



The Town of Truro
Massachusetts

Energy Reduction Plan



Prepared by:
Town of Truro Energy Committee
June 2011

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I. PURPOSE and ACKNOWLEDGEMENTS

This Energy Reduction Plan is presented as part of the Town of Truro's efforts related to becoming a Green Community. Truro's Green Community goals include decreasing energy use and associated costs, conserving natural resources, reducing waste and emissions, protecting public health and the environment, and promoting the use of clean technologies as well as renewable and alternative energy while increasing the community's overall sustainability.

The intent of this plan is to assist the Town of Truro in its ongoing green efforts, particularly in the Town's current goal to become a designated Green Community through the Massachusetts Department of Energy Resources (DOER) Green Communities Program. This plan satisfies in part Criterion 3 of the program, which requires a community to establish a baseline benchmark for energy use and develop a plan to reduce its energy use by 20 percent within 5 years. Truro's energy baseline is computed from FY2010 energy usage, the most recent complete year, and will be discussed in Section III this plan.

The purpose of the Energy Reduction Plan is to identify opportunities and establish a timeline with specific targets to reduce energy use in municipal buildings and vehicles by 20% over a five-year period. The action plan draws upon information from energy audits performed by Cape Light Compact and RISE Engineering, and provides a realistic path for implementation. The decreased energy use reduces both associated greenhouse gas emissions and Town operating costs.

A. Letters Verifying Adoption of the ERP

General Government - See attachments in Appendix A for record of the approval votes of the Energy Reduction Plan by the Town of Truro Board of Selectmen.

Public School District - See attachments in Appendix A for record of the approval votes of the Energy Reduction Plan by the Town of Truro School Administration.

B. Contributors to the Energy Reduction Plan

Truro Energy Committee (TEC): Brian Boyle, Sally Brotman, Rebecca Bruyn, Ronni Farrell, Bob Holt, and William Worthington (alternate)

School Superintendent, Brian Davis

School Committee: Theresa Humes, Kenneth Oxtoby, Michelle Jarusiewicz, Thomas Dickey, and Pamela Medeiros

Public Works, Paul Morris, Director, and Michael Kaelberer

Town Administrator, Pam Nolan

Assistant Town Administrator/Planner, Charleen Greenhalgh

Town Accountants Office, Trudi Brazil and Tami Micks

Board of Selectmen: Curtis Hartman, Gary Palmer, Janet Worthington, William Golden, and Breon Dunigan.

Town Librarian, Meg Ryoka

Police Chief, John Lundborn

Fire Chief, Brian G. Davis

Golf Course: Jim Knowles

Community Center: Susan Travers and Kelly Sullivan

Building Department: Tom Wingard and Arozana Davis

Town Counsel, E. James Veara

Town Administration: Julie Dupree and Nicole Tudor

Data management assistance: Carl Brotman and Jay Vivian

Massachusetts DOER-Regional Coordinator Green Communities, Seth Pickering

Cape Light Compact: Nicole Price

RISE Engineering: Kevin Galligan, Bill Ferguson, Vin Graziano, TJ Turner and Bill Branton

II. EXECUTIVE SUMMARY

A. Narrative Summary of the Town

Truro is a town in Barnstable County, MA. Incorporated in 1709, it recently celebrated its tercentennial. About 70% of the town's 26 square miles lie within the Cape Cod National Seashore (CCNS). One state highway, Route 6, runs the 14-mile length of the Town, which has a width of 4 miles at its southern border and ½ mile at its northern border. The town maintains 40 miles of paved roads, but has even more unpaved sand roads and 11 sandy beaches, which must be patrolled by municipal vehicles. Public transportation (by bus) is provided through the Cape Cod Regional Transit Authority (RTA).

Truro has an open town meeting form of government and a five person Board of Selectmen, with a Town Administrator and an Assistant Town Administrator for planning.

Located two hours outside Boston, Truro is a summer vacation community situated just shy of the tip of Cape Cod with a year-round population of 2,003 (2010 census) and a summer population estimated at 15,000-20,000.



Truro leases and operates a 9-hole Highland Links Golf Course which belongs to the CCNS.

Truro has one elementary school (K-6). After 6th grade, Truro students attend a regional middle school in Orleans and high school in Eastham. Truro pays tuition at these schools; it is not part of the Region.

1. Early Energy Conservation Efforts

The Town of Truro is and has for some time been committed to reducing its usage of fossil fuels and thus its “carbon footprint.” On November 17, 2004, the Board of Selectmen created the Truro Energy Committee of five volunteers plus the ex officio participation of the Assistant Town Administrator and Planner, and the director of the Department of Public Works. The original charge was to investigate and study methods for conserving the use of all energy sources at Town-owned facilities, and the potential for using alternative sources of energy (e.g., wind turbines, solar panels) on Town-owned property. Also, it was to liaise with the Building Committee on energy issues in any new construction of Town buildings. Just a year later, at the request of the new committee and the Truro Recycling Committee, with which it worked actively, the Board

of Selectmen endorsed the U.S. Mayors Climate Protection Agreement. The Truro Energy Committee (hereinafter TEC) began collecting data on the use of electricity in all Town buildings, part of the necessary baseline study, and outlining a plan for steadily reducing Truro's carbon footprint. It recommended a number of energy-saving changes to the Town Administrator, including occupant-sensitive light switches, purchase of only Energy Star equipment, regular energy audits for all Town buildings, and reduced exterior lighting, many of which have been adopted.

Convinced that the task of coping with the challenges of the climate change crisis demanded regional (Cape-wide) effort, members of TEC worked actively with the Cape Cod Commission (especially on climate change related issues in its 2008 5-year Regional Policy Plan), the Cape and Islands Renewable Energy Collaborative, the Cape Light Compact (CLC), and the Cape Cod Renewable Fuels Partnership. It was instrumental in starting the association of all Cape Cod energy committees and participating in its meetings.

An early task was to explore the possibilities for wind power in Truro. The TEC chair adapted a model text from the Cape Cod Commission into a new town zoning by-law (adopted in 2005) regulating the establishment of wind turbines. After surveying the possibilities, TEC drew up a list of promising Town-owned sites and submitted it to the University of Massachusetts Renewable Energy Research Laboratory, which rejected them all.

TEC had helped persuade the requisite 3% of Truro citizens to sign up for CLC-provided renewably generated electricity, resulting in CLC's putting a small 2 kW photovoltaic system on the roof of the Truro Central School in the summer of 2006. TEC then surveyed all south-facing roofs of Town buildings, found the School's roof the most suitable, obtained U.S. stimulus grant funding and persuaded the town to appropriate matching funds for a 25 kW PV system. That was installed on the school's roof in September 2010, where it has been supplying approximately 13% of the school's electricity and helping the students learn about renewable energy. Truro's school has for a decade had an active educational program on climate change and coping with it through renewable energy, conservation, recycling, composting, etc.

An important part of TEC's work has been to educate Truro citizens about energy efficiency and related issues. A semi-annual Sustainability Newsletter, soon renamed Truro Tidelines, was mailed to all postal box holders from 2007 to 2010, when it was replaced by the current emailed monthly Truro eNewsletter. During these years between the founding of TEC and Truro's applying to the Green Communities program for a preparatory grant in 2009, other forms of public education included a free showing of "An Inconvenient Truth"; a series of public lectures ("Greening Truro"); preparation

in 2006 of a 10-page document, *"101 Ways You Can Combat Global Warming,"* a list of things the ordinary citizen can do to reduce GHG emissions, given out along with other information at numerous public meetings (e.g., at Truro's Step It Up rally in 2007) and steadily enlarged to 120 Ways.

An Energy-Saving Survey in June-July 2008 was mailed to all postal box holders, posted on line via Survey Monkey, and distributed at public meetings. There were over 200 responses, about a 15% reply rate. Introduced as a part of our baseline study of energy consumption and practices, it presented a list of 33 energy-saving practices inquiring how often or how much the respondent engaged in each, incidentally pointing them out as ways to combat global warming. Also in 2008, the work of the TEC was publicized through a dedicated web site, www.truroenergy.org, supplementing the committee's page at the municipal web site, www.truro-ma.gov.

In the fall of 2009, TEC prepared a successful application to the Green Communities program for a planning grant.

B. Summary of Municipal Energy Uses

Energy use is categorized by the category of the "user", namely building, vehicle, or street or traffic light. Each of these categories has different energy profiles with usually different strategies for conserving energy.

1. Municipal Buildings

Truro has 14 municipal buildings including one elementary school, namely the Truro Central School (TCS). (see Table 1). This does not count sheds that do not consume energy or have their own electric meter. The Police and Fire/Rescue departments (PFR) share a single Public Safety building.

2. Vehicles

The Town owns 9 vehicles subject to the Fuel Efficient Vehicle Policy ("non-exempt vehicles") and a fleet of 41 gas and diesel powered maintenance and public safety vehicles (Appendix B) that are exempt from the Policy. Truro Central School owns no vehicles, but contracts for bus transportation for its students.

3. Street and Traffic Lights

The Town owns 3 of the 40 streetlights, with 37 leased from NSTAR.

There are no full traffic signals in Truro. There is one blinking light on Rt 6 and one on Rt 6A, as well as two blinking lights at the TCS.

4. Water and Sewer

There is no municipal water supply or sewer system. The neighboring Town of Provincetown operates water wells and a pumping and piping system in North Truro. Over 400 dwelling and private businesses and 5 Truro Town buildings are supplied water from the same main as part of the inter-municipal agreement. In addition there are 19 Public Water Supply (PWS) wells, servicing a variety of restaurants, stores, cottages and condominiums. These wells are privately operated. The remaining private homes and businesses have their own water wells and all have Title V septic systems. All Town buildings have Title V septic systems.

The Golf Course operates a seasonal grass irrigation system for greens and fairways.

Table 1 below summarizes the various Energy Users.

Table 1: Summary of Truro Municipal Energy Users

	Number	Ownership
Buildings	14	
Oil Heat	7	Town of Truro
Propane	7	Town of Truro
Vehicles	50	
Non-Exempt	9	Town of Truro
Exempt	41	Town of Truro
School Vehicles	None	
Street Lights	40	
Municipally owned	3	Town of Truro
Utility owned	37	NSTAR
Traffic Lights	4	Town of Truro
Golf Course Irrigation	1	CCNS

5. Energy Providers and Sources of Energy Data:

Electricity for the entire Town is delivered by NSTAR and provided by Con Edison Solutions through a Cape Light Compact municipal contract.

Heating oil is currently purchased through a single contract with Cape Cod Oil. Propane is purchased from F. A. Day & Sons. As of March 2010, all fueling for Town vehicles occurs at the Highway Department facility. Fuel is purchased in bulk and consumption is tracked for each vehicle using an electronic key system.

C. Summary of Energy Use Baseline and Plans for Reductions

Since 2009 the Town of Truro has been compiling its energy usage data for municipal and school facilities from utility bills and accounts into Microsoft Office Excel spreadsheets. Energy data for most of Truro's buildings reaches as far back as to include information on electricity and other energy consumption for fiscal year 2009. More recently the MassEnergyInsight (MEI) energy tracking system has been employed in addition to these other programs.

MassEnergyInsight data has been included in this report to show where Truro stands in terms of its current energy use. Electricity was measured in kilowatt hours (kWh). Heating oil, liquid propane gas, gasoline, and diesel have been measured in gallons.

MassEnergyInsight monitors energy using *one million British thermal units (MMBtus)* as the standard unit of measurement. This allows energy use from the various units of measure to be combined to show overall energy consumption. MMBtus are therefore used as the common unit of measure of energy in this report.

A conversion table for converting kWh and gallons into MMBtus is provided in Section VII. As brief examples, a car idling for 9 hours uses about eight (8) gallons of gasoline which is the equivalent of one MMBtu; or a 1500 watt hair dryer left on for 8 days would also consume about one MMBtu.

The ERP uses fiscal year 2010 for the baseline inventory year. This was the first full year of operation of the new Community Center, and provides a stable baseline for future comparison and reduction measurement, and from which to track Truro's progress towards meeting its energy reduction goal of 20% over five years.

Approximately 63% of the total energy use was consumed by buildings and 36% by vehicles. Street and traffic lights plus golf course irrigation consumed 0.5% and 0.2% respectively.

