A. Appendix 1. – 2018 Letter to Clean Energy Task Force

August 20, 2018

Clean Energy Task Force
245 DeKoven Drive
Middletown, Connecticut 06457

Middletown Energy Plan

Dear Members of the Middletown Clean Energy Task Force (CETF):

Attached is the current version of the Middletown Energy Plan accepted by the Clean Energy Task Force (CETF) over five (5) years ago. The plan is presented to you with this letter with the request to re-accept the plan along with the following strategic guidance (**Guidance**) as part of two important efforts; the 2018 Sustainable CT application for certification, and the planned updating and rewriting of the Middletown Energy Plan during fiscal year (FY) 2019.

The City of Middletown (Middletown) participated in a utility-sponsored benchmarking program in FY2017. That program resulted in useful benchmarking data for all major City energy users comparing baseline FY2011 with FY2015. Both the baseline year and the then-current year were chosen based on the availability of data at the time of benchmarking.

The baseline year of FY2011 reflects energy improvements made through an Energy Performance Contract (Performance Contract) that was completed immediately prior to FY2011. Thus, it is important to note that the energy savings generated by the Performance Contract have not been captured by the benchmarking program. However, these savings contributed to the long-term Clean Energy Communities program and commitment in which Middletown participated through FY2017, at which time the program was dissolved due to a loss of funding.

The benchmarking program resulted in a Benchmarking Report as well as a Municipal Action Plan that offered a snapshot of changes to Middletown's energy profile between FY2011 and FY2015.. Both of these reports have also been submitted with our 2018 Sustainable CT certification application. The organization, data and planning comprised by these two reports have been incorporated in the **Guidance** and the **Energy Use Overview** provided below.

The **Guidance** offered provides a framework of strategic themes that have emerged as essential to helping the City move forward with continued energy progress. These themes, including the development of a strong *vision*, fin*ancial criteria*, *budgets* and *project development process*, represent experience gained over the last few years in developing pilot energy efficiency and renewable energy projects that move beyond the comprehensive energy improvements provided by the Performance Contract prior to 2011.

The **Energy Use Overview** provides a snapshot summary of the benchmarking data including adjustments made to bring the data current with FY2018, by incorporating recent additions to Middletown's renewable energy portfolio.

Energy Use Overview

Table I. below illustrates total energy and electrical energy use in megawatt-hours (MWh). Total Energy Equivalent (TEE) includes both electricity use and fossil fuel use, all of which are expressed in MWh for ease of comparison.

Table I. Energy Summary

Total Energy (MWh Equivalent)	FY2011	FY2015	% Change 2011 to 2015	FY2018 Current	% Change 2011 to 2018
Municipal	6,188	5,252	-15%	5,227	-16%
BoE	20,197	20,786	3%	20,786	3%
Street & Traffic Lights	3,172	3,186	0%	3,122	-2%
Sewer (includes pump stations)	6,606	6,890	4%	6,890	4%
Total	36,163	36,114	0%	36,025	0%
Electrical Energy					
Municipal	2,517	2,292	-9%	2,267	-10%
BoE	6,940	7,370	6%	7,370	6%
Street & Traffic Lights	3,172	3,166	0%	3,101	-2%
Sewer (includes pump stations)	5,838	5,421	-7%	5,421	-7%
Total	18,467	18,248	-1.2%	18,159	-1.7%
Renewable Contribution	(1,664)	(134)	-92%	(3,449)	107%
% Renewable	9%	1%	-92%	19%	107%

TEE use for all buildings in FY2011 was 36,163 MWh and electrical energy use was 18,467 MWh. In FY2015, TEE remained virtually unchanged at 36,114 MWh. FY2018 (current) data shows a slight improvement due to projects discussed below. FY2018 also reflects greater renewable energy contribution.

Electrical energy use in FY2011 was 18,467 MWh and in FY2015, 18,248 MWh. In FY2018, use was 18,159 MWh; about a 1.7% decline over FY2011.

Renewable energy was generated by a 200 kW fuel cell in 2011, contributing 1,664 MWh, 9% of total electrical energy use. In 2015, this contribution briefly declined until a new 400 kW fuel cell was brought online in FY2017. FY2015 renewable contribution consisted of energy from a 21 kW photovoltaic (PV) system on the Police Station, and an 88 kW PV system on Moody School. The overall, current renewable energy contribution has increased by 107% over FY2011 levels and represents 19% of total city-wide electrical energy use. The increase is attributable to the systems described above and a recently installed 218 kW PV system installed at the Bacon Water Treatment Plant (Higby). Table II. below summarizes current renewable energy systems.

Table II. Current Renewable Energy Systems

Renewable Energy System	Capacity (kW)	Annual Production (MWh)
Police Station PV	21	21
Moody School PV	88	113
High School Fuel Cell	400	3,035
Higby PV	218	280
Total	727	3,449

Adjustments; FY2015/2018 – In FY2015, the Senior Center was brought on line, adding 344 MWh to the overall city energy use.

Between FY2015 and FY2018, other items to note include a small reduction in energy use by traffic signals and street lights due to an upgrading of about half of all signals to LED technology, and an upgrade to about 115 out 5,072 street lights (2.3%). City Yard lighting was upgraded throughout as well.

In FY2018, the removal of the Water Pollution Treatment plant (WPCA) was initiated, to be replaced by pumps that will move the water to the Mattabassett treatment plant in Cromwell. There is no net energy impact expected from this change.

Table III. below summarizes these adjustments.

Table III. Adjustments FY2015/2018

FY2015 Adjustments		
Senior Center	**344**	MWh
FY2018 Adjustments		
Street lights	(21)	MWh
Traffic signals	(44)	MWh
City Yard	(25)	MWh
WPCA	-	MWh
Total	(89)	MWh

Guidance

The updating and rewriting of the current energy plan in FY2019 will, among other things, address the addition of a strategic framework that can facilitate the implementation of the plan. The following guidance consists of suggested themes that the City of Middletown should consider incorporating in the energy plan, and implementing.

Vision – It is recommended that the revised Energy Plan be grounded with a vision statement. The purpose of the vision statement is to express the ideals leading the City forward inside of the energy-related realities unfolding, and to offer a picture of the results expected through the implementation of the energy plan.

In this regard, the vision statement should acknowledge changes in the energy landscape of the future that the City of Middletown wishes to accommodate. These changes include the reality of finite sources of fossil fuels, including the concept of peak oil, in which continued reliance on fossil

fuels results in decreasing Energy Return on Investment (EROI), and ever-increasing economic and environmental costs.

The physics of EROI are straight forward, acknowledging the increasing expenditure of energy required to produce equivalent levels of usable energy, and the ultimate resolution whereby energy expended exceeds energy obtained, and thus the viability of fossil fuels collapses.

Fossil fuel extraction technologies, including hydraulic fracturing (Fracking) to obtain shale oil and natural gas are characterized by temporary bubbles of energy supply at very low EROI, and increasing environmental damage. Energy obtained by these technologies is also short-lived in comparison to the more easily obtained supplies that have fueled the fossil fuel industry for the past century. For example, at the onset of the fossil fuel period, the EROI was over 100 to 1, in which 100 units of energy could be obtained through the expenditure of a single unit of energy. Today the average EROI of fossil fuel is 10 to 1 and continues to drop.

In addition to the reality of constrained sources of fossil energy – implying increasing competition for remaining supplies, associated higher costs, and the increasing environmental degradation related to the exploration and acquisition of fossil fuels – there is the equally critical issue of climate disruption emerging from the use of fossil fuels.

Given the above discussion, holding the ideal vision of **100% Renewable Energy** is not only a worthy endeavor, but perhaps an essential one. To this end, there are programs to analyze and design 100% renewable sources that can be applied to all energy use within City boundaries. Peoples Action for Clean Energy (PACE) offers one such program. The City is encouraged to enroll in this program and develop a vision that can supply the energy needed to maintain the vitality of our economic and social fabric. From such a vision, policy, strategic planning, prioritization, and funding initiatives can emerge.

A 100% renewable energy plan goes beyond generating, procuring or offsetting energy needs with renewables. It represents a holistic, comprehensive approach to managing the supply and demand for energy, including:

- deep efficiency and conservation,
- generation of renewable energy,
- energy storage,
- electrification of transportation, heating, and cooling,
- active load management (i.e., "demand response"),
- a modern community microgrid and
- a new utility rate structure and business model.

Such a program would seek to answer the following questions pertinent to a comprehensive vision:

- How much energy do we currently use, including electricity, heating, cooling and transportation?
- How much could we reduce this energy usage through conservation, efficiency and electrification of all heating, cooling (i.e., heat pumps) and transportation (i.e., electric vehicles)?
- How much renewable energy could we produce in town?
- How do we re-think and redesign the electric grid using community microgrids to accommodate a higher level of distributed energy resources (DERs)?
- How do we constructively engage with the electric utility to develop new technical, business, and financial models?

Finally, the 100% effort can help develop a city-wide picture of deployed decentralized, renewable infrastructure such as windmills on brownfield sites, solar arrays on roadway medians, coordinated micro-grid systems and other examples of the localization of energy generation and delivery. To the extent that these elements are reflected in the Energy Plan, they have a much better chance of being brought to fruition.

Policy – Through the effort to develop a useful vision as the context for an energy plan, the City will become much more capable of articulating guiding ideals that are broadly supported by City leaders and constituents. In order to better serve these ideals, the City should consider codifying them in the form of policies, resolutions and ordinances. The effort to put forth a vision of the future supported by a matrix of policy offers positive leadership, and the ability to respond proactively to energy, environmental and economic challenges.

As the environmental and economic challenges of the energy future reveal themselves more fully, it will be increasingly important to install a framework of acceptable and not acceptable responses. To the extent that these challenges are non-negotiable, it is useful to consider the perspective of 'responding' rather than the less realistic, but more hopeful, idea of 'solving' the challenges.

Examples include:

- Requiring minimum efficiency standards for vehicles and buildings
- Encouraging all new buildings to meet 'net zero' criteria
- Focusing on providing equitable access for everyone to clean water, healthy food, safe habitation and strong community
- Prioritizing the use of otherwise unusable land, such as brownfields, for the siting of renewable energy infrastructure
- Banning/limiting plastic bags and other forms of plastic including eliminating single use plastic water bottles

Well-developed policies can provide important support to the implementation of the energy plan. The CETF can provide important leadership by crafting and proposing to the Common Council policies, policy statements, resolutions and ordinances consistent with the vision of the energy plan.

Financial Criteria – Energy opportunities span a range of economic potential from robust returns on investment to marginal or non-returning, capital-intense investments. While capital improvements are ultimately unavoidable as systems and equipment reach their end-of-useful life, other improvements can offer reductions in operating costs that represent a return on the investment. Some of these investments can be compelling. While much effort is expended managing capital improvements, optional investments that reduce operating costs often do not receive priority and are overlooked.

For example, some projects can reduce operating costs in excess of the recurring bond-service cost that might be used to finance such a project, resulting in net-positive cash flow. What this means is that the project reduces current operating budgets with no net upfront investment.

By developing financial criteria, the City can benefit from a framework that prioritizes projects with beneficial returns on investment and supports the prioritization and implementation of such projects. When applied within a strategy of long-term goals, the criteria can positively move forward a process of project identification, development and implementation. This is an essential aspect to implementing the Energy Plan.

It is recommended that the financial criteria be as simple as making a commitment to implement any project that provides a 5-year or sooner simple payback – which is approximately a 20% return on investment. Such projects can be financed with a 10-year bond at current interest rates and provide net, positive cash flow immediately.

Energy Efficiency Budget – A second aspect of the recommended financial criteria is the development of an energy efficiency budget that will bound efforts on an annual basis; contextualizing – and prioritizing - the energy efficiency work inside of the larger city financial and debt-management picture.

Based on previous commitments to reduce energy use by 20% over baseline levels, a budget guideline of $5,000,000 was developed that would achieve those efficiency results. Additionally, renewable energy projects can be constructively approached through Power Purchase Agreements (PPA) that do not require upfront funding – and thus don't impact the efficiency budget. The PPA approach is most often the most beneficial because it allows third-party developer/owners to take advantage of tax credits - that can be reflected in lower pricing - from which municipalities do not otherwise benefit. (see additional discussion below under 'Procurement')

While additional work can be done to project the costs of achieving efficiency goals, the above general guidelines would go a long way toward energizing the development of efficiency projects and implementing the Energy Plan. This is particularly true because of the difficulty in funding the work required to make sound life-cycle cost decisions.

Energy efficiency projects are predicated on the basis of future reductions in costs based on present-day investment. The work needed to bring such projects to decision points and implementation includes:

- Identification (ie., through 'auditing')
- Screening – understanding the relative strength and weakness of a portfolio of opportunities
- Additional design, cost estimating and analysis of the most attractive projects
- Invest-Grade design and analysis offering detailed cost and benefits that can be offered in a contract proposal

Energy efficiency service companies undertake the above process using risk management tools. One such tool is the requirement of a level of commitment from the City that a project will go forward if it meets certain criteria. In the absence of such criteria, project development risks are justifiably perceived as higher, and, thus, obtaining development support that much more difficult. Moreover, procurement rules requiring multiple bids can also have a chilling effect on obtaining project development support.

When a well-articulated financial criteria and budget can be expressed, the development risks are greatly reduced and the work to identify a portfolio of projects that will reduce long-term costs can go forward. Conversely, in the absence of specific criteria, the appetite to provide the requisite design and analysis is greatly reduced. The alternative would be to fund this work specifically.

One of the attractions of performance contracting is the inclusion of the development work in the proposal preparation phase. All of the same risk-mitigation techniques apply to performance contracts, however, with proper assurances, the companies that specialize in this work are willing to undertake the development work in exchange for the potential of higher margins. A more

favorable approach, financially, for the City, would be the establishing of financial criteria and budgeting that would allow us to self-manage an efficiency program.

Comprehensive Energy Auditing – Supported by the recommendations above, the first step in a comprehensive energy plan would be the auditing of all energy use and identification of a portfolio of project possibilities.

This was done as part of the previous performance contract - to which there has been mixed reviews. One of the challenges of performance contracting is that the operating cost savings generated are deployed to increase the project scope – ostensibly addressing needed capital improvements.

A thoughtful alternative to this would be the implementation of projects that offer a minimum return on investment, enjoying the resulting improved financial condition, and then addressing needed capital improvements as they arise.

While the performance contract was implemented just prior to the baseline year FY2011, new lighting technologies have emerged offering robust returns on investment. Moreover, the building automation/energy management systems (BMS) installed under the performance contract appear to provide rudimentary efficiency control with more sophisticated options left as future 'enhancements'. Unfortunately, this approach has required the City to be captive to proprietary aspects of the BMS with attendant higher pricing. Budgeting for a next round of improvements should consider implementing Open Source options that can be provided by a number of competing providers.

Building Sector – For the building sector, auditing involves the engineering review of energy consumption, the configuration of current mechanical and electrical systems, and a comparison with more efficient scenarios. Under a comprehensive approach, each building would receive a report of project possibilities with sufficient information provided to screen each project in comparison to all projects identified across all buildings.

Transportation Sector – The transportation sector provides additional opportunity for the City to analyze all transportation use and the current means of meeting these needs. From that baseline, alternate, more efficient approaches can be identified. The alternatives would then be subject to cost/benefit analyses that would support a process of screening and prioritizing as discussed above.

Master Planning & Performance Contracting – The development of a well-articulated vision, supported by policy, provide the core values that can be incorporated in a master planning process. The additional details provided by identifying acceptable financial criteria, establishing a budget, and performing comprehensive energy auditing, provide the additional framework for the master plan to be specific and time-bound. This process parallels the development of performance contracting proposals, and can also be applied to the City's own, internal procedures in the case of a self-directed program.

Some of the pros and cons of performance contracting are mentioned above. While this approach to energy efficiency work provides the benefit of accomplishing the needed development work – identification of opportunities, screening, prioritizing, preliminary design, savings analyses, cost estimating, and subsequent iterations to fine-tune a portfolio of projects – performance contracting also commands higher-than-usual margins, and can suffer from a lack of transparency.

The financial benefits of performance contracting are real, though not necessarily optimal given the above. Moreover, it has been the experience of the City of Middletown to have a perception of being under-served by past performance contracts. One of the key reasons for this is the fact that the monetary savings generated by a performance contract are most usually redirected to include additional work scope in the project, namely more capital-intense efficiency measures.

While accomplishing additional scope can be a good thing, it is done at the expense of redirecting savings from operating budgets that would have otherwise benefitted. This easily produces the perception that the project did not generate expected savings. An alternative to performance contracting would be a self-directed program that targets projects with attractive savings as dictated by the financial criteria established in the master planning. The savings generated can then flow to the affected operating budget and the City enjoys an enhanced financial condition.

The need for capital projects does not go away in either case – performance contracting or self-directed program. However, the latter can provide more control and transparency that can then feed a greater sense of success as well as improved overall financial performance.

Procurement – Procuring efficiency project services, energy commodity and renewable energy all must be done in the context of the City's procurement rules. This typically involves obtaining three prices for work under $20,000, and conducting requests for proposals (RFPs) for larger projects. Alternatively, some work is characterized as a professional service and can sometimes benefit from a specific professional services agreement (PSA) that waives the competitive requirements. Such dispensation requires a justification in the form of uniqueness of services, high-quality and standardization goals.

Project Services – The procurement of energy efficiency projects is not typically conducive to competitive bidding because of the inherent development process and need to mitigate risks for any vendor providing the process of identifying, screening, prioritizing, designing, analyzing, and cost estimating projects. Risks can be mitigated through the use of financial criteria, supported by a commitment to move forward with projects that meet the criteria and fall within an acceptable budget, or by funding the development process separately.

Funding the development process is difficult in that it requires an expenditure of about 10% of the costs of any expected portfolio of projects. Thus, if the budget is $5,000,000 for energy work, the development costs could be as high as $500,000. Generally, until a project is developed and a commitment to implement it is achieved based on the benefits to be derived, project funds are not available. The City could consider developing a budget to separately fund project development costs. This approach would provide the greatest level of control over the process.

Alternatively, a professional services agreement could be put in place providing the guidelines for working with an energy services company. Such an agreement can help reduce the vendor's risks by providing assurances that work will be implemented if the final project proposal meets agreed-upon criteria. This approach can support project development work without the need to fund it upfront.

Commodity Services- Maintaining cost competitive pricing for energy commodity – electricity, natural gas, fuel oil and transportation fuels – is an important adjunct to implementing efficiency projects. To the extent that costs reductions can be achieved, the City benefits from a stronger financial position from which efficiency improvements can be pursued. To the extent that long-term

pricing can be developed, the City can insulate itself from market volatility, and, to a certain extent, price escalation.

