

# **CLEAN ENERGY ROADMAP**

## ***COMPREHENSIVE ENERGY PLAN***

### ***for the Town of Chester***

**August 2011**





The Comprehensive Energy Plan was written by the Energy Subcommittee of the Chester Conservation Commission during Winter/Spring 2011 and was presented to the Board of Selectmen in July 2011 and subsequently endorsed by them. The purpose of the plan is to provide guidance to the Board of Selectmen and operational units of government in Chester and to provide valuable information to residents on topics including energy conservation, renewable energy systems and related topics.

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- Tom Marsh, *Chester First Selectman (ex officio)*

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Roger Smith, Clean Water Action

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## ***COMPREHENSIVE ENERGY PLAN***

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## INTRODUCTION

The Chester Conservation Commission is tasked with inventorying the town's natural resources and making recommendations for their best use. Energy, as a natural resource, has become increasingly important. For the past several years, the Conservation Commission has been involved in a number of energy related projects. The commission:

- Participated in the Connecticut Clean Energy project in which the town received a \$5,000 grant to promote use of renewable energy,
- Conducted energy audits of municipal buildings,
- Recommended energy conservation improvements (insulation) to the Town Hall in 2009, resulting in an energy saving (corrected for climatic influences -- e.g. degree-days) of 5%,
- Recommended electrical modifications to the Town Hall resulting in a decrease in electric use from 146 mWh (in 2008) to 128 mWh (in 2009) to 120 mWh (in 2010),
- Encouraged residents to sign up for the residential clean energy option on their electric bills,
- Sponsored a writing contest at Chester Elementary School in which children wrote short essays on the subject of energy use and conservation in Chester, and
- Collaborated with the library to purchase Kill-a-Watt meters to loan to residents to enable them to monitor their energy use.

Additionally, the Board of Selectmen, recognizing the potential for cost savings, have adopted policies and strategies to promote energy conservation and to foster the use of renewable energy within town facilities and departments. The BOS:

- Voted to have Chester participate in the Connecticut 2010 campaign in which the town agreed to purchase 20% of its electricity from renewable sources by 2010;
- Entered into an agreement with North American Power for the town to purchase 20% renewable energy and also arranged to make this available to town residents;
- Authorized the Public Works Department to use bio fuels in town-owned trucks to reduce the town's dependence on fossil fuel;
- Adopted energy conservation measures in various town buildings (e.g. Town Hall lighting and automatic shutoffs)
- Secured a grant to install energy efficient doors as part of renovations to the Chester Hose Company Firehouse; and
- Initiated a streetlight survey to identify lights that could be reduced, turned off, or operated for fewer hours per evening to save electricity and costs to the town.

All of these activities, individually and collectively, have been of benefit to Chester; they have, however, been pursued in an ad hoc and opportunistic manner. The Conservation Commission believes that the town will benefit from having a comprehensive energy plan. Such a plan will establish clear energy conservation goals, objectives and tasks and will help the town monitor its progress towards achieving these goals. Reducing energy use in town facilities and reducing Chester's reliance on energy produced with fossil fuels is a win-win. It will save the town money, will reduce carbon emissions contributing to global warming, and will serve as a model for businesses and residents to follow.

## **WHAT'S INCLUDED IN THIS PLAN**

This Plan addresses the entire Town of Chester, including town staff, businesses and citizens. It supplies information, conveys basic concepts, and provides guidance about clean energy. The Plan's most immediate purpose, however, is to offer recommendations to the Board of Selectmen (BOS). These recommendations include policies, goals, and actions. Town leadership is being asked to adopt these policies and goals. As to the actions— some of them may require specific BOS approval, especially the critical one establishing an Energy Advisory Team; but many could be implemented as part of normal town business, once the policies and goals are set. For a few of the actions, separate BOS resolutions might need to be adopted. Finally, some of the actions may require BOS assistance for implementation outside of any resolutions.

Naturally, the Plan could not deal with every single topic related to clean energy in Chester. Many items did not make it into the Plan, and some items, doubtless, never crossed the Energy Subcommittee's collective mind. Nonetheless, the subcommittee has worked hard to make the Plan genuinely comprehensive. It covers all the basics, and it shows the way for Chester to continue to make progress in reducing energy consumption.

# **RECOMMENDED CLEAN ENERGY POLICIES, GOALS, and ACTIONS**

## **Baselines and Benchmarks**

### **Electricity Consumption**

In 2010 Chester's municipal electricity consumption was 1,088,248 kilowatt-hours (kWh) at a dollar cost of \$211,644. This represents a 0.55% increase in the town's electric energy consumption from 2009 when total electricity use was 1,082,314 kWh at a dollar cost of \$179,289.

