

## **Appendix 5**

### **Alternative Energy & Energy Conservation**

- 1. Wind Data Report, Ocean View Drive Test Tower**
- 2. Wellfleet Viewshed Statement for Commercial Land Based Turbines**
- 3. Cape and Islands Renewable Energy – Overview**
- 4. Energy Action Plan for Cape and Islands Communities**
- 5. Wellfleet Environmental Action Plan**

# **WIND DATA REPORT**

## **Wellfleet, MA**

**December 1<sup>st</sup>, 2006 – February 28<sup>th</sup>, 2007**

**Prepared for**

**Massachusetts Technology Collaborative  
75 North Drive  
Westborough, MA 01581**

**by**

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**Report template version 3.0**

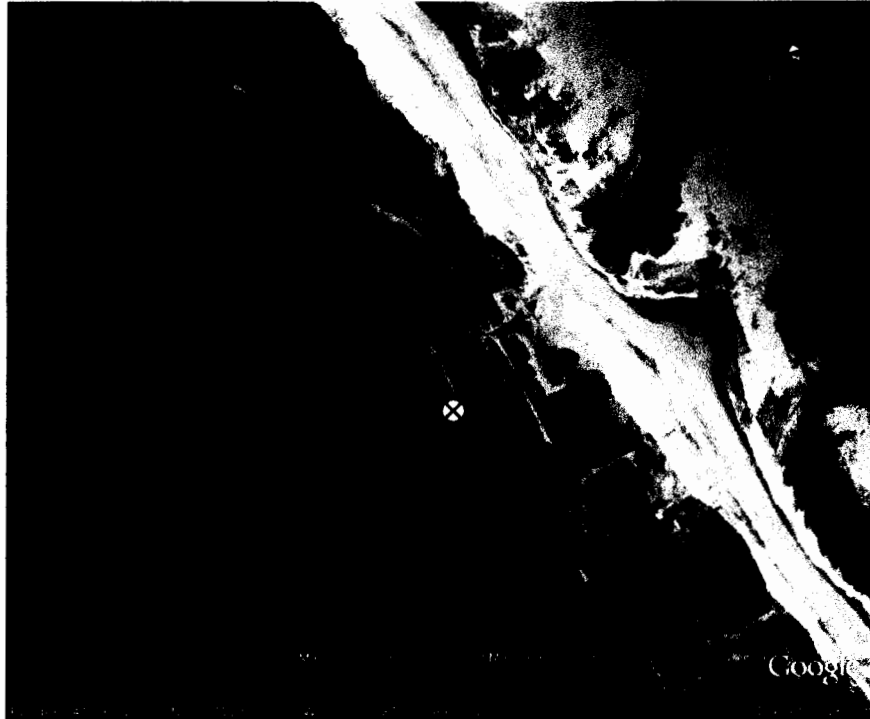
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## SECTION 1 - Station Location

The site is located at a parking lot very near the beach on Ocean View Drive in Wellfleet. The site elevation is 29 m above sea level. The circle in Figure 1 shows the exact location of the tower. The location of the tower base is at 41.934°N, 69.980°W (WGS84/NAD83).



**Figure 1 - Wellfleet Site Location**

Source: Google Earth

## SECTION 2 - Instrumentation and Equipment

Wind monitoring equipment is mounted on a standard NRG 50 m tall 6-inch diameter tilt-up guyed tower. Wind vanes and anemometers are located at three heights on the tower: 50 m, 38 m, and 20 m. Redundant anemometers are positioned at 50 m and 38 m.

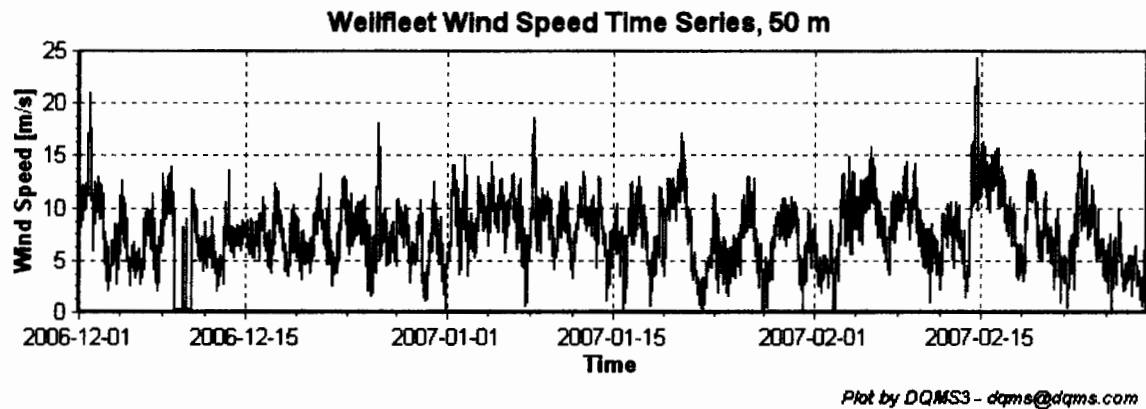
Additional equipment and models:

- NRG model Symphonie Cellogger
- 5 – #40 Anemometers, standard calibration (Slope - 0.765 m/s, Offset – 0.350 m/s)

direction. The wind blows most often from the WNW, but it is strongest from the ESE.

