

UMASS CLEAN ENERGY EXTENSION

Quarterly Progress Report to MA Department of Energy Resources

Period ending March 31, 2023

Contacts: Dwayne Breger, Director, dbreger@umass.edu 413-545-8512
River Strong, Associate Director, gcstrong@umass.edu 413-545-8513
Prashant Shenoy, PI, 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 January 1, 2023 to March 31, 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), 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 completed the contract's Budget Period 1 and submitted a Continuation Application which was reviewed positively by DOE management. As part of completing Budget Period 1, CEE completed two information sheets for the general public and the research community. The research team is finalizing its technical documents: the agricultural extension team on the site trial protocols and lessons learned on site designing and deploying site monitoring equipment; and the economic researchers on a uniform tool for on-site cost and yield data tracking as well as literature reviews on economic theoretical models for solar renewable energy production on agricultural land, and on existing social acceptance of renewable energy projects. The project was presented or included in presentations/discussions at five venues during the budget period, and a conference presentation at a national annual agricultural conference was delivered in January/February 2023.

MassEnergyInsight Technical Support

Prime Funding: OptiMiser, as subcontract with DOER Green Communities

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 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 65 requests for user support across 45 municipalities and other entities. CEE participated in weekly team meetings with DOER and OptiMiser.

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 drafted community solar surveys, associated promotional materials, and survey distribution plans. Online surveys for all ten municipalities went live in early March and printed surveys were distributed via drop boxes in some partner towns.

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 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). 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, completed the third round of scholarship funding. Based on the review by the Selection Committee, we awarded 6 scholarships, 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 and new 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, we enrolled 6 new scholarship students for the Spring 2023 semester, including 2 BIPOC / ethnic minorities, 4 women or gender nonconforming, one veteran with disabilities, and a resident of an Environmental Justice Community. (One of these 6 was for one course only, to enable a current student to finish the program.) We also enhanced our outreach with attendance and an exhibitor booth at the Business Network for Offshore Wind, IPF annual conference in Baltimore. We finalized the design of our Industry Partnership Program (IPP), publishing a brochure and program web page (<https://ag.umass.edu/clean-energy/offshore-wind-certificate/industry-partnership-program>) and are preparing for a first phase of the IPP launch in April 2023.

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 made progress on the GHG inventories, including continuing to collect data, refine our methodology, analyze results, and finalize the inventory layout. We started the net zero scoping process with a thorough review of MassEnergyInsight data for the communities, began meeting with communities to collect additional information, and began to modify our municipal energy profile template to include emissions and net zero information.

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. 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 began outlining and 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. We provided guidance to USFWS regarding bird and bat monitoring considerations at offshore wind facilities.

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 31 communities, including beginning 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) as part of a service learning program with UMass students (see *Community-Informed Solar Siting & Financing* above).

City or Town	Technical Assistance
Agawam	Continued data collection and analysis for draft GHG inventory.
Amherst	Continued building inventory pilot for the Climate Leaders program. Began a Clean Energy Corps study of Amherst Town Hall.
Ashfield	Students completed final <i>Solar Resource & Infrastructure Assessment</i> report; developed and initiated electronic distribution of a <i>Community Solar Survey</i> .
Ashland	Met with staff to discuss energy efficiency opportunities in town buildings.
Belchertown	Developed draft community GHG inventory. Reviewed municipal energy data for NZ scoping.
Blandford	Continued data collection for draft GHG inventory.
Colrain	Students completed final <i>Solar Resource & Infrastructure Assessment</i> report; developed and initiated electronic distribution of a <i>Community Solar Survey</i> .
Cummington	Continued data collection and analysis for draft GHG inventory.
Deerfield	Students completed final <i>Solar Resource & Infrastructure Assessment</i> report; developed and initiated electronic distribution of a <i>Community Solar Survey</i> .
East Longmeadow	Continued data collection for draft GHG inventory.
Framingham	Began Clean Energy Corps study of Framingham Memorial Building (City Hall).
Heath	Students completed final <i>Solar Resource & Infrastructure Assessment</i> report; developed and initiated electronic distribution of a <i>Community Solar Survey</i> .
Holyoke	Continued to support study of water-source heat pump proposal made by Clean Energy Corps in 2021. Assisted with concept paper for DOE’s Renew America’s Schools grant program.
Leverett	Students completed final <i>Solar Resource & Infrastructure Assessment</i> report; developed and initiated electronic distribution of a <i>Community Solar Survey</i> .

