Climate Action Plan

April 2022 Update

Colorado State University

CSU Land Acknowledgment

Colorado State University acknowledges, with respect, that the land we are on today is the traditional and ancestral homelands of the Arapaho, Cheyenne, and Ute Nations and peoples. This was also a site of trade, gathering, and healing for numerous other Native tribes. We recognize the Indigenous peoples as original stewards of this land and all the relatives within it. As these words of acknowledgment are spoken and heard, the ties Nations have to their traditional homelands are renewed and reaffirmed.

CSU is founded as a land-grant institution, and we accept that our mission must encompass access to education and inclusion. And, significantly, that our founding came at a dire cost to Native Nations and peoples whose land this University was built upon. This acknowledgment is the education and inclusion we must practice in recognizing our institutional history, responsibility, and commitment.

Executive Summary

Welcome to the Colorado State University Climate Action Plan (CAP) – 2022 update. The CAP is a living document, intended to build upon the original CAP written in 2010. Two fundamental changes define this CAP update 1) moving the goal for carbon neutrality from 2050 to 2040 – based on the understanding of the climate emergency that makes greenhouse gas emissions reductions increasingly urgent. In addition, technological innovation, renewable electricity markets, and CSU's renewed commitments makes the goal achievable. 2) This CAP has been formatted to align with the categories of CSU greenhouse gas emissions – bringing attention to the categories based on the size of their impact.

While developing this CAP, the campus community expressed a desire for more details on tactics, funding, etc. However, in previous versions of the CAP more specific details and costs were included and this information did not always "age well". Strategies and tactics are fluid and can be implemented faster (or slower) than expected or be completely changed given technology improvements, shifting campus priorities and funding opportunities. Therefore, to keep the CAP relevant, it remains at a strategic level without those specific details.

This CAP is:

- A broad-based plan for CSU to reach carbon neutrality by 2040
- A description of the eight categories of CSU's emissions
- A 30,000-foot view of strategies to reduce emissions in each category to achieve carbon neutrality by 2040

This CAP is not:

- A detailed explanation, timeline, or cost analysis of strategies and tactics to be implemented
- A full campus sustainability plan. Carbon emissions are not the only focus for sustainability. Diversity, equity, inclusion, social and environmental justice, water scarcity, pollution, biodiversity, and much more are vitally important issues to address. More information regarding CSU's work in these additional areas are outlined in Appendix D, which include but are not limited to:
    - Courageous Strategic Transformation – CSU's 2022-2026 Strategic Plan
    - President's Sustainability Commission – University-wide Sustainability Strategic Plan
    - Parking & Transportation Master Plan
    - CSU Facilities Management – Campus Master Plan, District Energy Master Plan, Integrated Solid Waste Programs, and more.
    - CSU's STARS report

CSU has conducted greenhouse gas (GHG) inventories annually since FY08 (the FY08 inventory estimated emissions for the two previous years). The history of CSU GHG inventories can be found here. The GHG inventory provides the metric for measuring impacts and progress toward the CAP goal. While the University is making significant progress in reducing carbon emissions,

growth in both campus buildings and student enrollment increase our challenge. In the second decade of climate action commitments, CSU recognizes the need to “double down” on efforts to ensure progress and eventual success.

The global pandemic, since 2020, proved to be a good teacher in carbon reduction potential and challenges. It is possible to dramatically reduce air travel and commuting. Working remotely is a successful model for many employees. However, most campus buildings were not designed for low occupancy – the need to improve building operations and space utilization to better respond to changes in the number of people coming to campus is imperative for efficiency and resource conservation. Implementing these lessons and the strategies that follow will not be simple, but each one will help CSU respond to the climate emergency and to bring the University closer to achieving the carbon reduction goal.

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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 signed the American College & University Presidents Climate Commitment (ACUPCC), whereby CSU agreed to conduct greenhouse gas emissions (GHG) inventories, adopt a Climate Action Plan (CAP) to reduce emissions, and set a date to achieve climate neutrality.

CSU completed its first GHG inventory in 2008 and adopted its first CAP in 2010. Those early steps began the process of defining a path for CSU to achieve carbon neutrality by 2050. The original CAP, subsequent updates, and annual GHG inventories have provided a framework for assessing progress toward greenhouse gas emissions reductions. This 2022 update is intended to challenge CSU to continue to achieve new milestones, but also to move further, faster.

In the spring of 2021, CSU, through the Office of the President and the President's Sustainability Commission adopted an updated goal – to achieve carbon neutrality by 2040.

Climate Action Plan Approach

This document begins with a discussion of the sources of CSU's greenhouse gas (GHG) emissions. The GHG inventory provides the context for the focus of the strategies and helps prioritize efforts to achieve the University's goal.

The intent of the CAP is to guide the University to achieve carbon neutrality on or before the target date of 2040. The term carbon neutrality refers to achieving net-zero greenhouse gas emissions by reducing or mitigating our identified emission sources. The CAP is an outline of strategies that address GHG emissions reductions and mitigation. Therefore, CAP strategies focus on emissions reductions related to electricity, natural gas, air travel, commuting, agriculture, fleet vehicles, refrigerants, solid waste, and include the purchase of carbon offsets when needed. A more detailed description of these categories is in Appendix B.

