

SOLAR DEVELOPMENT IN MASSACHUSETTS:

STATE INCENTIVES AND MUNICIPAL PLANNING

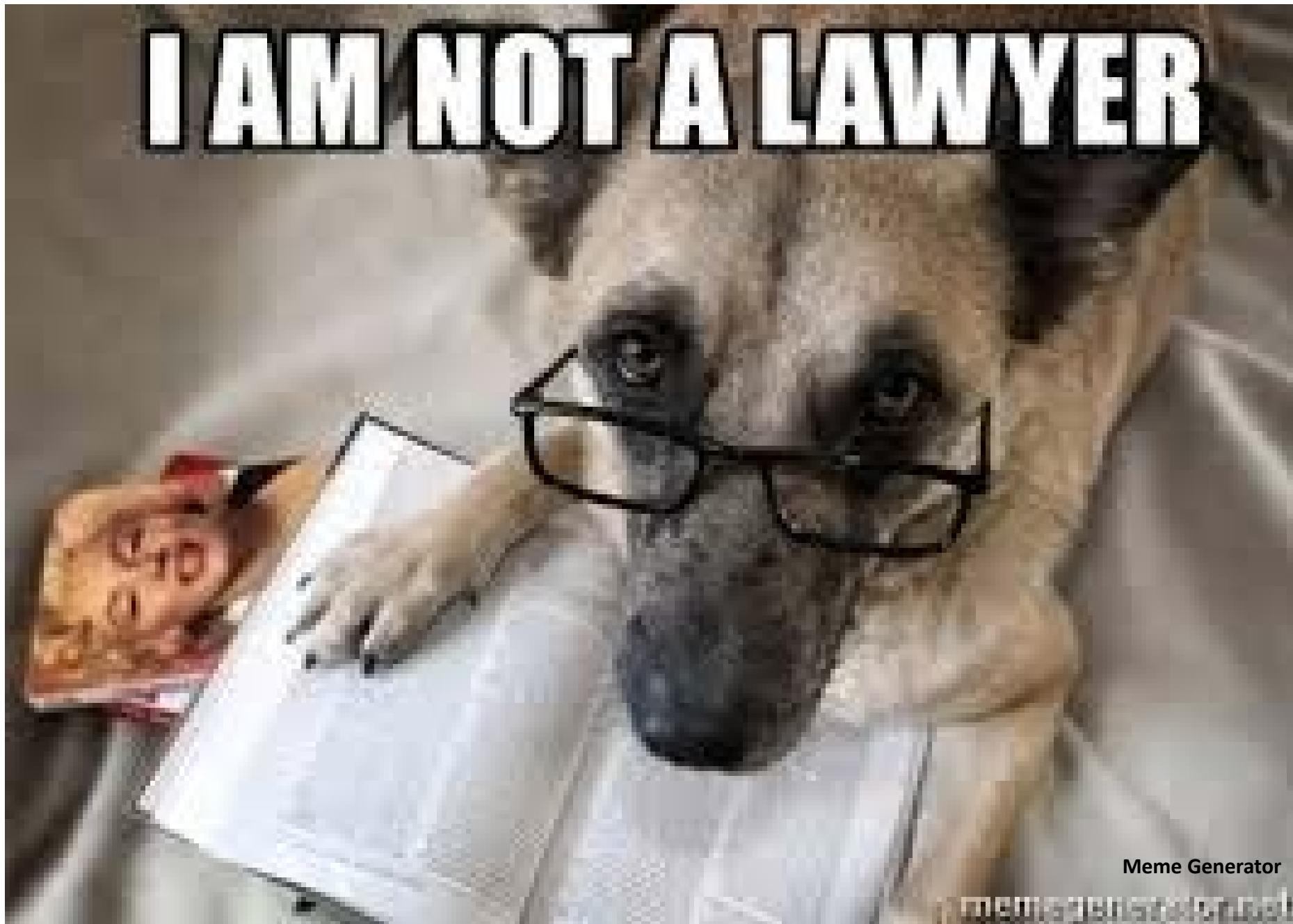


Zara Dowling, UMass Clean Energy Extension
May 27, 2020



UMassAmherst

I AM NOT A LAWYER



Why Municipal Planning for Solar Matters

- So municipal officials and boards can “be prepared!”
- New state solar incentive program (SMART) includes specific provisions related to municipal zoning
- Community values regarding land use, aesthetics, renewable energy sources
- Financial implications for municipalities (e.g. PILOT payments, reduced electricity rates, decommissioning)
- Public safety implications
- ***Shaping the Future!***



