



Greenhouse Gas Inventory Technical Report

FY 22

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Introduction

Colorado College's Greenhouse Gas Inventory Technical Report gives a detailed accounting of our carbon footprint. We reached carbon neutrality as of January 1st, 2020, although our work is not finished. Colorado College (CC) still produces gross emissions and continues to actively reduce residual emissions. This report summarizes CC's emissions for Fiscal Year '22 (FY22), July 1, 2021 to June 30, 2022. Colorado College submits annual reports to both [AASHE STARS®](#) and [Second Nature](#). These organizations support higher educational institutions with sustainability initiatives.

This report will be organized in "Scopes." These are consistent categories among higher education institutions as well as corporations that are part of a uniform accounting system called the [Greenhouse Gas Protocol](#). This system records carbon neutrality, carbon offsets, and Renewable Energy Certificates (RECs). This report will explain how we collected our data and the limitations of the data that we collect. We will also summarize our data and trends from previous years. And finally, we will discuss our initiatives to maintain our carbon neutrality goal and continue to lower our emissions while maintaining the integrity of our community.

Terms and Definitions

Carbon Neutrality or Net Zero Emissions: This occurs when gross carbon emissions are lowered to zero through the use of carbon offsets.

Carbon Offsets: Used to decrease or eliminate carbon dioxide and carbon dioxide equivalents entering the atmosphere by either sequestration or avoidance. Sequestration is the capturing and storing of carbon in natural materials such as trees and soil. Avoidance is when business as usual is changed in order to avoid emissions that would have otherwise occurred. One carbon offset represents the sequestration or avoidance of one metric tonne of carbon dioxide equivalent (MTCO_{2e}).

Emissions Scopes: GHG emissions divided into three categories

- Scope 1 (Direct Institutional): Scope 1 includes a measurement of direct emissions from sources controlled, owned and/or operated by Colorado College. This includes emissions from on-campus stationary sources, fuel for the college's vehicles, refrigerants, and fertilizer.
- Scope 2 (Indirect Institutional): Scope 2 measures indirect emissions from electricity purchased by Colorado College. The emissions from the purchased electricity are generated at the facility where the electricity was produced, not on the CC campus.
- Scope 3 (Indirect): Scope 3 includes indirect emissions that are produced by the purchasing and operational activities of sources not owned or operated by the college; however, these emissions can occur as a result of the students, staff, faculty, and college's operations or decisions. Reporting scope 3 commuting and air travel emissions is required by Second Nature's Climate Commitment. CC also chooses to measure emissions from study abroad, student travel to-and-from home, college-funded car travel, solid waste, wastewater, paper usage, and T&D losses.
- For more information regarding Scope definitions, refer to the GHG Protocol.

Terms and Definitions

Global Warming Potential (GWP): A standard index for the amount of potential heat absorbed by a GHG in the atmosphere compared to carbon dioxide. This ratio provides insight to the degree of potential harm caused by a gas. Methane (28 times as potent as carbon dioxide) has a lower GWP than nitrous oxide (265 times more potent than carbon dioxide) but both GHGs exacerbate global warming more than carbon dioxide (Intergovernmental Panel on Climate Change).

Metric Tonnes of Carbon Dioxide Equivalent (MTCO_{2e}): the unit of measurement for GHG emissions where all regulated GHG are scaled to carbon dioxide-equivalent emissions.

Greenhouse Gas Emissions (GHGs): Gasses including but not limited to carbon dioxide (CO₂), methane (CH₄), water vapor, and nitrous oxide (N₂O) collect in the atmosphere and absorb radiant energy, and trap heat under the atmosphere. An increase of GHGs in the atmosphere results in more heat being trapped. Human activities are the primary cause of increasing GHGs leading to increased global warming.

Renewable Energy Certificate (REC): RECs are an accounting method for renewable energy production and utilization. RECs are acquired when renewable energy producers feed renewable energy into the power grid. RECs can be used to ensure purchased electricity is coming from renewable energy sources, such as wind or solar power.

