



June 18, 2023

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Re: Emergency Regulations, Tariffs and Land Use Considerations

Dear Secretary Tepper and Secretary Hoffer:

We cheered the election of Maura Healey and her choice of you both to head up efforts to execute the vision of the legislature to decarbonize our economy. We have been so impressed with your appointments of so many subject matter experts at EEA, DOER and D.P.U. But after eight years of what we experienced was deliberate neglect of the solar industry in Massachusetts by the Baker Administration, emergency regulations and tariffs need to be created to keep this industry healthy and to put it in a condition to meet Governor Healey's 10 gigawatts of installed solar by 2030. Nearly every Executive Office in the Healey administration will benefit from and be charged to manage the transition to an 85% net zero emissions economy.



Even After a Required Increase in Compensation, Today's Pricing of Solar Benefits the Ratepayer:

The history of the solar programs in Massachusetts were intended to start a nascent industry and bring it to scale to lower cost. The transfer of cost to ratepayers has always been a concern and growth control measures were put in place to slow the industry down while policy makers haltingly watched to see how policies were affecting the market after implementation. Once the SMART program was put into place, regulators knew what they were doing, but the politics of the transition to renewables has stifled the potential of the SMART program structure. However, the global post-pandemic energy market has changed since November of 2018. Policy makers intended for solar cost to follow the technology market and decline at an increasing rate. That was wishful thinking, as cost decreases ceased years ago with 30% tariffs on imported solar products which remain in place today.

Existing Cost of Electricity to Residential Ratepayers: (See Attachment No. 1, 1a, 1b Page 13)

Basic Service (D.P.U.) R-1	May 2023	July	Delivery	Total – July 2023
National Grid M.D.P.U No. 1-23 -D <u>SMART Charges included: (\$0.00420 / kWh)</u>	\$0.33891	\$0.14115	+\$0.15023 (5/1/23)	= \$0.29138 / kWh
Eversource M.D.P.U. No. 1-23-B <u>SMART Charges included: (\$0.00469 / kWh)</u>	\$0.25776	\$0.16078	+\$0.14622 (1/1/23)	= \$0.307 / kWh

The higher global cost of energy has now made solar competitive as an energy source for ratepayers. It is time to recognize the benefits of investing in the electrification of the Massachusetts economy. The 2050 Decarbonization Roadmap Study, Economic and Health Impacts Report project for Massachusetts finds that the benefits of decarbonization produce three dollars for every dollar invested.

“For example, the least-cost pathways all experience returns in terms of economic output that are greater than three dollars per dollar spent – levels that are higher than direct investment in impacted industries because such investment reduces the need for, and total cost of, energy imports. Approximately 472,000 job-years¹ are created by investment in the benchmark decarbonization pathway (All Options) over the course of 30 years, translating to an average of 15,000 jobs annually.”¹

“Ground-mounted solar paired with storage is the next-lowest cost solution to replacing dispatchable resources such as hydroelectric energy”²

It is time to leverage the emission reductions requirements of St. 2021 c.8 to the economic benefit of Massachusetts residents.

¹ Economic and Health Impacts Report, Page 5, 2050 Decarbonization Roadmap Study, EEA December 2020.

² Clean Energy and Climate Plan for 2025 and 2030, Page 64, EEA, June 30, 2022

D.P.U.: Without Timely Interconnection Capability, Great Legislation is Meaningless.

The first Capital Improvement Program (CIP) approved by the D.P.U. is the Dartmouth Westport D.P.U. 22-53, CIP and has a 4-year time frame for completion.³. At the outside, system upgrades should take no longer than 3 years to reach a commercial operations date to service decarbonization electrification. Speaking with Eversource, the time frame for permitting alone is 1 to 1.5 years (at the earliest) for the expansion of an existing substation, where Eversource owns the existing parcel of land. The Healey Administration needs to reduce all-in time frame for existing utility substation upgrades to accomplish the requirements of St.2021 c.8, The Next Generation Roadmap.

Create Legislation for expansion of existing substations to meet the emission reduction requirements of the Next Generation Roadmap St. 2021 c. 8. The Healey Administration needs to create legislation that waives local zoning and site plan review requirements and allows expansion of existing substations after two public hearings. Wetland and endangered species, if any, shall be mitigated off-site within a transmission or distribution corridor under the control of an EDC within its service area. The EDC's shall submit stamped drawings to the municipality and make submission to and pay for the municipalities' third-party review engineering company, who shall take no longer than 14 days to review. The municipality is kept informed with submittal of all required engineering, but for existing substations, the police power of zoning enforcement and site plan approval should not apply, and there should be no provision for appealing expansion of a substation made to meet the requirements of St.2021 c.8. An appeal process, if constitutionally required, could be made to D.P.U.

