

Marshfield Energy Committee

Summary of Projects May 2008 to May 2023

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Key Accomplishments

Solar Array Project on Town's Capped Landfill (December 2019) The Board of Selectmen voted to award a contract to No Fossil Fuel to construct a solar array on the town's capped landfill on Clay Pit Road – bringing in **\$21,717,172** over the course of the 20-year contract. Construction and installation of the new 5.9 megawatt array is anticipated to begin in 2020. As of May 2023 the project is still in progress. In addition to the array, a 3 megawatt battery will also be installed to store excess energy produced.

Green Communities Grants – Marshfield awarded \$977,267 of grant money for clean energy and energy efficient projects.

Solar Power Purchase Agreement (January 2014) is in effect for a solar project on a privately owned (Sylvester Ray Site) capped landfill in Marshfield. This agreement will save the Town money.

Energy Efficiency Project (September 2013) Marshfield's \$4.7M energy efficiency project with Trane for town and school buildings.

Mission

Our Mission is to serve the residents by recommending energy and alternative energy policies that will reduce energy consumption and greenhouse gas emissions in the Town of Marshfield. The Board of Selectmen appointed the Energy Committee in 2008 and approved the following charge:

- Develop a climate action plan to reduce greenhouse gas emissions. This plan will include measures to reduce energy consumption in all Town buildings, facilities, schools, vehicles, and equipment in an effort to lower operating costs and reduce greenhouse gas emissions now and in the future.
- Inventory the energy consumption in all Town owned buildings and vehicles to develop benchmarks and baseline data on the Town's energy consumption. The baseline data (Greenhouse Gas Inventory) will be used in the future to measure progress in achieving the Town's goals for the reduction of greenhouse gas emissions.
- Develop policies and recommendations to promote and implement energy conservation measures for existing Town buildings and all future expansions, renovations and alterations of buildings.
- Research and explore the feasibility and funding sources for developing renewable energy sources such as wind energy and photovoltaic panels. Develop policies and recommendations to promote renewable energy initiatives. Assist with implementing renewable energy initiatives.
- Join the International Coalition for Local Environmental Initiatives (ICLEI), U.S. EPA Community Energy Challenge and/or other organizations that could provide technical assistance, grants and other resources that will assist in reducing the Town's energy consumption and greenhouse gas emissions.
- Advocate, promote and educate town residents and business owners on the benefits of emissions reductions. Increase town residents awareness of energy efficiency programs and rebates such as; Energy Star rated appliances, building materials and insulation. Work with local utility companies on energy conservation and clean energy programs.
- Support and work with the Marshfield School District to develop energy-related projects that will increase students' awareness of energy and conservation issues. Seek grants from utilities and organizations to assist teachers in developing energy-related projects.

Projects - Chronological Highlights

- (2023) **Community Choice Aggregation** goes into effect. This was a citizen lead initiative supported by the Energy Committee.
- (2019-2021) **Heatsmart Program** a community clean energy initiative for property owners supported by the state and our town government. To help transition away from fossil fuel-based heating, HeatSmart Marshfield presents 4 clean heating and cooling technology options: (1) cold climate air source heat pumps (ASHP), (2) ground source (or geothermal) heat pumps (GSHP), (3) modern wood heating, and (4) solar hot water.
- (July 2021) **Marshfield awarded a fifth Green Communities grant of \$135,921** to fund energy conservation measures.
- (August 2020) **Marshfield awarded a fourth Green Communities grant of \$200,000** to fund energy conservation measures.
- (December 2019) **Solar Array Project on Town's Capped Landfill** The Board of Selectmen voted to award a contract to No Fossil Fuel to construct a solar array on the town's capped landfill on Clay Pit Road – bringing in **\$21,717,172** over the course of the 20-year contract. Construction and installation of the new **5.9 megawatt array** will begin in 2020. As of May 2023 the project is still in progress. In addition to the array, a 3 megawatt battery will also be installed to store excess energy produced.
- (October 2019) **Town issues a Solar RFP for Town of Marshfield Capped Landfill at Clay Pit Road-** The Town of Marshfield, acting through its Board of Selectmen, hereby seeks competitive bids for the lease of Town-owned real property to design, permit, construct, own and operate a commercial or utility class Large Scale Ground Mounted Solar Photovoltaic Installation ("Installation") and associated equipment for the purpose of creating renewable electrical energy. The Town will consider an option to enter into a power purchase agreement to purchase energy created by the proposed Installation
- (August 2019) **Marshfield awarded a third Green Communities grant of \$246,661** to fund energy conservation measures, LED lighting, steam trap survey/repair, mechanical insulation, and administrative and technical support, in municipal facilities including Daniel Webster Elementary School, Furnace Brooke Middle School, Town Hall, Martinson Elementary School, and Eames Way Elementary School
- (April 2019) **Community Choice Aggregation – Citizens Article Passed** at April 2019 Town Meeting What is Community Choice Aggregation (CCA)? Community Choice Aggregation allows a community to easily switch to cleaner sources of electricity for everyone who is on basic service (residents and small businesses) and take positive action on the increasingly important issue of climate change.
This is a process, enabled by a 1997 state law that allows towns and cities to choose electricity that is generated in a way that aligns with their community's values and to have local control over their electricity sources.
- (July 2018) **Marshfield awarded a second grant of \$211,965** to fund energy conservation measures.
- (February 2017) **Marshfield awarded Green Communities Status and \$182,720** of grant money.
- (November 2016) After reworking the application with an improved Energy Action Plan, the Marshfield Board of Selectmen approve submitting a **Green Communities** Application to the State of MA. Prior to approval from the Selectmen, the

