Community Solar Action Plan

for

the Town of Whately

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Completed using the *Community Planning for Solar* Toolkit available at

https://ag.umass.edu/solarplanning

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# Executive Summary

The intent of this *Community Solar Action Plan* is to help guide future solar development within the Town of Whately by providing specific actions town residents and officials can take to develop solar on municipal properties, promote solar on residential and commercial properties, encourage solar development on locations preferred by the community, and adopt bylaw amendments and permitting processes in line with resident preferences. This Action Plan is a result of a thorough planning process, which included an assessment of community solar resources and infrastructure, distribution of a community solar survey, and based on these activities, development of this Plan. This process followed the steps outlined in the *Community Planning for Solar* Toolkit which is available on the UMass Clean Energy Extension website (<http://ag.umass.edu/solarplanning>).

Whately residents are highly supportive of solar development on previously disturbed and developed sites, while supporting little or no development of agricultural land and natural, undeveloped spaces. This Action Plan is based around a goal of achieving community self-sufficiency from solar, which would require roughly 33 MW of solar development. This could largely be accomplished through development of previously disturbed and developed spaces, but would require some limited development of farmland or undeveloped land. Whately has relatively few disturbed areas (gravel pits, former landfills, etc.). Instead, its major assets are large rooftops and parking lots owned by businesses and farms, most of which are located near three-phase lines and could safely connect to the grid. Whately also has major roads – Interstate 91 and Route 5 & 10 – running through it, and residents are supportive of development along these routes.

This Action Plan calls for outreach to residents, businesses, institutions, and farms to encourage solar development on rooftops and parking areas, as well as bylaw updates to streamline development of solar on these sites and along major roads. Whately has requirements in place to protect its agricultural land and natural lands as more solar capacity is developed, but some bylaw changes are recommended, as well as efforts to actively conserve valuable agricultural or wildlands at risk of solar development due to proximity to three-phase lines. Deployment of solar plus storage at municipal sites is recommended to provide the town with energy savings, as well as more effective emergency operations and shelter sites in case of a power outage.

# Terms, Abbreviations, and Acronyms used in this Plan

The following terms, abbreviations, and acronyms are used in this report.

### Terms

**Photovoltaic**, or “PV,” systems are solar arrays composed of panels that generate electricity from sunlight. These panels are a different type of technology than the types of panels used in “solar hot water” or “solar thermal” systems.

**Voltage** of an electric power line can be thought of as the equivalent of pressure in a water line. The voltage of transmission and distribution power lines is typically measured in kilo-volts (kV). One kilo-volt is equivalent to 1000 volts (V). In residential use in the United States, electrical wires within a household carry electricity at 120 V.

**Capacity** of a solar array is a description of the instantaneous power output of the panels at top production (i.e, in full sun). It is typically measured in kilowatts (kW) or megawatts (MW). A residential-size solar system is typically 5-10 kW in capacity. Commercial-scale solar arrays are typically 1 MW or greater in size. An average 1 MW array would cover approximately 4-5 acres of land.

**Annual generation** of a solar array is a measure of the yearly energy output produced by the panels. It is typically measured in kilowatt-hours (kWh) or megawatt-hours (MWh). In New England, annual generation is approximately equal to the array’s capacity (in DC) \*14% \* 8760 hours per year.

**DC** is the abbreviation for direct current, the type of electricity produced by solar panels. The DC capacity of a solar array is a good indication of its size, and footprint on the landscape.

**AC** is the abbreviation for alternating current, the type of electricity flowing into the grid from a solar array, after it has gone through a transformer. In the absence of energy storage, a typical DC to AC ratio for solar array capacity is about 1.25:1. However, with energy storage, that ratio can be significantly higher (close to 2:1), since excess electricity can be stored in batteries during the day, and released into the grid during the night, when the panels are not generating electricity.

**SMART** is the abbreviation for the current state solar energy incentive program (the Solar Massachusetts Renewable Target program). This program replaced earlier solar incentive programs, commonly known as “SREC” programs, in November of 2018, and was further updated through an emergency regulation in April 2020. The SMART regulation includes incentives for projects up to 5 MW AC in size. Additional incentives are available for projects located on buildings, parking lot canopies, landfills, brownfields, and “dual-use” solar and agriculture projects, as well as certain types of projects that benefit public entities, like municipalities. The updated regulation places restrictions on what types of large, ground-mounted projects can receive incentives, if they are sited on undeveloped land designated as BioMap2 Critical Natural Landscapes or Core Habitat, by the state MassWildlife Natural Heritage and Endangered Species Program.

### Abbreviations & Acronyms

**CEE**  - UMass Clean Energy Extension

**DOER** - Massachusetts Department of Energy Resources

**FRCOG** - Franklin County Regional Council of Governments, the regional planning authority for Franklin County, MA

**kV** - kilo-volt

**kW**  - kilowatt

**kWh**  - kilowatt-hour

**MDAR** -Massachusetts Department of Agricultural Resources

**MVP**  - Municipal Vulnerability Preparedness plan, a municipal planning document

**MW**  - megawatt

**MWh**  - megawatt-hour

**OSRP**  - Open Space and Recreation Plan, a municipal planning document

**PV** – photovoltaic, the type of solar panels that generate electricity from sunlight

**sf** - square feet

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# INTRODUCTION

## 1.1 Purpose

The intent of this *Community Solar Action Plan* is to help guide future solar development, municipal bylaw amendments, and solar permitting decisions within the Town of Whately. This plan also includes recommendations regarding specific activities to develop solar on municipal properties, campaigns to promote solar on residential or commercial properties, and next steps to encourage solar development on locations preferred by the community.

## 1.2 Planning Process

This draft *Community Solar Action Plan* was composed for the Town of Whately by UMass students Jessica Podesta and Myah Shostek and UMass Clean Energy Extension staff, as part of a two-semester, service-learning class at the University of Massachusetts Amherst, in which UMass undergraduates partnered with local communities to conduct a proactive, community-oriented solar planning process.

The draft *Community Solar Action Plan* developed through this project is the result of a thorough planning process, which included 1) an assessment of community solar resources and infrastructure, 2) development of town-specific alternative solar development alternatives, 3) distribution of a community solar survey and analysis of survey results, and finally, based on these activities, 4) development of this draft *Community Solar Action Plan*. This process followed the steps outlined in the *Community Planning for Solar* Toolkit which is available on the UMass Clean Energy Extension website (<http://ag.umass.edu/solarplanning>).

Before the *Community Solar Action Plan* is finalized, it will undergo review by municipal representatives involved in the project through the Energy Committee and members of other relevant municipal boards (e.g., Select Board, Planning Board, Conservation Commission). It will be presented to community residents at a community forum, with the opportunity for residents to provide feedback. These review processes are expected to result in revisions which will improve the clarity, content, and implementation of the plan. The planning process was initiated in September 2022, the community survey was conducted in March-May 2023, and the community forum is expected to occur in late summer or early fall 2023.

Because Whately is one of the first towns to complete this planning process via collaboration with UMass students and staff, **we welcome and encourage comments not only on the town-specific content contained within this draft *Community Solar Action Plan*, but also on the scope, organization, and readability of information contained within this plan**. This more general feedback will help us to develop final deliverables and examples that provide greater clarity and utility for municipal representatives and community residents in towns across the state.

## 1.3 Community Goals & Plan Structure

Whately residents generally are motivated to combat climate change and have a positive perspective on solar. 93% of survey respondents indicated that they felt positively or very positively about solar energy and 87% reported that they are “extremely” or “moderately” concerned about climate change.

Whately residents are most supportive of solar development on brownfields, spaces along major roads, and municipal rooftops and parking lots. Residents take pride in their town’s natural beauty and agriculture, and show little support for widespread development of these landscapes for solar.

A majority of Whately residents were supportive regarding a goal of solar development sufficient to meet community needs (60%) or regional (57%) energy goals. Slightly less than a majority expressed support (48% support/27% neutral) for meeting state energy goals.

**With these results in mind, this Plan focuses on strategies and actions designed to aid in development of currently developed spaces and disturbed lands for solar, as well as exploring additional ground-mounted solar development which would be necessary to meet a goal of community self-sufficiency or to support regional goals for solar development.** Based on our analysis, to help support electricity needs for the 4-county Western Mass region (Franklin, Hampshire, Hampden, and Berkshire counties), Whately would need to develop roughly 1.25% of its land area, or about 60-90 acres. This would equate to 33 MW of solar, 4x Whately’s current solar capacity. Our estimates suggest community self-sufficiency might ultimately require 39 MW of solar development in Whately, 5x the current amount of solar installed. This estimate is based on future projections of energy use by 2050, including a transition from fossil fuel-powered vehicles to electric cars, and from traditional heating sources to renewable sources. Our estimates suggest this might require development of 90-150 acres of undeveloped land. *[Note that these are estimates based on rough projections of future electricity needs and electricity sources. Future technological advances, land use decisions, and changes in population, community infrastructure, or energy use can be expected to lead to modifications to these estimates. It is anticipated that this plan and the calculations included herein will be revisited and updated regularly.]*

Meeting a goal of community self-sufficiency or supporting regional electricity needs will require active efforts to deploy solar on developed spaces, disturbed lands, and other sites acceptable to the community. This plan is designed to help guide these efforts.

Discussions of solar development options are divided into five categories – residential, municipal, local business/institution, on-farm, and large, ground-mounted solar on private land. Within each category, we discuss the current status of existing solar capacity, needs, and community perspectives, the future potential for solar development and needs, potential next steps, and specific action items.

Following the sections addressing solar development options is a section addressing the existing solar bylaw and how the bylaw and permitting processes could be updated to better reflect community attitudes expressed in the solar survey.

Finally, the plan concludes with a summary of action items and the anticipated timeline for when this plan will be revisited and revised.

