



Learning with Purpose

# UMASS LOWELL

## Climate Action Plan Update



June 2017

# FIVE YEARS INTO THE CLIMATE ACTION PLAN

*In 2007 UMass Lowell became a signatory to the American College & University Presidents' Climate Commitment (ACUPCC), now the Second Nature Climate Commitment, which laid the ground work for the development of the university's Climate Action Plan (CAP) in 2012. The 2012 CAP charts a course toward carbon neutrality by 2050 with milestone goals in 2020 and 2030. The CAP is supported at the highest level through the university's 2020 Strategic Plan and through the University of Massachusetts System Policy on Sustainability.*

# 1

## **2020 Strategic Plan Sustainability Goal 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.

In the fall of 2015 Second Nature expanded the Climate Commitment to incorporate resiliency. Resilience is defined by Second Nature as "the ability of a system or community to survive disruption and to anticipate, adapt, and flourish in the face of change." UMass Lowell has committed not only to mitigating campus greenhouse gas (GHG) emissions but also to increasing our capacity within the Lowell community to adapt to unexpected changes, reduce vulnerability and increase opportunity.

On a parallel path, in the fall of 2016 Governor Baker signed Executive Order 569, "Establishing an Integrated Climate Change Strategy for the Commonwealth," which requires the Executive Office of Environmental & Energy Affairs (EOEEA) and the Department of Public Safety to establish a framework for state agencies, including the UMass system, to assess their vulnerability to climate change and identify adaptation options.

The Massachusetts Emergency Management Agency (MEMA) and EOEEA will be developing a statewide Hazard Mitigation and Climate Adaptation Plan in the fall of 2018. UMass Lowell will be a stakeholder agency that has an opportunity to contribute to the statewide plan.

UMass Lowell expects to revise the CAP in 2018 to incorporate resiliency as well as changes to our mitigation strategy with a targeted focus on renewable energy opportunities.

The purpose of this *2017 CAP Update* is to provide a snapshot of progress to date and overview of the revised strategy which will be more fully developed in the 2018 revision to the CAP. As required under the expanded Second Nature commitment, the CAP will be updated every five years to incorporate new information and make changes to the strategy and framework accordingly.



# 2

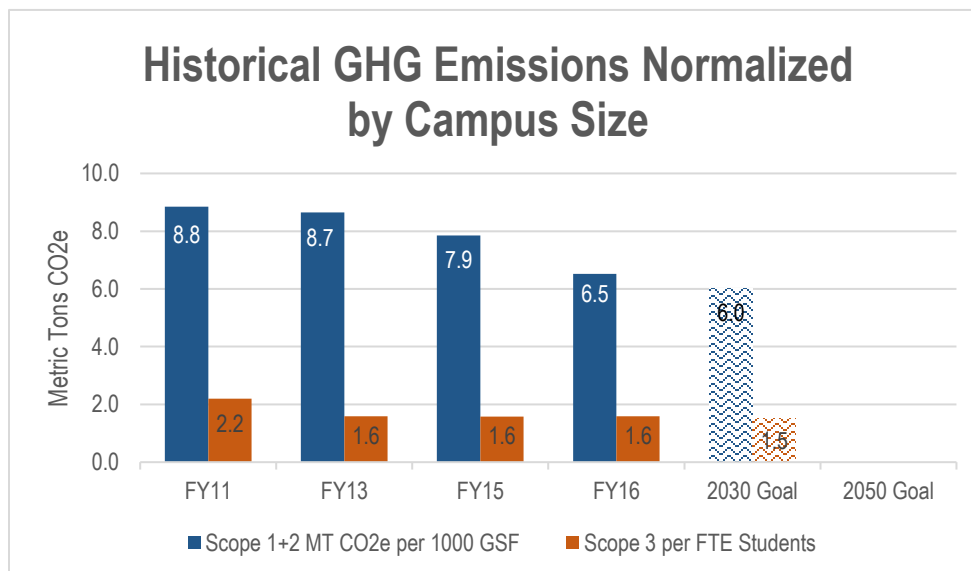
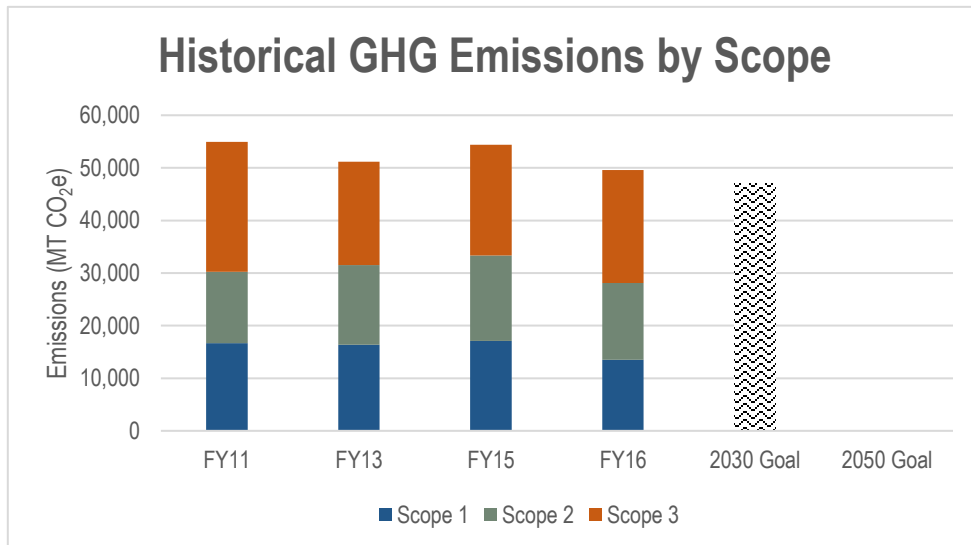
## CAMPUS EMISSIONS: PROGRESS & NEXT STEPS

