



Michael V. O'Brien
City Manager

CITY OF WORCESTER

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Attachment for Item #

8.7 A

November 10, 2009

TO THE WORCESTER CITY COUNCIL

COUNCILORS:

The attached quarterly report regarding implementation of the City's Climate Action Plan, received from Assistant City Manager for Economic and Neighborhood Development Julie A. Jacobson, is forwarded for the information of your Honorable Body.

Respectfully submitted,

Michael V. O'Brien
City Manager





CITY OF WORCESTER, MASSACHUSETTS
Executive Office of Economic, Neighborhood & Workforce Development
Planning and Regulatory Services Division

Julie A. Jacobson
Assistant City Manager

Joel J. Fontane, Jr
Director of Planning and
Regulatory Services

To: Michael V. O'Brien, City Manager
From: Julie A. Jacobson, Assistant City Manager
Date: November 5, 2009
Re: Energy Efficiency and Conservation Program Quarterly Report
November 2009

The attached quarterly report summarizes programmatic activities related to the City's Energy Efficiency and Conservation Program since its last report in July 2009. It is one of a series of quarterly reports intended to inform the City Council and the public of the progress the City is making regarding its implementation of the Climate Action Plan and related efforts. It is important to note that this report highlights 1) aspects of our implementation that have been completed, and 2) efforts currently underway that are particularly timely, but does not include all pipeline activities, which when more fully developed, will be presented in upcoming quarterly reports.

This quarter's report focuses on our grant strategy and covers activities in three overarching areas based on those outlined in the City's Climate Action Plan: Energy Efficiency and Conservation; Renewable Energy; Outreach, Education and Green Space. It also provides a detailed White Paper about municipal aggregation and a summary section on this topic. I am please to report that we have made progress in each of these categorical areas and will continue our successful implementation of this program.

At the request of City Council, we have conducted an initial assessment of municipal aggregation through a White Paper prepared by World Energy for the City of Worcester (see attached). The White Paper provides an overview of the requirements and key



tasks related to implementing a municipal aggregation program as well as providing an analysis of the benefits, costs, risks and responsibilities associated with this significant organizational undertaking. The paper concludes that while the probable aggregate net savings are estimated to be between \$258,000 to \$668,000 per year, these savings when distributed among the City of Worcester's roughly 71,000 customers yields an average annual savings of just \$3.64 - \$9.43 per participant.

Moreover, there is a risk that the program could run a deficit. For example, should the supplier not beat the standard offer rate with National Grid, there would be no savings realized to pay for recurring costs, which could lead to a deficit depending on how the aggregation was structured.

The administration of a municipal aggregation program requires significant resources and would likely require the creation of a new office or division with dedicated resources and staffing to operate the program. While the aggregate savings can likely cover the costs of such an operation, particularly with a performance based supplier contract, the net savings to each customer is so insignificant on an annual basis that it may not warrant the administrative and operational effort required to implement and maintain such an effort. The administration is carefully evaluating the findings of the White Paper as part of its decision making process and will make a recommendation to you once this process is complete. This recommendation will weigh the risks and responsibilities associated with the administration of a municipal aggregation program with the probable net savings and opportunities.

In addition to the research on municipal aggregation, staff continued to make progress on many fronts as several key milestones were achieved this quarter:

- Nov. 2009 World Energy submits Municipal Electric Aggregation assessment White Paper to the City for consideration.
- Nov. 2009 Honeywell International submits comprehensive Investment Grade Energy Audit for all City and School Dept. owned facilities to the City for consideration.
- Oct. 2009: National Grid provides a match pledge that helps the City leverage a \$3M lead abatement grant that will abate lead hazards in ~225 homes and provide energy efficiency upgrades in approximately ~30 owner-occupied properties.
- Oct. 2009: City commences its first wind measurement study at Green Hill in partnership with UMASS and the Massachusetts Technology Collaborative to analyze wind potential for the Worcester Technical High School.
- Sept. 2009 City responds to U.S. Dept. of Energy's "Request for Information" related to its competitive Energy Efficiency and Conservation grant program.

- Sept. 2009 Honeywell International submits "Priority Building" Investment Grade Energy Audit to the City for consideration.
- Aug. 2009: City amends its energy contract to achieve its 20% clean, renewable electricity for municipal use by 2010 goal – as set forth by City Council resolution in March 2005.

Additionally, we are in the process of finalizing our recommendations to you for both reappointments and new appointments to the Energy Task Force and will provide those recommendations shortly. If you need any additional information, please advise.

Sincerely,

A handwritten signature in cursive script that reads "Julie A. Jacobson".

Julie A. Jacobson
Assistant City Manager

City of Worcester



Energy Efficiency & Conservation Program Quarterly Report November 2009

Written By:

Joel J. Fontane, Jr., Program Director

John Odell, Program Manager

Executive Office of Economic, Neighborhood & Workforce Development
Planning & Regulatory Services Division
City of Worcester, Energy Efficiency & Conservation Program
44 Front Street, Suite 510, Worcester, Massachusetts 01608
Telephone: (508) 799-1400 Fax: (508) 799-1393
E-Mail: planning@ci.worcester.ma.us
Website: www.ci.worcester.ma.us/ocm/planning

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Introduction

This quarterly report summarizes programmatic activities related to the City's Energy Efficiency and Conservation Program since July 2009. It is one of a series of quarterly reports intended to inform the City Council and the public of the progress the City is making regarding its implementation of the Climate Action Plan and related efforts. It is important to note that this report highlights 1) aspects of our implementation that have been completed, and 2) efforts that are currently underway that are particularly timely, but does not include all pipeline activities, which when more fully developed, will be presented in upcoming quarterly reports.

This quarterly report provides updates on our activities and accomplishments related to three of the five overarching categories outlined in the City's Climate Action Plan: Energy Efficiency, Renewable Energy and Education and Outreach. It also includes two special categories, one related to municipal Aggregation and the other, our Grant Strategy.

Background. As the result of two City Council resolutions¹, the City of Worcester joined the Cities for Climate Protection (CCP) Campaign – a project of the International Council of Local Environmental Initiatives (ICLEI). As part of this campaign, Worcester completed a greenhouse gas (GHG) emissions inventory, and developed a Climate Action Plan (CAP) that set a GHG emissions reduction target – three important steps in ICLEI's "Five Milestone" process for addressing climate change. To implement the City's CAP, the City Manager assembled an interdepartmental team from throughout his administration. Since the Action Plan's endorsement by the Worcester City Council in January 2007, the administration has made significant progress in the above mentioned categories while building the organizational capacity to sustain GHG reduction measures and related efforts as demonstrated by the milestones that follow.

Executive Summary – Climate Action Milestones.

- | | |
|------------|--|
| Nov. 2009 | World Energy submits Municipal Electric Aggregation assessment White Paper to the City for consideration. |
| Nov. 2009 | Honeywell International submits comprehensive Investment Grade Energy Audit for all City and School Dept. owned facilities to the City for consideration. |
| Oct. 2009: | National Grid provides a match pledge that helps the City leverage a \$3M lead abatement grant that will abate lead hazards in ~225 homes and provide energy efficiency upgrades in approximately ~30 owner-occupied properties. |
| Oct. 2009: | City commences its first wind measurement study at Green Hill in partnership with UMASS and the Massachusetts Technology Collaborative. |
| Sept. 2009 | City responds to U.S. Dept. of Energy's "Request for Information" related to its competitive Energy Efficiency and Conservation grant program. |

¹ Cities for Climate Protection, October 7, 2003 and Clean Energy Resolution, March 2005.

- Sept. 2009: Honeywell International submits "Priority Building" Investment Grade Energy Audit to the City for consideration.
- Aug. 2009: City amends its energy contract to achieve its 20% clean, renewable electricity for municipal use by 2010 goal – as set forth by City Council resolution in March 2005.
- Jun. 2009: City submits application to U.S. Dept. of Energy for \$1.733M Energy Efficiency and Conservation Block Grant.
- May 2009: Comprehensive energy audit of all City-owned facilities begins.
- Apr. 2009: City awarded \$64.5K grant from Massachusetts Technology Collaborative.
- Apr. 2009: Contract with Honeywell International for energy services commences.
- Feb. 2009: City hires Program Manager for Energy Efficiency and Conservation.
- Aug. 2008: City completes Request for Qualification process and selects Honeywell International as the City's Energy Services consultant (ESCO) and begins contract negotiations.
- Jul. 2008: City creates the position of Program Manager for Energy Efficiency and Conservation.
- Fall 2008: City completes high efficiency (LED²) traffic signal lighting project throughout City.
- Jul. 2008: City implements single-stream (zero sort) recycling for its curbside recycling program.
- Fall 2007: School Dept. implements single stream recycling at all schools facilities.
- Fall 2007: City completes high efficiency lighting projects in city-owned public parking garages.
- Fall 2007: City completes energy audits of select City-owned buildings and implementation of lighting related energy efficiency measures through National Grid.
- Aug. 2007: Public Service & Transportation Subcommittee endorses Climate Action Plan.
- Feb. 2007: Land Use Subcommittee endorses Climate Action Plan.
- Jan. 2007: Energy Task Force completes City's first Climate Action Plan (CAP) and transmits it to City Council.
- Feb. 2006: City Manager appoints Energy Task Force and hires Energy Consultant to develop Climate Action Plan and propose GHG reduction target.
- Mar. 2005: City Council adopts resolution that sets as a goal 20% clean, renewable electricity for municipal use by 2010.
- Apr. 2004: City's first greenhouse gas inventory completed.
- Oct. 2003: Council adopts resolution to join the Cities for Climate Protection Campaign.

