

UMASS CLEAN ENERGY EXTENSION

Quarterly Progress Report to MA Department of Energy Resources

Period ending September 30, 2023

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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, 2023 to September 30, 2023.

Externally Funded Project Activities¹

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), American Farmland Trust, 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 continued to make significant progress with data collection and analysis on three sites in active farming this agricultural year. On the Hadley vegetable site, the solar array installation was completed, the control area was completed, and data is being collected with a late summer planting of broccoli. Agricultural data was collected on the Grafton vegetable site, including yield and marketability. A manuscript describing tools to collect and analyze site-trial cost data was submitted and accepted for publication in a peer-review journal, *The Journal of Extension*.

MassEnergyInsight Technical Support

Prime Funding: OptiMiser, as subcontract with DOER Green Communities

CEE continued to provide user support services to Green Communities MassEnergyInsight (MEI) users in partnership with DOER-and OptiMiser, LLC. During this quarter, CEE successfully addressed 109 requests for user support across 105 municipalities and other entities.

¹ 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.

CEE participated in 9 weekly team meetings with DOER and OptiMiser. We made updates to internal documentation on support procedures, tested new functions that will be added to MEI in the future, and attended an MEI annual report beta users meeting. We organized three office hour sessions in preparation for Annual Report filing and published a newsletter announcing trainings for Annual Reporting.

Community-Informed Proactive Solar Siting and Financing

Prime Funding: iCons Program, UMass

Following completion of the *Clean Energy Living Lab: Community Solar Planning Teams* course in Q2 2023, CEE (Dowling) continues to provide support to the ten participating municipalities in holding community solar forums, finalizing *Community Solar Action Plans*, and taking next steps to implement priority actions identified in the plans.

Offshore Wind Energy Professional Graduate Certificate Program

Prime Funding: UWW Registration Fees; Mass Clean Energy Center, OSW Workforce Development Program (see two related MassCEC grants below).

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 began the Fall 2023 program course (ECO 610 *Offshore Wind Energy: Technology, Resources, Grid Integration, and Trends*), with enrollment of 47 students (8 UMass graduate students and 39 professional continuing education students). This registration sustains the substantial growth of the program.

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 has built 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. The program has supported more than the anticipated 8 participants over this two-year pilot and developed recruitment pipelines with UMass campuses and other targeted institutions and workforce and economic development organizations. We also established a framework to expand the program across other higher education institutions and Priority Groups, and leverage foundation and industry support for a sustained scholarship fund. This grant period is now concluded, but our work continues, in part with support from the partly concurrent grant noted below.

During this reporting period, CEE, in collaboration with contractor and workforce diversity specialist Libby DeLucia, finalized our fourth round of scholarship funding. Five scholarships were awarded in combination with our partly concurrent MassCEC grant *Expanding*,

Broadening, and Sustaining the UMass Amherst Offshore Wind Professional Certificate Program (see below). New scholarship recipients included 3 women, 3 BIPOC/ethnic minorities, and 3 residents of Gateway Cities and/or Environmental Justice Communities. In addition to these new scholars, CEE continued to provide support to our current scholarship awardees. This reporting period brings this grant period to an end, and CEE provided its final deliverables to MassCEC.

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. 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.

During this reporting period, CEE concluded the Summer 2023 course, with 9 scholarship students enrolled. We finalized our fourth round of scholarship applications (in combination with our partly concurrent MassCEC grant *Creating Equity in the Offshore Wind Professional Workforce* (see above), awarding 5 scholarships; recipients included 3 women, 3 BIPOC/ethnic minorities, and 3 residents of Gateway Cities and/or Environmental Justice Communities. We also continued to develop our Industry Partnership Program (IPP), finalizing Equinor as our first Industry Partner and conducting broad outreach to several partner prospects.

