

## UMASS CLEAN ENERGY EXTENSION

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

Period ending December 31, 2023

*Contacts:* Dwayne Breger, Director, [dbreger@umass.edu](mailto:dbreger@umass.edu) 413-545-8512  
River Strong, Associate Director, [gcstrong@umass.edu](mailto:gcstrong@umass.edu) 413-545-8513  
Prashant Shenoy, PI, [shenoy@cs.umass.edu](mailto:shenoy@cs.umass.edu), 413-577-0850

This Progress Report provides a summary of work accomplished by the UMass Clean Energy Extension (CEE) during the period October 1, 2023 to December 31, 2023.

Over this reporting period, CEE has appreciated the opportunity to work with DOER in amending its ISA as a no-cost extension through June 2024. This extension will allow for the original (2015) funding to be fully expended, before we begin significant use of the new (2023) ISA funds. The amendment was executed by UMass in December 2023, and fully executed by DOER in January 2024.

### 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), 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 completed its site trial monitoring on three agrivoltaic sites in active farming this agricultural year. Sensors were removed between late October and early December with several million data points recorded. Crops studied during this period include butternut squash, lettuce, broccoli, and hay. Data analysis is underway and will be reported to DOE next quarter.

---

<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.

## **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 supported the successful rollout of the new web-based annual reporting system, including addressing 203 requests for user support across 120 municipalities and other entities. CEE participated in 11 weekly team meetings with DOER and OptiMiser. We made updates to internal documentation on support procedures and made edits to the MEI FAQ to clarify and/or update information. We co-hosted 7 office hour sessions in preparation for Annual Report filing and published 5 newsletters announcing trainings for Annual Reporting. We constructed and distributed a survey for user feedback on the new web-based Annual Report system.

## **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) continued 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. In November 2023, Ashfield held its community solar forum, identifying next steps for residential and municipal solar development, and recruiting additional volunteers to work on priority actions. Colrain, Montague, and Whately followed up on suggestions regarding potential changes to town solar bylaws.

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

**Prime Funding:** *UWW Registration Fees; Mass Clean Energy Center, OSW Workforce Development Program (see related MassCEC grant 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 concluded 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.

## **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 is currently funding (1) 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; (2) increased support for our successful Career Access Scholarship program to fund an additional cohort of students from underserved backgrounds targeting MA and HBCUs; and (3) enhancements to our curricular and pedagogical design and delivery with increased enrollment to 60-80 students per semester. It is also supporting 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 is supporting 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 Fall 2023 course, with 10 scholarship students enrolled; 5 of these students completed the certificate with this course. We continued to develop our Industry Partnership Program (IPP) and conduct broad outreach to several partner prospects.

### **Preparing for Success: Restructuring Program Website and Branding, and Opening Undergraduate Pathways (for the UMass Amherst Offshore Wind Professional Certificate Program)**

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

CEE contract with MassCEC on this award started in November 2023. As a first task, CEE has completed drafting a Request for Proposal for a website design and program branding vendor. CEE anticipates advertising this RFP in January 2024, with responses due in February.

### **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, addressing offshore wind research priorities related to birds and bats. The RWSC Science Plan was edited and finalized. RWSC’s Offshore Bat Working Group began developing guidance 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 a draft Workplan for 2024.

### **Technical Assistance to Lawrence, MA Community Organization for Solar Planning**

*Prime Funding: National Renewable Energy Laboratory*

During this period, participated in a series of coordinating meetings with NREL staff and the Lawrence Stakeholder Coalition to further envision, refine, and develop project deliverables. Based on NREL’s and the Coalition’s expressed interests, CEE delivered three draft documents to NREL staff for review and feedback: (1) *Review of Representative Residential PPA Terms in Lawrence and Evaluation of Alternatives*, (2) *GIS Analysis of Community Solar Siting in Lawrence and Adjacent Cities*, and (3) a *Community Solar Guidebook*. CEE anticipates finalizing and presenting these documents to the Coalition in early 2024.

## **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 ten communities, including arranging projects for the 2024 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](http://ag.umass.edu/solarplanning)). CEE staff and affiliated faculty also met with DOER to discuss

plans for the Climate Leaders program and our role in providing related technical assistance to participating communities.

