Colorado State University

Climate Action Plan

Update July 2015

Colorado State University

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July 22, 2015

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 update to our Climate Action Plan (originally submitted September 2010 and updated most recently in 2013). The original plan, the 2013 update, and this latest update all 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. This spring, Colorado State University received the significant recognition of the highest STARS rating ever achieved by a university, earning the first "platinum" rating in STARS history. This represented of a true campus-wide effort to expand sustainability into all aspects of the University's operations. Additionally, the US Department of Education named CSU a Green Ribbon School in April 2015 – one of only nine higher education institutions to be recognized nationally.

Colorado State University became a signatory to the ACUPCC in 2008 and submitted its first Climate Action Plan in 2010 – a 40-year plan targeting a net-zero campus by 2050. 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. As noted in this report, this 2015 update provides an opportunity to demonstrate progress made toward the original goals and explain updates to the original plan.

This plan update was completed by a group representing a broad cross section of expertise within the campus community and involving students, faculty, and staff. In particular, I want to thank Ms. Carol Dollard, chair of the Climate Action Plan Task Force.

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,

Dr. Tony Frank
President

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Colorado State University is designated as an official Tree Campus USA

1.0 Introduction

On March 20, 2008, Colorado State University (CSU) 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 (CAP) began the process of defining a path for CSU to achieve climate neutrality. This 2015 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 restabilize 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 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 has developed sustainability efforts that can be seen throughout campus and are being acknowledged across the nation. Recent recognition of sustainability accomplishments include:

- Association for the Advancement of Sustainability in Higher Education (AASHE) awarded CSU the first ever Platinum rating in the Sustainability Tracking, Assessment and Rating System (STARS) in March 2015.
- U.S. Department of Education named CSU a 2015 Postsecondary Sustainability Awardee – one of only nine higher education institutions to be recognized nationally.
- Princeton Review ranked CSU #12 in their "Top 50 Green Colleges for 2015".
- BestColleges.com recognized CSU as "America's Greenest University" in July 2015.
- Sierra Club Cool Schools 2014 ranked CSU #11.
- The Smithsonian National Museum of American History recognized Fort Collins in the "Places of Invention" exhibit that opened in July 2015. The exhibit shows how CSU, the City and local businesses actively pursue collaboration that result in local innovations with global impact.

We continue to build on this strong reputation around sustainability and clean energy through many programs on campus including the School of Global Environmental Sustainability (SoGES) and the Powerhouse Energy Institute. These are just some of the assets that 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.

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 and provide leadership to reverse climate change and help create a thriving, sustainable society.

By signing the ACUPCC, Colorado State University agreed to:

- Develop a greenhouse gas (GHG) emissions inventory. *Inventories have been submitted to the ACUPCC for fiscal years FY06-FY14.*
- Within two years, set a target date and interim milestones for becoming climate neutral. *The CAP sets a carbon neutral target date of FY50 and a goal of 75% reduction by FY30 over FY10 emissions.*
- 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.*
- 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 and staff can ride Transfort (the community bus system) free (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 tier (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 CSU 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. 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 guidelines established by the ACUPCC as well as the ACUPUU *Implementation Guide*. This document 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, if needed.

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

> *To achieve climate neutrality under the terms of the Commitment, all Scope 1 and 2 emissions, as well as those Scope 3 emissions from air travel paid for by or through your institution and regular commuting to and from campus, must be eliminated and/or neutralized.*

The original CAP was developed through a collaborative process involving input from a campus task force, the campus community at large, and a consultant team. This 2015 update was prepared utilizing a subcommittee of the CSU President's Sustainability Committee representing Facilities Management, Housing & Dining Services, and Parking and Transportation Services.

The President's Sustainability Committee (PSC) consists of representatives from a broad cross-section of campus units identified in the Appendix of this report. The mission of the PSC is to "promote and facilitate the effective integration of sustainability across all aspects of the University".

The goals of the President's Sustainability Committee include:

- Advocate for sustainability efforts on campus
- Advise on campus-wide sustainability initiatives including but not limited to STARS**, planning, budgets, community & public partnerships, and new buildings
- Help connect sustainability efforts across the university (including academics, research, operations, student engagement, administration & public outreach)
- Utilize STARS** as a framework to help set goals and assess progress

** STARS – Sustainability Tracking, Assessment, & Rating System administered by Association for the Advancement of Sustainability in Higher Education (AASHE)

545 kW solar array located on the Student Recreation Center at CSU

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. Note that a new commuting survey was just completed, those results will be incorporated into the FY15 GHG inventory. The units of metric tons of carbon dioxide equivalent ($MTCO_2e$) 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 (CO_2), methane (CH_4), nitrous oxide (N_2O), and various refrigerants. The University has completed inventories for fiscal years FY06 through FY14 as shown in Figure 1 below.

