

December 20, 2021

Letter concerning the development of a new Amherst Solar Zoning Bylaw and need for a solar study from the Amherst Energy and Climate Action Committee (ECAC)

Dear members of the Amherst Town Council, Community Resources Committee, and Planning Board,

We write to offer our perspectives and suggestions concerning a new solar zoning bylaw for Amherst. While we support the town in developing a new solar zoning bylaw, we believe a solar resource assessment and planning process is needed to develop the best possible new solar zoning bylaw for Amherst. As summarized below, Amherst may eventually need to accommodate hundreds of acres of ground-mounted solar in town, even beyond siting capacities on roofs and parking lots, to contribute to Massachusetts binding renewable energy commitments and Amherst's own commitments to climate action. We also outline below key questions that a solar resource assessment needs to address before a bylaw can be completed.

Massachusetts was one of the first states in the nation to develop a comprehensive plan to achieve greenhouse gas reduction (GHG) goals, starting with the Massachusetts Global Warming Solutions Act of 2008. During the State of the Commonwealth address on January 21, 2020, Governor Baker announced new goals to achieve net-zero greenhouse gas emissions by 2050 through the "Massachusetts 2050 Decarbonization Roadmap". Implementation of these plans is now being addressed in the "Massachusetts Clean Energy and Climate Plan for 2025 and 2030" initiated by Gov. Baker in March 2021 and ongoing with a July 1, 2022 completion deadline. The interim goals state "The 2030 emission limit shall be at least 50% emissions reduction below the 1990 baseline, and the 2040 emissions reduction shall be at least 75% emissions reduction below the 1990 level." Also in March 2021, the Governor and Massachusetts state legislature passed the "Next-Generation Roadmap for Massachusetts Climate Policy", which further affirms these policies and changes Massachusetts laws to accommodate them.

The Town of Amherst also has its own commitments and an active climate action plan. Amherst's policies include near-net zero requirement for new town buildings and GHG emissions reduction targets (25% reduction by 2025, 50% reduction by 2030, and carbon neutrality by 2050). The completion of the "Climate Action, Adaptation, and Resilience Plan" (CAARP) in June 2021 following extensive community and town staff participation was a major milestone. The CAARP provides implementation plans for a wide range of projects in five categories:

- Governance and Communications
- Buildings
- Renewable Energy
- Land Use and Natural Systems
- Transportation and Infrastructure

The Energy and Climate Action Committee is working to recommend specific actions in these categories.

The Massachusetts 2050 Roadmap to Decarbonization and its supporting technical reports are long and complex (links to all are provided at the end of this letter). However, the goals of the Roadmap can be summarized in five lines:

1. Phase out more than 90% of all fossil fuel use including gasoline and diesel;
2. Greatly improve energy efficiency of existing buildings and set high energy efficiency standards for new buildings;
3. Electrify everything possible;
4. Massively expand wind and solar power to meet clean energy needs;
5. Increase intra-and interstate electric power transmission capacity.

The 2050 Roadmap acknowledges that “Achieving Net Zero by 2050 will require significant transformations across the Commonwealth.” While the transformations will be extremely challenging to implement, the 2050 Roadmap notes that many of these transformations are technically and economically achievable and will have positive impacts:

- “Massachusetts has a robust, though not unlimited, range of viable options for deep decarbonization which will allow us to achieve our climate change mitigation goals at reasonable costs and using technologies and solutions that are known and, for the most part, available today.”
- “... working to achieve Net Zero will also provide broad and substantial economic opportunity and public health benefits to everyone in Massachusetts.”
- “... transitioning away from the use of fossil fuels across the economy promises to deliver significant improvements in air quality and health benefits to overburdened Environmental Justice populations and communities of color.”

The ECAC would like to emphasize that *not* achieving Net Zero by 2050 will also result in significant transformations across the Commonwealth and these transformations will be largely negative to our health, our lands, and our economy.

A key component of the 2050 Roadmap is expanding wind and solar power to provide the energy previously provided by fossil fuels. While overall energy use is expected to decrease 40% due to increased efficiency, electricity demand is expected to more than double due to widespread electrification of buildings and transportation services. Doubling the clean electricity supply will require solar and wind generation to increase more than ten times from 2025 through 2050. Offshore wind power is slated to provide the majority of the new generation capacity, but the Energy Pathways Report found that 20-23 GW of solar capacity will be necessary. As of the end of 2020, Massachusetts had about 3.4 gigawatts (GW) total solar capacity installed. To meet the 2050 goals, solar capacity will need to accelerate from the roughly 400 megawatts (MW) installed per year over the past six years to more than 600 MW installed each year by 2030 and grow by at least 1% per year to reach 1,000 MW installed annually in years 2048 – 2050. This is a staggering amount of new solar capacity! The Clean Energy and Climate Plan for 2025 and 2030 states that “even with maximal rooftop deployment far in excess of historic levels, [this] will require the installation of ground-mounted solar on approximately 60,000 acres of land in Massachusetts over the next thirty years”. The Town of Amherst’s “share” of 60,000 acres proportioned by population works out to be about 335 acres, which is a little less than 2% of Amherst’s total land area. Using different calculations, the ECAC has estimated that to meet the current electricity demand of the Town (before we “electrify everything”), approximately 270 acres of solar would be necessary without including our academic institutions, and a bit over 400 acres would be needed including these institutions.

