

UMASS CLEAN ENERGY EXTENSION

Quarterly Progress Report to MA Department of Energy Resources

Period ending March 31, 2022

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This Progress Report provides a summary of work accomplished by the UMass Clean Energy Extension (CEE) during the period January 1, 2022 to March 31, 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>. This quarter, CEE has shared its plan with key supporters and allies in the state and university.

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, was selected for a \$1.8M research award for *Impacts of Dual-Use Solar on Crop Productivity and the Agricultural Economy in Massachusetts and Beyond*, by the U.S. Department of Energy, Solar Energy Technology Office. The research will provide outcomes to fill the significant knowledge gap regarding the impact of dual-use solar on farm productivity and economics. This knowledge is critical for the solar and agricultural sectors, and policymakers, to confidently move forward with dual-use solar deployment. This quarter, CEE and the project team conducted additional pre-construction soil sampling and continued activities on generating research hypotheses, site trial designs, and monitoring protocols, and for field research. Work progressed to establish plantings and data collection and monitoring equipment for this agricultural year. Materials were prepared for pre-

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.

site trial interviews, and work continued to obtain restricted USDA federal data. Literature reviews continued on economic theoretical models for solar renewable energy production on agricultural land, and on existing social acceptance of renewable energy projects. A Project Advisory Committee was established with a first meeting scheduled for May 2022, and a project website was published.

MassEnergyInsight Technical Support

Prime Funding: Peregrine Energy, as subcontract with DOER Green Communities

CEE continued to provide user support services to Green Communities MassEnergyInsight (MEI) users in partnership with DOER, Peregrine Energy, and OptiMiser, LLC. During this quarter, CEE successfully addressed 80 requests for user support across 65 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.
- Provided additional MEI support to Holyoke and Brookline in relation to the program review process, including replacing all Holyoke data for the baseline and latest year with monthly data, in order to allow for weather normalization calculations.
- Continued adding to internal guidance document on MEI Support protocols, common support scenarios, etc.
- Met with representatives from Eversource and Towns of Natick and Weston to gain a better understanding of special ledger bills provided for certain facilities with solar generation.
- Met with representative from City of Quincy to discuss correction bills and review the new report to identify canceled bills that need deletion.
- Drafted and sent out a user survey to query users about their usage patterns and experience, helpfulness of user support, and improvements they would like to see on the platform; reviewed user feedback to determine plan of action based on results.
- 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 and its project partners continued work under a grant with the National Renewable Energy Laboratory's (NREL) Solar Energy Innovation Network program in the category of *Solar in Rural Communities*. The project includes building a "tool kit" for towns to assess scenarios of solar build-outs, conducting interviews and surveys to assess community preferences regarding solar, and evaluating financial opportunities to retain local economic benefits.

During this quarter, final formatting was begun on documents returned from NREL after DOE review, and the project web page was updated.

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 recruited our first cohort of 3 scholarship recipients, including two self-identified people of color/ ethnic minority individuals, two residents of a gateway city, and one veteran. We engaged the recipients in individual needs assessment meetings and continued work on refining our industry partnership program, which includes priority access to our scholarship recipients for internships.

Life-Cycle GHG Analysis of Cross-Laminated Timber (CLT) for Buildings

Prime Funding: MA EEA, subcontractor New England Forestry Foundation

Over this reporting period, the New England Forestry Foundation and (NEFF) research team continued its analysis and CEE and NEFF continued planning to engage a project advisory committee.

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 evaluated existing GHG inventory tools, tested these tools with data from participating communities, and identified improvements to incorporate into our tool. We also developed a preliminary methodology and collected and collated energy use data. We worked with a student intern to develop materials addressing GHG sources not to be included in the inventory (since they represent a smaller fraction of emissions and are difficult to accurately track).

Offshore Wind & Wildlife Science & Collaboration

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

During this period, we initiated work with RWSC to provide support for their Bird & Bat Subcommittee, which will be working on developing recommendations for a Science Plan. The Plan 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 13 communities, including support for project implementation, conducting Green Communities program reviews, and working with the Clean Energy Corps class on in-depth projects in five towns.

