

City of Bristol Energy Plan



Mayors Energy Task Force

December 2017

City of Bristol Energy Plan

December 1, 2017

Dear Mayor Zoppo-Sassu and Members of the City Council;

The Mayor's Energy Task Force (METF) is submitting its recommendations to you in the form of an Energy Plan for the City of Bristol. As the Chairman of the Energy Task Force, I encourage you to carefully consider the recommendations made in the Energy Plan and direct the implementing departments in City Hall to conduct further studies to determine the feasibility of the recommendations as many of them need more in-depth analysis. The Task Force's recommendations consider ways to conserve energy and promote the use of renewable resources in Bristol. The recommendations are comprehensive and we believe will lead to significant energy savings and promote inspiring environmental stewardship when implemented.

We urge you to continue the City's energy conservation efforts, as this Plan serves only as a starting point for much more work that is necessary to assist Bristol in energy conservation, efficiency and use of renewable resources. We believe implementation of a robust, comprehensive energy plan will make Bristol a more attractive community for business and residents.

Sincerely,

Frank J. Stawski

Chair, Mayor's Energy Task Force (METF)

Enclosures: City of Bristol Energy Plan

RESOLUTION OF THE ENERGY TASK FORCE TO SUBMIT THE BRISTOL ENERGY PLAN TO THE MAYOR AND CITY COUNCIL

WHEREAS, the Mayor and City Council created the Mayor's Energy Task Force and charged it with the responsibility to develop a comprehensive Energy Plan for the City of Bristol;

WHEREAS, energy efficiency and renewable energy help to combat otherwise increasing concentrations of pollution;

WHEREAS, energy prices continue to fluctuate and the potential for energy savings is real and effects municipal operations and all residents of Bristol;

WHEREAS, sound energy policy has proven to be a catalyst for economic development; and

WHEREAS, the Task Force has spent the past year analyzing City energy issues and developing the policies and programs in the Energy Plan to conserve energy and promote renewable and clean energy resources;

WHEREAS, the City has made the pledge to seek reduction of municipal buildings energy consumption by 20% before the end of 2018 in accordance with the Clean Energy Communities Municipal Pledge;

NOW, THEREFORE, BE IT RESOLVED, that the Task Force approves the policies, programs, and directives for implementation as set forth in the Energy Plan and encourages the City Council to adopt the Energy Plan as a guide for future action.

APPROVED BY THE MAYOR'S TASK FORCE ON ENERGY CONSUMPTION

By a Vote of 10 – 0 Date 11/30/2017

City of Bristol Energy Plan

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SECTION I: INTRODUCTION AND SUMMARY OF TASK FORCE FINDINGS

In 2009, Mayor Art Ward established the Mayor's Task Force on Energy Consumption to propose a comprehensive energy plan (Plan) for the City's buildings, lighting and other infrastructure and to identify opportunities for (i) energy mitigation through improved efficiencies and a culture of conservation and (ii) the increased use of clean and renewable energy sources. An initial plan was submitted in 2010, but was not adopted by the Council. The Task Force has revisited and refreshed the plan. This new Plan aims to guide the City toward clean, efficient energy usage and policies through changes in technologies, individual actions and education. In its draft form, it does not address opportunities to further clean energy among town residents and businesses. The Task Force believes that implementation of the Plan will further Bristol's efforts in addressing global climate change, supporting economic development while at the same time will result in both short and long term savings for the City.

The submission of this Plan should not be taken to mean that the Task Force believes that any of the City's major cost centers – the Public Works Department, the Board of Education, the Water Department, or the Police and Fire Departments – are fiscally or operationally mismanaged. On the contrary, the Task Force believes that all of these cost centers have been creative in finding ways to manage in challenging financial times. However, the impact of global warming, the fiscal situation facing Bristol and other cities around the globe and the desire of younger generations to incorporate smart energy policy and choices into their lives force us to take action to reduce both energy spending and the production of global warming pollutants. Residents and businesses are increasingly considering energy issues when determining where to live, work and play.

A growing number of communities are focusing on the triple bottom line of energy policy – energy security, economics and the environment. The essential challenge this poses to municipal leaders is to strike a balance between pleasing the taxpayers and leaving a better, more sustainable community for our grandchildren. Adopting sustainable practices and policies and building a sustainable community is key to meeting the needs of our current residents without compromising the potential for our future.

Implementation of more sustainable, cleaner and cost effective energy resources, such as solar, biomass, geothermal and fuel cells, along with conservation, will lead to improved energy security and better health. Additionally, renewable energy projects have the potential to provide tax revenue, economic growth through jobs and attraction of businesses, brownfield redevelopment and local grid resiliency. Renewable energy resources can be combined with micro-grids to further strengthen the grid and protect against prolonged outages. Locating generation close to load reduces energy costs by avoiding costly transmission.

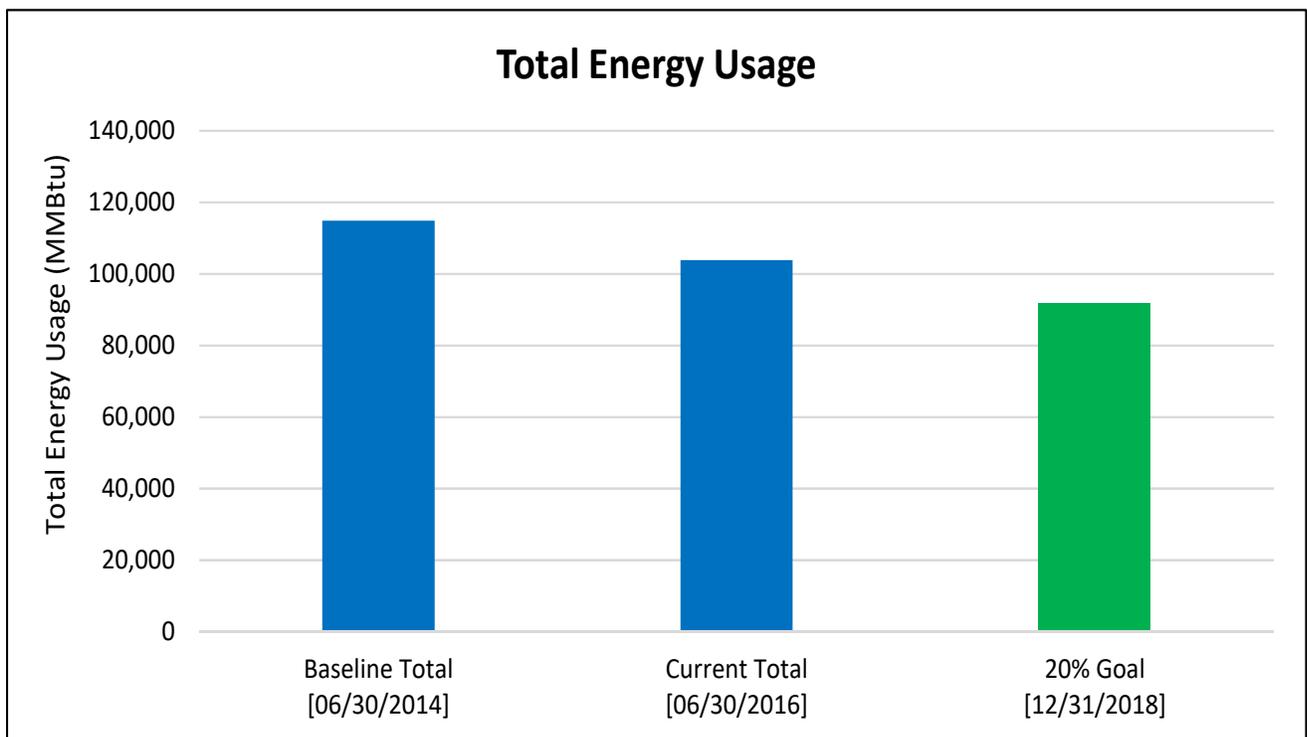
The Task Force has attempted to make recommendations to help achieve this triple bottom line for the City of Bristol and realize cost savings, energy security and a better environment for our residents.

The EPA ENERGY STAR Portfolio Manager is an online system used to measure and track energy and water consumption, as well as greenhouse gas emissions. The online database is used to benchmark the performance of one building or a whole portfolio of buildings, all in a secure online environment. The system allows the City to evaluate buildings against comparable type facilities to determine if they are above, below or on par with similar buildings throughout the country.

Currently, the Public Works Facilities Manager manages the data for the City of Bristol's Portfolio Manager Account, which includes both City and Board of Education (BOE) facilities. That individual continually oversees and reviews the data being automatically updated monthly, and also consults with the BOE, the Water Department and other City departments represented in the City's Portfolio regarding any usage anomalies or operational changes.

Bristol's Portfolio Manager account contains sixty-two facilities. Thirteen are Board of Education (BOE) facilities and sixteen are City facilities. There are also thirty-three water treatment facilities that are benchmarked in Portfolio Manager and are tracked in Bristol's analysis workbook, but they are not included in this analysis.

The baseline for Bristol was set to fiscal year 2014 because this was the year with the greatest energy use. Between the baseline of fiscal year 2014 and current fiscal year 2017, the total energy use at the twenty-nine properties included in this analysis has decreased by more than 10%. The site energy use intensity (total site energy use per square foot or site EUI) also decreased by 10%, from 62.0 to 56.0 kBTU per square foot. The below chart (Figure 1) shows the change in total energy and energy use intensity between 2014 and 2016. In order to reach a 20% savings goal, Bristol will need to reduce its site EUI to 49.6 kBTU per square foot.



CLEAN ENERGY COMMUNITIES MUNICIPAL PLEDGE

The Clean Energy Communities program is an initiative funded by both the Clean Energy Finance and Investment Authority (CEFIA-formerly known as the Connecticut Clean Energy Fund) and the Connecticut Energy Efficiency Fund. CEFIA and the Energy Efficiency Fund develop programs which collectively seek to have Connecticut cities and towns both reduce energy use and increase support for clean, renewable energy for municipal facilities. The Energy Efficiency Fund programs are administered by The Connecticut Light and Power Company (now Eversource), The United Illuminating Company, Yankee Gas Services Company, The Southern Connecticut Gas Company, and/or Connecticut Natural Gas Corporation (collectively, "the Companies").

The City of Bristol pledges to reduce its municipal building energy consumption by 20% by 2018. Building energy consumption shall be determined by benchmarking municipal building energy consumption to a baseline fiscal year. The City of Bristol will seek to reduce its municipal building energy consumption for municipal facilities by at least 20% by 2018.

Energy Efficiency Participation	Total Energy Used	Achievements	Rewards	Contact
 <p>This Town has earned the achievement of Clean Energy Community SILVER LEVEL.</p>				
✓	 Municipal Pledge	The Town signed the municipal pledge to join the Clean Energy Communities program. Click the icon to view this town's signed		
✓	 Bright Idea Grant	The Town has earned and used a Bright Idea Grant, click the icon to view this town's signed documents and completed project		
✓	 Benchmark 100%	The Town has met their pledge commitment by benchmarking 100% of their municipal buildings.		
✓	 MUNICIPAL ACTION PLAN	The Town has completed their Municipal Action Plan (MAP). Click the icon to view this towns MAP.		
✓	 eesmarts™	This Town has integrated eeSmarts curriculum within their schools.		
✓	 Renewable Energy Campaign	The Town has completed a Renewable Energy Campaign		
✓	 Energy Efficiency Campaign	The Town has completed an Energy Efficiency Campaign		
✓	 Energy Use Reduction	The Town has reduced at least 10% of their municipal energy use and is halfway towards achieving their 2018 goal.		
✗	 Energy Reduction Goal	The Town has met their energy reduction goal of reducing their municipal energy use by 20% by 2018.		

