

FY 2018

Annual Sustainability Report

November 2018



University of Massachusetts

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University of Massachusetts Amherst

Sustainability at UMass Amherst continues to be a point of pride for the flagship public research university of the Commonwealth. UMass Amherst students are learning, living, and leading in sustainability by doing! They are learning about innovative solutions to the global problems of the 21st century and applying their knowledge and skills locally and throughout communities across the Commonwealth and beyond. FY18 was a year of impressive accomplishments in sustainability operations, academics, engagement, planning and administration, and innovation. The campus submitted its fourth AASHE STARS report and was awarded the STARS Gold rating with a 75.77 score, placing UMass Amherst into the Top 10 Doctorate Granting institutions in the United States. Highlighted below, are a few of the exemplary practices where UMass Amherst made strides in FY18.

School of Earth & Sustainability

Established in 2016, our new School of Earth & Sustainability (SES) serves as the central hub for research, education and outreach focused on sustainability in both the natural and built environments. The School is a cross-disciplinary enterprise between multiple departments and colleges joining together a network of over 100 world-class faculty, 20 undergraduate programs with more than 1,300 undergraduates, and five graduate degree programs with 350 graduate students. In FY18, SES co-hosted several campus conferences that engaged with campus and regional leaders on important concerns such as climate resiliency, economic development for the green economy, and advances in sustainable technologies; hosted a series of faculty lightning talks to build collaborative research networks on clean energy, sustainable systems, and resiliency; organized several professional development workshops for sustainability students; co-sponsored an interdisciplinary seed grant program to support faculty developing interdisciplinary proposals in social science and sustainability; and collaborated in securing a career staff position to support student training in earth, environmental and sustainability fields for the green workforce. Additionally, SES played an instrumental role in coordinating and convening cross-campus sustainability programs and initiatives such as the Sustainability Curriculum Fellowship Program, Energy Corps, Paperbark, Envirothon, Eureka! Girls Inc., and the Eco-Rep student leadership program.

Master of Science in Sustainability Science

Sustainability Science is a one-year professional master's degree program that trains students for sustainability-focused careers in industry, academia, government, and the nonprofit sector. Students in the program must complete a 150-hour professional-level internship; as of FY18, the program contributed nearly 13,000 hours of service to the regional green workforce through its internship requirement. With the graduating class in FY18, the Sustainability Science Program has over 80 graduates with an 86% employment rate for graduates in the sustainability field.

Sustainability Curriculum Fellowship

Established in 2013, the UMass Sustainability Curriculum Fellowship (SCF) is a yearlong interdisciplinary faculty training program designed to bring together faculty who are teaching undergraduate or graduate courses with a focus on sustainability. In FY18, the program hosted its fifth cohort. The university now has

over fifty faculty fellows from every college from across 28 departments. With the addition of the recent faculty fellows, thousands of undergraduate students and several hundred graduate students benefit from an enriched curriculum in sustainability.

Water Use Reductions and Innovation

In FY18, UMass expanded the use of reclaimed water to irrigation, reducing overall potable water consumption drastically throughout the year. In early 2018, the campus received an extension of the Class A Reclaimed Water Permit to expand the use of treated reclaimed water from the Amherst Wastewater Treatment Plant for the use of dust control and for watering plants to conserve potable water used for irrigation in response to the Town of Amherst water ban restrictions. Prior to this expansion, reclaimed water was used only for cooling towers and boiler make-up water to produce steam at the Central Heating Plant. This year, reclaimed water made up over 17% of the total water consumption, with over 49 million gallons treated for campus buildings' and grounds.

Plastics Reduction and Green Events

In early 2018, UMass took a major step in reducing plastic consumption by expanding the use of outdoor water stations for large campus BBQ's and events. The school now has three water units each equipped with four easy-to-use hydration stations. These units utilize town of Amherst tap water and uses multiple levels of filtration technology as well as cooling compressors to chill the water for the campus community. The use of these water stations were on full display at some of the largest campus events including the College of



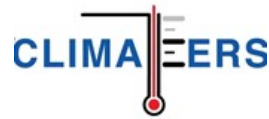
Natural Science College Day BBQ last October which was a zero waste event, serving over 5,000 people local food and recycling or composting over 90% of the event waste. No single use water bottles were used at the event! These water stations help reduce the cost of hosting events on campus because they do not have to purchase water bottles and the units are provided at no extra charge for student organizations.

Community Engagement with Climate Change and Student Leadership

“Talking Truth: Finding Your Voice Around the Climate Change Crisis” is a campus/community opportunity for ongoing transdisciplinary, psycho-social engagement with climate change through storytelling, reflective writing, authors/speakers, films, discussion, and art making. Talking Truth harnesses the power of contemplative practices like mindfulness and reflection to strengthen our resilience and community through workshops, film screenings, and other climate change-focused events. Co-sponsored by Office of Civic Engagement and Service-Learning, UMass Amherst Libraries, the School of Earth & Sustainability, and Psychology of Peace and Violence Program. Many important outcomes have formed out of Talking Truth in FY18 including: The forming of the



Climateers, a student-run climate change group focused on spreading awareness, taking action, and creating a community built around climate change.



Paperbark

Paperbark is an interdisciplinary magazine of creativity and sustainability founded by graduate students, faculty and staff within the School of Earth & Sustainability (SES) and from across campus. Supported by SES in partnership with the UMass Libraries and the College of Humanities and Fine Arts, Paperbark aims to showcase the best sustainability literary work happening on campus and from across the Pioneer Valley while drawing connections to the global context. In FY18, the magazine formed its team of staff, secured all the necessary funds to support the magazine in its first few years, hosted a launch magazine event, co-hosted numerous campus engagement events around the issues of sustainability and climate change, and sent Issue 1 to print. The inaugural issue of Paperbark, *Emergence*, is scheduled for release in fall 2018, and highlights climate change and the renewed vigor of the climate justice movement in the wake of the United States’ withdrawal from the landmark Paris Climate Accord.



UMass Clean Energy Corps

The UMass Clean Energy Corps, a program of the School of Earth & Sustainability (SES) and the UMass Clean Energy Extension (CEE), is a student-centered initiative focused on assisting communities and organizations develop and meet their clean energy goals. Energy Corps members provide energy analyses and consulting services to Massachusetts cities and towns under DOER’s Green Communities program, helping communities identify and implement clean energy solutions that reduce costs, address climate goals, and strengthen local economies. In FY18, Energy Corps worked with 7 communities, bringing the total number of communities that have received technical assistance from the program to 26. Each community received a recommendations report for how to improve energy savings on a specific building by up to 50%. In anticipation of the large-scale offshore wind development planned off the Massachusetts coast, Energy Corps members also worked to develop a system dynamic model that simulates the energy, capacity, and economic implications of adding large-scale energy storage to offshore wind projects.



The University of Massachusetts Boston is Boston's only public university and is a doctoral degree granting research institution serving nearly 17,000 undergraduate and graduate students. UMass Boston was the only public university in Massachusetts to sign the historic 1990s Talloires Declaration on sustainability, and formed part of the leadership circle in 2007 ACUPCC Climate Commitment. It was the first campus in the UMass system to establish a comprehensive sustainability program in 2002. It was recognized as a recipient of Second Nature organization's Marks of Distinction for its continued efforts as signatories to the 2016 Climate Commitment (carbon neutrality and resilience) thereby continuing to set high-performance goals, demonstrating and reporting measurable progress towards its goals. UMass Boston also earned the 2018 Gold and 2017 Pinnacle level awards for 'Excellence in Commuter Options' from MassRides and the MA Dept. of Transportation (received Leadership level 2011-2016) and has consistently been featured as one of the top green colleges in the country by Princeton Review Green College Rankings 2010-2018.

Key Sustainability Achievements

In FY2018, UMass Boston built on its performance in many of the 10 focus areas of sustainability. Other than the four briefly highlighted areas below the campus was also a recipient of a Coca Cola/ KAB grant for recycling bins and launched the "Dear Future Boston Challenge" for Fall 2018, inviting young adults to help make Boston greener. The winner would be paired with Coca-Cola and Save the Harbor Save the Bay to implement a \$30,000 grant to bring their idea to reality. Additionally, as part of environmentally-preferable purchasing, 100% of IT computers in the UMB Replace Program were EPEAT Gold-Rated and 60% of its total copy paper purchases towards 30% or higher post-consumer recycled paper. As of FY2018, UMB had 5,444,240 kWh of net purchased credits from its 3.9 MW rooftop solar clean energy PPA investment (largest in MA at the Boston-Dedham line) that became active in 2017.

Green Building Design and Sustainable Campus Operations: UMB RESIDENCE HALLS

UMass Boston inaugurated its first ever Residence Halls in 53 years of its existence as a campus. The 1,077-bed, \$120 million, 260,000-square-foot complex was built through a public-private partnership, the first of its kind for the UMass system. The building is tracking LEED Gold similar to the campus two recent LEED GOLD academic and research buildings. A variety of green construction and operations features include a 500-seat Dining Commons featuring zero-waste dining with non-disposable dinnerware and numerous sustainable dining, single stream recycling and composting along with outdoors access for walkability, outdoors recycling, bike racks, access to the harbor and marine recreational and learning facilities.





Move-in Day in Fall 2018 also kicked-off the popular “Green Planet LLC” living learning community with a ZERO PLASTIC WASTE POLLUTION INITIATIVE. More than 1000 reusable bottles handed out by UMB School for the Environment to residents along with green move-in tips and green living/décor how to’s and exciting programming such as Coastal Cleanup, Trash to Art and more.

CLIMATE RESILIENCE AND PREPAREDNESS

On April 13, 2018 UMass Boston’s Sustainable Solutions Lab (SSL) released a new report Financing Climate Resilience: Mobilizing Resources and Incentives to Protect Boston from Climate Risks at the 3rd session of the Climate Adaptation Forum in Boston. This was attended by 200 professionals from leading city, state and private organizations. As a harbor city that is facing increasing risks of substantial damage from storm surge, extreme precipitation, and sea level rise (parts of Boston were flooded by two "100 year" winter storms in 2018) the city faces challenges as it attempts to reconcile future growth and climate resilience. The Climate Ready Boston initiatives have assessed these risks and set out important strategies to advance climate resilience.



Authored by Dr. David Levy, Professor of Management, UMass Boston, and Academic Co-Director, Sustainable Solutions Lab, the report assessed the financial challenge of implementing climate adaptation measures in Boston, described a range of financing mechanisms and incentives, and made a series of recommendations. (The SSL is a collaboration of four schools within UMass Boston: The College of Liberal Arts, College of Management, McCormack Graduate School of Policy and Global Studies, and School for the Environment). This was featured in the Boston Globe April 2018 and as well as in the AASHE Bulletin (<https://www.bostonglobe.com/metro/2018/04/12/umass-report-cautions-billions-needed-for-local-climate-change-preparations/yWd2khQxMei8DNzUhrATkM/story.html>).

Significantly, this report was also selected and published on PreventionWeb - the global knowledge sharing platform on disaster risk reduction, managed by the UN Office for Disaster Risk Reduction (UNISDR), which released its World Report on Climate Change & Economic Losses in October 2018.

SUSTAINABLE TRANSPORTATION:

In FY2018, the campus introduced a number of new green transportation programs including the appointment of a designated interim Employee Transportation Coordinator (ETC) to enhance student engagement and car-free low emissions options. There are now three miles of bike lanes with bike racks that now provide an impressive 582 bike parking spaces easily accessible from each of the 7 buildings on campus as well as satellite Bayside area. There are an additional 125 bike spaces in West Garage and about 60 bike spaces in the new Residence Halls. The UMB Massrides/Bay State Commute (formerly NuRide) Partnership hosts monthly tabling events including Welcome Weeks, Orientation events, Human Resources Benefits Fair, and Winter Preparedness Orientation events with free giveaways and sign-ups. The university hosts quarterly transportation events to

increase awareness of transportation options that reduce SOV usage, including biking and carpooling. The university inaugurated its section of the Harbor Walk in 2015 receiving a Spotlight Award for Walkability in 2016 to beautify and enhance walkability around campus - the new stretch features benches, lighting, gathering spaces, native plants, and interpretive signs with historical narratives, and an area to display artwork. More than 60% of the community uses car-free options to get to the campus as compiled from DEP campus-wide surveys. In 2018, UMass Boston hosted its first Clean Commute Challenge, Bike to Work event, Ride-Matching event and is working on installation of EV chargers and a Solar Canopy at its new Parking garage.



ACADEMICS, STUDENTS & COMMUNITY ENGAGEMENT



UMass Boston's School for the Environment (SFE) is its premier interdisciplinary environmental school. This year student engagement highlights include SFE-Mass Audubon Partnership with a summer 2019 SFE - Mass Audubon camp for elementary aged children, providing counsel positions to UMass Boston students. Students from UMass Boston's Urban Planning and Community Development programs travel to Simeto Valley, Italy, where they are joined by students from Cornell University, the University of Memphis, and University of Catania Sicily where they work with local officials and community organizations contributing to one of Europe's most ambitious regional sustainability initiatives: the Simeto River Agreement. UMB College of Mgmt. SERC: Dr. Vesela Veleva continues to lead the Center for Sustainable Enterprise & Regional Competitiveness (SERC) research on emerging business models and collaborations to advance the circular economy. UMB Green Chemistry UMass Boston is home to the first PhD program in Green Chemistry in the country. Dr. Wei Zhang, a professor of chemistry and director of the Center for Green Chemistry, and Berkeley Cue '69, an adjunct professor of chemistry at UMB professors re-launched a second edition of their green chemistry textbook, *Green Techniques for Organic Synthesis and Medicinal Chemistry*, due to strong sales. UMB School for the Environment hosted its 6th Annual Environmental Research Colloquium that includes Inter-UMass and Boston-area campuses, research presentations, employment fairs with guest speakers, poster presentations and celebrated its sixth year in 2018 <https://www.youtube.com/watch?v=Q9x3tD8RD94>.