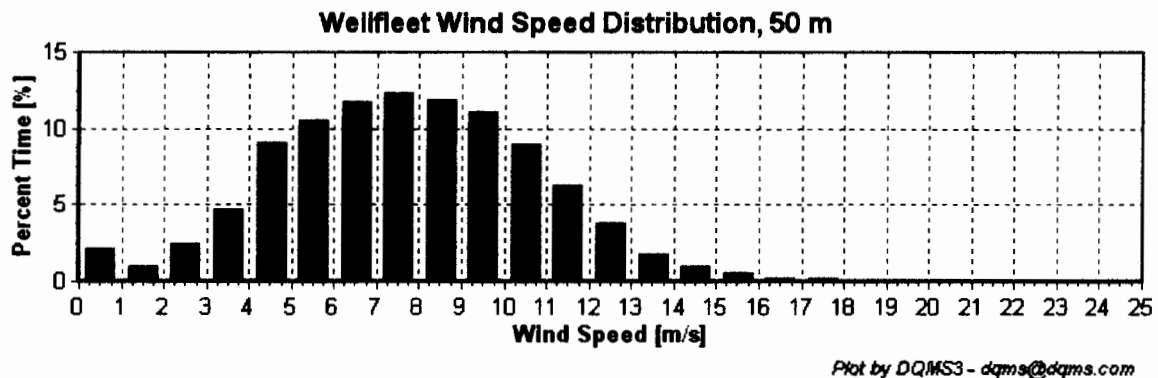
Data for the wind speed histograms, monthly and diurnal average plots, and wind roses are included in APPENDIX B.

### Wind Speed Time Series



**Figure 2 - Wind Speed Time Series, December 1, 2006 – February 28, 2007**

### Wind Speed Distributions



**Figure 3 - Wind Speed Distribution, December 1, 2006 – February 28, 2007**

### Monthly Average Wind Speeds

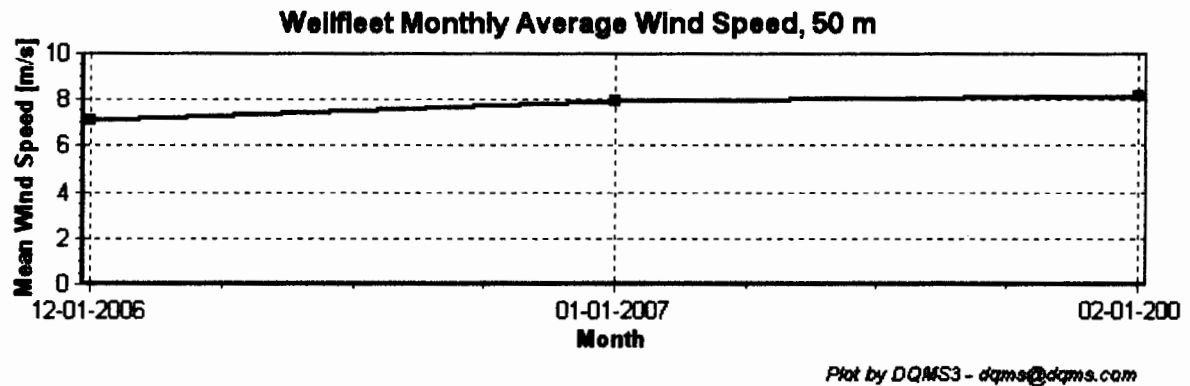


Figure 4 – Monthly Average Wind Speed, December, 2006 – February, 2007

### Diurnal Average Wind Speeds

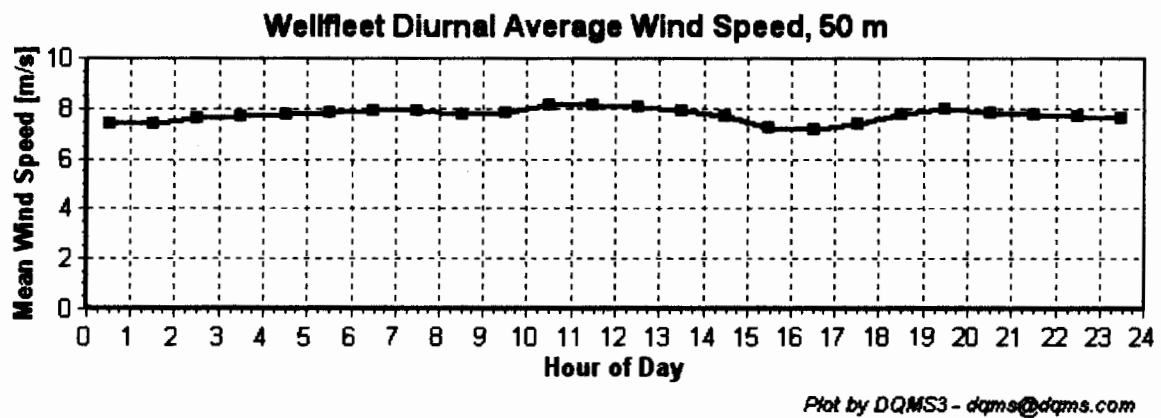
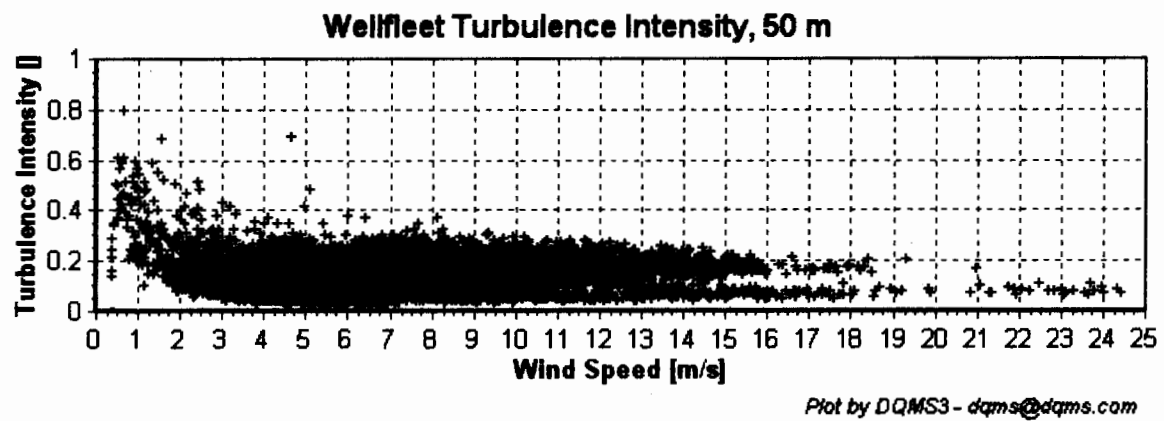