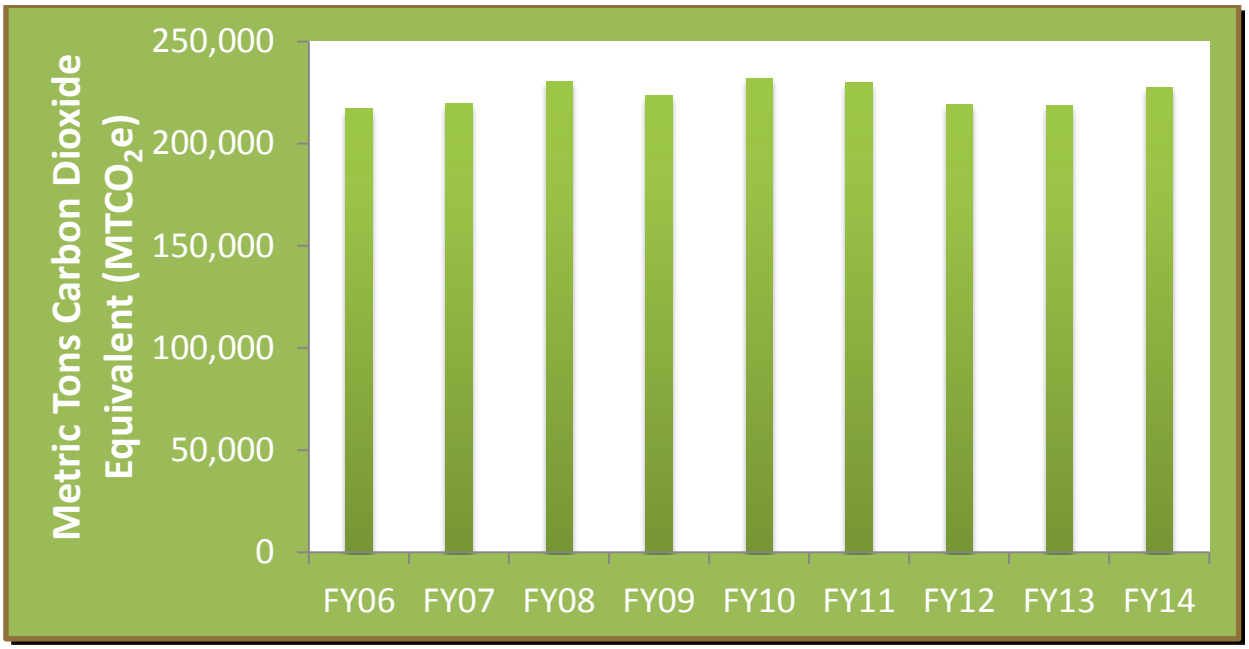


Figure 1 – CSU Annual Greenhouse Gas Emissions

Following ACUPCC guidance, CSU's inventory includes all direct emissions, or "Scope 1" emissions such as those from on-campus stationary fuel combustion, fleet vehicles, 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.

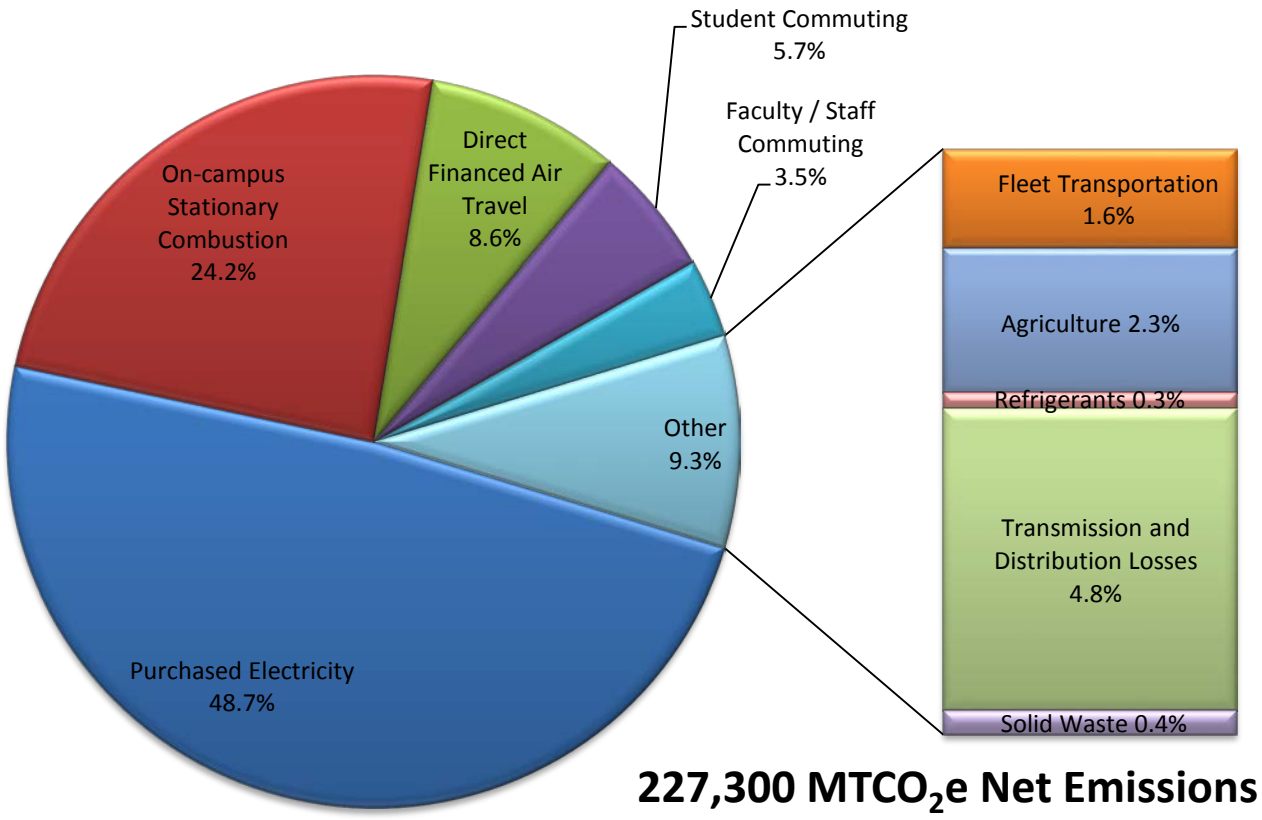


Figure 2. FY14 Greenhouse Gas Emissions Sources

This 2015 Climate Action Plan update considers CSU's projected emissions and identifies potential reduction and mitigation strategies between fiscal years FY10 and FY50. 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 100,000 square feet annually through FY19 and then 50,000 square feet annually after that).