UMass Boston hosted the Fall 2017 NSF-GEO-INTERACTIVE CLIMATE RESOURCES workshop series along with leading faculty at UMass Lowell, and presentations by the UMB Office of Sustainability, UMB SFE faculty as well as supporting TRIO staff. The Boston Green Ribbon Commission Higher Education Working Group comprises leading sustainability-minded institutions in the Boston area including Boston University, Harvard University, MIT, Northeastern University, Tufts University and UMass Boston. It helped initiate a report on institutional renewable energy purchasing. The study conducted methods for quantifying the actual emissions impacts of institutional renewable energy purchases and correctly evaluating the claims made" www.greenribboncommission.org/document/institutional-renewable-energy-procurement-quantitative-impacts-addendum/

In 2018 UMass Boston, was selected as a Northeast Outdoor Club Campus funded by the Outdoor Foundation (<https://outdoorindustry.org/participation/>). This program engages colleges and universities over the course of a full academic year – building a strong connection between campus communities outdoor recreation and the National Park Service (click <https://youtu.be/LmL4qoF0I6I> for the video about the clubs).



UMass Dartmouth continues to make strides across a wide variety of programs, academics and operations to be a sustainable campus. We were again recognized by the Princeton Green Schools Guide for the sixth year in a row for those efforts.

Resiliency Planning

The campus began internal discussions of our resiliency planning. Building on the work of our Emergency Management Plan, we recognize that due to climatic changes forecast for the Northeast through the National Climate Assessment, which we are going to be experiencing more, significant water events in shorter periods of time during all seasons. It will also be getting hotter. As such, we need to plan accordingly and look toward 500-year flood standards as well as more ways to prevent heat build-up in our infrastructure. We have been participating with the resiliency planning exercises sponsored by the Massachusetts Emergency Management Administration to insure we are instituting best practices across all state agencies.

Transportation

This past year we engaged in several transportation related efforts to support multi-modal methods for our campus community to get to and move around our campuses. This included our first full year in partnership with the Southeast Regional Transit Authority which allowed our students to ride the public buses for free when presenting their UMass Pass. This increased their ridership while providing greater access to community resources



with no additional carbon footprint from our students. We also surveyed the campus regarding bike share programs and launched a test week where our campus community was able to test 5 different bike share companies. After another round of surveys, we chose VeoRide as the vendor we would work with for a fall launch of the program. We also held our first Drive Electric event, showcasing 4 different electric vehicles and allowing their owners to answer questions about what it is like to own, maintain and drive one.

Land Management

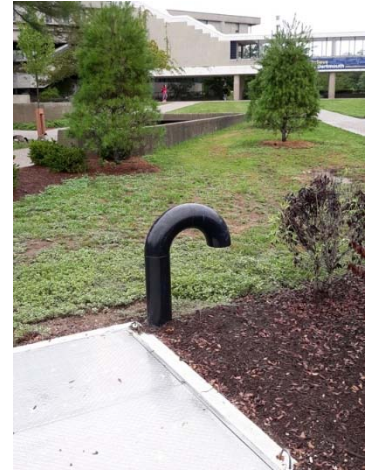
In the area of sustainable land management, the campus has started two exciting projects. The first was working with a biology student to create an invasive species management plan in consort with the state Department of Environmental Protection as well as the Department of Fish and Wildlife. This is going to help us to maintain the Cedar Dell field vista at the lower end of Paul Rudolf’s main green space where it connects with the Cedar Dell pond. We also started a research project with the Biology Department to study 5 test plots of land that are designated as No Mow areas. This includes studying the plants, insect, soil and animals that may then inhabit what was mowed grass. The intent is to see what grows and inhabits those spaces and see if natural grasses and flowers return to the area to support pollinators like bees, butterflies and hummingbirds.

Energy

From an energy perspective, the University completed our 6-year effort to completely replace our underground steam pipes. For the first time since the initial construction of the campus, we have an operating, closed-loop system that is working efficiently. The amount of steam pressure loss has been reduced and the amount of make-up water purchased has been reduced significantly.

Academics

In our academic realm, the Sustainability Minor continues to be the largest minor on campus. This has bolstered our work in moving forward the proposal for both a Bachelor of Arts and a Bachelor of Science degree in Environmental and Marine Science, which is moving to the Board of Higher Education for their review.





Entrepreneurial Approach to Sustainability

Since its inception in 2015, UMass Lowell’s Office of Sustainability has taken an entrepreneurial approach to the stewardship of human, physical and financial resources in support of the sustainability goals outlined in the university’s 2020 Strategic Plan.

Through consensus building and a strong partnership focused approach, our core sustainability functions have been enhanced by a steady stream of grant awards over the last two fiscal years. Totalling over \$300,000 these grants have supported innovative approaches to waste and recycling, sustainable transportation and a unique urban agriculture program.

In addition, the student body at UMass Lowell has become increasingly engaged and active with sustainability initiatives on campus. In 2016, UMass Lowell students established an opt-out sustainability fee to support the campus strategic plan’s sustainability goals. Funding is administered through the Office of Sustainability and supports a range of activities focused on sustainability including student employment and internship opportunities.

\$50,000 of this student sustainability funding is available annually through a competitive Sustainability Engagement and Enrichment Development (S.E.E.D.) grant program. Since its inception, the program has funded 19 projects on campus focused on a wide array of areas from agriculture and energy enhancements to lab-based water conservation projects.

Based on the success of the SEED program and the student body’s role in administering the funds, UMass Lowell students recommended changing the sustainability fee from its initial opt-out format to a mandatory annual fee with the caveat that student involvement in the administration of fund be continued.

This past year, UMass Lowell’s reputation as an urban focused center of excellence for sustainability was further enhanced. Underpinned by our AASHE STARS Gold Rating, UMass Lowell made an unprecedented jump in in the Sierra Club’s Sustainability Rankings, from 124 in in 2017 to 22 in 2018. We were also listed in the Princeton Review’s Guide to Green Colleges.

Sustainability is now a core part of both the day-to-day and strategic mission of UMass Lowell. As our program continues to grow, we are confident of continued gains in all sustainability ranking and rating systems. This past year, we have made remarkable progress in a number of areas including transportation, energy efficiency and deferred maintenance, and an innovative, partnership based approach to urban agriculture.

Regional Transit

UMass Lowell is a direct beneficiary of a strong collaborative relationship with both Merrimack Valley Regional Transit Authority (MVRTA) and Lowell Regional Transit Authority (LRTA). All students and staff can ride any of the Lowell Regional Transit Authority’s (LRTA) 18 bus lines at no cost to them with their campus ID. The program also provides free service on the Merrimack Valley Regional Transit Authority’s (MVRTA) Route 01/41 bus, which connects Lowell to Dracut, Lawrence and Methuen, as well as Haverhill, where the university recently opened a satellite campus. Since the Regional Transit Pass Program was



implemented in 2017, LRTA has seen ridership peak at 9,000 UML-affiliated riders per month. This represents a significant and growing percentage of total ridership and a significant diversion of vehicular traffic removed from regional roadways. The approach also saves the university significant operating costs.

UMass Lowell took its vision for regional transportation excellence further in the summer of 2018 announcing a unique and innovative partnership with the MBTA. The pilot program is the first of its kind for the MBTA Commuter Rail providing free commuter rail access, on the Lowell Line, to our community. In addition to making it easier for commuter students and university employees to reach campus, the program gives residential students a free and convenient way to travel to Boston for co-op jobs and internships.

The Lowell Commuter Rail Line serves the towns of Billerica, Wilmington, Woburn, Winchester and West Medford on route to Boston's North Station. This service zone represents a key catchment area for both students and staff at the university. It also provides direct service from Bunker Hill Community College to the UMass Lowell campus. The program supports a key goal of the university's Climate Action Plan: the reduction of greenhouse gas emissions by reducing the reliance on single-occupancy vehicles driving to and from campus.



Lowell Canal Bridges

Construction work began this year on the Lowell Canal Bridges TIGER Project. This project is the result of a \$13.4 million FHWA TIGER grant that will majority fund the repair and replacement of a network of canal bridges in Lowell, including two that serve as vital links to the campus. University staff were integral in securing the TIGER grant for Lowell.

On East Campus, the one-lane bridge used by many residential students to cross the Northern Canal, will be replaced by a more attractive span that will include a 12-foot-wide sidewalk.

The Pawtucket Street bridge over the Pawtucket Canal, located between University Crossing and Wilder Street (heading toward South Campus), is also being replaced. The current bridge, last rebuilt in 1920, is unable to accommodate the weight of university buses, which must detour through the city to reach South Campus. When complete, this project will have a positive impact on transportation-related GHG emissions both for the university and the city through more direct transportation links and added amenities for bicyclists and pedestrians. In addition to greenhouse gas emissions reductions, the TIGER project will result in significant operational savings for UMass Lowell's transit system through the elimination of costly and time-consuming detours. \$23.8M, annual saving \$1.1M

Energy Efficiency

UMass Lowell is in the final stages of implementing its multi-year Accelerated Energy Program (AEP). This \$23.8 Million state-sponsored AEP, one of the largest in the Commonwealth, will result in comprehensive campus-wide energy retrofit projects that will generate over \$1.1 million in annual savings while addressing deferred maintenance in many of our campus buildings. As result of the AEP, annual campus electricity has been reduced by over 6 million Kwh, annual fuel use by 500,000 therms, and annual water consumption by 2.5 million gallons.

Urban Agriculture Program

UMass Lowell’s Office of Sustainability has developed an innovative urban agriculture program in partnership with Mill City Grows, a local food justice organization. This community partnership is unique in that it provides services to both the university and also to residents of the City of Lowell in an innovative and engaging setting. Community engagement focused on food access and justice is particularly important in Lowell. The majority of neighborhoods in the city are classified as low income with low food access by the United States Department of Agriculture. Development of this site has been supported by over \$150,000 in grant funding from the Massachusetts Department of Agricultural Resources. Underpinned by an 1,800 square foot greenhouse on an acre of ground which was formally an East Campus parking lot, the site serves as a testing ground where university researchers and students are paired with community members to develop new and efficient ways to use water and energy to grow sustainable crops year-round.



Produce from this site is sold and donated back to the local community in Lowell, while fresh food donations are provided to the UMass Lowell student food pantry.

Faculty from the Francis College of Engineering and Zuckerberg College of Health Sciences are actively using the greenhouse and site for research proposals focused on the food / energy / water nexus. In addition, UMass Lowell launched an innovative approach to Community Supported Agriculture (CSA) this year.

The CSA Pilot Program is a joint initiative between the Office of Sustainability, the Center for Public Opinion and Biomedical and Nutritional Sciences. The goal of the pilot program is twofold: to set the table for a more formal CSA program at UML starting next summer and to provide opportunities for funded research in the areas of urban and community-supported agriculture and sustainable food systems. The research component of this project presents an incredible opportunity to fuse research and service while also benefitting the health of the university community. This project will allow UMass Lowell to develop best practices for establishing a university-based CSA program managed by the Office of Sustainability.

Education, Research and Engagement

UMass Lowell currently holds a STARS Gold rating from AASHE for its campus-wide sustainability efforts. This achievement was made possible due in large part to the university’s extensive integration of sustainability and climate change literacy in curriculum and research. UMass Lowell offers over 200 courses focused on sustainability. Approximately 27% of faculty are engaged in sustainability research and 55% of research-producing departments are engaged in sustainability research. The university also embodies using the campus as a living laboratory by supporting student projects that asses building energy efficiency and campus greenhouse gas emission reduction efforts.



The University of Massachusetts Medical School (UMMS) prioritizes energy efficiency and sustainability in its mission to advance the health and well-being of people through pioneering education, research and health care delivery with its partner UMass Memorial Healthcare (UMMHC). This effort is broad-based, with participation from students, faculty and staff. UMMS continues to partner with UMMHC on campus, sharing its committees, coordinating events and education of its staff.

Resiliency Planning

UMass Medical School continues to implement and explore initiatives which enhance campus resiliency. Utility resiliency is integral to the mission of the medical school and support of our clinical partner UMass Memorial Health Care.

In FY18 UMass Medical School began a project to relocate the central plant’s point of common coupling (PCC) to the existing National Grid point of service. This will prevent National Grid from interacting with the Plant’s E-bus (Campus-wide critical loads) to disconnect the generation from the National Grid electrical system. Additionally, relocating the PCC to allow onsite generation the capability to supply the entire campus load and enhance the stability of the central plant in the event of a utility interruption.

UMass Medical School received funding for several study which will explore potential resiliency options for the campus. The first study, funded by DCAMM, explored the overall practicality and economic viability of district-scale water reclamation and reuse on campus as well assess alternative water supply options, inclusive of rainwater/storm water capture and reuse, groundwater (well) supply, building sump reclamation, and surface water use among others. This study additionally evaluated existing water management practices and develop strategies to minimize water supply risk for critical heating, cooling, fire suppression and other campus operations; improve the University’s environmental footprint through reuse and reduced wastewater discharge; and, Reduce long-term water and sewer utility costs.



Sewer water samples being collected as part of water resiliency study site work

The second resiliency study is funded though the Department of Energy Resources Clean Energy Grant for State Entities. This study which is currently underway will explore energy storage as a resiliency strategy for the UMMS Central Plant, including the potential for energy storage to provide that plant with blackstart capabilities without the use of liquid fuel, additional redundancy for hospital critical loads, and voltage a frequency regulation to enhance plant stability when in island mode and when in parallel with grid service.

Energy Efficiency

UMass Medical School continues to focus on reducing campus energy consumption through significant lighting upgrades, installation of variable frequency drives and chilled beams, and retro-commissioning of existing buildings.

UMass Medical School, as part of the DCAMM Accelerated Energy Program, implemented retro commissioning initiatives in the Lazare Research Building and Main School Building. Initiatives included, the installation of 12,000 LED bulbs, addition of variable frequency drives, and updates to building control sequences. This project will save approximately 35,000 MMBtu of energy equivalent to over \$350,000 annual.