Table 2: Summary of Municipal Energy Use Baseline

	MMBtus Used in Baseline Year	% of Total MMBtu Baseline Energy Consumption	Projected Planned MMBtu Savings	Savings as % of Total MMBtu Baseline Energy Consumption
Buildings	7,032	63.4%	1,234	11.1%
Vehicles	3,983	35.9%	984	8.9%
Street & Traffic Lights	53	0.5%	11	0.1%
Golf Irrigation	25	0.2%	3	0.0%
Total	11,092	100%	2,234	20.1%

D. Summary of Goals and Strategies to be Used in Carrying Out the Action Plan

The goal of the present Energy Reduction Plan is to reduce total municipal energy use by at least 20% in five years. Green Community program requirements and grant funding are important elements to the success of this plan. A subsidiary goal is to meet the standards of the US Mayors' Climate Protection Plan.

This Energy Reduction Plan will be monitored and executed by the School Administrator and Principal, the Board of Selectmen, the Town Administrator and Assistant Administrator/Town Planner, the DPW director, and department heads and building Energy Managers all working together with the TEC.

Each building has an appointed "Energy Manager" who is aware of the operating characteristics of the building and its effect on the occupants, and who is also interested in helping to reduce its energy consumption. This helps insure that the mission of energy reduction is organizationally grounded, and that there are the appropriate knowledgeable, responsible and motivated managers on the energy reduction team. The building Energy Managers are listed in the schedule below.

<u>BUILDING</u>	<u>ENERGY MANAGER</u>
School	Brian Davis
Public Safety PFR	John Lundborn
Town Hall	Charleen Greenhalgh
Community Center	Susan Travers / Kelly Sullivan
Library	Meg Ryoka
DPW Office/Garage	Paul Morris
Golf Clubhouse/Garage	Jim Knowles
Transfer Station	Tim Rose
Beach Office	Dick Seed
Swap Shop	Tim Rose
Snow's Field	Kelly Sullivan
Harbormaster	Joe Francis

A **first major strategy** will be to address the recommendations in the Cape Light Compact (CLC) audits performed on town buildings in late 2009 through early 2011. Many of the recommendations will be eligible for funding through CLC incentives that pay 100% of pre-approved work for municipal facilities up to \$150,000.

A **second energy reduction strategy** is to initiate a 3-year energy audit schedule for town buildings to keep current with CLC opportunities for energy retrofit and funding

opportunities. An auxiliary strategy is to endeavor to qualify Town buildings as Energy Star Buildings, taking advantage of that program's benchmarking score and related recommendations as well as the funding rebates available.

A **third strategy** is to draft and implement a maintenance, renewal and replacement schedule for town facilities, vehicles, and equipment using Energy Star appliances and energy-efficient building construction.

A **fourth strategy** is to implement idling technologies to minimize fuel consumption when a vehicle is left idling.

A **fifth strategy** is for the office of the Town Administrator to update and monitor the Town's energy use regularly through MEI to determine opportunities for energy conservation, address inefficiencies, and draw attention to problem areas.

TEC has proposed energy use guidelines for Town buildings to ensure that each facility is operated and used in a manner that minimizes energy use. The TEC supports the Town Administrator in working with the designated building energy manager to ensure that the guidelines are implemented. We believe that change can be effected through careful monitoring of energy expenses and by enlisting town personnel in a common effort, by encouraging reducing waste through regular feedback and education.

III. ENERGY USE BASELINE INVENTORY

A. Identification of the Inventory Tool Used

MassEnergyInsight (used as primary baseline inventory tool)

Excel spreadsheets (used along with MassEnergyInsight for data entry, confirmation, and special calculations and graphing)

B. Identification of the Baseline Year

FY2010, namely July 1, 2009 through June 30, 2010

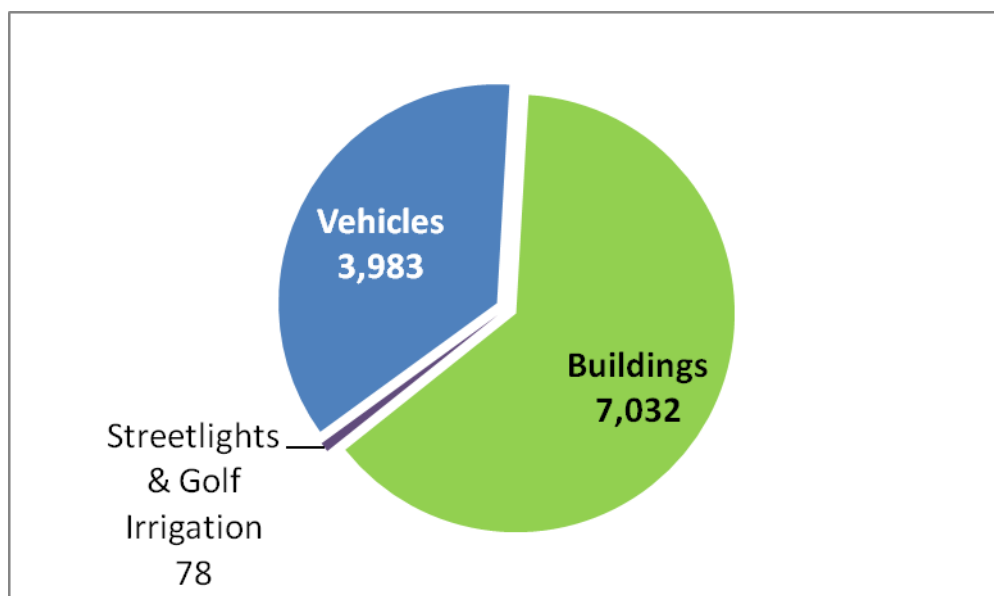
C. Municipal Energy Consumption for the Baseline Year

1. Summary

The Town of Truro municipal use for FY2010 was a total of **11,092 MMBtus** at a total cost of **\$310,743**. The pie chart in Figure 1 below shows the usage in MMBtus by the major user categories:

- Buildings use 63% of total MMBtus;
- Vehicles use 36% of total MMBtus;
- Street and Traffic lights and Golf Irrigation are placed in a third category because of the small combined usage, and use less than 1% of total MMBtus.

Figure 1: Energy Consumption Summary in MMBtus



2. Building Detail

Table 3a below provides an overall breakdown of the building energy consumption of **7,032 MMBtus**, showing each of the 14 buildings with its units of energy consumption. Street and traffic lights, and golf course irrigation pumps are also shown. Total cost by type of fuel for FY2010 was

- Electricity \$152,553
- #2 Fuel Oil \$57,688
- Propane \$12,723

Table 3a: Municipal Energy Use Baseline (excluding Vehicles)

	Electricity		#2 Fuel Oil		Propane		Total MMBtu
	kWh	MMBtu	Gals	MMBtu	Gals	MMBtu	
School	222480	759	9640	1340	2372	216	2,315
Public Safety PFR	169686	579	4149	577	0	0	1,156
Town Hall	116240	397	4614	641	0	0	1,038
Community Center	112640	384	0	0	5638	513	897
Library	69520	237	3363	467	0	0	705
DPW Garage	0		2471	343	0	0	343
DPW Office	26225	89	0	0	319	29	119
Golf Clubhouse	19701	67	685	95	0	0	162
Golf Garage	10145	35	0	0	283	26	60
Transfer Station	19571	67	0	0	93	8	75
Beach Office	3321	11	446	62	0	0	73
Swap Shop	2683	9	0	0	405	37	46
Snow's Field	4708	16	0	0	116	11	27
Harbormaster	4382	15	0	0	0	0	15

BUILDINGS Total	781302	2666	25368	3526	9226	840	7,032
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Golf Irrigation	7314	25	0	0	0	0	25
Street/Traffic Light	15533	53	0	0	0	0	53

ADDITIONAL Total	22847	78	0	0	0	0	78
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3. Vehicles

In the baseline year FY2010, a total of **32,464 gallons** of vehicle fuel were consumed at a total cost of **\$87,769**. This was in a year when the average fuel cost was only \$2.70 per gallon. This converts to total usage by vehicles of **3,983 MMBtus**.

The combined usage of the DPW and Police departments represents 83% of that consumption. Another 14% was consumed by the combined usage of the Golf Course, the Council on Aging, and the Fire and Rescue departments. The remaining departments combined consumed 3% of the fuel.

The largest users of vehicle fuels are the first five departments listed, which represent over 97% of the town's vehicle fuel consumption. Table 3b below shows the gallons used by department in FY2010.

Table 3b: Vehicle Fuel Use Baseline by Department

Department	Gallons Used	% of Total
DPW	14,126	44%
Police	12,866	40%
Golf Course	1,833	6%
Council on Aging	1,800	6%
Fire & Rescue	983	3%
Beach	418	1%
Building	308	1%
Recreation	83	0.3%
Animal Control	29	0.1%
Harbor	18	0.1%

Table 3c below provides an overall breakdown of energy consumption with the gallons consumed by vehicles also included in the aggregate.

Table 3c: Municipal Energy Use Baseline - (including Vehicles)

Categories of Energy Use	FY2010 - Baseline Year		
	Vehicle Fuel (gallons)	MMBtus Used	% of Total
Vehicles in Aggregate	32,464	3,983	35.9%
Buildings		7,032	63.4%
Street/Traffic lights & Golf Irrigation		78	0.7%
TOTAL ENERGY CONSUMPTION		11,092	100.0%

D. Areas of Least Efficiency/Greatest Waste

As noted in Table 2, Truro's buildings contribute approximately two-thirds of the MMBtus consumed by the town, while gasoline and diesel vehicles generate the remaining one third MMBtus. Street and Traffic Lights and Golf Irrigation contribute only 0.7% of the MMBtus. The obvious first place to look for energy saving is the town buildings.

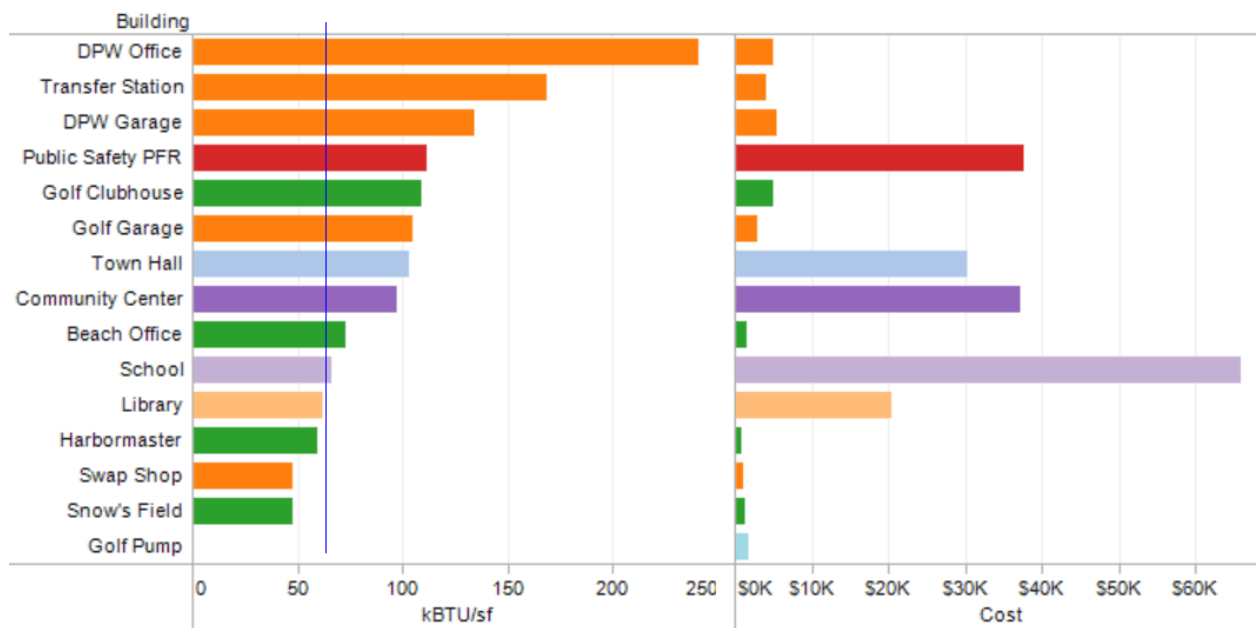
1. Buildings

MassEnergyInsight provided a summary of "Buildings to Target" by looking at relative energy consumption per square foot of space. Buildings with the highest MMBtus per square foot are the least efficient. Furthermore, the larger the MMBtu consumption of these inefficient buildings, the larger is the energy reduction opportunity.

Figure 2 below shows two key comparative bar graphs.

- The graph on the left shows the relative efficiency of the building on an MMBtu per square foot basis.
- The graph on the right shows the cost of the energy consumed by that building in FY2010.

