

## **1.1 Program Title**

TEMPLE CLIMATE PROTECTION AND ENERGY REDUCTION INITIATIVE

## **1.2 Program Type**

The *Temple Climate Protection and Energy Reduction Initiative* (“The Program”) is designed to reduce greenhouse gas emissions (GHGE) through implementation of the following components as described in the PUC *Greenhouse Gas Emissions Reduction Fund (GHGERF)* RFP:

GHGERF #1. Energy audits - completed in 2007 and 2008

GHGERF #2. Weatherization of NH residential housing and commercial building stock

GHGERF #8. Programs to improve the electric and thermal energy efficiency of new and existing residences and commercial buildings

GHGERF #10. Education, outreach and information programs that promote energy efficiency, conservation, and demand response

GHGERF #12. Other: Pilot Recycling Program to expand recycling, which will conserve resources and reduce greenhouse gas emissions generated within New Hampshire

## **1.3 Program Summary**

The *Temple Climate Protection and Energy Reduction Initiative* (“The Program”) is designed to save energy within the community. It will reduce GHGE through a multifaceted plan including retrofitting its municipal buildings, a residential weatherization project, a low-income home winterization project, a land use and climate connection project, a pilot recycling project, and an energy conservation education and outreach project for the residential sector.

## **1.4 Low Income Residential Customer Qualification**

The Program will benefit all the residents of Temple. Low-income residential customers are served through both direct and indirect means:

- a. A free home winterization program for low-income residents by Temple volunteers
- b. Ongoing energy conservation outreach and educational events
- c. Municipal retrofitting to reduce Temple’s municipal energy consumption thereby lowering the tax burden for every citizen

Of the \$333,100 budget, more than 90% is expected to serve low income residential customers. 100 % of Temple low income citizens (as defined in PUC 2603.1) will benefit from one or more of these programs.

## **1.5 Identification of Applicant Organization**

*Temple Economical Energy Committee (TEEC)* on behalf of:  
Town of Temple, PO Box 191, 423 Rt. 45, Temple, NH 03084

## **1.6 Identification of Subcontractors and Partners**

Partners include Cool Monadnock<sup>1</sup>; Stay Warm NH<sup>2</sup>; PSNH<sup>3</sup>; NH the Beautiful<sup>4</sup>; The Congregational Church of Temple<sup>5</sup>; Carbon Challenge<sup>6</sup>; and Margaret Dillon, Energy Auditor, S.E.E.D.S<sup>7</sup>

<sup>1</sup>Cool Monadnock Overview and Partners at <http://www.antiochne.edu/anei/programs/coolmonadnock/>

<sup>2</sup>The official New Hampshire government website at <http://www.staywarmnh.org/>

<sup>3</sup>*Making the Regional Greenhouse Gas Initiative Work for New Hampshire*” at <http://www.psnh.com/SharePDFs/RGGI%20Fact%20Sheet.pdf>

<sup>4</sup>New Hampshire, The Beautiful -- a non-profit, charitable organization which offers recycling and anti-litter programs throughout New Hampshire at <http://www.nhthebeautiful.org/>

<sup>5</sup>The Congregational Church of Temple offered the use of its “Friendship Hall” and other back-up support

<sup>6</sup><http://carbonchallenge.sr.unh.edu/>

Until the competitive bidding process is complete and a contract for work has been signed, the retrofit estimates must be kept confidential by the Town, therefore the names of contractors/subcontractors have not been provided. Temple will hire only contractors/subcontractors who will agree to all best employment practices including Equal Opportunity and prevailing wage rates.

**1.7 Authorized Negotiator(s)**

John Kieley, Chair, Temple Select Board: 603-878-1220, [johnkieley574@gmail.com](mailto:johnkieley574@gmail.com)  
 Beverly Edwards, Chair, Temple Economical Energy Committee: 603-878-3227  
[nadesha@msn.com](mailto:nadesha@msn.com)

**1.8 Projected Energy Savings**

The program will generate the following energy savings (*see attachment titled Savings Details*):

- Municipal Complex (Fire Department and Municipal Building) Retrofit: 2,200 gallons of fuel oil per year replaced with 875 gallons of propane. Electricity consumption reduced by 500 kWh/year.
- Mansfield Library Retrofit: 3,313 gallons of propane reduced to 1150 gallons per year. Electricity consumption reduced by 500 kWh/year.
- Residential energy use in Temple reduced by an estimated 265,000 kWh of electricity and from an estimated 206,000 gallons to 198,000 gallons of fuel oil per year (a reduction of about 8,000 gallons per year).

Overall, we expect to save 10,200 gallons of fuel oil, 1,300 gallons of propane, and 266 MWh of electricity.

**1.9 Projected GHG Reductions**

Conversions from predicted energy reductions to GHG reductions were performed using the PUC spreadsheet, yielding the following results:

Reductions from	Amount	Units	CO2 Reductions Pounds	CO2 Reductions Metric Tons
Electricity	266	MWh	289,142	131
Distillate Fuel Oil (#2)	10200	Gallons	228,480	104
Propane	1300	Gallons	16,510	7
<b>TOTAL</b>				<b>242 MT</b>

**1.10 Length of Program**

The Program will run for one year.

**1.11 Total Program Costs**

The total cost is \$333,100 plus 500 volunteer hours from TEEC and other Temple committee and board members.