United Nations' 17 Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs) are a universal call to action to end poverty, protect the planet, and improve the lives and prospects of everyone, everywhere. 17 Goals were adopted by all UN Member States in 2015 as a part of the 2030 Agenda for Sustainable Development which set out a 15-year plan to deliver the Goals by 2030. More on SDGs in Appendix C.

In this CAP, select SDGs are identified and associated with each section. These linkages were developed using guidance in the "STARS Aligned" document created by the Association for the Advancement of Sustainability in Higher Education (AASHE) to show how SDGs map to STARS criteria and thus the strategies in this CAP. CSU has been an active participant in the AASHE STARS program, achieving a Platinum rating three times. STARS is the Sustainability, Tracking, Assessment, and Rating System. Colorado State University | Institutions | STARS Reports (aashe.org)

Greenhouse Gas Emissions Inventory

Colorado State University has prepared a greenhouse gas (GHG) inventory annually for fiscal years FY08 through FY21 as shown in Figure 1. FY10 serves as the baseline year, corresponding to the adoption of CSU's first CAP. During FY21, CSU emitted 159,300 metric tons of CO_2 equivalents ($MTCO_2e$).

The trend of the annual GHG inventory reflects a 31% emissions reduction between FY10 and FY21. These reductions can be attributed to actions taken as outlined in prior versions of the CSU CAP and the greening of the electric grid. However, the FY21 inventory, and CSU's total emissions, were impacted by the global pandemic, resulting in significantly lower emissions in the categories of air travel and commuting. Absent the pandemic, it is estimated that CSU emissions would have been nearly 190,000 $MTCO_2e$. The downward trend of emissions reflects a significant achievement, given CSU's growth in square footage of buildings and student population over this period. However, a 31% reduction per decade is insufficient to achieve the intended goal and the necessities of significant carbon reductions called for by global scientists and leaders.

CSU's CAP documents and GHG inventories are available at
https://www.fm.colostate.edu/reports

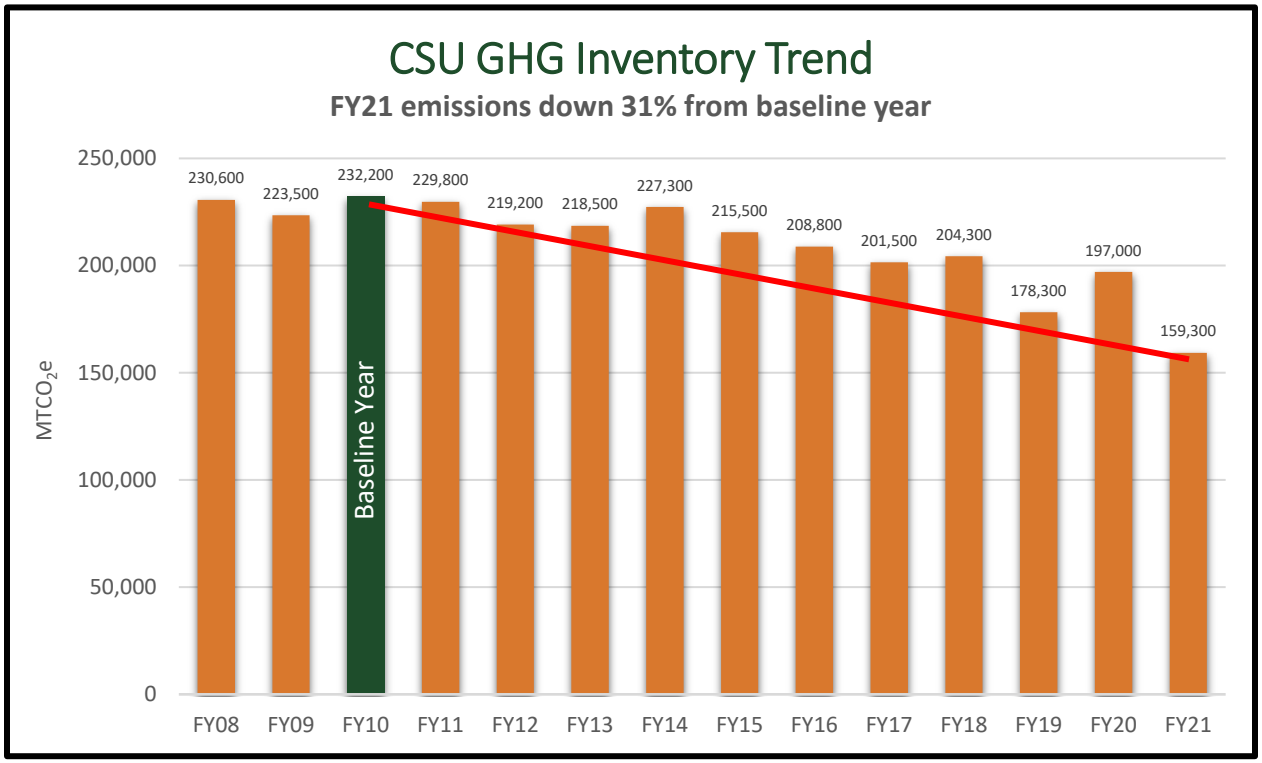


Figure 1. CSU Annual GHG Emissions

The GHG inventory is a comprehensive account of utility data, source data collected from staff, an annual campus commuting survey, and other University records. 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 chemical refrigerants.