Figure 2: Buildings to Target: Building Efficiency and Cost



Truro's three least efficient buildings are also among the smaller of the town's buildings. While the gain from efficiency measures may be significant relative to their energy

consumption, the larger facilities are the areas to target to achieve significant energy reduction.

a) Statewide Median Efficiency – 64.4

The MEI database shows a median efficiency for all Massachusetts elementary schools of about 64.4 kBtu/sf. This is shown on the graph in Figure 2 as a blue vertical line. The Truro Central School appears to be an “average” consumer (66.3 vs. a median of 64.4, or about 3% less efficient than the median). Although there is likely some variation from a school to other municipal buildings, the hours of operation are comparable, and a median metric of about 64 can provide some idea of where Truro buildings compare on a state-wide basis.

b) DPW Facility

The most exceptional and inefficient building complex is the Department of Public Works. It currently has two conditioned buildings: the DPW Office and the DPW Garage. Both are old, poorly insulated buildings. In fact the walls of the DPW Garage are un-insulated concrete masonry units (“concrete blocks”). A solution to this highly energy inefficient facility will be discussed later in this plan.

2. Vehicles

a) Non-Exempt (<8500 lbs GVWR)

The town owns 9 non-exempt vehicles which are on an 8-year replacement cycle. These vehicles will adhere to the fuel-efficient vehicle replacement policy adopted by the Board of Selectmen in March 2011.

b) Exempt (police cruisers or vehicles over 8500 lbs GVWR)

Reduction in gasoline usage due to idling of the 8 police cruisers is a major opportunity that will be discussed in more detail. Also replacement of the older model Ford Crown Victoria cruisers represents an additional opportunity.

The remaining 33 exempt vehicles have specific functions which limit the potential for energy savings through replacement. Savings on gasoline and diesel therefore are more difficult to target through vehicle replacement. Some opportunity for energy conservation can be achieved through attention to scheduled maintenance, limiting unnecessary travel, avoiding idling, and cutting use where feasible.

3. Traffic and Street Lights

The town’s 40 street lights and 4 traffic lights consumed 53 MMBtus in the baseline year. There are opportunities to reduce this with new lighting technology.

E. Areas that can be most easily addressed

Achieving greater energy efficiency may not require significant efforts or costs; these measures are often referred to as the “low hanging fruit” of energy efficiency as they are typically within reach financially and operationally. Lights that remain turned on unnecessarily may be one of the greatest sources of wasted energy use while at the same time this may be one of the simplest issues to address with simple changes such as motion sensitive switches. Small cost effective efforts such as these are likely to have the greatest impact on facility wide energy use especially within Truro’s larger buildings.

Another area that may be addressed with little cost and minimal effort may be as simple as adjusting thermostats and ensuring personnel are familiar with their operation. Programmable thermostats preset to more energy efficient settings may result in greater energy and cost savings.

TEC is in the process of working with the appointed Energy Managers of each of the town’s buildings, to jointly determine which of the Energy Conservation Measures identified in this plan represent easy-to-address areas for improvement.

In addition, additional energy conservation will come from education and conscientious attention to reducing waste through carefully monitoring consumption, reporting use trends, focusing on problem areas, understanding consequences and encouraging improvement.

Two exempt police vehicles have recently had IdleRight™ systems installed. Cruisers often have to keep lights, radios, etc. operating when they are standing still, often for extended periods, in order not to drain their batteries. The system shuts off the engine when feasible, restarting it only as necessary to keep the battery charged. These pilot installations are meeting expectations for significant gasoline savings. The Energy Committee is working closely with the Police Chief to cost-justify installation of the IdleRight system in the other 6 police cruisers. Significant gasoline savings are projected from this project with a relatively small investment.

Several buildings can benefit from re-lamping lighting fixtures with more efficient lighting technologies. These projects can be accomplished relatively easily.

The combination of these opportunities will certainly contribute to the town’s MMBtu energy savings. Next are projects that will require additional engineering and cost, and these additional projects will be phased in over the five year plan. Detailed energy audits of each building have revealed specific Energy Conservation Measures that can be undertaken to address energy consumption. These audits and the measures planned will be discussed in the next section.

IV. SUMMARY OF ENERGY AUDITS

Truro has worked closely with Cape Light Compact (CLC) to review the energy efficiency of the larger town buildings. CLC has further engaged RISE Engineering to provide a Scoping Assessment of the Town's Buildings, Energy Audits of four town buildings, and energy consultations on problem issues in the Town Hall and Public Library.

Selected energy upgrades funded by CLC have been performed at no cost to the town (see Audits and Scoping Assessment Attachments in Appendix C). The Library was audited, but there were no electrical energy conservation opportunities for RISE to address. Therefore, no report was sent to the town.

An audit of the Community Center took place on May 26, 2011. It had not been audited earlier, since it was a relatively new building put into commission in 2009. However, its baseline energy efficiency and energy cost is not much better than older buildings, so an audit was commissioned to look for energy conservation opportunities.

The audits resulted in lists of potential Energy Conservation Measures (ECMs) relating to optimizing energy efficiency. Most of the reports included a focus on upgrading the lighting systems; some of the lighting savings will be further enhanced with the installation of occupancy controls that will automatically shut lights off when rooms are unoccupied. These lighting ECM's show good potential for energy savings and are worthy of investment. Some of the lighting ECM's are eligible for incentives provided through CLC.

Figure 3 below shows the dates and building scope of the five audits that have been conducted on the larger town buildings. It is largely from these audits that the Energy Conservation Measures have been identified. A total of 13 building audits have been performed.

Figure 3: Truro Building Energy Audits

<i>Sponsor:</i>	CLC	CLC	CLC	CLC	CLC
<i>Auditor:</i>	RISE	A. Mulak	RISE	RISE	N. Price
<i>Date:</i>	12/4/09	4/14/10	7/21/10	8/17/10	5/26/11
School		X	X		
Public Safety PFR		X	X		
Town Hall	X	X			
Community Center					X
Library		X		X	
DPW Garage		X	X		
DPW Office		X	X		

A summary of these audits along with their key findings is provided below.

A. 12/4/2009 – Town Hall Audit

A partial audit of the Town Hall by RISE Engineering was conducted in December 2009 to address heating and air conditioning problems. The following Energy Conservation Measures (ECM) were recommended:

- ECM – 1 Provide a variable frequency drive (VFD) for AHU-1.
- ECM – 2 Provide a variable frequency drive (VFD) for the Lead pump only of the glycol system.

B. 4/14/2010 – 5 Building Audit

This assessment provided a prioritized list of the recommended Energy Conservation Opportunities (ECO) found in this report.

Group #1: Recommended for immediate implementation in all facilities:

- ECO – 1 Group Relamp T8 Lighting with High Performance Fluorescent Lighting
- ECO – 2 Install / Replace Occupancy Sensors
- ECO – 3 Replace all non-LED exit signs with LED units
- ECO – 4 Lighting Control Plug Load with Sensing Surge Protectors

Group #2: Recommended for implementation in specific facilities:

- ECO – 5 Survey Town Hall and Library with Infrared Camera
- ECO – 6 In the School and Public Safety Facility, replace Hot Water Tank with On-Demand Units (upon burnout of existing units)
- ECO – 7 In the School, install Vending Machine Controls
- ECO – 8 In the School, install Economizers on Walk-in Coolers and Freezers
- ECO – 9 In the School, replace existing Boilers
- ECO – 10 In the DPW office, replace existing HVAC equipment with ductless mini split inverter technology
- ECO – 11 In the Public Safety Facility, replace existing HVAC equipment with ductless mini split inverter technology (upon burnout of existing units)
- ECO – 12 In the DPW yard, replace existing exterior lighting

C. 7/21/2010 – 3 Building Audit

An additional audit of Truro Central School (TCS), DPW, and Public Safety Facility was conducted by RISE Engineering. Recommendations for TCS included lighting lamp replacements, ballast replacements, vending machine sensor, and parking lot lights. Recommendations for DPW included lighting and ballast replacement. Recommendations for the Public Safety Facility included an automatic light sensor.

All work from this audit was completed at the TCS and at the Public Safety Facility. It has been scheduled but not yet completed at the DPW.

D. 8/17/2010 – Library Audit

An audit of the Library by RISE Engineering was conducted in August 2010. At that time no electrical problems were found, but it was noted that there was a lack of insulation in the attic. RISE Engineering referred us to Bill Branton who met with the Library Director in April 2011, and made a proposal to install insulation and air sealing and install a Boiler Reset Control. The work will be completed in June 2011.

E. 5/26/2011 – Community Center Audit

An audit of the Community Center was conducted by Cape Light Compact on May 26, 2011. The report generated is meant to be an addendum to the April 14, 2010 Scoping Assessment Report. This audit provided the following prioritized list of recommended Energy Conservation Opportunities (ECO), with details found in the report.

- ECO – 4 Lighting Control Plug Load with Sensing Surge Protectors
- ECO – 5 Survey with Infrared Camera
- ECO – 6 Replace Hot Water Tank with On-Demand Units (upon burnout of existing units)
- ECO – 7 Install Vending Machine Controls
- ECO – 9 Boiler Reset Controls
- Other Thermostatically Controlled Valves
- Weather-stripping

F. Future Supplemental Audits

Truro plans to continue to perform energy audits every three years and implement suggested energy efficiency upgrade projects. The result can be significant reductions in energy use and related costs, with relatively short payback periods. These can be further shortened by use of available utility incentive programs and other funding resources.

V. ENERGY USE REDUCTION

A. Narrative Summary - Overview of Short- and Long-Term Goals

1. Short-term goals

- To implement the building Energy Conservation Measures recommended in the above-referenced audits and outlined in this plan;
- To implement the IdleRight fuel conservation system in all police cruisers and other selected vehicles;
- To seek further opportunities to reduce the electricity used for street lights and other outdoor lighting and signaling;
- Purchase only Energy Star appliances and office electronic devices for Town buildings (i.e., printers, copiers, etc.).

2. Long-term goals

- To rebuild the town's DPW facility to the latest level of energy-efficiency;
- To maximize the energy efficiency of Town buildings, striving to qualify them for Energy Star status;
- To implement the planned replacements for Town vehicles;
- To minimize use of fuel by the Town's fleet of vehicles and other fuel-using machines using Fuel Economy Measures;
- To work with the Town Administrator, the building Energy Managers and the Board of Selectmen to seek further energy efficiencies while maintaining the gains attained.

B. Getting to a 20% Energy Use Reduction Within the 5 Year Period Following the Baseline Year

Truro has identified over 70 specific measures and programs with projected reductions to turn these goals into realized energy reductions. These reductions come from every building and every vehicle pool owned by the town.

With a **baseline energy use of 11,092 MMBtus**, and based on a **minimum target of a 20% energy use reduction**, Truro must identify specific projects and programs that will yield a **reduction in energy use of 2,218 MMBtus** in total.

1. List of Strategies to Reduce Energy Usage

a) Buildings

A regular schedule of repeated energy audits and Energy Star “benchmarking” will be followed by putting into effect as many of the recommended changes as can be afforded. We will use money saved through energy conservation, Green Community grant money, and subsidies from the Cape Light Compact and NSTAR to finance the recommended projects.

b) Vehicles

The Town of Truro has adopted the recommended new Green Communities Criterion 4 fuel-efficient vehicle policy. In addition to adherence to that policy, efforts will be made to reduce, where possible, the size of the fleet and/or mileage traveled, and to replace exempt vehicles by more energy-efficient ones as necessary and feasible. For example, the Police Chief has indicated his intention to complete the replacement of all (exempt) cruisers by a more efficient Dodge Charger model he has on order for one of the Crown Victoria cars.

In 2010 the town installed a fuel depot at the DPW which facilitates monitoring of gasoline and diesel consumption by vehicle. While bulk purchasing will provide a financial efficiency for the town, it is anticipated that vehicle based oversight will enable the town to discover inefficiencies and fuel savings opportunities at the vehicle level, and to take appropriate action. This will also encourage conservation through the Fuel Economy Measures discussed below.

Idling technology will be installed in all vehicles that consume fuel due to significant amounts of idling (e.g., police cruisers).

c) Street and Traffic Lighting

Where not presently implemented, lighting near buildings will be scheduled by use of automatic, timed or light-sensitive programming. Existing street lights will be upgraded to LEDs as soon as the technology is commercially available and subsidized by CLC.

d) General Conservation

In addition to changes in municipal policy and procedure, a good deal of energy can be saved by the individual actions of employees. For the most part, the ways we go about our everyday work are not matters of deliberate decision, but are ingrained habits, not easy to change even with the best intentions. The individuals themselves must understand the reasons change is necessary and must have a voice in decisions to act in more energy-efficient ways. The Board of Selectmen, Town Administrator, Department Heads and Building Energy Managers can encourage gradual change.