Offshore Wind & Wildlife Science & Collaboration

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

During this period, we held two meetings with the RWSC Bird & Bat Subcommittee. The draft RWSC Science Plan was made available for public comment. An Offshore Bat Working Group was launched to address development of guidelines for deployment of acoustic detectors and other bat monitoring equipment offshore. CEE staff and graduate students continued development of materials to support the Subcommittee, including development of a spreadsheet of bird species with the potential to be affected by offshore wind impacts.

Technical Assistance to Lawrence, MA Community Organization for Solar Planning

Prime Funding: National Renewable Energy Laboratory

During this period, CEE completed contracting with NREL and participated in a series of coordinating meetings with NREL staff and the Lawrence Stakeholder Coalition in which the

CEE’s scope of work and community needs were discussed and clarified. Based on the Coalition’s expressed interests in better understanding the implications of current solar sales patterns at the residential level, CEE developed, drafted, and delivered a report entitled *Review of Residential Solar Sales Offerings and Comparative Evaluation of Homeowner Net Savings*. The report was subsequently revised, and CEE provided a summary presentation of the report to the Coalition in late September.

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 15 communities, including completing in-depth projects with five communities in the 2023 Clean Energy Corps class, providing support for implementation of past recommendations, and continuing planning for solar development with ten towns using CEE’s toolkit (ag.umass.edu/solarplanning).

City or Town	Technical Assistance
Ashfield	Advised town on finalization of <i>Community Solar Action Plan</i> .
Belchertown	Had follow-up discussions via email on the municipal energy profile and net zero scoping report that we completed in the previous quarter.
Colrain	Advised town on finalization of <i>Community Solar Action Plan</i> .
Deerfield	Advised town on finalization of <i>Community Solar Action Plan</i> .
Framingham	Had follow-up discussions on spring 2023 Clean Energy Corps study of Framingham Memorial Building (City Hall).
Heath	Advised town on finalization of <i>Community Solar Action Plan</i> .
Hopkinton	Planned for a 2024 Clean Energy Corps study of high school.
Leverett	Advised town on finalization of <i>Community Solar Action Plan</i> .
Leyden	Advised town on finalization of <i>Community Solar Action Plan</i> .
Montague	Advised town on finalization of <i>Community Solar Action Plan</i> .
Monterey	Advised town on finalization of <i>Community Solar Action Plan</i> .
Northfield	Advised town on finalization of <i>Community Solar Action Plan</i> .
Springfield	Did a thorough review of city’s MEI data, sent findings and questions to city staff for review, requested a meeting to discuss data and collect additional information needed for municipal energy profile and net zero scoping report.
Westhampton	Advised town on finalization of <i>Community Solar Action Plan</i> .
Whately	Advised town on finalization of <i>Community Solar Action Plan</i> .

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.

Western Massachusetts Solar Forum

CEE worked with our western MA legislators, Senator Jo Comerford and Representative Mindy Domb to organize a solar forum for local and state government officials, regional planners,

environmental groups, solar developers, and the interested public to elevate the discussion and regarding the opportunities and challenges associated with solar PV development and installation in western Massachusetts. During this period, we held the first three sessions of the Forum, with speakers including Melissa Hoffer, Massachusetts Climate Chief; Rebecca Tepper, Secretary of the Executive Office of Energy and Environmental Affairs; Elizabeth Mahony, DOER Commissioner; Katherine Antos, EEA Undersecretary of Decarbonization & Resilience; and many others from government, planning agencies, industry, academia, non-profits, and finance. Total attendance was estimated to be over 350. The fourth session was delayed due to technical issues; planning began to revise and reschedule that session. See <https://ag.umass.edu/clean-energy/solar-forum>.

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 two dual-use pre-determination applications.

Pollinator-Friendly Solar Certification Program

During this reporting period, we continued 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. In collaboration with the UMass Environmental Conservation Department's DOE-Funded SolWEB study of bird and pollinator activity at solar arrays, we began completed two pilot studies led by UMass CAFE Summer Scholars. The first focused on tracking bird and wildlife activity at conventional and pollinator-friendly solar arrays using AudioMoth sound detectors and trail cameras. The second focused on a cost-benefit analysis tool for developers and researchers to understand financial implications of pollinator-friendly versus conventional solar development.

