

Colorado State University

Climate Action Plan Update February 2013





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February 4, 2013

Mr. David Hales
President, Second Nature
The American College and University Presidents' Climate Commitment
18 Tremont Street, Suite 308
Boston, MA 02108

Dear Mr. Hales:

I am pleased to enclose Colorado State University's first update to our Climate Action Plan (originally submitted September 2010). In keeping with our responsibility as a signatory of the American College & University Presidents' Climate Commitment, Colorado State issued an online update of this plan in December 2012. However, we felt that update limited our ability to tell the story of the progress made – and challenges still ahead – in order to achieve our carbon reduction goals. The original plan and this update both reflect our continued work to minimize greenhouse gas emissions and promote education, research and outreach in support of environmental sustainability and long-term climate neutrality.

Colorado State University became a signatory to the ACUPCC in 2008 and submitted our first Climate Action Plan in 2010 – a 40-year plan targeting a net-zero campus by 2050. Just two years into that 40-year plan, Colorado State's efforts are both just beginning and well underway. Colorado State's original Climate Action Plan (CAP) outlined 16 strategies in 3 broad categories to fulfill the goal of making progress toward climate neutrality. Each strategy has been evaluated and a determination of progress has been made on each. At this time, none of the original strategies have been recommended for removal from the CAP. However, two of the strategies have been combined and one strategy has been added. Thus, the 2013 update also contains 16 strategies.

At this time, Colorado State University is pleased to report that since FY10, our total GHG emissions have dropped by 6 percent. During this same period of time, the total campus square footage has increased by 9 percent and the total student population has increased by 5 percent. These figures contribute to an even larger reduction in GHG emissions when benchmarked to these metrics.

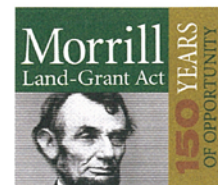
This plan update was completed by a group representing a broad cross section of expertise within the campus community. In particular, I want to thank Dr. Ron Sega, chair of Colorado State's Sustainability, Energy, and Environment Advisory Committee, and Ms. Carol Dollard, chair of the Climate Action Plan Task Force. The CAP Task Force consisted of representatives from across the campus community including students, faculty, and staff.

Thank you for your leadership and vision in guiding this nationwide effort. Colorado State University remains proud to be an ACUPCC signatory and a partner with other institutions in demonstrating our shared responsibility – as a national community of scholars – to the health and preservation of our earth.

Sincerely,

A handwritten signature in black ink, appearing to read "Tony Frank".

Dr. Tony Frank
President



Acknowledgements

The following individuals and organizations are recognized for their valuable input to the development of this Climate Action Plan.

Sustainable Energy and Environment Advisory Committee

Climate Action Plan Task Force 2012

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1.0 Introduction

On March 20, 2008, Colorado State University announced its intent to “seek environmental solutions that include making CSU carbon neutral in a rapid timeframe.” Subsequently, CSU committed to signing the American College & University Presidents Climate Commitment (ACUPCC), whereby CSU agreed to set climate neutrality as a long-term climate goal. The original 2010 Climate Action Plan began the process of defining a path for CSU to achieve climate neutrality. This 2013 update provides an opportunity to demonstrate progress made toward the original goals and explain updates to the original plan.

The ACUPCC is a high-visibility effort by a network of colleges and universities to address global climate change. Participating institutions have committed to eliminate net greenhouse gas emissions from specified campus operations and to promote research and educational efforts to equip society to re-stabilize the earth’s climate. Its mission is to accelerate progress toward climate neutrality and sustainability by empowering the higher education sector to educate students, create solutions, and provide leadership by example for the rest of society.

The University is proud to put forth this update to the initial plan for achieving climate neutrality that recognizes CSU’s unique land-grant heritage and strong research ties. As a land-grant university, CSU has unique opportunities to utilize renewable energy from wind and solar resources and to consider the potential for sequestering carbon in forest and grassland projects.

CSU is building a strong reputation around sustainability and clean energy through the School of Global Environmental Sustainability (SoGES), Clean Energy Supercluster and the Powerhouse Energy Institute. These assets are increasing the potential to advance research that will better enable CSU to achieve climate neutrality and reduce greenhouse gas emissions, both on campus and in the broader global community. Finally, CSU will also be relying on the strong commitment of students, faculty, and staff to implement this plan and further sustainable practices on campus.

1.1 ACUPCC Commitments

The ACUPCC provides a framework and support for colleges and universities to implement comprehensive plans in pursuit of climate neutrality. It recognizes the unique responsibility that institutions of higher education have as role models for their communities and in educating the people who will develop the social, economic, and technological solutions to reverse global warming and help create a thriving, sustainable society.

By signing the ACUPCC, Colorado State University agreed to:

- Develop a greenhouse gas emissions inventory. Inventories have been submitted to the ACUPCC for fiscal years 2006-2012.
- Within two years, set a target date and interim milestones for becoming climate neutral. The 2010 CAP set a carbon neutral target date of 2050.

- Take immediate steps to reduce greenhouse gas emissions by choosing from a list of short-term actions, listed below. See notes below on the actions already underway that met this requirement.
- Integrate sustainability into the curriculum and make it part of the educational experience. See Section 3.0 below for a discussion of CSU's sustainability-related curriculum.
- Make the Climate Action Plan, inventory, and progress reports publicly available. CSU's CAP documents and GHG inventories are available at <http://rs.acupcc.org>.

Signatories are required to take two or more of the following tangible actions to reduce greenhouse gas emissions while the Climate Action Plan is being developed:

- a. Establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's Leadership in Energy and Environmental (LEED) Silver standard or equivalent.
- b. Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist.
- c. Establish a policy of offsetting all greenhouse gas emissions generated by air travel paid for by the institution.
- d. Encourage use of and provide access to public transportation for all faculty, staff, students, and visitors.
- e. Within one year of signing the ACUPCC, begin purchasing or producing at least 15 percent of the institution's electricity consumption from renewable sources.
- f. Establish a policy or a committee that supports climate and sustainability shareholder proposals at companies where the institution's endowment is invested.
- g. Participate in the Waste Minimization component of the national RecycleMania competition, and adopt three or more associated measures to reduce waste.

The University was well positioned because three of these actions were already in place. Specifically, under the guidance of Senate Bill 07-051, CSU has a policy that all new significant campus construction will be built to the U.S. Green Building Council's LEED Gold standard or equivalent (a). CSU encourages use of and provides access to public transportation for faculty, staff, students, and visitors. Students can ride Transfort – the community bus system – free by showing their student ID while faculty & staff can purchase subsidized bus passes (d). Finally, the University has participated every year in both the Grand Champion and Waste Minimization component of the national RecycleMania competition – regularly finishing in the top 5% of participating universities (g). On top of these efforts, in 2012 CSU adopted an Environmentally Responsible Purchasing Policy (ERP). The purpose of this policy is to support campus sustainability at Colorado State University and to provide guidelines, information, and resources in procuring products that will minimize negative impacts on society and the environment to the greatest extent practicable. An ERP Program takes into consideration both the long and short term costs associated with the full life cycle of the product. The life cycle includes extraction, production, manufacturing, distribution, operation, maintenance, and disposal. This policy will guide CSU employees who wish to purchase goods and services for CSU to finding more environmentally sound products, and may require the use of environmentally preferable products in many instances (b).

1.2 Climate Action Plan Approach

Since CSU is a signatory to the ACUPCC, the original 2010 CAP, this update and associated analyses were prepared in accordance with the above guidelines established by the ACUPCC as well as the *Implementation Guide: Information and Resources for Participating Institutions* prepared by ACUPCC. It includes a discussion of CSU's greenhouse gas emissions, its curriculum, research and outreach related to sustainability, and a set of greenhouse gas mitigation options to carry CSU toward long-term climate neutrality.

The term “climate neutrality” refers to achieving net zero greenhouse gas emissions by reducing or mitigating emissions through projects addressing energy efficiency, renewable energy, transportation, solid waste diversion, and other strategies along with a means to offset any remaining emissions with the purchase of carbon offsets.

