

# **Recommendation Draft for Energy Reduction Plan**

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**Table of Contents:**

**Introduction.....3**

**Energy Use Baseline Inventory.....3-4**

**Measures Already Implemented.....4**

**Plan Summary.....4-13**

**Renewable Energy.....13**

**New Construction Ideas.....14**

**Conclusion and Long Term Goals.....14**

**References.....14**

# Introduction

The town of Auburn is home to a population of roughly 16,000 residents. The town operates 18 municipal buildings, 12 pumping stations, 70 vehicles, and 3 traffic lights. Buildings are powered by National Grid electricity and natural gas, with some buildings heated by oil. National Grid also owns 1,122 streetlights in the Town of Auburn as well as the remainder of traffic lights in the town.

Reducing energy consumption in Town operations has been a priority of Auburn since 2011. Auburn joined ICLEI in April of 2012 and became a designated of the Green Community in July 2012. The town’s goal is to reduce energy consumption by 20% within 5 years of 2011, their baseline year. By doing this, the town hopes to reduce their spending as well as their emissions. The town is already headed in the right direction by taking the action of becoming involved with ICLEI.

The town of Auburn has already taken many steps to reduce energy consumption in town facilities and day to day operations. To be considered for the Green Communities of Massachusetts, Auburn had submitted a draft of an Energy Reduction Plan in 2012, but this plan focused only on the municipal facilities.

The newer municipal in Auburn are LEED certified and already operate efficiently in regards to energy consumption.

The Town of Auburn has been tracking its energy consumption.

The following tables represent the energy use of the municipalities in Auburn.

## Baseline Energy Use

**Table 1: Municipal Facilities and Infrastructure Using Energy**

	Number	Ownership
<b>Buildings</b>		
Oil Heat	12	Town of Auburn
Natural Gas	5	Town of Auburn
Propane Heat	1	Town of Auburn
<b>Vehicles</b>		
Non-Exempt	12	Town of Auburn
Exempt	58	
<b>Street Lights</b>	1122	NGrid
<b>Traffic Lights</b>	3	Town of Auburn
<b>Sewer</b>	12	Town of Auburn

**Table 2: Summary of Energy Baseline and Reduction Plans**

<b>BASELINE YEAR FY 2011</b>	<b>MMBtu Used in Baseline Year</b>	<b>% of Total MMBtu Baseline Year</b>	<b>Projected Planned MMBtu Savings</b>	<b>Savings as % of Total MMBtu Baseline Energy Consumption</b>
<b>Buildings</b>	34,241	72.5%	9,750	20.6%
<b>Vehicles</b>	9,624	20.4%	0	0%
<b>Street/Traffic Lights</b>	39	0.7%	0	0%
<b>Water/Sewer/Pumping</b>	3,307	7%	345	0.7%
<b>Office Space</b>	0	0%	0	
<b>Total</b>	<b>47,211</b>	<b>100%</b>	<b>10,095</b>	<b>21.3%</b>

## Measures Already Implemented

### *Plan Summary*

#### **I. Municipal**

The Town of Auburn’s main goal is to reduce the energy consumed by the operation of the government and school district by twenty percent in the five years following FY2011. In order to meet this goal Auburn will focus on energy efficiency through: weatherproofing buildings, upgrading inefficient and old heating and air conditioning systems, replacing outdated, unsuitable and inefficient lighting systems, working with the Sewer Division to formulate a plan to replace the existing pump equipment at sewer pumping stations with newer and more efficient pumps, and replacing old vehicles with more fuel efficient vehicles that meet the guidelines in the Town’s policy. Auburn would also propose to implement an energy awareness/operation and maintenance program for municipal employees to further reduce the energy used in buildings. This would save the Town money through energy savings, reduce carbon emissions and set a positive example for the public and surrounding communities to follow.

Guardian Energy Management Solutions provided the Town with free walk through audits of many municipal and school buildings. These audits have given Auburn an excellent starting place to identify ways to reduce energy usage and increase efficiency.

Many buildings in Auburn are currently using lighting ballasts and bulbs that are either out of date or could be reduced in wattage. Many of the buildings in this category are school buildings that have very high lighting usage and would recognize significant savings

through the introduction of lower watt bulbs. The School District has been working with National Grid to audit its light fixtures and is currently awaiting the most recent report on the utility's site visit.