## 1.4 Planning Process Documents

The final *Community Solar Action Plan* will be made available as an example on the UMass Clean Energy Extension website.

The *Community Solar Action Plan* will also be made available on the town website. Additional documents developed as part of the planning process (e.g. the *Solar Resource & Infrastructure Assessment*, the *Community Solar Survey* *Results Summary*) will also be made available on the town website.

# MUNICIPAL SOLAR

*This section addresses solar on municipal building rooftops, municipal parking lots, and municipal properties, including public schools located within the community and the regional high school located elsewhere in the district.*

## 2.1 Current Status

### Existing Infrastructure & Electricity Use

Whately has 11 municipal buildings which are currently listed in the town’s Mass Energy Insight (MEI) account. The largest electricity users, from highest to lowest, are the Elementary School, Water/Sewer Pump House, Town Offices, Library, Town Hall, Police Station, Highway Garage, Fire Station, Center School Offices, Transfer Station, and Pavilion. Additionally, municipal streetlights use small amounts of electricity.

The Town of Whately uses approximately 377,000 kWh (377 MWh) of electricity each year to power municipally owned buildings. If the entirety of Whately’s municipal electricity needs were to be generated with solar energy, this would require 290 kW of solar capacity.

In Whately, there are currently not any municipally owned solar arrays or energy storage facilities; however, the town has recently received a grant to install a roof-mounted PV system with battery storage on the Town Offices building. This system is expected to be an 87-kW system.

Whately also shares responsibility for energy use at Frontier Regional, the district regional middle and high school, located in neighboring Deerfield. This energy use is not included in the town’s MEI account or reported here.

### Current Regulatory Status

Roof-mounted solar systems are allowed by right in all zoning districts. Solar canopies over municipal parking lots would be classified as ground-mounted systems with 10-500 kW capacity. These systems are not permitted in the Agricultural-Residential 1 (AR-1) district, but are allowed by right with Site Plan Review in all other districts.

### Community Perspectives

Whately residents showed strong support for solar development on municipal buildings and properties. In the *Community Solar Survey*, 78% of respondents indicated that they felt the town should invest in solar development on municipal buildings and parking lots to meet municipal needs. 63% of residents who took the survey indicated that they think the town should also invest in solar projects to meet resident electricity needs.

## 2.2 Future Potential

### Future Electricity Use

Based on current fossil fuel use (heating oil, propane) to heat town buildings, we estimate roughly 344 MWh of electricity would be needed to heat municipal buildings with air-source heat pumps. In addition, if all municipal vehicles were to be converted to electric, an additional 104 MWh are estimated to be needed as an alternative to gas and diesel. Under this scenario, municipal electricity use would increase by 2.5x to 825 MWh, necessitating 635 kW of total solar capacity to meet municipal needs.

Note that this total does not include energy use at Frontier Regional, or potential future electricity use by school buses, which are currently owned and fueled by a private company. Both the state (<https://www.masscec.com/program/notice-intent-accelerating-clean-transportation-school-bus-actbus>) and federal government (<https://www.epa.gov/cleanschoolbus>) have recently begun providing competitive funding and/or technical support for the deployment of electric school buses.

### Potential Energy Storage Locations

As identified in the *Infrastructure Assessment*, energy storage at multiple municipal sites could be of benefit to the town:

* The **Elementary School** is a good candidate for an energy storage site, as it is one of the larger municipal buildings in the town and is used as the town’s primary emergency shelter. There is already backup power available there, and adding more energy storage options would be useful in case of emergency.
* The **Public Library** serves as a community cooling shelter during heat waves, so installing an energy storage system in this building would ensure that residents are able to stay cool during extreme summer heat, even in the case of power loss.
* The **Police Department, Fire Department, and Highway Department** are all located next door to one another, so constructing an energy storage facility in this part of town could power all three buildings in case of an outage. The Police and Fire Departments especially are critical buildings during an emergency, and it would be beneficial if they could maintain power so that they are able to continue serving the town.
* The **Water/Sewer Pump House** provides critical infrastructure to the town. It could also be of benefit for this location to have energy storage to provide power during an outage.

Whately’s MVP plan indicated that the town is working on obtaining generators for multiple town buildings, including the Pump House. As an alternative, the town could consider prioritizing investment in solar plus battery storage to provide consistent power during an outage.

### Municipal Rooftops & Parking Lots

The largest roofs on public buildings are the Town Offices and the Elementary School (**Table 1**).

|  |  |  |  |
| --- | --- | --- | --- |
| **Structure** | **Street Address** | **Total Roof Area**   (sq ft) | **Estimated Rooftop Technical Solar Potential**  (kW) |
| Town Offices | 4 Sandy Ln | 14,445 | 105\* |
| Elementary School | 273 Long Plain Rd | 32,203 | 235 |
| Fire Department | 63 Christian Lane | 4,071 | 16 |
| Highway Department | 71 Christian Lane | 4,029 | 16 |
| Salt Shed (DPW) | 71 Christian Lane | 3,915 | 15 |
| Police Station | 71 Christian Lane | 2,778 | 11 |
| Center School Offices | 218 Chestnut Plain Road | 2,744 | 11 |
| Town Hall | 194 Chestnut Plain Rd | 2,695 | \*\* |
| Library | 202 Chestnut Plain Rd | 2,344 | 9 |

**Table 1** Publicly owned properties with large areas of roof and parking lot available for solar. \*Note that 87 kW are being installed on the Town Offices. \*\*The Town Hall has a permanent preservation restriction that mandates adherence to the Secretary of the Interior's Historic Preservation Standards, which currently do not permit solar installations on historic slate roofs.

Other infrastructure includes the Water Pump House, Transfer Station, and Town Pavilion in Herlihy Park. These sites have smaller rooftops which may not be economically viable for solar production, but could still be considered in an on-site evaluation of municipal buildings.

One municipal location has a large, paved area which could be appropriate for solar. The Police and Highway Departments share a parking lot with an area of 2.2 acres. Parking lots can have a packing density of approximately 263 kW per acre.1   Hence, our estimate of solar technical potential at this site is 579 kW.

Our estimate of total technical potential on these roofs (418 kW) and parking lots (579 kW) is roughly 997 kW (1 MW). However, this is the technical potential. This estimate does not take into account roof condition, driveways, logistics, economic considerations, or other considerations, and hence is likely a significant overestimate of actual potential. All these locations would require on-site evaluations to understand use patterns, available space, and actual solar potential. In addition, the town is currently considering rental or sale of the Center School Offices, which are not being used for municipal purposes, which suggests this roof may not be suitable for solar.

Solar arrays over 50 kW in size often must connect to three-phase electricity distribution lines in order to interconnect to the electricity grid safely. Both large municipal rooftops which could accommodate an array over 50 kW in size are located near three-phase lines. The Police/Highway Department parking lot is also located near a three-phase line.

### Ground-Mounted Solar

This analysis did not identify any former landfills, previously paved, or otherwise disturbed sites on municipal land. However, the Energy Committee did identify an old stump dump off of Webber Road as a potential site for solar. This location does not have three-phase power, and hence could not host a large array at present.

The Committee also noted that the Whately Elementary School property has several areas that are currently maintained only as open lawn and which could host a small to medium-sized, ground-mounted solar array.

### Financial Considerations

Development of solar on municipal buildings and land can be simpler in some ways than development on private land because town boards have the greatest control over determining whether these projects proceed. However, towns do not always have funding available to pay for large solar projects.

Financial costs and benefits of municipal solar are dependent on many factors, including system size, system cost, electricity rates, solar incentives, federal and state tax credits, loan amount, and loan terms (interest rate, term). All of these items are site-dependent, and subject to change over time. Historically, municipal governments were unable to receive federal or state tax credits for solar development, which could make these projects more challenging from a financial perspective. However, with the recent passage of the federal Inflation Reduction Act, organizations and individuals that do not owe taxes now are eligible for a “direct payment” option, which can cover 30% of the costs of a new solar installation. This change will make small to medium-size municipally owned solar projects more financially viable. Depending on the size, location, and type of system, new solar arrays may also be eligible for solar incentives through the state SMART program on a fixed $/kWh basis; this program has a specific additional incentive for “public” projects owned, operated, or benefitting the municipality. Alternatively, the town can earn Renewable Energy Credits for each MWh of solar energy that is generated. Some financial institutions offer loans which can be applied to solar projects or may offer specific solar loans designed to cover the costs of new solar arrays. UMass CEE can assist the town with calculations of the costs and savings associated with specific municipal solar projects.

## 2.3 Next Steps & Action Items

Potential next steps for municipal solar development include:

* Conduct on-site evaluations of solar potential on rooftops and over paved areas at the Elementary School, Fire Department, Highway Department, Police Station, Library, Transfer Station, and Water/Sewer Pump House with the assistance of a solar installer.  Evaluations should include rough quotes for installation cost and identify potential obstacles to development (e.g., roof warranties, roof structure, interconnection).  Evaluations at the Elementary School, Police Station, Fire Department, and Water/Sewer Pump House should include assessments of energy storage options. Consider whether energy storage options should also be considered at the Library.
* Explore potential options to support solar development aside from direct use of town funds (e.g., ARPA funds, MVP grants, solar loans).
* Carry out financial analyses to understand costs and benefits of specific solar options (UMass CEE can assist).
* Complete a table to plan for future development, e.g.:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Building/Location** | **Address** | **Solar Potential** | **Rough Cost ($)** | **Roof Warranty Information** | **Roof Structural Needs/Cost** | **Energy Storage Needs?** | **Funding Sources?** | **Anticipated Year for Development?** |
|  |  |  |  |  |  |  |  |  |
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* Work with neighboring towns and district staff to understand energy usage at Frontier Regional. Discuss the feasibility of solar at these sites.
* Explore potential for electric buses and associated charging needs for Whately Elementary School and Frontier Regional.

