MMA Briefing on Renewable Energy

I. Introduction of Project & Description

In September 2001 the Massachusetts Technology Collaborative, which administers the Renewable Trust, awarded a Consumer Aggregation grant to the Massachusetts Municipal Association (MMA). Funds from the grant will be used to inform MMA members about renewable energy and research the interest level of MMA members in pursuing such an option. The MMA's primary goal for the project is to increase the awareness of towns and cities about renewable energy. In addition, the MMA hopes to measure the potential interest of its member communities in purchasing specific products related to renewable energy.[1] Based on this assessment, the MMA will examine the feasibility of developing a group of buyers to collectively purchase products.

The project focuses on two related tasks. First, the project seeks to inform members about renewable energy and its availability in the competitive market. Specialized consultants developed written materials about renewable power - such as this briefing paper - to send to local government decision makers. These materials include case studies about other municipalities that are purchasing renewable energy now, such as the cities of Santa Monica, California and Chicago, Illinois as well as the town of Westport, Connecticut. In addition, a basic presentation about renewable energy will be offered at regional seminars.

As a second task, this project includes market research to determine the extent to which MMA municipalities are interested in purchasing renewable energy to meet the energy demands of their municipal facilities. Consultants are performing market research that includes the design, distribution and analysis of a detailed survey as well as two focus groups of MMA members. Data analysis and product recommendations derived from this research will be provided in a written report to parties. The final report will be included in an educational presentation at select public forums of the MMA[1] The purpose of this paper is to provide detailed information to help Massachusetts's municipalities make informed decisions on buying renewable energy.

II. Defining Choice and Green Power

Competition in the electricity industry was introduced in Massachusetts with the implementation of the Electric Restructuring Act on March 1, 1998. Electric competition provides consumers the right to choose their own electricity supplier. The Massachusetts Division of Energy Resources (DOER) offers the following description of this opportunity:

> Prior to March 1st [1998], all aspects of your electrical power had been handled by your local utility company - everything from the power generation (converting energy into power) to the transmission (sending it across power lines to your utility company) to the distribution (delivering it into your home). You had little or no say in where your electricity came from, how much it cost or the types of fuel and technology used to produce it.
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> As of March 1st [1998], the combined services that were once provided by your local utility company have been divided into two parts. Your regulated electric utility (called your distribution company) will continue to deliver your power over the wires (transmission and distribution). Yet, the power (generation) running through those wires will be sold by competing firms, known as competitive power suppliers, that you get to choose. Unlike your distribution company, the prices that competitive power suppliers charge will not be regulated by the Department of Public Utilities, now known as the Department of Telecommunications and Energy. Instead, they will set their own prices.[1]

In the years following the passage of the Restructuring Act, few customers took advantage of the opportunity to choose. More recently, however, many commercial and industrial customers have purchased their electric supply from a competitive supplier.[1] Through the MMA's MunEnergy program, over 120 cities and towns have saved money in the competitive marketplace.

In choosing a competitive supplier, consumers may select from different product offerings. A number of characteristics, such as price, length of contract, may be used to differentiate electricity products. This briefing paper focuses on the physical characteristics of the energy product, specifically, the fuel used in generation.

> Several definitions are used throughout this paper. They are as follows:
>
> Undifferentiated Power refers to electricity produced from a variety of resources, which may include renewable resources. It is delivered to end use customers via the power grid.
>
> Green Power describes electricity generated with renewable resources and sold to end use customers in a competitive marketplace.[1]
>
> Renewable energy (renewable resources) are solar, wind, geothermal, biomass and hydroelectric. In general, renewable energy has a lower negative environmental impact than non-renewable sources.

All sources of power generation have some environmental impact, however the impact of renewable energy is generally less than other fuels such as oil or coal. Using Green Power can help offset or divert use of these fuels. This substitution means that more power is produced from less polluting resources than would have otherwise been. For example, air pollutants (such as particulate emissions, sulfur dioxide and nitrogen oxide) are generally avoided. In addition the "fuels" used to power renewable facilities are replenishable (wind, solar) or are recycled (biomass, wood waste).