If business as usual is followed in the permitting cycle of a substation owned by regulated utility charged with implementing the will of the legislature, nothing will be built of any significance by 2030, and electrification of the electric, transportation and building sectors will be severely impeded and not meet the 2030 CECP emission reduction requirements.

Create an Emergency Tariff for Acquisition of Long Lead Equipment: Emergency tariffs, created by the department to direct the EDCs to order long lead equipment elements that have a lead time of over 9 months is needed. While long lead equipment acquisition is being conducted in parallel to permitting by Eversource at the Dartmouth Westport group of projects, we are suggesting that the long lead items be ordered prior to the CIP being approved. It is also not clear that another EDC could take this approach and expose themselves to financial risk. The interest on the procurement would be rate based once the equipment is received in Massachusetts and the full value of the equipment will be rate based once the equipment is installed, providing constructive value to the ratepayer. Substation transformers have a lead time of 2 years, transformers for DG projects are 1 year, and there may be 3VO, capacitors, reclosers, and switchgear that all have long lead times due to global economic forces.

³ Eversource D.P.U. 22-53, April 29, 2022 Joint Testimony of Digaunto Chatterjee, Lavelle Freeman, Juan Martinez, and Gerhart Walker, Page 17 of 79

Litigating tariffs and implementing policy changes to deal with the electric system accommodating a sublimit of 900,000 EVs⁴ on the road by 2030, the installation of 75,000 public charging stations by 2030⁵, the conversion/installation of 1.11 million heat pumps⁶ and enabling the installation, through electrical system upgrades, of 25 to 35 gigawatts of solar energy by 2050⁷ with hopefully 10 GWs of solar being installed by 2030, is going to take time. If it takes 18 to 24 months to promulgate new policy, tariffs, and potentially new legislation, it should not take another two years for those mandates to be installed due to the physical constraints of long lead time manufacturing procurement and long permitting cycles. Waiting would result in no significant amount of solar being built until 2027, which is not sustainable for solar developers and contributes nothing towards reducing emissions and meeting our 2030 CECP requirements and driving our economic growth.

Statewide Solar Tariff:

Adopt a statewide solar tariff and remove the growth control constraints of each EDC's percentage of distribution is the basis of participation in the targeted solar program. This will also prevent municipalities like Fitchburg that have encouraged solar from being constrained by Unitil's one (1%) percent of load in Massachusetts. I have two farmers in Unitil territory that desire to place solar on their farms but are unable to do so due to lack of SMART capacity in Unitil.

Eliminate the Single Parcel Rule:

The single parcel rule is a growth control contrivance from SREC I that was designed to stop manipulation of the solar program in its infancy and remains a continuing pattern of EDC efforts to slow the solar programs down. Currently, the single parcel rule is unnecessarily stifling innovation, creating regulatory delay to combined installation of carports, roof mounted systems and particularly to condominium solar projects where multiple buildings and parking lots are on one deeded parcel. The only restriction on a parcel should be that there shall not be more than 5 MW per parcel for the SMART program.

DOER to Establish Solar Policy and D.P.U. to Issue a SMART Tariff in Two Months.

Regulatory turf wars between DOER and D.P.U. should be eliminated. Because DOER is more capable of being responsive to stakeholders, and they are in a better position to manage the Statement of Qualifications process, DOER should establish policy including the SMART compensation rates, and after a public hearing process, those rates should be handed to D.P.U. to promulgate a tariff within two months' time.

Hopefully, SMART rates will be reviewed on a biennial basis to protect ratepayers while also encouraging continuous solar development. D.P.U. should establish a set process, removing barriers to timely promulgation of a tariff in two months' time.

⁴ Clean Energy Climate Plan 2025 & 2030, EEA, Page 31 & 32, 2030 sublimit

⁵ Clean Energy Climate Plan 2025 & 2030, EEA, Page 32, 2030 sublimit

⁶ Clean Energy Climate Plan 2025 & 2030, EEA, Page 28, Figure 3.2 Residential Space Heating Stock, Phased Scenario

⁷ Massachusetts 2050 Decarbonization Roadmap, as presented by DOER, October 4, 2022.

Recent history with D.P.U. on lack of timely promulgation of a SMART tariff (over 2 years) and pushing back on policy relative to a “pollinator adder,” which the legislature asserted itself and put back the pollinator adder, indicates continued resistance to change and adherence to old philosophy of ratemaking that has no place in achieving our decarbonization requirements.

DOER – Create Emergency SMART Regulations including revised SMART compensation rates to give the solar industry a clear path forward that only requires statutory timeline compliance to be put into effect.

DOER – Maintain the Legal Structure of the SMART Program

The SMART program is a well-designed program to give confidence to developers, investors, and the financial community to invest in solar in Massachusetts. Keep the SMART program in place with the changes recommended below.

