

**Title: Clean Energy Extension****Project Leader: Dwayne Breger****Project Overview**

The transition to a clean energy economy is critical for Massachusetts to meet its greenhouse gas reduction commitments and provides an opportunity to foster new economic development in the Commonwealth. UMass Clean Energy Extension (CEE) provides a resource dedicated to reducing market barriers and accelerating the adoption of clean energy for Massachusetts cities and towns, businesses, institutions, farms, low income and other multiunit housing, and others. CEE provides technical support and advice upon request, and proactively seeks opportunities to promote clean energy projects and research initiatives focused on fostering the clean energy marketplace. Specifically, CEE focuses in the following four areas:

1. **Market Analysis & Outreach:** This activity area is focused on conducting strategic research, analysis, and reporting related to determining the characteristics, extents, and dynamics of potential Massachusetts clean energy markets. In addition, we conduct outreach and education in promising markets with the goal of developing and identifying clean energy project and strategic opportunities within those markets.
2. **Collaborative Applied Research:** This activity area is focused on supporting the UMass research mission and expanding the public knowledgebase that supports the advancement and adoption of energy efficiency and renewable energy in Massachusetts and society at-large. To that end, we actively foster applied clean energy research and development activities in three key areas: UMass faculty seed grants, university research partnerships, and industry research partnerships.
3. **Technical Assistance & Advisory Services:** This activity area is focused on providing direct assistance to our client-base as provided by CEE faculty and staff specialists. Assistance generally takes the form of information sharing, pre-feasibility and scoping studies, proposal development, funding guidance, project support services, and general consulting services. The aim of technical assistance is to maximize the quality of project conception, implementation, and impact by supporting decision-making, vendor selection, policy and financial support navigation, etc.
4. **Education & Workforce Development:** This activity area is focused on supporting the UMass educational mission, the mission of Center for Agriculture, Food and the Environment (CAFE), and the state's economic prosperity by providing workforce development and skills training opportunities to UMass students and other potential clean energy workers in the clean energy sector. The aim of this activity area is to maximize clean energy educational opportunities and expand the volume and quality of the Commonwealth's clean energy workforce to meet current and anticipated demand.

For greatest impact in advancing the Massachusetts clean energy economy, we directly serve:

- Municipal staff and officials
- State agencies and policymakers
- UMass staff, faculty, and students
- Business owners and business organizations

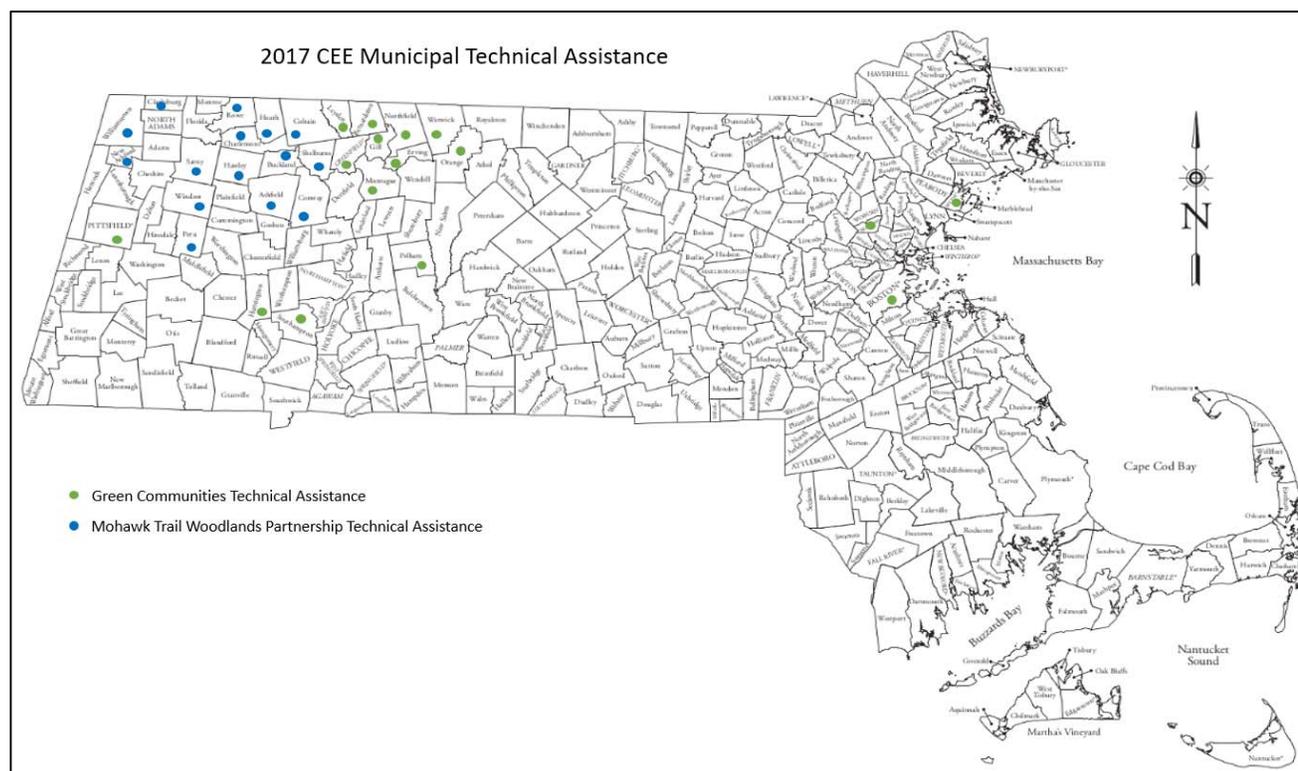
It's important to note that to avoid creating unfair advantage in the for-profit business sector, we strive to make our services equally accessible to these entities throughout the Commonwealth.

