

## UMASS CLEAN ENERGY EXTENSION

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

Period ending June 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 April 1, 2023 to June 30, 2023.

### 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 made significant progress with data collection on the two sites in active farming this agricultural year. At these sites in Monson with hay and in Grafton with row vegetables, plantings were established, monitoring equipment installed, and our first research data are being collected. Additionally, the research team has begun collecting economic site data to integrate into our financial tool, and qualitative field interviews were conducted with one farmer, and discussion opened with four other farmers.

#### **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 52 requests for user support across 35 municipalities and other entities. CEE participated in weekly team meetings with DOER and OptiMiser and published a newsletter informing users of a new Annual Reporting process.

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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.

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

***Prime Funding: iCons Program, UMass***

CEE staff (Dowling, Strong) developed and are co-instructing a UMass Carbon Zero 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 facilitating proactive community planning for solar development in collaboration with ten Massachusetts municipalities. The course utilizes CEE's *Community Planning for Solar* Toolkit, developed under a grant with the National Renewable Energy Laboratory's (NREL) Solar Energy Innovation Network program in the category of *Solar in Rural Communities*. During this reporting quarter, students received and analyzed community solar survey results from partner towns, drafted *Community Solar Survey Results Summary* reports, and drafted *Community Solar Action Plans* for each partner towns. Course instructors edited *Community Solar Survey Results Summary* reports for expected delivery next quarter.

## **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 concluded the Spring 2023 program course (ECO 611 *Offshore Wind Energy: Environmental Impacts, Siting, Permitting, and Stakeholder Engagement*), with enrollment of 50 students (7 UMass graduate students and 43 professional continuing education students). We also taught the Summer 2023 program course (ECO 612 *Offshore Wind Energy: Project Economics, Deployment, and Business Logistics*), with enrollment of 46 students (4 UMass graduate students and 42 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 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 and other targeted institutions and workforce and economic development organizations. 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, engaged in our fourth round of scholarship funding. We received 19 applications and prepared them for review by the Selection Committee, which met in late June and recommended 5 applicants. Scholarships will be awarded in combination with our partly concurrent MassCEC grant *Expanding, Broadening, and Sustaining the UMass Amherst Offshore Wind Professional Certificate Program* (see below). We continued to provide support to our current scholarship awardees.

### **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 Spring 2023 course, with 6 new scholarship students (including 2 BIPOC / ethnic minorities, 4 women or gender nonconforming, one veteran with disabilities, and a resident of an Environmental Justice Community) and a total of 12 scholarship students enrolled. We continued outreach to targeted communities (including North Shore Blue Economy, MA Gateway Cities, MA Veterans, and Historically Black Colleges and Universities) and made refinements to our LinkedIn outreach campaign. We published a blog post on the scholarship program on the NECEC website: *UMass Amherst Clean Energy*

#### ***Extension: Making Offshore Wind a More Accessible Career Option***

(<https://www.necec.org/member-dei-stories-details/umass-amherst-clean-energy-extension-making-offshore-wind-a-more-accessible-career-option>). We opened our next round of scholarship applications (in combination with our partly concurrent MassCEC grant *Creating Equity in the Offshore Wind Professional Workforce* (see above), receiving candidates from Gateway Cities and Environmental Justice communities. We launched the first phase of our Industry Partnership Program (IPP), securing a first partner.

### **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 developing municipal energy and emissions profiles with basic scoping for municipal-level net zero planning in 6

municipalities. During this reporting period, we completed and submitted the GHG inventories for all of the 11 communities and all but one of the municipal energy profiles/net zero scoping reports. Work on Springfield’s report is in progress after a delay in receiving permission to access the city’s data.

**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 regarding priority scientific activities necessary to assess and adequately address potential impacts offshore wind development on wildlife. We completed drafting the RWSC Science Plan, which addresses 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. The draft plan will be available for review and input on the RWSC website through the summer months.

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

***Prime Funding: National Renewable Energy Laboratory***

During this period, CEE responded to an inquiry from NREL to provide Technical Assistance to support solar development planning in Lawrence, MA. CEE is completing contracting with NREL and the project with Lawrence is planned to kick-off in July.

**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 28 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](http://ag.umass.edu/solarplanning)) as part of a service learning program with UMass students (see *Community-Informed Solar Siting & Financing* above).

