Project Partner Appendix A:
CriticalMass Project Partner Opportunities

Contents

Instructions and Details

The CriticalMass Program includes a list of Project Partners for the program. This Appendix provides a series of memos from entities that are looking to work with innovative growth-stage companies during CriticalMass projects.

Review the attached responses to see if the areas of interest align with its company's capabilities. If you are interested in pursuing a partnership, develop a short (up to 1 page) concept paper. The paper should include an explanation of the type of deployment you envision with the Project Partner, and the proposed or expected role and responsibilities of the Project Partner. Consider including with its paper a 3-5 slide deck to introduce its company.

Submit its concept paper and optional deck to **BOTH** criticallmass@masscec.com **and** the relevant Project Parter contact listed below. **Please submit concept papers as early as you are able**, to allow for ample time to co-develop a project ahead of the application deadline. The last possible day for submitting a concept paper is **Wednesday, August 20th, EOD.**

You can submit general questions to criticalmass@masscec.com. Questions for a Project Partner below should be submitted only following a concept paper submission.

Please note that the Project Partners listed in Appendix A have been recruited and onboarded by MassCEC and have signed an MOU agreeing to be a Project Partner for CriticalMass. However, MassCEC will not be involved with the any contract negotiations between a Project Partner and Grantee. MassCEC makes no representations or warranties regarding, and assumes no liability arising out of the relationship between a Project Partner and Grantee. All partnerships between a Project Partner and Grantee are undertaken at Grantee's own risk.

Project Partner	**Climatetech Topics (detailed in following memos)**
Town of Andover	Technologies that can: • Address decarbonizing housing and buildings • Advance the town's mobility infrastructure • Companies interested in setting up office space or manufacturing in Andover.
Alternative Vehicle Service Group	• Fleet MHDV refueling solutions, such as hydrogen refueling station technologies.
Berkshire Innovation Center	• Advanced Optics design, testing, and manufacturing • Micro-grid and grid-scale battery storage and energy management systems

	• Solar and renewable energy hardware (e.g., embedded photovoltaics) • Electrification and grid technologies (e.g., smart circuit breakers, EV chargers)
City of Boston	Priority for resilience-related technologies, specifically related to: • Urban heat mitigation and equitable cooling access. • Climate resilience and flood resilience. • Broader range of technology that addresses resilience issues. The City is also interested in building technologies, related to: • Building retrofitting at scale, including energy efficiency, heating and cooling, and ensuring buildings are climate-ready. • Reducing embodied carbon through innovative solutions, such as sustainable concrete or reuse of building materials.
Department of Conservation and Recreation	• Medium-and heavy-duty vehicles • Insulation, electrical capacity • Solar • Road and sidewalk materials • Water quality monitoring
Energy New England	Technologies that have the potential to: • Facilitate grid modernization • Enhance energy efficiency • Enhance decarbonization, such as smart-grid solutions and advanced energy storage technologies. • Technologies that can support widespread adoption of electric heating, transportation, and industrial processes while reducing overall energy consumption and peak demand stress on the grid.
Global Partners	Innovative solutions, including: • Driving operational energy efficiency of retail locations • Recycling technologies at retail locations • Any other broader technologies that might address challenges a retailer or small grocery might face. • Products that help meet regulatory and voluntary requirements of low-carbon fuels • EV charging and infrastructure solutions
International Brotherhood of Electrical Workers-National Electrical Contractors	• Innovative solutions that improve the economic viability and ease of developing, designing, and building electrical and energy systems.

Association (IBEW-NECA) of Greater Boston	• Technologies that enhance the underlying economics and performance of electrification projects • Integrated electrical and renewable energy systems • Smart panels and switchgear • Battery energy storage systems • EV charging infrastructure • Microgrid and grid-interactive technologies • Advanced lighting controls • Energy management systems
Leading Cities	• Technology agnostic
Littleton Electric Light and Water	• LELWD has not yet specified which technologies they are interested in working with and are open to different types of technologies.
City of Malden	• Geothermal technologies
Mass General Bringham	• Solutions that significantly reduce or eliminate carbon emissions • Solutions that provide heat energy, cooling energy and electricity that displaces existing carbon intensive natural gas use • Solutions that cost less than existing grid-based and on-site alternatives. • Solutions that meet requirements for reliability and resilience • Solutions that fit within space constraints of existing urban and sub-urban buildings • Resilient solutions that include fossil fuel free heating equipment • Solutions to electrify its vehicle fleet and charging infrastructure. Open to consider hydrogen solutions for fleet decarbonization.
Massachusetts Port Authority (MassPort)	• Sustainable ground transportation technology • Construction and design technologies and techniques, specifically related to biomimicry and circular design • Carbon sequestration technology • Resiliency strategies for active industrial waterfront properties • Sustainable Aviation Fuel adoption and other aviation technologies
Massachusetts Municipal Wholesale Electric Company (MMWEC)	• Technology that addresses the effectiveness of energy efficiency measures in homes in order to best assist residents and commercial spaces in cost-effectively electrifying. • Heat Pump Performance Technologies

	• Battery Technologies • interested in hearing from other types of technology providers not listed above.
Marine Renewable Energy Coalition (MRECo)	• Ocean Renewable energy generation technologies • Technologies addressing energy conversion by tides and waves
National Grid Partners	Technologies that: • Eliminates the need for electrical panel upgrades • Performs intelligent peak shaving to smooth grid demand during charging events. • Supports grid flexibility goals through behind-the-meter energy storage and load shifting
Olin College	• Window film/treatment to reduce solar gain for comfort and perhaps to produce energy • Machine learning/AI that optimizes how buildings perform • Solutions for domestic hot water heating – heat pumps, solar thermal, etc. • Geoexchange technology – drilling, piping, heat pumps, system design • Heat recovery technologies for space heating and cooling • Sustainable pavement that prevents ice buildup • Waste management - compost, recycling, trash • Energy storage and peak demand management strategies • Sustainable construction materials and buildings • Renewable energy • Microgrid strategies, systems, or controls • LED lighting and controls • Electric fleet vehicles and charging stations • Sustainable landscaping, fertilizer, irrigation • Campus food production, indoors or outdoors • Platforms that facilitate sustainable procurement
Saint-Gobain	Technologies that tackle key challenges in material circulation, such as: • Recovery of high-value materials from composite materials • Valorizing composite waste materials into new products • Technologies that leverage electrified thermochemical processes to improve the quality and energy-efficiency of material recovery.

Shrewsbury Electric and Cable Operations	Technologies that will: • Increase the adoption of energy storage, preferably non-lithium based technology for customers that can participate in demand response or virtual power plant programs • Utility-scale applications for emissions free peak shaving • Vehicle to grid technology • Any technology that enhances the dynamic interaction between a customer and the grid, to mitigate peak demand.
TRUE Collective	• Energy Storage (Battery and Thermal) • Electric Busses Microgrid • V2G (Vehicle to Grid) Charging • Solar • Demand management (VPP)
University of Massachusetts Amherst	• Zero Waste and Resiliency Technologies: open to exploring any emerging clean/climate technologies that will contribute to its decarbonization, resiliency, and waste reduction efforts. • Decarbonizing Technologies and Materials: interested in emerging technologies that will help with its Carbon Zero goals, such as energy storage (batteries or thermal), pilot opportunities to advance enhanced deep geothermal, innovation with vehicle-to-grid (V2G), or vehicle-to-everything recharging stations and energy management, high temperature thermal storage, and advanced utility scale high temperature heat pumps. • Low embodied carbon construction materials
University of Massachusetts Boston	• Building Integrated Photo Voltaic solutions • Non-polluting insulation coating materials to improve a building's energy efficiency • Other solutions to increase the performance of a building façade • Integrated energy performance platform
University of Massachusetts Lowell Rist Institute for Sustainability and Innovation Hub	Technologies that address: • Climate change mitigation and resilience • Renewable energy • Energy storage and transition • Hydrogen – production, storage, transport • Energy storage and transition • Batteries • Urban agriculture • Wind turbine blades

	• Advanced drone usage
Woods Hole Oceanographic Institution (WHOI)	• Sensor validation and testing for climate, carbon, and energy transitions within the ocean space, • Any technology that requires ocean testing • Technology related to parameter sensing via non-destructive sampling • Autonomous vehicle design technology • Energy efficiency and energy-focused designs for ocean technology

Town of Andover

Point of Contact: Paul Materazzo, Director of Planning and Community Development, Paul.Materazzo@andoverma.us, 978-623-8651

Andover has long been regarded as a premier place to live, work, study, and visit. The town's historic character, thriving commercial and industrial districts, excellent educational opportunities, tight-knit neighborhoods, and striking natural landscapes provide advantages that have enabled Andover to establish a reputation as one of Greater Boston's most desirable communities.

The Town's use of long-term, strategic planning processes and documents, such as the recently updated Comprehensive Plan sets the high-level goals and vision for Andover's future. It does so by honoring Andover's past and reaffirming the community's core values and priorities. The articulated economic development, housing and mobility goals within the Plan should be especially important to climatetech startups during the current moment in time when there is great uncertainty around global and national policies, economic trends, real estate and demographics because a community's comprehensive plan acts as prospectus. Relevant to the CriticalMass objectives, Andover Comprehensive Plan Vision Statement states:

"As Andover progresses into the future, we envision a community that embraces economic, social and environmentally sustainable growth. We welcome new neighbors and businesses and strive to preserve and support the history and people who built the strong foundation we enjoy today. By strategically designing and connecting its historic centers, commercial districts, vibrant open spaces, and neighborhoods, we will channel vitality that secures Andover's future while preserving its greatest resources".

Problem statement and potential areas of interest:

Andover's limited diversification in its commercial and industrial districts, particularly in areas focused on specialized laboratories and manufacturing, poses challenges for repurposing older building stock. However, the Town of Andover recognizes a unique opportunity in clean technology and clean tech manufacturing to transform these spaces and address existing vacancies. By leveraging the broad scope of clean tech, the Town aims to promote these facilities as a means to mitigate the impact of cyclical development patterns and strengthen its economic resilience.