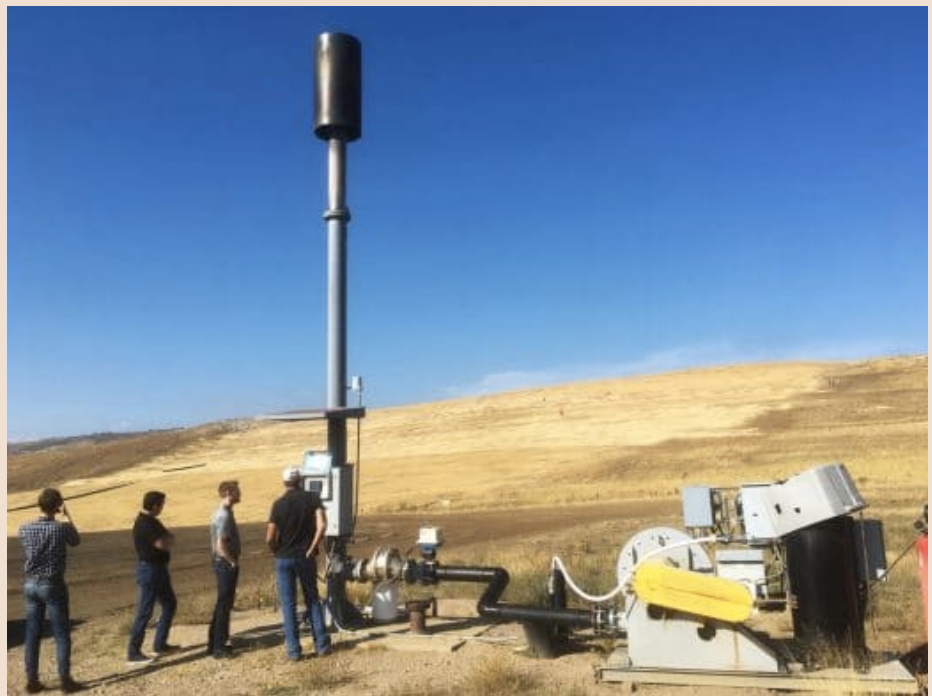
- Bundled RECs: When the renewable energy and REC are sold together creating a power purchase that is renewable and most often local.
- Unbundled RECs: When RECs are sold separate from power, this allows for a virtual transfer of renewable energy across power grid areas that may not be in the same geographic region.

Fiscal year (FY): An accounting year, often different from the typical yearly calendar. This report covers FY22 including the dates July 1, 2021-June 30, 2022.

Offsets and RECs

Two main initiatives, the purchasing of offsets and renewable energy certificates (RECs), allowed Colorado College to reach carbon neutrality for the first time on January 1st, 2020. However, we would like to clarify that 2021 was our first fiscal year that we were carbon neutral. At the moment, CC's main source of carbon offsets is the Larimer County Landfill Gas Destruction Project. This project involves the capturing of methane generated from the landfill to create electricity. REC's are certificates that allow for the accounting of an institutions' contribution to the production of renewable energy. Colorado College offsets Scope 2 emissions through the use of bundled REC's delivered with the power purchased from local solar generation. When Scope 2 emissions are certified using RECs this means that CC has purchased the right to renewable energy equivalent to the amount of energy used by the main campus. Notably, CC's purchased energy does not include RECs to offset emissions from the Gilmore Stabler Cabin (CC Cabin) or Baca Campus. Emissions from electricity use at these sites are offset through the purchasing of offsets from Larimer County Landfill.

Picture courtesy of 3Degrees, the third party that helps verify our carbon offsets. This is a picture of the flame where CO₂ is released into the atmosphere after the methane collected from the landfill has been burned.



Data Collection and Methodology

To monitor the college's greenhouse gas emissions, the Office of Sustainability established the Emissions Team. Members of the Emissions Team conduct an annual inventory of CC's emissions. The team collects emissions data by contacting the faculty or staff of various departments to collect data that specifically relates to greenhouse gas emissions. The team also conducts commuting surveys for faculty/staff and travel surveys for students. The team enters the data into the Sustainability Indicator Management and Analysis Platform (SIMAP®).