² Light emitting diode

Aggregation

At the request of City Council, the City has conducted an initial assessment of municipal aggregation through a White Paper prepared by World Energy for the City of Worcester (see attached). The White Paper provides an overview of the requirements and key tasks related to implementing a municipal aggregation as well as providing an analysis of the benefits, costs, risks and responsibilities associated with this significant organizational undertaking. The paper concludes that the:

“probable ongoing aggregate net savings are considerable \$258-\$668,000, yet these savings translate to an annual average of \$3.64 - \$9.43 per participant depending the magnitude of recurring costs. Moreover, should the supplier not beat the standard offer rate with National Grid, the program could run a deficit since for a period of time there would be no savings realized to pay for recurring costs. This risk can be offset by utilizing a performance based contract so that the aggregation contractor assumes all the cost risk.

While the potential benefits of aggregation appear sufficient to offset the costs associated with allocating resources to this initiative, it is important to recognize these risks and responsibilities in addition to the probable net savings and opportunities when determining whether an aggregation would be in the City’s best interest.”³

The following tables present an estimate of the range of annual “savings” in aggregate and per participant in the implementation year and on-going:

Net Annual Savings (Aggregate)

Year	Annual Net Savings (High Cost & Low Benefits)	Annual Net Savings (Low Cost & Low Benefits)	Annual Net Savings (High Cost & High Benefits)	Annual Net Savings (Low Cost & High Benefits)
Start Up Year	(\$298,131)	\$141,869	\$355,739	\$795,739
Remaining Years	\$13,869	\$257,869	\$667,739	\$911,739

Source: World Energy –Nov. 2009 Municipal Aggregation White Paper

Net Annual Savings (Per Participant)

Year	Avg Annual Net Savings (High Cost & Low Benefits)	Avg Annual Net Savings (Low Cost & Low Benefits)	Avg Annual Net Savings (High Cost & High Benefits)	Avg Annual Net Savings (Low Cost & High Benefits)
Start Up Year	(\$4.21)	\$2.00	\$5.02	\$11.24
Remaining Years	\$0.20	\$3.64	\$9.43	\$12.88

Source: World Energy –Nov. 2009 Municipal Aggregation White Paper

The administration is considering the findings of the White Paper as part of its decision making process currently underway.

³ World Energy. November 5, 2009, Municipal Aggregation White Paper

Grant Strategy

Given the unprecedented level of Federal funding through the American Recovery and Reinvestment Act (ARRA) there have been a host of new and expanded opportunities for many program initiatives including those related to implementing the City's Climate Action Plan. The Division of Planning & Regulatory Services with the assistance of the Grants Division and the Dept. of Public Works & Parks has identified available grant and finance opportunities applicable to the City's Energy Efficiency and Conservation program. The City's overarching approach consists of five elements: 1) Identification and assessment of available of grant and financing resources, 2) Pursuit of all formula-based funds related to the Federal American Recovery Act, 3) Pursuit of formula-based related to Clean Energy Choice and other state programs, 4) Development of creative ways, through internal collaboration and external partnership, to leverage additional resources, 5) Assessing competitive grant opportunities as appropriate. The following provides an overview of the City's approach to developing grant resources for this program.

1) Identify available grant and financing resources and assesses their requirements and programmatic alignment.

- The City is actively pursuing four grant and three financing opportunities including the Department of Energy's Energy Efficiency and Conservation Block Grant, Massachusetts DEP State Revolving Fund Loan Program For Drinking Water Projects, and the Massachusetts Technology Collaborative - Clean Energy Choice Program. Many of the sources considered⁴ require completed design studies, high monetary or in-kind match obligations, or both and were therefore not pursued or deferred for later consideration as appropriate. Others, like the SmartGrid electricity infrastructure upgrade program, focused on areas better suited for our partners at National Grid. While some grant programs are not accepting applications yet. The City is monitoring the grantmaking programs identified and will reassess their applicability to our needs on an on-going basis.

⁴ 14 of the 20 sources considered.

2) Pursue all formula-based funds and financing related to the Federal American Recovery Act (Stimulus).

- **Stimulus Related Grants.**
 - On June 24, 2009 the administration applied⁵ for the City of Worcester's formula-based Energy Efficiency & Conservation Block Grant. This ~ \$1.7M grant will be used for renewable energy and energy efficiency projects identified at City Hall and the Technical High School as well as to augment the City's Phase I –Neighborhood Stabilization Program through the inclusion of energy audits, insulation, air-sealing materials and high efficiency HVAC equipment for homes within the target areas.
 - In September, the DPW&P has applied to the Massachusetts Dept. of Environmental Protection (DEP) for ~\$1.4 million to fund⁶ hydroelectric, photovoltaic and energy conservation projects identified by an energy audit of the filtration plant. These include:
 - Installation of 24-kilowatt hydroelectric generator
 - Installation of a 150-kilowatt solar photovoltaic system and associated electrical upgrades
 - Upgrades to the ventilation system that will reduce natural gas consumption used for heating the filtration plant.
- **Stimulus Related Financing** The City is actively considering the application of the following bond tools as part of an overall financing strategy for its energy efficiency and conservation program:
 - *Qualified Zone Academy Bonds:* QZABs are tax credit bonds authorized for qualifying schools in economic recovery zones or with 35% of students eligible for free/reduced price lunches. \$1.4B is authorized in 2009 and 2010, up from \$400M authorized in recent years. The State of Massachusetts was allocated \$6.2M for the 2008 cycle and \$21.8M for the 2009 cycle. Allocation of these funds is via the Massachusetts Department of Education. Only banks, insurance companies and corporations actively engaged in the business of lending money are considered "eligible taxpayers" able to obtain the tax benefits of QZABs.

⁵ Authorized by City Council resolution May 28, 2009 agenda item 8.7A

⁶ Although called a "revolving loan fund" loans made by DEP through this fund are already forgiven since DEP is mandated to use 20% of its stimulus monies to fund green infrastructure improvements. The revolving loan fund is merely the mechanism by which DEP is, in part, doing so.

- *Eligible Projects:* The funds can be used for renovation and repairs, energy efficiency and renewable energy, equipment and technology, curricula development and Professional development (teacher training).
 - *Requirements:* A 10 percent match is required from a business or nonprofit partner which can be in cash or in-kind donations. The Worcester School Department is currently reviewing match opportunities.
- *Qualified School Construction Bonds:* QSCBs are tax credit bonds to finance school construction and renovation projects. \$11B is authorized each year for 2009 and 2010. The State of Massachusetts was awarded \$144.8M for 2009. It is expected the Massachusetts Department of Education will allocate these bonds.
 - *Eligible Projects:* TBA
 - *Requirements:* TBA
- *Qualified Energy Construction Bonds:* QECBs are tax credit bonds for renewable energy, energy conservation and related projects issued by state and local governments. \$3.2B is authorized. Funds are directly allocated to the largest cities and counties, with remaining funds allocated to the states. Under the U.S. Department of Energy formula, \$1.8M will be awarded to the City of Worcester, with an additional \$6.3M awarded to Worcester County. The bonds provide federal tax credits for bond holders in lieu of interest in order to significantly reduce an issuer's cost of borrowing.
 - *Eligible Projects:* Energy efficiency, conservation, and renewable energy projects are eligible.
 - *Requirements:* Projects are required to reduce energy consumption in a publicly-owned building by at least 20%.
- *Recovery Zone Bonds:* There are two types of Recovery Zone Bonds - \$15B authorized for Recovery Zone Facility Bonds (RZFB) and \$10B authorized for Recovery Zone Economic Development Bonds (RZEDB). RZFBs would not benefit Worcester as they only provide tax-exempt interest – the City is already tax exempt. On the other hand, through use of RZEDBs the issuer receives a cash subsidy from the US Treasury equal to 45% of the total interest payable to bondholders. This should result in net-interest cost lower than tax-exempt bonds.
 - *Eligible Projects:* Recovery Zone Bonds can be used to promote development in a recovery zone, including capital expenditures for property in a recovery zone and expenditures for public infrastructure and construction of public facilities.

- *Requirements:* A recovery zone is an area designated by the issuer (the City) as having significant poverty, unemployment, rate of home foreclosures or general distress or an area for which a designation as an empowerment zone or renewal community is in effect.

3) Pursue formula-based Clean Energy Choice grants and Commonwealth Wind and Commonwealth Solar.

- The City has been awarded a ~\$64K grant from MTC's Clean Energy Choice program, a formula-based grant program dependent on the number of households signed up to purchase clean energy⁷. This grant will be used to fund an education and outreach program related to renewable energy and other initiatives as described in our last report to City Council. The City will apply for its remaining ~\$16K under this program in the Fall 2009. This will be the last application for these resources as the program has been discontinued.
- Commonwealth Solar and Commonwealth Wind offer additional funding sources that the City may pursue. Our work with Honeywell will help define potential sites for a wind turbine, solar array or both as part of the City's efforts to reduce greenhouse gases and hedge against future energy cost increases. Commonwealth Solar and Wind offer significant resources for design and construction of these facilities. According to the State:

"The goal of the Commonwealth Wind Incentive Program is to assist responsibly sited wind energy projects of all scales in achieving successful and timely installations, while also supporting Governor Patrick's goal of having 2,000 megawatts (MW) of wind power capacity installed in the Commonwealth by 2020. The Commonwealth Wind Incentive Program (CommWind) provides rebate, grant, and loan funding for the installation of wind projects in Massachusetts. Funding is available for residential, commercial, industrial, and public facilities that are customers of investor-owned electric distribution utilities or Municipal Light Plant Departments that pay into the Renewable Energy Trust."