Due to compliance legislation being in place, Massachusetts solar programs in the past had a reputation “that at the end of the day, Massachusetts regulators will do the right thing” in promulgation of new solar programs. Development pressure remains in place today because of this continuing perception due to St.2021 c. 8 the Next Generation Road Map law and the election of Gov. Maura Healey. Most large projects are not economically feasible today, including carports, due to the cost of steel, labor, equipment cost, the declining block and a doubling of the past average interconnection cost.⁸ But hope for a successor program to SMART remains. (See Attachment 2, Page 14)

SMART 10-year, 12 GW Program: Set SMART solar program to be 10 years and co-terminus with the federal Inflation Reduction Act base 30% ITC in 2033. Place in regulations a solar review period starting in 2031 for a successor program to be in place by 2033 with no cessation of program availability. Set program size to be 12 GW of solar installed within Massachusetts. Let’s keep the jobs, careers, and economic multiplier here in Massachusetts.

Create a Biennial SMART Compensation Review in Regulation:

There is a balance between encouraging continuous solar development and protecting the ratepayer. DOER should engage a third-party energy expert immediately to review the SMART compensation and adopt the Rhode Island model where the developers get a targeted 11% to 12.5% After-Tax Equity IRR. The pricing model of SMART promulgated in 2018 based upon a 2016 pricing study is unresponsive to changes affecting development year to year. (See Attachment 10, RI Financing Assumptions, Page 17)

Since 2018, the solar industry in Massachusetts has experienced: a one-week near-exhaustion of National Grid SMART 900 MW capacity block capacity once opened; in November of 2018, ISO-NE mandated ASO Studies lasting 2-3 years; 30% tariffs on

⁸ See Attached National Grid chart provided in D.P.U. 20-75 testimony, May 3, 2021, Average cost \$0.23 per watt.

Chinese solar panels and equipment, which remain in place today; 2+ year delay by DOER in fully promulgating and extension of the SMART program plus a 2 year delay in DPU litigation of the SMART tariff; a pandemic; supply chain delays due to the pandemic; spikes in steel, transportation and commodity pricing; inflation; removal of 64% of the land in Massachusetts by the Baker Administration by eliminating solar development in the BioMap2 Core Habitat and Critical Natural Landscape⁹ areas; a doubling of interconnection cost;¹⁰ and a declining block structure that is oblivious to market forces which has made solar development uneconomic. (See Attachment 3, BioMap2, Page 14)

The declining block in law with 4% reduction in compensation every 200 MW with a 3 to 4-year interconnection queue does not work. If the declining block is unable to be removed in law, it should be reduced to 0.0025 % and substituted with a biannual review of compensation to encourage continuous development and protect the ratepayer.

The Baker Administration had to make a choice for acceptable interconnection cost that would be passed to solar developers under a new “cost causation” model. The Baker Administration could choose the “average” cost of \$0.23 per watt¹¹ or the cost which was “occasionally” accepted by solar developers of \$0.50 per watt. The Baker Administration chose \$0.50 per watt AC, which makes most solar projects no longer economically viable. If today’s regulators chose to maintain interconnection cost up to \$0.50, they will need to model these costs in the successor solar compensation schedule. Existing SMART tariff rates are based upon economic studies completed by DOER in 2016. (See Attachment 2, National Grid Average Cost Page 14) (See DOER 2016 Interconnection Cost Study, Attachment 9, Page 17)

Between lack of manpower, competing program requirements, and for the past 8 years, political neglect, DOER has been behind on keeping the SMART program current with foreign equipment tariffs, federal tax regulations, supply chain issues, material cost, inflation, interest rates, labor costs which are now union scale rates due to the IRA, and interconnection cost.

A Biennial SMART Compensation Review (every other year) by an energy consultant hired by DOER would commence its review every 15 months after each SMART Compensation Review, report to DOER in 90 days with its findings, whereupon DOER would hold a public hearing in 60 days, approve the revised SMART Compensation Rates and send them to D.P.U. to be litigated in a SMART tariff within 60 days. Legislation may need to be passed to authorize/direct this process to happen on an expedited basis. If regulatory processes are not drastically changed by DOER and D.P.U., the interconnection of solar projects will not be enabled, and the installation of 900,000 EVs, 75,000 public charging stations, and 1.11 million homes converting to heat pumps will be handicapped as well, as the same electrical system infrastructure is used for all emission reduction systems and technologies.

