Town of Marion, Massachusetts

Energy Reduction Plan

Prepared by the Southeastern Regional Planning and Economic Development District (SRPEDD) with support from the Town of Marion

In Fulfillment of the
Massachusetts Green Communities Grant Program
Criterion #3

October 25, 2018

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I. Purpose and Acknowledgements

A. Letter from the General Government Verifying Adoption of the Energy Reduction Plan

Town of Marion
Two Spring Street
Marion, Massachusetts 02738

MA Department of Energy Resources
Green Communities Division
100 Cambridge Street – Suite 1040
Boston, MA 02114

October 25, 2018

To Whom It May Concern,

The Board of Selectmen held a public meeting on October 25, 2018, and reviewed and considered the Energy Reduction Plan being proposed by the Town of Marion and its Energy Management Committee as part of our Green Community Application.

Marion will be establishing FY2017 as its baseline year to measure a reduction in energy use. The Board of Selectmen are happy to endorse and adopt the measures outlined in the Marion Energy Reduction Plan.

We thank you for your assistance throughout the Green Community designation process.

Sincerely,

Norman A. Hills
Chairman, Marion Board of Selectmen

Randy L. Parker
Vice-Chairman

John P. Waterman
Clerk

B. Letter from the School District Verifying Adoption of the Energy Reduction Plan

OLD ROCHESTER REGIONAL SCHOOL DISTRICT
MASSACHUSETTS SCHOOL SUPERINTENDENCY UNION #55

Marion - Mattapoisett - Rochester
135 Marion Road, Mattapoisett, MA 02739
Tel. (508) 758-2772 FAX (508) 758-2802
www.oldrochester.org

Superintendent of Schools
Douglas R. White Jr., Ed.D.

Assistant Superintendent of Curriculum, Instruction & Assessment
Elise M. Frangos, Ed.D.

Director of Student Services
Michael Nelson, M.Ed.

November 26, 2018

Massachusetts Department of Energy Resources
Green Communities Division
100 Cambridge Street, Suite 1040
Boston, MA 02114

To Whom It May Concern:

The Marion School Committee sent a letter to Mr. Marcus Springer on October 26th, 2018 and it has come to our attention that the letter needs to be addressed to the Green Communities Division instead.

The Marion School Committee is adopting and is fully committed to the town of Marion's Energy Reduction Plan as proposed by the Marion Energy Committee.

This letter is confirmation that the Sippican School does not own any vehicles and if it were to purchase one in the future, it would comply with the Fuel Efficient Vehicles Policy.

Sincerely,

Douglas R. White, Jr. Ed.D.
Superintendent of Schools

C. List of Contributors

The Town of Marion Energy Reduction Plan would not have been possible without the collaborative efforts of the residents of the Town of Marion and from:

Marion Board of Selectmen:
Norman A. Hills, Chairman
Randy L. Parker, Vice-Chairman
John P. Waterman, Clerk
Paul F. Dawson, Town Administrator

Marion Energy Management Committee:
David K. Pierce, Chairman
Eileen J. Marum, Secretary
Jennifer Francis
William G. Saltonstall
Christian Ingerslev
Robert D. Fisher
James Bride III

Marion Planning Board:
William W. Saltonstall, Chairperson
Stephen L. Kokkins, Vice Chairperson
Norman A. Hills, Clerk
Eileen J. Marum
Christopher Collings
Andrew Daniel
Kristen Saint Don-Campbell
Gil Hilario, Town Planner

Marion Facilities Department
Shaun Cormier, Facilities Manager

Marion Building Department:
Scott Shippey, Building Commissioner/Zoning Officer

Massachusetts Department of Energy Resources (DOER):
Seth Pickering, Green Communities Southeast Regional Coordinator

Energy Source
Dalton Ling, Director of Operations & Development

Southeastern Regional Planning and Economic Development District (SRPEDD):
Eric Arbeene, AICP, Principal Comprehensive Planner

II. Executive Summary

A. Narrative Summary of the Town

The Town of Marion is located in southeastern Massachusetts by the Buzzards Bay and is in Plymouth County. It is located 50 miles south of Boston and 40 miles east of Providence, Rhode Island. The town has an approximate area of 26.1 square miles and is bordered by Wareham on the north and northeast; Mattapoisett on the southwest; and Rochester on the northwest. According to the 2010 U.S. Census, Marion had a population of 4,907, having experienced a 4.2% decrease in population since 2000.

