

## UMASS CLEAN ENERGY EXTENSION

### Quarterly Progress Report to MA Department of Energy Resources

Period ending September 30, 2021

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This Progress Report provides a summary of work accomplished by the UMass Clean Energy Extension (CEE) during the period July 1, 2021 to September 30, 2021.

### Externally Funded Project Activities

*In this section, we provide updates and progress on projects for which CEE has received substantial funding support from outside the DOER Interagency Service Agreement (ISA). We recognize that these activities still rely critically on the ISA for enabling CEE to pursue external funds and to sustain and stabilize our staff and office needs generally.*

Note on External Funds and CEE: An important strategic objective of CEE is to attract and compete for funds beyond our ISA with DOER. These external funds are tied to specific scopes of work and do displace some portion of CEE core staff salaries from DOER funds; however, the bulk of these funds are typically used to extend CEE's capacities with other faculty, graduate students, consultants, and expenses tied to the project scope.

### **U.S. DOE Award Selection - Impacts of Dual-Use Solar on Crop Productivity and the Agricultural Economy in Massachusetts and Beyond**

CEE, in collaboration with state solar industry partners, state agencies (DOER and MDAR), a non-profit organization, and UMass collaborators, was selected for a \$1.8M research award for *Impacts of Dual-Use Solar on Crop Productivity and the Agricultural Economy in Massachusetts and Beyond*, by the U.S. Department of Energy, Solar Energy Technology Office. The research will provide outcomes to fill the significant knowledge gap regarding the impact of dual-use solar on farm productivity and economics. This knowledge is critical for the solar and agricultural sectors, and policymakers, to confidently move forward with dual-use solar deployment. This quarter, CEE continued working with our DOE Program Managers and our internal grants office to finalize the scope and budget. The contract start date has been set at October 1, 2021. The project research team has been meeting every two weeks during this reporting period to prepare for the work ahead.

### **MassEnergyInsight Technical Support**

*Prime Funding: Peregrine Energy, as subcontract with DOER Green Communities*

CEE continued to provide user support services to Green Communities MassEnergyInsight (MEI) users in partnership with DOER, Peregrine Energy, and OptiMiser, LLC. During this

quarter, CEE successfully addressed 86 requests for user support across 60 municipalities and other entities. Other key tasks for this quarter included:

- Collaborated with Eversource and National Grid to obtain and/or rectify missing/flawed data.
- Continued working closely with Eversource to address a long-standing issue surrounding the way solar production data is supplied to MEI.
- Continued adding to an internal guidance document on MEI Support protocols, common support scenarios, etc.
- Trained and effected transition to new support staff.
- Conducted targeted outreach to MEI users identified as high priority by DOER staff (e.g., new users, RPA employees, etc.).
- Offered a series of three online trainings.
- Initiated and completed improvements to MEI site and support procedures.
- Published online newsletter, announcing upcoming office hours session and informing users of new emissions data tables.
- Participated in weekly team planning meetings with DOER and Optimiser.

### **Community-Informed Proactive Solar Siting and Financing**

#### ***Prime Funding: NREL Solar Energy Innovation Network – Solar in Rural Communities Program***

CEE and its project partners continued work under a grant with the National Renewable Energy Laboratory's (NREL) Solar Energy Innovation Network program in the category of *Solar in Rural Communities*. The project includes building a “tool kit” for towns to assess scenarios of solar build-outs, conducting interviews and surveys to assess community preferences regarding solar, and evaluating financial opportunities to retain local economic benefits.

During this quarter, seven of the twelve documents comprising the tool kit were revised based on NREL review, formatted into a final layout, and returned to NREL for DOE review; the remaining five documents are actively under revision in preparation for DOE review. A survey of all town residents was conducted and analyzed.