Energy Committee along with other Town employees and Boards completed the 5 criteria required to be a Green Community. Upon approval from the State, Marshfield will be eligible to receive grant money to fund energy efficiency and renewable energy projects.

- (October 2015) Marshfield Board of Selectmen approve submitting a **Green Communities Application** to the State of MA. Prior to approval from the Selectmen, the Energy Committee along with other Town employees and Boards completed the 5 criteria required to be a Green Community. Upon approval from the State, Marshfield will be eligible to receive grant money to fund energy efficiency and renewable energy projects. The application was denied.
- (Fall 2014) Marshfield Town Meeting passes the Green Communities Stretch Code. In 2009, Massachusetts became the first state to adopt an above-code appendix to the "base" building energy code-the "Stretch Code". The Stretch Code, which emphasizes energy performance, as opposed to prescriptive requirements, is designed to result in cost-effective construction that is more energy efficient than that built to the "base" energy code.
- (December 1, 2013) **NSTAR** is pleased to offer a series of rebates and services to Marshfield homeowners. The program is supported by the Marshfield Energy Committee and the Board of Selectmen
- (Spring 2013 Town Meeting) After evaluating the Real Goods Solar Power Purchase Agreement Proposal and the No Fossil Fuel Power Purchase Agreement Proposal, the BOS has decided to move forward with the No Fossil Fuel Agreement for the Sylvester Ray site. The BOS presented this as an article at Town Meeting in April and the article passed. This agreement will save the Town money on energy. Given the limits of Net Metering, a municipal solar project at Wheeler Pit with a corresponding power purchase agreement with the Town will not be moving forward.
- (March 2013) **Real Goods Solar submits a Power Purchase Agreement** to the Town for the Wheeler Pit only due to restrictions on the size of an agreement that could be executed due to Net Metering and the Town's energy consumption.
- (August 1, 2012) **Issued Request for Qualifications (RFQ) for Solar Array** on Town owned capped landfill and Wheeler Pit from solar energy developers.
- (June 11, 2012) **The Board of Selectmen approved a bond purchase agreement** for the purchase of the Town's \$5M of Qualified Energy Conservation Bonds to fund the Energy Management Services project.
- (April 26, 2011, Annual Town Meeting) – **Energy Management Services Project of \$5,000,000- Article 3 is approved**
 - Proposed energy conservation measures include seven (7) boiler plants, ventilation units and new windows at Eames Way ES and Daniel Wester ES. insulation and 24/7 centralized, Web-based controls and monitoring. In addition to much needed infrastructure improvements, this program would also reduce energy costs and our town's carbon footprint.
- (October 24, 2011 – Special Town Meeting) **Articles 18, 19 and 22** are on the agenda which relate to the town's the potential Carolina Hill Wind Turbine Project.
- (June 2011) **Submitted a Wind Turbine Feasibility Application** to the Massachusetts Clean Energy Center (MCEC).