The process could begin with a series of discussion groups made up of Town employees, in which those issues will be raised for the group to talk about. The meetings will then be guided to the question, what can we do about conserving the use of energy in our everyday work lives? Ideas generated by the people who need to follow them are far more likely to be accepted than those handed down as new rules or policies decided from above.

Guided brainstorming can eventually lead to group decisions to make such changes as making sure that lights and equipment are turned off when not to be used for some hours (as on leaving at the end of the work day), promptly reporting to Energy Managers of buildings any problems with room temperature—for just a few examples.

Based on the experience of other towns, it seems reasonable to estimate an additional 1%-2% savings in MMBtus over the five year period. For the purposes of this plan, a conservative reduction of 1% in five years has been assumed.

2. Program Management Plan for Implementation, Monitoring and Oversight

The Town Administrator will be responsible for oversight of the ERP and implementing energy conservation measures in the Energy Reduction Plan. Department Heads will be responsible for the implementation of the energy reduction plan for their respective departments. The town accounting department will be responsible for recording data on energy use and cost.

“You can't manage what you don't measure.”

Recently, the Board of Selectmen, at the suggestion of the Energy Committee, asked the Town Administrator to appoint an “Energy Manager” for each of the Town’s facilities. This will provide knowledgeable points of contact with which to implement and monitor energy conservation measures.

The Energy Committee will continue to assist the Town Administrator, Department Heads, and Energy Managers, as well as facilitate audits and make recommendations for new strategies and opportunities to maximize energy conservation by keeping focused on developments in renewable energy and conservation. Truro is a small town with a simple organizational structure. The Energy Committee meets regularly at posted meetings, and much of the work is conducted by talking directly with the Town Administrator and department heads in an impromptu fashion. Cooperation between the Town Administration, the Selectmen, the departments and the Energy Committee is frequent and informal, thus a defined structure for implementation and monitoring the ERP is relatively uncomplicated and efficient.

3. Energy Conservation Measures (ECMs)

The contributors to this plan have created a prioritized list of specific projects that can be undertaken, each with projected energy savings. For Buildings and Streetlights, these projects are called ECM's or Energy Conservation Measures. For each ECM, we have noted the source of the projected savings, e.g., audit, manufacturer data, etc. Also for each measure, we have provided the total projected savings in native units of energy (e.g., kWh, gallons, etc.) and MMBtus.

For vehicles energy efficiency essentially equates to fuel conservation and various Fuel Conservation Measures (FCMs) have been planned and are underway. The term FCM is equivalent to ECM for vehicles.

Projected annual MMBtu savings for each major category have been subtotaled: buildings, vehicles, and street/traffic lights as well as a grand total for the Town of Truro.

a) Executive Summary

(1) Buildings

Further details are provided in this Section, but a thorough analysis has indicated that **seven (7) major building-related projects (the "Top 7") will contribute 60% of the building-related savings.** The remaining 40% of the savings comes from 60 smaller projects (less than 50 MMBtu savings each) spread across all 14 buildings. Each of the major projects contributes a target reduction of at least 50 MMBtus.

(2) Vehicles

Five (5) major vehicle-related Fuel Conservation Measures (the "Big 5") have been identified, which account for the energy savings related to the various vehicle fleets. **These Big 5 programs can contribute even more energy savings than the Top 7 building projects,** but less than all building projects in total.

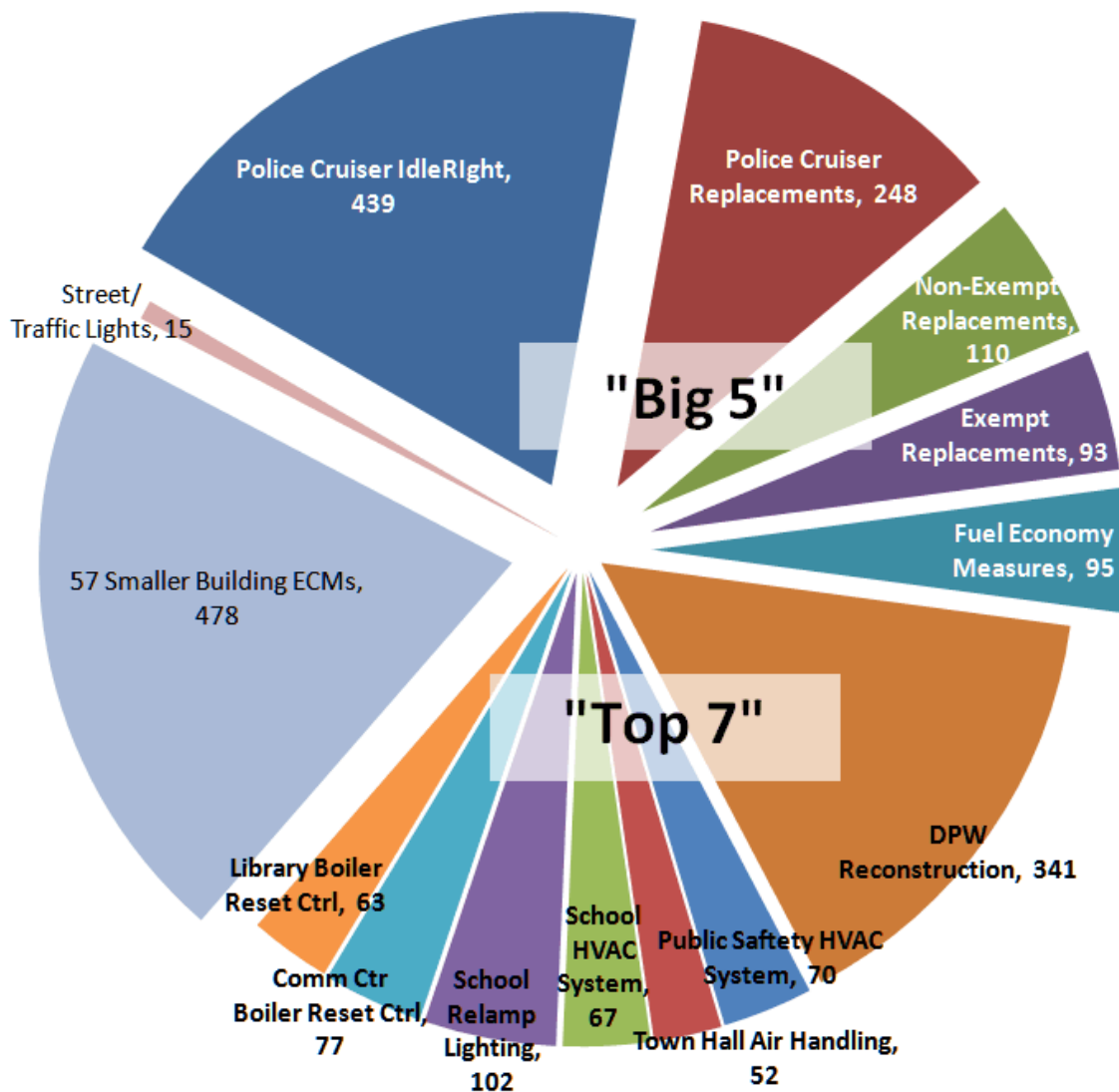
(3) Implementation

Figure 4 below summarizes this approach, and shows the MMBtu savings projected by the end of the 5 year period.

The Top 7 building projects and the Big 5 vehicle projects are clearly shown.

The total MMBtu savings of the smaller 57 building projects are shown in the aggregate, along with street and traffic light related projects.

Figure 4: MMBtu Savings of Top 7 Building Projects, Big 5 Vehicle Programs, and 57 Smaller Building Projects



The strategy to achieve the energy reductions will be to complete the Top 7 building projects that contribute 60% of the building-related goal, while keeping sight of the numerous small projects to be accomplished that also contribute 40% of this goal.

In parallel, we must maintain focus on the Big 5 vehicle fuel conservation programs.

b) ECM Summary by Building

Table 4 below summarizes the **projected savings** of all building-related ECM's by building.

TABLE 4: Energy Conservation Measures – Totals Summary

Building	# of Energy Conservation Measures	Projected Annual Savings			
		kWh	gallons Oil	gallons Propane	MMBtus
School	8	42,391	578	150	239
Public Safety PFR	8	9,337	616	-	118
Town Hall	12	22,607	796	-	188
Community Center	9	5,360	-	1,885	190
Library	8	14,357	615	-	135
DPW Garage	7	1,250	-	-	346
DPW Office					
Golf Clubhouse	3	2,265	-	-	8
Golf Garage	1	250	-	20	3
Transfer Station	1	900	-	10	4
Beach Office	4	400	-	-	1
Swap Shop	1	150	-	20	2
Snow's Field	1	100	-	15	2
Harbormaster	1	200	-	-	1
TOTAL Projected Savings	64	99,566	2,606	2,100	1,234

Note that because of the planned reconstruction of the entire DPW facility, the DPW Garage and Office are combined for planning purposes.

c) ECM Detailed Project Information

Appendix D shows the details for each of the 64 ECMs, including the ECM's description and source. Virtually all of this detail arose from one of the 13 building audits conducted in the past one and a half years.

Table 4a below shows one of the Top 7 ECMs to illustrate the detail provided in Appendix D for all ECMs.

Table 4a: Example ECM Detailed Project Information

Projected Savings	Building	School
	ECM Key	ECO-1
	One of "Top 7"	Y
	Description	Group Relamp T8 Lighting with High Performance Fluorescent Lighting
	Source for Measure	Cape Light Compact Assessment 4/14/2010
	kWh	29,748
	Oil (gals)	
	LP (gals)	
	Vehicle Fuels (gals)	
	Annual MMBtus	102
	Annual \$ Saved	\$6,545
	Source for Projected Savings	RISE Engineering Audit 7/2010
Cost	Projected Cost to Implement	\$16,168
	Potential Utility \$ Incentives	\$16,168
	Net Cost w/ Incentives	\$0

Years to Pay back	-
Payback Years w/ Incentives	-
Implementation FY	2011
Timing Consideration	Completed 12/10 at no cost

d) ECM Scheduling by Fiscal Year

Each of the 64 ECMs has been scheduled to be implemented in the appropriate fiscal year as shown in the ECM detail. The result is a year-over-year reduction of energy usage. Although there are improvements each year, a major improvement occurs when the DPW buildings, which are highly inefficient, are rebuilt to the latest level of energy efficiency. This is shown in the fifth year.

Figure 5 below shows the projected MMBtu usage for buildings for each of the five years of the plan.

This provides a set of year-by-year energy use targets to help determine if the overall energy reduction progress is producing the projected results.

