The Town of Stoughton Energy Reduction Plan

Prepared by the Metropolitan Area Planning Council with support from the Town of Stoughton & the Stoughton Energy and Sustainability Committee

In fulfillment of the
Massachusetts Green Communities Grant Program
Criterion 3

September 2015

I. Purpose and Acknowledgements

A. Letters from Both General Government and School District Verifying Adoption of the ERP

TOWN OF STOUGHTON
BOARD OF SELECTMEN

Stoughton Energy & Sustainability Committee

On this day, Tuesday, October 6, 2015 the Town of Stoughton Board of Selectmen unanimously voted to approve and support the

Town of Stoughton Energy Reduction Plan

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the Stoughton Energy and Sustainability Committee
In fulfillment of the
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Criterion 3

Joseph M. Mokrisky; Chairman

David J. Sousa; Vice Chair

Thomas J. Recupero

Robert J. O'Regan

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MARGUERITE C. RIZZI, Ed.D.
SUPERINTENDENT OF SCHOOLS

October 13, 2015

To Whom It May Concern:

Please be advised that the Stoughton Public School District approves adoption of the Town of Stoughton Energy Reduction Plan as part of Stoughton's Green Communities Application for Designation. The Stoughton School Committee voted to approve the plan at its regularly scheduled meeting on October 13, 2015, and the meeting minutes reflect this vote. As Superintendent of Schools, I affirm my approval of the plan as well.

Sincerely,

Marguerite C. Rizzi, Ed.D.
Superintendent of Schools

B. List of Contributors:

The collaborative efforts of the offices of Town Manager Michael Hartman and Director of Maintenance and Operations for the Stoughton School Department Joel Harding served to produce this plan.

This plan was produced primarily by the Metropolitan Area Planning Council (MAPC), with significant involvement and assistance from Stoughton municipal staff and the Stoughton Energy and Sustainability Committee.

Much of the information in this plan was derived from energy audits performed by Prism Energy, led by Paul Hurley. Preliminary discussions regarding audit feasibility and coordination were advised by National Grid representative Chuck Norden and Columbia Gas representative Ernie Robinson. A Streetlight LED Retrofit Proposal was developed by Speclines. Technical assistance was provided by the Metropolitan Area Planning Council (MAPC).

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II. Executive Summary

A. Narrative Summary of the Town

The Town of Stoughton is a Norfolk County community situated around 16 miles south of Boston and 35 miles from Cape Cod. Stoughton was first settled in 1713, and was officially incorporated in 1726. With an area of 16.3 square miles, Stoughton has a population of 26,962 according to the 2010 Census. Stoughton's historic core industry has been manufacturing, although recent years have seen an emerging cluster of regional retail with a substantial base of land for commercial and industrial purposes. The Town is governed by a Selectmen-Manager plan with a representative Town meeting.

B. Summary of Municipal Energy Uses

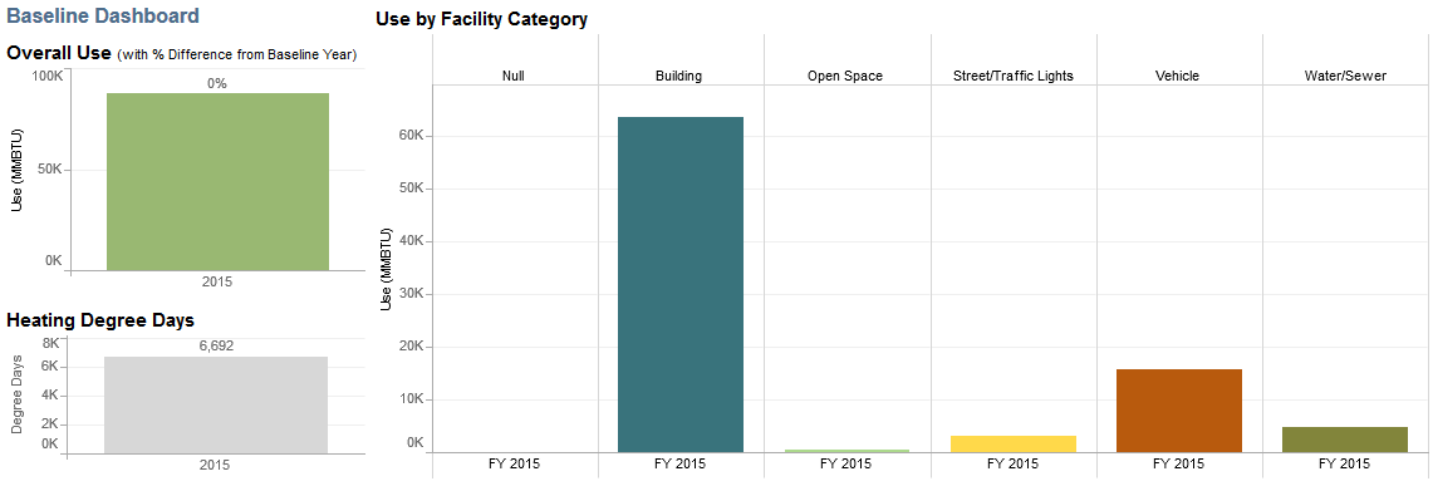
- Total Number of Municipal Buildings – The Town of Stoughton has 22 municipal buildings.
- Total Number of Municipal Vehicles: 186
- Total Number of Street Lights and Traffic Lights: 2,149
- Water and Sewer: The Massachusetts Water Resources Authority
- Pumping Stations: 8

Table 1: Municipal Energy Use Summary

	Number	Ownership
Buildings	22	
Oil Heat	0	
Natural Gas Heat	22	Municipality
Propane Heat	1	
Biomass Heat	0	
Other Heat Type	0	
Vehicles		
Non-Exempt	44	
Exempt	142	
Street Lights	2,123	Municipality
Traffic Lights	26	Municipality
Water and Sewer		
Drinking Water Treatment Plant	0	
Wastewater Treatment Plant	0	
Pumping Stations	8	

C. Summary of Energy Use Baseline and Plans for Reduction

Figure 1. Municipal Energy Use Baseline Dashboard from MEI (FY 2015).



Drill down by Department (showing Use (MMBTU))
Hover over Department, Complex, etc. and click the plus or minus signs to expand and collapse the table.