Figure 5 - Diurnal Average Wind Speed, December 1, 2006 – February 28, 2007

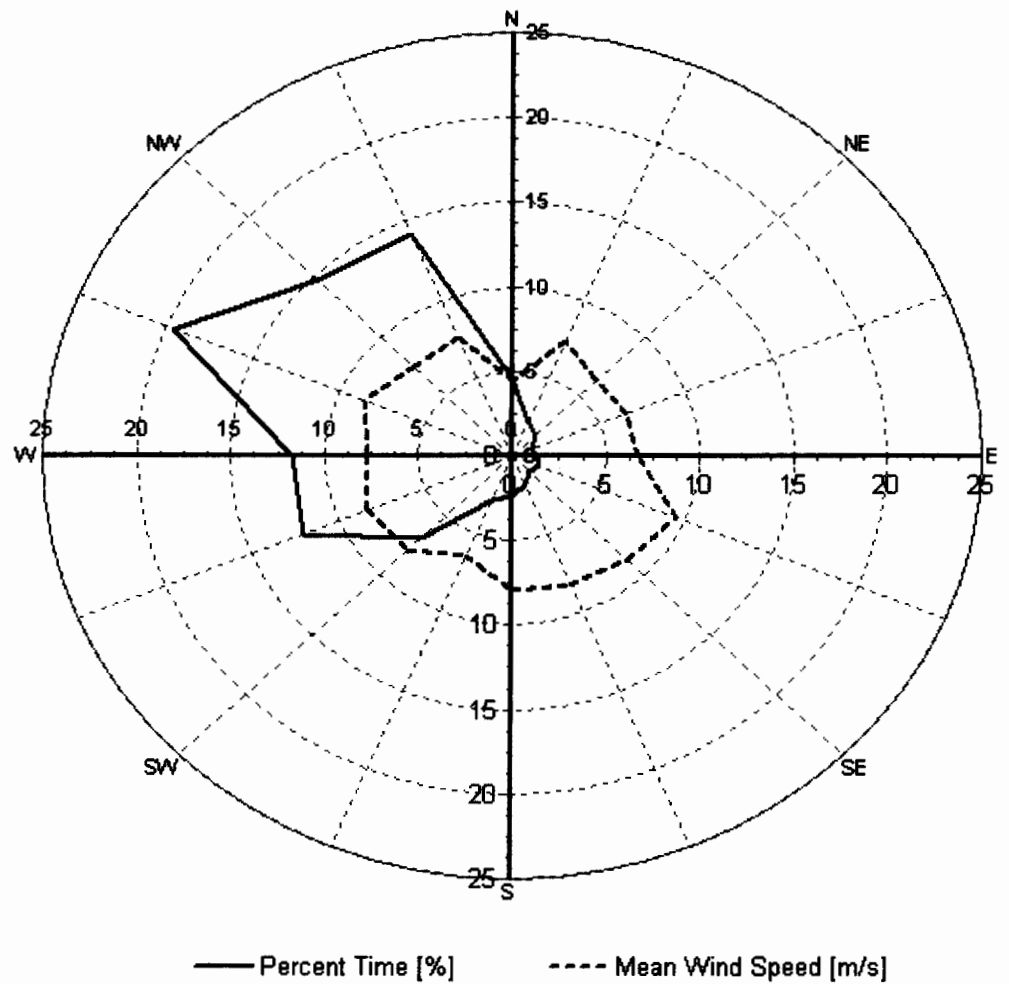
### Turbulence Intensities



**Figure 6 – Turbulence Intensity, December 1, 2006 – February 28, 2007.**

## Wind Roses

### Wellfleet Wind Rose, 50 m



Plot by DQMS3 - [dqms@dqms.com](mailto:dqms@dqms.com)

**Figure 7 – Wind Rose, December 1, 2006 – February 28, 2007**

## **Viewshed Statement with respect to Commercial Wind Generation in Wellfleet**

**The Cape Cod National Seashore Park has held meetings with outer Cape towns in consideration of viewshed qualities and areas that wind generation sites might affect. The following is Wellfleet's guideline response.**

### **I. Wellfleet's key viewshed area consists of Wellfleet Harbor and Cape Cod Bay.**

**Due to the combination of topography with respect to innumerable prevalent sight lines (\*1) and existing residential development surrounding this key viewshed, we presume it to be an area that precludes any feasible commercial wind generator development.**

**(\*1) These innumerable key viewshed sight lines overlooking Wellfleet Harbor**



and Cape Cod Bay include Fresh Brook, Lieutenant Is., Loagy Bay, Blackfish Creek, Drummer Cove, Indian Neck, The Cove, Duck Creek, Mayo Beach, Herring River, Bound Brook Is., Duck Harbor, Griffin Is., Great Is., and all adjacent marsh lands and or bay side beaches.

For purposes of simplification -- as cited above with respect to the innumerable sight lines along with all the residential development along this viewshed area -- we consider *all* (\*2) the area west of Route 6 as being in this key viewshed area and thus disqualifies itself from commercial wind generator siting.

(\*2) An exception to this viewshed guide could be made for the accommodation of the Audubon Sanctuary plan for a windmill. They own enough property and could site it such that it would not adversely or blatantly infringe upon any of the above cited

Wellfleet Harbor and Cape Cod Bay viewshed sight lines. It is our understanding that the Audubon presently has a wind metering pole up, and they are also developing photo-simulations of various sized windmills under consideration for their site and how it would look from various vantages.