### Action Items

|  |  |  |  |
| --- | --- | --- | --- |
| **Action** | **Lead Entity (or Entities)** | **Supporting Entities** | **Start Year/ Annually?** |
| Conduct on-site solar evaluations | Whately Energy Committee | Solar Installer |  |
| Review energy usage data for Frontier Regional | Energy Committees for Conway, Deerfield, Sunderland, and Whately | Green Communities Program; School Committee; Frontier Regional Superintendent’s Office |  |
| Conduct on-site solar evaluation at Frontier Regional | Energy Committees for Conway, Deerfield, Sunderland, and Whately | Green Communities Program; School Committee; Frontier Regional Superintendent’s Office |  |
| Explore solar funding options for municipal projects | Whately Energy Committee | Finance Committee, FRCOG |  |
| Carry out financial analyses | UMass Clean Energy Extension | Energy Committee, Finance Committee |  |
| Create a timeline for future municipal solar development | Whately Energy Committee | Finance Committee, Select Board |  |
| Explore opportunities for electric bus use & charging needs at Elementary School | Whately Energy Committee, School Committee | school staff, EPA, MassCEC, bus companies |  |
| Explore opportunities for electric bus use & charging needs at Frontier Regional | Energy Committees for Conway, Deerfield, Sunderland, and Whately | Green Communities Program; School Committee; Frontier Regional Superintendent’s Office |  |

# RESIDENTIAL SOLAR

*This section addresses solar on residential properties, including solar on house rooftops or in residential yards.*

## 3.1 Current Status

### Existing Infrastructure & Regulatory Status

Currently, Whately has about 112 residential solar systems, with an average size of 8.7 kW, and representing a total of 974 kW of solar capacity. Roughly 18% of households have a residential solar system.

In Whately, most residential systems would fall under the category of small-scale systems in the town’s bylaw. Roof-mounted of any size and small ground-mounted systems up to 10 kW are allowed by right in all zoning districts with a building permit. Some residential-scale ground-mounted systems would likely be greater than 10 kW in size, and would hence be regulated as ground-mounted systems with 10-500 kW capacity. Such systems are not permitted in the Agricultural-Residential 1 (AR-1) district, but are allowed by right with Site Plan Review in all other districts.

### Community Perspectives

Whately residents indicated strong support for solar development on residential rooftops and in residential yards: 78% felt “positive” or “very positive” about solar installed in this location, and 67% indicated they felt “positive” or “very positive” about solar development on residential yards. Only 8% objected to solar located on residential rooftops and 9% felt negative about these systems located in residential yards.

Major reasons residents cited for not having a system installed were upfront cost (48%), having a shaded property (29%), distrust of solar developers (21%), a perception that paying their current electricity bill is cheaper than installing solar (21%), and concern about solar as a safety hazard (19%).

Of the respondents who do not currently have a solar array installed at their home, 33% were interested in the possibility, 31% were not interested, and 35% were unsure.

## 3.2 Future Potential

### Solar Potential on Residential Rooftops & Yards

Potential residential solar capacity in Whately can be estimated through several different methods. If solar were installed on all small building roofs in town, the total technical potential would be 10.7 MW. However, installing solar on many roofs may not be technically or economically feasible, due to shading, roof structures, and economies of scale (i.e., installing scattered, small systems on very small roofs may not make financial sense). Based on estimates of shading on residential properties, it may be more reasonable to assume about 78.8%[[1]](#footnote-1) of residential properties in Whately have roofs or unshaded yard space available for solar (see *Solar Infrastructure and Resource Assessment* for more details). Currently, the average size of a residential solar PV system in Whately is 8.7 kW.[[2]](#footnote-2) If 79% of homes were to install a solar PV system of this size, it could provide about 4.3 MW of electricity generation capacity. This would be equivalent to about 11% of the electricity generation capacity anticipated to be needed in the future to support 100% of the community’s electricity needs with solar power.

Residential solar PV systems are typically sized to generate enough electricity to cover current household electricity needs. A 5.5 kW residential solar PV system can generate what works out to an average of 600 kWh of electricity per month (the average household monthly electricity use in Massachusetts), with higher solar generation occurring in summer months and lower generation during the winter. Average monthly electricity use in Whately is 794 kWh, which is higher than the state average. The average size of a household solar PV system in Whately is 8.7 kW, generating an average of 942 kWh per month. This suggests current solar systems in town are located on houses with higher than average electricity use or are designed to meet more than current electricity needs.

As personal vehicles and home heating systems are converted to electricity-based systems, we predict average household electricity use in Whately could increase by roughly 2.5x, necessitating a system of roughly 21 kW to offset future household electricity demand. Ultimately, if 79% of households were to install a 21 kW system to meet future electricity needs, residential systems could contribute 8.9 MW of solar. This is equivalent to 23% of the estimated 39 MW of solar capacity needed to offset Whately’s anticipated future electricity demand.

While some of this technical potential is captured in the values discussed above, it is worth noting that as a community with a long history of farming, Whately has many barns, some of which are in commercial use (see Sections 4 and 5), but others of which are on residential properties. From a desktop analysis, it is not always clear which barns are being used for agriculture or other commercial uses, as opposed to residential use. There are some properties with large houses (over 5,000 sf), houses attached to large barns, or stand-alone barns on residential properties.

### Financial Considerations

Financial costs and benefits of a residential solar are dependent on a number of factors, including the system size, system cost, electricity rates, solar incentives, federal and state tax credits, loan amount, and loan terms (interest rate, term). All of these items are site-dependent, and subject to change over time. Despite high interest rates and minimal solar incentives, our estimates suggest that residential solar systems are nevertheless currently a financially feasible option for Whately residents, because the cost of a monthly electricity bill is at this time higher than the cost of a solar loan payment, so a resident with a new solar system installed could pay less per month for electricity than one without, and after the loan is repaid, the solar system will continue to generate free electricity.

For example, UMass Five College Credit Union currently offers solar loans at a rate of 7.24% for 10 years or 7.49% for 15 years. Currently, there is a federal tax credit rebate of 30% of the cost of an installed solar system, in addition to a $1,000 tax credit available for Massachusetts state taxes. Solar incentives through the state SMART program have dropped to $0 for residential systems (<25 kW) in Whately. However, as an alternative to the SMART program, residents can earn Renewable Energy Credits for each MWh of solar energy that is generated; RECs currently can be sold for about $34 per REC, although that number is expected to decrease over time, and our estimates use an average value of $22 per REC. With federal tax credits, state tax credits, and solar incentive payments, the monthly payment on a 15-year loan on the remaining balance for an 8.7 kW system priced at $3.59/kW (the Franklin County average according to [MassCEC](https://www.masscec.com/production-tracking-system-pts)) is below the monthly cost of electricity generated by a system of that size that would appear on an Eversource electricity bill. For a 10-year loan, there is significant cost to the customer over the first 10 years ($250-$550 per year), but the net value is positive due to avoided electricity costs ($40,000 over 25 years, not adjusted for the opportunity cost of not investing the money elsewhere). The resident would likely need to replace the inverter for the system after about 10-12 years, but would still make money over the course of the PV system lifespan.

The financial balance could be more challenging for low-income residents. However, there are some potentially feasible options available. The nonprofit Capitol Good Fund last year began offering “DoubleGreen” solar loans at a fixed rate of 3.1%-4.2% for 25-year terms for low-income ratepayers in Rhode Island, which if offered in Massachusetts could make solar PV systems economical for low-income residents here. Through the passage of the federal Inflation Reduction Act, low-income residents who do not owe taxes are now eligible for a direct payment equal to 30% of the installed cost of a new residential solar system. In addition, low-income residents are currently eligible for an approximately $0.009 per kWh state solar incentive, or the REC payment of $34/MWh described above. Affording a solar loan might still be challenging for some low income (R-2) customers, who are eligible for reduced electricity rates to begin with, and therefore might have difficulty obtaining a monthly loan payment that is lower than their reduced electricity bill. UMass CEE can assist in estimating the specific financial costs and benefits for Whately residents.

## 3.3 Next Steps & Action Items

### Potential Next Steps

Since there is strong interest and support for residential solar, there is potential for a large increase in solar capacity on residential roofs and in residential yards. The major barriers to overcome appear to be 1) lack of knowledge of options and safety regarding solar PV systems, 2) financial concerns, and 3) logistical challenges with locating solar PV systems on some shaded residential properties.

#### Public Information Sessions

In order to overcome general hesitancy, address concerns, and increase resident knowledge, Whately residents could benefit from annual or semi-annual public information sessions about residential solar, highlighting state and federal incentives and solar loan options, addressing safety concerns, and elucidating the range of options available. Some recommendations regarding these sessions include:

**Speakers and content**. Given some residents’ lack of trust of the utility or solar companies, it would be preferable to have the majority of information presented by a neutral party rather than a company with a vested interest in solar development. It would be helpful to include participation by town residents who have had solar installed, and who could speak to the benefits and any challenges associated with installing a residential solar array. This session could include specific financial information (see below), as well as opportunities for neighbors to coordinate on solar installations.

**Financial analysis of residential systems**. CEE is happy to work with Whately to provide a simple calculator to help residents at a public forum estimate the costs and benefits of a solar system that meets their needs and specifications.

**Specific solar loan programs available through financial institutions**. CEE plans to compile a list of institutions involved in solar financing around the state, and specific solar loan programs, which could be addressed included the public forum. The state’s [Mass Solar Loan](https://www.masssolarloan.com/) program is no longer active. If revived, it would be helpful to include information about this program as well.

#### Handouts and Factsheets

In addition to information sessions, factsheets/handouts with content similar to that provided at Public Information Sessions could be distributed at annual Town Meeting or other local events.