- (April 28, 2011) **Town Articles 19 and 21 Approved Related to the State's Green Community Program**
- (March 10, 2011) **Hosted a MA State Climate Protection Network Meeting** sponsored by ICLEI. Speakers from NASA, EPA, MA Department of Energy Resources, Boston and Cambridge made presentations about MA Climate Change. Dr. Cynthia Rosenzweig, a Senior Research Scientist at NASA Goddard Institute for Space Studies was a featured speaker.
- (February 28, 2011) **Applied Science Associates (ASA) approved** as Wind Turbine Feasibility Consultant
- (December 1, 2010) **Issued Request for Qualifications (RFQ) for Wind Turbine Feasibility Consultant**
- (October 18, 2010) **Produced Energy Audit Videos of Town Facilities**
- (June 4, 2010) **Milestone 1 Completion Award from ICLEI** for the Town's Greenhouse Gas Inventory.
- (April 26, 2010) – **Town Meeting – Wind Bylaw Approved.** Also a Marshfield Energy Committee Municipal Wind Turbine Update was presented.
- (March 1, 2010) **Sponsored Wind Education Workshop** presented by Cape Cod Self Reliance and Marshfield's Town Planner.
- (February 22, 2010) **MassEnergyInsight Training**
- (January 19, 2010) **Attended Green Communities Seminar** conducted by the Director of the Green Communities Program in Quincy, MA
- (November 30, 2009) **Carolina Hill Wind Turbine Site Recommended**
- (November 30, 2009) **Energy Consumption and Greenhouse Gas Inventory Accepted**
- (October 19, 2009) **Energy Audit Approved at Special Town Meeting**
- (October 1, 2009) **Energy Savings Contract Presentation** at BOS Meeting by Eileen McHugh of the MA Department of Energy Resources.
- (August 18, 2009) **Green Communities Presentation** by the Director of the Green Communities Program.
- (June 24, 2009) **NSTAR's Marshfield Energy Challenge Report**
- (April 7, 2009) **Green Communities Application Submitted** to the Department of Energy Resources.
- (March 23, 2009) **Wind Turbine Site Survey Application Submitted** to the MRET's Wind Collaborative for review.
- (October 2008) **Sponsored Educational Series on Energy Efficiency and Solar Energy**

Solar – Town Capped Landfill on Claypit Road

(December 2019) **Solar Array Project on Town’s Capped Landfill** The Board of Selectmen voted to award a contract to No Fossil Fuel to construct a solar array on the town’s capped landfill on Clay Pit Road – bringing in **\$21,717,172** over the course of the 20-year contract. Construction and installation of the new **5.9 megawatt array** will begin in 2020, In addition to the array, a 3 megawatt battery will also be installed to store excess energy produced.

(October 2019) **Town issues a Solar RFP for Town of Marshfield Capped Landfill at Clay Pit Road- Information and Questions** The Town of Marshfield, acting through its Board of Selectmen, hereby seeks competitive bids for the lease of Town-owned real property to design, permit, construct, own and operate a commercial or utility class Large Scale Ground Mounted Solar Photovoltaic Installation and associated equipment for the purpose of creating renewable electrical energy. The Town will consider an option to enter into a power purchase agreement to purchase energy created by the proposed Installation

Solar panels on capped landfill expected to save the town millions

Wheeler Cowperthwaite The Patriot Ledger
July 19, 2020



MARSHFIELD — Marshfield is one step closer to turning its second capped landfill into an 5.6-megawatt solar power station after an approval by the zoning board of appeals.

The project, built in conjunction with private developer, No Fossil Fuels, will save the town \$21 million over 20 years, Town Administrator Michael Maresco said.

"It's huge for taxpayers," he said. "It's tantamount to an override for \$1 million every year."

The zoning board of appeals approved the variance for the capped landfill at its July 14 meeting, Maresco said.

The solar power station will generate energy credits for the town toward its total electricity use, part of the Solar Massachusetts Renewable Target Program, also referred to as SMART, he said.

"This is the best use for a capped landfill," Maresco said. "We went out to market, put together a plan, asked companies to give us their best plan of what can be built."

The solar panels are buffered already, produce no noise or smell and did not result in a single tree being cut down, he said.

"It's perfect for the environment," he said.

The town selected No Fossil Fuel to construct the solar array. One of the complications with a capped landfill is how to keep the solar panels on the ground, because the cap cannot be punctured, Maresco said.

The solar panels will go into cement shoes that sit on top of the ground, he said.

"The selectmen asked me to get involved in green technology," Maresco said. "I've done that."

The new power station plan has been in the works for just over a year and included writing a power purchase agreement and payment in lieu of taxes agreement, which required the town to hire an attorney who specializes in power agreements.

"It took a couple of months to iron out the details," he said.

Maresco said he expects the new power station will start generating energy by next summer.

Town energy consultant Matt Parent said the solar panels will take up 10 to 12 acres of the 20-acre site.

