

Climate Action Plan 2017



Framingham
State University

Contents

Page	Actions	Target GHG Reduction
1.	Introduction	
3.	About this Action Plan	
4.	Greenhouse Gas Inventory	
5.	Annual Emissions Report	
6.	Emissions BreakDown	
7.	Overview of Course of Action	
8.	Highlights	
8.	Conversion of Power Plant and Other Upgrades_____	2,061 metric tons
9.	Increase Use of Renewable Sources to 25% of Total Purchased Electricity Portfolio_____	1,035 metric tons
10.	Effectively Address the Transportation Issues Contributing to Emissions and Congestion _____	3,468 metric tons
12.	Increase Building Energy Efficiency_____	Policy
14.	Make Dining Services as Energy and Food Efficient as Possible_____	Policy
15.	Increase the Use of Alternative Energy Sources_____	Policy
16.	Increase University Recycling Ratio _____	Policy
17.	Reduce Paper and Toner Use by 30%_____	Policy
17.	Decrease Campus Water Use_____	Policy
19.	Make More Efficient Use of Flexible Scheduling_____	Policy
19.	Increase Campus Computer Efficiency_____	Policy
20.	Make Campus Grounds Keeping More Eco-Friendly_____	Policy
22.	Establish Environmentally Conscious Purchasing Policies_____	Policy
22.	Create a Campus Forum for Discussion of Sustainable Policies_____	Policy
23.	Establish an Interdisciplinary Curriculum which Allows Each Department to Play an Active Role in the Creation and Implementation of the Climate Action Plan_____	Policy
25.	Conclusion_____	Reduce CO ₂ emissions by an estimated 6,564 metric tons

Introduction

This 2017 update of Framingham State University's Climate Action Plan report is transmitted on behalf of Dr. F. Javier Cevallos, the President of Framingham State University.

In April of 2007, Massachusetts Governor Deval Patrick issued Executive Order No. 484 mandating reductions in greenhouse gas emissions and energy consumption for all state agencies and institutions.

In May of 2007, Framingham State University became one of the signatories of the American College and University President's Climate Action Commitment (ACUPCC), the ultimate goal of which is the elimination of carbon emissions from higher education campuses and infusion of sustainability into the curriculum and operation of the campus.

Global climate change is the consummate challenge of the 21st century. In 2014, the United Nations Intergovernmental Panel on Climate Change (IPCC) released its most updated and comprehensive report on climate change. The IPCC is the science authority for the United Nations Framework Convention on Climate Change and is generally regarded throughout the international community as the authority on climate change.

The IPCC periodically produces extensive reports on the risks of climate change with the 5th Assessment Report (AR5) released on March 31st 2014. The report is a continuation of the 4th Assessment Report (AR4) and has involved over 12,000 scientific references and over 1,700 expert reviewers. Not only does the report recognize that anthropogenic activity is very likely to have contributed to climate change, but it also "considers how impacts and risks related to climate change can be reduced and managed through adaptation and mitigation."¹

The addition of greenhouse gases (GHG) from anthropogenic sources (such as fossil fuel combustion) has increased total atmospheric GHG concentrations to well above natural levels. According to the IPCC the concentrations of such greenhouse gases such as carbon dioxide, methane, and nitrous oxide have all drastically increased since pre-industrial levels as a result of human activity. For example, the global atmospheric concentration of carbon dioxide has risen from a pre-industrial level of 280 parts per million (ppm) to 379 ppm in 2005. This value is significantly elevated when compared to the natural range determined from ice cores, which fluctuated between 180 and 300 ppm over the past 650,000 years. This increase in GHG concentrations is very likely exacerbating global warming, resulting in global climate change.²

Changes in the Earth's climate have been effectively linked to food shortages, species habitat loss and subsequent extinction, droughts, frequency and intensity of wildfires and storms, unpredictable weather patterns and rises in sea level. It is incumbent upon all nations, institutions, businesses and individuals to act in a responsible manner in addressing these issues for the greater good as well as for their own self-interest.

¹ IPCC 5th Assessment Report, Working Group II, "Summary for Policymakers," p. 3.
www.ipcc-wg2.gov/AR5/images/uploads/IPCC_WG2AR5_SPM_Approved.pdf

² IPCC 4th Assessment Report, Working Group I, "Summary for Policymakers," Section B
www.ipcc.ch/publications_and_data/ar4/wg2/en/spmssp-b.html

Framingham State University is committed to mitigating its consumption to the global dilemma by adopting new policies and procedures designed for reducing our carbon footprint, promoting a healthier community, and providing an educational model to prepare students for futures in a new economy and for their roles as responsible stewards of their communities.

In the summer of 2007 the writing of the Plan was started by the Facilities Office. A carbon inventory was completed using the Clean Air Cool Planet carbon calculator. Various interest groups in the University participated in the vetting of the report, including the Environmental Subcommittee of the Facilities Strategic Planning Committee, student clubs, and staff groups. Each of these interest groups coordinate efforts, develop action items, and implement recommendations of the Climate Action Plan (CAP).

In adopting this Climate Action Plan, Framingham State University recognizes its responsibility to not only adhere to the deadlines and conform to the expectations of these obligations, but to lead by example in providing for a holistic and sustainable educational environment for students, faculty, and staff.

Participants in the authoring of this Plan include:

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About this Action Plan

This Climate Action Plan describes the climate and environmental protection actions and policies planned for Framingham State University. The Plan includes a strong emphasis on reducing CO₂ emissions and energy use as well as new policies intended for creating a sustainable, healthy, and inspirational environment for the campus community. The intention of these policies is to enhance responsible decision-making, thoughtful discussion, and a holistic approach to this campus-wide concern.

The Plan calls for new investment; consolidation of environmental campus concerns; changes in lifestyle; coordination of policies, purchasing and curricula; and for the University to improve the use of its existing resources.