However, the energy commodity markets have their own unique challenges including difficulty in understanding market price, particularly for future time periods. The industry standard involves working with a single broker, for example, as a professional service, and then soliciting competitive supply proposals from suppliers. However, this process is highly susceptible to broker bias and manipulation. Creative approaches to introduce competition to the broker's role is very much also needed to obtain the best pricing.

Renewable Energy – As the costs of renewable energy becomes more competitive, it can offer additional long-term energy price control. The most recent and real example is a 20-year solar contract at the Bacon Water Treatment plant at the Higby Reservoir (Higby). The Higby project is a PPA under which the City purchases solar-generated electricity at a rate of $0.085, fixed for 20-years. That rate is for the most part all inclusive – it is a 'delivered rate' meaning the there are no other distribution or transportation charges added to the core rate if the electricity is used concurrent with its generation. This may or may not be true as the plant can use electricity at any time, day or night, but the solar system only produces during sunlight hours. Some energy will not be used at the time of generation, and other energy will be demanded during off-hours. For this reason, and given the variability of the operation of the plant, additional charges from Eversource will apply. However, the fixed contract rate does insulate the City from future price escalation in the electricity market.

As with efficiency project development, some solar projects are customized and optimized for a specific application. In this case, it may be best to work with a qualified developer under a PSA. Smaller, more common solar projects may be suitable for competitive bidding as the development process is straightforward and not overly costly.

In either case, the City will most likely be best served by a PPA in which the system is owned by the vendor who can benefit from tax credits of which the City cannot make use. The tax credits lower the overall system cost and thus support lower long-term PPA pricing.
There is an emerging new perspective pertinent to solar on schools where the City may consider owning the system. Under this scenario, the City foregoes the tax credits, but applies for reimbursement of the system costs as a capital improvement through the state School Facilities Unit. For Middletown, this means the potential to recoup 55% of system costs through state funds – a significantly larger benefit than the tax credit shared with a vendor.

Role of the Energy Coordinator – The role of the Energy Coordinator (EC) involves administrative work with regard to utility billing and managing of energy infrastructure such as street lights, analysis to review opportunities, and advocacy work to lead the City toward good projects. The EC serves as a consultant to the City and the Mayor's office, and as staff on the CETF.

The EC provides technical competency and seeks to develop transparency with regard to project proposals. This includes complete analysis of savings potential and optimal sharing of project risks between parties – with the goal being an equitable deal for everyone. This approach is consistent with a pursuit of greater sustainability where energy-, environmental-, social- and economic-justice is served.

The Mayor's office has developed the following discussion of the role:

The Energy Coordinator is assigned to work in the following general areas:

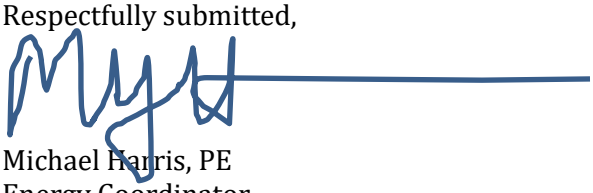
- To support the Mayor's efforts to promote energy efficiency through the City, as part of the broader mission to improve effectiveness and efficiency in all areas of municipal government.
- To identify opportunities and help the City undertake "sustainability projects" that promise to reduce negative impacts on the environment and raise the quality of life and general appeal of the Middletown community, for residents, businesses, and visitors.
- To improve the City's measurement and analysis of energy consumption and expenses, and to identify opportunities to reduce consumption and costs.

To achieve progress in these areas, the Energy Coordinator needs the ability to work with the leaders and staff of all City departments. In this way, the knowledge base, resources, goals and concerns of each department can be available and useful to other departments for purposes of trouble-shooting and long-range planning. Our City will function more effectively with greater inter-departmental communication and integration of vision.

In the short to medium term, the Energy Coordinator is working primarily in the areas of 1) electricity and natural gas consumption; 2) "complete streets" improvements for pedestrians and bicyclists; and 3) renewable energy and electrical grid security.

Closing – In closing, the guidance provided herein represents observations and recommendations based on my current three-year experience in the role of EC. It is my recommendation that this guidance be reviewed for inclusion in the next iteration of the City of Middletown Energy Plan. The energy data in the benchmarking discussion can provide a useful starting point for our next phase of planning.

Respectfully submitted,



Michael Harris, PE
Energy Coordinator
City of Middletown

B. ***Appendix 2. – Energy Action Plan***

Clean Energy Communities Municipal Action Plan

Middletown
245 DeKoven Dr.
Middletown, CT 06457

Eversource
Clean Energy Communities Program

Prepared by:
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100 Cambridgepark Drive
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March 2017

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Executive Summary

The Clean Energy Communities program is an Energize Connecticut initiative that incentivizes Connecticut cities and towns to improve energy efficiency and promote the use of clean and renewable energy. Under the program, Connecticut cities and towns pledge to reduce municipal building energy consumption by 20% by 2018 and to voluntarily purchase 20% of municipal electrical needs from renewable sources by 2018. Eversource has provided Technical Assistance to Connecticut cities and towns and this Municipal Action Plan is the result of Planning Assistance provided to the City of Middletown.

The Municipal Action Plan is designed to guide the City of Middletown towards the 20% energy consumption goal by providing a snapshot the City's energy consumption in the baseline year fiscal year (2011) compared to current (2015) energy performance. This document also provides an Energy Reduction Plan to illustrate the subsequent steps to be completed in order for the community to meet the goals of the Clean Energy Communities Program. Each section includes a timeline of activities and a responsible party to encourage each community to track progress toward meeting the goals as a Clean Energy Community. These tasks are summarized in the Activity Tracker below.

In addition to the benchmarking analysis and the Energy Reduction Plan, the Municipal Action Plan includes information on Middletown's Clean Energy Task Force, internal procedures, and public policies and community strategies that can keep the mission of the Clean Energy Communities program active and impactful. The appendices include background information on the program, a summary of the Energy Assessment Report, as well as additional tools and resources.

The purpose of the Municipal Action Plan is to be a living document that can be updated periodically as Middletown continues to make progress towards its Clean Energy Communities goals.

Activity Tracker

Background

Middletown made a commitment to achieve the goals of the Clean Energy Communities. Below is a summary of the activities that Middletown will conduct over the next 12 months in order to implement a strategic Municipal Energy Action Plan that will result in the reduction of Municipal and Board of Education building energy use by 20% by 2018.

Person Responsible:

Clean Energy Task Force will provide annual updates to this chart.

Strategic Energy Action Plan Tasks				
Tasks To Be Updated Annually by the City of Middletown	**Q1 2017**	**Q2 2017**	**Q3 2017**	**Q4 2017**
Prior Audits & Completed Projects				
Establish priorities for project installations using audit information.				
Identify projects that may need additional technical assessments.				
Fill in energy Data, expected energy savings and Financial Data (if available) in the "Completed Projects" table				
Energy Reduction Plan				
Fill in Project, Energy, and Financial Data in the "Planned Energy Efficiency Measures" table.				
Maintain "Planned Energy Efficiency Measures" table updated with new planned projects.				
Identify projects that may need additional technical assessments.				
Renewable Energy Plan				
Summarize a Renewable Energy Strategy to achieve the CT Clean Energy Communities goals.				
Clean Energy Task Force				
Update goals, tasks and action items for the ongoing development of the Clean Energy Task Force.				
Process for Updating the Municipal Action Plan				
Establish the date to annually review and update the Municipal Action Plan.				
Using Portfolio Manager				
Establish a timeframe for entering energy data into Portfolio Manager. Monthly or quarterly data entry is recommended.				
Establish a process for generating Reports from Portfolio Manager to track progress toward meeting the 20% energy reduction goal.				
Identify the person who will assume responsibility for updating data in Portfolio Manager; identify the contacts who will receive Portfolio Manager.				
Conducting Audits				
Establish a procedure for conducting facility assessments. This may include assessments by Eversource staff as well as vendors selected by the city.				
Financing and Prioritizing Projects				
Establish a strategy or process for prioritizing and financing energy efficiency projects.				
Internal Policies and Mission Statements				
Establish a strategy or timeframe for developing internal policies and procedures.				
Public Policies and Community Strategies				
Identify Public Policies that may be a priority to establish.				
Identify and schedule public events or strategies for engaging community businesses and residents.				

Energy Use Comparison using EPA ENERGY STAR Portfolio Manager®

Background

The Municipal Technical Assistance Program and participating communities establish an energy use baseline using data that is recorded in Portfolio Manager. This baseline period will be used to track achievement toward meeting energy reduction goals.

Person Responsible

Clean Energy Task Force will provide annual updates to this chart.

Baseline (2011)								
Property Name	**Property Floor Area (ft²)**	**Site Energy Use (kBtu)**	**Electricity (kBtu)**	**Natural Gas Use (kBtu)**	**Fuel Oil #2 Use (kBtu)**	**Propane Use (kBtu)**	**Site EUI (kBtu/ft²)**	**WN Site EUI (kBtu/ft²)**
City Hall	37,500	2,907,020	1,463,581	1,443,377			78	
Water & Sewer Bldg	36,704	2,804,918	923,953	1,880,966			76	74
Russell Library	45,000	3,817,757	1,577,897	2,239,861			85	84
Police HQ	59,949	6,031,270	3,535,320	2,495,950			101	101
Fire HQ	7,806	1,209,056	306,074	902,983			155	149
Cross St Fire	4,000	613,696	613,696				153	153
Parks Department	12,534	1,010,170	213,772		796,398		81	80
City Yard	25,000	4,353,245	476,141	1,100,130	2,776,974		174	174
Bielefield Elementary School	45,949	2,579,671	948,837	1,630,834			56	55
Farm Hill Elementary School	61,042	1,019,589	980,909	38,680			17	17
Lawrence Elementary School	44,232	2,262,764	1,536,045	726,719			51	50
Macdonough School	39,149	2,941,802	880,951		2,060,851		75	75
Moody School	50,533	3,336,195	555,357		2,780,838		66	66
Spencer School	50,273	3,503,433	914,498		2,588,935		70	
Wesley School	54,264	3,178,634	2,101,682			1,076,952	59	58
Woodrow Wilson Middle School	157,053	13,385,019	3,593,791	563,996	9,227,232		85	85
Snow Elementary School	67,405	4,434,726	1,237,710	3,197,016			66	64
Keigwin Middle School	83,241	4,656,099	1,996,706	2,659,392			56	55
Admin Building	20,955	1,208,737	486,956	721,781			58	56
Middletown High School	326,104	17,916,234	2,657,379	15,258,855			55	53
Baseline Total [06/30/2011]	1,228,693	83,170,035	27,001,255	34,860,538	20,231,227	1,076,952	67.7	61.6
20% Goal 12/31/2018		**66,536,028**					**54.2**	
Water Treatment Facilities								
Roth Water Treatment	11,516	11,307,955	9,669,618		1,638,336		982	982
Higby Water Treatment	1	1,892,848	909,598		983,250		1,892,848	1,892,848
WPCA	1	7,333,070	7,333,070				7,333,070	7,333,070
Water Treatment Facilities Baseline Total [6/30/2011]	11,518	20,533,873	17,912,287		2,621,586		1,782.8	1,782.7

Current (2015)									
Property Name	**Property Floor Area (ft^2)**	**Site Energy Use (kBtu)**	**Electricity (kBtu)**	**Natural Gas Use (kBtu)**	**Fuel Oil #2 Use (kBtu)**	**Propane Use (kBtu)**	**Site EUI ($kBtu/ft^2$)**	**WN Site EUI ($kBtu/ft^2$)**	**% Improvement**
City Hall	37,500	2,758,707	1,416,083	1,342,624			73.6	71.1	5%
Water & Sewer Bldg	36,704	3,004,430	967,453	2,036,977			81.9	77.8	-5%
Russell Library	45,000	3,213,476	1,429,881	1,783,595			71.4	68.1	19%
Police HQ	59,949	5,505,597	2,850,868	2,654,729			91.8	90.5	10%
Fire HQ	7,806	769,625	301,878	467,747			98.6	93.6	37%
Cross St Fire	4,000	701,875	701,875				175.5	175.1	-14%
Parks Department	12,534	762,267	236,073		526,194		60.8	60.5	25%
City Yard	25,000	3,034,740	409,506	1,179,961	1,445,274		121.4	120.1	31%
Bielefield Elementary School	45,949	3,096,888	1,010,223	2,086,666			67.4	64.3	-18%
Farm Hill Elementary School	61,042	961,837	903,663	58,174			15.8	15.7	6%
Lawrence Elementary School	44,232	2,526,603	1,552,522	974,081			57.1	54.4	-9%
Macdonough School	39,149	3,731,976	876,921		2,855,055		95.3	95.3	-27%
Moody School	50,533	2,601,238	506,868		2,094,371		51.5	51.4	22%
Spencer School	50,273	3,898,334	764,478		3,133,856		77.5	77.5	-11%
Wesley School	54,264	2,934,869	1,894,901			1,039,968	54.1	53.6	8%
Woodrow Wilson Middle School	157,053	12,404,727	3,214,661	434,905	8,755,161		79	78.9	8%
Snow Elementary School	67,405	5,672,731	1,298,926	4,373,805			84.2	80.7	-26%
Keigwin Middle School	83,241	5,772,959	1,775,696	3,997,263			69.4	67.1	-23%
Admin Building	20,955	1,381,781	484,750	897,032			65.9	64.2	-15%
Middletown High School	326,104	22,271,152	4,676,453	17,594,700			68.3	67.2	-26%
Current Total [06/30/2015]	1,228,693	87,005,812	27,273,677	39,882,257	18,809,910	1,039,968	70.8	69.4	
% Savings Achieved		**-5%**					**-5%**		
Water Treatment Facilities									
Roth Water Treatment	11,516	9,703,060	7,735,181		1,967,880		843	843	14%
Higby Water Treatment	1	2,391,154	1,385,134		1,006,020		2,391,154	2,370,868	-25%
WPCA	1	6,402,780	6,402,782				6,402,780	6,381,404	13%
Water Treatment Facilities Baseline Total [6/30/2011]	11,518	18,496,995	15,523,097		2,973,900		1,605.9	1,602.3	**10%**

Analysis of Portfolio Manager Comparison

Background

ENERGY STAR® Portfolio Manager®, a tool developed by the U.S. Environmental Protection Agency (EPA), equips building owners and managers with a roadmap to strategically manage energy across their building portfolio, offering guidance and tools to assess energy performance, set energy reduction goals, track savings over time, and recognize and reward improvements.

The Clean Energy Communities Technical Assistance has resulted in analyzing the energy use and energy use intensity (EUI) as reported by benchmarking municipal and Board of Education buildings in Portfolio Manager. The following figures detail the results of this analysis.

Middletown's Portfolio Manager account contains 20 properties. Twelve buildings are Board of Education buildings and eight are town buildings. This analysis has been broken up into three sections. The first section is an analysis of the complete portfolio, the second section covers only town buildings and the third section covers only the Board of Education buildings. The analysis was expanded into these three sections in order to more clearly understand the energy consumption patterns across the portfolio and to aid in selecting an appropriate building to audit.

Analysis Report for Complete Middletown Portfolio

Between the baseline of fiscal year 2011 and current fiscal year 2015, the total energy usage at these 20 properties has increased by 5%. The site energy use intensity (total site energy use per square foot or site EUI) also increased by 5%, from 67.7 kBtu to 70.8 kBtu per square foot. Figures 1 and 2 show the change in total energy and site EUI between 2011 and 2015. In order to reach a 20% savings goal, Middletown will need to reduce their portfolio's site EUI to 49.3 kBtu per square foot.

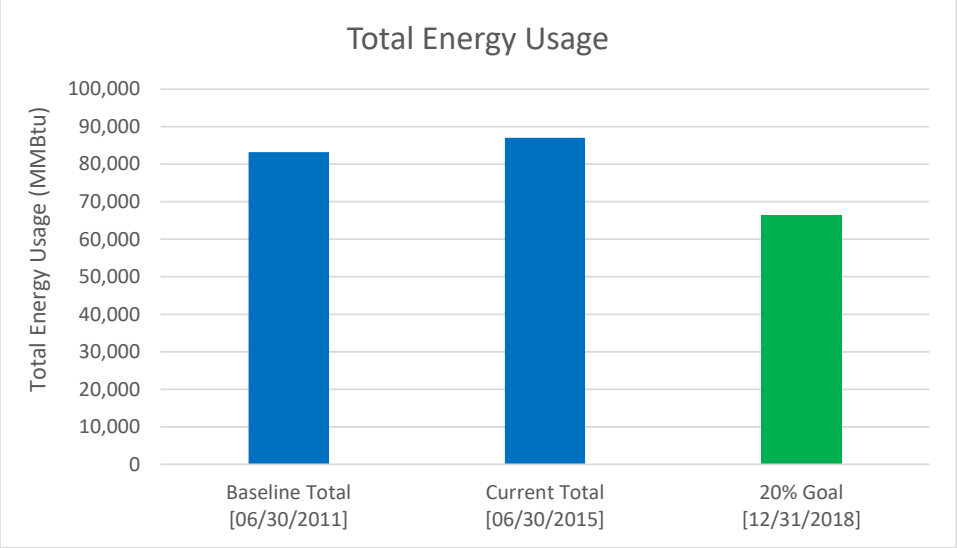


Figure 1

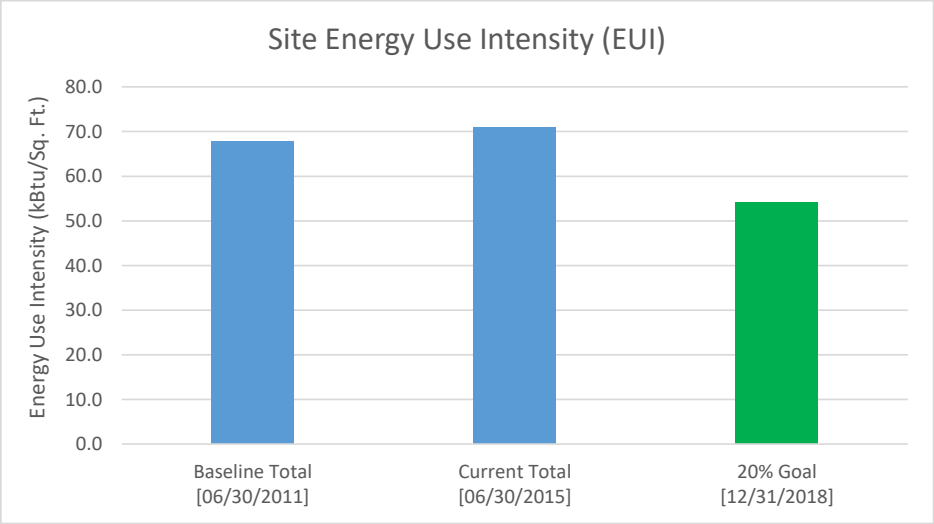


Figure 2

Most of Middletown's energy use can be attributed to school buildings, which is 73% of the total energy consumption in town. The top three energy users are Middletown High School (26%), Woodrow Wilson Middle School (14%) and Keigwin Middle School (7 %). Figures 3 and 4 show the percent of total portfolio energy used by each property in 2011 and 2015. In these figures, the top ten energy users are shown for clarity, with all other properties grouped into the "Other" category. Energy use distribution among the buildings did not change significantly in 2015.

