

UMASS CLEAN ENERGY EXTENSION

Quarterly Progress Report to MA Department of Energy Resources

Period ending September 30, 2022

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This Progress Report provides a summary of work accomplished by the UMass Clean Energy Extension (CEE) during the period July 1, 2022 to September 30, 2022.

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

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

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 continued to refine research protocols and collect and analyze site soil data. Preliminary analysis of construction impacts on soil properties were conducted for two sites. Development of cost tracking tools and enterprise budget templates continued, and progress continued on a draft template was developed for site trial data collection. Work continued on the literature reviews on economic theoretical models for solar renewable energy production on agricultural land, and on existing social acceptance of renewable energy projects. A project dissemination plan was completed, and a review of the project was presented at a tour of dual-use sites. A strategic plan was prepared for project dissemination and outreach to both

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.

the research and stakeholder communities. The Project Advisory Committee held a second meeting and continued to provide feedback. A review of the project was presented at a tour of dual-use sites sponsored by AgriSolar Clearinghouse, and the project PI held two interviews with news media interested in the research project and dual-use solar generally.

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 105 requests for user support across 63 municipalities and other entities. Other key tasks for this quarter included:

- Continued adding to an internal guidance document on MEI Support protocols, common support scenarios, etc.
- Held an office hours session in September and scheduled a second one in October to provide user assistance in preparation for the upcoming Annual Report deadline.
- Published three newsletters. Topics included training and support resources, as well as helpful tips relevant to the filing of Annual Reports.
- Participated in weekly team planning meetings with DOER and OptiMiser.

Community-Informed Proactive Solar Siting and Financing

Prime Funding: NREL Solar Energy Innovation Network – Solar in Rural Communities Program

CEE 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 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*.

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 2022 program course (ECO 610 *Offshore Wind Energy: Technology, Resources, Grid Integration, and Trends*), with enrollment of 56 students (10 UMass graduate students and 46 professional continuing education students). This registration sustains the substantial growth of the program.

Marketing activities continued, including conducting a targeted e-mail campaign communicating the success of the program, posting announcements in various association newsletters, and continuing a social media campaign about the program. The program success continues to be

reflected in multiple students and alumnae securing positions in offshore wind and related fields, as well as awareness of the program spreading directly from alumni and current students.

CEE expanded industry and academic networks in the offshore wind space and continued forging relationships with industry and other workforce training programs. In addition, we continued development of strategic industry partnerships this quarter, including industry guest speaker roles and investigation of industry funding of scholarships for underrepresented populations. An internal effort was continued to establish structures for industry companies and guest instructors to help fund student diversity scholarships. Additionally, CEE continued work on the MassCEC-funded Offshore Wind Career Access Program designed to expand access to the certificate program to underrepresented and target populations, (see details in *Externally Funded Project Activities* section above).

Creating Equity in the Offshore Wind Professional Workforce

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

CEE received a grant from MassCEC to expand access to our Offshore Wind Professional Certificate Program to underrepresented and target populations, starting with BIPOC/ethnic minorities, followed by Veterans, individuals in Gateway Cities/EJCs, and indigenous populations, and women. Through its Offshore Wind Career Access Program, CEE will build capacity and a sustainable program for STEM-oriented near-term and recent graduates from 4-year college degree programs from these Priority Groups, providing tuition scholarships and non-curriculum student support, a comprehensive professional development program, development of a robust recruitment pipeline, and solutions to potential barriers for the Priority Group students. We anticipate supporting 8 participants over this two-year pilot and developing recruitment pipelines with UMass campuses, MIT, and the City University of New York (CUNY). We will also establish a framework to expand our program across other higher education institutions and Priority Groups, and leverage foundation and industry support for a sustained scholarship fund.

During this reporting period, CEE, in collaboration with contractor and workforce diversity specialist Libby DeLucia, successfully completed the second round of scholarship funding through which we brought in four new Access Scholars to the class cohort (one of whom decided to hold their acceptance until the Spring 2023 semester). We also expanded our recruitment protocol to include new organizations and networks; with our additional outreach and recruitment avenues, we successfully reached over 50 organizations involved with underrepresented students, including community programs, nonprofits, business networks, and education programs across the state. Our current cohort of scholarship awardees continued to receive support during their third and final course in the series.

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

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

CEE was awarded a grant from MassCEC to expand, broaden, and sustain our Offshore Wind Professional Certificate Program. Specifically, this grant will fund focused outreach and

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

During this reporting period MassCEC has provided UMass with a proposal contract for the funding, which remains in final review.

Municipal GHG Inventories & Net-Zero Planning

Prime Funding: Pioneer Valley Planning Commission

As part of a collaboration with PVPC, we are developing GHG inventories for 11 Massachusetts communities located in Hampshire and Hampden counties, as well as assisting with basic scoping for municipal-level net zero planning in 6 municipalities. During this reporting period, we continued to collect data and refine our methodology.

