



Demonstrating Sustainability



2011 Climate Action Plan





Submitted to: American College & University
President's Climate Commitment

Submitted By: Missouri University of Science and Technology
Institute for Environmental Excellence
<http://e3.mst.edu>

Date: January 30, 2011

For additional Information: Angela B. Rolufs, Director
Institute for Environmental Excellence
rolufsa@mst.edu
573-341-7500



Institute for Environmental Excellence



Missouri University of Science and Technology

Executive Summary

The Green Campus Committee (GCC) of Missouri University of Science and Technology (Missouri S&T) has set a goal to reduce its greenhouse gas emissions 20% below 2010 levels by 2020. In order to meet this goal, Missouri S&T will implement the following actions:

- Install a campus wide ground source heating and cooling system,
- Retrofit older campus buildings with energy efficient technology,
- Implement Thin Client computers and power management computer settings,
- Demonstrate sustainable business practices,
- Improve non-hazardous solid waste management practices, and
- Create incentive programs to encourage behavior change.

Using our ISO14001 certified Environmental Management System (EMS) objectives and targets programs and the Association for the Advancement of Sustainability in Higher Education (AASHE) Sustainability Tracking and Rating System (S.T.A.R.S.) as tools to guide and track these efforts, we are confident we can reach and will likely surpass our reduction goal.

Introduction

In January 2008, Chancellor John F. Carney III announced his directive to make our campus “sustainable”. This spurred the development of the GCC, the appointment of a director for the Institute for Environmental Excellence (IEE), and the hiring of a Green Campus Coordinator. The University of Missouri System, which includes the Missouri S&T campus, became signatories of the American College and University President’s Climate Commitment (ACUPCC) in January 2009, solidifying the Chancellor’s directive. Dedicated management and personnel, together with new ideas and defined initiatives, propelled environmental awareness and energy efficient thinking throughout campus. IEE is charged with the oversight of the GCC and shares management of the EMS with Administrative Services. This positions IEE to collaboratively drive the initiatives set forth in this plan.

Commitment to Sustainability

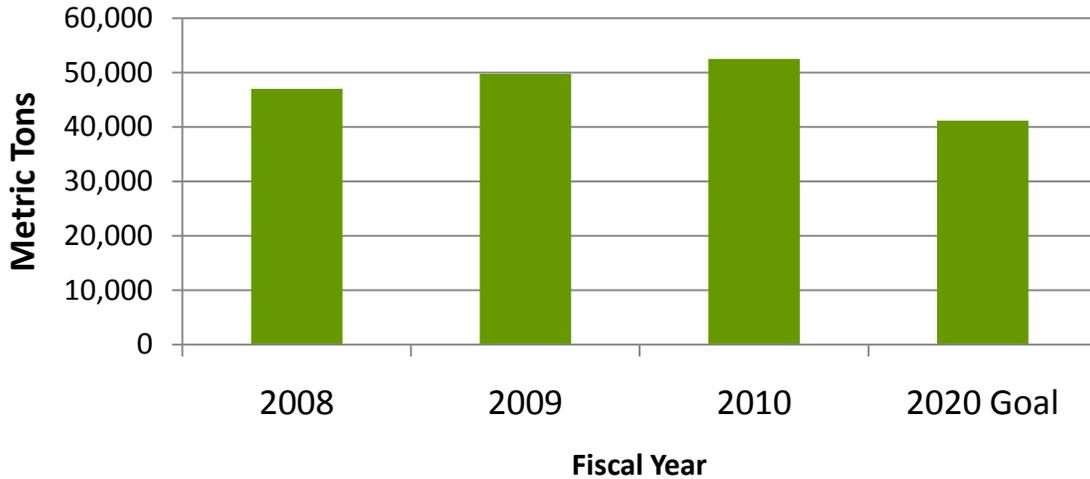
We believe that Missouri S&T must exercise leadership in the community and for our students by modeling sustainability practices in daily operations. Missouri S&T has made a firm commitment to minimize its pollutants and greenhouse gas emissions while providing knowledge and developing educated graduates who are aware of the importance of good environmental stewardship. The Sustainability Policy adopted in 2009 provides a clear, unifying vision of Missouri S&T’s pledge to:

- Reduce emissions of greenhouse gases
- Provide knowledge, education and active demonstration of sustainable living to faculty, staff, students and members of surrounding communities
- Comply with regulatory and other requirements to which the University subscribes
- Reduce impact on the environment with regard to water, air emissions and non-hazardous solid waste
- Continually improve our environmental stewardship with respect to materials, water and energy use

Greenhouse Gas Emissions Reduction Pledge

The campus commits to reducing greenhouse gas emissions 20% based on 2010 data by the year 2020. Data was collected using the Cool Air-Clean Planet calculator. The following graphs show the last three years' emissions and our 2020 goal.