The resulting Energy Plan emphasizes seven areas:

1. The Role of Government - defines the role of government in promoting and facilitating energy efficiency, use of renewables and conservation.
2. Municipal Operations - considers energy conservation possibilities in City operations ranging from street lighting and transportation to public building retrofit.
3. Board of Education Operations – supports the Clean Energy Communities goals in the Energy Plan with its facilities presenting the largest opportunity for savings gain while supporting our mission to lead all Bristol students into a cleaner and successful future.
4. Renewable Resources - explores ways to increase local use of solar, biomass, fuel cells and geothermal energy technologies along with maximizing conservation and recycling opportunities.
5. Facilities Retrofitting - evaluates retrofitting Bristol's municipal buildings with energy conservation measures.
6. New Construction and Site Design - addresses issues of improved efficiency in buildings, protection of rooftop solar access, energy-conscious landscaping, and innovative building design.
7. Promotion and Education - promotes improvement in the quality and availability of energy information, facilitating public input to the Energy Plan, and promotion of energy awareness and understanding through the implementation of school programs.

Conclusions and Recommendations for Future Actions

- With continued Administration and City Council support and involvement, it is anticipated that this Energy Plan will be effective in realizing energy conservation, boosting economic development, fighting rising energy costs, and make City operations a model of low cost efficiency.
- Revise this Plan yearly and make it a living document. Set an update schedule, create periodic department reporting to assess progress and verify objectives are being met.
- Create a deadline for launching a comprehensive, evolving Plan including all residents, businesses and other City institutions.
- Create a permanent Energy Commission to continue the work the Plan prescribes and drive continuing clean energy usage and innovation.

SECTION II: Energy Plan Goals, Policy Statements and Policy Objectives

Goals

The Plan initially focuses on City operations and infrastructure. The Task Force reviewed the suggested actions included in the latest edition of the “U.S. Mayors’ Climate Protection Agreement “(2014) and other related recommendations with the goal to identify actions the City could take to reduce energy expenditures, usage and the pollution created thereby. The Plan identifies opportunities for (i) energy use mitigation through improved efficiencies and a culture of conservation and (ii) the increased use of clean and renewable energy sources. The scope of the Plan includes, but is not limited to an evaluation of mechanical and personal uses of energy, policies and practices to achieve reductions in energy usage and an analysis of available public utility, state and federal financial incentives. The Plan prioritizes actions that reduce energy costs over the lifetime of the investment, volatility in energy costs, indoor and outdoor air pollution and dependency on fossil fuels.

Policy Statement: Role of Government

The City of Bristol, in conjunction with all City departments along with the Board of Education and the Water Department, shall coordinate and/or implement clean energy-related programs and activities, and shall encourage conservation actions in the public sector.

Policy Objectives

Energy Task Force: Extend the term of the Energy Task Force to assist in the implementation of this Energy Plan. Task Force responsibilities and tasks will include:

1. Promoting input from and support by the largest number of City departments, agencies and allied organizations as feasible for the Energy Plan;
2. Promoting the policy goals and objectives of the Energy Plan;
3. Making recommendations to the City Council to implement programs recommended in the Energy Plan.
4. Guiding the implementation of the recommended programs of the Energy Plan;
5. Considering proposals for additions or changes to the Energy Plan; and
6. Evaluating recommended energy programs periodically.

KEY ACTIONS: Role of Government

Implementation of Plan: Ensuring that all City policies and programs are consistent with the Energy Plan through a process of continual review and recommendations to the City Council and City departments by the Mayor and the Energy Commission.

Facilitating the timely achievement of the City's energy conservation policies by establishing and implementing enforceable objectives of the Energy Plan in order to promote energy conservation in all sectors of the community.

Promoting energy conservation by using City government as a role model for the community, especially with regard to conservation in the operation of public buildings and the deployment of clean energy solutions by continuing and expanding City energy programs.

Developing and maintaining a reliable data collection system on energy use and costs in the City along with providing public summaries and announcements of such data.

Working with the Board of Education to encourage energy awareness through the introduction of clean energy technologies and energy conservation systems in school curricula and their inclusion in school operations and policy.

Working with other City departments as appropriate in fulfilling the objectives of the Energy Plan.

City government should apply this policy throughout the municipality in conjunction with Purchasing, Department of Public Works, Board of Education, and the Water Department.

SECTION III: Recommended Actions and Programs

Policy Statement: Energy Commission

The evolution of the METF into a formal Energy Commission is necessary to carry forward the work of the Task Force and continually advance the Plan. The METF looks forward to working with the Mayor's office to appoint members from City departments, the business community and the public to further develop the Plan.

Policy Objectives

-) General Operations -The Mayor's Task Force on Energy Consumption: A City Energy Management Task Force, consisting of ten (10) voting volunteers nominated by the Mayor who are responsible for reviewing energy consumption and cost functions along with recommending energy policy, was formed in 2009. This task force should continue to provide a top-level forum for making recommendations to the City administration and City Council on energy issues affecting municipal operations.
-) Energy Efficient Procurement -The City should develop a procurement policy where the entire life cycle of all purchases is considered.
-) General Operations - Water Conservation Program: Bristol's Water Department should promote and encourage water conservation with flow restrictors. Public awareness and other methods for encouraging this type of energy conservation should be developed and implemented. City Administration should back such efforts despite the potential for reduced water usage resulting in lower City revenue.

KEY ACTIONS: Energy Commission

-) Specific Department Operations—Building Monitoring for Energy Conservation: A City-wide Building Management System (BMS) is integrated in our large energy-consuming facilities with data collected by various software systems and exported to the Portfolio Manager system. As conservation goals are set for energy consumption in City buildings, a feedback system providing information on energy usage will be essential. Research and reports on options available to automate the monitoring of buildings are underway and should be continued and expanded.
-) Specific Department Operations—Energy Conservation in the Solid Waste Operation: An analysis of the municipal solid waste stream brought to the Bristol Transfer Station for disposal was undertaken by Public Works to determine the amount and type of refuse available for material and energy recovery. This information should be used to determine energy conservation measures in the solid waste operation.
-) Specific Department Operations—Street Lighting Replacement Program: An energy management plan for the newly installed LED street lighting is currently being prepared to measure and verify that original investment and planned Return on Investment (ROI) projections are being met. This plan should be completed and implemented.

Policy Statement: Municipal Operations

The METF recommends that Bristol follow the examples set by West Hartford, Hartford, Stamford other Connecticut clean energy municipalities and hire a full-time, in-house Certified Energy Manager the costs of which will be offset by energy savings generated through the position. Many communities including but not limited to West Hartford currently have a dedicated Energy Manager to source grants and take advantage of the plethora of energy programs available, in addition to planning and overseeing implementation of energy efficiency projects. We envision this revenue generating position will create comprehensive building upgrade plans, motivate and train building operators and users on building efficiency practices, educate city staff and create community outreach, 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. The City may consider sharing the costs and efforts of this position with neighboring communities.

Policy Objectives

-) General Operations—Mayor's Task Force on Energy Consumption: A City Energy Management Task Force, consisting of volunteers who are responsible for major energy consuming functions, was developed in 2009. This task force will continue to provide a top-level forum for making recommendations to the Mayor and City Council on energy issues affecting municipal operations until a permanent commission is created.
-) Energy Efficient Procurement: The City should develop a procurement policy where the life cycle of ALL purchases is considered.
-) General Operations—Water Conservation Program: The City Water Department should promote and encourage water conservation with flow restrictors. Public awareness and other methods for encouraging this type of energy conservation should be developed and implemented. City Administration should back such efforts despite the potential for reduced water usage resulting in lower City revenue.
-) Pursue Virtual Net Metering opportunities.

KEY ACTIONS: Municipal Operations

-) Establish a requirement that all City departments including the Board of Education and the Water Department aggregate their energy procurement contracts into combined strategic purchasing agreements with the goal of realizing greater savings for the taxpayers by 2020.
-) Increase the average miles per gallon or equivalent alternative measurement across all municipal fleet vehicles by 20% by 2020.
-) Specific Department Operations—Street Lighting Replacement Program: An energy management plan for the newly installed LED street lighting is currently being prepared to measure and verify that original investment and planned Return on Investment (ROI) projections are being met. This plan should be completed and implemented.

- J Specific Department Operations—Energy Conservation in the Solid Waste Operation: An analysis of the municipal solid waste stream brought to the Bristol Transfer Station for disposal was undertaken by Public Works to determine the amount and type of refuse available for material and energy recovery. This information should be used to determine energy conservation measures in the solid waste operation. Opportunities for installation of photovoltaic arrays installed at the Transfer Station should continue to be strongly considered.
- J Actively pursue regional cooperation for energy purchasing for school districts and local public agencies which could potentially save tax dollars on the purchase of electricity, natural gas, and renewable energy, as well as pursue other grant opportunities.
- J Incorporate microgrid systems to provide power independence during major outages and high demand periods.
- J Actively pursue opportunities for installing clean energy technologies such as fuel cells, geothermal systems, solar systems and digesters where economically and technically feasible.
- J Establish a plan to reduce the annual total number of gallons of gasoline and diesel fuel used by municipal fleet vehicles.
- J Specific Department Operations—Continue implementation of Vehicle Fleet Management Programs CompassCom and RouteSmart to improve route efficiencies, maximize staff and fleet resources and reduce fuel consumption.

Policy Statement: Board of Education Operations

The Board of Education (BOE) firmly believes that energy efficient operations of its school facilities is a cost saving measure that will reduce ever increasing budgetary pressures. There are thirteen BOE buildings in Bristol's portfolio of buildings. Between the baseline of fiscal year 2014 and fiscal year 2016, the total energy usage at these thirteen properties has decreased by 6%.

Most of the City's overall energy use can be attributed to school facilities, which represent about 70% of the total energy consumption. Among BOE properties, the largest energy users are Bristol Eastern High School (~20%), Bristol Central High School (~17%), Northeast Middle School (~9%) and Stafford School (~7%). Together, these four schools represent half of the energy consumption among BOE buildings.

Bristol Eastern High School and Bristol Central High School are the largest energy consumers in Bristol and energy saving actions taken there may have a more significant impact on overall savings.

The BOE will work closely with the Energy Commission to meet the Clean Energy Communities goals in the Energy Plan while supporting our mission to lead all Bristol students into a cleaner and successful future.

Policy Objectives

-) Fully support and participate in all efforts of the City to attain the CEC Municipal Pledge of 20% reduction of energy consumption by 2018.
-) Ensure Energy Efficient Procurement for all building and equipment purchases.
-) Develop curriculum elements at all grade levels to instill a 'Culture of Conservation'.

KEY ACTIONS: Board of Education

-) Reduce Central and Eastern High School energy consumption by 20% by the year 2018 according to the Clean Energy Communities Municipal Pledge using 2014 as a baseline. Utilize the recommendations of the DRA Facilities Feasibility Study report to prioritize energy efficiency investments.
-) Expand Energy Star certification process for three (3) eligible schools, South Side, Stafford and Mountain View.
-) Incorporate the eeSmarts energy education initiative to further understanding of energy efficiency by Bristol students.
-) Negotiate and combine energy procurement contracts with City contracts.
-) Explore opportunities for clean and alternate energy solutions to be installed on and around facility properties during renovations and new construction.
-) Explore a fuel cell or other Combined Heat & Power (CHP) installation at Central High School.

Policy Statement: Renewable Resources

The City will investigate renewable energy sources for its own energy production. The City shall encourage a shift from the consumption of nonrenewable energy resources by municipal, institutional, commercial and residential users to the use of renewable resources, including, but not limited to; passive, active and hybrid solar systems, fuel cells, geothermal systems, low emission combined heat and power (CHP), anaerobic digesters, nuclear, low head hydroelectricity, wind electricity, biomass/methane, storage, waste heat recovery systems and waste recycling.