UMass Campus – Carbon Mitigation Planning and Living Lab: *Putting EVs to Work for Campus and Commuters*

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. This fall semester, CEE began a Living research Lab project with 5 undergraduate students *Putting EVs to Work for Campus and Commuters* to be completed over the 2023/2024 academic year. The project will examine the technical, economic, business, and policy aspects and impacts of utilizing EV vehicle-to-grid to utilize the anticipated hundreds of commuter EVs on campus in the mid-2030s to mitigate grid electricity consumption and peak demands.

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
MA EEA, Mike Judge; and DOER Kerry Judge	July 10, virtual; and August 18	Breger	Reviewed federal Solar for All opportunities for state response and CEE roles
Metropolitan Area Planning Commission	July 12, virtual	Breger, Dowling, Strong	Discussion of CEE's review and feedback of MAPC's draft Solar + Storage toolkit.
National Grid	July 12, virtual	Breger, Strong	Discussion of CEE's work with solar and storage, as well as NG's interest in the agrivoltaics space.
Anne Gobi, MA Director of Rural Affairs	July 18, virtual	Breger, Strong, Chris Dunn, UM Donahue Institute, FCCDC	Discussed solar proposal and options for funding.
George Propane	July 18, virtual	Breger, Strong	Discussed clean energy industry trends and related market opportunities for George Propane.
MassCEC OSW Works Community of Practice Meeting	July 19, at Mass Maritime Academy	Breger	Presentations, updates, and networking of MassCEC OSW COP.
MDAR Grant Review	July 20, virtual	Strong	Meeting to review grant applications for MDAR's Agricultural Energy Grant program.
WBUR, Barbara Moran	July 25, virtual	Breger, Dowling	Interview on CEE work in agrivoltaics and pollinator friendly PV.
CT Farmland Trust, Kathleen Doherty	July 27, virtual	Breger	Discussed CEE work in agrivoltaics and opportunities for CT.
UMass Arts Extension Service	August 3, virtual	Breger, Strong	Team meeting to kick-off the newly awarded Clean Energy in the Cultural Sector EmPower MA Innovation & Capacity Building Grant led by the UMass Arts Extension
Action4Energy, Tashia Green-Williams and Weezy Waldstein	August 10, virtual	Breger, Strong	Discussed employee barrier for small business in EE/electrification markets and training needs.
Cooler Communities	August 25, virtual	Breger, Strong	Discussion of respective activities and exploration of collaborative opportunities.
EDC of Western MA, consultants	September 15, virtual	Breger	Discussed strategic economic investment opportunities for Pioneer Valley in clean energy.
UMass Wind Energy Center, OSW Industry Advisory Board	September 29, virtual	Breger, WEC faculty and graduate students	Update on WEC and CEE activities in OSW and input from industry.

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
RWSC Bird & Bat Subcommittee Meeting	August 22, virtual	Dowling	Science Plan, Offshore Bat Working Group	Offshore wind researchers and stakeholders	60
Monterey Community Solar Forum	August 24, Monterey, MA	Dowling	Draft Community Solar Action Plan for Monterey	Town officials and residents	35
MassCEC Award Celebration, OSW Works Grants	August 29, in person, Dorchester, MA	Breger	Attended award ceremony as recipient	EEA Secretary, other state/local/MassCEC officials, and award recipients.	150
Western Mass Solar Forum, Session 1	September 5, virtual	Breger, Dowling, Kraus, Mattison, Strong	Solar in MA: Past, Present, and Future	Local and state government officials, regional planners, environmental groups, solar developers, other stakeholders	350
Western Mass Solar Forum, Session 2	September 12, virtual	Breger, Dowling, Kraus, Mattison, Strong	Solar and Land Use in MA	Local and state government officials, regional planners, environmental groups, solar developers, other stakeholders	350
Business Network for Offshore Wind - Foundation 2 Blade Training	September 14, New Bedford, MA	Strong	UMass Offshore Wind Professional Certificate and Access Scholarship	Offshore wind industry professionals and supply chain stakeholders	50
Western Mass Solar Forum, Session 3	September 19, virtual	Breger, Dowling, Kraus, Mattison, Strong	Solar, Equity, and Community Benefits	Local and state government officials, regional planners, environmental groups, solar developers, other stakeholders	350
RWSC Bird & Bat Subcommittee Meeting	September 19, virtual	Dowling	Science Plan, Offshore Bat Working Group	Offshore wind researchers and stakeholders	60

