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Greenhouse Gas Inventory Technical Report

Colorado College
Office of Sustainability

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Introduction

The goal of this report is to provide an overview of Colorado College's (CC) carbon emissions. CC began tracking carbon emissions in 2008 and made a goal to be carbon neutral by 2020. That goal was accomplished on January 1st, 2020. This report provides an overview of emissions data for Fiscal Year '20 (FY20), or July 1st 2019-June 30th 2020. It includes Colorado College's gross emissions, as well as net emissions that take into account carbon offsets and carbon sinks (carbon sequestration by compost). Colorado College tracks its carbon emissions by submitting annual reports to AASHE STARS® and Second Nature, two organizations dedicated to assisting sustainability initiatives in higher education institutions.

This report begins by providing a snapshot of CC's FY20 gross and net emissions. We provide information about greenhouse gases and the different "scopes" CC uses to differentiate sources of carbon emissions. We also explain carbon neutrality, carbon offsets, and Renewable Energy Certificates (RECs). The report then moves on to summarize the data collected during the FY20 greenhouse gas inventory process, beginning with methodology and ending with graphs from SIMAP®, the online platform used for the inventory. Lastly, we provide an update on past recommendations to lower our carbon emissions, as well as offer new recommendations for lowering our current emissions.



FY20 Emissions Snapshot

Overall Emissions



Emissions by Scope

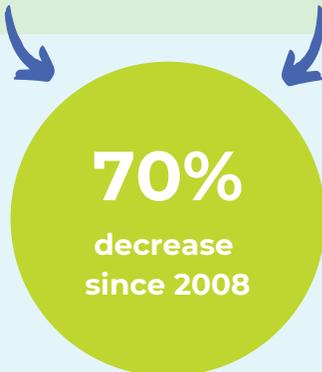
6748.21
Gross Scope 1 Emissions
(MTCO2E)



1325.72
Gross Scope 2 Emissions
(MTCO2E)



9164.27
Gross Scope 3 Emissions
(MTCO2E)



8073.93
Combined Gross
Scope 1&2 Emissions
(MTCO2E)

2008 is CC's
baseline year for
measuring carbon
emissions.

Measuring Greenhouse Gases

Greenhouse gases (GHGs) include gases such as carbon dioxide, water vapor, methane, and nitrous oxide. Solar radiation (sunlight) is absorbed by the Earth and released back into space. However, GHGs in the atmosphere absorb the energy that is trying to leave and radiate it back at the Earth. More energy is reabsorbed than is released; excess heat is prevented from leaving the atmosphere. This imbalance leads to global warming. Increased emissions from human activities are increasing the amount of GHGs in the atmosphere, which is exacerbating global warming.

Colorado College keeps track of GHG emissions by sorting them into categories based on their source. These are called “scopes”:

Scope 1 - Direct Institutional

Scope 1 emissions measure direct emissions from sources that are owned and/or operated by Colorado College. This includes natural gas for heating, gasoline and diesel for CC's vehicle fleet, and fertilizers and refrigerants.

Scope 2 - Indirect Institutional

Scope 2 emissions measure indirect emissions from the generation of purchased electricity.

Scope 3 - Indirect Behavioral

Scope 3 emissions are related to behavioral choices. CC has chosen to measure emissions from study abroad, faculty and staff commuting, student travel to and from home, business travel paid for by Colorado College, solid waste and wastewater, and paper usage.