Policy Objectives

-) Education
 - o Promote the use of renewable, clean and alternative energy resources by providing educational materials and seminars, financial support in the form of low-interest loans and/or grants and technical assistance regarding appropriate application of these resources to the citizens of Bristol.
 - o Increase awareness of how individuals, households, businesses, and the entire community can use energy more efficiently and convert to use of renewable resources.
-) Solar
 - o Promote the use of solar photovoltaic electricity generation systems and solar hot water heating systems in municipal, institutional, commercial and residential facilities.
-) Fuel Cells
 - o Promote the use of fuel cell electricity generation systems in municipal, educational, institutional and large commercial facilities.
-) City Programs
 - o Encourage community support for feasible and cost-effective programs to conserve energy and to utilize renewable resources.
 - o Expand private and public involvement in recycling and composting activities.

KEY ACTIONS: Renewable Resources

-) Actively support the potential installation of fuel cells on the proposed Middle Street site, Water Pollution Control wastewater facility and other municipal sites when the opportunity presents itself.
-) Collaborate with Bristol commercial installers to create new opportunities to implement larger solar system arrays.
-) Micro Energy Systems

Policy Statement: New Construction, Site Development and Facilities Retrofitting

The City of Bristol shall promote green building design, the use of energy efficient building infrastructure systems and the use of renewable energy resources to the greatest extent possible in renovations, repairs and reconstruction. The City shall adopt basic sustainable design criteria to ensure a positive impact on public health and the environment, reduce municipal operating costs and help create a sustainable community. These criteria will focus on optimizing the energy efficiency of new construction techniques, using energy-conscious site planning and landscaping practices, and protecting the access of appropriate building and site spaces for use of solar photovoltaic collection devices.

Policy Objectives

-) Building Codes
 - o Adopt the most current International Energy Conservation Code (IECC) and any other applicable codes and standards as used by the State of Connecticut.
 - o Promote the use of solar photovoltaic collection devices, Energy Star-rated appliances and sustainable building materials in renovated building construction by amending the city's Building Code to reflect a higher standard of energy efficiency, use of alternative energy resources and greater use of renewable construction materials.
 - o Consider an ordinance to exempt Class I renewables from building permit fees pursuant to Connecticut General Statute 29-263.
-) Solar Access
 - o Promote the use of solar photovoltaic collection devices by protecting solar access in the planning, zoning, subdivision control, and site-plan review processes of the City.
-) Landscaping and Site Design
 - o Provide planning guidelines and incentives that encourage use of native, drought-resistant plant materials and low-irrigation/zero-irrigation landscaping techniques throughout the city.
 - o Underneath the aegis of Public Works, create planting and landscaping guidelines, which are conducive to energy and water conservation, such as use of appropriate street plantings and landscaping of municipal streets, parking lots and buildings.
 - o Promote use of grey water for irrigation.
-) Building Innovation
 - o Encourage the use of innovative energy-conscious building designs that exceed current building code requirements, such as earth-sheltered, super-insulate buildings, net-zero energy buildings and alternative energy source buildings such as geo-thermal and solar photo-voltaic by minimizing the regulatory barriers that discourage their construction.

-) Outdoor Lighting
 - o Increase the energy efficiency of outdoor lighting by encouraging the use of color-tuned LED light sources, decreasing maximum fixture operating duration and restricting certain types of outdoor lighting when its advertising potential and visibility serve little purpose.

KEY ACTIONS: New Construction and Site Development

-) Require all new building construction to meet LEED Gold green building or equivalent standards and the latest International Building Code's energy efficiency standard.
-) Create a comprehensive citywide building efficiency strategy with prioritization of upgrades, timelines and an assessment of funding options by December 2018.
-) Use LED light fixtures and BMS controls to minimize energy consumption
-) Re-use of rain and storm water (gray water) to reduce site watering consumption
-) Use of native vegetation/drought resistant plants for site landscaping to reduce water consumption

KEY ACTIONS: Facilities Retrofitting

-) Employ Energy Star, LEED and other green building rating requirements for bids, new projects
-) Replace windows and doors with high performance alternates
-) Use renewable energy to offset fossil fuel use
-) Recommission all building energy and water systems to minimize consumption
-) Optimize recycling and reuse of demolition/construction debris
-) Apply daylight, HVAC and lighting sensors
-) Use natural ventilation and fresh air intake to reduce cooling/heating loads
-) Use solar shading devices for windows to reduce heat gain
-) Reduce heat island effect through removal of excess pavement
-) Create a short-term renewable energy strategy prioritizing City buildings for solar photovoltaic, fuel cell and / or solar water heating installations by December 2018

Policy Statement: Promotion and Community Awareness

Develop culture of conservation by educating end-users on strategies to reduce energy consumption and support clean energy integration and technology.

Policy Objectives

Encourage the participation of the Bristol community in energy efficiency, renewable, and sustainability efforts. The City shall promote energy efficiency and educate the community on measures and issues related to energy efficiency and renewable energy.

) Education

- Inform the community of current trends in the use and cost of energy in all sectors of the City.
- Increase awareness of how individuals, households, businesses, and the entire community can reduce energy consumption and make use of renewable resources, including available state and utility programs and incentives.
- Make energy information readily available to the Bristol community through multiple channels such as web, social media, mailings, media, and in-person workshops and events.

) Promotion

- Publicize the Mayor's Task Force on Energy Consumption and its work.
- Encourage widespread community participation in the further development and implementation of the Energy Plan.
- Encourage community support for feasible and cost-effective programs to reduce energy consumption and to utilize renewable resources.
- Showcase the City's energy reduction and sustainability initiatives in an effort to lead by example.

KEY ACTIONS: Promotion and Education

-) Create Green Teams for each school and municipal building involving students, teachers, facility managers, city employees, and other stakeholders to work with the Energy Commission in monitoring and coordinating progress towards meeting the goals of the Energy Plan.
-) Implement visual means of demonstrating building energy data to users with information kiosks, dashboards and other online software display systems.
-) Create energy guidelines and incentives to eliminate unnecessary energy consumption. The guidelines should address wasteful energy activities including, but not limited to, the use of personal electric space heaters, leaving lights (interior and exterior) on when not in use or failing to employ energy-saving settings in electronic devices.

SECTION V: Appendix

A. References

Town of Bristol Portfolio Manager Summary Report

Bristol's Portfolio Manager account contains sixty-two properties. Thirteen are Board of Education buildings and sixteen are town buildings. There are also thirty-three water treatment facilities that are benchmarked in Portfolio Manager and are tracked in Bristol's analysis workbook, but they are not included in this analysis.

The baseline for Bristol was set to fiscal year 2014 because this was the year with the greatest energy use. Between the baseline of fiscal year 2014 and current fiscal year 2016, the total energy use at the twenty-nine properties included in this analysis has decreased by 10%. The site energy use intensity (total site energy use per square foot or site EUI) also decreased by 10%, from 62.0 to 56.0 kBTU per square foot. Figures 1 and 2 show the change in total energy and energy use intensity between 2014 and 2016. In order to reach a 20% savings goal, Bristol will need to reduce its site EUI to 49.6 kBTU per square foot.

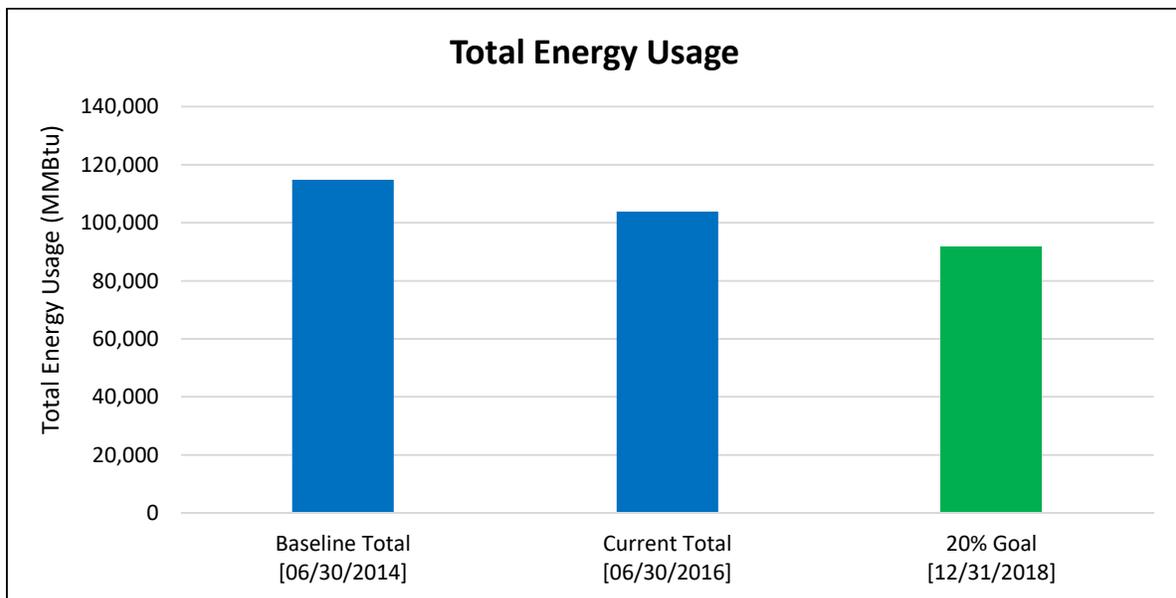


Figure 1

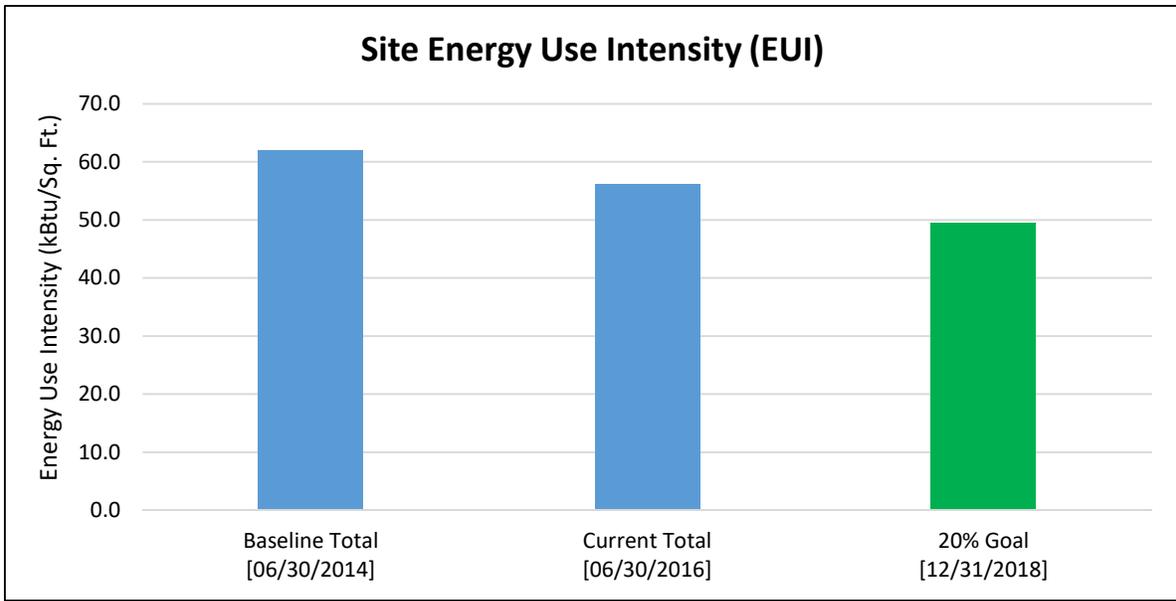


Figure 2

Most of Bristol's energy use can be attributed to school buildings, which represent about 70% of total energy consumption for the town. Of these, the top three energy users are Bristol Eastern High School (~14%) and Bristol Central High School (12%). Police/Court House Complex is the largest energy user on the town side, at ~8% of total energy consumption, followed by City Hall at 5%. Figures 3 and 4 show the percent of total portfolio energy used by each property in 2014 and 2016. 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 from baseline to current year.