Following guidance from the original ACUPCC commitment, CSU's inventory includes the following categories.

- Scope 1 emissions: natural gas combustion, fleet vehicles, agriculture, and refrigerants
- Scope 2 emissions: purchased electricity
- Scope 3 emissions: university-funded air travel, student commuting, employee commuting, electrical transmission and distribution losses, and solid waste disposal.

The eight source categories and their percentage of emissions contribution to CSU's inventory are depicted in the three figures below. From a global perspective, emissions reductions are important across all contributing categories, but the priority of strategies becomes more specific as the emissions in question become more local. What is important for one institution, organization, or sector, may be different for Colorado State University. In this CAP, emission reduction strategies have been organized relative to the largest impacts and based on the specifics of CSU's institutional inventory.

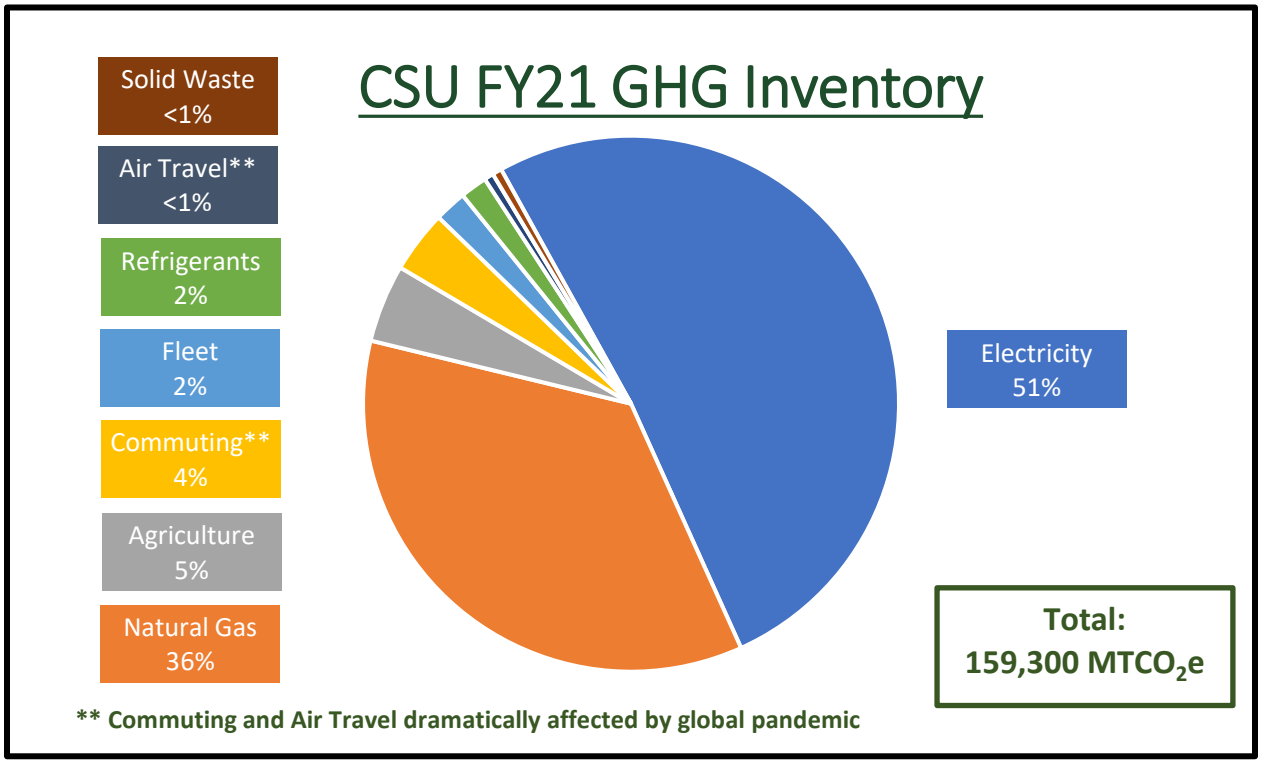
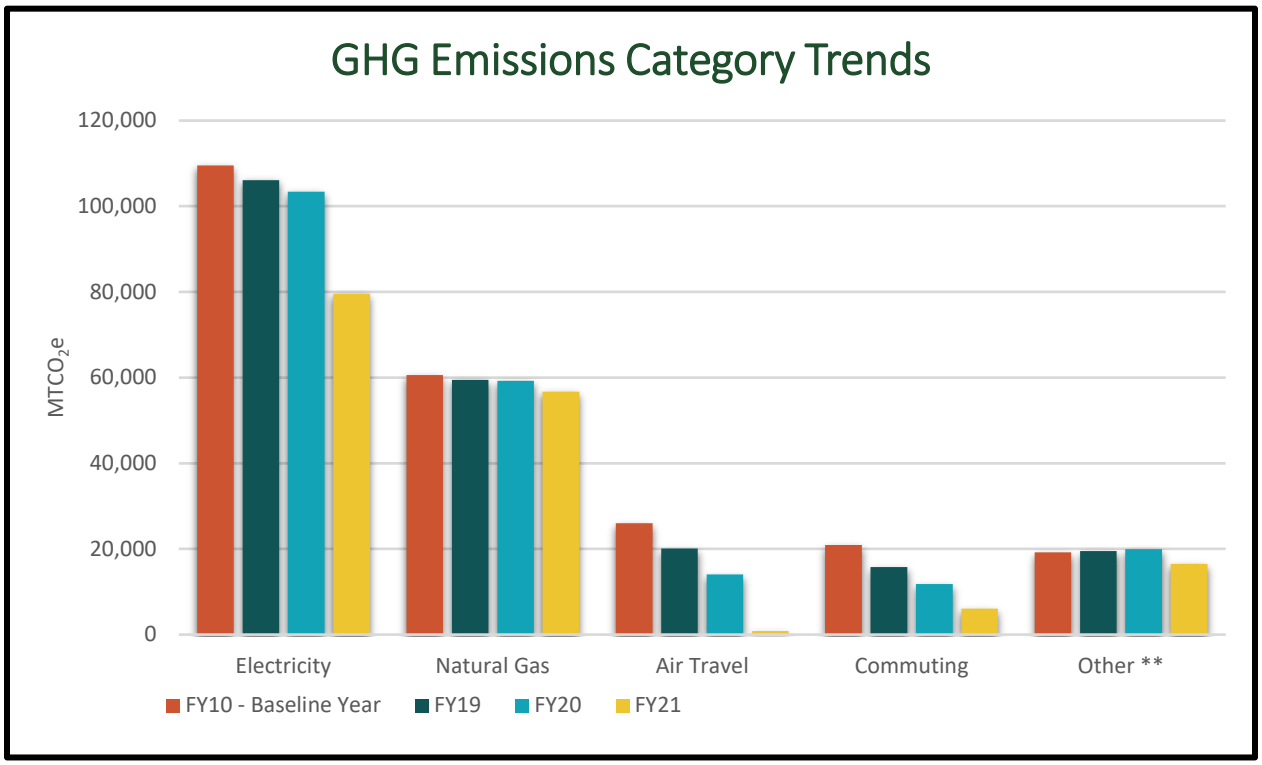