Diversify and Strengthen Andover's Economic Community

- Support a holistic economy of employment in science, technology, health care and the arts of attracting a diverse range of industries and cultures to Andover, which includes a business outreach plan, creation of incubator spaces, and removing barriers through zoning changes

Entice Employers to Andover

- Attract employers who bring a greater commercial tax base and can expand employment opportunities, which includes tax incentives to attract employers offering high wage jobs in fields such as manufacturing the technology and evaluating existing infrastructure conditions to ensure capacity for growth

Grow Green Business Initiatives

- Reduce the reliance of Andover's businesses on fossil fuels and expand environmentally friendly and sustainable practices among all Andover businesses which includes providing incentives and advocating for green manufacturing businesses to relocate to Andover, as well as partnering with local schools (and colleges) on creating internship opportunities to connect with local businesses.

Alternative Vehicle Service Group (AVSG)

Point of Contact: Scott Zepp, VP Operations, sz@avsglp.com, 603-231-1940

AVSG is a Boston-based developer of CNG alternative fueling stations. Founded in 1993, AVSG specializes in the design, construction, installation, maintenance, and management of a network of CNG fueling stations in the northeast. AVSG currently operates and maintains over a dozen full public-access CNG stations in MA, NH, and RI. In 1995, AVSG designed, built, and installed New England's largest full public-access CNG station at Logan International Airport. This station is still operational today.

Today, AVSG currently provides Fuel for over 1-million gallons diesel equivalent (DGEs) per year using CNG to the regional haul, last-mile delivery, regional transit authorities (RTAs), municipalities and refuse fleet trucking industry in the Commonwealth. AVSG also recognizes a growing societal need and commercial interest in medium and heavy-duty vehicle (MHDV) zero-emission trucking options. Yet, battery equivalents often fall short in terms of performance its clients need, and grid upgrades for fast charging represent real barriers to implementation and adoption. AVSG is seeking low-to-no carbon hydrogen fueling alternatives to complement its CNG stations to help reduce greenhouse gas, road-side emissions and diesel particulates from the difficult to electrify MHDV fleet sector that can improve local health outcomes for the Commonwealth's urban population.

Problem statement and potential areas of interest:

Recently, Massachusetts formally adopted the California Advanced Clean Truck (ACT) rule beginning this year (model year 2025 or "MY25"). This regulation requires between 7-11% of truck sales in Class 2b-3, Class 4-8, and Class 7-8 Tractors categories to be zero-emission type starting in MY25 and increasing yearly thereafter. The aim of this rule is targeted reduction in both greenhouse gas emissions and local ambient air pollution from medium and heavy-duty vehicles (MHDVs). Many of the Class 4 and larger truck fleets use diesel fuel and operate in and around urban centers. Ambient concentration of diesel fine particulates PM2.5 and its precursors like NOx have been linked to a variety of health effects in peer-reviewed epidemiological studies according to the "Massachusetts Clean Energy and Climate Plan for 2025 and 2030". Health effects can include increases in premature mortality, acute bronchitis and myocardial infarction (heart attacks), exacerbation of asthma symptoms, respiratory illnesses, and loss of workdays. However, electrification of larger Class 4 and above MHDVs using battery-only technology often under-perform in real-world operation and requires significant electrical power and demand from the grid, resulting in lengthy and costly grid infrastructure upgrades, and excessive operating charges for power. Fleet MHDV refueling

solutions which mitigate these barriers are of interest to promote the greater adoption of medium and heavy-duty zero-emission trucking in the Commonwealth.

AVSG is primarily interested in piloting hydrogen refueling station technologies within its existing CNG refueling site(s) that can be modular and scalable to meet growing demand, allowing them to offer a differentiated zero-emission tailpipe alternative for its fleet client base. Using hydrogen, ZEMHDVs using fuel-cell engine platforms are better suited for its customers' operations which require fast-filling, longer range and/or heavier vehicle duty profiles while also providing better resilience against the colder climate and hilly terrain found in its region compared to BEV with battery charging.

Berkshire Innovation Center

Point of Contact: Ben Sonse, Executive Director | ben@the-bic.org | 917-628-0483

The Berkshire Innovation Center (BIC) was established as an independent 501(c)(3) in 2014, with a vision of bridging industry, academia, and governmental partners together to spur regional economic development in the innovation economy. BIC headquarters opened in 2020 at the William Stanley Business Park in Pittsfield, on a brownfield site formerly home to General Electric's Plastics Division. This location is a daily reminder of the importance of investment in the climatetech industry, and the impact a strong manufacturing sector has on its region.

The BIC supports climatetech startups through our three core pillars:

Learning: providing access to human skills training and educational programming to support entrepreneurs, engineers, technicians, and other talent driving regional firms.

Technology: providing access to advanced equipment, technical training, SBIR & STTR research support, design & engineering services, office, and shared & exclusive use lab space.

Community: convening researchers, entrepreneurs, investors and stakeholders to promulgate our local expertise in advanced manufacturing and the development of critical supply chains.

Problem statement and potential areas of interest:

Western Massachusetts is a rural region with a legacy of sophisticated manufacturing. Despite the expertise and industrial capacity of our manufacturing base, there has been a lack of climatetech manufacturing support infrastructure in Western MA that bridges the gap between R&D and commercial deployment. These problem areas are of particular interest to the BIC:

- Grid scale solutions to decarbonize energy generation, storage and distribution, especially to support climate justice in low-income regions and/or propel development & manufacturing of cleantech HW powered by a cost-effective and clean microgrid.
- "Fishbowl Deployments" – As a tight-knit region, pilot studies can be conducted with less outside influence, helping firms collect better data sooner.
- Sustainable materials and circular economy – development of high-performance materials that meet the needs of our manufacturing base with reduced cost to the environment.
- Climatetech hardware startups facing challenges accessing advanced prototyping, electronics, and testing equipment. Hardware is hard – the BIC's in-house expertise, facilities, and network of contract manufacturers can make it easier.

These challenges align closely with the barriers identified by MassCEC, including the difficulty startups face in connecting with demonstration partners, navigating deployment risk, and acquiring market traction beyond TRL 8.

The BIC's interest in a wide range of climatetech technologies and industries reflects the diversity of both the established manufacturing base in Western MA, and of the startups the BIC has engaged with to date. The BIC has actively supported firms, sought out interested parties, and convened stakeholders for the development and/or deployment of:

- Advanced Optics design, testing, and manufacturing
- Micro-grid and grid-scale battery storage and energy management systems
- Solar and renewable energy hardware (e.g., embedded photovoltaics)
- Electrification and grid technologies (e.g., smart circuit breakers, EV chargers)
- Robotics and advanced manufacturing
- Environmental remediation and water treatment

City of Boston

Point of Contact: Abigail Menendez, Climate Technology Strategist
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The City of Boston is advancing bold climate goals that require transforming the systems that power, move and protect its communities. These goals include: (i) reducing community-wide carbon emissions by 50% in 2030 and 100% in 2050, (ii) reducing municipal emissions by 60% in 2030 and 100% in 2050, (iii) implementing coastal resilience and adaptation projects to close all

near-term pathways, (iv) reducing localized temperatures and increasing access to cooling resources, and (v) reducing disruption and damage from severe precipitation.

Problem statement and potential areas of interest:

Resilience Technologies:

Urban Heat: Over the past decade, the City has seen a rise in temperatures by almost 3.5°F, with more hot days and nights than any decade in the last 50 years. Heat-absorbing surfaces like asphalt, pavement, and dark roofs make Boston's urban environment hotter than surrounding areas, with some neighborhoods 15 to 20 degrees hotter. As the intensity, duration, and frequency of extreme heat events increases, solutions for urban heat mitigation and equitable cooling are needed. Specific needs include:

- Near-term urban heat island interventions, such as materials that can help cool the built environment, e.g., reflective pavements, cool roofs, etc.
- Tools that collect, analyze and/or present temperature data to inform planning, establish baseline conditions, and track the effectiveness of cooling interventions.
- Methods to quantify the full impact of heat waves including health, infrastructure, and equity to support robust cost-benefit analyses.

Coastal and Inland Flooding: The City is also focused on increasing resilience to coastal and inland flooding. The proportion of stronger storms and the intensity of daily precipitation with all storm types are projected to increase over the course of this century. Flood projections are expected to be more intense near the coastline, where rising sea levels and flooding events threaten coastal infrastructure, drinking water supplies, and other natural resources. They have identified several priority areas for innovation:

- Refining coastal forecasting and modeling, including by expanding the City's collection and incorporation of sensor data.
- Engaging residents in planning, supported by interactive visualization tools and participatory platforms.
- Lowering the cost and timelines to build solutions, e.g., through new materials, construction methods, etc.
- Improving the maintenance of nature-based infrastructure such as green roofs, living seawalls, and permeable surfaces, which face both technical and funding challenges.
- Maximizing co-benefits of resilience investments to deliver a broader range of benefits, e.g., living seawalls.
- Addressing water quality issues caused by flooding and storm surges.

Building Technologies:

The City has implemented the Building Emissions Reduction and Disclosure Ordinance (BERDO), which requires large buildings to comply with building emissions standards that decrease over time, with all buildings expected to reach net-zero by 2050. The City's zoning code was recently updated to include the Net Zero Carbon Zoning amendment, establishing a net zero emissions standard for new project filings after July 1, 2025. Small and large projects as defined in Article 80 will also be required to report on embodied carbon, while large projects must also conduct an embodied CO2e emissions life cycle assessment analysis. Specific areas of needs for building innovation include:

- Reducing embodied carbon through innovative solutions, such as sustainable concrete or reuse of building materials.
- Reducing the technical and financial challenges to retrofitting at scale, particularly in a larger, older building stock and when assessing how to incorporate resilience features during retrofit.
- Lowering the high construction and materials costs when retrofitting affordable housing and municipal buildings.

Massachusetts Department of Conservation and Recreation (DCR)

Point of Contact: Ryan Kingston, Decarbonization Program Manager, Ryan.C.Kingston@mass.gov

Now the ninth largest state park system in the nation, the Massachusetts Department of Conservation and Recreation (DCR) proudly manages 500,000 acres of diverse land consisting of parks, forests, beaches, lakes, ponds, water supply protection lands, playgrounds, swimming pools, skating rinks, trails and parkways. The DCR's mission across all its properties is "To protect, promote and enhance its common wealth of natural, cultural, and recreational resources for the well-being of all."