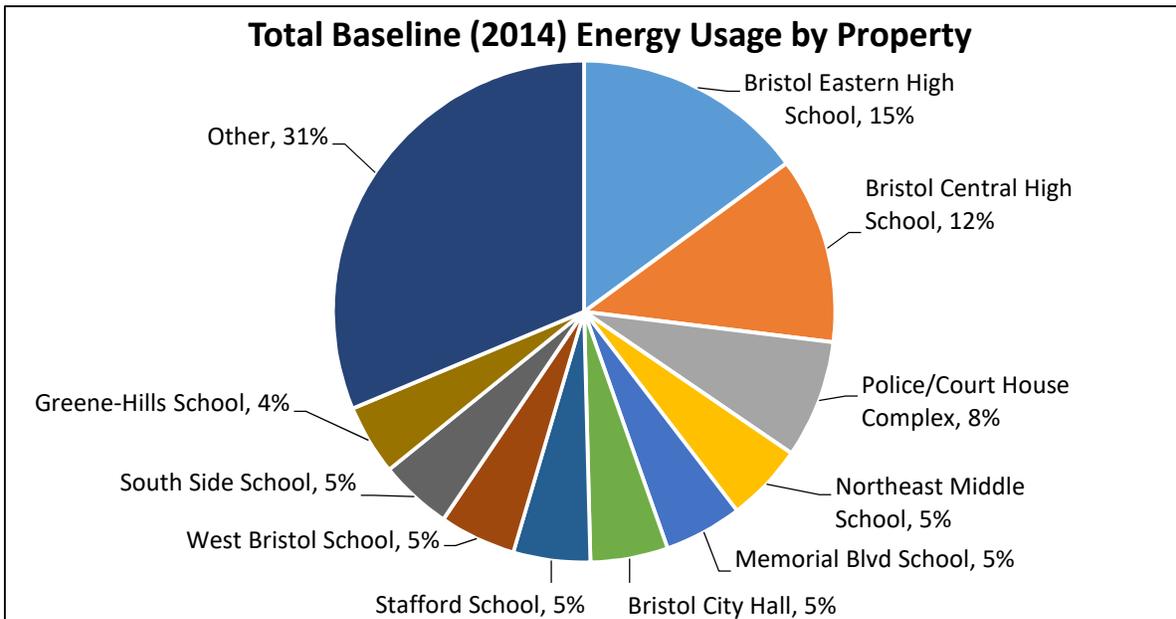


Figure 3

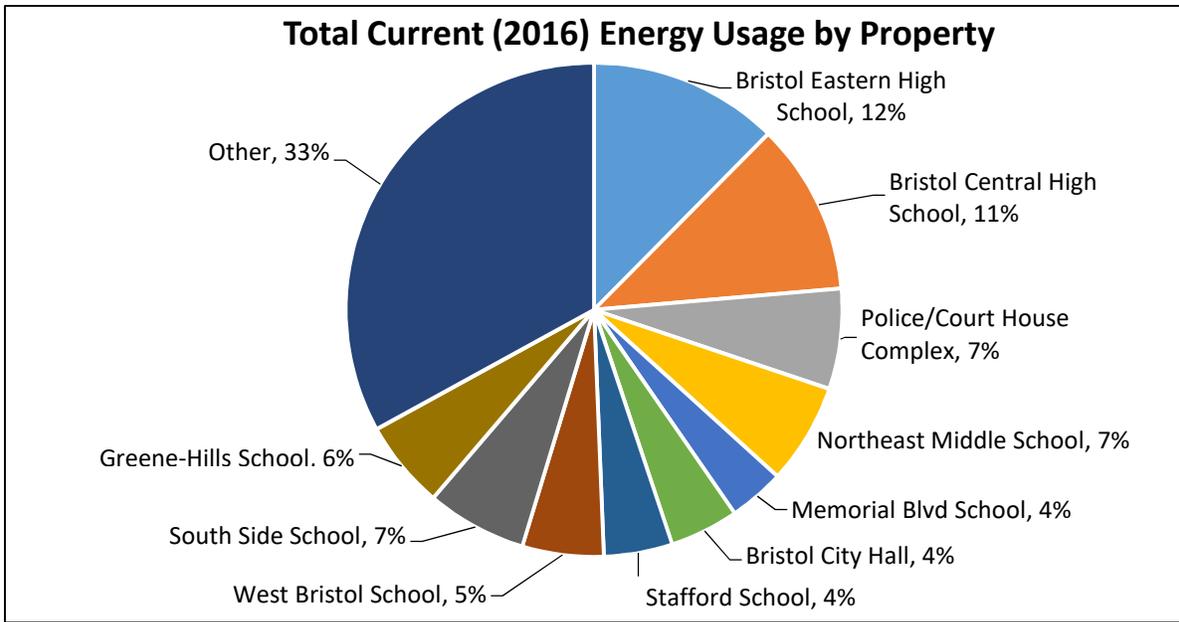


Figure 4

Bristol's energy consumption is mostly heating energy from fuel oil and natural gas. Figures 5 and 6 show this distribution, with the proportion of natural gas and electricity expanding from baseline to current year.

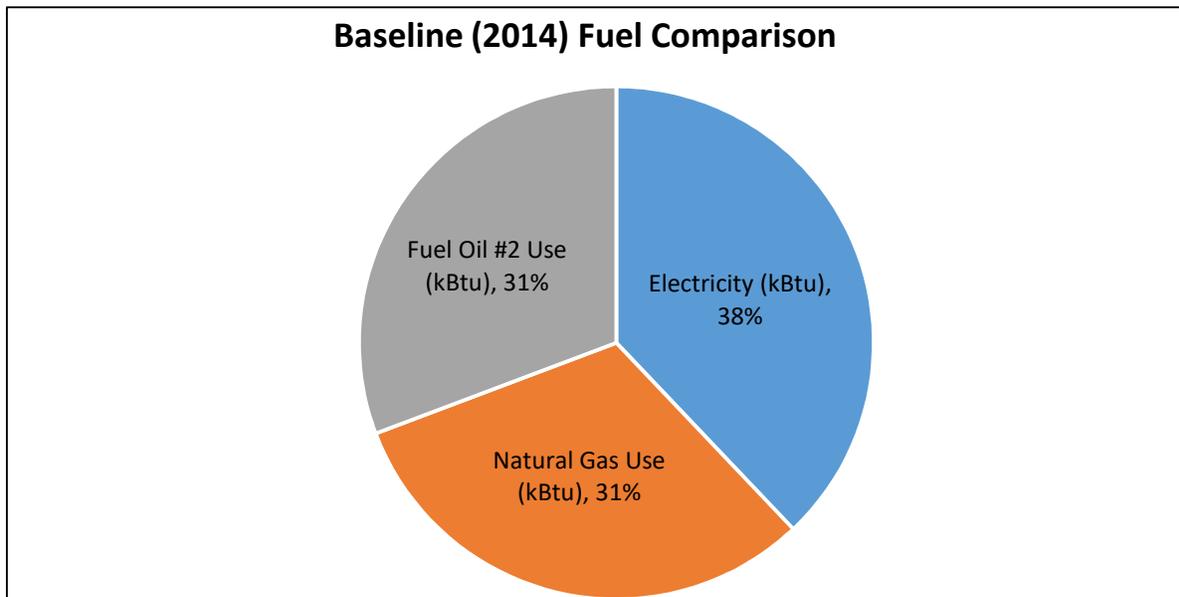


Figure 5

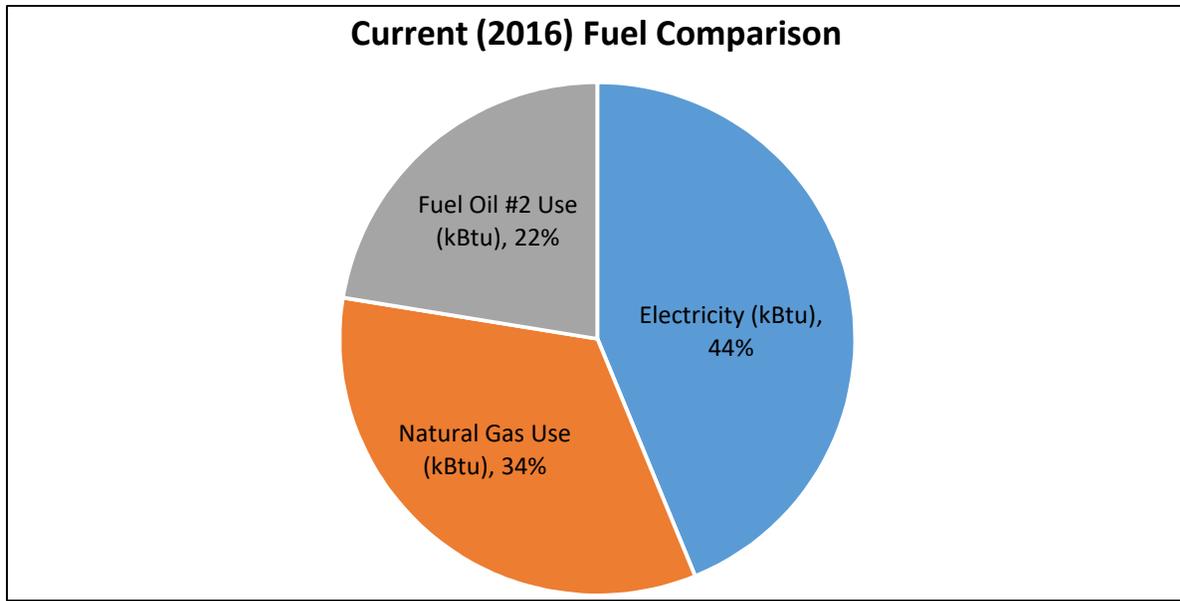


Figure 6

Figure 7 shows the baseline and current total energy usage for all properties. Figure 8 shows the baseline and current site EUI for all properties. Among the top ten energy users shown in these figures, South Side School (-50%), Northeast Middle School (-19%) and Greene-Hills School (-18%) had the largest increases in site EUI from baseline 2014. Memorial Blvd School (21%), Stafford School (19%) and Bristol City Hall (12%) have the greatest energy improvements. Based on its total energy usage compared to the whole portfolio and their increase in site EUI, Northeast Middle School may provide opportunities for future energy efficiency projects. However, Bristol Eastern High School and Bristol Central High School are the largest energy consumers in Bristol and energy saving actions taken there may have a more significant impact on overall portfolio savings. It will be important to review any recently completed projects to determine the best candidates for an audit.

