--------|----------------------------------|--------------------------|--------|
| | Employment | Number of Establishments | Output | Employment | Number of Establishments | Output |
| | % | % | % | % | % | % |
| Barnstable MSA | | | | | | |
| Agriculture, Forestry, and Fishing | 1.8% | 4.0% | 1.3% | -0.36% | 2.68% | 1.49% |
| Mining | 0.1% | 0.0% | 0.1% | 3.44% | -1.88% | 8.28% |
| Construction | 7.1% | 13.6% | 10.7% | 5.80% | 4.71% | 6.37% |
| Manufacturing | 4.1% | 3.0% | 5.1% | -0.07% | 2.18% | 4.20% |
| Transportation and Public Utilities | 3.9% | 3.8% | 5.0% | -1.61% | 1.32% | 0.44% |
| Wholesale Trade | 2.7% | 4.2% | 7.9% | 3.71% | 4.63% | 6.54% |
| Retail Trade | 28.8% | 27.9% | 25.5% | 1.11% | 1.21% | 4.15% |
| Finance, Insurance, and Real Estate | 4.1% | 6.3% | 17.1% | 0.88% | 2.67% | 7.04% |
| Services | 31.6% | 33.6% | 20.9% | 3.27% | 4.03% | 7.09% |
| Public Administration | 15.9% | 3.6% | 6.5% | 2.33% | 2.36% | 6.12% |
| Total Industries | 100.0% | 100.0% | 100.0% | 2.03% | 2.88% | 5.38% |
| Massachusetts | | | | | | |
| Agriculture, Forestry, and Fishing | 1.5% | 4.1% | 0.7% | 1.5% | 2.1% | 2.1% |
| Mining | 0.0% | 0.1% | 0.0% | 0.5% | -0.2% | 3.3% |
| Construction | 4.2% | 11.4% | 5.2% | 2.9% | 4.1% | 5.3% |
| Manufacturing | 12.0% | 5.0% | 16.6% | -2.1% | -0.5% | 2.4% |
| Transportation and Public Utilities | 4.9% | 3.8% | 5.8% | 0.6% | 1.4% | 4.3% |
| Wholesale Trade | 4.7% | 5.7% | 12.5% | -0.6% | 0.0% | 3.2% |
| Retail Trade | 16.8% | 21.6% | 15.6% | 0.5% | 0.7% | 4.5% |
| Finance, Insurance, and Real Estate | 6.9% | 6.9% | 16.4% | 0.7% | 1.7% | 6.2% |
| Services | 36.1% | 36.0% | 22.2% | 2.4% | 2.9% | 6.8% |
| Public Administration | 12.7% | 5.4% | 5.0% | 0.5% | 0.5% | 4.2% |
| Total Industries | 100.0% | 100.0% | 100.0% | 0.8% | 1.8% | 4.6% |

Source: Global Insight's Business Demographics Navigator, 2002.

Table 2.3 presents baseline data for Barnstable and Yarmouth from the “Community Report Builder” databases maintained by the Massachusetts Department of Revenue, Division of Local Services. Barnstable and Yarmouth are the two municipalities in the ROI where the direct effects of M/A and C/I and operation would be most concentrated. Barnstable had an estimated population of 47,821 persons in 2000, which had risen to 48,854 persons by July 1, 2002 according to the US Census, while Yarmouth’s population was 24,807 persons. Yarmouth was also the most densely populated municipality in Barnstable County in 2000 with a density of 1,028 persons per square mile. Finally, the table shows that both Barnstable and Yarmouth are classified as growth communities.