The ACUPCC *Implementation Guide* provides its own specific definition of climate neutrality for colleges and universities:

For purposes of the ACUPCC, climate neutrality is defined as having no net greenhouse gas emissions, to be achieved by minimizing greenhouse gas emissions as much as possible, and using carbon offsets or other measures to mitigate the remaining emissions. To achieve climate neutrality under the terms of the Commitment, all Scope 1 and 2 emissions, as well as those Scope 3 emissions from commuting and from air travel paid for by or through the institution must be neutralized.

The original plan was developed through a collaborative process involving input from a campus task force, the campus community at large, and a consultant team. When this update was being prepared, Colorado State created a new Climate Action Plan Task Force comprised of 19 volunteer members representing departments across campus, including faculty, staff, and students.

The original plan and this update have also been developed with oversight from and coordination with CSU's Sustainability, Energy, and Environment Advisory Committee (SEEAC). The vision of the SEEAC is to “Always consider energy, environment, and the community.” Its mission is to advise the University president and members of the President's Cabinet on the best methods of integrating energy issues, environmental stewardship, sustainability principles, and community action into campus operations in the interest of improving efficiency, generating awareness, and being a responsible public organization.

The SEEAC committee is chaired by Dr. Ron Sega, the Woodward Professor of Systems Engineering and the President's Special Advisor for Energy and the Environment. The SEEAC Committee consists of representatives from a broad cross-section of campus units identified in Appendix A.



2.0 Campus Greenhouse Gas Emissions Inventory

The University’s greenhouse gas inventory is prepared annually using the Clean Air – Cool Planet (CACP) Campus Carbon Calculator. The CACP tool was developed specifically to provide higher education institutions with a consistent approach to calculating campus greenhouse gas emissions and is recognized as an acceptable tool by the ACUPCC.

The inventory is based on utility data, other University records, discussions with staff, and a 2008 online campus commuting survey. The units of metric tons of carbon dioxide equivalent (MTCO₂e) are used in the inventory and throughout this plan to account for the collective global warming potential of all six greenhouse gases including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and various refrigerants. The University has completed inventories for fiscal years 2006 through 2012 as shown in Figure 1 below.



Figure 1 – CSU Annual Greenhouse Gas Emissions

Following ACUPCC guidance, CSU’s inventory includes all direct emissions, or “Scope 1” emissions such as those from on-campus stationary fuel combustion, vehicle fleet operations, agricultural activities, fertilizers, and refrigerants. Indirect energy emissions, or “Scope 2” emissions, from electricity purchases are also included. Other indirect emissions, or “Scope 3” emissions from directly financed air travel, student commuting, faculty/staff commuting, electrical transmission and distribution losses, and solid waste disposal are also included. The contribution of these emissions sources to CSU’s inventory are depicted in Figure 2.

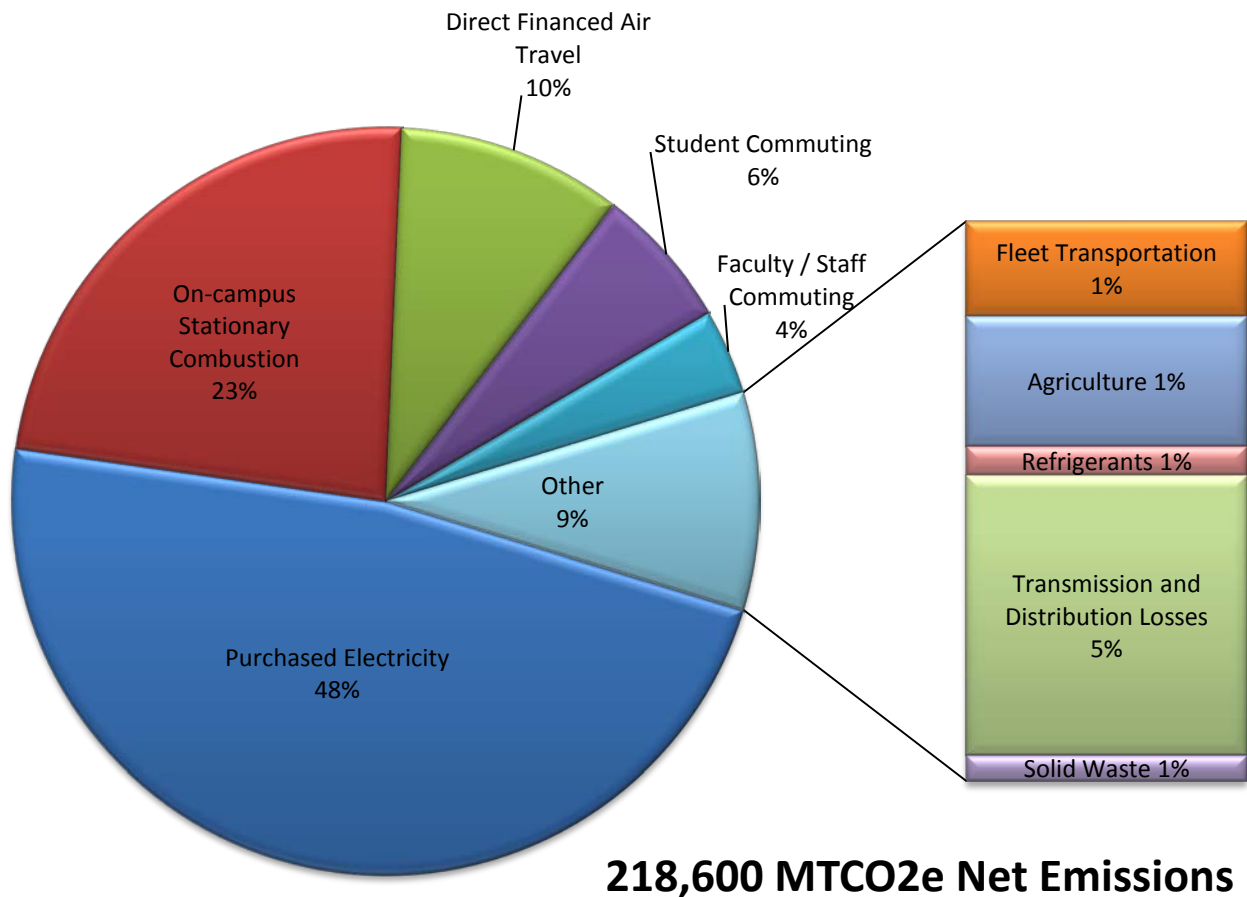


Figure 2. FY12 Greenhouse Gas Emissions Sources

This Climate Action Plan update considers CSU’s projected emissions and identifies potential reduction and mitigation strategies between fiscal years 2010 and 2050. The business-as-usual forecast of emissions is primarily driven by increases in the intensity of electricity consumption in existing buildings (about 1 percent annually based on historical trends), and the construction of new buildings (assumed to be an average of 50,000 square feet annually).

