Shutesbury & Solar Decision-Making

MA Solar Policy, Community Planning, and Municipal Bylaws & Permitting

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- Part of Center for Agriculture, Food, and the Environment (CAFE) at UMass Amherst
- Renewable energy and energy efficiency
- Outreach and applied research
- On-going technical assistance services (including MEI and Green Communities support)
- Current initiatives
  - Offshore wind professional workforce training
  - Cumulative impacts on wildlife of wind development (with AWWI)
  - Energy storage
  - Reducing fuel use by municipal fleets
  - **Community-driven solar siting and financing**
  - **Pollinator-friendly solar PV certification**
  - **"Dual-use" solar PV and agriculture**

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Solar PV Basics

PV - photovoltaic panels which generate electricity from sunlight

Capacity – measure of maximum energy production in full sun, typically in kilowatts (kW) or megawatts (MW)

- 1 MW covers roughly 4-5 acres of land
- **DC** – direct current (produced by panels)
- **AC** – alternating current (feeds into the grid)
- No energy storage: 1 MW AC = 1.25 MW DC
- Energy storage: 1 MW AC = up to 2.5 MW DC (depends on battery size)

AMP proposal for SHUTESBURY: (20 MW AC = 45 MW DC)*

***From Select Board letter about the AMP Solar Proposal, January 22, 2021**

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Bell Telephone

Solar Incentive Programs in MA

- **~2,500 MW built under previous programs** (RPS, Solar RPS Carve-out I & II)

- **Solar Massachusetts Renewable Target (SMART) Program**
  - Began November 2018
  - Set to continue until 1,600 MW developed
  - So far: 1,220 MW approved or pending; ~550 MW built(?)

- **SMART Emergency Regulation ("SMART-ER")**
  - Modified regulation filed April 14, 2020
  - Went into effect immediately, still undergoing DPU review
  - Expanded SMART to 3,200 MW
  - So far: 151 MW pending

Where are we headed?

Draft Clean Energy and Climate Plan for MA

- **Execute on Existing Procurements**
  - 3.2 GW of offshore wind
  - 3.2 GW of solar
  - 1 GW of hydroelectricity
- **Plan for Additional Clean Energy**
  - 2 GW of distributed clean energy generation between 2025-2030
  - 6 GW of offshore wind between 2030-2040

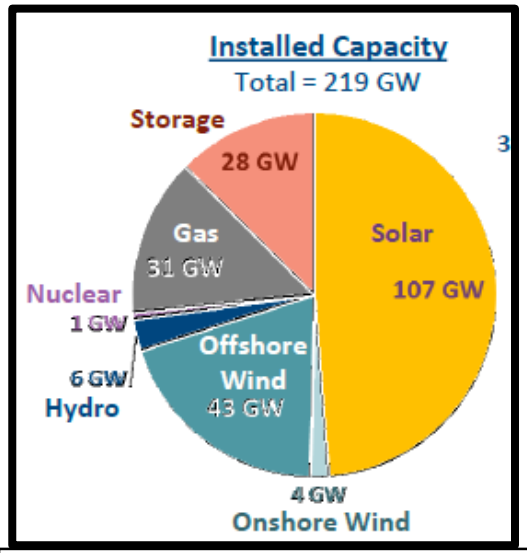
2,500 MW under RPS, SREC, SREC II

+ 3,200 MW under SMART/SMART-ER

+ 2,000 MW (primarily solar?)

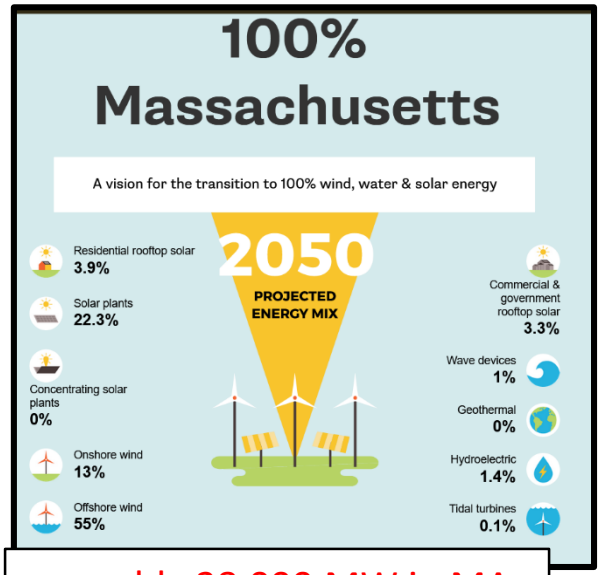
= ~7,500 MW by 2030?

Brattle Group: New England by 2050



= roughly 50,000 MW in MA

Stanford Solutions Project: MA by 2050



= roughly 38,000 MW in MA

At least 10x what we have now by 2050?