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. DOE Offshore Wind Centers of Excellence, Request for Information

Last reporting period, CEE contributed to a response from UMass, led by the Wind Energy Center, to the RFI from U.S. Department of Energy. We await a decision by DOE on this award.

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

This quarter, CEE collaborated with UMass colleagues on the initiation of work funded under this grant. CEE's role in the project is to coordinate with developers to ensure the inclusion of pollinator-friendly solar facilities in a research study of pollinator and bird ecology at solar facilities. CEE has also piloted several research studies noted above.

U.S. Environmental Protection Agency Region 1, Environmental Justice Thriving Communities Technical Assistance Center (EJ TCTAC)

This quarter, CEE collaborated with UMass Dartmouth who is leading this proposal to EPA. CEE would have a primary subaward role to provide technical support to environmental justice communities across New England in accessing clean energy federal funding programs. The project would provide UMass Amherst/CEE with \$1.05M over 5 years. UMass Dartmouth submitted the proposal to EPA by the September 29 deadline.

U.S. Department of Energy, Renewable Energy Siting through Technical Engagement and Planning (R-STEP)

CEE worked closely with DOER and other partners to develop and draft a response to provide for strategic solar siting and planning across state, regional and local levels across Massachusetts. The state proposal *Empowering Communities: Facilitating Local and Regional Solar Planning to Achieve Statewide Goals* was submitted by DOER.

University-based Proposals and Initiatives

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

Clean Energy in the Cultural Sector. During this period, a project team led by UMass Arts Extension Services was notified that it was awarded project funding for its proposed Cultural Sector from the *MassCEC FY23 EmPower MA Innovation & Capacity Building Grant* program. A project kick-off meeting was held in July. During the project, CEE and UMass Arts Extension Service will collaborate with partner arts organizations to assess their facilities, operations, programming, and other opportunities for clean energy intervention in alignment with their organizational capacity and priorities. The partners will then work together to lay out potential implementation pathways for clean energy adoption, support identification of funding and financing options, and document organizational processes to create an overview report summarizing the process and participant experiences.

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.

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.P., Undergraduate	Environmental Conservation	Breger	Work with CEE and Town of Amherst on analyzing survey results on energy issues, rental properties, and landlords.
5 Student Research Group, Undergraduate	Commonwealth Honors College, iCons, interdisciplinary	Breger	Putting EVs to Work for Campus and Commuters – integrating EV/V2G as storage to serve campus electrification and enhance car ownership
W.P., MS3 Practicum	Environmental Conservation	Dowling	Practicum related to agrivoltaics and solar planning.
N.P., CAFÉ Summer Scholar	Environmental Conservation	Dowling	Conduct economic analysis of pollinator-friendly solar
R.D., CAFÉ Summer Scholar	Environmental Conservation	Dowling	Conduct pilot field study of wildlife and bird use of solar arrays
J.D., Graduate RA	Environmental Conservation	Dowling	Develop materials to support RWSC Bird & Bat Subcommittee
L.H., Graduate RA	Organismal and Evolutionary Biology	Dowling	Support Offshore Bat Working Group