In addition, [...] the Patrick Administration and the Massachusetts Renewable Energy Trust recently introduced a new initiative, Commonwealth Solar, to accelerate the number of solar electric photovoltaic (PV) projects within the Commonwealth and spur growth of the Massachusetts solar industry. Commonwealth Solar provides rebates through a non-competitive application process for the installation of PV projects at residential, commercial, industrial, and public facilities. commercial projects are eligible for rebates for PV projects up to 500 kilowatts (kW) and residential projects are eligible for up to 5 kW. The applicant (and project site) must be a customer of a Massachusetts investor-owned electric utility."

⁷ Currently about 350.

4) Develop and implement creative ways to leverage additional funds through internal collaboration and external partnerships.

- Working with our partners at National Grid, the Division of Planning & Regulatory Services secured a pledge of \$175K from National Grid's conservation program⁸ to provide the City's match⁹ (\$175K) for the Division of Neighborhood and Housing Development's (DNHD) most recent Lead Hazard Abatement grant application to the U.S. Dept. of Housing and Urban Development. Recognizing that lead abatement work offers opportunities to improve energy efficiency, staff partnered with National Grid, for the first time in this way, to leverage additional funds. The match from this partnership has successfully leveraged a \$3M program that will abate lead hazards in ~225 homes¹⁰ and provide energy efficiency upgrades in approximately ~30 owner-occupied properties.

This program, managed by DNHD, is on pace to complete 245 homes by the end of 2009 with the resources from a 2007 HUD lead abatement grant. We look forward to continuing this work through additional funding this grant round.

5) Assess competitive-based funding opportunities and apply as appropriate.

The City, with the assistance of Honeywell International, the City's Energy Services Consultant, will develop a portfolio of projects and related funding sources and financing options that will strive to seize competitive-based funding opportunities offered by the Federal stimulus package and other State sources.

- The U.S. Dept. of Energy's \$390M competitive Energy Efficiency and Conservation program is targeting a small number of grantees (8-20 nationally) for high-profile awards (\$5M to \$75M) that will enable large-scale energy efficiency and conservation programs to serve as models for other communities. DOE strongly encourages applications that plan to leverage the participation and support of multiple partners, including utilities, other government agencies, businesses, financial institutions, non-governmental organizations, and State energy offices. The City of

⁸ National Grid's Conservation Program is funded by a surcharge formula 2.5 mills per kWh which is mandated by State Law.

⁹ Applicant Match (cash match plus in-kind): \$601,449 - includes the contribution from the Worcester Lead Action Collaborative as well as the City of Worcester.

¹⁰ This effort will target households with incomes between 60% and 80% of median income – a group not covered under the Community Action Council's weatherization program.

Worcester responded to the DOE's "Request for Information" (RFI), the first step in being considered for this grant program. More on the City's RFI later.

- The Massachusetts Department of Energy Resources (DOER) has made approximately \$15M available in grant funds received under the American Recovery and Reinvestment Act for their MA High-Performance Buildings Grant Program. DOER anticipates awarding individual grants ranging from \$500K to \$5M, and any Massachusetts private, non-profit or governmental entity is eligible to apply for this competitive grant. The grant program seeks to fund proposals in one or more of four (4) focus areas: 1) deep retrofit of buildings, 2) transformative space conditioning technologies, 3) high-impact energy conservation measures, and 4) community mobilization.

While the City has been working as a partner with both local governments and private firms on grants related to focus areas 1 and 2 within this program¹¹, the City of Worcester will apply as lead applicant for a \$1.5M grant to fund a community mobilization demonstration program. This program will aim to dramatically increase the household participation rate in energy efficiency and renewable energy programs, and will dovetail with the City's current efforts to develop a community education and outreach campaign.¹² The City's application to DOER will request grant funds, leveraged as applicable, to expand our outreach efforts to meet measurable goals through the development and implementation effective models for encouraging more businesses, residents, and organizations to take advantage of energy saving opportunities (please see resolution agenda item).

- In addition to Federal funds, the State's recently passed Green Communities Act offers access to a \$10M competitive grant pool for those municipalities designated as "Green Communities". The City is currently assessing its readiness, resources needed and the trade-offs associated with meeting the requirements of this act. More on the City's efforts later in this report.
- Lastly, the City intends to identify and assess grant and related funding opportunities from regional and national Foundations. The Doris Duke Foundation's Climate Change Initiative, for example, provides funding for policies that bring available technologies to market more quickly – particularly technologies related to energy efficiency and renewable energy.

¹¹ A combined heat & power grant and a deep retrofit for residential buildings grant.

¹² As indicated in our quarterly report regarding the City's Energy Efficiency and Conservation program.

Energy Efficiency & Conservation

Energy Audit. The centerpiece of the City's efforts this year is the kickoff of its energy services contract with Honeywell International and the Investment Grade Audit of all city facilities. The goals of this project are: reduce the City's energy use, costs, and greenhouse gas emissions; improve school and city facilities; and demonstrate to the community at large what can be done to save energy, cut greenhouse gas emissions and reduce reliance on fossil fuels. Day-to-day management of this project is provided by Program Manager, John Odell and Contracting Officer, Tom Zidelis as well as facilities management staff. Key advisors to this project include Jarrett Connor, Budget Director, Joel Fontane, Director Planning & Regulatory Services Division, Jeff Lassey, Director of Facilities – School Dept., and Karen Meyers, Assistant City Solicitor.

In pursuit of these goals, and recognizing the increasing market volatility and rising cost of energy in general, the City commenced an Energy Services Contract with Honeywell International in late April 2009. This three phase contract begins with the Energy Audit phase that includes a detailed assessment of all city-owned facilities related to the following categories:

- Building Envelope
- Environmental Controls
- Heating, Cooling and Ventilation Systems
- Lighting and Electrical Systems
- Water Systems

In addition, Honeywell will provide a preliminary assessment of various renewable energy opportunities. These efforts will allow the City to develop and successfully implement a comprehensive program to reduce energy use. The Energy Audit will also establish an energy use baseline that will be used to gain "Green Community" status¹³.

The audit will serve as the basis for implementing a variety of Energy Efficiency and Conservation Measures (EECMs) and will be delivered in two parts: 1) the "Priority Buildings" and 2) the balance of City and School facilities. The "Priority Building"¹⁴ phase of the audit was completed September 3, 2009. The final IGA report, including all facilities, was completed as scheduled on November 3, 2009. The City is now reviewing this comprehensive 3,400 page analysis covering 170+ facilities. The evaluation team will consider various project portfolio alternatives and will decide which to implement and contract accordingly.

¹³ The State's Green Community Act sets as a goal a 20 percent reduction of energy use below this established baseline within 5 years of initial participation in the program. The City will assess the feasibility of achieving this goal as part of the energy audit with Honeywell.

¹⁴ Previously referred to as the "Top Fifteen Building". These buildings were selected primarily based on their size.

Energy Efficiency and Conservation Competitive Grant Program.

Last quarter's report detailed the City's June 25, 2009 application to the United States Department of Energy (DOE) for its formula-based award of \$1.733M¹⁵. The City of Worcester has completed and submitted all subsequent application materials as required by DOE and awaits receipt of these funds.

In mid-September, the U.S. DOE announced its \$390M competitive grant program seeking to award innovative, "game changing" ideas that create a comprehensive framework for building retrofits, including processes for financing, delivery and monitoring, that are self-sustaining, replicable, scalable, and enable continued energy efficiency investment beyond the grant period. As mentioned earlier, the City of Worcester responded¹⁶ to the U.S. DOE's "Request for Information", submitting a concept proposal requesting a \$60M award to leverage a \$360M program. In concept, this program consists of four energy efficiency and conservation elements including: 1) a community-wide retrofit for residential properties, 2) a retrofit for municipal properties, 3) a revolving loan fund for implementation of energy efficiency and renewable energy measures, and 4) a program marketing and outreach element as follows:

Proposed Program:

- | | |
|--|-------------|
| • Two-phase Community Residential Retrofit | \$36M (60%) |
| • Revolving Loan Fund | \$12M (20%) |
| • Municipal Facilities Retrofit | \$6M (10%) |
| • Program Marketing and Administration | \$6M (10%) |

DOE Grant Sub-Total: \$60M

Leverage Sub-Total: \$300M

Total Program: \$360M

Although only in concept now, we intend that the program would be fully integrated with our Neighborhood Stabilization efforts and would leverage additional private investment through collaborative partnerships with area colleges and universities, gas and electric utilities, local non-profit organization(s) and the City's ESCo, Honeywell. Given changes to programmatic requirements the size of the City's grant request will likely be around \$30M instead of the \$60M indicated in our response to DOE's request for information.

¹⁵ See July 2009 City of Worcester Energy Efficiency and Conservation Program –Annual Report – On CM item July 28, 2009 City Council Meeting.