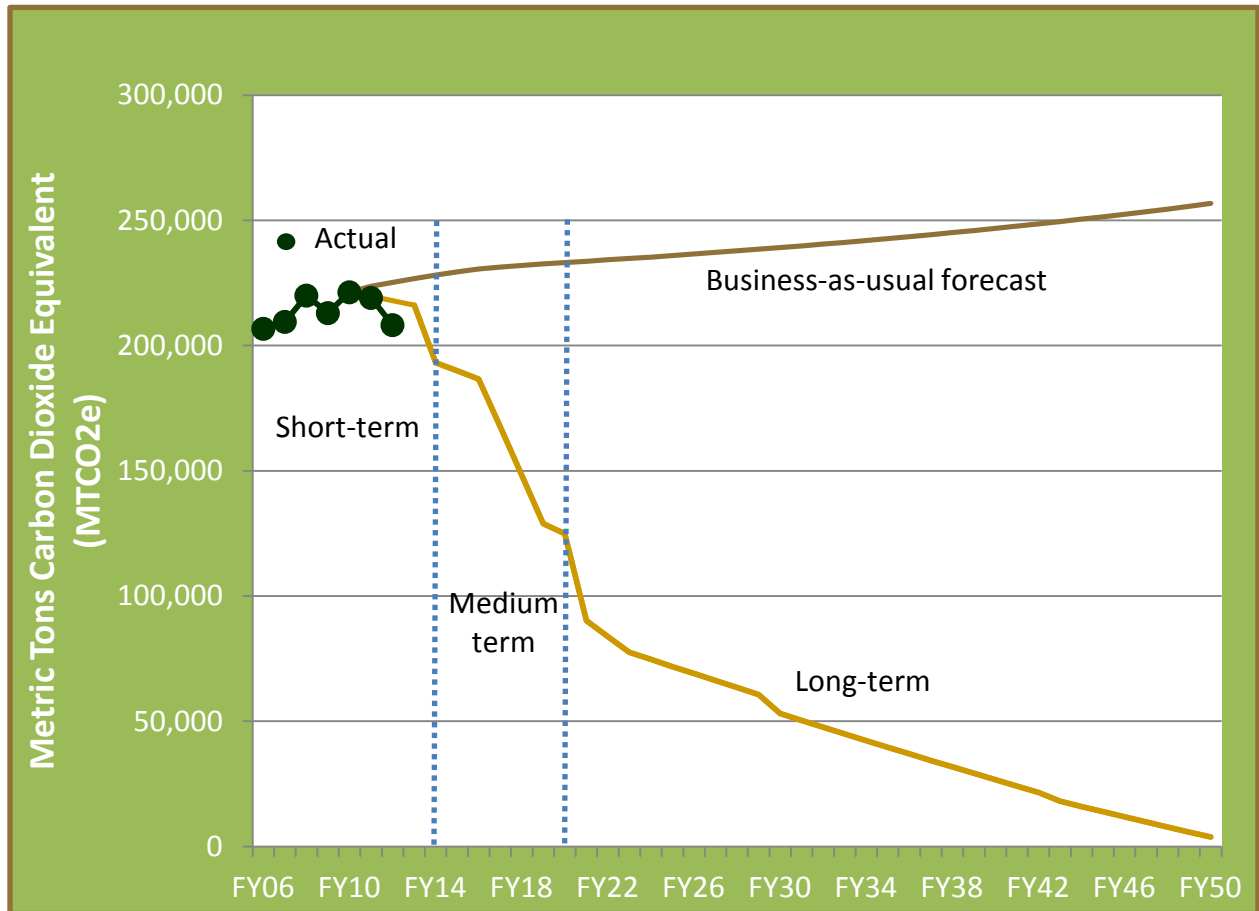


Figure 3. Business-as-usual Emissions Trajectory and Climate Action Plan

The CSU plan establishes a set of reduction and mitigation strategies that are divided between short-term (0-3 years), medium-term (3-10 years), and long-term (>10 years). As depicted in Figure 3, these strategies are projected to reduce CSU’s net emissions to climate neutrality by approximately 2050. As an intermediate goal along this trajectory, CSU aims to achieve a reduction in emissions of 50 percent over business-as-usual projected emissions by 2020.

3.0 Education, Research, and Community Outreach Efforts

One of the commitments CSU made as a signatory to the ACUPCC is to integrate sustainability into the curriculum and make it part of the University educational experience. Academic areas at CSU that address environmental sustainability are offered in all eight of the University's colleges and span across programs in engineering, natural resources, forestry, public policy, environmental ethics, global and sustainable business, atmospheric science, soil and crop sciences, construction management, and many other programs. As one of the highest scoring universities in the Sustainability Tracking, Assessment & Rating System (STARS), the University has been nationally recognized for its curriculum and research programs related to sustainability; some of these primary programs and initiatives are discussed below.

It is also important to recognize the links between professional development, research and learning, and the opportunities moving forward as the plan is implemented. Providing faculty with professional development opportunities in the realm of sustainability will help them integrate these topics into their research and teaching. Furthermore, academic research drives new technologies and understanding, which in turn can be integrated to inform decisions and create beneficial outcomes for larger society. This generates a "feedback loop" that can help accelerate this plan's goal of reaching carbon neutrality at CSU while benefitting broader society.

3.1 School of Global Environmental Sustainability (SoGES)

Launched in 2008, SoGES is an organization that encompasses sustainability, environmental education and research at CSU. It engages with the public and policy makers in translating our discoveries into practical solutions to environmental problems. It is an interdisciplinary program that conducts the innovative research necessary to solve the most pressing human-environmental problems. The School provides innovative and challenging education programs to equip students – and the community – with the principles and the practices of sustaining the environment and meeting demands of the workforce for the environmental economy.

SoGES positions CSU to address the multiple challenges of global sustainability through broad-based research, curriculum, and outreach initiatives. Areas of emphasis include food security; environmental institutions and governance; sustainable communities; land and water resources; biodiversity, conservation and management; and climate change and energy. This approach capitalizes on CSU's historic strength in global environmental research and education that already exists within all eight colleges on campus from the Warner College of Natural Resources to the College of Business.

The specific mission of SoGES is:

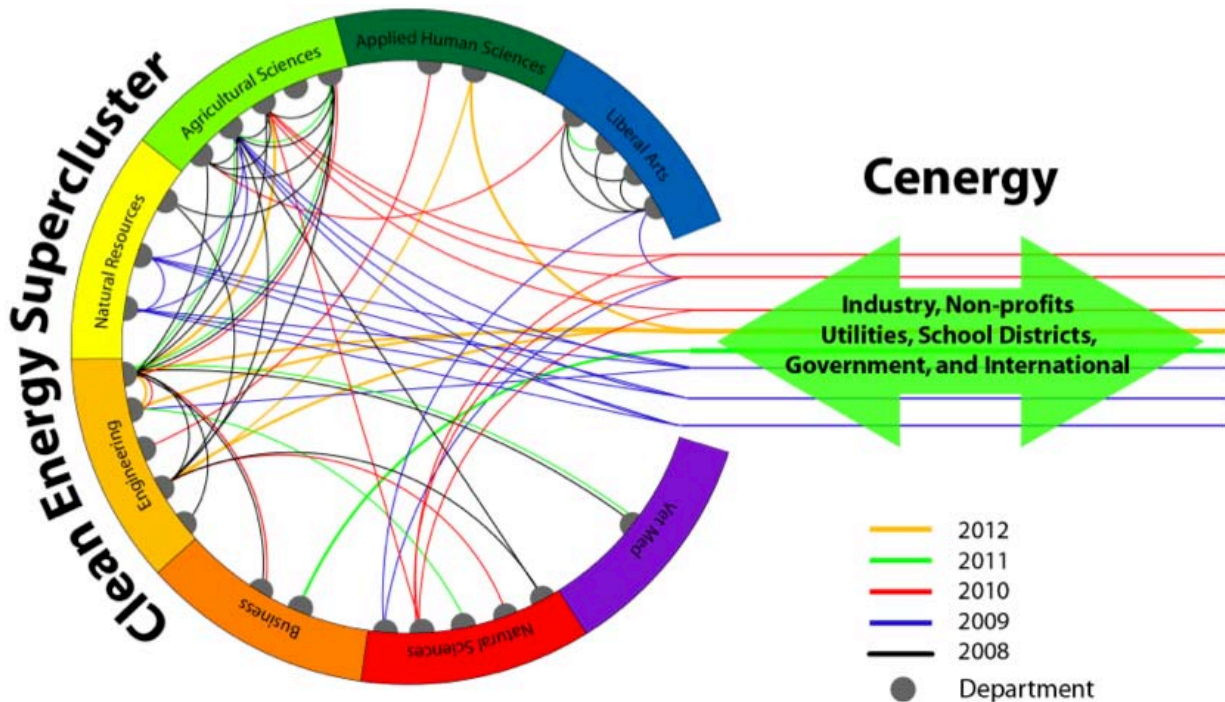
To develop new strategies for global sustainability that will address and inform solutions to global human-environmental grand challenges and inform solutions to global environmental problems.

The School will accomplish this mission using a human-environmental framework that advances scientific understanding while supporting the generation of new science and linkages to economics and society. This will be enhanced by engaging CSU’s world-class expertise in innovative ways that cross traditional disciplinary boundaries.