Image Source

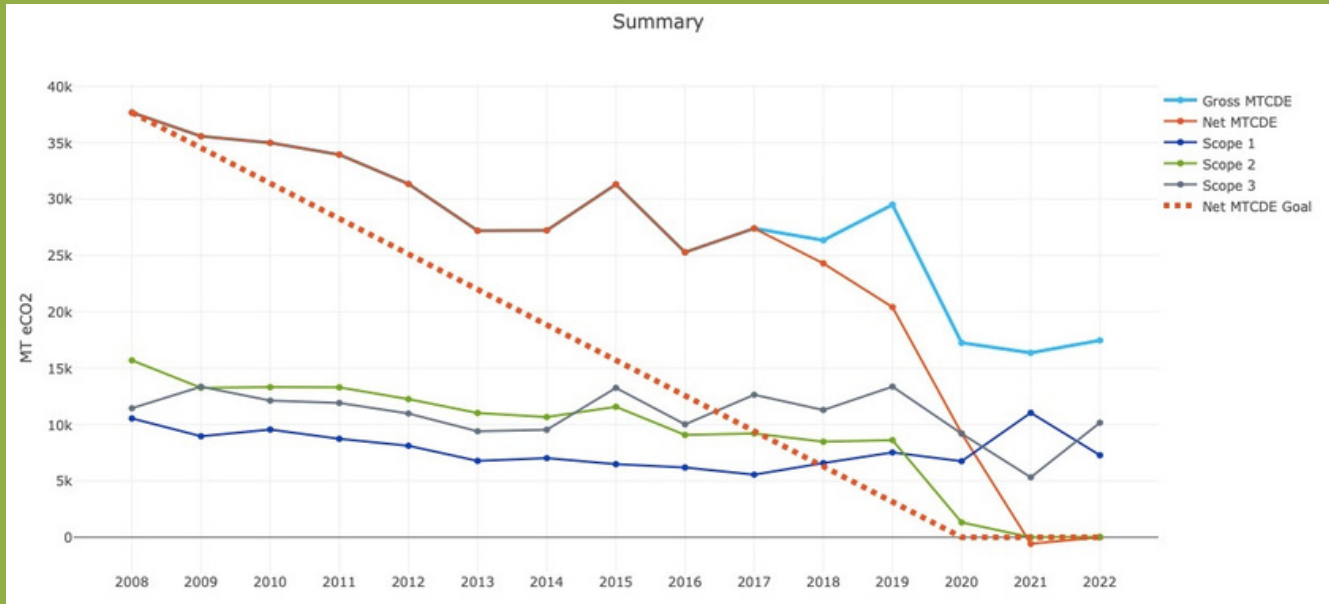
The SIMAP platform calculates the college's emissions by using emissions factors to convert our emissions data into metric tonnes of carbon dioxide equivalent (MTCO_{2e}). SIMAP's embedded calculation equations are frequently updated and based on the most recent Assessment Report of the United Nations' Intergovernmental Panel on Climate Change. Our team verifies the data and compares it to the data from the previous year to ensure its consistency and reliability.



**University of
New Hampshire**

Image Source

Introduction to Results



Overall emissions and trends for fiscal year 2008 to 2022. This includes how our emissions are broken down by scope, net emissions, gross emissions, and our carbon offsets. Emissions are measured in MTCO_{2e}.

Even as more aspects of the college's operations returned to normal after the Covid-19-induced decline in institutional energy use and travel, gross emissions remained similar to previous years and gross emissions were fully offset to maintain carbon neutrality. On-campus stationary emissions from various fuel sources contributed the most to overall emissions, at 39.9% of gross emissions, with air travel emissions also making up a significant portion of total emissions.

Note that emissions from refrigerants and chemicals have decreased from fifteen percent of gross emissions during FY21 to less than one percent of emissions for FY22. This was due to a sizable leak in a chiller rack in FY21 that led to a large leak of R-404a. The leak was subsequently fixed. Also, the stationary sources category now includes emissions for fuel sources at Gilmore Stabler Cabin (CC cabin) and Baca Campus, a small change in reporting boundaries over previous years. These changes are intended to better reflect the changing landscape of Colorado College and its properties away from the main campus.

FY22 Emissions Summary

Scopes	Emissions By Scope FY22	Percent Changes	
		FY08 - FY22	FY21 - FY22
Scope 1	7,276.93 MTCO ₂ e	-31.0%	-34.1%
Scope 2	28.11 MTCO ₂ e	-99.8%	+28.11*
Scope 3	10,160.58 MTCO ₂ e	-11.3%	+91.0%