¹⁶ On September 28, 2009

Renewable Energy

Electricity production using fossil fuels contributes greatly to the Commonwealth's greenhouse gas emissions. Roughly one-third of all CO₂ emissions are produced as a by-product of electricity generation. While efficiency and conservation measures are important and the focus of much of the City's efforts, the development of clean, renewable sources of energy is equally important as we strive to reduce the use of fossil fuels and address our increasing demand for energy.

As mentioned in our previous report, the City's efforts related to the development of renewable energy sources include 1) the adoption of local zoning legislation regarding wind turbines and 2) assessing wind and solar power potential at City-owned properties through a partnership with Clark University, the Massachusetts Technology Collaborative and our energy audit of City-owned facilities with Honeywell. Given the long lead time to assess and implement renewable energy projects, the administration has included the purchase of renewable energy credits (RECs) as part of its renewable energy strategy.

An REC is a commodity that allows customers to earn credit for the purchase and use of renewable energy within or outside of local distribution lines. The customer does not "receive" the renewable energy per se; instead the producer assigns the renewable energy to purchasers. The premium paid for RECs covers the incremental cost associated with their production as well as its environmental benefits associated with reduced pollution and greenhouse gas emissions. In Worcester's case, wind renewable energy supplied from generation delivered into the electric grid control region of the United States will be the source of the RECs purchased.

The City's First Renewable Energy Purchase. In August 2009, the City of Worcester amended its Electricity Sales Agreement with Consolidated Edison Solutions, Inc. to include the purchase of an additional 15% of its electric power from renewable sources for the next three years. By doing so, the City will meet and sustain the goal of the City Council's Clean Energy Resolution by 2010. This City Council resolution calls for the City to purchase or produce 20% of its municipal related electricity use from clean, renewable sources by 2010.¹⁷

¹⁷ Note: Nuclear energy is not considered a clean, renewable resource by the Commonwealth's Renewable Energy Portfolio Standard, or the Massachusetts Technology Collaborative.

For an incremental .0005 cents (.032%) per kWh, the City will purchase RECs¹⁸ through Consolidated Edison Solutions Inc. that will offset 15% (10.5M kWh) of municipal government electric use. This purchase, in conjunction with the 5% renewable energy already provided by our utility company¹⁹, not only achieves our 20% by 2010 goal, but is also a cost effective way to make progress toward our overarching policy goal of reducing total green house gas emissions. Through this purchase the City will avoid an estimated 3,894 tons of eCO₂ per year²⁰.

Based on the City's current electric energy consumption level the fiscal impact of this three (3) year commitment is ~\$31.5K per year or 0.032% of the City's nearly \$10M yearly electric budget. The impact will be mitigated through the use of \$20K already allocated for this purpose²¹ and savings achieved from the implementation of energy efficiency and conservation measures. Moreover, this purchase enables the City to make a strong case for additional grant monies as we seek competitive grants related to energy efficiency and conservation.

Achieving Green Community Status. Signed into law by Governor Patrick in July 2008, the Green Communities Act encourages the implementation of energy efficiency measures and production of renewable energy through the creation of a grant program and its related requirements. "Green Community" designation under this program provides the City the opportunity to apply for additional State grant monies (up to \$10M annually) for energy efficiency and renewable energy projects. According to the most recent information from the Department of Energy Resources, the Green Communities Grant Program will be launched in the fall-winter of 2009-2010.

The City is actively pursuing "Green Community" status and has begun developing zoning ordinance amendments related to renewable energy research, development and production facilities, and is developing a municipal vehicle plan to meet the program's requirements. Moreover, the City is evaluating the tradeoffs associated with the State's local option building stretch code, a requirement to become a "Green Community", which would require more energy

¹⁸ Given the high cost (ten times higher) of renewable energy credits from Massachusetts suppliers the City, through Consolidated Edison, will use an out of State supplier to maximize the number of kWhs offset.

¹⁹ The Commonwealth of Massachusetts requires through its the Renewable Portfolio Standard that electricity providers to generate or purchase 5% of all electricity from clean, renewable sources by 2010. Therefore, the City will achieve the 20% goal set forth by the City Council's resolution through the purchase of Renewable Energy Credits representing an offset of 15% of the City's electric energy use.

²⁰ eCO₂ is a metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP).

²¹ Transferred to account #18S601 on September 18, 2007 Note that the City initially intended to purchase renewable energy credits from a Massachusetts supplier and anticipated a \$20K match from the Massachusetts Technology Collaborative (MTC) for doing so. However, the City was unable to make this purchase because the sources of these funds (State) preclude the City from receiving a match from MTC. Moreover, given the high cost (ten times higher) of renewable energy credits from Massachusetts suppliers, purchasing from an out of State supplier maximized the number of kWhs off set and enabling the City to achieve its goal of 20% clean renewable electricity for municipal use by 2010.

efficient building construction – more about these considerations in a future quarterly report.

Legislative Efforts Related to Renewable Energy. There are four legislative initiatives currently under development by the Division of Planning & Regulatory Services related to renewable energy. Two are specifically aimed at achieving the State’s “Green Community” designation and the others adapt our local regulations to provide flexibility with regard to the height of wind turbines and to address small wind facilities.

The following provides a brief summary of the amendments that are expected to be formally presented to City Council for consideration in the Fall 2009:

By-right, Renewable Energy R&D and Manufacturing. This Zoning Ordinance amendment explicitly defines and allows by-right siting of renewable or alternative energy research, development and manufacturing facilities within appropriate manufacturing and business zones. It will also call for an expedited application and permitting process under which these facilities will be considered and approved.

Wind Turbine Amendment Related to Small and Large Wind Turbines. The Division of Planning & Regulatory Services has resumed its deferred research efforts related to the development of a small wind Zoning Ordinance amendment to address the location of small-scale wind turbines. Per City Council’s vote, this is the Division’s highest legislative priority. Recommendation to City Council is expected within 30 days.

This amendment will also include provisions that will permit large utility-scale wind turbines through a waiver consideration as part of the existing Special Permit process through the Worcester Planning Board. This amendment, if adopted, will enable future wind turbines to capture additional wind energy through use of higher towers and larger turbine machines in appropriately chosen locations.

Assessing Wind Power at City-Owned Properties.

Background. The Massachusetts Technology Collaborative (MTC) provides grants and technical assistance to municipalities and organizations seeking to develop renewable energy installations. As part of our ongoing consideration of renewable energy, the City partnered with MTC to consider the wind power potential of City-owned properties. After conducting a preliminary wind power study in 2007²², the MTC offered to further consider Green Hill as one of a number of sites throughout the state that warrant further study. The City accepted this technical assistance and MTC retained Black & Veatch to perform a “screening-level feasibility study”²³ for a single turbine wind project and to make recommendations regarding data collection and project development.

Although the Black & Veatch study²⁴ identified several potential locations in Green Hill Park, it was determined that locating a wind turbine in the park was **not** feasible due to conservation restrictions. However, the nearby Technical High School property may offer a potentially viable location for a large utility-scale turbine. The Technical High School property is not subject to a conservation restriction and is under the care, custody and control of the School Department; moreover this installation would complement the Technical High School’s Renewable Energy Education and Training grant²⁵, which is in keeping with the intended educational use of the school property²⁶. The study estimated the Green Hill area to be a marginal wind resource and recommended that detailed wind measurements be taken for 12 months to accurately assess the viability of a wind turbine project.

²² MTC through the Renewable Energy Research Lab, surveyed several locations throughout the City (including North High and Crow Hill), and identified Green Hill Park as warranting further study.

²³ Funded by the Community Wind Collaborative of the Renewable Energy Trust

²⁴ The Black & Veatch study (Jun. 2008) estimates the wind resource, examines site characteristics, electrical infrastructure, and potential environmental concerns related to a wind turbine project. It puts forth a conceptual design, estimates project costs and provides a preliminary financial analysis within the context of alternatives based on conformance with the City’s Zoning Ordinance.

²⁵ MTC is currently working with Peter Crafts and John O’Connor from the Technical School on this grant.

²⁶ For “new Technical school and similar education purposes” pursuant to a July 16, 2002 vote of the City Council.

Measuring Wind Power. In September 2009, the City of Worcester entered a 14-month²⁷ agreement with the UMASS Wind Resource Center to borrow, through an in-kind grant from the Massachusetts Technology Collaborative (MTC), a SODAR (Sonic Detection and Ranging)²⁸ device to measure wind speed and direction in the Green Hill area. This testing equipment is scheduled to be installed in October 2009 at the Technical High School's ball field parking lot for the duration of the test. To learn more about these devices and to hear a demonstration of the sound they emit visit www.sodar.com

Considering a Wind Turbine at the Technical School. This quarter, City and School Dept. officials²⁹ met to discuss the preliminary concept of a utility-scale wind turbine at the Technical School and to identify the challenges and opportunities of this location. The meetings were fruitful and provided the opportunity to discuss similarly located wind turbines through case studies and a presentation of the impact considerations related to wind turbines in general. In addition, school officials from Diocese and Holy Name participated in one of these meetings to provide a first hand account of how they made the decision to pursue a wind turbine on their school's property. City officials also explained how the wind testing (SODAR) mentioned above, will enable an accurate assessment of the likely performance of a wind turbine at this location, and that grants would be needed to underwrite project costs³⁰, as was the case for Holy Name. Moreover, the group discussed achieving broader policy goals regarding renewable energy and GHG reductions and other projects, both underway and planned, for the technical school.