Plan for Today

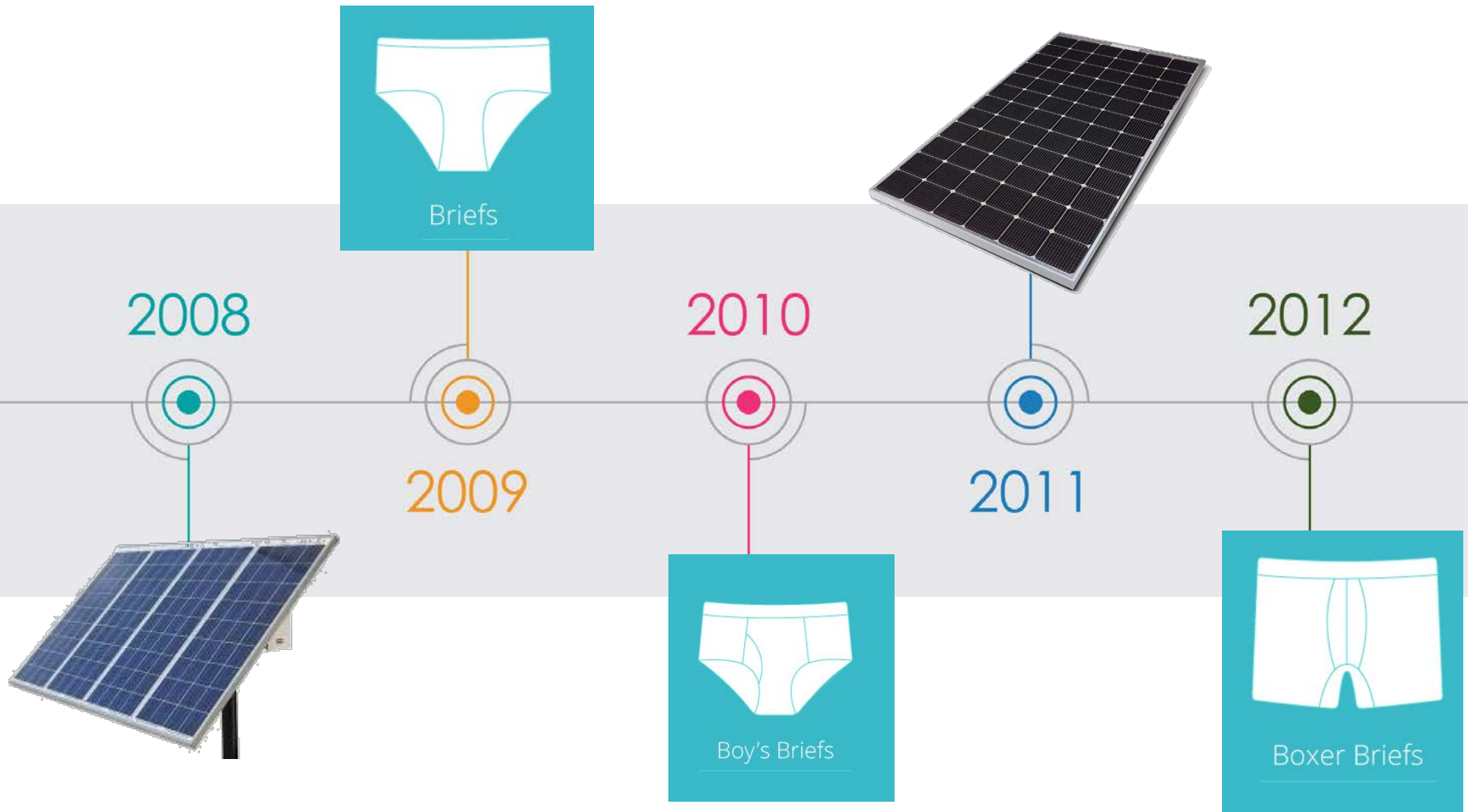
- Solar PV Basics
- Brief history of solar incentive programs in Massachusetts
- Structure of updated SMART solar incentive program
- Municipal permitting and zoning considerations
- Resources for municipalities

