

UNIVERSITY OF MASSACHUSETTS ANNUAL SUSTAINABILITY REPORT

FISCAL YEAR 2017



PREPARED BY
UMASS PRESIDENT'S OFFICE SUSTAINABILITY COUNCIL
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EXECUTIVE SUMMARY

The University of Massachusetts (UMass), 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” including not only fiscal resources but also a commitment to be environmentally responsible. 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, a more sustainable entity. The efforts and achievements of each of the campuses demonstrates the strong responsibility felt by members of the University community.

The report that follows represents the programs and achievements of our campuses during fiscal year 2017. For prior year reports on campus sustainability efforts, links to each campus’ sustainability websites, and for additional details please refer to our website: www.umassp.edu/budget-office/sustainability

This year’s sustainability report is the first assessment of progress under the University’s Sustainability Policy adopted by the Board of Trustees in December 2016. The process undergone by the Sustainability Council to draft the policy represents the extensive work underway at all campuses and this year’s report includes metrics used to measure progress under the policy.

The policy was developed through an eighteen-month process beginning with research. Utilizing the research conducted helped shape the format of the policy and organized the guiding principles outlining the areas of focus that impact sustainability on campuses. It is important to note that the guiding principles are reflective of the sections outlined in this report for each campus to provide updates on efforts underway. Specific goals are outlined under each principle along with the metrics utilized to assess progress.

The Administrative Standards were developed to address each goal with more specific information and determine how it would be evaluated over time. The development of the standards was achieved by answering six questions which centers on the importance of the goal, defines the goal, outlines progress achieved, etc. Further, the standards have incorporated metrics for each goal to be evaluated on moving forward.

We have included metrics that are currently already required for reporting by Second Nature, the Commonwealth of Massachusetts, National Association of College and University Business Officers (NACUBO), and/or the Association for the Advancement of Sustainability in Higher Education’s (AASHE’s) Sustainability Tracking, Assessment & Rating System (STARS), which is the standard for measuring sustainability in higher education. Utilizing key STARS credits provides all campuses with a shared language on which to benchmark themselves. In addition, it provides a clear framework for peer comparison and managing the progress towards the University of Massachusetts sustainability goals.

As previously noted, this is the first report drafted under the policy consistent with key metrics established by the Sustainability Council and utilized by industry groups to measure progress towards the policy goals.



MEMBERS OF THE UMASS SUSTAINABILITY COUNCIL RECEIVE THE 2016 LEADING BY EXAMPLE AWARD FROM THE DEPARTMENT OF ENERGY RESOURCES.

The UMass Sustainability Council was recognized in the last round of awards for our continued and collective efforts as active members of the Leading By Example Council. Here is an excerpt from the award announcement:

“The UMass System, representing the 5 UMass campuses, collaborates effectively through the UMass Sustainability Council which brings each campus and the UMass President’s Office together regularly. Collective system-wide achievements include a 14% reduction in GHG emissions despite a 35% growth in building square footage since 2004, the construction of 18 LEED Certified building since 2010, the installation of two of the five largest clean-burning natural gas combined heat and power systems in MA, and the publication of an annual sustainability report with details on energy and environmental progress.”

This report is organized into ten sections highlighting the activity under the ten guiding policy principles adopted in the UMass Board of Trustees Sustainability Policy. Each section contains information from the campuses to provide examples of the work undertaken across our system. The Appendix section of the report mirrors these ten sections, providing an additional layer of details for each campus and summary charts on the key sustainability metrics for each policy principle.

POLICY PRINCIPLES HIGHLIGHTS

1. Sustainability Strategic Planning

Integration of sustainability planning, practices, and strategies into the University's strategic planning processes

Since 2010, UMass Lowell's transformative growth and development has been guided by a multi-year strategic planning process, titled UMass Lowell 2020 Strategic Plan, which provides a blueprint for how the University will achieve national and international recognition as a world class institute by 2020. In addition to academic and research initiatives, this strategic plan includes specific objectives related to master planning, facilities renewal, and sustainability. The plan is updated regularly with the participation of over 200 campus constituents and its progress is reviewed against quantitative benchmarks on an annual basis.

The Strategic Plan identifies both operational and academic goals focused on sustainability. In addition, all of UMass Lowell's supporting planning efforts on campus focus on sustainability and greenhouse gas reductions.

2020 Strategic Plan Sustainability Goals for Operations:

- Responsibly renew and enhance energy systems and infrastructure for sustainability and cost avoidance and meet the university's Climate Action Plan milestones.
- Modernize existing buildings to improve energy conservation. Strive for LEED certification in new building and renovation projects.
- Implement the university's Accelerated Energy Program (AEP) to provide significant energy efficiency and conservation enhancements.
- Implement sustainable practices, including transportation and landscaping initiatives and water conservation.
- Evaluate and implement renewable energy opportunities.

2020 Strategic Plan Goals for Academics & Research:

- Support the creation of programs and sustainability-related curricula and climate change-related learning outcomes.
- Enhance student, faculty and staff engagement in sustainability initiatives that promote the university as a living laboratory, locally and globally.
- Ensure that all students have the opportunity to graduate with an understanding of environmental stewardship, sustainability and climate change.
- Establish UMass Lowell as an urban-focused center of excellence for climate change, sustainability and resiliency that merges expertise in academics, research and operations.
- Expanding internship and collaboration opportunities with renewable energy technology leaders.
- Expanding community service opportunities to advance progress toward a more sustainable and resilient future.

This past year UMass Lowell's Climate Action Plan was updated to reflect the changing nature of the campus with an enhanced focus on resiliency and mitigation strategies.

The Strategic Development Plan for 2016-2021 details projects that are under development, as well as the University's plan to minimize, mitigate, and reduce its environmental effects. This document also serves as an official Notice of Project Change under the Massachusetts Environmental Policy Act (MEPA) in conjunction with the Special Review Procedure that was established for the review of University projects in 2011.

In the Fall of 2016, UMass Lowell earned a gold rating from the AASHE Sustainability Tracking, Assessment & Rating System (STARS) for its campus-wide sustainability efforts.

Sustainability planning efforts are currently underway across the other four campuses and are described in detail later in this report.

2. Clean Energy

Supports the development and use of clean and renewable energy sources

The University of Massachusetts System, through various state grant programs, in cooperation with the Massachusetts Department of Energy Resources and the Leading By Example team have collectively installed



solar arrays on all of their campuses. Additionally, all campuses have net-metering agreements for large commercial projects in the state. The System is one of the largest off-takers of net-metering in the region with agreements totaling over 50MW.

Despite this, the actual percent of campus' energy use generated through renewable sources is low. In the renewable energy power agreements the university maintains, the renewable energy credits (RECs) are not retained. They are sold and provide an economic credit towards campus' energy bills. In order to claim the environmental attributes from renewable energy, organizations must not sell the

RECs on the open market. The metrics the System is utilizing to measure campus energy use generated from renewable sources only pertains to energy produced from renewable sources where the RECs are retained for the organization.

However, the System, through the support of Competitive Energy Services (CES), an energy procurement consultant, continues to evaluate available renewable energy options and work to keep energy costs low. Avenues to support and implement renewable or alternative energies on each of the campuses are reviewed thoroughly as they arise.

In 2007, the UMass System committed to a carbon neutrality deadline of 2050 where 100% of emissions must be eliminated or otherwise "offset" through reductions elsewhere. A significant shift toward renewable energy will be necessary for all campuses to achieve neutrality. A major focus of the next few decades will be identifying strategies to generate a higher percentage of power on our campuses from renewable sources.

UMass Amherst installed the largest solar project on a college campus in New England, a 5.3 MW solar project across 7 locations on its campus in early 2017. Two large parking canopies and five rooftops received solar array systems through a Power Purchasing Agreement (PPA) that allows the campus to purchase the system any

time after year seven and own the REC's after year ten. The projects are expected to produce 5.9 million kWh annually and save UMass Amherst \$3.6M (NPV) over 20 years.

UMass Boston demonstrated its commitment to clean energy by investing in a 3.9 MW net metering agreement. This agreement led to the construction of the largest rooftop array in the Commonwealth. The Boston-based array is projected to generate 4.8 million kWh annually. This agreement is projected to save UMass Boston \$5 Million in energy costs over the next 20 years.

UMass Dartmouth is participating in two net metering projects. They include a 2.4 MW project in Dartmouth and a 6 MW project in Freetown. These contracts achieve significant cost savings for the Dartmouth campus--\$544,000 in FY 2017 alone.

UMass Lowell brought its first garage rooftop solar PV array online in FY2017. It nearly doubled the amount of onsite solar power generated. . This system is by far the most efficient of the five solar arrays on campus. For comparison, the array is made up of 600 panels and generate 200 kW. The other 4 arrays on campus total 1,172 panels and generate 246 kW. Additionally, UMass Lowell supports 16 MW of net-metering projects throughout the state.

3. Climate Resilience and Preparedness

Implementation of strategies to mitigate or reduce environmental impact

The UMass System takes planning for resilience and disaster readiness seriously. The System became one of two universities in New England to have a state and FEMA approved Hazard Mitigation Plan. The System plans are intended to enhance disaster safety and resiliency by assessing risks to facilities, transportation, utilities and research. The plan also identifies actions and estimates costs for mitigating those vulnerabilities. Universities with FEMA-approved Hazard Mitigation Plans can apply for certain kinds of pre- and post-disaster funding for projects to mitigate risk to both public and private property, such as generators, storm-water management projects or structural retrofits of existing facilities.



The campuses in the system are also working with state agencies to guide the implementation of Massachusetts Executive Order 569: Establishing an Integrated Climate Change Strategy for the Commonwealth. EO 569 focuses on making the Commonwealth more prepared for the threats of natural disasters which are projected to increase in future years due to climate change and also requires state agencies to determine how they will meet federal and state greenhouse gas reduction targets.



To foster communication around Climate Preparedness and Resiliency all campuses have publically committed to climate neutrality through Second Nature. These public commitments reaffirm the university’s commitment to combating the effects of climate change and ensuring the university is sustainable and resilient as its effects are increasingly felt in the region.