#### Assisting Residents with Shaded Properties

Forested residential properties, as are common in Whately, may not be appropriate for solar. Residents may in some cases choose to cut some trees to provide an opening for solar, but this is not always possible or preferred. Creative approaches are necessary to provide residents of shaded properties the benefits of solar. Solutions to give residents living on shaded properties access to solar include:

**Neighbors helping neighbors.** Residents with properties that could host solar have the opportunity to install a larger system that meets more than their current needs. There are not clear financial models available at present to have neighbors jointly own a small array and share in tax credit benefits. However, there are straightforward pathways for net metering agreements between community residents to share in the benefits of solar generation. In this situation, a resident with a large roof might install and own a system larger than that necessary to meet their own needs, then net-meter electricity credits over to a different community member’s account through a form known as a Schedule Z. It is possible (and common) to establish a legal contract which could guarantee the price per net metering credit - providing the project host/owner a known income each year - and such an agreement could include a commitment to pay a portion of upfront installation costs.

**Community solar array**. If about one in five residential properties in Whately cannot host solar, there is likely to be appetite for community solar for people who own shaded properties. It is worth considering whether there are properties where a community-owned project on public or private land could be owned by a group of local residents.

#### Residential Solar Campaign

The town Energy Committee or a committed group of residents could conduct a [Solarize Mass](https://www.masscec.com/program/solarize-mass)-style campaign to encourage multiple households to install residential solar PV systems at the same time. The Solarize Mass program is no longer active, but the campaign tools developed as part of the program are still available. The benefits of such a campaign include neighbor support in the purchasing of a solar array and the opportunity to work through challenges together, as well as the feeling of participation in a collective, community effort. In addition, residential solar campaigns can lead to lower installation costs, due to economies of scale associated with the solar installer working on multiple projects in one location.

#### Specific Next Steps

Based on the above, specific potential next steps for residential solar development include:

* Organize and hold a community solar forum once annually to discuss options for residential solar development.
* Design and distribute flyers/handouts to explain residential solar development options, highlighting their financial feasibility, and including a description of how to arrange a net metering agreement with a neighbor to share solar electricity generation.
* Research sites around town which could be potential sites for community-shared solar facilities.
* Conduct a residential solar campaign each year, with a goal of recruiting 20 households per campaign.
* Reach out to residents with large barns on their property to assess their interest in solar to meet their needs and those of neighbors.

### Action Items

|  |  |  |  |
| --- | --- | --- | --- |
| **Action** | **Lead Entity (or Entities)** | **Supporting Entities** | **Start Year/Annually?** |
| Organize and hold a community solar forum | Whately Energy Committee | CEE, Solar Installers, Financial Institutions |  |
| Design and distribute a residential solar handout |  |  |  |
| Research sites around town which could support community-shared solar facilities |  |  |  |
| Conduct a residential solar campaign |  |  |  |

# SOLAR FOR BUSINESSES & INSTITUTIONS

*This section addresses solar on commercial and institutional buildings and parking lots.*

## 4.1 Current Status

### Existing Infrastructure

Currently, the only solar arrays in Whately that are not residential arrays are associated with agricultural or horticultural businesses, and are detailed in Section 5.

There are a number of large buildings and large paved areas on commercial and institutional properties which might be suitable for solar (*see Future Potential*).

### Current Regulatory Status

Roof-mounted solar systems are allowed by right in all zoning districts. Solar canopies over commercial parking lots would be classified as ground-mounted systems with 10-500 kW capacity or greater than 500 kW capacity. Systems in the 10-500 kW range are not permitted in the Agricultural-Residential 1 (AR-1) district, but are allowed by right with Site Plan Review in all other districts. Larger systems are also not allowed in the AR-1 district either, but are permitted by Special Permit in other districts.

### Community Perspectives

A large percentage (49%) of residents expressed that knowing a business uses solar energy makes them feel more positively towards that business or institution. One quarter (25%) of survey respondents said that knowing a business uses solar energy makes them more likely to purchase from that business. Only one resident responded that knowing a business uses solar energy makes them feel negatively or less likely to purchase from the business. One quarter of respondents indicated the presence of solar on a business does not affect their attitude towards the organization.

On average, residents reported wanting to see 84% of large roofs developed for solar.

## 4.2 Future Potential

### Commercial Rooftops

Rooftops can provide roughly 1.5 kW of solar per 100 sf of suitable roof space. On medium roofs (5,000-25,000 sf), about 49% of the roof area is suitable for solar; on larger roofs (25,000+ sf) about 66% of the roof area is suitable for solar.

There are a total of 33 medium and large roofs owned by businesses and institutions in Whately. These roofs total 708,190 sf in area and 6.26 MW of technical solar potential.

Locations with the greatest potential for roof-mounted solar on businesses or institutions are summarized in **Table 2**. All of these roofs would require on-site evaluations to review the underlying roof structure, identify any shading concerns from adjacent vegetation, identify roof-mounted equipment that could interfere with the placement of solar panels, and determine actual solar potential.

|  |  |  |  |
| --- | --- | --- | --- |
| **Structure** | **Address** | **Roof Area** | **Estimated Technical Solar Potential** |
|  |  | (sf) | (kW) |
| Business- Yankee Candle | 102 Christian Ln | 228,842 | 2,266 |
| Business- Covestro LLC | 8 Fairview Way | 148,474 | 1,470 |
| Business- Goulet Trucking Inc. | 20 Industrial Dr W | 35,496 | 351 |
| Business | 454 State Rd | 24,748 | 182 |
| Business- Northampton Co-op Auction | 353 Long Plain Rd | 16,200 | 119 |
| Business | 139 Westbrook Rd | 15,121 | 111 |
| Business- Holy Ghost Ukrainian Cemetery | 370 Long Plain Rd | 14,561 | 107 |
| Business- Happy Hounds Center | 203 Long Plain Rd | 14,281 | 105 |
| Business - (Vehicle Repair) | River Rd | 13,288 | 98 |
| Business - C.N. Wood | State Rd | 12,116 | 89 |
| Business- NUPRO LLC | 10 Sandy Ln | 12,022 | 88 |
| Unclear - Old Concrete Pad? | Old State Rd | 11,765 | 86 |
| Business- Tea Guys | 110 Christian Ln | 11,578 | 85 |
| Business- New England Broach Co. | 199 Long Plain Rd | 10,931 | 80 |
| Business- The Fire Place | 100 State Rd | 10,844 | 80 |
| R/M Shop | 3 Egypt Rd | 9,838 | 72 |
| Store - Orchard Trailers RV | 78 State Rd | 9,328 | 69 |
| Barn - Mustang Whately Investors | S/S Christian Ln | 8,076 | 59 |
| Self-Storage Units | 94 State Rd | 8,066 | 59 |
| Self-Storage Units | 94 State Rd | 7,958 | 58 |
| Self-Storage Units | 94 State Rd | 7,873 | 58 |
| Self-Storage Units | 94 State Rd | 7,860 | 58 |
| Warehouse - Underground Supply | 82 State Rd | 7,724 | 57 |
| Store - Muffin's General Store | 28 State Rd | 7,063 | 52 |
| Barn - Mustang Whately Investors | S/S Christian Ln | 6,963 | 51 |
| Barn - State of MA | Off River Rd | 6,854 | 50 |
| Unknown - Mustang Whately Investors | S/S Christian Ln | 6,717 | 49 |
| Barn - State of MA | Off River Rd | 6,377 | 47 |
| Barn - Mustang Whately Investors | S/S Christian Ln | 6,147 | 45 |
| ? - Sanderson Bros Realty | W/S Long Plain Rd | 5,672 | 42 |
| Barn - State of MA | Off River Rd | 5,272 | 39 |
| Store - Apple Creek Furniture | 50 Old State Rd | 5,093 | 37 |
| Barn - State of MA | Off River Rd | 5,038 | 37 |

**Table 2.** The 33 largest roofs on commercial or institutional buildings in Whately.

The largest 25 commercial or institutional rooftops in Whately could potentially host a solar array over 50 kW in size. Solar arrays over 50 kW in size often must connect to three-phase electricity distribution lines in order to interconnect to the electricity grid safely. Conveniently, almost all of the medium and large commercial or institutional roofs in Whately are located adjacent to three-phase lines. Three-phase lines run along Long Plain Road, River Road, Christian Lane, Sandy Lane, and Industrial Drive West, as well as State Road south of Christian Lane. The only large roof that may have difficulty connecting to three-phase power is the business on Westbrook Street. For large rooftops not located near three-phase lines, the size of the system may be limited to less than 50 kW by local grid infrastructure, or local infrastructure may need to be upgraded to accommodate larger projects. Alternatively, integration of an energy storage system with the solar array may allow a larger solar array to be interconnected to the grid.

Solar arrays under 50 kW in size can typically safely connect to single-phase or three-phase electricity distribution lines.

### Commercial Parking Lots

Potential sites for solar parking canopies on businesses or institutions are summarized in **Table 3**. Parking lots can have a packing density of approximately 263 kW per acre[[3]](#footnote-3), but because the paved areas noted here in some cases include driveways, estimates of technical potential based purely on acreage are likely to be overestimates. All of these locations would require on-site evaluations to understand use patterns, available space, and actual solar potential.

|  |  |  |  |
| --- | --- | --- | --- |
| **Organization Name** | **Street Address** | **Area of Parking Lot/ Pavement** (acres) | **Estimated Technical Solar Potential** (kW) |
| Deerfield Industrial Park | Fairview Way | 7.7 | 2,025 |
| Whately Truck Plaza | 372 State Rd | 4.7 | 1,236 |
| Deerfield Industrial Park, Goulet Trucking | 20 Industrial Dr W | 3.8 | 999 |
| Holy Ghost Cemetery | 375 Long Plain Rd | 3.4 | 894 |
| Yankee Candle Main Lot | 102 Christian Ln | 3.1 | 815 |
| Yankee Candle Rear Lot | 102 Christian Ln | 2.4 | 631 |
| The Whately Inn | 193 Chestnut Plain Rd | 0.75 | 197 |

**Table 3** Privately owned properties with large areas of parking lot suitable for solar.

As with roof-mounted arrays, parking lot over 50 kW in size often must connect to three-phase electricity distribution lines in order to interconnect to the electricity grid safely. Conveniently, all of the parking lots in **Table 3** are located near three-phase lines.