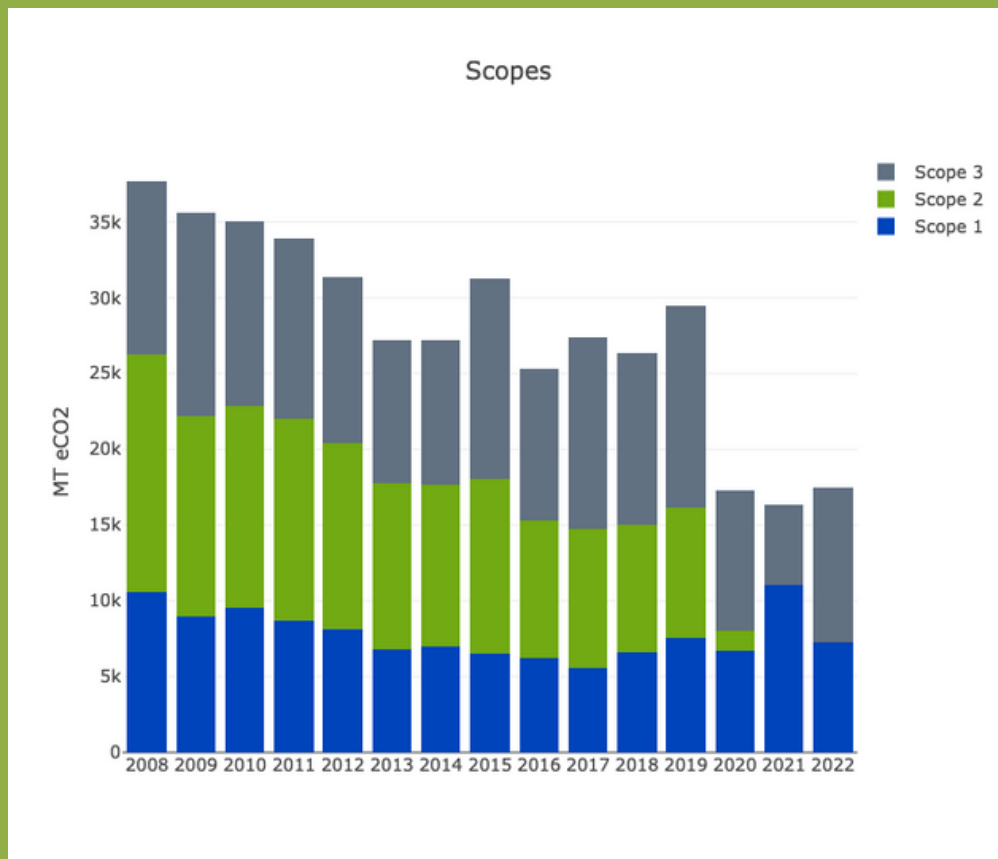
**17465.62 MTCO₂e (total) - 17465.62 MTCO₂e (offsets)
= Net Zero Emmissions!**

- Our natural gas usage decreased this year which resulted in a significant decrease in scope 1 emissions.
- *This unit is in MTCO₂e. This year we accounted for the Baca campus and the CC Cabin which makes up all Scope 2 emissions. Although these campuses use renewable energy, they do not have RECs.
- Return to normal practices such as study-abroad and directly-financed travel increased scope 3 emissions.

Results (Scope 1)

Scope 1 includes a measurement of direct emissions from sources controlled, owned and/or operated by Colorado College. This includes emissions from on-campus stationary sources, fuel for the college's vehicles, refrigerants, and fertilizer.

Scope 1, as defined by the [Greenhouse Gas Protocol](#), are direct GHG emissions from sources that are owned or controlled by the company. For Colorado College, this includes stationary sources such as propane use, distillate oil, and natural gas. Our overall Scope 1 emissions decreased from last year (FY21) from 11,042.06 MTCO₂e to 7,276.93 MTCO₂e. This is a decrease of 3,765.13 MTCO₂e, which equates to a 34.1% reduction in Scope 1 emissions. This is also a 3,265.69 MTCO₂e reduction from our baseline year of FY08, which equates to a 31.0% reduction in Scope 1 emissions.