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
- **Generation** – measure of amount of power produced, typically in kilowatt-hours (kWh) or megawatt-hours (MWh)
- **Annual Generation** – in New England, annual generation = capacity*14% * 8760 hours per year
- **DC** – direct current (produced by panels)
- **AC** – alternating current (feeds into the grid)



“Brief” History of Solar Incentive Programs in MA

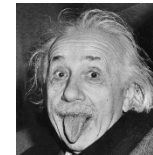


Brief History of Solar Incentive Programs in MA

- **~2,500 MW built under previous programs**
 - Renewable Portfolio Standard (on-going) – 75 MW
 - Solar RPS Carve-Out (SREC) program (2010-2013) – 650 MW
 - Solar RPS Carve-Out II (SREC II) program (2014-2018) – 1760 MW

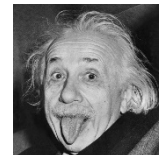
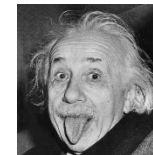
- **Solar Massachusetts Renewable Target (SMART) Program**

- Began November 26, 2018
- Set to continue until 1600 MW developed
- 400 MW review results announced September 2019
- 1,133 MW approved or pending
- 152 MW built (???)

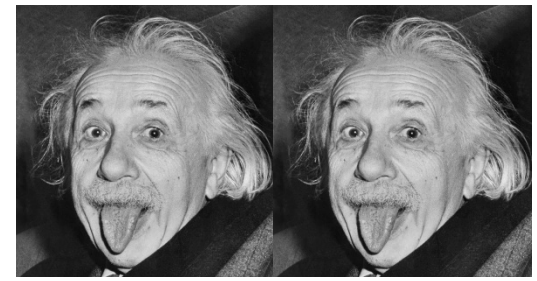


- **SMART Emergency Regulation (“SMART-ER”)**

- Modified regulation filed April 14, 2020
- Goes into effect immediately
- Not a new program – expands existing program by 1600 MW to 3200 MW
- Public comment period through June 1: <https://www.mass.gov/info-details/smart-emergency-rulemaking>



“SMART-ER”: The Basics



- Solar photovoltaic (PV) systems
 - Grid-connected
 - No more than 5 MW AC capacity
 - Located in Massachusetts
 - Not in areas served by a municipal utility
- Solar Tariff Generation Unit, or “STGU”
- Incentives come in form of “tariff” payments through a check or direct deposit, RECs go directly to utility
- 3200 MW total, including capacity already allocated in SMART
- At least 20% of capacity reserved for “small” projects (<25 kW), at least 20% of capacity reserved for “medium” projects (25-500 kW)

SMART Basics: Ineligible Land Use

Ineligible Land Use

- Wetland Resource Areas (unless permitted by Conservation Commission)
- Properties in the State Register (unless permitted by Historic Commission)
- Designated permanently protected Open Space (under Article 97)
- Land subject to a conservation, agricultural, or watershed preservation restriction (Chapter 184, sections 31-33), provided it is not agricultural land under Category 1

How SMART Incentives Work

- Base Compensation Rate (¢/kWh)
 - Service territory
 - System size
 - Capacity blocks
- Adders (¢/kWh)
- Subtractors (-¢/kWh per acre)