Fortunately, Massachusetts has over 3.3 million acres of forest that currently sequester about 5 million metric tons CO₂e per year, which is equivalent to roughly 7% of the Commonwealth’s current GHG emissions. The 2050 Roadmap notes that even with inevitable population-driven forest clearing for housing and the deployment of clean energy resources, Massachusetts forests “will continue to grow and mature throughout the next three decades” and “are likely to continue sequestering about 5 million metric tons of CO₂e each year regardless of such land use change impacts, however reasonably mitigated through policy.”

The transformations required to achieve carbon neutrality by 2050 are staggering. Every aspect of the 2050 Roadmap will require changes on unprecedented scales and will require community collaboration and compromise on likewise unprecedented scales. However, as we note above, failure to achieve the goals we have set for ourselves will result in unprecedented transformations that will be largely negative and unhealthy. The ECAC concurs with a quote in the Roadmap report from Dan Jørgensen, the Danish minister for Climate, Energy, and Utilities:

“We have decided not to aim for what we know to be possible, but what we know to be necessary. Our task is now to make the necessary possible”

In order to encourage responsible local solar development and protect our rich diversity of natural resources, the Town of Amherst should conduct a solar resource assessment to guide municipal, community, and private solar development

efforts in our town. A good solar resource assessment coupled with an informed solar planning strategy and solar zoning bylaw will ensure the protection of “highest and best use” values of natural lands while facilitating emissions reduction and retaining co-benefits. Some of the ecosystem service values that a well-crafted solar zoning bylaw can protect include drought resilience, wildlife habitat, agricultural productivity, flood storage capacity, and carbon sequestration. A solar resource assessment should be completed before a solar zoning bylaw is completed and should address the following questions:

- How much roof-top, parking lot canopy, brownfield, and ground mounted solar will be needed in Amherst to meet Amherst’s and the Commonwealth’s climate action goals for 2025, 2030, and 2050?;
- How much land is available in Amherst that currently qualifies for Massachusetts SMART program incentives? What are the current uses and ownerships of these lands (forest, farming, orchard, pasture, landfill, golf course, parking lots, etc. and private versus municipal versus state ownership)?;
- How much land will be needed for solar facilities to meet 2050 goals beyond that allowable under current land use policies? (that is, an inventory of land categories that are currently restricted from solar development but may be needed to meet 2050 climate action goals);
- What could be the potential impact or contribution the town of Amherst has in supporting the state’s climate change goals?

Apart from the technical aspects of a solar resource study, ECAC suggests the town engage in a broader solar planning process to 1) consider its goals for hosting solar capacity, 2) define alternative scenarios for siting such capacity goals and evaluate cost and other impacts, 3) assess constituents’ perspectives and preferences, 4) evaluate local benefits of solar financing and ownership options, and 5) chart a plan to engage with our Community Choice Aggregation and solar developers that can deliver solar projects in the form and under the financial conditions identified by the town process. UMass Clean Energy Extension has prepared a “toolkit” for communities to engage in this solar planning process, which will soon be publicly available.

Guided by the solar study, a new Amherst solar zoning bylaw should be developed with community participation to clarify local preferences and goals for solar and energy storage. The solar zoning bylaw should:

- Recognize the importance and likely need for ground-mounted solar for meeting climate action goals;
- Guide solar development to favorable locations and balance ecological, economic, social, cultural, and other values of the community’s abundant natural lands with the need for renewable energy;
- Incentivize solar developments in suitable areas through an expedited review and permitting process;
- Identify and require best practices for long-term land and natural resource management on all parcels requiring vegetation alteration greater than 1 acre (e.g., visual screening from public ways, vegetative buffers, storm water management, soil preservation and improvement, soil carbon sequestration, ...)
- Be consistent with existing local and state laws, including climate action commitments.

Developing a solar project can take years from concept to operation, and a well-crafted Amherst solar bylaw can help to expedite this process by streamlining permitting, encouraging responsible siting, and incentivizing best practices. The ECAC is happy to help support the Town Council and Planning Board in developing the RFP for a solar study, interpreting its results, and helping to develop an Amherst solar bylaw.

Sincerely,
The Amherst Energy and Climate Action Committee

Laura Draucker, Chair
Andra Rose, Vice Chair
Don Allison
Dwayne Breger
Darcy Dumont, Town Council Representative

Vasu Raghavan
Steve Roof
Jesse Selman

Information Sources Cited Above:

Massachusetts Decarbonization Roadmap: <https://www.mass.gov/info-details/ma-decarbonization-roadmap>

Land Sector Report. A Technical Report of the Massachusetts supporting the Decarbonization Roadmap
<https://www.mass.gov/doc/land-sector-technical-report/download>

Energy Pathways to Deep Decarbonization. A Technical Report of the Massachusetts 2050 Decarbonization Roadmap Study, December 2020
<https://www.mass.gov/doc/energy-pathways-for-deep-decarbonization-report/download>

Massachusetts Clean Energy and Climate Plan for 2025 and 2030
<https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2025-and-2030>

MA GHG Emissions and Mitigation Policies

<https://www.mass.gov/info-details/ghg-emissions-and-mitigation-policies>

This page offers detailed insights into the Commonwealth's progress toward the goals of the Global Warming Solutions Act.

Massachusetts Solar Massachusetts Renewable Target (SMART) Program: <https://www.mass.gov/solar-massachusetts-renewable-target-smart>

Umass Center for Agriculture, Food, and the Environment Clean Energy Extension Resources:

- Solar Resources for Municipalities: <https://ag.umass.edu/clean-energy/resources/solar-pv/solar-resources-for-municipalities>
- Community-Driven Solar Siting & Financing (under development): <https://ag.umass.edu/clean-energy/research-new-initiatives/solarplanning>