Total eCO₂ Emissions

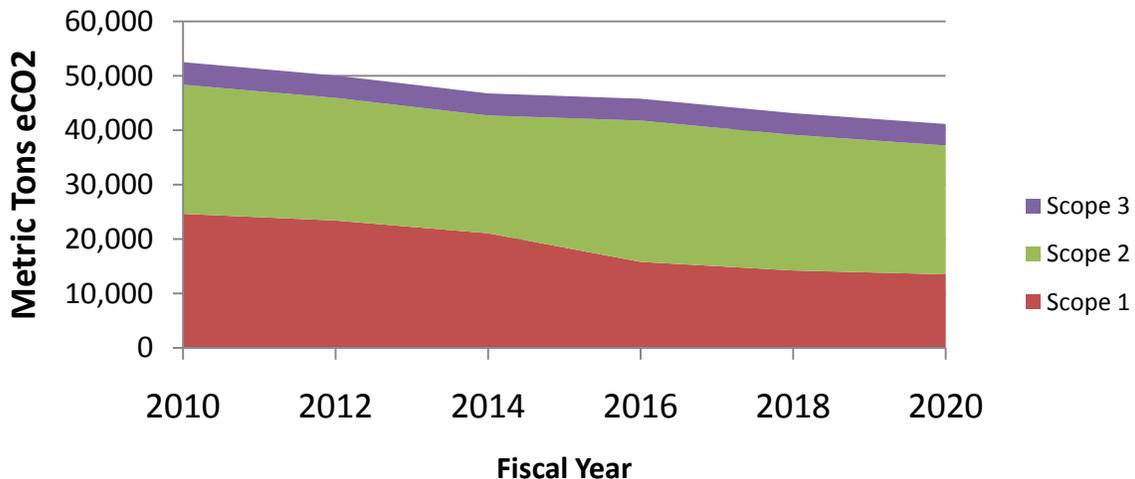


- Scope 1 - On-campus generation
- Scope 2 - Purchased electricity, steam, chilled water
- Scope 3 - Commuting, travel, solid waste, wastewater, paper, offsets

Plan Overview

This plan is developed by scope with each area being addressed simultaneously. We expect to see an initial decrease in Scope 2 as building and computer efficiencies improve but as we move away from on-campus generation, Scope 1 will reduce dramatically while Scope 2 may increase.

Projected Decrease by Scope



Plan Details

Scope 1 – Ground Source Heating and Cooling System

The development and installation of a closed loop ground source heating and cooling system is underway. This system will replace the campus' current coal and wood chip fired boilers. The ground source heating and cooling system is expected to be 40% more efficient than the power plant and will significantly reduce Scope 1 GHG emissions. The project will be complete within five years.

Scope 2 – Energy Efficiencies

Missouri S&T strives to keep its facilities state of the art while preserving its historical nature. Older campus buildings are being retrofit with new sensor lighting and temperature control programming in order to reduce everyday electricity usage. Currently, there are several projects in the works to replace old boilers with newer more efficient ones. Other projects identified in a year-long energy study will be completed as funding allows. While these projects will bring our facilities more up to date with efficient equipment, we anticipate a slight increase in Scope 2 emissions because of anticipated campus growth.

A potential offset to the increase caused by facility upgrades is a project currently in proof of concept phase, the Virtual Desktop Infrastructure (VDI) implementation of thin client computers. Once the validation is complete and the concept is approved, the Information Technology (IT) department will begin replacing University owned desktop systems with a thin client, which estimates an 80% energy savings over a traditional desktop system. With over 4000 computers currently on campus, this project could provide a significant reduction in Scope 2 GHG emissions. During the three-five year roll out period, the IT department will provide instructions for individual users to set their computers to its greatest energy efficient setting. All new computers installed in the last year and from now on are Energy Star 5 rated.

Scope 3 – Behavior Modification

As a university demonstrating sustainability in everyday business practices, altering the way we travel, conduct meetings, review documents, handle waste, and purchase materials will result in a reduction of Scope 3 emissions.

Missouri S&T's EMS uses the Sustainability Policy as the impetus to change people's way of thinking. In order to challenge employees and students, the EMS subcommittee sets objectives and targets such as reducing energy intensity per square foot of education and general buildings, reducing recyclable material in the non-hazardous solid waste stream from 38% to 25%, and initiating a fuel reduction plan for fleet vehicles. These targets set a common goal for all University employees to work toward by using energy efficient practices and environmentally friendly thinking in all job functions.

AASHE S.T.A.R.S. will be used to identify strengths and weaknesses of current practices. Using this information, the GCC will develop behavioral modification and education programs based on existing campaigns. Helping people understand their environmental impact will teach them how to live healthier and cleaner lives.

Research and Education

Opportunities to increase research of renewable energy sources, smart grid technology, biofuels, and behavior modifications will be pursued with various governmental and private industry partners. By working with our local community and state agencies, we will enhance the educational experience of our students by offering an increasing number of experiential learning opportunities.



The Institute for Environmental Excellence will use the Solar Village, a group of four Solar Decathlon houses, to educate the public, provide research opportunities, and demonstrate current and future GHG reduction steps available to the community. Figure at left shows the Missouri S&T solar village.

Tracking Success

We will use the Cool Air-Clean Planet program to continue tracking and compiling GHG emissions data. Additional development of this plan will be conducted by the Green Campus Committee. The Institute for Environmental Excellence is responsible for tracking and reporting progress. By clearly conveying the success of actions and impacts of infrastructure changes, more benefits and ideas from the S&T constituents are anticipated.

Conclusion

By improving infrastructure, developing strategic partnerships, and implementing energy savings projects, Missouri University of Science and Technology will reduce its greenhouse gas emissions 20% by 2020, increase awareness among students, employees and community citizens, and demonstrate sustainability in such a way that environmentally friendly living will become a way of life.