

UMASS CLEAN ENERGY EXTENSION

Quarterly Progress Report to MA Department of Energy Resources

Period ending December 31, 2019

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This Progress Report provides a summary of work accomplished by the UMass Clean Energy Extension (CEE) during the period October 1, 2019 to December 31, 2019.

During this reporting period, the Clean Energy Extension continued its support of the Green Communities and SMART solar-agriculture dual-use programs, advanced efforts in support of clean heating and cooling markets, presented findings on the early-stage battery innovation ecosystem at the Massachusetts Statehouse, and facilitated interactions across industry, the university, and a range of research and outreach activities. Some key highlights, further discussed below for this reporting period include:

- Completed development of two new tools to support the Green Communities program: Municipal Energy Profile (a template that will be used to generate custom profiles for cities/towns) and an [Energy Efficiency Checklist for Municipal Buildings](#).
- Presented findings from the CEE project report [Creating Opportunity: Building a Massachusetts Battery Energy Storage Innovation Ecosystem](#) to the Massachusetts Statehouse Energy Caucus.
- Continued development with support from the MassCEC of the Offshore Wind Energy Professional Graduate Certificate Program in coordination with the University College of Natural Sciences (CNS) and University Without Walls. During this quarter, planning commenced for a Spring 2020 soft launch of the program with one course module (*Offshore Wind Energy: Environmental Impacts, Siting, Permitting and Stakeholder Engagement*) to be taught by Dr. Alison Bates. In addition, CEE developed and distributed a market research survey targeted toward industry professionals.
- CEE continued to provide user support services to Green Communities MassEnergyInsight users in partnership with DOER, Peregrine Energy, and OptiMiser, LLC. During this quarter, CEE successfully addressed over 230 requests for user support across 130 municipalities and other entities. This included managing responses to a particularly high load in November, as communities prepared to submit their Green Communities Annual Report.

- Advanced collaborations with farmers, developers, UMass Agricultural Extension, DOER, and Massachusetts Department of Agricultural Resource (MDAR) to develop tools, guidance, and a pre-determination form for those considering dual-use PV systems under the recently launched SMART program. Over this reporting period, CEE has continued its review of Pre-Determination applications for dual-use agricultural STGUs, providing reviews of six new dual-use applications, and one revised application. We also participated in one dual-use site visit to provide further recommendations and clarifications at proposed sites. In addition, CEE helped advance discussions relating to dual-use research needs and opportunities with industry and UMass stakeholders.
- CEE provided direct support to 15 communities, including planning and conducting energy audits, evaluating clean energy projects, and supporting project implementation.
- In coordination with the Clean Cities Program, we continued efforts to launch our joint telematics pilot project, to support municipalities in identifying opportunities to reduce municipal fuel consumption. Two communities have signed contracts to participate in the telematics pilot, and a third voted at its Select Board meeting to participate.
- CEE Director and the campus Sustainability Manager are co-chairing the Chancellor's Carbon Mitigation Task Force charged with charting a plan for the University to rely on renewable energy and eliminate greenhouse gas emissions. The 17 member Task Force hosted five consulting firms as finalist in our consultant RFP on campus in October, and unanimously recommended one firm to the Vice Chancellor who approved moving forward. Contracting for this consultant is currently underway.
- During this reporting period, we discussed potential pollinator-friendly solar projects with municipal board members and a consultant. We further refined our recommended plant species list based on input from the Xerces Society.

1. Extension Administration and Management

CEE Associate Director chaired a Search Committee for a Web Designer/Online Strategist for the Center for Agriculture, Food and the Environment (CAFE). The search resulted in a position offer and hire.

CEE Associate Director continues to support diversity, equity, and inclusion (DEI) efforts within CAFE and the College of Natural Resources, and helped coordinate a December DEI workshop for Extension staff and faculty.

2. Public Events and Outreach Activities

During this reporting period, CEE staff and affiliates have engaged in the following public events.