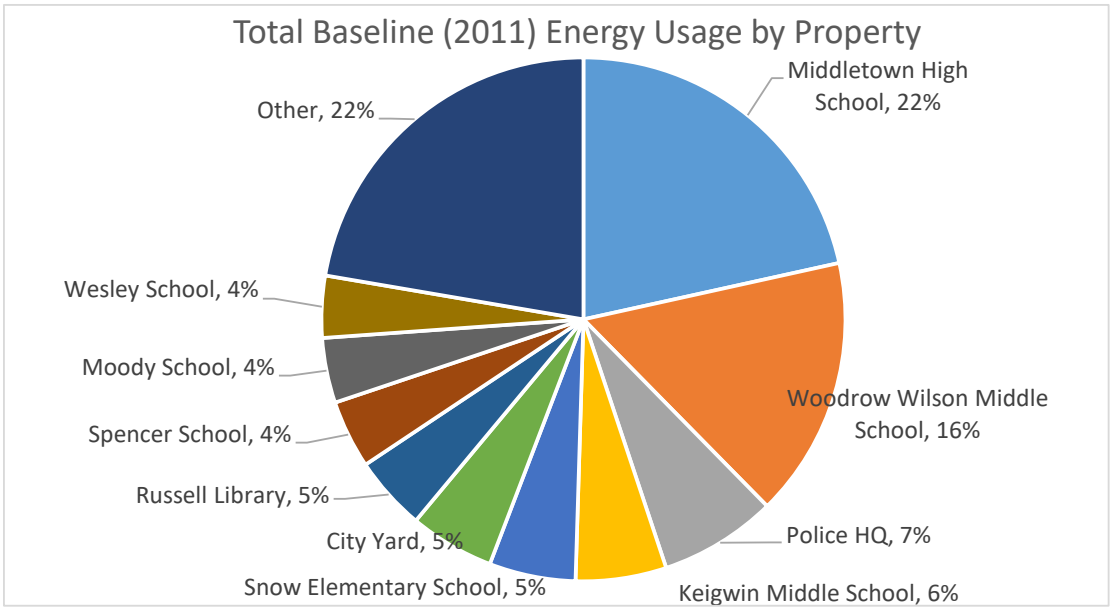


Figure 3

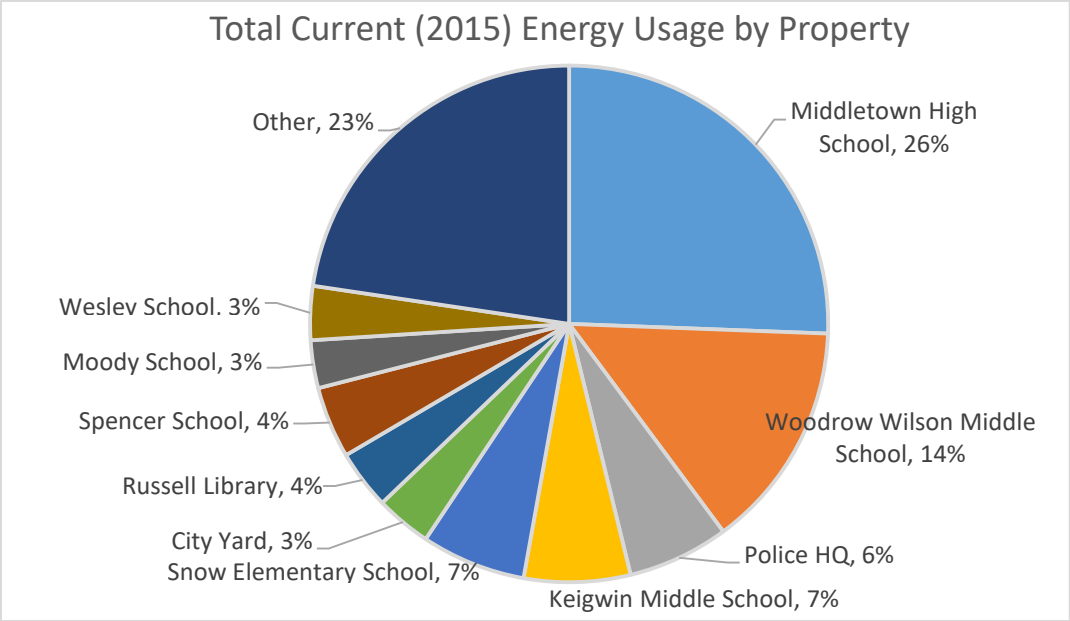


Figure 4

Middletown's energy consumption is about 46% natural gas, 31% electricity, 22% fuel oil and 1% propane. Most of the energy use is heating energy from natural gas and fuel oil. The energy consumption distribution is consistent from baseline to current year. Figures 5 and 6 show this distribution.

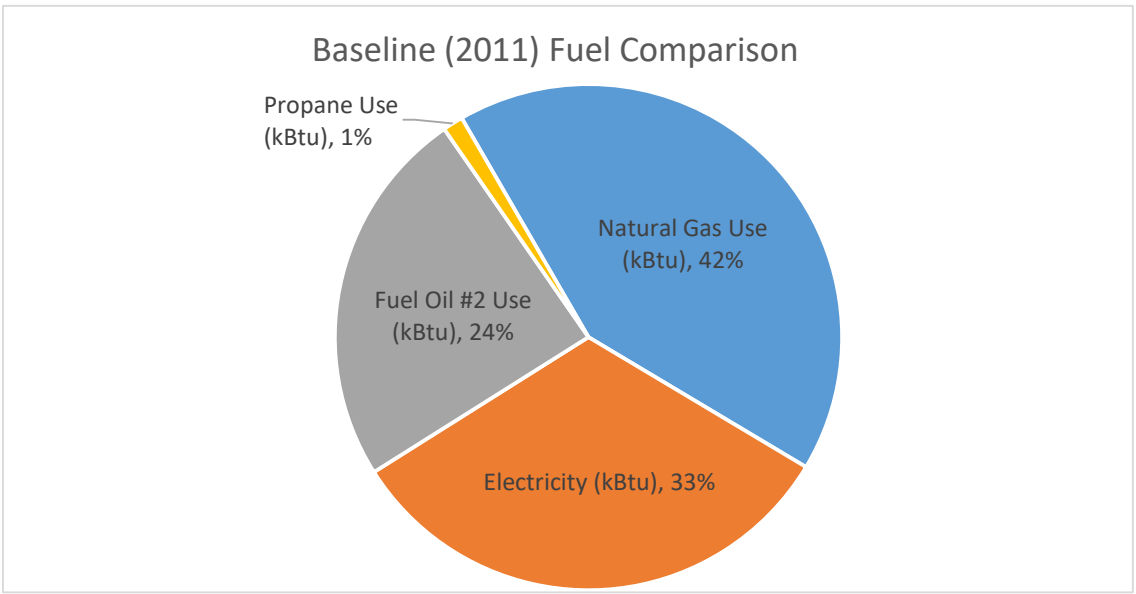


Figure 5

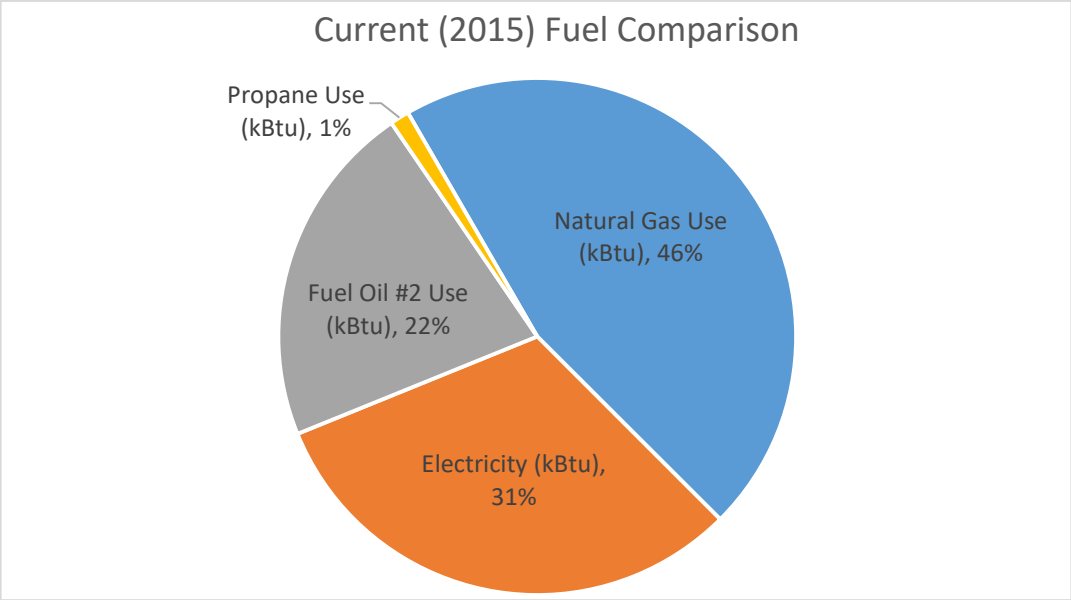


Figure 6

Figure 7 shows the baseline and current total energy usage for the top ten largest energy users, with all other properties grouped into the "Other" category. Figure 8 shows the baseline and current site energy usage for the same group of properties. Among the top ten energy users, City Yard (31%), Moody School (22%) and Russell Library (19%) have shown the greatest energy use improvements since 2011. Middletown High School (-26%), Snow Elementary School (-26%) and Keigwin Middle School (-23%) have shown the largest increases in energy use since 2011. Based on their total energy usage compared to the whole portfolio and their increase in weather normalized energy use intensity, Middletown High School, Snow Elementary School and Keigwin Middle School may provide opportunities for future energy efficiency projects. It will be important to review any recently completed projects to determine the best candidates for an audit.

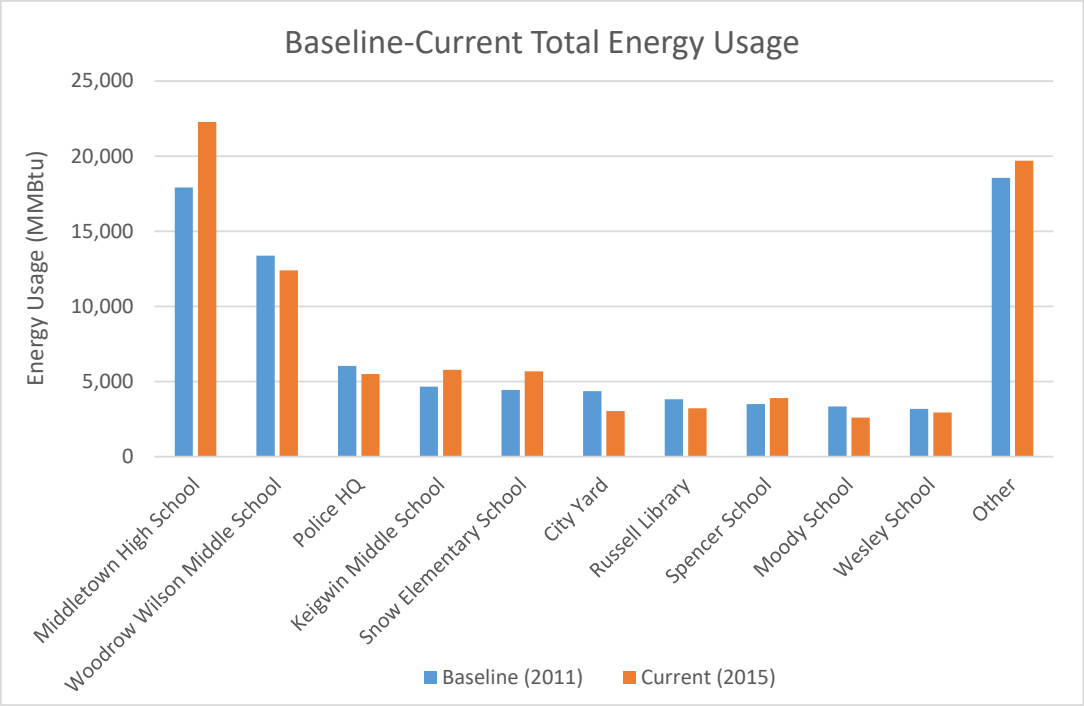


Figure 7

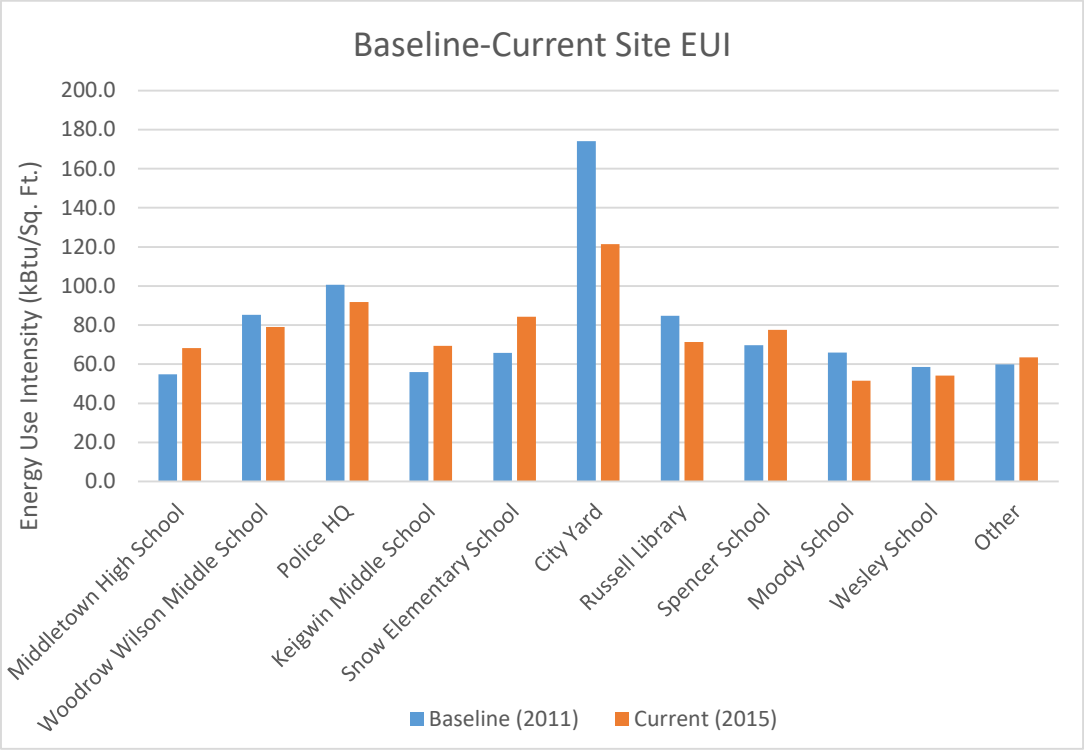


Figure 8

Analysis Report for Middletown Town Buildings Only

There are eight town buildings in Middletown's portfolio of buildings. Between the baseline of fiscal year 2011 and fiscal year 2015, the total energy usage at these eight properties has decreased by 13%.

The site energy use intensity (total site energy use per square foot or site EUI) decreased by 13%, from 99.6 to 86.4 kBtu per square foot. Figures 1 and 2 show the change in total energy and energy use intensity between 2011 and 2015. In order to reach a 20% savings goal, Middletown's town buildings will need to reduce their weather normalized site EUI to 79.6 kBtu per square foot.

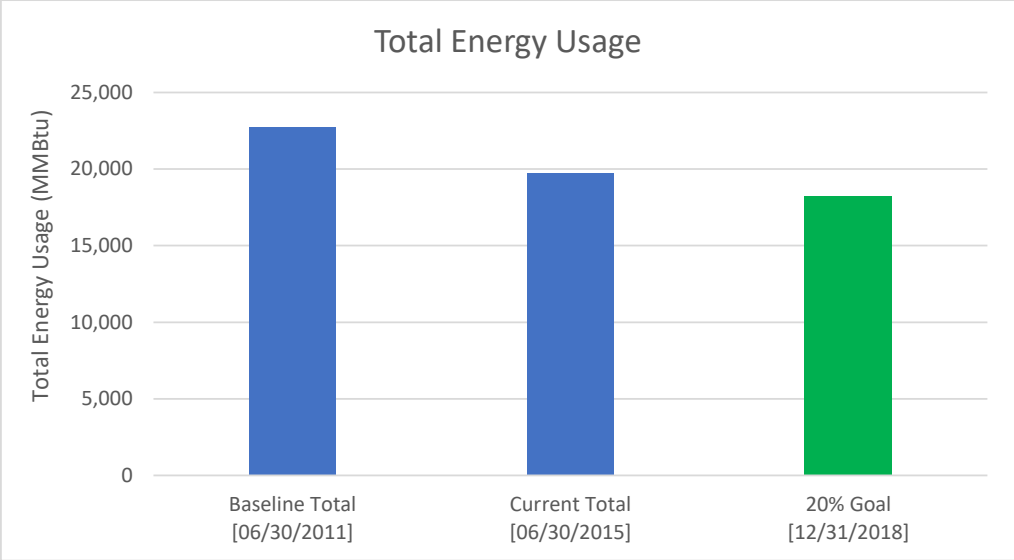


Figure 1

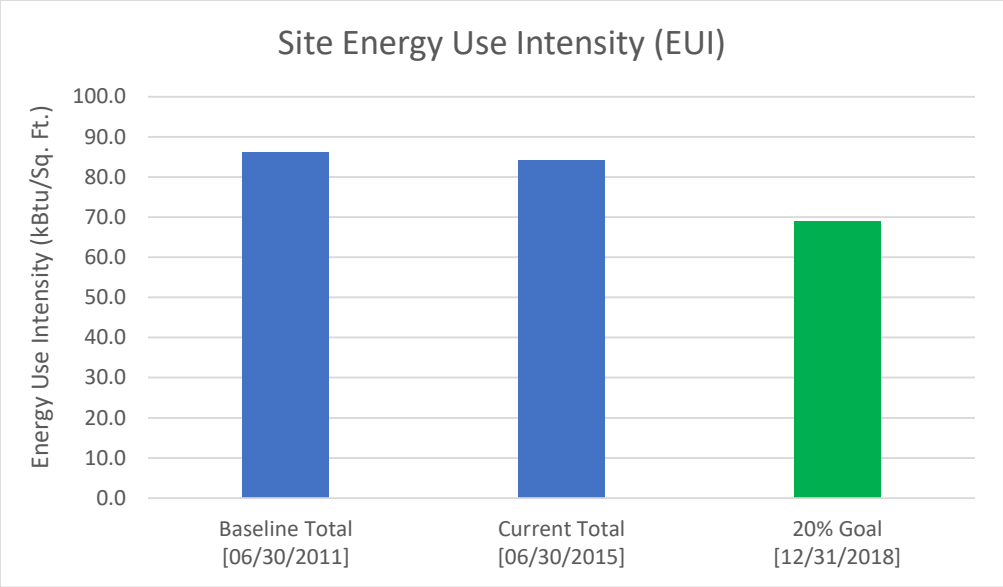


Figure 2

The largest energy user among town buildings is Police HQ, representing about 28% of total energy use. City Yard, Russel Library, City Hall and Water & Sewer Building follow, with about 15% of consumption each. Figures 3 and 4 show the percent of total portfolio energy used by each property in 2011 and 2015. Energy use distribution among the buildings did not change significantly in 2015.