### Financial Considerations

Financial costs and benefits of commercial and institutional solar are dependent on many factors, including system size, system cost, electricity rates, solar incentives, federal and state tax credits, loan amount, and loan terms (interest rate, term). All of these items are site-dependent, and subject to change over time. Currently, there is a federal tax credit of 30% of the cost of an installed solar system, in addition to a $1,000 tax credit available for Massachusetts state taxes. Through the passage of the federal Inflation Reduction Act, non-profit organizations who do not owe taxes are now eligible for a direct payment equal to 30% of the installed cost of a new solar system. Depending on the size, location, and type of system, new solar arrays may also be eligible for solar incentives through the state SMART program on a fixed $/kWh basis; alternatively, businesses and institutions can earn Renewable Energy Credits for each MWh of solar energy that is generated.

Some financial institutions offer business loans which can be applied to solar projects or may offer specific solar loans designed to cover the costs of new solar arrays. For example, UMass Five College Credit Union currently offers solar loans for up to a 10-year term. More information about financing and other aspects of solar for businesses and institutions can be found at: <https://www.masscec.com/resources/commercial-solar-information-hub>.

## 4.3 Next Steps & Action Items

Potential next steps for solar development on at businesses and institutions include:

* Conduct outreach to businesses and institutions listed in Tables 2 and 3 to determine their interest in roof-mounted or parking canopy solar systems.
* Outreach could also be conducted to other, smaller businesses to determine their interest in small-scale solar.
* Assist interested businesses with estimation of costs and rebates.

### Action Items

[To be filled out based on what Energy Committee and other municipal boards want to take on in the next 3-5 years.]

|  |  |  |  |
| --- | --- | --- | --- |
| **Action** | **Lead Entity (or Entities)** | **Supporting Entities** | **Start Year/ Annually?** |
|  |  |  |  |

# ON-FARM SOLAR

*This section addresses solar on farms, including solar arrays on farm buildings and greenhouses, solar canopies designed to shelter parked farm vehicles, and ground-mounted solar development on land owned by farm businesses or actively farmed.*

## 5.1 Current Status

### Existing Infrastructure

Whately has many active farms and significant acreage in agricultural production. Based on Mass GIS Land Cover data, the town has roughly 1,356 acres in cultivation and 634 acres in pasture or hay production. About 3,500 acres of agricultural land are protected in perpetuity through an Agricultural Preservation Restriction. In addition, at least 61 properties totaling 284 acres participate in the Chapter 61A program for the purposes of agricultural production (not including productive woodlots). There are large areas of roofs on barns, greenhouses, and other farm buildings which could be suitable for solar (see *Future Potential*).

Farms and agricultural properties where solar systems are already installed include:

* Full Bloom Farms has three separate installations sized 10 kW, 93 kW, and 629 kW.
* Fairview Farms (345 Long Plain Road) has one large project with a capacity of 2,385 kW.
* Nasami Native Plant Nursery (128 North Street) has a small project with capacity of 17 kW.

Whately has a number of other farms, orchards, and other agricultural businesses. These include the following:

* **Nourse Farms** - 41 River Road
* **Sweet River Farm** - 64 River Road
* **Golonka Farm** - 8 State Road
* **Quonquot Farm** - 9 North Street
* **Chamutka Farm** - 14 Conway Road
* **River Valley Farm** - 239 River Road
* **Poplar Hill Farm** - 28 Poplar Hill Road
* **LaSalle Florists** – 23 LaSalle Drive
* **Lombrico Market Gardens** – 21 Poplar Hill Road
* **Bear Path Compost** – 134 Webber Road

### Current Regulatory Status

Roof-mounted solar systems are allowed by right in all zoning districts; solar greenhouses would likely be regulated in the same manner. Solar canopies over agricultural business parking lots would be classified as ground-mounted systems with 10-500 kW capacity, as would medium-scale ground-mounted arrays. These systems are not permitted in the Agricultural-Residential 1 (AR-1) district, but are allowed by right with Site Plan Review in all other districts. Larger systems (over 500 kW) are limited to 10 or 15 acres of land, prohibited in the AR-1 district, and allowed by Special Permit in other districts.

Special guidance is provided regarding solar development on farmland. Facilities located on farmland must be designed with the lowest possible impact to the land in mind. For land protected under Chapter 61 or 61A programs within several years of development, the owner of the solar facility must pay a Resource Replacement Fee to the Town of Whately for every acre of land developed for solar.

### Community Perspectives

Whately residents were generally not supportive of widespread, conventional ground-mounted solar development on farmland. Nearly half (48%) of respondents wanted to see no solar development on farmland. The average amount of development respondents preferred was 18%. Residents did respond more favorably to certain types of solar facilities installed on farms. These included:

* Installations located on the margins of agricultural fields (54% support/28% neutral)
* Co-location of solar installations with active agriculture underneath the panels (47% support/30% neutral).

Opinions on development of fallow farmland not currently in production were mixed (37% support/25% neutral/38% oppose).

Residents expressed strong opposition to traditional solar development on land currently in vegetable/fruit production (81% oppose) or pasture (66% oppose).

## 5.2 Future Potential

### Rooftops, Greenhouses, and Parking Canopies

As discussed above, rooftops can provide roughly 1.5 kW of solar per 100 sf of suitable roof space. On medium roofs (5,000-25,000 sf), about 49% of the roof area is suitable for solar; on larger roofs (25,000+ sf) about 66% of the roof area is suitable for solar.

There are a total of 50 medium and large roofs located on barns, greenhouses, and other agricultural businesses in Whately. These roofs total 841,200 sf in area and 7.6 MW of technical solar potential. [Note that some barn roofs may be on residential property and not in agricultural use. This can be difficult to determine from assessors’ records alone.]

Locations with the greatest potential for roof-mounted solar on agricultural buildings are summarized in **Table 4**. All of these roofs would require on-site evaluations to review the underlying roof structure, identify any shading concerns from adjacent vegetation, identify roof-mounted equipment that could interfere with the placement of solar panels, and determine actual solar potential.

|  |  |  |  |
| --- | --- | --- | --- |
| **Structure** | **Address** | **Roof Area** | **Estimated Technical Solar Potential**  (kW) |
|  |  | (sf) |
| Greenhouse | State Rd | 166,445 | 1,648 |
| Business- Full Bloom Market Garden | 216 Long Plain Rd | 97,507 | 965 |
| Business- Fairview Farms | 345 Long Plain Rd | 55,005 | 545 |
| Greenhouse | River Rd | 53,151 | 526 |
| Business- Chang Farm | 309 River Rd | 49,478 | 490 |
| Business- Nourse Farms | 41 River Rd | 46,067 | 456 |
| Business- Nourse Farms | 41 River Rd | 42,038 | 416 |
| Business- Sweet River Farm | 64 River Rd | 39,728 | 393 |
| Business- Harvest Farm of Whately | 125 Long Plain Rd | 18,469 | 136 |
| Business- Nourse Farms | 41 River Rd | 13,855 | 102 |
| Business- LaSalle Florists and Greenhouses | 23 Lasalle Dr | 10,776 | 79 |
| Barn | Poplar Hill Rd | 10,104 | 74 |
| Business - Nourse Farms | 29 River Rd | 8,070 | 59 |
| House+Barn Complex | 13 River Rd | 7,924 | 58 |
| Barn - Residential | 33 Christian Ln | 7,863 | 58 |
| Barn | W/S Long Plain Rd | 7,594 | 56 |
| Store - Nasami Farm Plant Nursery Office | 128 North St | 7,516 | 55 |
| Barn - Residential | 105 Christian Ln | 7,500 | 55 |
| Barn - Pasiecnik | 255 River Rd | 7,487 | 55 |
| Barn - Golonka | 6 State Rd | 7,040 | 52 |
| Barn - Residential | 61/63 Dickinson Hill Rd | 6,939 | 51 |
| Barn - Pasiecnik | 255 River Rd | 6,904 | 51 |
| Barn | W/S Long Plain Rd | 6,747 | 50 |
| Allards Farms Inc | Off Long Plain Rd at Deerfield Line | 6,690 | 49 |
| Barn - Sanderson Bros Realty | 362 Long Plain Rd | 6,677 | 49 |
| Barn - Full Bloom Market Garden | 212 Long Plain Rd | 6,572 | 48 |
| Barn/Warehouse | Off Long Plain Rd | 6,370 | 47 |
| Barn | 72 River Rd | 6,355 | 47 |
| Barn - Allard | Off E/S State Rd | 6,340 | 47 |
| Barn - Szawlowski Realty Inc | E/S State Rd | 6,326 | 46 |
| Barn - Szawlowski Realty Inc | 44 Christian Ln | 6,223 | 46 |
| Barn | Between I-91 + B&M Railroad | 6,044 | 44 |
| Barn - Pasiecnik | 207 River Rd | 5,993 | 44 |
| Barn - Full Bloom Market Garden | 212 Long Plain Rd | 5,986 | 44 |
| Barn - Pasiecnik | W/S River Rd | 5,904 | 43 |
| Barn complex with house | 182 Chestnut Plain Rd | 5,900 | 43 |
| Barn - Quonquont | 9 North St | 5,697 | 42 |
| Barn - LaSalle Florists | 23A LaSalle Dr | 5,660 | 42 |
| Barn - Residential | W/S North St | 5,623 | 41 |
| Barn - Sanderson Bros Realty | 345 Long Plain Rd | 5,604 | 41 |
| Barn - Quonquont | 9 North St | 5,591 | 41 |
| House+Barn Complex | 21 River Rd | 5,589 | 41 |
| Barn - Pasiecnik | 207 River Rd | 5,570 | 41 |
| Barn - Residential | 195 North St | 5,351 | 39 |
| Barn | W/S Long Plain Rd | 5,249 | 39 |
| Barn complex with house - Sanderson | 19 North St | 5,211 | 38 |
| Barn - Sanderson Bros Realty | 362 Long Plain Rd | 5,171 | 38 |
| Barn/Business | W/S Long Plain Rd | 5,157 | 38 |
| Barn | W/S Long Plain Rd | 5,114 | 38 |
| Barn - Nourse | E/S Long Plain Rd | 5,006 | 37 |