"It will take up the whole landfill cap," he said.

Parent said he is looking at other town-owned facilities to increase the total solar footprint to 10 to 14 megawatts. The town is building a new police station and a new Department of Public Works facility.

"The best tax credits are on town-owned property," he said.

Another capped landfill, across the street, is already the site of a 4-megawatt solar array. It began providing energy in 2014.

Scituate placed solar panels on its capped landfill in 2013 and Braintree did the same in 2014, as did Cohasset in 2017. Rockland also has a similar facility.

Reporter Wheeler Cowperthwaite can be reached at wcowperthwaite@patriotledger.com.

Solar – 2014 PPA – Sylvester Ray Site

2014 – Town of Marshfield Solar Power Purchase Agreement -4 MW Solar Array Operational – Sylvester Ray site, Clay Pit Road



Picture of solar arrays on the Clay Pit Road site.

Washington Gas Power Purchase Agreement for privately owned solar array on Sylvester Ray site on Clay Pit Road

(Spring 2013 Town Meeting) After evaluating the Real Goods Solar Power Purchase Agreement Proposal and the Washington Gas (originally the No Fossil Fuel) Power Purchase Agreement Proposal, the BOS has decided to move forward with the Washington Gas Agreement. The BOS presented this as an article at Town Meeting in April and the article passed. This agreement will save the Town money on energy. Given the limits of Net Metering, a municipal solar project at Wheeler Pit with a corresponding power purchase agreement with the Town will not be moving forward.

Municipal Solar Project – Wheeler Pit and Municipal Capped Landfill

(March 2013) Real Goods Solar submits a Power Purchase Agreement to the Town for the Wheeler Pit only due to restrictions on the size of an agreement that could be executed due to Net Metering and the Town's energy consumption.

(August 1, 2012) Town issues Request for Qualifications (RFQ) for Solar Arrays – The Town of Marshfield, MA issued a Request for Qualifications (RFQ) to solicit statements of qualifications under M.G.L. c. 25A, § 11I, from solar energy developers. The Energy Committee, Department of Public Works and the Board of Selectmen unanimously support the RFQ

The Town seeks qualifications from entities in the business of planning, designing, financing, installing, owning, operating and maintaining solar power electric generation facilities to finance,

install, own, operate and maintain solar power electric generation facilities at; (A) The 27 acre capped municipal landfill site off Clay Pit Road and (B) The 65 acre Wheeler Sand Pit located off Forest St. The developer will allow the Town to evaluate multiple options, ownership structures and determine the project and financial arrangement that best meets the Town's interest.

Green Communities

Green Communities Designation Information:

Criterion 1 is met by a municipality passing zoning in designated locations for the as-of-right siting of renewable or alternative energy generating facilities, research and development facilities, or manufacturing facilities.

Criterion 2 is met by a municipality adopting an expedited application and permitting of one year at most, under which facilities interested in locating their facility in a designated renewable zone may be sited within the municipality.

To demonstrate compliance with Criterion 3, municipalities must:

- Establish an energy use baseline inventory for municipal buildings and facilities (which can include schools, water, wastewater treatment plants and pumping stations, and open space), street and traffic lighting, and vehicles; and
- Adopt an Energy Reduction Plan (ERP) demonstrating a reduction of 20 percent of energy use after five years of implementation.

Criterion 4 requires all departments within a Green Community to purchase fuel-efficient vehicles for municipal use, whenever such vehicles are commercially available and practicable.

To meet this requirement municipal governments and school districts must:

- Adopt a Fuel-Efficient Vehicle Policy requiring all municipal departments and divisions to purchase fuel-efficient vehicles,
- Develop and maintain a vehicle inventory for all four-wheeled vehicles, and
- Provide a plan for replacing non-exempt vehicles with vehicles that meet specified fuel efficiency ratings.
- Stretch Code adoption Over 90.8% of the population live in a city or town that has adopted the stretch code
- Criterion 5 requires that municipalities minimize the life-cycle cost of all newly constructed homes and buildings. DOER recommends communities do this by adopting the Stretch Code (225 CMR 22 and 23). Buildings constructed to the Stretch Code use significantly less energy than buildings built to other current and previous building codes.