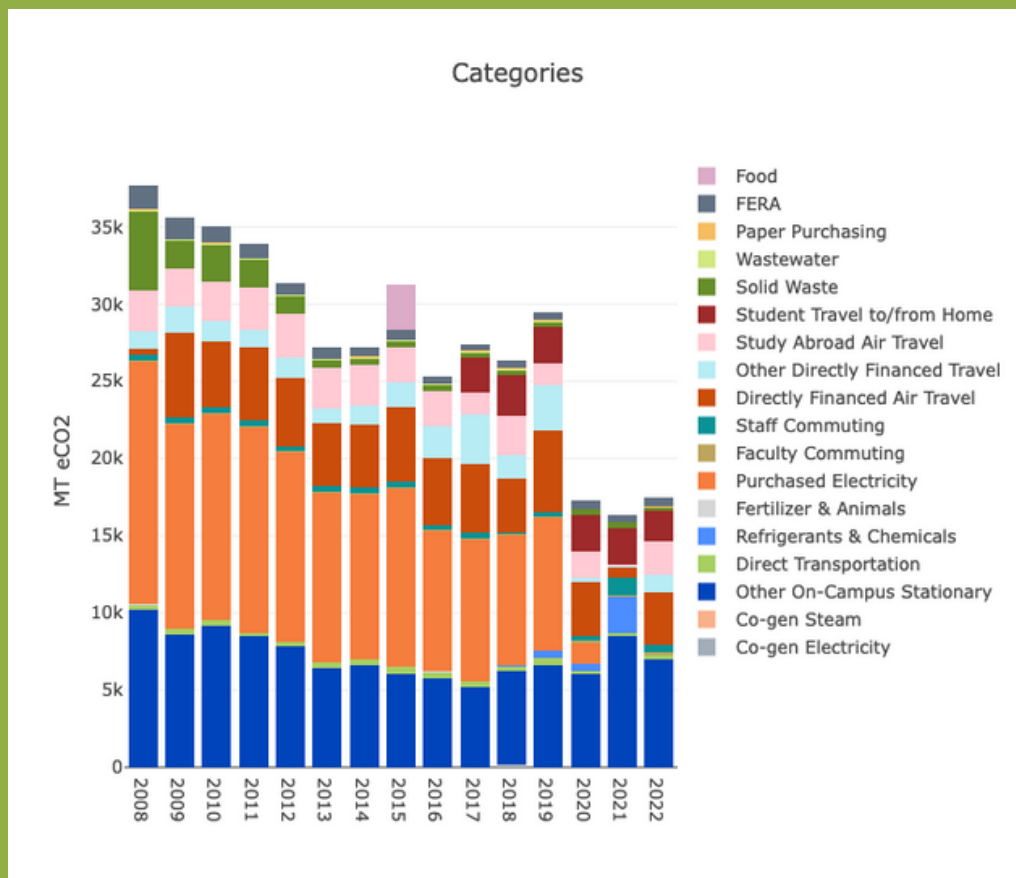


A graph depicting Colorado College's gross emissions over time by Scope starting at FY08. Blue indicates Scope 1, which is where Colorado College has the most direct control. Green indicates Scope 2, which is direct-indirect emissions. And Scope 3 is in gray, which are indirect emissions. Our baseline year is Fiscal year 2008. Measurements are Metric Tonnes of Carbon Dioxide Equivalent.

Results (Scope 1)

Compared to last year, our largest section of Scope 1 emissions, on-campus stationery, saw significant reductions. This year, our propane use increased due to the inclusion of the Baca Campus; however, our overall natural gas use went down, which likely accounts for this decrease in emissions for on-campus stationary sources. Direct transportation rose slightly. This is likely a result of the return to normal activity and more people on campus.

Refrigerant and chemical emissions also drastically declined due to the lack of leaks during this fiscal year. This was an unusual source of emissions last year and has returned to levels of normal use. We no longer have an appreciable amount of compost data thus we do not collect compost data and have no comparable data to FY08.



A chart of the sources of Colorado College's emissions. These sources are part of all three scopes. Units are in Metric tonnes of Carbon dioxide equivalents.

Results (Scope 2)

Scope 2 measures indirect emissions from electricity purchased by Colorado College. The emissions from the purchased electricity are generated at the facility where the electricity was produced, not on the Colorado College campus.

Scope 2, as defined by the Greenhouse Gas Protocol, includes emissions from the purchase of electricity that is consumed by the institution. Colorado College consumed 100% renewable energy with bundled RECs. Bundled energy RECs mean that the energy we are purchasing from is clean energy and is being produced in the same market. Our energy RECs are not being traded nor sold separately, thus our RECs are bundled. During FY21, we had zero emissions in this category. For FY22, the emissions team began accounting for the Baca campus and the CC Cabin, which do not have RECs associated with their electricity due to the fact that they are serviced by a separate power provider. This accounts for a slight increase of 28.11 MTCO_{2e} from last year. From the baseline year of FY08 to FY22, we have seen reductions of 99.8% for our Scope 2 emissions.



This image depicts one of Colorado Springs Utilities' Community Solar Gardens. Colorado Springs Utilities is the Utilities Provider for Colorado College's main campus.

Results (Scope 3)

Scope 3 includes indirect emissions that are produced by the purchasing and operational activities of sources not owned or operated by the college; however, these emissions can occur as a result of the students, staff, faculty, and college's operations or decisions. Reporting scope 3 commuting and air travel emissions is required by Second Nature's Climate Commitment. CC also chooses to measure emissions from study abroad, student travel to-and-from home, college-funded car travel, solid waste, wastewater, paper usage, and T&D losses.

Our Scope 3 emissions increased from 5,320.35 MTCO_{2e} in FY21 to 10,160.58 MTCO_{2e} this year. Although mathematically this is a 90.96% increase from last year, in comparison to our baseline year of 2008, our emissions in this category have decreased by 11.24%. In FY08, Scope 3 emissions were 11,447 MTCO_{2e}. This large increase from FY21 to FY22 is most likely due to the reinstatement of study abroad and increased travel emissions from a 'return to normal' in post-pandemic activity. Surprisingly, staff commuting emissions dropped sharply from FY21. It appears that this reduction may be due to decreases in the average distance of commute for staff driving to campus. The fact that this is a survey of a subset of the staff population indicates it may be prone to variation, and we should be hesitant to assume these results reflect the entire population.

