University of Colorado
Denver | Anschutz Medical Campus

# Sustainability Update October 2019

## SUMMARY

The University of Colorado Denver and the University of Colorado Anschutz Medical Campus continue to foster sustainability on the campuses. A commitment to energy and water efficiency and conservation, LEED® Gold construction standards and transit planning have contributed to significant greenhouse gas (GHG) reductions and are assisting the campuses in meeting their goals for climate action planning that are consistent among all four CU campuses and with the State of Colorado Climate Action Plan.

On the CU Denver Campus, we continue to have students leading the way on a myriad of sustainability-related issues - sustainable development that includes community design and planning, urban agriculture, equitable business practices, transit and public policy. The Auraria Sustainable Campus Program (https://www.sustainableauraria.org/) provides funding to enable students to invest directly in sustainability measures they have developed in the tri-institutional buildings on campus. The newest CU Denver facilities - Student Commons and the Health & Wellness Center, are LEED Gold certified and the First Year Student Housing Building (2021) will be the first Gold certified project under LEED Version 4.0.

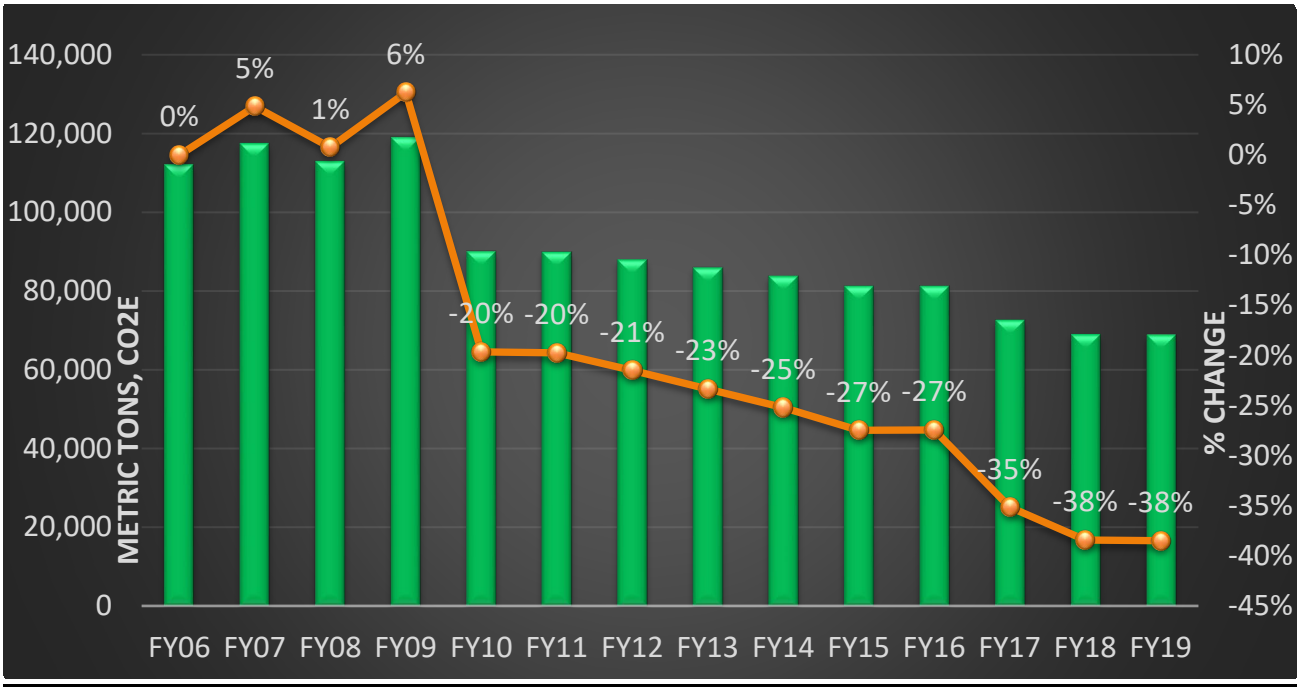
The Anschutz Medical Campus continues to grow, while at the same time becoming more efficient. The campus now has four LEED Gold certified buildings and the new Anschutz Health Sciences Building (2021) will be the first LEED Version 4.0 Gold Certified facility. Investment in energy efficiency projects in Research 1 is saving over $900k per year in utilities while also creating a more reliable facility. Master planning efforts have focused on sustainable development strategies to enable the best uses of the land on campus. Expanded light rail and campus shuttle operations are providing more options for students, faculty and staff while helping lower commuter emissions. Student groups are active in developing policies and protocols to make clinical work more environmentally sustainable. Faculty, staff and students continue to work on ideas that make health care more equitable for all communities.