Marion was settled in 1679, as a village known as Sippican, which was part of Rochester. Rochester, Mattapoisett and Sippican were widely separate villages under the domain of Rochester, but gradually developed different interests and economies. These factors led to the independence of Sippican, which was renamed Marion in honor of the Revolutionary War hero, Francis Marion, in 1852. Throughout the 19th century, Marion was a thriving seacoast town that focused on whaling and was home to many sea captains and sailors. As the 20th century approached and the whaling industry faded, Marion became a summer tourism destination for the rich and famous and was the summer home of President Grover Cleveland in the late nineteenth century.

Today, Marion can be described as a small, desirable seaside community along Buzzards Bay, where recreational boating is a major summer activity for residents and tourists alike. Marion's population grew steadily from the 1950s through 2000, but decreased slightly during the last decennial census in 2010. Marion is accessible to the larger southeastern Massachusetts region via the north-south Interstate 195 and Route 6 and via the east-west Route 105.

B. Summary of Municipal Energy Uses

- Total Number of Municipal Buildings: 10
- Total Number of Municipal Vehicles: 76
- Total Number of Street Lights: 298
- Total Number of Traffic Lights: 2
- Water & Sewer: 5 drinking water pumping stations, 8 wastewater pumping stations, and 1 wastewater treatment plant

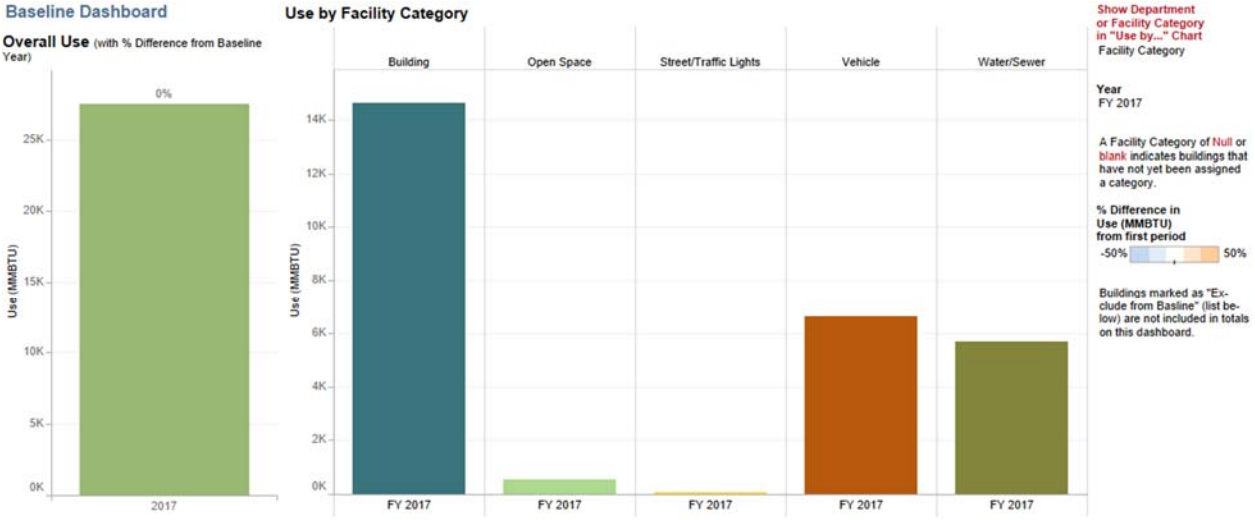
Table 1: Municipal Energy Use Summary

	Number	Ownership
Buildings	**10**	
Oil Heat	3	Municipality
Natural Gas Heat	6	Municipality
Electricity	1	Municipality
Vehicles	**70**	
Non-Exempt	4	Municipality
Exempt	66	Municipality
Street Lights	298	Municipality
Traffic Lights	2	Municipality
Water & Sewer	**9**	
Drinking Water Pumping Station	5	Municipality
Wastewater Treatment Plant	1	Municipality
Wastewater Pumping Station	8	Municipality

C. Summary of Energy Use Baseline and Plans for Reductions

This Energy Reduction Plan commits Marion to reduce energy use in municipal facilities by at least 20% compared to Fiscal Year 2017 over five years. In the baseline year, the town used 27,552 MMBTUs of energy, which means the town must reduce usage by at least 5,510 MMBTUs over the following five-year period.

Figure 1: Municipal Energy Use Baseline Dashboard from MEI (FY 2017)



Drill down by Facility Category (showing Use (MMBTU))
Hover over Facility Category and Subcategory and click the plus or minus signs to expand and collapse the table.

Facility Category	FY 2017
Building	14,644
Open Space	561
Street/Traffic Ligh..	70
Vehicle	6,606
Water/Sewer	5,671

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 2017
Null	27,551

Marion has identified energy savings measures in each facility category to reduce energy use 20% based on the total baseline usage, as illustrated in Table 2.