**1.12 GHGER Funds Requested**

The cost of GHGER program is \$333,100.

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<sup>7</sup> Margaret Dillon is an educator and an independent energy consultant based in New Hampshire.

## **Section 2 Executive Summary**

Temple is at a defining moment for reducing GHGE through its retrofitting, weatherization, and community outreach program. The time is ripe for Temple to capitalize on the energy audits for its municipal buildings, ordinance energy audit, municipal energy use and GHGE inventory, and the community outreach work already completed. This request for \$333,100 from the GHGER fund is intended to enable Temple to achieve substantial GHGE reductions by implementing The Program.

The largest component of The Program is retrofitting municipal buildings. Energy audits of the Municipal Complex (Fire Department and Municipal Building) and of the Mansfield Library show major energy losses in all buildings. Insulation is inadequate or lacking, doors and windows are “leaky” and have poor R-ratings, and dampness from the Library crawl space requires use of heating/cooling systems at times not justified by the outside temperature.

The second component is act on an energy audit of Temple’s zoning. This component is primarily volunteer-staffed. The Temple Economical Energy Committee (TEEC) will work with the Planning Board. Funds are requested to support the audit author’s participation in a community forum for public input and education.

The third component focuses on community education and outreach. It is exclusively volunteer-staffed. The GHGER grant will fund materials, supplies, handouts, and a website. The focus of this component will be the NH Carbon Challenge with a workstation at the Mansfield Library. (The Library will have a dedicated energy-saving kiosk with books and handouts for the public). Temple will pair with a neighboring community in a competition to reduce GHGE. Another informational education tool will be a TEEC website.

The fourth component is a pilot recycling program. Working with New Hampshire the Beautiful and Temple Elementary School, TEEC will begin this program at the school. This will engage the children in hands-on projects involving math and science, as well as recycling paper, bottles, and cans.

The Town of Temple has been a pioneer in energy and GHGE reduction initiatives in Southwest New Hampshire, and is a leading community in the efforts of achieving a 10% reduction in GHGE by the year 2010<sup>8</sup>. The Temple Select Board formed the Temple Economical Energy Committee (TEEC) in 2007 as an outgrowth of the Carbon Coalition Resolution that was passed at town meeting that year. Temple joined the Cool Monadnock initiative<sup>9</sup> in 2007 and soon moved to the forefront in the Monadnock region in climate protection and energy reduction. Temple’s leadership in the region is due to the commitment of community volunteers, town employees, and elected officials. Since its inception, TEEC has relied on hundreds of volunteer hours to provide education and outreach to the citizens, municipal staff, and elected officials of the town.

In 2007, Temple took the first step in a municipal retrofitting program to reduce GHGE by partnering with the electric utility (PSNH) to audit and upgrade municipal lighting via the 50/50

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<sup>8</sup> David Eisenstadter, *Temple leads the way in reducing greenhouse gases*, Monadnock Ledger-Transcript, August 26, 2008 at <http://www.ledgertranscript.com/apps/pbcs.dll/article?AID=/20080826/LEDGERTRANSCRIPT/808260420/1315/STATICPAGE>

<sup>9</sup> Cool Monadnock is a collaboration between Clean Air Cool Planet, Antioch New England Institute and Southwest Region Planning Commission to provide technical assistance, training, and guidance to the local energy committees in the region.

program offered by PSNH. TEEC then took significant steps towards accomplishing its mission when in April 2008, it was instrumental in completing a GHGE and energy inventory of municipal operations for the Cool Monadnock project. This inventory report showcases energy usage, CO2 emissions, and energy costs across various Temple municipal sectors. These sectors include transportation (public fleet), waste, buildings, and streetlights. The report further identifies specific building performance by utilizing the Environmental Protection Agency Portfolio Manager software<sup>10</sup>. The inventory analysis and final report were completed by support from the Cool Monadnock initiative through the graduate internship program of Antioch NE Institute. *See attached Municipal Inventory Report which provides detailed information.*

The report identified the prime municipal buildings that would warrant a decision grade energy audit by a paid professional. Temple hired an independent certified energy consultant and auditor, Margaret Dillon, to conduct these audits for the Municipal Complex and Mansfield Library. The audits recommended retrofits to reduce the GHGE and energy usage associated with these buildings. At a special combined meeting of the Select Board and TEEC in August 2008, the auditor presented a 1.5 hour power point presentation of the audit report of the Municipal Complex. The Mansfield Library audit report was completed in November 2008. *See attached audit reports.*

TEEC obtained the support from the Temple Planning Board for an energy audit to be conducted of Temple's Master Plan and Zoning Ordinances by Jeffrey H. Taylor & Associates<sup>11</sup>, consultants in community planning and economic development. This report analyzed the master plan, zoning ordinances, and site plan/subdivision regulations for inconsistencies with Temple's goal to reduce energy and greenhouse gas emissions. Temple qualified for receiving this service through funding provided by the Cool Monadnock initiative. Following the completion of the land use audit, the auditor presented a draft report of its findings and recommendations to the Planning Board in February 2009<sup>12</sup>. This presentation provided the participants with invaluable information on the connection between land use and GHGE. The Planning Board recommended a joint meeting be scheduled with TEEC to discuss the issues raised in the report and prioritize the recommendations. This will take place on April 15, 2009.