All agreed that further consideration and research was needed to determine if the Technical School property is an appropriate location for a wind turbine. A more detailed environmental analysis will need to be conducted and its findings weighed before making a recommendation to the City Manager, Superintendent, School Committee and City Council. Moreover, the results of the wind measurement study will determine if the wind resource is sufficient enough to merit the installation of a wind turbine.

²⁷ Two months more than is needed to ensure a complete year of data is collected.

²⁸ A SODAR measures wind speed and direction by taking advantage of the Doppler shift. Acoustic waves are emitted from the SODAR and based on an analysis of their reflections from turbulence created by the wind, the wind's speed and direction can be calculated up to a range of 200 meters above ground.

²⁹ Principal Sheila Harrity, Quadrant Manager, June Eressy, Peter Crafts, Ted Coghlin, President Skyline Technical Fund, and Director of Facilities, Jeff Lassey participated in at least one meeting of the three meetings with City officials. William Mulford, Associate Superintendent for Business and Head Master, Edward Reynolds from Holy Name also participated in one of the meeting. City officials included Assistant City Manager Julie Jacobson, Director of Planning & Regulatory Services, Joel Fontane, and Program Manager for Energy Efficiency and Conservation, John Odell.

³⁰ Note Holy Name received a \$575,000 grant from the MTC to make its wind turbine project financially feasible.

Outreach, Education & Green Space

Community Education and Outreach Campaign. One of the overarching community related goals of the City's Climate Action Plan is to increase the use of clean, renewable energy. The City of Worcester has issued a Request for Bid for consultant services related to the development of a community education and outreach campaign aimed at encouraging residents and institutions to purchase clean, renewable energy. On September 17, 2009, the City of Worcester commenced a contract with Caitlin Connelly et.al. (see attached) to assist program staff with the research and development of a community education and outreach campaign that focuses on renewable energy and related energy and environmental issues. The scope of this campaign consists of an education and outreach media campaign described in our last report.

Attachment – Municipal Aggregation White Paper

Municipal Electric Aggregation White Paper

Prepared by World Energy for:
City of Worcester, MA

November 5, 2009

I. Objective

To provide the City of Worcester (“the City”) with an assessment of a City-wide municipal electric aggregation through a balanced, objective review of the opportunities and costs associated with energy aggregation for residential and small business customers presented in a concise white paper that addresses:

- The costs and benefits of instituting a municipal electric aggregation including:
 - The administrative and management capacity necessary to implement and manage this type of energy procurement arrangement
 - The financial risks involved and the potential monetary benefit such as access to funds for demand side management and renewable energy.
- The pros and cons of instituting a municipal electric aggregation

II. Overview of Municipal Electric Aggregations

Municipal Electric Aggregation is a method by which the City can buy electric power on behalf of the consumers within City borders.

Key Elements/Features of a Municipal Electric Aggregation include:

- “The formation of a group of consumers into a single buying pool for the direct purchase of electricity supply.”¹ This formation is referred to as “Load Aggregation” and is permitted in the Restructuring Act of 1997².
- A local government needs an affirmative vote³ to start the aggregation process.
- Development of an Aggregation Plan in consultation with the Division of Energy Resources (“DOER”). Elements of the plan include:
 - A detailed explanation of the process and consequences of aggregation
 - Universal access, reliability, and equitable treatment of all customer classes
 - Organizational structure
 - Program operations
 - Rate setting and other costs
 - Methods for entering and terminating agreements

¹ Commonwealth of Massachusetts, Office of Consumer Affairs and Business Regulation, Division of Energy Resources, Guide to Municipal Electric Aggregation in Massachusetts, January 2003, http://www.mass.gov/Eoeea/docs/doer/electric_deregulation/aag-guid.pdf.

² The Restructuring Act of 1997 as contained in Chapter 164 of the Acts of 1997 is “an act relative to restructuring the electric utility industry in the Commonwealth, regulating the provision of electricity and other services, and promoting enhanced consumer protections...” (<http://www.mass.gov/legis/laws/seslaw97/sl970164.htm>)

³ A town may initiate a process to aggregate electrical load upon authorization by a majority vote of town meeting or town council. A city may initiate a process to authorize aggregation by a majority vote of the city council, with the approval of the mayor, or the city manager in a Plan D or Plan E city.

- Rights and responsibilities of participants
- Termination
- Constituent notification and enrollment
- It is an “opt-out” aggregation, which means that all classes of participating consumers, as defined in the Aggregation Plan participate automatically, unless they specifically request not to be or if they have an electricity supply contract currently in place with an electricity supplier.
- Citizens get to review the completed Aggregation Plan.⁴ It is then submitted to the Massachusetts Department of Public Utilities (“DPU”) for certification.
 - Prior to its decision of whether or not to approve the Aggregation Plan, the DPU will conduct a public hearing.
- The Aggregation Plan must address “Rate Setting and Other Costs.” This includes the method used to establish the price for energy and/or energy-related services. If the prices charged to participating consumers vary according to load or service characteristics, justification for those price differences must be included. This is a critical part of the Plan since it establishes the price benchmark which allows the Municipal Aggregation to award a contract for electricity supply.
 - The electricity price cannot exceed Standard Offer Service unless excess is due to the purchase of renewable energy.⁵
 - The Aggregation Plan can include custom services, such as “cleaner-than-average” electricity (i.e., renewable energy).
- Furthermore, a Municipal Aggregation may have access to energy efficiency funds⁶ if the Aggregation develops, submits, and has the DPU approval an Energy Plan (more on this in Section II).
- To date, there have been two DPU approved Municipal Electric Aggregations in Massachusetts: Cape Light Compact (21 cities and towns) and the City of Marlborough. Both are successful in that both achieved pricing under the standard offer service. The Town of Marlborough has achieved reductions off the standard offer of approximately 2% for residential accounts and 1% for small commercial accounts. The Cape Light Compact does not release savings numbers.

⁴ The Town of Marlborough accomplished this through a series of town meetings. The legislation is not specific on how this is to be accomplished but is clear that there must be an opportunity for citizens to review the Aggregation Plan.

⁵ If funds for the purchase of renewable energy come from the Department of Energy Resource’s Green Communities Program, the type of renewable energy purchased must comply with the program’s definition. If the cost is to be borne by just the City, then it appears that the City has complete flexibility to define the type and location of the renewable energy in the Aggregation Plan. This will enable the City to come up with definition that can minimize this cost to the constituents in the aggregation.

⁶ Please refer to Step 4 in Section III The Process for additional information on available funds.

III. The Process

Step 1: Vote

In order to commence a Municipal Electric Aggregation, the City must receive authorization by a majority vote of city council, with the approval of the mayor, or the city manager in a Plan D or Plan E city.

Step 2: Develop an Aggregation Plan

After confirmation of an affirmative vote, a municipality must develop an Aggregation Plan in consultation with the DOER. This plan must be provided to the citizens for review.⁷

It is important to note that State law makes it clear that ongoing communications with citizens is essential. Communications must change as the aggregation progresses. Initial communication informs constituents about deregulation, purchasing opportunities, and basic terminology. Subsequent consumer education materials focus on keeping constituents apprised of project status and decisions. Finally, they may provide formal notification to constituents as required by the Act. The Act states, "It shall be the duty of the aggregated entity to fully inform participating ratepayers in advance of automatic enrollment that they are to be automatically enrolled and that they have the right to opt-out of the aggregated entity without penalty."

Even though a Municipal Electric Aggregation is "opt-out" it is important to assess if the majority of constituents are willing to participate in an aggregation on an ongoing basis. In other words, will the services provided through a municipal aggregation be competitive with other options available to participants over the duration⁸ of the plan?

Step 3: Submit the Aggregation Plan for Approval

Once citizens⁹ have reviewed the Plan, it is submitted to the DPU for certification. Public approval is not required, but some form of a public comment period is necessary. The City of Marlborough held a few town meetings. Prior to its decision regarding whether to approve the Aggregation Plan, the DPU conducts a public hearing.

Step 4 (Optional): Apply for Energy Efficiency Funds

The City, if it decides to establish a Municipal Electric Aggregation, may adopt an Energy Plan that defines the manner in which it will implement demand side management programs and/or renewable energy programs. The Energy Plan must be consistent with state energy conservation goals developed pursuant to chapter 25A or chapter 164.

The Energy Plan is adopted in the same manner as the Aggregation Plan. The adopted Energy Plan is submitted to the DPU for approval. As with the Aggregation Plan, the DPU conducts a

⁷ M.G.L. Chapter 164: Section 134 (a)

⁸ The duration of the Aggregation Plans and Energy Plans are for many years. However, the energy supply contracts negotiated with suppliers can be as short as six months and as long as two years.

⁹ The definition of citizens is not provided in the documentation however it is safe to assume that it refers to any members of the rate classes that are included in the Aggregation Plan.

public hearing prior to deciding whether to approve the Plan. Once approved by the DPU, the City will have access to monies from the System Benefit Charge.¹⁰ Specifically, the City may:

- a) Apply to the Massachusetts Technology Collaborative¹¹ ("MTC") for monies from the Massachusetts Renewable Energy Trust Fund, pursuant to chapter 40J, and
- b) Receive money from the demand side management system benefit charges or line charges in an amount not to exceed that contributed by retail customers within said municipality.

Within two years of approval of its Energy Plan, the aggregation shall provide written notice to the DPU that it has implemented the plan. Otherwise, the DTE may revoke certification of its energy plan.