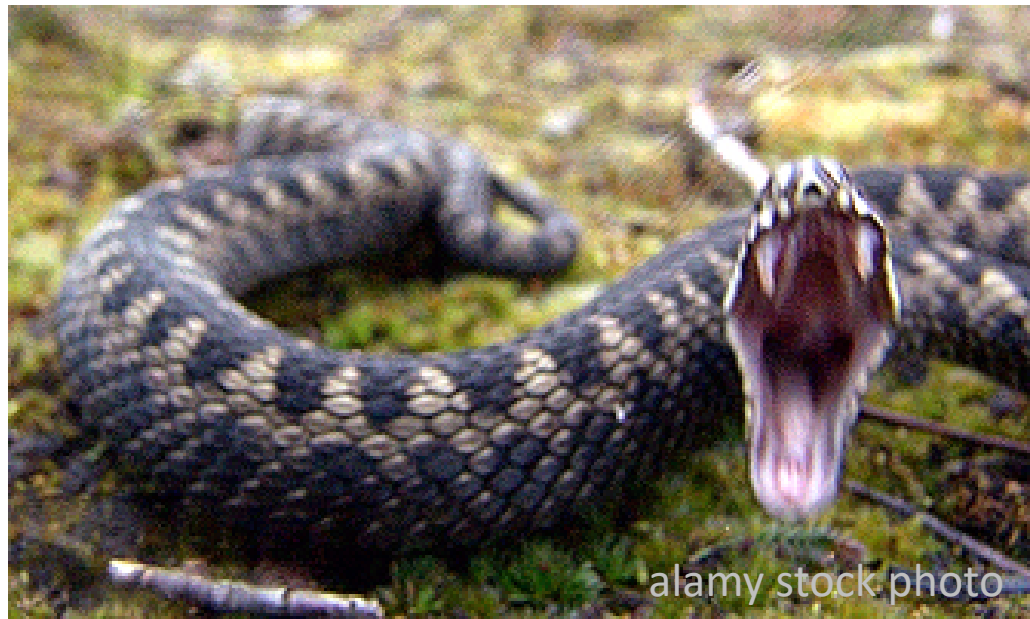
SMART - Base Compensation Rates

Range of about \$0.12-\$0.31 (for Block 8)

Massachusetts SMART Program - Block 1 Base Compensation Rates by Service Territory and Project Size							
Generation Unit Capacity	Base Compensation Rate Factor	Term Length	National Grid – Massachusetts Electric	National Grid – Nantucket	Eversource – NSTAR	Eversource – WMECO	Unitil – FG&E
Low income less than or equal to 25 kW AC	230%	10-year	\$0.35795	\$0.39100	\$0.39100	\$0.32862	\$0.35795
Less than or equal to 25 kW AC	200%	10-year	\$0.31126	\$0.34000	\$0.34000	\$0.28576	\$0.31126
Greater than 25 kW AC to 250 kW AC	150%	20-year	\$0.23345	\$0.25500	\$0.25500	\$0.21432	\$0.23345
Greater than 250 kW AC to 500 kW AC	125%	20-year	\$0.19454	\$0.21250	\$0.21250	\$0.17860	\$0.19454
Greater than 500 kW AC to 1,000 kW AC	110%	20-year	\$0.17119	\$0.18700	\$0.18700	\$0.15717	\$0.17119
Greater than 1,000 kW AC to 5,000 kW AC	100%	20-year	\$0.15563	\$0.17000	\$0.17000	\$0.14288	\$0.15563

“SMART-ER” Adders

- Energy Storage (~\$0.05/kWh)
- Tracking Systems (\$0.01/kWh)
- Pollinator Habitat (\$0.0025/kWh)
- Off-taker Based
- Location Based



“SMART-ER” Off-taker Based Adders

Generation Unit Type	Adder Value (\$/kWh)
Community Shared Solar Tariff Generation Unit	\$0.05
Low Income Property Solar Tariff Generation Unit	\$0.03
Low Income Community Shared Solar Tariff Generation Unit	\$0.06
Public Entity Solar Tariff Generation Unit	\$0.04



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



“SMART-ER” Category 1



Category 1 Non-Agricultural

- Any project that qualifies for a location-based adder (building-mounted, canopy, brownfield, landfill, floating)
- **Public entity projects**
- Small to medium-sized projects (less than 500 kW)
- Large, ground-mounted projects on previously developed land

Category 1 Agricultural (Important Farmland Soils or Chapter 61A properties)

- Building-mounted, canopy, or floating projects
- “Dual-use” agricultural projects
- Projects sized to meet no more than 200% of on-farm load



“SMART-ER” Categories and “Greenfield” Development



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.

Category 2

- Large ground-mounted arrays (greater than 500 kW)
- 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



“SMART-ER” Incentives and Categories Summary

■ Category 1

- Receives a base compensation rate
- Potential for location-based and other types of adders
- No greenfield subcontractors
- No land siting requirements

■ Category 2 & 3 (large projects on undeveloped land)

- Receives a base compensation rate
- Potential for some types of adders (not location-based)
- Subject to greenfield subcontractors
- Subject to land siting requirements



SMART vs. “SMART-ER”

Towns may see some current projects “grandfathered” in under SMART provisions.