Table 2.3: Community Profiles for Barnstable and Yarmouth

| TOWN | BARNSTABLE | YARMOUTH |
|---|-------------------------------|------------------------------|
| County | Barnstable | Barnstable |
| Kind of Community | Growth Community | Growth Community |
| School Structure | K to 12 | Non-Operating |
| Regional Schools | •CAPE COD | •Dennis, Yarmouth & Cape Cod |
| Form of Government | Town Manager | Selectmen |
| 2000 Population | 47,821 | 24,807 |
| 2001 Labor Force | 24,039 | 10,830 |
| 1989 Per Capita Income | \$17,376 | \$15,042 |
| Population Per Square Mile | 795 | 1,028 |
| 2001 Unemployment Rate | 2.5 | 3 |
| 2000 EQV Per Capita | \$127,949 | \$104,233 |
| Moody's Bond Rating | Aa3 | A1 |
| FY2002 Cherry Sheet | | |
| Estimated State Aid | | |
| Education Aid | \$ 12,845,862 | \$ - |
| General Government | \$2,879,873 | \$1,729,485 |
| Total Receipts | \$15,725,735 | \$1,729,485 |
| Total Assessments | \$2,360,841 | \$568,669 |
| Net State Aid | \$13,364,894 | \$1,160,816 |
| FY2002 Tax Classification | | |
| Tax Classification | Tax Rate | Tax Rate |
| Residential | 9.26 | 11.10 |
| Open Space | | 11.10 |
| Commercial | 9.26 | 11.10 |
| Industrial | 9.26 | 11.10 |
| Personal Property | 9.26 | 11.10 |
| FY2002 Revenue Sources | | |
| Tax Levy | \$ 69,349,434 | \$32,070,726 |
| State Aid | \$16,235,873 | \$ 1,869,377 |
| Local Receipts | \$29,153,818 | \$20,138,185 |
| Other Available | \$8,995,349 | \$5,003,872 |
| Total | \$123,734,474 | \$59,082,160 |
| FY2002 Proposition 2 ½ Levy Capacity | | |
| New Growth | \$1,151,310 | \$449,238 |
| Override | | |
| Debt Exclusion | \$4,814,133 | \$3,302,700 |
| Levy Limit | \$69,356,539 | \$ 32,562,353 |
| Excess Capacity | \$7,105 | \$491,627 |
| Ceiling | \$187,228,491 | \$72,231,365 |
| Override Capacity | \$122,686,085 | \$42,971,712 |
| FY02 Average Single Family Tax Bill | | |
| Number of Single Family Parcels | 20,521 | 12,480 |
| Assessed Value of Single Family | \$5,765,148,600 | \$2,027,482,800 |
| Average Single Family Tax Bill | \$2,601 | \$1,803 |
| FY00 Revenues and Expenditures | | |
| Revenues | General Fund \$ 91,354,146 | General Fund \$38,819,857 |
| Expenditures | \$88,583,967 | \$40,946,008 |
| Police | \$7,294,264 | \$ 3,711,981 |
| Fire | \$ - | \$2,620,551 |
| Education | \$52,889,421 | \$ 15,080,169 |
| Public Works | \$ 4,253,568 | \$ 2,724,109 |
| All Other | \$24,146,714 | \$ 16,809,198 |
| Source: Massachusetts Department of Revenue, Division of Local Services (http://www.dls.state.ma.us/allfiles.htm) | | |

Global Insight performed a shift-share analysis of the Barnstable County economy, using 2-digit SIC code employment data in order to better describe the county's economic structure and to identify key economic sectors that could be affected by the Cape Wind project. The analysis showed that between 1990 and 2002, the total increase in the county's employment could be disaggregated into the following three effects: 1) national effect or growth in the US economy – 71%; 2) industry mix, or the county's % shares of high-growth and low-growth sectors as defined at the US level – 16%; and 3) competitive effect, or the extent to which individual economic sectors in the county grew faster or slower than the same sectors in the US economy – 13%. For a region heavily dependent on tourism, these shares are typical, suggesting that economic growth in Barnstable County largely depends on economic growth in the Commonwealth of Massachusetts and US economies (i.e., the extent to which growth in real incomes in the state or US enables people to take vacations, buy second homes, engage in recreational activities, etc.). We also used the shift-share analysis to classify economic sectors in Barnstable County into the following types:

Competitive Advantage & Specialized: an economic sector whose employment growth rate in Barnstable County over the last 12 years was higher than its employment growth rate at the U.S. level over the same period, and whose percent share of total employment is higher than its percent share of total U.S. employment. Sectors in this category are major sources of increased growth in a region, and higher growth occurs because of competitive advantages (e.g., labor costs, natural and recreational resources, agglomeration effects, skilled labor, proximity to market, lower cost of living, etc.) Almost 55% of Barnstable County's 2002 employment was in sectors classified as competitive advantage & specialized. The top five private sectors in this category, based on employment in 2002, were:

- Eating and Drinking Places (SIC 58)
- Health Services (SIC 80)
- Special Trade Contractors (SIC 17)
- Hotel and lodging places (SIC 70)
- Social Services (SIC 83)

Competitive advantage, not Specialized: an economic sector whose employment growth rate over the last 12 years in the County was higher than at the U.S. level, but whose percent share of total employment in 2002 was less than its share of total U.S. employment. These sectors may represent targets of opportunity and emerging industries, as there may be competitive advantages that are enabling them to achieve above-average growth rates. Approximately 13% of Barnstable County's 2002 employment was classified as competitive advantage, not specialized. The top five private sectors in this category, based on employment in 2002, were:

- Amusement and Recreation Services (SIC 79)
- Wholesale Trade (SIC 50 and 51)
- Auto Repair & Services (SIC 75)
- Trucking and Warehousing (SIC 42)
- Motion Pictures (SIC 78)

Competitive disadvantage, but specialized: a sector whose share of total County employment was higher than its share of U.S. employment, but whose employment growth rate over the last 12 years was lower its growth rate at the U.S. level. These sectors have traditionally been major components of a regional economy, as evidenced by their high employment shares, but may be declining in relative importance and now have below-average growth rates. Approximately 22% of Barnstable County's 2002 employment was in sectors classified as competitive disadvantage, but specialized. The top five private sectors in this category, based on employment in 2002, were:

- Food Stores (SIC 54)
- Miscellaneous Retail (SIC 59)
- Engineering and Management Services (SIC 87)
- Apparel and Accessory Stores (SIC 56)
- Building Materials and Garden Supplies (SIC 52)

The remaining 10% of the County's employment in 2002 consisted of economic sectors that were not significant contributors to its economy as they had both below average growth rates and below average employment shares.

3.0 Analysis of Impacts

3.1 Impacts on the Local Economy

The purpose of this analysis was to determine the economic impacts in Barnstable County and the Commonwealth of Massachusetts that would be generated by the two primary direct economic impacts: 1) the purchases of goods and services required to construct and operate the proposed project; and 2) the expenditures of wages and salaries by temporary construction workers and then by residents hired to work at the facility once it begins to operate.

Economic Impacts During M/A and C/I

The direct economic impacts in the ROI and Massachusetts (MA) during M/A and C/I would consist of the hiring of M/A and C/I workers and the purchase of non-labor goods and services. The applicant indicates that most of the specialized components of the wind turbine generators (WTGs) such as the nacelles (i.e., the portion of the WTGs that contain the drive train and the electromotive generating systems), and the rotors will be purchased outside the ROI and very likely outside of Massachusetts. Other non-labor goods and services will be bought in Massachusetts such as concrete, steel, and barge services. The temporary increase in economic activity within the ROI and MA during the M/A and C/I phase will be the sum of the: 1) direct economic impacts – hiring of M/A and C/I workers and purchases of non-labor goods and services; 2) indirect effects – the additional demands for goods and services, such as replacing inventory, from the industries that sell goods and services directly to the project; and 3) induced effects – the increases in employment, income, etc. generated by the expenditure of disposable income of the newly hired M/A and C/I workers. The size of the temporary increase in economic activity in the ROI and MA during M/A and C/I and operation will depend on the proportion of direct expenditures that take place within these regions. Once the Wind Park begins operating, the direct, indirect and induced economic effects would be permanent changes to the state and ROI economies.