Land Use, Economics, & the Pace of Development

Land Use: Development of Forest and Farmland

- **Clark University Solar Study:** 49% of large solar projects built on forest land, 23% on cropland, through 2019; 7,687 acres of forest cleared for solar.
- **Harvard Forest Solar Study:** In Pioneer Valley, 77% of large solar acreage went in on previously undeveloped land, as of 2018.
- **Mass Audubon *Losing Ground* 2020 report:** Solar arrays represent 25% of all new development across the state.

…vs. Increasing Renewable Energy Capacity Quickly and Economically

- Shutesbury has ~100 residential-scale projects totaling 0.75 MW, and 1 large, ground-mounted project of 4.5 MW.
- In general, financial costs are higher (on a per kWh basis) for small and medium-scale projects than for large projects; higher on parking lots, brownfields, landfills, etc.

SMART Solar Incentive Program

State incentives strongly influence where and how solar development occurs

Grid-connected solar PV built in MA, up to 5 MW AC per project
Incentives in form of "tariff" payments in cents per kWh generated (not SRECs)

- *Base Compensation Rate* (¢/kWh)
  - Service territory
  - System size
  - Capacity blocks

- *Adders* (¢/kWh)
  - Energy Storage, Tracking
  - Pollinator-Friendly
  - Offtaker **(inc. Public Entity, +4 ¢/kWh)**
  - Location-Based

- *"Greenfield" Subtractors*

(-¢/kWh per acre)

SMART Location Based Adders

Generation Unit Type	Adder Value ($/kWh)
Building Mounted Solar Tariff Generation Unit	$0.02
Floating Solar Tariff Generation Unit	$0.03
Solar Tariff Generation Unit on a Brownfield	$0.03
Solar Tariff Generation Unit on an Eligible Landfill	$0.04
Canopy Solar Tariff Generation Unit	$0.06
Agricultural Solar Tariff Generation Unit	$0.06

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SMART-ER "Greenfield" Subtractors

Apply to large ground-mounted arrays (greater than 500 kW) on undeveloped land

Category 2

- Local zoning, any of the following:
  - Zoned for commercial or industrial development
  - OR: in a solar overlay district
  - OR: zoning specifically mentions power generation or solar
- "Greenfield" subtractor of $0.00125/kWh per acre of solar panels

Category 3

- Local zoning does not address commercial, industrial, or solar development
- "Greenfield" subtractor of $0.0025/kWh per acre of solar panels

Ineligible Land Use: Category 2 and 3 projects cannot be located on BioMap2 Core Habitat or Critical Natural Landscape, or on parcels with more than 50% of land area in these categories. **(EXCEPTION: Public Entity projects)**

Shutesbury Proposed Solar Projects

Amp also discussed a "public-private partnership" with the Town of Shutesbury, in which Amp would pay the town a annual fee over 30 years to handle all property work (snow plowing, grass cutting, security and access control) and solar work (preventative maintenance, emergency response and corrective maintenance) at the five sites. The "public-private partnership" is a new state program developed by the Department of Energy Resources (DOER) revised regulations in April of 2020 for its Solar Mass Renewable Energy (SMART) program.

- from Select Board letter about the AMP Solar Proposal, January 22, 2021

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Public Entity Projects

Public Entity Solar Tariff Generation Unit. A Solar Tariff Generation Unit that is:

(a) Sited on property owned by a Municipality or Other Governmental Entity and is either:

(i) owned or operated by a Municipality or Other Governmental Entity; or

(ii) the Owner has assigned 100% of its output to Municipalities or Other Governmental Entities; or

(b) Sited on privately owned property and is either:

(i) Owned or operated by the Municipality in which the Solar Tariff Generation Unit is sited; or

(ii) the Owner has assigned 100% of its output to the Municipality or Other Governmental Entities in the Municipality in which the Solar Tariff Generation Unit is sited.

- from SMART Regulation 225 CMR 20.00, updated April 2020

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Public Entity Projects

Developers have strong incentives to pursue Public Entity projects.

- No BioMap2 land use restrictions
- No Greenfield Subtractor
- $0.04/kWh Adder
- Looser restrictions regarding application material deadlines