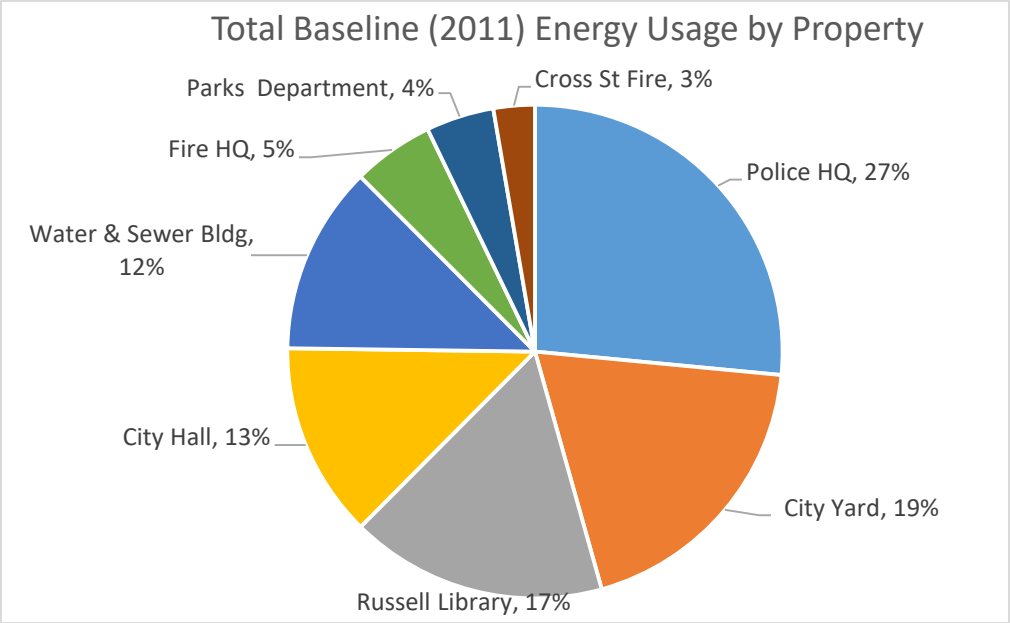


Figure 3

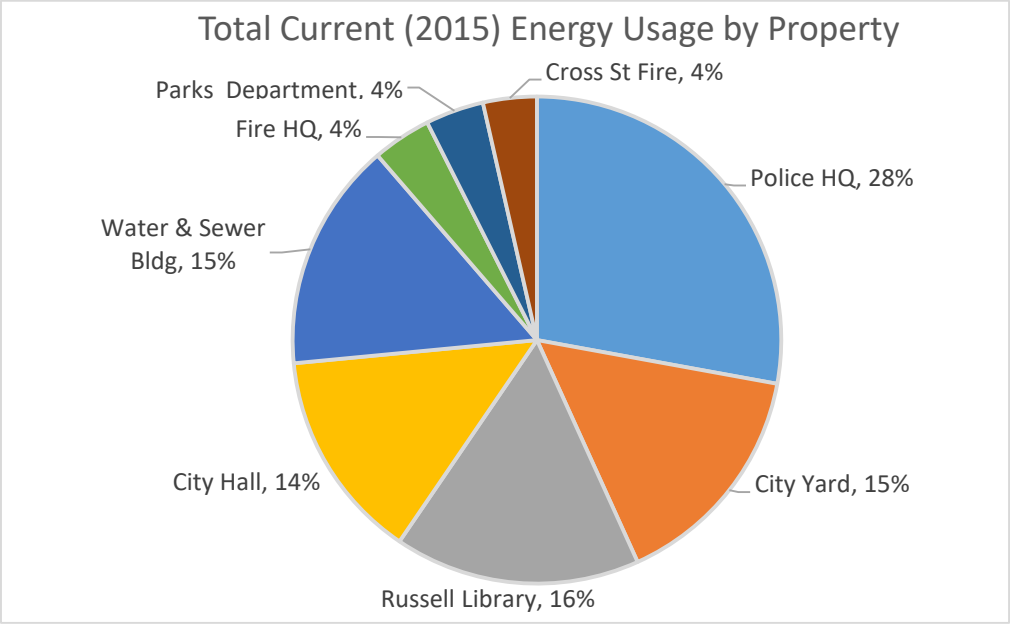


Figure 4

Most of the town buildings' energy use is heating energy from natural gas (~46%) with electricity making up another ~41%. About 13% is fuel oil. In both 2014 and 2015 fuel oil use was about half of Middletown's energy consumption, with natural gas making up 18% of energy use in 2014 and 19% in 2015. The proportion of electricity and natural gas increased while fuel oil use decreased. Overall, the total energy used in town buildings decreased.

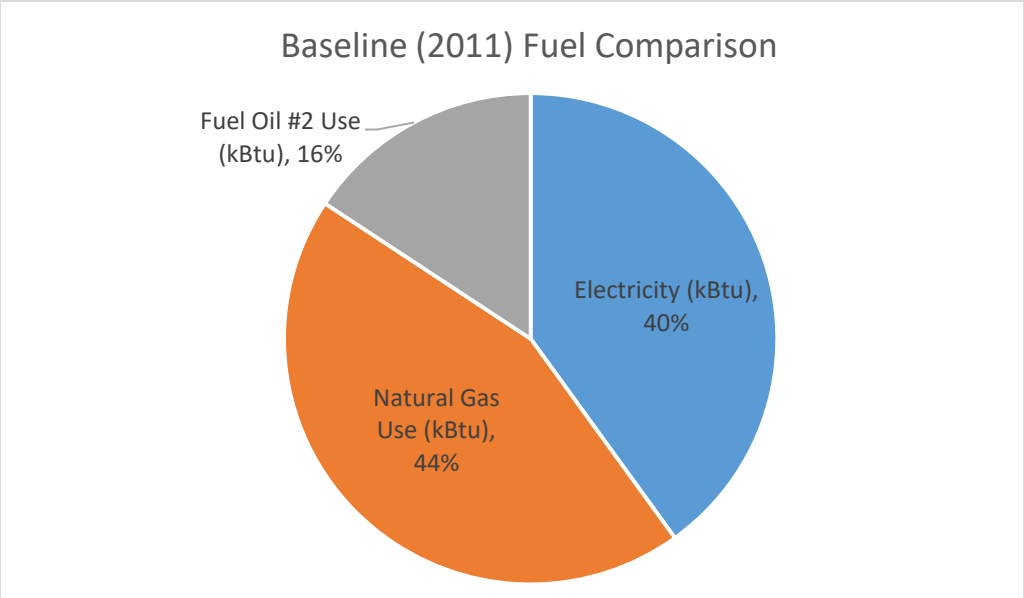


Figure 5

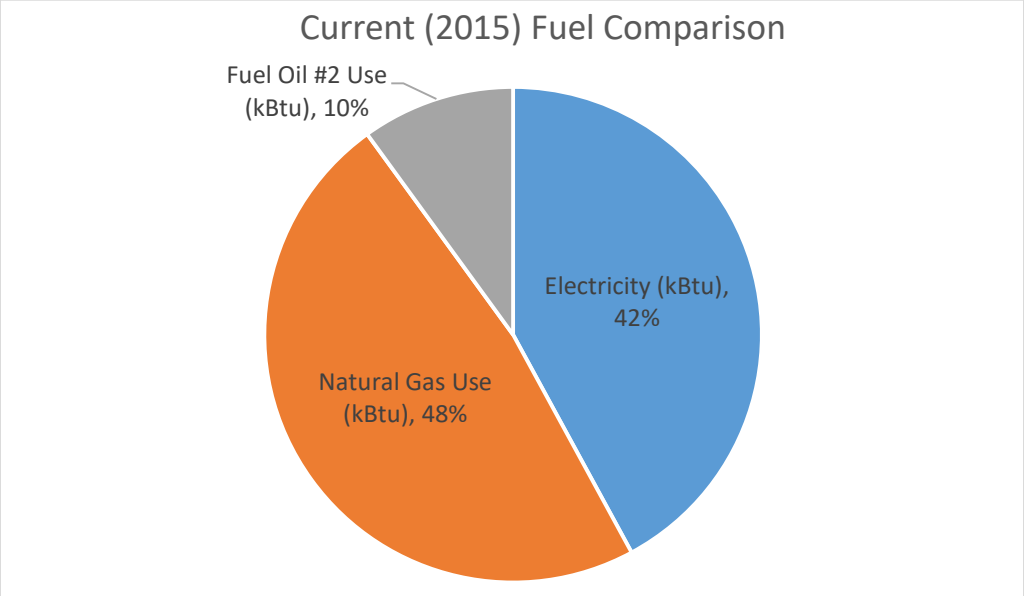


Figure 6

Figure 7 shows the baseline and current total energy usage for all properties. Figure 8 shows the baseline and current weather normalized site energy usage for all properties. Cross St Fire (-14%) and Water & Sewer Building (-2%) showed increases in weather normalized site EUI while all other properties showed decreases in site EUI. Fire HQ (37%), City Yard (31%) and Parks Department (25%) had the greatest improvements. Based on their increase in weather normalized site EUI usage, Cross St Fire and Water & Sewer Building may provide opportunities for future energy efficiency projects.

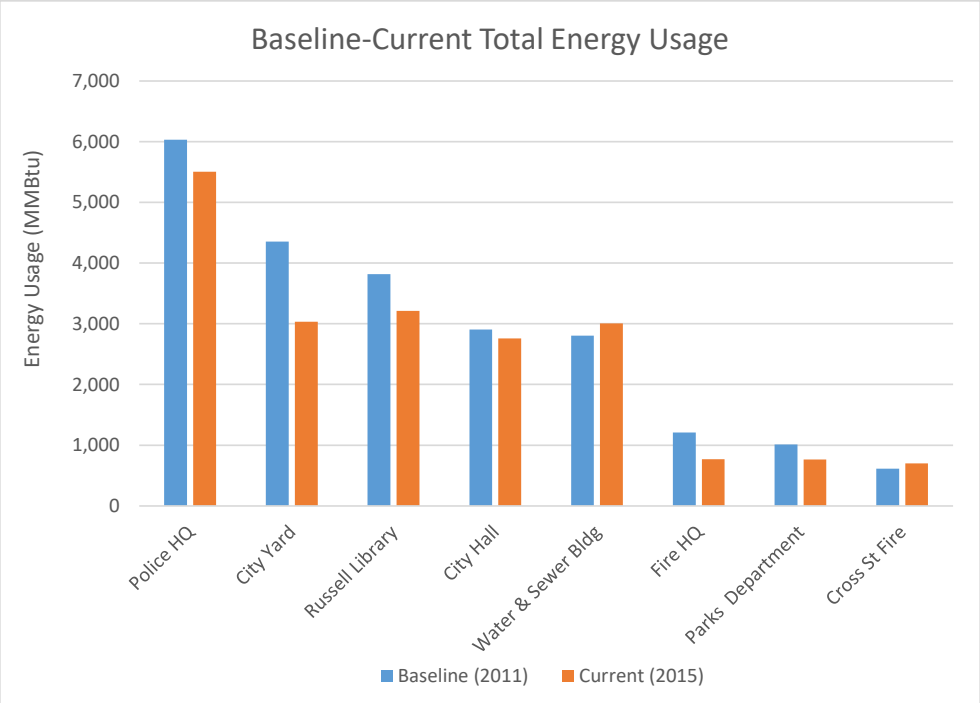


Figure 7

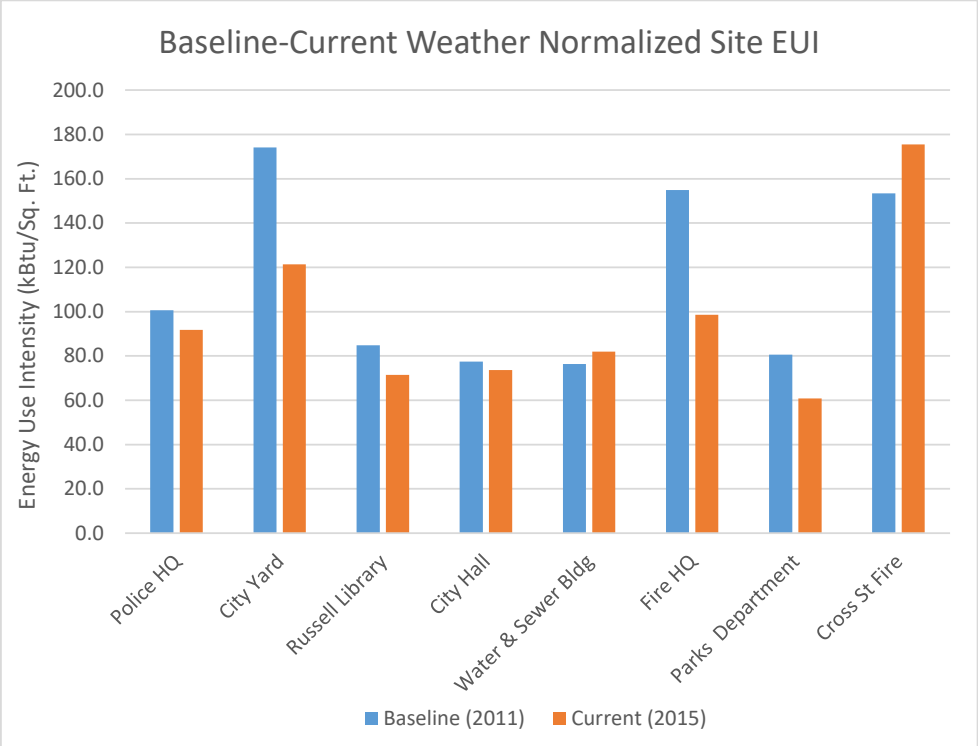


Figure 8

Analysis Report for Board of Education Buildings Only

There are twelve Board of Education buildings in Middletown's portfolio, including one administration building. Between the baseline of fiscal year 2011 and fiscal year 2015, the total energy usage at these twelve properties has increased by 11%. The site energy use intensity (total site energy use per square foot or site EUI) increased by 11%, from 60.4 kBtu to 67.2 kBtu per square foot. Figures 1 and 2 show the change in total energy and energy use intensity between 2011 and 2015. In order to reach a 20% savings goal, Middletown's Board of Education buildings will need to reduce their site EUI to 48.3 kBtu per square foot.

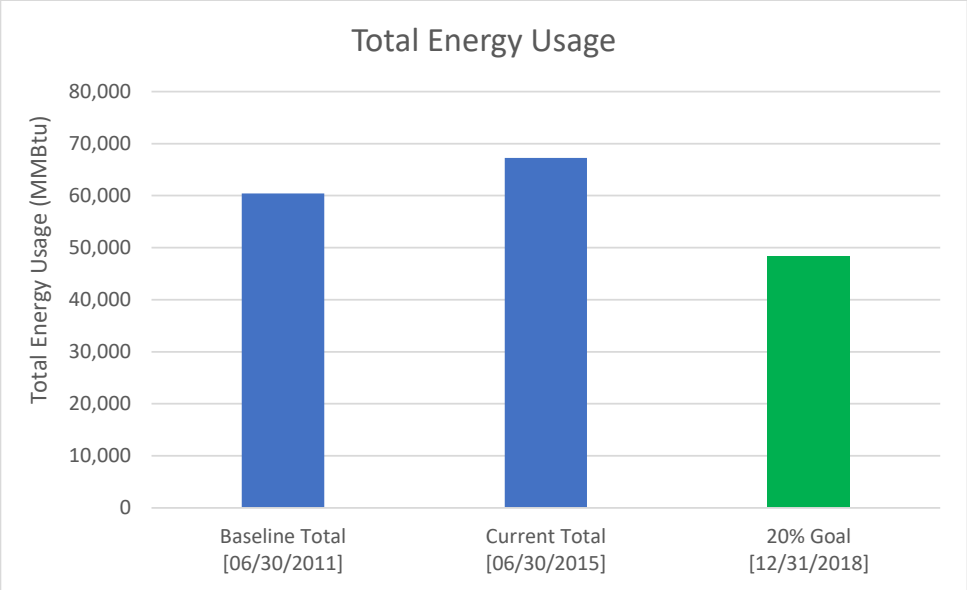


Figure 1

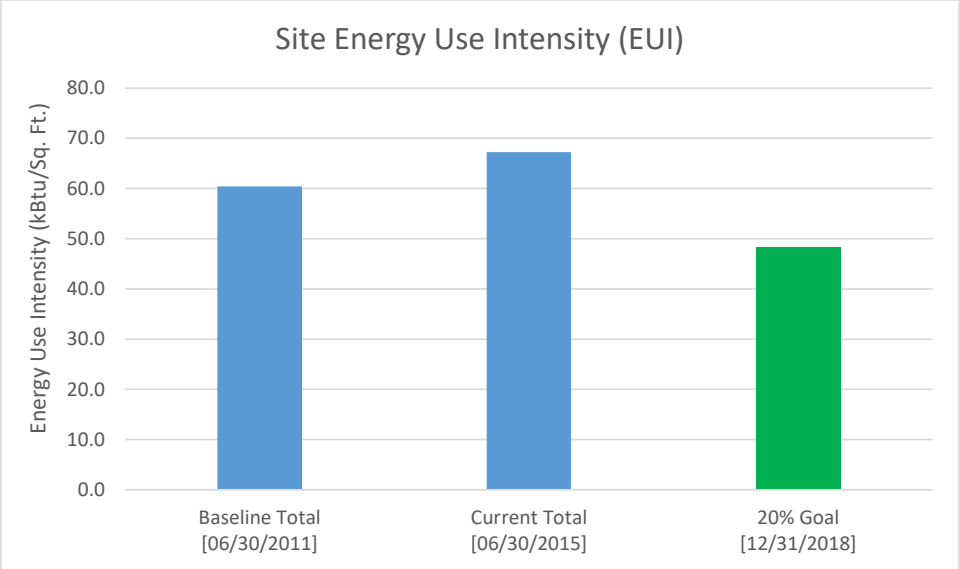


Figure 2

Middletown High School and Woodrow Wilson Middle School consume about half of the total energy use among Board of Education buildings. Figures 3 and 4 show the percent of total portfolio energy used

by each property in 20112 and 2015. Energy use distribution among the buildings did not change significantly in 2015.