**II. Wellfleet's second key viewshed area consists of the Atlantic Ocean.**

More specifically, this viewshed consists of all the town beach areas of LeCount Hollow, White Crest, Newcombs, Cahoon Hollow and primary views thereof along the beach and onto the Atlantic. There is also the large swath of Cape Cod National Seashore Park land from LeCount Hollow south consisting of the Marconi Station & Beach, and open heath lands.

Ocean View Drive as one can look out

from it onto the Atlantic Ocean comes under this viewshed parameter. This area too is mostly in the domain of the CCNS, although there are a number of residential homes (primarily seasonal) along it.

The town owned Wellfleet by the Sea land parcel under consideration for a commercial wind site does abut Ocean View Drive, but the set-backs are such that it would not directly infringe upon the ocean views thereof, and is in many other regards the optimum location for feasible wind power development by the town.



# Cape & Islands Renewable Energy Collaborative

*Promoting a sustainable energy future*

<http://www.cirenew.org/>

## Overview & Current Emphasis

The Cape & Islands Renewable Energy Collaborative (CIREC) was formed in 2000 to promote a sustainable energy future. CIREC participants work together to build awareness of the benefits of energy efficiency and renewable energy, to increase the use of clean and green practices and technologies, and to lay the groundwork for transforming the energy basis of the Cape & Islands region. In September 2005, CIREC became a chapter of the Northeast Sustainable Energy Association.

As a collaborative forum and membership organization, CIREC brings professionals and consumers together to help maximize local benefits and minimize adverse impacts associated with energy supply and use, but it does not take positions on individual projects. CIREC participants are working together in the areas of *Public Outreach & Education, Community Planning, Technology Deployment, Workforce Development & Training, Clean Energy Cluster Building, and Policy Development & Implementation*. Active collaborators include the following local businesses, organizations, and agencies:

<b>A + E Architects</b>	<b>Attorney to Protect Nantucket Sound</b>
Americorps Cape Cod	Building Diagnostics
<b>Cape &amp; Islands Self-Reliance</b>	<b>Cape Clean Air</b>
Cape Cod Chamber of Commerce	Cape Cod Commission
<b>Cape Cod Community College</b>	<b>Cape Cod Economic Development Council</b>
Cape Cod Technology Council	Cape Light Compact
<b>Clean Energy Design</b>	<b>Clean Power Now</b>
Cotuit Solar	Waquoit Bay National Estuarine Research Reserve
<b>Water Energy &amp; Ecology Information Services</b>	<b>Woods Hole Research Center</b>

## Cape & Islands Renewable Energy Action Plan

Over the past several years, community planning activities conducted through CIREC have revealed strong consensus regarding the adverse impacts of the present-day energy system, the benefits associated with increased efficiency and reliance on renewables, and the need for concerted action to address multifaceted energy issues facing Cape Cod, Martha's Vineyard, and Nantucket.

The Cape & Islands Renewable Energy Action Plan (CI REAP) is being developed to accelerate near-term progress toward ambitious long-term goals defined in stakeholder visioning exercises:

1. Generate sufficient renewable energy to meet 100% of net electricity needs by 2020.
2. Reduce direct use of fossil fuel for heating and transport by 50% in 2020, relative to 2006 levels.

The CI REAP will incorporate a collaborative plan of action for CIREC participants, as well as targeted action plans for residents, visitors, businesses and organizations, students and schools, agencies and officials, and communities. Working groups are organizing effort in the areas of Technology Strategy, Economic Development, Community Planning & Public Outreach, and Policy. Outreach is under way to build awareness among municipal and regional decision-makers, businesses, and consumers and to identify planning, research, education, training, and other needs.

The CI REAP is scheduled to be issued for public comment in mid 2007, in parallel with launch of a "CiGoGreen" public involvement campaign. For information on CIREC and the CI REAP, contact Chris Powicki, 508.362.9599, [chrisp@weeinfo.com](mailto:chrisp@weeinfo.com).



a guide to sustainable living on the cape & islands

Visit <http://www.cigogreen.org/community>

## **Initial Energy Action Plan for Cape & Islands Communities**

### **I**

#### **Set Objectives**

Adopt overarching energy-related goals and policies relating to efficiency, renewables, cost control, economic development, climate change, and energy independence.

***Tell us your aspirations for the energy future.***

### **II**

#### **Get Organized**

Establish a committee or task force structure addressing all fuel sectors, all municipal departments and facilities, and energy use and associated impacts at the municipal and community levels. ***Tell us about your approach.***

### **III**

#### **Start Counting**

Commit to the development of energy and emissions inventories both for municipal operations and on a community-wide basis. ***Tell us what you need to make progress.***

### **IV**

#### **Go Green**

Plan to audit, upgrade, and re-commission energy-consuming systems in all existing municipal buildings; to adopt sustainable design and green building practices for new facilities; and to establish green procurement practices for municipal operations.

***Tell us what you hope to achieve.***

### **V**

#### **Engage Constituents**

Encourage residents and businesses to get energy audits, act on recommendations, and employ savings for purchasing green power. ***Tell us how they respond.***

## **Wellfleet Environmental Action Plan**

The Wellfleet environmental Action Plan is focused on actions the Town of Wellfleet can take at the local level to reduce our environmental impact. While many actions and regulations are beyond our local control, this plan focuses on direct action that we can take as a town and to provide our citizens with the information and tools to undertake their own actions. The plan covers three main areas:

### **I. Energy Use**

*A. Renewable Resource Development*

*B. Energy Efficiency & Conservation*

*C. Transportation*

### **II. Air Protection**

### **III. Water Protection**

At the end of each section is a bulletized list of specific immediate actions that can be undertaken and longer term actions to achieve:

- a reduced greenhouse gas footprint for the town
- reduced energy and water use
- lower costs to the town and its residents
- reduced local air and water pollution
- stewardship of a sustainable, clean environment

### **I. Energy**

Climate Change or global warming is ultimately a local problem. Its causes lie in our daily activities in our homes, workplaces, schools, places of worship and on our roads. Wellfleet is particularly exposed to the possible impacts, in fact insurance modelers have already affected the ability of many people to get insurance due to the belief that global warming will cause catastrophic category 5 hurricanes to impact the Cape. As sea levels rise our ocean beaches and harbors could be altered radically. And while local action alone can't solve the problem we are well positioned in Wellfleet to make a significant contribution toward solutions.