The top two electricity users consistently have been:

1. The schools, including allocations for regional schools, which, in total comprised 71 % of total 2010 kWh use.
2. Streetlights, which comprised 13% of the kWh used by the town in 2010

In 2008, the Town Hall used almost as much electricity as the town's streetlights, but due to efficiency efforts over this two year period, electric energy consumption in this facility was decreased by more than 18%.

*Refer to Exhibit A – Chart of use and cost*

### **Fuel Oil**

The highest use of heating oil is by the schools, including the Elementary School, and Chester's allocations for Valley Regional High School and the Winthrop Middle School. The aggregated school use of 36,707 gallons comprises 76% of the 48,422 gallons of fuel oil used by the town in 2010.

After the schools, the next highest users of fuel oil are the Town Hall (3420 gallons) and the Fire House (3889 gallons), each using approximately 7-8% of the total.

The carbon emissions cost of the heating fuel used by the town in 2010 was 537 tons, calculated according to the methodology used by the Intergovernmental Panel on Climate Change (IPCC), as cited by the United States Environmental Protection Agency.

### **Transportation and Equipment Fuels**

Chester's 2009-2010 usage of fuels for town owned and operated cars and heavy vehicles for police, fire, ambulances and public works for the 2009-2010 fiscal year was approximately 8,900 gallons of gasoline and diesel, at a total dollar cost of \$33,000 and a

cost in carbon emissions of 94 tons.<sup>1</sup> Chester's share of the diesel fuel used by school buses for the Chester elementary school and regional schools for 2010 was 12,446 gallons at a cost of \$36,966.

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1 *Carbon emissions for 1 gallon of diesel=22.2 pounds. 48,422 gallons x 22.2 pounds = 1,074,968pounds. Dividing this by 2000, the number of pounds in a US ton = 537. Gasoline calculation is 19.4 pounds per gallon of gasoline.*

*Ref: <http://www.epa.gov/oms/climate/420f05001.htm>*

# Recommended Clean Energy Policies

## 1. Pursue Cost-Effective Conservation and Energy Efficiencies

Cost-effective conservation and energy efficiency investments should be Chester's highest priority. Conservation (curbing waste) and increased energy efficiency (accomplishing more per unit of energy) must be the cornerstone of any energy management and capital investment plan.

## 2. Establish and Use Performance Measurement Systems

Three elements are key to implementing cost-effective energy conservation and efficiency programs:

- accurate and up-to-date measurement/monitoring systems for present and future energy use and carbon emissions (“it can’t be managed if it can’t be measured”);
- benchmarking in order to quantify goals (benchmarking establishes the baseline energy-use profile so that changes can be measured); and
- energy audits to identify opportunities for conservation, implementation of new energy management procedures and energy-reducing capital improvements.

These three activities should be undertaken for all municipal buildings, infrastructure, operations, vehicles and equipment.

## 3. Pursue Renewable Energy Supply Technologies

Explore alternative technologies (wind, solar, hydro, etc.) for added supply with low or no carbon emissions. Various options are worthy of consideration but must be tailored to the location, application and user group.

## 4. Promote a Culture of Conservation

Develop a culture of conservation, efficiency and sustainability by

- a. Educating energy users on opportunities to reduce energy consumption
- b. Developing incentives to ensure involvement
- c. Promoting the generation and exchange of ideas
- d. Providing timely and meaningful feedback on performance
- e. Publicizing progress and problems

## 5. Leverage Town's Purchasing Power and Pursue Regional Approaches

Wholesale energy markets offer competitive pricing options and significant potential cost savings. These markets are complex and continually changing, so expertise will be needed to secure the most favorable energy purchase contracts. The town should explore the potential to leverage its purchasing power by collaborating on “regional” energy initiatives with neighboring towns.

## Recommended Clean Energy Goals

Chester's overall goal is to become recognized as a community that embraces and proactively strives to achieve high standards for clean energy through conservation, efficiency and sustainability.