### **Battery Energy Storage Innovation Ecosystem Development Support**

#### ***Prime Funding: DOER/MassCEC ACES, UMass Physical Plant***

CEE has received approval from DOER, MassCEC, and UMass Physical Plant to direct a portion of awarded UMass ACES funding toward supporting key recommendations from CEE's June 2019 report [\*Building a Massachusetts Battery Energy Storage Innovation Ecosystem\*](#). During this reporting period, CEE, with its contractor John Fabel, finalized the report, [\*Leading the Charge: Accelerating the Massachusetts Battery Energy Storage Innovation Ecosystem\*](#) that (1) summarized outcomes from the December 2021 day-long online symposium [\*Creating Opportunity: Advancing the Massachusetts Battery Energy Storage Innovation Ecosystem\*](#), and

(2) included a concept proposal summary aimed at attracting funding to further advance the Massachusetts BES innovation ecosystem. The report was distributed to Symposium participants and other stakeholders. The full concept proposal was provided to a key group of legislative stakeholders.

### **Life-Cycle GHG Analysis of Cross-Laminated Timber (CLT) for Buildings**

**Prime Funding: MA EEA, subcontractor New England Forestry Foundation**

CEE and the New England Forestry Foundation and (NEFF) finalized an ISA amendment to extend the project timeframe and budget necessary to address unexpected project cost overruns due to modeling complexities and interface with data from third-party CORIM. Over this reporting period, the NEFF research team continued its analysis and UMass and NEFF continued planning to engage a project advisory committee.

### **Green Your Bottom Line in Food and Beverage Businesses**

**Prime Funding: US EPA Pollution Prevention grant**

CEE worked with the UMass Lowell Center for Sustainable Production to plan and host a monthly webinar series (running April-September 2021) for this ongoing initiative to promote and support energy efficiency and sustainability in the food and beverage sector.

## **Green Communities and Municipal Support**

*In this section, we provide updates and progress on our activities directly serving Massachusetts municipalities in coordination with the Green Communities program. These activities are funded by DOER under the scope of our ISA.*

CEE provided direct support to 13 communities, including support for project implementation, conducting Green Communities program reviews, and arranging projects for next semester’s Clean Energy Corps class.

<b>City or Town</b>	<b>Technical Assistance</b>
Brookline	Began Green Communities progress review, with initial data analysis and kickoff meeting
Buckland	Provided email guidance on efforts in town library
Charlton	Met with Water and Sewer Superintendent, US DOE, MassDEP, and National Grid about energy use in wastewater treatment plant and technical assistance programs
Deerfield	Assisted municipal board member with questions about solar bylaw updates and net metering.
Gill	Met with member of energy and finance committees to consider working on one of the town’s facilities in next semester’s Clean Energy Corps class
Holyoke	Assisted with META grant application to pursue Clean Energy Corps recommendation for a water-source heat pump in Dean Technical High School. Held a series of discussions with city and Holyoke Gas & Electric staff to consider collaboration on an application to MassCEC EmPower grant program. Provided guidance to HG&E on design of new commercial heat pump program.
Hopkinton	Began Green Communities progress review, with initial data analysis and planning of kickoff meeting
Longmeadow	Held two meetings with town volunteers and staff to help them understand municipal energy use, prioritize efforts, and consider working on one of the town’s facilities in next semester’s Clean Energy Corps class. Created first draft of municipal energy profile. Held one meeting and several calls with town volunteers and staff to discuss financial analyses of municipal solar projects.

<b>City or Town</b>	<b>Technical Assistance</b>
Monson	Followed up and helped to implement MEI baseline corrections recommended during our previous Green Communities review.
Natick	Assisted with Green Communities grant application to install new heat pump based on Clean Energy Corps recommendation. Discussed another potential project for next semester's Clean Energy Corps class.
Shelburne	Met with energy committee member, shared information on studies we have previously done for the town and offered additional assistance for town to pursue implementation. Assisted committee member with net metering questions.
Tewksbury	Worked on memo documenting progress review.
Westhampton	Followed up to offer support for implementation of Clean Energy Corps recommendations for elementary school.
Weston	Began discussion about a potential project for next semester's Clean Energy Corps class.
Westwood	Began Green Communities progress review, with initial data analysis and planning of kickoff meeting

### **Green Communities Progress Reviews**

This quarter, we began progress reviews for the Towns of Brookline, Hopkinton and Westwood, and worked on the memo for our review of Tewksbury, as detailed in the table above.

### **Green Communities Energy Analysis Tool**

We did extensive work this quarter to enhance the Excel-based Green Communities Energy Analysis Tool that we developed in 2019, including seeking feedback from regional planning agencies that use the tool.