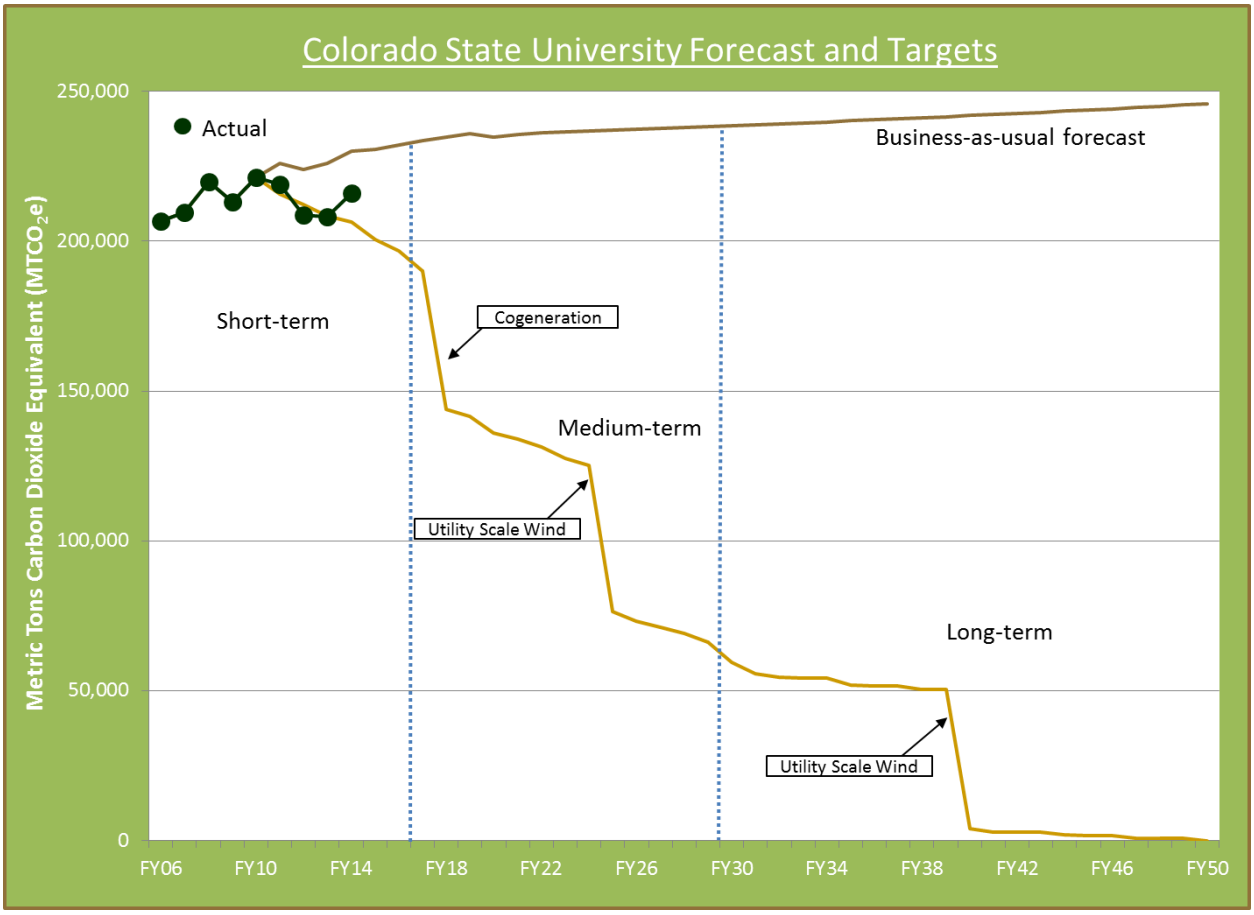


Figure 3. Business-as-usual Emissions Trajectory and Climate Action Plan

The CSU Climate Action Plan establishes a set of reduction and mitigation strategies that are divided between short-term (0-7 years), medium-term (7-20 years), and long-term (>20 years). Note that these timeframes were modified in this version of the CAP in order to align more closely with a CAP recently adopted by the City of Fort Collins. As depicted in Figure 3, these strategies are projected to reduce CSU's net emissions to climate neutrality by FY50. As an intermediate goal along this trajectory, CSU aims to achieve emissions reductions of 75 percent below FY10 emissions by FY30.

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 the first university to achieve Platinum in the Sustainability Tracking, Assessment & Rating System (STARS), the University has been nationally recognized for its curriculum and research programs related to sustainability; a few of these primary programs and initiatives are discussed below. In addition, CSU was one of just nine institutions recognized with a 2015 U.S. Department of Education Postsecondary Sustainability Award.

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)

The School of Global Environmental Sustainability (SoGES) connects all eight colleges at CSU to foster innovation in interdisciplinary sustainability research and education. A Special Academic Unit located under the Office of the Provost, the School builds on the University's legacy of leadership in environmental science by integrating sustainability studies with the other natural and social sciences, humanities, arts, and business. To strategically address CSU's strengths, the School's research and engagement is organized into six subject areas: climate change and energy; food security; environmental institutions and governance; sustainable communities; land and water resources; and biodiversity, conservation, and management.

The School encourages creative, interdisciplinary approaches to the grand challenges of sustainability through broad-based research, curriculum, and engagement initiatives. SoGES invests in research that crosses traditional disciplinary boundaries and addresses the inherent complexity of global sustainability science. It offers sustainability curricula and official recognition for courses campus-wide that incorporate sustainability education. And the School is a conduit for information and engagement, working to communicate and make sustainability science available to diverse audiences at the University, locally, and globally.

3.2 Energy Institute

The Energy Institute serves as a nucleus of research, education, and outreach for the faculty, staff, and students of CSU.

At CSU there are over 130 faculty members spanning all eight colleges who work each day to reinvent energy. There are labs, policy centers, Superclusters, and start-ups. What if that energy was all under one roof, bringing together world class people in a world class place? Then there would be something special – a powerhouse.

Continued access to clean, reliable and abundant energy is central to almost every major challenge the world faces today. CSU has long recognized the crucial role energy plays around the globe and pioneered research in this area – from developing better combustion engines that emit fewer pollutants to testing new smart grid technologies. Today, faculty members across CSU are developing new technologies, exploring the economics, environmental, and sociological impacts of energy use, and proposing energy policy solutions.

CSU created the Energy Institute in 2013 to consolidate its vast energy research under one organization. Through its affiliated centers, the Institute aims to increase collaboration with industry and governmental partners to solve real-world energy problems and create new research and educational opportunities for CSU faculty and students. The Energy Institute is headquartered at CSU's new Powerhouse Energy Campus on North College Avenue in Fort Collins.