Step 5: Implement the Plan

There are many steps contained within this one step. Some examples are listed below.

- Collect and analyze load data for all potential participants (i.e. all residents and small businesses within the City that are not already under a supply contract)
 - Determine which accounts, if any, are already under a supply contract
- Create and host a call center where constituents can call to opt out of the program
- Implement a customer education plan
- Develop an RFP
- Review responses to RFP
- Development and negotiate contract terms
- Provide ongoing management and monitoring of supply contract

IV. Costs

There are many costs associated with developing a Municipal Electric Aggregation. The following section details the various tasks necessary for implementing an aggregation as well as a corresponding estimate of the time and money needed to complete each step. We have assumed that the average fully burdened cost per hour per person is \$100/hour.¹² It is possible that the Municipal Aggregator may staff the tasks with different labor categories and hourly costs; however, assuming an optimal staffing plan in developing the cost estimate will likely lead to an underestimation of costs. Therefore, the analysis only includes one standard labor rate but provides a range of billable days and therefore achieves the same objective of providing a range of possible costs.

¹⁰ System Benefit Charge: A line item charge (stated in fractions of a cent per kWh) to all customer classes on their utility bills that is used for a public benefit. The Massachusetts Technology Collaborative, the State's economic development agency for renewable energy, manages these funds.

¹¹ Massachusetts Technology Collaborative is an initiative of the Massachusetts Technology Park Corporation (MTPC), an independent instrumentality of the Commonwealth created in 1982 to advance the growth of the technology sector of the Massachusetts economy through collaborative activities among industry, universities and state government. MTC is the successor to the Massachusetts Microelectronics Center, MTPC's first public private partnership that addressed the training needs of the state's computer and defense electronics industries.

¹² Fully burdened includes salary, benefits and overhead – material costs not included.

Task 1: Writing Aggregation Plan –

Team of four, 15-30 billable days each, estimated cost of \$48-96,000 (*Startup Cost*).

This Plan, to be filed with the DPU, must include: detailing the process, goals, and consequences of an aggregation¹³; describing method of ensuring universal access, reliability, and equitable treatment of all customer classes; specifying the organizational structure of the aggregation; outlining the methods for entering and terminating agreements; addressing method of rate setting; explaining the rights and responsibilities of participants; describing method of constituent education and enrollment. In order to write such a comprehensive plan a lot of research will have to be completed up front. The time estimate supplied here includes a team of four researching guidelines and other relevant information in the first two weeks, and writing the Plan in the third and fourth week. The process of researching and writing the Aggregation Plan will likely be an iterative process – as once the writing process begins, frequently questions of research arise. This could increase the time and costs associated with this task.

Task 2: Creation of a Citizens Committee –

Team of five, 5-10 billable days each, estimated cost of \$20-40,000 (*Startup Cost*).

This committee will be responsible for reviewing the Municipal Aggregation Plan and identifying constituent preferences regarding pricing product options. The cost of the committee's time and efforts are not captured here. What is captured is the cost of identifying constituents to participate in the committee and developing the guidelines for their research and outreach. This task has the potential to grow in scope and cost.

Task 3: Educating Consumers –

Team of Two, 20-80 billable days each, estimated cost of \$32-128,000 (*Startup Cost*).

Before developing the content of the education materials, the City should assess consumer knowledge regarding electric utility restructuring and aggregation, as well as what services and/or features constituents are currently using as well as the services and/or features they want. The information gathered is used to create educational materials based on actual market awareness as well as the development of the Aggregation Plan. Assessing consumer knowledge can be collected via survey or public meetings, which is the technique utilized by the city of Marlborough.¹⁴ In addition to targeting consumers, the City should consider informing legislators, municipal employees, community leaders, and the media.

The educational materials must be designed so that the information reaches everyone in the municipality such as the visually impaired, low income, elderly, people who speak English as a second language, etc. To be effective the information should be tailored to audience and community. This may involve creating a multi-lingual call center that constituents can call if

¹³ For participants, possible consequences include savings in electricity bills relative to the standard offer as well as any other benefits expected through the aggregation, such as a greater range of pricing options and higher levels of renewable energy. For the municipality, these consequences include broader availability of energy savings, improvements in the local economy, greater control of energy efficiency funds and possible increase in administrative costs.

¹⁴ <http://www.colonialpowergroup.com/calendar.htm>

they have questions regarding the aggregation and if they choose to opt out of the aggregation.

For these reasons the cost estimate is fairly broad since assessing customer knowledge could require a multi-lingual survey and supporting materials or a considerable amount of outreach.

Task 4: Working with DOER and DTE to Formalize Plan –

Team of Two, 10-30 billable days each, estimated cost of \$16-48,000 (*Startup Cost*)

This will include attending hearing(s) hosted by DTE to review the aggregation plan. As well as working side-by-side with DOER when developing the plan. While, the lower budget estimate for this task is 10 billable days, the coordination required may lengthen the time needed to complete this task, the range provided accounts for this risk.

Task 5: Analyzing Load Data –

Team of five, 50-60 Billable days each, estimated cost of \$200-240,000 (*Recurring Cost*).

The task of obtaining and “scrubbing” electric use load data for an estimated 71,000 accounts will not be trivial. Unfortunately, the usage data supplied by utilities is often in an unusable format and sometimes must be manually re-entered, line by line, into a spreadsheet. Furthermore, more often than not, the data supplied is imperfect. There may be months of usage data missing for a particular account for no apparent reason. Each data anomaly must be identified and researched, and with approximately 71,000 accounts and 12 months of data for each account, the potential for anomalies is great. The accounts represent all the rate classes included in the Aggregation Plan, provided they have not opted out, regardless of income level or credit risk.

This task will recur on a periodic basis. Depending on the pricing product utilized by the aggregation and the specific terms and conditions in the RFP, this may need to be completed semi-annually to once every 2-3 years depending on energy agreement. For example, if a fixed price product is utilized, this task would have to be completed more frequently since the standard offer is only guaranteed for six months and state law mandates that the aggregation must get a lower price than the standard offer. Therefore, the aggregation would need to solicit revised pricing much more frequently and would require an updated database. If an index price product is utilized, the discount could carry forward despite changes to the standard offer.

For this white paper, it is assumed that this cost recurs annually.

Task 6: Administering RFP Process –

Team of four, 40-50 billable days each, estimated cost of \$128-160,000 (*Recurring Cost*)

The content and design of the RFP will vary depending upon the specific services and service features solicited. In general, the RFP must include several components: account data, services and features of supply, qualification criteria, selection criteria, essential (i.e. nonnegotiable) terms and conditions of the contract, term of service. Qualifying and selecting suppliers from the RFP process will involve: pre-bid conference, review and answer of bidder questions, evaluating proposals, interviewing finalists, etc.

As discussed with the previous task, this cost could recur twice a year or every 2-3 years depending on energy agreement. We assume that this cost recurs annually.

Task 7: Negotiating Contract –

Team of four, 5-10 billable days each, estimated cost of \$16-32,000 (*Recurring Cost*)

After the RFP has been issued and proposals have been received, the final step will be to negotiate and finalize the terms of the supply contract with the winning supplier.

As discussed with the previous task, this cost could recur twice a year or every 2-3 years depending on energy agreement. We assume that this cost recurs annually.

Task 8: Contract Management–

One staff person, 65-260 billable days, estimated cost of \$52-208,000 (*Recurring Cost*)

Even after the contract has been awarded to a supplier, the City¹⁵ will still be involved in: ensuring the constituents receive the correct electricity price on their bills¹⁶, opt-out requests, answering constituent inquiries, handling any problems with the power supplier or local delivery company (“LDC”)¹⁷, ensuring that constituents drop and add accounts in a timely and proper manner, staying apprised regulatory changes, and generally ensuring that the aggregation program meets the goals set out in the approved aggregation plan.

If the City also implements an Energy Plan, additional resources will be necessary. A quick perusal of the Cape Light Compact’s website clearly demonstrates that ongoing costs can be significant. The Cape Light Compact appears to have a staff of around 10 engaged in a variety of activities including education, program management, and energy efficiency.¹⁸ In fact, it is clear that the initial education activities undertaken to put the Aggregation Plan together change in focus but continue on.

In summary, we estimate that the cost to implement a Municipal Electric Aggregation will range from \$512-952,000 in the first year and will cost approximately \$396-640,000 per year thereafter (recurring costs). The following table summarizes these costs:

¹⁵ The Town of Marlborough directs these calls to its consultant.

¹⁶ Bills continue to be generated by National Grid and submitted to ratepayers. The electricity cost on the bill will reflect the final price negotiated by the City with a supplier.

¹⁷ National Grid will continue to operate and maintain all local infrastructure and will handle all calls regarding this. The City will receive calls from ratepayers regarding the program, pricing, opt-out requests, and billing issues. In fact, it should be anticipated that the City will receive calls that should be directed to National Grid.

¹⁸ The Cape Light Compact consists of 21 cities and towns with about 200,000 aggregation participants. In addition, the Compact has both an approved Aggregation Plan and Energy Plan.