### **Sustainable Wastewater Infrastructure of the Future (SWIFt)**

Met with U.S. DOE and MassDEP to continue planning for our partnership to offer DOE's Sustainable Wastewater Infrastructure of the Future (SWIFt) initiative to public wastewater treatment plants in Massachusetts.

## **Other Project Activities and Initiatives**

*In this section, we provide updates and progress on projects and initiatives that CEE pursues using funding primarily supported under the scope of our ISA.*

### **Floating Offshore Wind Technology Research and Development**

CEE is collaborating with the Professor Krish Sharman of the UMass Amherst College of Engineering in the research and development of a new technology designed to support enhanced performance of floating offshore wind installations. During this reporting period, the research team was awarded a MassCEC Catalyst grant to (1) advance and test the technology, and (2) develop an intellectual property plan and commercialization pathway.

### **ASTGU (Dual-Use Solar) Pre-determination Application Review for DOER SMART**

CEE continues to advance discussions relating to dual-use research needs and opportunities with industry, state policymakers, and UMass stakeholders. During this quarter, CEE and Extension staff reviewed three dual-use pre-determination applications (including one revised application that was previously submitted) and conducted one site visit, as requested by an applicant.

### **Pollinator-Friendly Solar Certification Program**

During this reporting period, we received twelve applications from proposed solar PV facilities for Pollinator-Friendly Certification and provided certification to four projects which completed the review process. We continue to field questions and offer technical support to solar developers considering pollinator-friendly development, as well as discuss potential pollinator-friendly solar projects with environmental consultants and municipal board members.

### **Offshore Wind Energy Professional Graduate Certificate Program**

With the MassCEC Offshore Wind Workforce Development grant formally concluded in December 2020, CEE continued to develop the program in coordination with the UMass Department of Environmental Conservation, the College of Natural Sciences (CNS), and University Without Walls (UWW). During this quarter, CEE secured instructor Ramon Rosquete from the OSW industry to instruct the Fall 2021 program course (ECO 610 *Offshore Wind Energy: Technology, Resources, Grid Integration, and Trends*), finalized the course syllabus, and began course instruction with enrollment of 29 students (4 UMass graduate students and 25 professional continuing education students) – an increase in enrollment from 18 in the spring 2021 semester and 24 in the summer 2021 semester.

Marketing activities continued, including conducting a targeted e-mail campaign communicating the success of the program and sending a reminder for the fall course, posting announcements in various association newsletters, and putting out multiple social media posts about the program. The program success is already reflected in multiple students and alumnae securing positions in offshore wind and related fields.

CEE expanded industry and academic networks in the offshore wind space and continued forging relationships with industry and other workforce training programs. In addition, we continued development of strategic industry partnerships this quarter, including industry guest speaker roles and investigation of industry funding of scholarships for underrepresented populations. An internal effort was continued to establish structures for industry companies and guest instructors to help fund student diversity scholarships. Additionally, CEE was successful in receiving a grant for a proposal to a MassCEC Offshore Wind Workforce solicitation designed to expand access to the certificate program to underrepresented and target populations (see details below).

### **Creating Equity in the Offshore Wind Professional Workforce**

CEE received a grant from MassCEC to expand access to our Offshore Wind Professional Certificate Program to underrepresented and target populations, starting with BIPOC/ethnic minorities, followed by Veterans, individuals in Gateway Cities/EJCs, and indigenous populations, and women. CEE will build capacity and a sustainable program for STEM-oriented near-term and recent graduates from 4-year college degree programs from these Priority Groups, providing tuition scholarships and non-curriculum student support, a comprehensive professional development program, development of a robust recruitment pipeline, and solutions to potential

barriers for the Priority Group students. We anticipate supporting 8 participants over this two-year pilot and developing recruitment pipelines with UMass campuses, MIT, and the City University of New York (CUNY). We will also establish a framework to expand our program across other higher education institutions and Priority Groups, and leverage foundation and industry support for a sustained scholarship fund.

During this reporting period, CEE worked towards contract finalization and set up management structures. In collaboration with contractor and workforce diversity specialist Libby DeLucia, we began setting up criteria and frameworks for the scholarship fund, recruitment, selection committee, and application process, and began designing marketing materials.