The Campuses will continue to pursue sustainability goals and continue to lead on these efforts in the communities in which they reside. The following information represents some specific areas in which commitments and efforts continue.

## Greenhouse Gas Emissions

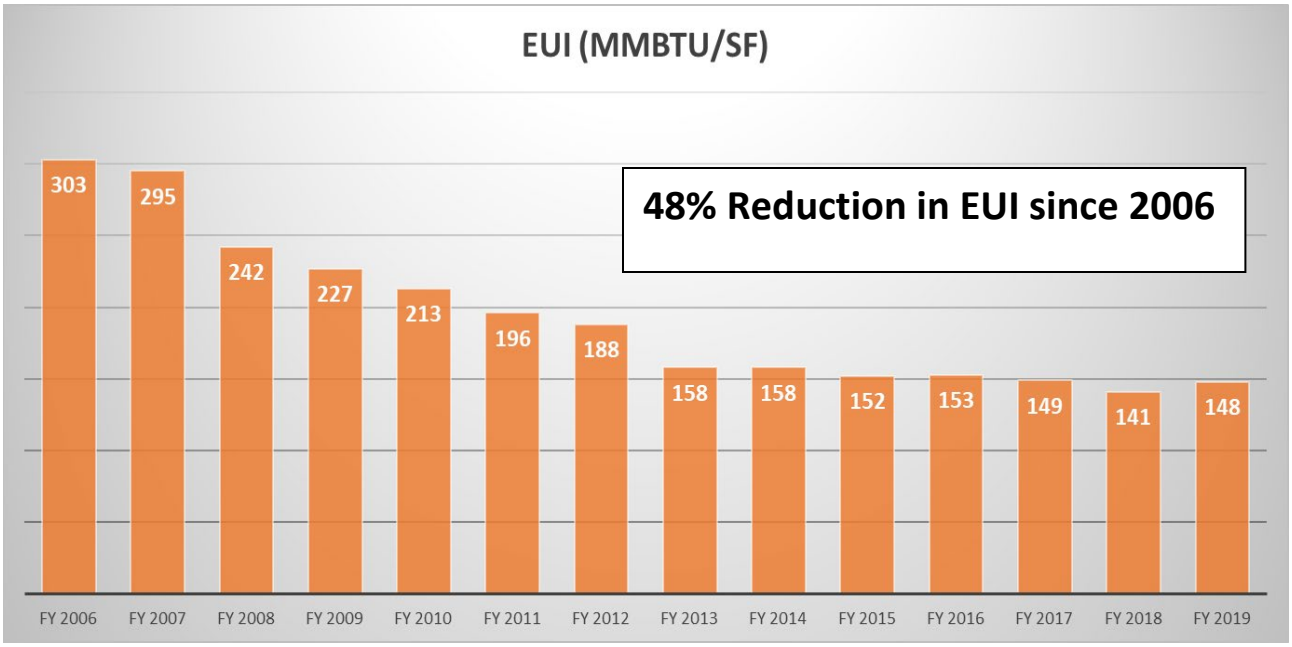
The Climate Action Plan (CAP) created in 2010 plotted an incremental plan to reduce GHG emissions with a focus on the first goal of a 20% reduction by 2020. That first ten-year phase finds the campuses ahead of schedule, with a *38%* reduction from the benchmark year of 2006. This is due to energy efficiency & conservation projects including HVAC updates, motion and CO2 sensors, LED lighting, green lab efforts, temperature setbacks, recommissioning & room scheduling programs. Xcel Energy's energy resource mix (move away from coal-fired plants) has also had an effect on the emissions of the electricity we purchase from them. It must be noted that even though we have reduced emissions every year since 2009, part of that reduction represents the subtraction of the 9th & Colorado campus from the inventory. Future goals are a 50% reduction by 2030 and an 80% reduction by 2050 and challenges will present themselves, as the CAP requires absolute reductions and both campuses continue to grow. Please see charts below.