ENERGY INSTITUTE

Member Organizations of the Powerhouse Energy Institute

3.3 Colorado State University Extension

As a land grant university, CSU 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 important sustainability programs including:

- Center for Agricultural Energy
- Colorado Energy Master Program
- Consumer Education on Energy Topics
- 4-H Youth Development
- Water Quality and Water Saving Education
- Native Plant Masters
- Nutrition Education
- Clean and Renewable Energy

Ammons Hall

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 work by the PSC and the CAP subcommittee to review priorities and strategies that can provide climate benefits while also providing the most significant economic, social, and environmental benefits to the University. Note that in this 2015 update, one strategy has been removed (Landfill Gas) and another strategy has been added (Ground Source Heat Pump). Mitigation strategies roughly fall into three categories:

Energy Use in Buildings

- Building Energy Efficiency (4.1)
- Outreach, Advanced Metering, and Behavioral Engagement (4.3)
- Recommissioning and Retrocommissioning (4.4)
- Computer Power Management, Server Consolidation and Server Virtualization (4.8)
- High-Performance New Construction (4.14)

Renewable Energy

- Cogeneration / CCHP (4.2)
- Ground Source Heat Pump (GSHP) (4.9)
- Solar Electricity (4.5)
- Utility & State Policies (4.11)
- Wind Power (4.13)

Other

- Fleet Fuel Consumption (4.6)
- Waste Diversion (4.7)
- Commuting (4.10)
- Carbon Sequestration in Forests & Grasslands (4.12)
- Offset Airline Travel (4.15)

Each of these strategies identified as short term (0-7 years), medium term (7-20 years), and/or long term (> 20 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 is a wedge diagram illustrating the relative contributions of each strategy over time.

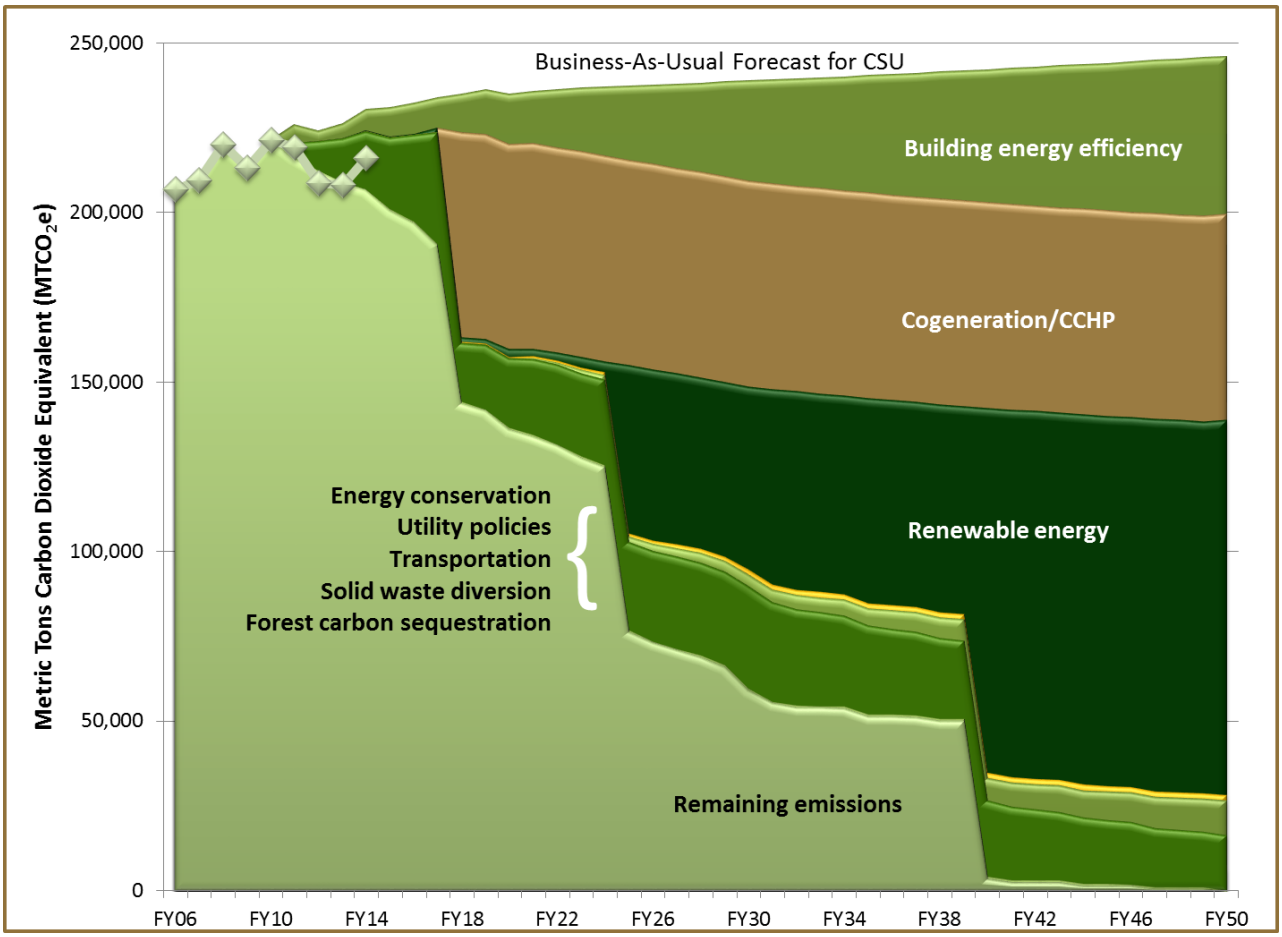


Figure 4. Greenhouse Gas Reduction Contributions by Strategy Type

4.1 Building Energy Efficiency

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY09 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Short Phase 1- Completed	(1,300)	1%	$500,000	$0	$124,000	25%
Short Phase 2 – Completed	(4,600)	2%	$1,639,000	$0	$435,000	27%
Medium Phase 3	(6,500)	3%	$2,500,000	$0	$700,000	28%
Medium Phase 4	(8,700)	4%	$6,600,000	$0	$1,200,000	18%
Long Phase 5	(12,700)	6%	$8,700,000	$0	$1,300,000	15%
Long Phase 6	(20,900)	9%	$32,300,000	$0	$3,500,000	11%

The University has made significant strides in increasing building energy efficiency in a number of its facilities. This strategy focuses on a portfolio 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, and more than 100 additional projects have been identified, including:

- Lighting upgrades
- Heat recovery
- Demand control ventilation
- Controls upgrades
- Variable-air-volume terminals
- Free cooling
- Fume hood upgrades
- Coil replacement

Energy Reserve Fund

In FY12, the Vice President of University Operations developed the Energy Reserve Fund (ERF). The fund was "seeded" with one-time money of $500,000/year for the first 5 years. In addition, savings from projects implemented with these funds return to the ERF in subsequent years. As a result, once the seed money runs out at the end of FY16, the fund will be self-sustaining with annual allocations of savings from previous projects. The project list for the ERF is developed each year by the Energy Team in Facilities Management. A subcommittee of the Presidents Sustainability Committee also reviews the list of projects each year.