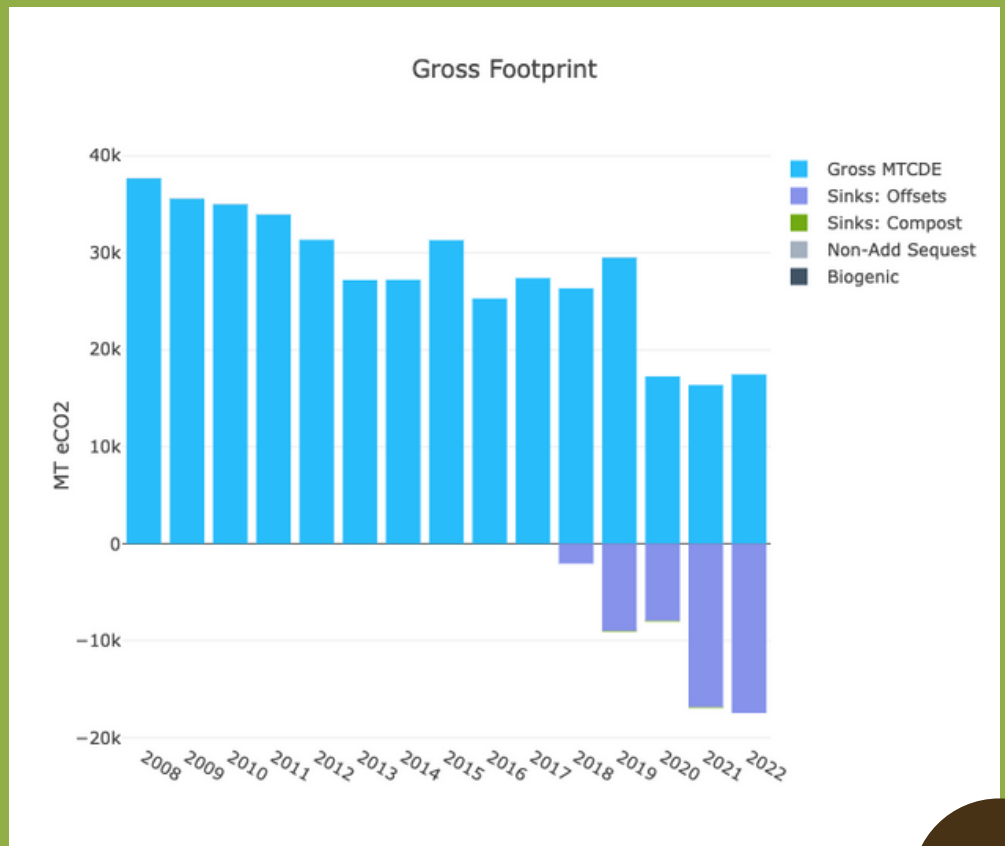
The landfill that Colorado College's solid waste goes to recently installed methane recovery and flaring, which cut our landfill emissions to one third of what they would be if there was no recovery and flaring

Gross Emissions

Through our continued efforts to maintain carbon neutrality and reduce our institution's emissions, Colorado College has continued to strengthen its commitment to sustainability across campus and in all of our operations. Emissions remained much lower than when we first began keeping track in FY08, even as the effects of Covid-19 diminished and led to an increase in campus activities and operations. It is also important to take into consideration that institutional physical spaces have increased by 13% since FY08, making achieving overall emissions reductions slightly more difficult.

Gross emissions have seen a 54% reduction from FY08 levels, and net emissions have fallen to zero with carbon offsets. Additionally, we have reduced emissions in Scope 1 and Scope 2 by 72% since FY08. From FY21, when campus operations and travel were more limited, gross emissions have increased by 6%. Additionally, gross emissions are almost identical to FY20, as they only saw an increase of 1.2% from FY20 to FY22. All of these changes indicate that Colorado College is on track to continue reducing its emissions even as the campus grows and pre-Covid-19 activities fully resume.

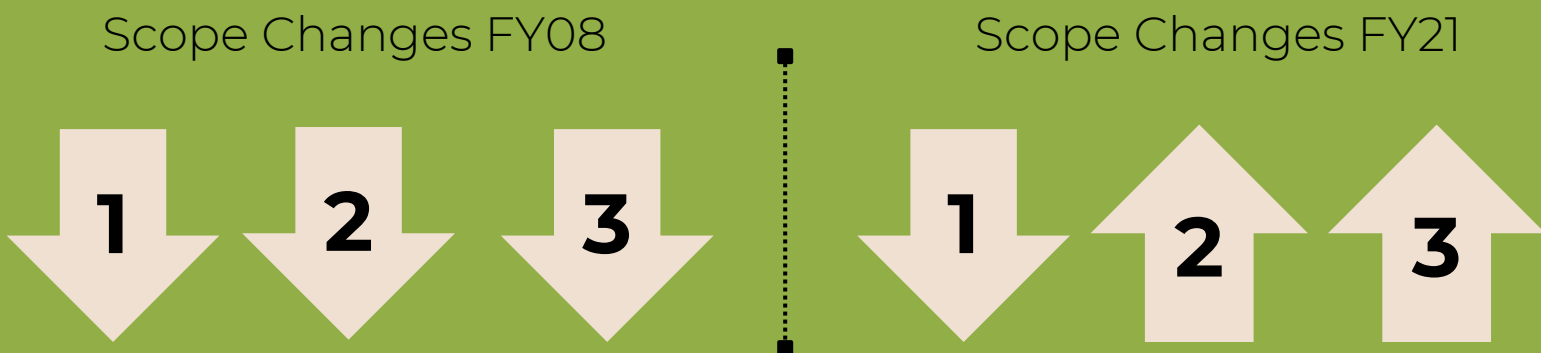
A chart of the Gross emissions footprint for Colorado College starting with our baseline year of 2008. Light blue indicates emissions and purple is carbon offsets. We did not record any compost data for FY22. All Carbon sinks are from the Larimer County Gas Destruction Project.