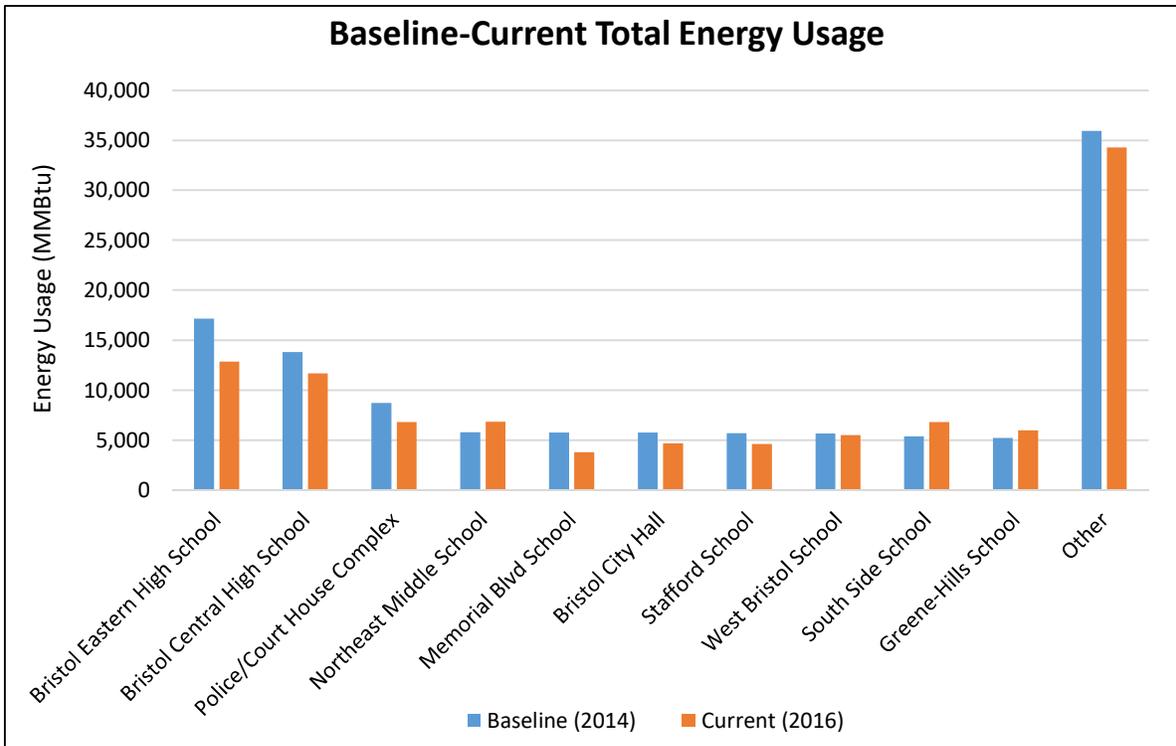


Figure 7

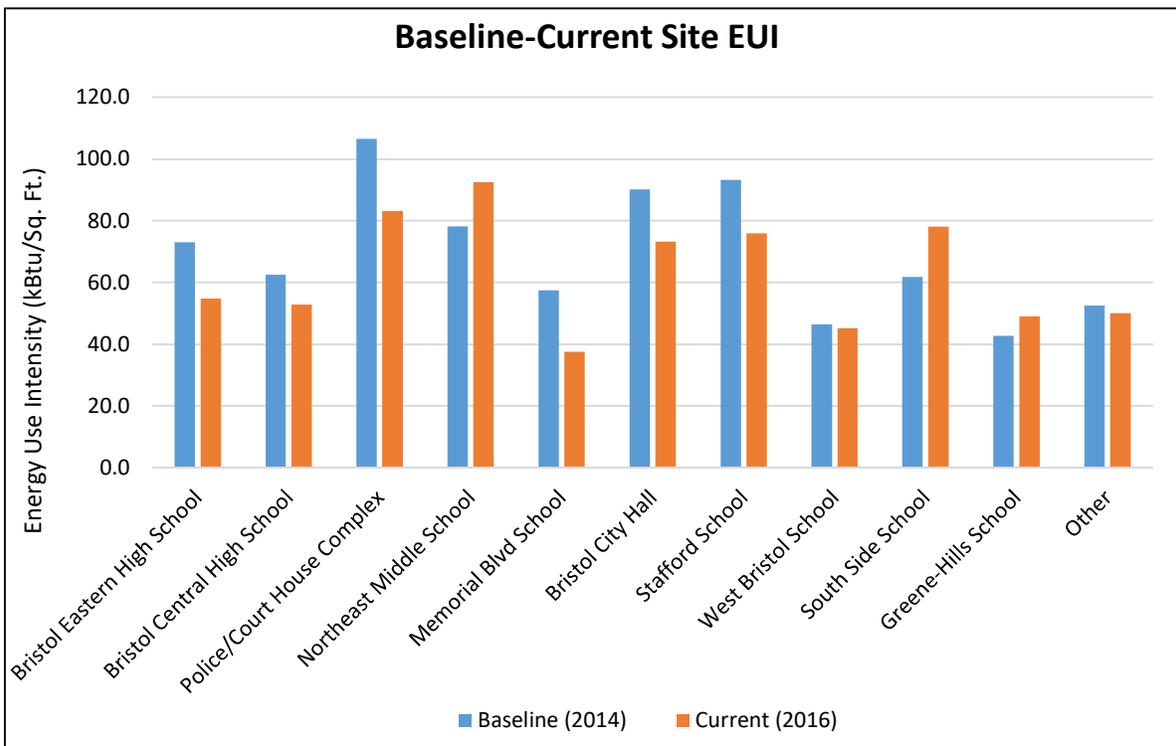


Figure 8

Summary Report for Town Buildings Only

There are sixteen town buildings in Bristol's portfolio of buildings. Between the baseline of fiscal year 2014 and fiscal year 2016, the total energy usage at these sixteen properties has decreased by 16%. The site energy use intensity (site energy use per square foot or site EUI) decreased by 16%, from 77.2 to 64.7 kBtu per square foot. Figures 1 and 2 show the change in total energy and energy use intensity between 2014 and 2016. In order to reach a 20% savings goal, Bristol's town buildings will need to reduce their site EUI to 61.8 kBtu per square foot.

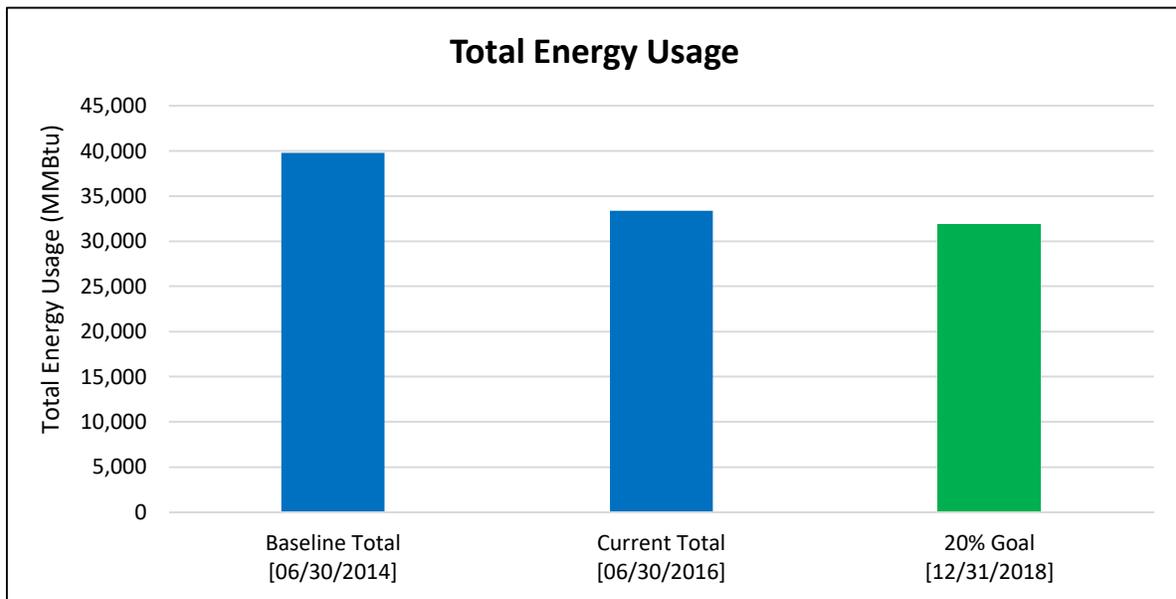


Figure 1

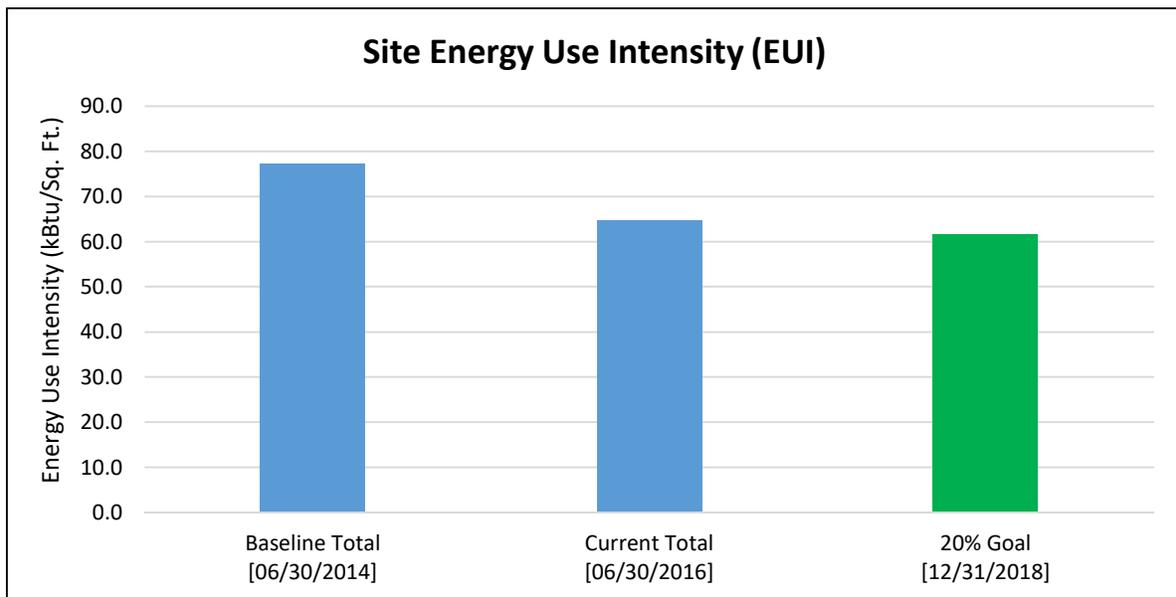


Figure 2

Among Bristol's town properties, the largest energy users are the Police/Court House (~24%), Memorial Blvd School (~14%) and Bristol City Hall (~14%) and Beals Senior Center (~13%).

Figures 3 and 4 show the percent of total portfolio energy used by each property in 2014 and 2016. 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 2016.