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, and other equipment can yield large energy cost savings. Such retrofits not only save money and reduce greenhouse gas emissions; generally they lead to increased comfort and productivity for students, faculty, and staff who utilize the buildings.

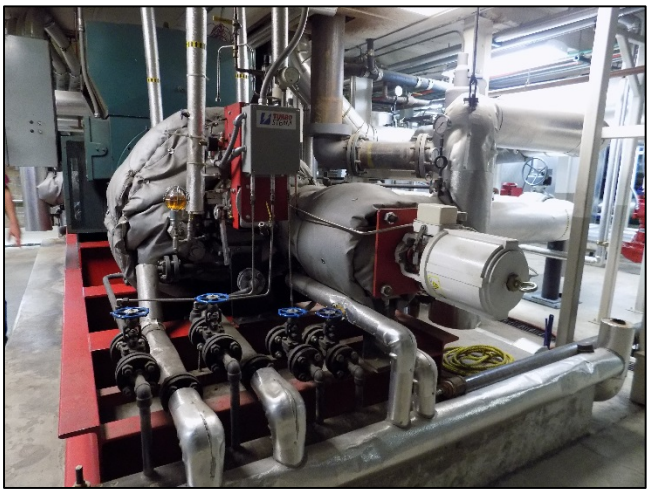
The revitalized Lory Student Center features numerous energy efficiency upgrades, including: smart glass, energy-efficient lighting and lighting control packages, low-emissive glass, overhauled mechanical heating and cooling systems, low-flow fixtures and water-efficient appliances, and high-performance insulation on all perimeter walls.

4.2 Cogeneration or Combined Cooling, Heating and Power (CCHP)

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(60,600)	27%	$0	$0	$0	-

In the previous version of the CSU CAP this strategy was focused on biomass cogeneration. Since that time natural gas prices have come down to historic lows. As a result, the current effort is focused on natural gas. While biomass is a renewable option, the use of Combined Cooling, Heat & Power (CCHP) with natural gas still significantly reduces GHG emissions due to (1) the increased efficiency of producing both electricity and steam and (2) displacing coal fired electricity generation with natural gas fired electricity generation.

CCHP is the generation of electrical power using a fuel source and recovering the waste heat for beneficial purposes such as the production of steam to be used for heating. The process of generating power with a turbine produces high temperature flue gases, which can be routed through a waste heat boiler to generate high-pressure steam. The turbine uses natural gas that when ignited expands air to rotate turbine blades similar to a jet engine. Rotation of the turbine creates power through an electrical generator. The exhaust gases can produce steam without additional heating which is defined as the unfired state. A typical system would add a duct burner, which elevates the turbine exhaust gases to a higher temperature before they enter the waste heat boiler thereby increasing steam output. This is called duct firing. The most efficient CCHP plant utilizes all the waste heat from the turbine to some beneficial use. For the CSU campus, production of campus steam would be the major benefactor of this waste heat. In addition, steam powered chillers would likely be incorporated as well in order to take advantage of the thermal energy year-round.



800 kW Steam Turbine Generator at the Main Campus Central Heating Plant recovers enough waste heat energy to meet 5% of the campus peak electrical load

4.3 Outreach, Advanced Metering, and Behavioral Engagement

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Short - Completed	(300)	0.1%	$0	$20,000	$37,000	--
Medium	(1,300)	1%	$0	$80,000	$149,000	--

CSU has involved and engaged students in sustainability efforts for many years through curriculum, dozens of student organizations, and Residence Life. In addition, the Associated Students of Colorado State University (student government) has appointed a student Director of Environmental Affairs to increase outreach and involvement of the student community.

Housing & Dining Services has a Senior Sustainability Coordinator who administers the Eco Leaders program. There is one Eco Leader per residence hall who helps educate students about sustainability issues such as waste reduction and energy conservation, and helps plan activities and campaigns. The Eco Leaders program started in 2011 and has grown each year since.

The Campus Energy Coordinator, a position in Facilities Management, is responsible for developing energy, water, and resource conservation engagement programs targeting faculty, staff, and students. The Campus Energy Coordinator initiatives include:

Smart Meters for a Smart Campus

In FY15, CSU began the installation of an Advanced Metering Infrastructure (AMI) system. All of the electric meters have been upgraded to the AMI system along with some of the water and natural gas meters. Additional future funding will allow the conversion of the remaining meters (water, steam, gas, and chilled water). Real time utility data allows staff to troubleshoot high energy use buildings and support behavioral engagement campaigns.

- "Faces of Conservation" – energy reduction challenges in campus buildings
- Outreach and education specific to: campus Building Proctors, IT managers, Facilities Management staff, and various student organizations
- Development of a "Sustainable Labs" (Green Labs) program

This strategy also includes improved utilization and expansion of the building automation controls infrastructure on campus. Improved scheduling, monitoring and control of individual loads and temperature setpoints can achieve energy and cost savings through demand control and reduces loads during periods of low occupancy.

