

Auraria Sustainable Campus Program

Auraria FY2019 Greenhouse Gas Inventory and Climate Action Game Plan

Executive Summary

Author: Jackie Slocombe

Prepared for the Auraria Sustainable Campus Program
Master of Urban and Regional Planning Candidate



College of Architecture and Planning
UNIVERSITY OF COLORADO DENVER

Prepared by:
Jackie Slocombe

Prepared for:
Auraria Sustainable Campus Program/ Auraria Higher Education Center
Denver, CO
Chris Herr, Sustainability Officer
Chris.herr@ahec.edu

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Author's Note: The capstone client preferred footnotes and Chicago Manual of Style citations instead of APA citations. For this program requirement, those footnotes are converted to APA style to satisfy industry standards. Footnotes are maintained to avoid lengthy parenthetical citations in the middle of callout bubbles, etc.

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In fiscal year 2019, activity related to Auraria campus operations generated 67,407 metric tons of carbon dioxide equivalents (MT CO₂e). This includes emissions related to campus energy consumption, commuting, directly-financed air travel, landfilled waste and a handful of small indirect emissions sources; it does not represent an exhaustive inventory of Auraria's indirect emissions sources, such as embodied energy or supply chain emissions. The portion of emissions generated by building energy use totaled 32,571 MT CO₂e in fiscal year (FY) 2019. Put into



64,740 MT CO₂e generated in FY 2019

3,718 lb CO₂e/headcount (faculty, staff and students)



32,571 MT CO₂e (Scope I and II)

22 lb CO₂e/Sq Ft.



16.4% (from 2008 baseline)



2020 Projection: 18.5% decrease

without any changes (just additional library solar production)

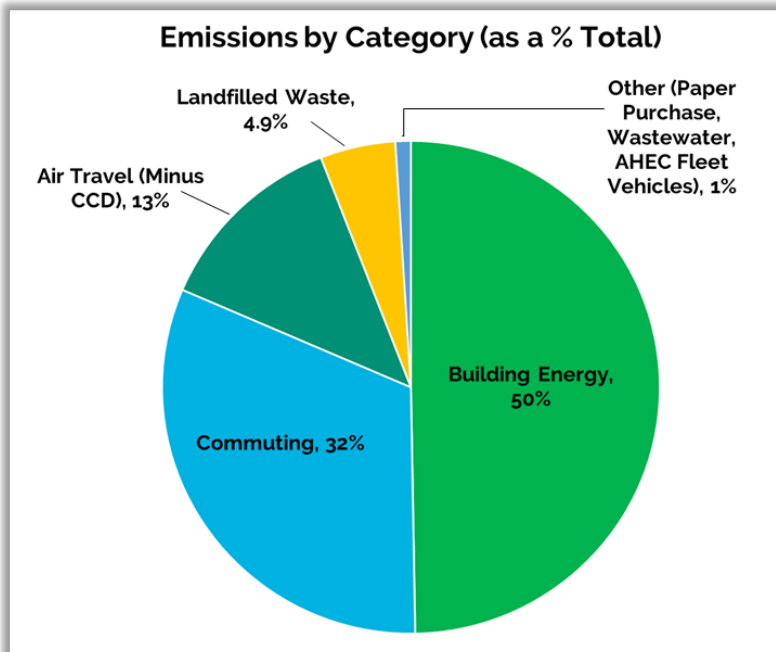
perspective, these building-related emissions are generated at a rate of roughly 22 lbs of CO₂e per gross square foot of buildings on the Auraria campus (which totaled over 4.3 million square feet in FY2019). Total campus emissions normalized per full-time-equivalent (FTE) pupil (which sums to 38,925 across students, faculty and staff) is 3,718 lbs. of CO₂e/FTE. When these emissions are split amongst the three institutions responsible (based on headcount and building occupancy), MSU Denver is responsible for 53%, CU Denver is responsible for 32% and the Community College of Denver (CCD) is responsible for 15%.