Chester's goals will be achieved through cost-effective reductions in energy use by installing and adopting efficiency measures in municipal buildings and equipment and by increasing the use of renewable energy. These goals cover town and Chester Elementary School buildings and equipment. Specific goals are:

- I. Reduce the town's overall energy use**
  - A. Achieve a net reduction of 10% in all municipal energy uses by 2015
  - B. Achieve a net reduction of 20% in all municipal energy uses by 2020
  
- II. Reduce the use of carbon-based energy sources by purchasing energy produced from renewable sources (e.g. solar, wind, hydroelectric, etc.)**
  - A. Obtain 30% of municipal electricity from clean energy sources by 2015
  - B. Obtain 50% of municipal electricity from clean energy sources by 2020
  
- III. Acquire equipment, through purchase or lease, to produce energy from renewable sources**
  - A. Acquire 10% of energy through town owned or leased renewable energy sources by 2015
  - B. Acquire 25% of energy through town owned or leased renewable energy sources by 2020

The baseline against which to measure reductions will be 2010 energy use.

## Recommended Clean Energy Actions

To achieve the recommended clean energy goals, the town should take the following actions:

### **1. Create an Energy Advisory Team**

- A. The Energy Task Force recommends that the BOS create an Energy Advisory Team (E-Team) to utilize volunteer citizens with participation of the town department heads and the Conservation Commission. The E-Team will operate as a Sub-Committee of the BOS and consist of appointed volunteers (three at-large members appointed for two years), a member of the Conservation Commission and a Town Department Head (the Department Head member serving on a rotating six month basis).

*Target date: July 2011*

- B. In order to accelerate energy management efforts, consider hiring an Energy Manager, perhaps in a shared arrangement with other local towns or consider finding a performance contractor to facilitate and accelerate the efforts of the E-Team.

*Target date: July 2011*

- C. Budget energy costs (electricity and heating and transportation fuels) as line items in each departmental budget to better track actual annual energy budgets. Develop a process to record and distribute energy consumption and cost data to help promote energy conservation.

*Target date Fiscal Year 2011 - 2012*

### **2. Conduct Energy Audits and Establish Monitoring Program**

- A. The E-Team should systematically benchmark all municipal facilities using a program such as the EPA Portfolio Manager.

*Target Date: Ongoing*

- B. The E-Team should conduct Energy Audits, performed by professionals, at all municipal facilities, to identify conservation needs and assess potential for application of alternative technologies.

*Target date: December 2011*

- C. The E-Team should identify and prioritize conservation and efficiency improvements and identify conservation and efficiency improvement options, including the potential to convert to cleaner alternative fuels.

*Target date: January 2012*

## **Street Lighting**

- D. The E-Team should audit street lighting and develop a protocol to determine if/where lights can be eliminated or hours of use reduced

*Target date: January 2012*

## **Transportation and Equipment Use**

- E. The E-Team should quantify all transportation and equipment fuel use by fuel type, vehicle type and function, and evaluate options for improved management systems, fleet efficiency improvements (potential use of hybrid fuel vehicles) and the potential for conversion to cleaner alternative fuels. Evaluate equipment and equipment use practices for management and equipment changes. Encourage school bus provider to develop an alternative fuel demonstration project.

*Target date: December 2012*

## **3. Ensure Quality/Timeliness of Information**

- A. The E-Team should work with the BOS, Accounting, and others as appropriate to institute a municipal energy information system. This system should track energy use and costs on an ongoing basis and should serve to alert the town to excessive energy use at any facility.

*Target date: December 2011*

- B. The E-Team should work with energy suppliers to provide monthly reports of deliveries/use by building and fuel type.

*Target date: December 2011*

## **4. Identify Priority Upgrades**

- A. Based on energy audits, the BOS, E-Team, BOF and town departments, as appropriate, should develop plans including budgets and schedules to implement energy upgrades to town facilities.

*Target date: Begin February 2012*

- B. Based on energy audits, the BOS, E-Team, BOF, BOE and Chester Elementary School's facility manager should develop plans including budgets and schedules to implement energy upgrades to Chester Elementary School.

*Target date: Begin February 2012*

- C. The BOE should work with appropriate officials and consultants to assure that designs for any new school facilities or major school renovations provide optimum cost-effective energy efficiency and energy management over the useful life of the building and should incorporate the 2012 (and subsequent revisions) International Energy Conservation Code into future building and/or renovation plans.

*Target date: Ongoing*

D. The BOS should work with appropriate officials and consultants to assure that designs for any new municipal buildings or major renovations to municipal buildings provide optimum cost-effective energy efficiency and energy management over the useful life of the building and should incorporate the 2012 (and subsequent revisions) International Energy Conservation Code into future building and/or renovation plans.