City or Town	Technical Assistance
Barnstable	Assisted with resources for information on solar and storage.
Brookline	Continued in-depth review of MEI data and provided detailed information on questions to investigate and necessary corrections
Deerfield	Ben Weil and Clean Energy Corps visited several town buildings and began working on recommendations to restore and upgrade to high performance Deerfield’s former senior center building and the adjacent historic church building that was recently acquired by the town. Lauren Mattison arranged a meeting with energy committee representatives, school facilities staff, Ben Weil, and Eversource to discuss opportunities to improve operation of the school HVAC system that we identified on the site visit.
Gill	Ben Weil and Clean Energy Corps visited the Public Safety Complex, worked with Lauren Mattison on recommendations to reduce energy use and improve comfort and air quality, and delivered presentation to town representatives, Eversource, and DOER.
Holyoke	Continued work with Holyoke on corrections to MEI data for baseline and most recent years (detailed in MEI support section). Provided updated municipal energy profile based on corrected MEI data and other new developments. Ben Weil and Lauren Mattison met with Mayor Garcia and Director of Conservation and Sustainability Yoni Glogower to discuss municipal clean energy efforts and priorities. Continued to support study of water-source heat pump proposal made by Clean Energy Corps last spring.
Hopkinton	Lauren Mattison and Ben Weil held two meetings with Hopkinton staff to review energy use in targeted facilities and strategize approaches to reduce energy use.
Longmeadow	Ben Weil and Clean Energy Corps visited Center Elementary School and began work on analysis and recommendations to reduce energy use.
Natick	Lauren Mattison, Ben Weil and Clean Energy Corps met with Natick Sustainability Director and Facilities Director on zoom, reviewed town’s capital plan and top energy users, and began work on analysis and recommendations for several facilities.
Provincetown	Responded to inquiries from Renewable Energy Committee.
South Hadley	Met with members of Sustainability and Energy Commission to discuss municipal energy use, Green Communities program, and support offered by UMass.
Walpole	Responded to inquiries from Walpole Green committee.
Weston	Lauren Mattison, Ben Weil and Clean Energy Corps met with Weston Sustainability Coordinator and Facilities Director on zoom and began analysis of potential for renewable district energy system at the Case campus.
Worcester	Lauren Mattison and Ben Weil met with staff on zoom to advise on energy retrofits in Worcester City Hall.

Green Communities Progress Reviews

This quarter, we continued progress reviews for the Towns of Brookline and Hopkinton, as detailed in the table above.

Clean Energy Corps

This quarter, the Clean Energy Corps class worked on projects with five towns, as detailed in the table above.

Other Activities

CEE staff began working with the UMass Boston Collins Center and Central Massachusetts Regional Planning Commission on a session for their upcoming webinar series, including planning the agenda and finding a municipal representative to speak in the session.

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, and the research team was supported by an undergraduate student working under the I-Corps @ UMass Amherst program to market research and a commercialization pathway.

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 four dual-use pre-determination applications and began review of one additional application; we also completed the review of a revised application that was previously submitted.

Pollinator-Friendly Solar Certification Program

During this reporting period, we received three applications from proposed solar PV facilities for Pollinator-Friendly Certification and provided certification to one project which completed the review process. Applications have slowed considerably as developers await a decision by DPU and DOER regarding the pollinator adder. We continue 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.

Offshore Wind Energy Professional Graduate Certificate Program

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 provided the Spring 2022 program course (ECO 611 *Offshore Wind Energy: Environmental Impacts, Siting, Permitting, and Stakeholder Engagement*), with enrollment of 41 students (5 UMass graduate students and 36 professional continuing education students). This registration sustains the substantial growth of the program, which had 8 registered students last fall, 18 in the spring 2021 course, and 24 in the summer 2021 course, and 29 in the fall 2021 course.

Marketing activities continued, including conducting a targeted e-mail campaign communicating the success of the program, posting announcements in various association newsletters, and putting out multiple social media posts 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).

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 all of the UMass Extension, was also selected to participate in a 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. The working group presented its report to the Deans last fall and based on feedback received this quarter will be reconvening this spring to prepare an updated plan responsive to their input.

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
Ben Paulos, on behalf of Illinois Power Agency	January 5, virtual	Breger, Dowling	Discussed MA experience with solar incentives and access to solar for low-income individuals to inform development of Illinois Power Agency regulations and programming
USDA-DOE Inter-agency Workshop on Agrivoltaics 2022	January 10	Breger	Invited participant in joint federal agency program experts on solar and agriculture.
Pioneer Valley Planning Commission Economic Development, Dan Hodge	January 13, virtual	Breger, Strong	Met with to discuss Pioneer Valley economic development opportunities related to solar development.