The actions described in this Plan will allow for sustainable progress in effectively addressing the criteria laid out in Executive Order No.484 as well as the mandates put forth by the ACUPCC. The publication of this plan is intended to be just the beginning of a campus-wide endeavor. Progress will be measured and reported along the way, with a subsequent campus-wide appeal for community cooperation and communication to assist in the further structuring of this plan as well as its implementation. It is anticipated that this Climate Action Plan will be a dynamic document, with yearly edits and updates.

This is the 8th edition of this plan. It can also be found at:

www.framingham.edu/facilities/sustainability/climate-action-plan-and-updates.html

Greenhouse Gas Inventory

A greenhouse gas emissions inventory is essential to developing a Climate Action Plan. The Inventory establishes a baseline emissions level and demonstrates trends in the University's emissions and energy use. Data from fuel consumption, electricity purchased, transportation habits and other categories were collected and analyzed to determine the "carbon footprint" of the University. Using the Clean Air-Cool Planet Calculator, emissions were determined for the fiscal years 2001-2012 (June 30-July 1st). Another assessment was completed for fiscal year 2012 by the organization Sightlines to continue the analyses of the University's consumption and emissions level.

The inventory includes both direct and indirect emissions resulting from various University activities including: fertilizer use, purchased electricity, on-campus steam generation, commuter habits, air travel, etc. According to the carbon calculator, these sources were divided into three scopes.

- **Scope 1** includes all direct sources of GHG emissions from sources that are owned or controlled by the institution including production of electricity, heat or steam; transportation of materials, products, waste, and community members; and fugitive emissions from unintentional leaks.
- **Scope 2** includes GHG emissions from imports of electricity, heat or steam associated with the generation of imported sources of energy.
- **Scope 3** includes all other indirect sources of GHG emissions that may result from the activities of the institution but occur from sources owned or controlled by another company such as air travel, outsourced activities and contracts, emissions from waste generated by the institution when the GHG emissions occur at a facility controlled by another company (i.e. methane emissions from landfill waste), and commuting habits of community members. The main contributor to Scope 3 emissions at Framingham State University is commuting to and from the University by faculty, staff, and students.

The combined total of these categories represents the total GHG emissions from the University activities.

The most significant sources of GHG emissions were derived from three major sources:

- Commuting by faculty, staff, and students (Scope 3)
- On-campus steam generation (Scope 1)
- Purchased electricity (Scope 2)

Annual Emissions Report

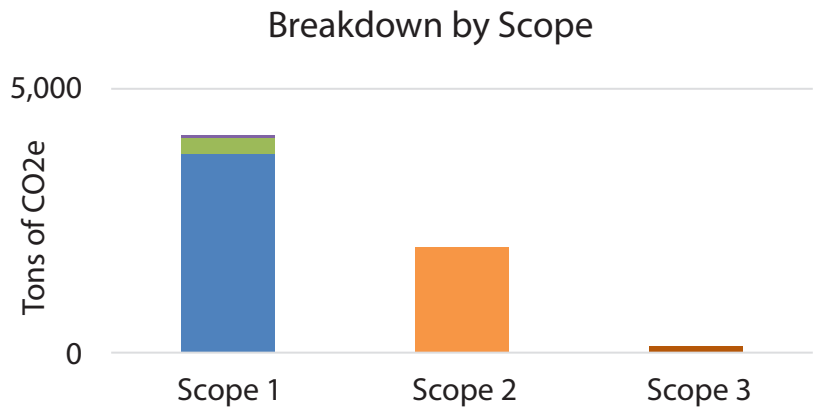
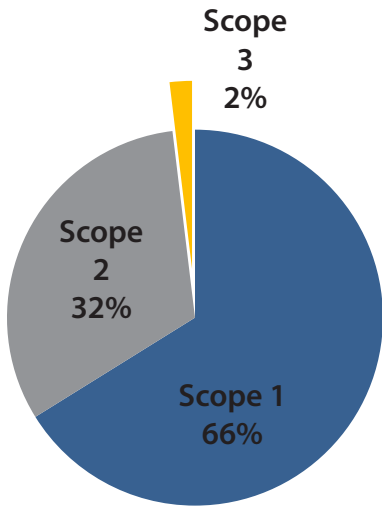
Scope 1	CO ₂ e	CO ₂	N ₂ O	CH ₄	HFCs	PFCs	SF ₆	Unit
Stationary, On-Site Fuel Combustion	3,765	3,761	0.0073	0.0716				metric tons
Steam/Electricity from Cogeneration	0	0	0.0000	0.0000				metric tons
Vehicle Use	312	311	0.0035	0.0153				metric tons
Fugitive Refrigerants	46				0.02			metric tons
Agriculture (only N2O applies)	0		0.0000					metric tons
SCOPE 1 TOTAL	4,123	4,072	0.01	0.09	0.02	0.00	0.00	metric tons

Scope 2	CO ₂ e	CO ₂	N ₂ O	CH ₄	HFCs	PFCs	SF ₆	Unit
Purchased Electricity (State Emissions Factors)	1,991	1,736	0.8439	0.1197				metric tons
Purchased, District Cooling	0	0	0.0000	0.0000				metric tons
SCOPE 2 TOTAL	1,991	1,736	0.84	0.12	0.00	0.00	0.00	metric tons

Scope 3	CO ₂ e	CO ₂	N ₂ O	CH ₄	HFCs	PFCs	SF ₆	Unit
Travel: Air	0	0	0.0000	0.0000				metric tons
Travel: Vehicle	0	0	0.0000	0.0000				metric tons
Employee Commute	0	0	0.0000	0.0000				metric tons
Student Commute	0	0	0.0000	0.0000				metric tons
Transmission Loss from Electricity	119	104	0.0506	0.0072				metric tons
Transmission Loss from Cogeneration	0							metric tons
Transmission Loss from District Cooling	0	0	0.0000	0.0000				metric tons
Waste (only calculated in MTCO ₂ e)	0							metric tons
SCOPE 2 TOTAL	119	104	0.05	0.01	0.00	0.00	0.00	metric tons

2016 Emissions Totals*	CO ₂ e	/FTE	/MM Sq Ft	/MM S Rev	Unit
Own Source	6,114	7.89	1,923	58	metric tons
Scope 3	119	0.15	38	1	metric tons
Total	6,233	8.04	1,960	59	metric tons

Emissions Breakdown



- Waste (only calculated in MTCO₂e)
- Transmission Loss from District Cooling
- Transmission Loss from Cogeneration
- Transmission Loss from Electricity
- Student Commute
- Employee Commute
- Travel: Vehicle
- Travel: Air

Overview of Course of Action

Massachusetts Executive Order No. 484 mandates Scope 1 and Scope 2 GHG reductions, measured on an absolute basis of:

- 25% below FY 2002 by FY 2012
- 40% by FY 2020
- 80% by 2050

Additionally, the Order mandates overall energy reductions, calculated on a basis of BTUH per square foot building area, of:

- 20% below FY 2004 baseline by FY 2012
- 35% by 2050

The American College and University President's Climate Commitment further requires the University to meet certain criteria in an effort to become a more sustainable campus.