*Target date: Ongoing*

E. The BOS, with assistance from the E-Team, should develop and institute a review schedule for public facilities lighting, incorporating lighting re-design and efficiency benchmarks

*Target date: July 2012*

F. The BOS, consulting with E-Team, should investigate the use of alternative fuel and/or hybrid vehicles as may be appropriate.

*Target date: Ongoing*

G. The BOS, consulting with E-Team, should investigate the increased use of bio-diesel fuels in town vehicles.

*Target date: Ongoing*

## **5. Acquire Renewable Energy Technologies**

A. E-Team, with assistance from BOE, BOF and BOS, should investigate model demonstration projects in renewable energy technologies for teaching and energy production purposes at Chester Elementary School.

*Target date: TBD*

B. E-Team, with assistance from the BOS, should investigate ideas for cost-effective applications and demonstration clean energy projects at town facilities.

*Target date: Ongoing*

C. E-Team, with assistance from the BOS, should work to obtain solar panels at town facilities through the CT Clean Energy Options Program and other options.

*Target date: Ongoing*

D. E-Team, with assistance from the BOS, should evaluate the viability of solar thermal heating systems for hot water and/or heat and wind power systems to generate clean electricity at town facilities—and acquire as appropriate.

*Target date: Ongoing*

## **6. Improve Efficiencies**

### **Electricity**

- A. The BOS, with assistance from the E-Team, should investigate the viability and value of participating in demand-response programs.  
*Target date: Ongoing*
  
- B. BOS, with assistance from the E-Team and BOF, should establish staff and departmental guidelines for eliminating electricity waste (buying only Energy Star appliances, discouraging the use of certain wasteful appliances, shutting off computers and lights, etc.).  
*Target date: Annually*

### **Transportation**

- C. E-Team collaborate with the 9-Town Transit District on advancing plans for improved mass transit, commuter infrastructure and cleaner, higher efficiency vehicles.  
*Target date: Review annually*
  
- D. E-Team, consulting with DOT, Planning & Zoning and Police Department, should evaluate and expand the availability of parking incentives and accommodations for hybrid vehicles, motorcycles, scooters, mopeds and bicycles. Create bike paths and pedestrian walkways to encourage alternative forms of low-energy transportation.  
*Target date: Review annually*

### **Building Codes**

- E. P&Z, working with the E-Team, should review zoning regulations to identify any changes necessary and possible to encourage energy efficiency, e.g. revisions to shade tree and other landscaping regulations, amendments to accommodate clean energy supply technologies, and provisions facilitating green buildings, per whatever rating standard is deemed most useful (Leadership in Energy and Environmental Design [LEED], Green Globes USA, or other).  
*Target date: Review annually*
  
- F. Building Department, working with E-Team, should ensure that its procedures are updated to the energy-efficiency provisions of the State Building Code. Ensure that building official is well trained in that aspect of Code compliance.  
*Target date: Review annually*

## **7. Promote Education and Public Outreach**

- A. The E-Team should support the Chester Public Library, schools, environmental advocacy groups, Chester merchants, and civic groups in efforts to educate the public about clean energy, particularly the Clean Energy Options program and the efficiency incentives and audits offered through CL&P.

*Target date: ongoing*

*Potential funding source: CT Energy Efficiency Fund*

- B. The E-Team should support teachers at any level with accessing Continuing Education programs, special funding, and any other resources helpful to them for teaching students about clean energy.

*Target date: ongoing*

*Potential funding source: CT Energy Efficiency Fund*

- C. The E-Team should use Chester's web site to promote local success stories about energy conservation and privately owned renewable energy systems; should provide links to other energy-related web information; and should make available energy-related fact sheets and how-to manuals. The E-Team should develop and publish a Chester online energy scorecard to highlight and publicize the town's energy-related accomplishments and should provide opportunity for public input and ideas.

*Target date: Ongoing*

- D. The E-Team should investigate the development of a neighbor-to-neighbor assistance program and training for volunteers (see [www.heetma.com](http://www.heetma.com) – MA Home Energy Efficiency Team – a grass roots organization dedicated to helping others conserve energy). Use town agencies such as Social Services to identify low-income individuals who could benefit most from energy conservation improvements. Develop a volunteer workforce to provide free weatherization services for those who could otherwise not afford to lower their energy costs.

*Target date: Ongoing*

*Potential funding source: CT Energy Efficiency Fund*

- E. The E-Team should arrange public information forums to provide guidance on topics such as solar installations to groups of interested individuals. Consider partnering with the League of Conservation Voters which produced the energy fair at Waters Edge in March 2011.

*Target date: Ongoing*

- F. The E-Team and Town should promote the use of public transportation.