Since the CAP 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 an accomplishment we are very proud of. 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 due 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.

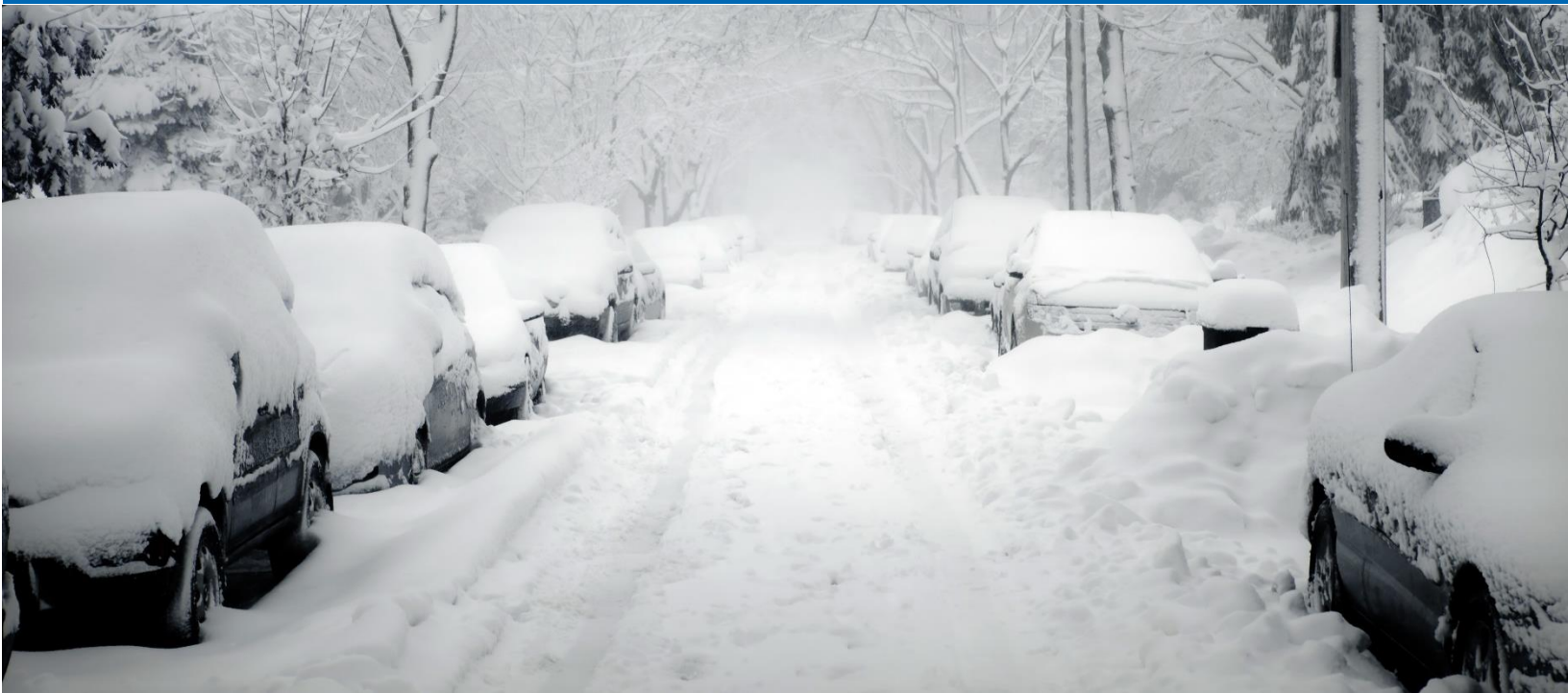
Over the next 13 years, the university needs to reduce emissions to meet its 2030 goals by the following:

- Reduce total emissions by 4%.
- Reduce Scope 1 & 2 emissions per 1000 SF by 8%.
- Reduce Scope 3 emissions per FTE by 5.6%.