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 also continued to collect information about current and recent bird and bat research activities occurring in the Northwest Atlantic. These recommendations and information will form components of the RWSC Science Plan, which will address collaboration opportunities and research priorities regarding effects of offshore wind development on wildlife species of interest to state and federal agencies, environmental NGOs, and offshore wind developers.

Green Communities and Municipal Support

In this section, we provide updates and progress on our activities directly serving Massachusetts municipalities in coordination with the Green Communities program. These activities are funded by DOER under the scope of our ISA.

CEE provided direct support to 23 communities, including beginning to arrange in-depth projects with five communities for the 2023 Clean Energy Corps class, providing support for implementation of past recommendations, and initiating community planning for solar development 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
Amesbury	Provided new staff member with information on the 2019 progress reviews we completed with MAPC and information on UMass CEERE audits of water and wastewater treatment plants through Industrial Assessment Center program.
Amherst	Began to plan a building inventory pilot in Amherst for the Climate Leaders program.
Ashfield	Talked with Energy Committee member about GHG inventories, solar assistance, and our past audit of the highway garage. Initiated community solar planning process.
Colrain	Initiated community solar planning process.
Deerfield	Answered follow up questions about 2022 Clean Energy Corps study on former senior center building and the adjacent historic church building that was recently acquired by the town. Initiated community solar planning process.
Framingham	Continued discussion with Sustainability Coordinator, analysis of energy data and review of building information to select a facility for a Clean Energy Corps study next year.
Gill	Answered follow up questions about 2022 Clean Energy Corps study on Public Safety Complex.
Heath	Initiated community solar planning process.
Holyoke	Continued to support study of water-source heat pump proposal made by Clean Energy Corps in 2021. Assisted with city's proposal to DOE Community Geothermal grant program.
Leverett	Initiated community solar planning process.
Leyden	Initiated community solar planning process.
Medfield	Answered follow up questions about 2021 Clean Energy Corps study on proposed geothermal district energy system.
Montague	Initiated community solar planning process.
Monterey	Initiated community solar planning process.
Natick	Assisted with application to MassDEP Gap Grant program for implementation of recommendations from UMass CEERE audit of water treatment plant. Supported ongoing implementation of heat pump thermal storage project in library that was initially proposed in a 2021 Clean Energy Corps project.
New Salem	Advised Energy Committee members on HVAC system in fire station.
Newburyport	Continued discussion with Energy Advisory Committee chair about Clean Energy Corps study of city hall next year.
North Adams	Began to assist with improving operation of dysfunctional GSHP system in library.
Northfield	Initiated community solar planning process.
Orange	Began discussion with Planning Technician about doing a Clean Energy Corps study of town hall in 2023.
Sherborn	Talked with Sustainability Coordinator about possible collaborations.
Weston	Answered follow up questions and offered ongoing support for renewable district energy system proposed in 2022 Clean Energy Corps study.
Whately	Assisted Whately with evaluation of solar energy and energy storage incentives. Initiated solar planning process.

Climate Leaders

Lauren Mattison and Ben Weil continued working with DOER and OptiMiser on planning for the Climate Leaders program, including beginning development of a data collection plan for building inventories and beginning the process of hiring students to pilot the inventories 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.

Floating Offshore Wind Technology Research and Development

CEE is collaborating with the Professor Krish Sharman of the UMass Amherst College of Engineering in the research and development of a new technology designed to support enhanced performance of floating offshore wind installations. During this reporting period, technology design and testing advanced, scale prototype was deployed and tested, and intellectual property and commercialization strategies were further refined in coordination with the UMass Amherst Technology Transfer Office.

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 seven dual-use pre-determination applications and began review of one additional 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.

UMass Campus – Carbon Mitigation Planning and Sustainability Strategies

CEE has taken an active role in a set of university-wide committees that have been established by the administration to plan for the campus’ own carbon mitigation and clean energy transition, and to design and establish an integrated “Living Lab” to bring widescale multidisciplinary learning, research, and engagement of the campus community as a vital part of this energy transition. CEE, representing UMass Extension, continues to participate in phase II of the Sustainability Strategies Working Group convened by the Deans, to offer recommendations on the creation, scope, and organizational structure of a campus wide sustainability focus for teaching, research, and outreach/extension.

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
African Heritage Reparation Assembly, Town of Amherst	July 6, virtual	Breger	Discussed opportunity for solar business, and project ownership financial returns as form of reparations.
InSPIRE Summer Advisory Committee	July 12, virtual	Breger, Strong	Participated in NREL InSPIRE web meeting to discuss national activities in agrivoltaics.
DOE EERE Staff	July 14, virtual	Breger, Dowling, Strong	Discussed opportunities and challenges associated with solar siting in MA with federal agency.

