

UMASS CLEAN ENERGY EXTENSION

Quarterly Progress Report to MA Department of Energy Resources

Period ending March 31, 2020

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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, 2020 to March 31, 2020.

During this reporting period, the Clean Energy Extension continued its support of the Green Communities and SMART solar-agriculture dual-use programs, advanced efforts in support of clean heating and cooling markets, advanced development of the Offshore Wind Energy Professional Graduate Certificate, and facilitated interactions across industry, the university, and a range of research and outreach activities. Some key highlights, further discussed below for this reporting period include:

- Continued development with support from the MassCEC of the Offshore Wind Energy Professional Graduate Certificate Program in coordination with the University College of Natural Sciences (CNS) and University Without Walls. During this quarter, CEE initiated a soft launch of the program with a one-course module (*Offshore Wind Energy: Environmental Impacts, Siting, Permitting and Stakeholder Engagement*) taught by Dr. Alison Bates during the Spring 2020 semester. Development of the additional course online modules progressed, including both refinement of the curriculum and recording of online modules. In addition, CEE analyzed a market research survey (distributed in the previous quarter) targeted toward industry professionals. Feedback from this survey served to influence adjustments to the program and curriculum. The three graduate level courses, along with the Certificate Program, have been submitted to the Faculty Senate for approvals.
- 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 over 136 requests for user support across 77 municipalities and other entities. A user survey, designed last quarter, was issued and feedback analyzed, resulting in action items to improve the MEI platform and user support. In coordination with DOER, CEE also commenced planning for MEI user trainings, with strategies for adjusting the format to distance learning due to the Covid-19 situation.
- Advanced collaborations with farmers, developers, UMass Agricultural Extension, DOER, and Massachusetts Department of Agricultural Resource (MDAR) to develop tools, guidance, and a pre-determination form for those considering dual-use PV systems

under the SMART program. Over this reporting period, CEE provided reviews of two new Pre-Determination applications for dual-use agricultural STGUs, with both projects to occur on the same farm. We also participated in two dual-use site visits, covering three proposed ASTGU projects, to provide further recommendations and clarifications at proposed sites. In addition, CEE helped advance discussions relating to dual-use research needs and opportunities with industry, state policymakers, and UMass stakeholders.

- In collaboration with state solar industry partners, state agencies, non-profit organizations and UMass collaborators, CEE submitted a project concept proposal entitled *Impacts of Dual-Use Solar on Crop Productivity and the Agricultural Economy in Massachusetts and Beyond* in response to a U.S. Department of Energy solicitation. Full proposal invitations are expected to be announced in the next quarter. If awarded, this 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 solar and agricultural sectors, and policymakers, to confidently set a forward path for successful and implementable dual-use policy and development guidelines in Massachusetts and the U.S. Impacts of dual-use solar on farm agronomic and economic productivity across a broad range of farming systems and sizes.
- Working with local municipal officials, regional planning agencies, and clean transportation industry partners, CEE helped to provide outreach and coordinate applications related to the MassCEC solicitation under its Accelerating Clean Transportation Now (“ACTNow”) Program.
- CEE received approval from DOER, MassCEC, and UMass Physical Plant to direct a portion of awarded UMass ACES funding toward supporting key recommendations from CEE’s June 2019 report [Building a Massachusetts Battery Energy Storage Innovation Ecosystem](#). Specifically, CEE commenced planning for report Recommendation 1 (Create a Massachusetts BES Leadership Consortium/Steering Group) and Recommendation 2 (Convene and Facilitate BES Industry Events, Symposia, and Networking Opportunities). CEE contracted with John Fabel, who assisted in the development of the above report, to support this next phase of effort.
- CEE was invited to collaborate 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. Cooler Communities is supported in part by the Harold Grinspoon Charitable Foundation’s Ener-G-Save program, led by Uli Nagel and Stan Rosenberg.
- CEE and our Clean Energy Corps class provided direct support to 14 communities, including planning and conducting energy audits, evaluating clean energy projects, and supporting project implementation.