Carbon Neutrality

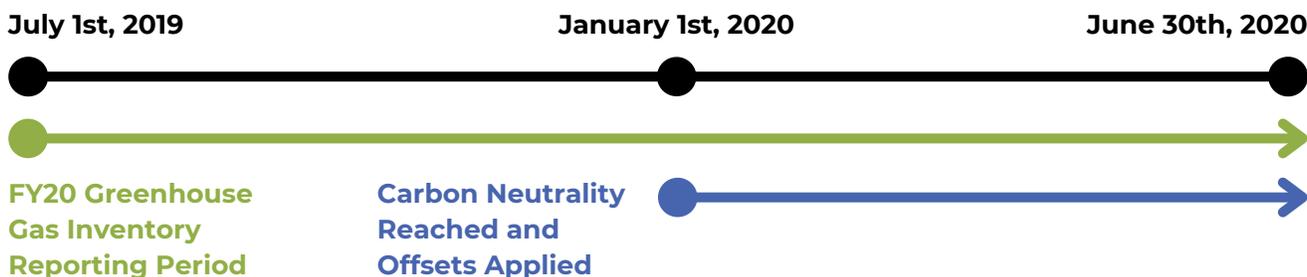
COLORADO COLLEGE

CARBON **NEUTRAL 2020**

On January 1st, 2020, Colorado College officially became a carbon-neutral institution. Carbon neutrality is defined as “having no net greenhouse (GHG) emissions, which is achieved by eliminating net GHG emissions, or by minimizing GHG emissions as much as possible, and using offsets or other measures to mitigate the remaining emissions” (ACUPCC). CC’s status as a carbon-neutral institution does not mean that the college doesn’t produce carbon emissions. Any carbon emissions still generated by CC are balanced out by carbon offsets purchased by the college. Since 2008, CC’s net emissions in all scopes have decreased dramatically—Scope 2 emissions have now decreased by 100%.

This year’s technical report is the first to account for carbon neutrality. It is important to note that this year’s greenhouse gas inventory occurred across the fiscal year, whereas CC reached carbon neutrality at the beginning of the calendar year. This means that carbon neutrality was met halfway through our emissions reporting period. For this year’s report, Colorado College appears to be “half” carbon-neutral because offsets could only be applied to emissions from January 1st, 2020 onward. Next year’s data will fully capture Colorado College having met carbon neutrality.

An example of this misalignment is that reaching carbon neutrality allowed CC to decrease Scope 2 emissions by 100%; the college began purchasing solely renewable energy on January 1st, 2020. However, the data from the FY20 inventory process states that Scope 2 emissions have decreased by 92% (as shown on the emissions snapshot page) because our reporting period includes emissions from before carbon neutrality was reached.

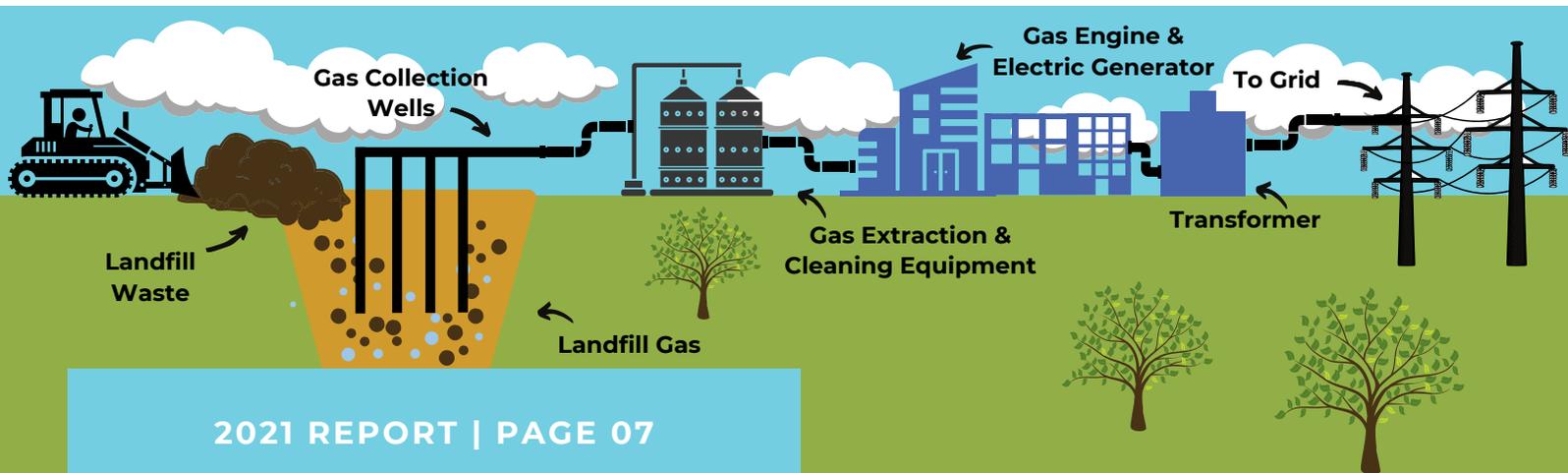


Offsets and RECs

Colorado College achieved carbon neutrality through investments in carbon offsets and renewable energy certificates (RECs). Carbon offsets are used to offset emissions from Scope 1 and 3 sources. One carbon offset represents the removal or avoidance of one metric ton of carbon dioxide equivalent (MTCO₂E). This is a way to quantify the emission of GHGs. There are two main tactics to offset emissions: sequestration and avoidance. Sequestration focuses on capturing and storing carbon in trees, forests, soil, and other natural materials. Avoidance means changing business as usual, therefore avoiding future emissions.