Problem statement and potential areas of interest:

Executive Order 594 (EO594) directs state agencies to reduce emissions from onsite fossil fuels by 95% by 2050. Goals and targets of this Order include the conversion to an all-electric fleet by 2050, reduce fuel oil use by 95% by 2030, and deploy 500 EV charging stations at state facilities by 2030. DCR ranks 13th out of 50 state entities in terms of emissions from onsite fossil fuels (Scope 1 emissions), 4th in fuel oil use (~190,000 gallons in FY24), 2nd in fleet size (~800 vehicles), and 1st in overall number of buildings (1,492 structures). As the steward of over 500,000 acres of land, maintainer of hundreds of miles of roadways and trails, and overseer of dozens of recreational facilities including pools and ice rinks, DCR has a significant opportunity to lead the transition away from fossil fuels for heating, transportation, and operational needs.

DCR is interested in exploring innovative technologies that will help its facilities, vehicles, and equipment operate without the need for fossil fuels. These technologies should support DCR's unique needs as a parks and recreation agency, without sacrificing critical areas of operation. A few examples of topic areas, challenges, and potential technologies are listed below.

- **Medium- and heavy-duty vehicles.** About half of DCR's fleet is medium-duty and larger, and includes trucks used for plowing parkways and sidewalks, forest fire response vehicles, garbage trucks, and more. Retrofitting these vehicles to run on alternative fuels (e.g., biodiesel or renewable diesel) may be of interest, or utilizing new fossil-fuel free equipment for snow management or other needs may be appropriate.
- **Building electrical capacity.** As DCR facilities transition to air-source heat pumps and add EV charging stations, many remote sites, particularly in Central and Western Mass, do not have sufficient electrical capacity. Innovative technologies that support decarbonization on limited electrical capacity could be of interest.

- **Insulation, weatherization, and thermal efficiency.** DCR owns and maintains hundreds of buildings of various typologies, from small office buildings to large maintenance facilities and ice rinks. Many structures are historic, limiting the agency's ability to conduct work on the building exterior, while other buildings lack large enough cavities for standard wall insulation. Concrete block walls, particularly in buildings heated by air-source heat pumps, are also difficult to insulate. Innovative technologies that can improve building envelope tightness and overall efficiency of renewable thermal systems like air-source heat pumps are of interest.
- **Solar.** While DCR has no formal targets for solar PV deployment, the agency is looking to deploy solar rooftops and parking lot canopies where cost effective and appropriate. Due to land use restrictions related to Article 97, DCR must own and maintain these systems, rather than procuring third-party ownership models such as Power Purchase Agreements. The agency would be interested in innovative, low-cost, and modular solar PV systems that can reduce electricity costs, support off-grid applications, and advance the Commonwealth's broader grid decarbonization goals. These might include thin, flexible solar PV systems, walkable and drivable surfaces, off-grid and battery-integrated systems, lightweight systems for any rooftop, and low-profile systems to reduce visual impacts, for example.
- **Road and sidewalk materials.** DCR does not currently have an embodied carbon reduction strategy, but its materials and testing lab has worked to implement sustainable road materials where appropriate. As the steward of hundreds of miles of parking lots, roads, and sidewalks, DCR may be interested in piloting low-carbon or other sustainable road materials as well as materials that help reduce flood risk and/or the urban heat island effect.
- **Landscaping.** DCR's properties are managed by a large fleet of mowers, handheld equipment, and utility vehicles. Parks across the state are transitioning to battery-powered equipment. Various sites may be apt to pilot new equipment for general landscaping needs.
- **Water quality monitoring.** DCR monitors drinking water quality in the Quabbin and Wachusett reservoir and swimming water quality across lakes, ponds, and coastal beaches. Remote monitoring technologies, data management systems, and information- sharing portals may support these efforts.
- **Portable saw mills.** DCR's wood utilization programs work to find the highest and best use for wood products across the state. When trees are removed as hazards or for sustainable forest management, staff rely on portable mills powered by fossil fuels. Staff is interested in exploring clean options, such as those powered by large-capacity batteries or alternative fuels.
- **Snow management.** In addition to equipment needs referenced above for medium- and heavy-duty vehicles, DCR parks are interested in reducing the use of salt and

snow melt for snow and ice management. Innovative technologies and materials to support snow management would be of interest.

- **Other Clean Tech/Off Grid solutions.** DCR manages and maintains many buildings and equipment across the Boston Harbor Islands. George's Island is one of the largest fossil fuel consumers in DCR's portfolio in large part because it is off-grid and relies heavily on generators to meet summer power demand. The facility is increasingly moving towards solar PV + battery energy storage solutions, but additional power will be needed to eventually move towards net zero. This location may be a good candidate for innovative technologies like tidal and wave power, micro wind, high density batteries, and other clean energy technologies. Other locations, particularly those in the Berkshires, often lose power in the winter and rely on generators for backup. Clean energy technologies such as multi- day battery storage would be of interest.

Energy New England

Point of Contact: Noel Chambers, CEM, CMVP, CDSM Director, Energy Efficiency and Electrification (508) 698-1233, nchambers@ene.org

Energy New England, LLC (ENE), is a municipal energy cooperative serving approximately 40
Municipal Light Plants and Rural Electric Cooperatives across Connecticut, Massachusetts, Rhode Island, and Vermont. ENE provides a comprehensive suite of services, including wholesale power supply and hedging strategies, distributed energy sources bidding and scheduling, legislative and regulatory advocacy, transportation electrification initiatives, and energy efficiency and
conservation programs for both residential and commercial sectors. Its mission is to support municipal utilities and their communities in delivering reliable, cost-effective, and sustainable energy solution.

Problem statement and potential areas of interest:

ENE is committed to advancing the clean energy transition by supporting innovative technologies that address the challenges of energy efficiency, electrification, and grid modernization. One key area of focus is enhancing the ability of municipal utilities to integrate renewable energy sources while maintaining grid reliability and affordability. Many of its municipal utility partners face challenges in managing the variability of renewable generation, and ENE is interested in solutions
that optimize grid resilience through energy storage, demand response, and smart grid innovations. Additionally, as electrification accelerates, ENE is seeking technologies that can support widespread adoption of electric heating, transportation, and industrial processes while reducing overall energy consumption and peak demand stress on the grid.

ENE is particularly interested in technologies that facilitate grid modernization, energy efficiency, and decarbonization. Smart grid solutions, such as AI-driven demand response systems, could significantly improve grid flexibility and efficiency by enabling real-time adjustments to energy consumption patterns. Advanced energy storage technologies, including long-duration battery systems and virtual power plants, have the potential to help municipal utilities manage renewable energy intermittency while enhancing reliability. Additionally, as municipalities and businesses look to electrify transportation, ENE is interested in innovations in electric vehicle (EV) charging
infrastructure, including vehicle-to-grid (V2G) technology that allows bidirectional energy flow. Other areas of interest include networked geothermal heating, next-generation heat pumps, and AI- powered energy monitoring tools that optimize energy use in residential and commercial buildings.

Global Partners

Point of Contact: James Cater, Senior Director and Sustainability Strategy and Innovation, James.Cater@globalp.com

Based in Waltham, MA, Global has been a leading energy provider in the Northeast for over 75 years. Today, Global owns, controls, or has access to one of the largest terminal networks in New England and New York. Global Partners sources and transports petroleum products and renewable fuels through its vertically integrated, adaptive distribution network across the U.S. and Canada. In addition, Global Partners is a leading wholesale distributor of petroleum products in New England and New York. Through its network, approximately 1M automobile tanks are filled per day. Customers stop at one of its gasoline stations to fill their tanks, recharge their vehicle, enjoy a fresh cup of coffee, or grab a snack.

Problem statement and potential areas of interest:

Based in Waltham, MA, Global Partners LP ("Global") has been fueling the Northeast for over 90 years. As one of the largest integrated owners, suppliers, and operators of liquid energy terminals, fueling locations, and convenience destinations, Global plays a critical role in both the wholesale and retail energy landscape.

Through its expansive terminal network—one of the largest in New England and New York—Global sources and transports petroleum products and renewable fuels across the U.S. and Canada using an integrated, highly reliable supply chain. As a leading wholesale distributor, Global helps fill nearly one million tanks a day, supplying gasoline and diesel to gas stations, commercial fleets, municipalities, and resellers.

At the same time, Global brings energy to life at the retail level where guests can fuel up, recharge, grab a fresh coffee, or pick up a snack—whatever keeps them moving.

Problem statement and potential areas of interest:

1. **Retail**

With a strong retail presence across Massachusetts, Global is focused on creating meaningful guest experiences and supporting the Commonwealth's sustainability efforts. Global Partners is currently exploring how to make specific pieces of their retail portfolio more energy efficient. Upgrading refrigeration, HVAC, and smart lighting systems are typically complex projects that can be costly. Global is interested in innovative solutions that drive operational efficiency and reduce costs. This could include utilizing greenspace or rooftops for solar canopies, green roofs, or other sustainable infrastructure.

Global has also recognized an opportunity to divert landfill bound waste by offering collection bins at its retail locations. With thousands of guests stopping by every day, these sites are well-positioned to serve as accessible drop-off points for non-traditional items, giving these materials

a second life. Currently, Global offers textile recycling collection bins at some locations, and is actively exploring similar initiatives.

On a broader scale, Global is interested in solutions that address everyday operational challenges faced by retailers and small format grocers, particularly those that enhance sustainability, efficiency, or guest satisfaction.

2. Low Carbon Fuels

As Global expands its portfolio of low-carbon fuels, they have identified a significant gap in the availability of truly transformative, low-carbon, liquid fuels in the Northeast market. While reduced carbon liquid fuels do exist, there is an increasing demand for liquid fuel products for difficult-to-abate-sector use, with even greater emissions reductions, compared to traditional petroleum-based refined products. The problem is especially acute in gasoline, aviation, and maritime fuel markets as these markets are expected to rely on liquid fuels for decades but lack commercially viable alternatives.

