

UMASS CLEAN ENERGY EXTENSION

Quarterly Progress Report to MA Department of Energy Resources

Period ending December 31, 2018

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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, 2018 to December 31, 2018.

During this reporting period, the Clean Energy Extension continued its support of the SMART solar-agriculture dual-use program, advanced efforts in support of clean heating and cooling markets, continued to explore the early-stage battery innovation ecosystem in Massachusetts, 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:

- Advanced research initiative to explore the early-stage battery innovation ecosystem in Massachusetts and facilitate interactions across industry and the universities – in collaboration with DOER and MassCEC. Supported a technical consultant and two Clean Energy Corps students, conducted industry and academic outreach, drafted findings and a database of findings. Final report forthcoming in next reporting period.
- 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 begun its review of Pre-Determination forms for SMART applicants (5 forms reviewed with comments provided to applicant and DOER/MDAR), and conducted one on-farm meeting to offer direct assistance. In addition, we continue to update our fact sheets, add resources to our website, and provide one-on-one guidance to farmers and developers, as new information becomes available.
- Supported DOER in its data management and performance analysis of APS-qualified CHP projects, and provided DOER with a scope of work to further this analysis and findings.
- Initiated project with DOER, in collaboration with the Metropolitan Area Planning Council, to support Green Communities program evaluation of a sample of designated communities' progress on energy reduction criterion.

- Supported 12 communities in the Green Communities designation application process, clean energy project evaluation and implementation, and general technical assistance.
- In coordination with DOER and Clean Cities Program, identified two towns (Pelham and Becket) to pilot telematics to track driving times, routes, and fuel usage to evaluate rural transportation challenges and opportunities to reduce municipal fuel consumption.
- Worked with MassCEC to organize a training session on heat pump and variable refrigerant flow technology by invitation only with National Grid staff with approximately 40 attendees.
- CEE Director was tapped by the University Chancellor to co-chair, with the campus sustainability manager, the Carbon Mitigation Task Force charged with charting a long-term plan for the University to eliminate greenhouse gas emissions. Co-chairs have identified and recruited members representing faculty, facilities and student, and will convene starting in the spring semester. Task Force mission is also to use this effort as a learning opportunity for students.
- Identified and hired six Clean Energy Corps students to support the development of a greenhouse gas inventory and clean energy plan for the newly acquired UMass Amherst Mount Ida campus during the Spring and Summer of 2019. This public service learning initiative is in coordination with campus Physical Plant Sustainability Manager, and will be integrated with DOER Leading by Example.
- Supported the Western Massachusetts Community Choice Energy (WMAcce) effort (comprised of Amherst, Northampton, and Pelham) by participating in Task Force activities, including project planning, developing funding proposals, and supporting research efforts.
- Convened a Review Board of stakeholders and experts to provide guidance on development of criteria and Best Management Practices for establishing and maintaining pollinator-friendly vegetation under and around solar PV arrays.
- Supervised, mentored, and coordinated four undergraduate Fall 2018 Clean Energy Corps students to assist with municipal technical assistance services, rural transportation efficiency research, Community Choice Aggregation project mapping, and transportation policy research.

1. Extension Administration and Management

CEE Director and Associate Director held a review meeting with our Principal Investigators on December 21 to review strategic plan, budget, staff, and other issues.

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	Audience	Estimated Attendance
Horizon 18 Conference	Oct 10-11, Boston	Mattison	Attendee	Clean Energy industry, NGO, policymakers	200 (est.)
MTWP Advisory Committee Meeting	October 16, Charlemont, MA	Breger, with Rick Peltier	Update on the UMass CEE Regional Heat Demand & Air Quality and Public Health Study	MTWP Advisory Committee	40
Central MA Business Environmental Network meeting	Oct 23, Worcester	Mattison	Presented information on UMass IAC and CEE	Business and environmental leaders in central MA region	40
UMass Sustainability Alumni Reception	November 2, Olver Design Building, UMass	Breger	n/a	UMass MS3 and other graduate students, and faculty/administration	60
Center for Food, Agriculture, and the Environment (CAFE)	Nov 5, Old Chapel, UMass	Breger, Strong	Poster on CEE activities	CAFE administration, staff, and invited guests	120
Northeast CHP Initiative, Annual Meeting/Conf.	Nov 28, 100 Cambridge St., Boston	Mattison	Attendee	CHP industry, university, state agencies	40
Pittsfield Green Commission	Nov 19, Pittsfield Town Hall	Strong	Provided update on CEE technical assistance to microgrid project	Municipal officials, microgrid team members	6, plus community TV
Royal Danish Embassy - Decarbonizing District Energy Systems - Workshop	Nov 27, Smith College, Northampton	Breger, with Ezra Small	Invited participant, provided overview of UMass Carbon Mitigation Task Force.	Campus sustainability staff and faculty from MA, NY, New England. Danish and U.S. based.	50
Renewable Thermal Alliance – Webinar of	Dec 11, Webinar	Breger, Strong	Provided overview of RTA award to CCE for RT	RTA members (northeast industry, state agencies, non-profits, university)	50