Entity and Attendees	Date and Format	Extension Staff	Purpose and Outcomes
Bee Better Electric working group, Xerces Society, EPRI	January 18, virtual	Dowling	Participated in efforts to develop a bee-friendly certification for electricity generation and transmission facilities across the US
Atlantic Shores, Paul Phifer	January 19, virtual	Breger, Strong, Dilthey	Discussion concerning potential guest speaking opportunities in CEE's Offshore Wind Professional Certificate.
UMass Gloucester Marine Station, Dr. Katherine Kahl	January 27, virtual	Breger, Strong	Met with Dr. Kahl to discuss CEE-GMS collaborations related to offshore wind.
Sun Agri & ECP Solar	January 28, virtual	Breger, Strong	Met with Sun Agri, ECP Solar, and MDAR staff to discuss dual-use solar technologies and potential collaborations.
Pioneer Valley Clean Energy Climate Action Group	February 9, virtual	Breger, Dowling, Mattison	Participated in discussion amongst clean energy practitioners based in Hampshire, Hampden, and Franklin counties
UMass Boston, Collins Center	February 16, virtual	Mattison, Strong	Discussed potential areas of alignment and collaboration.
Massachusetts Municipal Association	February 16, virtual	Breger, Strong	Presented on CEE's projects and strategic plans and discussed area of potential collaboration.
Bee Better Electric working group, Xerces Society, EPRI	February 16, virtual	Dowling	Participated in efforts to develop a bee-friendly certification for electricity generation and transmission facilities across the US
UMass Lowell	February 22, virtual	Breger, DeLucia-Harting, Dilthey, Strong	Discussed areas of mutual support related to offshore wind training and solicitations.
Jo Comerford, MA Senator; Jared Freedman	February 23, and March 1, virtual	Breger, Dowling, Strong	Planning meetings for western MA solar symposium to be held in fall
EU Collective Action Models for Energy Transition and Social Innovation (COMETS)	January 25, virtual	Breger, with Michael Ash, Economics/ETI	Introduction and exchange of ideas with COMETS project principal regarding common goals and activities.
Avangrid	March 16, virtual	Breger, DeLucia-Harting, Dilthey, Strong	Discussed CEE's Offshore Wind Professional Certificate's Industry Partnership Program.
Bee Better Electric working group, Xerces Society, EPRI	March 16, virtual	Dowling	Participated in efforts to develop a bee-friendly certification for electricity generation and transmission facilities across the US
Climate Convening, UMass Extension staff	March 22, virtual	Breger, Dowling	Participated in discussion of UMass climate initiatives and opportunities for collaboration/interdisciplinary planning

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
Greenfield Recorder, Interview	January 4, virtual	Breger	Interview for article on agrivoltaics and US DOE research project	Greenfield Recorder readers	
Net Impact Club, UMass Isenberg School of Management	February 22, ISOM	Breger	Spoke to graduate student group about clean energy and policy	Graduate students	5
MACC Conference	March 8, virtual	Dowling	Solar & Conservation Planning	Municipal officials	90
Virginia Tech, Dual-use Webinar	March 24, virtual	Strong	Agriculture & Solar: Massachusetts Solar PV Dual-Use Program & Research	Agricultural and solar professionals, educators	40

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. Department of Agriculture, Rural Energy Pilot Program Grant – Letter of Intent

CEE led a regional effort to submit a Letter of Intent to USDA REPP for a \$1,685,000 proposal “Putting Solar and Equity to Work for the Local Rural Economy: Western Massachusetts Local Solar Market Development Partnership”. The project abstract is:

The Western Massachusetts Local Solar Market Development Partnership ties together strategic organizations committed to work collaboratively to pilot five 100-200 kW solar PV projects that are locally owned and directing lifetime economic benefits to rural, low-income, energy burdened, and racially diverse ratepayers. The pilot projects are in rural communities spanning the western Massachusetts region, and each community, led by its town, will establish a business model to develop, finance, and operate the project. The business development will be supported by local community development corporations, local solar co-operative and financial lenders, and local B-corporation and co-operative solar development companies. Across the regional effort, the UMass Clean Energy Extension will provide technical assistance, organizational support, and project analysis and evaluation.

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 advanced conversations with Ener-G-Save identifying funding sources, and planning 2022 community engagements.

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.

Campus as Living Lab for Carbon Mitigation. 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. The group received a \$10,000 Presidential Grant from the Davis Educational Foundation (DEF) to support this planning during the fall 2021 semester, which CEE will manage with a graduate student.

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.
L.R., Undergraduate	Business Administration in Finance, Environmental Science	Breger, Strong	Support for community solar planning financial tools and floating offshore wind technology commercialization pathway.
N.M., Undergraduate	Environmental Science	Dowling	Support for development of greenhouse gas inventory and carbon neutral planning tools
H.K., Undergraduate	Environmental Science	Dowling	Investigated challenges and opportunities regarding development of solar in transmission line ROWs