TEEC has provided educational materials, workshops, pilot projects, and relevant energy and GHGE information to the public. This consisted of educational booths at 2007 and 2008 Harvest Festivals, a float in the 2008 4<sup>th</sup> of July parade focused on energy conservation and wind power, a recycling program for all appropriate major town events (Good Roads Day, Town Meeting, 4<sup>th</sup> of July events, Harvest Festival, Half Marathon, etc.), and a pilot home weatherization workshop. The majority of this work was reliant on over 490 volunteer hours by committee members in 2007 and 2008. TEEC was also able to reach out to low income residents by partnering with Stay Warm NH and back up support from the local Congregational Church to foster a program enabling New Hampshire fuel-assistance-qualified residents to receive free weatherization in their homes, conducted by Temple volunteers. This grant proposal seeks the funds for a comprehensive initiative to reduce GHGE reductions.

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<sup>10</sup> Donald Gilligan and Scott Serota, *EPA Software can help ESCOs Overcome Marketing Challenges*, at [http://www.naesco.org/resources/industry/documents/epa\\_software.pdf](http://www.naesco.org/resources/industry/documents/epa_software.pdf)

<sup>11</sup> <http://www.jhtplanning.com/>

<sup>12</sup> Temple Planning Board Meeting Minutes at <http://templenh.info/planning.shtml>

### **Section 3; Proposed work scope and schedule**

As part of this proposal, the Temple Economical Energy Committee (TEEC) intends to expand its climate protection, energy reduction, and community education program by implementing the following bulleted programs with details on scope and schedule listed below in the ensuing subsections:

- Municipal Retrofits
- Comprehensive Climate and Energy Planning
- Community Education
- Pilot Recycling Program

#### ***Municipal Retrofits:***

The largest component of this funding proposal will allow for the municipality to implement the recommendations from the 2008 energy audit reports and municipal energy inventory report for the combined Municipal Complex and the Mansfield Library.

The plan is to begin the work in the summer of 2009. Initially, Margaret Dillon, energy auditor, will hold a six-hour meeting with the construction manager and Dr. Robert Wills<sup>13</sup>. Then in the Municipal Complex, the work will begin with pervasive air sealing throughout. From there the steps will go as follows: 1) Spray icynene spray foam at the soffits of the Fire Department (FD) to the inside of the exterior walls; 2) install 8” of blown-in cellulose insulation on top of the existing blown in fiberglass and over the entire FD attic area; 3) install 2” rigid insulation board and 1x3 strapping on all exterior walls of Municipal Complex; 4) replace existing siding and increase effective wall insulation to R 23, 5) Foam seal to existing perimeter foam, and install new siding on vertical furring strips creating a vented drainage plane; 6) replace all windows with high performance window units with maximum .28 and .3 U-values; 7) replace exterior entrance doors and all FD overhead garage bay doors with R10 Thermacore units with maximum air sealing; 8) add a roof replacement over the Municipal Building, achieving an R 40 above deck; 9) remove existing fascia roof trim, and install 2x4 roof edge blocking and 10) install 4” rigid insulation nailing board and then new 1x roof fascia board. *Alternatively*, over the Municipal Building only, strip off old shingles, putting down 3x5 + 3” poly iso insulation with board attached. The latter rigid insulation would lead to a 40.5 R value and bring the top of the envelope to the roof. The FD roof could be insulated from inside the attic so it would only need new shingles. The alternative was estimated to take 500 person-hours.

Margaret Dillon will then perform a blower door test to check air infiltration and to size the replacement of the old oil burner with a sealed combustion high efficiency Buderus GB142-60<sup>14</sup> or a Knight Lochinvar<sup>15</sup> condensing propane boiler. Lastly, install a new circulator, new zone components, new outdoor reset control, new 1,000 gal buried propane tank, and install pipe insulation in the boiler room and a humidistat in bathroom.

At the Mansfield Library the steps are as follows: 1) work will begin in the crawl space to seal off the dirt floor with Stego Wrap Vapor Barrier, spray foam foundation on the walls, plates and rim joist with closed cell polyurethane foam; 2) air seal at wall penetrations and access points;

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<sup>13</sup> Robert Wills is a Temple resident and a member of TEEC. He is a licensed professional engineer.

<sup>14</sup> <http://www.buderus.net/>

<sup>15</sup> <http://www.lochinvar.com/>

3) install new glass-enclosed direct vented gas insert in the old wide open fireplace; 4) replace all windows with high performance units, and air seal; 5) install duct insulation; 6) air seal the attic space; add additional 10-12" of cellulose over the existing insulation; 8) insulate and seal the attic hatch 9) insulate the brick interior walls by injecting liquid based minimal expanding foam to fill the exterior wall cavity between finished interior wall and brick through small holes which will be patched after insulation.

Program oversight for financial management of the program will be provided by John Kieley, Select Board Chair. Beverly Edwards, TEEC Chair, will oversee the educational program. Oversight for the retrofitting work will be shared by Dr. Wills, Margaret Dillon, and the construction manager who will later be determined by Temple's bidding process. *Resumes are attached.* As previously mentioned, Margaret Dillon will hold a six-hour meeting with the construction project manager prior to the start of work. She will also conduct two site visits, perform a blower door test, and will provide professional quality assurance prior to the completion of the work. The entire retrofit is estimated to take 2,207 person-hours.