3.2 Clean Energy Supercluster

The Clean Energy Supercluster at CSU is an innovative model to rapidly move the University’s clean energy research into the global marketplace, creating new companies and jobs that enhance Colorado’s economy while improving lives throughout the world. The Supercluster consists of a University wide multidisciplinary alliance of researchers, social scientists, and business experts working on innovative research and discovery. An associated enterprise, Cenergy, functions as the business arm of the Supercluster and greatly enhances the ability of University scientists and business partners to speed clean and renewable energy research to the marketplace. Cenergy directly enhances Colorado’s leadership in building a new energy economy as well as improving quality of life for people around the world.

More than 100 faculty members in all eight colleges participate in cross-disciplinary programs expanding knowledge, creating alternative energy solutions, and developing policies in the areas of biofuels, solar energy, wind power, efficiency, and clean-burning engines. This research supports Colorado’s efforts to lead the nation in creating clean and renewable energy technology and training the “green-collar” workforce. Faculty members represent fields as diverse as the physical sciences, engineering, humanities, applied human sciences, and business.



3.3 Powerhouse Energy Institute

At Colorado State University we have over 130 faculty members spanning all eight colleges who work each day to reinvent energy. We have labs, policy centers, Superclusters, and start-ups. What if we put all of that energy under one roof, bringing together world class people in a world class place? Then we would have something special - a powerhouse.

The Powerhouse Energy Institute includes:

- Center for Energy & Global Health
- Center for the New Energy Economy
- Engines & Energy Conversion Lab
- Advanced Fuel Lab
- Electric Power Systems Lab
- Gas Technology Consortium

3.4 Colorado State University Extension

As a land grant university, Colorado State University plays a key role throughout Colorado in education, engagement, and outreach through Extension. The system of county offices puts Extension resources within easy reach of residents in all of Colorado's 64 counties. Extension has developed a number of Energy Programs including:

- Center for Agricultural Energy
- Colorado Energy Master Program
- Consumer Education on Energy Topics
- K-12 Education on Energy Topics

4.0 Climate Action Plan: Reduction and Mitigation Strategies

The following sections identify a number of proposed greenhouse gas reduction and mitigation strategies for fulfilling the Climate Action Plan's goal of making progress toward climate neutrality. These strategies are the reflection of significant work by the SEEAC and Climate Action Plan Task Force as well as campus input to identify priorities and strategies that can provide the most significant economic, social, and environmental benefits to the University. Two minor changes were implemented in the 2013 update:

- “Reduction of Full Load Operation of Equipment & Tighter Scheduling” was combined with “Outreach, Smart Metering & Behavior Change”.
- An additional measure was added – “Offset Airline Travel”

Mitigation strategies roughly fall into three categories:

Energy Use in Buildings

- Building Energy Efficiency
- Outreach, Advanced Metering, Behavioral Engagement, and Reduction of Full-Load Operation of Equipment
- Re-commissioning and Retro-commissioning
- Computer Power Management and Server Virtualization
- High-Performance New Construction

Renewable Energy

- Biomass Boilers or Cogeneration
- Net Metered Solar Facilities
- Statewide Renewable Energy Standard
- Wind Power
- Landfill Gas

Other

- Fleet Fuel Consumption
- Waste Diversion
- Commuting
- Carbon Sequestration in Forests & Grasslands
- Offset Airline Travel

Each of these strategies is identified as short term (0-3 years), medium term (3-10 years), and/or long term (greater than 10 years) depending on their particular implementation characteristics. Each section below summarizes the context for each strategy and provides projections of greenhouse gas emission reductions and costs. Cost estimates include:

- one-time or first capital cost for implementing the strategy, annual O & M cost
- annual cost savings based on current utility rates
- a simple annual return on investment (net annual cost savings/one-time cost)

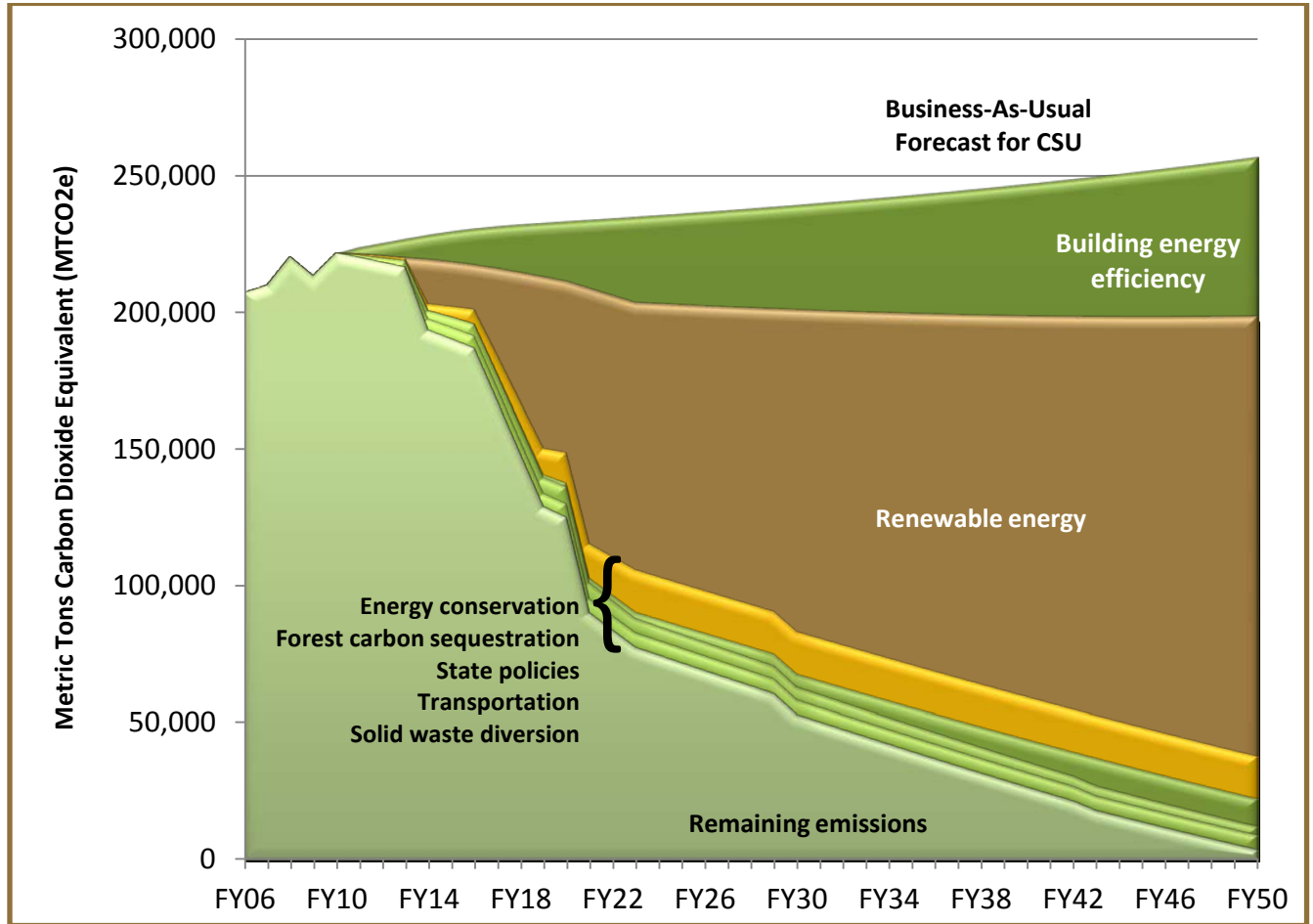


Figure 4. Greenhouse Gas Reduction Contributions by Strategy Type

4.1 Building Energy Efficiency

Term	Projected MTCO _{2e}	Percentage of Net FY09 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Short Phase 1- Completed	(3,800)	-2%	\$1,700,000	\$0	\$344,000	20%
Short Phase 2	(2,100)	-1%	\$1,000,000	\$0	\$200,000	25%
Medium Phase 3	(5,500)	-2%	\$3,500,000	\$0	\$525,000	20%
Medium Phase 4	(5,500)	-2%	\$3,500,000	\$0	\$525,000	15%
Long Phase 5	(14,900)	-7%	\$15,000,000	\$0	\$1,470,000	13%
Long Phase 6	(14,900)	-7%	\$15,000,000	\$0	\$1,470,000	13%

The University has made significant strides in increasing building energy efficiency in a number of its facilities. This strategy focuses on a number of energy efficiency opportunities, grouped into six phases, which can be implemented over the short, medium, and long term based on anticipated payback. Many projects have been completed, others have been funded and are underway, yet more than 100 additional projects have been identified, including:

- Lighting upgrades
- Heat recovery
- Synchronous belt drives
- Demand control ventilation
- Retrocommissioning
- Controls upgrades
- Variable-air-volume terminals
- Heat-exchanger upgrades
- Fume hoods
- Server consolidation/virtualization

Recent Energy Efficiency Projects

- In 2011 and 2012, CSU implemented lighting upgrades in over two million square feet of buildings. These upgrades resulted in approximately \$300,000 per year in energy savings

- A plate & frame heat exchanger was added at District Cooling Plant #2 in order to take advantage of “free cooling” when the weather conditions allow. This upgrade will reduce the energy required for cooling when loads are small.