Summary of Green Communities Grants – \$977,267 Awarded to Date

Marshfield	Feb-17	\$182,720	to fund the following energy conservation measures in Council on Aging, Ventress Memorial Library, and Police Station: interior and exterior lighting retrofits
	Jul-18	\$211,965	to fund energy conservation measures, LED lighting, mechanical insulation, electric vehicle acquisition and charging station, in municipal facilities including Furnace Brook and Martinson Schools, and Central Fire
	Aug-19	\$246,661	to fund energy conservation measures, LED lighting, steam trap repair, pipe insulation, and grant support, in municipal facilities including Daniel Webster, Martinson, and Eames Way Elementary Schools, Furnace Brooke Middle School, and Town Hall
	Aug-20	\$200,000	to fund energy conservation measures, LED lighting mechanical insulation, steam trap replacement, and administrative assistance, in municipal facilities including Martinson Elementary School and Water Treatment Plant
	Jul-21	\$135,921	to fund energy conservation measures, LED lighting, boiler replacement, and administrative assistance, in municipal facilities including Furnace Brook Middle School and Central Fire Station

- (July 2021) **Marshfield awarded a fifth Green Communities grant of \$135,921** to fund energy conservation measures.
- (August 2020) **Marshfield awarded a fourth Green Communities grant of \$200,000** to fund energy conservation measures.
- (August 2019) **Marshfield awarded a third grant of \$246,661** to fund energy conservation measures, LED lighting, steam trap survey/repair, mechanical insulation, and administrative and technical support, in municipal facilities including Daniel Webster Elementary School, Furnace Brooke Middle School, Town Hall, Martinson Elementary School, and Eames Way Elementary School
- (July 2018) **Marshfield awarded a second grant of \$211,965** to fund energy conservation measures.
- (February 2017) **Marshfield awarded Green Communities Status and \$182,720 of grant money.**
- (November 2016) After reworking the application with an improved Energy Action Plan, the Marshfield Board of Selectmen approve submitting a **Green Communities Application** to the State of MA.
- (October 2015) Marshfield Board of Selectmen approve submitting a **Green Communities Application** to the State of MA. Prior to approval from the Selectmen, the Energy Committee along with other Town employees and Boards completed the 5 criteria required to be a Green Community. Upon approval from the State, Marshfield will be eligible to receive grant money to fund energy efficiency and renewable energy projects. The application was denied.
- (Fall 2014) Marshfield Town Meeting passes the Green Communities Stretch Code.
- (April 28 2011) Town Articles 19 and 21 Approved Related to the State’s Green Community Program **Criterion One**
 - The Town Approved Article 19 related to Large-Scale Ground Mounted Solar Photovoltaic installations. According to the language of the warrant: “This article will create a new section of the Zoning Bylaw that will regulate ground mounted solar voltaic panels on a large, commercial scale of one acre or larger. This use will be allowed in the Industrial I-1 Zoning District with Site Plan Approval from the Zoning Board of Appeals (ZBA) and by Special Permit from the ZBA in the Airport Zoning District. These comprehensive new regulations will allow for this type of renewable energy generation while protecting the environment and safety of the town residents. Adoption of this bylaw will satisfy one of the criteria for the Town to be designated by the State Department of Energy Resources as a “Green Community”.”

- Article 21 according to the language of the warrant:”allow[s] the construction of renewable or alternative energy research & development facilities in large buildings, 50,000 square feet or larger within the I-1 Industrial Zoning District.”
- (August 30, 2009) An Energy Consumption and Greenhouse Gas Inventory for Marshfield was completed by an NSTAR Intern with the support of a Senior Engineer at NSTAR. The Inventory will aid meeting a Green Community **Criterion 3**. The report was reviewed by the Energy Committee and accepted by the Board of Selectmen. The data was included in our original ESCO Request for Qualifications (RFQ) which was awarded to TRANE.

Energy Efficiency

Energy Efficiency Improvements with TRANE

What is an Energy Services Contract (ESCO)? According to MA DOER's website, "Many cities and towns choose to use an **ESCO** to execute their energy efficiency plans. An **ESCO** offers a number of significant advantages. As a type of performance contracting, the cost of implementing efficiency measures is paid for in whole or in part by the energy and water savings guaranteed from the project by the chosen vendor. It creates a seamless process, from conceptualization and design, to building and monitoring. It also eliminates the costs and potential delays of multiple bidding processes, since cities and towns have to go out to bid only once, as the contract is awarded for the whole project.

What is an Energy Services Company? According to the MA DOER website, "An **ESCO** is a firm that coordinates all of the activities of a performance contracting project, including: technical audits, design engineering, equipment installation, construction management, project financing, staff training, equipment maintenance, and project monitoring.

