

## UMASS CLEAN ENERGY EXTENSION

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

Period ending June 30, 2022

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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, 2022 to June 30, 2022.

### CEE Completes new 5-Year Strategic Plan: 2022-2026

Following its first Strategic Plan in 2017 and seven years of evolution and production, CEE completed in January a new Strategic Plan to articulate its value to the Commonwealth and the University, and to lay out six focus areas and a financial plan to sustain and expand its impact. The Plan is available at <https://ag.umass.edu/clean-energy/about/strategic-plan>.

This quarter, CEE has shared its plan with key supporters and allies in the state and university and published a public version of the plan on the CEE website. CEE conducted review of the Plan with DOER leadership and resolved a scope and budget to sustain CEE's work and partnership with DOER. A new Interagency Service Agreement is being prepared.

### Externally Funded Project Activities<sup>1</sup>

*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 our staff and office needs generally.*

#### **Impacts of Dual-Use Solar on Crop Productivity and the Agricultural Economy in Massachusetts and Beyond**

***Prime Funding: U. S. Department of Energy***

CEE, in collaboration with state solar industry partners, state agencies (DOER and MDAR), a non-profit organization, and UMass collaborators, is leading a \$1.8M research project for *Impacts of Dual-Use Solar on Crop Productivity and the Agricultural Economy in Massachusetts and Beyond*, funded by the U.S. Department of Energy, Solar Energy Technology Office. This quarter, CEE and the project team refined research protocols, continued to collect site soil data, and acquired sensors and prepared for their deployment. Development of cost tracking tools and

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<sup>1</sup> Note on External Funds and CEE: An important strategic objective of CEE is to attract funds beyond our ISA with DOER. These external funds are tied to specific scopes of work and displace a 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.

enterprise budget templates continued, and a draft template was developed for site trial data collection. Work continued to obtain restricted USDA federal data, and literature reviews continued on economic theoretical models for solar renewable energy production on agricultural land, and on existing social acceptance of renewable energy projects. A first meeting of the Project Advisory Committee was convened, with research team presentations on site trials, crop research status, and economic research. The research team had the opportunity to speak at several events about the project.

### **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 56 requests for user support across 38 municipalities and other entities. The subcontract with DOER Green Communities ended on June 30, and a new RFP was issued. A proposal was submitted by OptiMiser, LLC, teaming with CEE as a subcontractor, and the team was awarded a new 3-year contract to continue these providing services. Other key tasks for this quarter included:

- Continued adding to an internal guidance document on MEI Support protocols, common support scenarios, etc.
- Published two newsletters. Topics included helpful tips for MEI users based on survey responses, a report on a recent upgrade to the weather normalization routine in MEI, and other subjects.
- Trained a UMass graduate student to join the MEI support team.
- Continued adding to an internal guidance document on MEI Support protocols, common support scenarios, etc.
- Worked on review of a sample of data in the new Canceled Bills report to check that it accurately identifies bills that should be deleted from MEI.
- 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 finalized 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 Community Planning for Solar Toolkit 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, final formatting was completed and final versions of documents were submitted to NREL. The full toolkit was posted on the project [web page](#), making these tools available to towns.

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

### ***Prime Funding: Mass Clean Energy Center, OSW Workforce Development Program***

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. Through its Offshore Wind Career Access Program, 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, in collaboration with contractor and workforce diversity specialist Libby DeLucia, prepared for and promoted our next round of scholarship applications, due in early July. We continued to support our first cohort of 3 scholarship recipients, and continued work on refining our industry partnership program, which includes priority access to our scholarship recipients for internships. We published a new program web page, linked from the main program web page, showcasing our scholarship students. We will be submitting a quarterly progress report to MassCEC in August. We also were successful in securing additional funding from MassCEC, in response to another solicitation under the OSW Workforce Development Program, which will further support this program (see item below).

## **Expanding, Broadening, and Sustaining the UMass Amherst Offshore Wind Professional Certificate Program**

### ***Prime Funding: Mass Clean Energy Center, OSW Workforce Development Program***

CEE was awarded a grant from MassCEC to expand, broaden, and sustain our Offshore Wind Professional Certificate Program. Specifically, this grant will fund focused outreach and recruitment from the Massachusetts workforce targeting the North Shore Blue Economy initiative, Gateway Cities, and MA Veterans, along with national targets including the offshore oil and gas industry; will provide increased support for our successful Career Access Scholarship program to fund an additional cohort of students from underserved backgrounds targeting MA and HBCUs; and will support enhancements to our curricular and pedagogical design and delivery with increased enrollment to 60-80 students per semester. It will also support the development of an undergraduate OSW overview course; and the provision of linkages to applicable training programs – such as the UMass Lowell OSHA safety trainings and the UMass Wind Energy Center FAST course – to our Certificate students. Further, the award will support the development of an industry partnership program to 1) generate sufficient revenue for our long-term stability and growth, 2) mutually serve diversity workforce goals of CEE and the industry, and 3) further enhance the program's value to industry needs.