Event	Date and Location	Extension Presenter/ Attendee	Presentation Title(s)	Audience	Estimated Attendance
2019 Statewide Conference for Municipal Officials and Staff	October 8, Worcester	Mattison	N/A	Municipal officials and staff	200
NAWEA/WindTech 2019	October 14 – 17, UMass	Breger, Dowling, Strong	Offshore Wind Professional Graduate Certificate Program; Addressing Effects of Offshore Wind Development on Bats	Wind energy industry professionals, government officials, and researchers	30 (per session) 200 (poster)
EEA-led MA Delegation to Tamil Nadu, India	October 19-26	Breger	Traveled with EEA delegation representing UMass to explore U.S. State Department program state-to-state collaboration on energy policy with Tamil Nadu	Energy policy and utility officials of Tamil Nadu, India; National Institute of Wind Energy; IIT Chennai.	50
Presentation of findings from the CEE project report <i>Creating Opportunity: Building a Massachusetts Battery Energy Storage Innovation Ecosystem</i>	October 29, Boston	Breger, Strong	Creating Opportunity: Building a Massachusetts Battery Energy Storage Innovation Ecosystem	Massachusetts Statehouse Energy Caucus, industry representatives, and the general public	50
Energy Transition Institute	October 31, UMass Amherst	Breger	Second planning meeting to build concept of a campus-wide, interdisciplinary Energy Transition Institute	UMass faculty, staff, researchers	70
Board of Public Overseers Meeting	December 10, Shrewsbury, MA	Strong	N/A	UMass Extension staff, faculty, BOPO officials	25

Event	Date and Location	Extension Presenter/ Attendee	Presentation Title(s)	Audience	Estimated Attendance
Franklin County Energy Committees Coalition	November 12, Greenfield, MA	Weil	UMass Clean Energy Extension Assistance to Cities and Towns	Members of energy committees in Franklin County	15
MAPC Clean Energy Forum	December 11, Boston	Mattison	N/A	Municipal staff, clean energy advocates, etc.	200

3. Green Communities and other State/Municipal Assistance

Community Choice Energy (Northampton, Amherst, Pelham)

CEE continues its engagement with the Western Massachusetts Community Choice Energy organizers to support the towns of Northampton, Amherst and Pelham, which have all approved the exploration of a municipal aggregation for electricity with innovative efforts to enhance strategic investments in local energy efficiency, demand reductions, and renewable generation. CEE is providing analytical support, and is participating in Task Force activities, including project planning, developing funding proposals, and supporting research efforts. During this quarter, work continued on the consulting project scope of analyzing the feasibility and specifics of further developing and implementing the WMCCE. In addition, CEE played a lead role in drafting and distributing a Task Force draft findings report, [*Report of the Inter-Municipal Task Force on Community Choice Aggregation*](#).

Green Communities

CEE continues to assist Massachusetts cities and towns in support of the Green Communities program. During this reporting period, CEE engaged directly with 15 communities, detailed in the table below, and worked on tools and training to support communities across the state.

We completed development of two new tools this quarter, after reviewing them with DOER and Mass Save PAs:

- Municipal Energy Profile – A report template that provides an overview of the community’s energy use and helps to prioritize steps for energy reduction. We are now able to generate reports upon request for communities that provide us read-only access to their MEI data.
- Energy Efficiency Checklist for Municipal Buildings – Explains prescriptive and other relatively simple measures that are often cost-effective and eligible for Mass Save incentives. We have found that some of these measures are rarely included in building audits, so we created the checklist to educate communities about these opportunities. It is now posted on our website at http://ag.umass.edu/sites/ag.umass.edu/files/pdf-doc-ppt/energy_efficiency_checklist_for_municipal_buildings.pdf. The checklist includes a link to the page <http://ag.umass.edu/clean-energy/mass-save-contacts>, on which we worked with the Mass Save PAs to compile regional Mass Save contacts for

municipalities because we have found that some communities do not know their local contacts.

We are continuing development of this tool:

- Decision Guide for Energy Retrofits in Massachusetts Schools – A decision tree to help communities narrow down the appropriate options for their school buildings in advanced retrofits of heating and ventilation systems, building envelope, and installation of clean heating and cooling technologies. The current draft will be tested by our Clean Energy Corps class in the spring semester.