(September 2013) TRANE, an Energy Services Company (ESCO), has completed all Marshfield's \$4.7M energy efficiency improvements. Town officials signed a *Certificate of Completion* in October, 2013 and the Maintenance Phase of the energy services contract began.

Trane estimates the Energy Savings project will reduce Marshfield's emissions and eliminate approximately 1 M pounds of carbon dioxide each year which is the environmental equivalent of approximately 2,165 passenger cars taken off the road over a 20 year period.

New energy efficiency windows have been installed at Eames Way ES and Daniel Webster ES. New high efficiency boilers and classroom heating ventilation units have been installed at South River ES, Daniel Webster ES and Eames Way ES and new control systems. At the Town Hall, new heating/cooling and ventilation units have been installed and a new control system. TRANE has guaranteed a 20% energy savings to the town and the town hopes for even greater savings.

(March 2013) Most of the energy efficiency improvements have been completed by **Trane**, an Energy Service Company (ESCO). Among the improvements are new energy efficient windows at Eames Way Elementary School and Daniel Webster Elementary School. Also new high efficiency boilers and classroom heating/ventilation units have been installed at South River Elementary School, Daniel Webster Elementary School and Eames Way Elementary School. The last building to be completed is the Town Hall with new heating/air conditioning and ventilation units.

(April 2012) The Annual Town Meeting approved an article for the purpose of funding a \$5 million Energy Services Contract with TRANE to implement energy conservation measures. The financing for the project was provided by a Qualified Energy Conservation Bond (QECB) at (0%) interest to the town. Trane will replace outdated and often inoperable heating systems and controls, ventilation units and inefficient windows in town buildings and schools and install an automated control system.

Trane Project – Results

- Phase I completed – September 2013
- Over \$4.7M in facility improvements implemented
- Utility rebates exceeding \$200,000 secured for the Town
- Transition into maintenance and guaranteed savings phase planned October 2013
- Guaranteed energy savings > \$128K/year – validated and reported annually for 20 year term
- Financing for the project was provided by a Qualified Energy Conservation Bond (QECB) at (0%) interest to the town.

Facility Improvements Implemented

Furnace Brook Middle School:

- New Variable Frequency Drives for hot water heating pumps
- Building envelope improvements

Martinson Elementary School:

- New high efficiency boiler plant
- Air cooled condenser for walk in refrigerator (*replace once-through water cooled*)

South River Elementary School:

- New high efficiency boiler plant
- 27 New classroom unit ventilators
- New air handler for Gym, Café, Arts room and Computer room
- New Energy Management System
- Building envelope improvements

Governor Winslow Elementary School:

- Air cooled condenser for walk in refrigerator (*replace once-through water cooled*)

Eames Way Elementary School:

- New high efficiency boiler plant
- 22 New classroom unit ventilators
- New air handler for Café and Kitchen
- New Energy Management System
- New high efficiency windows

Daniel Webster School:

- New high efficiency condensing boiler plant
- 28 New classroom Unit Ventilators
- New Air Handler for Café, Primary Activity Room and Gym:
- New Energy Management System
- New high efficiency windows
- New motors and Variable Frequency Drives for hot water pumps
- Air Cooled Condenser for walk in refrigerator (*replace once-through water cooled*)

Marshfield Town Hall:

- New air cooled chiller
- New chilled water distribution system throughout the facility
- 39 @ 4 Pipe (heating and cooling) Fan Coil Units – building perimeter
- New Air Handling Unit with heat recovery wheel for core areas and meeting rooms
- New high efficiency boiler plant
- New Energy Management System

South River Street Fire Station – New Overhead Doors, Main Street Fire Station-Building envelope improvements

Police Station – Building envelope improvements, Recreation Center – Building envelope improvements

Next Steps

- Construction Phase I completed September 2013
- Trane commences ongoing maintenance and guaranteed energy savings phase – Planned October 2013 (*Annual reports validating energy saved*)
- Option for Phase II project to develop and implement additional conservation measures at schools, town facilities, DPW – WWTP

Environmental Benefit

Environmental Study Town of Marshfield

Year One Annual Energy Savings:

Annual Kilowatt Hours Saved 161,187 kWh
 Annual Natural Gas Saved 75,157 Therms
 Annual Fuel Oil Saved - Gallons

Emission Reductions	In One Year	In 5 Years	In 20 Years
Pounds of Carbon Dioxide	1,104,356	5,521,780	22,087,120
Pounds of Sulfur Dioxide	522	2,609	10,435
Pounds of Nitrogen Oxide	1,265	6,326	25,302
Metric Tons of Carbon Dioxide	501	2,505	10,019
Metric Tons of Sulfur Dioxide	0.2	1	5
Metric Tons of Nitrogen Oxide	0.6	3	11