City or Town	Technical Assistance
Ashfield	Held community solar forum and advised Energy Committee on follow-up actions.
Colrain	Advised town on solar bylaw updates and finalizing <i>Community Solar Action Plan</i> .
Deerfield	Advised town on next steps to review <i>Community Solar Action Plan</i> . Supported town’s application to HEET/MassCEC Kickstart Mass grant program for funding to move forward with consideration of the geodistrict first proposed in our 2022 Clean Energy Corps study.
Holyoke	Supported city’s successful application for a Green Communities competitive grant to fund lighting and weatherization measures in several buildings.
Hopkinton	Planned for a 2024 Clean Energy Corps study of high school.
Montague	Advised town on next steps to review/finalize <i>Community Solar Action Plan</i> .
Northfield	Advised town on next steps to review <i>Community Solar Action Plan</i> .
Orange	Supported town in pursuing implementation of recommendations made in 2023 Clean Energy Corps study of Town Hall.
Pelham	Planned for a 2024 Clean Energy Corps study of elementary school.
Whately	Advised town on solar bylaw updates.

## 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 fourth session of the Forum, focusing on perspectives from a range of stakeholders, including government officials, solar developers, non-profits, and town residents; speakers included Representative Jeff Roy, MDAR Commissioner Ashley Randle, and many others. More than 425 people registered for the Forum and nearly 100 people attended the fourth 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. Given continued financial uncertainty regarding state pollinator-friendly solar incentives, no new

applications to our certification program were received. In collaboration with the UMass Environmental Conservation Department’s DOE-Funded SolWEB study of bird and pollinator activity at solar arrays, we continued one pilot study initiated in Q2 by a UMass CAFE Summer Scholar. This study focuses on tracking bird and wildlife activity at conventional and pollinator-friendly solar arrays using AudioMoth sound detectors and trail cameras.

**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. CEE is facilitating a Living Lab project this academic year with 5 undergraduate students *Putting EVs to Work for Campus and Commuters*. 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. This fall semester, the project completed its literature review, report draft outline, draft survey of campus community, heard from a couple subject matter experts on campus, and began the development of an analytical model.

**Business and Community Outreach and Support**

The Clean Energy Extension staff held substantive direct interactions with the following businesses, state entities, and other organizations.

<b>Entity and Attendees</b>	<b>Date and Format</b>	<b>Extension Staff</b>	<b>Purpose and Outcomes</b>
WPI faculty, land trusts, regional planning agencies, social justice non-profits	October 3, in person	Dowling	Discussed models to address land use issues related to energy, equity, and conservation
Site visit to UMass South Deerfield Research Farm’s dual-use research installation with Connecticut Farmland Trust and Connecticut Department of Agriculture staff and administrators	October 5, in-person	Strong	Reviewed background and status of the research site, current UMass agrivoltaics research and initiatives, and state agrivoltaics policy landscape.
Site visit to Hyperion System’s agrivoltaics project at the Czajkowski Farm in Hadley, MA with state officials and leading stakeholders	October 6, in-person	Strong	Discussed background and status of the project, as well as MA agrivoltaics research and policy landscape generally. Audience included UMass Extension faculty and staff and agrivoltaics business, agriculture, and policy stakeholders.
Leading by Example and Green Communities staff	October 10, hybrid	Breger, Mattison, Strong, Weil	Discussed background, status, and next steps regarding a geothermal feasibility study to address several S. Deerfield municipal buildings.
MassCEC Offshore WindWorks Community of Practice	October 18, virtual	Breger, Strong, Dilthey	Heard updates from MassCEC grant recipients and networked on collaboration opportunities.

<b>Entity and Attendees</b>	<b>Date and Format</b>	<b>Extension Staff</b>	<b>Purpose and Outcomes</b>
Kimball Farms Nursing Care Center staff and Sen. Paul Mark	October 18, virtual	Breger, Strong	Discussed background, goals, and next steps regarding the potential for solar PV and EV charging infrastructure at this Lenox, MA facility.
Giner Labs staff	October 18, virtual	Breger, Strong	Discussed the status of CEE's efforts to develop the Massachusetts Battery Energy Storage Innovation Ecosystem and explored potential collaborations.
Cooler Communities and Green Communities staff	October 30, hybrid	Breger, Mattison, Strong, Weil	Discussion to explore strategies for securing funding for and providing energy assistance to Massachusetts public schools.
Site visit to UMass South Deerfield Research Farm's dual-use research installation with Massachusetts Department of Agricultural Resources staff	November 2, in-person	Breger, Strong	Discussed background and status of the research site, current UMass agrivoltaics research and initiatives, and state agrivoltaics policy landscape.
ADL Ventures staff	November 15, virtual	Breger, Strong	Discussed CEE's work with municipalities and ADL's MassCEC EmPower grant focused on testing business models for locally owned renewable energy co-ops to improve clean energy access for low-income and disadvantaged communities.
Economic Development Corporation of Western MA	November 17, virtual	Breger	Participated in regional meeting advising consultant on clean energy economic development opportunities for the Pioneer Valley.
Sunwealth staff	November 21, virtual	Breger, Strong	Discussed Sunwealth's Community Solar program, CEE's work supporting the MA solar market and communities, and explored potential collaborations.
Fred Connor, City Councilor-elect, West Springfield	December 1, virtual	Breger, Strong	Discussed the city's interest in conducting a feasibility study and cost/benefit analysis for a municipal solar park on a 17-acre parcel of open land that is currently an industrial landfill.
MassCEC Western MA Clean Energy Workforce Summit - Planning Meeting	December 7, virtual	Breger	Planning meeting for 2024 Western MA event.
Humboldt County, CA Economic Development staff	December 12, virtual	Breger, Dilthey, Strong	Discussed Humboldt County's funding to provide paid training to a group of the county's employers and employees interested in completing the UMASS OSW Professional Certificate program as a strategy to build OSW expertise in the community.
Anser Advisory staff	December 13, virtual	Breger, Strong	Discussed Anser's interest in providing Greenhouse Gas (GHG) Inventory services, CEE's municipal technical assistance, and collaborative potential.