Once the retrofitting is complete, it will be used by the Cool Monadnock initiative<sup>16</sup> as a model program for the regional community on the advantages and benefits of a comprehensive municipal climate and energy program. As a part of this educational effort, Cool Monadnock will highlight Temple on its website showing the benefits of retrofitting buildings for energy and GHGE reductions. A case study will be created by the Cool Monadnock team on the process Temple employed with step-by-step guidance on how neighboring communities can replicate the process. This case study will be featured on the Cool Monadnock website<sup>17</sup>, Clean Air Cool Planet Community Toolkit and showcased at the New Hampshire Local Energy Committee Conference on June 20, 2009 in Concord<sup>18</sup>.

***Comprehensive Climate and Energy Planning:***

In order to connect land use with GHGE reductions, TEEC is working with the Planning Board to adopt as many of the recommendations from the energy audit of the Master Plan and Zoning Ordinances as possible. That includes the adoption of an Energy Chapter into the Master Plan and the adoption of the principles of energy efficiency and energy conservation into the land use regulations and development policies for Temple.

The total volunteer hours of work for this effort are unknown at this time, aside from the combined 1½ hour meeting of TEEC with the Planning Board, scheduled for April 15, 2009. That meeting will involve the participation of all 8 members of TEEC and the seven member Planning Board, producing a combined 22 hours of volunteer work. It was set up to chart the course for the process of selecting and prioritizing the proposed recommendations from the audit.

In order to build community support for this effort, TEEC will host a public forum in November 2009 to showcase the results of the land use audit. The forum will be used to include additional community recommendations and address concerns or questions that arose from the report. Part

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<sup>16</sup> Cool Monandnock initiative is to achieve significant reductions in greenhouse gas emissions in the Monadnock region at <http://www.antiochne.edu/anei/programs/coolmonadnock/>

<sup>17</sup> Ibid

<sup>18</sup> The Carbon Coalition Local Energy Committee Working group will host the first annual LEC state-wide training and information sharing conference for energy reduction efforts at the local level at <http://www.carboncoalition.org/>

of this grant proposal would allow for TEEC to pay for the original consultant to participate in the forum by answering questions from the public. This forum will involve two hours of the auditors' time plus ten hours of volunteer work for the organizing and promotion of the forum. TEEC will also dedicate ten volunteer hours to present the report and recommendations to existing town organizations, clubs, and associations.

***Community Education:***

TEEC will provide 45 hours of volunteer time to work with the NH Carbon Challenge<sup>19</sup> in an aggressive outreach program into the residential community to reduce GHGE. This partnership would begin in June 2009. TEEC would identify a neighboring community in the region to challenge and create a competition based on the NH Carbon Challenge model. This challenge would kick-off at the Harvest Festival in September 2009.

In order to attract community attention to the Carbon Challenge, TEEC will work with the library staff to create a kiosk at the Temple Library with information on the challenge. Part of this proposal will provide funding to supply the kiosk with the tools and materials residents can take home that provide direction on taking the challenge and on simple behavior and weatherization techniques they can employ at home and at work to reduce energy usage. A computer will be dedicated at the kiosk for taking the challenge, watching the videos created, and obtaining information related to climate change and energy.

The kiosk will also contain information on the municipal retrofits. Video footage will be taken of the retrofits in process and made available for loan at the library. This DVD will showcase the retrofits along with footage interviewing key staff, contractors and energy auditors describing the process and benefits of the work. A paper summary of the retrofits and benefits will also be available at the kiosk station. TEEC will also create copies of the list of New Hampshire energy auditors that can be contacted to perform residential energy audits. Approximately 54 volunteer hours will be needed for the video, interviewing, and written parts of this project, largely conducted by Mike Darnell, Temple Select Board and interviewing Margaret Dillon, and Dr. Robert Wills.

In May 2009, TEEC member Mary Beth Ayvazian will volunteer 24 + hours over the course of one year to create and oversee an informative website that will serve as the clearinghouse for Temple residents on energy conservation issues. The site will be interactive so that questions can be asked and answers given on issues related to climate change, home weatherization and retrofitting, renewable energy, the Carbon Challenge program, tax credits for eco-friendly upgrades, and incentives for the purchase of Energy Star appliances.

***Pilot Recycling Program:***

A recycling program will begin in October 2009 for the Temple Elementary School. Partnering with "NH the Beautiful," Members of TEEC will invest 86 volunteer hours to order recycling bins and initiate a fun, hands-on recycling club at the school. The students will collect paper trash and report results on reduced GHGE. They will display the information at local fairs, the school, and bring home educational material on their project.

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<sup>19</sup> New Hampshire Carbon Challenge takers are taking simple steps to reduce their energy consumption and protect our climate at <http://carbonchallenge.sr.unh.edu/>

## **Section 4 Project Benefits**

### **4.1 Reduce greenhouse gas emissions from all fuels used to provide electricity, heating and cooling in New Hampshire.**

The education component will reach Temple's 1,500 residents and neighboring towns. If Temple's residents reduce their energy use by 10%, they would save almost 4,000 TBTUs of energy.<sup>20</sup> The pilot recycling project involves students in hands-on efforts, encouraging adoption of voluntary efforts in the residential sector. This will reduce landfill loads and associated GHGE, as well as build a culture of energy-efficiency stewardship for the next generation. The comprehensive climate and energy planning will help the community avoid increases in GHGE due to future development and land use decisions. The municipal building retrofits will reduce the GHGE by reducing the amount of energy used for heating, cooling and electrical power for appliances. Temple reduced the electrical power used for municipal lighting in 2007 by the energy-efficiency upgrades under the PSNH 50/50 program. Temple's efforts to increase energy efficiency in its municipal and residential building stocks will be documented and publicized. This will result in GHG savings benefits that will be spread throughout the region and beyond as other communities follow and learn from Temple's model.