Equivalent Impact	In One Year	In 5 Years	In 20 Years
Passenger Cars off the Road	108	541	2,165
Passenger Car Miles Driven	1,298,733	6,493,665	25,974,661
Planted Acres of Trees	151	753	3,012
Gallons of Gasoline	57,043	285,216	1,140,864
Barrels of Oil	1,165	5,825	23,301
Number of Powered Homes	64	320	1,281

Marshfield Energy Challenge



The Marshfield Energy Challenge was a pilot program cosponsored by NSTAR and the Massachusetts Technology Collaborative (now the Mass Clean Energy Center). The goal was to create community awareness and local commitment to making Marshfield a greener, more energy efficient town. “This is the first pilot program in the country to address energy efficiency, load response and renewable energy options simultaneously to cut power costs”, according to NSTAR. Our thanks to NSTAR and the Marshfield Energy Challenge for their support of our goals and community. The pilot program began in March 2008 and ended in the fall of 2009.



As part of NSTAR’s Marshfield Energy Challenge, Solar Panels were installed on the Recreation Department Building at Coast Guard Hill on 6/10/09.

(6/24/09) NSTAR provided a preliminary Marshfield Energy Challenge report. As a result of the Marshfield Energy Challenge, a 3% savings in energy consumption and accompanying emissions was projected. These are the accomplishments:

- Over 1200 homes (of about 9000 homes) and 100 businesses of about (800 businesses) have had energy audits and implemented energy efficiency measures.
- Over 30 Marshfield residences have had photo-voltaic solar panels (PV) installed – a record in Massachusetts,
- Significant PV systems will be installed at two Marshfield commercial facilities,

- High efficiency lighting has been installed in seven schools and town buildings
- Three PV systems have been installed or will be installed on town facilities
- Over 500 students have participated in NSTAR's 'Energy Pursuit' or 'Energy Wizard' school programs.

(August 30, 2009) An Energy Consumption and Greenhouse Gas Inventory for Marshfield was completed by NSTAR staff. The Inventory will aid meeting a Green Community **Criterion 3**. The report was reviewed by the Energy Committee and accepted by the Board of Selectmen. The data was included in our original ESCO Request for Qualifications (RFQ) which was awarded to TRANE.

Wind

Municipal Wind Turbine

- Decided to move forward with solar projects rather than wind.
- (October 24, 2011 – Special Town Meeting) Voters approved Articles 18, 19 and 22. The voters approved a land exchange between DPW and the Conservation Committee for purposes of better siting of a proposed wind turbine. Also, the voters approved seeking an eminent domain authority from the legislature for a parcel of land at Carolina Hill as a potential wind turbine site. Finally, the voters authorized a match for a grant of up to \$85,000 from the Massachusetts Clean Energy Center for a Feasibility study. The match is contingent on receiving an award from MCEC for our Feasibility application.
- (June 2011) The Energy Committee submitted a Feasibility application to the Massachusetts Clean Energy Center (MCEC). If approved, the town may receive up to \$85,000 for the feasibility study with a small match by the town. A Feasibility study includes environmental impact and financial options. The Feasibility application was subsequently denied.
- (February 28, 2011) Applied Science Associates (ASA) recommended as Wind Turbine Feasibility Consultant.
- (December 1, 2010) Request for Qualifications (RFQ) for Wind Turbine Feasibility Study submitted with the approval of the Board of Selectmen.
- (11/30/09) Carolina Hill Site Recommended – The Marshfield Energy Committee recommended Carolina Hill as the first choice for siting a municipal wind turbine to the Board of Selectmen. The town attorney did a title search and examination of Carolina Hill, Marshfield HS and Rexhame Beach as potential sites for a wind turbine and concluded that only a cluster of town-owned parcels on Carolina Hill was suitable for siting a wind turbine.
- (3/23/09) Marshfield Board of Selectmen approve the Wind Turbine Site Survey application – The Marshfield Energy Committee is following the process of the Massachusetts Renewable Energy Trust’s Commonwealth Wind Collaborative (now the Mass Clean Energy Center – MCEC). Members of the Marshfield Energy Committee researched and collected information for a wind turbine site survey application that was approved by the Board of Selectmen and forwarded to the MCEC’s Wind Collaborative.