There will be two types of activities during the 27-month M/A and C/I phase:

- **Manufacture & assembly** of the blades and other WTG components in New England before being barged to the project site on Horseshoe Shoal. According to the applicant, approximately 80% of the labor needs required during the M/A and C/I phase will be needed for manufacturing and assembly operations.
- **Construction & installation** of the WTGs on Horseshoe Shoal, includes the installation of the undersea monopile foundations that will support the WTGs, the on-site assembly of the WTGs; the construction of the electric service platform (ESP); and installation of the offshore and onshore components of the transmission line that convey the project's electric power to the region's existing electric transmission and distribution system. About 20% of the labor needs during the M/A and C/I phase will be required for construction and installation activities.

The impact assessment presented below addresses both the manufacture & assembly activities conducted onshore, and the construction & installation activities that will occur offshore and along the transmission line right-of-way (ROW).

Based on the applicant's estimate of total person-months of M/A and C/I-phase labor required, Global Insight finds that a total of 880 person-years of labor will be required during the M/A and C/I phase, 711 for manufacture & assembly operations and 169 for construction & installation activities. Assuming a 27-month M/A and C/I phase, this translates into an annual average of 391 full-time jobs during the 27-month period, consisting of 316 for the manufacturing & assembly activities, and 75 for construction and installation activities. However, in actuality the M/A and C/I activities will not be evenly distributed across the M/A and C/I phase, but will instead peak during year 2 when the maximum temporary employment at the two locations at one time will be about 600 workers. Given the size of the regional M/A and C/I labor market, and proximity of M/A and C/I phase operations to both the Boston and Providence MSAs, Global Insight estimates that 75% of the construction and installation workers will be from Massachusetts, while 25% of the manufacturing & assembly workers will be from Massachusetts. The latter proportion could rise if some or all of the manufacturing & assembly operations are conducted in Fall River, MA, or possibly southeastern Massachusetts. Global Insight estimates that total payments of wages and salaries to Massachusetts' residents hired during the M/A and C/I phase will be about \$17.158 million.

The applicant has determined that about 20% of the project's total capital cost of \$700 million will be needed for labor, while 80% will be required for non-labor goods and services, including the WTG components; electric equipment including transmission lines; environmental studies and licensing costs; materials; legal service; construction materials such as steel; and transportation services. The unique characteristics of the proposed project make the percent shares of the total capital cost for labor and non-labor components different from those required for the construction of a fossil-fueled, electric generating plant. The 80% share for non-labor costs means that the temporary increase in economic activity in the ROI and MA, and even in New England, during the M/A and C/I-phase will depend primarily on the value of non-labor items purchased within these regions. Based on the location of likely suppliers for the WTG components as identified by the applicant, Global Insight estimates that between \$150 million and \$250 million in purchases on non-labor goods and services will occur in MA during the M/A and C/I phase.

In order to estimate the temporary increase in economic activity during the M/A and C/I phase, Global Insight used the IMPLAN input/output (I/O) model for Massachusetts. This model was chosen because it enables the direct economic impacts (i.e., expenditures for labor and non-labor goods and services) to be allocated into specific economic sectors (i.e., 3-digit and 4-digit SIC codes). Global Insight's Energy Group identified the appropriate final demand 3-digit SIC code sectors for the purchases of the non-labor goods and services, while the payments of wages & salaries were allocated to the household sector. The IMPLAN model produces multipliers for the total statewide increases in employment, output, value added, and income. We obtained the year 2000 structural matrices for MA, and then used the I/O model to derive the appropriate multiplier impacts at the state level. The multiplier effects within the ROI will be lower than at the state level due to the leakage of expenditures from the local economy, and because most of \$150 million to \$250 million in purchases of non-labor goods and services will be made outside the ROI, such as in the Boston MSA.