CEE began to work with DOER to plan heat pump training targeted toward municipal staff and volunteers, based on a need identified by Green Communities staff. We are looking to hold a few regional sessions in 2020.

CEE also supported DOER in reviewing Green Communities designation applications. This work included participating in a meeting at the DOER office to learn about the process, detailed review of energy reduction plans and MEI data for five communities, and documentation of questions and discrepancies for DOER staff to address with the communities.

CEE staff and affiliates have engaged with the following cities and towns in support of the Green Communities program:

City or Town	Technical Assistance
Agawam	Discussed energy efficiency opportunities in water and sewer pumping stations. Connected city staff with Eversource to pursue incentives toward implementation of recommendations made in previous facility audits.
Amherst	CEE (Strong) met with Stephanie Ciccarello, Sustainability Manager, to discuss (1) the potential for CEE assistance with building efficiency efforts, and (2) partnering on a Mass Save community energy efficiency solicitation.
Buckland	Reviewed energy data for the Shelburne Falls Wastewater Treatment Plant, which serves the Towns of Buckland and Shelburne, and planned a facility audit to be conducted by our Clean Energy Corps class in January.
Chicopee	Met with Chicopee mayor and staff to review results of UMass CEERE’s wastewater treatment plant audit and discuss other opportunities to support energy efficiency in municipal facilities and local businesses.
Heath	CEE (Strong, Mattison) communicated with Noy Holland of the Heath Energy Advisory Committee to discuss building energy challenges, energy efficiency priorities and clean heating and cooling options, then introduced the town to National Grid for assistance with a heat pump project.
Leverett	Planned an audit of Leverett Elementary School by our Clean Energy Corps class in February.
Monson	Had a follow up discussion on recommendations made in the program review we conducted in the spring. Discussed town facilities that could benefit from an audit, and planned an audit of water and sewer pumping stations by our Clean Energy Corps class in February.
Northampton	Arranged and completed an audit of the water treatment plant through UMass CEERE’s Industrial Assessment Center program. Planned an audit of Smith Vocational and Agricultural High School by our Clean Energy Corps class in March.

City or Town	Technical Assistance
Pittsfield	CEE (Breger, Strong) met with Toryl Hanna regarding with the regarding progress on the City of Pittsfield microgrid feasibility study.
Springfield	CEE (Breger, Strong) met with Springfield officials (Tina Quagliato, Sean Pham) to discuss CEE’s past work in analyzing the potential for distributed generation and a microgrid in the Mason Square neighborhood, and the potential for building on these efforts.
Northfield	CEE (Weil) met with town Energy Committee to review outcomes of envelope retrofits to Northfield Elementary School and devise next phase (heating system and controls upgrade)
Walpole	CEE (Strong) met with Norfolk County Agricultural High School student council parent member to discuss options for exploring and financing a solar PV installation at the school.
Westborough	Arranged and completed an audit of the water treatment plant through UMass CEERE’s Industrial Assessment Center program.
Westhampton	Planned an audit of Westhampton Elementary School by our Clean Energy Corps class in March.
Whately	CEE (Weil, Mattison) met with energy and school committee members to organize implementation of energy retrofit plan developed and presented in May.
Worcester	Analyzed and discussed MEI data to identify a school that could benefit from an audit, and planned an audit of Columbus Park Elementary School by our Clean Energy Corps class in February.

MassEnergyInsight

CEE continued to provide user support services to Green Communities MassEnergyInsight users in partnership with DOER, Peregrine Energy, and OptiMiser, LLC. During this quarter, CEE successfully addressed over 230 requests for user support across 130 municipalities and other entities. This included managing responses to a particularly high load in November, due to preparation for the Annual Report. Other key tasks for this quarter included:

- Publishing two MEI user newsletters and sending out two shorter bulletins with timely quick tips.
- Setting up a framework to address longstanding problems and needs for clarification that require collaboration with utilities.
- Designing a user survey to be sent to users in January 2020.
- Participating in weekly team planning meetings with DOER and Optimiser.

4. Business Outreach and Support

The Clean Energy Extension staff held substantive direct interactions with the following businesses, state entities, and other organizations.