Figure 2. FY21 GHG Emissions Sources

FY21 GHG Emissions by source, volume, and percent			
Category	Scope	$MTCO_2e$ in FY21	% of total in FY21
Electricity	2	81,900	51
Natural Gas	1	56,700	35
Airline travel	3	900	< 1
Commuting	3	6,000	4
Agriculture	1	7,500	5
Fleet vehicles	1	3,100	2
Refrigerants	1	2,600	2
Solid Waste	3	900	< 1
Offsets*	N/A	-400	N/A
Totals		**159,300**	**100**
*REC purchases and onsite composting			

Figure 3. FY21 GHG Emissions by source, volume, and percent



** Other = Agriculture, fleet vehicles, refrigerants, and solid waste

Figure 4. GHG emissions trends by category including baseline year and last three fiscal years

GHG Reduction and Mitigation Strategies

To achieve the Climate Action Plan goal of carbon neutrality by 2040, CSU must eliminate or offset the current annual emissions of 159,300 $MTCO_2e$. The following sections identify GHG reduction and mitigation strategies to achieve that goal between now and 2040. Reduction and mitigation strategies are needed to address each of CSU's eight emissions sources.

1) **Electricity & Natural Gas – part 1**
   Energy Use in Buildings
2) **Electricity & Natural Gas – part 2**
   Energy Sources
3) **Airline Travel**
4) **Commuting**
5) **Agriculture**
6) **Fleet Vehicles**
7) **Refrigerants**
8) **Solid Waste**

Additional considerations of the CAP:

- **Offsets**
- **Embodied Carbon**
- **Adaptation, Resiliency, and Regeneration**
- **The Future – Opportunities & Uncertainties**

This CAP prioritizes strategies with the greatest emission reduction potential while maintaining a triple bottom line perspective.

1. Electricity & Natural Gas – Energy Use in Buildings

Building Energy Efficiency / High-Performance New Construction & Remodels / Outreach & Engagement

FY21 GHG Emissions Energy Use in Buildings					
Category	Use	Units	Scope	$MTCO_2e$	% of total emissions
Electricity	161,128,870	kWh	2	81,900	51%
Natural Gas	1,066,813	MMBtu	1	56,700	35%
Total				**138,600**	**86%**

In FY21, energy use accounted for roughly 86% of CSU's annual GHG emissions: 138,600 $MTCO_2e$. These emissions originate from purchased electricity and the burning of natural gas to provide heat and domestic hot water to the buildings. Efficiency and conservation measures reduce emissions and utility costs associated with that consumption. This category focuses on energy use in buildings.

To achieve emissions reductions related to energy use in buildings, CSU must focus on three strategies simultaneously:

- Existing Building Energy Efficiency
  - retro-commissioning and deep energy retrofits
  - efficiency in lighting, equipment, and building automation controls
  - optimize space utilization
- High-Performance New Construction – prevention and reduction of future emissions
- Outreach & Behavioral Engagement – individual actions focused on energy conservation

In FY21, the utility costs for the energy used in CSU buildings was almost $20M (electricity = $13.6M, natural gas = $5.8M). These strategies all reduce energy usage, which results in avoided costs, that provide a revenue stream that can be used to help offset the costs of implementing these measures.