Since the total purchases of labor and non-labor requirements will occur over a three-year period, Global Insight performed three separate simulations with the I/O model, one for each year of the M/A and C/I phase, and allocated the probable purchases of both labor and non-labor needs to each year based on the labor schedule prepared by the applicant. We averaged the model results to give a range of average annual economic impacts that would occur during M/A and C/I, recognizing that at any point in time during the M/A and C/I phase the actual total economic impacts would be higher or lower. Unless noted otherwise, impacts are stated in 2002 dollars, with the gross domestic product deflator used to convert results from the IMPLAN model to 2002 dollars. Global Insight estimates the following average annual changes in Massachusetts during the M/A and C/I phase of the Cape Wind Energy Park:

- Between 597 and 1,013 full-time jobs will be created in MA, with the range of the increase varying based on the value of non-labor purchases of goods and services made in MA. This increase in employment includes the direct employment effects of 391 new full time jobs in construction and the additional indirect and induced employment, which would range from 206 to 622 jobs.
- Total output in MA will increase by between \$85.0 million and \$137.4 million annually, while the annual increase in value added will range between \$43.9 million and \$71.0 million.
- Total labor income (consisting of wages & salaries, and income to sole proprietors) will increase by an average of between \$32.1 million and \$52.0 million annually, generating an annual increase in MA personal income tax revenues of between \$1.6 and \$2.6 million, or a total of between \$4.8 and \$7.8 million during the entire M/A and C/I phase.
- Other property income, comprised of rent, dividends & interest, and corporate profits, would rise by between \$9.2 million and \$14.8 million annually, producing an annual increase in corporate income taxes of between \$434,900 and \$702,200 if half of the increase were taxable corporate net income. The total increase in corporate income tax revenues during the M/A and C/I phase could range between \$1.304 million and \$2.106 million.

Economic Impacts During Operation

Once the Wind Park begins operation, the applicant estimates that the annual O&M purchases would be approximately \$16 million, including \$2.644 million for wages & salaries paid to the 50 workers required to maintain the facility. The annual purchase of O&M services would generate additional permanent increases in economic activity in the ROI and Massachusetts. Global Insight assumed that 90% of the O&M workers would be residents of Massachusetts. The combination of the direct, indirect and induced effects as described above would generate the following permanent increases in MA, most of which would be concentrated in the ROI:

- Annual permanent increases, starting in 2007, of 154 jobs, \$21.8 million in output, \$10.2 million in value added, and \$6.93 million in labor income.
- The annual increase in Massachusetts' personal income tax revenues would be \$346,500, while the rise in corporate income tax revenues would be approximately \$113,900. We have assumed that the scheduled reduction of Massachusetts's personal income tax rate to 5% in 2003 occurs as planned; however due to the state's budget deficit, this reduction may be delayed.
- The on-land improvements of the transmission line and related facilities located in Barnstable and Yarmouth would have an assessed value of \$26.25 million, and generate annual property tax revenues of \$62,500 in Barnstable and \$217,200 in Yarmouth. According to the Applicant, approximately 25% of the upland transmission facilities will be located in Barnstable and 75% will be located in Yarmouth.

The multiplier effects in the ROI during the operations phase would be larger than during the M/A and C/I phase for two reasons: 1) a higher share of the O&M workers would likely be residents of the ROI; and 2) experience at other energy facility sites shows that over time local vendors develop the expertise, and add the required product lines, to provide an increasing share of the specialized goods and services required to operate and maintain new facilities, thus increasing the local permanent economic impacts. Overall, we forecast that the operation and maintenance of the Cape Wind Energy Park would have a positive effect on the economy of both the Barnstable MSA and the Commonwealth of Massachusetts.

3.2 Fiscal Impacts During the M/A and C/I Phase

This section describes the net fiscal impacts that would occur in Yarmouth, Barnstable, and the Commonwealth of Massachusetts during the M/A and C/I phase. Net fiscal impacts are the difference between the additional increases in annual, local and state tax revenues and the demand for additional public services generated by the M/A and C/I workers. Potential demands for locally provided government services are discussed in order to define the potential net fiscal impacts on the affected local governments.