GHG reductions will be measured on an absolute basis and not adjusted for facility expansion or load growth. Energy reductions shall be based on a Fiscal Year 2004 baseline and measured on a BTU per square foot basis. Therefore, to comply with these standards, Framingham State University must enact a comprehensive and holistic initiative addressing many aspects of the University community.

The Framingham State University Climate Action Plan is composed of 15 major action points. Each point will include a discussion on: identification of the issue, proposed solutions, and anticipated benefits. Progress will be measured from a quantitative and qualitative perspective, depending on the proposed action.

The points are divided into three basic energy and GHG reduction categories: general campus policies; upgrades and projects; and lifestyle changes for students, faculty, and administration.

Implementation of the action items of the Plan will be a joint responsibility of the Facilities Department and the University President. However, the cooperation and support of the entire University community will be essential.

A student organization, The Green Team, has been assembled to coordinate student involvement and to help facilitate new policies involving student lifestyle changes campus-wide.

Highlights

This Climate Action Plan calls for creating and effectively coordinating policies that will reduce the campus carbon footprint, create campus-wide policies that will enhance and support sustainable endeavors, and produce educational opportunities that will enrich and expand the backgrounds of the students.

The Plan is divided into three sections:

- Because of the exigency in reducing greenhouse gases, Action 1-6 deal primarily with both structural investment and policy matter that have a direct correlation to reducing both CO₂ emissions and energy demands.
- Actions 7-13 are more policy oriented, addressing the need to conserve and protect all campus natural resources. These actions mandate little if any financial cost to the University, but suggest lifestyle changes that can enhance the sustainable programs of the University.
- Actions 14 and 15 promote the importance of the educational aspects essential for the plan to be comprehensive, holistic and representative; thus allowing it to fulfill its pedagogical objective.

Action #1: Conversion of the Power Plant and Other Upgrades

The ISSUE was the power plant boilers, which produce the steam used for heating and cooling 95% of the campus, while dependable, were 48 years old, antiquated, and burned #6 heating oil. The burning of #6 heating oil is very high in GHG emissions. The plant was emitting approximately 7,000 metric tons of CO₂ per year. This was the second leading contributor to the campus carbon footprint.

The SOLUTION arrived at was to convert the power plant to a cleaner burning fuel, to disperse the heating and cooling generation to several areas of the campus creating less dependence on a single source while incorporating new technology, and adopting policies that demand less fuel consumption. Although alternative energy sources may be preferable in a long range plan, conversion from #6 oil to natural gas is currently the most feasible immediate solution.

Converting the boilers to natural gas was priced at an estimated \$1.9 million dollars and was projected to reduce CO₂ emissions by 2,061 metric tons per year, a 30% reduction. Offsets of this expense could be realized from an estimated increase in energy efficiency of 10% yearly.

The BENEFITS of converting the power plant to natural gas is that it potentially creates a direct, measurable and significant effect on the campus carbon footprint, possibly reducing GHG emissions by 2,061 metric tons annually accounting for an estimated 30% reduction in the second largest contributing category.

As of 2013 the power plant conversion was fully implemented creating an estimated 39% reduction in GHG emissions.

Goal for AY 2017 - 2018:

Continued maintenance of the natural gas power plant and consideration of other power sources.

Progress Sequence: April 2009 through April 2017

- ✓ The University submitted a request for Federal stimulus funding.
- ✓ Alternative funding was also explored.
- ✓ A study was completed as to the feasibility of converting the power plant. The Energy Efficiency and Sustainable Building Group of the Department of Capital Asset Management agreed to initiate a study for a Comprehensive Performance Contract that considered both upgrades to the power plant and other energy reduction projects on campus.
- ✓ An energy performance investment grade audit was conducted by DCAM to determine the cost and feasibility of converting the boiler plant fuel burners from #6 oil to natural gas.
- ✓ A 2.7 million dollar grant was secured to retrofit the power plant boilers from #6 oil to natural gas thereby reducing carbon emissions by 25%. This project was a part of a larger 6 million dollar Energy Performance Contract program.
- ✓ The power plant was converted from #6 oil to natural gas and the underground oil tanks were removed.

Action #2: Increase Use of Renewable Sources to 25% of Total Purchased Electricity Portfolio

The ISSUE is that a significant amount of the electricity used at the University is currently produced off site. Framingham State University consumed 9,521,349 kWh of electricity at a cost of \$1,420,870 in FY 2008. Of the amount of electricity purchased, only .01% was derived from renewable sources. Electricity purchases account for the third leading contributor to our carbon footprint producing 4,141 metric tons of CO₂e.

The SOLUTION is to convert our electricity portfolio to allow for a portion of our purchased power to be produced from renewable sources. Currently the most feasible of these sources is wind energy. Our electricity provider offers an option in which a portion of the purchased electricity can be derived from a wind farm in upstate New York. This choice would cost the University .837 cents per kWh. At current usage rates, and a 25% purchase target, that would be an added expense to the school of \$40,323. It would cut CO₂ emissions by 1,035 metric tons, a decrease of 25%.