Increasing energy efficiency in campus buildings saves both natural resources and money by decreasing electricity and natural gas use and thus reducing environmental impacts and utility costs. Colleges and universities control a large number of buildings including offices, housing, classrooms, labs, and athletic facilities and must pay for energy use in all of them. Straightforward retrofits to lighting, motors, heating & cooling systems, or building envelopes can yield large energy cost savings. Such retrofits not only save money and reduce greenhouse gas emissions; they also lead to increased comfort and productivity for students, faculty, and staff who use the buildings.

4.2 Biomass Boilers or Cogeneration

Term	Projected MTCO _{2e}	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(15,000)	-7%	\$200,000	\$103,000	\$105,000	1%

This strategy builds on a pilot project already implemented - the installation of a biomass boiler - by adding a second biomass cogeneration facility to provide energy for campus operations. When the original plant was designed and built, the fuel cost for biomass was approximately one-half the cost of natural gas; however, more recently lower natural gas prices have hurt the economics of this strategy. On the other hand, recent feasibility work has been centered on a larger plant that would be owned and operated by a third party. This would allow the university to avoid the significant upfront investment and reduce risk in addition to allowing the third party to utilize tax incentives not available to the university. The plant being considered would utilize cogeneration technology that could further reduce CSU’s greenhouse gas emissions by generating electricity as well as thermal energy. Cogeneration is the process of generating both electricity and thermal heat from the same energy source.

Biomass is effective in achieving lower greenhouse gas emissions because using energy from biomass displaces the need for fossil fuel-based energy sources and reduces the number of dead or dying trees from being burned during wildfires or prescribed burning. Thinning of forests to remove dead or dying wood generally yields about ten tons of wood per acre; as a result, the second boiler will support the additional thinning of several hundred more acres of forest per year. Wood chips will come from forest fire mitigation projects and potentially some urban tree pruning. The fuel is therefore considered renewable. Controlled burning in a biomass boiler produces 96 percent fewer overall emissions (CO, NO_x, SO₂, particulate matter, etc.) than natural forest fires and 97 percent fewer emissions than prescribed burning.¹ Burning biomass also recycles atmospheric carbon that was absorbed during its growth cycle and does not add significantly to greenhouse gas emissions.

¹ Washington State Department of Natural Resources, http://www.dnr.wa.gov/Publications/em_forest_biomass_and_air_emissions_factsheet_8.pdf

CSU Biomass Cogeneration Feasibility Study

In 2011, CSU partnered with a third party developer to study the feasibility of a much larger biomass facility for the Foothills Campus. As envisioned, the plant would utilize wood chips, horse manure & bedding and food pulper waste. These sources would provide a majority of the heating, cooling & electrical needs for the Foothills Campus. The low price of natural gas in 2012 put the project on hold, but the technical analysis looks quite promising.



Wood Chip Storage at CSU's Biomass Plant

4.3 Outreach, Advanced Metering, Behavioral Engagement, and Reduction of Full Load Operation of Equipment

Term	Projected MTCO2e	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Short	(1,000)	-0.5%	\$0	\$120,000	\$142,000	18%
Medium	(14,500)	-7%	\$2,980,000	\$480,000	\$917,000	30%

Colorado State University has involved and engaged students in sustainability efforts for many years with curriculum, various student organizations and Residence Life through Housing & Dining Services. Housing & Dining Services has formalized their efforts with the addition of a Sustainability Coordinator and more recently, the Associated Students of Colorado State University (the student government) appointed a student Director of Sustainability to increase outreach and involvement of the student community. Facilities Management has also hired a Campus Energy Coordinator, a position focused on developing energy and resource conservation engagement programs targeting faculty and staff. The Campus Energy Coordinator initiatives include:

- “Faces of Conservation” energy challenges in ten buildings
- outreach efforts to campus building proctors
- outreach to campus IT managers
- outreach and education for custodial staff

Smart Meters for a Smart Campus

In the fall of 2012 CSU issued bid documents for an Advanced Metering on campus. As this document is being prepared, those bids are being evaluated. It is anticipated that CSU will be able to convert all the electric meters to the Advanced Metering System. Additional funding in future years will allow the conversion of the remaining meters (water, steam, gas, and chilled water). These more advanced meters will allow staff to troubleshoot high energy use buildings and support behavioral engagement campaigns.

This strategy also involves utilizing and expanding the controls infrastructure on campus in order to fine tune operation of buildings. The goal is to improve scheduling and monitor and control individual loads and temperature setpoints. These adjustments can achieve energy and cost savings through demand control and by reducing loads during periods of low occupancy such as holidays & summer months.



Facilities – Faces of Conservation

Stacey Baumgarn

Utilities Services - Campus Energy Coordinator



I took the pledge 6/1/2012



“Faces of Conservation”

This project began by engaging Facilities Management staff members to take a pledge to be a “face of conservation.” Through the pledge, staff will commit to reducing energy and resource use. Opportunities for energy and resource conservation surround every employee of Facilities Management everyday (as well as faculty and staff members). Facilities staff are the eyes, ears and often hands of opportunities to reduce waste and improve efficiencies. Facilities staff serve as the ambassadors of sustainable behavior and initiatives at Colorado State University. Once a staff member takes the pledge – their pledge is posted in the building.

4.4 Re-Commissioning and Retro-Commissioning

Term	Projected MTCO _{2e}	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Short	(1,000)	-0.5%	\$130,000	\$50,000	\$89,000	30%
Medium	(8,000)	-4%	\$1,200,000	\$200,000	\$803,000	51%

In 2012, Facilities Management and the Mechanical Engineering Department entered into a partnership to help implement this strategy. Under the agreement, Facilities helps support a ME research associate who works with Facilities personnel to retro-commission buildings. In addition, Mechanical Engineering students are utilized to help complete the work which helps leverage the staffing required and helps provide valuable hands-on training. To date, the project has resulted in a detailed study of more than a dozen buildings. The success of the pilot year of the program has all the participants anxious to continue the project moving forward.

What are Commissioning, Re-commissioning & Retro-Commissioning?

Commissioning is a quality assurance process that takes place after construction of a new building is complete, while re-commissioning essentially consists of a “tune-up” of an existing building’s mechanical and control systems. Commissioning verifies that building systems are performing as intended. Retro-commissioning, or commissioning of existing buildings that were not commissioned when they came on line, optimizes building systems so that they operate efficiently and effectively, resulting in reduced energy use and increased occupant comfort.

Re- or retro-commissioning may include testing energy-efficiency and thermal/environmental performance of a building’s automatic control, heating, cooling, and refrigeration systems. It can also include lighting and daylighting controls (e.g., verify sensor calibrations) and building envelope systems. The commissioning process can be particularly valuable in laboratory space and/or where internal loads and space layouts have changed. The purpose of testing, adjusting, and rebalancing heating, ventilation, and air conditioning (HVAC) systems is to assure that a system is providing proper airflow with maximum occupant comfort at the lowest energy cost possible. Instrument calibration and reporting can also help to optimize operations that affect energy consumption that might go unnoticed for years.