**Table 4.** The 50 largest roofs on barns and other agricultural business buildings in Whately.

The 22 largest agricultural business rooftops in Whately could potentially host a solar array over 50 kW in size. Solar arrays over 50 kW in size often must connect to three-phase electricity distribution lines in order to interconnect to the electricity grid safely. Most of the buildings listed above are adjacent to three-phase power. The only buildings likely to have solar capacity significantly constrained by interconnection opportunities are the properties on LaSalle Drive and Poplar Hill Road. For these rooftops, the size of the system may be limited to less than 50 kW by local grid infrastructure, or local infrastructure may need to be upgraded to accommodate larger projects. Alternatively, integration of an energy storage system with the solar array may allow a larger solar array to be interconnected to the grid.

Solar arrays under 50 kW in size can typically safely connect to single-phase or three-phase electricity distribution lines.

In addition, two farms have large, paved areas. Nourse Farms (41 River Road) has 2.8 acres of parking lot, with an estimated technical solar potential of 736 kW. Quonquont Farm (9 North Street) has 1.1 paved acres with a technical potential of 289 kW.

### Ground-Mounted Solar: Agrivoltaic & Conventional Ground-Mounted Systems

##### Agrivoltaic Projects

Whately residents were largely supportive of, or neutral towards, agrivoltaic projects.

All farms, but particularly those which graze livestock (including dairy cows) or carry out hay production, might be interested in pursuing an agrivoltaic project.

“Agrivoltaic” refers to agricultural production and electricity production from solar PV panels occurring together on the same piece of land.  These facilities may also be referred to as agrisolar, “dual-use,” or co-location of solar and agriculture. Rows of solar panels in these systems are generally placed further apart and raised higher above the ground to allow agricultural activities to continue to be conducted beneath them, ensure crops receive appropriate sunlight, and make it possible for farm vehicles to easily access all areas in agricultural production.

Agrivoltaic systems are still relatively new, and their economic potential in the temperate Northeast is still being explored. There is currently a lack of robust research and information on (1) the agricultural productivity of these systems, (2) the economic impacts of dual-use systems on farms and farmers, and (3) the effect of these systems on the broader agricultural economy. In general, agronomists are relatively comfortable with the idea that pasture and hay fields can be anticipated to produce reasonable yield of hay or forage, but less is known about the appropriateness of these systems for fruit and vegetable production. UMass Extension is currently working with project partners to better study and understand the agricultural yield and economic aspects of these systems (see <https://ag.umass.edu/clean-energy/research-initiatives/dual-use-solar-agriculture/researching-agricultural-economic-impacts-of-dual-use-solar>).

##### Conventional Projects

Whately residents were largely supportive of or neutral towards solar arrays located at the margins of farm fields.

##### Locations for Ground-Mounted Systems

Smaller agrivoltaic or conventional solar projects could be interconnected to the grid anywhere in town where distribution lines are present. Currently, larger projects (>50 kW) are likely only feasible in areas serviced by three-phase distribution lines, or areas within roughly ½ mile of those lines. **Figure 1** shows areas of cultivated land, pasture and hay production, and land that is permanently protected in relationship to three-phase lines.

As evident in the map below, three-phase lines only run through eastern portions of Whately. Western portions of Whately are only served by single-phase lines. Whately is a very agriculturally active community, with pasture/hay production close to three-phase lines throughout the central portion of town, and cultivated land near three-phase lines throughout the eastern portion of town, near the Connecticut River. While many parcels are permanently protected, there are still many properties that are not, and which have the potential to host large agrivoltaic arrays or smaller arrays around the margins of fields.

A map of a city

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**Figure 1.** Map of pastureland (light green), cultivated land (speckled orange), and permanently protected land (dark green) as compared to locations of three-phase lines (thick orange lines) in east Whately.

### Financial Considerations

Financial costs and benefits of rooftop, greenhouse, or parking canopy solar projects on farms are dependent on many factors, including system size, system cost, electricity rates, solar incentives, federal and state tax credits, loan amount, and loan terms (interest rate, term). All of these items are site-dependent, and subject to change over time. Agricultural projects are eligible for the same federal and state tax credits as other types of systems. These types of projects are also likely to be eligible for SMART solar incentives (on a fixed #/kWh basis) or Renewable Energy Credits (for each MWh of solar energy generated, RECs are sold at auction). Grants to develop solar PV projects that support on-farm energy needs may be available through the state’s [Agricultural Energy Grant Program](https://www.mass.gov/service-details/agricultural-energy-grant-program-ener).

Agrivoltaic projects may be eligible for an Agricultural adder through the SMART program. In order to qualify for incentives, these projects must be 25 kW in size or larger. To be economical, these projects are often much larger – the average size of standalone dual-use agricultural projects currently in the state program is roughly 3.2 MW DC (~15 acres), although one Agricultural project of 25 kW (~1 acre) has been constructed.

Conventional, ground-mounted solar projects may also be eligible for SMART solar incentives or RECs. Current SMART program regulations place some restrictions on solar development on agricultural land – some large, conventional developments on recently active agricultural land may not be eligible for incentives.

## 5.3 Next Steps & Action Items

Potential next steps for solar development on farms include:

* Conduct outreach to property owners listed in Table 4 to assess their interest in roof-mounted solar on large building roofs to provide electricity for on-farm needs and/or local residents and businesses. Additionally, Nourse Farms and Quonquont Farm could be approached regarding their interest in solar parking canopies.
* Consider outreach to other farm owners/operators listed under “Existing Infrastructure” to assess their interest in small-scale roof or ground-mounted solar.
* With interested farms, explore options for small to medium ground-mounted solar arrays deployed between fields.
* Near three-phase lines (see map), particularly on existing pastureland or hayfield, explore landowner and farm operator interest in establishing an agrivoltaic operation.
* Assist interested farms with evaluating and applying to grant opportunities for agricultural energy projects, as well as evaluating costs and benefits of other financing structures.
* Work with local land trusts to identify at-risk farmland parcels of high agricultural or cultural value in the eastern portions of town and consider options to preserve them.
* Encourage enrollment of active farmland located along three-phase lines into Chapter 61A, so as to provide an opportunity for preservation should they come up for sale or lease for solar development.

### Action Items

[To be filled out based on what Energy Committee and other municipal boards want to take on in the next 3-5 years.]

|  |  |  |  |
| --- | --- | --- | --- |
| **Action** | **Lead Entity (or Entities)** | **Supporting Entities** | **Start Year/Annually?** |
|  | Agricultural Commission |  |  |
|  |  |  |  |

# LARGE, GROUND-MOUNTED SOLAR ON PRIVATE LAND

*This section addresses large, ground-mounted solar development on private land, including solar projects sited on previously disturbed sites (e.g. gravel pits, quarries, right-of-ways, private landfills, brownfields) and those sited on undeveloped land* *(e.g. forest, meadow, shrubland) not addressed under* On-Farm Solar*.*

## 6.1 Current Status

### Existing Infrastructure

#### Current Land Use

According to Mass Audubon’s *Losing Ground* report,Whately ranks 128th in the state in terms of the total amount of protected land, with 3,785 acres (30%) of the town under permanent protection. There are large properties which are permanently protected by state agencies as well as smaller, privately owned properties that are permanently protected through conservation and agricultural restrictions. Whately currently (2022) has at least 32 properties totaling 302 acres enrolled in Chapter 61 and 61B protection programs.

Despite having a high percentage of conserved land, the town also has a significant acreage of privately owned forest and other natural habitat that is not conserved, which means the potential for large, ground-mounted solar development on undeveloped land remains.

Only 8% of the land area of Whately is currently developed for housing, businesses, or other purposes.   Whately has three previously disturbed sites (see *Future Potential*).

#### Solar Infrastructure

There are two large commercial solar facilities in Whately, with respective capacities of 1,794 kW (1.8 MW) and 2,633 kW (2.6 MW).

#### Grid Infrastructure

Whately is served by two circuits which form a network of three-phase power lines (**Figure 2**). One of these lines runs along State Road before it branches off, running east and west on Christian Lane, and to the west splits again going north and south along North Street and Chestnut Plain Road. A small stretch of this three-phase line heads west on Haydenville Road. Heading east from State Road, the three-phase line continues along Christian Lane and branches off north and south on Long Plain Road, where it feeds into the elementary school in the north. It also branches off Christian Lane to the north and south on River Road. The line crosses the Connecticut River level with Straits Road. There is a small section of this line that also enters Whately in its northeastern corner near the Connecticut River.

There is another thre-phase line along Long Plain Road heading south from Straits Road to the town’s southern border, crossing into Hatfield. It also serves the very southern end of Chestnut Plain Road.