Faces of Conservation

A commitment to energy and resource conservation

Morgan Library – electricity usage:

Morgan Library - electricity usage - month-by-month							
	FY12	FY13	FY14	3-year monthly average	FY15	Are we saving?	% change
July	274,680	325,477	276,569	292,242	266,978	YES!	9%↓
August	286,847	325,282	283,889	298,673	283,338	YES!	5%↓
September	290,825	326,067	292,521	303,138	288,475	YES!	5%↓
October	335,192	319,944	301,291	318,809	296,357	YES!	7%↓
November	310,076	292,471	312,188	304,912	290,022	YES!	5%↓
December	281,320	271,023	296,437	282,927	283,552	Not yet	0%↑
January	284,005	290,282	311,305	295,197	284,290	YES!	4%↓
February	304,754	305,383	322,207	310,781	302,604	YES!	3%↓
March	275,940	313,526	315,072	301,512	301,165	YES!	0%↓
April	346,789	290,192	319,253	318,745	309,633	YES!	3%↓
May	317,340	295,476	315,327	309,381			
June	334,290	277,400	306,843	306,178			
FY total kWh used	3,642,059	3,632,523	3,652,901	Over 3 years, use is ↓ & ↑	120,521 kWh saved!	YES!	Ave. ↓ = 4%/mo
FY total cost	$210,112.14	$212,796.36	$226,197.00	Total costs are trending up	Conservation can make a difference		

Just the facts:

- The Morgan Library consumes an average of 3,640,000 kWh/year of electricity
  - That is equivalent to the use of 434 average homes in Fort Collins
  - That means we burn ~2,774,000 pounds of coal/year

Why we care:

- Over the past 3 years, our annual use is both ↓ & ↑
- And, the cost of electricity has increased
  - this is NOT so great
- To reduce our environmental impact and better control costs, we need conservation!
  We need YOU to be a Face of Conservation ☺
- Let's share our commitment to conservation and sustainability at CSU

GOAL: This year we want to *use less* than our 3-year average

Example of a Faces of Conservation Educational Poster

4.4 Recommissioning and Retrocommissioning

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Short - Completed	(1,000)	0.5%	$0	$35,000	$130,000	-
Medium	(5,000)	2%	$0	$120,000	$480,000	
Long	(6,000)	3%	$0	$300,000	$610,000	-

Facilities Management has had a full time Recommissioning Engineer since FY13. In FY15, a full time Controls Technician was added to the team. This team troubleshoots and repairs small problems. In addition, they identify larger capital needs in buildings that are using lots of energy and/or water or are challenged by big comfort or control problem. The results to date have been fantastic. The team has solved a multitude of operational and comfort problems and provided dramatic utility savings.

What are Commissioning, Recommissioning & Retrocommissioning?

Commissioning is a quality assurance process that takes place during construction of a new building, while recommissioning essentially consists of a "tune-up" of an existing building's mechanical and control systems to ensure operations are continuing efficiently and effectively. Retrocommissioning is just recommissioning of existing buildings that were not commissioned when they came on line. All of these strategies are intended to verify that building systems are performing efficiently and effectively, resulting in reduced energy and water use and increased occupant comfort.

4.5 Solar Electricity

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Short On-buildings Completed	(250)	0.1%	$0	$0	$23,000	-
Medium Solar PPAs	(2,600)	1%	$1,625,000	$25,000	$247,000	13%
Long Solar Purchases	(9,900)	4%	$11,346,000	$170,000	$927,000	7%

This strategy includes net metering currently existing solar photovoltaic (PV) facilities on CSU's Main Campus, Foothills Campus, and Veterinary Teaching Hospital and several additional installations being studied for the future. 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.

CSU Foothills Campus, Chrisman Field Solar Array – 5,300 kW

In FY15, CSU installed a total of 1,200 kW of solar on campus buildings in response to a City of Fort Collins incentive. These installations bring the total installed capacity on campus to nearly 6,700 kW. There is a wide variety of ownership strategies on these existing systems but basically they fall into three categories.

- Small systems installed with building funds. CSU owns both the electrical output and the environmental attributes. These are the short term projects.
- Chrisman Field (5,300 kW) where a third party will own and operate the plant until 2030 when CSU has the right to purchase the plant at fair market value. Currently CSU receives the electricity from this plant but Xcel Energy owns the environmental attributes. When the plant ownership changes in 2030, the ownership of the environmental attributes will revert to CSU. This is a medium term project since the environmental attributes are in the future.
- Rooftop Solar installed in FY15 (1,200 kW) is owned and operated by a third party for 20 years, and Fort Collins Utilities pays an incentive to the owner for both the electricity and the environmental attributes. In 2035, CSU has the option to buy out the systems and take ownership of both the electrical generation and the environmental attributes. This is a long term project since the environmental attributes are further in the future.

Sunny Colorado

In addition to the large solar array at Chrisman Field, Colorado State University is currently home to 13 additional solar PV arrays on the:

- Engineering Building
- Lake Street Parking Garage
- Academic Village
- Behavioral Science Building
- Research Innovation Center
- The Cube at Morgan Library
- Powerhouse
- Braiden Hall
- Parmalee Hall
- Edwards Hall
- University Center for the Arts
- Veterinary Teaching Hospital
- Student Recreation Center

In the next several years, it is expected that the cost of solar systems will reach "grid parity" with traditionally generated electricity. This has already happened in many areas of the country where electricity prices are higher. Once that point is reached, installing solar systems where the university retains the ownership of both the electricity and environmental attributes will become a net benefit for the university. Therefore, much of the long term projects are estimated to be this type.

4.6 Reduce Fleet Fuel Consumption by Ten Percent

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(300)	<1%	$0	$0	$95,000	-

CSU can reduce 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, downsizing vehicles, optimizing fleet routes and combining trips to reduce vehicle miles traveled, more comprehensive maintenance practices, use of electric vehicles and use of alternative fuels.

Electric Vehicle at a CSU Charging Station

EV Charging Stations

CSU Parking and Transportation Service received a matching grant of $12,500 for the installation of two dual-head EV Chargers from the Colorado Energy Office's Charge Ahead Colorado grants. The charger will be placed in the Lake Street Garage for use by students, employees, and visitors. Charging and energy usage stats will be captured through direct communication from the charger to an online database.

4.7 Increase Waste Diversion to 75 Percent

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(200)	<1%	$0	$22,000	$32,000	-

Under this strategy, CSU would increase it solid waste diversion rate to 75 percent using a combination of reduction, recycling, and composting. In FY14, the University diverted 68 percent of its waste from the landfill. The diverted materials included bottles, cans, plastics, cardboard, paper waste& organics. CSU maintains the ongoing practice of recycling construction and demolition waste. In order to reduce organic waste going to the landfill, CSU has added strategies to divert nearly all (>90%) of the food waste from the residence halls. These strategies include: in-vessel composting, an agreement with the City of Fort Collins to send pulped waste to the wastewater treatment plant to help in methane generation, and contracted services to take any additional food waste to a local anaerobic digester.