Lastly, the UMass Medical School has an islanding project underway which will allow the central plant to provide power to all campus loads in the event of utility interruptions and instability. This project will ensure continuity to campus operations and provide stability of the central plant, which is particularly important as the central plant provides utility to the the affiliated Hospital which serves patients in the Worcester region and includes a level I trauma center.

The UMass Sustainability Council will continue to collaborate and work towards developing more robust climate resilience and preparedness strategies.

4. Green Building Design and Sustainable Campus Operations

Strategies to address emissions associated with designing, building, maintaining, and operating campus buildings and grounds

In September 2017, Massachusetts was named the most energy efficient state in the nation by the American Council for an Energy-Efficient Economy (ACEEE) for the seventh consecutive year. Massachusetts continues to receive top marks for its energy efficiency policies and programs, which continue to drive down greenhouse, gas emissions and save operational dollars across the Commonwealth.

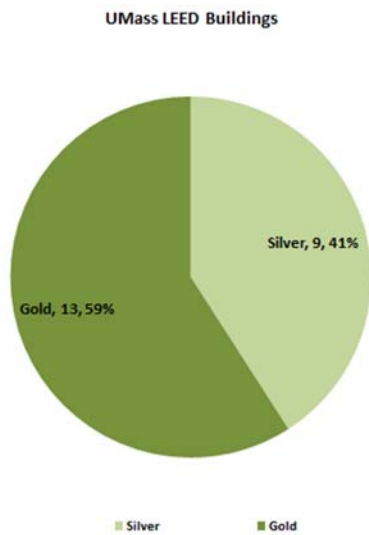


The UMass System approach to Green Building Design and Sustainable Campus Operations is integral to this success. As of November 2017, the UMass system holds 22 of the current 72 LEED (Leadership in Energy and Environmental Design) Certified State Buildings in Massachusetts. This equates to 3.08 million square feet or 30% of the 9.95 million square feet of total LEED certified state building space. The LEED standard, established by the U.S. Green Building Council (USGBC), awards certifications in Certified, Silver, Gold and Platinum levels for clean energy, energy efficiency and environmental design integration.



This remarkable upward trend in Green Building Design and Sustainable Campus Operations across the system directly correlates with the upward trajectory of the UMass system. The Baker-Polito Administration chose UMass Lowell's University Crossing in late 2016 to announce that over 50 state owned buildings have received a LEED certification recognizing advanced energy and environmental design. Green Building Design and Sustainable Campus Operations across the system contribute to the continued efforts on each campus to promote sustainability and awareness of climate change both inside, and outside, of the classroom.

UMass Amherst now has over 1.2 million square feet of LEED certified space on campus. Most notable and recently completed in the past year is the LEED Gold certified Old Chapel renovation, the Design Building, and the South College Academic Facility. The John W. Olver Design Building and South College are pending LEED certification. Renovations to the iconic Old Chapel structure included a new entry pavilion, a new double height entry lobby with an elevator, a new multipurpose space, and the unveiling of the existing rose window on the north elevation viewed from the Great Hall for the first time since 1936. The Design Building is located on the southern portion of parking Lot 62 north of the Studio Arts Building and houses academic programs including Landscape Architecture & Regional Planning, the Department of Architecture, and the Building Construction Technology program. The DB showcases integrated design through a stacked courtyard surrounded by studios,



Of the 22 LEED Buildings installed through the UMass System 13 are Gold and 9 are Silver.

classrooms, workshops, and offices. The DB is the largest CLT (cross-laminated timber) building east of the Colorado Rockies. South College is a multipurpose facility that has undergone renovations with upgrades to all mechanical, electrical and plumbing systems. Additionally, the building received a four-story addition to the Hicks way/west side of the building that includes common areas, faculty offices, classrooms and auditoria with state-of-the-art audio-visual and communications systems.

UMass Boston’s Integrated Sciences Complex (ISC) opened in 2015 was its first new academic building in 40 years, its first LEED GOLD building and a first for the Dorchester- Boston Harbor area. UMass Boston University Hall (UH), which began a phased opening in January 2016, is UMB’s second new building to achieve a LEED Gold certification. The 190,000 gross square feet facility at UH also features a number of green design and sustainable features including daylighting, lab ventilation lighting, high performance exterior envelope and glazing system, cantilevered roof shades the southeast-facing glazed wall at the atrium to balance aesthetics and user comfort and LED theatrical lights to reduce electrical loads. UH also includes features numerous water conservation fixtures, indoor and outdoor recycling bins, FSC certified wood, native landscaping and green cleaning practices.

The UMass System commitment to building, and maintaining, energy efficient buildings continues to reduce energy costs and drive down greenhouse gas emissions, which in turn saves taxpayer dollars and further insulates students from increased costs.

5. Sustainable Transportation

Integrating sustainable best practices for the use and maintenance of campus fleets, student/employee commuters, and public transportation options

In April 2017, UMass Boston won the Pinnacle (highest) level award by MA Dept. of Transportation Eco-Awards. It was the Spotlight winner for walkability in 2016 in addition to being awarded at the Leadership level in the past years 2011 through 2016. Green transit options at UMB includes eco-friendly free shuttle buses in fleet, Hubway, Zipcar, Lyft, walkability access, the new Harbor walk connections, commuter options such as Nuride, Emergency Ride Program, real time GPS monitoring of shuttle buses, Carpool and Vanpool incentives, bike racks, shower facilities, motorbike parking and monthly tabling by MassRides for students, HR fairs etc. Currently as part of the UCRR project, and its two new LEED Gold buildings, numerous bike racks have been added to the campus increasing its sustainable transportation options.

In line with its comprehensive approach to Sustainability Strategic Planning, UMass Lowell’s transportation programs are strategically integrated with related land use, infrastructure and sustainability policies. The university offers a full suite of Transportation Demand Management options for students, faculty and staff including:

- **Car Share** – UMass Lowell partners with Zipcar to provide a fleet of 14 vehicles on campus. Utilization rates over the last year indicate that each Zipcar available on campus results in an average of 13 less private vehicles parking on campus. This lessens the burden on parking demand while also contributing to continued transportation related greenhouse gas emissions reductions.

- **Bike Share** – UMass Lowell offers a comprehensive, no-charge, bike share program on campus to all faculty, staff and students. UMass Lowell was once again recognized as a Bicycle Friendly University by the League of American Bicyclists in 2017.
- **Electric Vehicle Program** – Beginning in 2014, UMass Lowell has taken advantage of a number of grant programs to build out its EV charging network. We currently offer 14 Level II charging locations on campus with numerous Level I points located throughout each of our parking garages. This past year, UMass Lowell’s Police Department availed of a MassDEP grant program to procure a 100% electric Nissan LEAF. This vehicle is used to support the university’s Community Policing Program.

In early 2017, UMass Lowell launched a program that allows students and employees to ride any of the Lowell Regional Transit Authority’s (LRTA) 18 bus lines for free 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. Funded in part by an opt-out student sustainability fee, the program has been hugely successful; averaging over 5,000 rides a month since its inception.



Announcing the new LRTA/UMass Lowell Partnership: UML’s Richard Lemoine, LRTA’s Jim Scanlan, UML’s Jacquie Moloney, LRTA’s Philip Shea and Rowdy the River Hawk.

Design work was completed 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 several that serve as vital links to the 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.

Pawtucket Street over the Pawtucket Canal serves as a vital link to the UMass Lowell Campus. It currently serves an average of 7,000 pedestrians a day along with UMass & LRTA transit.



6. Waste Reduction and Recycling

Promote strategies to encourage waste reduction and re-use and acknowledge the importance of preventative measures



The UMass System approach to waste reduction and recycling efforts has a consistent theme centered on educating our campus communities on strategies to reduce trash and repurpose useful items. In the short-term, these efforts benefit the University by encouraging faculty, students, and staff to determine the most sustainable approach to disposing of an item once they are done utilizing it. In the long-term, educating our communities about the waste that they generate in their own lives and encouraging sustainable thinking in their daily lives is a priority. Each of the residential campuses (Amherst, Dartmouth, and Lowell) have a sustainable move-out program offered to students and the campus community. The program provides students an opportunity to donate unwanted dorm furniture or other supplies,

which would otherwise be tossed in a dumpster, and other students can get the used items for their use during the school year or materials are donated to regional nonprofits. The Medical School runs a similar program called the SWAP (Surplus With A Purpose) Shop, an exchange room for unwanted office and lab items in good condition, which opened in October 2015 to facilitate the reuse of items on campus. The Shop is located in the Main School Building and is a resource to faculty, staff, and students of the medical school. Since opening, over 6,600lbs of items have been reused with a value of over \$75,000.

7. Environmentally Preferable Purchasing

Implement a procurement approach to access environmentally-conscious products whenever applicable and available

UMass Medical School and affiliated hospital has taken an innovative approach to green cleaning on campus. Instead of using harsh chemicals, the Medical School and affiliated hospital use self-generated Orbio multi-surface cleaner to clean approximately 1.7 million square feet for floors, equaling over 60% the cleanable square footage on campus. This non-hazardous multi-surface cleaner is created onsite from tap water and a small amount of salt, which are combined, and flow through an electrolyte cell in the Orbio onsite generation system (OGS) to create a 0.05% sodium hydroxide cleaning solution. Through the use of Orbio multi-surface cleaner, UMMS is improving the health and wellbeing of our employees by minimizing exposure to hazardous cleaning chemicals, and reducing waste by minimizing the number of cleaning chemicals and bottles brought and disposed of on campus.



ORBIO WATER IN ACTION AT MEDICAL SCHOOL

8. Sustainable Food Services

Supporting sustainable food systems through food and beverage purchases

The Dartmouth campus is fortunate to be working with Chartwells as a food service provider because they understand our sustainable culture and they incorporate that into their practices. This is evident in their operation of the Freight Farms Leafy Green Machine which produces the equivalence of 1 ¼ acre of growing space within a 40' shipping container. All greens grown there are organic, use 90% less water and require no trucking across country as it's right in our backyard (literally, they walk the box of lettuce across the parking lot). They have embraced our vegans, using locally harvested fish that are by-catch, and have offered more protein choices that are not as resource intensive as beef. Lastly, we work together on a "Project Clean Plate" program which encourages students to be aware of the amount of food that they throw away. Typically, students will take smaller portions because of this awareness campaign.