In FY18 the Medical School began a multiyear renovation in the main school building clinical wing to convert laboratories to administrative offices to support our clinical partner. This project will replace the existing dual duct air handling system with a chilled beam system. The new system is expected to reduce electricity consumption by 10%, steam consumption by 6% and chilled water consumption by 15%.



Installation of LEDs in the Lazare Research Building

Sustainable Dining

In FY18 UMass Medical School went out for bid for a new dining services vendor, incorporating sustainable dining criteria into the request for proposal. Additionally, the ability and extent the vendors were able to meet the sustainable dining criteria was used as a measure of selection. The sustainable dining language used in the scope of services for the RFP will be incorporated into the contract language committing selected vendor to increasing sustainable dining into services at UMMS.

APPENDIX:
BOARD OF TRUSTEES REPORT PRESENTATION
UNIVERSITY SUSTAINABILITY POLICY

FY18 Sustainability Report

Administration & Finance Committee

November 29, 2018



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Sustainability Policy Reporting

- ❑ Second year of reporting under the Board adopted Sustainability Policy
- ❑ Established key metrics for annual reporting and continuing to refine the methodologies utilized and appropriate data sources
- ❑ Efficiencies in reporting requirements- consistent metrics with Commonwealth reporting requirements has streamlined and eased the campuses reporting through the Leading By Example program
- ❑ Improvements to our metric reporting and time spent refining these methodology has a direct effect on our reputation as a University. Numerous organizations such as the Sierra Club, Princeton Review, and AASHE's STARS reporting rely on these metrics to determine their annual rankings on sustainability.

Sustainability Metrics

Sustainability Strategic Planning

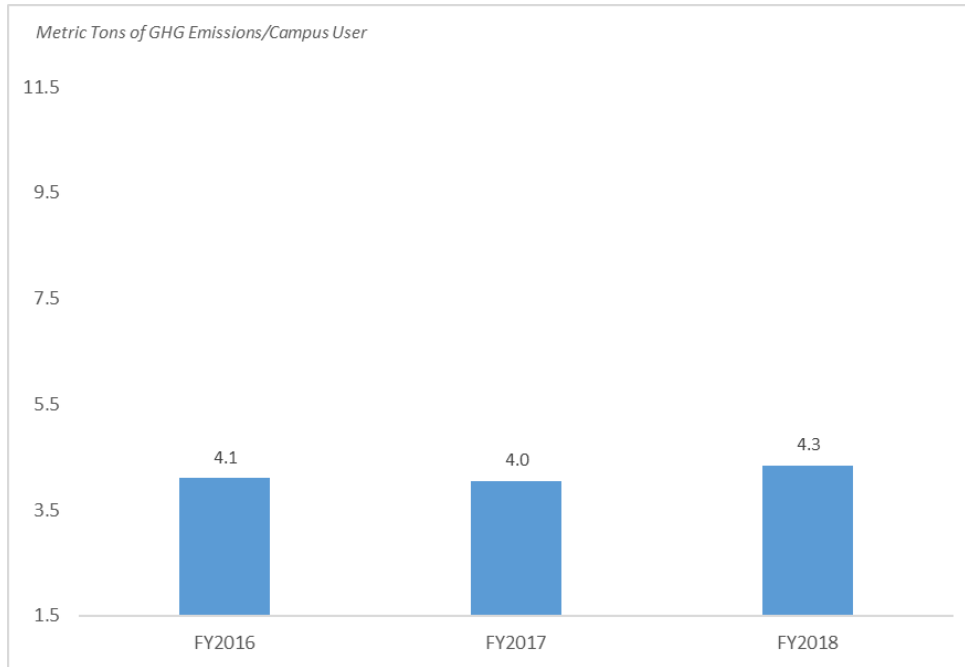
Best Practices Achieved

- ❑ Sustainability elements integrated across the campuses into the Strategic and Capital Planning processes
- ❑ Climate Action Plans are current and up to date at Boston, Lowell, and the Medical School
- ❑ Medical School is completing an Energy/Utility Master Planning effort; campuses in stages of analysis

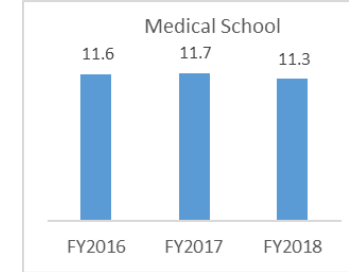
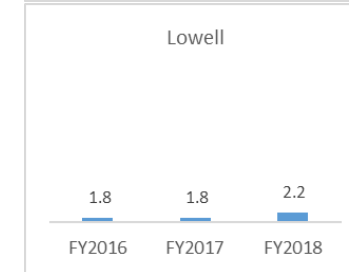
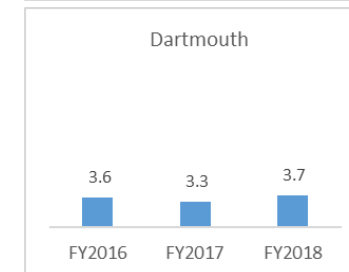
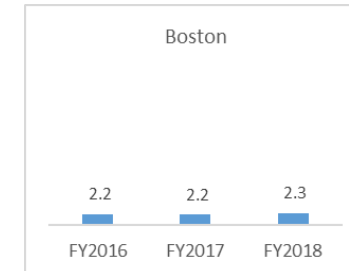
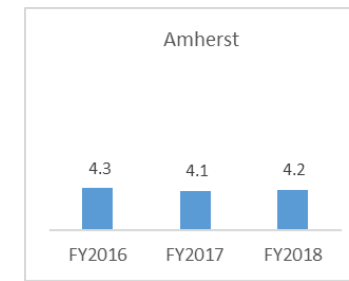
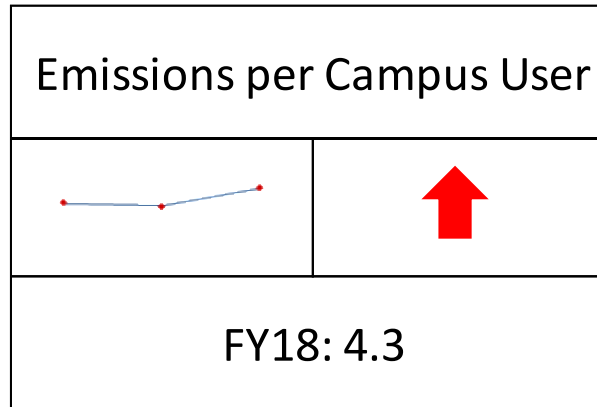
Planning Ahead

- ❑ Amherst and Dartmouth Climate Action Plans are in need of updating
- ❑ Sustainability Master Planning efforts are an identified best practice with campuses in various stages of development
- ❑ Coordinating campuses around aligning regular reporting through the STARS program on sustainability metrics

Greenhouse Gas Emissions – Emissions Per Campus User



Metric Tons of GHG Emissions/Campus User	FY2016	FY2017	FY2018
Amherst	4.3	4.1	4.2
Boston	2.2	2.2	2.3
Dartmouth	3.6	3.3	3.7
Lowell	1.8	1.8	2.2
Medical School	11.6	11.7	11.3
University	4.1	4.0	4.3



Climate Resilience and Preparedness

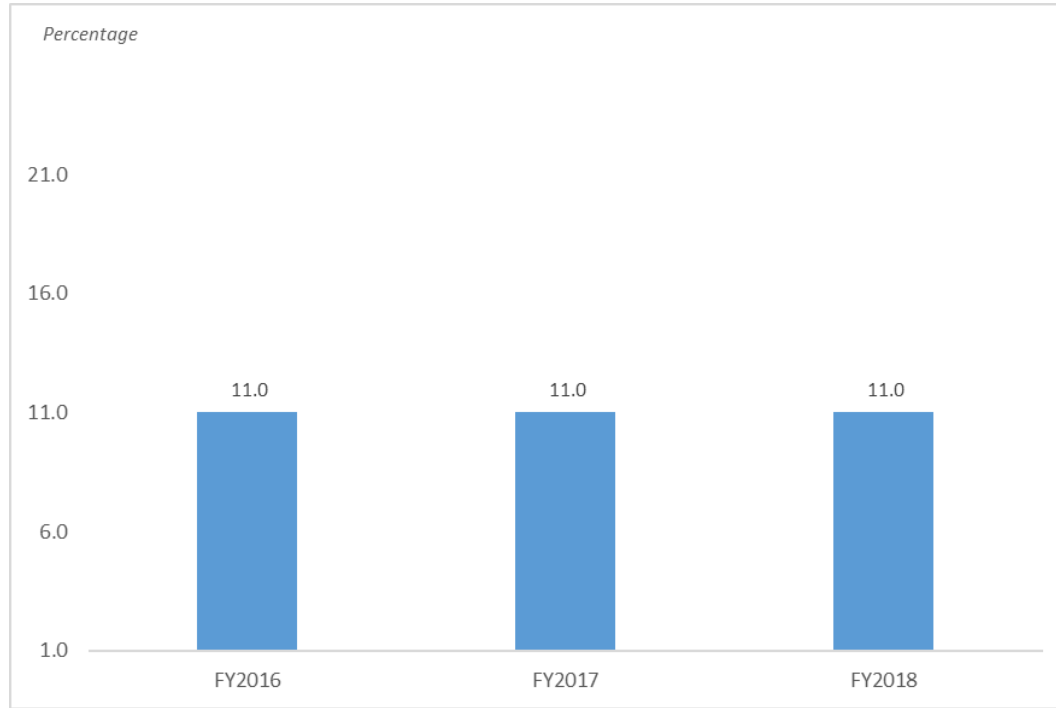
Best Practices Achieved

- ❑ All campuses have aspects of climate resilience and preparedness included in key campus planning documents.
- ❑ Through the Hazard Mitigation Planning efforts, climate resiliency for our campuses has been addressed on a consistent basis

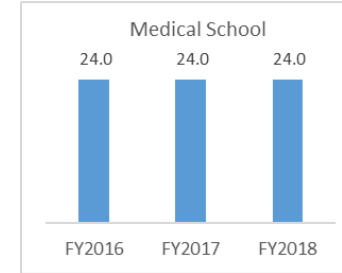
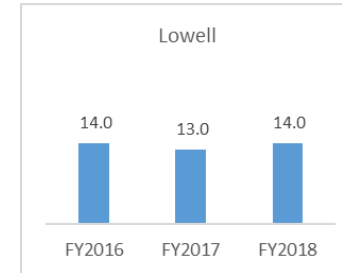
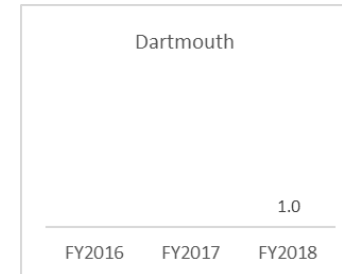
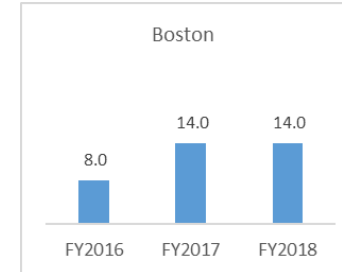
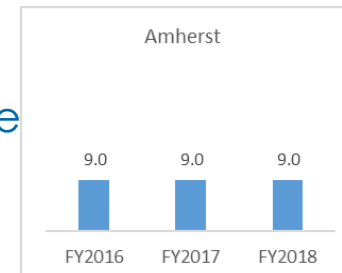
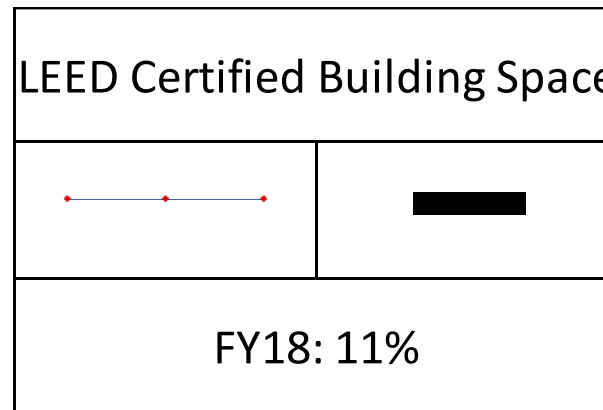
Planning Ahead

- ❑ Developing climate resilience and preparedness in the future after guidance from Executive Order 569 is issued
 - ❑ EO 569 establishes an Integrated Climate Change Strategy for the Commonwealth
 - ❑ Specifically maps out climate resilience planning as a key element

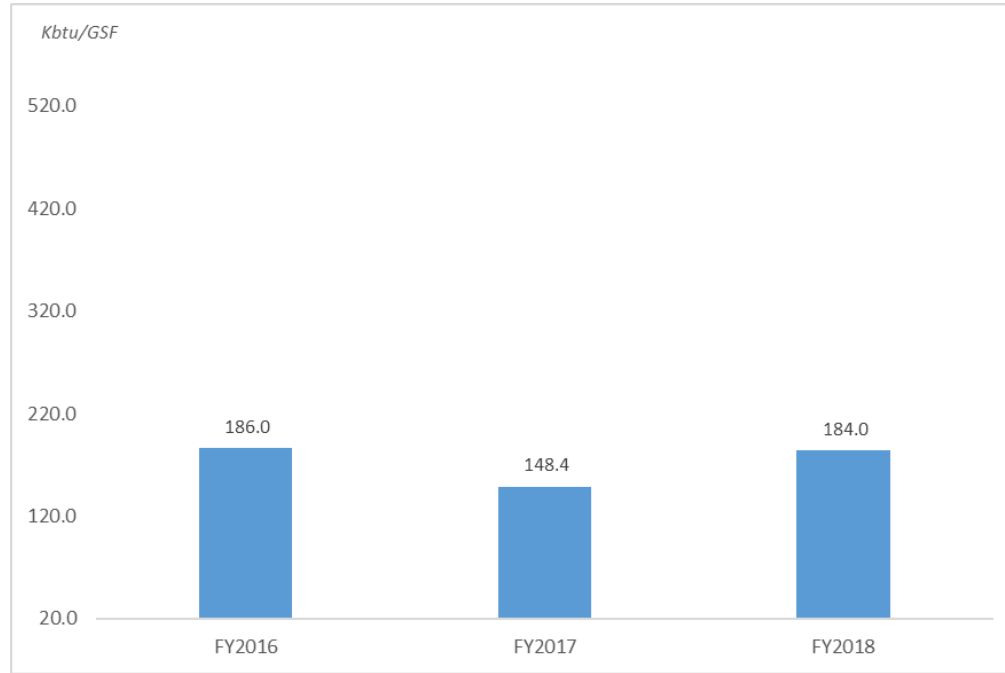
Building Operations – Percentage of LEED Certified Building Space Square Footage