- CEE worked closely with DOER to plan heat pump training sessions targeted toward municipal staff and volunteers.
- CEE supported DOER by compiling and analyzing performance data for CHP systems in the APS program.
- In coordination with the Clean Cities Program, we launched our joint telematics pilot project, installing telematics software in municipal vehicles in the town of Leverett. Data collection began in early February. Two other communities are interested in participating, but are awaiting contract and funding decisions at the state level.
- CEE Director and the campus Sustainability Manager are co-chairing the Chancellor’s Carbon Mitigation Task Force charged with charting a plan for the University to rely on renewable energy and eliminate greenhouse gas emissions. Over this reporting period, the University has contracted with a consultant team, led by MEP Associates, to provide technical support and conduct a climate mitigation plan in close coordination with the Task Force. The Task Force and the consultants had a kick-off meeting in February and a second meeting in March.
- During this reporting period, we received our first two Pollinator-Friendly Certification applications. We continued to field questions and offer technical support to solar developers considering pollinator-friendly development, and discussed potential pollinator-friendly solar projects with municipal board members.
- Together with three rural Massachusetts communities and several other project partners, CEE was awarded a grant from the National Renewable Energy Laboratory’s (NREL) Solar Energy Innovation Network program in the category of *Solar in Rural Communities*. Over the next 15 months, the project team will develop a framework for community-focused solar siting and financing in rural communities. The project will demonstrate “bottom-up” solar siting processes driven by community residents and municipal officials and evaluate financing mechanisms that can keep solar benefits within the community. The project will result in actionable solar development plans for three rural Massachusetts communities along with clear protocols and templates to facilitate replication of the processes in other communities.

1. Extension Administration and Management

CEE Associate Director continues to support diversity, equity, and inclusion (DEI) efforts within CAFE and the College of Natural Resources, and helped coordinate committee planning meetings for Extension staff and faculty workshops.

DOER and CEE continued discussions and progress towards implementing a no-cost extension to the Interagency Service Agreement.

2. Public Events and Outreach Activities

During this reporting period, CEE staff and affiliates have engaged in the following public events.

Event	Date and Location	Extension Presenter/ Attendee	Presentation Title(s)	Audience	Estimated Attendance
Environmental Business Council of New England meeting with Secretary Theoharides	January 22, Boston	Mattison	N/A	Environmental professionals	100
Amherst Media – “Byline with Stan Rosenberg”	January 24, Amherst	Breger	Discussant with Stan Rosenberg on local Community Choice Aggregation effort	Public TV, local viewers	50-100
Board of Public Overseers Meeting	February 11, Shrewsbury, MA	Strong	N/A	UMass Extension staff, faculty, BOPO officials	25
DOER/MDAR ASTGU Guideline Working Group Session	February 26, Holyoke Community College	Breger	N/A	Invitees from dual-use solar, agriculture, and NGO stakeholders	15
Guest Lecture, Planning for Climate Change	March 5, UMass	Strong	GHG Inventory Principles and Practices	UMass faculty, graduate and undergraduate students	50
Integrated Science Building, Gallery Opening “Making A Difference” (Lightning Talks and Gallery exhibit/reception)	March 9, UMass	Breger, Strong, Fabel	Creating Opportunity: Building a Massachusetts Battery Energy Storage Innovation Ecosystem	UMass faculty, students and staff	60

3. Green Communities and Other State/Municipal Assistance

Community Choice Energy (Northampton, Amherst, Pelham)

CEE continues its engagement with the Western Massachusetts Community Choice Energy organizers to support the towns of Northampton, Amherst and Pelham, which have all approved the exploration of a municipal aggregation for electricity with innovative efforts to enhance strategic investments in local energy efficiency, demand reductions, and renewable generation. CEE is providing analytical support, and is participating in Task Force activities, including

project planning, developing funding proposals, and supporting research efforts. During this quarter, work continued on the consulting project scope of analyzing the feasibility and specifics of further developing and implementing the WMCCE. In addition, CEE played a lead role in drafting and distributing a Task Force draft findings report, [Report of the Inter-Municipal Task Force on Community Choice Aggregation](#). This report was shared with DOER on March 24.

Green Communities

CEE continues to assist Massachusetts cities and towns in support of the Green Communities program. During this reporting period, CEE engaged directly with 14 communities, detailed in the table below, and worked on tools and training to support communities across the state.

This quarter we began to plan training and support for the Green Community review process for which DOER awarded grants to several RPAs. This review will be based on the program review we conducted with MAPC for DOER in 2019. We will train RPAs to use the process and tools we developed to assist selected communities in evaluating their approach to energy management, understanding their energy use and effectiveness of measures implemented to date, and planning to achieve their savings goal. As a first step, we are making some enhancements to the Excel-based Green Communities Energy Analysis Tool we developed last year.