## 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
Offshore WINDPOWER 2023 Conference & Exhibition	October 3-4, Boston, MA	Dilthey, Strong	UMass Offshore Wind Professional Certificate – Booth and Networking	Offshore wind industry members and stakeholders	2,000+
RWSC Bird & Bat Subcommittee meeting	October 17, virtual	Dowling	RWSC Bird & Bat Science Plan updates, Marine Bird Distribution Models	Offshore wind and wildlife stakeholders	60
CT NCCD Board of Directors 2023 Annual Meeting	October 25, hybrid	Breger	Dual-Use Solar/Agrivoltaics in Massachusetts and UMass	Board members of CT NCCD	15
Project Advisory Committee, US DOE Dual Use Grant	October 27, virtual	Breger, Strong, Kraus, UMass Extension	Update and Discussion of Dual-Use grant activities	Project PAC of energy/ag experts and stakeholders	20
Ashfield Community Solar Forum	November 6, hybrid	Dowling	Ashfield Community Solar Action Plan	Ashfield board members and other residents	30
Agrivoltaics in Maine: Knowledge Sharing Meeting	November 14, hybrid	Strong	Dual-Use Solar/Agrivoltaics in Massachusetts and UMass	University of Maine Extension faculty and staff; agrivoltaics academic, business, agriculture, and policy stakeholders from the Northeastern U.S.	25
MA Envirothon, class offering to high school students	November 14, UMass campus, in person	Dilthey, Strong	Creating and delivered hands-on class on wind energy to participating MA high school students.	High school students participating in state Envirothon	40
MA Envirothon, class offering to high school students	November 14, UMass campus, in person	Breger	Class on workforce needs and career opportunities in clean energy	High school students participating in state Envirothon	30
RWSC Bird & Bat Subcommittee meeting	December 12, virtual	Dowling	Offshore Bat Acoustic Monitoring Guidance; 2024 Workplan	Offshore wind and wildlife stakeholders	60
Western Mass Solar Forum, Session 4	December 19, virtual	Breger, Dowling, Kraus, Mattison, Strong	Perspectives on Solar	Local and state government officials, regional planners, environmental groups, solar	90

Event	Date and Location	Extension Presenter/ Attendee	Presentation Title/Topic	Audience	Estimated Attendance
				developers, other stakeholders	

## 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

Last reporting period, CEE contributed to a proposal from UMass, led by the Wind Energy Center, to the U.S. Department of Energy Wind Energy Technology Office. While we await a decision on this award during this reporting period, we were informed by DOE in February 2024 that UMass was awarded the Center of Excellence.

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

Last reporting period, 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 and the team awaits a decision by EPA on this award.

### 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. In early January 2024, CEE participated with DOER on a call with DOE to support the proposal.

### 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.*** Funded by a *MassCEC FY23 EmPower Massachusetts Innovation & Capacity Building Grant*, CEE is providing technical support to a project team led by UMass Arts Extension Services (AES). CEE has provided assistance to AES on an organizational and site survey to understand organizational goals and collect energy data. With AES, CEE has met with partner arts organizations to initiate a collaboration to assess their facilities, operations, programming, and other opportunities for clean energy intervention in alignment with their organizational capacity and priorities.



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.*

<b>Student Initials, Status</b>	<b>Department</b>	<b>Extension Staff Mentor</b>	<b>Project Description</b>
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
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