Students Come, Students Go

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 the fall of 2014, over 16 tons of cardboard was recycled.

During residence hall move-out in the spring, unwanted items are collected by the Integrated Solid Waste and Surplus Property Departments under the Leave It Behind program. Items collected include, clothing, shoes, towels, dishes, lamps, desks, couches, coffee pots, plants, and more. In spring 2015, Leave it Behind collected 18 tons of materials which were sold through Surplus Property at a large "yard sale" raising over, $7,000 for the Housing & Dining Services Eco Leaders program.

The CSU in-vessel composter processes up to 2,000 pounds/day of food waste and animal bedding

4.8 Computer Power Management, Server Consolidation and Server Virtualization

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Short - Completed	(200)	0.1%	$17,000	$2,000	$13,000	66%
Medium	(6,800)	3%	$533,000	$65,000	$431,000	69%

The objective of this activity is to explore options for improving efficiency by reducing the energy use of information technology (IT) equipment across campus.

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.

Saving Electricity One Computer at a Time

Since 2013, CSU's Facilities Management has achieved persistent electricity savings through the use of Power Save, a computer power management software. Deployed on about 200 computers, this virtually invisible approach is saving Facilities Management over 24,000 kWh/year (6% of the electricity use of the entire building).

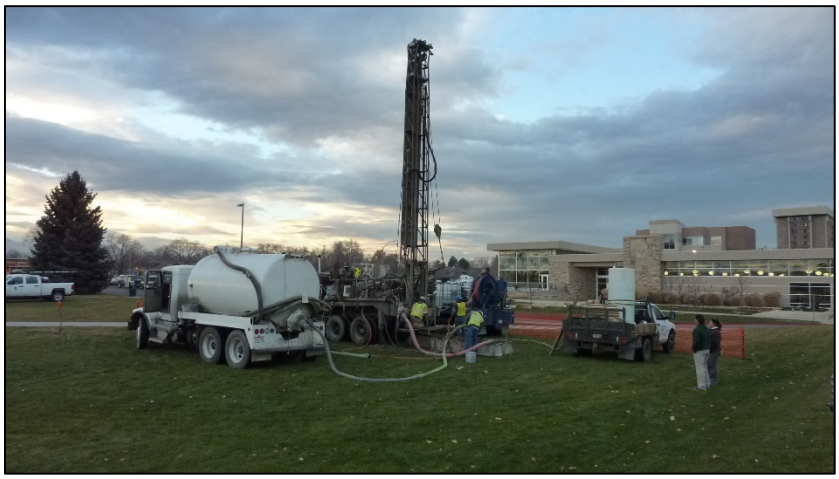
A new partnership is forming between the campuses IT community and Facilities Management in order to meet mutual goals of having safe, secure, productive, and energy efficient IT systems on campus.

4.9 Ground Source Heat Pump (GSHP)

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(1,700)	1%	$732,000	$0	$119,000	16%

The Main Campus of CSU receives steam for heating, hot water and process loads from a central steam plant located near the Administration building on the Oval. As the campus grows and the ability to expand the steam plant in its current location is constrained, the University has decided to consolidate the steam system to the east side of campus – converting the buildings west of Meridian Avenue to alternative heating sources. Some of the residence halls have already converted to small district systems utilizing high efficiency boilers. The Moby complex is nearly 300,000 square feet including an 8,000 seat basketball arena, a swimming pool, offices, and labs. A study was completed in FY14 to understand the feasibility of installing a GSHP rather than a traditional boiler/chiller system to serve this complex. The one-time cost listed above is the incremental cost of installing the GSHP rather than the traditional system.

GSHP systems are an energy efficient technology that use passive energy stored in the ground from collection of the sun's energy and energy transferred from the core of the earth. With these systems, geothermal heat pumps are used to convert the energy in the ground to usable heating water and chilled water energy for the buildings. The most obvious benefit of a GSHP system is the free energy extracted and rejected through the seasons from the ground loop. Electrically powered chillers, condensing units and cooling towers along with natural gas powered boilers are not needed to condition the building.



Drilling a test well to determine conductivity in the soil

4.10 Reduce Single-Occupancy Vehicle Commuting by Five Percent

Term	Projected $MTCO_2e$ Reductions	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. Commuting by means other than single occupancy vehicles 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 MAX, a transit corridor for Fort Collins that serves two of the CSU campuses. The corridor includes bus rapid transit, dedicated pedestrian paths and bikeways. The MAX became operational in 2014.

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, has on campus bike repair facilities, and provides free bus passes to faculty, staff and students.

Faculty, staff and students have free access to the bus system in Fort Collins

4.11 Utility & State Policies

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(17,900)	8%	-	-	-	-

This strategy consists of two different components of state and local public policy. First the Colorado Renewable Energy Standard (RES) is incorporated into the plan. CSU receives electric power from multiple utilities – Fort Collins Utilities, 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. 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.

The second component of this strategy is the recently approved City of Fort Collins CAP. In that plan the City lays out a strategy to achieve 80 percent reduction in GHG emissions by 2030. Part of that strategy is to have 80 percent carbon-free electricity by 2030. Since the majority of CSU's campuses are served by the Fort Collins municipal utility, the university would also be a beneficiary of that strategy.

Solar Panels on the CSU Behavioral Sciences Building

4.12 Carbon Sequestration in Forests or Grasslands

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium/Long	(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. In addition, research is underway at the university to help understand how "no-till" and other minimal impact farming techniques can improve carbon sequestration in grasslands.

Terrestrial carbon sequestration is the process through which CO_2 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 CO_2 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.

Colorado State Forest Service Tree Nursery on the CSU Foothills Campus

4.13 Develop Wind Power on CSU Lands

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(46,300)	21%	$0	$2,300,000	$4,300,000	-
Long	(46,300)	21%	$0	$2,300,000	$4,300,000	-

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

Wind energy is a clean energy source that results in no CO_2, nitrogen oxide (NO_x), or sulfur dioxide (SO_2) emissions. Wind facilities could 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, Fort Collins, and the State of Colorado Climate Action Plans.

