

UMASS CLEAN ENERGY EXTENSION

Quarterly Progress Report to MA Department of Energy Resources

Period ending June 30, 2018

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This Progress Report provides a summary of work accomplished by the UMass Clean Energy Extension (CEE) during the period April 1, 2018 to June 30, 2018.

During this reporting period, the Clean Energy Extension continued its support of the Mohawk Trail Woodlands Partnership (MTWP), advanced efforts in support of clean heating and cooling markets, made significant progress in support of the SMART solar-agriculture dual-use program, and continued working with Clean Energy Corps students engaged with Clean Energy Site Assessments (CESAs) and a range of research and outreach activities. Some key highlights, further discussed below for this reporting period include:

- Advanced collaborations with farmers, developers, UMass Agricultural Extension, DOER, and Massachusetts Department of Agricultural Resource (MDAR) to develop tools and guidance for those considering dual-use PV systems under the forthcoming SMART program.
- Drafted and refined a series of seven fact sheets addressing various aspects of the SMART program and dual-use solar-agriculture applications.
- Established a scope of work in collaboration with DOER and MassCEC, in response to the special legislative commission on battery storage, to explore the early stage battery innovation ecosystem in Massachusetts and facilitate interactions across industry and the universities. Completed funding arrangements, hired a technical consultant and two Clean Energy Corps students to support CEE effort, and launched research effort in June.
- Provided presentations to town officials associated with five community site visits, and completed associated energy analyses as part of Professor Ben Weil's Clean Energy Corps course.
- Hired one graduate student and five undergraduate Clean Energy Corps students to assist with Community Choice Aggregation business planning, municipal technical assistance services, energy storage research, rural transportation efficiency research, and independent research projects. Funding for two students was provided via external scholarship funds.

- Completed air emissions monitoring at two wood pellet boiler sites, in coordination with Rick Peltier's team and mobile monitoring laboratory. Prepared a set of proposed opportunities for funding to deploy the monitoring truck next heating season.
- Advanced collaboration efforts with DOER's Leading By Example program in support of deploying clean heating and cooling technologies in in state facilities.
- Facilitated discussions with the Solar Energy Business Alliance of New England (SEBANE) regarding utility interconnection issues.
- Supported the Massachusetts Department of Agricultural Resources Energy Grant proposal review process by reviewing 58 grant proposals.
- Conducted planning and attended training associated with holding a two-day clean energy workshop and field trip with Girls Inc. of Holyoke – a youth program dedicated to introducing empowering and educating middle-school girls by introducing them to STEM topics at the UMass Amherst campus.
- 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.
- Reviewed applications for the MassCEC InnovateMass program. The InnovateMass program provides up to \$250,000 in grant funding and technical support to applicant teams deploying new clean energy technologies or innovative combinations of existing technologies with a strong potential for commercialization.

1. Extension Administration and Management

CAFE Board of Public Overseers – CEE Reporting

The Center for Agriculture, Food and the Environment, CEE's parent unit, meets quarterly with a Board of Public Overseers. CEE (Breger) attended the CAFE Board of Public Overseers meeting at the UMass Cold Spring Orchard in Belchertown on May 17. BOPO was created in 1997 to give stakeholders in UMass Extension areas a formal advisory role. The Board, a majority of whose members are appointed by the Governor, advises the UMass Chancellor and the Extension staff on goals, budget, and program. CEE joins CAFE senior staff at these quarterly meetings and provides highlights and updates on activities and progress, including at the May 17 meeting this period. Information, membership, and minutes on the board is available at <https://ag.umass.edu/advisory-groups/umass-extension-board-public-overseers>.

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
Outreach and Public Engagement Forum	April 9, UMass Amherst, Design Building	Dowling	Exhibitor	UMass faculty, staff and students; non-profit organizations from western MA	75
Massachusetts Climate Leadership Summit	April 18, UMass Amherst, Design Building	Breger Beebe, Dowling	Attendee, and assisted UMass Administration in organizing event Attendees	UMass admin, western MA industry, and public officials	150
IGERT Seminar Presentation	April 19, UMass, Mechanical Engineering	Breger	Clean Energy Extension comes to UMass	IGERT faculty and students	25
IGERT 2018 Wind Energy Poster Session	April 26, Amherst	Breger, Strong Dowling	Attendee Presenter	Faculty, students	40
Daily Collegian, UMass newspaper	April 26, UMass	Breger	Interview on recent solar purchase commitment by New England colleges	Student reporter	n/a
Massachusetts Forest Forum	May 16, Harvard Forest, Petersham	Breger	Updates on MTWP and CLT Life-cycle GHG assessment	EEA and Forestry stakeholders	40
Valley Venture Mentors' Accelerator Awards Ceremony	May 24, Mass Mutual Center, Springfield	Breger	Invited Attendee by MassCEC	VVM entrepreneurs, local businesses, local, state and academic officials.	300
Pioneer Valley Plan for Progress, Coordinating Council Meeting	June 20, PVPC, Springfield	Breger, Keynote Speaker	Clean Energy: Context and Opportunities for the Pioneer Valley	Plan for Progress Coordinating Council	20