## ***Policy Background***

Since 1999, the scientific consensus has grown stronger that climate change is already happening and that greenhouse gas emissions from human activities are the primary cause. In addition to the reports of the Intergovernmental Panel on Climate Change (IPCC) and the National Academy of Sciences, the American Meteorological Society, the American Geophysical Union, and the American Association for the Advancement of Science have issued statements concluding that the evidence for the human role in climate change is compelling.

Internationally, the will to act has also grown stronger. With Russia's ratification of the Kyoto Protocol, the pact took effect on February 16, 2005. While the U.S. has withdrawn from the treaty, actions at the regional and state levels have accelerated.

All six of the New England governors have entered into a regional climate change action agreement with the five eastern Canadian premiers. State legislation in Maine and Connecticut has formalized the commitments of the states.

Governor Mitt Romney issued the Massachusetts Climate Protection Plan 2004. California, Oregon, and Washington have jointly agreed to a set of climate protection actions under the West Coast Governors' Global Warming Initiative. Governor Schwarzenager has passed a tough California Greenhouse Gas Reduction law.

The New England states and New York have developed a regional greenhouse gas cap and trade system. Auctions allow those who reduce emissions to sell the credits. Our most recent regional auction netted over \$57.10 per credit and amounted to over \$22,600 in revenue for the Mass Maritime Academy. These credits were generated as a result of a wind project. An international market has also developed for CO<sub>2</sub> credits. On the Chicago and London boards of trade, the most recent price was \$3.25/100 metric tons of CO<sub>2</sub> verifiably reduced.

California issued regulations in 2004 requiring automobile manufacturers to reduce greenhouse gas emissions from vehicles sold in that state by 30 percent.

## ***Scientific Background***

There is broad scientific consensus on both the fact that global warming is occurring and the potential impacts if we do nothing to curb our greenhouse gas emissions. Some observations include:

- Temperatures are in fact rising. Over the twentieth century, average global surface air temperature has warmed between 0.7 and 1.5 degrees F.
- Sea level has been rising by an average of 0.1 to 0.2 meters during the twentieth century. This is mostly attributed to heat expansion of global waters. This could have significant adverse impacts on Wellfleet due to increased erosion and the potential for a breach of the ocean at Blackfish creek.
- Concentrations of carbon dioxide in the atmosphere have increased 31% since 1750. The present CO<sub>2</sub> concentration has not been exceeded during the past 420,000 years and probably not during the past 20 million years. The current rate of increase is unprecedented during at least the past 20,000 years. Concentrations of other greenhouse gases have also increased significantly since 1750, including methane (151%) and nitrous oxide (17%).
- Mountain glaciers around the globe are retreating. Glaciers in the European Alps have lost about 30 to 40% of their surface area and about half of their volume since 1850. In the New Zealand Southern Alps, glaciers have lost about 25% of their area over the past 100 years. Mount Kilimanjaro in East Africa has already lost 82% of its ice since 1912. At current rates of warming, the famous snowcap will disappear in 20 years. In Glacier National Park, Montana, the number of glaciers dropped from an estimated 150 in 1850 to about 50 today; at current rates of warming experts predict that the park's glaciers will be gone by 2030.
- The extent and thickness of Arctic sea ice is decreasing. Declassified data collected by U.S. and Russian submarines show that the central Arctic ice has thinned 1.3 meters over the past 20 to 40 years, representing a 40% decrease in volume. Satellite data indicate a 10 to 15% decrease in summer sea ice concentration over the entire Arctic. This year with nearly one more month of melting to go, the Arctic Sea Ice has already diminished to its lowest level ever recorded.
- Spring melting of ice on rivers and lakes is arriving earlier. Ice-out dates in Lake Winnepesaukee in New Hampshire are four days earlier on average than in 1886.

***Possible impacts that could affect our region include the following:***



- Extreme weather events such as heavy rainfall, ice storms, floods, droughts, and heat waves are likely to become more frequent. Increased damage to public and private property and more insurance claims would be the result.
- Summer temperatures will likely increase, causing more 90 degree days. Smog levels would increase and more frequent unhealthy air quality days would damage public health.
- Conditions may become more favorable for disease-carrying organisms such as mosquitoes.
- Droughts may affect water supplies as runoff decreases and evaporation increases.

### ***Climate Change Impacts***

Warming of air temperatures is just the first step in climate change. Rising temperatures lead to changes in rainfall and snowfall patterns, soil moisture, and sea level, which in turn cause physical changes in the landscape, modifications in the ranges of plants, animals, and other living organisms, and impacts on human structures and systems. The federal government commissioned the New England Regional Assessment (NERA) to evaluate potential impacts on our region.

Based on climate models, NERA projects that average temperatures in New England may increase by 6 to 10 degrees F by 2090. While this may not seem like a large difference, consider that there was only a 10 to 12 degree F difference between the peak of the last glacial period, when New England was under two miles of ice, and now. NERA provides another perspective; a six-degree increase would cause Boston's climate to become more like that of Richmond, Virginia. A ten-degree increase would make our climate more like that of Atlanta, Georgia.

This modeling data is also the reason for loss of insurance carriers on the Cape and a serious hit to the pocketbook of every Wellfleet homeowner.

For Additional information:

### **Major Scientific Reports Since 1999**

- International Panel on Climate Change, *Fourth Assessment Report*, 2007
- National Academy of Sciences, *Climate Change Science: An Analysis of Some Key Questions*, 2001
- Arctic Council, *Impacts of a Warming Arctic: Arctic Climate Impact Assessment*, 2004

- Pew Center on Global Climate Change, *Observed Impacts of Climate Change in the U.S.*, 2004

### ***Other Reasons to Take Action***

The primary purpose of this plan is to reduce the GHG emissions that cause climate change, but actions that reduce GHG emissions also achieve other goals.

