

Project Overview & Objectives

Context / Problem Statement

My work focused on Massachusetts clean energy policy, municipal energy systems, and solar permitting/decommissioning. I researched how municipalities can expand renewable energy while balancing environmental protection, affordability, community benefits, and long-term accountability.

Key topics included:

- Municipal energy aggregation
- DOER expedited solar permitting
- Solar decommissioning and recycling
- Community benefit agreements (CBAs)
- Microgrids and virtual power plants (VPPs)

A major challenge is ensuring renewable energy projects are developed responsibly. Municipalities still face questions about where projects should be built, how communities benefit, and who is responsible for cleanup at the end of a project's life.

My work explored the need for:

- clearer decommissioning standards,
- stronger financial assurance requirements,
- equitable community engagement,
- and more resilient local energy systems.

This work is important because sustainable energy requires long-term planning for recycling, land restoration, resilience, and community accountability, not just renewable energy installation.

Current State of the Issue / Project

Massachusetts recently adopted new DOER permitting regulations, creating expedited permitting for many solar projects and establishing site suitability scoring systems. However, decommissioning standards and financial assurance requirements are still evolving, especially regarding escrow structures, enforcement, and long-term accountability. I worked on a memo sent to DOER with ideas on how to improve the decommissioning plan. At the same time, communities like Chelsea, Massachusetts are developing microgrid and resilience projects that combine solar, battery storage, local governance, and equity-focused planning. After doing baseline research, we are hoping to connect to the leader of the program to see if it is possible to implement it into Lowell or surrounding towns.

We are still researching possibilities for Lowell to develop its own local energy system, and these topics help provide a foundation NMCOG can build from.

Deliverables and Findings

1. Solar Decommissioning Remains a Major Policy Gap

Massachusetts now requires decommissioning plans and financial assurance for solar projects, but many implementation details remain unresolved.

Key findings:

- Municipalities may require escrow accounts, bonds, or letters of credit
- No standardized statewide escrow formula currently exists
- Concerns remain about long-term developer accountability and bankruptcy risks

Action:

- Wrote and sent a memo to DOER about their decommissioning plan

2. Municipal Aggregation Can Support Local Clean Energy Goals

Research showed aggregation programs allow municipalities to:

- purchase cleaner electricity
- stabilize pricing
- potentially fund local renewable energy projects or energy manager positions.

Programs vary significantly across communities in:

- renewable energy content
- supplier choice
- contract structure
- and green energy options.

During the research that I did towards Municipal Energy Aggregation, I wrote a memo which went into detail about how it works with communities such as Lowell and the surrounding towns. I also attended the Electric Connections Improvements Forum in Boston and wrote a memo with energy aggregation in mind.



3. Chelsea Microgrids and Fuel Cell Integration

Fuel Cells: Devices that generate clean electricity from hydrogen, producing only water as a byproduct. More efficient than fossil fuels (better suited for long-duration power than batteries), they represent a promising technology for future microgrid applications.

Chelsea Microgrid: A community-led, virtual clean energy microgrid powered by solar and batteries. Funded through state grants and loans, it was initiated by GreenRoots to improve energy resilience and environmental justice in Chelsea and is designed to be a model for other cities.

4. Rural Electric CO-OPs

History & Origins: Before 1935, fewer than 10% of rural Americans had electricity. The REA used federal loans to help communities build member-owned cooperatives, expanding coverage to ~90% by 1950.

Governance: Co-ops were designed as democratic, one-member-one-vote institutions, but participation and transparency have eroded over time; many members don't even know they're owners. Restoring accountability is as important as upgrading infrastructure.

Eastern Maine Electric Cooperative (EMEC) is a real-world example of this model in action: a nonprofit utility serving Aroostook, Penobscot, and Washington Counties in Maine, divided into 11 zones where members elect board representatives every 3 years.

Modernization: The transition away from centralized fossil fuels toward distributed energy (solar, batteries, microgrids, VPPs, agrivoltaics) mirrors the original electrification effort and requires similar levels of public investment. EMEC reflects this directly through a \$2M grid upgrade in the Calais region, replacing 10.6 miles of distribution lines, transformers, and poles, with goals including increased grid resilience, reduced outage frequency, clean energy workforce development, and addressing disproportionate energy burdens.

Economic Equity: Energy projects only create lasting community benefit when paired with local ownership, workforce development, community benefit agreements, and inclusive financing. Hudson's lower energy prices through cooperative ownership are an example of what surrounding communities like Lowell could aim for, which is why NMCOG (and the surrounding regions) is exploring developing an independent electric grid separate from National Grid or Eversource.

Main Takeaways

Summarize main takeaways

Key Takeaway 1: Renewable energy expansion requires long-term lifecycle planning, including decommissioning, recycling, and financial assurance.

Key Takeaway 2: Community engagement and governance are just as important as the technology itself in determining whether energy projects benefit local communities.

Key Takeaway 3: Distributed energy systems such as microgrids, VPPs, and aggregation programs can improve resilience, affordability, and local control while supporting decarbonization goals.

Impact: Why my work matters for Sustainable Energy.

This work matters because municipalities across Massachusetts are rapidly confronting decisions about:

- solar siting,
- grid modernization,
- energy affordability,
- climate resilience.



My research helps identify:

- policy gaps
- best practices
- emerging governance models that can support more equitable and sustainable energy systems.

The work contributes to sustainable energy planning by emphasizing:

- responsible renewable energy development,
- stronger environmental protections,
- improved community participation,
- and long-term infrastructure accountability.

It also highlights how clean energy policy can support:

- economic development,
- resilience
- local ownership and environmental justice



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Contact Me!