⁹ See attached Massachusetts Department of Fish and Game Executive Summary, BioMap2, 2010

¹⁰ See Attached National Grid chart provided in D.P.U. 20-75 testimony, May 3, 2021

¹¹ See Attached National Grid chart provided in D.P.U. 20-75 testimony, May 3, 2021

Since DOER has traditionally been more responsive to stakeholders and is considered nimbler as a department, and the Statement of Qualifications (SOQ) process has been managed by DOER for 20 years, SMART rate setting policy should remain with DOER. With policy established, litigating a tariff should be perfunctory function of D.P.U. taking less than 60 days. The legislature may need to define roles and timelines to avoid interagency conflict.

Remove Growth Control Measures From SMART:

The SREC and initial SMART programs were nascent programs that were capacity size constrained because the policies were new, and the actual total system costs were yet to be determined. The total cost of a solar program has now become more clearly understood. The Next Generation Roadmap legislation, St. 2021 c. 8 requires a monumental shift in solar policy regulations to accomplish the emission reductions required and to power the building and transportation sectors with in-state renewable generation.

Eliminate the Following Growth Control Measures:

Eliminate the Adjacent Parcel Rule – The adjacent parcel rule was a growth control mechanism that should be removed, as its effect on constraining solar development is contrary to achieving the emission reduction requirements of St. 2012 c. 8.

Eliminate the Declining Block by legislation or reduce the block reduction to \$0.0025 while instituting a Biennial (every other year) SMART Compensation Review Program.

Eliminate the Greenfield Subtractor while instituting an active on-site species mitigation program discussed below.

The 2050 Decarbonization Roadmap forecasts that **323 million square feet of single-family homes**, 51 million square feet of small multi-family residential units and 186 million square feet of large wood-frame multi-family units will be built by 2030, all totaling 560 million square feet of residential construction in Massachusetts by 2030. By 2030, large steel-frame multi-family units totaling 33 million square feet¹² will, generally speaking, be built in the cities due to building codes requirements.

By 2050, 929 million square feet of residential building space will be built in Massachusetts.¹³ (See Attachment 5, Table 3, Residential Construction, Page 15)

By 2030, 270.4 million square feet of commercial industrial space will be built, with 856.8 million square feet of commercial industrial space to be built by 2050.¹⁴ See Attachment 6, Table 4, Commercial Construction, Page 15)

¹² Table 3. Projected Residential Growth by Decade in the Building Sector, Page 28, Building Sector Report, A Technical Report of the Massachusetts 2050 Decarbonization Roadmap, Dec 2020.

¹³ Table 3. Projected Residential Growth by Decade in the Building Sector, Page 28

¹⁴ Table 4. Projected Commercial Growth by Decade in the Buildings Sector, Page 29

By 2050, the 2050 Decarbonization Roadmap is forecasting that **1,785.8 billion square feet of building space** will be built. If the theory that solar is developing land that would otherwise remain treed, the 2050 Decarbonization Roadmap written by EEA indicates that using treed land will be used in driving the prosperity of Massachusetts.

Provide On-Site Species Mitigation: What We Are Doing Now is Not Working

With all the conservation measures we have in place and all the growth that is forecasted by the Commonwealth to take place as indicated above, what we are doing now is not working. Increasingly, insect and avian species on the Atlantic Flyway are becoming endangered. (See Attachment 7, Atlantic Flyway, Page 16)

The monarch butterfly has recently been listed under the Endangered Species Act.¹⁵

Milkweed is an upland soil plant that provides the only food that Monarch caterpillars can eat and habitat for which Monarch butterflies need the milkweed plant to lay their eggs.¹⁶

Combined with other pollinators currently envisioned in law and policy, the addition of habitat for Monarch butterflies would be an addition to current conditions in Massachusetts. The decentralized nature of solar development and the 30-year time frame until 85% net zero is reached will provide widespread benefits for the Monarch Butterfly and other pollinators. (See Attachment 8, Monarch Butterflies, Page 16)

Habitat for other species may be considered with this on-site mitigation measure.

The cost, however minor, could be considered in the cost modeling of the successor to the SMART program. We do hope the SMART program will be continued within the basic legal and policy structure that exist.

Eliminate the 80 MW restriction on dual-use Agricultural Solar Tariff Generation Units (ASTGU). As many farms as possible should qualify for dual-use agricultural solar projects. Maximizing in-state investment in decarbonization yields a return that is greater than three dollars for every dollar invested.¹⁷ EEA should study the economic multiplier of having dual-use solar projects on a farm, as the economic multiplier should be greater than 3x for every dollar invested.

“Massachusetts has 7,241 farms on 491,653 acres and the average farm produces \$65,624 worth of agricultural products on 68 acres. The average farmer’s age is 59.1 years old”¹⁸

Farms are under pressure not only from economic pressures but also from generational estate transition issues. The fact of the matter is revenue from a dual-use agricultural solar project land lease will help keep the farmers in business on the farms. It has been our experience that non-farming family members have a strong interest in keeping the

¹⁵ <https://www.fws.gov/initiative/pollinators/monarchs>

¹⁶ <https://www.almanac.com/plant/milkweed>

¹⁷ Page 5, 1st Paragraph, Economic and Health Impacts Report, A Technical Report of the Massachusetts, 2050 Decarbonization Roadmap Study, December 2020.