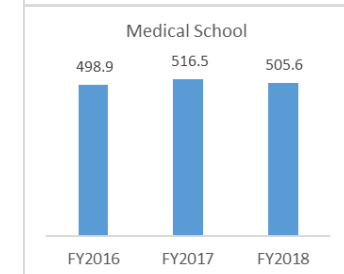
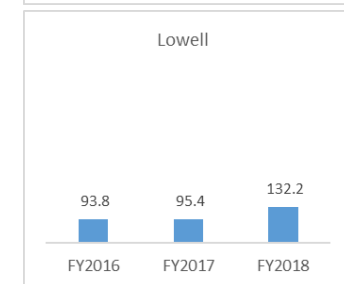
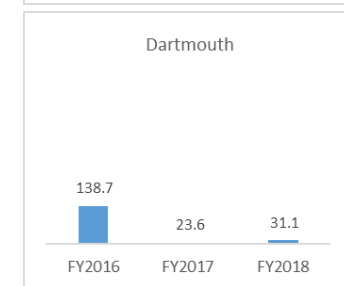
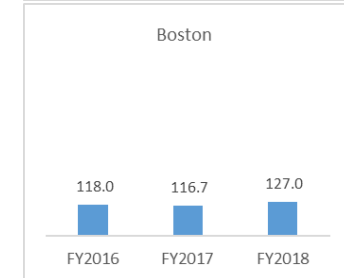
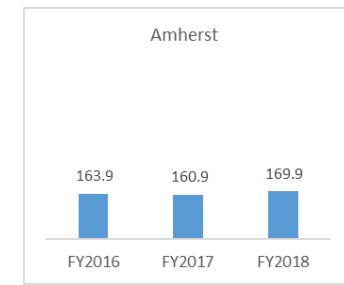
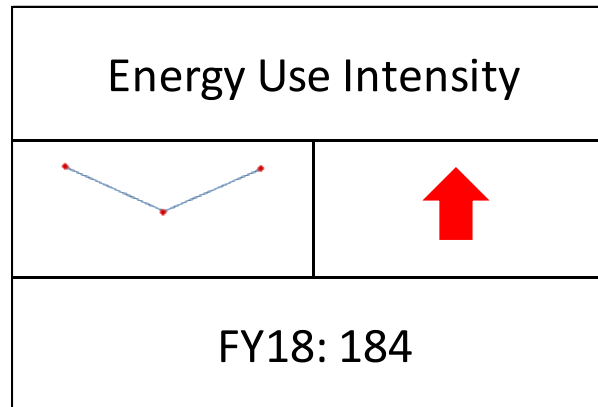
%	FY2016	FY2017	FY2018
Amherst	9.0	9.0	9.0
Boston	8.0	14.0	14.0
Dartmouth	0.0	0.0	1.0
Lowell	14.0	13.0	14.0
Medical School	24.0	24.0	24.0
University	11.0	11.0	11.0



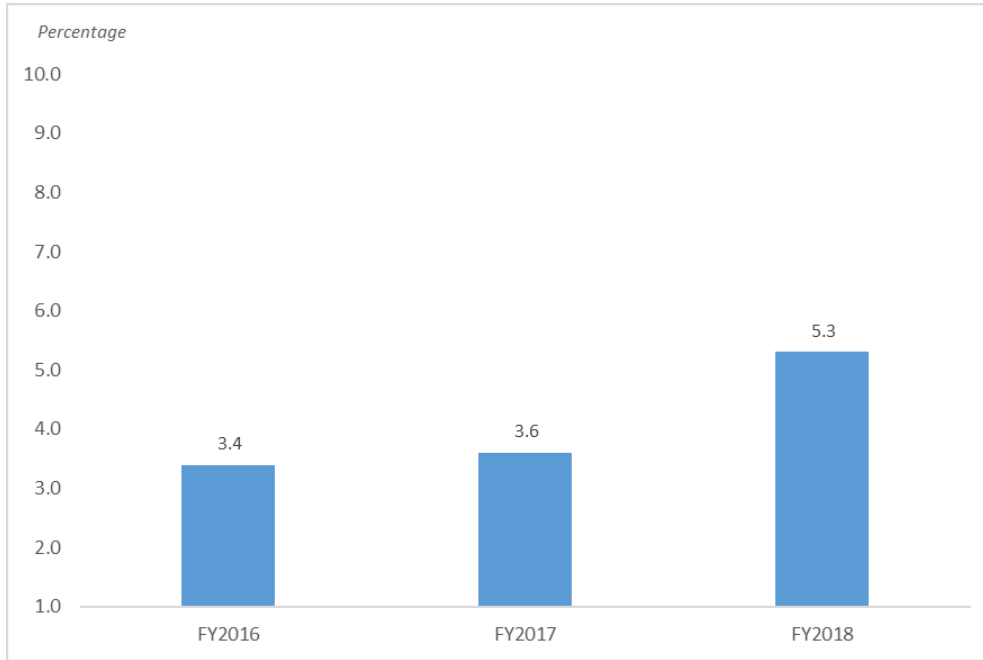
Energy Consumption - Energy Use Intensity



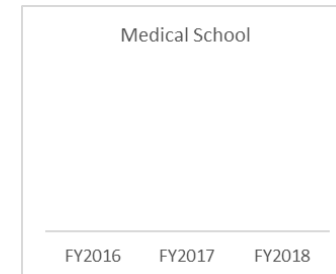
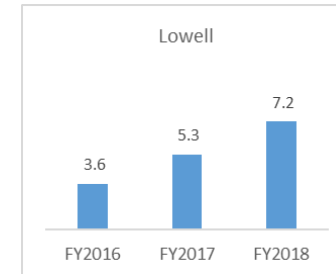
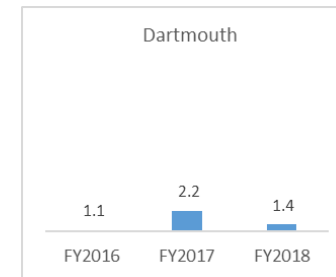
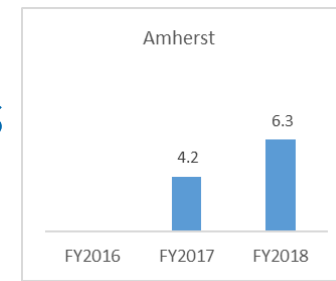
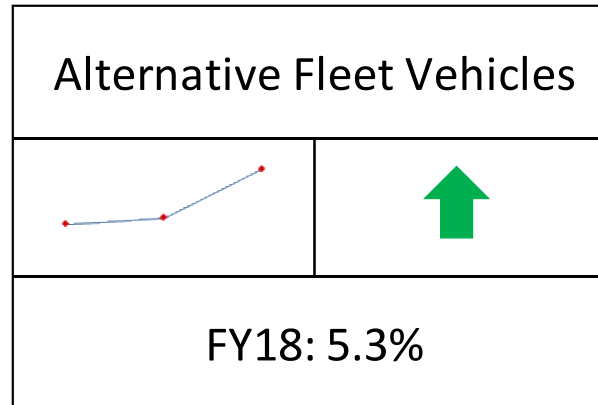
Kbtu/GSF	FY2016	FY2017	FY2018
Amherst	163.9	160.9	169.9
Boston	118.0	116.7	127.0
Dartmouth	138.7	23.6	31.1
Lowell	93.8	95.4	132.2
Medical School	498.9	516.5	505.6
University	186.0	148.4	184.0



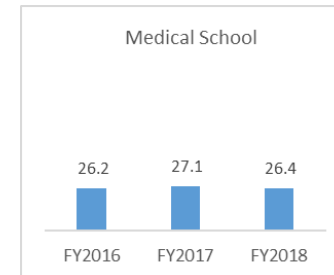
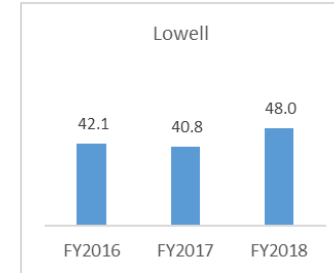
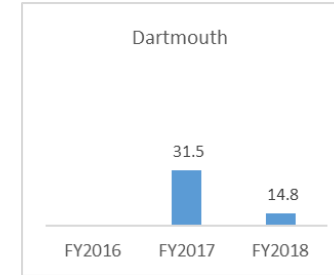
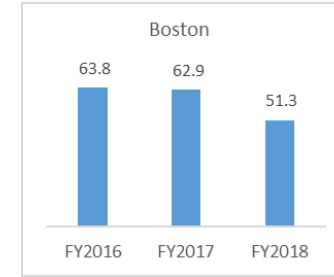
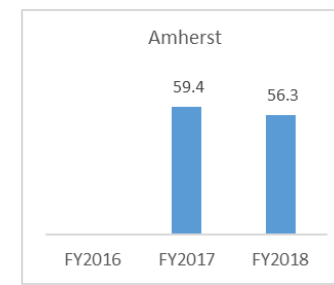
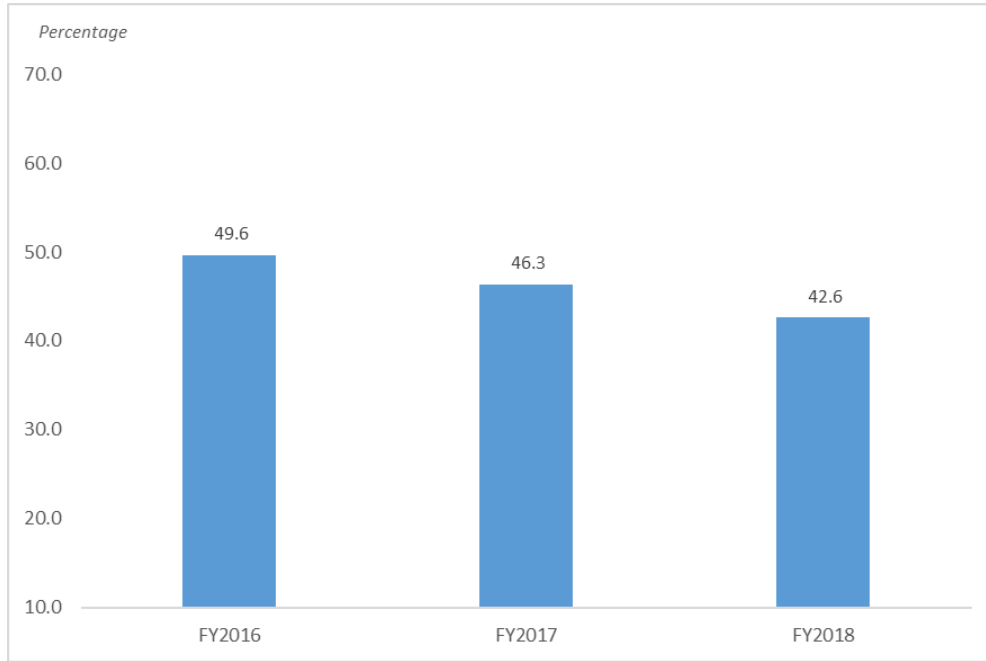
Sustainable Transportation – Alternative Energy Fleet Vehicles



%	FY2016	FY2017	FY2018
Amherst	NA	4.2	6.3
Boston (1)	0.0	0.0	0.0
Dartmouth	1.1	2.2	1.4
Lowell	3.6	5.3	7.2
Medical School	0.0	0.0	0.0
University	3.4	3.6	5.3

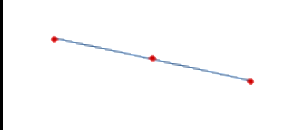



Waste Reduction – Disposal Diversion



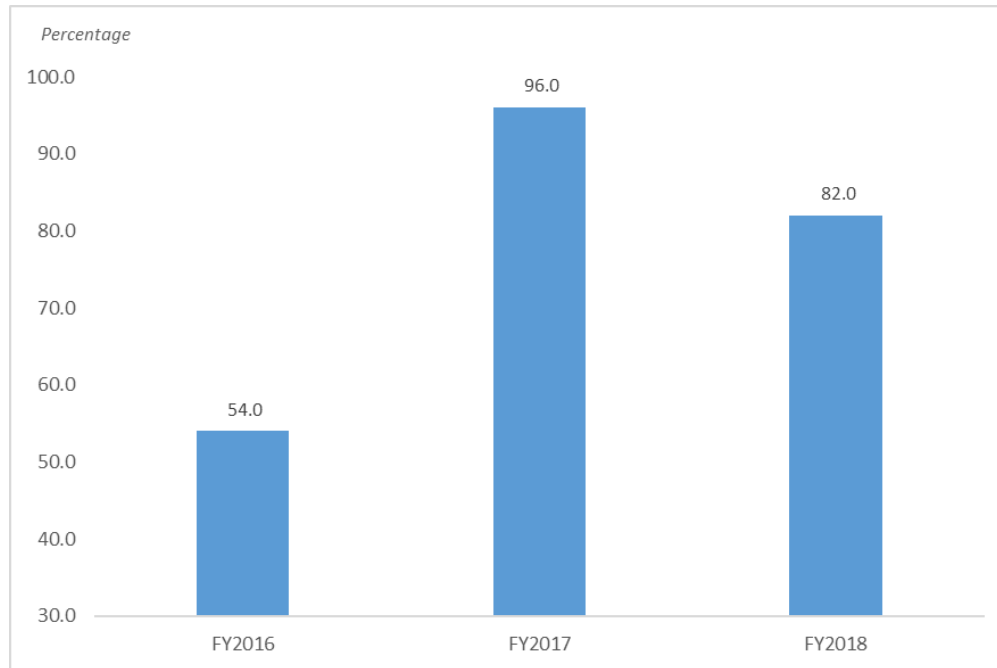
%	FY2016	FY2017	FY2018
Amherst	NA	59.4	56.3
Boston	63.8	62.9	51.3
Dartmouth	NA	31.5	14.8
Lowell	42.1	40.8	48.0
Medical School	26.2	27.1	26.4
University	49.6	46.3	42.6

