

FY2015

Annual Energy Report



EMORY

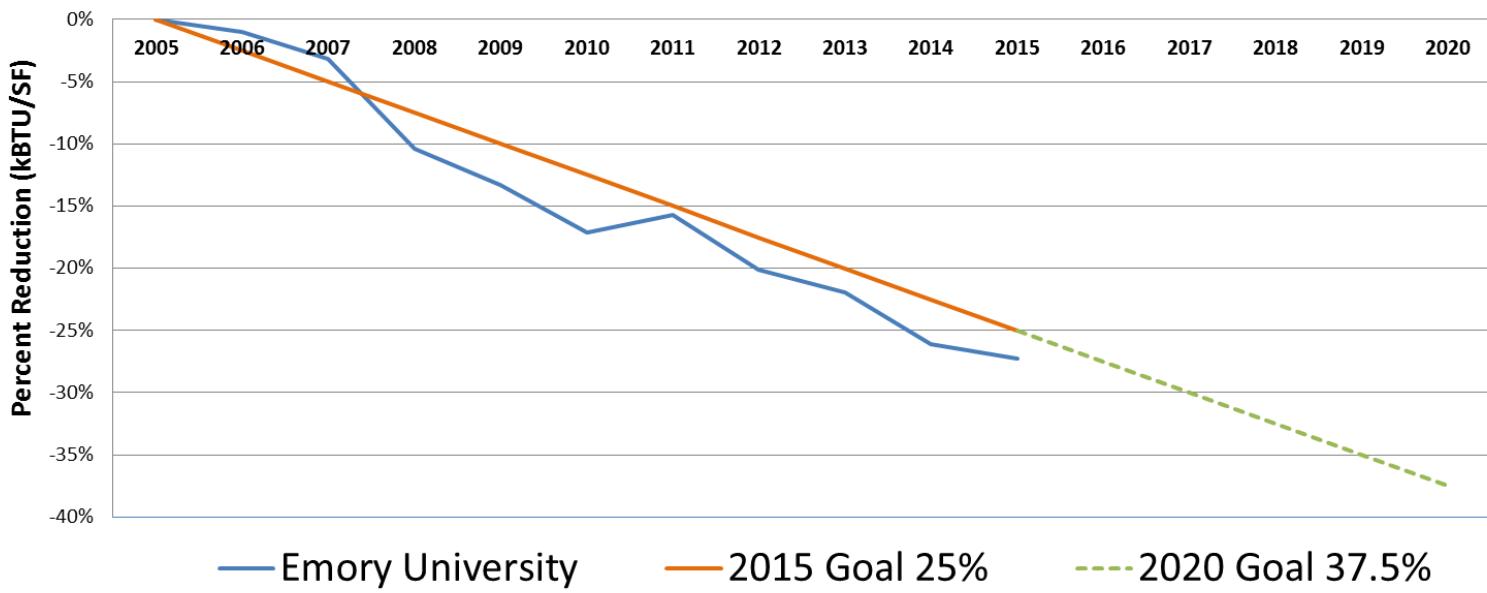
Fiscal Year 2015

In 2005, Emory pledged to reduce energy use, per square foot, by 25 percent in 10 years. Thanks to a shared vision and strong commitment to sustainability, the university has exceeded the goal ahead of schedule. The reduction goal was based on energy use per square foot, rather than a total dollar amount or total amount of energy used, because the university continues to grow and change.

Achieving the goal required extensive engagement across all levels of the university — from administrators who saw the wisdom of investing in energy efficient systems for both new and old buildings to every individual who turned off a light or an appliance.

The goal set in 2005 challenged Emory to reach a very aggressive goal. This progress, over the years, has been tracked in relation to the total amount of energy (BTUs) per square foot. This method was chosen due to the continued growth and change of the facilities on the campus. The following graph shows this progress over the years and points us toward the next interim goal of **37.5% by 2020**. Opportunities for savings and efficiencies continue to evolve and present themselves.