Department	FY 2015
Null	15,761
Council On Aging / Youth Co..	884
Fire	2,486
Library	1,335
Police	1,994
Public Works	10,789
Recreation	507
Schools	51,768
Town Hall	2,095

Table 2: Summary of Municipal Energy Use: Baseline Year FY 2015

Category	MMBTU Used in Baseline Year	% of Total MMBTU Baseline Energy Consumption	Projected Planned MMBTU Savings	Savings as % of Total MMBTU Baseline Energy Consumption
Buildings	63,522	72.5%	12,634.26	14.4%
Vehicles	15,761	18.0%	2,206.54	2.5%
Street/Traffic Lights	3,043	3.5%	1,902.95	2.2%
Water/Sewer/Pumping	4,829	5.5%	986.91	1.1%
Open Space	464	0.5%	-	0.0%
Total	**87,619**	**100%**	**17,731**	**20.2%**

III. Energy Use Baseline Inventory

A. Identification of the Inventory Tool Used – The Town of Stoughton used the Department of Energy Resources (DOER) MassEnergyInsight (MEI) web-based energy inventory and analysis tool.

B. Identification of the Baseline Year – Fiscal Year (FY) 2015 will serve as the baseline year. FY 2015 ran from July 1, 2014 to June 30, 2015. This will give the Town the maximum amount of time (FY 2016 – FY 2020) to reach its 20% energy reduction goal.

C. Municipal Energy Consumption for the Baseline Year (FY 2015) – During the FY 2015 baseline year, the municipality used 87,620 MMBTUs of energy. Table 3 presents energy use for each municipal facility in native units and MMBTUs.

In order to reach the Green Communities goal of reducing energy consumption by 20%, Stoughton will need to reduce its energy consumption by 17,525 MMBTU.

Buildings: Stoughton's 22 buildings use 63,522 MMBTUs, around 73% of Stoughton's total municipal energy use. The buildings with the largest energy use are the High School (16,144 MMBTU) and O'Donnell Middle School (11,577 MMBTU).

Street/Traffic Lights: There are 2,123 streetlights in Stoughton. These lights have been purchased back by the municipality from their utility provider, National Grid. Additionally, Stoughton has 26 traffic lights. Traffic and street lights consume 3,043 MMBTUs, 3.5% of the Town's energy use.

Vehicles: Stoughton's 186 municipal vehicles use 18% of the baseline total, or 15,761 MMBTUs.

Water/Sewer Facilities: The Town of Stoughton is serviced for Wastewater by the MWRA. The Town does not own or operate any Drinking Water treatment plants, but operates eight pump stations. The Town of Stoughton does not currently utilize energy obtained from renewable sources in municipal facilities.

Table 3.0: Municipal Energy Consumption for Baseline Year FY 2015 (MMBTU)

		2015					
		Diesel	Electric	Gas	Gasoline	Propane	Total
Null	Unknown Accounts		47				**47**
	Total		**47**				**47**
Building	South ES		539	3,281			**3,820**
	Joseph H Gibbons ES		751	4,251			**5,002**
	West ES		839				**839**
	Edwin A Jones ECC			4,234			**4,234**
	Joseph R Dawe Jr ES		840	5,005			**5,845**
	Stoughton HS		3,429	12,715			**16,144**
	O'Donnell MS		2,049	9,529			**11,577**
	Town Hall		689	882			**1,572**
	Helen Hansen ES		573	3,733			**4,306**
	Clapp Library / Historical Soci..		28	491			**519**
	Fire Station #1		359	1,232			**1,590**
	Council on Aging / Youth Com..		239	645			**884**
	Fire Station #2		392	496			**888**
	Police Station		814	1,087			**1,901**
	Stoughton Public Library		666	669			**1,335**
	Highway Barn		143				**143**
	Dog Pound		93				**93**
	Pleasant St Radio Bunker		8	0			**8**
	DPW Headquarters		392	2,238		145	**2,774**
	Total		**12,842**	**50,488**		**145**	**63,475**
Open Space	Faxon Veterans Memorial Park		4				**4**
	Club House		201	259			**460**
	Total		**205**	**259**			**464**
Street/Traffic Lights	Streetlights		2,938				**2,938**
	Signals		105				**105**
	Total		**3,043**				**3,043**
Vehicle	Vehicle Fuel	9,904			5,857		**15,761**
	Total	**9,904**			**5,857**		**15,761**
Water/Sewer	Lift Station, Lucas Drive		104	3			**107**
	Pump Station 1, Muddy Pond		29	271			**300**
	Pump Station 2, Harris		919				**919**
	Pump Station 3, Fennel		260				**260**
	Pump Station 4, McNamara		16				**16**
	Pump Station 5, Gurney		685				**685**
	Pump Station 6, Pratts Ct		415				**415**
	Pump Station 7, Goddard		295				**295**
	Lift Station, Daly Drive Extensi..		161				**161**
	Lift Station, York Street		336	8			**344**
	Lift Station, Hawes Way		125				**125**
	Lift Station, Royal Road		54	59			**113**

Table 3.1: Municipal Energy Consumption for Baseline Year FY 2015 (MMBTU)

		2015					
		Diesel	Electric	Gas	Gasoline	Propane	Total
Water/Sewer	Lift Station, Turnpike Street		186	111			**297**
	Lift Station, Queen Anne Way		91	71			**161**
	Lift Station, Beaver Brook		121				**121**
	Lift Station, West Street		0				**0**
	Lift Station, Morton Street			27			**27**
	Tanks and Other Water		105				**105**
	Pump Station 8, MWRA		375	0			**376**
	Total		**4,279**	**550**			**4,829**
Grand Total		**9,904**	**20,416**	**51,297**	**5,857**	**145**	**87,619**

Table 3.3: Municipal Energy Consumption for Baseline Year FY 2015 (Native Units)