Task	Start Up	Recurring	FTEs	Low Est. Billable Days per FTE	High Est. Billable Days per FTE	Aggregation Plan Cost (Low Est.)	Aggregation Plan Cost (High Est.)
Task 1: Writing Aggregation Plan	Yes	No	4	15	30	\$48,000	\$96,000
Task 2: Creation of a Citizens Committee	Yes	No	5	5	10	\$20,000	\$40,000
Task 3: Educating Consumers	Yes	No	2	20	80	\$32,000	\$128,000
Task 4: Working with DOER & DPU	Yes	No	2	10	30	\$16,000	\$48,000
Sub-total Start Up Costs						\$116,000	\$312,000
Task 5: Analyzing Load Data	Yes	Yes	5	50	60	\$200,000	\$240,000
Task 6: Administering RFP Process	Yes	Yes	4	40	50	\$128,000	\$160,000
Task 7: Negotiating Contract	Yes	Yes	4	5	10	\$16,000	\$32,000
Task 8: Contract Management	Yes	Yes	1	65	260	\$52,000	\$208,000
Sub-total Recurring Costs						\$396,000	\$640,000
Total Costs						\$512,000	\$952,000

V. Benefits

The primary fundamental, quantifiable benefit of a Municipal Electric Aggregation is a lower cost to energy consumers. The savings an aggregation generates are largely a result of group efficiency – there is a lower transaction cost for the supplier. Rather than obtaining accounts one-by-one, an aggregation gives a supplier the opportunity to obtain thousands of accounts in a single procurement thus achieving economies of scale. We have estimated the following for the City of Worcester:

Aggregation Plan Rate Classes	Accounts	Est. Monthly Usage per Account (kWh)	Annual Load per Account	Annual kWh by Rate Class
Residential Accounts	70,000	650	7,800	546,000,000
Commercial Accounts - G1	760	3,500	42,000	31,920,000
Commercial Accounts - G2	46	14,000	168,000	7,728,000
Totals	70,806			585,648,000

The estimated usage per residential account is based on a comparison with the City of Boston rather than the Town of Marlborough since Marlborough consists of single family homes rather than a mixture of housing.

We estimate that the City could negotiate a discount off the Standard Offer of approximately 2.1% for Residential and 1.2% for small commercial accounts. Our estimate is based on the discount achieved for the Town of Marlborough adjusted downward to account for number of accounts in the City of Worcester as well as the difference in creditworthiness and payment delinquency. There is no direct cost to the city for delinquent accounts or poor credit; however, poor credit and higher delinquency rates do make the aggregation less attractive for a supplier and will result in lower savings as compared to the Town of Marlborough and the Cape Light Compact. Basically, these costs are socialized across the entire aggregation.

Aggregation Plan Rate Classes	Cost / KWH (Utility)	Negotiated Standard Offer Discount	Cost / KWH (Program)	Savings
Residential Accounts	\$0.109200	2.106%	\$0.106900	\$0.002300
Commercial Accounts - G1	\$0.106510	1.230%	\$0.105200	\$0.001310
Commercial Accounts - G2	\$0.106510	1.230%	\$0.105200	\$0.001310

Gross Savings: Across ~71,000 accounts, we estimate the potential gross savings to be \$653-1,308,000 for the first year. This equates to an average savings ranging from \$8.97-17.94 per year for approximately 70,000 residential accounts, between \$27.51-55.02 for approximately 760 G1 commercial customers, and between \$110.04-220.06 for approximately 46 G2 commercial accounts.

Aggregation Plan Rate Classes	Monthly Gross Savings per Account (Low Est.)	Monthly Gross Savings per Account (High Est.)	Annual Gross Savings per Account (Low Est.)	Annual Gross Savings per Account (High Est.)	Annual Gross Savings by Rate Class (Low Est.)	Annual Gross Savings by Rate Class (High Est.)
Residential Accounts	\$0.75	\$1.50	\$8.97	\$17.94	\$627,900	\$1,255,800
Commercial Accounts - G1	\$2.29	\$4.58	\$27.51	\$55.02	\$20,908	\$41,815
Commercial Accounts - G2	\$9.17	\$18.34	\$110.04	\$220.08	\$5,062	\$10,124
Total Benefits					\$653,869	\$1,307,739
Average Benefits	\$0.77	\$1.54	\$9.23	\$18.47		

Net savings for the entire program in the first year, after subtracting all the costs, is estimated to be \$141-356,000. However, if the benefits turn out to be on the low end and the cost turn out to be on the high end, net savings could be approximately *negative* \$298,000 in the first year. On the other hand, if the benefits turn out to be on the high end and the cost turn out to be on the low end, net savings could be as high as approximately \$796,000 in the first year. In subsequent years, net savings are estimated to range from \$257-668,000 since some of the start up costs do not recur, but could be as high as \$912,000 or as low as \$14,000 depending on the combination of costs and benefits (see tables below).

Therefore, net saving on average are estimated between \$2.00-5.02 per participant in the first year but could be as high as \$11.24 or as low as *negative* \$4.21 depending on the combination of costs and benefits (see tables below). In later years, the average annual net savings increases to \$3.64-9.43 per participant with a range of \$0.20 to \$12.88 per participant.

Year	Annual Net Savings (High Cost & Low Benefits)	Annual Net Savings (Low Cost & Low Benefits)	Annual Net Savings (High Cost & High Benefits)	Annual Net Savings (Low Cost & High Benefits)
Start Up Year	(\$298,131)	\$141,869	\$355,739	\$795,739
Remaining Years	\$13,869	\$257,869	\$667,739	\$911,739

Year	Avg Annual Net Savings (High Cost & Low Benefits)	Avg Annual Net Savings (Low Cost & Low Benefits)	Avg Annual Net Savings (High Cost & High Benefits)	Avg Annual Net Savings (Low Cost & High Benefits)
Start Up Year	(\$4.21)	\$2.00	\$5.02	\$11.24
Remaining Years	\$0.20	\$3.64	\$9.43	\$12.88

Aggregation Plan Rate Classes	Monthly Net Savings per Account (Low Est.)	Monthly Net Savings per Account (High Est.)	Annual Net Savings per Account (Low Est.)	Annual Net Savings per Account (High Est.)	Annual Net Savings by Rate Class (Low Est.)	Annual Net Savings by Rate Class (High Est.)
Residential Accounts	\$0.14	\$0.37	\$1.74	\$4.49	\$121,728	\$314,637
Commercial Accounts - G1	\$1.69	\$3.46	\$20.28	\$41.57	\$15,412	\$31,597
Commercial Accounts - G2	\$8.57	\$17.22	\$102.81	\$206.63	\$4,729	\$9,505
Totals	\$0.17	\$0.42	\$2.00	\$5.02	\$141,869	\$355,739

It is important to note that net savings depend upon who bears the costs and how the costs are borne as well as the size of the organization created to provide ongoing contract management. For instance, if the City chooses to bear all costs associated with contract management, net savings would increase by *at least* \$52-208,000 presuming that existing tax levy funds could be used to cover expenses without diminishing other City services. Therefore, our analysis assumes that a consultant is hired to provide this service.

There are also qualitative benefits of a Municipal Electric Aggregation:

- Strength in Numbers – because accounts are grouped together, the purchasing power of the aggregation grows exponentially. More pricing options, such as supply contracts that include renewable energy, are available to residents.¹⁹
- Potential Improvements to the Local Economy
- Broader Availability of Energy Savings
- Potential to take advantage of the Energy Efficiency Funds

VI. Other Considerations

Beyond the costs and benefits presented here, there are other matters to consider. For instance, although \$356,000 (the high end of the potential net savings) is a substantial sum in aggregate, it is approximately \$5.02 per customer account per year. Even though net savings increases after implementation to \$9.43 per year, savings may seem paltry to constituents.

It is important to note that there are multiple risks and responsibilities involved with municipal aggregation. For example, the Town of Marlborough suspended the program for six months when prices escalated rapidly and the supplier could not beat the standard offer. All the accounts were returned to the standard offer with National Grid for no less than six months. Once the supplier could beat the standard offer, the program was reinstated. In this case gross savings would be cut in half yet many of the recurring would be reduced, but not proportionately, which significantly impacts net program savings.

Furthermore, by aggregating and acting as contract manager, the City assumes a very large responsibility. If any issues arise regarding electricity, whether they are issues of mistaken billing or more general contract issues, the City would be obligated to play a part in the issue's resolution. In the absence of a Municipal Electric Aggregation, the City is not obligated. In

¹⁹ Given the estimated net savings, it is highly unlikely that the City will be able to obtain additional renewable energy without using a significant portion of the net savings. While the law allows the purchase of renewable energy through aggregation, the City would need to solicit support for purchasing renewable energy with any savings achieved prior to doing so. Regardless, customers may opt-out of the program if a significant portion of the savings is used to purchase renewable energy instead of being pass through to them. The Cape Light Compact allows participants to opt in to programs that provide additional renewable energy but does not include it as part of the base contract.

addition, the City is obligated to provide on going contract management to allow participants to opt-out as well as a certain level of ongoing education outreach.

VII. Summary

The costs associated with implementing a Municipal Electric Aggregation are significant. The City must weigh the value of resources to be allocated to this undertaking as well as the risk associated with assuming such a large responsibility against the potential savings for the public.

The probable ongoing aggregate net savings are considerable \$258-\$668,000, yet these savings translate to an annual average of \$3.64 - \$9.43 per participant depending the magnitude of recurring costs. Moreover, should the supplier not beat the standard offer rate with National Grid, the program could run a deficit since for a period of time there would be no savings realized to pay for recurring costs. This risk can be offset by utilizing a performance based contract so that the aggregation contractor assumes all the cost risk.