<b>City or Town</b>	<b>Technical Assistance</b>
Agawam	Finalized GHG inventory.
Amherst	Continued building inventory pilot for the Climate Leaders program. Completed a Clean Energy Corps study of Amherst Town Hall.
Ashfield	Students completed draft <i>Community Solar Action Plan</i> and entry of community solar survey results.
Belchertown	Finalized community GHG inventory. Completed municipal energy profile and net zero scoping report.
Blandford	Finalized community GHG inventory.
Colrain	Students completed draft <i>Community Solar Action Plan</i> and entry of community solar survey results.
Cummington	Finalized community GHG inventory.
Deerfield	Students completed draft <i>Community Solar Action Plan</i> and entry of community solar survey results.

City or Town	Technical Assistance
East Longmeadow	Finalized community GHG inventory.
Framingham	Completed Clean Energy Corps study of Framingham Memorial Building (City Hall).
Heath	Students completed draft <i>Community Solar Action Plan</i> and entry of community solar survey results.
Holyoke	Continued to support study of water-source heat pump proposal made by Clean Energy Corps in 2021, and advised on weatherization plans for a few municipal buildings.
Leverett	Students completed draft <i>Community Solar Action Plan</i> and entry of community solar survey results.
Leyden	Students completed draft <i>Community Solar Action Plan</i> and entry of community solar survey results.
Longmeadow	Finalized community GHG inventory. Completed municipal energy profile and net zero scoping report.
Montague	Students completed draft <i>Community Solar Action Plan</i> and entry of community solar survey results.
Monterey	Students completed draft <i>Community Solar Action Plan</i> and entry of community solar survey results.
Newburyport	Completed Clean Energy Corps study of City Hall.
Northfield	Students completed draft <i>Community Solar Action Plan</i> and entry of community solar survey results.
Orange	Completed Clean Energy Corps study of Town Hall.
Palmer	Finalized community GHG inventory.
Pelham	Finalized community GHG inventory. Completed municipal energy profile and net zero scoping report.
Springfield	Finalized community GHG inventory.
Sunderland	Discussed with Energy Committee a possible Clean Energy Corps study of Sunderland Elementary School in 2024.
Westhampton	Finalized community GHG inventory. Completed municipal energy profile and net zero scoping report.
Whately	Students completed draft <i>Community Solar Action Plan</i> and entry of community solar survey results.
Wilbraham	Completed municipal energy profile and net zero scoping report. Finalized community GHG inventory.
Worcester	Completed Clean Energy Corps study of City Hall.

### Climate Leaders

Lauren Mattison, Ben Weil, and two student interns continued working with DOER and OptiMiser on planning for the Climate Leaders program, including a building inventory pilot in Amherst.

## 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 is working 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. The Forum is planned over four sessions in September and agendas, virtual webinar logistics, and speakers are being finalized. 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 one dual-use pre-determination application, which was a revision of a previously submitted application.

**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 two pilot studies led by UMass CAFÉ Summer Scholars. The first will focus on tracking bird and wildlife activity at conventional and pollinator-friendly solar arrays using AudioMoth sound detectors and trail cameras. The second will focus 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 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. During this reporting period, CEE has begun organizing student and faculty engagement in a Living Lab project for the 2023/2024 academic year to 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.

<b>Entity and Attendees</b>	<b>Date and Format</b>	<b>Extension Staff</b>	<b>Purpose and Outcomes</b>
SRS Land Use Stakeholder Working Group	April 24, virtual	Breger	Participate in WPI research (NSF funded) project on solar and land use.
Tony Kerzmann and others, University of Pittsburg, Engineering School	April 27, virtual	Breger, Strong	Discussed research work on agrivoltaics.
Kearsarge Solar	May 19, virtual	Strong	Discussed dual-use pre-determination application process.