City or Town	Technical Assistance
Leyden	Students completed final <i>Solar Resource & Infrastructure Assessment</i> report; developed and initiated electronic distribution of a <i>Community Solar Survey</i> .
Longmeadow	Continued data collection for draft GHG inventory. Reviewed municipal energy data for NZ scoping.
Montague	Students completed final <i>Solar Resource & Infrastructure Assessment</i> report; developed and initiated electronic distribution of a <i>Community Solar Survey</i> .
Monterey	Students completed final <i>Solar Resource & Infrastructure Assessment</i> report; developed and initiated electronic distribution of a <i>Community Solar Survey</i> .
Natick	Assisted with proposal to DOE Renew America’s Schools grant program for Ben-Hem Elementary School, as follow-up to 2022 Clean Energy Corps project.
Newburyport	Began Clean Energy Corps study of City Hall.
North Adams	Continued assistance with improving operation of dysfunctional GSHP system in library.
Northfield	Students completed final <i>Solar Resource & Infrastructure Assessment</i> report; developed and initiated electronic distribution of a <i>Community Solar Survey</i> .
Orange	Began Clean Energy Corps study of Town Hall.
Palmer	Continued data collection and analysis for draft GHG inventory.
Pelham	Continued data collection and analysis for draft community GHG inventory. Reviewed municipal energy data for NZ scoping.
Springfield	Continued data collection for draft community GHG inventory.
Sunderland	Discussed with Energy Committee a possible Clean Energy Corps study of Sunderland Elementary School in 2024.
Westhampton	Developed draft community GHG inventory. Reviewed municipal energy data and met with town representative for NZ scoping.
Whately	Students completed final <i>Solar Resource & Infrastructure Assessment</i> report; developed and initiated electronic distribution of a <i>Community Solar Survey</i> .
Wilbraham	Reviewed municipal energy data for NZ scoping.
Worcester	Began 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.

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, no dual-use pre-determination applications came in for review. We finalized our protocol for financial compensation for our UMass agricultural extension colleagues who support the application reviews and set the process in motion for applicable reviews to date.

Pollinator-Friendly Solar Certification Program

During this reporting period, we provided certification to six projects which completed the review process. 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. We also provided input to DOER regarding financial costs of pollinator-friendly solar development and connections to solar facility owners developing pollinator-friendly projects. This assistance was provided as part of the department’s process to evaluate reinstatement of a pollinator incentive (following enacting legislation in 2022).

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 contributed to the planning of the 2nd annual Energy Transition Symposium to be held May 15th.

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
New Jersey Institute of Technology, Phil Pong	January 9, virtual	Breger	Provided NJIT with advice and letter of support for their application to the NJEDA Offshore Wind Workforce and Skills Development Challenge
UMass Lowell	January 17, and follow ups, virtual	Breger, Strong	Supported UML collaboration with UMA College of Engineering on offshore wind undergraduate student diversity proposal.
Kearsarge Energy, Dan Voss and team	January 18, virtual	Breger, Strong	Provided information on dual use agriculture research and market activities to solar developer.
National Renewable Energy Laboratory, Wendy Hawthorne	January 19, virtual	Breger	Discussed opportunity to partner with NREL to provide technical assistance to community group in Lawrence, MA on solar project planning.
UMass Wind Energy Center, OSW Industry Advisory Board	January 27, virtual	Breger, WEC	Participated as partner with WEC in inaugural meeting of their recently convened Offshore Wind Industry Advisory Board.
University of Pittsburgh, Student team	February 9, virtual	Breger, Strong	Discussion with Pitt student team researching dual-use solar technology, economics, and policies.
Bat Data Standards Workshop, Association of Fish & Wildlife Agencies, USGS	February 14, virtual	Dowling	Presented offshore wind perspective on bat data standardization needs
Metropolitan Area Planning Council	February 27, virtual	Breger	For project with DOER Green Communities, interview to learn more about CEE experience