Global Partners is seeking new to market, niche, products to help meet emerging regulatory and voluntary requirements. Today, most low-carbon fuel production is geared toward the West Coast, drawn by market incentives and mature infrastructure. The Northeast, by comparison, lacks regional production and supportive tax incentives—despite having feedstock advantages like woody biomass and waterborne logistics. While tax credits such as 45Z do exist, they require the fuel to be domestic, which complicates logistics due to absence of low carbon fuel production in the Northeast that has imported more product than other regions due to its waterborne efficiencies. With the right partners, R&D, and supply chain innovation, Global Partners seeks to shift more production east, taking advantage of local feedstocks, using their infrastructure to support commercialization, improving access to renewable fuels throughout the region.

3. EV Charging

With the need for electric vehicle (EV) charging growing and investment in EV charging infrastructure increasing across its retail footprint, Global is noticing high deployment costs, high utility fees, and longer than usual lead time for essential equipment.

As Massachusetts and other states push for higher adoption rates of zero-emission vehicles (ZEVs), Global is looking to streamline the charger deployment process to create a more commercially viable experience. Reducing the complexity, lead-times, and high cost of the deployment process would allow Global to scale its deployments faster. This will help to expand access and drive adoption in the market. Once chargers are in place, Global seeks to improve the guest experience, whether that's through site design, services, or integrated technology.

IBEW-NECA of Greater Boston

Point of Contact: Ramsay Stevens, Clean Energy Advisor, ramsay@PDPLatform.com, 561-373-9501

As the organized high-road electrical industry of Greater Boston, its members are critical linchpins in achieving the equitable clean energy transition its economy and communities need. IBEW-NECA is fully committed to delivering best-in-class training to apprentices

and journeyperson electricians and technicians through its world-class Joint Apprenticeship Training Center. In addition, IBEW-NECA provide a top-tier education programs for its signatory contractors, consistently seeking to introduce new technologies and business practices that can drive innovation and improve project delivery.

Problem statement and potential areas of interest:

1. IBEW-NECA needs better solutions for identifying, analyzing, and prioritizing potential clean energy projects to efficiently target business opportunities.
2. IBEW-NECA needs more advanced solutions for streamlining the design, engineering, and construction phases of clean energy projects to enhance competitiveness and reduce overall project timelines and costs.
3. IBEW-NECA needs improved technologies and strategies to support contractors and developers in effectively proposing, marketing, and securing clean energy projects.

IBEW-NECA is currently deploying a range of clean energy technologies and are particularly interested in innovative solutions that improve both the economic viability and ease of developing, designing, and building electrical and energy systems. IBEW-NECA is especially excited by technologies that enhance the underlying economics and performance of electrification projects. Priority areas include integrated electrical and renewable energy systems, smart panels and switchgear, battery energy storage systems (BESS), EV charging infrastructure, microgrid and grid-interactive technologies, advanced lighting and controls, and energy management systems. These innovations align with its core electrical expertise and play a critical role in scaling clean energy infrastructure across its communities.

Leading Cities

Point of Contact: Michael Lake, CEO and President, m.lake@leadingcities.org **|** +1 617-506-3499

Headquartered in Boston, Leading Cities is a global nonprofit dedicated to urban sustainability, resilience, and climate action. By fostering partnerships between cities, startups, and industry leaders, Leading Cities bridges the gap between emerging technologies and real-world deployment. As urban areas drive sustainability efforts, Leading Cities empowers cities with scalable, smart solutions through innovation, collaboration, and resilience-focused strategies to shape a more sustainable future.

Problem statement and potential areas of interest:

Municipalities often face barriers such as limited staff capacity, risk aversion, outdated procurement processes, and difficulty identifying trusted, high-impact solutions. Even when motivated to act on climate, cities struggle to evaluate emerging technologies, secure funding, and implement pilots efficiently—especially in small to mid-sized communities. Leading Cities overcomes these challenges and turns companies' innovation breakthroughs into a revenue-generating, cost-saving, community-transforming reality for municipalities across Massachusetts. Whether the company is a seed-stage startup or scaling solution, Leading Cities offers the ability to pilot, validate, and expand climatetech innovation in real communities through: (1) unmatched access to municipal partners, (2) structured support from project ideation to implementation, and (3) a track record of turning great technologies into city-adopted solutions.

- **Deep Municipal Access** – Leading Cities offers direct introductions to 287 cities and towns statewide, from Boston to the Berkshires.
- **End-to-End Guidance** – Through its virtual incubator, LaunchPad 11, Leading Cities provide acceleration, pilot design, procurement support, and PPP coaching so a companies team glides past red tape.
- **Technology-Agnostic, Impact-Focused** – It does not matter whether a startup is hardware or software, Leading Cities focuses only about the measurable values such as revenue for local governments, operational savings, and societal benefits.

Wide-Ranging Solutions Leading Cities Deploys *(If a technology doesn't fit neatly in one of these boxes, that is not a problem—its city partners relish breakthrough ideas.)*

Domain	Example Solution Types
Energy & Electricity	Microgrids, long-duration storage, AI-driven demand response, wave & tidal generation, biogas optimization hardware
Buildings & Infrastructure	Low-voltage DC smart-building systems, heat-pump orchestration platforms, carbon-negative concrete additives, predictive maintenance IoT
Mobility & Transportation	Curbside EV chargers, smart curb/parking orchestration software, AI traffic-flow analytics, electric micromobility hubs
Manufacturing & Industry	Circular-economy plastics reprocessors, waste-to-value molecular rematerialization units, low-carbon industrial heat systems

Agriculture & Water	Nature-based filtration units, precision-irrigation AI, gravity-fed rainwater harvesting kits, nutrient-cycling waste solutions
Resilience & Adaptation	Satellite-driven environmental risk analytics, drought-proof turf seed, flood-forecasting sensor networks

Real-World Impact

- **Boston – EV Charging at Speed:** An EV-charging startup that deploys curbside units in under three days per site, creating a new revenue stream for property owners and accelerating Boston's net-zero transportation goals.
- **New Bedford – Smart Parking Optimization:** A data-integration startup consolidated every meter and garage into one live app, cutting congestion and boosting parking revenue.
- **New Bedford and Lowell – Environmental Intelligence for Resilience:** An environmental analytics startup that delivers satellite-driven flood risk assessments and resilience data platforms, equipping city leaders with actionable insights to better prepare for extreme weather events and protect vulnerable infrastructure.

Littleton Electric Light and Water Departments

Point of Contact: David Ketchen, Assistant General Manager, dketchen@lelwd.com, 978-540-2254

With over 113 years of experience successfully managing and maintaining municipal electric systems in Massachusetts, LELWD is exceptionally positioned to be a trusted and competent project partner. LELWD strives to provide reliable, safe, and efficient electric service to the residents and businesses of Littleton and Boxborough. This will always remain the top priority of LELWD and its team's extensive knowledge, commitment to service excellence, and proven track record.

Problem statement and potential areas of interest:

LELWD is committed to managing a power supply portfolio that complies with the Municipal Lighting Plant Greenhouse Gas Emission Standard ("MLP-GGES") (M.G.L. c. 25A, § 11F3/4), while still providing its ratepayers with the lowest possible cost. LELWD also recognizes that reductions in carbon emissions through non-power supply portfolio measures (through enhanced energy efficiency measures, promotion of energy efficient products such as electric vehicles, and rate design) are important contributors to future planning. LELWD will analyze new technologies to achieve the emissions reduction goals and to reduce LELWD's overall power supply expenses.

Technical barriers that LELWD is facing currently include finding the right balance between supply and demand on different distribution circuits throughout its system. LELWD has installed various generation sources throughout the system and to continue to do so LELWD needs to strategically place new generation within the system that does not cause reverse power back into onto the transmission grid.

LELWD is strategically positioning itself to meet the emissions standards as stated in the Clean Energy and Climate Plan for 2050. While LELWD works towards meeting these goals, LELWD is constantly searching for new ways to decarbonize. LELWD believes that the CriticalMass program provides a way to explore new and improved technologies that can help it meet its decarbonization goals while still providing reliable, safe, and efficient electric service to its customers.

City of Malden

Point of Contact: Rebekah McPheeters, Sustainability & Grants Manager, rmcpheeters@cityofmalden.org, 781-324-5720 x5736

Problem statement and potential areas of interest:

Massachusetts state policy requires that greenhouse gas (GHG) emissions be reduced to net zero by 2050. In the City of Malden, the building sector produces well over half of its greenhouse gas emissions, primarily through heating and power supply. Therefore, Malden is seeking ways to transition all of its building stock—residential, commercial, and municipal properties alike—off of natural gas. In particular, the City would like to explore "whole neighborhood approaches," like neighborhood-scale networked geothermal.

Ideally, Malden would like to partner with a climate tech start-up that could conduct a feasibility study to evaluate the potential for networked geothermal in Malden and potentially even implement a pilot geothermal solution for one of its municipal buildings.

Mass General Bringham

Point of Contact: Dennis Villanueva, Director of Utilities, Energy Strategy & Procurement, dvillanueva@mgb.org, (857) 282-2326

As a healthcare organization committed to sustainability and innovation, Mass General Brigham (MGB) is eager to explore opportunities for decarbonizing its hospital facilities through the adoption of advanced technologies. Its dedication to reducing its carbon footprint aligns with the objectives of the CriticalMass program, and MGB looks forward to the potential collaboration that will help it achieve its environmental and operational goals.

Founded by some of the oldest and most prestigious hospitals in the world, MGB encompasses a range of health care organizations. With two of the world's best known academic medical centers—Massachusetts General Hospital and Brigham and Women's Hospital— its system features renowned specialty hospitals, community hospitals, a leading rehabilitation network, health insurance plan and physician network, a teaching organization and numerous locations for urgent and community care and care at home. The system is comprised of over 23 million square feet of space across 600+ buildings. MGB is the state's largest employer with a workforce of more than 80,000 people across its network of hospitals and academic medical centers.

MGB recognizes that climate change is one of the greatest public health challenges of its time. As an integrated academic healthcare system, MGB is committed to reducing its environmental impact while continuing to provide world-class patient care. Its leadership in decarbonization reflects a deep responsibility to its patients, its communities, and future generations. By prioritizing energy efficiency, clean electricity procurement, and the deployment of new clean energy assets, MGB is setting a new standard for sustainable healthcare operations. you can find more in its Sustainability Impact Report.