Furthermore, HVAC systems in the buildings throughout Town are generally old and energy inefficient. In the past 6 months the School District has replaced two of its older oil boilers with contemporary natural gas furnaces however these projects are the exception not the rule amongst public buildings. Town Hall, the Middle School and the Fire Station could all benefit from new HVAC systems. The boiler providing heat to Town Hall is a single zone system that does a poor job of providing equitable comfort throughout the building resulting in various offices opening windows at various times to alleviate the excessive heat. Furthermore, the inconsistent temperatures are damaging to the computer systems and equipment which requires a regulated and consistent temperature. Conversely the cooling system at Town Hall is located in a wooded area and tends to collect leaves, pine needles and other natural and manmade refuse in the air intake. This combined with the fact that one of the two compressors that cool the air is not functional creates a very inefficient system that only marginally cools the air. The Town has not had the opportunity to have full energy audits done yet, but it is clear that many of the Town's older buildings could benefit from HVAC replacements or upgrades.

A complete energy audit of all Town and School buildings would be the first priority if the Town of Auburn were designated a Green Community and receives the corresponding grant funding. These audits would give Auburn a comprehensive look at the areas where energy is being used in municipal and school buildings and provide the information needed to target areas for efficiency upgrades. This would aid in guiding the Town towards the most effective system upgrades for each building and offer other indications that could direct the Energy Reduction Plan more efficiently and comprehensively. In the meantime proposed projects were derived from discussions with Guardian Energy Management Solutions staff after initial walkthroughs of Town and School buildings for identification of potential issues.

The Town of Auburn will look to increase the walkability of Drury Square and the surrounding areas when possible. As of now there are not enough sidewalks or crosswalks and there are nonfunctioning crosswalk signals that need to either be repaired or replaced in the future.

Auburn would look to take advantage of all possible funding sources and efficiency partners. Specifically, the Town would be looking to take advantage of the utility companies' incentive and financing programs for the implementation of energy reduction measures.

## **II. Residential**

The residential sector of Auburn could greatly reduce the energy they use and save massive amounts of money in the process if they follow this Energy Reduction Plan. After surveying residents of Auburn we have targeted key areas on which residents should focus on reducing their energy use.

### **Mass Save**

Mass Save is an initiative sponsored by the gas and electric utilities suppliers and energy efficiency service providers of Massachusetts. The Mass Save program provides homeowners owners with many ways to help you save energy. Mass Save offers new construction and equipment as well as building or equipment upgrades. Mass Save offers free home energy assessments to help save energy in the most cost effective way. These free energy audits come from a portion of the monthly utility bill that customers pay to energy companies that sponsor the Mass Save program. When conducting these energy audits the auditor gives the homeowner energy efficient light bulbs, programmable thermostats, and low flow showerheads at no additional cost to the homeowner. These energy companies that do business with Mass Save include NSTAR and National Grid. Mass Save could also qualify homeowners with no-cost loans if they apply (Mass Save, 2013).

### **Appliances**

ENERGY STAR® appliances and electronics are the best products to purchase if you want to reduce the amount of energy your household produces. In order for a product to be named an ENERGY STAR® product it has to meet strict government standards for energy efficiency, saving you money.

### **Programmable Thermostats**

Programmable thermostats automatically adjust your home's temperature settings, allowing you to save energy while you're away or sleeping, and are more convenient and accurate than manual thermostats (Ilyas pdf).

When set correctly programmable thermostats can save you about 150 dollars a year:

- Set your thermostat to 68 degrees when you're home, and 60 degrees at night or when you are away
- Setting the temperature to return to a comfortable setting a half hour before you come home will remove the chill from the house without wasting energy while no one is home

- Use the thermostat's pre-programmed settings for maximum energy and money savings

## **Clothes Washers**

ENERGY STAR® qualified clothes washers are energy efficient and easier on your clothes, your pocketbook and your schedule. ENERGY STAR® clothes washers use today's technology to adjust for load size and water temperature. They extract more water from the clothes being washed allowing them to have a shorter drying time.

Compared to a 10 year old clothes washer, an ENERGY STAR® qualified clothes washer can save about \$100 on average per year on your utility bills because ENERGY STAR® qualified clothes washers use up to 50% less energy and save about 25 gallons of water per load. Saving that much energy and water per load add up to a substantial environmental and financial savings (Ilya's pdf).