Figure 5: Projected MMBtu Usage by Year for all Buildings

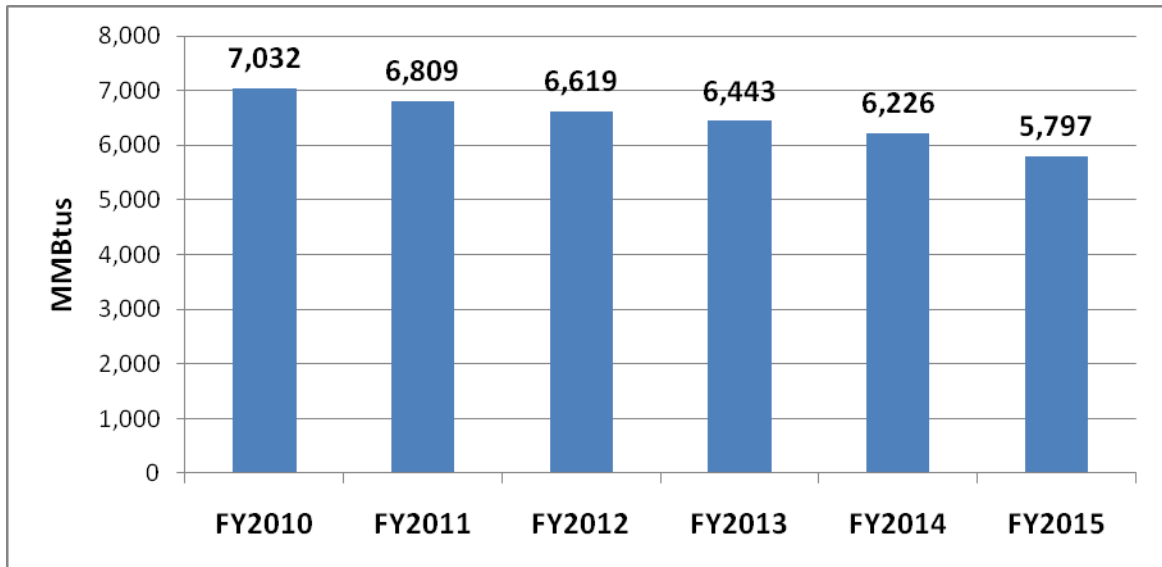
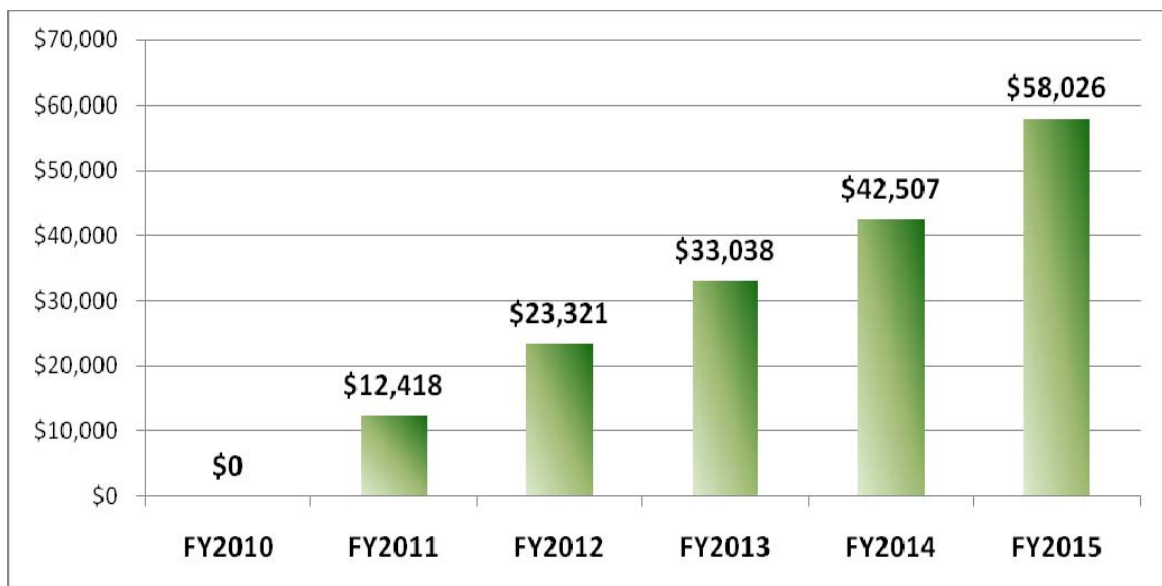


Figure 6 below projects these MMBtu savings in terms of money saved in each fiscal year due to implementing ECMs related to buildings only.

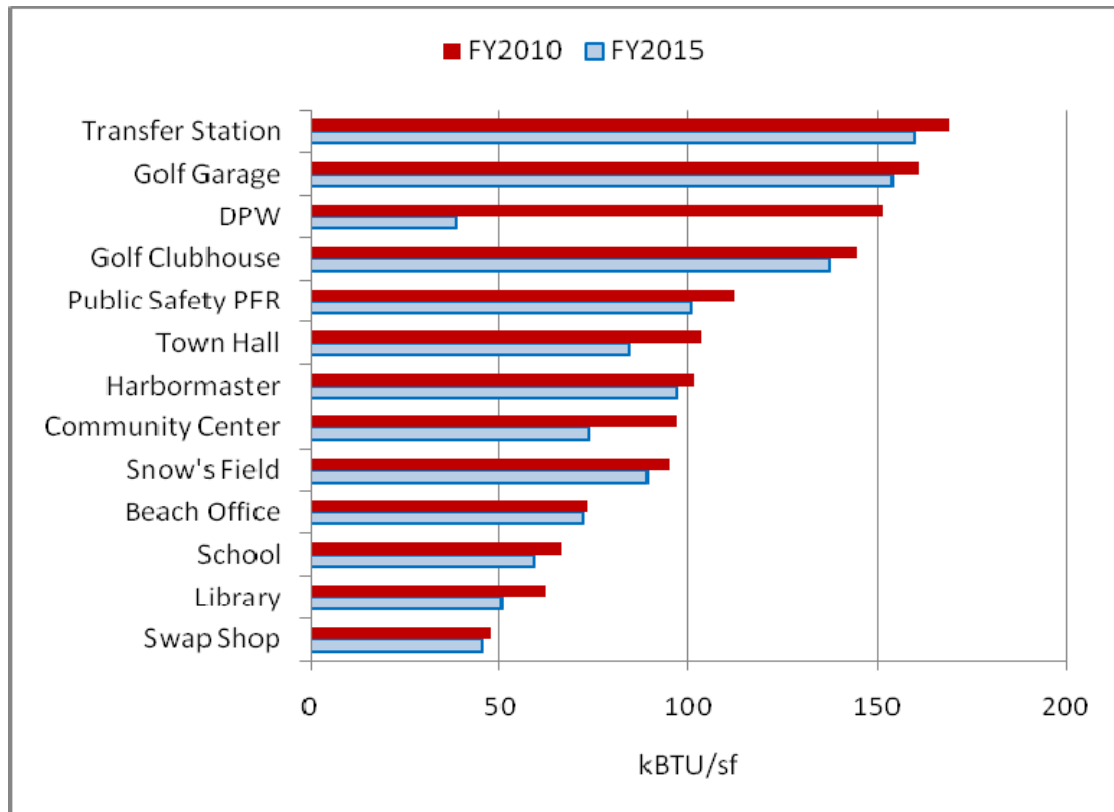
Figure 6: Annual Projected \$ Savings by Year for all Buildings (not including Vehicles)



Note: A 5% increase in energy rates per year has been assumed.

As a result of implementing the various building ECMs, the efficiency of each building should improve. Figure 7 below illustrates the baseline FY2010 energy efficiency of each building, and compares it to the projected 2015 energy efficiency after implementation of all 64 ECMs.

Figure 7: Building Efficiencies, FY2010 vs. FY2015



e) Police Vehicle Gasoline Savings

The Truro Police Department has a strong interest in energy conservation. The new Police Chief, John Lundborn, was commissioned on June 3, 2011 after a year as acting Chief of Police. He has been working closely with the Energy Committee on ways to reduce the Police Department's energy consumption. In addition to energy conservation measures for the Public Safety Facility (Police/Fire/Rescue), Chief Lundborn is also focusing on two significant fuel reduction programs. The Police Department is the 2nd largest consumer of vehicle fuels, so these programs should make a major contribution to the Energy Reduction Plan. Both the IdleRight program and the vehicle replacement program are discussed below.

(1) IdleRight Plan for Police Cruisers

The IdleRight technology is available from Havis, Inc. and is described more completely at www.havis.com/idleright.htm.

The system monitors the vehicle battery's condition and automatically turns the vehicle on to idle only when necessary. While idling at an emergency or construction scene, a typical police cruiser uses about 0.9 gallon of gasoline per hour¹. That same vehicle, equipped with the IdleRight system uses only about 1/10th of a gallon of gasoline per hour — and never jeopardizes the charge in the battery needed for start-up. See Section VII for additional information and sources on fuel savings experienced.



Table 4b below shows the calculated savings for implementing the program on all police vehicles.

Table 4b: IdleRight Fuel Reduction Plan for Police Cruisers

Truro Police Cruiser Characteristic (each)		
A	Hours per Day Idling	1.5
B	Days per Week on Duty	7
C=AxB	Hours per Year Idling	546
G	Gallons per Hour Saved	0.81
S=CxG	Gallons Saved per Vehicle per Year	442
Total for All Cruisers		
N	Number of Police Cruisers	8
SxN	Total Gallons Saved per Year	3,538
	MMBtus Saved per Year	439

The cost of implementing the IdleRight equipment is approximately \$450 per vehicle. This means that the system will **pay for itself in about 3 to 4 months** of operation.

When this program is fully implemented, the **Police Department use of gasoline should be reduced by 27%**, from the baseline of 12,866 gallons per year to approximately 9,328 gallons per year.

¹ Additional references and independent field case studies on the IdleRight system's performance are listed in Section VII – List of Resources.

(2) Police Vehicle Replacement Program

The Police Department is also **committed to replacing its cruisers with more fuel-efficient vehicles**. For example, the department recently replaced three of its nine Ford Crown Victoria vehicles, which get 16 MPG, with the combination below.

- Ford Fusion Hybrid (39 MPG)
- Dodge Charger² (20MPG)
- Honda Motorcycle (44 MPG)

As Police Chief John Lundborn explains, “The 2011 Dodge Charger has a patented fuel saver technology which reduces the 8 cylinder engine down to 4 when the power is not needed. Even without this technology, the vehicle is slightly smaller and yields higher gas mileage than the Ford Crown Victoria, which is in its last year of production.”

As most of the police department vehicles generate high mileages, we anticipate that this **replacement program will reduce non-idling gasoline consumption** by approximately 2,000 gallons per year (**248 MMBtus saved**).

This represents a **21% savings on the net 9,328 gallon usage projected** after taking into consideration the IdleRight program. That percentage savings is commensurate with the improvement in MPG being seen in recent police vehicle replacements.

² Dodge's fuel-saving MDS system seamlessly alternates between smooth, high-fuel-economy four-cylinder mode when less power is needed, and V-8 mode when more power from the new 5.7-liter HEMI engine is in demand.

f) Non-Exempt Vehicles

Truro's non-exempt³ vehicle fleet comprises 9 vehicles which drive an estimated 80,000 miles per year in total. In accordance with the Town's Fuel-Efficient Vehicle Policy, these **vehicles will be replaced with more efficient models at the end of their useful lives.**

A replacement schedule has been projected and based on that schedule an estimated fuel savings has been computed. The projected savings in the 5th year are 887 gallons per year, or **110 MMBtus saved**. Table 4c below shows this vehicle pool.

Table 4c: Non-Exempt Vehicle Inventory and Replacement Schedule

Department	Year	Make /Model/ Drive	Current MPG*	Replacement Schedule (FY)						New MPG*
				10	11	12	13	14	15	
DPW	2004	F150 4WD	14			R				17
DPW/BEACH	2004	F150 4WD	14			R				17
ANIM CNTRL	2007	F150 4WD	15						R	18
BUILD INSP	2009	F EXPL 4WD	15						R	18
FIRE	2003	F CRN VIC	18			R				18
COA	2004	F FREE ST 2WD	17			R				18
POLICE	2007	F TAURUS 2WD	20				R			39
TOWN HALL	2010	F FUSION FWD	25	(1)						(1)
T HALL/REC	2010	F FOCUS FWD	28	(1)						(1)

estimated gallons saved in 5th year 887
estimated MMBtus saved in 5th year 110

* Mileage refers to "combined mileage" as defined by EPA
 (1) replaced prior vehicle with 16 MPG

³ "non-exempt" refers to the Fuel-Efficient Vehicle Policy. Non-exempt vehicles are included in the policy (i.e., they are not exempt from the policy).

g) Exempt Vehicles (excluding Police vehicles)

Non-police exempt vehicles use 3.3 times the total fuel (15,014 gallons) as the non-exempt vehicle fleet (4,584 gallons). Although these vehicles are not subject to the fuel-efficient vehicle replacement policy, their **natural turnover and replacement will provide opportunities for additional fuel savings.**

Given their heavy fuel usage, if the relative savings achieved in this fleet were just 30% of the non-exempt fleet's, the absolute fuel savings should be comparable, and save 887 gallons per year. Another, more conservative, way to envision this objective is to strive to reduce this fuel consumption via replacement at the rate of 1% of the fuel consumption per year.

This would amount to a reduction in five years of 750 gallons of annual usage (93 MMBtus). So Truro will make a long term effort to reduce exempt vehicle fuel consumption via **selective replacement** to achieve an additional **93 MMBtus saved**. Replacement would be cost justified on a vehicle-by-vehicle basis as each replacement opportunity presents.

One way to accomplish this goal is to replace heavy-duty exempt vehicles with hybrid exempt models, as well as downsizing vehicles with more appropriately sized vehicles whenever possible. Please see Appendix B for an inventory of these vehicles.