The university will need to maintain the reductions realized to date and continue to reduce emissions as the campus continues to grow. Between 2030 and 2050, 100% of emissions must be eliminated or otherwise "offset" through reductions elsewhere. A significant shift toward renewable energy will be necessary to achieve neutrality.







# 3

## Resiliency Strategy

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)
- 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.



# 4

## MITIGATION STRATEGIES

Due in large part to the success of the AEP project which is still underway, UMass Lowell has significantly reduced campus GHG emissions from existing heating, cooling and lighting systems. The next phase of mitigation will require a dramatic shift toward renewable energy both on and off campus as a primary focus. Mitigation strategies may include:

- Increasing reliance on renewable energy:
  - Solar
  - Hydroelectric
  - Geothermal
  - Biomass/renewable fuel
  - Wind
- Increasing procurement of electricity from clean energy sources.
- Continuing to identify opportunities to improve energy conservation and efficiency.
- Expanding sustainable commuting options.
- Generating and/or purchasing carbon offsets or credits.
- Developing corporate partnerships to advance renewable energy technology innovation.

UMass Lowell has already made important progress implementing these strategies ranging from off and on campus solar installations, increased public transit ridership options, partnering with Café Solar to bring solar production technology to coffee farmers, and exploring the possibility of creating an Energy Innovation Center on campus with industry partners. As the AEP approaches completion over the next two years, resources will be re-allocated to support these important strategic priorities.

The Accelerated Energy Program (AEP) is a \$26 Million state-sponsored, comprehensive energy retrofit project that will:

- Generate \$1.4 Million in annual savings
- Improve many of our campus buildings
- Reduce annual campus electricity usage by 6 Million kWh
- Reduce annual campus fuel consumption by 500,000 therms
- Reduce annual campus water consumption by 2.5 Million gallons of water.

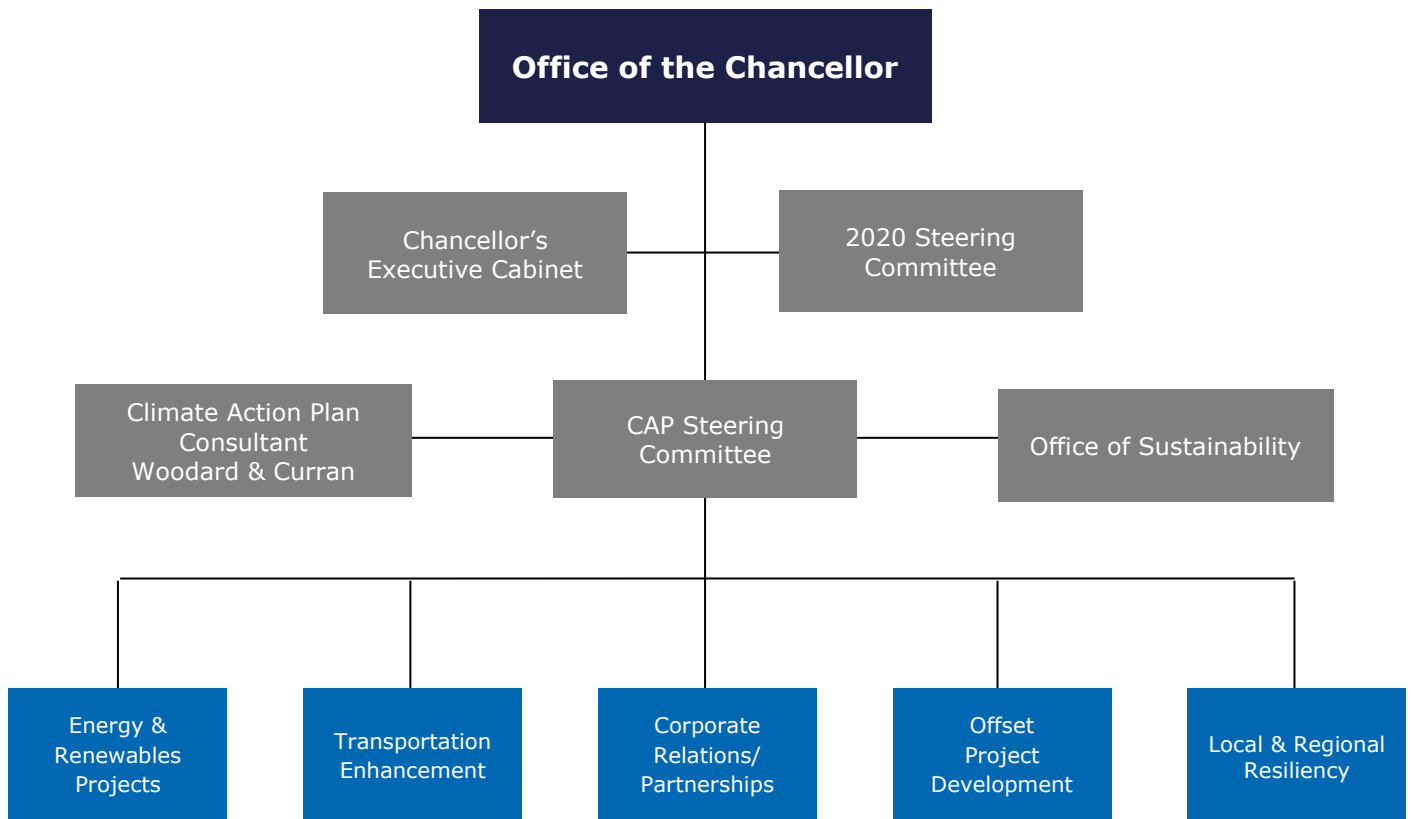
The UMass Lowell AEP project is the largest in the Commonwealth.