HAMPSHIRE DINING COMMONS PILOT PROJECT

The UMass Amherst “Local, Healthy UMass Food System Initiative” is a cutting-edge approach to supporting a healthy & resilient New England food system. As a result, UMass Dining has invested over \$4.5 million in local and sustainable foods in the past fiscal year with more than half sourced from New England farms, cooperatives, and vendors. The grant-funded pilot project “Hampshire Dining Commons Pilot Project” converted one of UMass Amherst’s on-campus dining halls (Hampshire Dining Commons) into a premier campus eatery dedicated to sustainability, health, and great-tasting foods.

It provides a defensible and cost-effective example to implement campus-wide. UMass Amherst Dining aims to work with large-volume food service providers across New England to implement similar initiatives. UMass Dining published the “Making Local, Healthy Sustainability Delicious: The How-To Guide for Food Service Operators” in late 2016. As part of the grant initiative with the Henry P. Kendall Foundation, UMass Dining is documenting the journey towards sourcing additional local, healthy foods to make a defensible and cost-effective model for all campuses to emulate. The How-To Guide for Food Service Operators is a manual for restoring real food and regional food systems to their right place in our society.

For over a decade, the Dining Services program at the University of Massachusetts Amherst (UMass Dining) has been an industry leader in environmentally conscious practices. The serious commitment to sustainability has changed the way college students on our campus think about food and food consumption. They now understand that food is an essential source of personal health and wellness; that eating local, sustainable meals contributes to a strong and vibrant regional food system in New England and beyond.



UMASS AMHERST’S COLD SPRING ORCHARD

9. Sustainable Water Systems

Reducing campus water withdrawals can reduce pressures on local aquifers, streams, rivers, lakes, and aquatic wildlife



The Amherst campus currently uses about 350 million gallons of water per year. UMass Amherst is making strides in reducing the amount of potable water consumption through an array of water conservation efforts including the use of treated reclaimed water (effluent) from the Amherst Waste Water Treatment Plant. In March, 2017 the campus filed for 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. This use for dust control and irrigation will be conducted under the existing Class A permit for reuse and the permit is being amended for this additional use.

10. Academic and Research Programming and Community Engagement

Ensuring sustainability is part of Academic and Research programming and part of community engagement efforts



Sustainability is rooted in the University's curriculum across the system contributing students' liberal arts education. While in the community, the University is recognized as a key leader and resource on sustainability issues or topics. Each campus has a different experience in these areas, which warrants an example of the campuses activity to better illustrate the University's position.

Amherst - A collaborative partnership between UMass Amherst Residential Life Student Services, Residence Education, and Sustainable UMass has resulted in the

integration of sustainability concepts into Residence Education's departmental initiatives, specifically the Residential Curriculum. The Residential Curriculum is an alternative approach to traditional programming models and focuses on student learning outside of the classroom.

Boston - UMass Boston currently offers at least 57 courses per semester in sustainability or sustainability related areas in addition to research and other student opportunities. A diverse array of programs exist that focus on climate change, sustainability and natural resource management. The campus estimates that 25% of students have taken at least one sustainability course.

Dartmouth - There are 25 researchers on the Dartmouth campus involved in sustainability research. The research topics within this group stretch across the disciplines on campus to include assessing the scallop stocks in the Atlantic Ocean to understanding the effects of climate change on public water supplies.

Lowell - UMass Lowell currently offers over 200 courses focused on sustainability and nearly 500 related to sustainability. Approximately 27% of faculty are engaged in sustainability research and 55% of research-producing departments are engaged in sustainability research.

Medical School - Through the Diversity & Inclusion Office the Sustainability Office was able to get two interns from the Worcester area this summer to help with sustainability programs on campus.

NEXT STEPS & CONCLUSION

The University Sustainability Policy outlines the areas of focus, which drives the activity and formally recognizes sustainability as an institutional value. Considering all the achievements that the University has attained, there remains significant work ahead in these sustainability areas. Each campus under this new policy is beginning at a different starting point in their sustainability planning and activity. With that understanding, the Sustainability Council drafted the first principle in the policy dedicated to sustainability strategic planning recognizing that it would be necessary for each campus to evaluate their current state in sustainability efforts and map out their next steps. These planning efforts are meant to better understand the opportunities that each campus, and thereby the system, can utilize to develop sustainability action plans in a variety of areas, determine the appropriate goals for these areas and ultimately achieve the identified goals. Sustainability strategic plans are the critical next step to advance the University's sustainability and will drive much of the sustainability work ahead.

This year's report celebrates that the University community shares tremendous pride in the sustainability efforts while recognizing the work that lies ahead. Students, faculty, and staff are excited by the work happening across the campuses and continue to inspire future efforts. Our commitment to sustainability efforts and the drive to be a leader in the field is steeped by our history as a land-grant institution and the responsibility to do our part in addressing the challenge of climate change.

APPENDICES

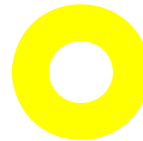
APPENDIX A - CAMPUS NARRATIVES AND METRICS

How to Read this Section

The Appendix is divided into the ten principle areas of the policy where key metrics are reported and each campus provides to highlights to their efforts in addressing the principles. The metric reports include information for each campus and a summary of the data to highlight the achievements at a University-level since many goals are measured at the institutional level and as a System. The System level data metrics are calculated by rolling up the campus data and apply the various metric methodologies. It can be difficult without the appropriate context to determine if the trending metrics is occurring in a positive or negative direction. To address that context we have included symbols indicating the status of the metric and a faster way to review the metrics. Below is a legend for the symbols you will notice to the right of each metric table:



Green star =
Positive progress
achieved



Yellow circle =
Unchanged or
stable outcomes

The campus examples under each principle cover three themes. Best practices providing examples of a campus program/project which would be a best practice in the principle area or advanced the campus closer to achieving the identified goals. Planning for future focus providing examples of already identified program/projects/efforts to advance your campuses efforts but has not been accomplished. In addition, areas of improvements: providing examples of where the campus has some work to do in these areas so they are clearly identified areas where more efforts are necessary.

While reviewing the metric section of each policy principle, please note that each chart contains the reporting year as part of the header above each campus. As this reporting process is in its inaugural year, some campuses were not able to produce complete data for the FY17 reporting year or in some cases for FY16. It is critical to note that some of the data might be lagging in time or missing when trying to analyze the metric results. The reporting data for these metrics will improve from this point in time as reporting timelines will adjust to comply with the policy.

POLICY PRINCIPLE 1 - Sustainability Strategic Planning

Goal 1.1 - 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.

Campus Examples of Efforts Related to Policy Principle

AMHERST - The UMass Amherst Chancellors Sustainability Advisory Committee (CSAC) chaired by Campus Sustainability Manager Ezra Small is currently developing a 4 year strategic plan. The planning process is called the Sustainability Integration Plan and started in the spring of 2017. The goal of the plan is to identify a set of strategic sustainability initiatives that are collaborative and helps advance sustainability and the Chancellor’s strategic institutional goals. The process is being led by a collaborative CSAC task force comprising a team of faculty, facilities staff, and an outside consultant. The task force began by reviewing existing campus planning documents and sustainability activities, then conducted face to face interviews and

developed and conducted a survey to the 17 member CSAC for collecting an inventory of sustainability efforts currently happening, ideas for future collaboration, and “big ideas” for turning the dial for achieving excellence in sustainability. The task force first looked at the current sustainability situation on and off campus. Then they built the case from the string of successes, to the fact that further sustainability integration would be beneficial. This idea was validated by CSAC and through project investment by 5 senior executives. Then the team determined what factors CSAC might be able to influence the most and cross referenced those factors with the suitability for Chancellor talking points on sustainability that most powerfully support the campus mission. The task force ended up with 30 big ideas/initiatives which were voted on by CSAC and whittled down to 10 leading ideas. These 10 ideas were then voted on again by grading them through a set of 6 criteria developed by the task force. These criteria included “alignment with campus priorities, increasing the status of the University, defensibility, newsworthiness, and chances of achieving goal within 4 years, and return on investment.” Through this final round of grading, the task force has developed a set of 6 top ideas that form a Sustainability Integration Plan that was presented to the Chancellor on October 23, 2017 for support towards implementation and integration into the fiscal year '19 budget process by the end of the calendar year. Over 400 students have been surveyed and have been asked to grade each of the final 10 ideas from least important to most important to them. Students' interests largely reflect the priorities of the committee. The six high level priorities to emerge from the planning process are: Carbon Mitigation Planning, Resiliency and Climate Adaptation Planning, Zero Waste Campaign, Hands-On Learning, Increasing Food Security on Campus, and Sustainability Branding. The Chancellor is largely supportive of the outcomes of the Strategic Plan and is arranging for a full Chancellor's Leadership Council (CLC) presentation. Furthermore, he urged the committee to develop and seek funding from his office for symposiums and speaker series focused on these topic areas of sustainability to engage the campus community. Areas of improvements which are being addressed in the strategic planning effort mentioned above include but are not limited to sustainability governance (establishing a more centralized office of sustainability and/or academic based sustainability institute), better coordination between A&F departments to move the campus towards zero waste (for example, Auxiliary Services, Office of Waste Management, and Physical Plant doing more collaboration to address waste at new retail dining locations in Physical Plant managed buildings), and a more unified sustainability messaging and branding campaign to more succinctly tell the sustainability story at UMA.

BOSTON - The UMB Campus Center built with LEED principles opened in 2004. Since 2007, the campus has embarked on its 25 year Master Plan with Sustainability as one of its guiding principles. The campus achieved its first ever LEED GOLD rating for two of its new buildings – the Integrated Sciences Complex (ISC, opened 2015) and University Hall (UH, opened 2016). The campus is currently engaged in completing its first ever 1000-bed Residence Hall project as a Public Private Partnership (P3) of the UMass Building Authority (UMBA) and Capstone Development, seeking LEED certification and scheduled to open in Fall 2018. In Spring 2017, UMB also began construction on its free-standing parking garage funded by the UMBA. Along with the potential for solar-ready roofs, the 1,400 space garage will also include dedicated spaces for carpoolers, electric vehicles and a high capacity indoor bicycle storage. UMB is currently engaged in the UCRR (Utility Corridor and Roadway Relocation) project with a targeted completion date in 2018. The UCRR project is creating a new utility corridor to support current utility relocation from the failing substructure and provide reliable and efficient utility services to the campus facilities. The project design incorporates many sustainable design features such as two-way roadways, sidewalks, bike lanes, tree lawns, and storm water management with bio-retention areas including native plantings.