Table 2: Summary of Municipal Energy Use and Reductions

Facility 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	14,644	53.2%	4,459	95.9%
Vehicles	6,606	24.0%	0	0.0%
Street/Traffic Lights	70	0.3%	0	0.0%
Water/Sewer/Pumping	5,671	20.6%	191	4.1%
Open Space	561	2.0%	0	0.0%
Total	**27,552**	**100%**	**4,650**	**16.9%**

III. Energy Use Baseline Inventory

A. Identification of the Inventory Tool Used: The Town of Marion 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) 2017 will serve as the baseline year. FY 2017 ran from July 1, 2016 to June 30, 2017. This will give the Town until June 30, 2022 (FY 2018 – FY 2022) to reach its 20% energy reduction goal.

C. Municipal Energy Consumption for the Baseline Year (FY 2017): In baseline year, the town used 27,552 MMBTUs of energy. The Appendix presents energy use for each municipal facility in MMBTUs and native units.

- Buildings: Marion's 10 buildings use 14,644 MMBTUs, approximately 53.2% of Marion's total municipal energy use. The buildings with the largest energy use is the Sippican Elementary School (8,205 MMBTUs) as shown in Figure 2.

- Street/Traffic Lights: There are 298 streetlights and 2 traffic lights in Marion. These lights consume 70 MMBTUs, 0.3% of the Town's energy use.

- Vehicles: Marion's 70 municipal vehicles use 24% of the baseline total, or 6,606 MMBTUs.

- Water/Sewer Facilities: The Town of Marion is serviced for water and wastewater by the Town's Water & Sewer Division. Water & Sewer Division facilities consume 5,671 MMBTUs, or 20.6% of the town's energy use.

Table 3A: Municipal Energy Consumption for FY2017, Native Fuel Units

ERP Guidance Table 3a - Municipal Energy Consumption for 2017 (Native Fuel Units)

		2017					
		Electric (kWh)	Gas (therms)	Oil (gallons)	Gasoline (gallons)	Diesel (gallons)	Propane (gallons)
Building	Sippican ES	719,412	57,501				
	Harbormaster	15,076					
	Music Hall	29,078	7,590				
	Taber Library	38,392	3,604				
	Atlantis Drive	34,800	6,212				
	Fire Station #1 (Spring St.)	56,825		3,468			
	Fire Station #2 (Point Rd)	6,344		719			
	Town House	74,912	13,842				
	Police Department	194,000	3,336				
	Community Center	7,415					
	Town Barn	58,027	5,274	823			
	Total	**1,234,281**	**97,359**	**5,010**			
Open Space	Parks	164,365					
	Total	**164,365**					
Street/Traffic Lights	Street Lights	20,526					
	Total	**20,526**					
Vehicle	Vehicles				33,901	17,281	
	Total				**33,901**	**17,281**	
Water/Sewer	Waste Water Treatment Plant	740,720		7,126			
	Drinking Water Pump Stations	363,437					7,157
	Waste Water Pump Stations	45,720		760			
	Total	**1,149,877**		**7,886**			**7,157**
Grand Total		**2,569,049**	**97,359**	**12,896**	**33,901**	**17,281**	**7,157**