Entity and Attendees	Date and Format	Extension Staff	Purpose and Outcomes
Town of Amherst Waste/Blue Thermo – WWTP Heat Recovery Project	October 1, Amherst	Strong	Kick-off meeting for an innovative wastewater-source heat pump pilot project at the town WWTP that will deliver heat to the building facility.
Eversource	October 18	Mattison, Weil, Kosanovic	Discussion about each of our programs and how to increase collaboration and support for project implementation
Hyperion Systems/Rep. Blais/Rep. Domb/Sen. Comerford	October 21	Strong	Meeting to discuss status and next steps for the dual-use solar PV system at the UMass S. Deerfield Farm
Berkshire Gas	October 21	Mattison, Kosanovic	Discussion about each of our programs and how to increase collaboration and support for project implementation
National Grid	October 23	Mattison	Discussion about each of our programs and how to increase collaboration and support for project implementation
Tina Clarke	October 30, November 25	Breger, Strong	Meeting to discuss clean energy collaborations between Gaia Trust, Pioneer Valley Regional Ventures Center
UMass Arts Extension Service	November 4	Breger, Strong	Meeting with Arts Extension to discuss potential collaboration in bringing energy efficiency, clean energy, and sustainability resources to the 2,000+ arts organizations in MA.
Arcadia Wildlife Sanctuary – MA Audubon	November 5	Strong	Meeting with Arcadia board member to discuss funding options for facility retrofits related to CEE-recommendations for building performance and energy efficiency for this non-profit located in Easthampton, MA.
John Snell	November 13	Breger, Strong	Meeting with John (formerly of Peregrine Energy Group) to discuss current contract to provide MEI support and other potential collaborations.
Mark Rabinsky, Joanne Bissetta, Brian Sullivan	November 18	Mattison, Weil	Meeting/call to discuss CEE municipal services with new and existing Green Communities staff
BlueWave Solar	November 22	Breger, Strong	Meeting with leadership team from BlueWave to discuss dual-use solar PV, SMART program status, and collaborative research opportunities.
MassCEC	December 13	Breger, Strong	Meeting with Mike Condon to discuss details and outreach support associated with the Accelerating Clean Transportation NOW RFP.
Steve Russell, Clean Cities	December 16	Breger, Dowling, Strong	Meeting to discuss next steps for Clean Cities in MA – and potential roles for CEE – following Steve’s January retirement.
Unitil	December 23	Mattison	Discussion about each of our programs and how to increase collaboration and support for project implementation

Entity and Attendees	Date and Format	Extension Staff	Purpose and Outcomes
Jon Hacker & J.S. Rancourt, Daikin	Bi-weekly, since summer	Kosanovic, Mattison, Weil	Developing M&V sensor and data recording protocol to evaluate in situ performance of large VRF systems.

5. Research Activities and UMass Clean Energy Corps

Research Activities and Funding Opportunities

CEE continued to develop the Offshore Wind Energy Professional Graduate Certificate Program in coordination with the University College of Natural Sciences (CNS) and University Without Walls. CEE was awarded a MassCEC Massachusetts 2018 Offshore Wind Workforce Grant for \$105,500 and secured an additional \$32,000 from the university to develop the program. During this quarter, planning commenced for a Spring 2020 soft launch of the program with one course module (*ECO 697WD - Offshore Wind Energy: Environmental Impacts, Siting, Permitting and Stakeholder Engagement*) to be taught by Dr. Alison Bates. In addition, CEE developed and distributed a market research survey targeted toward industry professionals, and designed to assess upskilling educational needs for the professional workforce and across the breadth of academic disciplines. The survey was distributed to more than 400 individuals and generated a 12% response rate. Results will be compiled, analyzed, and reported in early 2020.

CEE in collaboration with colleagues in Resource Economics and industry partner Sustainable Energy Advantage, LLC (SEA), is working on its Seed Grant from the UMass Institute for Social Science Research. The project is evaluating and quantifying the magnitude and recipients of the economic rents from Massachusetts solar SREC II program. With assistance from a graduate student, CEE completed the cash flow spreadsheet model and a draft report based on early input and assumptions. CEE is coordinating with SEA to review and enhance the model assumptions, which will then enable completion of our preliminary results and scope of the seed grant.