Offsets for this expense will be derived from several sources to be discussed in other sections of the plan, but basically by adding on-campus renewable sources, combined with new conservation policies and procedures, the University intends to decrease its electricity demand by 10%, realizing a savings of approximately \$142,087 at current rates. This reduction could be attained by a combination of:

- Lighting reductions in hallways and exterior of buildings
- Campus-wide computer power management

- Reduction in weekend use of buildings for non-direct campus use
- Increased awareness of personal responsibility for turning off office, dorm, and classroom lights when leaving
- Reduction in photocopy use
- Systematic replacement of all motors on campus with ultra-high efficiency motors
- Efforts in food services to reduce dish washing
- Purchasing of Renewable Energy Credits
- LEED Gold Certification of North Hall

Although lifestyles may be slightly altered by conservation plans, the economic and environmental BENEFITS of reducing emissions by 1,045 metric tons, a reduction of 25%, coupled with the move toward energy independence should provide incentives to offset any perceived inconveniences.

Goal for AY 2017 - 2018:

To achieve the goal of 25% electricity being produced by renewable sources.

Progress Sequence: April 2009 through April 2017

- ✓ Purchased Renewable Energy Certificates for \$16,900 to achieve 25% renewable electric.
- ✓ Completed new 108KW PV installations scheduled for the Athletic Center and McCarthy Center.
- ✓ North Hall’s geothermal well generates energy credits towards 25% renewable source target.
- ✓ 100% of the electricity purchased for North Hall is derived from renewable sources. This in combination with solar panels on the Athletic Center and the McCarthy Center increases our renewable energy percentage to 19.25%.
- ✓ The energy purchased from renewables increased to 19.25%.

Action #3: Effectively Address the Transportation Issues Contributing to Emissions and Congestion

The ISSUE is that 70% of the University staff, faculty, and students commute to the campus. This provides for an estimated 15,991 metric tons of CO₂ emissions as well as traffic congestion and parking issues that not only affect the campus and surrounding community environments, but also the quality of life on campus.

The SOLUTION to this problem is complex and requires the coordination of policy changes in several aspects of campus planning. The goal of this action is to reduce campus related traffic by 20%. This will be accomplished through a combination of several policy changes including:

- Rescheduling of class offerings could accommodate less commuting to and from school for students and faculty. This may be accomplished by more efficient use of classroom scheduling,

a more aggressive approach to using the 4:30 teaching block, and improving access between the day and evening schools. If there is effective coordination of these and other proposals this could result in an efficient class consolidation schedule. This could then potentially reduce each commuter's trips by 20%

- Promote carpooling for students. Currently there are few viable incentives for carpooling. It is largely viewed as inconvenient, with scheduling differences being the major concern. If the scheduling of classes was condensed, this could address a portion of that concern. The creation of a parking fee may also act as an incentive for carpooling (a deterrent for not carpooling). Students who did carpool, and registered as carpoolers, would have their fee waived and would be provided with preferential and guaranteed parking.
- Increasing access to rail service. Because Framingham State University is adjacent to a rail line, a feasibility study needs to be updated to consider how many commuters would be accommodated by rail service, and how cost effective it would be to negotiate a link to the current commuter lines in Framingham.
- More efficient use of the Campus Police fleet. The relative size of the campus may lend itself to more foot patrol and bicycle patrols, particularly in warm weather months. The energy efficiency of the fleet will be taken into consideration. Hybrids or electric vehicles may be an option. The University purchased four hybrid vehicles.
- Reduce campus fleet overall and establish a no-idling policy for all of the University and guest vehicles.
- Promote ride share programs like zipride.com
- Provide bike racks, storage, and rent free bikes for students to borrow.
- Add online and hybrid courses.

The BENEFITS of addressing an effective and coordinated approach to these and other policy changes would include: reducing an estimated 3,468 metric tons of CO₂ emissions, which is a significant reduction in our largest GHG source; reducing traffic congestion on campus and providing for a healthier quality of life campus-wide.

Goal for AY 2017 - 2018:

To broaden our carpool participation, continue to make campus vehicle use more efficient, and to reduce commuting by 20% through expansion of course offerings allowing for more flexible class scheduling.

Progress Sequence: April 2009 through April 2017

- ✓ A campus Green Fee has been adopted for AY 2011 (beginning fall 2010). This fee will help fund campus-wide green projects.
- ✓ A carpool decal was created and a lot was established for AY 2010.

- ✓ The shuttle kiosk was moved from the center of the campus and was replaced by 2 bicycle racks.
- ✓ 6:30 time blocks were created to allow day students more flexibility in choosing their classes potentially leading to less commuting days.
- ✓ MWRTA has amended their bus routes to allow for direct service for students from downtown Framingham and other MetroWest destinations.
- ✓ Two Zip Cars have been added to assist in more effected auto congestion on campus.
- ✓ A new "Ram Tram" service encourages use of shared transportation to local destinations including the Natick commuter rail station.
- ✓ FSU hired a transportation coordinator to increase efficiency of shuttle and commuter issue
- ✓ RAM TRAM tracker was initiated allowing students to track school shuttles for availability on their phones
- ✓ A partnership with a local taxi service has created a voucher program for students offering an inexpensive alternative to having more cars on campus
- ✓ NuRide is a new program offered through MassRIDES (a division of Mass. DOT). This program allows students to earn redeemable reward points by taking public transportation, carpooling, biking, walking, or working from home.

Action #4: Increase Building Energy Efficiency

The ISSUE is that many of the campus buildings are old and were not built to today's standards for energy efficiency.

The SOLUTION is to improve on the campus structures wherever possible to decrease energy waste, and to employ campus-wide policies designed to make the most efficient use of the structures that are in place.

A campus-wide inventory of doors, windows, and other portals should be conducted to identify the obvious sources of inefficiency. Once completed, these issues can be addressed, the costs being partially offset by increased savings in energy costs.

A policy should be adopted mandating that lights be turned off in rooms that are not in use. This is a lifestyle change that, similar to recycling, may take an extra effort initially. With effective implementation it can promote significant decreases in energy demand at no cost added to the University.

The use of University facilities in general, particularly those events that are non-university related, should be closely scrutinized as to their effect on the University both economically and as to energy use.