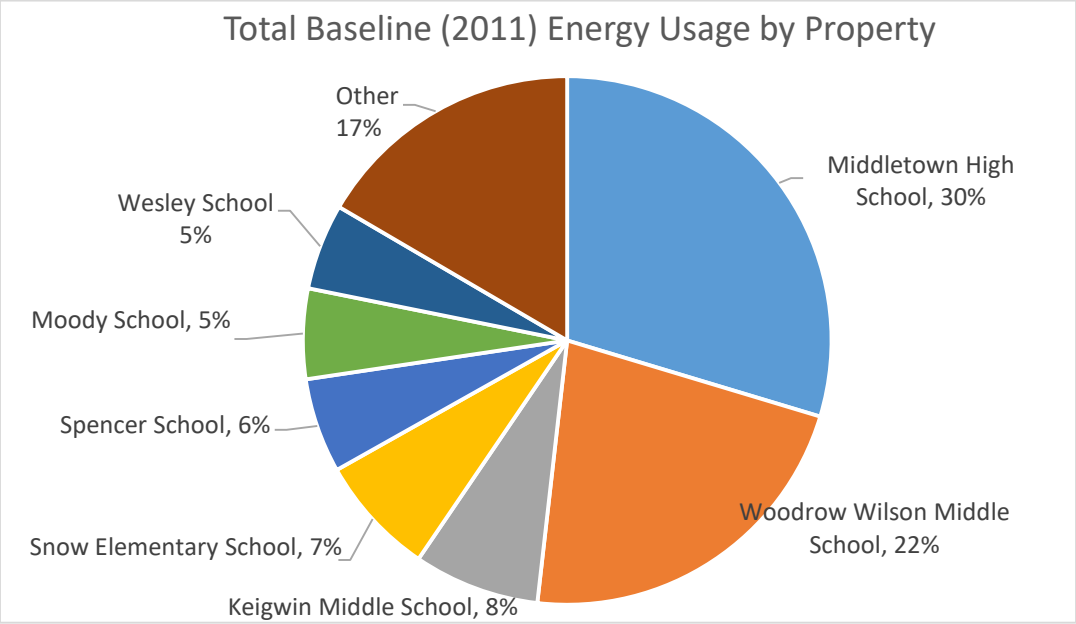


Figure 3

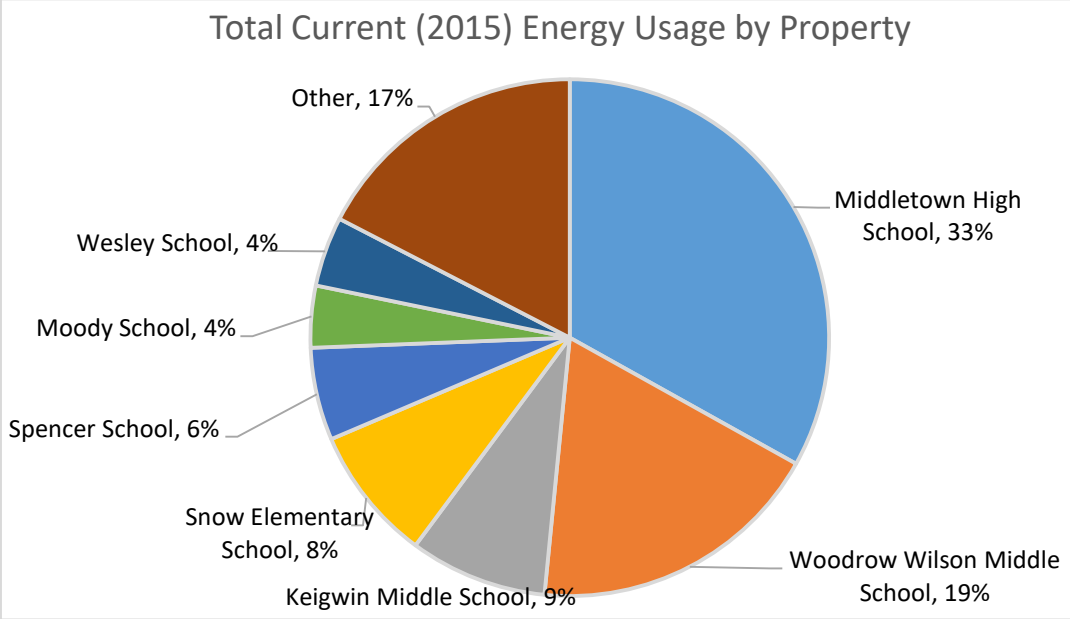


Figure 4

Most of the school buildings' energy use is heating energy from natural gas and fuel oil, representing about 75% of the total energy use in both the baseline and current year. The distribution of fuel sources did not change significantly between the baseline and current years.

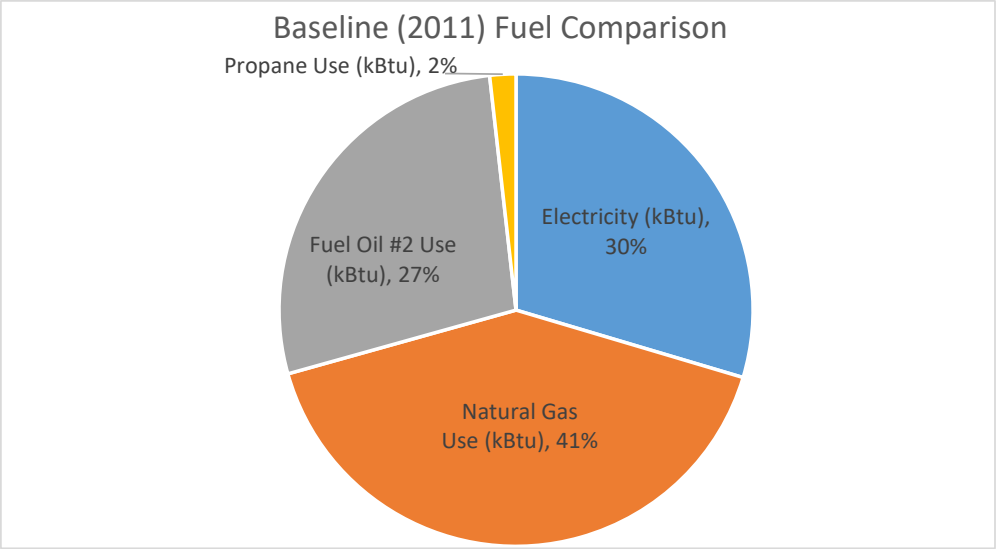


Figure 5

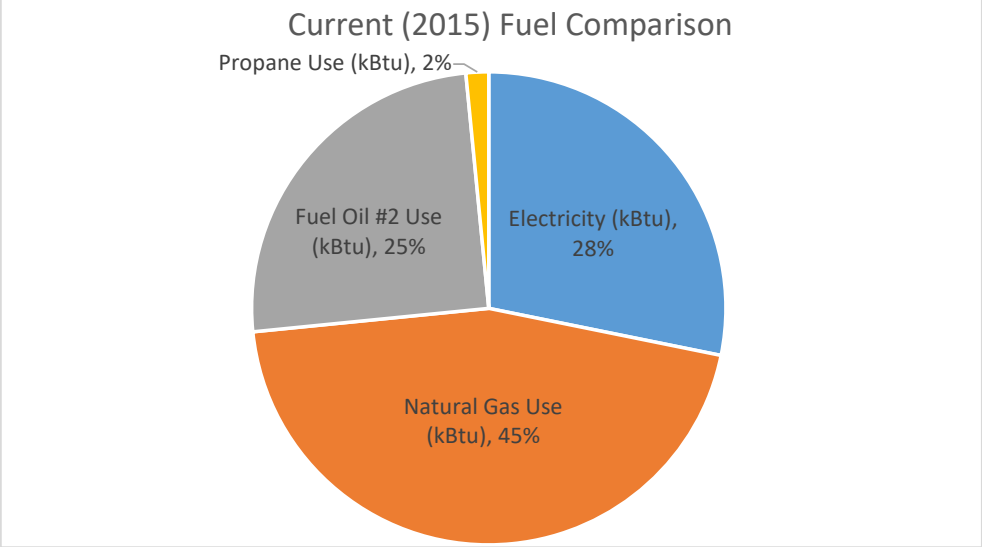


Figure 6

Figure 7 shows the baseline and current total energy usage for all properties. Figure 8 shows the baseline and current weather normalized site energy usage for all properties. Several properties showed increased in energy use intensity between baseline and the current year, including Macdonough School (-27%), Middletown High School (-26%), Snow Elementary School (-26%) and Keigwin Middle School (-23%). Based on their total energy usage compared to the whole portfolio and their increase in weather normalized site EUI, Middletown High School, Snow Middle School, and Keigwin Middle School may provide opportunities for future energy efficiency projects. It will be important to review any recently completed projects to determine the best candidates for an audit.

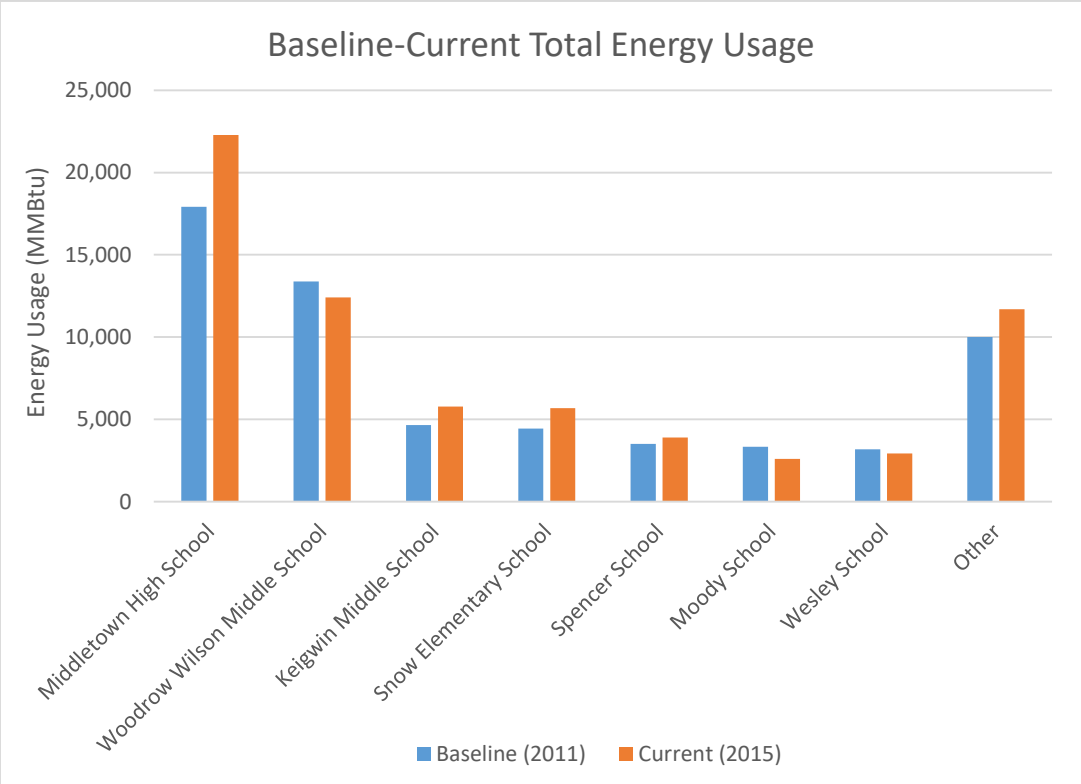


Figure 7

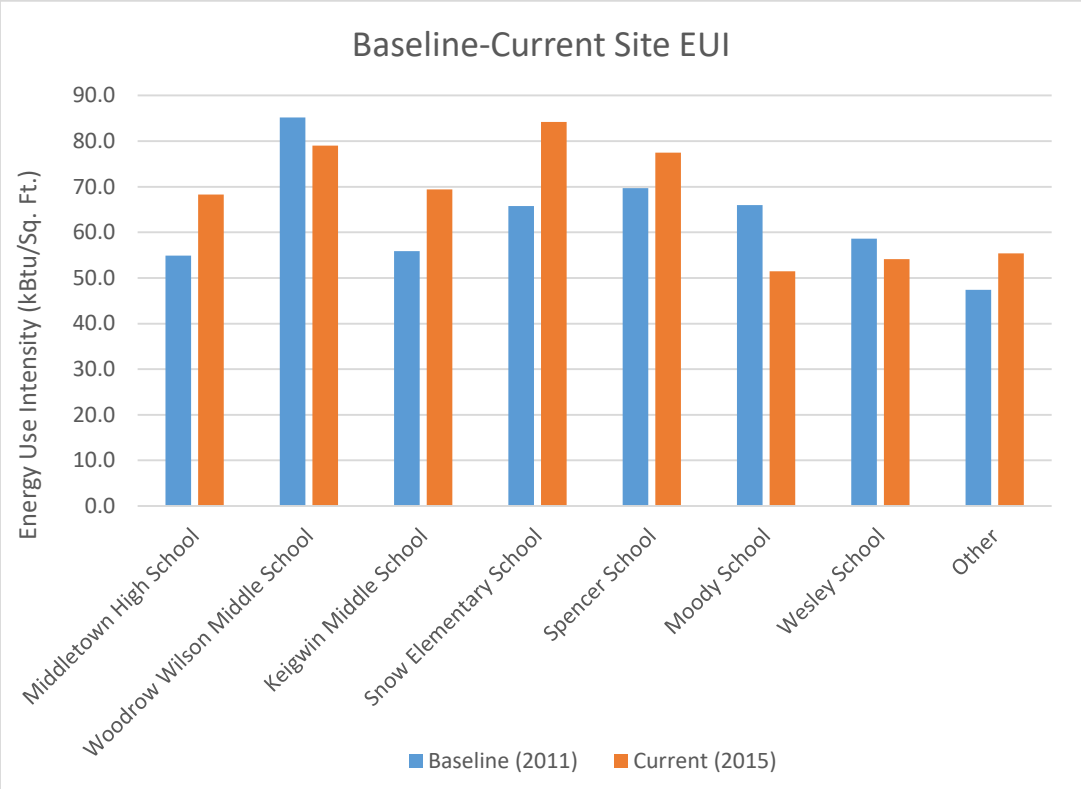


Figure 8

Energy Assessments and Completed Projects

Background

Energy Assessments provide details on building equipment and building operations to help the building operators identify energy savings opportunities and to prioritize potential cost effective energy reduction projects.

Progress to Date

Prior to receiving technical assistance through the Clean Energy Communities program, Middletown had completed energy assessments and implemented a number of energy saving measures.

Through the Eversource Municipal Technical Assistance Project an ASHRAE Level I Energy Assessment was performed at the Snow Elementary School in October, 2016. The assessment identified several measures to reduce energy consumption. The complete Energy Assessment Report is attached.

Summary of Technical Assistance

- ICF conducted an ASHRAE Level I Energy Assessment for one facility
- ICF compiled the list of previously conducted audits or assessments as reported by the City
- ICF compiled the list of Completed Projects as reported by the City

Materials Distributed:

- The link for the Eversource Approved Vendors for the Small Business Energy Advantage (SBEA) Program: http://www.energizect.com/businesses/find-a-professional
- The Energy Assessment Report is attached separately.

Next Steps

Task	Date to be Completed
Establish priorities for project installations using audit information.	
Identify projects that may need additional technical assessments.	
Summarize the energy conservation measures and expected energy savings for completed projects.	
Fill in Energy Data and Financial Data in the “Completed Projects” table	

Person Responsible

Clean Energy Task Force will provide annual updates to this chart.

Completed Projects												
Measures			Status	Energy Data				Financial Data				
Building	Address	Energy Efficiency Measure	Date Completed	Projected Annual Savings (kWh)	Projected Annual Savings (gas/oil)	Unit (GALS/CCF)	Projected Annual Savings (MMBtus)	Projected Annual Cost Savings ($)	Total Installed Cost ($)	Bright Ideas Grant ($)	Utility Incentives ($)	Net Cost ($)
City Hall												
Water & Sewer Bldg												
Russell Library												
Police HQ												
Fire HQ												
Cross St Fire												
Parks Department												
City Yard												
Bielefield Elementary School												
Farm Hill Elementary School												
Lawrence Elementary School												
Macdonough School												
Moody School												
Spencer School												
Wesley School												
Woodrow Wilson Middle School												
Snow Elementary School												
Keigwin Middle School												
Admin Building												
Middletown High School												
Senior Center*												
Buildings Subtotal				0	0	0	0	$ -	$ -	$ -	$ -	$ -
Street Lights												
Street & Traffic Lights Subtotal				0	0	0	0	$ -	$ -	$ -	$ -	$ -
Roth Water Treatment												
Higby Water Treatment												
WPCA												
Water/Sewer/Pumping Subtotal				0	0	0	0	$ -	$ -	$ -	$ -	$ -
Total Projected Savings				**0**	**0**	**0**	**0**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Energy Reduction Plan

Background

The City of Middletown has reported a 5% energy increase since the baseline year. This means that the city will have to reduce energy by 25% by 2018 in order to reach the Clean Energy Communities goal. The following table is a tool to help Middletown determine which energy efficiency measures could be completed and to track these measures' progress and achievements over time.

Middletown will be using the results of the benchmarking analysis, energy assessment report, and portfolio manager report to determine what projects the City may like to implement in the future.

Summary of Technical Assistance

Bi-weekly calls with ICF and Eversource

During Workshop #2, ICF delivered ENERGY STAR resources, including calculators, to help the city identify methods for establishing priorities and identifying cost effective energy reduction projects

ICF created the Planned Energy Efficiency Measures table below to encourage the city to compile a master list of potential projects for all City and Board of Education facilities to track by gathering proposals from vendors. The summary below includes energy conservation measures recommended in the Energy Assessment Report.

Provided collaboration with Eversource energy engineers to encourage continued participation in Eversource energy efficiency incentive programs

ASHRAE Level 1 Energy Assessment: Report of Recommendations identifies potential projects or energy conservation measure installations

Next Steps

Task	Date to be Completed
Fill in Project, Energy, and Financial Data in the "Planned Energy Efficiency Measures" table.	
Maintain "Planned Energy Efficiency Measures" table updated with new planned projects.	
Identify projects that may need additional technical assessments.	

Person Responsible

Clean Energy Task Force will provide annual updates to this chart.