CEE Research Fellow received funding through the James A. Walker Future of Wind and Wildlife Postdoctoral Fellowship sponsored by the American Wind Wildlife Institute, to fund research related to development of an evaluation tool analyzing risks to wildlife and wildlife habitat from wind development and climate change. She is still continuing work on other CEE projects on a part-time basis.

Based on a concept proposal submitted in September, CEE was invited by the National Renewable Energy Laboratory's Solar Energy Innovations Network to submit a full proposal for community-driven solar siting and financing in rural communities. Associated stakeholders and partners in the proposal include Environmental Conservation department faculty, UMassFive Federal Credit Union, Massachusetts Department of Agricultural Resources, regional planning organizations, local solar development companies, and municipalities. CEE submitted the full proposal in November.

CEE continued work on the Renewable Thermal Alliance (Yale U.) Seed Innovation Grant award project: *Understanding Renewable Thermal Market Penetration Outcomes – Comparative Evaluation Tool*. With support from an undergraduate student, CEE has completed a survey form, which will be provided to targeted experts for review of the model inputs and assumptions, and has prepared a draft case study analysis for the town of Amherst.

CEE continued providing technical input to support the selection and design of a clean heating and cooling system calculator tool, in partnership with the Clean Energy States Alliance and northeast regional state energy offices. These efforts are in service of the Renewable Thermal Alliance (Yale U.) Seed Innovation Grant project: *Consumer-Facing Cost-Carbon Calculator for RH&C Technologies*.

CEE and its project partners (the Center for Energy Efficiency and Renewable Energy and the Water Innovation Network for Sustainable Small Systems, the Town of Amherst Wastewater Treatment Plant, Blue Thermo) participated in a project kick-off meeting. With funding assistance from MassCEC's Wastewater Treatment Innovative Technology Program, the project will pilot an innovative wastewater-source heat pump at the town WWTP and deliver heat to the building facility, and has

CEE continued to provide technical support to the communities of Northampton, Amherst, and Pelham under the Urban Sustainability Directors Network (USDN)-funded project to advance the western MA towns intent to establish a progressive Community Choice Energy Aggregation 3.0. The consulting team of Paul Gromer, Peregrine Energy and Paul Fenn, Local Power commenced work in January and are providing regular progress updates.

CEE in collaboration with Benjamin McDaniel, Dr. Beka Kosanovic and graduate researchers (CEERE) and Prashant Shenoy (CICS) continue to support the University Physical Plant as part of the ACES battery storage grant and installation. Physical Plant is now providing interval data for the battery system that is being used by the research team to support machine-learning methods to support improvement to the battery control algorithms. CEE has also provided a proposal to DOER and MassCEC to re-purpose the research scope originally targeted to explore the design and business plan for a battery test facility, to support key recommendations of the battery innovation ecosystem report completed by CEE in June 2019.

Clean Energy Corps

During this reporting period, Clean Energy Corps interns have worked on the following projects with CEE staff mentors:

- Masters of Science in Sustainability Sciences student Alexia Perides is working with CEE to evaluate the equity impacts of the Massachusetts RPS Solar Carve-Out programs.
- Undergraduate student in Sustainable Community Development Billy Polymeros worked with CEE to support the development of the Renewable Thermal Market Penetration Outcomes – Comparative Evaluation Tool.

- Corps member Devon Lukas is working with CEE staff to develop an update of Pioneer Valley Planning Commission's 2014 regional GHG Inventory. Results of this first phase of work were discussed at the December meeting of the Pioneer Valley Climate Action/Clean Energy working group. Findings from the update will help inform a subsequent phase of work in which the inventory is re-cast with a more robust methodology and data sources.
- First-year students in *NRC 100: Environment and Society* worked with CEE Research Fellow Zara Dowling on a project to raise awareness about songbird mortality, and to develop an infographic depicting the relative risks posed by cats as opposed to wind energy development.