**GHG Emissions Reductions (MT-CO2-e), Scopes 1 & 2 - Building Sector**



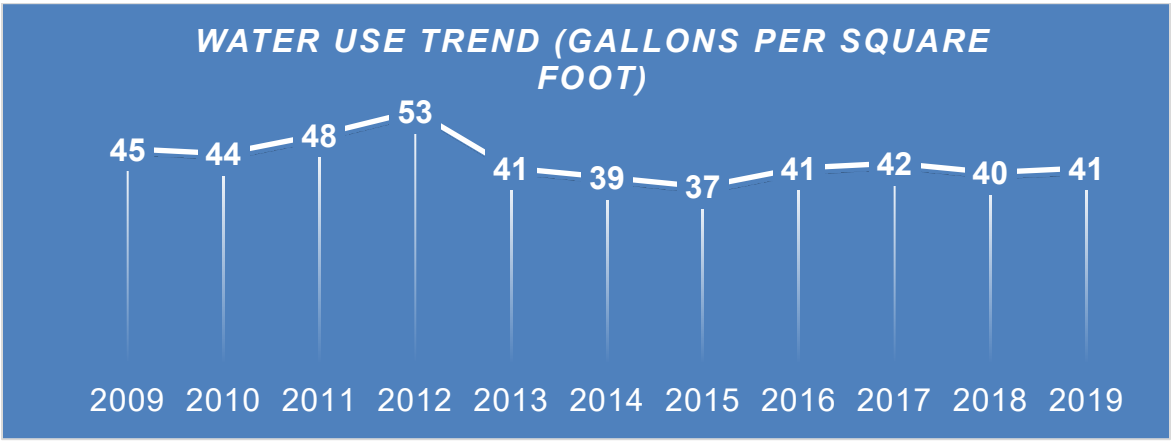
## Energy Use Index (EUI) Reduction

The Energy Use Index, or energy used measured per square foot of building space, tracks similarly to our GHG emissions and is affected by the same efficiency and conservations measures that have assisted in the emissions reductions. The campuses are currently at a *48%* reduction in EUI from 2006.




## Water Use

Water use has declined since the benchmark of year of 2008. Changes for process water use in the Central Utility Plant, replacement and updating of autoclaves and glass washers in labs, and landscape irrigation controls and sensors have greatly aided in this effort. The *9%* water reduction - normalized to gallons measured per square foot of building space - includes the subtraction of the 9th and Colorado Campus.



# LEED Construction

LEED Certified buildings are more efficient and create healthy, productive places to work and study while reducing their impact on the local environment. The campuses currently have over 800k square feet of LEED Gold Certified Space with two more buildings in construction and certified to a newer, more stringent LEED Version 4.0

CU Denver

- Business School (2012)
- Student Commons (2014)
- Rob and Lola Salazar Health & Wellness Center (2018)
- First Year Student Housing (V. 4, 2021)

CU Anschutz

- Pharmacy and Pharmaceutical Sciences (2011)
- School of Dental Medicine (2011)
- Anschutz Health & Wellness Center (2012)
- Fulginiti Pavilion (2012)
- Anschutz Health Sciences Building (V. 4, 2021)