*Target date: Ongoing*

- G. The E-Team should partner with the BOS and the Economic Development Commission (EDC) to promote and support the adoption of clean and efficient energy strategies at existing and prospective businesses. Up to date information on available energy consultation services and current Federal and State incentives and

rebate plans for businesses should be linked directly to the EDC information page on the Chester Town website.

*Target date: Ongoing*

## **8. Join the EPA Community Energy Challenge**

- A. The Town should seek to join the EPA Community Energy Challenge. This program will help the town achieve many of the goals outlined in this plan and will recognize the town for its accomplishments. An immediate benefit from joining the challenge will be a doubling in size of the solar photovoltaic system – from 2KW to 4KW – that the town has earned through the CT Clean Energy Program.

*Target date: July 2011*

## Appendix

### Town of Chester Energy Consumption 04/17/2011

<b>Town of Chester</b>						
<b><u>Electricity Totals (Facilities) 2008 - 2010</u></b>						
	<b>2010</b>		<b>2009</b>		<b>2008</b>	
<b>Facility</b>	<b>kWh</b>	<b>\$</b>	<b>kWh</b>	<b>\$</b>	<b>kWh</b>	<b>\$</b>
Town Garage	11,099	\$2,470	12,697	\$2,838	12,609	\$2,658
Elementary School	356,932	\$61,837	328,137	\$56,824	305,392	\$60,469
Valley High School*	291,430	\$76,485	293,604	\$69,903	284,023	NA
Winthrop Middle School*	240,784	\$33,733	249,729	\$42,554	234,171	NA
Fire House	34,961	\$6,745	42,424	\$8,587	42,203	\$8,072
Meeting House	21,399	\$5,611	17,946	\$4,925	16,340	\$4,185
Public Library	12,013	\$2,611	10,262	\$2,240	11,332	\$2,135
Town Hall	119,629	\$22,148	127,515	\$24,684	146,198	\$27,679
<b>Total:</b>	<b>1,088,247</b>	<b>\$211,640</b>	<b>1,082,314</b>	<b>\$212,555</b>	<b>1,052,268</b>	
<b><u>Streetlight Totals 2009 &amp; 2010</u></b>						
	<b>2010</b>		<b>2009</b>			
<b>Lumens</b>	<b>kWh</b>	<b>\$</b>	<b>kWh</b>	<b>\$</b>		
9500	75,124	\$20,458	74,833	\$21,302		
4000	5,098	\$2,054	5,070	\$2,138		
16000	6,378	\$1,486	6,342	\$1,595		
6300	33,673	\$10,738	33,464	\$11,261		
27500	29,466	\$5,933	29,301	\$6,435		
5000	7,774	\$1,415	7,730	\$1,538		
6300-2	692	\$360	689	\$371		
<b>Total:</b>	<b>158,205</b>	<b>\$42,444</b>	<b>157,429</b>	<b>\$44,640</b>		

<b>Heating Oil Totals 2009 &amp; 2010</b>						
	<b>2010</b>		<b>2009</b>			
<b>Facility</b>	<b>Gallons</b>	<b>\$</b>	<b>Gallons</b>	<b>\$</b>		
Town Garage	980	\$2,851	1,317	\$3,037		
Elementary School	14,233	\$49,531	12,994	\$31,835		
Winthrop Middle School *	7,643	\$18,037	8,222	\$19,403		
Valley Reg. High School *	14,832	\$35,004	13,787	\$32,538		
Fire House	3,889	\$11,307	4,102	\$9,573		
Meeting House	2,158	\$6,322	2,187	\$5,001		
Public Library	1,268	\$3,661	1,099	\$2,456		
Town Hall	3,420	\$10,019	3,572	\$8,224		
<b>Total:</b>	<b>48,423</b>	<b>\$136,732</b>	<b>47,280</b>	<b>\$112,067</b>		
<b>Transportation Fuel Totals 2009 &amp; 2010</b>						
	<b>2010</b>		<b>2009</b>			
<b>Facility</b>	<b>Gallons</b>	<b>\$</b>	<b>Gallons</b>	<b>\$</b>		
Bus Diesel-Elementary *	7,060	\$20,969	7,595	\$22,557		
Bus Diesel - Region 4 *	5,386	\$15,997	5,689	\$16,896		
Town Vehicles	8,900	\$33,000				
<b>Total:</b>	<b>21,346</b>	<b>\$69,966</b>	<b>13,284</b>	<b>\$39,453</b>		

\* Chester share of regional school usage