Map

Description automatically generated

**Figure 2** Map of major three-phase distribution lines serving Whately from the town’s *Solar Resource & Infrastructure Report*. Three-phase lines serving the 18G6 circuit are shown in blue, and the lines serving the 18G8 circuit are shown in red. Source: Eversource

### Current Regulatory Status

Large ground-mounted solar arrays (over 500 kW) are prohibited in the AR-1 district and allowed by Special Permit in other districts. These systems are subject to numerous requirements, including submittal of extensive documentation, standards for signage, lighting, and emergency response, property line setbacks and height limits, and restrictions related to vegetation management on site. They are limited to 10 or 15 acres of land in area.

Special guidance is provided regarding solar development on some types of agricultural and undeveloped land. For land protected under Chapter 61 or 61A programs, the owner of the solar facility must pay a Resource Replacement Fee to the Town of Whately for every acre of land developed for solar. All facilities must be located at least 100 feet from any wetland or Priority Habitat Area as delineated in accordance with Massachusetts Endangered Species Act regulations.

### Community Perspectives

In the *Community Solar Survey*, Whately residents expressed support for solar development on previously disturbed lands: 87% of respondents indicated that they “support” or “strongly support” developing former landfills, brownfields, and quarries. A total of 81% expressed support for solar development in electricity transmission line corridors.

For all other types of forested and open natural habitats, 50-86% of residents expressed opposition to development. These habitats included priority wildlife habitats (86% opposition) and mature forests (81% opposition). Among these ecosystem types, the least opposition expressed was to development of forests undergoing regular harvests (69% opposition) and meadows or shrublands (62% opposition). On average, residents wanted to see 15% of natural lands developed for solar, with 60% of residents indicating a preference for no development of undeveloped land.

In another portion of the survey, residents also indicated support (42% strongly support/37% support) for solar development along major roads, which in Whately would presumably focus along Route 5 and Interstate 91.

## 6.2 Future Potential

### Constraints on Large, Ground-Mounted Solar Development

Development of large, ground-mounted solar on large private properties in Whately is likely to be constrained by a number of factors. For all sites, these factors include 1) opportunities for interconnection to the electricity grid, 2) the locations of property owners willing to lease or sell their land for solar development, 3) potential project scale, and 4) eligibility for state solar incentives. For undeveloped lands, 5) existing conservation restrictions and 6) wetlands protections are also an important factor. While factor 2 cannot be determined without direct consultations with specific landowners, factors 1, 3, 4, 5, and 6 can be assessed in some detail.

**Interconnection Opportunities.** Large solar facilities require three-phase power lines in order to interconnect to the grid, so in the near-term, large facilities are most likely to be proposed in areas of town served by or adjacent to three-phase power. Areas currently served by three-phase power are described in the *Grid Infrastructure* section above.

**Existing Conservation Restrictions**.  As noted above, roughly 30% of Whately’s land area is under permanent protection and ineligible for solar development. Additionally, at least 584 acres (4%) are in temporary protection due to participation in the Chapter 61, 61A, or 61B programs. Participation in these programs does not exclude the possibility of solar development, but could make development economically unfavorable if back-taxes are required to remove the land from the program, or may allow the town right-of-first-refusal on any property lease or sale.

**Wetlands Restrictions.** The presence of wetlands on a property may also limit the extent of development, since solar development is prohibited on wetlands and buffers around a protected wetland are often required.  Solar development is regulated within 100 ft of most wetlands and water bodies, and within 200 ft of most perennial streams and rivers.

**Eligibility for State Solar Incentives.** In addition to the need for interconnection to three-phase lines, in order for solar development to be economically feasible, large-scale projects may need or desire to qualify for state solar incentives. At present, with limited exceptions, the current state solar program (SMART) does not provide incentives for solar facilities sited on land mapped as BioMap2 habitat or for parcels on which more than 50% of the habitat is mapped as BioMap2.

**Project Scale.** An important aspect of economic viability for solar projects is project scale.  Because interconnection costs are high and often fixed, as well as due to economies of scale, the larger the solar project, the more financially feasible it tends to be.  With this in mind, the larger the area available for development, the more likely it is to be attractive to solar developers. Large parcels of land (e.g., 5-10 acres or more) are likely to be of greater interest for development, especially if few or no protected land resources are present (e.g., wetlands, water bodies, BioMap2 habitat). In Whately, the town’s solar bylaw restricts the size of development to 10, 12.5, or 15 acres, depending on site conditions, which effectively limits projects to not much more than 2-3 MW DC. This could potentially render them economically unfavorable. (Note that there is ongoing debate and litigation regarding the extent to which solar bylaws can legally constrain solar development to “benefit the public welfare” as provided by Mass General Law.)

The following sections describe different types of locations where large, ground-mounted solar could potentially be developed, couched within the context of these constraints and resident preferences.

### Disturbed Sites

There are relatively few disturbed sites in Whately. We were unable to find any quarries, gravel pits, or MassDEP-identified brownfields in the town.

It is not clear if the two sites identified are in active use. There is a disturbed site on Mountain Street in south Whately that is surrounded by forested area. This site is roughly 4 acres and we estimate that it could have a solar capacity of 0.8 MW. There is another disturbed site on Westbrook Road, near where it intersects with Chestnut Plain Road. This site is around 1.4 acres, with an estimated capacity of 0.3 MW. This site is near three-phase lines.

### Electricity Transmission Right-of-Ways

In the *Community Solar Survey*, residents were strongly supportive of solar development in transmission right-of-ways (ROWs), but there are no electricity transmission right-of-ways that run through Whately.

### Parcels Adjacent to Major Roads

In the solar survey, residents expressed strong support for development along major roads, which in Whately would include Interstate 91 and Route 5 & 10. For large-scale development to occur, three-phase lines would need to be in close proximity.

Route 5 & 10 – Three-phase lines run along this route from the town’s southern border north to Christian Lane. There is also a short section at the northern end with three-phase service coming south from South Deerfield.

Interstate Route 91- Where this route is located adjacent to the southern portion of Route 5 & 10 in town, three-phase lines run near the interstate. In addition, three-phase lines intersect the road at overpasses or underpasses near Claverack Road, at Christian Lane, and by Route 116.

### Wildlife Habitat, Wetlands, and Water Bodies near Three-Phase Lines

Residents are generally unsupportive of solar development near wetlands, in priority wildlife habitat, or in large tracts of mature forest. In Whately, much of the forested area is concentrated in the western portion of the town, which is not served by three-phase lines and not likely to be developed for solar. Some large tracts of land are already protected in this portion of town. As shown in **Figure 3**, there are areas of valuable conservation land throughout the town, which in some cases do fall near three-phase lines. In addition, the three-phase line along River Road runs fairly close (as the name implies!) to the Connecticut River. Some parcels on the east side of this road are permanently protected, but others are not. Christian Lane, serviced by three-phase lines, crosses the Mill River about halfway between the town’s north and south borders.

A map of a city

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### Financial Considerations

Financial costs and benefits of solar projects on disturbed sites are dependent on many factors, including system size, system cost, electricity rates, solar incentives, federal and state tax credits, ownership structure, financing, and, importantly, any environmental or liability concerns associated with development of a site with potentially hazardous materials. All of these items are site-dependent, and may be subject to change over time.  Solar projects on previously disturbed sites are eligible for the same federal and state tax credits as other types of systems. These types of projects are also likely to be eligible for SMART solar incentives (on a fixed #/kWh basis) or Renewable Energy Credits (for each MWh of solar energy generated, RECs are sold at auction).

The Commonwealth of Massachusetts is strongly supportive of solar development on former landfill sites.  Projects on former landfills and brownfield sites are eligible for additional SMART incentive “adders” over and above base compensation rates, on the order of 3-4 cents per kWh. The Massachusetts Department of Environmental Protection (MassDEP) also has a website and set of guidance documents related to development of former landfill sites (<https://www.mass.gov/siting-clean-energy-at-closed-landfills>).

## 6.3 Next Steps & Action Items

* Reach out to the owners of the Westbrook site to consider whether solar development might be an option once the site is no longer active.
* Work with the local land trust to identify at-risk parcels of high conservation and recreation value and preserve them. Areas of particular interest may include the north end of North Street, properties along the Mill River in the southern half of town, and properties bordering the Connecticut River.
* Reach out to owners of large parcels along Route 5 & 10 and near Interstate 91 that are not mapped as priority wildlife habitat to explore their interest in large-scale solar development.
* Coordinate with MassDOT to understand constraints and opportunities for solar development in highway medians or adjacent to Interstate 91. (UMass CEE can assist with this).
* Implement bylaw updates in line with resident preferences around development (see next section).

### Action Items

[To be filled out based on what Energy Committee and other municipal boards want to take on in the next 3-5 years.]

|  |  |  |  |
| --- | --- | --- | --- |
| **Action** | **Lead Entity (or Entities)** | **Supporting Entities** | **Start Year/ Annually?** |
|  |  |  |  |

# MUNICIPAL ZONING, BYLAWS, & PERMITTING

7.1 Current Status

### State Law regarding Solar Zoning Bylaws

Local zoning laws are regulated by [Massachusetts General Law Chapter 40A Section 3](https://malegislature.gov/Laws/GeneralLaws/PartI/TitleVII/Chapter40A/Section3). The section relevant to solar zoning states that “*No zoning ordinance or by-law shall prohibit or unreasonably regulate the installation of solar energy systems or the building of structures that facilitate the collection of solar energy, except where necessary to protect the public health, safety or welfare*.” There has been much debate over what constitutes regulations that are necessary to protect public welfare, and whether this might include restrictions imposed to protect environmental or agricultural resources of value to the general public. In a recent case, *Tracer Lane II Realty, LLC v. City of Waltham*, the Massachusetts Supreme Judicial Court ruled that the City of Waltham could not impose a restriction that effectively limited large-scale solar development to no more than 2% of the municipality’s area. However, it did not address what would be an area reasonable to exclude from large-scale solar development. This limitation on local zoning is important to keep in mind when reviewing or updating the town’s bylaw. Law firms that commonly work with municipalities recommend basing updates on extensive planning efforts (such as this one) and ensuring that any restriction is grounded in an easily articulated reason related to public health, safety, or welfare. Always check with Town Counsel before implementing any changes.