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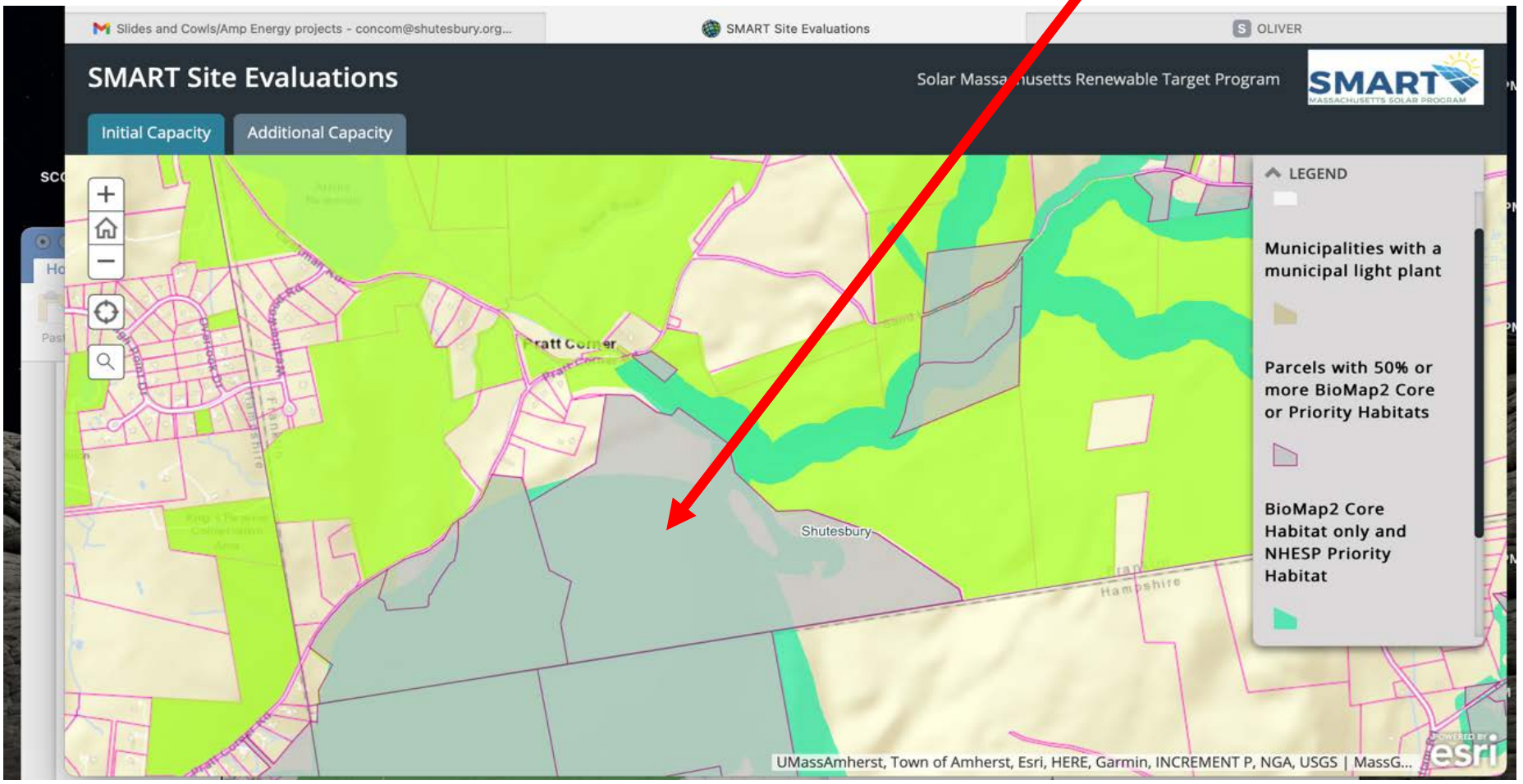
Shutesbury Proposed Solar Projects

Proposed solar projects on **two** parcels would likely not be eligible for SMART incentives except as Public Entity Projects.

-Based on ANRADs submitted to Shutesbury Conservation Commission



Public Entity Example Revenue

- 5 MW DC solar project on undeveloped forest in National Grid, Block 9:
  - Typical project: ($0.11461) – ($0.00125)*(5.9 acres of panels) = **$0.10725**
  - Public Entity project: ($0.11461) + ($0.04) = **$0.15461**
  - **44% more revenue from Public Entity project**

- 12 MW DC solar project on undeveloped forest in National Grid, Block 9:
  - Typical project: ($0.11461) – ($0.00125)*(14.1 acres of panels)= **$0.09695**
  - Public Entity project: ($0.11461) + ($0.04) = **$0.15461**
  - **59% more revenue from Public Entity project**

*does not include revenue from Energy Storage Adder

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Solar Community Benefits

- Shutesbury Proposed Community Benefits
  - PILOT payments
  - Renewable energy generation (benefits entire state/globe)
  - Jobs for local residents
  - (Additional town employees/responsibilities)

- Other Potential Community Benefits of Solar
  - Municipal or resident ownership of solar projects
  - Reduced electricity rates for community residents or municipal buildings
  - *Micro-grid/back-up power during electricity outages*

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Shutesbury Proposed Solar Projects

AMP's two concerns with Shutesbury are that the new solar bylaw amendments are too restrictive and AMP indicated they would seek waivers of some restrictions, and that the permitting process will be slow.