- No BioMap2 Land Siting restrictions in SMART
- Greenfield subcontractors have been increased by 2.5x
- Under SMART, projects in solar overlay districts, or where solar zoning applies, were Category 1 and received no subcontractor
- There was no Public Entity exception in SMART, Public Entity adder has been increased in “SMART-ER”
- Pollinator adder is new, but can be applied to existing projects
- Energy storage is now required for large (> 500 kW) projects
- Eversource East and West utility territories have been combined

Current Status of SMART

SMART Solar Block Status Update

Last Update: 5/5/2020 8:45 AM

SMALL PROJECTS (<= 25 kW AC)	Accepting Applications for Block ¹ :	Current Block Size (MW) ²	Total Allocated Capacity (MW) ³	Total Pending Capacity (MW) ⁴	Total Remaining Capacity (MW) ⁵	Waiting List (MW) ⁶
Electric Distribution Company (EDC)						
Eversource MA East	3 of 8	19.157	50.423	2.039	93.978	0.000
Eversource MA West	6 of 8	3.543	17.488	0.485	7.173	0.000
National Grid (Massachusetts Electric)	5 of 8	19.189	78.127	3.518	62.390	0.000
National Grid (Nantucket)	1 of 2	0.604	0.331	0.018	0.859	0.000
Unitil	3 of 4	0.921	1.975	0.088	1.096	0.000
Total			148.343	6.147	165.495	0.000
LARGE PROJECTS (>25 kW AC)	Accepting Applications for Block ¹ :	Current Block/Size (MW) ²	Total Allocated Capacity (MW) ³	Total Pending Capacity (MW) ⁴	Total Remaining Capacity (MW) ⁵	Waiting List (MW) ⁶
Electric Distribution Company (EDC)						
Eversource MA East	3 of 8	74.781	206.073	7.892	371.724	0.000
Eversource MA West	Waitlist	TBD	93.335	63.093	0.000	55.723
National Grid (Massachusetts Electric)	Waitlist	TBD	538.931	50.374	0.000	13.163
National Grid (Nantucket)	1 of 2	2.417	1.000	0.000	3.833	0.000
Unitil	Waitlist	TBD	12.444	6.435	0.000	6.248
Total			851.783	127.794	375.557	75.134

Important Take-Aways for Municipalities

- Eversource East and West utility territories have been combined – western and central MA municipalities where the grid is not saturated may see a large, potentially rushed influx of new permitting requests.
- 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
- Local zoning matters.
 - Determines size of Greenfield Subtractor
 - Category 2 subtractor may provide less discouragement of Greenfield development
- Community Shared projects receive a significant financial adder (\$0.05/kWh).
- Energy storage is required on new, large projects.

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.



Municipal Solar Zoning

Land Use and Siting Guideline:

What is a solar overlay district? What is meant by complying with established local zoning that explicitly addresses solar?

Projects located in a solar overlay district, sited by as of right siting, or sited in an area where solar is explicitly allowed with special permits, may fall under this categorization.

Municipal Bylaw Considerations

Green Communities Requirements

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

Municipal 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.

Guidance from MA DOER:

<https://www.mass.gov/files/documents/2017/10/16/model-solar-zoning-guidance.pdf>

Attorney General's Office Review of Bylaws

There are no court decisions to guide the Town and this Office in determining what qualifies as an unreasonable regulation of solar uses in contravention of G.L. c. 40A, § 3. However, the Town should be mindful of this requirement in applying the amendments adopted under Article 8 and consult closely with Town Counsel during the process.



Municipal Bylaw and Zoning Considerations

- Permitting process and required documents
- Zoning that reflects community preferences
- Streamline permitting for preferred project types/locations – e.g. building permits for canopy and building-mounted systems
- Property Line, Wetland, and other Setbacks
- Noise
- Visibility – Viewshed Analysis, Glare Analysis
- Lighting
- Vegetative Buffers
- “Pollinator-Friendly” certification requirements
- Slope
- Stormwater Design Criteria and Management Plan
- Sedimentation and Erosion Control Requirements
- PILOT payments
- Decommissioning funds

Solar PV and Community Preferences

Land Use and Development of Open Space

- **Clark University Solar Study:** Estimated 3,300 acres of undeveloped land developed for solar through 2015; majority of large projects built on forest land, second largest previous land use was agricultural
- **Harvard Forest Solar Study:** In Pioneer Valley, 77% of large solar acreage went in on previously undeveloped land, as of 2018
- **Under SMART:** 72% of capacity / 73% of large projects are on undeveloped land
- **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

- Solar incentives are higher (on a per kWh basis) for medium-scale projects than for large projects
- One 1 MW ground-mounted solar array (4-5 acres of land) is equivalent to 123 residential-scale projects (median size 8.1 kW).