Colorado has lands with 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 wind resource at this site has been monitored since fall 2013. While there are many hurdles (availability of the Production Tax Credit, transmission access, etc.), there is good wind potential at the site and the researchers 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, a third-party developer would own and operate the generation assets 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 turbines.

4.14 High Performance New Construction

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
On-going	(5,400)	2%	-	-	-	-

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 CO_2 emissions[1]. 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. For the most current list of LEED certified buildings on the CSU campus go to:

http://www.green.colostate.edu/green-buildings.aspx

Building to a Higher Standard

In FY15, CSU achieved their first LEED Platinum certified building – the Laurel Village Pavilion. The Pavilion is a commons building serving the newest residence hall complex on campus. The other residence hall buildings at Laurel Village achieved LEED Gold. The Pavilion uses a wide variety of strategies to achieve its outstanding energy performance. The most unique is a katabatic cooling tower that provides passive cooling.

[1]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

The Pavilion at Laurel Village – first LEED Platinum building on the CSU main campus

4.15 Offset Airline Travel

Term	Projected $MTCO_2e$ Reductions	Percentage of Net FY10 Emissions	One-time Cost	Annual Cost	Annual Cost Savings	Annual ROI
Medium	(2,600)	1%	$0	$47,000	$0	-
Long	(2,600)	1%	$0	$47,000	$0	-

While specific tactics of this strategy 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 offsets for travel impacts; however, 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. Because there is no cost savings associated with this measure, the implementation is anticipated as a medium and long term strategy.

The Lory Student Center

4.16 Emerging Technologies

Term	Projected $MTCO_2e$ Reductions	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, plasma waste-to-energy, algae biofuels, and other sequestration options such as capturing carbon for use in building materials.

Thermal storage tanks & solar photovoltaic panels at the Academic Village Residence Hall

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.

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 appraised of the latest funding opportunities. Note that several of these strategies have already been implemented to fund campus projects. This is a fast-changing landscape where legislation, incentives and rebates, and maturing technologies can rapidly improve the financial options of plan strategies.

Solar array installed on Braiden Hall as part of the City of Fort Collins SP3 Solar Power Purchase Program

6.0 Uncertainty

This Climate Action Plan update is the third 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 with no escalation.

- **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.

The Indoor Practice Facility is a LEED Gold building that uses natural daylighting, creatively cleans stormwater with vegetation before leaving the site, and features water-conserving landscaping

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 PSC 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. In early 2015, the City adopted a very aggressive community Climate Action Plan. CSU's plan has been modified to help align with the City's plan because CSU is a significant contributor to the GHG emissions in the Fort Collins community. Therefore, it is imperative that our strategies support each other's goals.

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.

As noted in the discussions of the specific strategies, many short term projects have already been implemented. Additional strategies can be implemented in a fairly short period of time while others will need to be phased over time. Establishing timeframes 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: President's Sustainability Committee Members

President's Sustainability Committee

Affiliation	Member
Chair	**Lynn Johnson,** Vice President for University Operations **Amy Parsons**, Past Vice President for University Operations
Co-Chair	**Carol Dollard**, Energy Engineer (Facilities Management)
Co-Chair	**Tonie Miyamoto**, Director of Communications and Sustainability (Housing & Dining Services and Student Affairs)
College of Engineering	**Mark Ritschard**, Assistant Dean
College of Engineering	**Jesse Parker**, Program Coordinator
Warner College of Natural Resources	**Esther Duke**, Director of Special Programs
College of Veterinary Medicine & Biomedical Sciences	**Colleen Duncan**, Assistant Professor of Pathology
College of Health & Human Sciences	**Brian Dunbar**, Executive Director of the Institute for the Built Environment
College of Health & Human Sciences	**Bill Timpson**, Professor of Education
College of Natural Sciences	**Tony Rappe**, Professor of Chemistry
College of Natural Sciences	**Andrew Warnock**, Director of Education and Outreach Center
Athletics	**Doug Max**, Senior Athletic Director for Facilities Management
Student Sustainability Center	**Jacob Kimiecik**, Director of Student Sustainability Center
Public Relations	**Dell Rae Ciaravola**, Senior Communications Coordinator
Morgan Library	**Neyda Gilman**, Assistant Professor
Extension	**Cary Weiner**, Extension Specialist – Energy
School of Global Environmental Sustainability	**Aleta Weller**, Research and Outreach Coordinator
School of Global Environmental Sustainability	**Michael Streight**, Assistant Research and Outreach Coordinator
Associated Students of Colorado State University	**Dakota Truitt**, Director of ASCSU Environmental Affairs

Housing & Dining Services	**Tim Broderick**, Sustainability Coordinator
Housing & Dining Services	**John Henderson**, Director of Parent and Family Programs
University Operations	**Jocelyn Hittle**, Director of Denver Operational Initiatives
Facilities Management	**Stacey Baumgarn**, Campus Energy Coordinator
Facilities Management	**Becca Wren**, Executive Assistant
Parking and Transportation Services	**Aaron Fodge**, Alternative Transportation Manager
Procurement Services	**Farrah Bustamante**, Strategic Sourcing Manager
Surplus Property	**Jake Drenth**, Surplus Property Manager
Classified Personnel Council	**Sheela Backen**, Integrated Solid Waste Manager
Administrative Professional Council	**Ann Bohm-Small**, Financial Transaction Coordinator
Faculty Council	**Paul Doherty**, Professor of Fish and Wildlife Biology
Faculty Council	**Mary Stromberger**, Associate Professor of Soil and Crop Sciences
Colorado State University Research Foundation	**Kathleen Henry**, President of the Colorado State University Research Foundation
Graduate Student Council	**Annabelle Berklund**, PhD. Student in Economics
Energy Institute	**Kirk Evans**, Director of Engineering, EECL and Powerhouse Energy Campus
Energy Institute	**Mac McGoldrick**, Director of Operations, Powerhouse Energy Campus

Acknowledgements: Many thanks to our dedicated intern, Chanin Tilakamonkul, for his hard work in putting this document together.