Wind By-Law

- (April 26, 2010) – Town Meeting – Wind Bylaw approved. In addition, a Marshfield Energy Committee Municipal Wind Update was presented.
- (1/25/10) Public Hearing for Wind Energy Facility By-law – After a public hearing for Monday, January 25th at the Town Hall, the Planning Board approved a draft and will post a warrant for approval at the April 26th Town Meeting. The draft was developed in collaboration with the Energy Committee.

Supplementary Info

COMMUNITY CHOICE AGGREGATION FOR MARSHFIELD FAQ

Town Meeting April 22- 23, 2019

What is Community Choice Aggregation (CCA)?

Community Choice Aggregation allows a community to easily switch to cleaner sources of electricity for everyone who is on basic service (residents and small businesses) and take positive action on the increasingly important issue of climate change.

This is a process, enabled by a 1997 state law that allows towns and cities to choose electricity that is generated in a way that aligns with their community's values and to have local control over their electricity sources.

How does Community Choice Aggregation work?

Community Choice Aggregation allows any Massachusetts city or town to combine all of its electrical customers into a single bargaining unit, which can then choose to discontinue its default electricity supplier, Eversource, and make its own decision about a different electricity supplier. By aggregating demand, communities gain leverage to negotiate better rates with competitive suppliers and choose greener power sources.

A town meeting warrant article allows the Board of Selectmen to pursue making Marshfield a CCA community.

Why choose CCA?

There are several potential goals for CCA. The Marshfield warrant article urges that the main goal be the lowering of Marshfield's carbon footprint. Electricity generation is a major source of climate change-causing pollution. Through CCA, Marshfield would choose an electrical supplier that would provide a higher percentage of electricity from clean renewable regional sources, or Class 1 energy. Other important benefits include the possibility of slightly lower prices, price stability for the duration of the contract, and local control of our energy sources.

What would change for customers?

All basic service customers would be automatically enrolled in the CCA program. The electrical supplier would change, but distribution (power lines, maintenance, etc.) and billing would still be through Marshfield's current utility, Eversource, so customers do not have to do or sign anything. They just continue to pay their one monthly Eversource bill. Customers not wanting to participate can opt-out at any time with no penalties by returning the opt-out card, calling, or emailing the supplier. Any residents already on contracts with other suppliers are bound by those contracts, but can opt into the CCA later.

How would CCA lead to an increase in renewable sources of energy?

Currently Marshfield residents get the state mandated 14% Class 1 clean regional electricity. This could be increased by applying the savings from buying in bulk to the purchase of more green energy. No change in infrastructure is required since electricity will continue to arrive using the

same wires as today. The only change would be that more electricity would come from regional, high quality renewable Class 1 resources such as solar, wind, geothermal, etc. and less from fossil fuel sources.

What does this mean for Marshfield?

Increasing our renewable sources of electricity through the CCA process is the perhaps the single biggest step that Marshfield could take right now to significantly reduce our reliance on fossil fuels and have an impact on climate change.

In addition, the process provides more consumer protection and transparency as the final plan must be reviewed and approved by the Mass. Attorney General's Office and the Mass. Dept. of Public Utilities. Also, our town selectmen, with the help of a green energy broker, not the utility company, will choose our energy suppliers.

How are energy brokers compensated?

The energy broker is paid a commission on the total electricity purchased in the plan, usually \$0.001 per kWh. This fee is included in the contract price of the power. The town pays nothing for the broker's service.

What has been the experience in MA to date with CCA programs?

CCAs, in a study released by UMass Amherst in Aug. 2018, beat the Eversource utility rate 75% of the time, and of the towns offering residents an option for 50-100% renewable energy approximately half secured a rate that was below the base utility price. At least 136 towns have approved CCA programs with 116 actively in progress. Further information on these programs can be found in studies done by the Univ. of NH 2017, Boston Univ. 2018, UMass Amherst 2018, the Metropolitan Area Planning Council and Mass Climate Action Network.

Basic outline of CCA approval process:

The CCA process is projected to take approximately 18 months from approval to implementation.

- Town meeting approval to pursue CCA
- Issue Request for Proposal (RFP) to hire energy broker
- Public hearings run by broker
- Broker creates aggregation plan at no cost to town
- Board of Selectmen approves aggregation plan
- MA Department of Energy Resources reviews aggregation plan
- MA Department of Public Utilities approves plan
- Broker issues RFP for competitive supplier, based on the plan
- Town selects a competitive supplier
- Broker publicizes CCA to residents and small businesses, and handles all opt-out requests

If no plans or energy prices are deemed acceptable, there is no obligation for the town to proceed.