### Municipal Bylaws

Whately’s solar bylaw was updated in June 2021. The purpose of the bylaw is to facilitate the creation of new Large-Scale Ground- Mounted Solar Electric Installations by providing standards for the placement, design, construction, operation, monitoring, modification and removal of such installations that address public safety, minimize impacts on environmental, scenic, natural and historic resources and to provide adequate financial assurance for the eventual decommissioning of such installations.

Regulation of solar facilities differs by installation type, size, and zoning district:

* Roof-mounted and small, ground-mounted systems (up to 10 kW AC) are allowed by right as an accessory use in all zoning districts, but do require a building permit.
* “Medium” ground-mounted arrays (10-500 kW AC, no more than 2 acres) are not allowed in A/R District 1, but are allowed by right in all other zoning districts with Site Plan Review.
* “Large” ground-mounted arrays (over 500 kW AC or 2 acres) are allowed by Special Permit with Site Plan Review outside of the A/R District 1. Depending on proximity to residential structures and underlying soil conditions, these systems are limited to 10 or 15 acres in size.

Large, ground-mounted systems are subject to numerous additional requirements, including submittal of extensive documentation, standards for signage, lighting, and emergency response, property line setbacks and height limits, and restrictions related to vegetation management on site.

Several stipulations to limit agricultural and environmental harm are included:

* Facilities must be designed to minimize impacts to agricultural and environmentally sensitive land and to be compatible with continued agricultural use of farmland whenever possible.
* For every acre of land assessed under the provisions of MGL Chapter 61, or 61A (in any of the previous three years) that will be occupied by a solar facility, the owner or operator is required to pay a Resource Replacement Fee to the Town of Whately Community Preservation Act Open Space Reserve for the preservation of farmland and timberland.
* Clearing of natural vegetation must be limited to what is necessary for the construction, operation and maintenance of the array.
* Installations are not allowed on any slopes greater than 15% in order to minimize erosion.
* All facilities must be located at least 100 feet from any wetland or Priority Habitat Area as delineated in accordance with the Massachusetts Endangered Species Act regulations.

### Community Perspectives

Based on the *Community Solar Survey*, residents provided the following information regarding their preferences for town permitting policies and processes relative to solar:

* A majority (61%) of residents believe solar should be allowed and promoted in appropriate circumstances.
* A significant number of residents (44%) are unsure or unaware of the solar development process in Whately at present.
* Residents voiced an interest in having a say in permitting decisions regarding large solar development projects. This could take a few forms, a number of which were favored by respondents:
  + Information should be shared at public meetings. (95% interest)
  + Community members should have the opportunity to purchase reduced-price electricity from a solar project. (85% interest)
  + Community members should have the opportunity to review and comment on the siting and design. (78% interest)
  + Community members should be involved in deciding where the best place in town is for a solar project. (72% interest)
  + Community members should have the opportunity to communicate concerns directly to the solar project developer. (63% interest)
* Community benefits of solar development favored by a majority of residents included:
  + Reduced electricity rates for all residents, or low-income residents.
  + Direct payments that reduce property taxes or support town budget needs.
  + Backup power to emergency shelters, schools, and senior housing.
  + Local ownership options for residents who can’t put solar on their homes.

## 7.2 Next Steps & Action Items

As noted above, a large fraction of residents are unsure or unaware of the solar permitting process in Whately. It would be beneficial to provide information on the town’s website and distribute information about the permitting process, perhaps as a part of sharing information about this solar planning process.

Whately’s bylaw aligns well with resident preferences in multiple respects, including the streamlining of permitting for rooftop solar, vegetation screening requirements, limitations on large, ground-mounted development on wildlife habitat, and compensation required for development on agricultural land. The town’s permitting process, in conforming to state Opening Meeting Law, meets residents’ desires for information-sharing at public meetings and an opportunity to comment on siting and design of large solar arrays. However, there are some aspects of the bylaw which could be updated to better align with state law, as well as with community preferences as identified in the *Community Solar Survey*, including resident support for a solar goal of community self-sufficiency.

**With review by Town Counsel, the town may wish to consider the following updates to the solar bylaw:**

**Expand Definition of Small-Scale Solar.** As discussed in Section 3 of this Plan, Whately residents are strongly supportive of residential-scale solar development. In order to support future electricity needs (for electric vehicles, mini-splits, etc.) it is anticipated that the average size of a residential solar array will need to increase. In addition, in order to provide solar electricity to neighbors with shaded yards, residents with space for solar may choose to over-size residential-scale systems relative to their current needs. To facilitate these types of projects and reduce costs associated with their development, the town should strongly consider increasing the size of ground-mounted array eligible for a streamlined (Building Permit only) permitting process to 25 kW (the state cut-off for a “small” solar system).

**Include Solar Parking Canopies**. Whately residents are highly supportive of solar on parking lots. The height restriction for ground-mounted solar could conflict with development of solar canopies over parking lots. The town may wish to develop a separate category for solar canopies (allowed by right with a Building Permit, for example), or indicate that height restrictions can be waived in the case of solar parking canopies.

**Allow “Medium-Scale” Solar in A/R-1 District.** To allow for easier installation of medium-scale ground-mounted systems adjacent to buildings, along major roads, as solar canopies over parking lots, and in other configurations supported by residents, the town should allow solar systems up to 500 kW in the A/R-1 district. This district appears to buffer main roads through town. As written, the town’s bylaw appears to prohibit solar canopies and medium-scale arrays for businesses located along roads, which based on survey results appear to be locations favored by residents.

**Allow “Large-Scale” Solar in A/R-1 District.** Residents favor solar development along major roads. With this in mind, the town may wish to remove its current prohibition on solar development in the A/R-1 District, which buffers many roads in town.

**Project Size.** The town’s current bylaw effectively limits solar facilities to 10 or 15 acres (roughly 2 or 3 MW). This restriction may be in keeping with the town’s general goal of maintaining a rural, agricultural aesthetic, but it could restrict large-scale solar development in a way that conflicts with state law regarding municipal solar bylaws and makes it difficult to achieve a goal of community self-sufficiency. It would be worth discussing this issue with Town Counsel and considering introducing more flexibility for larger projects deemed to meet community objectives.

**Siting on Agricultural and Undeveloped Land.** Whately’s requirements for compensation where solar is developed on Chapter 61 and 61A lands are well in keeping with residents’ opposition to solar development on agricultural land. The town could consider additional restrictions on solar development on farmland – for example, limiting solar on prime farmland in active agricultural production, or requiring demonstrably viable agrivoltaic systems on these sites. The town’s limits on solar development on priority habitat for wildlife are also in line with resident preferences. Because priority habitat only covers about 18% of the town’s area, this restriction is not likely to conflict with state law.

**Standalone Energy Storage.** As additional renewable energy resources are incorporated into the grid, more and more energy storage will be required to ensure grid reliability and security. While many of these systems are anticipated to be associated with renewable energy generation facilities – including solar PV – there may be valid economic, environmental, or logistical reasons to install some systems as standalone energy storage. This is one component of the fight against climate change. The town may wish to consider allowing and regulating these standalone systems so as to facilitate renewable energy deployment and grid reliability, and not restrict energy storage systems located at solar arrays to a size necessary only to support the solar array.

**Pesticide Use**. The restriction in the town’s current bylaw on herbicide use may conflict with Massachusetts Department of Agricultural Resources (MDAR) authority over pesticide use. The town may wish to check with Town Counsel.

### Potential Next Steps

* Review bylaw recommendations; potentially proposing bylaw amendments at a subsequent town meeting.
* Provide accessible information on the town’s website about the solar planning process and how large solar projects are reviewed and permitted.
* Compile a list of standard practices to 1) advertise public hearings regarding large solar projects widely, 2) advertise public hearings regarding proposed solar bylaw amendments widely, 3) identify resident interest in reduced electricity rates to solar project proponents, and 4) negotiate appropriate PILOT payments.

### Action Items

[To be filled out based on what Energy Committee and other municipal boards want to take on in the next 3-5 years.]

|  |  |  |  |
| --- | --- | --- | --- |
| **Action** | **Lead Entity (or Entities)** | **Supporting Entities** | **Start Year/ Annually?** |
|  |  |  |  |

# SUMMARY

## 8.1 Summary

This section provides a summary of the Action Items noted throughout this Plan.

## 8.2 Plan Review

This plan will be reviewed and updated in [5?] years by the Energy Committee in consultation with the Planning Board, Conservation Commission, and Select Board. Updates will consider progress made since the original plan was developed, and may require revisiting steps of the *Community Planning for Solar* process, including the *Solar Resource & Infrastructure Assessment* and *Community Solar Survey*.

## 8.3 Action Items

*This section will provide a table of Action Items, summarizing briefly each item, indicating which municipal board, committee, or group of residents is responsible for taking the lead on next steps, and indicating the projected timeline (calendar dates). The table will also include the anticipated timeline for action plan review and revision.*

1. Gagnon, P., Margolis, R., Melius, J., Phillips, C. and Elmore, R., 2016. *Rooftop solar photovoltaic technical potential in the United States. A detailed assessment* (No. NREL/TP-6A20-65298). National Renewable Energy Lab.(NREL), Golden, CO (United States). [↑](#footnote-ref-1)
2. MA DOER. 2022. https://www.mass.gov/service-details/lists-of-qualified-generation-units [↑](#footnote-ref-2)
3. Krishnan, Ram. 2016. *Technical solar photovoltaic potential of large scale parking lot canopies*. Dissertation, Michigan Technological University. [↑](#footnote-ref-3)