Waste Disposal Diversion

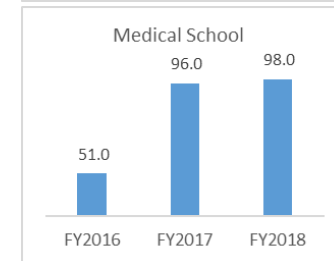
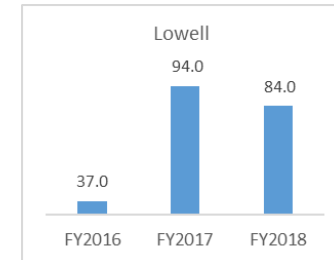
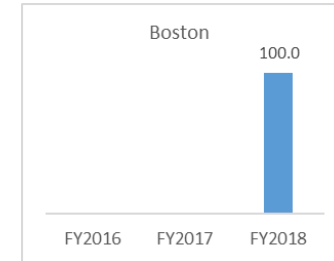
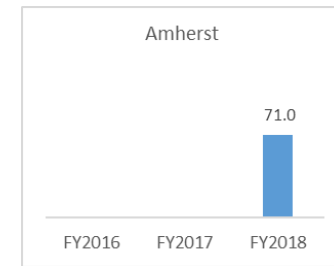
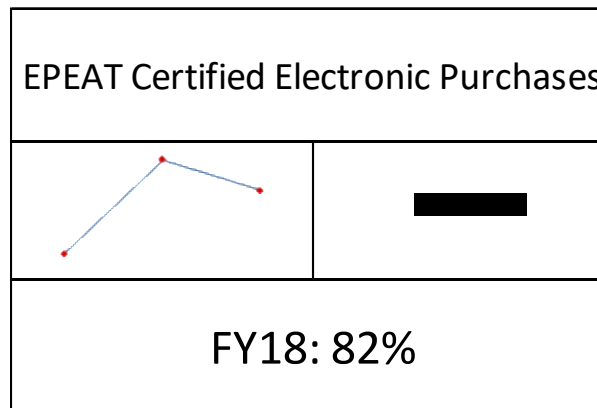



FY18: 42.6%

Environmental Procurement - EPEAT Electronics Procured

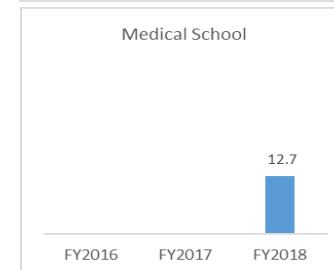
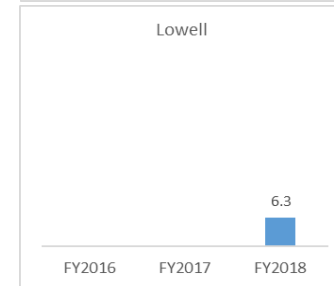
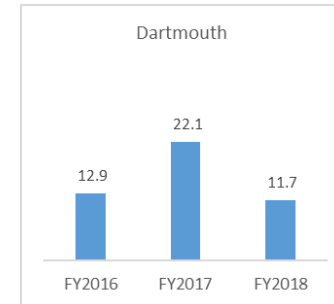
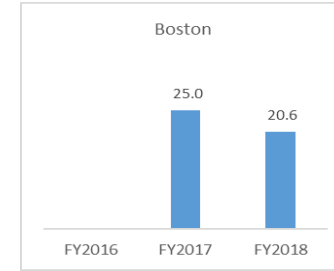
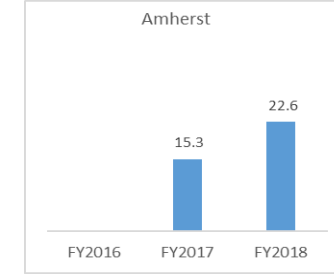
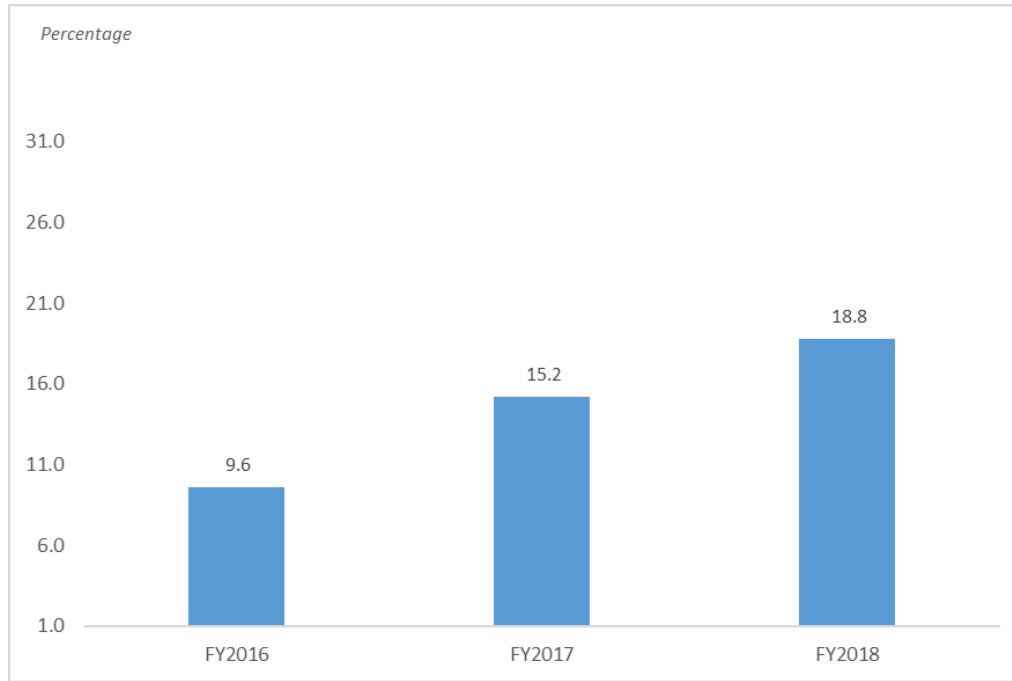


%	FY2016	FY2017	FY2018
Amherst	NA	NA	71.0
Boston (1)	NA	NA	100.0
Dartmouth	NA	NA	NA
Lowell	37.0	94.0	84.0
Medical School	51.0	96.0	98.0
University	54.0	96.0	82.0



(1) UMB figure for FY18 reflect a portion of electronic procurements through a Replace program, which is a majority of campus computer purchases; campus is refining available data to show complete procurement data

Sustainable Food Services – Locally Sourced Food

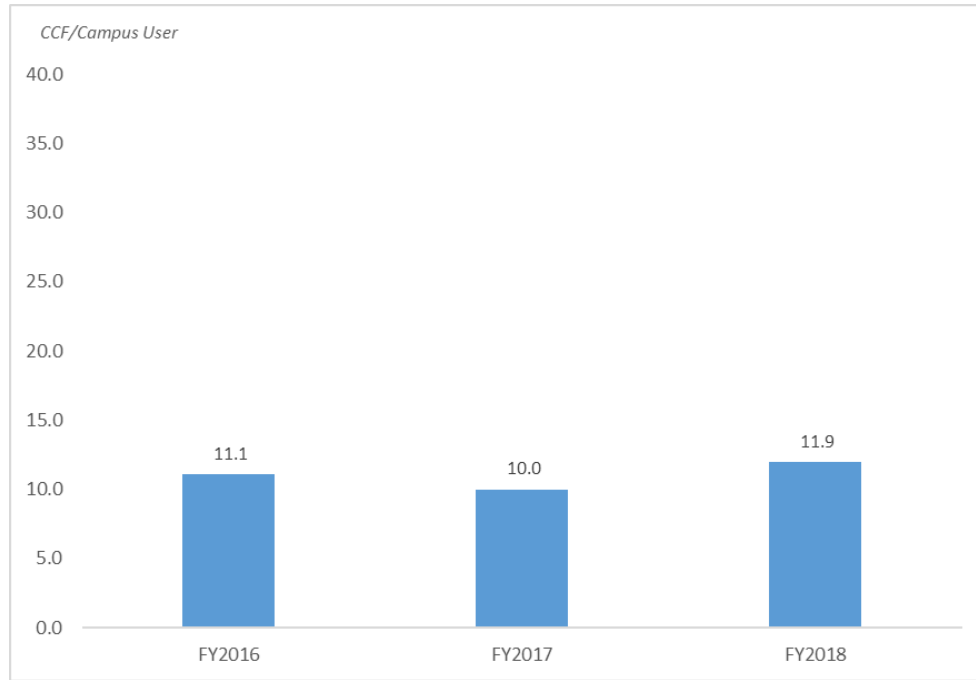


%	FY2016	FY2017	FY2018
Amherst	NA	15.3	22.6
Boston	NA	25.0	20.6
Dartmouth	12.9	22.1	11.7
Lowell	NA	NA	6.3
Medical School	NA	NA	12.7
University	9.6	15.2	18.8

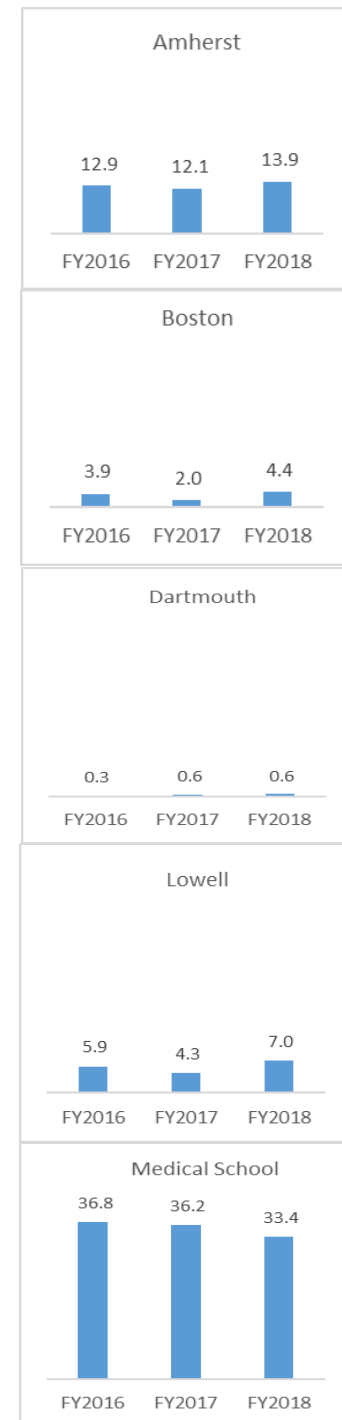
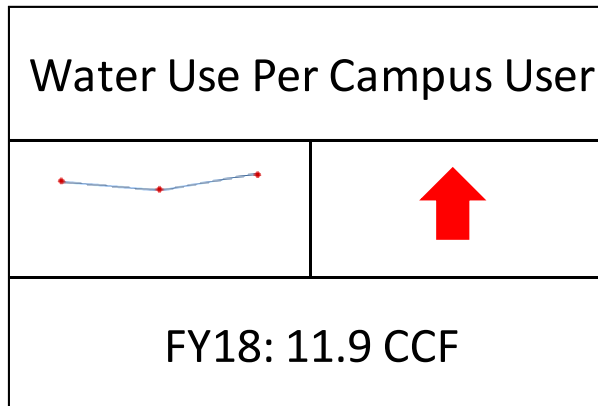
Certified Local Food Supply

FY18: 18.8%

Water Systems – Water Consumption Per Campus User



Hundreds of Cubic Feet (CCF)/Campus User	FY2016	FY2017	FY2018
Amherst	12.9	12.1	13.9
Boston	3.9	2.0	4.4
Dartmouth	0.3	0.6	0.6
Lowell	5.9	4.3	7.0
Medical School	36.8	36.2	33.4
University	11.1	10.0	11.9



Sustainability Community Engagement

Best Practices Achieved

- ❑ UMass campuses actively partner with other state agencies through the Leading by Example program to advance sustainability efforts and partner on best practices.
- ❑ UMass partners with national organizations such as Second Nature, Association for the Advancement of Sustainability in Higher Education (AASHE), and the U.S. Green Building Council, among numerous others

Planning Ahead

- ❑ Annually coordinates and programs around Earth Day celebration to spread awareness about sustainability efforts
- ❑ Partner with local advocacy organizations to collaborate on issues that range from transportation needs to costal environment protection.

UNIVERSITY OF MASSACHUSETTS
SUSTAINABILITY POLICY

PURPOSE

The Sustainability Policy exemplifies the long-term commitment of the five campuses of UMass to be good stewards of fiscal and environmental resources. Our environmental responsibility is rooted in the University's founding as a land-grant institution, designed to bolster good stewardship of land and industry as well as to serve the greater public good. With stewardship in mind, the efforts and achievements of each campus are celebrated while striving to be sustainability leaders, fulfilling our mission of advancing knowledge, and improving the lives of the people of the Commonwealth, nation, and world.

I. INTRODUCTION

The University of Massachusetts which includes five campuses in Amherst, Boston, Dartmouth, Lowell and the Medical School in Worcester has made a collective commitment to be "good stewards of resources". This includes responsibly managing our fiscal resources, investing in our capital assets, continuing our commitment to being environmentally responsible, and, in direct alignment with UMass' core mission, providing transformative education and research in the area of sustainability. Each of the University's campuses conducts a wide variety of sustainable programs and services many of which are unique to its campus population but all of which serve to make UMass as a whole better stewards of our environmental resources.