Associated UN SDGs:

2. Electricity & Natural Gas – Energy Sources

Renewable Electricity / Beneficial Electrification / Utility & State Policies

FY21 GHG Emissions Energy Sources					
Category	Use	Units	Scope	$MTCO_2e$	% of total emissions
Electricity	161,128,870	kWh	2	81,900	51%
Natural Gas	1,066,813	MMBtu	1	56,700	35%
Total				**138,600**	**86%**

In FY21, energy use accounted for roughly 86% of CSU's annual GHG emissions: 138,600 $MTCO_2e$. These emissions originate from purchased electricity and the burning of natural gas to provide heat and domestic hot water to the buildings. This category focuses on energy sources – the fuel mix of how purchased electricity is generated and the carbon intensity of all energy sources used by CSU.

CSU must focus on developing and procuring cleaner sources of electricity and eliminating the use of natural gas. In 2017, CSU adopted the Climate Reality Pledge, committing the University to utilize 100% renewable electricity by 2030. The following strategies support and guide CSU to emission reductions from energy sources:

- On-site Renewable Electricity – continue ongoing renewable electricity development on CSU owned lands and campus rooftops
- Beneficial Electrification (BE) – transitioning of natural gas fired loads to electrical sources
  - implementation of additional BE projects
  - adopt a "no new combustion" standard on campus
  - convert existing district energy (heating and cooling) systems to low-carbon alternatives
- Utility & State Policies
  - support State of Colorado renewable electricity policy development and adoption
  - support utilities working toward our mutual goal of reaching 100% renewable electricity by 2030

Associated UN SDGs:

3. Airline Travel

Trip Reductions & Offsets

FY21 GHG Emissions Airline Travel					
Category	Use	Units	Scope	$MTCO_2e$	% of total emissions
Airline Travel*	2.3	million miles	3	900	< 1%
Total				**900**	**< 1%**

* Emissions from air travel were dramatically reduced by the global pandemic in FY21

In FY21, University funded airline travel contributed 900 $MTCO_2e$ and < 1% of the total GHG inventory emissions. However, the global pandemic significantly affected air travel in FY20 and FY21. Pre-pandemic, air travel averaged approximately 20,000 $MTCO_2e$/year – the category with the third largest impact and hovering around 10% of CSU's GHG footprint for many years.

While the 2010 CAP did not specifically address emissions from airline travel, subsequent updates included a strategy to Offset Airline Travel. Only airline travel funded by CSU is accounted for in the emissions budget (i.e., if an employee or student travels to a conference, and that airline travel is not paid by CSU, the funding organization is responsible for the associated GHG emissions).

The President's Sustainability Commission created an air travel working group in 2017. The working group developed an Airline Travel Offset program to reduce air travel when possible and offset when necessary. The University adopted this program in the fall of 2021. Beginning in February 2022, a small fee will be added to each university-funded air travel trip. The dollars collected will be used to implement carbon reduction projects on CSU campuses. In addition, there will be an ongoing campaign to encourage continued virtual meetings and teleconferencing to reduce air travel.

In FY21 the university-funded approximately $300,000 of air travel. Before the global pandemic, annual university-funded air travel was over $7,000,000/year. Reduced air travel will additionally reduce other associated travel costs for the University.

This is an emissions source category where some amount of GHG emissions may remain long into the future – requiring CSU to offset these emissions in other ways.

Associated UN SDGs:

4. Commuting

Reduce Single Occupancy Vehicle (SOV) Commuting

FY21 GHG Emissions Commuting					
Category	Use	Units	Scope	$MTCO_2e$	% of total emissions
Employee Commuting*		miles	3	2,200	1.5%
Student Commuting*		miles	3	3,800	2.5%
Total				**6,000**	**4%**

* Emissions from commuting were reduced by the global pandemic in FY21

In the annual GHG inventory, the impacts of commuting are separated into two categories – employees and students. Added together, commuting accounted for 6,000 $MTCO_2e$ which is 4% of CSU's FY21 emissions. However, the global pandemic significantly affected commuting in FY20 and FY21. Pre-pandemic commuting averaged approximately 15,000 $MTCO_2e$/year and was the category with the fourth largest impact – approximately 7% of the University's GHG footprint.

While student commuting accounts for more total tons of emissions, there are over 34,000 students compared to roughly 7,600 employees. On a per-capita basis, students contribute much lower emissions than the average employee. The goal of this category is to reduce employee and student single occupancy vehicle (SOV) commuting to CSU campuses.

Specific strategies to reduce the emissions from commuting are outlined in the CSU Parking & Transportation Master Plan.

Associated UN SDGs:

5. Agriculture

Best Management Practices to Reduce Impact of Agricultural Activities

FY21 GHG Emissions Agriculture					
Category	Use	Units	Scope	$MTCO_2e$	% of total emissions
Agriculture – Animals*	3,214	Head	1	6,000	4%
Agriculture – Fertilizer	271	Tons	1	1,500	1%
Total				**7,500**	**5%**

* Primarily beef cattle

In FY21, agricultural activities contributed 7,500 $MTCO_2e$ or about 5% of the GHG inventory. Within the category, the GHG inventory accounts for the fertilizer use across all CSU campuses related to crop production and turf management, etc. The inventory also includes the large animals owned and maintained by the University during this period. A headcount is calculated accounting for the emissions produced by beef cows, bison, horses, sheep, swine, and goats, etc.