Also, some vehicles (e.g., ambulances) might be cost-effective candidates for installing the IdleRight system.

h) General Fuel Economy Measures – All Vehicles

Finally, vehicle fuel consumption can be reduced by a number of other measures, each of which can contribute in a small way toward overall fuel conservation. These Fuel Economy Measures include:

- Driving Sensibly
- Removing Excess Weight
- Keeping Engine Tuned
- Keeping Tires Inflated
- Using Recommended Oils

The combination of these measures can save significant fuel at virtually no cost to implement. Appendix E shows these measures in more detail, and provides a quantification of the estimated annual savings of 764 gallons or 95 MMBtus. For more information see www.fueleconomy.gov.

i) All Fuel Conservation Measures – Vehicle Summary

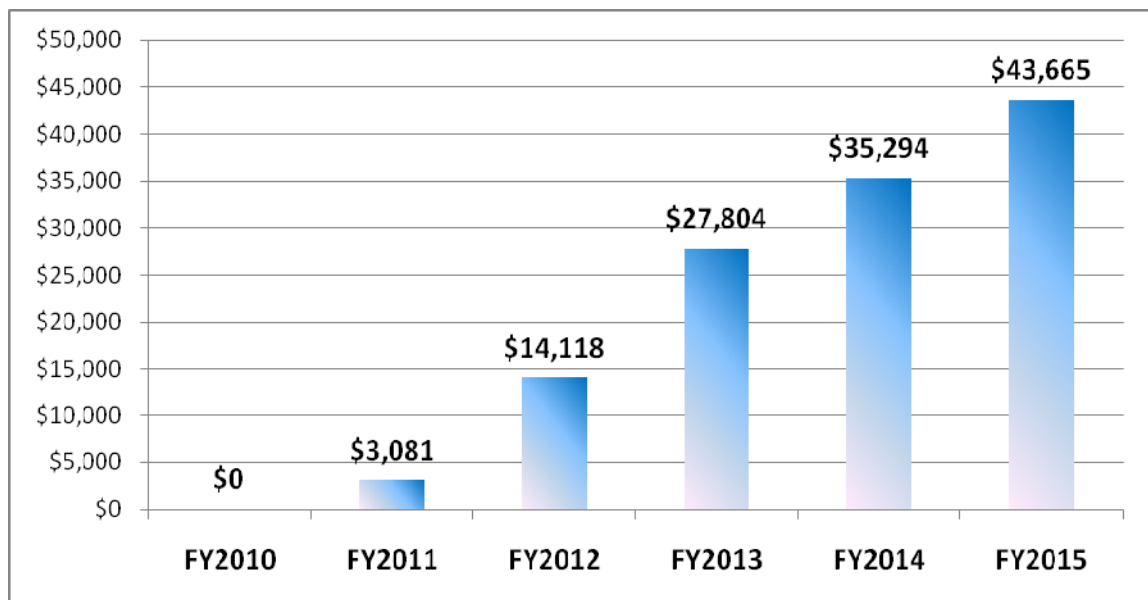
The various fuel conservation and economy measures described above are summarized below in Table 4d. This represents a total fuel savings of 24.7% of the baseline vehicle fuel consumption.

Table 4d Fuel Conservation Measures – Vehicle Summary

Categories for Fuel Reductions	FY2015 - 5th Year of Plan				
	MMBtu Reduction	% of Total Baseline	MMBtu Reduction	% of Fuel Saved	MMBtu Usage in 2015
Vehicle: Police IdleRight	439	4.0%	984	24.7%	2,999
Vehicle: Replacement, Police	248	2.2%			
Vehicle: Replacement, Non-Exempt	110	1.0%			
Vehicle: Replacements, Exempt	93	0.8%			
Vehicle: All Other Measures	95	0.9%			

Figure 8 below projects these fuel savings based on estimated timings of implementation, and using estimated fuel prices projects financial savings compared to remaining at the baseline fuel consumption per year.

Figure 8: Vehicle Fuel Savings – Cost Summary



Note: Fuel prices are assumed to be \$3.50 in FY2011 and increase at the rate of \$0.50 per year.

j) Street and Traffic Lights

By replacing the two flashing traffic lights with LED bulbs, Truro could reduce its electricity use by an average of 1314 kWh (4.5 MMBtus) and save \$300 in energy costs per year (based on Energy Star data – see source in Section VII, List of Resources).

Additional Street and Traffic light audits and focus are projected to save at least an additional 7 MMBtus, for a total savings in this category of 11 MMBtus by the 5th year.

4. Estimated Capital and Operating Costs

Presently, the Town's plan for the money saved is to use those savings for the general operating expenses. That said, these savings will be identified and quantified on a regular basis, and used to indirectly support additional appropriations of funding for future energy savings and/or alternative energy project funding.

The Town, the Board of Selectmen and all Town departments are keenly aware of the accelerating rise in the cost of energy and thus the need to conserve energy for economic as well as environmental reasons. It is the intent of the Town to track and use as much of the cost savings as possible to invest in conservation and to fund the construction of a solar farm to offset the cost of the Town's municipal electric consumption.

There is a clear understanding that investing in energy conservation improves the Town's fiscal well-being for the future. The school is saving \$6000 annually in electric costs with the solar panels installed on the roof, and there is a clear appreciation that investment in energy conservation pays for itself over time. While the Energy Committee will continue to seek grant opportunities and work with Cape Light Compact to fund projects in this Energy Reduction Plan, the Town believes that it is sound policy to funnel cost savings back into projects that have a fiscally responsible pay-back.

Table 5 below shows the projected financial savings for reducing energy costs in accordance with the building-related ECMs in this plan.

Table 5: Estimated Costs of Building ECMs

Building	Annual \$ Saved	Projected Total Cost of all ECMs	Potential Utility \$ Incentives	Net Cost	Years to Pay back
School	\$ 12,240	\$ 47,368	\$ 34,868	\$12,500	1.0
Public Safety PFR	4,520	57,978	30,978	27,000	6.0
Town Hall	8,158	22,200	16,600	5,600	0.7
Community Center	8,717	21,900	13,650	8,250	0.9
Library	5,620	12,287	11,287	1,000	0.2
DPW Garage	9,607	1,223	1,223	-	-
DPW Office					
Golf Clubhouse	498	700	700	-	-
Golf Garage	135	200	190	10	0.1
Transfer Station	238	300	285	15	0.1
Beach Office	88	750	750	-	-
Swap Shop	113	300	285	15	0.1
Snow's Field	82	200	190	10	0.1
Harbormaster	44	200	190	10	0.2
TOTAL	\$ 50,060	\$162,606	\$108,196	\$54,410	1.1

Utility Incentives are primarily based on audit done by Cape Light Compact, and are reflective of what the Town of Truro should expect for reimbursement of costs.

5. Schedule for Implementation:

Each ECM has been targeted for implementation in one of the five years in the plan.

Table 6a and 6b below provide a timetable for implementation of ECM's identified to date. Both the numbers of ECMs as well as the projected MMBtu reductions are shown by year for each building.

Table 6a: Schedule for Implementation (# of ECMs)

Building	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	5 Year Total
School	2	1	2	1	2	8
Public Safety PFR	1	0	6	1	0	8
Town Hall	0	1	4	7	0	12
Community Center	0	4	4	0	1	9
Library	3	3	2	0	0	8
DPW Garage	0	1	1	4	1	7
DPW Office						
Golf Clubhouse	0	2	1	0	0	3
Golf Garage	0	0	1	0	0	1
Transfer Station	0	0	1	0	0	1
Beach Office	0	0	1	3	0	4
Swap Shop	0	0	1	0	0	1
Snow's Field	0	0	0	1	0	1
Harbormaster	0	0	0	1	0	1
TOTAL # of ECMs	6	12	24	18	4	64

As the Table 6a above indicates, ECM activity is spread across all 5 years of the plan. “Low hanging fruit” is scheduled in the early years of the plan.

As much as it would be desirable to implement all the ECMs in the first year or two of the plan, there are personnel time constraints that do not make this always possible. Every reasonable effort will be made to accelerate ECM implementation ahead of this schedule.

Actual monthly or quarterly implementation scheduling will be dependent on personnel availability, financial incentives available and outside vendor scheduling.

Table 6b below shows how these ECM activities result in MMBtu savings in each of the 5 years of the plan.

Table 6b: Schedule for Implementation (MMBtus saved)

Building	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	5 Year Total
School	108	14	31	5	81	239
Public Safety PFR	9	0	39	70	0	118
Town Hall	0	29	19	140	0	188
Community Center	0	126	57	0	7	190
Library	106	9	19	0	0	135
DPW Garage	0	4	0	0	341	346
DPW Office						
Golf Clubhouse	0	7	1	0	0	8
Golf Garage	0	0	3	0	0	3
Transfer Station	0	0	4	0	0	4
Beach Office	0	0	1	1	0	1
Swap Shop	0	0	2	0	0	2
Snow's Field	0	0	0	2	0	2
Harbormaster	0	0	0	1	0	1
TOTAL MMBtus	223	189	176	217	429	1,234

6. Additions and New Construction

No new building additions are anticipated in the next five years. As briefly mentioned earlier, the DPW facility is planned to be reconstructed, but this does not represent a net addition.

7. Reconstruction of the DPW Facility

The DPW Garage is constructed of un-insulated concrete masonry units (“concrete blocks”), and the DPW Office is a 2x4 lightly insulated structure. Both of these structures are grossly energy inefficient. As the Town has grown, the DPW facility has grown over the years in a “make-do” manner due to fiscal constraints. It now consists of a combination of buildings, garages and sheds that represent this ad-hoc growth.

Recognizing these deficiencies, in May 2011, the Board of Selectmen voted to begin the process of relocating and rebuilding this facility, and mandated that the new facility be energy-efficient. It is anticipated that this project will be completed by FY2015, and that

its energy efficiency will be comparable to the 2015 International Energy Conservation Code, which will produce a 50% energy savings from the 2006 base code.

Rebuilding the DPW facility provides an excellent opportunity for significant energy conservation, as indicated in Table 4. As a result, any other ECMs performed on the DPW buildings will need to have a short enough payback to deliver the savings before these buildings are decommissioned.

The Energy Committee will be working closely with the Building Committee in the design stage of this project which will meet both the Stretch Code and Energy Star standards.

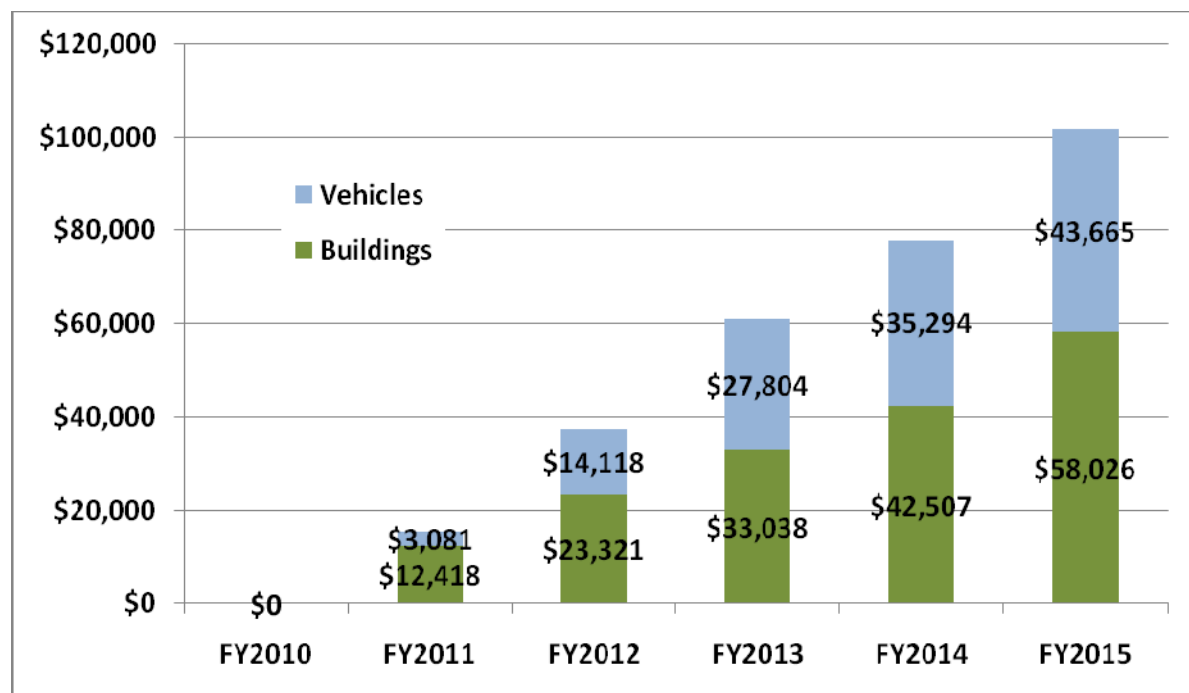
8. Total Projected Cost Savings

Figure 9 below represents the total of savings from implementing the Building Energy Conservation Measures, as well as the Vehicle Fuel Conservation Measures.