In 2007, the University President and all five campus Chancellors signed the American College & University Presidents' Climate Commitment (ACUPCC). In so doing, the University committed to developing a plan for achieving carbon neutrality, taking concrete initial steps to achieve that, and publishing required progress reports. During that same year, the Commonwealth of Massachusetts Executive Order 484 called "Leading by Example" (LBE) established aggressive targets for state agencies including reducing greenhouse gas emissions and energy consumption. In 2009, the Commonwealth of Massachusetts Executive Order 515, known as the Environmental Purchasing Policy, was signed to promote the use of clean technologies, recycled materials, and less toxic products. That Environmental Purchasing Policy is committed to reducing impact on the environment and enhancing public health by procuring Environmentally Preferable Products (EPP) and services whenever such products and services are readily available. Currently, the

University performs required compliance activities in accordance with Massachusetts Department of Environmental Protection regulations relating to solid waste, hazardous waste management, air pollution, underground storage tanks, wastewater, and other applicable regulations.

Since taking office in January of 2015, Governor Charlie Baker has indicated his commitment to energy and sustainability efforts with a focus on diversification of the Commonwealth's energy sources. The Governor's administration has been actively developing policy proposals and advocating for alternative sources of energy. In July 2016, the Legislature approved and the Governor signed an energy diversification law implementing requirements for utilities to enter into long-term commitments for off-shore wind and hydroelectric power. The new law also creates opportunities to finance energy improvements for commercial properties, addresses improvements to renewable power storage; and prioritizes gas leak identification and remediation. While the law does not directly impact the University energy portfolio, the legislation aligns with the University's goal of reducing carbon emissions and increasing renewable energy consumption.

Addressing climate change and carbon pollution have recently become more prevalent topics in the national discourse. On August 3, 2015, President Barack Obama announced a historic commitment to clean energy and reducing carbon emissions through the "Clean Power Plan." The Plan creates the first-ever carbon pollution standards for power plants and is designed to reduce carbon emissions by 32 percent by 2030 from 2005 levels. It further sets goals for each state based on its energy production and allows states to tailor their own state-specific plans to meet the Clean Power Plan goals. The Clean Power Plan bolsters efforts to expand renewable energy generation, build clean energy infrastructure, and promote energy conservation practices.

Over the course of this same period, the University has made historic investments in capital infrastructure to meet the need of increasing student demand but also to address the deferred maintenance needs of many of our campus buildings. Continued infrastructure investment will be needed to address outstanding needs and position our campus infrastructure for the future. As part of these efforts, strategic investments in energy efficiency, renewable energy, emissions reductions, recycling and waste reduction, water conservation, sustainable transportation, and other building/campus improvements have to be incorporated into all efforts of infrastructure and operational planning.

This Sustainability Policy has been developed using the principles currently employed by the campuses for planning and investments, and strategic initiatives such as the ACUPCC and Leading by Example. The University System has a responsibility to the people of the Commonwealth to take a leadership role in preserving resources for future generations by making sustainable decisions today.

II. POLICY STATEMENT

OVERARCHING PRINCIPLES

The University of Massachusetts is committed to responsible stewardship of resources and to demonstrating leadership in sustainable business practices. The University's five campuses should be continuously improving our practices for sustainability consistent with available funding.

The guiding principles for the University of Massachusetts Sustainability Policy include: Sustainability Strategic Planning, Clean Energy, Climate Resilience and Preparedness, Green Building Design and Sustainable Campus Operations, Sustainable Transportation, Waste Reduction and Recycling, Environmentally Preferable Purchasing, Sustainable Food Services, Sustainable Water Systems, and Academic and Research Programming and Community Engagement.

The goals below have been developed to address key elements of these guiding principles.

PRINCIPLES WITH GOALS

1. Sustainability Strategic Planning – Integration of sustainability planning, practices, and strategies into the University's strategic planning processes

- 1. Goal** - Complete a sustainability plan with a focus on energy projects at each campus, or update any existing plans, to align with the principles and goals outlined in this policy in order to adequately and efficiently understand the energy needs and potential sustainability projects on each campus.

2. Clean Energy – Supports the development and use of clean and renewable energy sources

- 1. Goal** - Achieve UMass' commitment to carbon neutrality by 2050 or as specified through the sustainability planning process occurring through the development of campus-specific action plans, as identified in Goal 1.1 as being necessary to achieve carbon reduction commitments and meet sustainability objectives, and UMass system's guiding principles towards this goal.
- 2. Goal** - Procure a defined amount of annual electricity consumption through renewable and clean energy sources as identified in Goal 1.1 as being necessary to achieve carbon reduction commitments and meet sustainability objectives.

- 3. Climate Resilience and Preparedness – Implementation of strategies to mitigate or reduce environmental impact**
 1. **Goal** - Build climate resilience and preparedness standards into the University’s capital planning process, emergency management and business continuity planning.

- 4. Green Building Design and Sustainable Campus Operations – Strategies to address emissions associated with designing, building, maintaining, and operating campus buildings and grounds**
 1. **Goal** - Any new construction must meet the MA Leadership in Energy and Environmental Design (LEED) Plus green building standards, (LEED most current version) or other standards as identified in Goal 1.1 as being necessary to achieve carbon reduction commitments and meet sustainability objectives, and continue to research and employ improved sustainable building practices.
 2. **Goal** - Reduce energy consumption, increase efficiency, and determine goals consistent with capital investments and annual programs implemented in support of energy consumption reduction as identified in Goal 1.1 as being necessary to achieve carbon reduction commitments and meet sustainability objectives.

- 5. Sustainable Transportation – Integrating sustainable best practices for the use and maintenance of campus fleets, student/employee commuters, and public transportation options**
 1. **Goal** - Reduce vehicle fuel consumption of the University vehicle fleet through promoting the use of public transportation, reducing the number of single occupancy vehicles and increasing the use of other alternative fuel transportation for faculty, staff, and students.

- 6. Waste Reduction and Recycling – Promote strategies to encourage waste reduction and re-use and acknowledge the importance of preventative measures**
 1. **Goal** 1 Employ strategies around preventative measures in waste diversion to promote source reduction, re-use and recycling of used materials.

- 7. Environmentally Preferable Purchasing – Implement a procurement approach to access environmentally-conscious products whenever applicable and available**
 1. **Goal** - Establish Environmentally-Preferable Products Procurement Program (EPP) and continue to implement annual procurement goals to move toward alignment with the standards of the Environmental Purchasing Advisory Council wherever appropriate and consistent with available funding.

8. Sustainable Food Services – Supporting sustainable food systems through food and beverage purchases

1. **Goal** - Strive for each campus food service operation to procure sustainable food products while maintaining accessibility and affordability for all students and campus patrons.

9. Sustainable Water Systems – Reducing campus water withdrawals can reduce pressures on local aquifers, streams, rivers, lakes, and aquatic wildlife

1. **Goal** - Reduce potable water usage and determine goals consistent with capital investments and annual programs implemented in support of reducing potable water.

10. Academic and Research Programming and Community Engagement – Ensuring Sustainability is part of Academic and Research programming and part of community engagement efforts

1. **Goal** - The UMass Sustainability Council will work with their respective campus curriculum governance units to identify where Academic and Research Programming and Community Engagement involving Sustainability already exists, and to explore more formal incorporation into core curriculum and identified learning outcomes.

III. REPORTING

The University will measure and track progress on achieving defined goals through the current reporting requirements of the ACUPCC and Leading by Example. With accountability and transparency in mind, the University commits to provide an annual report regarding each campus' sustainability activities to University Board of Trustees.

The University is committed to transparent and consistent reporting standards on sustainability metrics to critical external organizations. It is valuable to the University and the organizations to measure the achievements towards goals on a defined scale and to refine strategies to achieve continuous improvement. The University participates in numerous organizations advancing sustainability and the Commonwealth's Leading By Example initiative which all require reporting as described below.

- **Annual Board of Trustees Report:** provide an annual update on sustainability efforts across the University and detail areas of progress towards defined sustainability goals as well as on-going needs in order to achieve established benchmarks.
- **STARS Reporting:** provide necessary updates to the Sustainability Tracking, Assessment & Rating System (STARS), a program of the Association for the Advancement of Sustainability in Higher Education (AASHE) which measures

performance in sustainability, and encourages accountability and transparency in all reporting institutions. The reporting system collects data across various metrics organized into four categories: Academics, Engagement, Operations, and Planning & Administration. Each campus shall continue any STARS reporting in progress and work towards appropriate STARS ranking most applicable to the individual campus moving forward while striving for excellence in sustainability.

- **ACUPCC Reporting:** As a member of ACUPCC, institutions are required to report metrics to the organization in order to track progress towards the Presidents' Climate Commitment. ACUPCC incorporates the STARS reporting system for its interim reports, which will stream-line the reporting requirements to this organization.
- **Leading by Example or its Successor Executive Order:** The Commonwealth of Massachusetts program to reduce greenhouse gas emissions requires annual reporting on energy consumption and related costs.

IV. DELEGATION

The President and Chancellors may delegate all or any part of their authority set forth in this Policy in accordance with the University's delegation policy.

V. STANDARDS

The President, in consultation with the Vice President(s) and Chancellors, will issue administrative standards to implement this policy.

**ADMINISTRATIVE STANDARDS FOR THE
SUSTAINABILITY POLICY
(Doc. T16-055)**

I. INTRODUCTION

Sustainability Standards are intended to assist in the implementation of the University’s Sustainability Policy. The policy provides a framework within which the University reviews its progress toward meeting its sustainability goals. The University’s commitment to sustainability practices are not strictly limited to the topics outlined. The University endeavors to demonstrate leadership in sustainable practices in any topic area where it is applicable and appropriate in a manner that is compatible with these overarching UMass System sustainability principles.

II. STANDARDS STATEMENT

Principles – Goals – For each of the Principles, goals were established to determine how the principle would be evaluated over time. For background, each of the goals was evaluated to address the following questions:

- Define the goal issue and provide background information to understand the goal in layperson terms.
- Why is this goal important to highlight?
- Where do the University/campuses currently stand in meeting this goal?
- Are there other groups/departments who will be critical stakeholders in meeting this goal?
- What has been done in the past to advance towards this goal?
- What does the University/campus need to do in order to reach this goal?

III. RELATED PROCEDURES, FORMS, AND OTHER RESOURCES

<i>Principle</i>	<i>1</i>	<i>Sustainability Strategic Planning – Integration of sustainability planning and strategies into the University’s strategic planning processes.</i>
<i>Goal</i>	<i>1.1</i>	<i>Complete a sustainability plan with a focus on energy projects at each campus, or update any existing plans, to align with the principles and goals outlined in this policy in order to adequately and efficiently understand the energy needs and potential sustainability projects on each campus.</i>
<i>Metric</i>		<i>Biennially report on the development progress of an Energy Master Plan/Sustainability Plan consistent with the Capital Plan reporting.</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - The purpose of an energy master plan and/or sustainability plan centers on the need to evaluate where each campus stands as it relates to energy projects and show how university commitments for carbon emissions reduction, green building designs, and other sustainability objectives will be met, with approximate timelines and costs for meeting those commitments and objectives. To date, each campus has undertaken a variety of projects addressing renewable energy or energy consumption. However, some campuses have completed more or less projects than others resulting in the need for evaluating where each campus has the ability to pursue future projects and their impacts. A comprehensive understanding of the impact of recent energy projects and the feasibility of future energy projects will allow each campus to tailor strategies to meet its energy needs and goals.

- **Why is this goal important to highlight?**
 - When undertaking substantial initiatives or new policies it is important to evaluate the current situation to assist in determining the proper course moving forward. Sustainability planning/energy master planning allows each campus to map out options and prioritize projects dependent on funding sources and their general impact on University operations.

- **Where do the University/campuses currently stand in meeting this goal?**
 - Currently, the Amherst campus has completed an Energy Master Plan and is in the process of implementing the plan. However, the other four campuses have not undergone a formal evaluation and planning session.

- **Are there other groups/departments who will be critical in meeting this goal?**
 - While sustainability/energy master plans transcend all areas of the campuses and potentially spark priority conversations, the crucial departments involved in this process are sustainability and facilities/operations.

- **What has been done in the past to advance towards this goal?**
 - As previously stated, the Amherst campus has recently completed an Energy Master Plan and are utilizing it to determine projects and priorities. The other campuses have not undergone this type of comprehensive planning.

- **What does the University/campus need to do in order to reach this goal?**
 - The University must support these planning processes across all of the campuses for a consistent picture of where campuses currently stand and what can be done in the future to meet their energy needs in a sustainable and affordable manner. Each campus must engage their constituencies to engage in this planning as a way to accomplish many of the goals contained in this policy.

<i>Principle</i>	2	<i>Clean Energy – Supports the development and use of clean and renewable energy sources.</i>
<i>Goal</i>	2.1	<i>Achieve UMass commitment to carbon neutrality by 2050 or as specified through the sustainability planning process occurring through the development of campus-specific action plans, as identified in Goal 1.1 as being necessary to achieve carbon reduction commitments and meet sustainability objectives, and UMass system’s guiding principles towards this goal.</i>
<i>Metric</i>		<i>Annually publish latest available greenhouse gas (GHG) emissions inventory</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - In 2007, the President of the University of Massachusetts signed the American College & University Presidents’ Climate commitment (ACUPCC). In doing so the University committed to developing plans to achieve climate neutrality. In the context of this commitment climate neutral is the elimination of net greenhouse gas emissions from campus operations. The University under the commitment is required to reduce greenhouse gas emissions and report on the following: stationary sources (fossil fuels burned in boilers, central heating plants and power plants), mobile sources (fossil fuels used in vehicle fleet), purchased electricity, financed air travel, and commuting of faculty, staff and students. There are also additional reporting categories including refrigerants and chemicals, agricultural sources, other financed travel, study abroad, solid waste, and waste water which when included give a more comprehensive assessment of greenhouse gas emissions. Under this commitment each UMass campus developed baseline greenhouse gas inventories and created climate action plans which set interim goals and outlines mechanisms to achieve climate neutrality.