# Facility Projects of Note

## Research 1 Energy Project

The R1 facility was notoriously inefficient. Lights remained on in labs and provided a beacon for travelers passing by on I-225. Laboratory ventilation rates were higher than necessary and continued day and night. This project, performed over several phases, aimed to reduce energy consumption without changing the behavior or safety of occupants. Measures included installing networked lighting controls that communicated with the building automation system as well as automatically turning OFF the lighting and reducing the heating and air conditioning throughout the building (excluding vivarium) and adding direct evaporative cooling of the air supply. Work remains to gain additional future savings.

- Cost - $11.8MM Total of all projects
- Average Annual Savings - $989,906
- Simple Payback – 12 years
- Total Savings - $6.7MM
- Annual Energy Savings – 61,000 MMBtu, 346 homes equivalent
- Total Energy Savings – 350,000 MMBtu
- Xcel 2012 & 2016 Award - Energy Management Systems Achievement Award
- Xcel Rebate - $478,121 Total of all projects

- Annual $CO_2e$ Reduction – 7,342 Metric Tons

## Central Utility Plant (CUP) Chiller Efficiencies

The most recent chiller expansion project at the CUP included installing the most efficient chiller to date as well as modifying the existing eight (8) chillers with equipment to allow higher efficiency operation of these as well. Adding this high efficiency equipment resulted in annual electric energy savings of 10% in the production of chilled-water cooling for CU Anschutz and its affiliates.

- Cost - $169,460
- Annual Savings - $128,000
- Simple Payback – 1 year
- Total Savings - $271,000
- Annual Energy Savings – 5,459 MMBtu, 31 homes equivalent
- Total Energy Savings – 9,857 MMBtu
- Xcel 2016 Award - Highest Savings for Multiple Programs
- Xcel Rebate - $76,858 Total
- Annual $CO_2e$ Reduction – 1,217 Metric Tons

## LED Lighting Retrofit Projects

Facilities staff retrofit existing light fixtures in several buildings with more energy efficient LED lamps. These LED lamps improve lighting and reduce energy consumption. Locations completed to date include:

- Research 1 N&S – 1st & 2nd floor Atrium Corridors and restrooms, loading docks
- Education 1 – Corridors and 1st & 2nd Floor public spaces
- Health Sciences Library – Select public spaces, 1st – 3rd floors
- Nighthorse Campbell – Atrium, corridors, elevator lobbies, restrooms and exterior
- Barbara Davis Center – 1st floor Atrium, restrooms
- Building 500 – Entry/Elevator Lobby, Ground & 1st floors

CU Anschutz also performed a campus-wide study on outdoor lighting in order to increase safety and security. This led to a lighting improvement project that replaced 115 metal halide lamps with brighter and more efficient LED lighting, creating well-lit and safer surface areas. It also came with the added benefit of a 55% reduction in energy use.

**Event Management System to Building Automation System (EMS to BAS)**

The EMS system at CU Anschutz is used to schedule events in Lecture Halls, Classrooms and Conference Rooms. Facilities staff researched and discovered that the software utilized could also schedule the heating/cooling of each space. This project allowed the two systems to "talk" in order to save energy in rooms that were not occupied. Other functions of this integration provide one-stop room scheduling all departments to include setup, housekeeping, parking, security, etc.