DARTMOUTH - UMass Dartmouth is in the process of finalizing our next version of the Campus Master Plan. As an offshoot of that, Competitive Energy Systems was engaged to conduct both an Energy Strategic Plan as well as a Sustainability Master Plan. These would look to assess the opportunities that exist to meet the Executive Order 484 as well Second Nature's Carbon Commitment.

LOWELL - Since 2010, UMass Lowell's transformative growth and development has been guided by a multi-year strategic planning process, titled UMass Lowell 2020 Strategic Plan, which provides a blueprint for how the University will achieve national and international recognition as a world class institute by 2020. In addition to academic and research initiatives, this strategic plan includes specific objectives related to master planning, facilities renewal, and sustainability. The plan is updated regularly with the participation of over 200 campus constituents and its progress is reviewed against quantitative benchmarks on an annual basis.

MEDICAL SCHOOL - The University of Massachusetts Medical School updated the campus's climate plan in September of 2016 to include recommendations from the Division of Capital Asset Management and Maintenance (DCAMM) accelerated energy program's ASHREA level II energy audit, and benchmarks for meeting Executive Order 484 and Second Nature's Carbon Commitment.

POLICY PRINCIPLE 2 - Clean Energy

Goal 2.1 - 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.

Campus Emissions Performance

Current Reporting Year	FY 2017	FY 2016	FY 2017	FY 2016	FY 2017	
Emissions by Scope	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
Scope 1+2 Emissions/SF	0.01	0.01	0.01	0.01	0.03	0.01
Prior Reporting Year	FY2016	FY2014	FY 2016	FY 2015	FY 2016	
Emissions by Scope	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
Scope 1+2 Emissions/SF	0.01	0.01	0.01	0.01	0.03	0.01

The University greenhouse gas emissions reductions have remained relatively stable over the past year.

Goal 2.2 - 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.

Current Reporting Year	FY2017	FY2017	FY2017	FY2017	FY2017	
	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
Percent of Campus Energy Generated through Renewable Sources	0.0%	0.0%	0.0%	1.0%	0.0%	0.1%
Prior Year	FY2016	FY2016	FY2016	FY2016	FY2016	
	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
Percent of Campus Energy Generated through Renewable Sources	0.0%	0.0%	0.2%	0.6%	0.0%	0.0%

The University has experienced slight growth for energy generated through renewable sources.

Campus Examples of Efforts Related to Policy Principle

AMHERST- UMass Amherst has utilized state programs and incentives to develop a large scale on-site renewable energy portfolio that provides a sustainable model for the Commonwealth. Using internal revolving funding mechanisms to fund the first two on-site renewable energy projects, the campus in 2014 authorized \$1.7 million of Alternative Portfolio Standard (APS) revenue generated from the Central Heating Plant (CHP) Alternative Energy Credit (AEC) sales, to fund the 292 kW UMass owned Robsham Visitor Center solar parking canopy and the first solar thermal project on campus at the CHP. Once the first canopy system was completed and provided a successful pilot, UMass Amherst used the PPA model to expand solar parking canopies across the campus and completed a 5.3 MW solar project at 7 different campus sites including two large parking canopies in Lots 25 and 44 and roof mounted solar on the iconic Fine Arts Center bridge, the Police Station, Computer Science building, Champions Center, and Recreation Center, making it the largest campus solar project in New England. The MA Department of Energy Resources Leading by Example Department awarded UMass Amherst over \$2 million in Clean Energy Grants for these projects, most notably the \$146,000 grant for the Robsham Visitor Center solar parking canopy and the \$500,000 grant for the Campus-Wide Solar PPA project. On-campus solar projects provide a learning laboratory for studying renewable energy systems and provide opportunities for students to gain experience and knowledge in the solar industry. As part of the PPA project, UMass Amherst entered into a \$41,000 Educational Agreement with the solar developer. Through this agreement the developer provided the university with student internships with the developer in solar engineering and design, web development, and marketing as well as tours, and presentations. The agreement also provides electric vehicle charging stations and solar dashboards with granular data download capability for campus researchers studying solar efficiency and degradation. Data includes raw data (1-5 second intervals) of AC energy, array irradiance, windspeed, AC voltage, AC current, and power factor.

BOSTON - UMass Boston’s commitment to clean energy and jobs in renewable energy was demonstrated by facilitating the construction of a 3.9 MW rooftop solar array, the largest operational rooftop installation statewide. UMass Boston consulted with CES - Competitive Energy Services for the procurement of the net metering solar array. The solar rooftop installation is located at Boston Business Park, a 430,000-square-

foot manufacturing and distribution center on the Boston-Dedham line and is expected to generate 4.8 million kWh annually. Also involved in the project were Altus Power, Borrego Solar, and National Development. Altus Power owns the solar installation and will sell the energy produced to UMass Boston through a Net Metering Credit Purchase Agreement. Inaugurated in March 2017, it is projected to save UMass Boston \$5 million in energy costs over the next 20 years. In addition to being the state's largest solar rooftop installation – this in combination with other UMass campuses represents the largest off-taker of virtual net metering bringing the University up to 50 MW of solar power. UMass Boston's first 74 KW Solar PV project was developed on Wheatley Hall in 2011 with American Recovery and Reinvestment Act funds.

DARTMOUTH - UMass Dartmouth is participating in two net metering projects. They include a 2.4 MW project in Dartmouth and a 6 MW project in Freetown. These contracts achieve significant cost savings for the Dartmouth campus, with \$544,000 in FY17 alone. While the greenhouse gas reductions are not able to be claimed by the University, these projects could not have been built without the campus and showcase the campus commitment to the development of renewable energy. The Dartmouth campus is the only campus in the UMass system to have a co-generation plant, solar panels as well as a wind turbine.

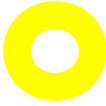
LOWELL - Since UMass Lowell's Climate Action Plan was developed in 2012, full time enrollment (FTE) has increased by 26%, gross square footage (GSF) has increased by 20%, and total campus emissions have decreased by 8%. Decreasing emissions during a time of campus growth is a significant accomplishment. Normalized to account for growth, Scope 1 (fuel use) and Scope 2 (purchased electricity) emissions per 1000 GSF have decreased by 26%. These reductions are due primarily to the \$26 million Accelerated Energy Program (AEP) initiative to upgrade and retrofit heating, cooling and lighting systems in 30 buildings across campus. Reductions in Scope 3 (commuting, air travel) emissions are primarily due to increased carpooling, bicycling and walking to campus as well as the construction of a new residence hall increasing the percentage of students living on campus.

MEDICAL SCHOOL - UMMS is participating in three solar net metering contracts. These projects include a 2.5M-DC array in Palmer, MA, a 6MW-DC array in Warren, MA and a 2.1MW-DC project in Williamsburg, MA. The net metering contracts achieve significant cost savings for UMMS: \$616,000 in FY15, over \$700,000 in FY16, and over \$850,000 in FY17. While the environmental attributes of this power was not retained by the Medical School, these projects serve as an example of investment in renewable energy by the University.

POLICY PRINCIPLE 3 - Climate Resilience and Preparedness

Goal 3.1 - Build climate resilience and preparedness standards into the University's capital planning process, emergency management and business continuity planning.

Current Reporting Year	FY2017 Amherst	FY2017 Boston	FY2017 Dartmouth	FY2017 Lowell	FY2017 Medical School
Does the campus integrate climate resilience and preparedness standards into the capital planning process?	Standards have not been established however multiple capital projects have increased energy resiliency, water efficiency, and lesson impact on natural environment.	Hazard Mitigation Plan includes climate resilience. EMBC program follows emergency management resilience standards. Look forward to what is developed per the new State Exec Order 569.	To the extent that we have a Hazard Mitigation Plan	Our existing Climate Action Plan, Strategic Development Plan and Hazard Mitigation Plan all contain references to climate resilience and preparedness. However, we are awaiting specific guidance from MA Exec. Order 569 before addressing both in a more comprehensive format.	No, there is no formal integrations of climate resiliency into strategic or capital planning. However, resiliency and continuity of operations is fundamental to meeting our strategic planning objective of healthcare delivery
Does the campus integrate climate resilience and preparedness standards into the emergency management and business continuity planning process?	No. The University has a FEMA approved Hazard Mitigation Plan in place but it largely does not include climate resilience nor adaptation strategies within that plan.	Hazard Mitigation Plan includes climate resilience. EMBC program follows emergency management resilience standards.	To the extent that we have a Hazard Mitigation Plan	As above in relation to Hazard Mitigation Plan. Will be developed more robustly with guidance from EO 569.	Regional climate modeling is not integrated into the emergency management and business continuity planning process. DCAMM is developing a statewide resiliency master plan, which include risk and vulnerability assessments.
Briefly describe how the emergency management planning process integrates these standards.	Climate change and climate related events are integrated into the Hazard Mitigation Plan. Additionally, DCAMM is developing a statewide resiliency master plan, which include risk and vulnerability assessments.	Planning process includes focus on weather and climate.	N/A	Climate change and climate related events are integrated into the Hazard Mitigation Plan.	Climate change and climate related events are integrated into the Hazard Mitigation Plan. Additionally, DCAMM is developing a statewide resiliency master plan, which include risk and vulnerability assessments.



The University's efforts in this area remain stable as the Hazard Mitigation plans have been recognized as a significant achievement but other efforts to integrate resilience planning into other planning remains in progress.

Campus Examples of Efforts Related to Policy Principle

AMHERST - UMass Amherst along with surrounding communities developed a Hazard Mitigation Plan for the University with the funding assistance from state agencies (MA MEMA and MA DCR) and FEMA. The plan was submitted to FEMA and approved. The plan recognizes the potential impact of disasters on the campus community and concluded that proactive efforts needed to be taken to reduce the impact of natural and human-caused hazards. In terms of how UMass is integrating resilience and preparedness into capital planning, the campus has implemented multiple capital projects in recent years that have increased the resiliency of its operations. The improvements include the addition of the \$26 million Tillson Electrical Substation, which links the campus directly to high-voltage major transmission lines to assure reliable power. Allowing the campus to do more sustainable on-site generation of renewable energy projects. The campus has also commissioned and completed comprehensive energy master and water plans, which look to develop new and improved infrastructure for increasing reliability, increase efficiency, and utilize innovative technology and smart planning to decrease the campus impact on natural systems.