Progress to Date

Plannd Energy Efficiency Measures												
Measures			Status	Energy Data				Financial Data				
Building	Address	Energy Efficiency Measure	(In progress, date?)	Projected Annual Savings (kWh)	Projected Annual Savings (gas/oil)	Unit (GALS/CCF)	Projected Annual Savings (MMBtus)	Projected Annual Cost Savings ($)	Total Installed Cost ($)	Bright Ideas Grant ($)	Utility Incentives ($)	Net Cost ($)
City Hall												
Water & Sewer Bldg												
Russell Library												
Police HQ												
Fire HQ												
Cross St Fire												
Parks Department												
City Yard												
Bielefield Elementary School												
Farm Hill Elementary School												
Lawrence Elementary School												
Macdonough School												
Moody School												
Spencer School												
Wesley School												
Woodrow Wilson Middle School												
Snow Elementary School												
Keigwin Middle School												
Admin Building												
Middletown High School												
Senior Center*												
Buildings Subtotal				0	0	0	0	$ -	$ -	$ -	$ -	$ -
Street Lights												
Street & Traffic Lights Subtotal				0	0	0	0	$ -	$ -	$ -	$ -	$ -
Roth Water Treatment												
Higby Water Treatment												
WPCA												
Water/Sewer/Pumping Subtotal				0	0	0	0	$ -	$ -	$ -	$ -	$ -
Total Projected Savings				**0**	**0**	**0**	**0**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Renewable Energy Plan

Background

Clean Energy Communities supports the implementation of renewable energy resources. Communities commit to the "Clean Energy Communities Municipal Pledge" to save energy in municipal buildings and voluntarily purchase renewable energy, fulfill the Clean Energy Communities Municipal Pledge by taking actions to save energy and to support renewable energy voluntarily, and earn energy efficiency and renewable energy points that can be redeemed for clean energy systems and grants for energy-saving projects. Once qualified, Clean Energy Communities can earn bonus renewable energy rewards by achieving special milestones or taking actions to accelerate renewable energy adoption.

Summary of Technical Assistance

This Municipal Technical Assistance Project focused on developing Municipal Action Plans to achieve a 20% energy reduction by 2018. Because the scope of work focused on energy efficiency improvements, ICF did not provide TA for renewable energy initiatives. The city wishes to include a section on Renewable Energy Strategies as part of its Municipal Action Plan strategy.

Next Steps

Task	Date to be Completed
Draft a summary of the Renewable Energy Strategy to achieve the CT Clean Energy Communities goals.	

Person Responsible

Clean Energy Task Force will provide annual updates to this section.

Clean Energy Task Force

Background

The development of an active Clean Energy Task Force is important for sustaining the ongoing work of monitoring municipal energy performance, identifying cost effective energy improvement projects, updating information in ENERGY STAR Portfolio Manager, and conducting recognition events that promote the local government's energy reduction achievements. The committee may include city officials, residents and commercial organizations engaged in promoting community-wide sustainability initiatives.

Summary of Technical Assistance

ICF began discussions about the role of the Clean Energy Task Force during recurring calls

ICF delivered a presentation on the value of developing a robust Clean Energy Task Force at Workshop #1 that was hosted by Eversource in Berlin, CT on July 28, 2016.

Materials distributed:

"Let's Get Started" slide presentation and schedule of the Municipal TA Project

ENERGY STAR Matrix assignment in preparation for Workshop #1:
http://www.energystar.gov/buildings/tools-and-resources/energy-program-assessment-matrix-excel

ENERGY STAR document to support Clean Energy Task Force development:

http://www.energystar.gov/ia/business/guidelines/continuous_improvement/Teaming_Up_To_Save_Energy.pdf

ENERGY STAR – Green Team Checklist:

https://workspace.icfi.com/ect/ee/CT%20Clean%20Energy%20Communities/Forms/AllItems.aspx?RootFolder=%2fect%2fee%2fCT%20Clean%20Energy%20Communities%2f2015%20PROGRAM&FolderCTID=&View=%7bF463FD70%2d52CC%2d461C%2dB9EC%2d6A81B7B86088%7d

Static documents were emailed to participants

Next Steps

Task	Date to be Completed
The Committee will use this tool to update goals, tasks and action items for the ongoing development of the Clean Energy Task Force.	

Person Responsible

Clean Energy Task Force will provide annual updates to this chart.

Internal Procedures

Process for Updating the Municipal Action Plan

Background

Eversource provided TA through this project to help municipalities develop an infrastructure for maintaining a sustainable strategic energy action plan. This Municipal Action Plan is organized in sections to encourage municipalities to update the Plan itself and to document achievements over time.

Next Steps

Task	Date to be Completed
Establish the date to annually review and update the Municipal Action Plan.	

Person Responsible

Clean Energy Task Force will provide annual updates to this chart.

Using Portfolio Manager

Background

Through ENERGY STAR Portfolio Manager, EPA equips building owners and managers with a roadmap to strategically manage energy across their building portfolio, offering guidance and tools to assess energy performance, set reduction goals, track savings over time, and recognize and reward improvements.

Progress to Date

ICF and Eversource staff created a Portfolio Manager account as a part of technical assistance; ICF and Eversource teams worked with Middletown to compile the facility and energy use data that is required for benchmarking. The baseline year for benchmarking the energy reduction of the municipally owned properties was established as 2011, and was then compared to the current year data. ICF completed analyses of the portfolio, summarized key indicators, and created two templates for generating reports within the Portfolio Manager account.

The Portfolio Manager account can be accessed using the following link, username and password. It is critical to keep this information recorded for the city, since it is the only way to access Portfolio Manager in the future; ENERGY STAR does not maintain records of usernames or passwords in the interest of privacy protection.

Portfolio Manager Username and Password:

Link: https://portfoliomanager.energystar.gov/pm/home.html
Username: MxEM245Dek
Password: 245DeKoven#713
Email address for receiving notices from Portfolio Manager:

Eversource Username and Password for accessing energy data to update Portfolio Manager:

Link: https://www.eversource.com/Content/ema-e/residential/programs-services/green-button
Username: MxEM245Dek
Password: 245DeKoven#713
Security Question and Answer: Q: A:

Summary of Technical Assistance

Created new Portfolio Manager account for Middletown

Held phone calls with the city and Eversource staff, to review all buildings and any missing data (such as square footage, year built, usage data, and other information that Portfolio Manager requires to add a new building to the account)

Materials distributed:

Instructions for developing reports in Portfolio Manager was created by ICF staff and delivered to participants. A copy of the instructions is provided in Appendix C

Created a template for reporting in Portfolio Manager and shared with the city via the Portfolio Manager account

Delivered ENERGY STAR resources including information about Portfolio Manager and a Technical Resource that defines the Weather Normalization process used by Portfolio Manager

ICF conducted analysis of the information provided by Portfolio Manager to identify potential energy reduction opportunities. Some buildings are eligible to receive a score in Portfolio Manager—the ENERGY STAR score for a building indicates how it's performing against peer facilities nationwide. For example, a score of 50 is typical, while a 30 means it's only more efficient than 30% of peer facilities. A low score suggests the need to conduct an on-site energy audit to identify energy conservation measures or improvements. A score of 75 or higher means that a facility is a top performer—and eligible for ENERGY STAR certification!

If buildings are not eligible to receive an ENERGY STAR score, because of a small footprint or mixed use, it is still valuable to track energy use by viewing the EUI of each facility. The EUI per square foot is an indicator of which facilities should be prioritized for conducting more detailed energy assessments or audits.

Next Steps

Task	Date to be Completed
Establish a timeframe for entering energy data into Portfolio Manager. Monthly or quarterly data entry is recommended.	
Establish a process for generating Reports from Portfolio Manager to track progress toward meeting the 20% energy reduction goal.	
Identify the person who will assume responsibility for updating data in Portfolio Manager; identify the contacts that will receive Portfolio Manager Reports.	
Gather outstanding fuel oil data, create meters and enter into Portfolio Manager for all facilities.	

Person Responsible

Clean Energy Task Force will identify the appropriate person to identify tasks and to update this chart.

Conducting Audits

Background

This Municipal Action Plan is designed to encourage the adoption of practices to encourage progress toward achieving energy reduction goals. Practices include identifying the city procedures for conducting facilities assessments.

Summary of Technical Assistance

- Based on the energy data reported by Portfolio Manager and discussions with Clean Energy & Sustainability Task Force, Snow Elementary School was selected to receive an On-Site Level 1 Energy Assessment as part of this TA Project. A summary of the On-Site Assessment Report is provided in Appendix B

Next Steps

Task	Date to be Completed
Establish a procedure for conducting facility assessments. This may include assessments by Eversource staff as well as vendors**.**	

Person Responsible

Clean Energy Task Force will identify tasks and update this chart.

Financing and Prioritizing Projects

Background

This Municipal Action Plan is designed to encourage the adoption of practices to encourage progress toward achieving energy reduction goals. Practices include identifying the city procedures for prioritizing projects in the city budget and the capital plan as well as identifying incentives from Eversource.

Next Steps

Task	Date to be Completed
Establish a strategy or process for prioritizing and financing energy efficiency projects.	

Person Responsible

Clean Energy Task Force will identify tasks and update this chart.

Internal Policies and Mission Statements

Background

This Municipal Action Plan is designed to encourage the adoption of practices to encourage progress toward achieving energy reduction goals. Practices include identifying the city procedures for developing policies or internal procedures. Policies may include items such as: procurement policies, policies for replacement of city owned vehicles that meet specified EPA criteria, policies that support renewable energy commitments, or a policy that supports technical training for facilities staff to achieve energy improvements through effective operations and maintenance practices. Communities are encouraged to establish a Mission Statement.

Next Steps

Task	Date to be Completed

Establish a strategy or timeframe for developing internal policies and procedures.	

Person Responsible

Clean Energy Task Force will identify tasks and update this chart.

Public Policies and Community Strategies

Background

Community strategies include the adoption of public policies that support energy reduction and renewable energy initiatives that demonstrate leadership to achieve long-range goals. This may include long range plans to host community awareness events, to promote engagement by the school communities and to offer recognition events that highlight achievements by city officials, and community leaders.

Next Steps

Task	Date to be Completed
Identify Public Policies that may be a priority to establish.	
Identify and schedule public events or strategies for engaging community businesses and residents.	

Person Responsible

Clean Energy Task Force will identify the appropriate person to identify tasks and to update this chart.

Policy or Mission Statement Goals

APPENDIX A: Municipal Technical Assistance Project

A.1. Introduction

The purpose of this Municipal Action Plan is to guide CT cities and towns in implementing a Strategic Energy Action Plan as a Clean Energy Community under the Connecticut Department of Energy and Environmental Protection (DEEP). Eversource has provided Technical Assistance to Connecticut cities and towns to assist them in qualifying as Clean Energy Communities. This Action Plan is the result of Planning Assistance provided to the City of Middletown.

The Clean Energy Communities program is an Energize Connecticut initiative that incentivizes Connecticut cities and towns to improve energy efficiency and promote the use of clean and renewable energy. Under the expanded Clean Energy Communities program, Connecticut towns and cities pledge to reduce municipal building energy consumption by 20% by 2018, and to voluntarily purchase 20% of municipal electrical needs from renewable sources by 2018. Eversource, United Illuminating, and the Clean Energy Finance & Investment Authority (CEFIA) are the Clean Energy Communities program administrators. The Clean Energy Communities program works from a grassroots and grasstops approach to bring energy efficiency and renewable energy to all community residents and businesses.

There are three steps that a municipality must take to become a Clean Energy Community:

1. ***Commit to the "Clean Energy Communities Municipal Pledge" to save energy in municipal buildings and voluntarily purchase renewable energy;***
2. ***Fulfill the Clean Energy Communities Municipal Pledge by taking actions to save energy and to purchase renewable energy voluntarily; and***
3. ***Earn energy efficiency and renewable energy points that can be redeemed for clean energy systems and grants for energy-saving projects.***

ICF International (ICF) was contracted by Eversource to provide Technical Assistance (TA) to twenty four communities in 2015 over an approximate seven month period. The assistance varied by community based on needs, but generally included: the development of community teams, two workshops to provide overviews of benchmarking skills and the components of strategic energy action plans, recurring weekly or bi-weekly phone conference with municipal "green teams," support for the development of municipal energy tracking and energy use analysis using the U. S. Environmental Protection Agency (EPA) ENERGY STAR Portfolio Manager® tool, the delivery of one ASHRAE Level I energy assessment with a corresponding report of recommendations, collaboration with Eversource energy engineering team to drive participation in Eversource energy incentive programs, collaboration with the Institute for Sustainable Energy at Eastern Connecticut State University, and ongoing communication and research to support the development of Municipal Action Plans. Additional technical expertise was provided as needed to assist with specific community needs.

This Municipal Action Plan describes the progress to date and the subsequent steps to be completed in order for the community to meet the goals of the Clean Energy Communities Program. A timeline of activities and a responsible party has been provided with the ultimate goal of having each community use the Municipal Action Plan to track progress toward meeting the goals as a Clean Energy Community.

A.2. Background Information

Initial Status

Assessment of Middletown's Energy Plan	Status at the Start of TA
1. Clean Energy Municipal Pledge	2011
2. Establish an Clean Energy Task Force	2011
3. Energy Use Baseline Inventory	2016
4. Summary of Completed Projects	2016
5. Proposed Energy Conservation Projects	Started
6. Strategic Energy Action Plan	On going

Executive Summary for the City of Middletown

Middletown is located in Middlesex County along the Connecticut River. It was incorporated in 1650 and is led by the Mayor and a Common Council and has a population of 47,043, according to the 2014 census.

A.3. Municipal Technical Assistance Project Launch

The initial welcome to the Municipal TA Project was coordinated with Eversource and ICF staff. The meeting began with introductions and a presentation about the Eversource Clean Energy Municipal TA Program. We discussed the scope of the Program and prioritized the city's needs and assigned responsibilities for proceeding with TA.

A.4. Resources from Workshops

PowerPoint presentations and other resources from Workshops #1 and #2 were provided to participants via email following the Workshops. They are provided as separate documents as a final deliverable to all municipalities that participated in the Municipal Technical Assistance Project.

A.5. Conclusions

As evidenced by this Municipal Action Plan and previous sustainability accomplishments, the City of Middletown has demonstrated its commitment to a greener energy future through energy efficiency improvements and the addition of renewable energy resources. Through the Municipal Technical Assistance Project provided by Eversource, the City of Middletown has taken many steps that have positioned it to achieve its commitment to the Clean Energy Communities initiative.

A.6. Acknowledgements

Background

The Eversource Clean Energy Communities Program provided funding for the Municipal Technical Assistance Project to support municipalities that committed to achieving a 20% energy reduction by the year 2018. ICF International was contracted to provide technical assistance to the towns that were selected by Eversource.

Summary of Technical Assistance

ICF Project Manager Marianne Graham guided the launch calls with communities, provided guidance and training materials for the project, provided a tracking tool for Eversource to update the progress with each community, worked with Eversource staff (including Community Relations Specialists and energy engineers to support Eversource goals for the municipalities), developed presentations, developed replicable program templates for Eversource to facilitate project expansion, and delivered two full day workshops that were hosted by Eversource in

Berlin, CT. Ms. Graham provided technical assistance to towns through bi-weekly calls, and the development of customized Municipal Action plans.

ICF Technical Liaison, Hanaa Rohman, delivered presentations on Portfolio Manager at Workshop #1, provided TA regarding Portfolio Manager, conducted analyses on town portfolios that were integrated into Municipal Action Plans and provided guidance for generating customized reports. Ms. Rohman provided technical assistance to towns through bi-weekly calls, and the development of customized Municipal Action plans.

ICF Auditor Chad Scherfner conducted on-site energy assessments, conducted energy savings analyses and prepared audit reports.

ICF Engineer Tom Quigley worked with the Eversource engineers to provide energy savings estimates that align with the Eversource energy efficiency programs.

ICF staff Jen Singer worked with the teams to schedule audits and to develop the customized Action Plans.

ICF staff Madeline Frieze worked with the teams to develop the customized Municipal Action Plans.

APPENDIX B: Energy Audit Reports

Background

Through this Technical Assistance Project, the Clean Energy Communities Program provides an ASHRAE Level I Energy Assessment in order to establish a clear direction of next steps required in order to reduce energy by 20% by 2018. Towns are encouraged to perform additional energy assessments that will reveal additional ways to reach the energy reduction goal.

Progress to Date and Summary of Technical Assistance

The ICF team, in collaboration with Eversource energy engineers, used information provided by Portfolio Manager reports to identify the facility that would receive an ASHREA Level 1 Energy Assessment. The city selected Snow Elementary School to receive an on-site assessment because the City believed the building had high energy savings potential.

ICF Auditor Chad Scherfner conducted an ASHREA Level I Energy Assessment in October, 2016. He compiled a summary of audit information that was provided by the city to help identify energy reduction opportunities.

Materials Distributed:

The ASHRAE Level I Energy Assessment overview is provided below. The full report is attached.

Next Steps

Task	Date to be Completed
Establish priorities for project installations using audit information	
Identify projects that may need additional technical assessments.	

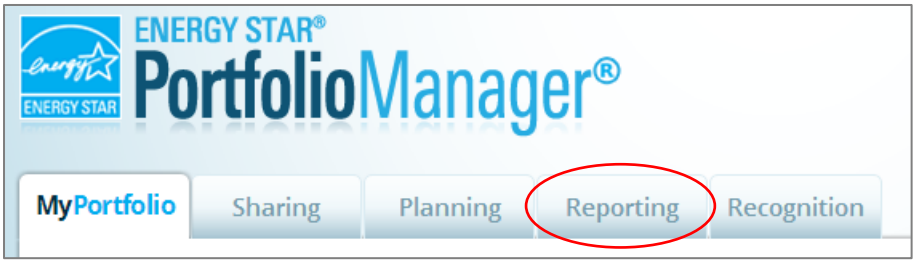
Person Responsible

Clean Energy Task Force will update each task.