Problem statement and potential areas of interest:

The health care sector is responsible for approximately 8.5 percent of carbon emissions in the United States. MGB is committed to reducing its carbon footprint and enhancing energy efficiency and lowering emissions. When it comes to sustainability, the health care industry faces particular challenges. Unlike most businesses, hospitals are open and operating 24/7, with significant power required to run medical equipment, air handling systems, sterilization processing units, refrigeration facilities, laboratories and complex technology around the clock. Identifying and implementing ways to reduce a hospital's carbon footprint, decrease the amount of waste sent to landfills and adopt environmentally responsible practices demands a collective and coordinated hospital-wide effort. The sector faces challenges such as

- High Upfront Costs: Transitioning to electrified systems—such as replacing gas-powered heating with electric heat pumps or upgrading to energy-efficient electrical grids—requires substantial capital investment.
- Infrastructure Limitations: Many of its legacy facilities rely on aging electrical systems that aren't equipped to handle the increased load from full electrification. Upgrading transformers, wiring, and grid connections to support technologies like electric HVAC systems can be logistically complex and expensive. Building electrification must be developed in tandem with external utility capacity upgrades and grid modernization to be able to handle new grid dynamics.

- Energy Reliability Concerns: Hospitals need uninterrupted power for critical operations. Electrification increases dependence on the grid, and at existing facilities with unreliable electric services or frequent outages, this poses a risk. Backup systems (e.g., diesel generators) undermine decarbonization goals, yet alternatives like battery storage are still costly and less proven at scale.
- Regulatory and Policy Gaps: Inconsistent government incentives, overlapping and conflicting codes, slow permitting processes, or lack of clear standards for healthcare facilities will stall progress. It is difficult to invest without assured long-term support or alignment with changing regulatory policies and incentives

In general, MGB is interested in deploying solutions that have the following characteristics:

- Solutions that significantly reduce or eliminate carbon emissions.
- Solutions that provide heat energy, cooling energy and electricity that displaces existing carbon intensive natural gas use.
- Solutions that cost less than existing grid-based and on-site alternatives.
- Solutions that meet requirements for reliability and resilience; and
- Solutions that fit within space constraints of existing urban and sub-urban buildings.

To achieve deeper decarbonization, MGB will need to address lowering emissions from thermal systems that operate with fossil fuels. These systems largely satisfy heating and process loads, and often also provide backup and resiliency. MGB is interested in resilient solutions that include fossil fuel free heating energy sources and equipment such as highly efficient and compact air-source and/or ground-source heat pumps, highly efficient and compact heat recovery systems, including heat recovery chillers and advanced heat exchangers; energy storage systems -electric and thermal, smart microgrid systems, including fuel cells and CHP that can be fed zero or low carbon fuels, such as hydrogen generated with renewable energy, or as an output from a carbon capture technology, or similar process that results in zero to low

carbon hydrogen feed. Additionally, MGB would be interested in advanced micro-turbines that can generate with waste heat streams.

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MGB is also interested in solutions to electrify its vehicle fleet and its charging infrastructure. MGB is also interested in technologies or alternatives that reduce the impact of emissions from refrigerants and anesthetic gases.

MassPort

Point of Contact: Meghan Casey, Project Manager, Real Estate and Asset Management, mcasey@massport.com | 617-568-1092

Massport is an independent public authority dedicated to connecting Massachusetts and New England to the world safely, securely, and efficiently. Massport operates three main business lines that are essential to the region's connectivity and economic vitality. Aviation operations involve the ownership and operation of Boston Logan International Airport, Worcester Regional Airport, and Hanscom Field, collectively accommodating millions of passengers and tons of cargo annually. Maritime operations encompass the Port of Boston, including Conley Container Terminal and Flynn Cruiseport Boston, facilitating international trade and cruise tourism serving Massachusetts and New England. Massport's commercial and maritime real estate development initiatives leverage its properties to support the Port of Boston and economic growth and job creation. These business lines work in synergy to enhance transportation infrastructure, drive economic development, and support the communities they serve.

Massport is deeply invested in climate action and sustainability. The Authority has set an ambitious goal to achieve Net Zero emissions by 2031. This commitment involves improving energy efficiency, transitioning to clean fuel sources, and generating renewable energy. Massport's climate initiatives not only aim to reduce its environmental footprint but also enhance the resilience of its facilities and benefit neighboring communities.

As Massport advances its sustainability and resiliency objectives, the demand for innovative solutions continues to grow. Embracing and nurturing new technologies is essential to addressing the challenges of today and tomorrow. Massport is enthusiastic about responding to MassCEC's Request for Interest for CriticalMass partners, as it presents a valuable opportunity to engage directly with the innovators who will help Massachusetts meet its collective goals. This collaboration will enable Massport to advance cutting-edge technology, drive progress in its sustainability initiatives, and reinforce its commitment to creating a resilient and environmentally responsible future.

Problem statement and potential areas of interest:

Massport is committed to advancing sustainability and resiliency across its aviation, maritime, and real estate portfolios. Massport has an institutional history of exploring and implementing clean fuels and other pioneering sustainable solutions, and is eager to dive deeper, including in the areas outlined below.

Sustainable ground transportation is one of the first sustainability areas that Massport explored and implemented several projects over the past two decades. Massport has electrified portions of its vehicle fleets, transitioned to renewable diesel fuel, and continues to look for alternatives for specialized equipment that meet operational safety and efficiency needs. Massport is working to tackle issues including converting entire fleets, coordinating with tenants, and developing robust charging infrastructure across assets.

As Massport and its partners renovate and develop the built environment, biomimicry and circular design offer an opportunity to reduce resources over a building's lifetime. A majority of Massport and Massport-tenant buildings are LEED certified, scratching the surface of innovative approaches that integrate circular building materials and sustainable construction practices. How can existing practices combine with biomimicry and nature-based design to enhance the environmental performance and efficiency of Massport's assets?

Carbon sequestration is another technological area in which Massport is seeking an understanding of potential use cases. Massport is interested in biologic and geologic methods to maximize carbon sequestration. Are there opportunities to leverage its access to the watersheet to enhance the ocean absorption potential or recreate wetlands, while using land-side assets to explore emerging technologies like Direct Air Capture?

Massport is also in the process of exploring resiliency strategies for its working waterfront properties. This involves protecting its port terminals and shipyards against sea-level rise and increased storm intensity while maintaining access to the water edge and preserving operational capacity. Massport aims to safeguard its maritime facilities and ensure their continued functionality in the face of environmental changes. In areas where seawalls are required, Massport is considering the integration of technologies like ECOncrete and Living Seawalls to invite sea life to an otherwise uninhabitable surface.

Massport is a member of the Zero Impact Aviation Alliance with MIT and other partners and is committed to increasing the adoption and use of Sustainable Aviation Fuel (SAF). This includes collaborating with airlines, fuel suppliers, and regulatory bodies to facilitate the transition to more sustainable fuel options. In addition to SAF, how can Massport encourage and support emerging innovation in the aviation sector?

MMWEC

Point of Contact: Zoe Eckert, Sustainable Program and Policy Senior Manager: zeckert@mmwec.org, 413-2181281

The Massachusetts Municipal Wholesale Electric Company (MMWEC) is the Commonwealth of Massachusetts' designated joint action agency for consumer-owned municipal utilities (MLP).

Through its enabling state legislation, Chapter 775 of 1975, MMWEC became a not-for-profit, public corporation and political subdivision of the Commonwealth of Massachusetts. MMWEC's enabling legislation gave it the unique power to issue tax-exempt revenue bonds to finance electric generating facilities and other projects. MMWEC provides a variety of power supply, financial, risk management and other services to the state's 40 consumer-owned, municipal light plants (MLPs).

In this statement of interest, MMWEC proposes that as the Commonwealth of Massachusetts' designated joint action agency for consumer-owned municipal utilities, it is well poised to coordinate with interested Startups and the 40 municipally-owned light plants within Massachusetts to determine product testing and implementation sites and measures.

MMWEC Member MLPs include: Ashburnham Municipal Light Plant; Boylston Municipal Light Department; Chicopee Electric Light; Groton Electric Light Department; Holden Municipal Light Department; Holyoke Gas & Electric; Hull Municipal Light Plant; Ipswich Electric Light Department; Mansfield Municipal Electric Department; Marblehead Municipal Light Department; Paxton Municipal Light Department; Peabody Municipal Light Plant; Princeton Municipal Light Department; Russell Municipal Light Department; Shrewsbury Electric & Cable Operations; South Hadley Electric Light Department; Sterling Municipal Light Department; Templeton Municipal Light & Water Plant; Wakefield Municipal Gas & Light Department; and West Boylston Municipal Light Plant.

Problem statement and potential areas of interest:

MMWEC's municipal utility members are committed to decarbonizing and electrifying their power portfolios, in alignment with the Commonwealth's carbon reduction goals. Approximately half of MMWEC's members have already met the 2030 decarbonization targets of 50% carbon-free energy sales. All of MMWEC's member utilities have power portfolio "roadmaps" to guide the way to net zero carbon emissions in 2050, including plans for solar, wind and energy storage. MMWEC and its members are committed to addressing environmental justice concerns and improving access to energy efficiency, decarbonization and electrification initiatives for underserved communities, including low- and moderate-income residents, and renters.

In continuing to address MLP decarbonization and electrification goals, MMWEC is, on behalf of interested MLPs, pursuing deployment of the following types or technologies, or finding solutions to the following challenges. This list is in no way comprehensive or prohibitive towards interest and involvement of other technologies and measures.

Energy Efficiency Measures: MMWEC's municipal light plant utility members are interested in technology that addresses the effectiveness of energy efficiency measures in homes in order to best assist residents and commercial spaces in cost-effectively electrifying.

Heat Pump Performance Measures: Due to the lower cost nature of municipal public power rates than that of investor-owned-utility rates, electrification of heating and cooling is incentivized not only up front for MLP ratepayers, but over the full lifetime use of the technology. This makes MLP ratepayers highly incentivized to complete conversions. However, MLPs look to mitigate the impact of heat pump technology in cold climate weather as customers with the currently available technology keep delivered fuel backup heating sources or heating resistance sources that either make decarbonization ineffective or the energy usage of the household too high to be sustainable for the homeowner or the utility during cold periods. MLPs seek more fully commercialized cold climate heat pump technologies.