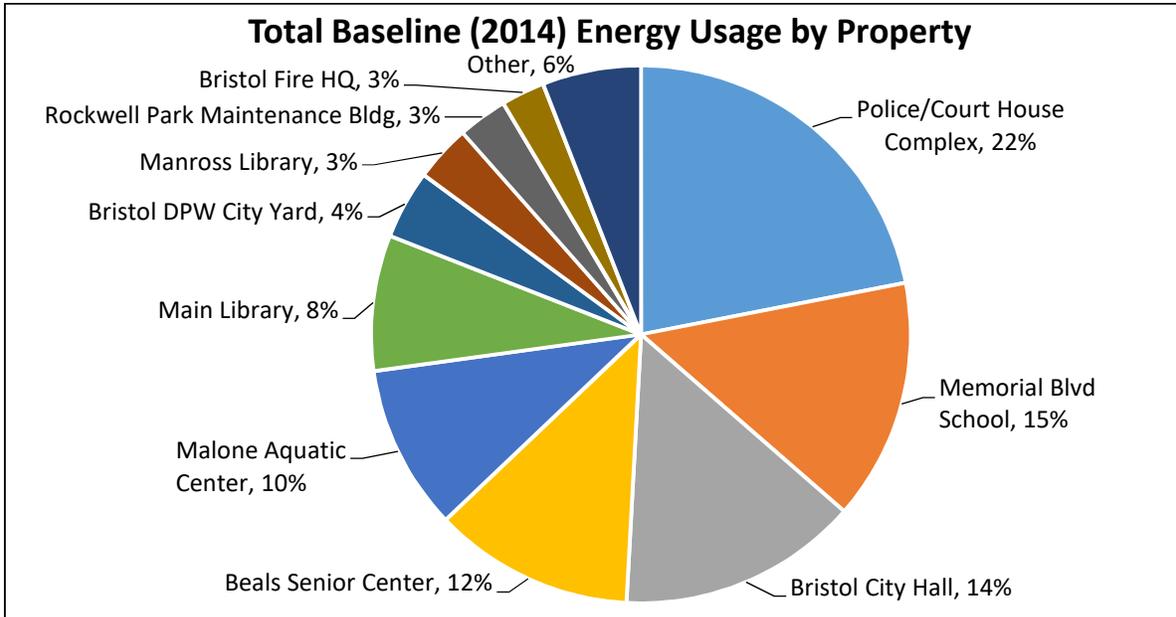


Figure 3

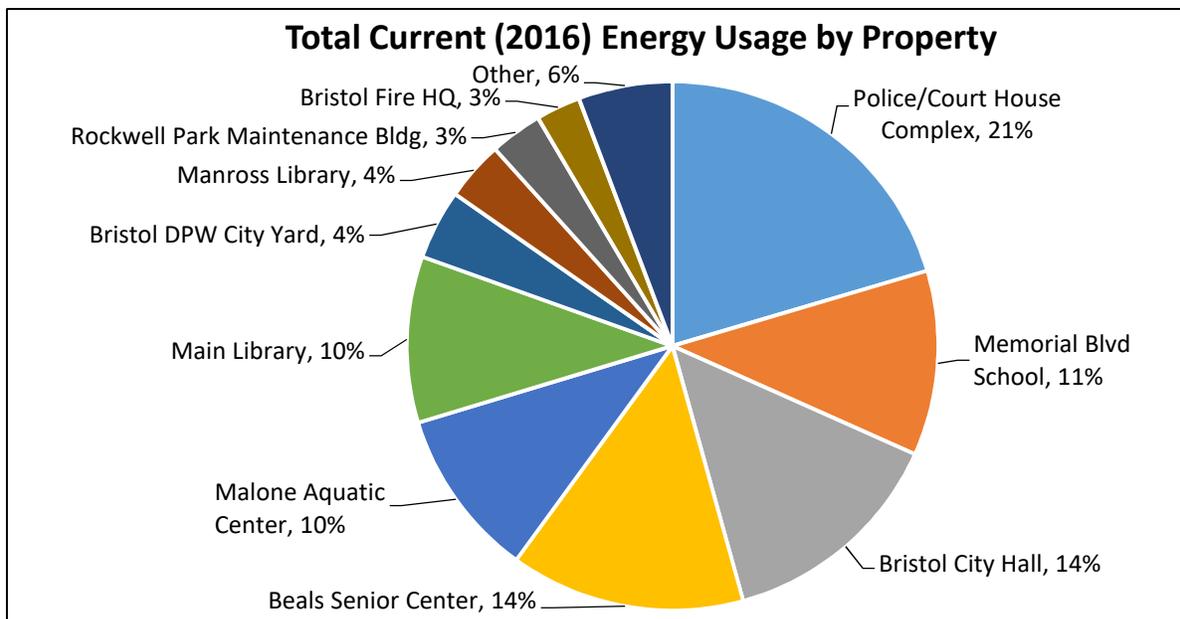


Figure 4

Most of the town buildings’ energy use is heating energy from fuel oil #2 and natural gas. Electricity use increased to 44% of energy consumption in Bristol in 2016 while fuel oil use decreased.

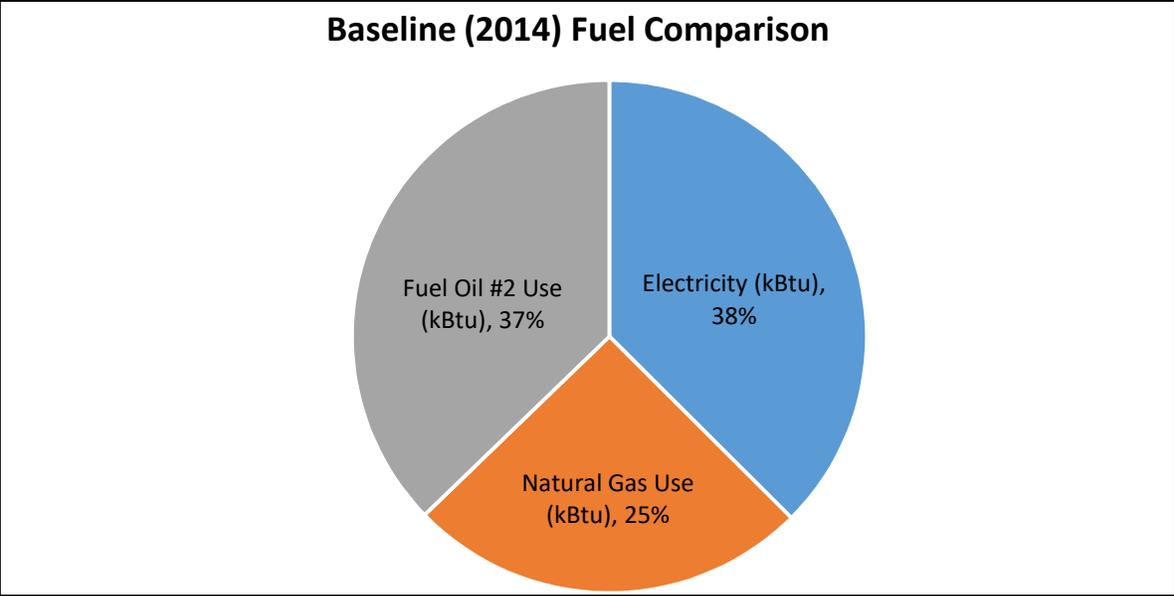


Figure 5

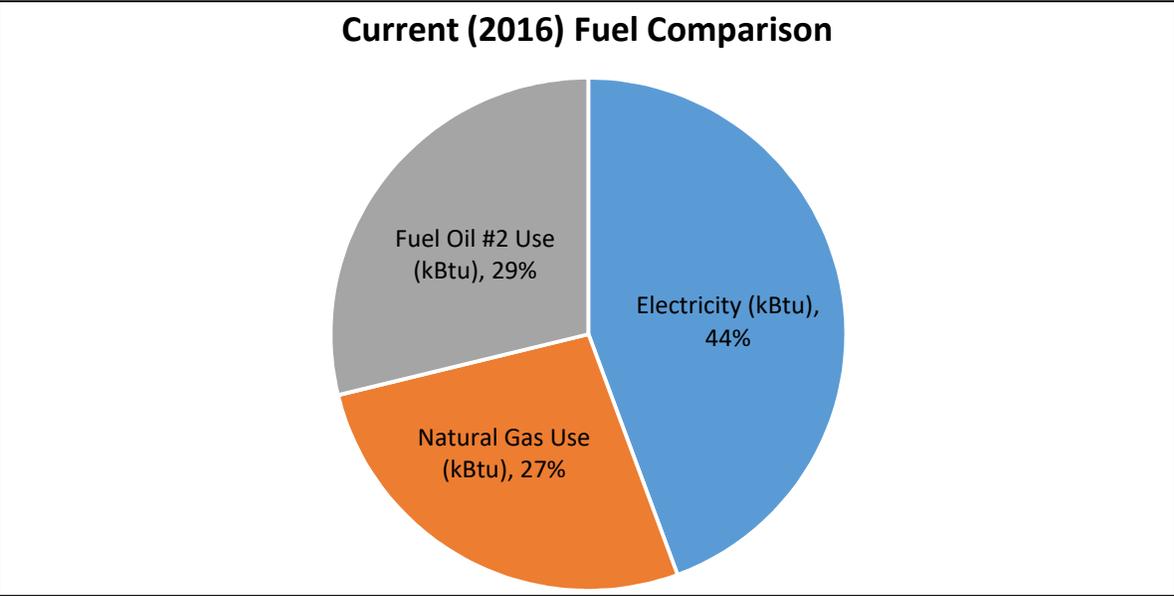


Figure 6

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, Main Library (-16%), Bristol DPW City Yard (-15%) and Beals Senior Center (-12%) had the greatest increases in weather normalized site EUI, while Memorial Blvd School (21%), Police/Court House Complex (13%) and City Hall (12%) had the largest energy improvements.