RTA seed grant awards			Regional Market Penetration Impact Model		
CAFE Board of Public Overseers meeting	Dec 13, UMass, Shrewsbury	Breger	CEE update; hosted presentation on Biochar by CEE Seed Grant recipient David Timmons, UMass Boston	BOPO members and CAFE administrators and staff	15

3. Green Communities and other State/Municipal Assistance

Mohawk Trail Woodlands Partnership

Professor Rick Peltier provided a presentation and Q&A at the October MTWP Advisory Committee Meeting offering his preliminary finding from the air emissions monitoring of wood pellet boilers during last winter. Prof. Peltier continues to analyze the data to for more intricate findings regarding the distribution of particle sizes and chemical constituents of the emissions.

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.

Green Communities

CEE continues to provide technical assistance to Massachusetts towns in support of Green Communities. During this reporting period, CEE engaged with 15 communities to support their Green Communities application and reporting processes, building assessments, and general clean energy activities. As part of Green Communities (or outside this program), CEE staff and affiliates have engaged with the following communities:

City or Town	Status	Technical Assistance
Becket	Green Communities technical assistance	CEE (Strong, Weil) provided assistance to the town regarding resources for an engineering assessment of a potential boiler replacement project in the town hall.
Chicopee	Green Communities technical assistance	CEE (Beebe) provided savings estimates to the town involving proposed City Hall projects: - HVAC system improvements

		<ul style="list-style-type: none"> - New windows & insulation - Auditorium ceiling insulation - Protective glazing on stained glass - LED lighting in auditorium
Cohasset	Green Communities technical assistance	CEE (Strong) provided assistance to town officials regarding resources and approaches related to assessing clean energy strategies for planned renovations at the town hall. In addition, CEE scheduled a town hall Clean Energy Site Assessment in the Spring of 2019.
Colrain	Green Communities technical assistance	CEE (Beebe, Strong) provided assistance to the town related to the town's Green Communities application and savings estimates at the Colrain Elementary School. CEE also conducted a site visit. The town was subsequently awarded Green Communities designation in December.
Easthampton	Green Communities technical assistance	CEE (Weil) provided building energy walk-thru assessments and findings to the town at the following facilities: <ul style="list-style-type: none"> - Easthampton High School - Center & Pepin Elementary Schools - Maple Elementary School - White Brook Middle School
Granby	Green Communities technical assistance	CEE provided project assistance related to the potential replacement of a fuel oil boiler to an alternative fuel.
Lanesborough	Green Communities technical assistance	CEE (Beebe) provided savings estimates to the town for a proposed project involving the replacement of approximately 100 windows in the elementary school.
New Salem	Green Communities technical assistance	CEE (Weil, Dowling, Strong Clean Energy Corps) CEE provided building energy walk-thru assessments and findings to the town at the Swift River school, as well as a review of the town's Green Communities Energy Reduction Plan.
Southeastern Regional Planning and Economic Development District (SRPEDD)	Assistance related to solar and biomass project feasibility resources	CEE (Beebe, Strong) provided assistance to SRPEDD related to resources for conducting solar feasibility analysis at a member community's municipal buildings wood heating at selected public schools.
Westhampton	Green Communities technical assistance	CEE provided MEI and Green Communities application assistance to Westhampton in collaboration with Pioneer Valley Planning Commission. The town was subsequently awarded Green Communities designation in December.
Western Massachusetts Community Choice Energy Task Force (Amherst, Pelham, Northampton)	Assistance related to project planning, developing funding proposals, and supporting research efforts.	CEE (Breger, Strong, Dowling, Clean Energy Corps) supported WMACCE by participating in Task Force activities, including project planning, developing funding proposals, and supporting research efforts.
Wilbraham	Green Communities technical assistance	CEE discussed MEI and Green Communities application assistance to Westhampton in collaboration with Pioneer Valley Planning Commission. The town was subsequently awarded Green Communities designation in December.