		2015				
		Electric (kWh)	Gas (therms)	Gasoline (gallons)	Diesel (gallons)	Propane (gallons)
Null	Unknown Accounts	13,730				
	Total	**13,730**				
Building	South ES	157,921	32,813			
	Joseph H Gibbons ES	220,000	42,511			
	West ES	245,840				
	Edwin A Jones ECC		42,337			
	Joseph R Dawe Jr ES	246,240	50,052			
	Stoughton HS	1,005,127	127,148			
	O'Donnell MS	600,401	95,287			
	Town Hall	202,080	8,824			
	Helen Hansen ES	168,080	37,329			
	Clapp Library / Historical Soci..	8,259	4,908			
	Fire Station #1	105,190	12,315			
	Council on Aging / Youth Com..	69,987	6,451			
	Fire Station #2	114,800	4,962			
	Police Station	238,560	10,873			
	Stoughton Public Library	195,240	6,692			
	Highway Barn	41,920				
	Dog Pound	27,230				
	Pleasant St Radio Bunker	2,233	2			
	DPW Headquarters	114,801	22,379			1,589
	Total	**3,763,909**	**504,883**			**1,589**
Open Space	Faxon Veterans Memorial Park	1,065				
	Club House	58,945	2,591			
	Total	**60,010**	**2,591**			
Street/Traffic Lights	Streetlights	861,186				
	Signals	30,645				
	Total	**891,831**				
Vehicle	Vehicle Fuel			47,231	71,253	
	Total			**47,231**	**71,253**	
Water/Sewer	Lift Station, Lucas Drive	30,600	26			
	Pump Station 1, Muddy Pond	8,400	2,710			
	Pump Station 2, Harris	269,436				
	Pump Station 3, Fennel	76,160				
	Pump Station 4, McNamara	4,782				
	Pump Station 5, Gurney	200,820				
	Pump Station 6, Pratts Ct	121,760				
	Pump Station 7, Goddard	86,428				
	Lift Station, Daly Drive Extensi..	47,320				
	Lift Station, York Street	98,453	81			
	Lift Station, Hawes Way	36,645				
	Lift Station, Royal Road	15,815	588			

Table 3.4: Municipal Energy Consumption for Baseline Year FY 2015 (Native Units)

		2015				
		Electric (kWh)	Gas (therms)	Gasoline (gallons)	Diesel (gallons)	Propane (gallons)
Water/Sewer	Lift Station, Turnpike Street	54,600	1,108			
	Lift Station, Queen Anne Way	26,575	707			
	Lift Station, Beaver Brook	35,571				
	Lift Station, West Street	0				
	Lift Station, Morton Street		274			
	Tanks and Other Water	30,820				
	Pump Station 8, MWRA	110,034	4			
	Total	**1,254,219**	**5,498**			
Grand Total		**5,983,699**	**512,972**	**47,231**	**71,253**	**1,589**

IV. Energy Reduction Plan

A. Narrative Summary

1. Overview of Goals for Years 1-3:

- Retrofit all interior and exterior lighting with consistent, energy efficient fixtures and bulbs in facilities identified through the lighting audits.
- Install lighting controls across all municipal buildings to prevent unnecessary energy use.
- Retrofit all streetlights with LED technology.
- Install programmable thermostats and boiler controllers at the Cedar Hill Golf Course, Clapp Library, DPW Truck Maintenance Garage, DPW Office and Storage Garage, Fire Stations #1 & #2, Pratts Court Water Treatment Plant, Joseph R. Dawe Elementary School, and South Elementary School facilities.
- Install low-flow sink aerators at the Cedar Hill Golf Course, Fire Station #2, and the Police Station.
- Install or expand existing Energy Management Systems (EMS) for Robert O'Donnell Middle School, Gibbons Elementary School, Joseph R. Dawe Elementary School, West Elementary School, Helen H. Hanson Elementary School, South Elementary School, and E.A. Jones Elementary School buildings.
- Add centralized cooling using 3 heat pumps at Fire Station #1.
- Replace boiler burner control at Helen H. Hanson Elementary School, E.A. Jones Elementary School, and High School buildings.
- Conduct weatherization upgrades to facility shell, doors, and windows at the Main Library and Robert O'Donnell Middle School.
- Implement PLC controls upgrade at Pratts Court Water Treatment Plant and at Pump Station #3.
- Replace ten (10) split systems on the roof (total of 29 tons) with two 20 ton RTUs to boost the cooling capacity and improve efficiency at the Police Station.

- Replace steam traps at West Elementary School, E.A. Jones Elementary School, and High School buildings.
- Install new hot water heater (DHW) to replace hot water tank at Robert O'Donnell Middle School.
- Adopt a city-wide "No Idling" policy for all municipal vehicles.
- Incorporate a switch to 100% synthetic oil for all municipal vehicles' oil replacement.
- Closely monitor vehicle tire air pressure to maintain vehicle fuel efficiency.