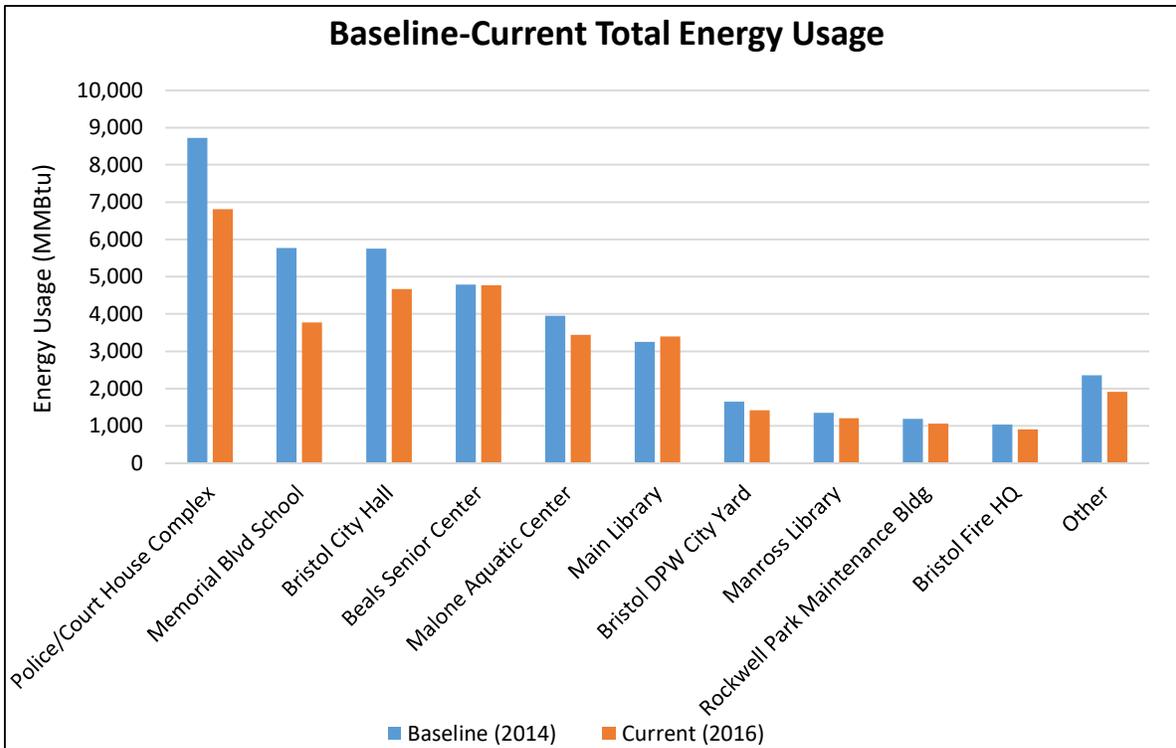


Figure 7

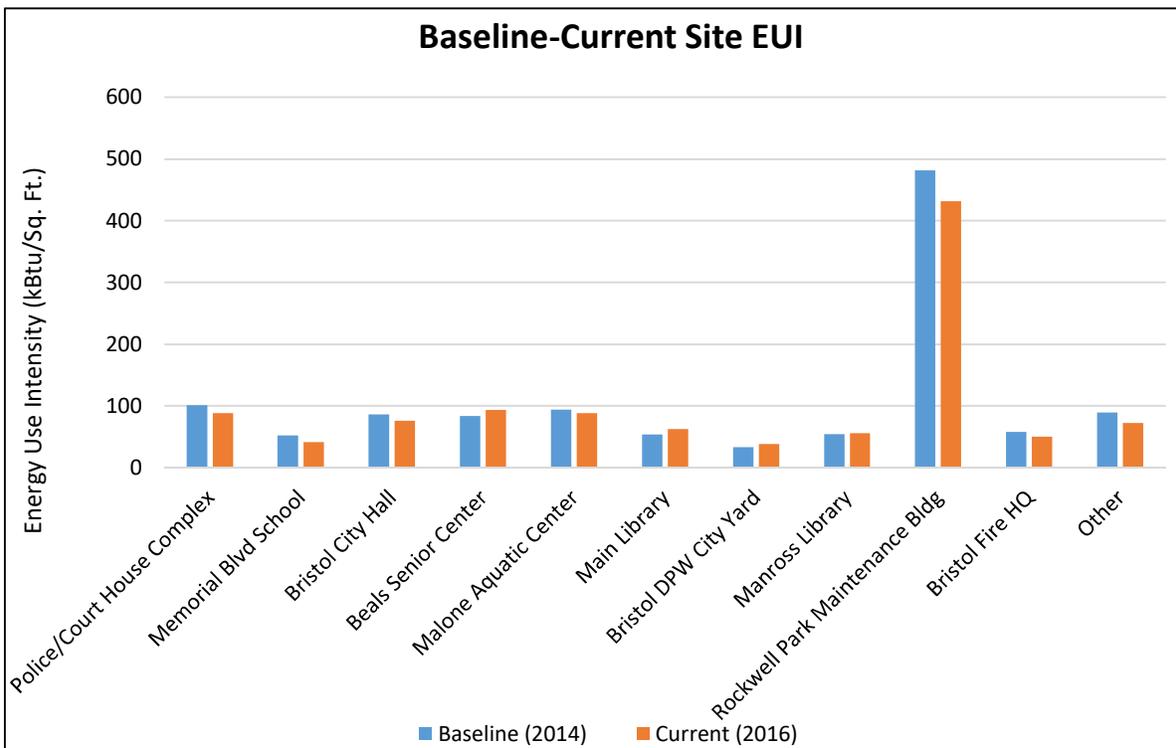


Figure 8

Analysis Report for Board of Education Buildings Only

There are thirteen Board of Education (BOE) buildings in Bristol's portfolio of buildings. Between the baseline of fiscal year 2014 and fiscal year 2016, the total energy usage at these thirteen properties has decreased by 6%. The site energy use intensity (site energy use per square foot or site EUI) decreased by 6%, from 56.1 to 52.7 kBtu per square foot. Figures 1 and 2 show the change in total energy and energy use intensity between 2014 and 2016. In order to reach a 20% savings goal, Bristol's town buildings will need to reduce their site EUI to 44.9 kBtu per square foot.

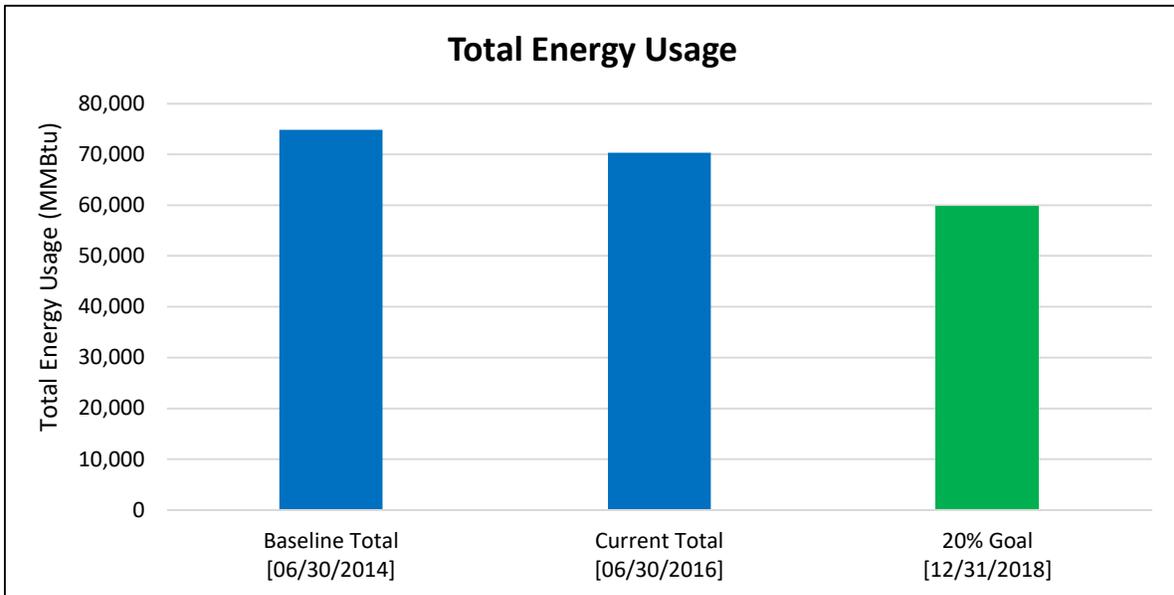


Figure 1

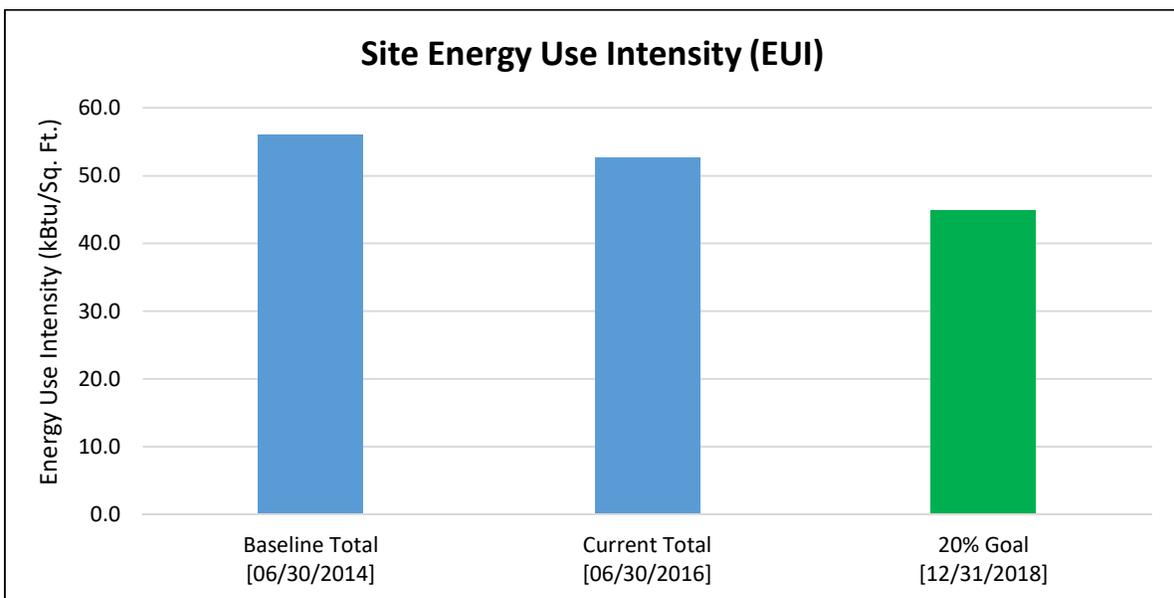


Figure 2

Among Bristol’s BOE properties, the largest energy users are Bristol Eastern High School (~20%), Bristol Central High School (17%), Northeast Middle School (~9%) and Stafford School (~7%). Together, these four schools represent half of the energy consumption among BOE buildings. Figures 3 and 4 show the percent of total portfolio energy used by each property in 2014 and 2016. In these figures, the top nine 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 2016.

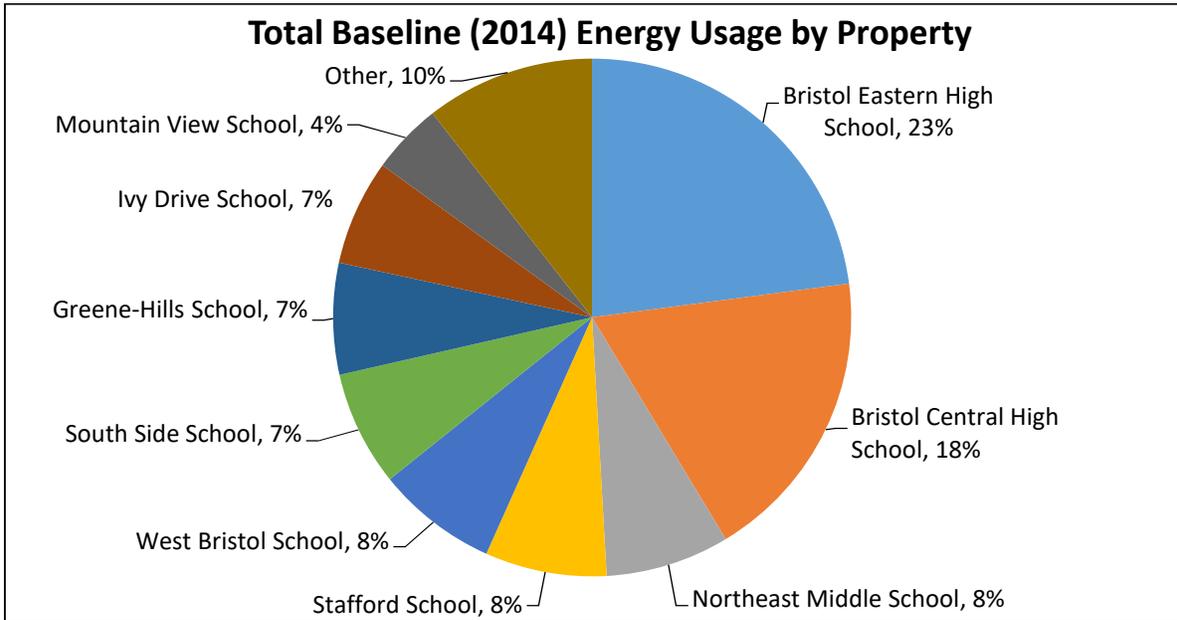


Figure 3

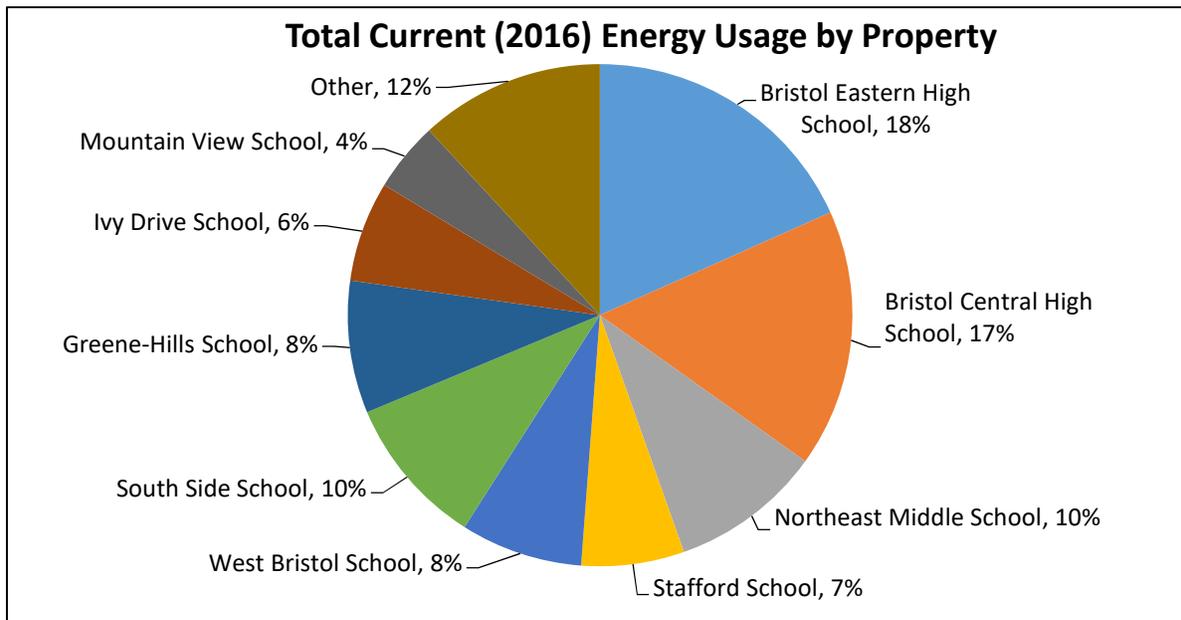


Figure 4

Most of the town buildings' energy use is heating energy from fuel oil #2 and natural gas. The proportion of fuel oil use decreased from baseline to current year, while natural gas and electricity use increased.