**UMass Campus – Carbon Mitigation Planning and Sustainability Strategies**

CEE (Breger) has taken an active role in a set of university-wide committees that have been established by the administration to plan for the campus’ own carbon mitigation and clean energy transition, and to design and establish an integrated “Living Lab” to bring widescale multidisciplinary learning, research, and engagement of the campus community as a vital part of this energy transition. CEE, representing all of the UMass Extension, was also selected to participate in a Sustainability Strategies Working Group convened by the Deans, to offer recommendations on the creation, scope, and organizational structure of a campus wide sustainability focus for teaching, research, and outreach/extension. The working group presented its report to the Deans in September and have a discussion meeting planned in October.

**Greenhouse Gas Inventory for Non-profit Connecticut River Conservancy**

CEE coordinated, administered, and mentored two students under a public service internship to conduct a greenhouse gas inventory for the Connecticut River Conservancy. Students have worked directly with CRC staff as a client to understand their environmental objectives, data sources and quality, and scopes of emissions to include. With CEE staff, the students are completing a GHG inventory spreadsheet tool, an inventory for a baseline 2019 year, and a final report. During the reporting period, the project was concluded with a final project presentation and final deliverables provided to CRC in July.

**Business and Community 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
Eversource; Haley Dunn and Theresa Hopkins-Staten	July 12, virtual	Breger	Discussed Concept Proposal for utilization of non-forest clean wood residues for modern wood heating.
Massachusetts Energy Efficiency Advisory Council	July 13, letter	Mattison	Submitted comment letter with findings on challenges experienced by participants in Mass Save and recommendations for improved program implementation
Listening session with Sen. Ben Downing and staff	August 2, CEE offices	Breger, Strong	Meeting to review CEE activities and priorities with former state senator and MA



<b>Entity and Attendees</b>	<b>Date and Format</b>	<b>Extension Staff</b>	<b>Purpose and Outcomes</b>
			gubernatorial candidate Ben Downing and staff.
MA Dept. of Agricultural Resources	August 3, virtual	Strong	Meeting to review MDAR renewable energy grant applications.
Northwest Energy Efficiency Council	August 5, virtual	Mattison	Meeting to discuss our recommendations to improve the content of their Building Operator Certification training program
Northeast Public Media, Alden Borne	August 9, phone	Breger	Local NPR radio interview re MassCEC OSW Access grant
DOER (Rabinsky, Tosches, Burstein, Swain)	August 12, virtual	Breger, Strong	General discussion regarding trends, challenges, and processes regarding Municipal Aggregation.
Los Angeles Times, Celina Tebor	August 13, virtual	Breger	Requested interview for article on OSW development and trends.
Mount Grace Land Trust	August 18, virtual	Dowling	Answered questions for local land trust regarding solar siting and current state policies
MA Dept. of Conservation & Recreation	August 25, virtual	Breger, Strong	Discussion of a CEE concept proposal related to wood heat and forest residue supply.
ASTGU Site Visit Czajkowski Farm	August 27, Hadley, MA	Breger, Strong	Review of proposed SMART dual-use solar installation site with project applicants and MDAR staff.
EcoFuturista, Hyperion LLC	August 30, Deerfield, MA	Dowling, Strong	Met with dual-use solar developers at UMass Research Farm dual-use solar array
Reach Energy - DG Marshall Associates, Inc., Sam Luke, John.	August 31, virtual	Breger, Strong	Discussed portable EV charging technology, markets, and resources with western MA start up business.
Clean Energy Economy, CLEER	September 1, virtual	Breger, Strong	Discussed solar siting and planning with rural Colorado based organization with similar issues.
Galehead Solar ASTGU meeting	September 2, virtual	Strong	Review of SMART ASTGU guidelines with Galehead and MDAR staff.
Offshore Wind Industry Partnership mtg	September 3, virtual	Breger, Strong	Meeting with Subsea 7 director to review partnership opportunities with UMass Offshore Wind Professional Certificate
National Center for Appropriate Technology	September 8, virtual	Breger, Strong	Collaboration discussion with NCAT staff related to solar planning tools and processes.
EEA/Tamil Nadu – MOU signing between UMass and Indian National Institute of Wind Energy	September 22, virtual	Breger, Sharman (Mech. Engineering, UMass)	MOU signing between UMass and NIWE for research collaboration on offshore wind energy.