4.5 Net Metered Solar Facilities

Term	Projected MTCO _{2e}	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Short On-buildings Completed	(230)	<-1%	\$0	\$0	\$17,000	-
Long On-buildings	(1,100)	-0.5%	\$0	\$81,000	\$102,000	-
Long Chrisman Field	(4,900)	-2%	\$2,650,000	\$40,000	\$171,000	5%

This strategy includes net metering of seven currently existing solar photovoltaic (PV) facilities on CSU’s Main Campus, Foothills Campus, and Chrisman Field and several additional installations being studied for installation in the next few years. Net metering is a policy that allows owners to take full credit for the cost of the electricity that their solar energy system produces and thereby reduces the amount of electricity that CSU has to purchase from the grid and the emissions associated with that electricity.

In 2013, CSU is investigating additional solar arrays on campus in response to recent incentives made available by the local municipal utility. It is anticipated that as much as 1,000 kW of additional solar arrays could be installed in response to this program. The installations will be owned and operated by a private entity and the city will purchase the rights to the environmental benefits for the first 20 years; however, the environmental benefits will revert to CSU within the timeframe of the Climate Action Plan. While the 5,300 kW Chrisman Field solar facility will be owned and operated by a private entity in the near term, CSU has the option to take ownership of this facility after 2030, creating an opportunity to utilize the environmental benefits of the facility.

Sunny Colorado

In addition to the large solar array at Chrisman Field, Colorado State is home to solar facilities on the Engineering Building, Lake Street Parking Garage, Academic Village, Behavioral Science Building, Research Innovation Center, and The Cube.



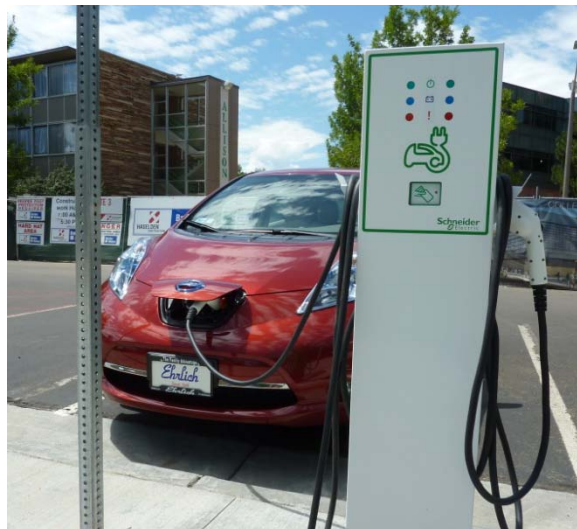
4.6 Reduce Fleet Fuel Consumption by Ten Percent

Term	Projected MTCO _{2e}	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(300)	<-1%	\$0	\$0	\$95,000	-

This strategy includes opportunities to reduce the CSU campus fleet’s conventional fossil fuel consumption by ten percent over FY10 values through a number of measures. This could include purchasing more efficient fleet vehicles when existing vehicles are due for replacement, optimizing fleet routes and combining trips to reduce vehicle miles traveled, more comprehensive maintenance practices, use of electric vehicles and use of alternative fuels.

Drive Electric Northern Colorado

In 2013, CSU was invited to participate in an initiative with the Drive Electric Northern Colorado (DENC). The project involved a partnership with the DENC, the local utility, private industry and other institutions in the Northern Colorado area to help accelerate the deployment of electric vehicles.



Electric Vehicle Recharging Station at CSU

4.7 Increase Waste Diversion to 75 Percent

Term	Projected MTCO2e	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(200)	<-1%	\$0	\$22,000	\$32,000	44%

Under this strategy, CSU would increase its solid waste diversion rate to 75 percent using a combination of reduction, recycling, and composting. In 2012, the University diverted 61% of the waste generated including bottles, cans, plastics, cardboard, and paper waste. Procedures are in place to increase the diversion of food waste from the landfill and the composting of pre-consumer food waste.

In addition, CSU maintains the ongoing practice of recycling construction and demolition waste. In 2011 Colorado State's Housing and Dining Services purchased an in-vessel composter. The composter takes 2,000 pounds/day of food waste and animal waste & bedding and produces compost used for landscaping projects on campus.

Students Come, Students Go

- ▶ Existing recycling and composting programs divert about 61% of CSU's waste from the landfill. The effectiveness of these programs has enabled CSU to finish in the top 5% of the RecycleMania Grand Champion category since 2006. RecycleMania is an annual 10-week friendly competition between hundreds of colleges and universities throughout the country to increase the diversion of solid waste from landfills.
- ▶ Each fall, new residents move into CSU's halls and empty many cardboard boxes in the process. Each year during residence hall move-in, "cardboard corrals" are set up throughout campus. In 2012, 19.5 tons of cardboard were recycled in 5 days.
- ▶ In an effort to divert solid waste from landfills, unwanted items are also collected by the Integrated Solid Waste and Surplus Property Departments during residence hall move-out in the Spring under the Leave It Behind program. Items collected include, clothing, shoes, towels, dishes, lamps, desks, couches, coffee pots, plants, and more. In spring 2012, 8.5 tons of materials were collected and resold in a "campus yard sale" that raised \$4,300 for the Housing & Dining Services Eco Leaders program.



In Vessel Composter processes up to 2,000 pounds per day of food waste & animal bedding

4.8 Strategy 4.8 was combined with Strategy 4.3

4.9 Computer Power Management and Server Virtualization

Term	Projected MTCO _{2e}	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(2,500)	-1%	\$751,000	\$0	\$134,000	18%

The objective of this activity is to explore options for improving efficiency by reducing redundant information technology (IT) functionality across campus, resulting in more streamlined and efficient IT services and more standardized power management practices.

CSU has nearly 26,000 hardwired devices and more than 30,000 wireless devices on its networks. These devices include switches, wireless access points, and printers, but many are computers. Computer power management is a great opportunity to reduce computer energy consumption by implementing lower power states. At CSU, the control of power management policies is currently decentralized and lies with each department that manages labs or faculty/staff desktop systems. As a result, the full potential effectiveness of power management is difficult to assess.

Furthermore, many IT services like email and file storage are provided at the departmental level; therefore, dozens of server rooms are distributed throughout campus. Server virtualization is an opportunity to reduce energy consumption of servers by combining the functions of multiple physical servers onto a single server and better utilizing that server's computational and memory resources. Some departments are beginning to virtualize their servers for any number of reasons, including flexibility, scalability, reliability, energy savings, and cost savings.

A new partnership is forming between the campus IT community and Facilities Management in order to meet mutual goals of having safe, secure, productive & energy efficient IT systems on campus.



4.10 Use Landfill Gas from Larimer County

Term	Projected MTCO ₂ e	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Long	(28,500)	-13%	\$200,000	\$300,000	\$312,000	6%

This strategy involves using gas collected from the Larimer County landfill in boilers at CSU’s Foothills Campus. In addition to offsetting CSU’s natural gas consumption, the University could also purchase carbon offsets for methane captured by this project. The benefits included in this strategy represent both avoided natural gas use as well as the purchase of associated offsets.

Presently, this strategy is considered mutually exclusive of Strategy 4.2 (Biomass Boilers) as current heating loads do not support using both methods for heating. Anticipated future buildings at the Foothills Campus or additional centralization of Foothills Campus loads, however, would add additional heating load and may support both projects.



Boiler at CSU’s District Energy plant

4.11 Reduce Single-Occupancy Vehicle Commuting by Five Percent

Term	Projected MTCO _{2e}	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(1,000)	-0.5%	\$0	\$20,000	\$0	-

This strategy is focused on reducing single-occupancy vehicle commuting by the CSU community by five percent. Alternatives to single-occupancy vehicle commuting can reduce greenhouse gas emissions, contribute to good air quality, and encourage healthy walking and cycling habits.

Enabling this strategy is the development of the Mason Street Corridor, a transit corridor for Fort Collins that will serve the CSU campuses. The corridor will include bus rapid transit, dedicated pedestrian paths and bikeways. Construction on this project began in 2012.