We are also continuing development of our Decision Guide for Energy Retrofits in Massachusetts Schools. This tool will help communities narrow down the appropriate options for their school buildings in advanced retrofits of heating and ventilation systems, building envelope, and installation of clean heating and cooling technologies. During this period, we made some improvements to this tool and began to test the latest draft with our Clean Energy Corps class.

CEE worked closely with DOER to plan heat pump training targeted toward municipal staff and volunteers, based on a need identified by Green Communities staff. Three sessions were planned around the state in May and June. Do to the public health crisis, we are now working to hold this training online instead.

CEE staff and affiliates have engaged with the following cities and towns in support of the Green Communities program:

City or Town	Technical Assistance
Agawam	Followed up on December discussion by reviewing past energy audits for water and sewer pumping stations and providing feedback.
Amherst	Visited two buildings (Monson Memorial Library and Pre-School/WIC office) that have building envelope issues, inefficient heating systems, and comfort issues. Working with Clean Energy Corps students on recommendations to improve efficiency and upgrade to heat pumps.
Buckland/Shelburne	Clean Energy Corps class audited the Shelburne Falls Wastewater Treatment Facility, which is located and Buckland and serves both towns. Working on analysis and reporting of recommendations.

City or Town	Technical Assistance
Concord	Arranged an audit of the wastewater treatment plant through UMass Center for Energy Efficiency and Renewable Energy's Industrial Assessment Center program, which was completed in January.
Greenfield	Provided assessment of HVAC replacement options for town yard. Specified new heat pumps for police station.
Leverett	Clean Energy Corps class audited Leverett Elementary School. Working on analysis and reporting of recommendations. Telematics units were installed in 12 municipal vehicles as part of a pilot project in collaboration with MA Clean Cities.
Methuen	Arranged a May audit of the water treatment plant through UMass Center for Energy Efficiency and Renewable Energy's Industrial Assessment Center program.
Monson	Clean Energy Corps class audited three water/sewer pumping stations. Working on analysis and reporting of recommendations.
Northampton	Clean Energy Corps class audited Smith Vocational and Agricultural High School. Working on analysis and reporting of recommendations, including a district energy system.
Northfield	Provided recommendations and analysis on HVAC upgrades for elementary school and library. Helped the town connect with Eversource for information on incentives.
Westhampton	Planned Clean Energy Corps class audit of Westhampton Elementary School, which had to be postponed indefinitely due to state of emergency.
Whately	Supporting planning to implement recommendations from last year's elementary school audit by Clean Energy Corps.
Worcester	Clean Energy Corps class audited Columbus Park Elementary School. Working on analysis and reporting of recommendations.

MassEnergyInsight

CEE continued to provide user support services to Green Communities MassEnergyInsight users in partnership with DOER, Peregrine Energy, and OptiMiser, LLC. During this quarter, CEE successfully addressed over 136 requests for user support across 77 municipalities and other entities. Other key tasks for this quarter included:

- Addressing longstanding MEI technical issues and needs for clarification that require collaboration with utilities, such as data errors caused by bill corrections, double counting of usage data, issues with net-metered accounts, improving efficiency of data requests, etc.
- Distributed the user survey designed last quarter, analyzing feedback, producing summary report.
- Based on survey analysis, identifies and prioritized action items to improve the MEI platform and user support.

- Strategized reconfiguration of MEI trainings to web-based delivery to accommodate Covid-19 restrictions.
- Participated in weekly team planning meetings with DOER and Optimiser.

Alternative Energy Portfolio Standard Analysis

CEE continued to support to DOER’s Renewable Energy division by compiling and analyzing performance data for the approximately 120 CHP systems in the APS program. This data is critical to understanding and operation of CHP systems across Massachusetts and evaluating program effectiveness.

4. Business Outreach and Support

Green Your Bottom Line in Food and Beverage Businesses

CEE continues our collaboration with UMass Lowell and other partners to promote sustainability in food and beverage processing. During this period, we began to plan a webinar series and began work on a proposal for a third round of EPA funding.