III. Key Legislation

In addition to the changes that competition brings to the electric industry and its consumers, the Restructuring Act introduced other policies. Key provisions in the legislation include:

Aggregation

Municipalities, organizations, and businesses were given consent to bring together constituents/customers and to purchase power on their behalf (Chapter 164 § 247).

Renewable Energy Trust Fund

As administrator of the Renewable Energy Trust (RET) since its inception in 1997, the Massachusetts Technology Collaborative (MTC) has carried out its legislative mandate to foster an increased supply and use of renewable energy resources while protecting the environment and providing distinct public benefits to the Commonwealth's citizens. Systematic examination of a variety of approaches to renewable energy sources and careful planning have set the stage for a number of programmatic initiatives, many of which have already been successfully implemented.

To date, a series of programs totaling $110 million have been launched from which almost $60 million in grants, loans and contracts have been awarded. The Consumer Aggregation Program, which seeks to support collective electricity purchasing consortia and harness their latent demand for power from renewable energy sources, has to date awarded $850,000 to nine groups.

Massachusetts Renewable Portfolio Standard

The passage of the Electric Restructuring Act brought changes to all aspects of the electric industry, including issues surrounding the use of renewable energy. Notably, there is a stipulation the Electric Restructuring Act (Chapter 164 §11F) that directs the Division of Energy Resources (DOER) to establish a Renewable Energy Portfolio Standard (RPS). The purpose of this standard is to increase the use of renewable energy in Massachusetts.

The Massachusetts RPS requires all suppliers to provide retail customers with electricity generated from "new" renewable resources - i.e., facilities that have begun commercial operation after December 31, 1997. The renewable resources that are eligible for the RPS are: solar, wind, ocean thermal, wave and tidal, fuel cells using renewable fuels, landfill gas, and "low emission" biomass. The standard requires that all suppliers of electricity (to end-use consumers) purchase a percentage of their energy supply from new renewable resources. In 2003, all suppliers must have 1.0% of their supply from renewable energy, in 2004; 1.5%, through 2009 when 4.0% of supply must come from new renewable energy resources. For more information on the renewable portfolio standard view the Massachusetts DOER's website at www.//http:state.ma.us/doer.

What is Happening in Other Areas?

- In Texas, Pennsylvania, Connecticut and Ohio, where competition has taken root, several suppliers offer, and many customers have chosen, Green Power products. In 1999 and 2000, consumers in California were a significant source of demand for Green Power and were the driver for the development of Green Power markets nationwide. With the changing market conditions, however, Green Power suppliers have focused on markets outside of California.

- In areas where choice and competition in the electricity market do not exist, utilities offer Green Power through regulated rates. The term "green pricing" refers to an optional utility service that allows customers to support a greater level of utility investment in renewable energy by paying a premium on their electric bill to cover any above-market costs of acquiring renewable energy resources. More than 80 regulated utilities in nearly 30 states offer green pricing programs.