School	% Total	Emissions (MT CO ₂ e)	Scope I & II Emissions (ACUPCC)
MSU Denver	53%	34,961	17,366
CU Denver	32%	20,973	10,418
CCD	15%	9,638	4,787
Total	100%	65,573	32,571

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When broken out by emissions source (by category), 50% of Auraria’s emissions are generated by building energy consumption, and a staggering 38% of total emissions are from electricity alone. Thirty-two percent of emissions are generated by commuting behavior to and from campus (automobile, bus and light rail), 12% is generated by directly-financed air travel and 5% is generated from the anaerobic decomposition of landfilled waste. The remaining 1% is comprised of paper procurement, gasoline for fleet vehicles and wastewater treatment. Several emissions sources (ie: supply chain emissions, construction emissions, embodied energy) were not quantified due to lack of time and data and could be investigated in the future.



To limit catastrophic climate change, warming must be limited to 1.5° C (2.7° F).

This means reducing GHG emissions 45% from 2010 levels by 2030, and 100 percent by 2050¹.

Normalizing emissions per square foot or per full-time-equivalent student offer a means of comparison with other educational institutions. In FY2019 Auraria generated an estimated 20.5 MT CO₂e/1,000 square feet and 1.9 MT CO₂e per student FTE. When considering *just* building-related emissions (arguably a more relevant metric when normalizing by built square footage), Auraria generated 10.2 MT CO₂e/1,000 square feet. When Auraria’s normalized metrics are compared with national datasets or peer institutions, the Auraria campus appears to be in the “middle of the pack”—particularly in regards to overall (scope I, II and III) emissions.

In FY2019 Auraria generated an estimated **20.5 MT CO₂e/1,000 square feet and 1.9 MT CO₂e per student FTE**

While Auraria’s building-related emissions are slightly lower than the national average and other front range schools, it is worth noting that Auraria, unlike these peer institutions, does not provide 24-hour housing and dining services that require additional electricity, air conditioning and heating—suggesting that energy efficiency is an area of improvement for this campus. Energy use intensity (EUI) metrics—which define how intensely buildings consume energy—suggest that

¹IPCC (2018). [“Global Warming of 1.5°C: An ipcc special report on the impacts of global warming of 1.5°c above pre-industrial levels and related global greenhouse gas emission pathways. Intergovernmental Panel on Climate Change.](#)

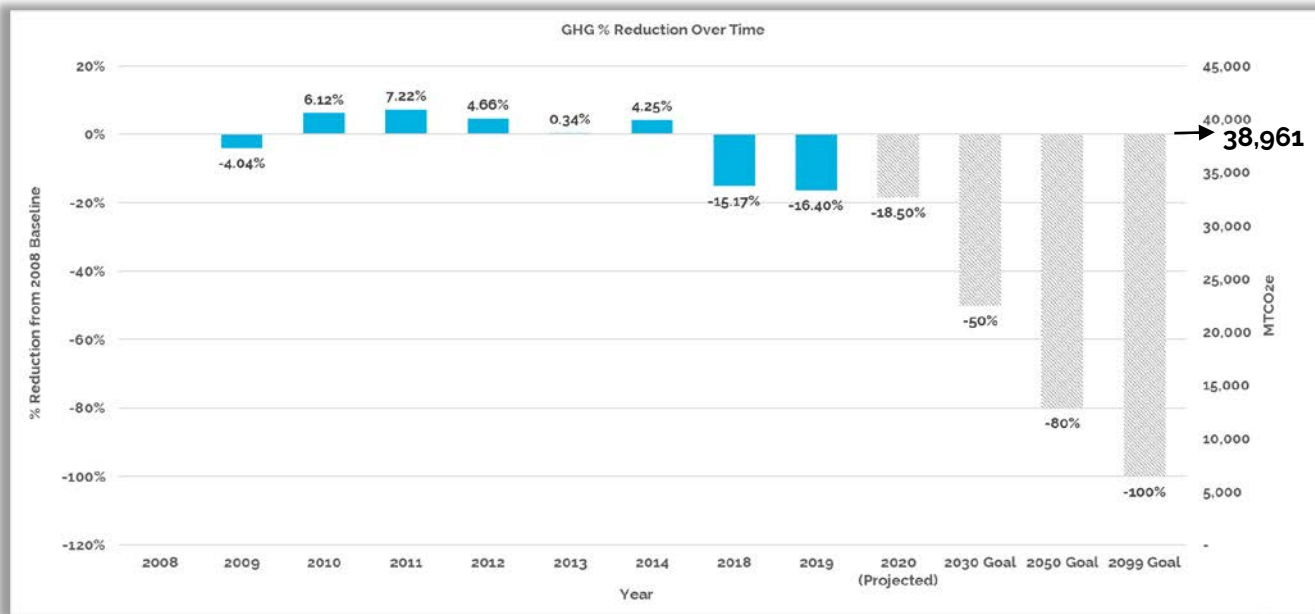
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Auraria lags considerably behind the national average for similar building use types.