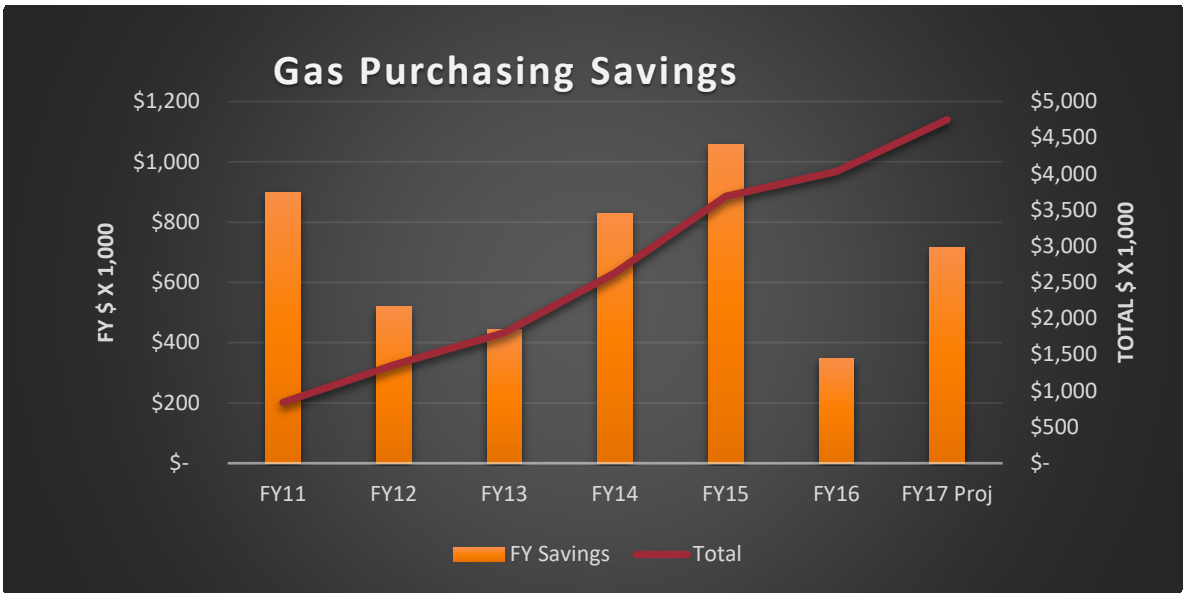
- Cost - $477,147
- Annual Savings - $173,248
- Simple Payback – 2.75 year
- Total Savings - $260,000
- Annual Energy Savings – 6,478 MMBtu, 37 homes equivalent
- Total Energy Savings – 9,717 MMBtu
- Xcel Rebate - $39,458 Total
- Annual $CO_2e$ Reduction – 678 Metric Tons

# Other Facilities Initiatives:

**Natural Gas Purchasing Strategy**

CU Anschutz purchases natural gas directly from pre-approved suppliers and transports the gas in Xcel Energy pipelines. Tier 1 purchases are from 12-24 months in advance for 30% of the estimated monthly volume. Tier 2 purchases are from 6-12 months in advance for another 30% of estimated volume. Tier 3 purchases are at each months' index price for another 30% of estimated volume. Xcel Energy requires gas transportation customers to balance volumes monthly in order to avoid storing gas in their pipelines and for them to have enough volume for their sales customers. The remaining 10% allows for balancing.

By hedging gas purchases in this manner CU Anschutz has realized average annual savings of $687,000 over the last 7 years when compared to Xcel Energy commercial rates with total savings over $4,750,000 in that timeframe.




## Utility Rebate Participation & Awards

Xcel Energy provides rebate programs for customers to participate in an effort to save energy costs. The rebate programs offset a portion of the cost of the energy efficiency initiative. CU Denver and the CU Anschutz have participated in many of the programs, winning several awards along the way. The Energy Design Assistance program has been used effectively for new building construction and major renovations. To date CU Denver/CU Anschutz received over $2.25MM in rebates. Rebates are utilized to fund additional energy efficiency opportunities. The awards since 2008 are:

- Most Energy Savings at One Premise (2008)
- Energy Management Systems Award (2012 & 2016)
- Highest Savings for Multiple Programs (2016)
- Most Natural Gas Savings in Energy Design Assistance Program (2018)
- Represents over 12,000 MT-CO2e saved

## Re-Commissioning of Facilities

The Building Performance Team has recommissioned the Library ($20k per year savings) and School of Dental Medicine ($70k+ per year savings) through evaporative cooling fixes and air handling unit adjustments. The payback for labor and materials used for these projects is under 2.4 years. The Fulginiti Pavilion and Education 1 facility are currently undergoing recommissioning with more expected resource and monetary savings.