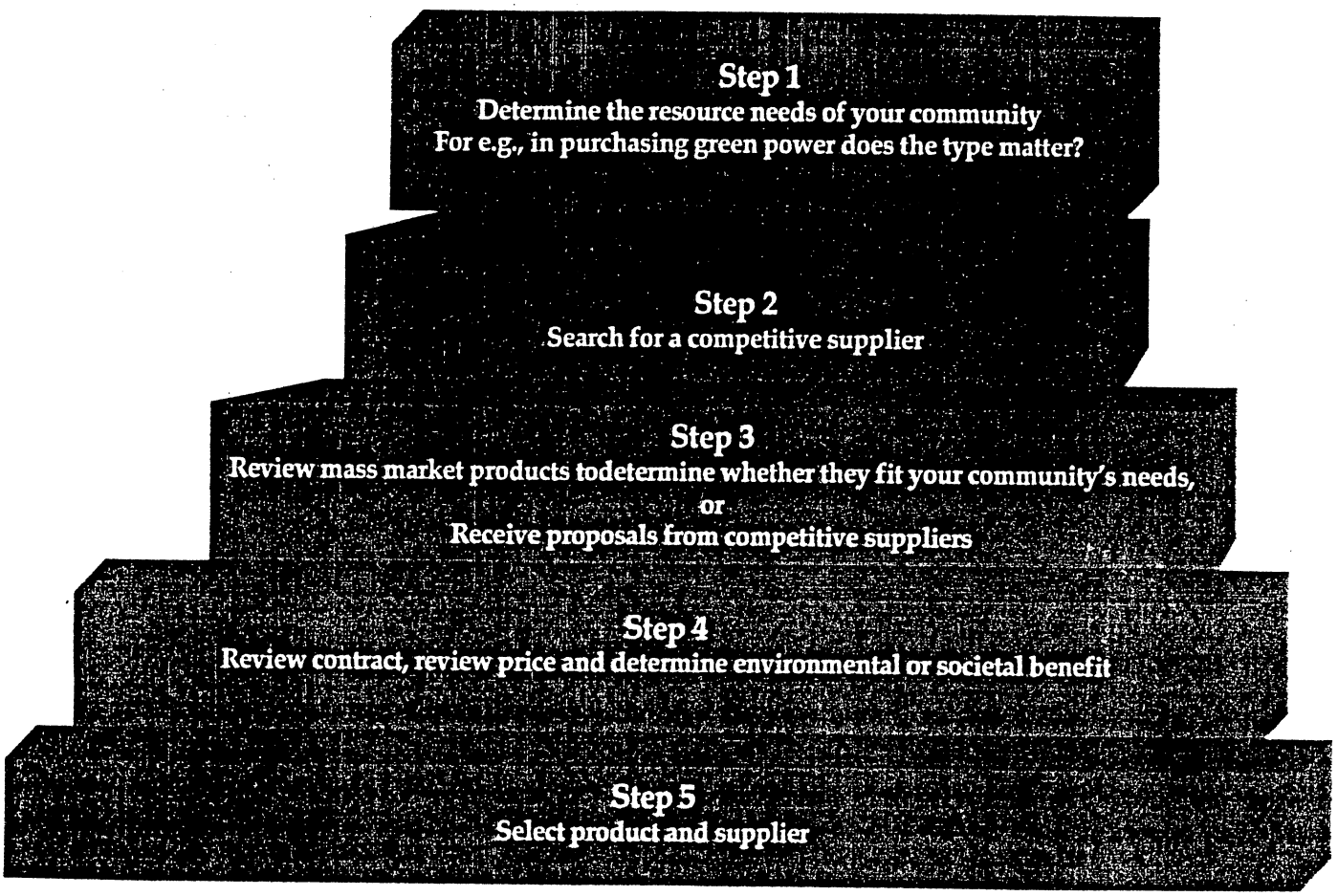
- Utilities in some states conduct auctions to determine the wholesale provider of electricity service to end-use customers. Some of these utilities have included renewable energy as a requirement for bids. This was the case in Ohio, where Green Mountain Energy Company successfully bid, and currently serves 450,000 customers.

- As in Massachusetts, many states have supported the development of new renewable energy by mandating renewable energy portfolio standards (RPS). Typically, these standards require suppliers, and in some cases, utilities, to purchase a minimum portion of their electricity from renewable sources. Massachusetts, Arizona, Texas, Maine, Connecticut, Nevada, New Mexico, Pennsylvania, and Wisconsin have all implemented such requirements.

- Several states have created public funds which disseminate monies to various Green Power projects. These are typically funded through system benefits charges assessed on customers - a per kilowatt hour surcharge levied on all electricity purchases. Massachusetts, Connecticut, and California, have such programs.

VI. How do we buy Green? What Are the Products?

The Green Power market, like the competitive market has been slow to develop in Massachusetts. The improving market conditions may result in more mass-market Green Power suppliers and products. In the meantime, interested MMA members should ask suppliers if they could offer a product specific to their needs. The following are the basis steps to making a Green Power purchase.



Whether it is through a customer specific contract, or via the mass market, competitive suppliers offer a variety of products to customers. The possibilities are endless, but products generally fall into one of the following categories:

- A competitive supplier engages in a direct bilateral contract with a renewable generator to obtain renewable energy. A supplier might offer products that contain 100% renewable energy or only a portion (e.g., 50%) that is from renewable energy. Alternatively, a supplier might offer a block product, which allows the customer to purchase a fixed amount of renewable energy each month. Several independent agencies offer certification and verification services for such products (see Green-e and Power Scorecard descriptions below).