Colorado College invests in an emissions avoidance project at Larimer County Landfill in Fort Collins, Colorado. This project, called the Larimer County Landfill Gas Destruction Project, breaks down methane in landfill waste and uses it to generate electricity. It converts previous sources of emissions into something much less potent, while also generating electricity. CC's investment in this project was instrumental in helping with the project's verification. CC has since used offsets from the project to reach carbon neutrality. Once the college invests in offsets, they are “available” until the amount of carbon they offset is used up. After this, they are “retired.”

To offset Scope 2 emissions from purchased electricity, Colorado College uses Renewable Energy Certificates (RECs). RECs allow the tracking of where purchased electricity is coming from to ensure that the electricity sources are renewable. The RECs that CC buys are “bundled.” This means that they come bundled with the local renewable energy that generated them. Similarly to offsets, once a REC has been assigned to a certain amount of electrical generation, the REC is “retired.” One REC is equivalent to one megawatt-hour (MWh) of electrical generation. To put this into perspective, one MWh of electricity can power an average U.S. home for 1.2 months. Investing in RECs is important because it supports the development of renewable energy and prioritizes renewable energy generation.



Data Collection and Methodology

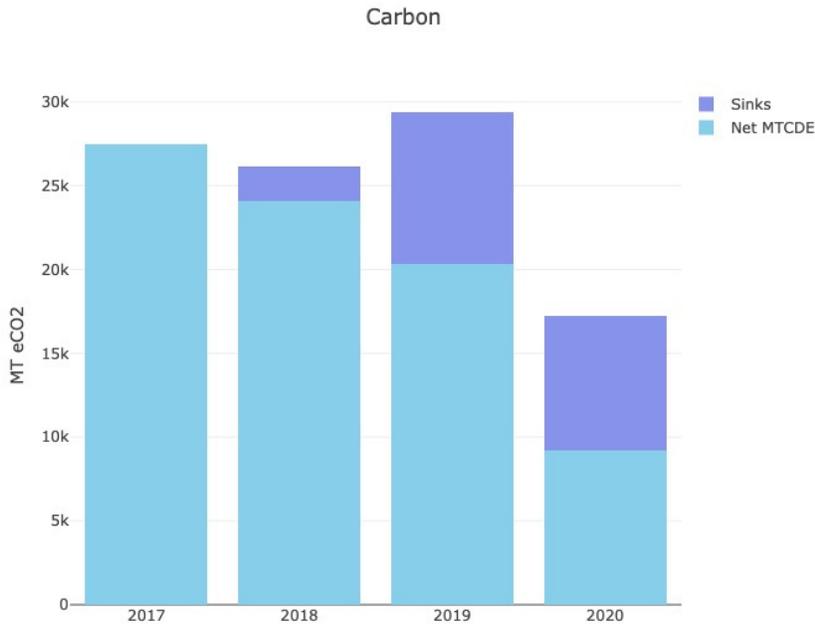
The Office of Sustainability created the Greenhouse Gas Inventory (GHG) Team to keep track of the college's carbon emissions. Every year, the members of the GHG team complete an inventory of these emissions. The team contacts faculty and staff to gather emissions data, and also runs surveys for student travel and faculty/staff commuting data. After compiling and organizing the data, it is entered into the Sustainability Indicator Management and Analysis Platform (SIMAP®).

SIMAP uses emissions factors to convert our emissions data into metric tons of carbon dioxide equivalent (MTCO₂E), which is how we quantify our overall emissions. The algorithms used by SIMAP are based on the latest science from the United Nations' Intergovernmental Panel on Climate Change's most recent Assessment Report and are updated frequently. From the emission factor conversions, the annual greenhouse gas inventory is created. Our team verifies the data and compares it to the previous year's data for consistency and reliability.