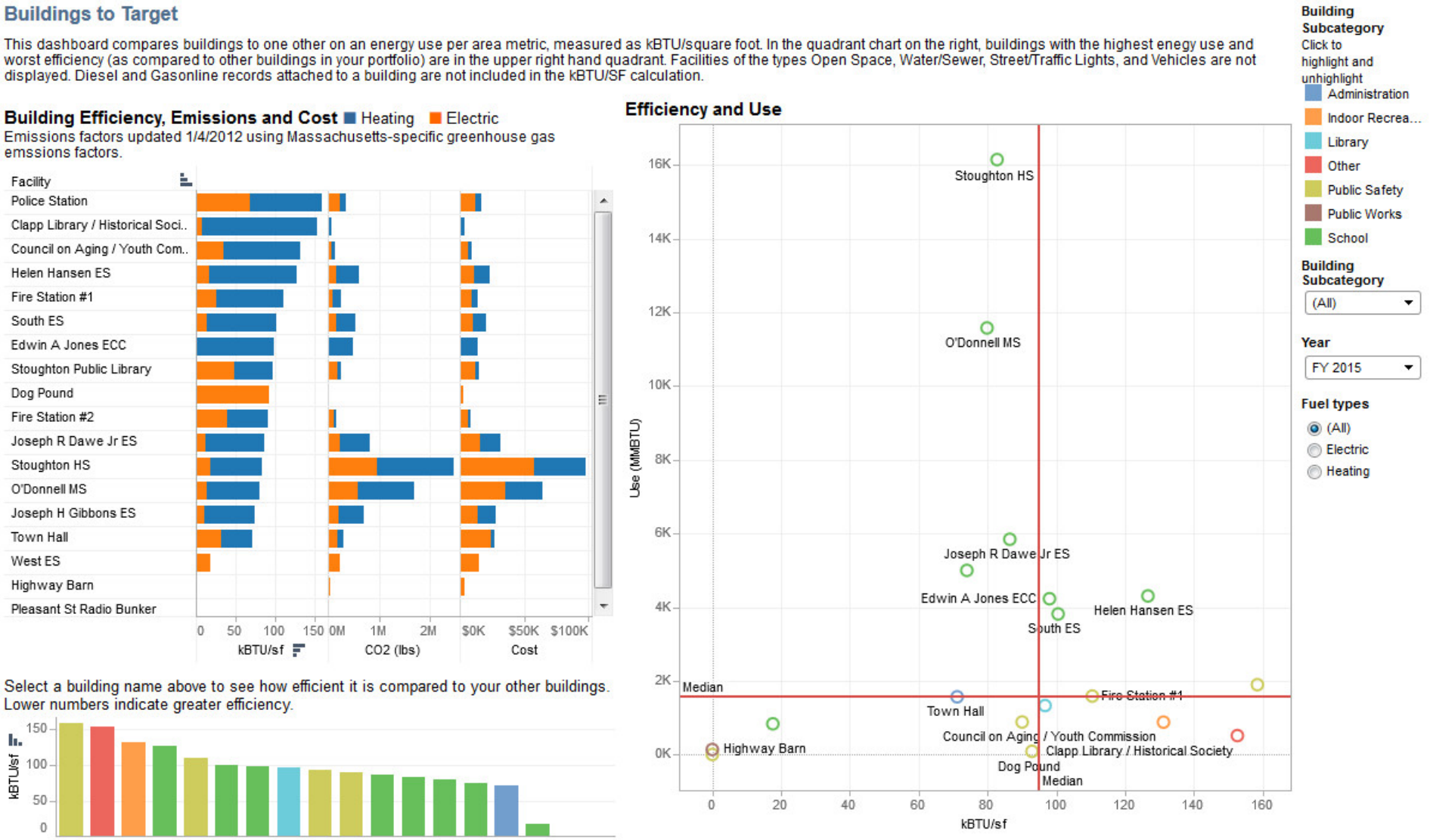
2. Overview of Goal for Years 4-5:

- Install demand control ventilation at Cedar Hill Golf Course, Police Station, Robert O'Donnell Middle School, Gibbons Elementary School, Helen H. Hanson Elementary School, and High School buildings.
- Make twenty-six (26) Variable Frequency Drive (VFD) upgrades to pump motors, water pumps, fan motors and air-handling units at the Cedar Hill Golf Course, Main Library, Pratts Court Water Treatment Plant, Robert O'Donnell Middle School, Gibbons Elementary School, West Elementary School, Helen H. Hanson Elementary School, South Elementary School, High School, and various pump stations.
- Install kitchen hood controls at Cedar Hill Golf Course, Robert O'Donnell Middle School, West Elementary School, and High School buildings.
- Replace electric stoves with natural gas stoves at Joseph R. Dawe Elementary School.
- Add centralized cooling using 3 heat pumps at Fire Station #1.
- Replace boiler with 600 MBH (Thousand BTUs per hour) high efficiency condensing boiler at the Clapp Library.
- Replace chilled compressor with high efficiency compressors at the Main Library.

3. Energy Efficiency Identification Measures:

- Utilize MEI's "Buildings to Target" tool to identify underperforming and/or wasteful buildings (see Fig. 2).

Figure 2. MEI's 'Buildings to Target' dashboard offers the Town insight into which facilities are the worst offenders in terms of energy consumption and emissions.



B. Path to 20% Energy Use Reduction by the end of Fiscal Year 2020

1. Program Management Plan for Implementation, Monitoring, and Oversight

   The Town Manager's office, in collaboration with the School Department, will be responsible both for oversight of the Energy Reduction Plan and for implementation of energy conservation measures within the Town. Stoughton's Town Planner will be responsible for the annual reporting requirements to maintain designation and eligibility for annual competitive grant funding.

2. Summary of Energy Audit(s) or Other Sources for Projected Energy Savings

   The attached spreadsheets detail interventions that reduce overall energy consumption by 15.5% over the next five years as identified by Prism Energy through a preliminary energy audit assessment and walkthrough. A streetlight analysis and LED retrofit proposal, performed by Speclines, predicts that the Town can reduce its streetlight electricity consumption by 1,930 MMBTUs. This will bring the baseline energy consumption down by a further 2.2%. Implementing the strategy outlined below will enable Stoughton to reach the remaining 2.3% reduction. The full Energy Audit is included in Appendix A. The full Streetlight Audit is included in Appendix B.

   Strategy: Fleet Management

   As municipalities across the commonwealth track their energy use, government officials have been surprised to learn what a large part of total energy consumption goes towards fueling municipal vehicles; municipal fleets often account for over one third of the city or town's total energy consumption. This information points to vehicles as important targets in the reduction of energy consumption and greenhouse gas emissions. Stoughton's municipal vehicles account for 18% of the Town's energy consumption. Early projections indicate that Stoughton can see energy savings beginning at 2.5% of total municipal consumption by adopting the fleet management strategies below.[1]

[1] The data presented in this table is informed by energy reductions in Green Communities: Framingham, Northfield, Westford and Gill as well as the government "Fuel Economy" website.

Municipal Fleet Energy Reduction Strategy	Details	Estimated Reduction in Consumption (% of Vehicle Consumption)
Closely monitor tire air pressure. When ready for replacement, choose fuel efficient tires.	Maintaining appropriate air pressure in vehicle tires can decrease that vehicles fuel consumption by as much as 4%.[2]	2% – 4%
Use 100% synthetic oil in all vehicles.	The use of 100% synthetic oils reduces fuel consumption, the number of annual oil change and labor costs.[3]	2%
Institute a city-wide "no idling policy" for municipal vehicles.	Idling vehicles contribute significantly to air pollution and waste fuel, increasing fleet management costs. Municipalities across the commonwealth and the nation have seen significant cost and greenhouse gas emission reductions since implementing Town-wide "no idling" policies for municipal vehicles.[4]	10%
Total Reduction in Vehicle Energy Consumption (%)	**(Based on Predicted Fuel Consumption)**	**14% – 16%**

Most municipalities find that the fuel used to power municipal vehicles can constitute between 20% and 40% of their overall energy consumption; therefore, increasing the efficiency of municipal vehicles can result in substantial cost and energy savings. The Town of Stoughton already uses FuelMaster to manage and monitor fuel usage for its municipal fleet. FuelMaster is a fuel economizer and pollution reduction device which utilizes magnetic hydrodynamic technology to improve the combustion of hydrocarbon fuels.[5] Additional elements to add to such a vehicle program may include: a preventative maintenance schedule that tracks use, repairs and preventative maintenance and the close monitoring of tire air pressure.