### **4.2 Program Cost Effectiveness**

Total Resource Cost (TRC) ratios were calculated using the March 2009 TRC spreadsheet. The results are summarized below:

<b>Type of Test</b>	<b>Ratio</b>
<b>Benefit/Cost Ratio for Full Program Costs, regular TRC</b>	<b>2.26</b>
<b>B/C ratio with GHGER Fund Costs only, regular TRC</b>	<b>2.33</b>
<b>B/C ratio, Full Program Cost, \$60/ton CO2 value</b>	<b>2.74</b>
<b>B/C ratio, GHGERF share only, \$60/ton CO2 value</b>	<b>2.82</b>

### **4.3 Reduce New Hampshire's peak electric load**

The retrofitting project will reduce peak period usage for air conditioning in Municipal Complex and the Mansfield Library. This program builds upon the 2007 upgrade of Temple's municipal lighting under the PSNH 50/50 program. The educational outreach component will assist residents in reducing peak electric load. TEEC has distributed hundreds of free CFLs and will continue to do so. The Library kiosk and the new website will promote the use of Energy Star Appliances, steps they can take at home and at work to reduce their electric use, and information on alternative sources for electric power.

Expansion of TEEC's free winterization program for the homes of low-income residents will directly reduce the electric load from all of the homes served. In 2009 TEEC will also be initiating the Carbon Challenge program in competition with another town. This program is designed to induce both short and long term reductions in home electricity use. These new projects will be built on the foundation of TEEC's free Weatherization Workshop<sup>21</sup> conducted in October 2008 and the free winterization project for low income residents in March 2009.

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<sup>20</sup> According to the Office of Energy and Planning, the average New Hampshire citizen used 257.4 TBTUs (trillions of British thermal units) of energy in 2005. For more information see <http://www.nh.gov/oep/index.htm>.

<sup>21</sup> Presentation conducted by Keith Abbott, Thermal House, information at <http://www.thermalhouse.com/Page.aspx?cid=7>

#### **4.4 Promote market transformation**

The Program will create additional demands for high efficiency products and market transformation through the materials used and items installed in the municipal retrofits such as: high performance, low U-value/high R-value windows; high performance high R-value Fire Department overhead garage doors; a sealed-combustion, high-efficiency condensing propane boiler; and icynene and cellulose insulation throughout. The education and outreach components will increase consumer knowledge of, and thus demand for, energy-efficient products.

#### **4.5 Promote innovative technologies**

The retrofit program will use the highest performance energy efficient windows available from Serious Materials Co.<sup>22</sup> and the Buderus<sup>23</sup> or the Knight Lochinvar<sup>24</sup> sealed combustion high efficiency condensing propane boiler for the Municipal Complex and Mansfield Library.

#### **4.6 Promote economic development**

The Program will immediately create construction, energy auditor, and debris removal jobs needed for the retrofitting of the municipal buildings. It will further create economic development through the purchase of the construction materials, high efficiency windows<sup>25</sup> and doors, a sealed combustion glass enclosed gas insert for the library fireplace, and a new sealed combustion high efficiency condensing boiler for the Municipal Complex. Local businesses will benefit from the needs of the construction crew for snacks, meals, gasoline, and other resources. The education and outreach component will require printing of public education materials, and purchase and distribution of items such as outlet insulators and CFL bulbs. Indirectly, the educational component will encourage the purchase of new high efficiency/Energy Star appliances and energy efficient automobiles, switching to alternative renewable sources of power and energy. This stimulation of economic growth will spread throughout the state because Temple's program and accomplishments will be showcased by Cool Monadnock, Clean Air-Cool Planet, the NH Carbon Challenge, and the 2009 Conference on Local Energy Committees.<sup>26</sup>

#### **4.7 Projected Cost Savings**

Projected cost savings are calculated by multiplying annual fuel reduction quantities by current fuel prices (*Source: NH OEP Average Fuel Price Monitoring Program March 16, 2009*). The residents of Temple stand to save \$70,000 per year from this program.

<b>Fuel</b>	<b>Amount</b>	<b>Units</b>	<b>Cost (\$) / Unit</b>	<b>Annual Cost</b>
<b>Electricity</b>	<b>266</b>	<b>MWH</b>	<b>\$164</b>	<b>\$43,624</b>
<b>Distillate Fuel Oil (#2)</b>	<b>1,0200</b>	<b>Gallons</b>	<b>\$2.16</b>	<b>\$22,032</b>
<b>Propane</b>	<b>1,300</b>	<b>Gallons</b>	<b>\$2.75</b>	<b>\$3,575</b>
			<b>Total</b>	<b>\$69,231</b>

<sup>22</sup> <http://www.seriousmaterials.com/>

<sup>23</sup> <http://www.buderus.net/>

<sup>24</sup> <http://www.lochinvar.com/>

<sup>25</sup> Mike Cassidy, *Serious Material's Purchase of Chicago window factory a bright spot in dismal economy*, Mercury News, February 2009 at [http://www.mercurynews.com/mikecassidy/ci\\_11802760](http://www.mercurynews.com/mikecassidy/ci_11802760)

<sup>26</sup> The Carbon Coalition Local Energy Committee Working group will host the first annual LEC state-wide training and information sharing conference for energy reduction efforts at the local level at <http://www.carboncoalition.org/>

#### **4.8 Promote collaboration and provide useful information for future program evaluation and improvement.**

Collaboration has been and will continue to be an important aspect of the energy efficiency program on the local level as well as within the broader NH community. Locally, TEEC has collaborated with Temple town staff, committees, boards, and organizations.