- Green certificates (also known as green tags, renewable energy certificates, or tradable renewable certificates) represent the environmental attributes of power generated from renewable energy sources. The certificate allows the environmental attribute to be sold separately from the energy. Several organizations sell green energy certificates separate from electricity service, so customers do not need to switch from their current electricity supplier in order to purchase renewable energy. PG&E, BPA, Calpine, and Reliant are some of the entities currently offer certificates. The California-based Center for Resource Solutions is developing a nationwide certificate program called RECs.

> On September 15, 2000, PG&E Corporation's National Energy Group began commercial operation of an 11.5 MW facility in Madison County, N.Y. The project, New York's first commercial wind farm, is located on farmland and consists of seven Vestas 1.65 MW wind turbines. Energy from the facility is sold to large wholesale customers through the state's competitive wholesale power market.[6]

- Offset programs, such as tree planting, may be offered as a way to balance the environmental effects of electric generation. Alternatively, a company might buy a tract of land and donate it to a trust in order to offset the pollution caused by its electricity use. Such efforts would need to be tied to specific kilowatt hour sold.

V. Verifying Your Purchase

Verifying that dollars spent for Green Power actually cause renewable energy to flow is important to ensuring consumer confidence. Verification and auditing methods are under development in the wholesale and retail electricity markets. Nearly all electricity is transported over the transmission system. Electricity generation puts power onto the electricity "grid"; consumers extract power every time they use electricity.

The implementation of a generation information system (GIS) for the New England Power Pool is underway. This system will track all sources of generation and record a facility's type of fuel, related emissions, and other factors. The system will produce certificates that list this information. Competitive suppliers and other buyers can purchase the certificates from specific generation sources as a way to prove that they are purchasing Green Power for their customers and as a means of satisfying renewable portfolio standard requirements (see above).

In addition, independent entities have established certification systems to help customers identify specific Green Power products. These organizations have established rating systems for different green products and to provide certification for products that have met certain standards.

Green-e is a voluntary verification program for environmentally preferred electricity products in competitive markets. Consumers can use the Green-e logo to quickly identify electricity products that meet objective consumer protection and environmental standards for renewable energy. When the Green-e logo is displayed next to an electricity product, the product must meet the following requirements:

- 50% or more of the electricity supply comes from one or more of these eligible renewable resources: solar electric, wind, geothermal, biomass, and small or certified low-impact hydro facilities,
- if a portion of the electricity is non-renewable, the air emissions are equal to or lower than those produced by conventional electricity,
- there are no specific purchases of nuclear power, and the product meets the Green-e new renewable requirement.

Green-e is administered by the Center for Resource Solutions, a non-profit organization based in San Francisco, California. Green-e was first launched in November 1997 in California. It is now available in Connecticut, Delaware, Maryland, Maine, Massachusetts, New Jersey, Ohio, Pennsylvania, Rhode Island, and Texas. For more information visit the Center for Resource Solution website at http://www.resource-solutions.org/

Pace Power ScoreCard™ - For energy consumers looking for additional detail on the environmental impacts of power products, the Pace Energy Project and five other environmental organizations[1] have developed the Power Scorecard -- an interactive web-based tool for consumers. Located online at http://www.powerscorecard.org/, the Power Scorecard can be used to further evaluate and compare various electricity products. Power Scorecard uses two different ratings to evaluate power products: 1) Overall Environmental Impact Rating; and 2) New Renewable Content Rating.

VI. Who Buys Green Power and How Do They Do it?

A number of governmental entities, including municipalities (either for municipal accounts or their residents), have purchased Green Power over the past few years. Typically they have exercised this option by either making a direct purchase, aggregating their purchases with other entities, or building a facility. The following are examples of each of these methods:

Direct Purchases of Green Power

In July 1998, Santa Monica became the first city in California to commit to purchase Green Power when it issued a Request for Proposals for 21 million kWh of renewable power to supply the city's annual municipal load. In March 1999, the city council approved a one-year contract with Commonwealth Energy to purchase 5 MW of geothermal power at a 5% premium, making it the first city to utilize 100% Green Power for its facilities. The contract has since been extended.