The university will also benefit from the improvements in federal standards for vehicle fuel economies as older vehicles are replaced with newer models. In addition, increased adoption of telecommuting options may produce even more significant reductions in the future. CSU also maintains a partnership with Zip Car, provides free student bus passes (paid through student fees), and provides discounted bus passes to faculty and staff.



All students can use their student ID card to gain access to the bus system in Fort Collins

4.12 Statewide Renewable Energy Standard

Term	Projected MTCO _{2e}	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(8,300)	-4%	-	-	-	-

This strategy incorporates Colorado’s Renewable Energy Standard (RES) into the plan. The University receives electric power from multiple utilities – Fort Collins Utilities (a municipal utility), Xcel Energy, and several rural electric associations served by Tri-State Generation and Transmission – all of which are required to comply with the latest standard. The RES will significantly increase the percentage of renewable energy required in each provider’s portfolio of energy sources and will thereby reduce the emissions associated with the electricity CSU purchases without any additional action on the part of CSU.

Colorado became the first state to create an RES by ballot initiative when voters approved Amendment 37 in November 2004. The original version of Colorado's RES required utilities serving 40,000 or more customers to generate or purchase enough renewable energy to supply 10 percent of their retail electric sales by 2015. Eligible renewable energy resources include solar electricity, wind, geothermal electrical energy, biomass, landfill gas, animal waste, hydropower, recycled energy, and fuel cells using hydrogen derived from eligible renewables.

Subsequent state legislation signed in 2007 and 2010 further increased the RES and made additional changes. Colorado’s RES now requires investor-owned utilities to increase their renewable energy portfolios to 30 percent, with cooperative and municipal utilities required to increase their renewable energy portfolios to 10 percent by 2020. These policies have already reduced electric emissions factors by 8% between 2010 and 2012 thereby helping to lessen the impact of campus electricity use.



Solar Panels on the Behavioral Sciences building

4.13 Carbon Sequestration in Forests or Grasslands

Term	Projected MTCO ₂ e	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(10,100)	-5%	\$12,500,000	\$0	\$0	0%

This strategy entails implementing projects to sequester carbon on university owned lands. This could include either forests or grasslands. Research ongoing at CSU show that grasslands may actually be more effective at sequestering carbon than forests.

As a land grant university, CSU could collaborate with the Colorado State Forest Service (CSFS) to plant trees under conditions where biomass sequestration can be increased. Scenarios might include planting in mountain areas of Colorado impacted by fire damage or pine bark beetles (an insect pest that has killed many trees in Colorado during a recent outbreak), and/or in lower-altitude areas as windbreaks and living snow fences for agricultural operations, highways, and other areas needing protection.

Terrestrial carbon sequestration is the process through which CO₂ from the atmosphere is absorbed by trees, plants, and crops through photosynthesis and stored as carbon in biomass (tree trunks, branches, foliage, and roots) and soils. The term “sinks” is also used to refer to forests, croplands, and grazing lands and their ability to sequester carbon. Agriculture and forestry activities can also release CO₂ to the atmosphere. Therefore, a carbon sink occurs when carbon sequestration is greater than carbon releases over some time period. Carbon sequestration rates vary by plant species, soil type, regional climate, topography, and management practice. In the U.S., fairly well-established values for carbon sequestration rates are available for most tree species.



CSFS Tree Nursery on the CSU Foothills Campus

4.14 Develop Wind Power on CSU Lands

Term	Projected MTCO2e	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(46,100)	-21%	\$0	\$2,300,000	\$4,200,000	-
Long	(64,600)	-29%	\$0	\$3,200,000	\$5,900,000	-

For this strategy, CSU would acquire significant wind power assets and take advantage of the favorable wind power generation conditions on CSU lands. Projects may involve partnering with third-parties, or may involve collaborating with other institutions. Such projects would reduce CSU’s carbon footprint and create opportunity for University research.

Wind energy is a clean energy source that results in no CO₂, nitrogen oxide (NO_x), or sulfur dioxide (SO₂) emissions. Wind facilities would be an educational laboratory to provide students a hands-on learning experience in renewable energy development. Furthermore, the strategy would create a sustainable energy source to meet the electric needs of CSU and would provide clean, efficient, renewable energy to assist in meeting Colorado’s RES requirements, CSU and the State of Colorado Climate Action Plans.

Colorado has wind resources consistent with utility-scale production. According to the National Renewable Energy Laboratory (NREL) in Golden, the state of Colorado alone has enough wind energy to supply 9 percent of the electricity consumption for the lower 48 states. That translates into 481 billion kWh per year of electricity.

Eastern Colorado Research Center (ECRC)

In 2012, CSU began investigating the potential for wind development on the ECRC, near Akron, CO. The university issued an RFI in order to select a private partner to help study the feasibility of this site and other CSU sites. While there are many hurdles (availability of the Production Tax Credit, transmission access, etc.), there is good wind potential at the site and the researcher working with cattle at the site are anxious to study the impact (if any) on their operation from the development of wind turbines at the site.

If a project is found to be feasible, the third party developer would own and operate the site and CSU would commit to a long term power purchase agreement. Thus the university could get access to clean power without the large capital investment (and subsequent risks) of owning and operating the site.

4.15 Improvements in New Construction

Term	Projected MTCO _{2e}	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
On-going	(300)	<1%	-	-	-	-

Buildings are the major users of energy on the CSU campus and nationwide. According to the U.S. Green Building Council, in the U.S. today buildings consume approximately 70 percent of electricity and account for nearly 40 percent of CO₂ emissions². As a result, in addition to exploring energy efficiency in existing buildings (see Strategy 4.1), this plan also includes a focus on high-performance building in new construction.

Energy efficiency, water conservation, and other elements of green design can be promoted and encouraged in new buildings and renovations. New development can be energy and resource efficient, use renewable and recycled building materials, provide for healthy working and living environments, reduce building operating costs, and help reduce greenhouse gas emissions. Almost all new major construction on CSU's campus is being designed and built to a standard of LEED Gold or higher, resulting in higher performing, more energy-efficient buildings.

Building to a Higher Standard

- ▶ CSU was the first university to obtain a LEED-CI (Leadership in Energy and Environmental Design - Commercial Interior) Certification, thanks to the efforts of students, faculty, and staff from the Institute for the Built Environment, Construction Management, Interior Design, and Facilities Management. Guggenheim's second-floor classrooms obtained the U.S. Green Building Council's LEED Silver Certification in 2006.
- ▶ CSU is now home to eleven LEED Gold Buildings,
- ▶ The new Recreation Center includes a remodel of existing space (100,000 square feet) and a significant addition (75,000 square feet). The resulting building, though nearly twice as large as the original, will spend no more for energy than the original building.

² U.S. Green Building Council. (2009) Green Buildings for Cool Cities: A Guide for Advancing Local Green Building Policies. <http://www.usgbc.org/ShowFile.aspx?DocumentID=6445>

4.16 Emerging Technologies

Term	Projected MTCO ₂ e	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Long	TBD	TBD	TBD	TBD	TBD	TBD

As a living document, this plan will undergo regular reviews, and the opportunities to include new technologies will be many. A myriad of technologies on the horizon may become viable within the timeframe of this plan and alter the course of CSU’s path to climate neutrality. Some of these technologies will come from the broader clean energy economy while others might emerge from research done at CSU. Some technologies that were considered for this plan but were not found to be viable at this time (either technically or economically) include synfuels, solar thermal, micro hydroelectric, anaerobic digestion for food and animal waste, additional cogeneration, plasma waste-to-energy, algae biofuels, and other sequestration options such as capturing carbon for use in building materials.



Thermal Storage Tanks & Solar Electric at the Academic Village Residence Hall

4.17 Offset Airline Travel

Term	Projected MTCO _{2e}	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(3,900)	-2%	\$0	\$71,000	\$0	-

When the CAP was reviewed by the Task Force in 2012, the team noted that airline travel was a significant portion of the university’s greenhouse gas footprint. While specific strategies have not yet been developed, there is a multitude of ways to either reduce trips or offset necessary travel. There are many commercial entities that can provide this service; however, the Task Force noted that many universities use local projects to achieve some of these offsets. Exploration of these projects will lead to ideas for innovative implementation of this strategy at CSU.