Battery Technology: MLPs see immense value in the deployment of both residential and large scale batteries as a means to providing continuous renewable power, even when intermittent resources might not be available. In addition, MLPs see the value in battery technologies helping support grid maintenance and strategic upgrades. However, concern remains from many stakeholder groups on the thermal runaway and fire safety of lithium ion battery technology. For this reason, MLPs are interested in pursuing non-lithium and long duration battery technologies.

MRECo

Point of Contact: John Miller, Executive Director, mrecnewengland@gmail.com, 508.728.5825

With 20 years experience in ocean renewable energy (ORE) generation, MRECo is uniquely positioned to provide critical test sites and industry expertise to startups particularly those with technologies addressing energy conversion by tides (TEC) and waves (WEC). MRECo and its predecessor at the University of Massachusetts, the Marine Renewable Energy Center (MREC), are leaders in the sustainable development of ORE in New England.

Problem statement and potential areas of interest:

MRECo has the only ocean test sites for hydrokinetic energy devices (Wave and tidal) in the Commonwealth and may have the only test stand for tidal energy prototypes in the world. MRECo is willing to assist in any way feasible to support ORE startups.

MRECo already has tidal and wave test sites and wide experience working with startups in wave, tidal, and associated instrumentation, and routinely provides advice to startups in ORE.

MRECo has two ORE sites:

Borne Tidal Test Site (BTTS) – BTTS is a fully permitted test site for tidal energy devices up to three meters in diameter. The fixed platform provides a stable support for both the turbine under test and sensors. The objective system will provide grid connection and broadband instrumentation connectivity. A support arm provides the ability to raise and lower a turbine, and power a power load for turbine testing and electrical power of sensors is provided. In addition, three sensor categories are available:

1. Power Curve Determination – The BTTS provides monitoring of water velocity and power output to allow determination of the power curve a device under test.
2. Environmental Monitoring -Video surveillance of the turbine and acoustic imaging of the turbine test aperture documents any potential approaches or other behavior by marine animals near the turbine under test. Surveys are made of birds, particularly diving species.
3. Other Sensors – BTTS can flexibly accommodate other sensors that might be desired by the testing company for turbine parameters like rpms, thermal characteristics, etc.

Cuttyhunk Wave Test Area (CWT) – The CTW provides a partially permitted test area for wave conversion devices. Fully permitting requires definition of the anchoring or other bottom mounted structures, and MRECo has the experience to facilitate the completion of these permitting requirements. The site provides power and grid connection with the micro-grid on

Cutthyhunk Island. MRECo has characterized the wave climate and continues to gather additional information for a DOE funded wave device test in 2026.

Industry Support – The MRECo staff has broad experience in the hydrokinetic (Tidal and wave) industry as well and product development and commercialization, start-up business planning and fund raising.

Permitting – MRECo has unrivaled experience in permitting and licensing tidal and wave projects and for both testing and commercialization of deployment sites.

National Grid Partners

Point of Contact: Sander Cohan, Head – Innovation Lab, sander.cohan@nationalgrid.com

Problem Statement and Potential Areas of Interest:

National Grid is actively seeking advanced, scalable solutions to mitigate grid impacts caused by the accelerating adoption of distributed energy resources, including electric vehicles. A pressing challenge is the strain on low-voltage distribution infrastructure—particularly in residential and small commercial sectors—where demand for Level 2 EV chargers is increasing exponentially.

Key barriers include:

- Panel capacity limitations in legacy buildings that cannot support 240V chargers without costly upgrades.
- Local transformer overload risk due to the clustering effect of EV adoption in neighborhoods.
- Peak load amplification, especially during evening hours when EV charging and residential demand overlap.

Areas of interest include solutions that:

- Eliminates the need for electrical panel upgrades.
- Performs intelligent peak shaving to smooth grid demand during charging events.
- Supports grid flexibility goals through behind-the-meter energy storage and load shifting.

Olin College

Point of Contact: Jess Charlap, Program Manager, jcharlap@olin.edu, 609-649-2388

Founded in 1997 to change undergraduate engineering education, Olin teaches students to be explorers, experimenters, and creators who design their own path forward.

Currently Olin College is working on transforming engineering education toward a world in which engineering serves everyone. Olin will provide students with meaningful impact-centered learning experiences that will develop engineers who are inclined to serve society and the planet, solve problems by understanding people's needs, and appreciate and understand perspectives other than their own. Focused on human and planetary health, Olin's College as a Living Lab (CaLL) will achieve the Engineering for Everyone vision through novel and transformative: 1) design, development, and delivery of impact-centered education, 2) pathways and access to engineering education, 3) public-private-people partnerships of

companies, public agencies, universities, institutes, communities, and individuals, and 4) convening of discussions and dissemination of learnings about the technical, social, and temporal dimensions of the sustainable solutions it investigates. This initiative positions Olin as an experimental testbed for reinvention and sustainability, and for transformation within and outside Olin.

The initial foci of Olin's CaLL strategy are 1) achieving net zero emissions by 2029, 2) integrating college operations and curriculum to create meaningful, impact-centered learning opportunities for students, faculty and staff, 3) developing students' identities as collaborators for change by practicing relational models of human-centered design and deepening and centering sustainability in the curriculum, 4) working towards equity, access, and inclusion by dismantling systemic barriers and creating new pathways for all to feel a sense of belonging, and 5) proposing new, bold, and innovative approaches to engineering education.

Problem statement and potential areas of interest:

The engineering and operations team is continuously looking for products and technologies that:

- Reduce energy usage
- Reduce GHG emissions
- Increase preventative maintenance and reduce unplanned maintenance
- Increase on-campus renewable energy
- Help to manage the campus energy and demand profile
- Improve comfort and air quality
- Improve campus sustainability (energy, waste, water, new construction, materials)

Some of the specific technologies Olin College would like to explore are:

- Window film/treatment to reduce solar gain for comfort and perhaps to produce energy
- Machine learning/AI that optimizes how buildings perform
- Solutions for domestic hot water heating – heat pumps, solar thermal, etc.
- Geoexchange technology – drilling, piping, heat pumps, system design
- Heat recovery technologies for space heating and cooling
- Sustainable pavement that prevents ice buildup
- Waste management - compost, recycling, trash
- Energy storage and peak demand management strategies
- Sustainable construction materials and buildings
- Renewable energy
- Microgrid strategies, systems, or controls

- LED lighting and controls
- Electric fleet vehicles and charging stations
- Sustainable landscaping, fertilizer, irrigation
- Campus food production, indoors or outdoors
- Platforms that facilitate sustainable procurement

Saint-Gobain

Point of Contact: Daphne de La Grandiere, External Venturing Project Manager, daphne.delagrandiere@saint-gobain.com

As the global population grows, Massachusetts' manufacturing sector faces heightened pressure to meet material demands while minimizing environmental pollution and reducing carbon emissions. Manufacturers have historically relied on the traditional linear model—extracting, using, and discarding materials—which contributes to waste and leads to intensive Scope 3 carbon emissions from raw material extraction and manufacturing. Transitioning to a circular economy—where materials are reused, recycled, repurposed, remanufactured, and redesigned—offers substantial opportunities to decarbonize material supply chains, enhance supply chain resilience, reduce landfill pollution, and unlock new economic and job opportunities.

Problem statement and potential areas of interest:

With operations in >70 countries, including >150 sites in North America alone, Saint-Gobain manufactures materials that go into almost every industry, including medical, automotive and construction markets. In Massachusetts, Saint-Gobain maintains 2 advanced R&D centers and 8 manufacturing plants producing materials such as roofing shingles & granules, silicone tubing, abrasive sandpaper, and ceramic products. Moving to a circular economy is a key pillar to decarbonizing Saint-Gobain's operations; however, many of Saint-Gobain's materials are notoriously difficult to circularize and limiting the state's ability to recover value from these materials. As an example, according to the Environmental Protection Agency, the majority of the 11 million tons of asphalt shingle scrap generated per year in North America goes to landfill.1 As such, Saint-Gobain seeks to support growth-stage companies to pilot solutions that tackle key challenges in material circularization:

- **Recovery of high-value materials from composite materials:** Most Saint-Gobain's materials are composites specifically designed for performance, durability and resistance toward wear and tear. Composite scrap generated at Saint-Gobain manufacturing sites or downstream customers (such as silicone tubing for medical applications, abrasive sandpaper, glassmat and roofing materials) often challenge conventional recovery via mechanical milling and recycling due to their durable and/or flexible nature. Other technologies for retrieving valuable components from these materials, such as pyrolysis, have limitations such as high energy requirements, incomplete decomposition, unpredictable end output quality, potential environmental concerns, and challenges with scalability and cost. Moreover, with increasing extreme

weather, durable composite materials will be increasingly desired to adapt to rising temperatures and other climate change impacts. Saint-Gobain seeks modular, cost-effective technologies that would be versatile enough to tackle waste streams in Saint-Gobain's Massachusetts plants, while being more sustainable and more energy-efficient than competing options.

- **Valorizing composite waste materials into new products:** Besides recovering high value components from composite waste streams, waste streams may also be transformed into new classes of products. This may be through mechanical or chemical treatments, novel forming technologies (e.g. 3D printing or hot press) or designs, and may involve a sequence of pretreatment or post-treatment technologies (e.g. milling, etc) to enable sorting, size reduction and/or adequate separation. Toward this end, SaintGobain seeks solutions that could have the ability to accept large quantities of waste relevant to Saint-Gobain plants in Massachusetts (such as silicone tubing, glassmat, abrasives waste), have a path toward economic viability, and a target customer market to test within this program.

Saint-Gobain is well-positioned to collaborate with the Massachusetts Clean Energy Center (MassCEC) and support growth stage startups – not only due to its manufacturing presence in the state, R&D expertise and facilities, and local and global leadership in sustainability and circular economy – but also its experience guiding maturing startups. Saint-Gobain's interactions with startups are facilitated by NOVA, the external venturing arm of Saint-Gobain, which has historically sponsored partnerships and accelerators with positive outcomes. In Massachusetts, NOVA is well embedded into the start-up ecosystem through strong collaborations with Greentown Labs in Somerville, MA.