Changes from Last Year

This year, the Emissions Team included Colorado College properties away from the Main Campus in our greenhouse gas inventory. We believe that it is important to account for all college-owned properties in our report to better reflect our overall emissions. This means that data for the energy use at Baca Campus and the Gilmore Stabler Cabin are included in this year's report. The inclusion of Baca Campus contributed to significant increases in propane use, and the inclusion of both the Baca Campus and the Gilmore Stabler Cabin contributed to the increase in electricity-related emissions compared to FY21.

Additionally, this will be the first year (FY22) during which emissions data from the new Robson Arena will be included in our calculations. The addition of this building added significantly to overall building space and contributed to propane use due to the zamboni (the previous arena also used a zamboni, but required less propane).



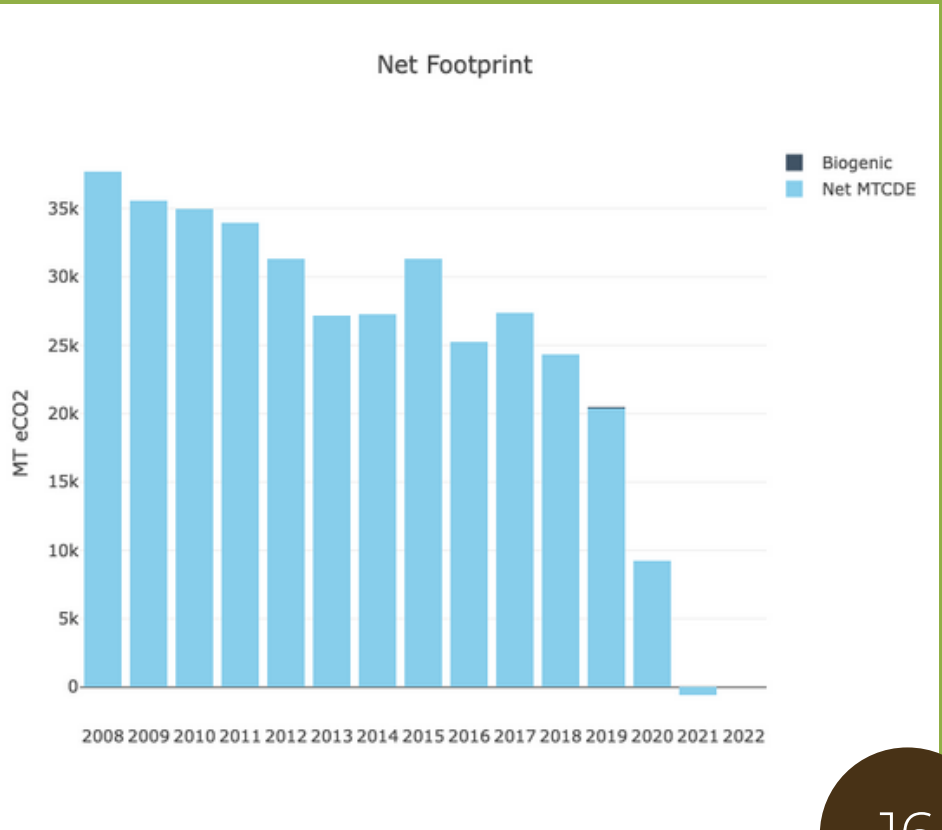
A number of emissions categories saw notable increases from FY21 to this year, FY22, that can largely be attributed to travel increases related to the lessening impact of Covid-19 on the college's operations. First, increases in transport fuel use this year contributed to large increases in Scope 1 direct transportation emissions. Large increases in business travel and study abroad also likely contributed to an increase in Scope 3 emissions from FY21. One other important change regarding transportation emissions is the inclusion of electric vehicles in data regarding staff and faculty commuting for the first time. It is possible that this contributed to the large decrease seen in staff commuting emissions from last year.