## Public Events and Outreach Activities

*In this section, we itemize significant public-facing events and outreach activities in which CEE participated.*

Event	Date and Location	Extension Presenter/ Attendee	Presentation Title/Topic	Audience	Estimated Attendance
Mass Energy Insight Trainings	July 22 & 29, August 5, virtual	Kraus	Trainings on platform used to help municipalities track energy data for Green Communities program	Massachusetts municipalities and others assisting them with Green Communities program	43 (17-30 per training)
Green Your Bottom Line in Food and Beverage Businesses	July 16, August 20, September 17	Mattison	Presented in webinar series about energy and water efficiency and assistance resources	Food and beverage businesses, environmental agencies, service providers	20-30 per session

## Prospective Activities and Proposals

*In this section, we provide updates and progress on proposals and collaborations that CEE pursues for prospective funded work to support CEE directly or in collaboration with activities led by other units on campus.*

### Cooler Communities, with Ener-G-Save and MassEnergize

CEE is collaborating at the invitation of Ener-G-Save in the expansion of the [Cooler Communities Program](#) – a statewide initiative dedicated to providing community-based climate, clean energy, and science education via K-12 educational curriculum in conjunction with school- and community-based events and engagements. CEE has supported the work in helping to develop a program budget, researching potential foundations and other financial supporters, and engaging with MassEnergize in a potential collaboration. During this reporting period, CEE advanced conversations with Ener-G-Save and MassEnergize identifying funding sources, and planning 2021 community engagements.

### University-based Proposals and Initiatives

CEE is engaged with university colleagues as participants in the following proposals and initiatives.

CEE plays an active role in the Steering Committee of the UMass Energy Transition Institute (ETI) led by the Colleges of Engineering, Natural Sciences, and Behavior Science, and the School of Earth and Sustainability. ETI is a broad campus initiative to bring faculty across diverse disciplines to collaborate on cutting-edge research focused on encouraging a clean energy transition that increases social equity.



*Campus as Living Lab for Carbon Mitigation.* CEE (Breger, Strong) plays a role on the steering committee established to vision, plan, and establish a Living Lab to integrate academics, research, service, and campus operations as educational and applied learning opportunities associated with the campus goal of achieving carbon neutrality by 2032. The group received a \$10,000 Presidential Grant from the Davis Educational Foundation (DEF) to support this planning during the fall 2021 semester, which CEE will manage with a graduate student. Using this planning grant, CEE co-led an effort to submit a more substantial grant (\$300,000) to DEF in September to fund a 3-year carbon and clean energy curricular project focused on campus carbon literacy and experiential learning with public service.

## Student Engagement

*In this section, in keeping with our mission to support students and workforce development, we list graduate and undergraduate students who have engaged with CEE during reporting period. Given confidentiality concerns, we provide only the students' initials in this publicly accessible report.*

<b>Student Initials, Status</b>	<b>Department</b>	<b>Extension Staff Mentor</b>	<b>Project Description</b>
I.W., Undergraduate	Environmental Science and Political Science	Breger, Strong	Non-profit organizational GHG and Clean Energy Planning for the Connecticut River Conservancy; various other CEE projects.
M.B., Undergraduate	Natural Resources Conservation	Breger, Strong	Non-profit organizational GHG and Clean Energy Planning for the Connecticut River Conservancy; various other CEE projects.
A.G., Graduate Student	Masters in Sustainability Sciences	Breger, Strong	Support and manage working group of faculty/staff to vision and plan for Living Lab is coordination with campus energy transition.
M.D., Graduate Student	Environmental Conservation	Breger, Strong	Support on-line preparation and instruction of OSW Certificate program courses.
D.B., Graduate Student	Sustainability Science and Regional Planning	Strong, Kraus	Technical support for MEI users.
L.R., Undergraduate	Business Administration in Finance, Environmental Science	Breger, Strong	Support for community solar planning financial tools and floating offshore wind technology commercialization pathway.
B.S., Undergraduate	Environmental Science	Breger, Strong	Committee members mentoring student's Honors Thesis on low carbon microgrids for remote Alaskan villages.