## **Refrigerators and Freezers**

Improvements in insulation and compressors mean today's freezers consume much less energy than older models. Additional tips are to leave space between fridge and wall to allow air flow. Another is to brush dust off of coils in back of fridge or freezer to maintain its efficiency.

ENERGY STAR certified refrigerators are required to use about 15% less energy than non-certified (Ilya's pdf).

## **Dishwashers**

Compact and standard capacity models of ENERGY STAR® qualified dishwashers are available and are designed to exceed minimum federal standards by at least thirteen percent.

Most of the energy used by dishwashers is used for heating water. Today's ENERGY STAR® qualified dishwashers internally heat water to 140 degrees Fahrenheit, allowing you to turn down your water heater to 120 degrees Fahrenheit and reduce overall water heating costs.

## **Home Electronics**

Home electronics accounts for 15 percent of household electricity use. Becoming more aware of vampire power and ways to prevent it can help you reduce home electronic energy use.

## **Advanced Power Strips**

The U.S. Department of Energy estimates that 75% of energy used by electronics is consumed when electronics are turned off, which is called vampire energy. To reduce this consumption, plug home electronics into a power strip and manually turn off the power strip after each use or unplug electronics from the wall after use.

Advanced power strips function much like regular power strips except they include three distinct plug categories. The first plug type acts as the control and master plug, usually for your TV or computer's CPU. The second plug type is for your peripherals, such as audio/DVD or computer monitors/printers, and is automatically turned off when the control plug has been shot off or is inactive from the sleep mode on your computer. The third plug type remains constantly active for those products needing constant power such as cable boxes or modems (Ilya's pdf).

## **Televisions**

When purchasing a television, the type and screen size can have a major effect on your energy use:

- Always look for the ENERGY STAR® label to save energy when in use, but also in standby modes.
- For every 10 inches you increase your screen size, the TV will use between 50-70 percent more energy.
- Although all types of size and screen technologies can be ENERGY STAR® qualified and save on energy use, LCD TVs generally use about 30% less energy than plasma TVs.

## **Computer and Monitors**

ENERGY STAR® qualified computer monitors use between 25% and 60% less electricity than standard models, depending on the size of the screen and the hours of operation. It is important to utilize the power management settings to save energy. This includes setting the "sleep mode" on your computer so that when it is not being used it will turn off the monitor screen.

## **Lighting**

Lighting accounts for about 20 percent in the average home electric bill. Upgrading your lighting to CFLs and LEDs can reduce that 20 percent helping you save money.



## **Compact Fluorescent Lamps (CFLs)**

CFL stands for compact fluorescent light bulbs (CFLs) and today's ENERGY STAR® qualified CFLs use 75% less energy to produce the same amount of light as incandescent light bulbs and will last up to 10 times longer. Given average usage, an energy efficient CFL bulb only has to be changed once every 5-7 years! CFLs can save you over \$50 in energy costs over each bulb's lifetime. They generate up to 75% less heat and can cut the energy costs associated with home cooling.

With new technology, ENERGY STAR qualified CFLs provide warm and inviting light without the flickering and humming of older fluorescent bulbs. An ENERGY STAR qualified CFL can replace regular bulbs in most lamps and are available in a variety of styles, shapes and sizes. Compact fluorescent light bulbs can also be purchased in dimmable models and models compatible with motion sensors.

CFLs do contain a very small amount of mercury sealed within the glass tubing and need to be properly disposed of at the end of their life (Ilya's pdf).

## **Light Emitting Diode (LEDs)**

LED light bulbs are illuminated by the movement of electrons through a semiconductor material chip. These chips directly convert electricity to light without the use of a filament or glass bulb.

LED light bulbs are used in many common applications we interact with everyday such as traffic lights, flashlights and cell phones. The life span of a LED light bulb is over 50,000 hours of use and it generates less than 12-watts of energy (Ilya's pdf)

## **Heating and Cooling**

### **Change Your Air Filter Regularly**

Check your filter every month, especially during heavy use months (winter and summer). If the filter looks dirty after a month, change it. At a minimum, change the filter every three months. A dirty filter will slow down air flow and make the system work harder to keep you warm or cool wasting energy. A clean filter will also prevent dust and dirt from building up in the system leading to expensive maintenance and/or early system failure.