On the state level, Temple began by collaborating with PSNH to audit municipal lighting and determine needs for energy efficiency upgrades. The recommended improvements were installed in the Municipal Complex and Mansfield Library in 2007. The results of those updates can now be measured and evaluated by comparing the energy usage of the electric bills on a yearly basis. This will provide both PSNH and TEEC with useful information for future program evaluation and improvement. There has also been and will continue to be an ongoing close collaboration with the Cool Monadnock initiative. In April 2008, TEEC completed a municipal energy usage inventory and provided it to Cool Monadnock for analysis.<sup>27</sup> The resulting report with pie charts, spreadsheets, and graphs, offers useful tools for measuring the results of retrofitting through the GHGER grant. Similarly, the collaborations with Stay Warm NH and the Carbon Challenge will provide those programs useful information for future improvements and evaluations.

#### **4.9 Otherwise be consistent with the public interest and the purposes of RSA 125-O:19.**

Temple's retrofit plans, comprehensive education and outreach project with the goal to reduce residential emissions, and link of land-use planning and climate change components directly address many of the tasks listed in the Draft of the New Hampshire Climate Action Plan.

The following recommendations from the Task Force that relate to this proposal are:

TASK 1: Maximize Energy Efficiency in Buildings<sup>28</sup>

TASK 8: Lead By Example in Government Operations<sup>29</sup>

TASK 10: Develop an Integrated Education, Outreach, and Workforce Training Program<sup>30</sup>.

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<sup>27</sup> Cool Monadnock used the EPA Portfolio Management Benchmarking software.

<sup>28</sup> The first task listed is to *Maximize the Energy Efficiency in Existing Commercial, Industrial and Municipal Buildings*. Chapter 5 of the Draft Action Plan suggests the development of a program to retrofit municipal buildings in New Hampshire to eliminate CO2 emissions. This proposal clearly will maximize the energy efficiency in the two Temple municipal buildings. The education component of the proposal also seeks to maximize energy efficiency in the residential sector as well.

<sup>29</sup> "All levels and categories of government in NH, including counties, municipalities, village precincts, and school districts can adopt the same measures recommended for state government." This proposal clearly sets up the municipality as an example to the community through the retrofitting program. TEEC feels it is essential for the municipality to complete the retrofits to show the residential sector the importance of replicating this action in their own homes. This proposal will allow the municipality to lead by example. One of the actions listed for state government under this task is to *Include Climate Change Adaptation and Mitigation in Programs and Planning*. Through this proposal, TEEC seeks to implement the recommendations from the land use energy audit into all the planning documents for the town. Each recommendations deals with climate mitigation in some form.

<sup>30</sup> One of the actions recommended in this task is to *Reduce Residential Energy Demand Through Education and Outreach*. The main objective for this proposal is to use the municipality as a leader in order to galvanize the residential community into reducing greenhouse gas emissions and energy demand through a comprehensive education and outreach program.

## **Section 5. Measurement and Verification**

Margaret Dillon, the energy auditor who conducted the building audits in 2008, will provide measurable verifications of the results from the retrofitting program during the latter stages of work. She will have a plan review prior to the start of the work, provide two site inspections-- one with a blower door test and one with a fog machine or other method-- prior to the finish of the surfaces, and a reassessment following the completion of work. The results of the retrofits can later be measured by comparing the fuel and electric bills (energy usage) of the buildings to that of previous years. The EPA Portfolio Manager software can also be used to assess the amount of energy used and GHGE reduced as a consequence of the work.

The success of the educational component of The Program can be measured indirectly by observing the results of the residents' actions after engaging in the Carbon Challenge. The recycling program for the Elementary School will provide opportunities to measure the results of the student's involvement in recycling as well. There will be a questionnaire for the students to bring home near the end of the school year to learn of any changes that resulted from their participation in the program both for themselves and for their families. Similarly, TEEC will be reaching out to the community through questionnaires at the Harvest Festival, on the interactive web site, and at the land-use regulation public forum. TEEC will assess the tangible and intangible effects of the overall educational efforts undertaken by The Program. How many are purchasing energy efficient products of all kinds? How many have begun to get serious about recycling? How many have hired an energy auditor to audit their homes or work environments? How many are simply lowering their room temperatures, turning off appliances and lights when they are not needed, or closing off an unused room in the winter?

## **Section 6 Budget**

In addition to this narrative, please consult the appended budget spread sheet and detail. This proposal is estimated to cost \$333,100. The majority of this cost is derived from quotes and estimates from local contractors. The labor component (person-hours) for the overall program is estimated at 2,207 hours. Pay rate used by all contracts need to comply with New Hampshire's prevailing pay rates for the various skills.