¹⁸ <https://www.mass.gov/info-details/agricultural-resources-facts-and-statistics>



land in farming including during generational estate transition. However, non-farming family members will not dedicate funds towards keeping the farm in business. In fact, there is an expectation of revenue for non-farming family members to justify retaining ownership of the farm. Dual-use AG solar projects provide 25 to 35-year revenue streams to the farms.

Eliminate the BioMap2 Critical Natural Landscape restriction on 1,783,000 acres of land currently under exclusion from solar development. The 1.783 million acres can be used for any other legal use without restriction other than solar development as currently constrained by the BioMap2 restriction.

BioMap2 Core Habitat areas restrictions will remain, leaving the 1,242,000 acres in place as protected land. This is a concession to stakeholders who do not wish to have any trees cut at all. Within the Core Habitat areas also include 325,449 acres of 163 Forest Cores which comprise just over 10% of Massachusetts forest.¹⁹ (See Attachment 3, BioMap2 Executive Summary, Page 14)

A land use section follows and is attached.

The Healey Administration has a great team assembled; now the hard work begins to move quickly to enable the emission reductions requirements in Massachusetts.

Best Regards,

A handwritten signature in black ink, appearing to read "Doug Pope", written over a horizontal line.

Doug Pope
President

¹⁹ BioMap2 Technical Report, Mass Fish & Game, Nov.2011, Page 62, Table 28 with Chart Figure 16, on Page 61

Solar Land Use in Massachusetts:

We are fortunate to live in a beautiful state. When we worked with the Town of Millis Planning Board to change the zoning for solar in the town, we proposed a 50' wide treed buffer from Town roads and residential properties.

The intent was to not change the streetscape as one drives through the Town of Millis nor affect the view from a residential property that may abut a solar project larger than 250 kW. We included some exceptions that provided natural sight barriers such as rivers, upland gradients and wetland setbacks required by the Conservation Commission. (See Attachment 11. Page 18)

Accordingly, we recommend that Massachusetts adopt a 50' treed buffer from municipal roads and abutting residential properties as it applies to solar development over 250 kW.

Using Land with Agricultural Soils for Solar Development:

The 2050 Decarbonization Roadmap forecasts 1.7858 billion square feet of residential and commercial building space to be built by 2050. Massachusetts should be using dual-use agricultural solar development to retain farmland soils in Massachusetts land inventory.

There will be a certain percentage of this land returned to farming that will be farmed/grazed by existing farmers as their leased land is consumed by housing development. ASTGU solar developers will also need to reach out to a farming cohort that does not have the capital to acquire land and this cohort will be young farmers.

Massachusetts should be using the capital stack of solar development to clear land containing farmland soils of Prime, Unique and Soils of Statewide Importance, plant a grazing or pollinator crop of ground cover, fence the land and bring municipal water or **drill a well for the benefit and health security of grazed animals. Young farmers** would be able to bring their animals to graze on the land, and the animals would have grazing, water, fence security and shelter/shade from the ASTGU raised solar system.

Massachusetts would be retaining farmland soils in state inventory, while increasing locally-grown food security and creating jobs for decades.

Solar Development is in Competition with Other Land Uses:

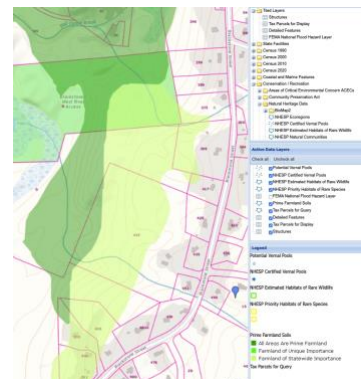
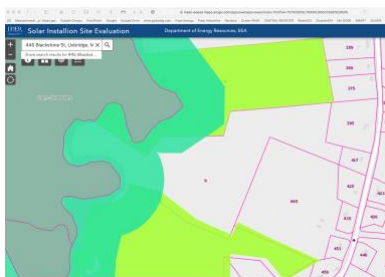
The discussion of the sites below is like sites we come across on a regular basis.

If solar development does not take place, the land will be used for some other purpose. This the case for two (2) 16-acre parcels in Uxbridge that abut Commonwealth of Massachusetts land and a Core Habitat area. Across the street from these parcels is a recently completed housing development. The landowner with whom we have land control prefers to do a solar lease but will sell the land for housing if solar is not feasible.