Table 3B: Municipal Energy Consumption for FY2017, Native Fuel Units

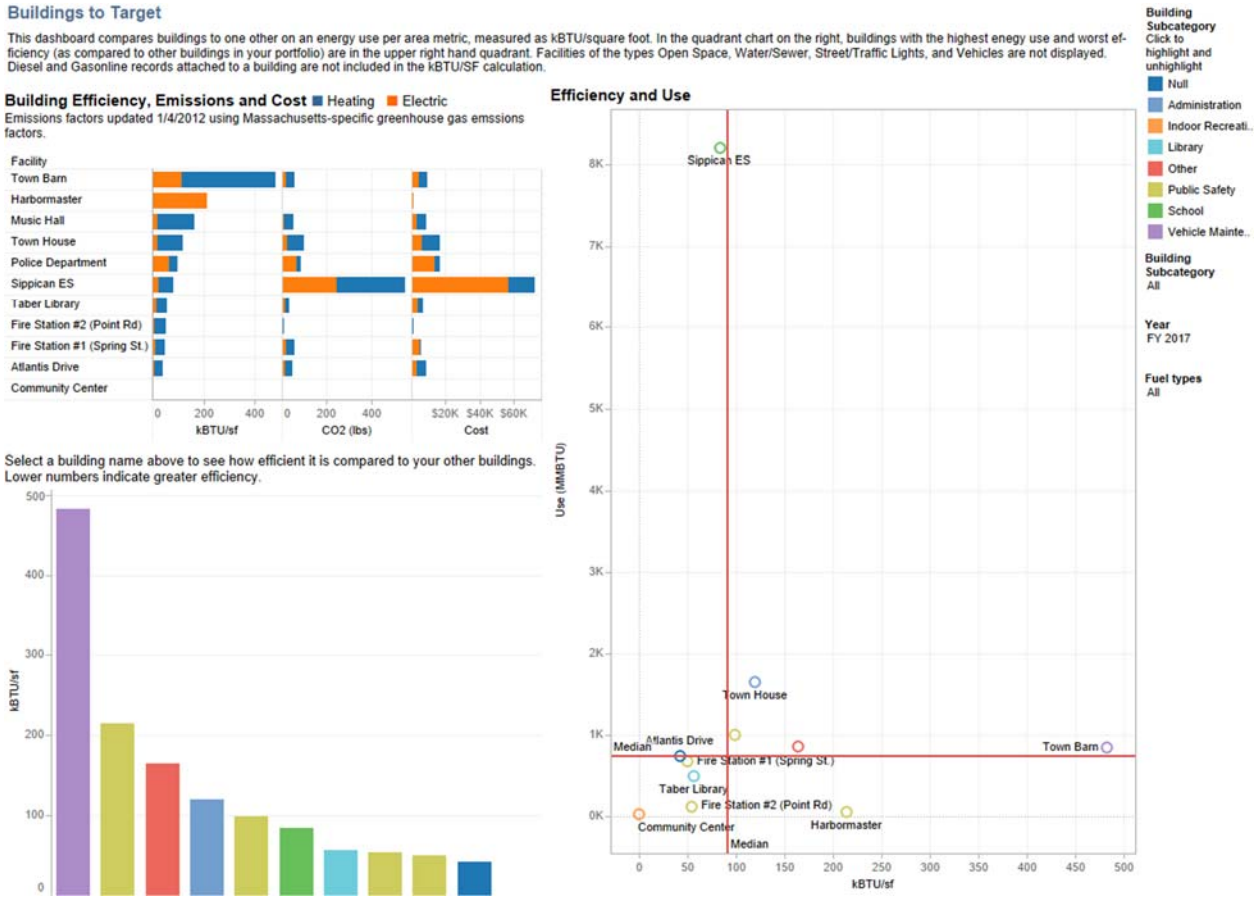
ERP Guidance Table 3b - Municipal Energy Consumption for 2017 (MMBTU)

Please make sure that any data submitted to DOER contains complete Data!

		2017						
		Diesel	Electric	Gas	Gasoline	Oil	Propane	Total
Building	Sippican ES		2,455	5,750				**8,205**
	Harbormaster		51					**51**
	Music Hall		99	759				**858**
	Taber Library		131	360				**491**
	Atlantis Drive		119	621				**740**
	Fire Station #1 (Spring St.)		194			482		**676**
	Fire Station #2 (Point Rd)		22			100		**122**
	Town House		256	1,384				**1,640**
	Police Department		662	334				**996**
	Community Center		25					**25**
	Town Barn		198	527		114		**840**
	Total		**4,211**	**9,736**		**696**		**14,644**
Open Space	Parks		561					**561**
	Total		**561**					**561**
Street/Traffic Lights	Street Lights		70					**70**
	Total		**70**					**70**
Vehicle	Vehicles	2,402			4,204			**6,606**
	Total	**2,402**			**4,204**			**6,606**
Water/Sewer	Waste Water Treatment Plant		2,527			991		**3,518**
	Drinking Water Pump Stations		1,240				651	**1,891**
	Waste Water Pump Stations		156			106		**262**
	Total		**3,923**			**1,096**	**651**	**5,671**
Grand Total		**2,402**	**8,766**	**9,736**	**4,204**	**1,793**	**651**	**27,551**

Figure 2: MEIs Buildings to Target Dashboard

In Figure 2 below, the points further to the right have a higher energy use per square foot (i.e. less energy efficient), while the points higher up use more total energy. The Sippican Elementary School, for example, uses the most energy of any building in Marion.



IV. Energy Reduction Plan

A. Narrative Summary

As shown below, the town has identified energy savings measures to reduce usage from FY2017 by 4,650 MMBTUs or 16.9%.

- **Install LED Lighting and Controls**
  It is recommended that high efficiency LED fixtures/kits are installed to replace the fluorescent lighting. This measure will reduce the energy consumption based on the decrease in lighting power output and the use of adaptive control technology. The scope of this work includes the following:
    - Supply and install new LED fixtures and/or kits
    - Supply and install lighting controls where applicable
    - Remove and recycle old fluorescent lamps and ballasts
    - Remove and recycle old fluorescent fixtures where applicable
    - Warranty on new LED lighting of five years

  By implementing this measure at the Sippican Elementary School, the Atlantis Drive Facility, Community Center, Fire Station #1, Fire Station #2, Music Hall, Police Department, Library, Town House, and Town Barn, the town will save 246,547 kWh (841 MMBTUs) of electricity and $44,378 annually.