[2] http://www.fueleconomy.gov/feg/pdfs/OwnerRelatedFuelEconomyImprovements.pdf
[3] http://www.fueleconomy.gov/feg/pdfs/OwnerRelatedFuelEconomyImprovements.pdf
[4] http://aceee.org/sector/local-policy/case-studies/minneapolis-anti-idling-vehicle-ordin
[5] http://fuelmaster.com/How_It_Works.htm

The use of 100% synthetic oil can reduce fuel consumption up to 2% according to national studies[6]. Synthetic oil also reduces the number of oil changes needed each year, leading to a corresponding reduction in associated oil expense and labor. Synthetic oil is safe to use as a substitute to conventional petroleum-based oils and does not result in ill-effects to engines including older engines. A no-idle policy for municipal vehicles has been enacted in several Green Communities, and in municipalities across the nation, and has led to significant reductions in both pollution and unnecessary fuel consumption.

3. Energy Conservation Measures

Table 4 lists recommended energy conservation measures. References for each measure is included in the table and these references are included as appendices to the Energy Reduction Plan. Projected annual MMBTU savings for each category (buildings, vehicles, street and traffic lights, water and sewer, and open space) are subtotaled to arrive at a municipal grand total.

[6] http://www.fueleconomy.gov/feg/pdfs/OwnerRelatedFuelEconomyImprovements.pdf

Table 4.0: Energy Conservation Measures for Stoughton Municipal Energy Use

Measure		Status	Energy Data					Financial Data						Reference	
Category/Building	Energy Conservation Measure	Status (Completed with month/year or Planned Quarter/year)	Projected Annual Energy Savings					Projected Annual Cost Savings ($)	Estimated Total Project Cost ($)	Green Communities Grant* ($)	Estimated Utility Incentives ($)	Estimated Cost After Utility Incentives ($)	Estimated Payback After Incentives (years)	Funding Source	Source for Energy Savings
			Electricity Savings (kWh)	Natural Gas Savings (Therms)	Gasoline Savings (gallons)	Diesel Savings (Gallons)	Propane Savings (Gallons)								
Cedar Hill Golf Course	Lighting	Proposed FY 2016 - 2018	3,985					**$655**	**$6,740**		$1,920	**$4,820**	**7.4**		Prism Energy Services (Appendix A)
Cedar Hill Golf Course	Programmable Thermostat - Men's Bathroom	Proposed FY 2016 - 2018	1,995					**$328**	**$1,200**		$499	**$701**	**2.1**		Prism Energy Services (Appendix A)
Cedar Hill Golf Course	Low-Flow Sink Aerators	Proposed FY 2016 - 2018		83				**$91**	**$700**		$83	**$617**	**6.8**		Prism Energy Services (Appendix A)
Cedar Hill Golf Course	Kitchen Hood Control	Proposed FY 2019 - 2020	3,219	1,641				**$2,334**	**$32,000**		$2,446	**$29,554**	**12.7**		Prism Energy Services (Appendix A)
Cedar Hill Golf Course	Demand Control Ventilation	Proposed FY 2019 - 2020	1,515	420				**$711**	**$7,800**		$799	**$7,001**	**9.8**		Prism Energy Services (Appendix A)
Cedar Hill Golf Course	VFD on RTU	Proposed FY 2019 - 2020	5,366					**$882**	**$11,000**		$1,342	**$9,659**	**10.9**		Prism Energy Services (Appendix A)
Council On Aging/Senior Center	Lighting	Proposed FY 2016 - 2018	12,825					**$2,108**	**$27,591**		$4,165	**$23,426**	**11.1**		Prism Energy Services (Appendix A)
Clapp Library/Historical Society	Boiler Replacement	Proposed FY 2019 - 2020		848				**$933**	**$48,000**		$4,000	**$44,000**	**47.2**		Prism Energy Services (Appendix A)
Clapp Library/Historical Society	Programmable Thermostats	Proposed FY 2016 - 2018		680				**$748**	**$3,300**		$680	**$2,620**	**3.5**		Prism Energy Services (Appendix A)
Dpw Truck Maint. Garage	Lighting	Proposed FY 2016 - 2018	42,256					**$6,947**	**$68,840**		$12,765	**$56,075**	**8.1**		Prism Energy Services (Appendix A)
Dpw Truck Maint. Garage	Maintenance Garage& Mechanical Bay Programmable Thermostats	Proposed FY 2016 - 2018	10,660	4,199				**$6,371**	**$19,700**		$6,864	**$12,836**	**2.0**		Prism Energy Services (Appendix A)
Dpw Office And Storage Garages	Lighting	Proposed FY 2016 - 2018	19,221					**$3,160**	**$41,510**		$10,600	**$30,910**	**9.8**		Prism Energy Services (Appendix A)
Dpw Office And Storage Garages	Main Entrance FCU Programmable Thermostat	Proposed FY 2016 - 2018		98				**$108**	**$700**		$98	**$602**	**5.6**		Prism Energy Services (Appendix A)
Fire Station 2	Lighting	Proposed FY 2016 - 2018	22,402					**$3,683**	**$44,063**		$4,200	**$39,863**	**10.8**		Prism Energy Services (Appendix A)