The school semester calendar should also take into account the efficiency of building use with regard to the heating and cooling requirements for all buildings.

All new building structures should be Leadership in Energy and Environmental Design (LEED) certified. Feasibility studies regarding the use of renewable energy sources campus-wide have been arranged. This

will be addressed in a separate section.

Framingham State University currently employs policies that are energy conscious. For instance, all use of incandescent light bulbs has been eliminated and replaced with fluorescent lighting. An energy management system has been put into place in an attempt to control the temperature extremes in those buildings with both heating and cooling systems.

The BENEFITS of adherence to these policies would include a decrease in campus energy consumption, allowing for lower energy costs, as well as a decrease in GHG emissions. These policies can also be employed, in many instances, with minimal cost to the University.

Goal for AY 2017 - 2018:

To implement all phases of the energy audit.

Progress Sequence: April 2009 through April 2017

- ✓ \$100,000 was designated for energy reduction projects.
- ✓ A campus-wide student energy and water conservation contest was conducted between the residence halls in November 2009. It resulted in a savings of 7,546 kWh and 434,130 gallons of water translating into a savings of close to \$9,000 for the University.
- ✓ The steam chiller was replaced in the McCarthy Center with modular high-efficiency chillers.
- ✓ A new central chiller (to replace the Hemenway Hall Chiller) was installed.
- ✓ The air-conditioning pumps in the McCarthy Center and the heating pumps in Larned Hall have been replaced by more energy efficient pumps.
- ✓ An energy investment grad audit of the entire campus has been completed, outlining an array of energy saving measures.
- ✓ Under our Energy Performance Contract: All lighting was replaced in the Library. The Library chiller was replaced. The Linsley Hall boiler was replaced. Improvements were made to the May Hall steam heating. Weather stripping and insulation were added to the doors campus-wide. Air-conditioning upgrades and replacements were made in Dwight Hall. All lighting was replaced in Larned Hall. Energy efficient entry ways were constructed on Hemenway Hall.
- ✓ North Hall was designated as LEED Gold certification.
- ✓ The newly approved residence hall (West Hall) will be financed with Green Bonds.
- ✓ All windows were replaced in Hemenway Hall and Annex.
- ✓ Low flow toilets were installed in North Hall.
- ✓ West Hall is LEED Gold certified.
- ✓ The University constructed a new science laboratory building that is LEED Silver certified. The building includes 49 Green Solution Hoods featuring Erlab's GreenFumeHood filtration technology.

Action #5: Make Dining Services as Energy Efficient and Food Efficient as Possible

The ISSUE is that, by nature, a large dining facility will produce large amounts of waste and consume large amounts of energy.

The SOLUTION is to implement as many policies as possible that will reduce energy waste and physical waste while simultaneously attempting to reuse anything possible.

The dining services at Framingham State University have already implemented several policies that are environmentally responsible. Among them are: a commitment to replace aging appliances with Energy Star certified appliances, and a policy that provides a discount of ten cents per beverage when using a reusable mug. Food services also employs policies of buying locally when possible, reducing delivery rates, and recycling of kitchen oil which is currently converted to bio-fuel and being reused in 2 campus buildings.

Currently all chemicals used by dining services are Green Seal Certified and a new Apex ware washing program has been employed which allows for savings of 30,113 gallons of water and 16,863 kWh of electricity over the previous program.

Dining Services is also committed to monitoring food origins in an effort to eliminate the support of factory farms which produce significant amounts of GHG's and threaten water supplies.

The BENEFITS of these policy changes are that they are relatively inexpensive, help to reduce consumption of energy and other resources, provide for a more responsible dining experience and require only the cooperation of the clientele.

Goal for AY 2017 - 2018:

To continue to educate, plan, and implement policies that encourage recycling, waste reduction and policies that support local sustainable food sources.

Progress Sequence: April 2009 through April 2017

- ✓ Reduced delivery frequency of vendors.
- ✓ Worked with vendors to obtain products that are produced and grown locally.
- ✓ All Green Mountain paper cups are now EcoTainers.
- ✓ Encourage use of travel mugs by offering discounts.
- ✓ Transitioned to EcoLab APEX chemicals.
- ✓ Recycle all waste oil from fryers to be converted to Bio-diesel.
- ✓ Converted napkin baskets to Xpressnap napkin dispensers.

- ✓ Dining services went tray-less as of January 2010. Eliminating this practice saves approximately 200,000 gallons of water per year and saves the University approximately \$3,500.
- ✓ Dining services moved to completely compostable plates and utensils in 2012 allowing all waste to be composted. Every two weeks two 96-gallon compost bails are sent to a local farm to be recycled as compost.
- ✓ Four water cooled coolers located in the McCarthy Center kitchen were replaced with new air cooled units, saving 547,500 gallons of water per year (\$7,150).
- ✓ The dining area has been completely renovated to accommodate composting.
- ✓ As a result of the fully compostable dining services changes, of the 31,000 weekly meals/transactions, each generates an average of 1.24 oz. of pulped organic product (post consumer waste, scraps, trimmings, etc.) which is equal to 1.2 tons per week. Without pulping, this number would increase to 2.2 tons per week. After dehydration those 1.2 tons are reduced to just 240 pounds of compostable material which is sent to a local composting company. This process diverts approximately 79 tons of food waste from entering a landfill.
- ✓ LeanPath used at FSU since 2014 has saved 10,418 lbs. of waste reducing waste 60% from the previous baseline
- ✓ Donated 1,073 lbs. of food to MetroWest Harvest Food Bank
- ✓ Food Recovery Network recovered 2,543 lbs. of food to date

Action #6: Increase the Use of Alternative Energy Sources

The ISSUE is that there are limited on-campus uses of renewable energy sources. Energy independence from the use of cleaner and more modern renewable sources is the wave of the future and the possible cornerstone of future economic development both statewide and at the national level.

The SOLUTION is to continue to increase the ratio of renewable energy sources for our purchased electricity and to actively pursue the feasibility of more renewable energy sources on campus.