## **Seal Your Heating and Cooling Ducts**

Ducts that move air to and from a forced air furnace, central air conditioner, or heat pump are often big energy wasters. Sealing and insulating ducts can improve the efficiency of your heating and cooling system by as much as 20 percent and sometimes much more. Focus first on sealing ducts that run through the attic, crawlspace, unheated basement, or garage. Use duct sealant (mastic) or metal backed (foil) tape to seal the seams and connections of ducts. After sealing the ducts in those spaces, wrap them in insulation to keep them from getting hot in the summer or cold in the winter. Next, look to seal any other ducts that you can access in the heated or cooled.

## **Tune Up Your HVAC Equipment Yearly**

Just as a tune up for your car can improve your gas mileage, a yearly tune---up of your heating and cooling system can improve efficiency and comfort.

## **Additional Saving Tips**

- Shut the lights off when you leave a room.
- Shut down your computer when you are done using it.
- Use the right size pot on stove burners while cooking (a 6-inch pot on an 8-inch burner wastes over 40% of the burner's heat.
- Use your microwave instead of the oven when you are reheating small portions and you can reduce your cooking energy by up to 80%.
- Seal air leaks before installing insulation to ensure that you get the best performance from the insulation.
- Spring cleaning involves making sure all the fans in your home are working properly and are dust free.
- In preparing for the summer, consider investing in some insulated, thermal backed drapes for your windows to keep heat at bay during hot summer days.
- Does your home have a sliding glass door? Make sure to keep its track clean. A dirty track can ruin the door's seal and create gaps where heat or cold air can escape.

- When dust and pet hair build up on your refrigerator's condenser coils, the motor works harder and uses more electricity. As part of your spring-cleaning routine, makes sure the coils are cleaned and air can circulate freely.
- Don't forget to check the seals on your refrigerator door to make sure they are clean and tight. Refrigerator accounts for up to 11 percent of your household's total energy use, which can have a major impact on your energy bill.
- A dehumidifier can greatly add to your electric bill. Make sure you have the appropriate sized dehumidifier for your home and if replacing an older model, be sure to look for a dehumidifier that has earned the ENERGY STAR® to save the most energy and money.
- Doing some spring cleaning in your basement? Make sure to have a look at your foundation walls. If you have an unfinished basement or crawlspace, check for air leaks by looking for spider webs. If there's a web, there's a draft. A large amount of heat is also lost from an un-insulated basement.
- Consider installing a ceiling fan. If you already have one, make sure to change the airflow on your ceiling fan. Make sure you change the direction of airflow on your ceiling fan. In the winter, let the fan push warm air toward the floor and in summer, switch the direction and draw air upward, cooling the room and ensuring constant airflow.
- Schedule a pre-season checkup of your central air conditioning cooling system to make sure it is operating at peak efficiency. If you have central air conditioning, keep your thermostat at 78 degrees. You can also save approximately an additional six to seven percent off your cooling costs for each degree above 78. If you are in the market to replace your old central air conditioner, make sure to look for a new ENERGY STAR® qualified model, which can reduce your cooling costs by 20 percent.
- Close window shades, drapes and blinds during the day to prevent the sun from heating your home in the summer.
- Remember to turn the fan off when you leave the room as a ceiling fan cools you not the room.
- Save electricity by shutting off home electronics, such as computers and televisions, when not in use.
- Keep central and room air conditioner units at highest temperature that's comfortable. A suggested temperature range for summer is between 74°F --- 78°F.

- Turn your air conditioner off when not at home. Use a timer or programmable thermostat to set it to turn on an hour before coming home.
- Find and seal air leaks that cause drafts and make your cooling system work overtime. When remodeling chooses ENERGY STAR® qualified windows to replace older models.
- Look for the ENERGY STAR® on products in more than 50 different categories, including cooling equipment, lighting, consumer electronics and appliances.
- Check your insulation especially your attic. By increasing and filling gaps in insulation in older homes you keep your home warmer in the winter, cooler in the summer, and save money all year round.
- If you're renovating or doing home improvement projects and considering purchasing new appliances, always look for the ENERGY STAR® label on new appliances. These products are more energy efficient and can help reduce your energy costs.
- If your heating system is more than 10 years old, replacing it with an ENERGY STAR unit could save up to 30% in energy costs per year.
- Schedule a checkup of your heating system. Just as a tune-up for your car can improve your gas mileage, a yearly tune-up of your heating system can improve efficiency and comfort. This is also a good time to change the air filter, which results in better system performance.
- Check the air filter on your heating system regularly and replace if dirty. A dirty filter will make the system work harder – wasting energy.
- Air dry clothing whenever possible