When the landowner was younger, he played in a pasture that is now his treed property. The land has had test pits completed for perk test. Both Prime and Soils of Statewide Importance exist on the property. We have maintained an agreement with the landowner for over 3 years and now the project is uneconomic. We filed an ASTGU Pre-application before the ASTGU Guidelines changed, but our application was rejected. We are unable to develop this parcel today as an ASTGU or any other solar project because: 1) the parcel is fully treed; 2) the land is currently not farmed; 3) the Greenfield subcontractor remains in place; and 4) the Declining Block has made projects uneconomic. The conditions represented by this potential project is typical of solar development impediments in Massachusetts.

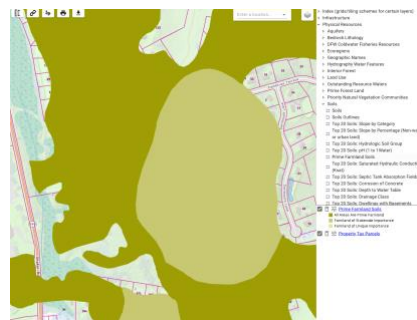
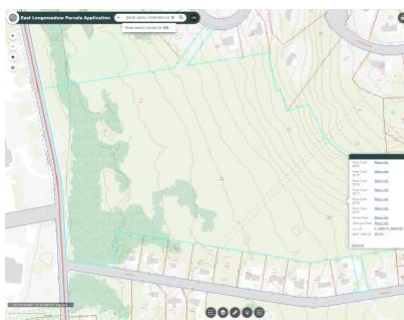
The adjacent parcel which has a greater percentage of Prime soils is farmed for hay, and while there is a farm right of way, there is no other access to this second parcel to develop a solar an ASTGU project. If we could develop the front parcel as an ASTGU project, we could also develop the second parcel that is used for grazing by a farmer that raises cattle. We are unable to develop the front 16-acre parcel as a standard ground-mount solar project because of the low SMART rates and the Greenfield subcontractor.

If these lots are not capable of being developed for ASTGU or ground-mount solar projects, they will be developed for a more intensive housing use.



Land with farmland soils should be encouraged to be developed for dual-use ASTGU projects, whether that land is currently fully treed or being farmed, to retain and increase the inventory of farmland soils in active farming use in Massachusetts. For example:

A 30 Acre Site in East Longmeadow, that has farmland soils, whose soils should be maintained in usable farmland inventory.

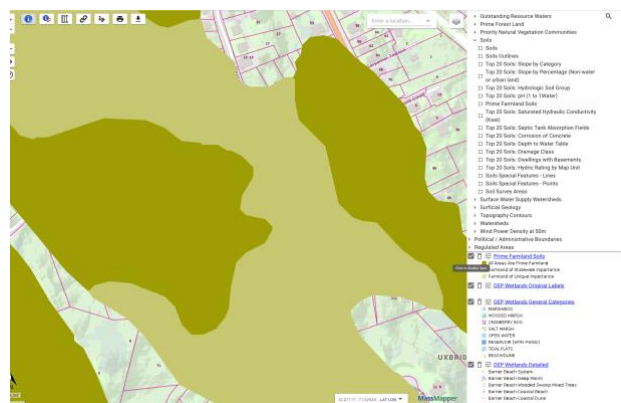
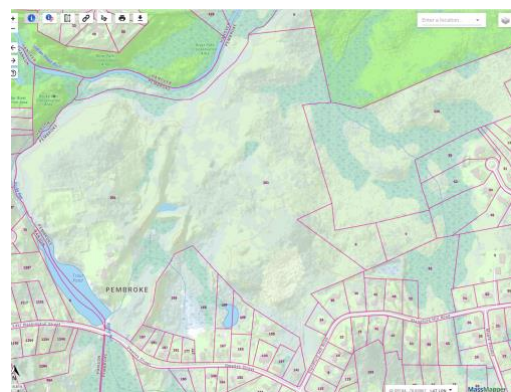


Additional examples of fully treed sites that have farmland soils and should be available for dual-use agrivoltaic (ASTGU) projects to maintain arable land in state inventory.

Another Typical Example: This parcel is 23 acres of land, on an open feeder designed for house lots, and has farmland soils that should be maintained in active farmland use. This site is not available for any solar project because 1) The Greenfield Subtractor exist 2) It is a fully treed site, so it does not qualify for an ASTGU (dual-use agrivoltaic) project, 3) The site is not currently farmed, so it does not qualify as an ASTGU project 4) Compensation is too low 5) While there is an available feeder, there is no visibility to what substation and transmission cost may be to the project.