In addition to the audiences listed above, we provide clean energy outreach and information to the Commonwealth in its entirety – including the residential market – through our website, social media, fact sheets, white papers, conferences, and other outreach materials and means.

## Outputs and Impact Summary

The table below provides a summary of CEE's outputs and impacts during the 2017 calendar year.

UMass Clean Energy Extension – 2017 Program Outputs and Impact	
Metric	Output & Impact
Individuals engaged in public events and outreach	1,623 people at 32 public presentations
Communities served	29 communities served
Substantive business outreach and support engagements	34 meetings with businesses, state entities, and other organizations
External Funding	4 external funding applications (3 awarded)
Research Collaborations	15 research projects across 11 UMass departments, 7 schools, and 3 campuses
Students Engaged	30 students – undergraduate and graduate
Website and Social Media Contacts	5,899 website and social media contacts
Publications	<ul style="list-style-type: none"> <li>• 15 CEE-authored publications</li> <li>• 4 Student-authored</li> <li>• 4 Academic publications (with CEE support)</li> </ul>



## Impact Highlights

- **Advancing Commonwealth Energy Storage (ACES) Award:** With support from CEE, UMass Physical Plant was awarded \$1.14 million to install a lithium ion battery storage system in its energy supply system. CEE is written into this award as an educational and research resource.
- **Dual-use Solar PV and Agriculture:** Established collaborations with UMass Agricultural Extension, DOER, and Massachusetts Department of Agricultural Resource (MDAR) to develop tools and guidance for those considering dual-use PV systems under the forthcoming Solar Massachusetts Renewable Target (SMART) program.
- **Eureka Girls, Inc.:** CEE hosted a two half-day program with 15 teenage girls as part of the UMass engagement with the Eureka Girls Inc. of Holyoke program, July 17 and 18. On the first day the girls were provided a mini lesson on energy matters and the construction of solar “pizza box” ovens. The second day was a field trip to the Holyoke Dam generation station with HG&E and of the anaerobic digester at Barstow Farm in Hadley.
- **Green Communities:** During 2017, CEE engaged with nine communities in support of their Green Communities designation applications, annual reporting process, and general efforts to advance clean energy projects,
- **Mohawk Trails Woodlands Partnership:** We provided direct technical assistance to 15 communities through the Mohawk Trail Woodlands Partnership, a group of 21 towns in the northwest of the state, as they consider economic development opportunities based on their forest resources. The Clean Energy Extension is providing information and research to address opportunities for modern wood heating and a local energy economy.
- **Montague Energy Infrastructure Asset Report:** Led by Clean Energy Corps graduate student, Jeremy Price, CEE conducted a review and analysis of Montague’s municipal energy infrastructure. The result will aid the town in its capital planning processes and as it explores opportunities to expand its use of clean energy while reducing municipal energy consumption, greenhouse gas emissions, and operating costs. Of the project, Town Administrator Steve Ellis said, “I can only say that our experience with Clean Energy Extension staff and interns was outstanding. We enjoyed a collaborative process when developing the project scope, found the CEE team to be professional and consistent in its communication during the project, and received a final product that provides useful and clearly organized findings that we will integrate into our broader capital planning agenda. Highly recommended.”
- **Seed Grant:** CEE is funding a Seed Grant to support Professor Ezra Markowitz in Environmental Conservation to conduct research in energy efficiency decision-making in the low income sector. Work includes survey and experimentation using university-owned graduate student housing which has been instrumented with real time electric usage monitoring and remote data collection.
- **UMass Clean Energy Corps:** CEE engaged, mentored, and 30 students within the UMass Clean Energy Corps program. The Corps is a critical aspect of our efforts to help achieve both the UMass educational mission and the clean energy goals of the Commonwealth. The Corps is a student-centered initiative focused on assisting entities across the Commonwealth develop and meet their clean energy goals. The Corps spring 2017 semester course led by Dr. Ben Weil led to detailed building energy assessments and diagnostics in coordination with town officials in Pelham, Greenfield, and Erving.
- **UMass Wood Heating:** CEE engaged with the University Physical Plant Director, Sustainability Manager, and staff, to support considerations of clean wood energy use for campus thermal needs. CEE delivered our report (completed by Clean Energy Corps student Rebecca Howard) examining