The BENEFITS of investing in wind and solar energy, coupled with the planned conversion of our renewable ratio regarding our electric power purchases, will serve to not only reduce our GHG emissions, but will reduce our dependence on fossil fuels, provide stimulation to a new green economy, and provide a working laboratory for our students who may be considering a career in the energy field post-graduation.

Goal for AY 2017 - 2018:

To pursue funding for further photovoltaic installations as well as other sources of renewable energy.

Progress Sequence: April 2009 through April 2017

- ✓ The Energy Efficiency and Sustainable Building Group of the Department of Capital Asset Management agreed to include the PV projects for the Athletic Center and the McCarthy Center.

- ✓ Solar Photovoltaic systems have been added to the Athletic Center and the McCarthy Center. These systems generate approximately 118 kWh of electricity.
- ✓ All electricity for North Hall is now purchased from renewable sources.
- ✓ There are plans in place to consider other solar panel projects.

Action #7: Increase the University Recycling Ratio

The ISSUE is that the University's recycling percentage in 2009 was 20%. The SOLUTION is to provide access for easier and more efficient recycling options and to create and implement an effective education curriculum campus-wide to encourage recycling by students, faculty and staff, with a recycling target goal of 50%.

Framingham State University initiated single stream recycling in September 2009, reducing the confusion of the recycling process. Toner cartridges, furniture, computers, fluorescent bulbs, telephones, and batteries are also recycled. The University has also implemented a policy of ordering only recycled paper for photocopying and printing.

The BENEFITS of a more efficient recycling program are numerous. Recycling reduces demand for new raw materials thereby reducing exploitation of natural resources. By conserving these resources we can help prevent exploitation through illegal harvesting, unsafe and unethical operations, and the unintended consequences of certain manufacturing and farming processes. Recycling also reduces the production of GHG's and provides for a cleaner environment overall.

Goal for AY 2017 - 2018:

To continue to pursue efficient and effective methods to increase our recycling percentage.

Progress Sequence: April 2009 through April 2017

- ✓ The number and size of recycling containers has increased with plans for signage and lids to encourage and understanding of what is recyclable.
- ✓ A truck load of fluorescent bulbs, computer equipment, and batteries were recycled in Fall 2010.
- ✓ 60 cubic yards of metal products are recycled per semester.
- ✓ Every two weeks 2 96-gallon bails of compost are recycled at a local farm.
- ✓ Fifty-one new receptacles with separate trash and recycling compartments were purchased and placed throughout the campus.
- ✓ Including the recycled compost from dining services, the percentage of recycling for the University is 30%.
- ✓ The University has added four (4) new water bottle filling stations, making a total of six (6), reducing the need for commercial water bottles.

Action #8: Reduce Paper and Toner Use by 30%

The ISSUE is that global deforestation has contributed significantly to climate change and to the release of GHG's. Clear-cutting of forests has led to loss of wildlife habitat, soil erosion, water pollution, and elevated CO₂ levels. Genetically engineered forests, preferred by some paper companies for their fast growth rates and the fact that they are easier to process into paper, have been linked to the production of plant toxins resulting in trees that are pesticide resistant which ultimately contributes to the evolution of resistant pests. Additionally, industrial timber forests often may not provide the same ecosystem services as natural stands.

The SOLUTION is to reject products that contribute to this environmental degradation. Framingham State University has committed to a policy of ordering recycled paper for purposes of photocopying and printing. Students, faculty and staff will be asked to print less, use online assignments when possible, converting business and student record functions to paperless electronic formats, and to actively participate in recycling their own paper waste.

The BENEFITS derived from this new policy are that it promotes sustainable forestry, saves energy by photocopying less, sustains the integrity of our forests, reduces the space required on campus for paper file storage and eventually reduces costs by reducing the demand for paper.

Goal for AY 2017 - 2018:

To continue to consolidate our printing devices and to continue to encourage a decrease in paper use.

Progress Sequence: April 2009 through April 2017

- ✓ Information Technology Services (ITS) conducted a printing assessment for the University community. This assessment took into account types of printers on campus, energy use, paper use, toner use, and associated costs. Suggestions were made to decrease the 5,800,000 pieces of paper (\$34,000) used campus-wide, as well as reduction on energy consumption and toner usage (\$70,500).
- ✓ The Admissions office has converted to an electric application process substantially reducing paper use.
- ✓ The combination of two sided printing, voluntary conservation, and network printing has reduced paper use significantly campus-wide.
- ✓ The University purchased a new platemaker which uses no chemicals. The old platemaker, using old technology, had a 5 n tank containing the chemical wastes from the print process which needed to be disposed of each month. This purchase eliminates those chemical wastes.

Action #9: Decrease Campus Water Use

The ISSUE is the world faces a global shortage of potable water. The combination of pollution, overuse, misuse, and climate change has contributed to an increase in local, regional, and worldwide shortages, with the potential for an international crisis of a shortage of water fit for consumption.

The SOLUTION is to implement policies that promote water conservation and to provide educational tools to students, faculty and staff essential in promoting the urgency of this issue, and to provide the remedies available for addressing this issue.

The most obvious water source on the campus is the lawn sprinkler system. Although not the most demanding on campus, it attracts the most attention. The University has installed new water sensors that automatically turn off the sprinkler when there is adequate moisture. This prevents the system from functioning during rainy days as it did on the original automatic timing system.

The operation of dining services consumes a large volume of water. The major sources of water consumption are the dormitories and the bathroom facilities in the Athletic Center and other classroom buildings. The general use of water in these facilities is unavoidable. However, conservation efforts (i.e. shorter shower, replacing leaky faucets, etc.) have been encouraged.

All new construction will consider incorporating rainwater collection, reuse of gray water, and low flow fixtures.

The BENEFITS of a sustainable potable water supply use policy enhance not only the campus, but the entire community and beyond. These conservation methods also affect cost savings in the long run in that less water will be purchased from the town of Framingham.

Goal for AY 2017 - 2018:

To use the Framingham State University Water Use Report as a guide in an attempt to decrease water use through conservation methods as well as improvements in dining services.