As a land-grant institution noted for agricultural research, CSU is likely to maintain crop production and various quantities of large animals through the years. However, that does not preclude carbon sequestration through soil and crop management as well as improving manure management practices or other innovative emissions reductions relative to large animal husbandry. Opportunities also exist to research and lead emissions reductions strategies related to fertilizer applications for crop production and turf management.

This is an emissions source category where some amount of GHG emissions may remain long into the future – requiring CSU to offset these emissions in other ways.

Associated UN SDGs:

6. Fleet Vehicles

Optimize Fleet / Electrify Fleet

FY21 GHG Emissions Fleet Vehicles					
Category	Use	Units	Scope	$MTCO_2e$	% of total emissions
Fleet Vehicles	305,000	Gallons*	1	2,800	
Reimbursement	33,000	Gallons*	1	300	
Total	**338,000**			**3,100**	**2%**

* Includes gasoline and diesel

This section accounts for the fuel consumed and emissions created by vehicles owned by CSU, including campus fleet, motor-pool, department-owned vehicles, service vehicles, etc. This category also includes mileage reimbursed to employees that use personal vehicles for university business. In FY21, fuel consumption resulted in 3,100 $MTCO_2e$ and 2% of the GHG inventory total.

CSU owns and operates almost 600 vehicles which consumed over 242,000 gallons of gasoline and 96,000 gallons of diesel fuel in FY21. Mileage reimbursements for personal vehicles driven by CSU employees on official business in FY21 totaled just over 790,000 miles.

Broad strategies to reduce emissions related to fleet vehicles include:

- Optimize fleet
  - improve fuel efficiency (MPG) by purchasing fuel-efficient vehicles when adding or replacing units in the fleet
  - right size fleet vehicles to optimize efficiency and efficient use of resources
  - downsize fleet where feasible
- Electrification of the fleet
  - adopt a goal: percent of CSU Fleet purchased vehicles should be electric or, flip the fleet over a given period (i.e., adopt a 10% conversion to EV's/year)

Because of the remote locations of some research field work and limitations in charging infrastructure, this is an emissions source category where some amount of GHG emissions may remain long into the future – requiring CSU to offset these emissions in other ways.

Associated UN SDGs:

7. Refrigerants

Best Practices for Refrigerant Use Management

FY21 GHG Emissions Refrigerants					
Category	Use	Units	Scope	$MTCO_2e$	% of total emissions
Refrigerants	2,572	Pounds	1	2,600	2%
Total				**2,600**	**2%**

Refrigerants contribute 2,600 $MTCO_2e$ or 2% to the CSU emissions inventory. While small, refrigerant management should not be overlooked. Managing leaks and retrofitting rooftop units and chillers to utilize refrigerants that have a lower global warming potential can reduce these impacts while alternatives and new technologies are developed.

Five refrigerant types are currently in use across the CSU campuses which include:

- R-404
- MP39-30
- R-134A (phasing out)
- R-410A (phasing out)
- R-22 (phasing out)

In addition to regulatory compliance related to the phase-out of certain refrigerants, it is incumbent on CSU to also consider each refrigerant used for its relative performance and impacts. Impacts to be taken into consideration include: the global warming potential (GWP) and the ozone depletion potential (ODP) of the refrigerant along with associated safety considerations like efficiency, toxicity and flammability.

This is an emissions source category where some amount of GHG emissions may remain long into the future – requiring CSU to offset these emissions in other ways.

Associated UN SDGs:

8. Solid Waste

Continue Diversion of Materials from Landfill

FY21 GHG Emissions Solid Waste					
Category	Use	Units	Scope	$MTCO_2e$	% of total emissions
Solid Waste	2,500	Tons	3	900	< 1%
Total				**900**	**< 1%**

Emissions from solid waste of 900 $MTCO_2e$ are the result of materials sent to the landfill from CSU campuses. Emissions from this category account for < 1% of the institution's total inventory. While this is the smallest category of our inventory, solid waste and associated recycling and composting initiatives are highly visible components of our campus sustainability efforts. Making continued progress to reduce the volume of materials sent to the landfill is an important demonstration of good stewardship. Note that the landfill primarily used by CSU practices methane capture and flaring – resulting in lower overall emissions compared to landfills without this practice.

Strategies to reduce emissions related to solid waste include:

- Continue diversion of material from the landfill through recycling, composting, and Surplus Property programs and initiatives
- Work with campus partners to provide compostable to-go containers at all food outlets
- Expanding locations of compost bins to all local CSU Fort Collins campuses
- Strive to maximize construction and demolition waste diversion (though not currently accounted for by CSU within the GHG protocol followed – this category is known to have a large impact on the Larimer County landfill)
- Adopt a zero-waste goal for CSU

Associated UN SDGs:

Additional Emissions Considerations

Offsets

FY21 GHG Emissions Offsets					
Category	Use	Units	Scope	$MTCO_2e$	% of total emissions
Compost	400	Tons	N/A	-100	N/A
Purchased Offsets	180	$MTCO_2e$	N/A	-180	N/A
Purchased RECs	248,000	kWh	N/A	-120	N/A
Total				**-400**	**N/A**

Beginning in 2021, the Renewable Energy Credit (REC) / offset market grew increasingly expensive. This change makes short-term purchases of RECs cost prohibitive. In past years, CSU has purchased RECs, usually associated with LEED building projects or green power purchases through utilities. RECs historically cost between $0.45 – $1.75/MWh. In 2021, as more companies and institutions used RECs to achieve sustainability goals, the price reached $8 per MWh.