In addition to its municipal Green Power purchases, Santa Monica initiated a public education campaign to encourage residents and businesses to become more energy efficient and to switch to a Green Power provider.

In January 23, 2002, Westport, CT became the first municipality in the Northeast to purchase Green Power. The town has agreed to purchase the Connecticut Energy Cooperative's EcoWatt™, a Green-e certified electricity product consisting of 100% renewable electricity from wind, water, and methane gas from landfills. Westport is purchasing enough Green Power to provide electricity for its town hall and recreation buildings - approximately one third of the town's total electricity load.

Although the cost of EcoWatt is slightly more than that of the conventional electricity used by Westport, members of the Westport Board of Selectmen that approved the purchase found the environmental benefits to be well worth the small price premium. According to their calculations, the premium associated with the Green Power purchase results in an additional tax burden for Westport residents of only 50 cents per resident per year.

Aggregate Purchases

NOPEC
NORTHEAST OHIO
PUBLIC ENERGY COUNCIL

In March 2001, the Northeast Ohio Public Energy Council (NOPEC) signed a contract with Green Mountain Energy Company that will result in the provision of lower electric rates and Green Power for the group's more than 400,000 residential customers. Although electricity from Green Mountain Power is sold at a premium in other states, NOPEC consumers will receive the electricity at a discounted price. Green Mountain also agreed to establish a wind farm and commercial solar facility in Ohio to help service the NOPEC contract.

NOPEC is made up of 100 large and small member communities, spread across eight Northeast Ohio counties. Voters in each community approved the formation of NOPEC in November 2000 by passing ordinances authorizing their local governments to aggregate utility customers within the community. The aggregation applies to residential customers only.
As outlined in Ohio's restructuring law, customers are automatically included as part of the aggregation unless they "opt-out."

By banding together as a large buying group, NOPEC was able to gain leverage in the deregulated market. The contract signed with Green Mountain results in a 1 to 3% savings below the state-mandated standard offer price for electricity. The contract will continue through 2006.

An aggregation of New Jersey agencies and universities is currently purchasing Green Power to meet about 15% of its collective electricity needs. The group has contracted with Conectiv Energy to purchase a 50% renewable, *Green-e* certified product comprised of landfill gas and small hydro resources. Over the course of the 16-month contract, the group will purchase a total of 152 million kWh at a cost of $2.1 million, or about 1.7¢/kWh over the cost of system power.

Participants in the aggregation group include departments and agencies within the State of New Jersey; 11 state universities; NJ Transit; the Port Authority of New York and New Jersey; the New Jersey Sports and Exposition Authority; the New Jersey Turnpike Authority; the New Jersey Highway Authority; the Hackensack Meadowlands Development Commission; the Delaware River Port Authority; the New Jersey Water Supply Authority; South Jersey Transportation Authority; and Palisades Interstate Park Commission.

When the Illinois electricity market opened up to competition, the city of Chicago and 47 other local government agencies announced the formation of the Local Government Power Alliance (LGPA) to aggregate electricity purchases. In 1999, the group, which includes the city of Chicago, the Chicago Transit Authority, and selected city colleges, was able to lower electric costs by more than $10.6 million, or 10%, through consolidated billing alone.

Finance and/or Build Facilities

Located in the Town of Hull, MA is a 660 kW wind turbine that stands 80 feet tall, with rotating blades of 150 feet in diameter. Owned and operated by the Town of Hull, the wind project is expected to save the town an estimated $50,000 per year in energy costs. *Beverly, Massachusetts*

Located onsite at the high school in Beverly, MA is a unique Green Power project that combines both wind and solar energy sources. The project in part consists of a 100 kW photovoltaic (PV) setup, which was originally completed in 1981 and is the only project still remaining from President Jimmy Carter's Photovoltaic Demonstration Project. The solar project provides between $10,000 and $20,000 of electricity to the city of Beverly. The PV system received an overhaul in 1994, when Solar Now, Inc. was created through a grant from Congress to update and manage the site. In 1997, a 10 kW wind turbine was donated to the site as a result of a 4-year effort of a local middle school. The wind turbine provides an estimated savings of $2,000 per year to the City of Beverly.