While the potential benefits of aggregation appear sufficient to offset the costs associated with allocating resources to this initiative, it is important to recognize these risks and responsibilities in addition to the probable net savings and opportunities when determining whether an aggregation would be in the City's best interest.

VIII. Assumptions

Assumptions	Value
Cost per Hhour per FTE	\$100.00
Residential Accounts	70,000
Commercial Accounts - G1	760
Commercial Accounts - G2	46
Residential Account - Monthly Usage (kWh)	650
Commercial Accounts - G1 Monthly Usage (kWh)	3,500
Commercial Accounts - G2 Monthly Usage (kWh)	14,000
Residential Accounts - Standard Offer (\$/kWh)	\$0.109200
Commercial Accounts - G1 Standard Offer (\$/kWh)	\$0.106510
Commercial Accounts - G2 Standard Offer (\$/kWh)	\$0.106510
Residential Accounts - Standard Offer Discount (Low %)	1.053%
Commercial Accounts - G1 Standard Offer Discount (Low %)	0.615%
Commercial Accounts - G2 Standard Offer Discount (Low %)	0.615%
Residential Accounts - Standard Offer Discount (High %)	2.106%
Commercial Accounts - G1 Standard Offer Discount (High %)	1.230%
Commercial Accounts - G2 Standard Offer Discount (High %)	1.230%

IX. Sources

"Guide to Municipal Electric Aggregation in Massachusetts" – January 2003

X. Additional Information

Town of Marlborough

Colonial Power Group, Inc.
234 Pleasant Street
Marlborough, MA 01752
508-485-5858
866-485-5858 (toll-free)
508-485-5854 (fax)

Cape Light Compact

Maggie Downey, Compact Administrator, 508-375-6636, mdowney@barnstablecounty.org
Joe Soares Sr., Power Supply Planner, 508-375-6623, jsoares@capelightcompact.org
Kevin Galligan, Energy Efficiency Program Manager, 508-375-6828, kgalligan@capelightcompact.org
John Burns, Commercial and Industrial Programs, 508-375-6829, jburns@capelightcompact.org
Vicki Marchant, Commercial and Industrial Program Analyst, 508-744-1278, vmarchant@capelightcompact.org
Deborah Shiflett-Fitton, Energy Education Programs, 508-375-6703, dfitton@capelightcompact.org
Margaret Song, Senior Residential and Marketing Program Coordinator, 508-375-6843, msong@capelightcompact.org
Briana Kane, Residential Energy Efficiency Program Coordinator, 508-744-1277, bkane@capelightcompact.org
Amy Voll, Marketing and Communications Coordinator, 508-744-1267, avoll@capelightcompact.org
Kathy Stoffle, Customer Service Coordinator, 508-744-1276, kstoffle@capelightcompact.org
Lindsay Stranger, Administrative Assistant, 508-375-6644, lstranger@barnstablecounty.org

Attachment – Community Education & Outreach Consultant Resumes

EXPERIENCE - CLIMATE CHANGE, SUSTAINABLE ENERGY, DEVELOPMENT

UNITED NATIONS (NEW YORK, PARIS, GENEVA)

Represented United Nations at international conferences and inter-agency meetings

Technical Advisor on Climate Change and Manager

10/1997-08/2001

- Lead the World Energy Assessment (WEA) project management team, a multi-million dollar project, pulling together information, experts and consultants, drafts, and events having a pivotal role in the success and impact of a major UN and private sector collaboration on sustainable energy and development.
- Developed and implemented capacity building and outreach for WEA.
- Managed key relationships with partnering organizations and expert authors to put out and promote two ground-breaking publications on climate change and development.
- Contributed input and member of agency-wide climate change task force playing a critical role in corporate climate change strategy development.

Energy Program Consultant

06/1997 – 10/1997

- Prepared speeches as well as briefing and presentation materials for the Director of the agency.
- Assisted in developing and implementing internal strategy on climate change.
- Managed energy program activities and co-coordinated of Global Environment Facility (GEF) task force. Task Manager of GEF project "Economics of Greenhouse Gas Limitations."
- Administered and provided review and editing of the joint UNEP IE and United States Environmental Protection Agency publication: *Greenhouse Gas Emission Reductions: The Role of Voluntary Programmes.*
- Organized workshop in coordination with the International Energy Agency (IEA) on "Mutually Beneficial Incentives" to promote Activities Implemented Jointly and co-reviewed and edited workshop summary report.

Inventory Specialist

10/1994 – 10/1995

- Liaised on international inventory database issues.
- Managed inventories database and prepared official inventory data for publication (verification, review, input, and output data tables and graphics) as well as identified information gaps for use in in-depth review visits.

OECD/IPCC (PARIS)

Member of OECD delegation at relevant climate change meetings

Technical Specialist and Junior Policy Analyst,

11/1995 – 5/1997

- Managed project grants (approximately \$300,000) and produced financial reports.
- Designed and constructed climate change unit's internet page.
- Organized and implemented expert group meetings for all sectors. Core team member revising IPCC Guidelines on national Greenhouse Gas Inventories.
- Conducted research, policy analysis, and provided statistical assistance on energy and climate change policy issues.

Intern and Technical Assistant

12/1992 – 10/1994

- Provided technical review and testing of inventories software for countries in preparation of their formal greenhouse gas (GHG) emission inventory submissions.
- Reviewed national inventories.
- Assisted in review and production of the Draft IPCC Guidelines, Volume I, Reporting Instructions.

Education & Languages: B.A. International Affairs, The American University of Paris, 1994. Graduate courses in sustainable development and public health. English (native); French (fluent); Spanish (good comprehension).

Leadership / Activities

- Director and instructor, for profit French language school, 2005 - ongoing
- Former president and board member, Grafton League of Women Voters
- Endurance athlete & spinning instructor
- "Rookie of the Year", Comprehensive Racing Triathlon Team, 2007
- Volunteer Head Coach, Grafton High School lacrosse team, 2004
- Volunteer French instructor, North Grafton Elementary School Enrichment Program, 2006



ENVIRONMENTAL EDUCATION AND ADVOCACY

For the Citizens Network for Sustainable Development (CitNet)

Coordinator and manager of email message list on 'Sustainable Development in New York City'

For the United Nations Development Programme (UNDP)

- Designed and taught an online course 'Environment and Sustainable Development'
- Prepared training and advocacy publications, including: *Gender Mainstreaming in Environment and Energy: Training Manual* (2007); *Gender and Energy for Sustainable Development: A Toolkit and Resource Guide* (2004), www.undp.org/energy/genenergykit/genderengtoolkit.pdf; and *Generating Opportunities: Case Studies on Energy and Women* (UNDP, 2001)
- Produced a booklet on *Sustainable Development, Energy and the Environment: UNDP's Climate Change Initiatives* (2001). www.undp.org/energy/publications/UNDP_CC_Oct01.pdf

For ENERGIA, an International Network on Gender and Sustainable Energy

Produced publications on *Biofuels for Rural Development and Empowerment of Women* (2009), and *Where Energy is Women's Business: National and Regional Reports from Africa, Asia, Latin America and the Pacific*, (2007) www.energia.org

For the Unitarian Universalist Fellowship of St. John, US Virgin Islands

Produced a community guide on sustainable lifestyles *Smart Guide to Island Housekeeping*
[http://www.uufstjohn.org/Smart_Guide_LoRes_for_eMail\[1\].pdf](http://www.uufstjohn.org/Smart_Guide_LoRes_for_eMail[1].pdf)

For the Island Resources Foundation

Lead author of *Trees in the Fish Bay Flat Land* (2007) www.irf.org/mission/protection/pubs.php
Information about 44 acres of wetlands conservation land in the US Virgin Islands owned by the Island Resources Foundation - promoting a local conservation ethic by educating people about the historic, cultural, ecological and spiritual significance of the trees.

Author of *The Wild Life in an Island House* (2004), a book about protecting biodiversity in the US Virgin Islands, including birds, bats, lizards, frogs, and insects.

Columnist for *The St. John Sun Times*, a bi-weekly journal published in the US Virgin Islands, with regular articles on local environmental issues, including eco-tourism and sustainable development

Author of chapters on Environment and Sustainable Development in *A Global Agenda: Issues Before the General Assembly of the United Nations*, a book published yearly by UNA-USA. (1995-2006)

LAW PRACTICE

Private practice and consulting since 1990

Law firm of Lord Day & Lord, Barrett Smith, New York, NY (1982-1990)

U.S. Environmental Protection Agency, Washington, DC (1980-1982)

State of Wisconsin, Department of Natural Resources (1979-1980)

EDUCATION

University of Wisconsin Law School, J. D. cum laude 1980, Madison, WI

University of Massachusetts, M. A. Political Philosophy 1977, Amherst, MA

Vassar College, B. A. Philosophy 1971, Poughkeepsie, NY

PROFESSIONAL AFFILIATIONS

United Nations Association-USA (10 years on the New York Chapter Board of Directors)

American Bar Association, Natural Resources and International Law Sections

New York State Bar Association, Environmental Law Section

Island Resources Foundation

US Citizens Network for Sustainable Development

REFERENCES

Jeffrey Barber, Integrated Strategies Forum, Director of the Secretariat for the US Citizens Network for Sustainable Development, jeffreyhbarber@gmail.com

Sheila Oparaocha, ENERGIA, Executive Director of International Secretariat, s.oparaocha@etcnl.nl

Minoru Takada, UNDP Sustainable Energy Programme, minoru.takada@undp.org