opportunities for decentralized wood heating for strategic parts of campus to reduce capacity strains on the central plant and steam line expansions.

## **Total Educational contacts**

	Adult Contacts	Youth Contacts
Direct Contacts	1,809	15
Indirect Contacts (Print, Web, etc...)	5,899	

## **Collaborating Organizations**

Following is a summary of CEE's collaborating organizations during the 2017 calendar year.

### *University Collaborators*

- College of Engineering
- College of Information and Computer Sciences
- College of Natural Sciences
- Department of Environmental Conservation
- Department of Landscape Architecture and Regional Planning
- Department of Resource Economics
- Institute for Social Science Research
- Isenberg School of Management
- School of Earth and Sustainability
- School of Public Health and Health Sciences
- State University of New York, Environmental Science and Forestry
- UMass Boston
- UMass Lowell
- UMass Physical Plant

### *State, Federal and Policy Collaborators*

- Association for Environmental Health and Sciences Foundation
- Environmental Protection Agency
- Executive Office of Energy and Environmental Affairs.
- Massachusetts Clean Energy Center
- Massachusetts Department of Agricultural Resources.
- Massachusetts Department of Conservation and Recreation.
- Massachusetts Department of Energy Resources.
- Massachusetts Department of Environmental Protection
- Massachusetts Food Policy Council
- Massachusetts Forest Forum
- Massachusetts Research Partnership (MRP) Offshore Wind Energy
- NSF Research Experiences for Undergraduates
- Pioneer Valley Renewable Energy Forum
- Representative Goldstein-Rose

- USDA/National Institute of Food and Agriculture (NIFA)
- Western MA Economic Development Council

*Business/Non-Profit Collaborators*

- Berkshire Regional Planning Commission
- Biomass Thermal Energy Council
- Citizens Climate Lobby
- Climate Neutral Cities Alliance
- Environmental Business Council of New England
- Eureka/Girls, Inc.
- Franklin Regional Planning Commission
- Green Roundtable on Green Jobs
- Massachusetts Public Interest Research Group
- Mohawk Trail Woodlands Partnership
- New England Forest Foundation
- New England Women in Energy and the Environment

## Program Photos



*Girls from Eureka Girls, Inc. building solar pizza box ovens.*



*Visiting Holyoke Gas & Electric hydroelectricity facility.*



*Dwayne Bregger and Rick Peltier inside emissions monitoring truck.*



*Emissions monitoring truck deployed at Briggs Elementary School in Ashburnham, MA*



*UMass Clean Energy Corps learning blower door deployment with Professor Ben Weil.*



*UMass Clean Energy Corps analyzing Pelham, MA Town Hall with CEE engineer Chris Beebe*