Worthington	Green Communities technical assistance	CEE provided MEI and Green Communities application assistance to Westhampton in collaboration with Pioneer Valley Planning Commission. The town was subsequently awarded Green Communities designation in December.
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In addition, we continue to develop information and resources regarding opportunities for communities to reduce fuel consumption of municipal fleets. During this reporting period, we completed two fact sheets regarding alternative, hybrid, and electric vehicles for municipal fleets.

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
MA Battery Storage Project Review w/Rep. Solomon Goldstein-Rose	October 1, CEE office	Breger, Strong, Fabel (CEE Contractor), Clean Energy Corps	Discussed collaborative efforts and strategy around MA battery storage ecosystem research project.
KC Blue, Center for Energy Efficiency and Renewable Energy, Water Innovation Network for Sustainable Small Systems	October 2, and Oct 25 (with Amherst WWTP tour), and Nov 14	Breger, Strong	Discussed and advanced collaborative proposal to MassCEC to help fund the installation and study of a pilot wastewater-source heat pump system at the Town of Amherst Wastewater Treatment Facility.
UMass Amherst Mount Ida Campus Tour	October 3 (Strong); Nov 14 (Breger), Mt. Ida Campus	Strong, Breger	Toured facilities and discussed potential GHG and clean energy initiatives with Deputy Chancellor, Steve Goodwin, Center for Agricultural Food and the Environment, and College of Natural Sciences staff.
Vineyard Wind, Wind Energy Center	October 3	Breger	Met with representatives from Vineyard Wind / Vineyard Power to discuss areas of potential collaboration on offshore wind and workforce development.
Pittsfield microgrid project	October 9, conference call	Breger, Strong	Reviewed Pittsfield microgrid feasibility study progress with Toryl Hannah.
Clean Heating & Cooling DOER-CEE Coordination Call	October 10 and bi-weekly, conference call	Strong	Bi-weekly call with DOER's Jon Parrott to discuss coordination on CH&C initiatives and projects.
Western MA EDC/UMass Conference – Innovations in Water Technologies	October 15, UMass	Breger, Strong	Networking and presentation regarding feasibility study of UMass water-energy research center.

SMART Stakeholder Information Session	October 19, UMass	Breger	Networking and presentation regarding SMART solar incentive process and plans.
REM TEC, In So Much Solutions (Europe/NY dual use solar company)	October 23, UMass	Breger, Strong, Dowling, MDAR, Ag Extension	Hosted meeting to learn about REM TEC “agri-voltaic” technology and installations in Italy/France, and discuss SMART program.
Green Communities Data Analysis	October 30, conference call	Breger, Dowling, Mattison, Strong	Discussion with Joanne Bissetta of DOER regarding conducting deeper analysis on selected Green Communities that are not reaching their program goals.
USFS Wood Innovation RFP	November 2, conference call	Beebe, Breger, Strong	Discussion with Eric Friedman of Leading by Example regarding wood energy project ideas and a potential collaborative response to the 2019 USFS Wood Innovation RFP.
Clean Energy States Alliance, Val Stori	Nov 7 and Dec 3, conference call	Breger, Strong, Beebe	Collaboration on Renewable Thermal Alliance seed grant proposal for renewable thermal screening tool.
Wildlife/Pollinator Friendly Solar PV – Advisory Group	Nov 28, UMass	Dowling, Strong, Breger	Hosted working session to discuss siting criteria and other matters.
Sustainability in the Food and Beverage Industry - team meeting	Nov 28, MassDEP offices	Mattison	Meeting with UMass Lowell, UMass, and state agencies to advance the EPA funded effort.
DOER Green Communities, with MAPC	Nov 30, DOER/Boston	Breger, Strong	Discussed and initiated CEE/MAPC collaboration to evaluate a sample of designated Green Communities progress on energy reduction criterion.
CEE/CEERE, DOER Meeting on APS CHP Data Analysis	Dec 3, DOER offices	Mattison, Kosanovic; Breger (by phone)	Discussed collaboration to support DOER on analysis of APS CHP performance data.
UMass ACES Energy Storage Project – kick-off meeting	Dec 5, UMass Central Heating Plant conf. room	Breger, Strong, Kosanovic, McDaniel	Project kick-off meeting with MassCEC, Borrego, UMass Physical Plant, CEE.
University of Maryland, Energy Extension Program	Dec 7, conference call	Breger, Strong	Exchanged information and discussed common areas of work and potential opportunities.
EBC, Energy Resources Committee	Dec 10, phoned in	Breger	Reviewed topics of interests and 2019 event planning. CEE to chair program on offshore wind workforce development in spring 2019.
RPA/DOER Meeting on META Grant Program Design	Dec 17, PVPC, Springfield	Strong	Participated in discussions related to Green Communities Municipal Energy Technical Assistance (META) grants – what is working well, what could be improved, and exploration of ideas for future META programs.