Due to the Covid-19 pandemic, data for faculty and staff commuting and student travel to and from home was unavailable, so data from 2019 was used in this year's reporting. Therefore, it is probable that emissions from these areas were over-reported. Last year's data was also reported for landfill waste and on-campus compost. The college's drop in emissions after Block 7 when operations dropped off is reflected in some, but not all of the data because some data had to be reused. The Scope 3 emissions reported for FY20 are likely overestimated.

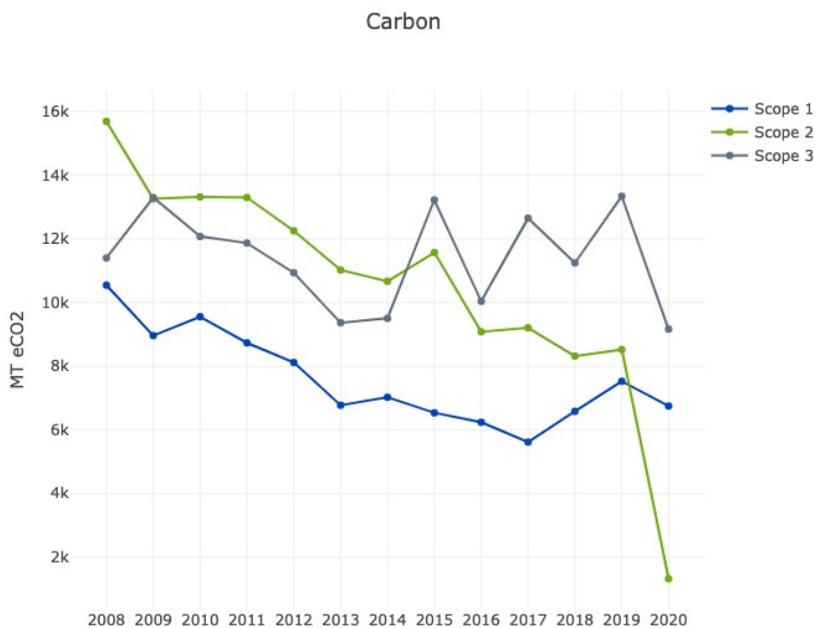


Data Summary



Data from SIMAP®

This graph shows CC's net carbon emissions and carbon sinks (offsets and carbon sequestration via compost) from 2017-2020. Both are measured in MTCO2E. The data from 2020 show that half of CC's gross emissions were covered by offsets and other sinks; this is due to the disconnect between FY20 and the calendar year. Any remaining gross emissions will be fully offset through the full fiscal years in the future.