**Reduce air pollution:** Burning fossil fuels results in conventional air pollutants that cause smog and other air quality problems. By reducing fossil fuel use through efficiency and switching to alternative fuels, actions can reduce GHGs while decreasing conventional air pollution.

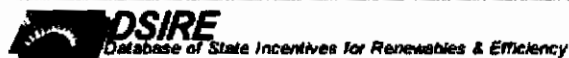
**Save money:** Using fuels and electricity more efficiently can lower operating costs. Savings can then be used for other Town purposes. The following table lists credits and incentives available under State and Federal law for energy efficiency and renewable energy programs. A town supported program can monetize some of these credits for the town, either through town specific projects or town supported projects where the proponent cannot obtain the credit.

## **State and Federal Credits**

Credits and incentives available for energy efficiency and renewable fuel use:

<b>Production Tax Credits</b>	1.8 cents per Kilowatt hour paid by the federal government
<b>Renewable Energy Credits</b>	\$2 - \$6.75/W up to \$50,000 Mass Technology Collaborative Fund
<b>Emission Reduction Credits</b>	
SO <sub>2</sub> Allowance	\$800 per ton federal
VOC Reduction	One time sale \$3500-4000 per ton
NO <sub>x</sub> Reduction	May-Sept -\$2300 per ton Oct-April \$750 per ton
Region Greenhouse Gas Initiative	\$57.10 per credit
CO <sub>2</sub>	credits @ \$3.25/100 metric tons Chicago & London Auction

In addition, the following list of programs is available in Massachusetts for energy efficiency and renewable energy programs, policies and projects taken from: <http://www.dsireusa.org/>



## **Massachusetts Incentives for Conservation & Renewable Energy**

### *Financial Incentives*

#### Corporate Deduction

Alternative Energy and Energy Conservation Patent Exemption (Corporate)  
Excise Tax Deduction for Solar or Wind-Powered Systems

#### Corporate Exemption

Excise Tax Exemption for Solar or Wind Powered Systems

#### Corporate Tax Credit

Corporate Tax Credit for Solar Water Heating Systems

#### Industry Recruitment

MTC - Business Expansion Initiative

MTC - Sustainable Energy Economic Development (SEED) Initiative

#### Personal Deduction

Alternative Energy and Energy Conservation Patent Exemption (Personal)

#### Personal Tax Credit

Renewable Energy State Income Tax Credit

#### Production Incentive

Mass Energy - Renewable Energy Certificate Incentive

#### Property Tax Exemption

Renewable Energy Property Tax Exemption

#### Sales Tax Exemption

Renewable Energy Equipment Sales Tax Exemption

#### State Grant Program

MTC - Clean Energy Pre-Development Financing Initiative (Grants)

MTC - Large Onsite Renewables Initiative (LORI) Grants

MTC - Massachusetts Green Communities™ Grant

MTC - Matching Grants for Communities

### State Loan Program

Boston Community Capital - Energy Advantage Program

MTC - Clean Energy Pre-Development Financing Initiative (Loans)

MTC - Massachusetts Green Communities™ Loan

### State Rebate Program

MTC - Small Renewables Initiative Rebate

### Utility Loan Program

MassSAVE - Statewide HEAT Loan Program

### Utility Rebate Program

KeySpan Energy Delivery - Solar Thermal Rebate Program

### *Rules, Regulations & Policies*

### Energy Standards for Public Buildings

State Buildings Energy Reduction Plan

### Generation Disclosure

Fuel Source and Emissions Disclosure

### Green Power Purchasing/Aggregation

Boston - Green Power Purchasing

Cape Cod & Martha's Vineyard - Green Power Purchasing

### Interconnection

Interconnection Standards

Net Metering Rules

Massachusetts - Net Metering

### Public Benefits Fund

Renewable Energy Trust Fund

### Renewables Portfolio Standard

Renewable Portfolio Standard

### Solar Access Law/Guideline

Solar Access Laws

### **Local Action Plan**

The major elements of a comprehensive plan and strategy include:

- 1) Development of wind, solar and other local renewable resources
- 2) Aggressive energy efficiency policies including zero impact goals:
  - a. Town Buildings and Town new construction
  - b. Zoning and bylaws
  - c. Commercial, Residential, Streetlight initiatives
- 3) Possible formation of a municipal light company
- 4) Transportation sector initiatives

### **Wind, Solar & Renewable Resources**

Wind turbine technology has advanced steadily since the early 1980's and is becoming viable and economically feasible on the East Coast. Cape Cod generally has excellent wind resources with the Outer Cape having the highest average wind speeds in the country. (Add existing report section)

#### **Immediate Actions**

- Creation of bylaw(s) to encourage development of wind resources by the town & private citizens

#### **Future Actions**

- Consider formation of a municipal light company in conjunction with a possible town sponsored wind facility

Solar photovoltaic and solar thermal energy have great potential in Wellfleet. Summer residency peaks over 20,000 from approximately 3,000 year round residents. This surge coincides with our surge in sunshine. Promoting solar photovoltaic and solar hot water when electric demand and electric rates are highest is a win, win, win for Wellfleet.

#### **Immediate Actions:**

- Include all possible PV, solar thermal and passive solar design features in new Town construction with possible additional funding from Mass Technology Collaborative's Zero Impact Initiative or other State, private and/or non-profit sources
- Add zoning regulations to require all new buildings to evaluate solar potential so as to maximize solar potential, regardless of whether features are used, so both current or future owner may add them. New construction should not reduce solar potential for other nearby buildings.