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

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

Over this reporting period, the New England Forestry Foundation and (NEFF) research team continued its analysis and planning to convene the project Advisory Committee. Project funding expired at the end of this quarter and CEE and NEFF developed a project close-out plan to convene the Advisory Committee, solicit feedback on a draft final report, and finalize the report during the fall of 2022.

## Municipal GHG Inventories & Net-Zero Planning

*Prime Funding: Pioneer Valley Planning Commission*

As part of a collaboration with PVPC, we are developing GHG inventories for 11 Massachusetts communities located in Hampshire and Hampden counties, as well as assisting with basic scoping for municipal-level net zero planning in 6 municipalities. During this reporting period, we collected and collated electricity and vehicle fuel use data for all municipalities and began summarizing assessors' data on building fuel use to compare with census estimates. We also met with DOER staff to explore alternative estimates of household fuel use.

## Offshore Wind & Wildlife Science & Collaboration

*Prime Funding: Regional Wildlife Science Consortium for Offshore Wind (RWSC)*

During this period, we held three meetings with the RWSC Bird & Bat Subcommittee. We made progress in developing detailed recommendations on data repositories and data collection workflow to streamline and standardize the process of data collection related to offshore wind and wildlife. We also collected information about current and recent bird and bat research activities occurring in the Northwest Atlantic. These recommendations and information will form components of the RWSC Science Plan, which will address collaboration opportunities and research priorities regarding effects of offshore wind development on wildlife species of interest to state and federal agencies, environmental NGOs, and offshore wind developers.

## 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 11 communities, including working with the Clean Energy Corps class on in-depth projects in five towns and providing support for implementation of past recommendations.

City or Town	Technical Assistance
Deerfield	Clean Energy Corps analyzed and presented recommendations to restore and upgrade to high performance Deerfield's former senior center building and the adjacent historic church building that was recently acquired by the town.
Framingham	Met with sustainability coordinator to discuss clean energy opportunities in municipal facilities and begin the process of selecting a facility for a Clean Energy Corps study next year.
Gill	Provided guidance to move forward with the recommendations presented earlier this spring for Gill's Public Safety Complex.
Greenfield	Talked with energy and sustainability director about clean energy opportunities in the wastewater treatment plant.

City or Town	Technical Assistance
Holyoke	Continued to support study of water-source heat pump proposal made by Clean Energy Corps last spring.
Hopkinton	Met with facilities director and others to discuss optimization of library heat pump system.
Longmeadow	Clean Energy Corps analyzed and presented recommendations for Center Elementary School.
Natick	Clean Energy Corps analyzed and presented recommendations to better align the town’s capital plan and sustainability goals. Arranged UMass CEERE audit of water treatment plant through DOE Industrial Assessment Center program.
Newburyport	Began discussion with Energy Advisory Committee chair about a possible Clean Energy Corps study next year.
Wellesley	Met with DOER and town representatives to advise on heat pump installation in water treatment plant.
Weston	Clean Energy Corps analyzed and presented recommendations for a renewable district energy system at the Case campus.

**Clean Energy Corps**

This quarter, the Clean Energy Corps class worked on projects with four towns, as detailed in the table above.

**Other Activities**

Lauren Mattison presented to about 75 people in a webinar on municipal clean energy hosted by the UMass Boston Collins Center and Central Massachusetts Regional Planning Commission. Lauren Mattison and Ben Weil met with DOER Green Communities staff to discuss plans for the Climate Leaders initiative.

**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, technology design and testing advanced, and the research team was supported by an undergraduate student working under the I-Corps @ UMass Amherst program to market research and a 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 four dual-use pre-determination applications and began review of four additional applications.

**Pollinator-Friendly Solar Certification Program**

During this reporting period, provided certification to one project which completed the review process. Applications were slowed considerably as developers awaited a decision by DPU and DOER regarding the pollinator adder. 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**

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 concluded the Spring 2022 program course and provided the Summer 2022 program course (ECO 612 *Offshore Wind Energy: Project Economics, Deployment, and Business Logistics*), with enrollment of 41 students (5 UMass graduate students and 36 professional continuing education students). This registration sustains the substantial growth of the program, which had 8 registered students last fall, 18 in the spring 2021 course, and 24 in the summer 2021 course, and 29 in the fall 2021 course.