The cumulative savings over the 5 year period total slightly in excess of \$300,000.

Of course each subsequent 5 year period will realize a savings well in excess of \$500,000 for the 5 year period.

Figure 9: Building Energy and Vehicle Fuel Savings – Combined Cost Summary



Note: This projection is the sum of the projections in Figure 6 and Figure 8.

C. Measurement and Verification Plan for Projected Reductions – Annual Reporting

1. Measurement Technology

MEI software will be used to track and verify the Plan for Projected Reductions and Annual Reporting.

2. Personnel Responsible for Measurement and Verification and Annual Reporting to Green Communities Division

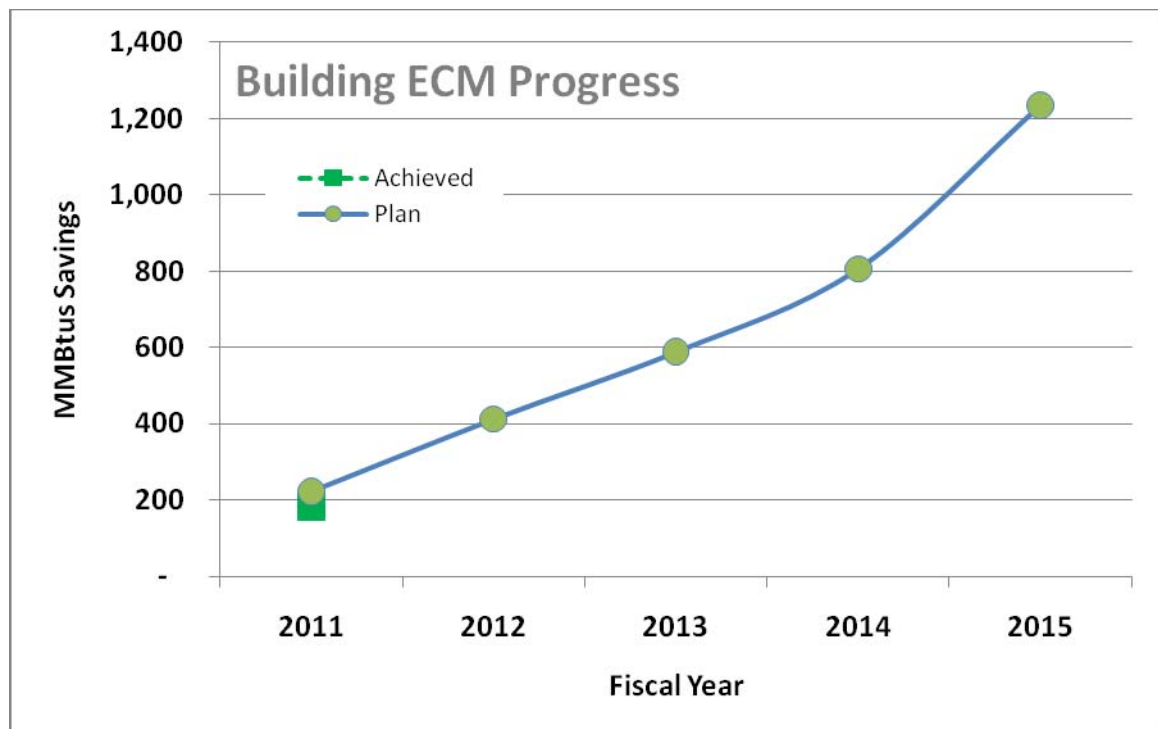
Town Administrator and Town Accountant with Energy Committee assistance.

3. ECM Progress Tracking

The Energy Committee has created a database of all ECMs, including savings, costs, and status. As ECMs are completed, this database is updated. This enables the TEC to produce an executive level dashboard for use by the Town Administrator and Board of Selectmen to monitor progress of the ERP.

Figure 10 below shows the Building ECM Progress as expected on June 30, 2011. Note that the FY2011 target is close to being achieved, as 2 of the Top 7 have been completed.

Figure 10: Building ECM Progress



D. Summary of Long-Term Energy Reduction Goals – Beyond 5 Years

1. Municipal Buildings

As oil and propane boilers need replacement, more efficient units will come on line and the potential for using heat pump technology will be evaluated.

2. Vehicles

Measures to reduce the number of miles driven will require a systematic approach to understanding the function and routes. Re-routing for the Town's school buses (which are not owned by the Town) achieved a considerable efficiency and savings in miles driven. A similar analysis can be made for plowing, mowing and garbage pickup.

3. Street and Traffic Lighting

Truro would like to find a source of funding to pay for the conversion of street lights and outdoor lights to LED technology. LED lights use 80 - 90% less energy than incandescent signals and last 5-10 times longer.

4. Perpetuating Energy Efficiency

The Energy Committee plans to discuss with the Finance Committee and Board of Selectmen recommendations for how to best account for and allocate the potential savings realized through the Energy Reduction Plan, including an allocation for reinvesting in further high financial return energy efficiency projects.

The Energy Committee has also been actively working with the building tradespeople in town to educate and promote conservation in construction. The intent is to expand the use of energy conservation in the community at large and raise awareness about the benefits of conservation and renewable energy options.

VI. ONSITE RENEWABLE ENERGY PROJECTS AND RENEWABLE ENERGY

A. Past Projects

1. 2kW Solar

Approximately five years ago, 3% of Truro citizens signed up for CLC-provided renewably generated electricity. This qualified for CLC's putting a small 2 kW photovoltaic system on the roof of the Truro Central School in the summer of 2006. That system was moved in 2010 to a nearby school roof to make room for the expanded system described below.



2 kW Solar Array in its new location

2. 25kW Solar

In 2009 Truro applied for and received a Massachusetts ARRA Energy Efficiency and Conservation Block Grant (EECBG) to help fund the installation of a 25kW photovoltaic system on the roof of the Truro Central School. The system was installed during August of 2010 and went live in late September 2010. It is estimated that this system will generate approximately 13% of the school's electricity usage.



25kW Solar Array being installed



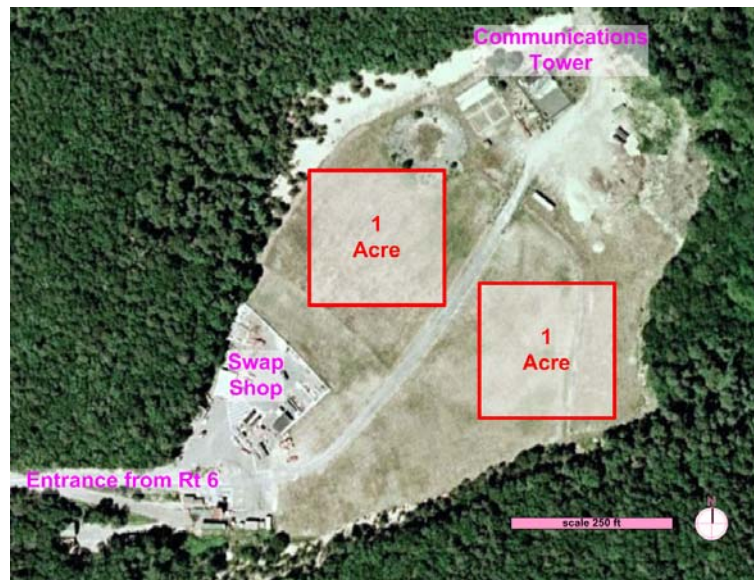
Inverters for DC to AC electricity

B. Future Projects

Truro's plans for additional onsite municipal renewable energy projects during the 5-year period include construction of a solar photovoltaic farm at the Town's capped landfill. The landfill site is over 10 acres, with some of it in active use as the transfer station and recycling center, as well as a swap shop. The capped landfill portion of the site is approximately five (5) acres.

Preliminary estimates indicate that approximately 2000 solar panels which would cover about two (2) acres would generate sufficient power on an annual basis to fully offset the Town's electrical usage. The zoning for the solar farm was approved by nearly unanimous vote at the April 2011 Annual Town Meeting.

The aerial photograph below shows the site of the planned solar farm. The one acre squares are shown just for reference to provide a sense of the land area that would be required. The actual siting of the photovoltaic panels will be based on subsequent engineering studies.



Capped Landfill Site for 2 Acre Solar Farm

In addition to implementing the energy conservation measures in this ERP, the construction of the solar farm is a major focus of the Town's long term energy strategy.

With the electricity savings generated by the conservation measures in this ERP, the footprint and cost of the solar farm can be reduced by approximately 14% and still fully satisfy the Town's municipal demand for electricity.

VII. LIST OF RESOURCES

Programs Related

Local

Truro Energy Reduction Plan web site: www.truroenergy.org/erp

Town of Truro: www.truro-ma.gov

Energy Committee:

www.truro-ma.gov/html_pages/boards_committees/bc_ENCOM.php

Department of Public Works:

www.truro-ma.gov/html_pages/offices/office_dpw.php

State

Green Communities: www.mass.gov

MEI: massenergyinsight.net/

Massachusetts Clean Energy Center: www.masscec.com/

Federal

Energy Star: www.energystar.gov

FuelEconomy.gov: www.fueleconomy.gov

Utilities

Cape Light Compact: www.capelightcompact.org/

Mass Save: www.masssave.com/

NSTAR Energy Advisor:

www.nstar.com/business/energy_efficiency/energy_advisor/default.asp

Energy Audits -- by Cape Light Compact and RISE Engineering

Please see Appendix C for audit copies. Available at <http://www.truroenergy.org/erp>

Energy Conservation Measures – Detail

Please see Appendix D for ECM details. Available at <http://www.truroenergy.org/erp>

Building Related

Boiler Reset Controls

These controls provide typical energy savings of 5 to 30%. 15% savings is average.

Source: Tekmar Controls: www.tekmarcontrols.com/energy-savings.html

Taco HVAC: www.taco-hvac.com/uploads/FileLibrary/OM01.pdf

Boiler Life Cycle Costs

Energy Star Boiler Calculator

Tankless Hot Water Heaters

www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=12820

Vending Machine Energy Controls

www.usatech.com/energy_management

www.michigan.gov/documents/CIS_EO_Vending_Machine_05-0042_155715_7.pdf

US Dept of Energy - Building

www.eere.energy.gov/topics/buildings.html

Vehicle Related

IdleRight

System Characteristics and Operation

www.havis.com/idleright.htm

www.granitestatecleancities.nh.gov/workshops/documents/gyf_idle_pres.pdf

Empirical Gasoline Savings

www.elightbars.org/f33/havis-idleright-system-6742

www.myrecordjournal.com/latestnews/article_dfdd4be8-9ff7-58cc-ac00-61ac4f219b4d.html

US Dept of Energy

www.eere.energy.gov/topics/vehicles.html

Street and Traffic Light Related

Energy Star Traffic Signal Energy Efficiency Criteria

www.energystar.gov/ia/partners/product_specs/eligibility/traffic_elig.pdf

NYS Lighting Research Center

www.lrc.rpi.edu/programs/transportation/led/nystrafficsignals.asp

Conversion Chart

MMBtu Conversion Chart

Fuel Energy Content of Common Fossil Fuels in use in Truro (per DOE/EIA)

BTU Content of Common Energy Units – (1 million Btu equals 1 MMBtu)

1 gallon of gasoline = 0.124 MMBtu

1 gallon of diesel fuel = 0.139 MMBtu

1 gallon of heating oil = 0.139 MMBtu

1 gallon of propane = 0.091 MMBtu

1 kilowatt hour of electricity = 0.003412 MMBtu

A Btu, or British thermal unit, is the amount of energy needed to raise one pound of water from 60°F to 61°F at sea level.

Appendix A - Letters Verifying Adoption

This appendix contains copies of two letters verifying adoption of the Energy Reduction Plan:

1. A letter from the Truro Board of Selectmen dated June 7, 2011;
2. A letter from the Truro Superintendent of Schools dated May 23, 2011.



TOWN OF TRURO

P.O. Box 2030, Truro MA 02666

Tel: (508) 349-7004 Fax: (508) 349-5505

June 8, 2010

Brian Boyle, Chairman
Truro Energy Committee
POB 2030
Truro, MA 02666

Dear Mr. Boyle:

It is my pleasure to inform you that a duly-held meeting on June 7, 2011, the Truro Board of Selectmen voted unanimously to adopt the Energy Reduction Plan for the Town of Truro.

Truro is committed to reducing municipal energy use by 20% between fiscal year 2010 and 2015. This plan will be presented as part of the Town of Truro's application for State designation as a Green Community.

The work that the Energy Committee has undertaken on behalf of the Town is of great significance and value. On behalf of myself and my colleagues, I thank you.