Some emissions source categories above are labeled with the note: “This is an emissions source category where some amount of GHG emissions may remain long into the future – requiring CSU to offset these emissions in other ways.” Future costs to offset these emissions are unknown and uncertain. It is important to note that offsets are an annual expense.

For these reasons, it is in CSU’s best interest to maximize emissions reductions through mitigation rather than rely on offsets to achieve the overall goal of carbon-neutral by 2040.

Embodied Carbon

The GHG footprint of CSU is an inventory of $MTCO_2e$ emitted by the operations of the University (in the categories described in this document). CSU recognizes there are also significant embodied carbon emissions associated with university infrastructure (buildings, utilities, streets, purchased goods, and services, etc.). The understanding of these emissions is a rapidly developing field and is being considered in new university projects. However, embodied carbon emissions are not included in this CAP.

Adaptation, Resiliency, and Regeneration

While this document is focused on strategies to reduce CSU’s GHG emissions, CSU is acutely aware that impacts of past carbon emissions are already being felt. The University, located in the semiarid west, has experienced extreme weather and associated consequences of climate change. Drought, extreme temperatures, record wildfires, and more have directly affected the University and our local communities. As a result, there is research and planning underway to

help the University position itself to be more adaptable and resilient in the face of these challenges. However, those efforts are not outlined here.

In addition to efforts toward mitigating our climate impacts and becoming more adaptable and resilient in the face of climate change, there is a growing focus on the ideas of renewal and regeneration. The fundamental ideas behind renewal and regeneration center on restoring and increasing social and ecological health, instead of simply reducing harm or figuring out how to adapt to adverse conditions.

The Future – Opportunities & Uncertainties

This 2022 version is the fifth update to the CSU Climate Action Plan and biennial updates to this document will be critical to maintaining its relevancy and ensuring that CSU is maintaining a trajectory toward carbon neutrality. Rather than attempting an exhaustive forecast of potential scenarios, CSU recognizes some key uncertainties associated with any CAP:

- **Growth rates for CSU's emissions** – Much of the potential for growth in CSU's emissions historically have been driven by new construction, enrollment, and research. Impacts of growth can be mitigated by strategies outlined in this report but are still difficult to forecast in continually fluctuating budgetary and political environments.
- **Utility rates** – Accurately projecting utility rates through 2040 is challenging. It is safe to assume that the cost of purchased utilities will increase, and the savings associated with energy use reduction and efficiency strategies will increase in parallel.
- **Legislation** – There have been significant legislation and policies adopted that will help the University achieve the goals set out in this CAP. These include:
    - 100% renewable electricity pledge by CSU, local, and regional utilities
    - City of Fort Collins Building Energy & Water Scoring Program
    - Colorado HB21-1286: Energy Performance for Buildings
    - Potential for federal or state legislation that affects the price of carbon emissions
- **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.
- **Emerging Technology** – In the future, emerging technologies will contribute to carbon neutrality by 2040. However, the specific impacts are unknown, therefore, the plan presented outlines a path utilizing existing technologies.

Appendix A

The 2022 Climate Action Plan Update Team

The CAP update team was initially formed in 2020 but put on hold due to the global pandemic. Some of the contributors listed below are no longer at Colorado State but have been included to acknowledge their work.

Employees

- **Stacey Baumgarn** – Campus Energy Coordinator
- **Michelle Betsill** – Former Professor and Chair, Department of Political Science
- **Susanne Cordery** – Environmental Engineer, Facilities Management
- **Carol Dollard** – Energy Engineer, Facilities Management
- **Brian Dunbar** – Executive Director, Institute for the Built Environment
- **Aaron Fodge** – Alternative Transportation Manager
- **Tim Kemp** – Former Assistant Director for Engineering and Capital Construction

Students

- **Danielle Backman** – Former Graduate Intern, The President's Sustainability Commission
- **Ally Bormann** – Undergraduate Student, Warner College of Natural Resources
- **Carolyn Conant** – Former Graduate Student, College of Liberal Arts
- **Ashley Geraets** – Undergraduate Student, College of Engineering
- **Bryn Hall** – Undergraduate Intern, The President's Sustainability Commission
- **Jadelyn Lippmann** – Undergraduate Student, College of Engineering
- **Jenna Parker** – Graduate Student, Warner College of Natural Resources
- **Kevin VonFeldt** – Former Impact MBA Sustainability Fellow, Facilities Management

Community Members

- **Adam Ekstedt**
- **Avery Franklin**

The President's Sustainability Commission at CSU

The President's Sustainability Commission (PSC) consists of representatives from a broad cross-section of campus units. The mission of the PSC is to "promote and facilitate the effective integration of sustainability across all aspects of the University". The PSC has developed a strategic plan to outline specific tactics to advance sustainability across CSU. To see the University-wide Sustainability Strategic Plan and to see a list of current PSC membership visit: President's Sustainability Commission – Green @ CSU (colostate.edu)

Appendix B

Greenhouse Gas Categories Defined

Scope 1: Direct Emissions – Emissions related to university-owned sources.