3. Green Communities and other State/Municipal Assistance

Executive Office of Energy and Environmental Affairs

At the request of Bob O'Connor, Director of Forest Policy, EEA, CEE (Breger) met with the Kestrel Trust and Christine Petersen, DFW to discuss an on-going Conservation Restriction negotiation with a forest owner who sought development of substantial solar projects on portions of the land. Breger provided details on the solar regulations under SMART related to capacity constraints, parcels, and incentive structure that related to the conservation goals of Kestrel Trust and EEA.

Mohawk Trail Woodlands Partnership

CEE, with Professor Rick Peltier and his staff, continued deployment of the air emissions monitoring mobile lab through the end of April. CEE completed an evaluation of the total building heating load for the MTWP region across all building sectors. A draft report is being prepared to deliver to MTWP and DOER. CEE met with Professor Henri Renski and discussed the progress on the regional economic impact modeling, and modifications to the scope given concerns of the MTWP chairs in advancing certain aspects of the plan.

Community Choice Energy (Northampton, Amherst, Pelham)

CEE has engaged 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 five non-MTWP communities to support their Green Communities reporting processes and general clean energy activities.

In conjunction with town officials, CEE (Strong and Beebe), graduate student Jeremy Price, and undergraduate Matt Raymond finalized and delivered the *Montague, MA Energy Infrastructure Asset Mapping Progress Report* – a draft report examining municipal building energy loads and strategic opportunities to reduce energy use and adopt clean energy.

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
Amherst, Pelham, Northampton	Western Massachusetts Community Choice Energy	CEE supported WMACCE by participating in Task Force activities, including project planning, developing funding proposals, and supporting research efforts.
Ashfield	Clean Energy Site Assessment	CEE delivered a Clean Energy Site Assessment of the Ashfield highway garage as provided by Prof. Ben Weil and the Clean Energy Corps.

Four Rivers Charter School	Clean Energy Site Assessment; Review of RFP development for solar PV installation	CEE delivered a Clean Energy Site Assessment of the Four Rivers Charter School as provided by Prof. Ben Weil and the Clean Energy Corps; Breger/Strong reviewed school's objectives and scope for RFP development for solar installation.
Gill	Clean Energy Site Assessment	CEE conducted analysis of building energy usage at Gill Elementary School based on a Clean Energy Site Assessment walk-through conducted in March by Prof. Ben Weil and the Clean Energy Corps.
Goshen	Clean Energy Site Assessment	CEE delivered a Clean Energy Site Assessment of the Goshen highway garage as provided by Prof. Ben Weil and the Clean Energy Corps.
Northampton Public Schools	Clean Energy Site Assessment	CEE delivered a Clean Energy Site Assessment of the Northampton's JFK Middle School as provided by Prof. Ben Weil and the Clean Energy Corps.
Shelburne	Clean Energy Site Assessment	CEE delivered a Clean Energy Site Assessment of Shelburne's Cowell Gymnasium as provided by Prof. Ben Weil and the Clean Energy Corps.
Windsor	Clean Energy Site Assessment	CEE delivered a Clean Energy Site Assessment for the town of Windsor as provided by Prof. Ben Weil and the Clean Energy Corps.

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
Solar Energy Business Alliance of New England	April 6, conference call	Breger, Strong	Discussed and strategized around utility interconnection issues.
NORESCO, Scott Silver	April 11, conference call	Breger, Strong	Discussed collaborative opportunities between CEE and NORESCO.
Girls Inc. of Holyoke	April 12, Amherst	Dowling, Strong	Participated in training session focused on best practices for educating middle school girls.
Local Power, Inc., Paul Fenn	April 25, CEE offices	Breger, Strong	Discussed Local Power's role in WMACCE and opportunities for developing a community choice incubator resource hosted at UMass Amherst.
John Fabel	May 3, CEE offices	Breger, Strong	Met to discuss contracting with John to assist with battery storage research efforts.
DOER, Gerry Bingham	May 10, conference call	Breger, Strong	Met with Gerry Bingham of DOER as a follow-up to the SEBANE meeting and to continue discussing barriers and solutions to commercial-scale solar PV interconnection costs and timelines.
DOER, Eric Steltzer and Mariel Marchand	May 11, conference call	Breger, Strong	Discussed potential CEE role in supporting DOER's ReHeat program with training and outreach services.