In November 2001, residents of San Francisco voted to approve two municipal bond measures that will generate $100 million for the installation of solar power, wind power, and energy efficiency technologies on city-owned property. Interest on the bonds is to be repaid from a combination of energy produced at the renewable installations, as well as from energy efficiency improvements at city facilities. Issuance of the bonds will not result in an increase in taxes.

The "Solar Revenue Bond" is expected to provide financing for 10 to 12 MW of solar power and about 30 MW of wind power. San Francisco city government currently utilizes about 160 MW of power. The solar panels will be installed on the rooftops of city facilities in the sunniest areas of the city. The wind turbines will be sited on city-owned property in the surrounding counties.

The second bond measure approved by San Francisco residents allows the city to use general revenue bonds for renewable energy projects, signaling an ongoing commitment to these sorts of projects. General revenue bonds are approved by the city's Board of Supervisors and do not require a public vote. Essentially, they enable the city to handle renewable energy investments in the same manner as other infrastructure investments, such as sewer and water systems.

Campaign materials in support of the two ballot measures touted the bond measures as a way for the city to improve its energy security. Promotional materials also suggested, "Renewable energy gives better protection against power shortages, erratic energy prices, fuel supply problems, and disasters. It also begins a u-turn toward a cleaner environment, and a sustainable way of life."

The $100 million revenue bond is expected to result in the construction of a solar photovoltaic factory in San Francisco, creating jobs and a new economic base. Furthermore, as the largest solar bond in the nation, the measure is expected to help push down the cost of solar energy on a national basis by increasing demand and encouraging investment in new manufacturing and assembly facilities.

The bond ballot measures were endorsed by at least 15 local and national non-profit organizations, including the San Francisco Chamber of Commerce, CALPIRG, Greenpeace, and the Sierra Club.

Other Government Entities

In addition, several state governments and federal agencies are purchasing Green Power or making commitments to purchase Green Power in the near future.

Federal Agencies, including the U.S. Environmental Protection Agency, U.S. Department of Energy, and General Service Administration are purchasing Green Power for facilities (e.g. Liberty Bell Plaza) across the country from an assortment of Green Power marketers. The U.S. Department of Energy's purchases are part of its efforts to have 7.5% of its electricity come from non-hydro renewable energy sources by 2010.

Building upon several years of support for Green Power, the State of Pennsylvania is currently purchasing enough renewable energy to supply 5% of the state government's electricity. Approximately 100 million kWh of Green Power is supplied to state facilities under contract with Community Energy Inc. The Green Power includes a mix of wind power, landfill gas, hydroelectric, and solar energy. The contract covers a period of two years, and began on January 1, 2002.

Pennsylvania's largest wind power project is located in the heart of the Allegheny Mountains, along more than a mile of ridge-top pastureland. Elevations range from 2700 to 2900 feet. The Somerset project and its sister wind farm in Mill Run, 15 MW and 9 MW respectively, combine to produce 63,000 MWh of electricity annually - enough electricity to power approximately 8,200 Pennsylvania homes. The two wind projects will result in an estimated reduction of 4,644 tons of coal and about 7,914 tons of carbon dioxide emissions annually - the equivalent CO2 benefits of taking over 1,000 cars off the road or planting over 2,000 acres of trees each year. The sixteen 1.5 MW turbines, six in Somerset and ten in Mill Run, are built on 215 foot steel towers, with spinning blades spanning 230 feet in diameter.

A consortium of companies, including wind farm developers Atlantic Renewable Energy Co. and Zilkha Renewable Energy, wholesale buyer Exelon Power Team, and the wind energy marketing firm Community Energy, Inc. developed both farms. Approximately 75% of the newly available wind energy is being sold to the nation's five largest retail wind energy purchasers- the University of Pennsylvania, Penn State University, Carnegie Mellon University, Philadelphia Suburban Water Corporation, and Giant Eagle, Inc.[5]

In 2001 the states of Maryland and New York issued orders requiring state facilities to purchase Green Power. In New York Governor George Pataki ordered that New York state buildings should obtain 20% of their electricity from renewable sources by 2010.