- **Why is this goal important to highlight?**
 - The ACUPCC outlines the importance of this goal as it relates to climate change. Climate change is defined as a change in the global or regional climate patterns. The scientific consensus is that climate change is real and attributed to increases in greenhouse gas emissions largely caused by humans. The speed and scale of climate change has the potential for large scale adverse health, social, economic and ecological effects. The Commitment states that to avoid the worst impacts of climate change greenhouse gas emissions need to be reduced 80% by midcentury.

- **Where does the University/campuses currently stand in meeting this goal?**
 - All five campuses have completed climate action plans and report on greenhouse gas emissions and progress to the ACUPCC. It is important to note that the interim goals and climate neutrality are not consistently normalized. Even if they were being normalized they are still not being met because the goals do not compensate for growing energy use intensities (Ex. Labs). Therefore, with the campuses growing, there is a struggle to meet the interim reduction goals and stay on track to become climate neutral by the target date.

- **Are there other groups/departments who will be critical in meeting this goal?**
 - Several departments are integral in moving forward to meet this goal, including Facilities, Engineering and Construction, Planning, Transportation, Purchasing, Sustainability & Energy Management, Power Plant Operations, Administration & Finance, and faculty, staff, and students.

- **What has been done in the past to advance towards this goal?**
 - The campuses have made significant gains in reducing greenhouse gas emissions despite aggressive growth and the addition of new buildings. These reductions come principally from energy efficiency measures, retrofits, fuel switching, and in part from LEED building design.

- **What does the University/campus need to do in order to reach this goal?**
 - High level support and funding is required to develop more extensive carbon reduction plans and to make investments to reduce greenhouse gas emissions.

<i>Principle</i>	2	<i>Clean Energy – Supports the development and use of clean and renewable energy sources.</i>
<i>Goal</i>	2.2	<i>Procure a defined amount of annual electricity consumption through renewable and clean energy sources as identified in Goal 1.1 as being necessary to achieve carbon reduction commitments and meet sustainability objectives.</i>
<i>Metric</i>		<i>Total GHG Emissions Reduced Since LBE Baseline (FY04)</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - When the Leading By Example Executive Order was written and signed into law in 2007, the Governor and the Commonwealth of Massachusetts acknowledged their buildings consumed over 1 billion kwh of electricity, 22 million gallons of heating oil, and 46 million therms of natural gas, resulting in over a million tons of GHG emissions a year contributing to “environmental and health issues...such as global climate change, regional mercury contamination, and urban asthma rates.”

Energy procurement plays a leading role in how the University addresses our long-term commitment to reducing greenhouse gas emissions. The campuses should seek to identify achievable levels of their electricity consumption that comes from renewable energy sources such as wind, solar, hydropower, etc. The University’s energy goals should be consistent with or exceed as feasible the Commonwealth’s energy priorities and funding.

- **Why is this goal important to highlight?**
 - As campuses expand and our energy consumption grows, the University must be seeking electricity from renewable energy sources to alleviate the greenhouse gas emissions impacts. The University is the largest energy consumer in the state and therefore can have a tremendous impact on the overall GHG emissions of Massachusetts. The environmental and human health impacts would be positively affected when the University prioritizes energy conservation, fuel switching, and renewable energy production to reduce GHG emissions.

- **Where does the University/campuses currently stand in meeting this goal?**
 - The campuses have experienced progress in expanding renewable energy sources particularly around solar photovoltaic (PV) projects. The campuses are a part of solar net-metering projects across the state and exploring other renewable energy options. Additionally, there has been an overall reduction of GHG emissions by 14.7% based on the FY 2004 baseline. Some of the campuses have developed interim emission reduction goals prior to the ACUPCC 2050 carbon neutrality commitment, some have not. Each campus must begin to conduct short term and long term emission reduction planning in order to move toward carbon neutrality and begin implementing wide-scale low-carbon energy strategies. Each campus will need to establish prioritized strategies to reflect local and regional needs, opportunities, and challenges. Some strategies may include, but should not be limited to, On-site renewable energy planning and procurement, energy conservation measures in campus buildings such as continuous commissioning, individual energy reduction strategy implementation and behavior change, along with consideration of net-zero energy growth policies.

- **Are there other groups/departments who will be critical in meeting this goal?**
 - The University will have to engage with our energy planners and facility staff in determining the most cost-effective and consistent renewable energy sources. The campus may have an opportunity to engage in conversations with their local electricity utility companies to discuss available resources in the region and ways to work together. The System Office will need to continue to play an important role of convener of Sustainability, Facility, and Administration from each campus in order to advance climate action planning, goal setting, and progress reporting. Each respective campus must have an active Sustainability Committee including decision makers and active community members from Facilities, Procurement, EH&S, Academics and Research, student leaders, and all major energy consuming units on campus including but not limited to: Residential Life, Dining and Auxiliary Services, Athletics, etc.

- **What has been done in the past to advance towards this goal?**
 - The University is currently a part of solar net-metering projects which allows for the credits to offset their electricity costs through large-scale solar PV projects which are not required to be in close geographical location. Despite rapid physical growth of most campuses within the UMass System and new development of very high energy

intensive facilities that help serve the academic mission of the University, the campuses have been effective in reducing energy and emissions through a variety of efforts dating back to the early 2000's. The UMass Building Authority has established the minimum standard for new constructions at all campuses must meet LEED Silver certification.

- **What does the University/campus need to do in order to reach this goal?**
 - The campuses must work to identify the renewable energy sources available to them and how much electricity consumption should be sourced by renewable energy. Carbon emission reduction efforts must be ramped up and prioritized through energy master planning, updates to carbon plan goals and GHG inventories, etc. as well as utilize innovative funding mechanisms such as green revolving funds which have very effective returns on investment throughout higher education and state government.

<i>Principle</i>	<i>3</i>	<i>Climate Resilience and Preparedness - Implementation of strategies to mitigate or reduce environmental impact.</i>
<i>Goal</i>	<i>3.1</i>	<i>Build climate resilience and preparedness standards into the University's capital planning process and emergency management and business continuity planning.</i>
<i>Metric</i>		<i>Published plans including measurable objective with corresponding strategies.</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - Climate resilience is the ability for a system, institution, or operation to withstand the impacts of climate change and related events and to modify assets and adjust operations based on changing circumstances. Climate resilience planning is a critical process for all major institutions to be mindful of when considering other types of planning.
- **Why is this goal important to highlight?**
 - Climate resilience planning for the campuses will assist the long-term planning at the campus level in order to be proactive about potential weather/climate related events impacting University assets and operations. Including but not limited to specific topic areas, such as tropical storms/hurricanes, snow storms, extreme heat, or sea level rise.
- **Where does the University/campuses currently stand in meeting this goal?**
 - The University has included aspects of climate resilience planning into the University Hazard Mitigation Plan.

- **Are there other groups/departments who will be critical in meeting this goal?**
 - The stakeholders involved in this goal are: facilities, administration & finance, design & construction, operations heads, academic heads, student affairs personnel, student government, IT, emergency management staff and campus communications.

- **What has been done in the past to advance towards this goal?**
 - The University has included aspects of climate resilience planning into the University Hazard Mitigation Plan.

- **What does the University/campus need to do in order to reach this goal?**
 - Continued participation and discussion at a local level; funding that can help both resilience and sustainability efforts.

<i>Principle</i>	<i>4</i>	<i>Green Building Design and Sustainable Campus Operations – Strategies to address emissions associated with designing, building, maintaining, and operating campus buildings and grounds.</i>
<i>Goal</i>	<i>4.1</i>	<i>Any new construction must meet the MA LEED Plus green building standards (LEED most current version) or other standards as identified in Goal 1.1 as being necessary to achieve carbon reduction commitments and meet sustainability objectives and continue to research and employ improved sustainable building practices.</i>
<i>Metric</i>		<i>Annual report of building construction and LEED Certifications</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - In 2006, the Massachusetts Sustainable Design Roundtable was assembled consisting of a public-private collaboration of 54 state agencies, private firms and non-profit organizations to create An Action Plan for Green Building in Massachusetts State Construction Project.
 - The Roundtable has recommended adoption of a new “Massachusetts LEED Plus” standard that specifically mandates certain LEED points for energy performance, building commissioning (i.e. 3rd party verification that a building’s systems work as designed), achievement of smart growth objectives, and water conservation.
 - This criterion evolved into LEED Silver for new buildings and the basic LEED Plus for construction projects less than 20,000 SF.

- **Why is this goal important to highlight?**
 - The Roundtable’s report found that in studying 33 green buildings that were already built, by spending an additional \$3-5 per SF in building costs, a savings of \$15 per SF in operational costs from lower energy, water and maintenance was observed.

- **Where do the University/campuses currently stand in meeting this goal?**
 - The University of Massachusetts Building Authority has established the Massachusetts LEED Plus and LEED Silver minimum standard for all new

construction. Where applicable the campuses have been designing to the LEED Gold standard or higher.

- **Are there other groups/departments who will be critical in meeting this goal?**
 - There are numerous stakeholders associated with the success of this goal: DCAMM and UMBA, Campus Leadership, University’s Facility Management (Planning, Project Management, Operations & Maintenance), Sustainability and Energy Management, and EH&S.
- **What has been done in the past to advance towards this goal?**
 - The establishment of an energy and sustainability standard of LEED Plus & LEED Silver for the Facilities departments to use when considering the renovations and designs for new buildings.
- **What does the University/campus need to do in order to reach this goal?**
 - The design of new construction and renovations provides the opportunity to evaluate the impact of energy infrastructure from a financial and energy efficiency perspective. The diligent application of these standards on all projects, no matter how large or small, will continue to demonstrate progress towards our goal.
 - The University must also examine opportunities to design beyond LEED standards depending on the project. Other building standards might be more suitable depending on the project details such as Zero Net Energy Buildings (ZNEB), Passive House, Lab 21 Green Lab Standards, Greening IT practices, Living Building Challenge, and Architecture 2030.

<i>Principle</i>	<i>4</i>	<i>Green Building Design and Sustainable Campus Operations – Strategies to address emissions associated with designing, building, maintaining, and operating campus buildings and grounds.</i>
<i>Goal</i>	<i>4.2</i>	<i>Reduce energy consumption and determine goals consistent with capital investments and annual programs implemented in support of energy consumption reduction, as identified in Goal 1.1 as being necessary to achieve carbon reduction commitments and meet sustainability objectives.</i>
<i>Metric</i>		<i>Total Energy Use Intensity Per Square Foot</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - Energy reduction goals need to be met in a variety to ways that include green procurement, enhanced recycling, IT, enhanced tree planting, increasing recycled paper, transit and clean energy options, residential dorms, building complete streets or smart/livable/walkable cities, food sourcing, green construction etc. and thus involves system-level planning over and above physical plant improvements.
- **Why is this goal important to highlight?**
 - The importance of this goal stems from the need to identify strategies that reduce the energy consumption of existing campus infrastructure and align the planned capital

investments with the goal of minimizing future energy usage. Progress in this goal area has the starkest impact on overall reduction in greenhouse gas emissions.

- **Where does the University/campuses currently stand in meeting this goal?**
 - Most campuses provide annual tracking data to Department of Energy Resources and also to ACUPCC & STARS - and should continue to do so.
- **Are there other groups/departments who will be critical in meeting this goal?**
 - Students are the most critical group on each campus when considering sustainability issues. Outreach to students through more effective, campus-wide education such as on campus social media. University communications should be engaged to reflect these sustainability priorities for the campus and use their expertise in emerging media techniques.
- **What has been done in the past to advance towards this goal?**
 - Since 2013, The System has created the annual sustainability report which has become an annual feature for the Board and the public to learn about the efforts taking place at each campus.
- **What does the University/campus need to do in order to reach this goal?**
 - Most campuses are moving in this direction, however, a greater transparency, and integration with A&F goals and budgeting is needed. Accomplishing significant savings associated with energy consumption is achievable through undergoing master planning exercises. Management of energy systems with a focus on conservation is a crucial part of reaching this benchmark.

<i>Principle</i>	<i>5</i>	<i>Sustainable Transportation - Integrating sustainable best practice for the use and maintenance of campus fleets, student/employee commuters, and public transportation options.</i>
<i>Goal</i>	<i>5.1</i>	<i>Reduce vehicle fuel consumption of the University vehicle fleet through promoting the use of public transportation, reducing the number of single occupancy vehicles, and increasing the use of other alternative fuel transportation for faculty, staff, and students.</i>
<i>Metric</i>		<i>Annually report on the vehicle fleet composition and growing commuting options for faculty, staff, and students</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - Transportation is a topic which impacts every individual at the University and there are various opportunities to be more environmentally friendly. This goal recognizes the move towards purchasing and utilizing fuel efficient vehicles and alternative fuel vehicles will assist in the need to reduce overall vehicle fuel consumption. It also encourages the implementation of strategies to encourage and assist students and staff to easily utilize alternative modes of transportation to commute to campus, and

encourage the use and accessibility of alternative modes of transportation to the broader community in addition to campus stakeholders.