- from Select Board letter about the AMP Solar Proposal, January 22, 2021

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Municipal Zoning Bylaw Considerations

MA Zoning Law

*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**.*

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Attorney General's Office Review of Shutesbury Bylaw

- from the Attorney General's Office standard review of Shutesbury's updated bylaw, letter dated November 4, 2020

There are no appellate level judicial decisions to guide the Town or this Office in determining what qualifies as an unreasonable regulation of solar uses under G.L. c. 40A, § 3.

*However, a Land Court decision provides some guidance. In Briggs v. Zoning Board of Appeals of Marion, 2014 WL 471951 * 5 (2014), the Land Court determined that a zoning board of appeals' decision maintaining a division between commercial solar energy and residential accessory solar energy was reasonable and did not violate G.L. c. 40A, 3.*

In applying the new Section 8-10 the Town should consult closely with Town Counsel to ensure that the Town does not run afoul of the solar use protections in G.L. c. 40A, § 3.

Main topics addressed in the letter regarding this bylaw:

- On-site mitigation
- Archaeological site information
- Herbicides and pesticide use
- Decommissioning/abandonment

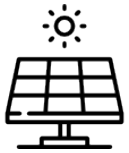
Environmental Review during Permitting

- **Stormwater Management:** *The Planning Board may impose conditions to contain and control stormwater runoff that might negatively impact identified wetlands or other hydrologic features even if the proposed work area is outside the jurisdiction of the Conservation Commission.* - from Shutesbury solar bylaw
- **Wetlands and Water Bodies:** Conservation Commission, with review by Mass Department of Environmental Protection
- **Rare Species Habitat:** *Proponents with projects and activities within rare species habitat must file with the NHESP for review and approval [to ensure] compliance with the Massachusetts Endangered Species Act (MESA). These habitats are mapped as Priority & Estimated Habitats.*

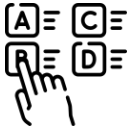
  Under MESA, [NHESP] will provide a determination letter stating whether or not a project or activity, as currently proposed, will result in a "Take " of state-listed species. Often projects will not negatively impact state-listed species or their habitats; others may require certain conditions such as timing restrictions to avoid impacts to state-listed species and their habitats. A small percentage of projects will impact state-listed species or their habitats and must either be revised to avoid such a "Take" or must meet the performance standards for the issuance of a Conservation and Management Permit.

  - from the MESA Regulatory Review website, https://www.mass.gov/ma-endangered-species-act-mesa-regulatory-review

Community Planning for Solar



Solar Resource & Infrastructure Assessment



Characterization of Solar PV Development Options

Financing Tools

Community Survey

Action Plan

- Pilot project with Blandford, Wendell, and Westhampton
- Led by UMass Clean Energy Extension
- Project partners include regional planning agencies, local credit union, local solar developers, towns
- Funded by NREL SEIN program

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(Icon source: https://www.flaticon.com)

Take-Aways

- A large growth in solar development is expected across the state over the next several decades.
- State solar incentives strongly influence where and how solar is developed. Community members can be part of the discussion at the state as well as local level.
- Shutesbury is not alone in having to make big decisions about where and how solar development occurs within town boundaries.
- Community planning for solar is an option, but it is a process, and can't be completed overnight.

- "Public Entity" status would likely be needed to make several of these projects eligible for incentives and would likely increase project revenue significantly (by roughly 50%).
- There is a standard permitting process in place for solar arrays. The town will have to determine, in consultation with Town Counsel, how and whether an MOU should be added to that process in this case.
- It is useful to consider preferred community benefits from solar. If a PILOT payment is a desirable outcome, the town should compare the proposed payment to what other towns are receiving.
- It is important to consider whether the town wants to assume the responsibilities/liabilities associated with operating large solar arrays, including whether emergency personnel have the expertise and equipment to handle a large electrical fire.

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Contact Information

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Solar Resources from CEE

- **Solar PV Information for Municipalities:** We are collecting links to resources for municipalities regarding solar PV siting and planning on our website: https://ag.umass.edu/clean-energy/solar

- **Municipal Planning for Solar Siting and Financing:** Through a grant from the National Renewable Energy Laboratory Solar Energy Innovation Network, UMass Clean Energy Extension is working with regional planning agencies, UMass Five Credit Union, local solar developers, and three rural municipalities (Blandford, Wendell, Westhampton) on developing a process for community-driven solar siting and financing. This project will be completed in June 2021. https://ag.umass.edu/clean-energy/research-new-initiatives/community-driven-solar-siting-financing

- **Pollinator-Friendly Solar PV Certification**. Find more information about our certification program on our website: https://ag.umass.edu/clean-energy/current-initiatives/pollinator-friendly-solar-pv-for-massachusetts.

- **Dual-Use Agriculture & Solar PV**. Find more information on our website: https://ag.umass.edu/clean-energy/current-initiatives/solar-pv-agriculture

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