Fire Station 2	Low-Flow Sink Aerators	Proposed FY 2016 - 2018		178				**$196**	$800		$178	**$622**	**3.2**		Prism Energy Services (Appendix A)
Fire Station 2	Dorm Programmable Thermostats - Heating	Proposed FY 2016 - 2018		141				**$155**	**$1,200**		$141	**$1,059**	**6.8**		Prism Energy Services (Appendix A)
Fire Station 2	Dorm Programmable Thermostats - Cooling	Proposed FY 2016 - 2018	2,236					**$368**	**$3,100**		$559	**$2,541**	**6.9**		Prism Energy Services (Appendix A)
Fire Station 2	Garage Bay - Programmable Thermostats	Proposed FY 2016 - 2018		2,122				**$2,334**	**$5,400**		$2,122	**$3,278**	**1.4**		Prism Energy Services (Appendix A)
Fire Station 1	Lighting	Proposed FY 2016 - 2018	14,356					**$2,360**	**$18,668**		$840	**$17,828**	**7.6**		Prism Energy Services (Appendix A)
Fire Station 1	Replace Boiler	Proposed FY 2019 - 2020		1,826				**$2,009**	**$97,500**		$8,000	**$89,500**	**44.6**		Prism Energy Services (Appendix A)
Fire Station 1	Add Centralized Cooling	Proposed FY 2019 - 2020	9,274					**$1,525**	**$45,000**		$2,319	**$42,682**	**28.0**		Prism Energy Services (Appendix A)
Fire Station 1	Main Common Area Programmable Thermostats	Proposed FY 2016 - 2018		354				**$389**	**$2,100**		$354	**$1,746**	**4.5**		Prism Energy Services (Appendix A)
Fire Station 1	Garage Bay - Programmable Thermostats	Proposed FY 2016 - 2018		5,658				**$6,224**	**$14,700**		$5,658	**$9,042**	**1.5**		Prism Energy Services (Appendix A)
Library	Lighting	Proposed FY 2016 - 2018	46,175					**$7,591**	**$98,629**		$12,205	**$86,424**	**11.4**		Prism Energy Services (Appendix A)
Library	Boiler Replacement	Proposed FY 2016 - 2018		1,118				**$1,230**	**$92,000**		$1,118	**$90,882**	**73.9**		Prism Energy Services (Appendix A)
Library	Weatherization	Proposed FY 2016 - 2018	220	189				**$244**	**$1,200**		$244	**$956**	**3.9**		Prism Energy Services (Appendix A)
Library	DCV	Proposed FY 2016 - 2018	3,349	383				**$972**	**$11,000**		$1,220	**$9,780**	**10.1**		Prism Energy Services (Appendix A)
Library	VFDs on Chilled Water Pumps	Proposed FY 2019 - 2020	5,981					**$983**	**$12,000**		$1,495	**$10,505**	**10.7**		Prism Energy Services (Appendix A)
Library	VFDs on Hot Water Pumps	Proposed FY 2019 - 2020	3,198					**$526**	**$12,000**		$800	**$11,201**	**21.3**		Prism Energy Services (Appendix A)
Library	Chiller Compressors Replacement	Proposed FY 2019 - 2020	12,000					**$1,973**	**$63,000**		$3,000	**$60,000**	**30.4**		Prism Energy Services (Appendix A)
Library	VFDs on AHUs	Proposed FY 2019 - 2020	16,678					**$2,742**	**$27,000**		$4,170	**$22,831**	**8.3**		Prism Energy Services (Appendix A)
Pratts Court Water Treatment	Lighting	Proposed FY 2016 - 2018	12,597					**$2,071**	**$23,209**		$1,640	**$21,569**	**10.4**		Prism Energy Services (Appendix A)
Pratts Court Water Treatment	Programmable Thermostats	Proposed FY 2016 - 2018		328			40	**$453**	**$4,900**		$328	**$4,572**	**10.1**		Prism Energy Services (Appendix A)
Pratts Court Water Treatment	VFDs on 60 HP and 15 HP Pump Motor	Proposed FY 2019 - 2020	47,772					**$7,854**	**$48,000**		$11,700	**$36,300**	**4.6**		Prism Energy Services (Appendix A)
Pratts Court Water Treatment	PLC Controls Upgrade	Proposed FY 2016 - 2018	7,000					**$1,151**	**$11,000**		$1,750	**$9,250**	**8.0**		Prism Energy Services (Appendix A)
Pump Station #1	VFD on 100 HP Pump Motor	Proposed FY 2019 - 2020	68,838					**$11,317**	**$55,000**		$12,500	**$42,500**	**3.8**		Prism Energy Services (Appendix A)
Pump Station #3	PLC Controls on three 40 HP VFDs	Proposed FY 2019 - 2020	18,895					**$3,106**	**$13,000**		$4,724	**$8,276**	**2.7**		Prism Energy Services (Appendix A)
Pump Station #5	VFD on 60 HP Pump Motor	Proposed FY 2019 - 2020	67,831					**$11,151**	**$45,300**		$8,250	**$37,050**	**3.3**		Prism Energy Services (Appendix A)
Goddard Well	VFD on 20 HP Pump Motor	Proposed FY 2019 - 2020	20,871					**$3,431**	**$19,000**		$3,900	**$15,100**	**4.4**		Prism Energy Services (Appendix A)
Three Sewer Pumps	VFD on three 25 HP pump motors	Proposed FY 2019 - 2020	34,959					**$5,747**	**$37,500**		$13,950	**$23,550**	**4.1**		Prism Energy Services (Appendix A)
Police Station	Low-Flow Sink Aerators	Proposed FY 2016 - 2018		208				**$229**	**$600**		$208	**$392**	**1.7**		Prism Energy Services (Appendix A)
Police Station	Cooling System Upgrade	Proposed FY 2016 - 2018	26,000					**$4,274**	**$72,000**			**$72,000**	**16.8**		Prism Energy Services (Appendix A)