- **Install Condensing Boilers**
  It is recommended that new condensing boilers are installed at a few town buildings. Condensing boilers (average efficiency 92%) can obtain a much higher efficiency than the standard non-condensing boiler (average efficiency 75-80%). The scope of this work includes the following:
    - Supply and install Lochinvar condensing boilers
    - Removal and disposal of existing boilers and all necessary piping and components of the old system no longer required
    - Installation of direct venting system for combustion air and exhaust air
    - Install outside air controls for maximum efficiency
    - Commissioning and startup of new boiler systems

  By implementing this measure at the Atlantis Drive Facility and the Sippican Elementary School, the town will save 10,710 therms (1,071 MMBTUs) and $12,852 annually.

- **Implement Building Weatherization Measures**
  By implementing this measure, a reduction in heat loss/heat gain will occur which will lead to energy savings. The scope of work includes the following:
    - A/C Unit Weatherization
    - Attic Bypass Air Sealing
    - Attic Flat Insulation
    - Attic Insulation Baffles

- Door Weather Stripping
- Hopper Window Weatherization
- Overhead Door Weather Stripping
- Wall Air Sealing/Insulation

By implementing a variety of these measures at the Atlantis Drive Facility, Community Center, Fire Station #1, Fire Station #2, Music Hall, Police Station, and Town House, the town will save 6,810 kWh (23 MMBTUs) of electricity, 2,496 therms (250 MMBTUs) of natural gas, 719 gallons of oil (108 MMBTUs) and $5,851 annually.

- **Install an Energy Management System**

  It is recommended that a new Energy Management System is installed and that the HVAC equipment is reprogrammed to allow energy savings to be realized for electricity and natural gas. In conjunction with the local controllers and their energy savings features, it will also allow for remote control, monitoring and alarming of the mechanical equipment. The energy management system will control the following mechanical devices:

  <u>Library</u>
  - (1) Hot Water Boiler
  - (2) Heating and Ventilating Units
  - (2) Air Handler Units
  - (6) Baseboard Radiator Zones

  <u>Music Hall</u>
  - (1) Hot Water Boiler
  - (1) Air Cooled Chiller
  - (1) Air Handler Unit
  - (2) Direct-Fired Reznor Units

  The savings from this measure will be met with the following control strategies:
  - Optimal Start/Stop which allows motors to turn off when the building is no longer being used during holidays, weekends, and unoccupied hours
  - Temperature setback which allows the temperature to decrease during unoccupied hours
  - 7-Day scheduling
  - Demand Control Ventilation (CO^2 monitoring)

  By implementing this measure at the Music Hall and the Library, the town will save 19,992 kWh (68 MMBTUs) of electricity, 1,590 therms (159 MMBTUs) of natural gas and $5,507 annually.

- **Oil-to-Gas Conversion at Fire Station #1**

  It is recommended that the boiler be replaced with a high-efficiency natural gas-fired condensing boiler. Due to the higher prices of oil compared to natural gas, significant cost savings can be achieved by converting to natural gas. In addition to the cost savings, the new burner will be significantly more efficient in its fuel consumption. The existing boiler is

approximately 77% efficient while the new condensing boiler would be approximately 92% efficient.

By implementing this measure, the new boiler will save approximately 725 therms (73 MMBTUs) per year. The combined efficiency savings of the new boiler and the cost savings of the fuel conversion is estimated at $2,650 annually.

- **Install Mechanical Insulation**
  It is recommended that bare pipes, valves, fittings, and tanks are insulated. By implementing this measure, a reduction in heat loss will occur, which will lead to energy savings. The scope of work includes air scoop insulation, end cap insulation, flange insulation, gate valve insulation, pipe fitting insulation, PRV insulation, pump insulation, steam trap insulation, straight pipe insulation, strainer insulation and tank insulation.

  By implementing a variety of these measures at the Town House and Community Center, the town will save 1,601 therms (160 MMBTUs) of natural gas and $1,921 annually.

- **Install Variable Frequency Drives**
  It is recommended that variable frequency drives are added to various pumps and fan motors at the Police Department, Main Water Pumping Station, Perry Hill Pumping Station, and Wastewater Treatment Plant to allow them to modulate based on actual demand/conditions. The VFD's will modulate based on differential temperature and/or differential pressure.