# 5

## Strategic Framework

With the shift in focus toward the next phase of mitigation strategies, the CAP subcommittees have been re-structured as follows:

- **Energy & Renewables Projects** – Identify projects and funding mechanisms for energy conservation, efficiency and on-site renewables such as solar, hydroelectric, geothermal, wind and biomass.
- **Local & Regional Resiliency** - Establish campus-community task force with City of Lowell and Massachusetts partners to conduct resilience assessment and prioritize areas for joint action.
- **Transportation Enhancement** – Expand sustainable transportation options and funding mechanisms.
- **Corporate Relations/Partnerships** – Develop corporate partnerships to advance sustainability related research and innovation.
- **Offset Project Development** – Identify and evaluate potential projects the university can either undertake or finance to generate carbon credits to sell to generate capital for sustainability projects or to retain and retire to reduce campus emissions. One potential project under consideration is UMass Lowell’s technology transfer partnership with the Mesoamerican Development Institute (MDI)





# 6

## Education, Research & Outreach

In 2016, UMass Lowell earned a gold rating from the Sustainability Tracking Assessment & Rating System (STARS) for its campus-wide sustainability efforts. This achievement was made possible due in large part to the university's extensive integration of sustainability and climate change literacy in curriculum and research. UMass Lowell 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 assess 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. As one example, the Office of Sustainability 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 growing space. The goal of the partnership is to increase the distribution of locally and sustainably produced food 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.

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.

### 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.



# 7

## Financing

The CAP Steering Committee and subcommittees will continue to work with private and public partners to identify financing mechanisms for sustainability and resiliency initiatives. Many of the projects completed to date have been financed through state funding mechanisms including:

- Massachusetts Lead by Example (LBE) Solar Canopy Grant Program
- MassSave incentives from National Grid
- MassDEP Solar Thermal Grant
- State bonds available through the Clean Energy Investment Program

In 2016, the UMass Lowell Office of Sustainability initiated a new Sustainability Engagement & Enrichment Development (SEED) fund which issues grants to faculty, staff and students for campus sustainability projects that support sustainability goals outlined in the 2020 Strategic Plan including:

- Increasing use of renewables
- Increasing efficiency of facilities
- Reducing waste generation
- Encouraging sustainable behaviors
- Integrating sustainability into teaching, research and service

UMass Lowell will also begin to evaluate options to generate and/or purchase carbon credits for off-campus offset projects. A carbon offset is a reduction or removal of carbon dioxide equivalent GHG emissions that is used to compensate for emissions elsewhere. Eligible "offset" projects can generate carbon credits that can be purchased by another entity to meet its GHG reduction goals.

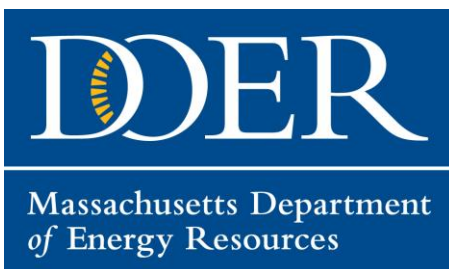
# 8

## Implementation & Tracking Progress

UMass Lowell will continue to track CAP metrics throughout the year and report progress through:

- Annual Second Nature Climate Commitment Report
- Annual Leading by Example Report
- Annual Board of Trustees Report
- STARS Reporting (at least every 3 years)

Once the resilience assessment has been completed and incorporated into the next CAP, the selected resiliency indicators will also be tracked and reported through the Second Nature reporting platform.







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