BOSTON - UMass Boston School for the Environment (SFE) professors Dr. Ellen Douglas, Associate professor of hydrology, and Dr. Paul Kirshen, Professor of Climate Adaptation were recognized with "Norman B. Leventhal Awards for Excellence in City Building" by A Better City organization in Boston for their work at the Boston's Research Advisory Group (BRAG), whose consensus report serves as the basis for Climate Ready Boston's climate resiliency solutions initiative. Led by UMass Boston's Dean Robyn Hannigan, School for the Environment (SFE), this group was established in 2015 to develop a consensus and consistent climate projection on the possible climate changes and sea level rise that the City of Boston and Metro Regions will face in the future by 2030, 2050, 2070, and 2100. On June 1, 2016, a landmark presentation and report on "Climate Ready Boston" was presented to the Mayor of Boston and the full meeting of the Green Ribbon Commission where Boston's leading business, civic, and institutional leaders share best practices, renewable

energy procurement, climate resilience and support the City of Boston's climate plan and in subsequent months and years to help inform next steps in Boston area climate preparedness.

As of Fall 2017, the Sustainable Solutions Lab at UMass Boston at the SFE and the Environmental Business Council of New England (EBC) have begun collaborating to establish a quarterly series of half-day Climate Adaptation Forums that will provide cutting-edge thought leadership on adaptation to climate change for environmental and energy professionals, policy makers, municipal officials, NGOs, and practitioners with their first meeting at the UMass Club in downtown Boston.

DARTMOUTH – The campus has a Hazard Mitigation Plan in place. This identifies many of the risks that the University could face and how the campus can work together on campus and with campus community partners to quickly return to normal operations. The University also started working with the South Coast Climate Change Coalition. It is a group that connects communities across the South Coast of Buzzard's Bay from the Cape to Rhode Island. This group is working with the Southeastern Region Planning and Economic Development District to evaluate how to best support all communities in their efforts to become more resilient in light of the changes brought on by our climate.

LOWELL - The first step in developing our campus resiliency strategy will be to establish a campus-community task force with our City of Lowell partners to ensure alignment with community goals and to facilitate joint action. The next critical step will be to complete a resilience assessment to determine the current state of climate resilience and prioritize areas for action.

The assessment must be completed in 2018 and consider five specific domains of resilience: Social (Governance & Engagement); Human (Health & Wellness); Natural (Ecosystem Services); Physical (Infrastructure); and Economic (Financial)

There is currently no single protocol or tool for assessing resilience. Specific "indicators" for each domain will need to be established and coordinated with the statewide EO 569 implementation. The results of the assessment must be incorporated into the CAP in 2018 including: Target date by which defined thresholds of resilience will be met; Interim target dates for meeting milestones that will lead to carbon neutrality and increasing resilience. ; Mechanisms and indicators for tracking progress including those that cuts across campus community boundaries.; Actions to make carbon neutrality and resilience a part of the curriculum and other educational experiences for all students.; Actions to expand research in carbon neutrality and resilience.

As part of this effort, UMass Lowell will incorporate elements of its Federal Emergency Management Agency (FEMA) approved Hazard Mitigation Plan as well as relevant elements of the University of Massachusetts System Five Year Capital Plan which also integrates resiliency. While hazard mitigation is an important component of resilience, resiliency planning goes beyond managing and recovering from extreme weather events and considers opportunities to thrive under changing conditions.

MEDICAL SCHOOL - In FY17 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 will provide the capability to supply the entire campus load and enhance the stability of the central plant in the event of a utility interruption.

POLICY PRINCIPLE 4 - Green Building Design and Sustainable Campus Operations

Goal 4.1 - 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.

Current Reporting Year	FY2017	FY2017	FY2017	FY2017	FY2017	
	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
Percent of Certified Building Space	11%	-	-	16%	24%	14%
Prior Year	FY2016	FY2016	FY2016	FY2016	FY2016	
	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
Percent of Certified Building Space	11%	8%	0%	14%	24%	11%



The growth in the percentage of certified building space meeting green building standards improves; some gaps for this metric exist and work will be done to gather this data for future reporting.

Goal 4.2 - 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.

Current Reporting Year	FY2017	FY2017	FY2017	FY2017	FY2017	
	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
Energy Use Intensity (KBtu/GSF)	187	280	74	179	542	226
Prior Year	FY2016	FY2016	FY2016	FY2016	FY2016	
	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
Energy Use Intensity (KBtu/GSF)	192	280	170	178	528	238



The reduction in energy consumption and increasing efficiency has driven the energy use intensity per gross square footage down resulting in progress for this metric.

Campus Examples of Efforts Related to Policy Principle

AMHERST - UMass Amherst continues to build new construction and major renovations to LEED Silver minimum standard and now has over 1.4 million square feet of LEED certified space on campus. Most notable and recently completed in the past year is the LEED Gold certified Old Chapel renovation, the Design Building, and the South College Academic Facility. The Design Building (DB) and South College are pending LEED certification. Renovations to the iconic Old Chapel structure included a new entry pavilion, a new double height entry lobby with an elevator, a new multipurpose space, and the unveiling of the existing rose window on the north elevation viewed from the Great Hall for the first time since 1936. The Design Building is

located on the southern portion of parking Lot 62 north of the Studio Arts Building and houses academic programs including Landscape Architecture & Regional Planning, the Department of Architecture, and the Building Construction Technology program. The DB showcases integrated design through a stacked courtyard surrounded by studios, classrooms, workshops, and offices. The DB is the largest CLT (cross-laminated timber) building east of the Colorado Rockies. South College is a multipurpose facility that has undergone renovations with upgrades to all mechanical, electrical and plumbing systems. Additionally, the building received a four-story addition to the Hicks way/west side of the building that includes common areas, faculty offices, classrooms and auditoria with state-of-the-art audio-visual and communications systems.

BOSTON - University Hall (UH): University Hall is the second new academic building in the UMass Boston Master Plan, and began a phased opening in January 2016 to achieve a LEED Gold certification after the ISC which opened in 2015. The 190,000 gross square foot facility features more than 25 general-use classrooms, including 18 classrooms seating 40 or fewer students, and specialized spaces that will help meet pressing academic needs and promote interactive teaching. Designed by Wilson Architects, the LEED Gold building features key green design and sustainable features at University Hall include Lab Ventilation Lighting, High performance exterior envelope and glazing system, Cantilevered roof shades the southeast-facing glazed wall at the atrium to balance aesthetics and user comfort, LED theatrical lights to reduce electrical loads, reduced lighting power density (20% better than code), heat recovery for lab space (run-around loop), Cascade Economizer control for lab ventilation, reduced ventilation during unoccupied hours, occupancy based control classroom, hydration stations as well as indoor and outdoor recycling bins. Building Design efficiency includes exterior wall, roof insulation, interior lighting, day light dimming, HVAC systems and more. The building also incorporates green procurement such as sustainable FSC wood as low VOC furnishings as well as numerous resilience and walkability features plus green transportation options for users. University Hall was the site of a USGBC tour hosted by designers, Wilson Architects and Pare Corporation program for Emerging Professionals in Fall of 2016.

The UMB Integrated Sciences Complex (ISC, opened 2015) was the first new academic building on the campus in nearly 40 years and was selected as a green design showcase site for the Second Nature's ACUPCC Presidential Summit on Climate Leadership Green Campus Tour in October 2014.

The campus is currently engaged in completing its first ever 1000-bed Residence Hall project as a Public Private Partnership (P3) of the UMass Building Authority (UMBA) and Capstone Development, seeking LEED certification and scheduled to open in Fall 2018.

In Spring 2017, UMB also began construction on its free-standing parking garage funded by the UMBA. Along with the potential for solar-ready roofs, the 1,400 space garage will also include dedicated spaces for carpoolers, electric vehicles and a high capacity indoor bicycle storage.

UMB is currently also engaged in the UCRR (Utility Corridor and Roadway Relocation) project with a targeted completion date in 2018. In addition to creating a new utility corridor to support current utility relocation from the failing substructure and provide reliable and efficient utility services to the current and new campus construction—the UCRR project is also in the process of incorporating many sustainable design features such as two-way roadways, sidewalks, bike lanes, tree lawns, storm water management with bio-retention areas including native plantings.

DARTMOUTH - The Dartmouth campus opened the Charlton College of Business Learning Pavilion, a 22,000 square foot expansion which is expected to achieve LEED Gold status. The School for Marine Science and Technology East building, a 66,000 square foot building, which recently opened and is expected to achieve LEED Silver status. These two buildings represent the first LEED buildings in the campus portfolio. The campus

completed the last of its six phases of steam and condensate line replacements, ensuring that the heat generated will remain in a closed loop system that runs efficiently.

LOWELL - Due in large part to the success of the Accelerated Energy Program (AEP) which is still underway, UMass Lowell has significantly reduced campus GHG emissions from existing heating, cooling and lighting systems. The Accelerated Energy Program (AEP) is a \$26 Million state-sponsored, comprehensive energy retrofit project that will reduce energy consumption and improve efficiency in the campus’s facilities.

MEDICAL SCHOOL - In FY17 the UMass Medical School focused on reducing energy use intensity of existing building during renovations of existing spaces and continues to upgrade lighting infrastructure on campus through the utilization of upstream utility incentives and through integration of LED lighting into refresh and renovations projects. Through upstream incentive programs in FY17 UMMS received 3,500 4 pin 14.5W LEDs to replace existing 26W fixtures, annual savings are estimated at \$30,000. Additionally, UMMS has two LEED Silver Buildings on campus. Most notably, the Albert Sherman Center, which opened in 2012, is one of the largest LEED Silver facilities at 513,000 square feet.

POLICY PRINCIPLE 5 - Sustainable Transportation

Goal 5.1 - 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.