Entity and Attendees	Date and Format	Extension Staff	Purpose and Outcomes
Elevate (solar equity program), Chicago, IL	July 19, phone	Breger	Caught up with Jan Gudell and discuss commonalities of work supporting solar equity.
Worcester Polytechnical Institute, NSF Solar Siting Stakeholder Working Group	July 25, July 5, virtual	Breger	Support WPI colleagues in NSF grant on solar siting challenges and opportunities in rural communities.
MDAR Grant Review	July 27, virtual	Strong	Meeting to review grant applications for MDAR's Agricultural Energy Grant program.
Valley Advocate	August 8, virtual	Breger	Interview with reporter regarding story on solar for African Heritage reparations proposal in Amherst.
DOER Solar Study Focus Group, Climable	August 16, virtual	Breger	Provided feedback to Climable on DOER Solar Study survey design.
Greenfield Recorder	September 6, virtual	Breger, Strong, Dowling	Interview with reporter on Clean Energy Extension and work on community solar planning toolkit.
Energy News Network	September 9, phone	Breger	Interview with reporter on dual use research and market activities.
Solar Forum Planning Committee	September 15, virtual	Dowling, Strong	Convened group of stakeholders/experts to discuss planning of Western Mass Solar Forum
Solomon Goldstein-Rose, consultant for Sage geothermal storage	September 22, virtual	Breger and others at UMass	Reviewed Sage geothermal storage technology and applications with UMass Carbon Zero plans.
EPRI / NY Power Authority – Agrivoltaic Feasibility Study Interview	September 26, virtual	Breger, Strong	Provided information on UMass dual-use solar research in support of EPRI and NYPA feasibility study.
University of Buffalo, NSF Informational Interview	September 28, virtual	Breger	Discuss common work in dual-use solar research and market engagement.
MassCEC Consultants – OSW Community of Practice	September 30, virtual	Breger, Strong, Dilthey	Provided thoughts on design and goals for reconvening the OSW Community of Practice.

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	July 21, virtual	Dowling	Offshore wind/wildlife data discussion	State and federal agencies, eNGOs, wind industry	50
NYSERDA Offshore Wind & Wildlife “State of the Science” Workshop	July 26-28, Tarrytown, NY	Dowling	RWSC’s work on bird/bat issues related to offshore wind	State and federal agencies, eNGOs, wind industry	200
AgriSolar Clearinghouse, Follow the Sun Tour: Massachusetts	August 10, in person tour (5 dual use locations in MA)	Breger, Strong	Hosted and kicked-off tour with presentation of dual-use activities in MA.	Regional and national stakeholders in dual-use solar.	50
RWSC Bird & Bat Subcommittee Meeting	August 25, virtual	Dowling	Offshore wind/wildlife science plan discussion	State and federal agencies, eNGOs, wind industry	50
AES/Grafton Dual-Use Solar Ribbon Cutting	September 12, Knowlton Farm, Grafton	Breger	Joined panel to offer remarks on dual-use research partnership with Grafton project.	State officials, project developers, stakeholders	100
UMass CAFE Summer Scholars Poster Session	September 14, UMass Campus Center	Breger, Dowling	Two CEE summer scholar interns presented poster on research projects	UMass faculty, administration, sponsors, and community members	150
RWSC Bird & Bat Subcommittee Meeting	September 22, virtual	Dowling	Offshore wind/wildlife science plan discussion	State and federal agencies, eNGOs, wind industry	50

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.

National Science Foundation – Planning Grant Proposal

CEE and colleagues contributed to the development of a substantial proposal for a planning grant under the NSF Regional Innovation Engine program. The proposal Northeast Carbon Zero provides a collaboration across the rural and second tier cities of New England states and New York to create a coordinated partnership in economic development and equity as we work

collaboratively on common energy transitions issues. The planning grant is led by the University of Vermont, includes academic and community organizations. The Clean Energy Extension is the lead center for UMass.

Cooler Communities, with Ener-G-Save and MassEnergize

CEE is collaborating at the invitation of Ener-G-Save in the expansion of the [Cooler Communities Program](#) – a statewide initiative dedicated to providing community-based climate, clean energy, and science education via K-12 educational curriculum in conjunction with school- and community-based events and engagements. CEE has supported the work in helping to develop a program budget, researching potential foundations and other financial supporters, and engaging with MassEnergize in a potential collaboration. During this reporting period, CEE continued to communicate with Ener-G-Save to discuss fundraising efforts, program updates, and program collaborations.

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

CEE collaborated on three concept proposals to the SolWEB FOA, all three proposals focused on evaluating the value of wildlife habitat provided by solar facilities, including a comparison of pollinator-friendly and conventional facilities in Massachusetts. No award decisions were received in this reporting period.

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 commenced 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.

CEE hosted a CAFE Summer Scholar who completed a GIS and techno/economic evaluation of solar siting along highway sound barriers. The project resulted in a technical report that was distributed to DOER, MassDOT, and Massachusetts-based Ko-Solar.

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.
J.S., Undergraduate	Environmental Conservation	Dowling	Investigating cost and time-efficient methods for wildlife surveys at solar arrays
L.D., Graduate Student	Building Construction Technology	Mattison	MEI support
E.B., Undergraduate	Urban Geography	Breger	CAFE Summer Scholar – research evaluation of solar siting opportunities along MA highway sound barriers.
H.C., Undergraduate	Environmental Conservation	Dowling	Senior capstone thesis regarding solar bylaws