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
PVPC Affordable Access Regional Coordination Mtg	January 7, Springfield	Breger, Weil	Stakeholder kick-off of DOER funded program to support low income and affordable housing access to clean energy.
NREL InSPIRE Advisory/Working Group meeting	January 13, videoconference	Dowling, Strong	Quarterly INSPIRE meeting to discuss national dual-use solar PV projects and initiatives.
DOER Green Communities division	January 15 and February 6 conference calls, February 19 at DOER office	Mattison	Planning for heat pump training
DOER Senior Staff	January 16, Boston	Breger, Mattison, Strong, Weil, Kosanovic	Meeting to review and discuss CEE projects, initiatives, budget, long-term planning, and alignment with DOER efforts.
CESA/Renewable Thermal Alliance	January 17, videoconference	Breger, Strong	Meeting with staff from CESA, VEIC, state energy officials from NY, MA, and CT to provide feedback on draft Cost-Carbon Calculator for RH&C Technologies.
Five Colleges Energy Manager	January 17, UMass	Breger, Strong	Meeting with Michelle Smith, Five Colleges Energy Manager, to explore

Entity and Attendees	Date and Format	Extension Staff	Purpose and Outcomes
			clean energy project areas, potential collaborations and, mutual support.
BlueWave Solar	January 28, conference call	Dowling, Strong	Meeting to discuss dual-use solar PV application with staff from BlueWave Solar.
CHS Energy	January 31, videoconference	Breger, Strong	Meeting with Chris Beebe and Ben McDaniel to discuss response to Leading by Example solicitation.
Appalachian Mountain Club, EEA	February 3, Northampton	Dowling	Meeting with AMC staff and Kurt Gaertner (EEA) to discuss municipal educational needs regarding SMART and town solar bylaws, planning for webinar
UMass Lowell and Eversource	February 3, February 28, March 26, conference calls	Mattison	Food/beverage initiative
UMass Data Science for the Common Good	February 4, UMass	Breger, Strong	Meeting with Brant Chiekes of DS4CG to discuss student participation in an Appalachian Mountain Club GHG summer project.
Pioneer Valley Planning Commission, City of Northampton, Town of Amherst	February 7, videoconference	Breger, Strong	Meeting to discuss group response the MassCEC ACTNow clean transportation solicitation.
MassCEC Offshore Wind Energy Workforce Development	February 12, New Bedford	Breger, Strong	Meeting with MassCEC and other OSW workforce grant recipients to discuss formation of recipient community of practice.
DOER Renewable Energy division	February 19, DOER office	Mattison	CHP APS analysis – review of results to date and plans for future work
Hyperion Systems, LLC	February 21, Amherst	Breger	Discuss state of dual-use solar and opportunities for collaboration in DOE grant opportunity.
Ener-G-Save/Cooler Communities	February 24, Amherst	Breger, Strong	Meeting with Stan Rosenberg to explore collaboration in advancing the Cooler Communities program
Pioneer Valley Planning Commission	February 25, Springfield	Dowling	Meeting with PVPC staff and town officials to discuss solar siting and creation of new BMPs, solar model bylaw
Town of Amherst	February 26, Amherst	Dowling, Strong	Meeting with Stephanie Ciccarelli regarding town of Amherst GHG inventory plans and needs
Metropolitan Area Planning Commission	February 27, phone	Dowling, Strong	Meeting with MAPC staff to discuss new GHG inventory and carbon neutral planning tools
NREL/SEIN Project Kickoff Planning	March 2, videoconference	Breger, Strong	Meeting to discuss planning and logistics for project kickoff meeting.
MA Department of Ag Resources & BlueWave Solar	March 4, videoconference	Breger, Strong	Meeting to discuss research, projects, and collaborations related to dual-use solar PV.

Entity and Attendees	Date and Format	Extension Staff	Purpose and Outcomes
GPS Insight	March 11, phone	Dowling	Call to discuss Leverett telematics account and data collection
DOER Distributed Generation Working Group – Gerry Bingham	March 23, videoconference	Breger, Dowling, Strong	Meeting to discuss updates from the Distributed Generation Working Group and preparation for NREL solar siting grant project.
Leading by Example Pollinator Habitat Working Group	March 27, videoconference	Dowling	Meeting to discuss pollinator habitat activities around the state

5. Research Activities and UMass Clean Energy Corps

Research Activities and Funding Opportunities

CEE continued to develop the Offshore Wind Energy Professional Graduate Certificate Program in coordination with the University College of Natural Sciences (CNS) and University Without Walls. During this quarter, the first course module (*ECO 697WD - Offshore Wind Energy: Environmental Impacts, Siting, Permitting and Stakeholder Engagement*) of the three program courses commenced as a Spring 2020 pilot classroom-based offering taught by Dr. Alison Bates. The course has 20 students and began as a classroom-based course. It has now shifted to remote learning in response to Covid-19. Dr. Bates and graduate student Max Dilthey are concurrently adapting the course material to an online platform and format. Curriculum development for the second course module is also underway, as led by graduate student Josh Watson with the assistance Max Dilthey and CEE staff. The academic approval process for the program and associated courses was advanced to the department, college, and to the Faculty Senate this reporting period. CEE continued to prepare materials for program outreach and business planning to ensure a successful program launch – still planned for the Fall 2020 semester. CEE staff attended a full-day meeting with MassCEC staff, professional facilitators, and other workforce grant recipients to discuss formation of a “community of practice” in which recipients will work together to support each other’s workforce development programs.