Limitations of the Data

While we strive to ensure that the data we collect is as accurate and complete as possible, there are inherent limitations that arise due to the nature of the data collection process. First, new waste data has not been available since 2018, so we continue to use data from that year. While not exact, we expect this data will provide a good estimate of our waste until we can obtain better annual data. We expect that in FY23 we will have more accurate data due to the renegotiation of our GFL (Green for Life) contract, the waste disposal service for Colorado College. In our new contract, GFL has installed scales into their trucks which will be the source of our waste data next year.

Additionally, we currently lack reliable data on solar energy produced on campus due to a change in our monitoring systems that has taken several monitors offline. Until we are able to install working meters on all solar panels, our on-campus solar energy generation will be excluded from our inventory. Lastly, since we are primarily a residential campus, with most students living on or adjacent to the main campus, data on student commuting is not collected. We instead choose to focus on collecting data on student travel to and from home on breaks, which is primarily air travel.

A chart of Colorado College's Net emissions footprint starting with our baseline year of 2008. Light blue indicates emissions, and because we did not record any compost data for FY22, there are no biogenic sources. All units are in metric tonnes of Carbon Dioxide Equivalent. This chart depicts that 2021 was our first fiscal year during which we were carbon neutral, and we continued to be carbon neutral in 2022.



Limitations of the Data

Along with areas where we lack data, we acknowledge that some data points may be prone to error. More specifically, our surveys to collect data on faculty and staff commuting and student travel are representative samples at best. It is possible that we missed certain segments of the college community in our survey efforts. Data points for some sources, including propane used by the zamboni in Robson Arena, were estimates and will require more accurate purchase and use data in the future.

While we acknowledge that there are some sources of error in our data, we believe that small amounts of error are inherent to any data collection process taking place on a scale such as this. Even with this error, we are confident in the accuracy of our data and believe that this report is an honest reflection of Colorado College's greenhouse gas emissions within the current boundaries.

Lastly, we have decided to maintain our baseline year of 2008, our original greenhouse gas inventory year. While the Greenhouse Gas Protocol guidance suggests updating our baseline year as boundaries change, we believe that at the moment, our baseline year of 2008 best supports our efforts to reduce our overall emissions and stay on track with our goals. Additionally, our emissions reductions goals, which will be discussed in more detail later in this report, are based on data from fiscal year 2008, so we feel maintaining this baseline year for the time being will help us measure our progress and meet our emissions goals.

Looking Ahead

Several categories of emissions stand out as areas where Colorado College could work to make significant improvements in the coming years. While Scope 2 emissions are almost at zero and have seen large decreases since the baseline year of 2008, Scope 3 and Scope 1 emissions show less drastic changes from 2008 levels. We expect travel to be the area with the most room for improvement in Scope 3, with both more sustainable transportation and stationary sources being important focus areas for Scope 1.

Colorado College has outlined a number of specific goals for future emissions reductions in Scopes 1 and 3. The college seeks to decrease Scope 1 emissions by an additional 25% from the 2008 baseline by 2030 and to decrease Scope 3 emissions by an additional 25% from 2008 levels by 2027. To reduce Scope 1 emissions, the Office of Sustainability plans to focus on improving the efficiency of buildings and electrifying the vehicle fleet. Regarding Scope 3 emissions, the Office is working to implement a travel offset program in order to reduce unnecessary travel and emissions.

Conclusion

For the second year in a row, Colorado College has maintained its carbon neutrality, fully offsetting any institutional emissions that remain. While we believe that this is an important achievement for the college, our commitment to sustainability does not end here. Colorado College will continue to work to reduce our emissions, so that less emissions need to be offset every year. This will require action not just from the college leadership, but from individuals across the community who work to become more aware of their own contribution to emissions and change their behavior to live more sustainably. Ultimately, we hope to continue lowering our Scope 1 and Scope 3 emissions towards zero. While we agree that this will be difficult given the significant progress already made in reducing emissions, the Office of Sustainability and the Colorado College community are uniquely prepared to tackle this challenge in the coming years.

Acknowledgements

We would like to thank the many individuals whose support made the collection of emissions data and completion of this report possible. Collection of data necessary for this report and creation of the report itself was carried out by the Emissions Team at the Office of Sustainability with the help of Mae Rohrbach, Coordinator of the Office of Sustainability, and Ian Johnson, Director of the Office of Sustainability. The Emissions Team is composed of two interns, Erin Mullins and Holden Maxfield, and three volunteers, Louise Dellarco, Iris Guo, and Emma Nawara. We would also like to thank the following individuals for their assistance in providing us with a multitude of data necessary for this project:

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