Current Reporting Year	FY2017 Amherst	FY2016 Boston	FY2017 Dartmouth	FY2017 Lowell	FY2017 Medical School	FY2017 System-Wide
Percent Alternative Vehicles	4%	7%	2%	5%	2%	4%
Prior Year	FY2015 Amherst	FY2015 Boston	FY2016 Dartmouth	FY2016 Lowell	FY2016 Medical School	FY2016 System-Wide
Percent Alternative Vehicles	4%	0%	1%	4%	2%	3%



This metric demonstrates modest growth in the percentage of alternative fuel vehicles within the University’s fleet of vehicles.

Campus Examples of Efforts Related to Policy Principle

AMHERST - UMass Amherst is the institutional partner in the Valley BikeShare program, a regional bike share program set to launch in spring 2018. This ongoing project which has been funded by the Federal Highway Administration CMAQ (Congestion Mitigation Air Quality) program for \$1.2 million for equipment, has entered into contract with the MA Department of Transportation (MASSDOT) and has selected a vendor, Bewegun Technologies to launch and operate the system. This bike share system will be one of the first regional programs in the country and the third largest bike share system with all electric assist bicycles in the world when it launches. The system is slated for 500 bikes and 50 stations. UMA will receive 50 bikes and 5 stations that will provide convenient, sustainable transportation options for the campus community and increase connectivity with the Amherst businesses and downtown area. UMass is the institutional partner along with the five municipalities of Springfield, Holyoke, South Hadley, Northampton, and Amherst.

BOSTON - In April 2017, UMass Boston won the Pinnacle (highest) level award by MA Dept. of Transportation Eco-Awards. It was the Spotlight winner for walkability in 2016 in addition to being awarded at the Leadership level in the past years 2011 through 2016. Green transit options at UMB include eco-friendly free shuttle buses in fleet, Hubway, Zipcar, Lyft, walkability access, the new Harbor walk connections, commuter options such as Nuride, Emergency Ride Program, real time GPS monitoring of shuttle buses, Carpool and Vanpool incentives, bike racks, shower facilities, motorbike parking and monthly tabling by MassRides for students, HR fairs etc. Currently as part of the UCRR project, and its two new LEED Gold buildings, numerous bike racks have been added to the campus increasing its sustainable transportation options.

DARTMOUTH - The Dartmouth campus added its first two EV charging stations in FY'17 on the main campus and created a plan for 17 additional locations around campus. It also conducted a Transportation Demand Study which resulted in a vendor being selected to operate campus shuttle services. The campus began a negotiation with the City of New Bedford to possibly bring a Bike Share program to campus. The campus negotiated with the Southeast Regional Transit System to allow UMass Dartmouth students to ride for free, which is projected to increase their ridership by students. Lastly, the campus expanded the number of Zip Cars on campus by two, bringing the current number to five vehicles.

LOWELL - With its industrial heritage, Lowell offers very walkable, as well as attractive, streetscapes. Besides improving public transit service and relieving parking condition on campus, the University promotes bicycling and walking as a sustainable and healthy way to travel between the campuses and other local destinations. Working with the City of Lowell and other partners, the University continues to improve the bike and pedestrian access to and among the three campuses. Furthermore, the University offers both bike-share and car-share (via Zipcar) services to students, faculty, and staff to reduce automobile use and parking demand.

MEDICAL SCHOOL - The Medical School continued to expand EV infrastructure by adding an additional Tesla Wall Charger and dedicating 4 outlets to EV charging. Total EV Charging infrastructure now includes two level II chargers, three level II Tesla chargers, and six level I "trickle" charge outlets. UMMS also received the MassDOT Pinnacle Eco award, as it has for the last several years, for the campus' dedication to sustainable transportation.

POLICY PRINCIPLE 6 - Waste Reduction and Recycling

Goal 6.1 - Employ strategies around preventative measures in waste diversion to promote source reduction, re-use and recycling of used materials.

Current Reporting Year	FY2017 Amherst	FY2016 Boston	FY2017 Dartmouth	FY2017 Lowell	FY2017 Medical School	FY2017 System-Wide
Diverted Materials Total						
Tonnage	4,444	916	887	538	1,008	1,601
Diversion Rate (Excluding Hazardous, Universal and C&D Waste)	59%	63%	31%	41%	27%	47%
Prior Reporting Year	FY2015 Amherst	FY2015 Boston	FY2015 Dartmouth	FY2016 Lowell	FY2016 Medical School	FY2016 System-Wide
Diverted Materials Total						
Tonnage	4,267	748	-	471	1,174.5	1,880
Diversion Rate (Excluding Hazardous, Universal and C&D Waste)	59%	50%	-	42%	32%	48%

The University's diversion rate for waste disposal avoiding the landfill has remained relatively stable (first metric); the tonnage of the diverted materials has experienced a minor decline over the past year (second metric).

Campus Examples of Efforts Related to Policy Principle

AMHERST- UMass Amherst has formed a Waste Reduction & Recycling Sub-Committee of the Chancellor's Sustainability Advisory Committee (CSAC) which meets monthly, is chaired by Residential Life and has membership from Office of Waste Management, Physical Plant Sustainability, Residential Life, Auxiliary Services, Athletics, SGA, and faculty. The sub-committee has made strides in integrating recycling and sustainability into residential education curriculums (see "Academic and Research Programming and Community Engagement" section of this report for details) and has instrumental in helping students publish a "UMass Amherst Guide to Zero-Waste Events" for the campus. The greenest event on campus became even greener in 2017. The College of Natural Sciences (CNS) College Day BBQ which serves over 5,000 community members in just a few hours, diverts 100% of the waste from the landfill. Other sustainable features include: locally sourced food, compostable utensils and paper goods, and minimal food packaging, repurposed decorations, hay bales, cornstalks, and pumpkins from the Hadley Farm & Student Farm, the student Eco-Reps and Waste Management managed recycling infrastructure that achieved the zero-waste goal, the new campus outdoor event water station to the cookout, showing that it's possible to quench the thirst of 5,000 picnickers without relying on one disposable water bottle, activities to raise awareness about Hunger Action Month, and students from the Food Recovery Network who safely packed up and shipped eight trays of uneaten food to the Not Bread Alone food pantry in Amherst.

BOSTON - UMass Boston was a recipient of a Keep America Beautiful and Coca Cola grant for supplementing its outdoors recycling bins. As a campus, more than 900 tons are removed from the waste stream every year for a high recycling rate of above 60% with composting and single stream recycling,

paper, bottles and cans, cardboard, bulk recycling, e-waste and toner cartridges. Most indoor and outdoor locations have recycling bins including those in the two new LEED Gold buildings. Currently all campus buildings have indoor and outdoor recycling bins and these grant funded bins will help supplement the new Campus Center outdoor renovations as part of the UCRR project.

DARTMOUTH - The Dartmouth campus has recently focused on improving its recycling bins, offering clear signage and co-location with garbage bins across the campus. This has resulted in an increase in recycling. Dining services has actively been supporting the collection of both pre and post-consumer food waste in kitchens and main dining halls. They also are actively supporting the Food Recovery Network in supplying unused food to local shelters. The New2U collection and donation program has been a big diverter of usable materials, this year diverting the equivalence of three shipping containers full of items from the landfill. The Dartmouth campus has a goal to be Zero Waste by 2025.

LOWELL - The University's primary goal is to reduce its overall output of waste and increase waste diversion wherever possible. UMass Lowell has expanded and improved recycling and composting opportunities throughout the campus. The EPA Region 1 again recognized UMass Lowell has continued improvements to its composting program this year. UMass Lowell's annual Move-Out Program was extremely successful with over 10,000 pounds of goods donated to local and regional charitable organizations.

MEDICAL SCHOOL - UMass Medical School, because of the unique campus challenges of recycling in a healthcare setting, UMMS has implanted innovative strategies for recycling. Including the implementation of a "centralized trash" program designed to increase recycling rates by removing desk side trash bins from office areas, leaving only blue recycling bins in place. Centralized trash bins were installed in a couple of locations on each floor. By design, the program keeps recycling at hand, but throwing something away required getting up and walking down the hall. This program has been implemented in the LRB, ASC and some areas of the Main School Building.

The SWAP (surplus with a purpose) Shop, an exchange room for unwanted office and lab items in good condition, opened in October 2015 to facilitate the reuse of items on campus. The Shop is located in the Main School Building and is a resource to faculty, staff, and students of the medical school. Since opening, over 6,600lbs of items have been reused with a value of over \$75,000.

POLICY PRINCIPLE 7 - Environmentally Preferable Purchasing

Goal 7.1 - 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.

Current Reporting Year	FY2016 Amherst	FY2017 Boston	FY2017 Dartmouth	FY2015/2016 Lowell	FY2017 Medical	System-
Electronics Purchasing						
Percent EPEAT Certified Procurement	100%	-	-	94%	96%	96%
Cleaning and Janitorial Paper Products Purchasing						
Percent Third-Party Certified Green Cleaning and Janitorial Paper	96%	-	-	77%	79%	83%
Office Paper Purchasing						
Percent minimum 30% Recycled or FSC or higher	53%	93%	-	44%	28%	46%
Prior Year	FY2014 Amherst	Boston	FY2016 Dartmouth	FY2016 Lowell	FY2016 Medical	System-
Electronics Purchasing						
Percent EPEAT Certified Procurement	100%	-	-	37%	51%	54%
Cleaning and Janitorial Paper Products Purchasing						
Certified Green Cleaning and Janitorial Paper Products	99%	-	-	85%	69%	84%
Office Paper Purchasing						
Percent minimum 30% Recycled or FSC or higher	48%	-	28%	0%	28%	39%



The University is procuring higher percentages of green certified products in these commodities.

Campus Examples of Efforts Related to Policy Principle

AMHERST - UMass Amherst has been steadily increasing sustainable paper purchasing since students, the Procurement Office and the UMass Print Services began working more closely on this issue two years ago. Procurement reports indicate that UMass Amherst has decreased its overall spending on paper by approximately \$74,000 between 2014 and 2016. More sustainable paper products have been purchased as well. The percentage of paper purchased with a 30% post-consumer recycled content minimum (30% - 100%) increased from 48% to 52% between 2014 and 2016, with most notably a \$6,000 increase in

50% post-consumer recycled paper and a \$12,000 increase in 100% post-consumer recycled paper.