- Provide preferential treatment for solar features including consideration of waived setback or other zoning requirements that could improve solar use

#### Future Actions

- Evaluate solar potential for streetlight, traffic light and other low energy uses
- Evaluate solar PV, solar thermal and passive solar additions for all town buildings
- Evaluate solar, tidal and methane recovery potential for Wellfleet

Other Renewable resources are available in Wellfleet and are worthy of promotion. In particular a great deal of work is on-going in tidal research and methane recovery from landfills and other biologic sources. As we all know from driving around at low tide, there is a significant amount of methane and other biologic activity that may be developable.

Biodiesel is a renewable fuel which is available in Wellfleet for home heating. This renewable fuel has substantial emissions and efficiency benefits:

Biodiesel is a cleaner burning alternative fuel, produced from domestic, renewable resources such as soybean, canola or algae oil and other renewable fats and vegetable oils. Biodiesel contains no petroleum, and it can be blended in any amount with petroleum diesel to create a biodiesel blend. It can be used in most diesel engines, industrial oil fired equipment and home heating systems with no modifications. Biodiesel is simple to use, biodegradable, nontoxic, and essentially free of sulfur and aromatics. Biodiesel is registered with the Environmental Protection Agency (EPA) and is legal for sale and use in the U.S. It must meet the national standard ASTM D-6751.

Biodiesel has become the fastest-growing alternative fuel in the country. Many diesel blenders are beginning to add biodiesel as a standard blend to improve the lubricity and performance of the new ultra low sulfur diesel which must now be sold nationwide (ULSD). Biodiesel is also becoming more widely available for home heating where it reduces emissions and maintenance while improving burner performance. The industry sold 200 - 250 million gallons in 2006 – triple the gallons sold in 2005. There are about 600 major fleets nationwide including all four branches of the U.S. Military. About 1000 retail pumps nationwide also make the fuel available to the public.

Biodiesel has the highest energy balance of any transportation fuel, according to the foremost biodiesel life cycle study, performed by USDA and DOE. The study found for every one unit of fossil energy needed to produce biodiesel, 3.2 units of energy are gained.

Biodiesel has the highest energy content (BTUs) of any alternative fuel. It offers significantly improved lubricity, which can reduce premature engine wear. It has higher average cetane than diesel and similar fuel economy, horsepower, and torque. Biodiesel is the only alternative fuel that can immediately and seamlessly transition a diesel fleet to a cleaner-burning fuel program.

Biodiesel dramatically reduces emissions. The EPA released a comprehensive technical report of biodiesel emissions data that shows pure biodiesel produces:

- 47 percent lower particulate matter emissions
- 67 percent reduction in unburned hydrocarbons
- 48 percent reduction in carbon monoxide
- 78 percent reduction in lifecycle Carbon Dioxide to reduce Global Warming and is
- 10 times less toxic than table salt and biodegrades as fast as sugar.

Biodiesel is the only alternative fuel to have completed the rigorous Health Effects testing required by the Clean Air Act. Results show biodiesel poses significantly less risk to human health than petroleum diesel. Breathing particulate has been shown to be a human health hazard, and biodiesel reduces particulate matter by 47 percent. Biodiesel emissions also reduce by 80 to 90 percent potential cancer causing compounds.

#### Immediate Actions

- Consider biodiesel for all town buildings that use heating oil

#### Future Actions

- Consider other methods of heating town buildings to reduce greenhouse gas emissions including ground source heat pumps, solar energy and other biomass fuels

#### **Aggressive energy efficiency policies including zero impact goals**

Town Buildings and Town new construction should be reviewed for:

- lowest life cycle energy costs
- advanced technology for energy efficiency,
- passive and active energy design features and

- work toward a zero impact building material, energy & water use

These low impact buildings include the use of recycled and low energy building materials ie. all aspects of the construction materials as well as the design. The Massachusetts Technology Collaborative and the Cities for Climate Protection Initiative can provide substantial funding and technology support for this type of construction. Most projects to date have cost less than traditional construction and have yielded such substantial water and energy savings that the buildings have little or no impact on the long term operating budget. In some cases, buildings are generating excess energy, which could actually provide a long term revenue stream for the Town.

#### Immediate Actions

- Focus on proposed new Town Owned Construction
- Develop energy review of all town buildings and create action plan for retrofits and upgrades for lowest lifecycle energy costs

#### Future Actions

- Conduct a full review of zoning regulations for all new construction and renovations to incorporate Town zero impact goals

#### **Commercial, Residential, Streetlight initiatives**

Wellfleet's commercial and residential building stock has great potential for energy improvement. With the town taking a leadership role and accessing the resources available to support town-wide initiatives and goals, a new focused effort on improving the existing energy profile of the town will help all taxpayers.

#### Near Term Goals

- Provide information and support to home owners for new construction and retrofits in the planning process
- Evaluate all opportunities for energy savings with streetlights, traffic lights and signs

#### Longer Term Goals

- Establish commercial & residential energy and water conservation plan



### **Transportation sector initiatives**

Town vehicles are a public face of the town. The quality, fuel use and efficiency of these vehicles all say something about the town's priorities. In addition, traffic is one of the major sources of pollution in the town:

#### **Approximate Community CO2 Emissions by sector:**

Transportation 39%  
Residential 31%  
Commercial 28%  
Waste 2%

Wellfleet can contribute to reducing transportation emissions in several ways:

- Town fuel use
- Town vehicle efficiency
- Traffic planning
- Public outreach

The quickest and easiest option for the town is to participate in either the National Seashore's (B20) or Barnstable Counties (B5) bid for biodiesel. The National Seashore is using and Ultralow Sulfur 20% biodiesel blend in all diesel vehicles. This can be done without vehicle modification and offers an immediate emissions benefit of:

- 10% particulate matter reduction
- 15% unburned hydrocarbon reduction
- 10% carbon monoxide reduction
- 16% carbon dioxide reduction
- 20% volatile organic compound and toxics reduction

It also offers an immediate image benefit of a visible clean renewable energy commitment. No other action of the town can have such an immediate symbolic impact. Moreover, the town can gain emissions credits and ensure compliance with the Energy Policy Act and other recently enacted legislation.