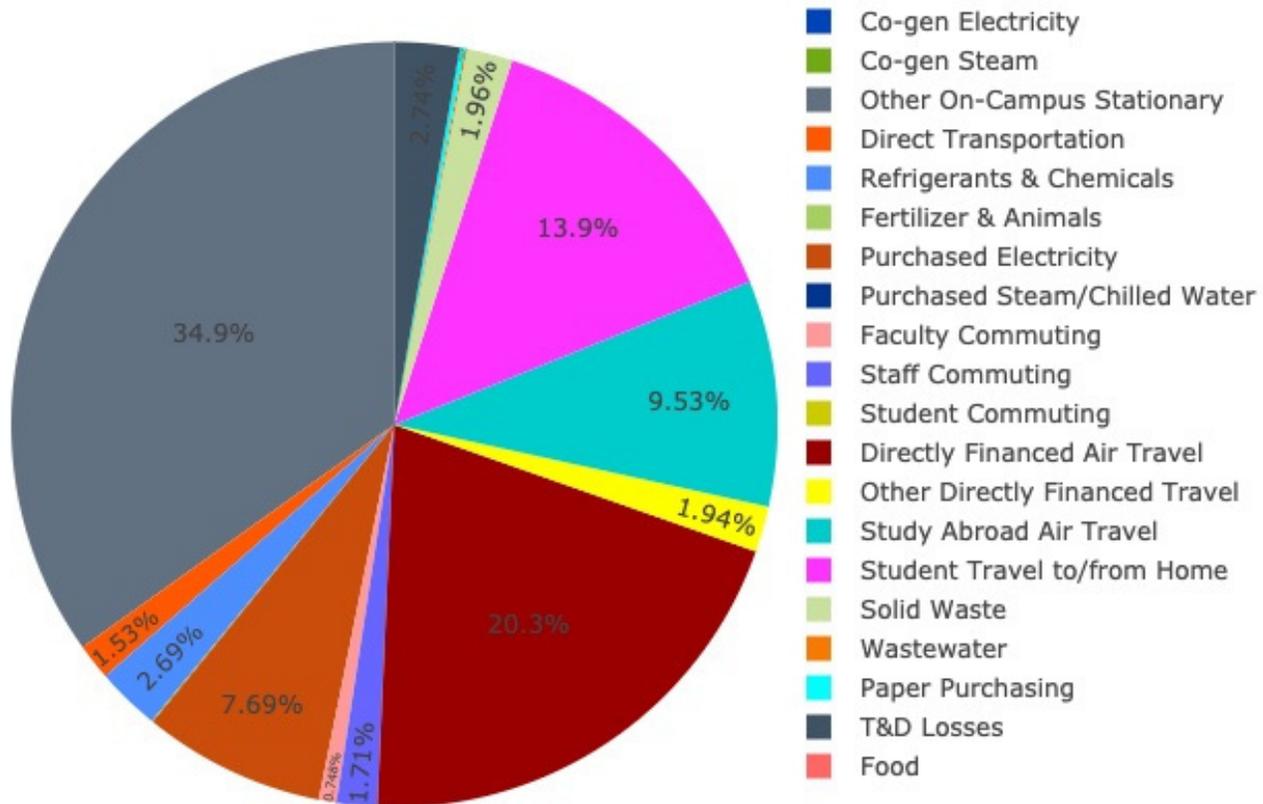


Data from SIMAP®

This graph breaks down CC's gross carbon emissions by scope since our base year, 2008. There are downward trends in all three scope categories, with Scope 3 numbers varying from year to year. Carbon emissions from all scopes decreased in 2020, and Scope 2 emissions are all but gone.

Data Summary

Carbon: 2020



Data from SIMAP®

This chart shows each source of carbon emissions that are included in the college's greenhouse gas inventory process. Based on this chart, CC's three largest categories of gross emissions for FY20 were other on-campus stationary sources (which includes distillate oil and natural gas), directly-financed air travel, and student travel to and from home. It is important to note that for this inventory year, FY19 data was used for student travel to and from home because of complications collecting data due to the pandemic. It is highly likely that this number is an overestimate of what the numbers would actually be for FY20. Something interesting to note is that all of CC's "travel emissions" are the largest category of remaining gross emissions. This is an important category to focus on for future emissions reductions.

Goals and Future Recommendations

In last year's technical report, Paige Shetty '20 recommended that CC introduce a shadow pricing strategy for carbon. Increased emission of greenhouse gases creates future costs to the health of humans and ecosystems. These costs are often felt by people not responsible for the emissions.

Shadow pricing would incorporate \$85 per MTCO₂E into the life cycle cost of new buildings and other capital-intensive investments, thereby increasing the incentive to reduce emissions. Due to the pandemic, this recommendation has not been acted upon; however, it is an important idea to consider for the future of carbon emissions at CC.

Another recommendation is that emissions from business travel be broken down by department, rather than being reported for the institution as a whole. This would better inform CC's many departments of the impacts of their travel habits.



Appendix: FY20 Greenhouse Gas Inventory Data

	Category	MTCO2E	
Scope 1	Other On-Campus Stationary	6012.31	
	Direct Transportation	264.03	
	Refrigerants and Chemicals	463.16	
	Fertilizer and Animals	8.71	
Scope 2	Purchased Electricity	1325.72	
Scope 3	Faculty Commuting*	128.9	
	Staff Commuting*	295.05	
	Directly Financed Air Travel	3503.93	
	Other Directly Financed Travel	333.89	
	Study Abroad Air Travel	1643.06	
	Student Travel to/from Home	2400.85	
	Solid Waste*	337.28	
	Wastewater	12.6	
	Paper Purchasing	36.13	
	T&D Losses	472.59	
Sinks	Offsets and RECs	-7956.24	
	Compost*	-82.47	
Totals	Total Scope 1	6748.21	
	Total Scope 2	1325.72	
	Combined 1 and 2	8073.93	
	Total Scope 3	9164.27	
	Total Gross Emissions	17238.21	
	Total Sinks	-8038.71	
	Total Net Emissions	9199.5	
	*FY19 data used due to the pandemic		

Acknowledgements

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