Another Typical Example: This 100+ acre parcel, with farmland soils shown below, represents an example of a potentially available site in a densely populated suburban area that someday, within the next 15-years, will have a vast majority of its building and transportation sector powered by electricity not fossil fuels. It should be advantageous to have an ASTGU solar + storage facility to power these homes and autos with renewable generation located close to load. Unfortunately, current solar policy does not encourage such development due to the four reasons listed above. All of the sites mentioned in this land use section discussion, will be subject to the 560 million square feet of single and multi-family building construction pressure listed on Attachment 5, Residential Construction, Page 15, Table 3, as provided by the Decarbonization Roadmap. Only SMART solar projects have restrictions on the cutting of trees. Currently, solar policy does not envision retaining farmland soils on treed lots and using those sites to develop agrivoltaic projects.



Attachment 2 National Grid DPU 20-75 - Testimony of Interconnection Cost

Substation CIP Fees with revised allocation



These costs do not include Distribution Line costs, which will be determined in each area through ongoing Group Studies

7

Attachment 3 Executive Summary Page 4, BioMap2, Mass Fish & Game

4 | EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The Massachusetts Department of Fish & Game's Natural Heritage & Endangered Species Program (NHESP) and The Nature Conservancy's Massachusetts Program developed *BioMap2* to protect the state's biodiversity in the context of projected effects of climate change.

BioMap2 combines NHESP's 30 years of rigorously documented rare species and natural community data with spatial data identifying wildlife species and habitats that were the focus of the Division of Fisheries and Wildlife's 2005 State Wildlife Action Plan (SWAP). *BioMap2* also integrates The Nature Conservancy's assessment of large, well-connected, and intact ecosystems and landscapes across the Commonwealth, incorporating concepts of ecosystem resilience to address anticipated climate change impacts.

Core Habitat consists of 1,242,000 acres that are critical for the long-term persistence of rare species and other Species of Conservation Concern, as well as a wide diversity of natural communities and intact ecosystems across the Commonwealth. Core Habitat includes

- Habitats for rare, vulnerable, or uncommon mammal, bird, reptile, amphibian, fish, invertebrate, and plant species;
- Priority Natural Communities;
- High-quality wetland, vernal pool, aquatic, and coastal habitats; and
- Intact forest ecosystems.

Critical Natural Landscape (CNL) consists of 1,783,000 acres complementing Core Habitat, including large natural Landscape Blocks that provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience; and includes buffering uplands around coastal, wetland and aquatic Core Habitats to help ensure their long-term integrity. CNL, which may overlap with Core Habitat includes

- The largest Landscape Blocks in each of 8 ecoregions; and
- Adjacent uplands that buffer wetland, aquatic, and coastal habitats.

	Total Acres	Percent of State	BioMap2 Acres Protected
Core Habitat	1,242,000	24%	559,000
Critical Natural Landscape	1,783,000	34%	778,000
BioMap2 Total (with overlap)	2,092,000	40%	861,000

Protection and stewardship of *BioMap2* Core Habitat and Critical Natural Landscape is essential to safeguard the diversity of species and their habitats, intact ecosystems, and resilient natural landscapes across Massachusetts.

Attachment No. 5, 2050 Decarbonization Roadmap Study, Projected Residential Development by Table 3.

Table 3. Projected Residential Growth by Decade in the Buildings Sector

Total Building Area (Msf)	Single Family Residential	Small Multifamily Residential	Large Multifamily (5-19 family)	Large Multifamily (20+ wood)	Large Multifamily (20+ steel)
2017-2030	323	51	78	108	33
2030-2040	122	21	32	41	11
2040-2050	55	11	16	21	6
TOTAL	500	83	125	171	50
% residential growth	54%	9%	13%	18%	5%

28

Attachment No. 6, 2050 Decarbonization Roadmap Study, Projected Commercial Growth by Decade, Table 4

Table 4. Projected Commercial Growth by Decade in the Buildings Sector

Total Building Area (Msf)	2017-2030	2030-2040	2040-2050	TOTAL	% of Commercial Sector Growth
Small Office	5.6	2.1	0.9	8.7	2%
Medium Office	27.5	10.6	5.1	43.2	10%
Large Office	102.8	40.7	22.1	165.6	39%
Hospital	5.3	2.1	1.1	8.6	2%
Laboratory	10.7	4.0	2.1	16.8	4%
Convention/Assembly	15.8	6.1	2.8	24.8	6%
Hotel	8.6	3.3	1.8	13.6	3%
Restaurant	4.6	1.8	0.8	7.2	2%
Retail	47.3	18.3	8.7	74.3	17%
K-12 School	3.2	1.2	0.5	4.9	1%
Supermarket	2.2	0.9	0.4	3.5	1%
Warehouse	36.7	14.2	6.4	57.3	13%
TOTAL	270.4	105.3	52.7	428.4	