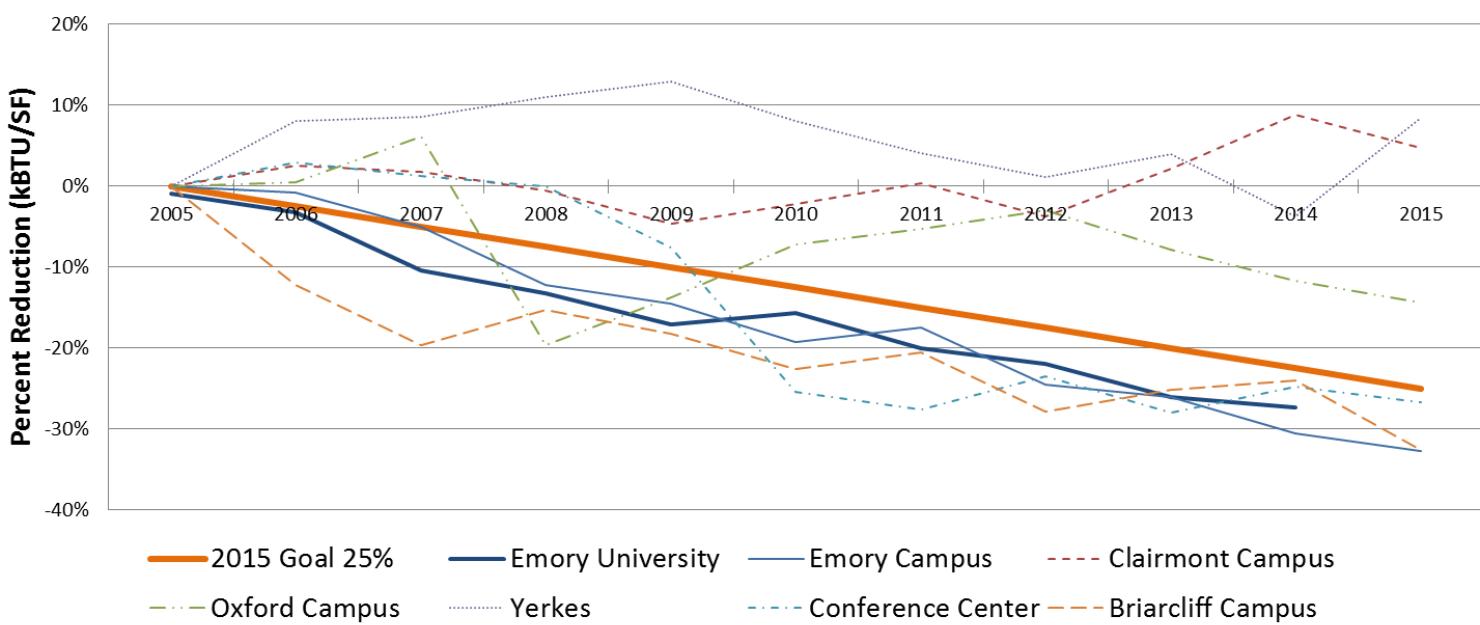
Emory University



Some of the major contributors to achieving this goal between 2005 - 2015:

- New Construction is required to meet a minimum LEED Silver certification.
- The Office of Sustainability was established and helped publicize the energy reduction goals through modified behavior.
- The Utility Reduction and Energy Conservation Agreement (URECA) was initiated to fund energy reduction projects such as lighting, weatherization, and heating and air-conditioning ventilation.
- The temperature policy is established to set thermostats at 68 degrees and 76 degrees based on the season and achievable energy conservation.
- 2011 - Recommissioning program to bring buildings in line with efficient design and operation.
- 2013 - The Sustainable Performance Program (SPP), an on-going commissioning program, which aims to maintain optimal performance of a building's mechanical systems.

Individual Results by Groups



The 2020 Goals

The next interim goals are to achieve a 37.5% reduction per sq. ft.; a 20% reduction in potable water use by 2020 (compared to 2010); and an overall 20% reduction in total GHG emissions. These will all keep us on track to meet the 2025 goals. The Sustainable Performance Program as well as increased self generation will help us with the energy goals. Continued optimization of chiller plants and full production from the WaterHub will be the primary areas of focus for water reductions.

✓ Recommissioning

Recommissioning (RCx) is an ongoing strategic process, which optimizes existing building systems by identifying controls, schedules, faulty equipment or installations and setting the building back on course for energy efficiency.

To date, **12** buildings have reduced their operating costs by **\$1.6 million savings.**

✓ Utility Reduction & Energy Conservation Agreement

URECA projects have been implemented at **12** buildings this past year and included:

- Lighting and fixture upgrades
- Lighting Controls
- Step dimming fixtures

To date, **37** Buildings have implemented URECA projects. Total savings from past projects total **\$9.4 million.**

✓ Efficient Design and Renovation

New design and construction standards with a minimum LEED silver requirement has produced buildings that are significantly more energy efficient and have been a large contributor to the energy reduction goals.