Progress Sequence: April 2009 through April 2017

- ✓ Going tray-less and in the dining areas created significant water savings. Going tray-less saves an estimated 500 gallons of water daily and by going fully compostable millions of gallons are saved through the elimination of the garbage disposal.
- ✓ An estimated 8.4 million gallons of water were saved by refrigeration conversion in the dining hall, creating a savings of \$148,400.
- ✓ An estimated 200,000 gallons of water are saved by going tray-less at a savings of \$3,300 to the University.
- ✓ A comprehensive review of campus water use has been completed to assist in addressing further water use issues and associated costs.
- ✓ In November 2012 all residence hall washers and dryers were replaced with new equipment, saving 1.9 gallons of water per cycle. The laundry vendor for the University, MacGray, ran the savings against current usage data and found that on average we have saved approximately 3,283 gallons of water per month. Over a full academic year, the savings were projected to be 26,264 gallons.
- ✓ Stickers were installed over the washing machine operation buttons which visually identify cold/cold cycles.

- ✓ The dining facilities were completely renovated to accommodate composting, contributing to a decrease in water use of 1.8 million gallons in 2010.
- ✓ All storm water runoff from North Hall is captured and recycled for irrigation.
- ✓ The University has added four (4) new water bottle filling stations, making a total of six (6), reducing the need for commercial water bottles.

Action #10: Make More Efficient Use of Flexible Scheduling

The ISSUE is that it is often inconvenient for students and faculty to schedule their classes in a manner that is time and energy efficient. This often leads not only to commuting to school every weekday, but often several trips/times per day. It also renders carpooling an inconvenient option.

The SOLUTION would be to approach the class schedule from a holistic perspective allowing for more efficient use of under used scheduling blocks, a new perspective on the sequencing of courses, more flexibility in course requirements outside the major and the incorporation of more hybrid and online courses.

There are models that offer courses sequentially, present more efficient use of the classroom space, allow for online student advising hours, and reduce campus congestion at certain peak times of the day. The feasibility of these models should be given serious consideration.

The BENEFITS to creative and flexible scheduling may lead to many students and faculty being able to reduce one day of commuting from their schedules. This could help to ease campus congestion, contribute significantly to reducing the campus carbon footprint, and attaining the goal set out in Action #3.

Goal for AY 2017 - 2018:

To continue to develop and encourage methods for flexible scheduling, offering the students and faculty an opportunity to decrease their commuting days.

Progress Sequence: April 2009 through April 2017

- ✓ 4:30 and 6:30 time blocks have been fully matriculated in the day school schedule allowing students and faculty more flexibility and the opportunity to reduce commuting days.
- ✓ A governance proposal has been approved that accommodates hybrid (mix of in-class and on-line) courses beginning AY2011.
- ✓ Class offerings in the 4:30 and 6:30 time blocks have continued to increase through 2014.

Action #11: Increase Campus Computer Efficiency

The ISSUE is that computer technology has a significant impact on the energy demands of the University. The SOLUTION is to implement policies that will assess current practices, and to incorporate

efficient and cost effective computer services campus-wide.

A “cross-functional” team within Information Technology Services (ITS) has initiated a plan that will address ways to reduce printing, reduce power consumption, and evaluate the life cycle and management of hardware.

ITS has also initiated a comprehensive assessment of on-campus printing, how the data center is equipped and managed and an inventory of how computers and printers are recycled.

The BENEFITS of these policies include: a more responsible approach toward paper use, a more accurate accounting of the hardware cycle, and a reduction in energy demand contributing to the overall target for reductions as a campus community.

Goal for AY 2017 - 2018:

To continue to evaluate the most energy and cost effective ways to coordinate IT campus wide.

Progress Sequence: April 2009 through April 2017:

- ✓ IT has activated the power management (or “sleep”) features on desktop computers. This policy will potentially save 50,000 kWh’s per year with a cost savings of \$12,500.
- ✓ Recommendations have been adopted to inform, educate, and provide the capability for faculty, staff, and students to eliminate the use of paper for 90% of daily printing.
- ✓ The University provides campus-wide information on methods to convert to a paperless campus including seminars, web-based communication, posters, classroom discussion, etc.
- ✓ IT provides the necessary software on how to use each campus work station in order to print, mark-up, sign, etc. electronically.
- ✓ Server consolidation has decreased from 60 to 46 (just below 25% of the systems infrastructure) saving an average \$5,200 annually.

Action #12: Make Campus Ground Keeping More Eco-Friendly

The ISSUE is that grounds keeping can be very energy-use intensive because of the use of motorized equipment. It also includes the application of chemicals, potable water, and synthetic fertilizers. Grounds keeping on campus can also be noisy, produce dust, and may alter landscapes. However, it is essential for not only the appearance of the campus, but also the health and well-being of the campus community at large.

The SOLUTION is to identify and promote environmentally responsible practices and to schedule activities that do not conflict unduly with classroom activities, while supporting the health and wellbeing of students, faculty and staff campus-wide.

Currently the grounds keepers employ several environmentally responsible practices such as hand weeding, support of native plant species on campus, and a ban on pesticide use.

However, snow and ice removal, grass cutting, and leaf removal, due in part to a limited staff to perform these tasks, often mandate the use of technology that is often noisy, odorous, and repugnant. Each task of grounds keeping should be re-examined to consider if there is a better alternative.

One example of this approach was implemented by the University in fall 2008. Leaf blower complaints have been a growing concern for years. Leaf blowers are loud, they produce noxious exhaust, and create a potential health hazard. Studies have shown that the practice of blowing wet leaves can propel certain fungal spores in to the air which is a health risk for humans and wildlife alike. Green Team volunteers offered to rake leaves in the quad and remove the leaves manually in exchange for not using leaf blowers in the quad area. The result was that the quad was kept clean, the campus community was spared the aggravation of the blowers, and some of the student body, faculty, and administrators received some exercise.

It is impractical to clean the entire campus in this manner, but this alliance of students and staff allowed for some relief to the busiest part of the campus from a perceived nuisance. Also, the more faculty, students, and administrators volunteer, the larger the effect of the program.