- Natural Gas – emissions associated with natural gas burned on site primarily for heating and hot water, but includes some laboratory and process uses.
- Agriculture – emissions associated with both animals and fertilizer which occur primarily on CSU's agricultural research campuses but include landscape fertilizers as well.
- Refrigerants – emissions associated with the release of refrigerants from any leaking HVAC or refrigeration equipment on campus. This category is tracked by amount purchased in each year so does not account for changes in inventory. As a result, year to year fluctuations can appear inconsistent.
- Fleet vehicles – emissions associated with the fleet vehicles owned by CSU. This also includes emissions relative to mileage reimbursed to students and employees for travel in personal vehicles for work trips.

Scope 2: Indirect Emissions Electricity – Emissions related to purchased electricity used on campus but generated elsewhere.

- Purchased Electricity – emissions associated with purchased electricity. Electricity is primarily used to operate campus buildings and provide chilled water used for building cooling and some process loads. A small amount of purchased electricity is used to charge electric vehicles. Solar electricity systems on campus where CSU has retained the Renewable Energy Credits (RECs) produce clean power that reduces the emissions in this category.

Scope 3: Indirect Emissions – Emissions created outside of university-owned sources that are utilized in relation to university activities. Note there are many emissions in Scope 3. CSU only tracks the three Scope 3 emissions outlined in the original 2008 ACUPCC Commitment.

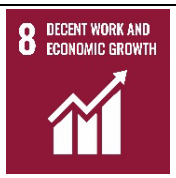
- Airline Travel – emissions associated with university funded air travel
- Commuting – emissions associated with trips and modes that students and employees use to travel to CSU. This data is derived from an annual transportation survey.
- Solid Waste – emissions associated with materials sent to the landfill. The majority of the solid waste generated at CSU goes to the Larimer County landfill which uses the practice of capturing and flaring methane.

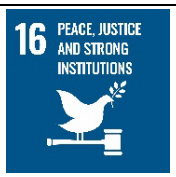
Credits:

- Compost – emissions credits associated with the composting of food waste and animal bedding at CSU's on-site facility. Processed compost is used for landscaping projects on campus and sold through CSU Surplus Property.
- Renewable Energy Credits (RECs) and offsets – emissions credits associated with the purchase of RECs and offsets. CSU only purchases Green-e certified RECs and offsets.

Appendix C

United Nations Sustainable Development Goals Defined

Icon	Goal
	**No Poverty** End poverty in all its forms everywhere
	**Zero Hunger** End hunger, achieve food security and improved nutrition and promote sustainable agriculture
	**Good Health and Well Being** Ensure healthy lives and promote wellbeing for all at all ages
	**Quality Education** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
	**Gender Equality** Achieve gender equality and empower all women and girls
	**Clean Water and Sanitation** Ensure availability and sustainable management of water and sanitation for all
	**Affordable and Clean Energy** Ensure access to affordable, reliable, sustainable and modern energy for all
	**Decent Work and Economic Growth** Promote sustained inclusive and sustainable economic growth, full and productive employment and decent work for all

	**Industry, Innovation and Infrastructure** Build resilient infrastructure, promote inclusive and sustainable industrialism and foster innovation
	**Reduced Inequalities** Reduce inequality within and among cultures
	**Sustainable Cities and Communities** Make cities and human settlements inclusive, safe, resilient and sustainable
	**Responsible Consumption and Production** Ensure sustainable consumption and production patterns
	**Climate Action** Take urgent action to combat climate change and its impacts
	**Life Below Water** Conserve and sustainably use the oceans, seas and marine resources for sustainable development
	**Life on Land** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
	**Peace, Justice and Strong Institutions** Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
	**Partnerships for the Goals** Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development Finance

Appendix D

Resource List for the Climate Action Plan

- AASHE Stars Aligned Document
  - https://aashe.informz.net/aashe/pages/2020_STARS_SDG_Publication
- AASHE STARS Report
  - https://reports.aashe.org/institutions/colorado-state-university-co/report/
- CSU Courageous Strategic Transformation – CSU 2022-2026 Strategic Plan
  - https://courageous.colostate.edu
- CSU Facilities Management Home Page (Master Plans, Integrated Solid Waste)
  - https://www.fm.colostate.edu
- CSU Facilities Management Sustainability Reports (previous versions of the CSU Climate Action Plan, Greenhouse Gas Emissions Inventories and Reports)
  - https://www.fm.colostate.edu/reports/
- CSU Land Acknowledgment
  - https://landacknowledgment.colostate.edu
- Parking & Transportation Services Master Plan
  - https://www.fm.colostate.edu/files/forms/CSU%20Parking%20and%20Transportation%20Master%20Plan_FINAL.pdf
- President's Sustainability Commission (PSC)
  - https://green.colostate.edu/presidents-sustainability-commission/
- PSC University-wide Sustainability Strategic Plan
  - https://green.colostate.edu/wp-content/uploads/sites/17/2022/01/2021-PSC-SUSTAINABILITY-STRATEGIC-PLAN_April2021.pdf
- United Nations' 17 Sustainable Development Goals (SDGs)
  - https://sdgs.un.org/goals