The proposed budget is also our minimum budget value (see spread sheets), however it is important to note that all components of The Program (Retrofitting Municipal Complex, Retrofitting the Mansfield Library, Educational Outreach, and Recycling) can stand-alone, and so could be funded individually.

Regarding the maximum budget: it is clear that the cost/benefit for the educational program is very high, while its costs are minimal. To this end, we propose a maximum budget that adds \$7,500 to the outreach program. If granted, these funds will be used to perform a complete inventory of Temple's residential and commercial buildings. This will include details such as building area, construction, age, occupancy, and fuel records. This work will form a basis for future energy conservation and GHG reduction work.

**Retrofit Program.** The retrofit program will begin in June 2009, with a six-hour plan review meeting with Margaret Dillon (energy auditor) and contractors to discuss work scope and details.

The retrofit will begin with a complete air sealing of existing penetrations throughout the Municipal Complex followed by the installation of Icynene Spray Foam at the soffits of the Fire Department (FD) garage bays to the exterior walls; the estimated cost for this work is \$4,295. Next, 8" of cellulose insulation will be blown-in on top of the existing blown-in fiberglass over

the entire FD portion of the building; the estimated cost for this will be \$10,850. Then, insulate the exterior walls of the building complex. Contractors will then remove the existing fascia roof trim, install roof edge blocking and install new roof fascia boards. The existing roof shingles will be replaced with new architectural grade asphalt shingles; the cost is estimated at \$53,250.

*Alternately*, for the Municipal Building only, strip off old shingles and put down 3x5+3 poly iso-insulation with the board attached. This rigid insulation will lead to a 40.5 roof R-value and bring the top of the envelope to the roof. The FD roof will only need new shingles since its insulation will be above the ceiling. This alternative is estimated to cost \$48,000 and was chosen for the requested and minimum-cost budget requests. Labor estimate for this work is 500 person-hours.

The next step will be to install 2" rigid insulation board and 1x3 strapping on all exterior walls to increase the effective wall insulation levels to R 23. This will be followed by adding foam seal to the existing perimeter and installing new siding on the vertical furring strips creating a vented drainage plane. The windows will be replaced with high performance R 4 window units and the old leaky FD overhead garage bay doors will be replaced with R 10 Thermacore units with maximum air sealing. This work requires modifying the existing openings in order to accommodate the added depth of the exterior wall assembly. The cost for this work is estimated to be \$196,250. At this point, energy auditor, Margaret Dillon will conduct a blower door test and fog machine tests to check air infiltration and to determine sizing for the high efficiency propane boiler.<sup>31</sup> This will either be a Buderus GB142-60 or a Knight "Wall Hung" by Lochinvar (now made in US). Also install a new circulator, 2 programmable thermostats, zone components, an outdoor reset control, a 1,000 gallon buried propane tank, install pipe insulation in the boiler room and install a humidistat in the bathroom. The total cost of the propane boiler, controls, and installation is estimated at \$28,760.

The retrofit work at the Mansfield Library will consist of sealing off the crawl space with Stego Wrap Vapor Barrier and then spraying 2" of closed-cell polyurethane foam on the walls, plates and rim joists to deal with the existing building moisture problem; the cost is estimated to be \$7,800. The amount of moisture that enters the library from the basement has been a significant source of air pollution and a major reason for propane use in winter and for using air conditioning in summer. Another challenge to address is the loss of heat through the flu of the open fireplace in the library's main room. A cost effective solution is to install a direct vented, sealed combustion fireplace gas insert with glass doors at an estimated cost of \$7,026. Replacing the seven double hung windows with new high performance units will also resolve the heat loss resulting from loose-fitting window jambs. Further work will be conducted to air seal openings, install weather stripping on all openings and exterior doors, and to spray-foam the exterior door casings; estimated cost is \$11,998. Air sealing the attic area, installing an additional 12" blown-in cellulose insulation to cover the ducts, insulating and then sealing the attic hatch will provide further energy efficiencies; the estimated cost is \$7,757. Finally, in order to deal with the uninsulated brick walls which "represent the single largest heat loss component of the envelope,"<sup>32</sup> liquid foam will be injected into the walls from the interior through small holes that will be later patched; estimated cost is \$8,051. Using Icynene foam, this will have a significant impact on the air sealing and will reduce convection between the brick walls.

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<sup>31</sup> She pointed out that propane doesn't have as many BTUs per gallon, but propane furnaces operate at far higher efficiencies than oil burners. Propane is also cleaner and produces about 40% less CO2 per BTU than fuel oil.

<sup>32</sup> Margaret Dillon, *The Temple, NH Energy Audit Report*, November, 2008

When construction is finished, but prior to surface finishing, the energy auditor will perform blower door and fog machine tests to verify air sealing. The overall budget for the energy auditor's work is \$2000. This breaks down as follows: initial review meeting (\$500), verification testing work (\$850), miscellaneous calls and questions (\$150), and re-assessment at the completion of work (\$500).