Sincerely,

Curtis Hartman, Chair
Board of Selectmen
Town of Truro

TRURO CENTRAL SCHOOL
317 RTE 6, POB 2029
TRURO, MA 02666
Phone: 508-487-1558
Fax: 508-487-4289



Brian T. Davis
Superintendent/Principal

May 23, 2011

Brian Boyle, Chair
Truro Energy Committee
Truro Town Hall

Dear Brian,

This letter of support and commitment is being submitted as a follow up to the School Committee meeting of May 16, 2011 at which the following votes were taken;

1. Ken Oxtoby made a motion to authorize the Superintendent to sign the papers necessary for the school to help the Energy Committee achieve their goals to become a Green Community, second by Michelle Jarusiewicz, vote 5-0.

In support of the Town's energy Reduction plan please be advised that the school has established the following goals and timelines as related to the independent energy audit. All measures are subject to appropriation.

Timelines for the Energy Committee's conservation measures

In reference to the final page of the Energy Use Reduction Plan the following recommendations are being submitted:

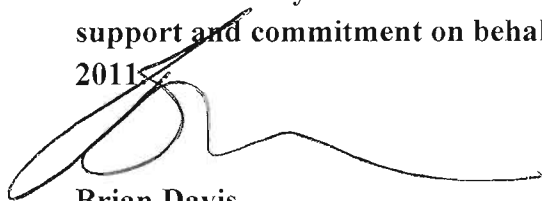
1. ECO 1: Group Re-lamp T8 Lighting with High Performance Florescent Lighting;
Timeline: **Completed 12/10 no charge.**
2. ECO 2: Install/Replace Occupancy Sensors; My understanding that this was to be completed by Rise Engineering as part of the re-lamping process. We have installed sensors in the supply closets as those lights were frequently left on and cannot be easily monitored. Problems have been encountered therefore follow up study and assessment is needed before moving to a school wide installation. Timeline: **July 1 – June 30, 2012**
3. ECO 3: Replace all Non- LED exit signs with LED units; these were replaced about 6-7 years ago at considerable expense. Timeline: **June 30, 2013**
4. ECO 4: Lightening Control Plug Load with Sensing Surge Protectors; Timeline: **June 30, 2014**

5. ECO 6: Replace Hot Water Tank with On-Demand Units; we have 2 tanks, not one. One tank provides hot water to the kitchen (very hot) one to the sinks (not so hot) these were replaced 3 years ago. Timeline: **June 30, 2015 or as existing ones fail.**
6. ECO 7: Install Vending Machine Controls; Timeline: **Completed 9/10, no charge.**
7. ECO 8: Install Economizers on Walk in Coolers and Freezers; Timeline: **These are part of the existing unit.**
8. ECO 9: Replace Existing Boilers; Timeline: Assessment of the current system by an independent consultant has revealed that the current system is 20 years old, has an expected life of 30-50 years, and is currently operating at 86% efficiency. An upgrade to a new system would only result in a 2% increase in efficiency at a cost of \$110,000. More efficient systems are in the \$300,000+ range. Timeline: **Continue to maintain its existing system until 2026+ or until it fails. In the interim, we will assess improvements to maintain and/or increase efficiency. For example during the summer of 2011 the school will reseal flue collectors, replacing gasket materials at clean outs, inspecting flue and clearing any restrictions. We will replace electrode assemblies on both boilers, fire and test operation of both vessels (\$2,105.68).**

Tim Dickey presented a motion to adopt policy EEBA, second by Ken Oxtoby, vote 5-0.

Attached is Policy EEBA Truro School District Fuel Efficient Vehicle Policy.

As authorized by the School Committee on Monday May 16, 2011 I submit this letter of support and commitment on behalf of the Truro School District on the 23rd day of May 2011.

A handwritten signature in black ink, appearing to read 'Brian Davis', is written over the text of the letter. The signature is fluid and cursive, with a long horizontal stroke extending to the right.

**Brian Davis
Superintendent/Principal**

Appendix B - Exempt Gas and Diesel Vehicles (excludes police vehicles)

Dept	Year	Vehicle	
DPW	2001	Ford 250	
	2008	Ford 250	
	1956	International Wrecker	
	1967	Kaiser Dump Truck	
	1975	AM General Dump	
	1983	John Deere Loader	
	1987	John Deere Loader	
	1988	WHGM Trackor	
	1994	International 40S470	
	1994	Ford 350	
	1994	Ford Van	
	1994	John Deere 490E Excavator	
	1997	Ford 350 Pickup Truck	
	2000	Sterling Dump Truck	
	2001	Ford SRWSUP Pickup Truck	
	2001	John Deere Loader 4WD	
	2004	Sterling Sweeper	
	2006	John Deere Tractor	
	2004	Ford LGTCON	
	2006	Ford E 250 Van	
	2006	Peterbilt CON Tractor	
	2008	Ford 250 Pickup Truck	
	2009	International 7400 Truck	
	2007	International 700 Dump	
Fire/Rescue	1975	Chevy Fire Truck	
	1988	GMC Tank Truck	
	1998	Ford Ambulance	
	2001	Ford 350 Pickup Truck	
	2003	Ford 450 Ambulance	
Golf	2006	HME Fire Truck	
	2005	Ford 350 DWR UP	
	2001	John Deere 4700 Tractor	
		TOTAL VEHICLES	32

Appendix C - Energy Audits and Assessments

Due to the volume of pages in each of the several energy audits, it is not practical to include each in this plan.

However, these audits provide valuable detail for planning and implementation, so these audits have been posted on-line as a reference resource.

The audits can be found in pdf format at the Truro Energy Reduction Plan website:

<http://www.truroenergy.org/erp>


Then click on the link with the title Energy Audits and Assessments.

There you will find an index listing each of the various energy audits.


The page below shows the present contents of the Truro Energy Reduction Plan website. This site will be updated from time to time to reflect progress on the ERP, and provides a “home page” for ERP activities.

Truro Energy Reduction Plan FY2010 - FY 2015


Energy Reduction Plan Document


 PDF copy of the plan


Appendix B


 Inventory of Non-Police Exempt Vehicles


Appendix C - Energy Audits and Assessments

 12/4/2009 – Town Hall Audit


 4/14/2010 – 5 Building Audit

 7/21/2010 – 3 Building Audit

 4/14/2011 – Library Contract


 5/26/2011 – Community Center Audit


Appendix D - Detail of Energy Conservation Measures (ECMs)


 Top 7 ECMS (60% of the total savings from buildings)

All ECMs by Building


 School Note: there are two pages to each pdf listing.


 Public Safety PFR

 Town Hall

 Community Center

 Library

 DPW Garage & Office

 Small Buildings & Other:

- ◊ Golf Clubhouse and Garage
- ◊ Transfer Station
- ◊ Beach Office
- ◊ Swap Shop
- ◊ Snow's Field
- ◊ Harbormaster
- ◊ Also: Street & Traffic Lights; Golf Irrigation

Miscellaneous

Police Department Initiatives

 Letter from Police Chief Lundborn

Vending Machines

 Michigan Energy Office Case Studies

Comments

If you have any questions, or suggestions for energy conservation at town facilities, please email them to truroenergy@gmail.com.

Updated 6/7/11

[Truro Energy Committee](#)

Appendix D - Detail of Energy Conservation Measures

1. ECM Details

The 64 Energy Conservation Measures for buildings have more detail than can comfortably be included in this ERP document. So these have been posted on-line as a resource.

The ECMs along with additional information can be found at the Truro Energy Reduction Plan website:

<http://www.truroenergy.org/erp>

Then click on the link with the title Detail of Energy Conservation Measures. There you will find an index listing each of the various ECMs by Building.

2. Top 7 ECMS

The Top 7 ECMs, that account for 60% of the energy savings are included in this appendix on the page below. They are also available at the Truro Energy Reduction Plan website.

Two of the Top 7 ECMs should be completed by June 30, 2011.

3. Small Buildings

The “Small Buildings” group of ECMs has been a second priority in this plan. Estimates are preliminary in nature, as the scale of these buildings is small and their energy use is mostly seasonal.

As progress is made on the larger energy users associated with the priority ECMs, these buildings will be addressed in further detail. These buildings include, for example, the Harbormaster’s seasonal small office next to the pier, and the Swap Shop at the Transfer Station.

4. A note about Cape Light Compact Incentives and Cost Estimates

Subject to budget availability, Cape Light Compact offers incentives for some of the recommended ECMs. Incentive amounts offered by Cape Light Compact are dependent upon the classification of the customer. As the Town of Truro Municipal Facilities are classified as Municipal Facilities, Cape Light Compact will pay 100% of pre-approved work up to \$150,000.

Top 7 ECMs

Over 50 MMBtu Savings Each; Totals 60% of all Building MMBtu Savings

Building	School	School	Town Hall	Public Safety PFR	Library	Community Ctr	DPW	
Key	ECO-1	ECO-9	09-B	ECO-11	BRC	ECO-9	REBLD	
Major?	Y	Y	Y	Y	Y	Y	Y	
Description	Group Relamp T8 Lighting with High Performance Fluorescent Lighting	Improve Efficiency of Heating System	Re-engineering of Air Handling Unit #1 and remediation	Replace existing HVAC equipment with ductless mini split inverter technology	Boiler re-set Control Tekmar outdoor reset control	Boiler Reset Controls	Rebuild DPW office and garage to 2015 IECC	
Source for Measure	Cape Light Compact Assessment 4/14/2010	Cape Light Compact Assessment 4/14/2010	RISE Engineering Assessment 12/4/2009	Cape Light Compact Assessment 4/14/2010	Cape Light Compact: work completed 4/2011	Cape Light Compact Audit 5/26/2011	Truro Board of Selectmen	
Projected Savings	Electricity (kWh)	29,748	1,000					
	Oil (gals)		482	350	500	450		
	Propane (gals)					846		
	Annual MMBtus	102	67	52	70	63	77	
	Annual \$ Saved	\$6,545	\$1,928	\$1,620	\$2,000	\$1,800	\$3,383	
	Source for Projected Savings	RISE Engineering Audit 7/2010	5% efficiency improvement	Cape Light Compact audit	Cape Light Compact audit	Cape Light Compact, Bill Branton; 15% savings	Cape Light Compact audit	Reduce kBtu/SF to 40
Cost	Projected Cost to Implement	\$16,168	\$20,000	\$5,000	\$50,000	\$1,300	\$5,000	tbd
	Potential Utility \$ Incentives	\$16,168	\$10,000	\$2,500	\$25,000	\$1,300	\$5,000	
	Net Cost w/ Incentives	\$0	\$10,000	\$2,500	\$25,000	\$0	\$0	
Years to Pay back	-	10	3	25	1	1		
Payback Years w/ Incentives	-	5	2	13	0	0		
Implementation FY	2011	2015	2014	2014	2011	2012	2015	
Timing Consideration	Completed 12/10 at no cost	Pending Engineering	Pending Engineering	Upon burnout of existing units	Completed 4/11 at no cost			

Appendix E - General Fuel Economy Measures

These five generally applicable fuel economy measures can help reduce fuel consumption without any additional cost or investment. The rightmost column represents the minimum savings that the Town of Truro will strive to achieve. These goals should be quite achievable as they are a small fraction of the estimated savings typically found.

Table E-1: FUEL ECONOMY MEASURES

Department	Key	Action	Description	Source for Measure	US Gov Estimate Range	ERP Estimate Used
All	DS-1	Drive Sensibly	Avoid aggressive driving (e.g., rapid acceleration and braking).	http://www.fueleconomy.gov/feg/driveHabits.shtml	5-33%	1%
All	EW-1	Remove Excess Weight	Avoid storing unnecessary items in your vehicle. An extra 100 pounds could reduce mpg by up to 2% especially in smaller vehicles.	http://www.fueleconomy.gov/feg/driveHabits.shtml	1-2%	0.5%
All	TU-1	Keep Engine Tuned	Fixing a vehicle that is out of tune or has failed an emissions test can improve gas mileage by an average of 4%.	http://www.fueleconomy.gov/feg/maintain.shtml	4%	0.5%
All	TI-1	Keep Tires Inflated	Improve gas mileage by up to 3.3% by inflating to proper pressure.	http://www.fueleconomy.gov/feg/maintain.shtml	up to 3%	0.5%
All	RO-1	Use Recommended Grade of Oil	Improve gas mileage by 1%-2% by using manufacturer's recommended grade of motor oil.	http://www.fueleconomy.gov/feg/maintain.shtml	1-2%	0.5%
TOTAL						3.0%

Source: www.fueleconomy.gov