Marketing activities continued, including conducting a targeted e-mail campaign communicating the success of the program, posting announcements in various association newsletters, and continuing a social media campaign about the program. The program success continues to be reflected in multiple students and alumnae securing positions in offshore wind and related fields, as well as awareness of the program spreading directly from alumni and current students.

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 continued work on the MassCEC-funded Offshore Wind Career Access Program designed to expand access to the certificate program to underrepresented and target populations, (see details in *Externally Funded Project Activities* section above). We also secured additional funding from MassCEC, in response to another solicitation under the OSW Workforce Development Program, which will further support both programs.

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

CEE 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 last fall and reconvened this spring to prepare an updated plan responsive to their input.

## 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
Avangrid	April 1, virtual	Breger, Dilthey, Strong	Discussed CEE's OSW certificate program diversity goals and industry sponsorship program design.
Equinor	April 8, virtual	Breger, Strong, Dilthey, DeLucia-Harting	Discussed CEE's OSW certificate program diversity goals and industry sponsorship program design.
Xodus Group	April 13, virtual	Breger, Dilthey, Strong	Discussed CEE's OSW certificate program diversity goals, Xodus' experience and goals, and potential areas of collaboration.
Avangrid Foundation	April 15, virtual	Breger	Met with new Foundation leadership and Marco Monoc, UMass Foundations Relations Director to introduce ourselves.
Living on Earth (NPR)	April 19, phone	Dowling	Spoke with Living on Earth producer for NPR re: pollinator-friendly solar
Local MA Legislative Delegation	April 27, virtual	Breger, Dowling, Strong	Met with local state senator re: initial ideas for a Western Mass solar forum to inform, educate, and promote constructive dialogue
Donahue Institute	May 4, virtual	Breger, Strong (with Monoc, Walker)	Introduction of CEE to Donahue Institute, Executive Director and Energy Modeling staff to discuss areas of collaboration.
Simple Gifts Farm	May 5, virtual	Breger, Strong	Discussed CEE's support for Simple Gifts' goals to integrate additional clean energy generation and resilience strategies into farm operations.
BlueWave	May 6, virtual	Breger, Strong	Meeting to discuss latest dual-use solar guidelines and pre-determination applications.
DOER Green Communities	May 18, virtual	Breger, Strong, Mattison, Weil	Review of proposed Climate Leaders program and provided feedback.
UMass Dual-Use Research Project – Project Advisory Committee	May 24, virtual	Breger, Strong, Kraus (and research team)	Inaugural meeting of PAC to review project scope and updates on site trials and work progress.
Hadley, MA – Library and Senior Center	May 27, virtual	Breger, Strong	Reviewed options for solar siting and planning for town library and senior center.
Tufts University, Vet School, Grafton, MA	June 3, virtual	Breger, Strong	Reviewed plans and options for siting solar and dual-use solar on vet school property.
USFWS, BRI	June 8, virtual	Dowling	Participated in discussion re: centralizing deployment of nanotags on birds and bats to encourage better scientific + other outcomes
Browning the Green Space	June 8, virtual	Strong, Dilthey, DeLucia-Harting	Reviewed areas of collaboration with OSW Career Access Scholarship Program
RENEW Institute, University at Buffalo	June 10, virtual	Breger, Strong	Meeting to discuss community-level issues related to clean energy, research goals, and areas of potential collaboration.
Mohawk Trail Regional School	June 23, virtual	Dowling	Meeting with Alia Woofenden regarding how CEE can assist with solar planning and deployment for school properties

Entity and Attendees	Date and Format	Extension Staff	Purpose and Outcomes
New England Clean Energy Council	June 29, virtual	Breger, Strong	Meeting with Jason Dias, NECEC summer intern, to CEE's work and NECEC research goals related to the Massachusetts clean energy workforce ecosystem.
Harvard Political Review, Climate Policy	June 30, Amherst Coffee	Breger	Interview on climate policy for Harvard review article.