#### **Immediate Actions:**

- Switch diesel vehicles to biodiesel under National Seashore fuel offer and add visible logos to vehicles
- Encourage bike to the beaches
- Encourage carpooling and telecommuting for town employees

- See if Flex bus would consider summer beach stops to reduce traffic

**Future Actions:**

- Ensure traffic planning minimizes stop & go patterns
- Evaluate hybrid, pure biodiesel, ethanol and CNG options for future fleet
- Ensure future town vehicle acquisitions have best in class fuel efficiency

## **II. Air Protection**

During the summer of 2002, the seven highest readings of air pollution levels in the state were taken at Truro Air Force Base. Due to the prevailing southwest summer winds, Wellfleet is directly downwind of the Canal power plant and summer transportation on the whole of route 6, and further down the east coast impacts the town. In the spring of 2003, the American Lung Association declared that Barnstable County has the worst air quality in the state of Massachusetts. While not all of that pollution is produced locally, we produce a substantial portion of it. It is the portion we produce that we can reduce to improve our local environment.

Our energy plan and transportation sector initiatives will go a long way toward reducing air pollution impacts. In addition, heavy summer traffic is a major source of irritation to both tourists and residents. Since tourism is the major industry on Cape Cod, we should do all we can to lessen the traffic in the summer months.

During the past three summers, traffic snarl on route 6 appears to be increasing. There are many more instances of stop & go traffic and a decrease in the smooth flow of traffic. This is a major contributor to local air pollution. The town through its police and highway department can play an active role to assess and possibly help alleviate the traffic flow.

**Immediate Actions:**

- Start data collection on traffic delays

**Future Actions:**

- Prepare traffic trend and impact study to look at remedies and coordination with other towns to ensure the smooth and more efficient flow of traffic to reduce air pollution

### *Alternative Fuel and Vehicle Policies*

U.S. Department of Energy's Alternative Fuels Data Center

### *Related Programs & Initiatives*

In addition, the site lists marketers of Renewable Energy Certificates (RECs)(also known as green tags or tradable renewable certificates), which represent the environmental attributes of the power produced from a renewable energy project. Whether or not consumers have access to green power through their local utility or a competitive electricity marketer, consumers can purchase RECs without having to switch electricity suppliers.

### *Wind Powering America*

The U.S. Department of Energy's Wind Powering America site provides state-by-state wind project information , including validated wind maps, anemometer loan programs, small wind guides, legislative briefings, wind working groups, and state-specific news.

**Improve energy security:** Petroleum and its products, such as gasoline and diesel fuel, are a major source of GHG emissions. The United States depends on petroleum imports from other countries. Reducing petroleum use makes us less vulnerable to disruptions in supply and reduces petrodollars in the hands of our those who are trying to harm us and our way of life. Reliance on foreign oil is one of the primary reasons for our involvement in the Gulf conflicts US tax dollars funding a global presence to protect oil supplies.

**Improve livability:** Actions that reduce automobile dependency can decrease traffic congestion. Planting trees cools summer air temperatures. Encouraging walking and bicycling can improve public health.

These actions can make Wellfleet more livable, protect our natural resources and maintain an environment that supports our shellfish, tourist and other environmentally dependent industries as well as our way of life.

Ultimately, however, Wellfleet should act in order to take responsibility for its share of GHG emissions. It should also act as a steward to provide information to its citizens to stimulate private local action and through leadership and its own actions provide examples for others to follow.

### *Local Government Action*

To begin this process Wellfleet should become a participating Town within the Cities For Climate Protection Initiative. This international effort is supported locally with Falmouth, Barnstable, Provincetown and Truro already members. As of February 28, 2007 the following Massachusetts local governments were participants in ICLEI's Cities for Climate Protection Campaign.

Amherst	Ipswich	Reading
Arlington	Lenox	Salem
Barnstable	Lynn	Shrewesbury
Belmont	Medford	Somerville
Boston	Natick	Springfield
Brookline	Newburyport	Truro
Cambridge	Newton	Watertown
Central MA Planning	Northampton	Williamstown
Devens	PioneerValley	Winchester
Falmouth	Planning	Worcester
Gloucester	Pittsfield	
Hull	Provincetown	

ICLEI – Local Governments for Sustainability is an international membership association of local governments dedicated to achieving sustainable development. ICLEI's mission is to improve global environmental conditions through the cumulative actions of local governments. On the topic of global warming, ICLEI initiated the Cities for Climate Protection® (CCP) Campaign in 1993, officially launching it in the U.S. in 1995. Since that time, ICLEI's U.S. membership has grown to over 250, including more than 80 local governments in the Northeast.

The CCP campaign sets five milestones for participants to accomplish:

- Prepare a greenhouse gas emissions inventory
- Set an emissions reduction target
- Develop a local action plan
- Implement the local action plan
- Monitor results

Joining the CCP will provide access to experts who can assist the Town with accounting for the first two items. Wellfleet will have direct access to leverage local and state support for a sustained and state of the art energy & environmental program. It will also plug Wellfleet into a network of additional people resources and staff to support Town initiatives.

As a responsible steward the Town should be committed to a public outreach effort beyond possible protection of town aquifers and to the whole of Wellfleet's public and private water resources.

**Immediate Actions:**

- Town mailer to all residents on best practices for healthy septic function and chlorine damage to septic performance. Mailer could also include information on best practices for water treatment to avoid salt discharge to septic from water treatment backwash, improve water quality and tout high quality well water drinking, as opposed to bottled water which has a large negative energy and environmental impact

**Future Actions:**

- consideration of new regulations around grey water discharge and use to increase septic performance and reduce water consumption
- New Town wide toxics policies to lessen pesticide and fertilizer use through education of best practices and where appropriate, coordination of pest applications