✓ Temperature Policy

The new temperature policy enabled the campus to operate buildings more efficiently during summer and winter.

✓ After Hours and Holiday Turndown

After hours setbacks of temperatures in 20 buildings and minimizing heating operations during the winter holidays provide opportunities for substantial savings

✓ Sustainable Performance Program

The SPP is an on-going commissioning program that strives to keep the building HVAC systems optimized and prevent performance degradation and the need for future re-commissioning.

12 buildings are in the current program.

Awards

EBie Award, given by the Urban Green Council

Rex Dillow Award, given by APPA for the “Outstanding Article of 2014-2015” in the Facilities Manager publication. The article was the original business case for SPP.

Energy – Around the Campus

Electricity

Georgia Power provides almost 300 million kilowatt hours of electricity annually to the central campus facilities. The peak summer electric demand is about 48 megawatts. Electric power is fed by Georgia Power directly to some buildings and through a substation and private Emory distribution system to the rest of the buildings. Electricity consumption is metered either by Georgia Power or Emory meters at every building.

Solar Energy at Emory

Two, large scale rooftop, solar projects were installed in FY15, a 183kW array at 1762 Clifton Road, and a 72kW array at the North Decatur building. These were part of Georgia Power's Advanced Solar Initiative and Emory retains the carbon reduction credits from the solar electric generation. A smaller installation was built for the new WaterHub.



These installations generated 138,000 kWh in just the few months from their installation to the end of FY15. Projects slated for FY16 include rooftop installations on HSRB and the new Library Service Center, located on the Briarcliff Campus.



Chilled Water Plants

Three chilled water plants provide cold water for space cooling to 48 buildings through underground distribution systems. The plants provide annually about 40,000,000 ton-hours of cooling by supplying 42F water used to cool and dehumidify air entering and circulating in the buildings. The plants have a combined capacity to supply 22,000 tons of cooling. Chilled water consumption is metered at each building for all of the buildings on the distribution system.

Great effort has gone into optimizing the operation and sequencing of the chillers. In FY2015, software logic changes to the central chilled water plants have improved efficiency over 20%.



Chilled Water Production

40 Million Ton-Hours/year

Steam Production

Emory operates five 100,000lb/hr. steam boilers that consume natural gas and fuel oil when the natural gas supply is interrupted. The boiler plant annually consumes about 775 million cubic feet of natural gas to produce about 714 million lbs. of steam. The steam is distributed underground to 55 buildings on the central campus for space heating, water heating, humidification, and process loads. Steam consumption is metered at every building. A new boiler will be installed in FY16, replacing a 45 year old inefficient unit.



Steam Turbine Generator

In the next year, Emory will be installing a steam turbine generator using higher pressure steam produced in the new boiler to generate approximately 1,000 kilowatts of power. This generation of electricity will help the university utilize steam capacity, avoid utility demand peaks, and increase reliability.

Steam

560,000,000 lbs were delivered in FY15

Natural Gas

Atlanta Gas Light annually delivers approximately 775 million cubic feet of natural gas, purchased through marketers, to the central steam plant as well as directly to some facilities.



Potable Water

DeKalb County annually supplies about 370,000,000 gallons of domestic water to the campus. All buildings are metered for domestic water.

Reclaimed Water

The Campus' first water reuse system for toilet flushing was installed at Few and Evans Residence Hall, and consists of a large storm water capture cistern that uses solar power pumps to circulate the water to the buildings for toilet flushing. The second system is a grey water system at Longstreet-Means Residence Halls that collects shower and sink water and reprocesses it for a supply of toilet water.

Emory's most recent reclaimed water system is called "WaterHub" and is an on-site water reclamation system which utilizes eco-engineering processes to clean waste water primarily for utility water make-up. It is the first system of its kind to be installed in the United States. Emory's WaterHub is capable of recycling up to 400,000 gallons per day –nearly 40% of Emory's total campus water needs.

Wastewater cleaned by the WaterHub is used as process make-up water in Emory's steam and chiller plants and for future toilet flushing in select residence halls.

Water Reclamation

19 Million Gallons since opening in May (enough to fill the Woodruff PE Center pool almost 29 times)

Awards:

American Society of Safety Engineers, GA Chapter – Superior Environmental Performance Award

Metro Atlanta Chamber E3 Award – Liquid Assets

Water Reuse Association – Innovation Project of the Year



For more information, contact:
Emory University Energy Manager
Energy@Emory.EDU
404.712.1693