  By implementing this measure at the Police Department, Main Water Pumping Station, Perry Hill Pumping Station, Wastewater Treatment RTU and Wastewater Treatment Circulation Pumps, the town will save 141,037 kWh (481 MMBTUs) of electricity and $25,387 annually.

- **Install Kitchen Hood Controls**
  It is recommended that a kitchen hood control system is installed at the Sippican Elementary School to allow the exhaust fans to modulate as needed based on actual cooking activity. The installation of variable frequency drives on the exhaust fans will allow them to modulate as needed instead of running at full speed. These VFD's will be controlled by temperature and optic sensors. Any increases/ decreases in temperature and/or smoke/particulates will cause the fans to ramp up/down to satisfy conditions without over-ventilating. The scope of work includes the following:
    - Supply and install (2) Variable Frequency Drives (VFDs) in place of the existing motor starters for the kitchen exhaust fans
    - Install temperature and optic sensors in the kitchen exhaust ductwork
    - Install new control keypad
    - Start-up and testing of the new VFDs
    - Warranty for one year

  By implementing this measure at the Sippican Elementary School, the town will save 6,482 kWh (22 MMBTUs) of electricity, 2,089 therms (209 MMBTUs) of natural gas and $3,674 annually.

- **Install Refrigeration Controls**

  It is recommended that refrigeration controls are installed to control the Sippican Elementary School's walk-in coolers and freezer. It is also recommended that the motors are replaced with Electronically Commutated Motors (ECMs). ECMs have a better motor efficiency compared to shaded pole motors (roughly 78%). In conjunction with the local controllers and their energy savings features, it will also allow for remote control, monitoring and alarming of the walk-in coolers/ freezers. The scope of this work includes the following:

  - Supply and install (3) zones of energy savings CoolTrol refrigeration controls to cycle temperature and evaporator fans
  - Replace (6) existing shaded pole motors with (6) high-efficiency EC motors in evaporators
  - Dew-point pulse control for anti-sweat door heaters
  - Start-up and testing of the new controls/motors
  - Installation to be performed by licensed electricians during business hours

  By implementing this measure at the Sippican Elementary School, the town will save 18,804 kWh (64 MMBTUs) of electricity and $3,385 annually.

- **Install Demand Control Ventilation**

  It is recommended that the current Energy Management System at the Sippican Elementary School is expanded to include Demand Control Ventilation. This will also include furnishing and installing duct CO^2 sensors for any Air Handler Units/ Rooftop Units. The scope of work includes the following:

  - Each HVAC equipment will include a non-proprietary field controller (if applicable)
  - Furnish and Install a CO^2 Sensor for each Air Handling Units or Rooftop Units
  - Integrate the sensors into the existing building management system

  By implementing this measure at the Sippican Elementary School, the town will save 18,362 kWh (63 MMBTUs) of electricity, 3,290 therms (329 MMBTUs) of natural gas and $7,253 annually.

- **Install High Efficiency Transformers**

  It is recommended that six standard efficiency transformers are replaced with Rex High Efficiency Transformers. By implementing this measure, the overall energy consumption of the transformers will decrease which will lead to annual energy cost savings. The scope of work includes the following:

  - Furnish and install six Rex High Efficiency Transformers
  - Removal of existing Transformers

  By implementing this measure at the Sippican Elementary School, Wastewater Treatment Plant and Perry Hill Pumping Station, the town will save 17,222 kWh (59 MMBTUs) of electricity and $3,100 annually.

- **Install Wi-Fi Programmable Thermostats**
  It is recommended that new Wi-Fi programmable thermostats are installed to give facility personnel access to space temperature through their cellular phone or computer. The scope of work includes the following:
    - Demo existing thermostats
    - Install new Wi-Fi programmable thermostats
    - Run "C" wire where applicable
    - Town IT department will need to supply appropriate network information for Wi-Fi access.

  By implementing this measure at Fire Station #1 and Fire Station #2, the town will save 203 gallons of oil (30 MMBTUs) and $461 annually.

- **Retrocommissioning**
  Retrocommissioning is the first stage in the building upgrade process. The staged approach accounts for the interactions among all the energy flows in a building and produces a systematic method for planning upgrades that increases energy savings. When the staged approach is adopted and performed sequentially, each stage includes changes that will affect the upgrades performed in subsequent stages, thus setting up the overall process for the greatest possible energy and cost savings. In this staged approach, retrocommissioning comes first because it provides an understanding of how closely the building comes to operating as intended. It also helps to identify improper equipment performance, what equipment or systems need to be replaced, opportunities for saving energy and money, and strategies for improving performance of the various building systems. It is recommended that the Sippican Elementary School be retrocommissioned. According to the Energy Star program https://www.energystar.gov/sites/default/files/buildings/tools/EPA_BUM_CH5_RetroComm.pdf each building that is retrocommissioned can expect to achieve a 7.5% savings in energy use.