## 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
Penn State University, Extension Program: A Conversation with Local Government Officials	April 19, webinar	Breger	Overview of MA solar, agriculture, and pollinator programs and research	Local government officials from throughout Pennsylvania	30
Land and Climate Teach-In	April 21, Hampshire College	Breger	Land and Solar in Massachusetts	Students, faculty, and community members	20
UMass Carbon Zero - Announcement	April 22, UMass Student Union	Breger, Strong (attendees)	Chancellor and other speakers announcing UMass campus commitment to zero carbon by 2032	Campus community, invited guests, and others	200
Energy Transition Symposium, UMass	May 3, UMass Student Union	Breger	Hosted keynote speaker, EEA Secretary Theoharides (introduced by Chancellor)	Faculty, students engaged in energy research	125
Virginia Tech Dual-Use Solar Site Visit	June 1, UMass Amherst South Deerfield Research Farm	Breger, Strong	Site visit with Virginia Tech faculty, MDAR staff, and UMass researchers to discuss the dual-use solar installation, review research status, and explore research collaborations.	Virginia Tech faculty, MDAR staff, and UMass researchers	10
Improving Energy Efficiency in Municipal Buildings: Successes, Challenges, and Strategies	June 22, webinar	Mattison	Building Energy and Technical Assistance	Massachusetts municipal staff and energy committee members	75



Event	Date and Location	Extension Presenter/ Attendee	Presentation Title/Topic	Audience	Estimated Attendance
Energy Efficiency at Water Utilities	June 29, webinar	Mattison	Industrial Assessment Center - Free Energy Assessments for Water and Wastewater Treatment Facilities	National audience, hosted by US EPA	100
Irving Institute, New Energy Summit	June 27-28, Dartmouth College	Dowling	Summit to understand areas of research overlap, potential for collaboration	Young professionals (postdocs, early professors) in energy fields	30

## 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.*

### **U.S. Department of Agriculture, Rural Energy Pilot Program Grant – Final Proposal**

CEE is leading a regional effort across five rural towns and six community resource partners to submit a final proposal to USDA REPP for a project “*Putting Solar and Equity to Work for the Local Rural Economy: Western Massachusetts Local Solar Market Development Partnership*”. The submission due July 18 follows USDA’s encouragement to submit the full proposal based on our Letter of Intent submitted earlier.

### **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 met with Ener-G-Save to discuss fundraising efforts, program updates, and planned 2022 community engagements.

### **U.S Department of Energy, Deploying Solar with Wildlife & Ecosystem Services Benefits (SolWEB)**

CEE collaborated on three concept proposals to the SolWEB FOA, which were all encouraged to proceed to the full proposal stage, and for all of which, full proposals were submitted. All three proposals focused on evaluating the value of wildlife habitat provided by solar facilities, including a comparison of pollinator-friendly and conventional facilities in Massachusetts. However, the level of CEE involvement and project partners varied by application (respectively, UC Davis/North Carolina State University/The Nature Conservancy; Argonne National Lab and 6 other universities; UMass Environmental Conservation Department). Award decisions are anticipated in September.

## 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.

*Carbon Zero Living Lab.* CEE (Breger, Strong) plays a leadership role in 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. During this reporting period, UMass Amherst publicly announced its [Carbon Zero](#) initiative with the goal of powering the Commonwealth’s 1,500-acre flagship campus with 100% renewable energy by approximately 2032. In addition, CEE staff (Dowling, Strong) commenced curriculum planning for a Living Lab pilot course in collaboration with faculty from UMass Integrated Concentration in Science (iCons) program. The course, entitled [Clean Energy Living Lab: Community Solar Planning Teams](#), is a two-semester, six-credit, project-based learning course, in which students will facilitate proactive community planning for commercial-scale solar development in collaboration with Massachusetts municipalities.

During this period, River Strong was awarded a Civic Engagement & Service-Learning (CESL) Faculty Fellow for the 2022-23 academic year. This fellowship program is designed for university faculty to share experiences and assist in developing new learning opportunities for students in collaboration with off-campus community partners. River will apply this fellowship to the development of the Clean Energy Living Lab: Community Solar Planning Teams course reported above.

## 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.*

Student Initials, Status	Department	Extension Staff Mentor	Project Description
M.D., Graduate Student	Environmental Conservation	Breger, Strong	Support pedagogy and instruction of OSW Certificate program courses.
N.M., Undergraduate	Environmental Conservation	Dowling	Support for development of greenhouse gas inventory and carbon neutral planning tools
H.K., Undergraduate	Environmental Conservation	Dowling	Investigated challenges and opportunities regarding development of solar in transmission line ROWs
J.S., Undergraduate	Environmental Conservation	Dowling	Investigating cost and time-efficient methods for wildlife surveys at solar arrays
L.S., Graduate Student	Building Construction Technology	Mattison	MEI support