## CU Anschutz Energy Audits

Using funds from the Xcel rebate program previously mentioned, a number of energy studies were performed to better understand efficiency opportunities in a number of facilities. These studies are currently being updated along with full Energy Audits being performed of the Research 2 and Pharmacy buildings. Facilities Management hopes to bundle the most financially attractive Energy Conservations Measures (ECMs) from these studies into a large efficiency and conservation project. Possible ECMs include:

- Research 1 Phase 3B completion – Direct Evaporative Cooling
- Education 2 ESMs – Exhaust reductions, lighting controls and efficiencies
- Barbara Davis Center – Lighting controls and efficiencies, equipment efficiencies
- Environmental Health & Safety – Lighting, HVAC improvements
- Perinatal Research Facility– Convert constant volume equipment and replace inefficient equipment
- Research 2 – Lighting controls and lab air change reductions
- Pharmacy – Currently under evaluation

## Expanded Recycling for Labs

The Sustainability Manager has worked with labs in the large research facilities to tackle the questions of what types of lab-specific materials might also go into the single-stream recycling program offered throughout campus. Working with Alpine Recycling, it was determined that a number of products used in daily lab functions could be part of the single-stream program even if not specifically labeled. This includes clean conical tubes, clean glass chemical containers, Kimwipes (non- biohazard), Styrofoam, media bottles & pipette tip boxes. Package recycling centers have also been set up in most lab-heavy facilities in order to assist the janitorial staff in dealing with the large amount of cardboard and Styrofoam that come into lab spaces. Labs may also opt to participate in a nitrile-glove recycling program.

## Transportation Planning at CU Anschutz

Planning and providing for transportation options at CU Anschutz has increased as options for transit and efficient transportation have grown. The opening of the Northeast Light Rail line in 2016 and the addition of a light rail shuttle on campus and between the hospitals has helped increase the number of EcoPass holders on campus. Currently, there are 3051 EcoPasses issued at CU Anschutz with about 400 daily riders on the light rail shuttle.

The campus also supports electric vehicles on campus with fifty-three (53) Level 1 charging stations in the Henderson Parking Garage and two (2) Level 2 charging stations in the East overflow Lot.

Zipcar is also an option on campus, with 5 dedicated spaces, and bicycle infrastructure is supported with bike lockers, bike racks and repair stations throughout campus. CU Anschutz hosts one of the largest breakfast stations in Denver metro for Bike to Work Day every June.

# Student Engagement

## CU Denver

### Auraria Sustainable Campus Program

The Auraria Sustainable Campus Program (ASCP) is a student-driven committee with the mission of reducing the campus's ecological impact and dependence on fossil fuels. By ensuring the campus is sustainable, the ASCP helps to reduce costs and improve campus life for all students, faculty and staff of Auraria Campus's constituent institutions: Community College of Denver, Metropolitan State University of Denver, and the University of Colorado Denver. Current initiatives include:

#### Library Solar Installation

In efforts to expand the solar portfolio on campus, AHEC has contracted Namaste Solar to install 753 kW of solar energy on the rooftop of the Auraria Library. Here are some quick facts about the array:

- 753 kW output
- Produce over 1 million kWh annually (enough to power over 100 homes)
- Offset over 2/3 of library's electricity usage
- Will save an estimated average of $45,000 a year in energy costs, which will be used to fund future energy efficiency and renewable energy projects
- Prevent 1.2 million lbs CO2 emissions from entering the atmosphere each year
- One of the largest singular rooftop array in downtown Denver
- Over 2,000 total panels
- *Expected Completion Date: December 2019*

#### LED Lighting Upgrades

Energy efficiency projects have had some of the highest returns on investment in terms of Greenhouse Gas emissions reductions so we continue to find opportunities to increase our efficiency. The replacement of 463 pedestrian lamppost heads to LED lightbulbs from metal halide light fixtures has saved an estimated 674 MTCO2e per year!