5.0 Financing

The costs and savings projected in the previous strategies are based on conservative assumptions such as no escalation in current utility rates. Financing mechanisms, such as bonding and third-party financing, can be used to reduce the capital requirements associated with climate neutrality and to level out the cost of this plan. Furthermore, many of the strategies proposed in this plan result in positive net cash flows and can be largely self-funding. This projection is based on today's utility rates, and the positive cash flow associated with utility savings will increase with increasing utility rates.

Due to current and anticipated future budget limitations, priorities for funding this plan may focus on low and no-cost strategies such as education programs, and those with very favorable paybacks that can help to finance the cost of later measures through their savings.

The University can explore several opportunities to help fund implementation of the plan's measures including:

- Utility rebates
- Third party ownership with Power Purchase Agreement
- Federal incentives
- Grants
- Lease-purchases or other financing mechanisms
- Performance contracting
- Capital campaigns
- Revolving loan funds

The University will stay apprised of the latest funding opportunities. This is a fast-changing landscape where legislation, incentives and rebates, and maturing technologies can rapidly improve the financial options of plan strategies.

6.0 Uncertainty

This Climate Action Plan update is the second version of a living document subject to further review and revision on a two-year cycle as strategies are implemented, new technologies and strategies develop and mature, progress is monitored, and intermediate goals are revisited.

The ACUPCC requires biennial updates of the greenhouse gas inventory and the Climate Action Plan in alternating years (e.g., inventory in 2011 and action plan in 2012). CSU has committed to update the greenhouse gas inventory annually to improve, and ensure continuity in, organizational practices around gathering information for the inventory. Updating the inventory annually also ensures more accurate tracking of progress toward emissions reduction goals.

Considering the many uncertainties in forecasting growth, greenhouse gas emissions, and the realities of implementing the strategies in this plan, it is apparent that the biennial updates to this living document will be pivotal to maintaining its relevancy and ensuring that CSU is establishing a trajectory toward climate neutrality. Rather than attempting an exhaustive forecast of potential scenarios, this plan recognizes some key uncertainties that could significantly alter the trajectory of CSU's greenhouse gas emissions or the financials associated with this plan:

- **Growth rates for CSU's emissions** – Much of the growth in CSU's emissions will be driven by new construction, enrollment, and research growth, which are difficult to forecast in a continually fluctuating budgetary environment. While improving construction practices, efficiency and conservation in existing buildings can minimize the impact of this growth, the plan is still very sensitive to these trends.
- **Utility rates** – The potential cost savings associated with most of the strategies in this plan are sensitive to utility rates. Accurately projecting utility rates through 2050 is an impossible task and subsequently dependent on the cost of fuels (e.g., coal, natural gas, and renewables) and the cost of carbon in a potentially monetized carbon future. Under these scenarios, it is generally safe to assume that the cost of utilities will increase and the savings associated with these strategies will improve from this conservative analysis using today's rates.
- **Legislation** – In addition to federal legislation that may affect the price of carbon, there is the potential of increased stringency in the state's RES. The majority of CSU's electricity purchases are from utilities that are currently required to supply 10 percent renewable energy by 2020. It is conceivable that this requirement will be elevated within the timeframe of this plan.
- **Financing mechanisms** – Legislation, tax credits, renewable energy standards, and community goals can drive the introduction of new financing mechanisms that could enable CSU to achieve some of these strategies with a minimum of up-front capital. For example, a third-party financing mechanism made the Chrisman Field Solar Plant financially feasible for

CSU and still allows CSU to recognize the environmental benefits of the project within this plan's timeframe.

- **Changing technologies and associated costs** – the technological picture with respect to the built environment, renewable energy generation, and transportation is changing rapidly, particularly with the current focus on development in these areas. There are likely to be existing technologies that become increasingly viable and new technologies that will be introduced into future iterations of this plan.



Aspen Hall is a LEED Gold building

7.0 Implementation and Measuring Success

The development of this Climate Action Plan and ongoing updates is a major step toward reducing the University's greenhouse gas emissions, pursuing climate neutrality, and furthering campus sustainability.

Collaboration among the members of the campus community, faculty, researchers, and community partners will benefit the implementation of the plan. A next step in implementing the strategies in this plan is to identify who will be responsible for implementing them and who can play a supporting role. The diverse nature of the strategies in this plan provides an opportunity for broad collaboration across the University. Within the SEEAC framework, working groups are being established around each of the plan's broad categories so that each can proceed independently and in parallel while still reporting results.

Partnerships are a particularly important component of implementation. CSU is fortunate to have many partners with an interest in sustainability in general as well as specific greenhouse gas reduction strategies in the Climate Action Plan. The CSU CAP aligns well with the plans put forth by both the City of Fort Collins & the State of Colorado. Such partnerships can be leveraged to share resources and expertise and can ensure that sustainability becomes part of the fabric of the campus and the community.

While this plan sets a long-term goal of climate neutrality, achieving interim milestones will help demonstrate tangible progress toward this goal over time. As discussed earlier in this plan, an interim goal has already been established to track progress.

Certain strategies contained in the plan can be implemented in a fairly short period of time while others will need to be phased over time. Establishing specific timelines for implementing various strategies will ensure that there is enough time to complete them before the target goal year is reached.

CSU has a strong foundation of existing research and operational activities on which to begin the journey to climate neutrality. This plan establishes an initial path to climate neutrality that recognizes CSU's unique opportunities to reach this goal as a land-grant research University. The plan also recognizes the many uncertainties associated with a long-term planning effort and the need to revisit this plan and refocus efforts on a regular basis.

With the strong commitment of students, faculty, staff, and the broader Fort Collins community, CSU is proud of the preliminary progress made and is eager to continue implementing this plan and begin to realize the local and global benefits of setting a trajectory for climate neutrality.

Appendix A: SEEAC and Climate Action Plan Task Force Members

Sustainable Energy and Environment Advisory Committee

Affiliation	Member
International Programs	Scot Allen
Classified Personnel Council	Sheela Backen
Facilities	Stacey Baumgarn
Associated Students of CSU (ASCSU)	Ryan Brenner
Procurement	Farrah Bustamante
College of Liberal Arts	Michael Carolan
School of Global Environmental Sustainability	Rich Conant
Graduate Student Representative	Jeff Cook
Faculty Council	Norm Dalsted
Facilities	Carol Dollard
College of Applied Human Sciences	Brian Dunbar
Vice President of Research	Bill Farland
University Libraries	Jim Farmer
Office of Energy & Environment	Tara Hancock
CSU Research Foundation	Kathleen Henry
Athletics	Doug Max
Housing and Dining Services	Tonie Miyamoto
Associated Students of CSU (ASCSU)	Andrew Oringer
Graduate Student Council	Douglas Ortega
Athletics	Mark Paquette
Cenergy & College of Natural Sciences	Tony Rappe
Vice President of Energy & Environment	Ron Segal (Chair)
College of Business	C.A.P. Smith
Vice Provost Outreach & Strategic Partnerships	Lou Swanson
Administrative Professional Council	Andrew Warnock
Clean Energy Supercluster	Bryan Willson
Vice President for External Relations	Emily Wilmsen
Graduate Student Representative	Katherine Zaunbrecher

Climate Action Plan Task Force

Affiliation	Member
Facilities Management	Elizabeth Atwater
Facilities Management	Stacey Baumgarn
Housing & Dining Services	Tim Broderick
School of Global Environmental Sustainability	Rich Conant
Student	Seth Danner
Facilities Management	Carol Dollard (Chair)
CSU Foundation	Karen Dunbar
Student	Olga Gladkova
Real Estate Office	Nancy Hurt
Athletics	Doug Max
Student	Lupe Mendoza
Student	Andrew Oringer
Cenergy & College of Natural Sciences	Tony Rappe
Student	Blaise Rosenberg
Institute for the Built Environment	April Wackerman
Institute for the Built Environment	Aaron Wagner
Vice President for External Relations	Emily Wilmsen
Facilities Management	Becca Wren
Brendle Group – outside reviewer	Seth Jansen