**Educational Outreach Program.** The budget for the educational component of the program includes 500 hours of volunteer work by TEEC and other town committee and board members and a request for \$2,430 for equipment, supplies and other expenditures. Starting in May 2009, Mary Beth Ayvazian<sup>33</sup> will spend 2+ hrs/month of volunteer time and \$180 to construct and run an interactive energy conservation website highlighting helpful, eco-friendly information. It will cost \$15 a month to update and maintain the site. Once the retrofitting work gets underway, Mike Darnell (Select Board member) will spend 20 volunteer hours to film the various stages of the work, needing \$200 for video supplies. By June there will be a \$400 expenditure for the cost of printing paper and ink cartridges for the upcoming year. Sign-making will begin for the student's recycling club, the Harvest Festival and the Carbon Challenge which all occur in the Fall. The kick-off for the Carbon Challenge will come alive at the Harvest Festival. Advertising and other booth attractions are estimated at \$400. TEEC members<sup>34</sup> will spend 48 cumulative volunteer hours discussing energy conservation with visitors and dealing with the recycling bins which will include sorting and transporting to a recycling center. In preparation for the challenge, the program will purchase a lap top computer and printer for \$1000 to be kept at Mansfield Library so that visitors who want to take the Challenge can readily get online and get started. There will also be a \$50 fee paid to the online monitor of the Carbon Challenge website as they track the competition and steps people are taking to reduce GHGE in their homes. TEEC will also print and mail invitations for a forum aimed at raising public interest and support for the issues raised by the audit of Temple's Master Plan and Zoning Ordinances in late October. The printing will cost approximately \$100 for 500 pieces, and the postage, an additional \$150. Beverly Edwards will be in charge of the mailing. There will be a fee of \$300 paid to Steve Whitman, the consultant who audited Temple's ordinances for the Planning Board. He will be asked to attend a question and answer session from the public about the audit and issues it raises. The weatherization program for low-income residents will be supported by Stay Warm NH (kits) and the Congregational Church of Temple (meeting space and possible supplemental funding). Advisory assistance will be provided by Cool Monadnock and the Carbon Challenge.

**Recycling Program.** The recycling program establishes a recycling club at the Temple Elementary School. The budget request of \$570 includes funds for recycling bins, containers and bags, printing of materials, and purchase of supplies, and club activities.

**Other Funds.** Efforts will also be made to obtain financing for The Program from Federal Stimulus funds.

### **Section 7 Applicant Qualifications**

The Temple Economical Energy Committee (TEEC) was appointed by the Temple Board of Selectmen in June, 2007.<sup>35</sup> The Select Board honored the request from Temple voters who

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<sup>33</sup> Mary Beth Ayvazian is a Temple resident and TEEC member.

<sup>34</sup> TEEC members: Beverly Edwards, Honey Hastings, Gayle Richards, Robert Wills, Deb DeIso, MaryAnne Pendleton, Mary Beth Ayvazian

<sup>35</sup> <http://www.templenh.info/Selectmen/Minutes/2007/MN20070612.pdf>

approved the passage of the Climate Change Resolution at the 2007 Temple Town meeting. Included in the Resolution was the statement: “The Town of Temple encourages New Hampshire citizens to work for emission reductions within their community, and we ask our Selectmen to consider the appointment of a voluntary energy committee to recommend local steps to save energy and reduce emissions.” In other words, as the “Applicant”, the members of TEEC qualify for their participation in this proposal because the committee was authorized by the Temple voters to be a voluntary body appointed by the Temple Select Board, as was the case. Members of the committee include two lawyers, a computer programmer and a licensed professional engineer. *See attached document titled “Resumes”.*

### **Section 8 Additional Information**

As stewards of the public’s health, safety and welfare, it inevitably becomes the responsibility of town select boards to ensure the health and safety of their communities. Reducing the town’s carbon footprint not only improves our sustainability as a species, it also lowers tax rates by saving money on the energy costs of all town-related activities. As citizens become more aware of the ways in which the town saves by employing energy-saving measures, they too can reduce their expenses through efficient lifestyle choices, such as changing lighting to CFLs, weatherizing their homes, and employing energy efficient designs that also provide opportunity to reverse the trends of global warming. This awareness can spread throughout the region, due to one community’s commitment and follow-through on programs such as The Temple Climate Protection and Energy Reduction Initiative (The Program).

Temple, NH is an innovative leader in the reduction of GHGE in the region. Recognizing the need for lessening harmful impacts on the environment, the town through its energy committee, TEEC, has taken substantive steps toward reducing its carbon footprint. TEEC Chair, Beverly Edwards first reached out to Clean Air Cool Planet<sup>36</sup> in 2007. This organization recognized the significant steps Temple had taken, and decided to hold Temple as an example for other communities. “Temple is one of our model towns right now,” said Christa Koehler, community program manager for Clean Air Cool Planet.<sup>37</sup>

The grant money which the RGGI initiative provides will allow TEEC to continue the significant work being done in Temple today that increases awareness across the region of the importance of climate change as a factor in a range of issues. This will provide help to accomplish the overall goals of RGGI: “Reinvesting auction revenue in the region will provide significant consumer benefits. Reinvestment of revenue in local economies will help businesses and homeowners to control their energy costs and create new jobs in the clean energy sector.”<sup>38</sup>

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March 23, 2009

John Kieley, Chair, Temple Select Board

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<sup>36</sup>A nonprofit organization dedicated to finding and promoting solutions to global warming. <http://www.cleanair-coolplanet.org/>

<sup>37</sup><http://www.ledgertranscript.com/apps/pbcs.dll/article?AID=/20080826/LEDGERTRANSCRIPT/808260420/1315/>

<sup>38</sup> <http://www.rggi.org/about/benefits>