- **Why is this goal important to highlight?**
 - This goal is crucial due to the fact that everyone has transportation needs on a college campus and the strategies used to get people to where they need to go should be considering the environmental impacts. Adjusting transit habits within the campus community can have significant environmental impacts as well as addressing other regional transportation priorities.
- **Where do the University/campuses currently stand in meeting this goal?**
 - The campuses are undertaking projects that align to the outlined goal. Many of the initiatives are highlighted in the annual Sustainability Report. For example, Lowell has instituted a “Park Once Policy”, a carpool program, bike share program, and offers Zipcars. The campus has drawn attention to local public transit options and organized educational campaigns on transit issues. The highlighted programs are also found at the other UMass campuses.
- **Are there other groups/departments who will be critical in meeting this goal?**
 - The campuses will have to continue to engage their campus communities in this process. The involvement of regional transit authorities and local government could provide an arena to align goals with regional planning efforts around transportation.
- **What has been done in the past to advance towards this goal?**
 - The University has demonstrated a commitment to providing alternative methods of transportation, such as shuttle services, to students, faculty, and staff at each campus.
- **What does the University/campus need to do in order to reach this goal?**
 - Each of the campuses will have to evaluate what programs and initiatives are on-going that seek to move forward in this goal area and develop plans for the areas where programs do not exist. The planning process should include transportation alternatives as a priority and consider guidance from complete streets, climate resilience strategies, clean fuels, EV charging stations, and green parking garages. It is also important to note that each campus has its own set of circumstances related to their geographic location and demographic make-up and that these considerations must be taken into account.

<i>Principle</i>	6	<i>Waste Reduction and Recycling – Promote strategies to encourage waste reduction and re-use and acknowledges the importance of preventative measures.</i>
<i>Goal</i>	6.1	<i>Employ strategies around preventative measures in waste diversion to promote source reduction, re-use and recycling of used materials.</i>
<i>Metric</i>		<i>Annually report on materials recycled, reused, composted, and disposed</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - This STARS reporting standards recognizes institutions that are diverting materials from landfills and incinerators and conserving resources by recycling and composting. Further, the University must be focused on minimizing the production of waste. While the benefits of recycling and composting cannot be overstated, the importance of preventative measures to avoid the waste should be a primary focus. Decreasing the total amount of materials that are used and discarded offers significant environmental benefits.

- **Why is this goal important to highlight?**
 - The reduction of waste disposed and enhanced recycling efforts can dramatically impact the carbon footprint of the University. These efforts are highly visible and require some educational context. In order to be successful, people must adjust their habits to help produce the desired results.

- **Where does the University/campuses currently stand in meeting this goal?**
 - Each campus has been consistently involved in notable recycling and waste reduction efforts helping to involve students, faculty, and staff while educating the entire campus community about the benefits to recycling and reducing waste. The campuses track their progress and achievements in this area in their own ways.

- **Are there other groups/departments who will be critical in meeting this goal?**
 - The University will need to be actively engaging students, faculty, staff, administrators, and the general public in this goal. Additionally, the University should evaluate if there are current vendors or other parties that could assist with programs or other infrastructure to assist in accomplishing this goal.

- **What has been done in the past to advance towards this goal?**
 - The campuses can point to marked progress in this area through the substantial programing taking place around this issue. The University's annual Sustainability Report highlights many of the initiatives underway across UMass.

- **What does the University/campus need to do in order to reach this goal?**
 - UMass must sustain the progress achieved by the campuses and capitalize on the enthusiasm for this issue, thereby generating more programs and strategies such as: the University's total annual waste generation (materials diverted and disposed).

<i>Principle</i>	7	<i>Environmentally Preferable Purchasing – Implement a procurement approach to access environmentally-conscious products whenever applicable and available.</i>
<i>Goal</i>	7.1	<i>Establish Environmentally-Preferable Products Procurement Program (EPP) and continue to implement annual procurement goals to move toward alignment with the standards of the Environmental Purchasing Advisory Council where ever appropriate and consistent with available funding.</i>
<i>Metric</i>		<i>Annually report on purchasing of electronics, office paper, cleaning products, etc. and progress towards meeting established goals</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - As part of the Commonwealth's overall goals of conserving natural resources, reducing waste, protecting public health and the environment, and promoting the use of clean technologies, recycled materials, and less toxic products, this policy committed to reducing State Agency impact on the environment and enhancing public health by procuring Environmentally Preferable Products (EPP) and services whenever such products and services are readily available.
 - Environmentally preferable products are products and services that have a lesser or reduced effect on human health and the environment when compared to competing products or services that serve the same purpose. They may include, but not be limited to, items that:
 - Contain recycled materials
 - Minimize waste
 - Conserve energy and/or water
 - Consist of fewer toxic substances
 - Reduce the amount of toxic substances disposed or consumed
 - Protect open-space
 - Lessen the impact to public health
 - Ensure that at least one person from the University is designated to stay in contact with the state regarding the EPP program and EO 515 to ensure that if updates and changes occur they can be communicated to the Sustainability Group and Procurement Director for implementation.
- **Why is this goal important to highlight?**
 - This goal is important since it complements the other goals surrounding sustainability and will help support those goals through the use of environmentally preferable products wherever possible.
- **Where does the University/campuses currently stand in meeting this goal?**
 - The Director for Enterprise Wide Procurement currently meets regularly with State procurement leaders and will follow-up on the implementation of this program and any changes that the University should be made aware of.

- **Are there other groups/departments who will be critical in meeting this goal?**
 - Working closely with the Procurement Council to ensure that EPP products are available on BuyWays and are competitively priced would be an important step to continue.

- **What has been done in the past to advance towards this goal?**
 - To date, specific products have been researched and launched but not a full scale EPP program. (i.e. Paper, ink cartridges)
 - The Director of Enterprise Wide Procurement has been meeting regularly as the University’s designee with the State’s Procurement Directors.

- **What does the University/campus need to do in order to reach this goal?**
 - The University must continue to work together to develop the best and most cost effective EPP program for the University and ensure that all information is effectively communicated to the necessary stakeholders using the products. The UMass Sustainability Council will provide recommendations to the Procurement office and collaborate on a regular basis.
 - Goals developed should continue to be met through regular communication with the State.
 - The EPP should also strive to meet or exceed existing campus practices keeping up with STARS criteria or other green purchasing best practices wherever appropriate and consistent with available funding.

<i>Principle</i>	<i>8</i>	<i>Sustainable Food Services – Supporting sustainable food systems through food and beverage purchases.</i>
<i>Goal</i>	<i>8.1</i>	<i>Strive for each campus food service operation to procure sustainable food products while maintaining accessibility and affordability for all students and campus patrons.</i>
<i>Metric</i>		<i>Annually report on the percentage of dining service food products that are third-party verified and/or local and community based sustainable food products</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - The STARS standards recognizes institutions that are supporting sustainable food through the purchase of their food and beverages. Institutions can do this by prioritizing the purchase of sustainably produced food and beverage items. These actions reduce the social and environmental impacts of food production and help foster robust local economies and food security; improved conditions for farm workers; healthier animals, soils and streams; and secure livelihoods for farmers.

- **Why is this goal important to highlight?**
 - This goal is important since food and beverages are a part of everyday life on a college campus and impacting the manner in which food is produced, transported, and consumed can have a systemic impact.

- **Where does the University/campuses currently stand in meeting this goal?**
 - Each of the campus have employed individual strategies or programs to address the theme of this goal. One example has been the commitment to local food options in various ways, including the sponsorship of a weekly farmer’s market at the Medical School.

- **Are there other groups/departments who will be critical in meeting this goal?**
 - To achieve progress in meeting this goal the campuses will have to continue to partner with their food service providers to identify products and other available options to accomplish this goal.

- **What has been done in the past to advance towards this goal?**
 - Each campus has been promoting sustainability-minded programs to encourage locally sourced food products and reduce food waste. The Amherst campus has committed to the Real Food Challenge, which requires that 20% of the University food and beverage purchases be local / community-based, fair, ecologically sound and humane by 2020. The Medical School hosts a weekly Farmers Market from June to October bringing local produce and food options to campus. Boston, Dartmouth and Lowell integrate local food options on campus depending on the type of products available and the time of year. Some of the campuses have adopted trayless dining, an effort to encourage students to be more mindful of their food selection thus reducing waste.

- **What does the University/campus need to do in order to reach this goal?**
 - The University’s dining services purchase food and beverages that meet at least one of the following criteria: a local or community-based producer and/or third party verified to be ecologically sound, fair and or humane. The University must also work to ensure that all vending operations, convenience stores, or concessions abide by the same standards as the campus food service if different.

<i>Principle</i>	<i>9</i>	<i>Sustainable Water Systems – Reducing campus water withdrawals can reduce pressures on local aquifers, streams, rivers, lakes, and aquatic wildlife.</i>
<i>Goal</i>	<i>9.1</i>	<i>Reduce potable water usage and determine goals consistent with capital investments and annual programs implemented in support of reducing potable water.</i>
<i>Metric</i>		<i>Annually report the potable water use per weighted campus user compared to baseline</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - In 2007, the Leading By Example Executive Order 484 which required state agencies to address resource use at state facilities and established the Leading by Example (LBE) Program to oversee the coordinated efforts state agencies, including UMass campuses and state and community colleges, to reduce their environmental impact.

- **Why is this goal important to highlight?**
 - Water efficiency is important as fresh water supplies are limited and the current systems of treating, pumping, and disposing of water is energy intensive, wasteful, and can be disruptive to downstream ecosystems. As Executive Order 484 states, buildings account for 13% of potable water use. Potable water is defined as water that meets drinking water standards and is safe for human consumption. Potable water is often used in buildings not only for drinking water but for toilets, urinals, hand washing facilities, showers, kitchens sinks, irrigation and cooling towers. Non-potable water include rainwater which is captured and stored, reclaimed water which is waste water that is treated and purified for reuse, and grey water which is waste water that has not come in contact with toilet or kitchen waste, and can be used as an alternative to potable water in some applications.

- **Where does the University/campuses currently stand in meeting this goal?**
 - While the LBE program faced challenges in tracking water usage at state facilities, the University of Massachusetts campuses are achieving LEED certification for new building projects, which helps to meet reduction goals for potable water usage. LEED establishes prerequisite and credit options for the adoption of water use reduction strategies. Currently, all LEED certified buildings are required to reduce outdoor water use so that either no irrigation is required or irrigation is reduced by 30%. This can be achieved through more efficient irrigation, careful selection of plant species, and the use of non-potable water sources. Indoor water use is required to be at least 20% below code to receive LEED certification. Adoption of low flow fixture and the use of non-potable water in certain applications can reduce the consumption of potable water. Additionally, increasing the efficiency of power plant cooling towers by increasing the number of time the water cycles before being replaced and integrating non-potable water, can also reduce overall potable water use.

- **Are there other groups/departments who will be critical in meeting this goal?**
 - Grounds, Facilities, Engineering and Construction, Planning, and Power Plant Operations will all be critical department to include in the discussion of potable water usage at the university.

- **What has been done in the past to advance towards this goal?**
 - Water use is to be considered early in the construction process for new buildings and renovations, irrigation requirements for landscaping and the use of non-potable

water, and opportunities to improve efficiency and the use of non-potable water for cooling towers.

- **What does the University/campus need to do in order to reach this goal?**
 - A challenge in meeting this goal will be that UMass campuses continue to grow and that the reduction goals for potable water established by Executive Order 484 are not normalized. Sources of water need to be metered so that tracking of water use can be effective. Continuing to achieve LEED requirements and credits for installation of low flow fixtures, efficient irrigation, and cooling processes can reduce water usage. Additionally, by using non-potable water where potable water is currently used will decrease overall water use.

<i>Principle</i>	<i>10</i>	<i>Academic and Research Programming and Community Engagement – Ensuring Sustainability is part of Academic and Research programming and part of community engagement efforts.</i>
<i>Goal</i>	<i>10.1</i>	<i>Comprehensively integrate sustainability and climate neutrality into the core academic curriculum and research programs to create a means to enable students to use their campus as a living, learning laboratory.</i>
<i>Metric</i>		<i>Annually report on sustainability curriculum available to undergraduate students and on-going curricular developments</i>

- **Define the goal issue and provide background info to understand the goal in lay terms.**
 - This is in concert with the mission of the University “to provide an affordable and accessible education of high quality and to conduct programs of research and public service that advance knowledge and improve the lives of the people of the Commonwealth, the nation and the world.”
 - Currently, the University offers a range of academic offering and research opportunities that provide students with an opportunity to learn about sustainability issues exclusively and as part of other content areas.
 - Campuses should seek to develop academic and research programming that enables students to use their campus as a living, learning laboratory.
 - Climate change and sustainability challenges are one of the foremost issues affecting our collective future and impacting the lives of the world’s citizens. University graduates should all be prepared to meet those challenges in their work beyond the University.
- **Why is this goal important to highlight?**
 - This directly aligns with a major part of the University’s mission to “advance knowledge and improve the lives of the people of the Commonwealth, the nation and the world.”
 - As an institution of higher education the University is positioned to train and educate future leaders, scholars, workers, and professionals to understand and address climate change and sustainability challenges. Moreover, the University can

prepare students to respond to the growing challenges our planet faces no matter their field or discipline.

- Growing our academic offerings and learning outcomes in the areas of climate change and sustainability is a core focus of the ACUPCC and STARS, to which the University has publicly committed itself.
 - The Princeton Review's 2015 Hopes & Worries Survey stated that 60% of students said it would contribute "Very Much/Strongly/Somewhat" to have information about a school's commitment to the environment (ie. from academic offerings to practices concerning energy use, recycling, etc.) in their assessments of whether to apply to or attend the school.
- **Where does the University/campuses currently stand in meeting this goal?**
 - This goal has been addressed on a campus-by-campus level and the robustness of the integration of sustainability into academic programs on each campus varies widely across the University.
 - **Are there other groups/departments who will be critical in meeting this goal?**
 - There is a wide range of stakeholders involved in achieving this goal such as Chancellors and Vice Chancellors; Provosts; Deans and Associate Deans; Department Chairs; Faculty Senates on each campus; centers or faculty organizations focused on climate change and sustainability challenges, like the Climate Change Initiative at UMass Lowell; and students.
 - **What has been done in the past to advance towards this goal?**
 - At this time, each campus has been undertaking the work of evaluating where general education requirements are to the identified goal and exploring the feasibility of integrating sustainability topics on a department-by-department basis.
 - **What does the University/campus need to do in order to reach this goal?**
 - Evaluate where general education requirements currently align to sustainability topics and determine the best practices to integrate key topics related to sustainability into student learning outcomes.