Barnstable and Yarmouth

Based on the proximity of the project to the Boston and Providence metropolitan statistical areas (MSAs), all of the M/A and C/I phase labor needs will be obtainable from within a daily one-way commuting distance, indicating that no M/A and C/I workers will have to relocate to either the Barnstable-Yarmouth MSA or to the onshore manufacturing & assembly sites in Fall River or Quonset Point. Depending on the location of the prime contractor, there may be a small number of management and supervisory personnel who would be required to relocate to the ROI

for the M/A and C/I phase. Yarmouth and Barnstable would experience minimal, temporary increases in demand for local government services during the M/A and C/I phase for police and traffic control due to likely daily commuting by M/A and C/I & installation workers. Since we do not foresee any significant permanent in-migration by M/A and C/I workers and their dependents to the ROI during the M/A and C/I phase, there would be no corresponding increase in the demand for locally provided government services. Therefore, there is likely to be a minimal net fiscal impact one way or the other on Yarmouth and Barnstable during M/A and C/I. Both jurisdictions would receive some one-time building permit fees during the M/A and C/I phase for the approximately \$26.25 million in on-shore facilities that would be constructed in these two jurisdictions.

3.3 Fiscal Impacts During Operation

Barnstable and Yarmouth

Based on the estimated capital cost of approximately \$26.25 million for the onshore improvements associated with the upland transmission cable system, there would be a permanent increase in the annual real property tax revenues of \$62,500 for Barnstable and \$217,200 for the Town of Yarmouth. According to the Applicant, approximately 25% of the value of the upland transmission system would be in Barnstable and approximately 75% would be in Yarmouth.

There would be a minimal increase, if any, in the demand for locally provided government services in Barnstable and Yarmouth once the project begins operations, primarily because there would be no permanent in-migration of O&M workers; as noted above we assumed that 90% of these employees would be residents of Massachusetts and reside within daily commuting distance of the project. Since the O&M workers would commute daily to an on-shore support base, possibly located in Yarmouth before being transported to the offshore WTGs, there would be only a minimal net increase in demand for new, locally provided, public services. Finally, there would not be any increase in demand for government services in adjacent municipalities.

Commonwealth of Massachusetts

As noted above, the annual increase in Massachusetts' personal income tax revenues once the Wind Park begins operation would be \$346,500, while the increase in corporate income tax revenues would be approximately \$113,900, for a combined permanent increase of \$460,400. The Commonwealth of Massachusetts could experience a moderate annual increase in sales tax revenues during operation, once again with the amount of sales and use revenues determined by two factors: 1) the share of the approximately \$10.44 million in annual O&M purchases that are made within Massachusetts, and 2) the extent to which project-related O&M expenditures would be subject to the sales and use tax since virtually all of the project is located outside state waters. Overall, the State would incur little, if any, increase in demand for government services attributable to the Wind Park over those currently provided to the site. Therefore, the net fiscal impact to the State would be positive.

3.4 Impacts of Savings in Wholesale Power Costs

The applicant estimates that the project will produce annual savings in wholesale electric power costs in Massachusetts of \$25 million, with the following savings by sector: \$7.5 million – residential; \$15 million – commercial; and \$2.5 million – industrial. This assessment is based upon a study conducted by La Capra Associates entitled *The Cape Wind Project: Impact on New England Electricity Market Prices, February 2002 Analysis*. The actual cost saving in the three sectors is based upon the assumption that the cost reductions are passed through by wholesale power producers to the retail market, and eventually to the final consumers. In the residential

sector, the savings would not be an increase in household income (i.e., no outward shift of the demand curve), but would free up some disposable income to be spent for goods and services other than electric power. The net economic impact of the shift in expenditures by households will depend upon which types of goods and services the freed-up disposable income is spent, compared to the economic impacts of purchasing electric power. For example, if households used the additional disposable income to eat at restaurants more often, it is probable that total output in MA would decline slightly, while total employment would rise. Within the non-residential sector, the reduction in power costs could increase corporate net income, with the extent of the increase depending on the shares of the foregone power costs that go directly to the bottom line or are spent for other goods and services used in the production process.

Global Insight used the IMPLAN I/O model to estimate the net economic impact of the shift in expenditures. We shifted \$25 million in final demand from the electric power sector to other types of expenditures by households and businesses to capture the net economic effect. Based upon the applicant's assumptions, we estimate the net economic effect of reducing wholesale power costs will be to generate an annual increase in output of between \$5.1 million and \$6.1 million; a decline in value added of between \$4.4 million and \$9.1 million, and a permanent increase in employment of between 142 and 215 jobs.