Entity and Attendees	Date and Format	Extension Staff	Purpose and Outcomes
(MAPC), Kat Kobylt, Julia Nassar			with municipal use of energy storage and solar generation.
UMass Arts Extension	February 27, virtual	Breger, Strong	Discussion related to projects and funding sources to advance clean energy and climate efforts in MA arts organization.
MassCEC Offshore Wind Works Community of Practice Meeting	March 2, virtual	Strong, Breger, Dilthey	Convening of COP of MassCEC OSW workforce grant recipients and stakeholders to enhance collaborations.
Lautec, Ramy Imam, R&D Manager	March 7, virtual	Dilthey, Strong, Breger	Discussed OSW Certificate program and industry engagement opportunities with Lautec.
Leverett Energy Committee, Solar planning, Richard Nathhorst	March 9, virtual	Strong, Breger	Discussed Leverett’s solar and microgrid project concept, and state programs.
NREL InSPIRE ASTRO quarterly call	March 14, virtual	Breger, Strong	National updates and short presentation on agrivoltaics research and projects around the U.S.
Eki Agrivoltaics	March 17, virtual	Breger	Discussed agrivoltaics research, markets, and policy to start-up company from MIT/Harvard with focus on s first project in Spain.
MA Climate Chief Melissa Hoffer	March 24, in person	Breger	Invited to meet with Chief Hoffer on her UMass visit with clean energy and climate colleagues. Provided brief introduction to CEE.
Business Network for Offshore Wind, International Partnering Forum (IPF) 2023	March 27-30, in person	Dilthey, Strong	Attended IPF 2023 in Baltimore, MD to promote the UMass Offshore Wind Professional Certificate, connect with current students and alumni, and network with industry organizations.

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
Community-Informed Proactive Solar Siting Project, LBNL, Ben Hoen	February 9, virtual	Breger, with Alison Bates, Colby College	Community Planning for Solar Toolkit: Community-Informed Proactive Solar Siting and Financing in Massachusetts	Academic researchers with UC Berkeley and LBNL	8
UMass Extension, Annual Retreat	February 17, virtual	Breger, Mattison, Kraus	Participated in retreat activities and discussions	Extension faculty and staff, UMass	40
Joint USDA-DOE Workshop on Agrivoltaics	March 1 and 2, virtual	Breger	Invited participant in 2-day, workshop.	USDA and DOE managers and external researchers	60
DOE Dual-Use Research, Project Advisory Committee	March 13, virtual	Breger, Strong, Kraus, UMass Extension	Agenda of presentation updates and discussion questions with PAC to support dual-use research efforts.	Invited PAC members and research project partners	20
Citizen Planner Training Collaborative Conference	March 18, Worcester, MA	Dowling	Community Planning for Solar	Municipal planning department staff, Planning Board and other MA municipal board members	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

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, UMass worked to finalize award negotiations for funding through the U.S. DOE's competitive SolWEB grant competition. CEE's initiated its role in the project, coordinating with developers to ensure the inclusion of pollinator-friendly solar facilities in a research study of pollinator and bird ecology at solar facilities.

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. 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

Student Initials, Status	Department	Extension Staff Mentor	Project Description
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
H.C., Undergraduate	Environmental Conservation	Dowling	Senior capstone thesis regarding solar bylaws
J.G. and O.P	Environmental Conservation	Weil and Mattison	Pilot of new building inventory system for Climate Leaders program