Police Station	Demand Control Ventilation	Proposed FY 2019 - 2020	6,612	1,259				**$2,472**	**$18,000**		$2,912	**$15,088**	**6.1**		Prism Energy Services (Appendix A)
Robert O'Donnell Middle School	Weatherization	Proposed FY 2016 - 2018	401	453				**$564**	**$3,800**		$553	**$3,247**	**5.8**		Prism Energy Services (Appendix A)
Robert O'Donnell Middle School	New Hot Water Heater (DHW)	Proposed FY 2016 - 2018		1,995				**$2,195**	**$37,000**		$1,995	**$35,005**	**16.0**		Prism Energy Services (Appendix A)
Robert O'Donnell Middle School	Kitchen Hood Controls	Proposed FY 2019 - 2020	4,507	1,597				**$2,498**	**$35,000**		$2,724	**$32,276**	**12.9**		Prism Energy Services (Appendix A)
Robert O'Donnell Middle School	VFDs on HW Pumps	Proposed FY 2019 - 2020	7,987					**$1,313**	**$18,000**		$2,000	**$16,000**	**12.2**		Prism Energy Services (Appendix A)
Robert O'Donnell Middle School	EMS	Proposed FY 2016 - 2018	3,491	787				**$1,440**	**$27,000**		$1,660	**$25,340**	**17.6**		Prism Energy Services (Appendix A)
Robert O'Donnell Middle School	Demand Control Ventilation	Proposed FY 2019 - 2020		2,520				**$2,772**	**$52,000**		$2,520	**$49,480**	**17.8**		Prism Energy Services (Appendix A)
Gibbons Elementary	Burner Electronic Control	Proposed FY 2016 - 2018		1,140				**$1,254**	**$16,000**		$1,140	**$14,860**	**11.9**		Prism Energy Services (Appendix A)
Gibbons Elementary	VFD on gym AHUs and Mech Room	Proposed FY 2019 - 2020	10,569					**$1,738**	**$27,000**		$3,000	**$24,000**	**13.8**		Prism Energy Services (Appendix A)
Gibbons Elementary	EMS	Proposed FY 2016 - 2018	5,479	5,616				**$7,078**	**$69,000**		$6,986	**$62,014**	**8.8**		Prism Energy Services (Appendix A)
Gibbons Elementary	Demand Control Ventilation	Proposed FY 2019 - 2020		1,057				**$1,163**	**$28,000**		$1,057	**$26,943**	**23.2**		Prism Energy Services (Appendix A)
Joseph R. Dawe Elementary	EMS	Proposed FY 2016 - 2018		1,064				**$1,801**	**$22,500**		$1,064	**$21,436**	**11.9**		Prism Energy Services (Appendix A)
Joseph R. Dawe Elementary	Burners Automatic Control	Proposed FY 2016 - 2018		655				**$721**	**$9,800**		$655	**$9,145**	**12.7**		Prism Energy Services (Appendix A)
Joseph R. Dawe Elementary	Programmable Thermostats	Proposed FY 2016 - 2018	16,885					**$2,776**	**$7,200**		$4,221	**$2,979**	**1.1**		Prism Energy Services (Appendix A)
Joseph R. Dawe Elementary	Kitchen Equipment Conversion	Proposed FY 2019 - 2020	14,400	-517				**$1,799**	**$28,000**		$3,600	**$24,400**	**13.6**		Prism Energy Services (Appendix A)
West Elementary	Kitchen Hood Control	Proposed FY 2019 - 2020	7,404	798				**$2,095**	**$35,000**		$2,649	**$32,351**	**15.4**		Prism Energy Services (Appendix A)
West Elementary	EMS	Proposed FY 2016 - 2018	3,162	9,809				**$11,310**	**$97,000**		$10,599	**$86,401**	**7.6**		Prism Energy Services (Appendix A)
West Elementary	Add VFD on the Gym AHU (2 -3 hp VFDs)	Proposed FY 2019 - 2020	10,285					**$1,691**	**$20,000**		$2,000	**$18,000**	**10.6**		Prism Energy Services (Appendix A)
West Elementary	Steam Traps Replacement	Proposed FY 2016 - 2018		1,880				**$2,068**	**$26,000**		$1,880	**$24,120**	**11.7**		Prism Energy Services (Appendix A)
Helen H. Hanson Elementary	EMS	Proposed FY 2016 - 2018	7,889	6,619				**$8,578**	**$87,000**		$8,591	**$78,409**	**9.1**		Prism Energy Services (Appendix A)
Helen H. Hanson Elementary	Burner Electronic Control	Proposed FY 2016 - 2018		1,700				**$1,870**	**$20,000**		$1,700	**$18,300**	**9.8**		Prism Energy Services (Appendix A)
Helen H. Hanson Elementary	VFDs on HW Pumps	Proposed FY 2019 - 2020	7,987					**$1,313**	**$18,000**		$2,000	**$16,000**	**12.2**		Prism Energy Services (Appendix A)
Helen H. Hanson Elementary	Demand Control Ventilation	Proposed FY 2019 - 2020		861				**$947**	**$22,000**		$861	**$21,139**	**22.3**		Prism Energy Services (Appendix A)
South Elementary School	Burner Electronic Control	Proposed FY 2016 - 2018		1,100				**$1,210**	**$20,000**		$1,100	**$18,900**	**15.6**		Prism Energy Services (Appendix A)
South Elementary School	VFDs on two Hot Water Pumps	Proposed FY 2019 - 2020	12,138					**$1,995**	**$18,000**		$2,000	**$16,000**	**8.0**		Prism Energy Services (Appendix A)
South Elementary School	EMS	Proposed FY 2016 - 2018	10,744	5,994				**$8,360**	**$97,000**		$8,680	**$88,320**	**10.6**		Prism Energy Services (Appendix A)