Solar PV and Community Preferences

Aesthetics



Solar PV and Community Preferences

Erosion and Run-off Concerns



Cemetery requires cleanup following storms, flooding



Municipal Permitting Considerations

(Planning Boards)

- Follow Open Meeting Laws and required Timelines
- Third Party Consultation, including Stormwater Review
- Fire Safety and Energy Storage
- PILOT Payments
- Bonds for Decommissioning
- Consider Aesthetics



Municipal Permitting Considerations (Conservation Commissions)

- MA DEP Guidance:

<https://www.mass.gov/guides/massdep-wetlands-program-policy-17-1-photovoltaic-system-solar-array-review#-siting-photovoltaic-systems->

- Don't be afraid to contact your MassDEP circuit rider!
- Follow Open Meeting Laws and required Timelines
- Coordinate with the Planning Board
- Third Party Consultation
- Wetland Boundaries and Stormwater Review
- You can require regular site checks – weekly, if necessary.
- You can use your discretion in the wetland buffer zone.
- You can ask for limited vegetation management in the trim zone.

Pollinator-Friendly Solar PV Certification Program

UMass Clean Energy Extension

“Silver” Level of Certification eligible for \$0.0025/kWh adder



GreenBiz.com

<https://ag.umass.edu/clean-energy/services/pollinator-friendly-solar-pv-for-massachusetts>

Native Plantings to Benefit Pollinators



Wildlife Passage and Habitat



American Kestrel Partnership

General Resources

- **Public Comments Regarding SMART Emergency Regulation:** The deadline for submitting written comments is now **Monday, June 1, 2020, by 5pm**. Written comments should be submitted to DOER.SMART@mass.gov with “SMART Public Comment” in the subject line.
<https://www.mass.gov/info-details/smart-emergency-rulemaking>
- **SMART Regulation:** <https://www.mass.gov/solar-massachusetts-renewable-target-smart>
- **SMART Program Progress Updates:** <http://masmartsolar.com/>
- **Ineligible Lands under “SMART-ER” (for Category 2 & 3):** <https://bit.ly/SMARTLanduse>
- **Dual-Use Agriculture & Solar PV:** Find more information on our website: <https://ag.umass.edu/clean-energy/current-initiatives/solar-pv-agriculture>
- **Pollinator-Friendly Solar PV:** Find more information about our certification program on our website: <https://ag.umass.edu/clean-energy/current-initiatives/pollinator-friendly-solar-pv-for-massachusetts>.

Municipal Resources

- **Solar Moratorium:** Some municipalities have chosen to implement a solar moratorium on large-scale solar projects, while updating relevant zoning and solar bylaws. *A moratorium is only allowable if municipal boards are actively working on development of an updated bylaw.*

Sample text available on the CEE website: <https://ag.umass.edu/clean-energy/solar>

- **DOER Model Solar Zoning Bylaw:** <https://www.mass.gov/files/documents/2016/08/nc/model-solar-zoning.pdf>
- **MAPC Solar Permitting and Zoning Bylaw Guidance:** <http://www.mapc.org/wp-content/uploads/2017/10/Solar-Permitting-and-Zoning-Bylaw-Guidance.pdf>
- **Solar PV Information for Municipalities:** We will be collecting links to resources for municipalities regarding solar PV siting and planning on our website: <https://ag.umass.edu/clean-energy/solar>
- **Fire Safety Training for Battery Systems:** <https://catalog.nfpa.org/Energy-Storage-and-Solar-Systems-Safety-Online-Training-P20882.aspx>

Forthcoming Resources

- **Model Bylaw:** Pioneer Valley Planning Commission (PVPC) is preparing an updated Model Solar Bylaw and Best Management Practices guide for municipalities. This is expected to be completed Fall 2020.
- **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.
- **PILOT Agreements?** We are looking for feedback regarding whether PILOT payment information would be of use to you – for example, a database of example PILOT agreements, or town-by-town PILOT terms comparison? If your town has a PILOT agreement with a solar facility, please send a copy to Zara at zdowling@umass.edu.

Contact Information

An aerial photograph showing a large solar farm with rows of blue photovoltaic panels. The solar farm is situated in a valley surrounded by dense forests with vibrant autumn foliage in shades of green, yellow, orange, and red. To the right of the solar farm, there are several buildings, including a prominent red and white structure, and some utility infrastructure.

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