For the demonstration pilot, Saint-Gobain envisions securing waste materials from manufacturing plants and/or customers in the region and piloting disruptive recovery/valorization technologies at a facility in Massachusetts – either at Saint-Gobain Research North America, or at a neighboring academic partner facility. If critical to the success of the project, Saint-Gobain may also consider deployment of the technology at one of Saint-Gobain's manufacturing sites. Since Saint-Gobain's 8 Massachusetts sites produce materials that serve almost every market sector, scaling up circularity technologies through this program would validate opportunities for Saint-Gobain to partner with customers, suppliers, and other stakeholders in MA to recover value from challenging post-industrial and postconsumer composite materials. This would further promote decarbonization of manufacturing and deliver compounded economic and sustainability benefits across the region.

Shrewsbury Electric and Cable Operations

Point of Contact: Patrick Collins, Integrated Resources Analyst, pcollins@shrewsburyma.gov, 508- 841- 8313

As a public electric utility, SELCO is a small but mighty organization that has progressive strategic goals that include 100% non-carbon power supply by 2032 and supporting the community of Shrewsbury in decarbonizing and electrifying.

Problem statement and potential areas of interest:

Energy storage will be an essential grid technology moving forward, as its power supply transitions to more intermittent renewable resources. Adoption of energy storage in Shrewsbury remains very low, both for behind the meter customer applications and utility-scale, mainly due to its high upfront cost. SELCO's reliability also makes the need for backup power very rare.

SELCO is interested in increasing the adoption of energy storage, preferably non-lithium based technology, for customers that can participate in demand response or virtual power plant programs, as well as utility-scale application for emissions free peak shaving.

SELCO is also interested in vehicle to X/grid technology.

The theme with these interests is enhancing the dynamic interaction between a customer and the grid, to mitigate peak demand as electrification increases. SELCO is interested in solutions that meet this goal.

The TRUE Collective

Point of Contact: Tanya Lobo, Executive Director, Tanya@thetruecollective.org, Tanya@thetruecollective.org

Its goal is to build a thriving community center that offers space and resources for personal, skill and career development and opportunities for community trust-building, organizing, and collaboration in a facility that serves as an exemplary clean energy community resilience hub (CCRH) through a process that embodies innovation, inclusion, diversity, equity and intensive community engagement.

Problem statement and potential areas of interest:

The TRUE Collective is developing a Clean Energy Community Hub and satellite climate tech training space for the Whittendon neighborhood of Taunton, and are facing the following challenges:

- Insufficient capacity and/or antiquated switchgear (5kV) serving LIDAC neighborhoods of the City.
- Space and challenges of getting an appropriately sized BES system approved by fire and town to support resilience requirements.
- Emission free transportation of disadvantaged youth to the facility
- EV Charging availability and reliable charging
- Insufficient clean and resilient energy job opportunities available for Taunton LIDAC community

Technologies that the TRUE Collective is interested in deploying:

- Energy Storage (Battery and Thermal)
- Electric Busses
- Microgrid
- V2G (Vehicle to Grid) Charging
- Solar
- Demand management (VPP)

University of Massachusetts Amherst

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The University of Massachusetts Amherst (UMass Amherst), having at its roots a long tradition of environmental stewardship as a Land Grant institution, and today as a Carnagie Community Engaged Institution, UMass Amherst is not only committed as a sustainability leader in higher education but also to lead by example and embrace its responsibility to serve the commonwealth and beyond with impactful engagement. Ranked within the top 25 green schools over the last two years by the Princeton Review Guide to Green Colleges and rated a AASHE STARS Gold institution six consecutive times since 2011, the institution has placed sustainability as one of seven core values in the 2024-2034 "For the Common Good" Strategic Plan. The goals of the MassCEC CriticalMass Program align perfectly with the strategic goals of the institution, namely its "Engage for the Common Good" and "Steward for the Common Good" goals. UMass Amherst is committed to "demonstrating its commitment to a sustainable and just future for all by expanding its engagement initiatives for the betterment of the commonwealth, the nation, and the world." UMass Amherst recognizes that "over the next decade, as the world demands breakthrough solutions to environmental, social, economic, and technological challenges, UMass Amherst will expand its engagement activity and increase its role as a positive force for change and the source of the best and most diverse talent." Expressing its interest in becoming a CriticalMass program project partner and hosting a clean/climate-tech start-up project, provides UMass Amherst a wonderful opportunity to carry out these institutional strategic goals.

Problem statement and potential areas of interest:

In 2017, through the work of the Chancellor's Sustainability Advisory Committee (CSAC) UMass Amherst identified six high level strategic sustainability areas to focus on over the next decade. These areas were Carbon Mitigation, Zero Waste, Food Security, Hands-On Learning, Resiliency, and Cohesive Communication. Its campus leadership prioritized Carbon Mitigation and Zero Waste and concurrent task forces, and consultant led studies were conducted.

Decarbonizing UMass

The Carbon Mitigation report resulted in its "UMass Carbon Zero" campaign. This has accelerated the work to decarbonize its campus resulting in multiple district level utility projects, new construction and major renovations of large facilities, and renewable energy projects, all contributing to the electrification and decarbonization of its campus and the compliance with MA Executive Order 594: Leading By Example: Decarbonizing

and Minimizing Environmental Impacts of State Government. With over 15 million square feet of facilities, 26 miles of steam lines, a state-of-the-art cogeneration power plant, and 300 buildings, this decarbonization process will be difficult but UMass Amherst is committed to reducing its carbon footprint and UMass Amherst is exploring different roadmaps to do so as quickly as is feasible. The ongoing projects demonstrate that UMass Amherst is committing considerable resources to these efforts. UMass Amherst is interested in how to leverage emerging clean energy technologies to further accelerate its decarbonization and to further understand how they can be integrated into its campus micro-grid, and to continue to provide the Commonwealth and beyond with proven strategies for the energy transition.

Getting UMass to Zero Waste

Its campus is also invested in furthering its ability to reduce its solid waste footprint and create a more circular economy. With a 50%+ waste diversion rate, student-led sustainable reuse programs, over 1,500 tons of food waste recovery and conversion to renewable energy through anaerobic digestion, and the year-round recycling of over twenty different difficult to manage waste streams at its own Waste Recovery Transfer Facility, UMass Amherst has made progress in this area but there is still more to do. UMass Amherst is interested in how to use emerging technologies such as AI to understand its waste profiles and contamination rates, to reduce landfill waste leaving its campus and improve its communications with its campus community. Its new and renovated, LEED Certified buildings consistently divert over 70% of construction waste from the landfill, and UMass Amherst is also interested in selecting and purchasing low embodied carbon construction materials.

Zero Waste & Resiliency Technologies

UMass Amherst is open to exploring any emerging clean/climate technologies that will contribute to its decarbonization, resiliency, and waste reduction efforts.

Decarbonizing Technologies & Materials

In addition to the decarbonization technologies currently in use here at UMass Amherst, it is interested in other emerging technologies that will help with its Carbon Zero goals, such as energy storage (batteries or thermal), pilot opportunities to advance enhanced deep geothermal, innovation with vehicle-to-grid (V2G), or vehicle-to-everything recharging stations and energy management, high temperature thermal storage, and advanced utility-scale high temperature heat pumps. UMass Amherst has state experts housed here at UMass who have specific interest in some of these technologies, such as State Geologist Brian Yellen.

UMass Amherst has supported cross-laminated timber and low embodied carbon material selection in many of its new buildings, such as the award winning Olver Design Building, the Computer Sciences Laboratories, the School of Public Health and Health Sciences Building, and the Sustainable Engineering Laboratories Building, which won the grand prize at the Embodied Carbon Challenge sponsored by the MassCEC and Built Environments Plus. UMass Amherst is interested in partnering with companies who are developing low embodied carbon construction materials, especially for concrete mixes, as well as improved methods and materials for concrete repair.

University of Massachusetts Boston

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UMB is an urban public research university with a commitment to environmental stewardship on campus, and sustainability research and education. It has a strong School for the Environment and leading climate and energy researchers on campus, as well as an Environmental Analytics core facility. It has published an Energy and Carbon Master Plan The goal of this plan is to provide a pathway that gets UMass Boston to net-zero and to a more resilient campus by 2050 by: a) Reducing energy consumption and enhancing resiliency in existing buildings; b) Building energy efficient and resilient new buildings; c) Switching fuel sources by electrifying the Central Utilities Plant and expanding sea-water heat pumps; and d)Utilizing renewable energy, on and offsite. Since 2009, the VDC at UMass Boston has been an engine for economic growth in the state, supporting over 200 advanced technology, life sciences and climate-tech startups, which have collectively raised over $2.5 billion in funding and created 3,000+ high-paying jobs in Massachusetts. Additionally, the VDC has trained hundreds of interns, many of whom have pursued successful careers in the region. The VDC currently has 4 resident companies in the areas of energy efficiency, carbon sequestration, sustainable bio-materials and recently graduated a sustainable marine fuel company. The VDC is very experienced and well positioned to support any start-up[s] selected to partner with UMB by Mass CEC.

Problem statement and potential areas of interest:

The UMB campus is currently comprised of 13 buildings totaling 1,751,900 square feet. The Overarching challenges as identified in its Master Plan:

- Buildings are currently provided with hot and chilled water from a central plant powered by burning natural gas. Major equipment at the central plant will need replacement within the next 5-10 years including a 33% capacity increase to meet anticipated growth by 2050. There is both key opportunity to electrify the central plant and avoid burning more fossil fuels on campus, as is also required by Leading by Example state executive orders.
- A collection of older buildings referred to as the Heritage Buildings will require major renovations. This is a key opportunity for projects to reduce loads imposed on the central plant, improve building energy efficiency, install Occupancy sensors / building controls and transition to low temperature hot water systems.
- There are operational issues, low-cost energy conservation measures, and deep energy retrofit opportunities that were identified during the plan development. These are key opportunities to reduce thermal loads imposed on the central plant, improve building energy efficiency, and install renewable energy technology. UMass Boston bring these

opportunities to its general attention given the range of potential solutions Mass CEC has in its portfolio of companies.