APPENDIX C: Portfolio Manager Energy Use Data Reports

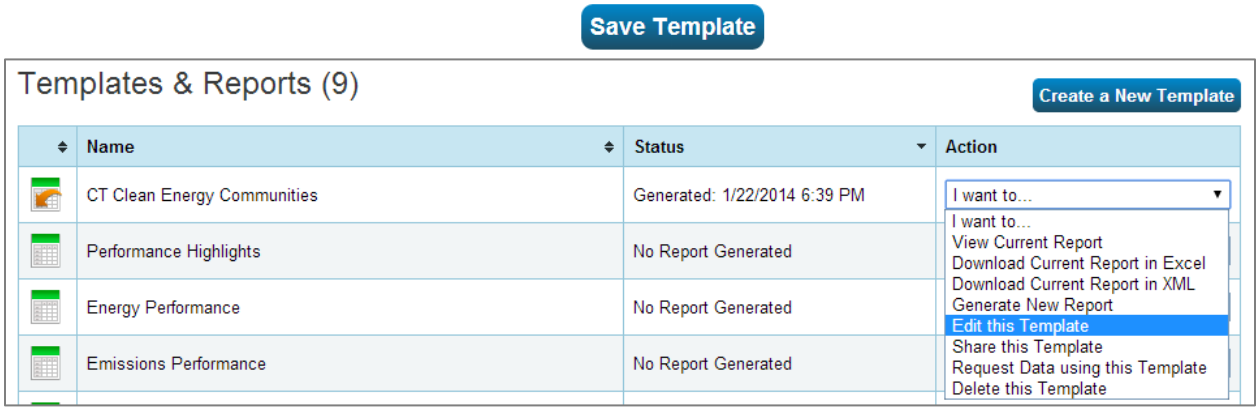
C.1. Instructions for Generating Portfolio Manager Reports

1. **Access the CT Clean Energy Communities report template** from the Reporting tab in Portfolio Manager and generate a report

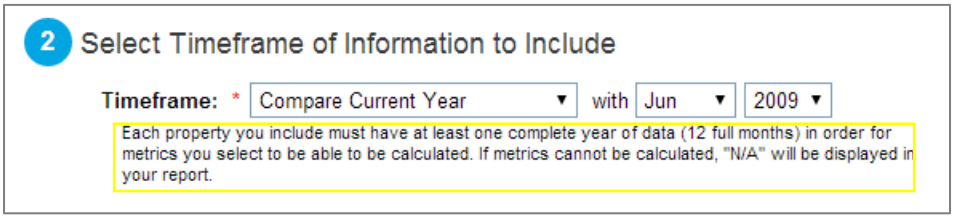


   a. The report will be shared with your account by your intern. Once it is shared, it is saved in your account and can be generated at any time.

b. From the drop down menu to the right of the report in the Template & Reports, select Edit this template.



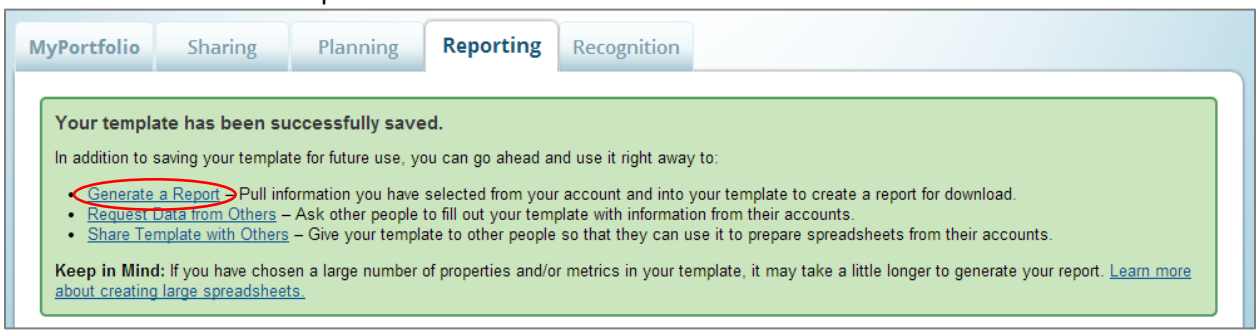
c. Make sure that the Timeframe is set to the correct options.
   i. To select a single baseline and current date for all properties, you can choose Compare Two Years and enter the two months that you would like to compare. The month chosen represents the 12 month period ending date (for example, selecting June 2009 will return 12 months of data from July 2008 through June 2009).
   ii. If all of your properties have the same baseline and current dates in Portfolio Manager, you can choose Current Year vs. Baseline Year.
   iii. Once you generate the report, there will be a column in the Excel spreadsheet displaying Baseline Period and Current Period, so you can adjust the dates that you are pulling accordingly. If you receive a lot of "Not Available" cells in the report, you should review the dates that you have selected or review the Energy Alerts and Property Alerts columns for the affected properties.



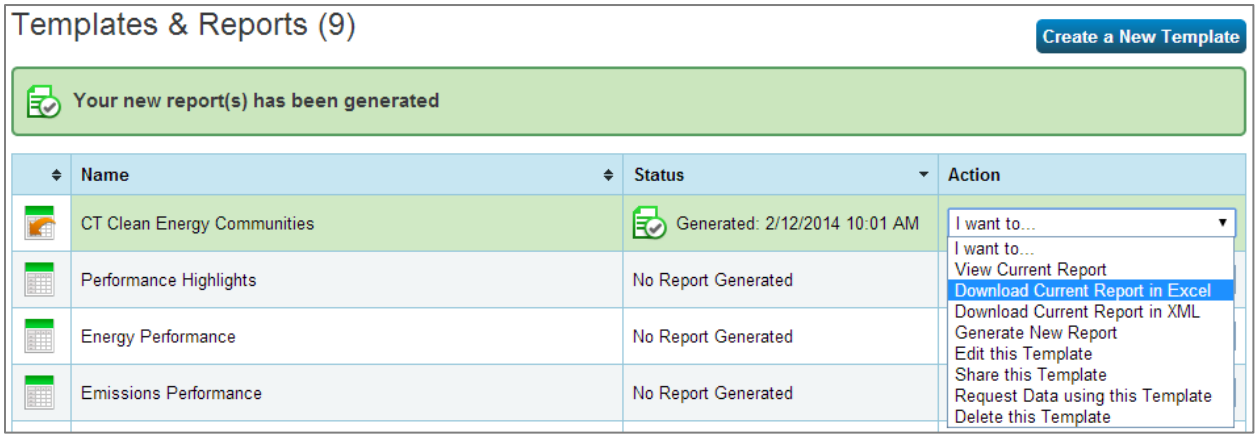
   iv. NOTE: If you are interested in pulling consecutive years (i.e. more than 2 time periods), you can set the timeframe field to Range. The range feature allows you to pull data for a range of dates, either monthly, quarterly, or annually.

d. Create and Export the Report
   i. Select Save Template.

ii. You will automatically be taken back to the Reporting tab. Select Generate a Report.



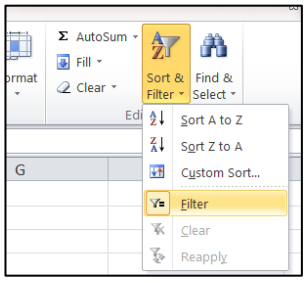
iii. Once the report is generated, the report row will be highlighted in green in the Templates & Reports table. From the drop down menu, select Download Current Report in Excel.



iv. The report will automatically download in your browser and prompt you to open a new Excel session.

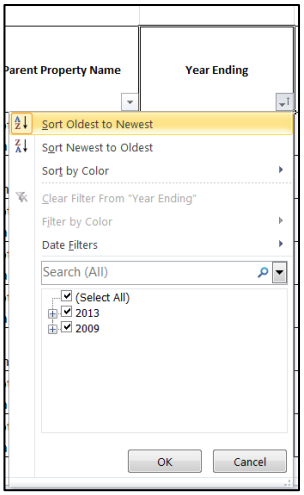
2. Format Data to Create Tables and Charts

a. The exported spreadsheet is sorted by Property ID number, which means that the baseline and current data for each property will be next to each other



b. It helps to sort the properties by date, so that we can compare baseline data to current data (sort by clicking on cell A5, then click on the Sort & Filter button in the top right hand corner of the window, and then by click filter – this allows you to organize the data using any column header)

c. Ideally, your properties will have the same baseline and current date, which means that you can sort column E from Oldest to Newest and the properties will be listed with the baseline data in the first set of rows and current data below. The properties will be listed in the same order as well, which will help when we go to make charts (in the example below the properties are listed with baseline 6/30/2009 in rows 6 through 9 and current 8/31/2013 in rows 10 through 13. Notice that the Property IDs and Property Names are in the same order for baseline and current.



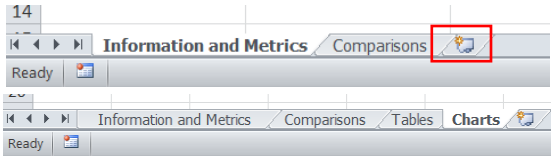
	Property Id	Property Name	Parent Property Id	Parent Property Name	Year Ending
5					Baseline Data
6	3866977	City Hall	Not Applicable: Standalone Property	Not Applicable: Standalone Property	6/30/2009
7	3866985	School Campus	3866985	School Campus	6/30/2009
8	3866989	Public Library	Not Applicable: Standalone Property	Not Applicable: Standalone Property	6/30/2009
9	3866990	Fire Station	Not Applicable: Standalone Property	Not Applicable: Standalone Property	6/30/2009
10	3866977	City Hall	Not Applicable: Standalone Property	Not Applicable: Standalone Property	8/31/2013
11	3866985	School Campus	3866985	School Campus	8/31/2013
12	3866989	Public Library	Not Applicable: Standalone Property	Not Applicable: Standalone Property	8/31/2013
13	3866990	Fire Station	Not Applicable: Standalone Property	Not Applicable: Standalone Property	8/31/2013

Current Data

d. We will be using data from columns K through V (Site Energy Use through Energy Cost Intensity) to generate charts. Follow the steps below to create standard energy usage and cost charts.

   i. To make a new tab in Excel, click on the spreadsheet logo with the yellow star in the bottom left corner.

   ii. Right click to rename the tab. Add a second to separate the data tables and charts.



e. Copy the property names from the Information and Metrics tab to the Tables tab for both the baseline and current rows. We will make two tables that we can reference for our charts. Then copy columns K through V for both sets of time periods. See the table below for an example:

	A	B	C	D	E
1	**Baseline**				
2	**Property Name**	**Property Floor Area (Building(s)) (ft²)**	**Site Energy Use (kBtu)**	**Electricity Use - Grid Purchase and Generated from Onsite Renewable Systems (kBtu)**	**Natural Ga (kBtu**
3	City Hall	126000	9,887,259	7,182,260	2,705
4	School Campus	84000	3,336,540	2,712,540	624
5	Public Library	40000	4,943,630	3,591,130	1,352
6	Fire Station	7000	343,930	343,930	Not Avai
7	Baseline 6/30/2009	257,000	18,511,358	13,829,860	4,681
8					
9	**Current**				
10	**Property Name**	**Property Floor Area (Building(s)) (ft²)**	**Site Energy Use (kBtu)**	**Electricity Use - Grid Purchase and Generated from Onsite Renewable Systems (kBtu)**	**Natural Ga (kBtu**
11	City Hall	126000	9,016,060	6,841,060	2,175
12	School Campus	84000	2,944,825	2,659,825	285
13	Public Library	40000	4,508,030	3,420,530	1,087
14	Fire Station	7000	266,136	266,136	Not Avai
15	Current 8/31/2013	257,000	16,735,051	13,187,551	3,547
16	20% Goal 12/31/2018	257,000	14,809,087	11,063,888	3,745

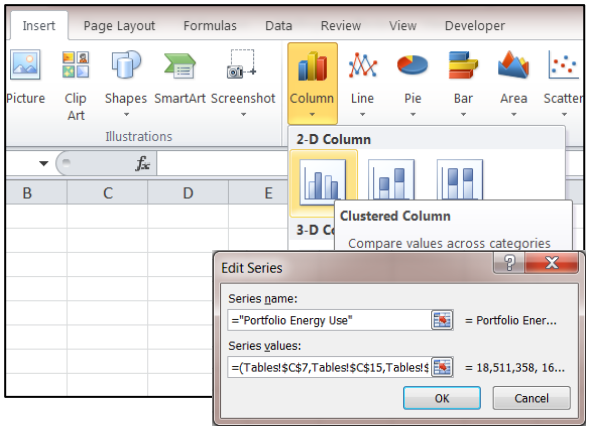
f. To calculate portfolio level metrics (energy used at all buildings in your city), we must create extra rows for the baseline and current totals.
   i. To the example above, I would add a new row titled “Baseline Totals” in row 7 and “Current Totals” in row 14.
   ii. The “Goal” row will be used as a comparison for Charts 1 and 2 below.
   iii. For total portfolio square feet, you can add the formula, *=sum(B3:B6)*, to cell B7. You can then do the same for the Site Energy and all fuel type columns.

Charts

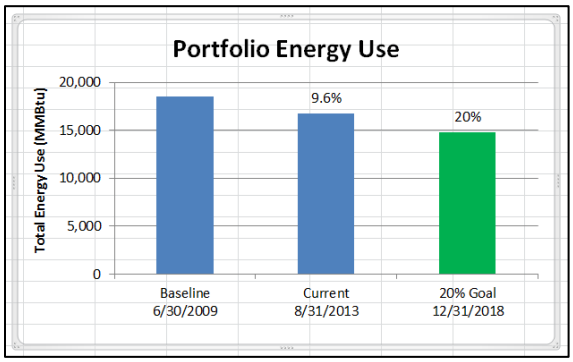
1. Portfolio Energy Use Over Time (Column Chart)
2. Portfolio Energy Use Intensity Over Time (Column Chart)
3. Total Baseline Energy by Property (Pie Chart)
4. Total Current Energy by Property (Pie Chart)
5. Baseline-Current Energy Comparison (Column Chart)
6. Baseline-Current Energy Use Intensity Comparison (Column Chart)
7. Baseline-Current Cost Comparison (Column Chart)
8. Baseline-Current Cost Intensity Comparison (Column Chart)
9. Baseline Fuel Breakdown (Pie Chart)
10. Current Fuel Breakdown (Pie Chart)

Column Chart Example

On the Charts tab, start by clicking Insert → Column → 2-D Column → Clustered Column. Excel will load a blank chart box. Right click in the box and select “Select Data”. From the Select Data Source box, click “Add” in the Legend Entries (Series) section. In the Series Name: bar, type the name of your chart (in this case we will call it Portfolio Energy Use). Next to the Series values: bar, you will see an icon with a red arrow inside of it. Click the icon. You are now able to highlight the cells that contain the data that you want to include in the chart. Go to the Tables tab

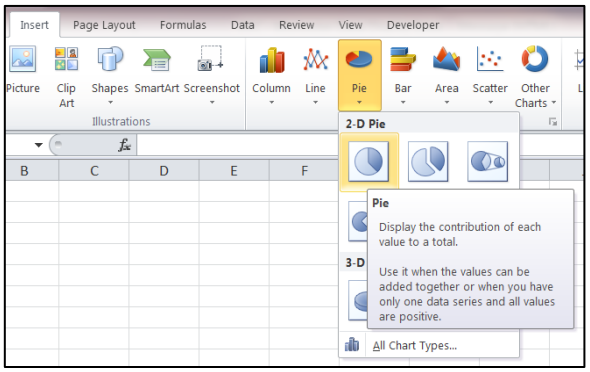


and click on the baseline, current, and goal cells in the Site Energy Use column. In the example above, that is cells C7, C15, and C16. To select 3 non-consecutive cells, use the Ctrl key. These will be the three columns on the chart. To add labels to the X-axis of the chart, click on the Edit button in the Horizontal (Category) Axis Labels section. Choose the values in column A from the Tables tab as your labels. In the example above, the corresponding labels would be A7, A15, and A16. The labels will automatically match up with the correct energy use values as they are match by order (1st label goes with 1st data point, and so on). Click OK.

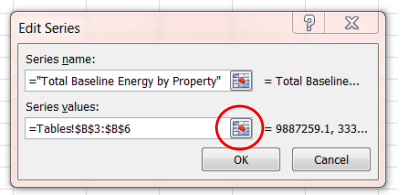


To add data labels, right click on any of the columns and select Add Data Labels. You can add the value of the bar by selecting Value. Once the values are added, you can edit the text in the box to show your own custom values. In the example below, I edited the labels to show the percent change since baseline in both the Current and Goal columns.

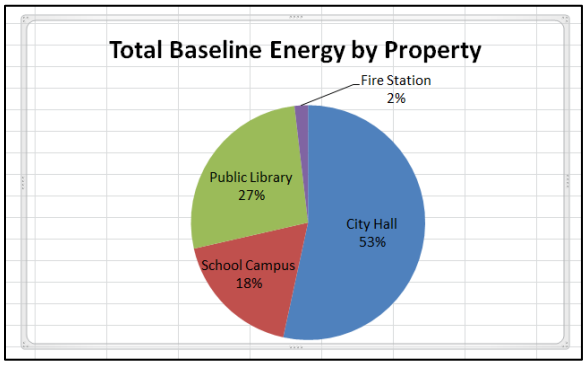
Pie Chart Example



On the Charts tab, start by clicking Insert → Pie → 2D Pie. Excel will load a blank chart box. Right click in the box and select "Select Data". From the Select Data Source box, click "Add" in the Legend Entries (Series) section. In the Series Name: bar, type the name of your chart (in this case we will call it Total Baseline Energy by Property). Next to the Series values: bar, you will see an icon with a red arrow inside of it. Click the icon. You are now able to highlight the cells that contain the data that you want to include in the chart. Go to the Tables tab and select the baseline total site energy (kBtu) cells. In my example that is cells B3 through B6. To add labels to you pie slices, click on the Edit button in the Horizontal (Category) Axis Labels section. Choose the property names from the Tables tab as your labels. The labels will automatically match up with the correct energy use values as they are match by order (1st label goes with 1st data point, and so on). Click OK.



To format the chart, right click on any one piece of the pie and select Add Data Labels. Right click on one of the new labels and select, Edit Data Labels. Select Category Name and Percentage (if there are a lot of data points, you might also consider selecting Show Leader Lines). You can then do the same for the Current energy use pie chart.



Troubleshooting

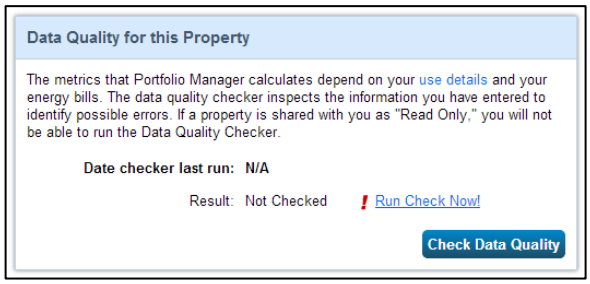
If you are having trouble generating metrics for your charts and graphs, there are a couple of steps you can take to find a solution.

1. Make sure you have a complete 12 months of data for the time period that you are pulling information. If you pull a report for June 2009, but your property only has data starting on January 1, 2009, all energy metrics will show as Not Available.

A possible solution for this would be to enter data back to July 1, 2009 (if available) or to pull a new baseline for all properties that would result in all properties having a complete 12 months of data.

2. If you do have complete data, but are still receiving Not Available for some properties, you may want to check the Energy and Property Alerts.

This can be done for an individual property using the Data Quality Checker located on the property's Summary page. The checker is run for a single property and a single time period.



APPENDIX D: Energy Project Details

D.1. Vendor Proposals

The City of Middletown will compile vendor proposals for future projects in this section of the Municipal Action Plan.

D.2. Equipment Specifications

The City of Middletown will compile equipment specifications for future projects in this section of the Municipal Action Plan.