B. Path to 20% Energy Use Reduction by the end of Fiscal Year 2022

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

The Facilities Manager with the Energy Management Committee will be responsible for the oversight of the Energy Reduction Plan and the implementation of its energy conservation measures. Regular updates will be made to the Board of Selectmen and the Town Administrator. The Town Administrator will complete the annual reporting requirements to maintain Green Community designation and eligibility for annual competitive grant funding.

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

- Building audits were provided by Energy Source in 2018 and provide an energy savings of 4,035 MMBTUs or 14.6%. The Energy Source audits are included in the Appendix.
- Retrocommissioning of the Sippican Elementary School would result in the savings of 615 MMBTUs or 2.2%.
- Vehicle policy and maintenance targeting overall vehicle usage would result in the savings 410 MMBTUs or 1.5%. The supporting documentation for these policy and maintenance measures are available in the Appendix.

3. Energy Conservation Measures

Table 3 lists recommended energy conservation measures. References for each measure are 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, and street and traffic lights) are subtotaled to arrive at a municipal grand total.

Table 4: Energy Conservation Measures for Marion Municipal Energy Use

Measure		Status	Energy Data						Financial Data						Reference	
			Projected Annual Energy Savings													
Category/Building	Energy Conservation Measure	Status (Completed Year or Planned Year)	Electricity Savings (kWh)	Natural Gas Savings (Therms)	Oil Savings (Gallons)	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
Sippican Elementary School	LED Lighting	2020	133,189	0	0	-	-	-	$23,974	$244,935	-	$25,000	$219,935	9.2	-	Energy Source Audit, 2018
Sippican Elementary School	Demand Control Ventilation	2021	18,362	3,290	0	-	-	-	$7,253	$16,320	-	$1,800	$14,250	2.0	-	Energy Source Audit, 2018
Sippican Elementary School	Refrigeration Controls	2019	18,804	0	0	-	-	-	$3,385	$19,671	-	$3,761	$15,910	4.7	-	Energy Source Audit, 2018
Sippican Elementary School	Kitchen Fan Controls	2019	6,482	2,089	0	-	-	-	$3,674	$28,692	-	$2,400	$26,292	7.2	-	Energy Source Audit, 2018
Sippican Elementary School	Condensing Boiler	2022	0	9,563	0	-	-	-	$11,475	$247,000	-	$14,344	$232,656	20.3	-	Energy Source Audit, 2018
Sippican Elementary School	High Efficiency Transformers	2021	4,489	0	0	-	-	-	$808	$16,105	-	$1,122	$14,983	19.1	-	Energy Source Audit, 2018
Sippican Elementary School	Retrocommissioning	2019	53,956	4,313	0	-	-	-	$	$0	-	$0	$0	-	-	Energy Star (www.energystar.gov)
Atlantis Drive	LED Lighting	2020	22,806	0	0	-	-	-	$4,105	$52,876	-	$4,561	$48,315	11.8	-	Energy Source Audit, 2018
Atlantis Drive	Condensing Boiler	2022	0	1,148	0	-	-	-	$1,377	$56,320	-	$7,500	$48,820	35.5	-	Energy Source Audit, 2018
Atlantis Drive	Building Weatherization	2019	1,003	565	0	-	-	-	$859	$22,289	-	$0	$22,289	26.0	-	Energy Source Audit, 2018
Community Center	LED lighting	2021	2,805	0	0	-	-	-	$505	$3,131	-	$300	$2,831	5.6	-	Energy Source Audit, 2018
Community Center	Mechanical Insulation	2019	0	166	0	-	-	-	$199	$4,948	-	$0	$4,948	24.8	-	Energy Source Audit, 2018
Community Center	Building Weatherization	2019	1,231	544	0	-	-	-	$874	$12,514	-	$0	$12,514	14.3	-	Energy Source Audit, 2018
Fire Station #1	LED Lighting	2021	11,223	0	0	-	-	-	$2,020	$13,526	-	$600	$12,926	6.4	-	Energy Source Audit, 2018
Fire Station #1	Oil-to-Gas Boiler Conversion	2021	0	-3,725	3,140	-	-	-	$2,650	$45,895	-	$4,000	$41,895	15.8	-	Energy Source Audit, 2018
Fire Station #1	Wi-Fi Thermostats	2019	0	0	158	-	-	-	$358	$4,064	-	$0	$4,064	11.3	-	Energy Source Audit, 2018
Fire Station #1	Building Weatherization	2019	950	0	429	-	-	-	$1,144	$17,498	-	$0	$17,498	15.3	-	Energy Source Audit, 2018
Fire Station #2	LED Lighting	2021	10,128	0	0	-	-	-	$1,823	$8,012	-	$1,800	$6,212	3.4	-	Energy Source Audit, 2018
Fire Station #2	Wi-Fi Thermostats	2019	0	0	45	-	-	-	$102	$1,161	-	$0	$1,161	11.3	-	Energy Source Audit, 2018
Fire Station #2	Building Weatherization	2019	681	0	290	-	-	-	$780	$15,585	-	$0	$15,585	20.0	-	Energy Source Audit, 2018
Music Hall	LED Lighting	2021	351	0	0	-	-	-	$63	$4,787	-	$70	$4,717	74.7	-	Energy Source Audit, 2018