BOSTON - UMass Boston has a broad longstanding commitment to environmental preferable purchasing (EPP) and varies from local foods to eco-friendly recycling bins, toner cartridges to hybrid buses and 30%-100% recycled paper (approximately 79,000 lbs/yr) to local food or green interiors and lighting in the new LEED Gold buildings. Varied campus dining and bookstore offerings include Fair Trade, GMO-free and cruelty-free personal products, organic or sustainable snacks, sustainable stationary, BPA-Free bottle options, reusable cups, green cleaning and FSC certified janitorial paper etc. Zero-waste dining uses corn-starch biodegradable bags for pre-and post-consumer composting. The UMB Campus Bookstore participates in the Better World Books Donation Program, where students are able to donate their textbooks that have a zero buyback value. Many campus computers, copier units and equipment are also Energy-Star certified. UMass Boston is in the process of developing improved data collection from its vendors in green computers and green cleaning among others, for the purposes of system-wide annual reporting.

DARTMOUTH - The UMass Sustainability Council has been working with Office Depot to identify our current spending patterns, 42% of which is currently made up of recycled content. The campus is working to implement a fully sustainable relationship with them that increases this to over 50%. The Dartmouth campus has already changed to 30% recycled content paper in our computer labs. Additionally, the Dartmouth campus has been purchasing green cleaning products for the past 10 years and helped to establish a standard for this throughout all of the campuses.

LOWELL - UMass Lowell has continued to make major strides in improving our environmentally preferable purchases in the areas of electronics, cleaning products and office paper. Nearly all of UMass Lowell's electronics purchased meet EPEAT Standards as outlined in the Electronics purchasing policy. Additionally, if electronics do not meet the standard they are required due to research or departmental needs. UMass Lowell's Facilities Management Department continues to increase its purchase of green chemicals under its new Green Cleaning Policy. As a result, all Janitorial Paper Products are made of 100% re-cycled content and Forest Stewardship Council (FSC) certified. In addition, the majority of all cleaning chemical expenditures are on Green Seal Certified products. UMass Lowell was Performance Cleaning certified in 2012, the first campus in New England to receive this certification. Our Facilities team continues to build on this achievement and implement sustainable solutions in the management of campus space. Through the Sustainable Paper Purchasing policy, it is noted that a stated preference for purchasing paper with a minimum of 30% post-consumer content is the expected, with a stated preference for purchasing higher recycled content paper where the opportunity allows. Each of the policies referenced above were developed through the Climate Action Plan Steering Committee.

MEDICAL SCHOOL - In addition to the use of Orbio multi-surface cleaner to limit the use of hazardous cleaning chemicals, UMass Medical School continues to reduce resource use through a new cloud based electronic contract management systems which was launched in September 2016. Annually, UMMS processes about 500 contracts for products and services used by the campus community, an average contract has 15 pages and is executed in triplicate: one copy each for the vendor, the contracting school department and the UMMS Financial Services files. Now these contracts are executed electronically avoiding the need to print contracts. To date the new process has reduced paper consumption by some 60,000 sheets, and reduced the purchasing departments supply budget by 25%.

POLICY PRINCIPLE 8 - Sustainable Food Services

Goal 8.1 - Strive for each campus food service operation to procure sustainable food products while maintaining accessibility and affordability for all students and campus patrons.

Current Reporting Year	FY2016	FY2017	FY2017	FY2017	FY2017	
	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
% Third-Party Verified or Local AND Community Based	15%	25%	22%	33%	1%	15%



There is substantial activity in this area at each campus, however at this time we do not have enough historical data to recognize a trend in this metric.

Campus Examples of Efforts Related to Policy Principle

AMHERST - The UMass Amherst “Local, Healthy UMass Food System Initiative” is a cutting-edge approach to supporting a healthy & resilient New England food system. As a result, UMass Dining has invested over \$4.5 million in local and sustainable foods in the past fiscal year with more than half sourced from New England farms, cooperatives, and vendors. The grant-funded pilot project “Hampshire Dining Commons Pilot Project” converted one of UMass Amherst’s on-campus dining halls (Hampshire Dining Commons) into a premier campus eatery dedicated to sustainability, health, and great-tasting foods and provides a defensible and cost-effective example to implement campus-wide. UMass Amherst Dining aims to work with large-volume food service providers across New England to implement similar initiatives. UMass Dining published the “Making Local, Healthy Sustainability Delicious: The How-To Guide for Food Service Operators” in late 2016. As part of the grant initiative with the Henry P. Kendall Foundation, UMass Dining is documenting the journey towards sourcing additional local, healthy foods to make a defensible and cost-effective model for all campuses to emulate. The How-To Guide for Food Service Operators is a manual for restoring real food and regional food systems to their right place in our society. For over a decade, the Dining Services program at the University of Massachusetts Amherst (UMass Dining) has been an industry leader in environmentally conscious practices. The serious commitment to sustainability has changed the way college students on campus think about food and food consumption. They now understand that food is an essential source of personal health and wellness; that eating local, sustainable meals contributes to a strong and vibrant regional food system in New England and beyond.

BOSTON - UMB Dining offers a variety of local, vegetarian, and international offerings. It also hosts farmer’s markets in the Campus Center and campus users can even order a special Earth Day menu. UMass Boston Dining works with local vendors and farms for baked goods, meats, cheeses and fruit or Global Chef international cuisine display events in the student food court.

UMB Dining uses 100% Cage-Free shelled eggs and has made efforts to educate its leadership and team on local and sustainable seafood and dining choices via educational workshops, site visits to Red Best Seafood, use of recycled paper napkins and wooden stirrers and all-paper food ware that can be composted. UMass Boston’s kitchens and dining service use biodegradable and compostable bags. The campus has had a zero-waste dining program since 2004 developed in collaboration with the sustainability office. Organics composting began at UMass Boston almost a decade ago and has grown to become a comprehensive zero- waste program over the years. Healthful “real-food” choices are available at vending

machines and fair trade coffees are now widely available all over campus. UMass Boston offers a reusable cup discount program at all dining cafes on campus since 2002. UMass Boston also hosts Campus Kitchens, which participates in food recycling, hunger relief, and nutritional information programs. Student government at UMass Boston passed a resolution in February 2012 to limit the use of disposable bottles. Hydration stations in campus buildings have saved more than 900,000 bottles/yr. from reaching the landfill. Campus Dining also participates in various leftover food donation programs and collaborates with UMB Fair Trade student groups etc. The campus is in the process of extending pre and post-consumer composting to its newest dining location – the LEED Gold University Hall Beacon Café in addition to its main Food Court and University Club.

DARTMOUTH – The campus is fortunate to be working with Chartwells as a food service provider as they understand the campus’s sustainable culture and they incorporate that into their practices. This is evident in their operation of the Freight Farms Leafy Green Machine which produces the equivalence of 1 ¼ acre of growing space within a 40’ shipping container. All greens grown there are organic, use 90% less water and require no trucking across country as it’s right in the campus’s backyard (literally, they walk the box of lettuce across the parking lot). They have embraced vegans, using locally harvested fish that are by-catch, and have offered more protein choices that are not as resource intensive as beef. Lastly, the campus and Chartwells work together on a “Project Clean Plate” program which encourages students to be aware of the amount of food that they throw away. Typically, students will take smaller portions because of this awareness campaign.

LOWELL - UMass Lowell has partnered with Mill City Grows, a local non-profit that focuses on urban food justice in the City of Lowell, to develop a unique urban agriculture operation on its East Campus. The goal of the partnership is to increase the distribution of locally and sustainably produced food both on campus, and to low-income residents in Lowell and beyond. Hundreds of UMass Lowell students and local youth and volunteers actively work in partnership to gain first-hand experience in urban agriculture. The Office of Sustainability secured over \$150,000 in grants from the State Dept. of Agricultural Resources to help finance this project.

MEDICAL SCHOOL - UMMS continues to support sustainable food systems on campus by minimizing solid waste through the donation of approximately 10,000 gallons of pre-consumer food waste to a local pig farmer and the recycling of 5,000lbs of waste oil from fryers annually. The campus community is provided opportunities to access local food and products during the farmers market which is held weekly from June through October on the campus green.

POLICY PRINCIPLE 9 - Sustainable Water Systems

Goal 9.1 - Reduce potable water usage and determine goals consistent with capital investments and annual programs implemented in support of reducing potable water.

Current Reporting						
Year	FY2017	FY2016	FY2017	FY2017	FY2017	
<i>(Measured in hundreds of cubic feet)</i>	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
Use Per Campus User	12	4	0.6	4	36	11
Use Per SF	0.03	0.02	0.00	0.02	0.09	0.03
Use Per Acre of Managed Land	4,260	-	18	1,291	5,674	1,699
Prior Year	FY2016	FY2015	FY2016	FY2016	FY2016	
	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
Use Per Campus User	13	-	0	6	37	13
Use Per SF	0.03	0.01	0.00	0.02	0.08	0.03
Use Per Acre of Managed Land	4,546	-	10	1,727	5,580	1,768



The decline in the water use per campus user and the use per acre of managed land represents the impact of water conservation efforts across the system.

Campus Examples of Efforts Related to Policy Principle

AMHERST - UMass Amherst Physical Plant has purchased the first outdoor event water station for providing safe, cooled, filtered tap water at all large outdoor events on campus, serving as a sustainable alternative to disposable single-use plastic water bottles. So far, the water station has provided tap water to attendees of three of the largest outdoor events of the year, the Welcome Back BBQ in September, the CNS College Day BBQ in October, and at the Student BBQ at the UMass home Football Games at McGuirk Stadium.

BOSTON - New construction at UMB features numerous sustainable water systems. At the Integrated Sciences Complex, the project has goals for the reduction of potable water use by 45.9% from a calculated baseline design through the installation of water closets, urinals, lavatory faucets, showers, and kitchen sinks; no permanent irrigation system has been installed.