### **III. Commercial**

The commercial sector of Auburn could benefit greatly from following these energy saving methods. A lot of the energy methods that are stated in the residential sector of this plan can also benefit the commercial sector. After interviewing owners of several local businesses, we have determined that the most important thing for businesses in Auburn to do is to receive energy audits. Businesses that have received audits and have made the recommended changes have seen a significant difference in their utility bills. We would suggest that they get their buildings audited every 4-5 years to keep up to date on the latest in energy efficiency methods. We suggest that business explore the following options.

#### **Mass Save**

Mass Save is an initiative sponsored by the gas and electric utilities suppliers and energy efficiency service providers of Massachusetts. Mass Save offers new construction and

equipment as well as building or equipment upgrades. When conducting these energy audits the auditor gives suggestions on the best ways to save money for your business. These energy companies that do business with Mass Save include NSTAR and National Grid. There are also other money saving incentives offered for saving energy such as discounted appliances and rebates on insulation and possibly even solar panels (Mass Save, 2013).

## **Lighting**

Businesses like residents should exchange their incandescent and florescent light bulbs with CFLs and LEDs. For businesses that have ballast they should look into installing T-5 ballast lights. These lights are like CFLs and LEDs, but they are formed to fit ballast lighting fixtures.

### **Motion-Sensor Lighting**

A motion-sensing light is one that is activated by a motion rather than by a conventional light switch. A motion-sensor can either replace conventional light switches or be placed onto an existing lighting fixture.

This prevents businesses from having to leave their lights on during all hours of operation. If there is a section of the business that is not being used for a distinct amount of time then the lights in that section will turn off saving the business energy.

## **Appliances**

### **Low Flush Toilets**

With the potential for rebates and lower water bills, WaterSense labeled toilets can save you money. Since the toilets uses less water you have potential to reduce your water bill. You can also receive rebates ranging from 25 to 200 dollars (USEP).

## **Renewable Energy**

Auburn has made it a goal to take steps in the direction of renewable energies for their future. One of the projects that Auburn is working on right now is the feasibility of a wind turbine in town. So far a site for the turbine has been picked and approved. Auburn has been meeting with a representative from the Sustainable Energy Department to accomplish this goal of theirs. The wind turbine is estimated to have a lifetime savings of \$2,812,451 after a payback period of 9.7 years.

## **New Construction Ideas**

Besides the wind turbine that Auburn is looking into, the Town is planning a Middle School project that has not yet been finalized. The goal for the project is to create at least a LEED Silver standard approved Middle School.

Another change that is being looked into is the walkability of the areas around Drury Square. Because there are a number of shops around there, including the Auburn Mall, it would be beneficial to make it more reasonable for people to walk from location to location. By walking rather than driving, these people would be saving money on gas and reducing the energy used by their motor vehicles. In a survey of Auburn residents over fifty percent strongly agreed that they would like to see a change in the walkability of Drury Square.

## **Conclusion and Long Term Goals**

The Town of Auburn is well on the way to become a leader among the Massachusetts Green Communities in operating sustainably and efficiently. The goals of the Green Communities program are the shared goals of the Town of Auburn. The long term goals of the town have been laid out clearly in this reduction plan document with an ultimate goal of 20% reduction. Auburn and its municipal and school leaders view all of these steps as part of a greater strategy to institutionalize and sustain its energy and sustainability efforts. The Town continues to look into new ways to incorporate sustainability into Auburn on a day-to-day basis and in the long term of municipal and school operations. This energy reduction plan includes many ways to save energy throughout the Town. This is important in getting everyone on board with the movement of a more sustainable Auburn with support from residents and local businesses. The Town of Auburn believes that this Energy Reduction Plan will serve as an important and informational document for moving forward in being a leading Green Community.

## **References**

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