5. Research Activities and UMass Clean Energy Corps

Research Activities and Funding Opportunities

CEE collaborated with UMass colleagues in engineering and resource economics to advance a concept proposal for internal University review in response to the NSF Research Traineeship (NRT) program opportunity to establish a graduate student research and training on the clean energy transition. The University approved the submission, but due to an administrative oversight by the engineering faculty lead PI, the proposal could not be submitted. The team is looking to advance this proposal again next year.

CEE submitted an application in October to the Renewable Thermal Alliance (Yale U.) Seed Innovation Grant program: *Understanding Renewable Thermal Market Penetration Outcomes – Comparative Evaluation Tool*. This proposal was awarded \$20,000, and the effort was kicked-off at the RTA webinar on December 11.

CEE partnered with the Clean Energy States Alliance in their application to the Renewable Thermal Alliance (Yale U.) Seed Innovation Grant program: *Consumer-Facing Cost-Carbon Calculator for RH&C Technologies*. This proposal was awarded \$20,000 and CEE will receive \$5000 for its technical input to support the selection and design of the calculator tool.

CEE submitted a proposal in November to MassCEC's Massachusetts 2018 Offshore Wind Workforce Solicitation. The proposal is to develop an *Offshore Wind Professional Certificate Program at UMass Amherst – Mt. Ida/Newton Campus*. CEE proposed a budget of \$105,000 and awaits the review and decision from MassCEC.

CEE, in collaboration with UMass colleagues in the Center for Energy Efficiency and Renewable Energy and the Water Innovation Network for Sustainable Small Systems, collaborated with the Town of Amherst Wastewater Treatment Plant and KC Blue on a proposal to MassCEC's Wastewater Treatment Innovative Technology Program. The proposal will pilot an innovative wastewater-source heat pump at the town WWTP and deliver heat to the building facility. The team is awaiting the review and decision by the MassCEC.

CEE provided technical support to the city of Northampton in their application (also on behalf of the towns of Amherst and Pelham) to the Urban Sustainability Directors Network (USDN) to advance the western MA towns intent to establish a progressive Community Choice Energy Aggregation 3.0. CEE is an observer/collaborator on the proposal. USDN awarded Northampton \$75,000 and the team has hired Paul Gromer, Peregrine Energy and Paul Fenn, Local Power as consultants to carry out the scope of work, which will kick off in January.

CEE with faculty colleagues in Environmental Conservation submitted a pre-proposal for an internal CAFE integrated research and extension grant program: *Stakeholder Preferences for Solar Photovoltaic Siting and Installation: Case Studies from Massachusetts*. This pre-proposal was not approved.

Clean Energy Corps

CEE staff, in collaboration with CEE PI Ben Weil, has been engaged with local Green Communities and other organizations in identifying energy problematic town/school/non-profit buildings for Prof. Weil's spring 2019 Clean Energy Corps class. Twelve buildings in 11 towns have been selected for deep assessments, in which Prof. Weil and students provide building energy system and envelope assessment, conduct analyses for recommended projects, and prepare resulting reports and presentations related to the building energy analysis, diagnostics, and recommendations.

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

- GIS mapping support for the Western MA Community Choice Energy aggregation Task Force.
- Support of Green Communities program providing western MA towns with Mass Energy Insights support, preparation of Municipal Energy Assessment and Clean Energy Assessment reports, and support in the development of Green Communities designation applications.
- Evaluation and data analysis of the challenges, opportunities and best practices to reduce fuel use and greenhouse gas emission in rural municipal fleets, in coordination with DOER Clean Cities program.
- Transportation policy research regarding opportunities and barriers to increasing access to public transportation and electric vehicles for underserved populations.