The section of the HarborWalk between the JFK Library and Museum and Harbor Point Apartments, was opened to the public. The 800-foot stretch of shoreline features a paved walkway, benches, lighting, gathering spaces, bike racks and an area to display artwork. The construction project, begun in 2014, placed 3,200 tons (6.4 million pounds) of stone along the shoreline to stabilize it, before adding the walkway and other amenities. The HarborWalk links UMass Boston to the JFK Library and the Edward M. Kennedy Institute for the U.S. Senate, to Carson Beach and Castle Island, and to the Seaport District. Areas along the section of the HarborWalk have been seeded with grass and native plants. All trees and bushes

are drought resistant and will not need to be watered after initial planting. About half of the grass being planted in the hilly area (closer to the DCR and lot D side) is meadow grass seeds. This area will not need to be mown, except once a year. Meadow is also a feature at the ISC. The rest of the grass near the site furniture (benches and scored concrete areas) is grass that needs to be mown regularly, but does not require watering. The newly installed rip rap will significantly improve resiliency of the shoreline.

At University Hall, the campus' second LEED Gold building, the interiors have numerous water saving features including targeting 40% water use reduction indoors, water-conserving features, easy to clean floors, and hydration stations. In addition to the tree plantings, there is nature-derived aesthetic for seating and native landscaping with low water needs.

The campus is in the process of collecting annual water use numbers, first reported to LBE in FY2013 and now annually for the sustainability metrics report.

DARTMOUTH - The Dartmouth campus has historically used only a small amount of water for irrigation of our campus. This is mainly focused on the campus main entrance and the athletic fields. During the first round of Energy Conservation Measures, the campus was able to incorporate low flow showers, urinals and toilets. In addition, with the completion of the steam line replacement project, the campus no longer need to throw away the steam line condensate, resulting in a reduction of water purchased.

LOWELL - The University has had water-efficient fixtures in its Design Standards since the first Plumbing Standard and Sustainability Guidelines were written in early 2011. All LEED designed buildings and renovations are fitted out with water-efficient fixtures in building interiors and exteriors. The Student Government Association (SGA) continues to take the lead on advocating for filtered hydration stations in each building on campus. The Facilities Planning Department continues to map and add these stations to our Facilities Information System.

MEDICAL SCHOOL - At UMass Medical School over half of the water consumption on campus is for use at the central plant, for this reason UMMS continue to explore opportunities to recue potable water use in the Central Plant. In FY17 UMMS focused on irrigation efficiency, while irrigation only represents a small portion of water consumption on campus, it is one of the visible sources of water use by the campus community. Preventative maintenance of rain sensors and scheduling using astronomical clocks, has led to a savings of 1.2 million gallons and 3% reduction in water consumption for irrigation this watering season compared to last year.

POLICY PRINCIPLE 10 - Academic and Research Programming and Community Engagement

Goal 10.1 - 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.

Current Reporting Year	FY2017	FY2017	FY2017	FY2017	FY2017	
Sustainability Courses Offered by the University						
	Amherst	Boston	Dartmouth	Lowell	Medical School	System-Wide
Percent of sustainability-related courses offered	6%	3%	7%	21%	12%	9%
Sustainability Research Conducted						
Percent of sustainability-related research conducted	21%	-	8%	27%	41%	24%

There is substantial course offerings at each campus, however at this time we do not have enough historical data to recognize a trend in this metric.

Campus Examples of Efforts Related to Policy Principle

AMHERST - UMass Amherst has one of the largest campus residential programs in the country at more than 13,500 residential students, so a concerted effort has been placed on building more sustainable education within the residential community. A collaborative partnership between UMass Amherst Residential Life Student Services, Residence Education, and Sustainable UMass has resulted in the integration of sustainability concepts into Residence Education’s departmental initiatives, specifically the Residential Curriculum. The Residential Curriculum is an alternative approach to traditional programming models and focuses on student learning outside of the classroom. Residential Life Student Services now has a Sustainability Coordinator for Residential Life who is responsible for developing and implementing initiatives in the residence halls that support the sustainability leadership mission and the student learning mission of the University. The position works closely with Residential Life staff and campus partners, and supports undergraduate staff to address sustainability education needs and operational sustainability issues, particularly related to waste and recycling, but also including energy and water conservation, and building foundational sustainability knowledge. Residence Education has appointed a Sustainability Education Chair (a new committee assignment as of the 2017-18 academic year) which was formerly the Recycling Committee. A Residence Director within the Residence Education department is appointed to serve in this role as a committee assignment and is responsible for representing the department at University meetings, integrating sustainability into the Residential Curriculum, providing crucial feedback and critical analysis of ongoing sustainability efforts, and establishing collaborative efforts with key stakeholders. These two new positions have worked within the CSAC Waste & Recycling Sub-Committee to achieve the following: A prompt, focusing on sustainability, has been added to the coursework for the fall 2017 and spring 2018 classes such as EDUC391R: Community of Residence Educators (CORE) which is a 1-Credit Course that all Resident Assistants (RA’s) and Peer Mentors are required to take. Sustainability concepts have been added into the full time Residence Education staff training. UMass Amherst participated in RecycleMania 2017.

This event was heavily promoted by the Residence Hall Association and featured an inter-building competition in which residence halls were able to compete against each other to determine which hall had the highest diversion rate. The Office of Waste Management had recently added LoadMan scales to waste removal trucks to track waste/recycling that was collected at each residence hall. Students from the winning hall were randomly selected and awarded a solar phone charger. Wide scale sustainability integration into the residential curriculum including open floor meetings, individual interactions, bulletin boards, and roommate/suitemate agreements. Sustainability social media posts have been integrated into the Residential Education Digital Engagement Strategy.

BOSTON - UMass Boston currently is in the process of investigating metrics to better enumerate its wide variety of sustainability-related courses, faculty and research. Currently it offers a minimum of about 57 courses per semester in sustainability or sustainability related areas in addition to research and other student opportunities. A diverse array of programs exist that focus on climate change, sustainability and natural resource management. The Boston Harbor Islands and the Nantucket campus act as living labs to teach, research and engage the community.

UMass Boston's School for the Environment (SFE) is its premier interdisciplinary environmental school. It offers BA and BS degrees in Environmental Sciences, Community Development, and will launch a BA in Environmental Studies and Sustainability in 2017. It offers over 6 environmental and sustainability minors including clean energy and sustainability, an MS in Urban Planning and Community Development, MS and PhD degrees in Environmental Sciences and Marine Science & Technology as well as on-water programs in boating and diving. With over 600 undergraduate students and 120 graduate students engaged in environmental and sustainability focused programs and numerous local communities engaged through K-12 outreach, community service, and citizen science programs, UMB leads the region in urban coastal environmental research and in training the next generation of environmental problem solvers. Additionally, the following offer a wide variety of degrees, immersions, outreach and expertise in sustainability and environmental academic programming: GIS, Clean Energy, Green Chemistry, Sustainable Management, Center for Sustainable Enterprise and Regional Competitiveness (SERC), Urban Harbors Institute, Biology, Living Labs and Biomimicry, Environmental Economics, Coastal, Harbors and Oceans, Center for Governance and Sustainability, and the Honors College.

DARTMOUTH - There are at least 25 researchers on the Dartmouth campus involved in sustainability research. The following is a sampling of their work: Heidi Berggren is researching the cohousing movement, with a primary interest in the civic/political engagement correlates of the movement (and sister phenomena such as intentional communities, etc.); Timothy Walker is assessing Historic Changes in Climate in the Indian Ocean, circa 1500-1950, using American and Portuguese maritime archival sources; Chad McGuire focuses on understanding how policies and laws impact society from an environmental and environmental justice perspective; Rachel Kulick is investigating community based research projects focusing on food security, food justice, and transition initiatives through which individuals/groups/larger networks are attempting to transition to a more just sustainable way of inhabiting their everyday lives; D. Steven White is focusing on sustainable development, global and social entrepreneurship, e-commerce, and open source applications in global business; Rob Darst is researching about social mobilization around issues related to industrialized livestock agriculture.; Crystal Lubinsky is studying 'ecological theology' in late antique patristic literature and hagiography; and sacred spaces and sacred sounds, how both build a sense of community within different social environments and ages; Kevin Stokesbury is assessing the actual scallop stocks along the Atlantic coast of North America to determine sustainable fishing quotas; Neil Fennessey focuses on the sustainable yield of surface water public water supply systems and their vulnerability to potential climate change due to global warming. UMass Dartmouth's Sustainability Minor is the largest minor on campus and there is

much interest in establishing a major. The Green Move Out / New2U Yard sale has been outstanding. We collected the largest amount of items this year, filling an entire shipping container, while also supporting local charities and food banks. The campus offers twice a year campus clean-up programs and trail clearing projects within the 400 acres of forest on campus. The campus also sponsor a sustainable movies series (now in its 10th year), America Recycles Day programs, and Earth Day programs and plant a tree every year during Arbor Day. This year's tree was a Tamarak Tree placed in front of Pine Dale Hall. The Tamarak is both a conifer, as it has needles and spreads its seeds by pinecone, but it is also a deciduous tree in that it loses its leaves (needles) in the winter.

LOWELL - In 2016, UMass Lowell earned a gold rating from the Sustainability Tracking Assessment & Rating System (STARS) for its campus-wide sustainability efforts. UMass Lowell currently offers over 200 courses focused on sustainability and nearly 500 related to 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. In 2015, UMass Lowell became one of only two university systems nationwide to be listed in the Carnegie Foundation's Community Engagement Classification system, which is considered the gold standard for measuring the service universities provide to their local communities. Over 63% of students are currently engaged in community service. Together with over 50 community partner organizations, UMass Lowell has led Earth Day celebrations annually since 2014. Organizations, individuals and families are invited to the streets of downtown Lowell to celebrate the greening of the city including parades, music and a festival.

MEDICAL SCHOOL - Through the Diversity & Inclusion Office the Sustainability Office was able to get two interns this summer to help with sustainability programs on campus. One student was through the Emerging Professionals Summer Internship Program (EPSIP), which is a ten-week paid internship experience for talented underrepresented minority college students, and the other student was through the Building Brighter Futures with Youth (BBFWY) program, which is broad-based strategic initiative to help youth in the Worcester Public Schools transition successfully to adulthood, earn extra spending money and gain real-world exposure to career options. Both EPSIP and BBFWY internships in the Sustainability Office exposed underrepresented students to sustainability, which is critically important as the Association for the Advancement of Sustainability in Higher Education staffing survey still shows 88% percent of those in sustainability positions identified as identified as "White/Caucasian"

APPENDIX B – UMASS SUSTAINABILITY POLICY (T16-055)

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 programming 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.