Entity and Attendees	Date and Format	Extension Staff	Purpose and Outcomes
Local Energy Advocates of Western Massachusetts, Terese Hammerle	May 26, virtual	Breger, Strong	Discussed local organization's role and activities in advocating for fossil fuel reductions.
STec Technology Inc., New Bedford, Erin Schulz, Bill Ramos	June 6, virtual	Breger, Strong	Discussed company's technology to reduce fuel use in marine engines and opportunities for collaboration. Established communications with UMass engineering programs and student research opportunities.
Eki Agrivoltaics, MIT/Harvard student entrepreneurs	June 12, virtual	Breger	Discussed agrivoltaics with student entrepreneurs working to establish agrivoltaics company in Spain.
Mass Audubon, Heidi Ricci	June 12, virtual	Breger	Discussed agrivoltaics and solar and land issues, and policy implications.
Julia Simon, NPR	June 14, virtual	Breger	Provided overview of solar and land issues in Amherst for reporter for NPR environmental story.
UMass Lowell, Sam Alpert	June 29, virtual	Breger	Discussed agrivoltaics research topics.
Olin College, Jess Charlap, Office of External Programs and Partnerships	June 30, virtual	Breger, Strong	Via introduction by MassCEC, discussed work of CEE, activities at Olin, and opportunities for collaboration.

## 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
Environmental Justice and Social Equity Meet Energy Research – Faculty Networking Event	April 19, UMass Campus	Breger	CEE: Extension as a Core Mission of the University, serving the Commonwealth	UMass faculty and administrators	40
IPF 2023 BNOW Offshore Wind Conference	April 28-30, Baltimore, MD	Strong, Dilthey	Provided panel presentation and conducted general networking related to the UMass Professional Offshore Wind Professional Certificate	Offshore wind industry stakeholder	50
Cooler Communities, Guest Speaker, West Springfield Middle School	May 10, West Springfield	Breger	Provided instruction to 3 sections of a 5 <sup>th</sup> grade class on renewable energy and applications to West Springfield community.	Middle school students and their science teachers	35

Event	Date and Location	Extension Presenter/ Attendee	Presentation Title/Topic	Audience	Estimated Attendance
UMass 2 <sup>nd</sup> Annual Energy Symposium	May 15, UMass Student Union Ballroom	Breger, Strong, Mattison	Assisted in Symposium organization and planning. Supported students in poster presentations. Provided introduction to UMass Carbon Zero presentation.	UMass and broader community	140
The Future of Sustainability at UMass, School of Earth and Sustainability	May 23, UMass Fine Arts Center	Breger	Lightning talk on the role of CEE on campus and for the Commonwealth	UMass faculty and administration engaged in sustainability	120

## 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

CEE contributed to a response from UMass, led by the Wind Energy Center, to the RFI from U.S. Department of Energy. CEE highlighted the demonstrated need for OSW professional interdisciplinary education and highlighted the success of our Certificate program and strong demand by industry for such a professional workforce.

### 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.

### University-based Proposals and Initiatives

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

CEE collaborated with the *UMass Arts Extension Service* and other partners to submit a proposal to the *MassCEC FY23 EmPower Innovation & Capacity Building* grant program. If successful, partners will collaborate with participating 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. As part of the UMass Amherst [Carbon Zero](#) initiative, CEE staff (Dowling, Strong) developed and are co-instructing 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 are facilitating proactive community planning for solar development in collaboration with Massachusetts municipalities.

During this period, River Strong continued serving as 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 is applying 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.
C.W., Undergraduate Honors Thesis	Environmental Conservation	Breger	Thesis Committee Chair on project evaluating and planning for reusable/returnable carry out containers for UMass Dining facilities
J.M., Graduate Student	Sustainability Sciences	Breger, Dilthey	Support services for administration of Offshore Wind Professional Certificate program
C.B., Undergraduate Honors Thesis	Environmental Conservation	Breger	Thesis Committee Member; UMass Amherst Campus Wellness Policy: Synergies Between the Okanagan Charter and Green Building Certifications
A.K., Undergraduate Honors Thesis	Public Policy	Breger	Thesis Committee Member; Implications of new federal IRA and Justice40 Initiative for Massachusetts residents and policy opportunities
J.G. and O.P.	Environmental Conservation	Weil and Mattison	Pilot of new building inventory system for Climate Leaders program
W.P.	Environmental Conservation	Dowling	Practicum related to agrivoltaics and solar planning.

<b>Student Initials, Status</b>	<b>Department</b>	<b>Extension Staff Mentor</b>	<b>Project Description</b>
N.P.	Environmental Conservation	Dowling	Conduct economic analysis of pollinator-friendly solar
R.D.	Environmental Conservation	Dowling	Conduct pilot field study of wildlife and bird use of solar arrays