Music Hall	Energy Management System	2021	8,730	1,154	0	-	-	-	$2,956	$32,208	-	$6,000	$26,208	8.9	-	Energy Source Audit, 2018
Music Hall	Building Weatherization	2019	323	195	0	-	-	-	$292	$2,844	-	$0	$2,844	9.7	-	Energy Source Audit, 2018
Police Department	LED Lighting	2021	25,009	0	0	-	-	-	$4,502	$22,472	-	$4,500	$17,972	4.0	-	Energy Source Audit, 2018
Police Department	Variable Frequency Drives	2021	6,937	0	0	-	-	-	$1,249	$13,130	-	$2,000	$11,130	8.9	-	Energy Source Audit, 2018
Police Department	Building Weatherization	2019	1,038	453	0	-	-	-	$730	$26,240	-	$0	$26,240	35.9	-	Energy Source Audit, 2018
Library	LED Lighting	2021	13,264	0	0	-	-	-	$2,388	$18,913	-	$2,500	$16,413	6.9	-	Energy Source Audit, 2018
Library	Energy Management System	2021	11,262	436	0	-	-	-	$2,550	$52,650	-	$6,000	$46,650	18.3	-	Energy Source Audit, 2018
Town House	LED Lighting	2021	24,832	0	0	-	-	-	$4,470	$33,367	-	$4,500	$28,867	6.5	-	Energy Source Audit, 2018
Town House	Mechanical Insulation	2019	0	1,435	0	-	-	-	$1,722	$36,638	-	$0	$36,638	21.3	-	Energy Source Audit, 2018
Town House	Building Weatherization	2019	1,584	739	0	-	-	-	$1,172	$14,241	-	$0	$14,241	12.2	-	Energy Source Audit, 2018
Town Barn	LED Lighting	2021	2,940	0	0	-	-	-	$529	$12,199	-	$588	$11,611	21.9	-	Energy Source Audit, 2018
Main Pumping Station	Variable Frequency Drives	2021	31,045	0	0	-	-	-	$5,588	$17,550	-	$3,105	$14,446	2.6	-	Energy Source Audit, 2018
Perry Hill Pumping Station	Variable Frequency Drives	2021	56,305	0	0	-	-	-	$10,135	$40,500	-	$5,631	$34,870	3.4	-	Energy Source Audit, 2018
Perry Hill Pumping Station	High Efficiency Transformers	2021	3,355	0	0	-	-	-	$604	$5,082	-	$839	$4,243	7.0	-	Energy Source Audit, 2018
Wastewater Treatment Plant	Variable Frequency Drives	2021	46,750	0	0	-	-	-	$8,415	$36,450	-	$5,600	$30,850	3.6	-	Energy Source Audit, 2018
Wastewater Treatment Plant	High Efficiency Transformers	2021	9,378	0	0	-	-	-	$1,688	$13,551	-	$2,345	$11,207	6.7	-	Energy Source Audit, 2018
Totals			**529,212**	**22,365**	**4,062**	**0**	**0**	**0**	**$116,418**	**$1,213,362**	**-**	**$110,864**	**$1,102,498**	**-**	**-**	**-**
Total MMBTUs Saved			**1,804**	**2,237**	**609**	**0**	**0**	**0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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, Marion 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 five years, and the Town will seek to explore even more efficient policies and tracking systems to enable more efficiency.

3. Perpetuating Energy Efficiency

Ongoing dialogue with Town and School staff can tap into the knowledge of the employees who use and maintain the buildings 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. The use of a web-based application system like See Click Fix creates additional real-time opportunities for efficiencies in operation and maintenance.

The Town of Marion 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.

V: Appendices

- Building Energy Audits – Energy Source
- SRPEDD Vehicle Calculations
- MMBTU Conversion Chart