**Compost & Recycling**

The ASCP has deployed brand new 3-bin systems (landfill, recycle, compost) in the 2nd floor break room of West Classroom and in the Library Cafe, in addition to the sorting stations in Tivoli and on the Quad. These are part of a 100-day pilot geared toward testing new infrastructure and the operational impact on our custodial staff. Depending on what we learn, we are prepared to expand more comprehensive composting and recycling efforts to the rest of campus. AHEC students will vote in the spring of 2020 to expand and make the program permanent.

**Green Office Program**

The ASCP is spearheading a certification program for interdepartmental offices on Auraria Campus. Ranked on points, departmental offices and their green "offices leaders" initiate sustainable and eco-friendly alternatives into campus office environments. The goal is to inspire behavior changes and reduce campus-wide waste and carbon emissions through ecologically minded sourcing practices, compost & recycling efforts, and reducing electricity usage.

## CU Anschutz

**Gold Humanism Honor Society (GHHS)**

Within the School of Medicine, GHHS is an honor society at medical schools throughout the country. This chapter recognizes individuals in each medical school class who exemplify "excellence in clinical care, leadership, compassion, and dedication to service". Members of GHHS are expected to conceive and lead projects that benefit the surrounding community. The CU Anschutz chapter felt that there was a need for a group on campus to promote sustainability and resource stewardship, so an action arm of GHHS emerged to assist CU Anschutz with the recycling program in lab and education buildings. This group also designs and delivers sustainability and climate change workshops to local elementary school classes. This work was highlighted in spring of 2019 when GHHS became a Distinguished Chapter - awarded to 4 of the 150 chapters across the country.

**University of Colorado Consortium for Climate Change and Health**

The Consortium is an interdisciplinary collaboration of clinicians, biomedical scientists, public health practitioners, epidemiologists, anthropologists, atmospheric scientists, climatologists, and graduate students who share an academic interest in studying the climate change and health nexus, as well as a collective desire to mitigate the effects of climate change in order to prevent disease and improve global health. The student contingent is presently expanding and the goal is to increase student involvement in on-campus sustainability projects, public education on the health effects of climate change, and advocacy for responsible policies that mitigate global warming and adapt our infrastructure for the climatic changes to come.

# Academics

Sustainability has been a focal point for a number of academic programs for some years. At least 6 Schools and colleges have either sustainability-focused or –related programs.

**College of Liberal Arts & Sciences** – Offers a Sustainability minor is which students must complete 18 hours of coursework chosen from a myriad of departments throughout the College.

**College of Architecture and Planning** – Offers a Bachelor of Science in Architecture and 6 graduate degree programs that place a great deal of focus on sustainability in Architecture, Landscape Architecture, Urban & Regional Planning, Urban Design and Historic Preservation.

**Business School** – Offers a Managing for Sustainability track for MBA, MS in Management and MS in Marketing students that focuses on sustainable business practices and emerging trends.

**College of Engineering and Applied Sciences** - Graduate specialty in Environmental and Sustainability Engineering is a unique, broad based program that links theory with engineering design for environmental protection and sustainable infrastructure systems.

**The School of Public Affairs** - Offers a certificate in sustainable urban infrastructure. The certificate is for students and working professionals who seek an interdisciplinary curriculum in the broad field of sustainable infrastructure to address complex water, energy, built environment and transportation challenges using engineering and social science strategies.

**School of Public Health** – Offers a Master's of Public Health with concentrations that are sustainability-related, including Community and Behavioral Health, Public Health Nutrition, Global Health and Health Disparities, and Community Health Education.