For More Information

The MMA's primary goal of this briefing paper is to increase the awareness of towns and cities about renewable energy. The MMA is also researching the interest of its member communities in purchasing specific products related to renewable energy. Based on this analysis, which should be completed in Spring 2002, the MMA will examine the feasibility of developing an aggregation group. In the meantime, please feel free to contact Carrie Cullen Hitt at 617-772-7535 with any questions.

Footnotes:

[1] The Massachusetts Renewable Trust is providing separate funding to the Cape Cod Light Compact to assist Cape Cod municipalities interested in Green Power aggregation. Information obtained by MMA under this proposal will be made available, however, to any towns, cities, counties, or their organizing entities that are exploring the possibility of a Green Power option for cities and towns.

[2] AES NewEnergy is assisting the MMA in execution of this project. If you have questions about the issues in this paper, or are interested in learning more about Green Power please call Carrie Cullen Hitt at 617-772-7535.

[3] Massachusetts Division of Energy Resources, "The Power is Yours," from http://www.state.ma.us/doer/, February 26, 2002

[4] For information on numbers of customers who have switched, see the website of the Massachusetts Division of Energy Resources at www://http:state.ma.us/doer

[5] This briefing paper uses "Green Power" to generally describe physical or financial products (environmentally beneficial) that use power grid and/or wholesale electricity markets.

[6] www.purewind.net/madisonsite.html

[7] The group includes Environmental Defense, the Izaak Walton League, the Natural Resources Defense Council, the NW Energy Coalition, the Pace Energy Project, and the Union of Concerned Scientists.

[8] www.newwindenergy.com/5largest.ht

Prepared Tuesday, March 26, 2002

Renewable Energy Trust Fund

MRET has awarded the City a grant of $377,500 to install 28 kilowatts of solar photovoltaic (PV) panels to generate electricity at City Hall Annex as part of the renovation project. The project designers estimate that the PV system will supply about 12 percent of the building's annual electricity consumption. Based on energy modeling performed to design the building renovation, the energy efficiency measures and the PV system will reduce greenhouse gas emissions by 43 percent compared to the building's energy use in 1998.

The City will continue to monitor MRET's programs for other opportunities.

Very truly yours,

Robert W. Healy
City Manager

RWH/mec

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CITY OF CAMBRIDGE • EXECUTIVE DEPARTMENT

Robert W. Healy, City Manager *Richard C. Rossi, Deputy City Manager*

June 10, 2002

To The Honorable, The City Council:

In response to Awaiting Report Item No. 02-45, regarding a report on Renewable Energy Fund for possible use for building renovations of City buildings and Awaiting Report Item No. 02-46, regarding a report on the MMA's green energy initiative, Assistant City Manager for Community Development Beth Rubenstein and Public Works Commissioner Lisa Peterson report the following:

MMA Green Energy Initiative

In response to the Council's request for a report on the Massachusetts Municipal Association's (MMA) green energy initiative, we report the following:

The MMA was awarded a $75,000 grant by the Massachusetts Renewable Energy Trust (MRET) to educate its members on green power and conduct a survey of municipalities regarding their interest in green power. The Public Works and Community Development Departments responded to the MMA written survey; John Bolduc, CDD's environmental planner, attended a focus group session on March 28, 2002. MMA expects to issue a report this summer. A copy of the MMA "Briefing on Renewable Energy" is attached.

The City is also participating in another green power project. MRET awarded a grant of $120,000 to the Massachusetts Energy Consumers Alliance (Mass Energy) to assess the feasibility of creating a green power product targeted toward members of environmental organizations and municipalities. Mass Energy also received a $50,000 grant from the John Merck Fund to support the project. The City, through the Community Development Department, has been participating as a Green Power Planning Network Partner along with other municipalities (Boston, Brookline, Newton) and environmental organizations. Mass Energy is aiming to create an option for electricity consumers to voluntarily purchase their power from clean, renewable sources (i.e., wind, solar, landfill gas, biomass). They hope to have a product ready by early 2003, which would be available to citizens of Cambridge.

S-180

Consent Agenda #6

Awaiting Report Item Number 02-45, regarding a report on Renewable Energy Fund for possible use of building renovations of City buildings and **Awaiting Report Item Number 02-46,** regarding a report on the MMA's green energy initiative.

In City Council June 10, 2002

REFERRED TO HEALTH AND ENVIRONMENT COMMITTEE.