CEE in collaboration with colleagues in Resource Economics and industry partner Sustainable Energy Advantage, LLC (SEA), is working on its Seed Grant from the UMass Institute for Social Science Research. The project is evaluating and quantifying the magnitude and recipients of the economic returns, rents, and expenditures from Massachusetts solar SREC II program. With assistance from a graduate student, CEE completed the cash flow spreadsheet model and met with SEA to review and enhance the model assumptions. The project was invited to present results to the Environmental Interest Group in the Department of Economic in April.

CEE Research Fellow Zara Dowling continues to receive funding through the James A. Walker Future of Wind and Wildlife Postdoctoral Fellowship sponsored by the American Wind Wildlife Institute, to fund research related to development of an evaluation tool analyzing risks to wildlife and wildlife habitat from wind development and climate change. She is still continuing work on other CEE projects on a part-time basis.

Together with three rural Massachusetts communities and several other project partners, CEE was awarded a grant from the National Renewable Energy Laboratory's (NREL) Solar Energy Innovation Network program in the category of *Solar in Rural Communities*. Over the next 15 months, the project team will develop a framework for community-focused solar siting and financing in rural communities. The project will demonstrate “bottom-up” solar siting processes driven by community residents and municipal officials and evaluate financing mechanisms that can keep solar benefits within the community. The project will result in actionable solar development plans for three rural Massachusetts communities along with clear protocols and templates to facilitate replication of the processes in other communities. Associated stakeholders and partners in the project include Environmental Conservation department faculty, UMassFive Federal Credit Union, Massachusetts Department of Agricultural Resources, regional planning organizations, local solar development companies, and municipalities. CEE submitted the full proposal in November.

CEE continued providing technical input to support the selection and design of a clean heating and cooling system calculator tool, in partnership with the Clean Energy States Alliance and northeast regional state energy offices. These efforts are in service of the Renewable Thermal Alliance (Yale U.) Seed Innovation Grant project: *Consumer-Facing Cost-Carbon Calculator for RH&C Technologies*.

CEE and its project partners (the Center for Energy Efficiency and Renewable Energy and the Water Innovation Network for Sustainable Small Systems, the Town of Amherst Wastewater Treatment Plant, Blue Thermo) continued to advance an innovative wastewater-source heat pump project at the Amherst WWTP that will deliver heat to the building facility. The project is has secured funding under MassCEC's Wastewater Treatment Innovative Technology Program. The project pace has slowed due to issues associated with trade and the Covid-19 crisis.

CEE in collaboration with Benjamin McDaniel, Dr. Beka Kosanovic and graduate researchers (CEERE) and Prashant Shenoy (CICS) continue to support the University Physical Plant as part of the ACES battery storage grant and installation. CEE received approval from DOER, MassCEC, and UMass Physical Plant to direct a portion of awarded UMass ACES funding toward supporting key recommendations from CEE's June 2019 [*Building a Massachusetts Battery Energy Storage Innovation Ecosystem*](#). Specifically, CEE commenced planning for report recommendation 1 (Create a Massachusetts BES Leadership Consortium/Steering Group) and recommendation 2 (Convene and Facilitate BES Industry Events, Symposia, and Networking Opportunities). CEE contracted with John Fabel, who assisted in the development of the above report, to support this next phase of effort.

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Clean Energy Corps

During this reporting period, Clean Energy Corps interns have worked on the following projects with CEE staff mentors:

- Masters of Science in Sustainability Sciences student Alexia Perides is working with CEE to evaluate the equity impacts of the Massachusetts RPS Solar Carve-Out programs.
- Clean Energy Corps member Kelsey Perry is working with CEE staff to develop an update of Pioneer Valley Planning Commission’s 2014 regional GHG Inventory. Results of this first phase of work were discussed at the March meeting of the Pioneer Valley Climate Action/ Clean Energy working group. Findings from the update will help inform a subsequent phase of work in which the inventory is re-cast with a more robust methodology and data sources.