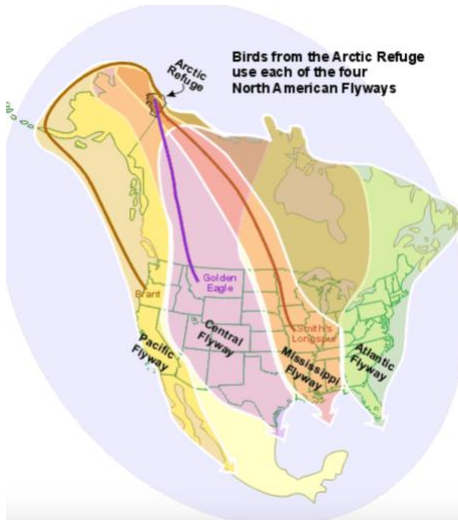
Attachment 7, North American Flyway and Atlantic Flyway

Attachment 8 , Monarch Butterflies, Listed as an Endangered Species

About Milkweed

Common milkweed (*Asclepias syriaca*) is the best known species of the over 100 perennial milkweed species native to North America. Milkweed plants support 12 species of butterflies : moths, including the Monarch butterfly.

The nectar in all milkweed flowers provides valuable food for butterflies, bees, and other pollinators. Butterflies don't only need nectar, but also need food at the caterpillar stage. The leaves of milkweed plants are the only food that monarch caterpillars can eat. And monarch butterflies also need the milkweed plant to lay their eggs on.



RECOMMENDED VARIETIES

- **Common milkweed (*Asclepias syriaca*)** is a hardy perennial that will thrive almost anywhere in the United States, especially east of the Rockies and into Canada. It needs sun, reaches 2 to 6 feet tall with wide, gray-green, velvety leaves, and is an aggressive grower. Don't plant this in your flowerbed or it will take over. It has a wide-spreading root system and needs an area all its own, where it can really stretch out. It has pale purple-pink flowers that are very fragrant and attract many pollinators in addition to Monarch butterflies.
- **Butterfly weed (*A. tuberosa*)** is less aggressive than the common milkweed, growing only 1 to 2-1/2 feet tall. It is commonly grown in gardens, adapts well to moist or dry soil, and its orange flowers are very showy. It likes full sun and is hardy in Zones 3 to 9.
- **Swamp milkweed (*A. incarnata*)** has thinner leaves and more colorful flowers than common milkweed. It is better-behaved than common milkweed, forming clumps rather than spreading out. It grows 2 to 4 feet tall, has deep rose-pink flowers, and is shade tolerant. It will grow in wet soil near lakesides or damp marshlands, but also grows well in average garden soil and is hardy in Zones 3-9.
- **Showy milkweed (*A. speciosa*)** is native from west of the Mississippi into California and north to Canada. It has pastel pink flowers on 2- to 4-foot tall plants. It is drought tolerant, making it a good plant for arid plains and prairie-lands, though it grows well in moist garden soils as well. It needs full sun and is hardy in Zones 3-9.

Attachment 11, Recommended Siting Requirement for Greater Than 250 kW SMART, 50' Treed Buffer to Municipal Roads and Residential Abutting Properties.

Language below is from The Town of Millis Zoning Change to Accommodate Larger Scale Solar.

9. Dimension and Density Requirements:

The following dimensional and density requirements shall apply to all LGSPI.

Setbacks:

For large-scale ground-mounted solar photovoltaic installations, front, side and rear setbacks shall be as follows:

- (a) Front yard: The front yard depth shall be at least 40 feet; provided, however, that where the lot abuts designated Conservation land or land currently used for Recreational purposes, the front yard shall not be less than 50 feet, **and where the lot abuts a Residential District, the front yard shall provide a treed fifty foot (50') wide buffer from all Town roads and residential properties, except as provided in (d) below.**
- (b) Side yard: Each side yard shall have a depth at least 20 feet; provided, however, that where the lot abuts designated Conservation land or land currently used for Recreational purposes, the side yard shall not be less than 50 feet, **and where the lot abuts a Residential District, the side yard shall provide a treed fifty foot (50') wide buffer from all Town roads and residential properties, except as provided in (d) below.**
- (c) Rear yard: The rear yard depth shall be at least 30 feet; provided, however, that where the lot abuts designated Conservation land or land currently used for Recreational purposes, the rear yard shall not be less than 50 feet, **and where the lot abuts a Residential District, the rear yard shall provide a treed fifty foot (50') wide buffer from all Town roads and residential properties, except as provided in (d) below.**
- (d) Subject to application for and receipt of a Special Permit, natural sight barriers (which shall include without limitation rivers, upland gradients, and any wetland setbacks required by the _____ Conservation Commission pursuant to applicable law) may be considered by the Planning Board as a basis for reducing the 50' treed buffer requirement of (a), (b) and (c) above.