Table 4.0: Energy Conservation Measures for Stoughton Municipal Energy Use

Measure		Status	Energy Data					Financial Data						Reference	
			Projected Annual Energy Savings												
Category/Building	Energy Conservation Measure	Status (Completed with month/year or Planned Quarter/year)	Electricity Savings (kWh)	Natural Gas Savings (Therms)	Gasoline Savings (gallons)	Diesel Savings (Gallons)	Propane Savings (Gallons)	Projected Annual Cost Savings ($)	Estimated Total Project Cost ($)	Green Communities Grant* ($)	Estimated Utility Incentives ($)	Estimated Cost After Utility Incentives ($)	Estimated Payback After Incentives (years)	Funding Source	Source for Energy Savings
South Elementary School	Programmable Thermostats	Proposed FY 2016 - 2018	433	292				**$392**	**$3,600**		$400	**$3,200**	**8.2**		Prism Energy Services (Appendix A)
E.A. Jones Elementary	Boiler 2 Pipe Insulation	Proposed FY 2016 - 2018		293				**$322**	**$2,600**		$293	**$2,308**	**7.2**		Prism Energy Services (Appendix A)
E.A. Jones Elementary	EMS	Proposed FY 2016 - 2018	2,161	6,596				**$7,611**	**$83,000**		$7,136	**$75,864**	**10.0**		Prism Energy Services (Appendix A)
E.A. Jones Elementary	Burner Electronic Control	Proposed FY 2016 - 2018		585				**$644**	**$20,000**		$585	**$19,415**	**30.2**		Prism Energy Services (Appendix A)
E.A. Jones Elementary	Steam Traps Replacement	Proposed FY 2016 - 2018		1,170				**$1,287**	**$22,000**		$1,170	**$20,830**	**16.2**		Prism Energy Services (Appendix A)
High School	VFDs on Fan Motors	Proposed FY 2019 - 2020	14,700					**$2,417**	**$24,000**		$3,675	**$20,325**	**8.4**		Prism Energy Services (Appendix A)
High School	DDC Overlay on Pneumatic Controls	Proposed FY 2016 - 2018	36,000	2,000				**$8,118**	**$98,000**		$11,000	**$87,000**	**10.7**		Prism Energy Services (Appendix A)
High School	Demand Control Ventilation	Proposed FY 2019 - 2020		4,600				**$5,060**	**$78,000**		$4,600	**$73,400**	**14.5**		Prism Energy Services (Appendix A)
High School	HVAC Start/Stop Scheduling	Proposed FY 2016 - 2018	165,000	4,200				**$31,746**	**$99,000**		$45,450	**$53,550**	**1.7**		Prism Energy Services (Appendix A)
High School	Heating HW temperature Reset	Proposed FY 2016 - 2018		2,000				**$2,200**	**$34,000**		$2,000	**$32,000**	**14.5**		Prism Energy Services (Appendix A)
High School	Steam Main Valve Control	Proposed FY 2016 - 2018		6,100				**$6,710**	**$74,000**		$6,100	**$67,900**	**10.1**		Prism Energy Services (Appendix A)
High School	Pipes Insulation	Proposed FY 2016 - 2018		1,700				**$1,870**	**$7,300**		$1,700	**$5,600**	**3.0**		Prism Energy Services (Appendix A)
High School	Kitchen Hood Control	Proposed FY 2019 - 2020	9,000	1,150				**$2,745**	**$29,000**		$3,400	**$25,600**	**9.3**		Prism Energy Services (Appendix A)
High School	Boiler Burners Controls	Proposed FY 2016 - 2018	8,200	5,600				**$7,508**	**$87,000**		$7,650	**$79,350**	**10.6**		Prism Energy Services (Appendix A)
High School	Steam Traps Replacement	Proposed FY 2016 - 2018		2,100				**$2,310**	**$23,000**		$2,100	**$20,900**	**9.0**		Prism Energy Services (Appendix A)
Buildings Subtotal	**MMBTU Saved:**	**13,621.16**	**907,108**	**105,247**	**-**	**-**	**40**	**$ 265,622**	**$ 2,690,751**	**$ -**	**$ 329,239**	**$ 2,361,512**	**8.89**		
Street Lights	LED Retrofit	Planned FY 2016- 2017	558,131					**$78,138**	**$362,511**		$141,545	**$220,966**	**2.8**	Town; EMS contract through procurement	Source: Speclines Town of Stoughton LED Retrofit Proposal. Assumptions: 25 cents per kWh saved utility incentive
Street Lights Subtotal	**MMBTU Saved:**	**1,902.95**	**558,131**	**-**	**-**	**-**	**-**	**$ 78,138**	**$ 362,511**	**$ -**	**$ 141,545**	**$ 220,966**	**2.83**		
Vehicle Maintenance	Switch to 100% synthetic oil	Planned FY 2017			945	1,425		**$7,495**	**$0**			**$0**	**-**	Town	The savings estimate accounts for any additional costs incurred by switching to costlier synthetic oil. Source: http://www.fueleconomy.gov/feg/pdfs/OwnerRelatedFuelEconomyImprovements.pdf
Vehicle Policy	City-wide "No Idling" policy for municipal vehicles	Planned FY 2017			4,723	7,125		**$37,474**	**$0**			**$0**	**-**	N/A	http://www.fueleconomy.gov/feg/pdfs/OwnerRelatedFuelEconomyImprovements.pdf
Vehicle Maintenance	Tire air pressure maintenance toolkit	Planned FY 2017			945	1,425		**$7,495**	**$0**			**$0**	**-**	N/A	http://www.fueleconomy.gov/feg/pdfs/OwnerRelatedFuelEconomyImprovements.pdf
Vehicle Subtotal	**MMBTU Saved:**	**2,206.51**	**-**	**-**	**6,612**	**9,975**	**-**	**$ 52,463**	**$ -**	**$ -**	**$ -**	**$ -**	**-**		
	Total MMBTU Saved	**17,730.63**	**1,465,239**	**105,247**	**6,612**	**9,975**	**40**								

*Please note that the 'Green Communities Grant' column is for reference only and will be filled in based on the designation and future competitive grant requests.

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

1. Municipal Buildings (including schools)

To better strategize for the long-term maintenance and management of municipal buildings, Stoughton will work with internal schools and Town staff as well as outside consultants, when necessary, to assess and document the condition of major municipal buildings on an annual basis. In addition to exposing continuing opportunities for energy use reductions, this effort will provide the Town with a clear, long-term asset management strategy for the effective budgeting and maintenance of buildings.

2. Vehicles (including schools)

The Fuel-Efficient Vehicle policy will have become engrained within municipal purchasing practices after 5 years, and the Town will seek to explore even more efficient policies and tracking systems to enable more efficiency.

3. Street and Traffic Lighting

As the Town expects to have all streetlights retrofitted with LED bulbs within the 5 year period, the Town will next look to retrofit traffic lighting with LEDs as well as other lighting opportunities into the future.

4. Perpetuating Energy Efficiency

An annual municipal audit by Town and Schools staff can tap into the knowledge of the employees who use and maintain the building every day. It can empower building staff to develop a detailed repair and management schedule and collect data on problems and inefficiencies that may be missed by traditional third party audits. Web-based application systems such as See Click Fix can be considered to create additional real-time opportunities for efficiencies in operation and maintenance.

The Town of Stoughton will grow its capacity to retrofit and build more efficient facilities, purchase more efficient vehicles, and illuminate the Town through more efficient lighting throughout the 5-year period. These practices will become more engrained in the culture of the Town and will provide opportunities to instill the ethos into additional policies and programs for more dedicated long-term funding streams and strategies.