This is one small example of how effectively bringing all parties together in addressing policies can lead to a more acceptable solution. The BENEFITS of this approach to grounds keeping are that it accomplishes the goals of the University, alleviates the annoying aspects of grounds keeping, possibly provides student jobs and creates an opportunity for volunteerism and physical exercise.

Goal for AY 2017 - 2018:

To replace areas of grass cover with alternative environmentally friendly ground cover reducing fuel use, noise and air pollution, while promoting eco-friendly habitat.

Progress Sequence: April 2009 through April 2017

- ✓ Facilities will continue to support the Green Team in promoting awareness by providing hand rakes for leaves and hand mowers for mowing. The Green Team has adopted the quad area near Dwight Hall as a motor free area to be maintained with rakes and hand mowers.
- ✓ A GIS inventory of the campus trees was created.
- ✓ The University has hired a landscape consultant to assist in converting grass ground cover to alternatives that are more environmentally friendly.
- ✓ A directive was issued to maintenance workers to only have lights on in the classrooms where they are actually working.
- ✓ A campus garden has been installed, providing fresh produce to dining services.
- ✓ 100 cubic yards of leaves were composted.
- ✓ The University purchased the Warren Conference Center in Ashland. The Center includes 75 acres of mostly open space and is adjacent to Ashland State Park and the Warren Woods conservation land.

- ✓ Included natural vegetation areas surrounding new building construction.

Action #13: Establish Environmentally Conscious Purchasing Policies

The ISSUE is that, although there has been a commitment by the University to adopt more responsible environmental policies and practices, there is currently no official mandate that governs a purchasing policy campus-wide with regard to environmental responsibility. Currently the University requires all appliances purchased on campus and all appliances used by students in their residence halls to be Energy Star certified.

The SOLUTION is to adopt a campus policy which mandates that all purchases over and above a certain threshold must, at a minimum, consider the cost benefit as well as the environmental benefit of any reasonably available sustainable alternatives.

The BENEFIT of such a directive is that it provides clarity and uniformity to the University's environmental practices with regard to significant purchases.

Goal for AY 2017 - 2018:

To re-enforce the President's directive to consider sustainable alternatives in major campus purchases.

Progress Sequence: April 2009 through April 2017

- ✓ A purchasing policy directive was implemented by the university president in 2008, instructing that sustainable products be considered whenever feasible.
- ✓ This directive was made a standing policy.
- ✓ A buy local directive was initiated.

Action #14: Create a Campus Forum for Discussion of Sustainable Policies

The ISSUE is that there was not a uniform forum that allows for easy and effective access to campus environmental policy or to allow for effective exchange of ideas in assisting to create a policy which is coordinated, evolving, understood and implemented by the entire campus community.

The SOLUTION involved the creation of a forum that can coordinate the entire Climate Action Plan. This forum would have the opportunity of evaluating adherence to new policies; creating an effective dialogue that interconnects facilities, administration, faculty and students; in addition to developing an educational network that provides the campus community with information regarding present campus policies as well as considerations for future policy issues.

This informational forum should consist of students, faculty, staff, and administration in an open campus discussion.

The BENEFIT of creating this forum would be to centralize all campus discussion of environmental policy issues from practical, theoretical, and pedagogical perspectives.

Goal for AY 2017 - 2018:

To broaden participation in the Environmental Campus Forum and to broaden sustainable practices as a part of the teaching curriculum.

Progress Sequence: April 2009 through April 2017

- ✓ The sustainable policies coordinator position was created to facilitate the implementation of the Climate Action Plan.
- ✓ The Environmental Forum has been created to informally discuss options for broadening the integration of climate change and other environmental concerns within the teaching curriculum.

Action #15: Establish an Interdisciplinary Curriculum which Allows Each Department to Play an Active Role in the Creation and Implementation of the Climate Action Plan

The ISSUE is that there are now many approaches to addressing climate change which are often viewed as unrelated. The SOLUTION would be to provide access for each department to become involved in the discussion, contributions and applications of this plan. Readings, projects and other assignments regarding the relevance of the discipline to sustainability could be made available as part of course and department curricula.

The BENEFIT of using an interdisciplinary approach is that students would realize not only the relevance of their own discipline to the environment, but also the interconnectedness of global and regional environmental issues.

The University has created an interdisciplinary Environmental Science major which incorporates aspects of eight disciplines in a holistic approach to environmental stewardship. To expand on this proposal would provide opportunities for the students, enhance the University curriculum, and maintain a service to the economic development of the community.

Goal for AY 2017 - 2018:

To expand and promote the Environmental awareness across disciplines.

Progress Sequence: April 2009 through April 2017

- ✓ An interdisciplinary environmental science major was added in 2009.
- ✓ The Environmental Forum discusses options available for curriculum expansion and promote interdisciplinary lecture series.

- ✓ A new major Environmental Policy and Sustainability was adopted within the Geography Department.
- ✓ The Center for Climate Change Education was established to create a forum to discuss climate change pedagogy.

Conclusion

Framingham State University has made a commitment to address global climate change. Executive Order No. 484 and the University President's endorsement of the American College and University President's Climate Commitment combined with our responsibility as an institution of learning and our roles as responsible stewards of our environment have created a mandate for this Climate Action Plan.

The Plan provides for a comprehensive and holistic approach to addressing our campus policies as well as an opportunity to discuss ways in which these policies may be changed or amended. The goals include a broader educational experience for the student, creating a healthier and more sustainable working and learning environment for the campus community, and enabling the University to act in a more responsible manner in its role as an institution of learning by effectively reducing its contribution to global natural resource depletion and climate change.

This Plan should be viewed as an ongoing project to be amended as needed. The proposals and policies contained within will also mandate the concerted effort and commitment of the University community as a whole in order to realize its goals. Many of these suggestions will require lifestyle changes within the community that may initially create slight variations from the way things have traditionally been approached and may require time for adaptation. But with the input, cooperation, and support of the students, faculty, and staff this plan can help to create a more sustainable and enjoyable experience for our entire campus community.



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