Hyperion Solar	May 15, CEE offices	Breger, Strong, Dowling	Discussed SMART program updates and respective efforts in working with SMART's solar-ag dual-use program.
Pioneer Valley Planning Association - Climate Action and Clean Energy Advisory Group Meeting	May 17, Springfield	Strong	Met with PVPC staff and partners to discuss updates and CEE's role in supporting the Pioneer Valley Climate Action and Clean Energy Plan.
MDAR, Myron Inglis	May 18	Breger, Strong	Discussed MDAR and CEE's roles in supporting SMART's solar-ag dual-use program development.
UMass Office of Research and Development, Loren Walker and Allison Koss	May 21, CEE offices	Breger, Strong	Discussed CEE's progress and accomplishments, and ORD's interest in drafting and distributing CEE's success stories.
NESEA, Jennifer Marapese	June 1, CEE offices	Breger, Strong	Discussed NESEA's current efforts and collaborative opportunities with CEE.
SolaBlock, LLC Open House	June 1, EastWorks, Easthampton	Breger	Joined company celebration of milestone progress in integrated solar/brick building construction system.
Sandri Energy, Thom Burden	June 5, conference call	Beebe, Breger, Strong	Discussed biomass district energy project opportunity and potential roles at Atlas Farm.
EBC Energy Resources Committee Program Planning Meeting	June 11, participated by phone	Breger	Planning meeting to discuss topics for EBC renewable program events.
John Larsen, Rhodium Group	June 21, Amherst	Breger	John is local consultant with DC-based Rhodium Group. Discussed areas of mutual interest and opportunities for collaboration.

5. UMass Clean Energy Corps and other Research Activities

On May 2, the UMass Clean Energy Corps presented their ideas to stakeholders from the municipalities of Northampton, Ashfield, Shelburne, Goshen, and Windsor. Faculty and staff from the Building Construction Technology program and the Clean Energy Extension were also in attendance. Working with their professor, Dr. Ben Weil, the students developed proposals that would cut energy use in the communities' highest energy-consuming facilities by as much as 72%. Stakeholders were actively engaged. Andrew Baker, of the Shelburne Selectboard, was excited about the potential not only to make the Cowell Gym facility much more energy efficient but also expand its functions and move some city offices into the lower level, since the Energy Corps proposal would also solve a long-standing mold problem. Mary Quigley, from Ashfield, commented that she was sure that the building operators would "buy in". Chris Mason, the Energy and Sustainability Officer for the City of Northampton, also saw big potential for energy savings at JFK Middle School and for moving the school away from consuming natural gas and towards renewable energy sources.

CEE successfully completed a grant application through CAFE to gain funding support from the USDA National Institute of Food and Agriculture (NIFA) for research work associated with its role in supporting and monitoring dual-use solar agriculture in Massachusetts. This support will provide a portion of Breger's salary.

CEE (Strong, Breger) completed an ISA with the Executive Office of Energy and Environmental Affairs (Bob O'Connor) to conduct a Greenhouse Gas Life Cycle Analysis for Cross Laminated Timber (CLT) sourcing, milling, and use in Massachusetts. CEE has partnered with the New England Forestry Foundation and other consultants to carry out this work which began in June.

CEE has joined colleagues in Mechanical and Industrial Engineering and Information and Computer Sciences in developing an ARPA-E proposal focused on modeling and optimization of microgrids, with UMass campus' microgrid serving as a research focus.

CEE (Mattison) finalized and published a Clean Heating and Cooling fact sheet to be used in renewable thermal market education and outreach.

CEE (Mattison) collaborated with UMass Lowell to submit a successful proposal to the Environmental Protection Administration for a second consecutive pollution prevention grant to provide outreach and education to regional food/beverage processors.

CEE (Mattison) worked with MassCEC to plan a 2018 Q3 (September 20) heat pump and variable refrigerant flow training to architects, building owners and managers, energy professionals, and HVAC contractors.

CEE (Mattison) collaborated with John Ballam of DOER to compile and analyze combined heat and power Alternative Portfolio Standard data.

CEE (Mattison) worked with Ben Weil and staff at Massachusetts Bay Transportation Authority to review HVAC system upgrade opportunities and approaches at the Riverside facility.

CEE has convened its summer Clean Energy Corps consisting of 5 undergraduate and 2 graduate students working on the following projects:

- Analytical and business development 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.
- Research and outreach to investigate battery research and business entrepreneurship in Massachusetts and means to facilitate coordination between and amongst our universities and emerging companies.
- 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. Student wages for this project are funded through the CAFE Summer Scholars Program.

- GIS mapping of renewable energy projects qualified under Massachusetts portfolio standard programs. Student wages for this project are funded through the UMass Lee-SIP Fellowship Program.
- Continued progress on system dynamic modeling of the value of grid-scale energy storage deployed in association with 1600 MW of offshore wind.