The following are areas of interest:

- The Campus Center and University Hall buildings present an opportunity to be very productive for Building Integrated Photo Voltaic [BIPV] solutions due to their location. UMB can potentially replace large areas of sun facing glass panels with transparent solar panels/BIPV technologies. This would allow UMB to retain ocean views but enable both energy efficiency and energy generation. UMB also has long glass panels with similar potential in its heritage, Wheatley building, 2nd and 3rd floors. One other benefit of this project will be to allow UMB overall to have more PV installed since its roofs will be at capacity after upcoming projects estimated at 2 MW in design phase are completed.
- UMB is looking for a non-polluting insulation coating material [not poisonous or dangerous to humans] to improve the entire building's energy efficiency. UMB has committed in its S&R plan to increase the performance of the building envelope. This translates into better insulation of walls, performance of windows and roof. It would be very interesting to implement vanguard new solutions to increase the performance of the building façade. Additionally, if UMB could find ways do these upgrades incrementally, it would be significant. Currently, whole floors or even whole buildings have to close during performance improvements. This is inconvenient and expensive.
- Occupancy sensors to help it manage the buildings better, and the ability to provide real-time data would be of great interest. UMB wishes to pursue an integrated energy performance platform for the entire campus and manage building energy consumption in a dynamic responsive way to also improve occupant comfort and provide potential energy use data, for student and faculty research projects. Its current systems do not allow this level of data sharing.

University of Massachusetts Lowell (UML) Rist Institute for Sustainability & Energy (Rist Institute) and Innovation Hub (iHub)

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The Rist Institute brings together the university's extensive R1 research enterprise, more than 12 core research and testing labs available to external users, more than 30 industry partners, and more than 85 entrepreneurial faculty members and its dedicated students to develop new clean energy and other sustainability solutions.

The iHub is an 11,000-square-foot sustainability-focused incubator/accelerator dedicated to advancing startups from anywhere who are developing climate tech, cleantech, energy, sustainable chemistry, other environmental and other sustainability-related innovations. The iHub works with Massachusetts startups and works to attract startups to Massachusetts and through the provision of a whole host of resources, including subject matter expertise, ongoing programming and a prototyping lab and access to a shared wet lab with over 100 pieces of shared equipment, helps to advance these technologies toward market launch.

Problem statement and potential areas of interest:

Among the areas that are of particular interest to the Rist Institute and iHub are climate change mitigation and resilience, renewable energy, energy storage and transition, hydrogen - production, storage, transport or application, energy storage & transition (heat, electricity), batteries - next gen, recycling & circular economy, clean chemistry innovation, and urban agriculture. Technologies within the organization that are of interest for deployment:

- Wind turbine blades - the use of drones, computer vision and artificial intelligence to detect damage in wind turbine blades which has the potential to revolutionize the way structural health monitoring of turbine blades is performed. The blades, which are made of fiberglass and epoxy resins, can measure hundreds of feet in length and weigh several tons. During normal operation, stress/strain on the blades can lead to cracks and other structural damage, causing the turbine to fail and disrupt power generation. Novel innovations for regular blade inspection and monitoring are needed to maintain reliability and safety.
- Advanced drone usage - the use of drones to monitor the structural integrity of buildings, bridges and roads. As it relates to the structural integrity of buildings, one

piece of the puzzle that experts are focused on is building energy efficiency to reduce the carbon footprint and to have a 'greener' built environment. To take it a step further, UMass Lowell experts have taken their work and technology a step further by using the scans developed to create more detailed, improved renderings of buildings (photogrammetry) that can be broadly deployed for many use cases.

- Climate change mitigation and resilience - UML is actively involved in both climate change mitigation and resilience deployment projects, collaborating with the city of Lowell and other organizations to create resilient and sustainable cities. This includes working on reducing carbon emissions, transitioning to renewable energy, and building community resilience to extreme weather events.
- Renewable energy – UML's Center for Renewable Energy is working on significant expansion of offshore wind energy deployment within the U.S.
- Energy storage and transition - UML is actively involved in energy storage and transition deployment, focusing on advancing clean energy technologies and supporting the state's energy transition goals. Various aspects of energy storage are involved, including battery technology, hydrogen production, and grid integration, with a strong emphasis on equitable and sustainable solutions.
- Hydrogen – production, storage, transport – UML has been involved in several hydrogen production and storage deployment projects, showcasing various approaches to clean energy storage and use. These have included renewable energy capture, hydrogen production via electrolysis, and long-term storage innovations. UML has also focused on using landfill gas or wastewater to produce hydrogen.
- Batteries - among others, UML has engaged in deployment projects that showcase the growing role of battery energy storage systems (BESS) in grid stability and renewable energy integration.
- Urban agriculture – UML has several urban agriculture deployment projects, including the Rist Urban Agriculture Greenhouse and Farm, rooftop gardens, and community gardens. These projects focus on local food security, sustainability, and community engagement.

WHOI

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The Woods Hole Oceanographic Institution (WHOI) is dedicated to advancing knowledge of the ocean and its connection with the Earth system through a sustained commitment to excellence in science, engineering, and education, and to the application of this knowledge to problems facing society. In its everyday work as scientists and engineers, WHOI pushes the boundaries of exploration and observation across the globe to carry out both basic and applied science research. Founded in 1930, WHOI pursues advancements in technology and advancements in science hand in hand, from sea-going field deployments of innovative mooring systems, to robust autonomous ocean systems that carry out complex tasks, to ocean energy system development to further research goals requiring remote, sustained power sources.

Problem statement and potential areas of interest:

As an institution, WHOI strives to lead innovation in ocean and climate technology and have developed unrivaled Access to the Sea and Equipment and Instrument Test Facilities to bring new methods and technologies from the drawing board to routine scientific use. Transitioning WHOI technologies outside of the institution to serve society has been a long-term focus for WHOI, which they seek to continue through a potential role as a project partner to the MassCEC's CriticalMass Program.

WHOI seeks to support Massachusetts' Climatetech goals by working as a potential project partner within the Clean Energy Center's CriticalMass program. Growth areas within the startup landscape across the Commonwealth that could benefit from WHOI engagement and potential effort include: Work on sensor validation and testing for climate, carbon, and energy transitions within the ocean space. Work that requires ocean testing or validation at permitted 'ocean test sites'. Work on parameter sensing via non-destructive sampling (i.e. 'lab on a chip', remote electromagnetic active or passive sampling, acoustic communications and sensing). Work on autonomous vehicle design, operational configurations, enclosure and/or housing research, behavior programming, and transitions to market. Finally, energy is an order one issue within oceanographic systems and critical to scientific progress, making energy efficiency and energy focused designs a key area of focus for WHOI's long-term mission and growth.

Interactions between WHOI and startups in the Commonwealth on these transformative issues could enable synergistic growth of experience and knowledge, successive launches of small firms, and a dramatic growth of both training opportunities for high tech workers and long-term high-tech jobs within the local climatetech community.

WHOI has numerous facilities, technical resources, and human resources that could be employed to help CriticalMass programs/projects achieve their start up goals. Several of the major facilities are highlighted here briefly:

Iselin Marine Facility: The WHOI pier at the Iselin Marine Facility has two principal berths, one 430 feet long and the second 256 feet long. Both can accept vessels with drafts equal to the 19-foot limit imposed by the approach channel to the harbor. Potable water, fuel and provisions are available, as are numerous small boat facilities, on dock ocean test wells, cranes, lifts, and machine shop services.

Institution test tanks and pressure test facilities: WHOI runs numerous test wells, pools, and pressure test facilities capable of simulating up to full ocean depth pressures for testing of housing, connectors, and sensor systems.

Instrument housing design, fabrication, and assembly: A component of its support for ocean-going research objectives, WHOI shops and labs have the ability to locally design, fabricate, and assemble world leading components from locally sources materials and expertise.

Maker Space and Project Support: WHOI's Autonomous Vehicles and Sensor Technologies (AVAST) center is a new initiative to accelerate innovation and improve collisions in ocean research, design, and education. AVAST provides a framework of training, materials, and resources to support research and engineering programs that are difficult to do with existing infrastructure. Part of this framework is the AVAST Innovation Hub, which is a physical space to foster research collisions and technical collaborations. Although AVAST takes its name from "Autonomous Vehicle and Sensor Technologies", these embrace only part of the spectrum of new projects and programs that AVAST supports at WHOI.

Open Ocean Test Facilities: WHOI's Martha's Vineyard Coastal Observatory (MVCO) and the Air-Sea Interaction Tower (ASIT) are both a plug and a platform in the ocean to support basic and applied research, instrument testing, and sensor validation. Created in 2001, MVCO has hosted critical experiments on the coupled air-sea boundary layer, underwater noise, autonomous underwater vehicle testing and development, and atmospheric research. Central to the MVCO, the ASIT is a cabled, fixed platform located approximately 3 km south of Martha's Vineyard in 17 m of water. An upgrade to the power and communications systems in 2019 provides up to 5 kW of power and enhanced data. Transfer speeds to support testing and validation of new atmospheric and oceanographic sensors. At the ASIT, WHOI has been maintaining the MetOcean Reference Site (MORS-1) since 2016. MORS-1 provides both publicly available reference datasets of wind energy specific metocean observations as well as a pre-permitted Lidar buoy validation location that has been used since 2019 to validate buoy systems for energy production data collection.

Oceanographic buoy and mooring systems: Multiple shops on campus are capable of designing, fabricating, deploying, and recovering buoy and mooring systems for both testing sensors as well as long term monitoring of the ocean and climate. These groups work with numerous investigators at WHOI and external and would be primed to work with additional stakeholders from the CriticalMass program.

Ocean and Climate Innovation Accelerator (OCIA) is a unique consortium generating new knowledge and accelerating climate solutions by focusing on the ocean and leveraging the strengths of academic research and commercial development. OCIA was launched in 2021 by Woods Hole Oceanographic Institution (WHOI) and Analog Devices, Inc. (ADI), through its shared recognition of the urgent need to understand fundamental ocean processes to predict future climate impact and to inform policies to address it. OCIA is intentionally designed to bring together organizations across sectors and areas of expertise to drive collective action and meaningful, scalable change.