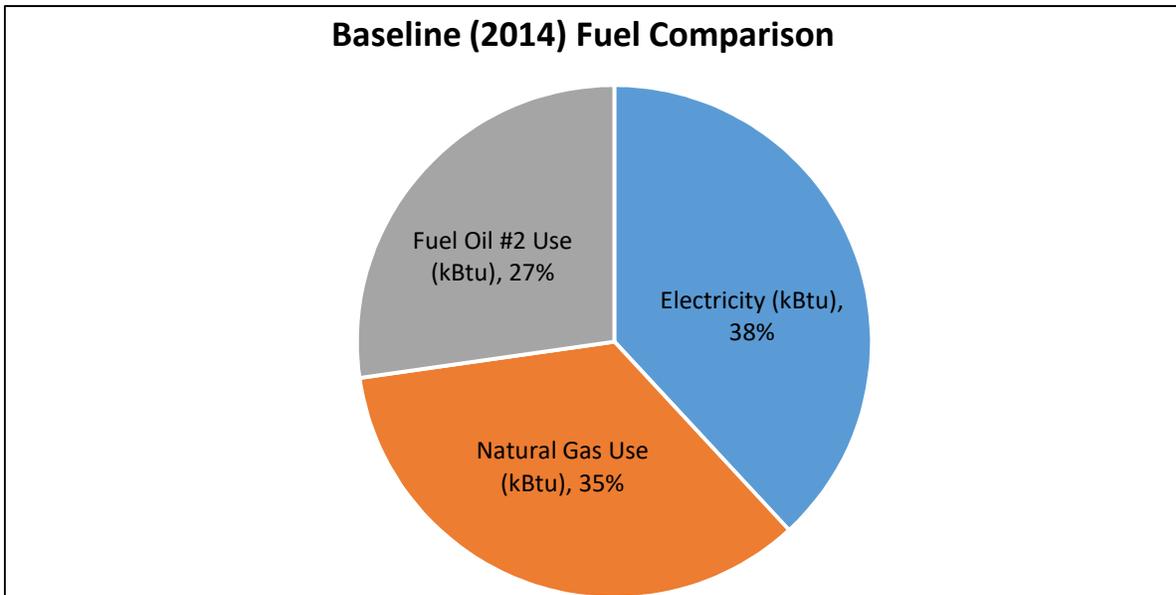


Figure 5

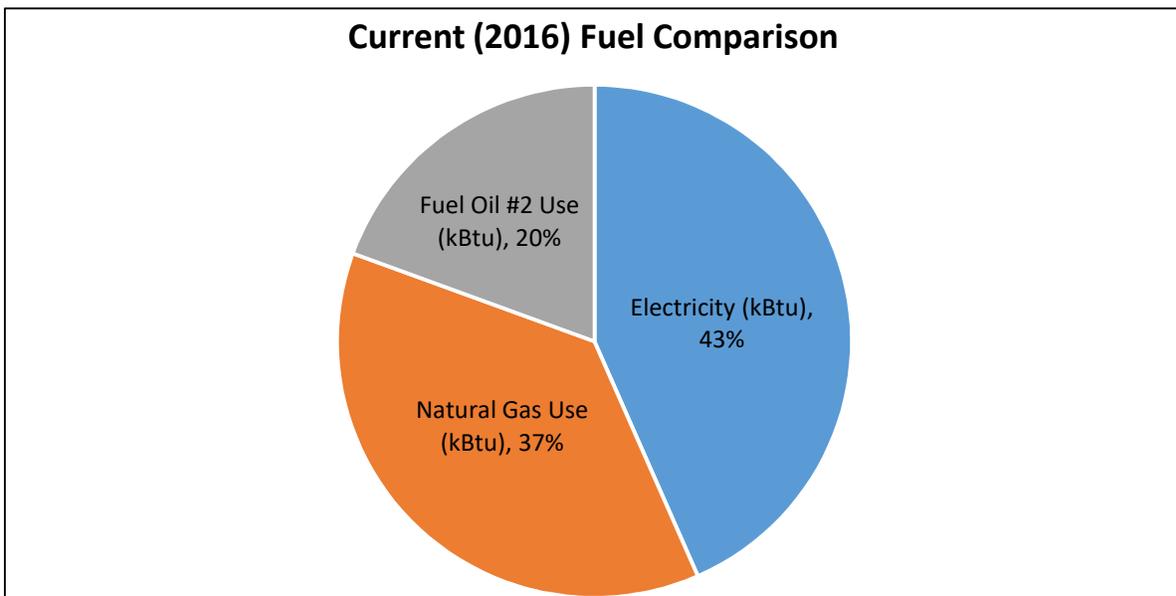


Figure 6

Figure 7 shows the baseline and current total energy usage for the top nine 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 nine energy users, South Side School (-50%), Northeast Middle School (-19%) and Greene-Hills School (-18%) had the greatest increases in site EUI, while Bristol Eastern High School (11%) and Stafford School (19%) had the largest energy improvements.

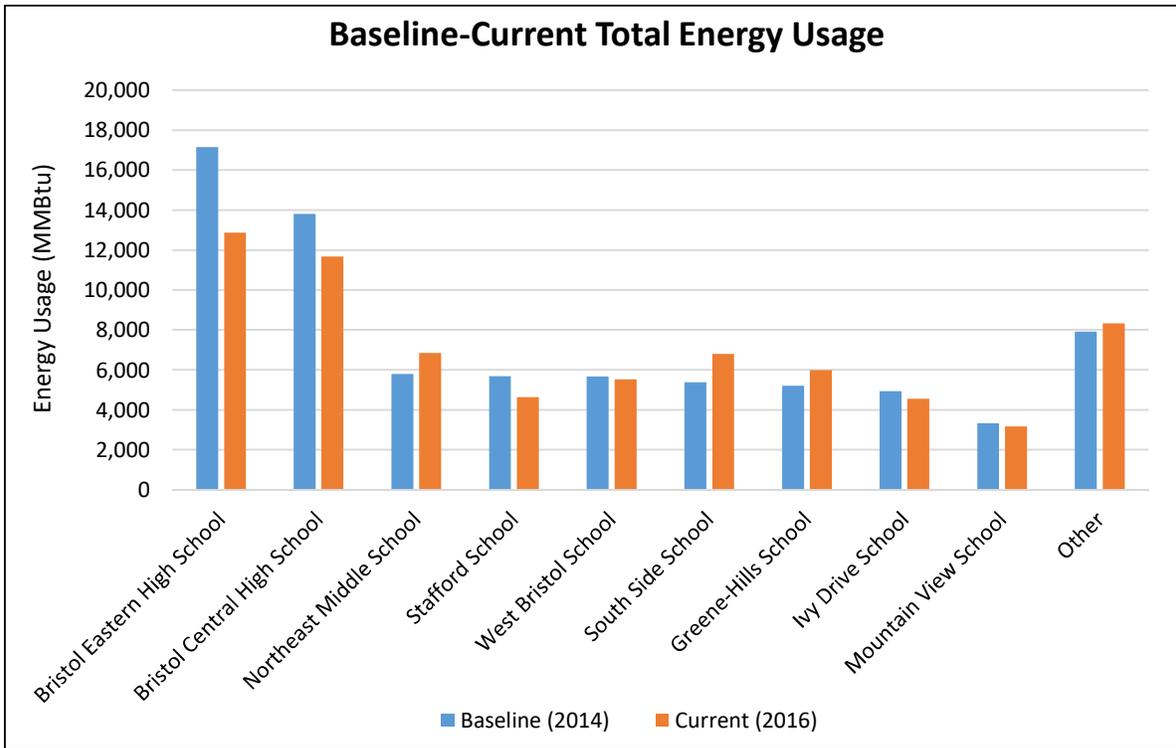


Figure 7

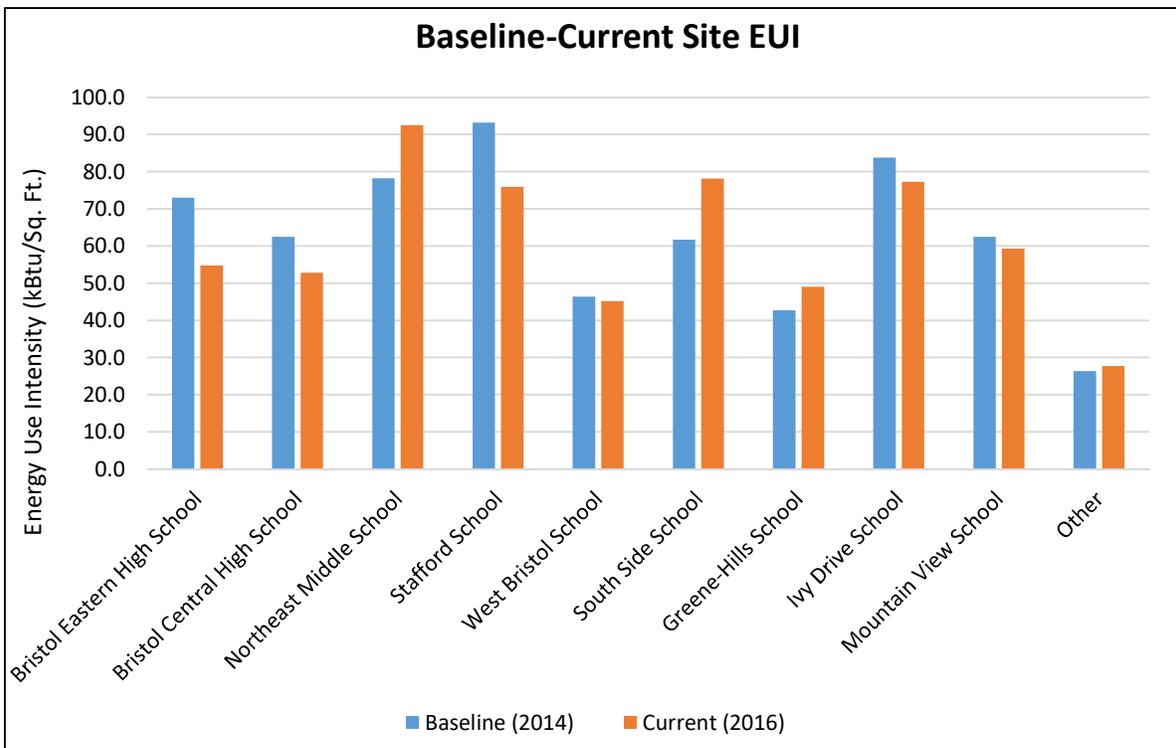


Figure 8

END OF PLAN