C. Appendix III – 2010 Energy Plan

City of Middletown
Energy Plan

I. INTRODUCTION

In June, 2009, the Middletown Clean Energy Taskforce began discussions to formulate a long range Energy Plan ("the Plan") to manage and lower the quantity and cost of energy being used by the City. This work builds on two (2) resolutions passed by the Common Council in April, 2005. The first resolution endorsed Middletown's adoption of the United States Mayors Climate Protection Agreement calling for lower emissions of greenhouse gases by municipalities. The second resolution supported Middletown becoming a Connecticut Clean Energy Community. This designation required a commitment to form a Clean Energy Taskforce to oversee energy related issues for the City and have 20% of Middletown's electricity be generated by Class I Renewable Energy by the year 2010. The following Plan also recognizes the pioneering work and report completed by former Michael J. Cubeta, Jr. and the Middletown ENERGY Committee in June, 1980. This report entitled, "Energy in Middletown's Future, A Preliminary Report to the Mayor and the Common Council" was prophetic in the importance given to linking energy planning and economic growth. The Plan in 1980 stated:

> "It will become increasingly difficult for Middletown to maintain, let alone improve, its stable economic base without a concerted energy plan. Yet, just as it is true that Middletown's economic base is threatened by the energy crisis, so it is true that a concerted effort to conserve and utilize alternative energy sources can actually improve the City's economic picture while improving the quality of life and the quality of the environment."

The Plan now being presented to the Mayor, Common Council and citizens of Middletown is modeled after the first such plan of this type prepared by West Hartford, CT. It recognizes the critical importance of a "roadmap" in understanding, managing and implementing technology to reduce the consumption and costs of energy, lower greenhouse gas emissions, and improve energy efficiency. The Plan also calls for establishing a culture of conservation to ensure every opportunity is investigated to become more energy efficient in the areas of Buildings Efficiency, Lighting, Power Generation, Vehicle Transportation, Outdoor Engines, Planning, Purchasing and Project Implementation.

II. BUILD A CULTURE OF CONSERVATION

A. Encourage employee, student, and resident participation in conservation activities

- Create a standing City-wide Environmental Stewardship Team, such as the Clean Energy Task Force, to organize a "clean energy team" in each City-owned facility: Small teams of employees and users of each building will engage in a collaborative process where building users help recommend and implement measures to improve their buildings.
- Create and disseminate energy survey for building users: The survey will ask building users, including students, to suggest ways to increase building efficiency and comfort. Consider offering rewards or recognition for the best entries. In conjunction, the City will install suggestion boxes (or a virtual equivalent) in municipal buildings to encourage resident participation on cost saving strategies.
- Implement a Middletown Public School energy saving competition**.** Consider expanding to non-school City buildings.
- Raise awareness and encourage volunteerism: Encourage residents to volunteer to use their time and skill to augment Middletown staff in matters related to energy and resource conservation such as pointing out inefficient practices, unnecessary lighting, etc.
- Installing other visual means of demonstrating building energy use to building users. Smart meters or other monitors can allow users to see actual results of building use, encourage efficient behavior, and enable them to track their progress.
- Hold competitions among City units to reduce fuel consumption.
- Post monthly data on fuel usage in each unit that uses the fleet. This will allow employees to see their actual fuel use and compare to other users. The increased awareness may promote fuel efficient use and increase ideas/opportunities for efficiencies.

B. Adopt conservation-minded policies

- Create department energy guidelines to eliminate wasteful energy consumption: The guidelines should address wasteful energy activities including, but not limited to, the use of personal electric space heaters, inefficient coffee pots, and leaving lights (interior and exterior) and computers left on when not in use.
- Encourage the phase out of inefficient dorm-sized refrigerators in all public facilities. .
- Adopt CT Department of Environmental Protection (DEP) 3 minute anti-idling requirement for all City departments.
- Post anti-idling signs provided by the CT DEP at all Middletown schools and other appropriate buildings: In addition, send out educational materials to City employees and contractors regarding this policy. Encourage building users to report excess idling.
- Analyze vehicle use per unit/department to identify opportunities to improve/lower fuel use: The evaluation should:
    - document baseline use;
    - evaluate opportunities to perform essential tasks/services using less vehicles/fuel or eliminating some vehicles from the fleet;

    - evaluate uses of each vehicle used primarily for transportation to determine business necessity of such use;
    - evaluate whether transportation vehicles could be shared (existing sharing increased) among users/uses, and eliminate less fuel efficient vehicles;
    - evaluate which transportation needs can be addressed through alternatives to gasoline/diesel fueled vehicles, such as electric-powered vehicles, bicycles, walking; and
    - evaluate opportunities for reducing vehicle miles for transportation such as carpooling to business meetings, pool cars so the most fuel efficient vehicle is used first, conference calls in lieu of driving to meetings, electronic mail exchange, closer meeting locations, "milk runs" (deliveries by one fuel-efficient vehicle making multiple stops instead of multiple vehicles making one delivery each; requires improved planning/transparency).
- Evaluate opportunities to improve landscaping efficiency: This will reduce fuel use associated with landscaping, including opportunities to reduce need/frequency of irrigation, mowing, mulching and other maintenance tasks. To this end, the City can design and implement pilot/demo projects to evaluate reduction in vehicle fuel use and adequacy of end landscape results.
- Evaluate sharing large vehicles with neighboring cities: For large vehicles that are only used on a non-urgent, scheduled basis (e.g., potentially some tree trimming vehicles, some dump trucks), evaluate opportunities to share new vehicle costs for high fuel efficiency vehicles and maintenance costs.
- Outdoor Equipment: Require that all landscape renovations, construction and maintenance, including contractors providing landscaping services, utilize sustainable landscape management techniques to lower use of gasoline/diesel powered equipment: For example, the City should select indigenous plants to reduce maintenance costs, including fuel and irrigation costs.

III. ENERGY: BUILDING, LIGHTING

A. Energy Assessment: Create a Baseline of Energy Usage

- Enter building data for all Middletown buildings into the Energy Star benchmarking tool by April 2010. The EnergyStar building portfolio manager tool compares the efficiency of City buildings with similar structures throughout the state, region and country and rates buildings based on their efficiency.
- Develop and implement use of standard forms for each City department to report energy consumption (all fuel types) for each facility and account or meter.
- Adopt a methodology for calculating full life cycle energy costs: The methodology can aid in prioritizing energy efficient upgrade projects. It can also distinguish between projects which have significant upfront costs but substantial benefit and projects which are simply an expense.

B. Establish Energy Efficiency and Clean Energy Master Plan and Policies for Buildings

- Encourage that all new building construction (or renovations in excess of $2 million) meet LEED Gold green building standards and the latest International Building Code energy efficiency standard: LEED Silver is the minimum required by state law, and Middletown as a community can and should go beyond the legal minimum to achieve significantly more environmentally sound buildings with significantly lower energy use.
- Expand building energy audits to all City buildings- conduct basic energy audits for all public facilities by [date]: The audits should include an assessment for heating, cooling and electricity, and must assess the payback period for building upgrades.
- Create building-by-building upgrade plans by [date] based on the results of the energy audits in previous bullet. Between now and 2020 the town should implement all energy efficiency measures that are cost-effective and save the City money over the lifetime of the investment.
- Compile building upgrade plans from previous bullet into a comprehensive City-wide building efficiency strategy with prioritization of upgrades, timelines and an assessment of funding options by [date].
- Retain third parties to conduct more detailed and rigorous building energy audits as buildings are upgraded beginning in 2010.
- Create a short-term renewable energy strategy prioritizing City buildings for solar photovoltaic and solar water heating installations by [date].
- Longer-term renewable energy strategy: Middletown should assess the ability of other technologies, including micro-wind turbines, geothermal heat pumps and fuel cells to meet building energy needs while reducing greenhouse gas emissions, energy costs and energy price volatility and increasing reliability.
- Examine potential for vegetative "green" roofs: These roofs can reduce run-off and reduce building cooling loads. Locations for this installation should focus on buildings where solar installations are not possible as they compete for roof space.
- Decline to participate in programs to run distributed diesel generators at non-emergency times.
- Establish a position for a dedicated in-house Energy Manager to oversee this process and implement these recommendations.

C. Non -Building Clean Energy Generation

- Prioritize central Combined Heat and Power systems when undertaking major renovations or new construction.
- Explore the installation of free-standing solar photovoltaic installations on underutilized property: If the state changes its rules governing solar installations, the City should assess potential sites and economics of free-standing solar at locations including parking lots, brownfields, and other underutilized spaces. The City could advocate, through its local and state elected officials, for changes in state laws to promote this type of sustainable power generation.
- Pursue other clean energy technologies: For example, micro-hydro turbines, micro and full scale wind turbines; including the cooperative development of the Mount Higby area

as a wind based resource, and fuel cells to reduce greenhouse gases, electricity costs and protection from price volatility over time.

D. Non-Building Lighting

- Assess the status of non-building street lighting: The City will assess the financial and logistical impacts of purchasing street lights. By owning and maintaining street lights, the City has more control over energy costs through efficiency projects.

IV. ENERGY: VEHICLES, TRANSPORTATION, OUTDOOR ENGINES

A. Fuel Efficiency

- Establish baseline information on fuel consumption**:** The City will assemble data for each unit of City government, for each of the prior three years: on miles driven per vehicle; gallons of fuel purchased per vehicle; cost of fuel per vehicle; expected year of replacement or end of service per vehicle; estimated fuel efficiency per vehicle; heavy duty diesel vehicle make; engine year, and VIN.
- Complete and document a "fleet analysis" describing the vehicle needs for each department and ways that fleet acquisition and deployment can maximize fuel efficiency and use electric vehicles wherever feasible.
- Prepare fleet information for CT DOT Request for Proposal (RFP) for CT Clean Fuel Program and Diesel Emission Reduction Act: The DOT program provides funding to municipalities to cover a portion of the purchase price for new alternative fuel or efficient (hybrid electric, compressed natural gas, propane, or electric) vehicles, or 100% of the price of diesel pollution control retrofits or auxiliary power units (APUs). The City should evaluate which vehicles need replacement over next two years, and submit applications in response to the RFP.
- Establish protocol to promote replacement of City vehicles, when scheduled/needed, with the most fuel efficient vehicle suitable for the vehicles use. .
- Prepare heavy duty diesel vehicles inventory: This inventory will assist the City in applying for pollution control retrofits from the DOT Clean Fuel Program and grant funding from the Diesel Emission Reduction Act (DERA), which is a component of the 2009 stimulus package. Diesel fine particle pollution from City vehicle operation has potential negative health impacts on City workers and residents. Similar pollution control technologies to those in place on Middletown diesel school buses can greatly reduce pollution from other types of diesel vehicles.
- Identify other funding sources and options for fleet modernization.
- Develop a fuel efficiency goal for 2015 for the City's heavy duty vehicles.
- Develop protocol to promote purchase of equipment that minimizes fuel use or that uses cleaner low-carbon fuels.
- Reduce overall vehicle fuel use by 5% from 2008 baseline in 2010 and 2011.
- Reduce overall vehicle fuel use by 10% from 2008 baseline by 2012.
- Ensure that 20% of the City's light duty fleet (sedans) has a fuel efficiency of 40+ miles per gallon by 2015.

- Continue to ensure proper maintenance of City vehicles: The City should use technologies such as synthetic lubricating oils and low-rolling resistance tires to increase fuel efficiency. The City should evaluate costs of synthetic oil versus savings from improved fuel efficiency and reduced maintenance.

B. Cleaner Fuel Options

- Evaluate the most effective options for reducing the carbon intensity of the City's vehicle fuel through strategies including electrification, advanced biofuels, and hydrogen.
- Require the use of on-road grade ultra-low sulfur diesel fuel (max 15ppm sulfur) for all on and off-road City diesel vehicles as well as in contracts for third parties working on construction projects for the City.
- Evaluate use of biodiesel for City-owned and contracted vehicles: The analysis should include whether biofuel use negatively impacts food production, what fuels were used in biofuel production, and whether biofuels in question truly reduce carbon emissions overall. The City will evaluate blends of B5, B10, B20, B50 and higher (number represents % of biodiesel in the fuel blend). In addition, the City will evaluate the potential location of biodiesel filling stations (including gauging the interest of local retail stations in supplying biodiesel), compatibility with City vehicles, environmental benefits, and cost estimates over next three years. If this evaluation if favorable, the City should contact suppliers of biodiesel and options for supplying stations in or near Middletown, as well as direct fueling to City fleet. Also, the City will contact CT DOT for background information on costs and suppliers. Evaluate whether Evaluate whether biodiesel or ethanol blends can be used in gasoline/diesel powered equipment (grass cutting, snow blowing, landscape equipment, etc).
- Identify types of vehicles and equipment with potential for electric alternatives and analyze cost-effectiveness for electrification of that equipment.

V. ENERGY: PLANNING, IMPLEMENTATION AND FINANCING

A. Planning and Implementation

- Establish a position of an in-house City energy manager: A City energy manager dedicated to the energy needs of the City who will oversee energy audits for all City buildings including schools, oversee implementation of energy efficiency projects, create a comprehensive building upgrade plan, train building operators and users on buildings efficiency practices, educate City staff whose work impacts energy use, develop procurement standards for products, apply for state and federal grants, update building energy inventory data, assess energy reduction strategies, and re-assess energy efficiency and clean energy options as new technologies arise. Dedicate resources for expert consultants: The City will continue to utilize these services, where appropriate, to facilitate further energy savings.
- Join ICLEI (International Council for Local Environmental Initiatives) for training, technical assistance and other resources**:** For an annual membership fee of $600 - $1200 (depending on the population of the municipality), ICLEI provides technical resources to assist towns in the formation and implementation of climate and energy plans.

B. Energy Financing

- The City can show its commitment to financing energy efficiency and clean energy upgrades by adopting funding procedures as may be appropriate for each upgrade as identified. Funding methods may include:
    - Grants as available: Prioritize grant research and writing for energy upgrades based on priorities in the City energy master plan.
    - On-Bill Financing: We recommend that the City maximize the use of on-bill financing to fund efficiency upgrades. With support from the CT Energy Efficiency Fund, the City can implement energy efficiency upgrades that save natural gas or electricity with no upfront capital cost. The City pays for the cost (at no interest) of the upgrade from the savings generated on the City's utility bills. After the utility provider recoups the cost, the City retains the future savings from the reduced energy use.
    - Capital Improvement Plan (bonding): Prioritize energy efficiency and renewable energy upgrades in the capital projects budget, as these projects will reduce operating costs and volatility of future City budgets. The City should create a separate capital project category for energy related investments in the Capital Improvement Plan and create an energy subgroup in each existing capital project category. Because Middletown has an Aa3 bond rating, the City can pay for major upgrades at a lower total cost to taxpayers. Accordingly, the City can bond for measures that stabilize and reduce energy costs which can pay for debt service on the bonds and reduce pressure on the City budget. However, current uncertainty in the financial markets makes bonding more difficult and current budget problems may reduce the ability to pay for projects with longer-term savings.
    - City Operating Budget: The City shall dedicate at least 50% of the energy surplus account and future conservation savings to a "clean energy trust" to support the implementation of the energy master plan and achieve additional energy savings to the City while also reducing the operating budget.
    - Middletown can pay for energy improvements within its annual budget via the capital non-recurring expenses account. The City can exert downward pressure on the City budget by prioritizing energy efficiency projects. This mechanism is ideal for smaller projects since the total funds available likely are too limited for major improvements.
    - Performance Contracting with third parties (Energy Service Companies or ESCOs): Hire performance contractors to make efficiency upgrades only when funding through other sources is not available.
    - The City can utilize outside companies to finance and implement efficiency upgrades and guarantee a fixed level of energy savings. Middletown can pay for the upgrades via the savings generated on the City's utility bills, less a commission for the third party. Similar to on-bill financing, there are no up-front costs with this mechanism. However, unlike on-bill financing, the City must share a portion of its energy savings with the third party. Additionally, the City must be aware of potential disputes over actual versus promised energy savings.
    - The City can obtain grants to defray the cost of energy-related improvements from various outside sources including the federal and state government, the CT

Energy Efficiency Fund, the CT Clean Energy Fund, Northeast Utilities, and other sources. While City employees work on grant writing as part of their overall responsibilities, Middletown currently has no dedicated staff working on grants. With a new focus on efficiency and clean energy at the federal level there likely will be opportunities for the City if it has shovel-ready projects. By proactively detailing an energy strategy as described in this plan, Middletown can have a competitive advantage over other entities seeking funds. It should be noted, however, that researching and applying for grants can be a time-consuming and uncertain process.

- Advocate for increased funding for municipal energy upgrades at state grant and regulatory level:
    - Advocate for removal of funding limits for municipal projects supported by the CT Energy Efficiency Fund and partner with Middletown's state legislators and other municipalities to advocate for this change.
    - Advocate at the state level for continued and expanded funding for the CT Energy Efficiency Fund and CT Clean Energy Fund.
    - Advocate at the federal level for support for clean energy infrastructure upgrades.

VI. PROCUREMENT AND PURCHASING

- Standardize purchases and procurement: The City should create guidelines for departments to encourage standardization in purchases to reduce staff training needed to operate the equipment and increase the likelihood that equipment will be used correctly. Building energy management systems should be prioritized for standardization.
- Purchase energy saving appliances: City departments should contact City facilities staff before purchasing any significant appliances using more than $15 of electricity per month for assistance choosing an efficient model. Departments failing to report major inefficient appliances may be held responsible for all energy costs through their own budgets.
- Give preference to electricity from clean, renewable sources: When the City purchases energy, it should give preference to options that maximize the use of new clean, renewable energy sources. Middletown has committed to 20% renewable energy by 2010 to foster these nascent industries, which will, over time, increase savings potential for the City and other municipalities.
- Lease or purchase only the most fuel-efficient models available that are suitable for the task: In addition, the City can reduce the number of vehicles required to be purchased through car-sharing and car-pooling.
- Require that new and replacement equipment for lighting, heating, ventilation, refrigeration and air conditioning systems, water consuming fixtures and process equipment and all such components shall meet or exceed Federal Energy Management Program (FEMP) recommended levels, whenever practical: For example, recommend that all future purchases achieve U.S. EPA Energy Star standards.
- Give preference to third party contractors who use California Air Resources Board or EPA certified diesel emissions controls on their on and off road equipment.

VII. CONCLUSIONS, RECOMMENDED FUTURE ACTIONS

- Revise this energy plan annually, set timelines for implementation and make it a living document.
- The Mayor and the Clean Energy Task Force will, together with key stakeholders in the community, develop a comprehensive clean energy plan to further the adoption of clean energy initiatives and energy efficiency by Middletown residents, businesses and institutions.
- Consider broader sustainability or greenhouse gas plans: There are additional areas in which the City could save money and improve environmental quality, including landscaping, water use, and recycling, but these areas largely fell outside the scope of this plan. Middletown has committed to the US Mayors Climate Protection Agreement which calls for the creation of a City-wide greenhouse gas inventory and climate plan, and we recommend Middletown follow through with this commitment.
- It is the intent of this plan to further the growth of green technology through economic development both regionally and in the City of Middletown.