While Auraria consumes an average 93.2 kBtu/square foot, the average college or university building consumes 87.3 kBtu/square foot and the average building at a vocational school consumes 52.4 kBtu/square foot². Based on Auraria’s annual energy consumption and expenses, the Department of Energy’s ROI calculator suggests that if Auraria operationalizes their energy management information system (EnergyCap) and actively monitors and analyzes energy use (through an Energy Manager), energy consumption could be decreased by 11% (32,863,885 MMBtu) over a two year period³, and continue to decrease in the succeeding years. This could save Auraria somewhere in the ballpark of \$650,000 a year—over 10% of AHEC’s projected FY20 shortfall from lost revenue due to the COVID-19 pandemic.

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In 2007, the three institutions comprising the One Auraria campus signed the American Colleges and Universities President’s Climate Commitment (ACUPCC), committing to reduce scope I and II greenhouse gas (GHG) emissions 20% below 2008 levels by the year 2020, 50% by 2030 and 80% by 2050. On the Auraria campus, scope I and II emissions are effectively emissions related to energy consumed in buildings. As of July 2019, Auraria had reduced emissions 16.4% relative to the 2008



GHG reductions from 2008 baseline over time

²EnergyStar Portfolio Manager (2018). Technical reference: U.S. energy use intensity by property type, as obtained from Commercial Buildings Energy Consumption Survey. *U.S. Energy Information Administration*.

³Based on an ROI calculator and report generated from the results of the DOE’s Better Buildings Campaign, which tracked energy savings across 679 buildings after installing an EMIS. Auraria’s numbers are based on \$5.7 million in energy spend across all four institutions and 298 million kBtu annual energy consumption.

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baseline; this was almost entirely due to Xcel adding more renewable sources to the local electricity grid that powers the Auraria campus. If energy consumption, commuting behavior and waste generation remain the same in FY2020, the Auraria campus is estimated to achieve an 18.5% reduction from the 2008 baseline, due to partial ownership of Renewable Energy Credits (RECs) associated with the brand new library solar array.⁴ If accurate, this estimate would place Auraria just 1.5 percentage points short of the 2020 ACUPCC commitment.

Climate change and climate action are heating up on the global stage and calls to action are particularly energized by advocacy amongst our global youth—many of whom attend the Auraria campus or will in the near future. The Intergovernmental Panel on Climate Change (IPCC) reports that emissions must be cut by 45% by 2030 and 100% by 2050 to limit global warming to under 1.5° Celsius and therefore avoid catastrophic climate change⁵. Last May, here in Colorado, legislators passed [House Bill 1261](#), requiring adherence to state GHG reduction targets as follows: a 50% reduction from 2005 emissions by 2030 and a 90% reduction by 2080. With the end of FY2020 around the corner, it is time for campus leaders to revisit Auraria’s climate commitments and re-commit to even bolder action that is necessary to reduce campus GHG emissions.

House Bill 19-1261: Climate Action Plan to Reduce Pollution

Establishes statewide GHG reduction goals (relative to 2005 baseline):

- 26% reduction by 2025
- 50% by 2030
- 90% by 2050

93%

of surveyed students agree:

"It is important to me that the Auraria Campus prioritize climate action and the reduction of our campus' greenhouse gas emissions..."⁶

The next five to ten years will be defining for the issue of climate change. The manner in which this *One Auraria* campus conducts itself over that time frame—as a higher education institution embracing and symbolizing a spirit of ingenuity—will have a lasting impact on the global *One Planet* we share. The ASCP hopes that this report will serve as a blueprint to guide an engaged campus-wide climate action planning process, set to commence this June and conclude by December 2020 with the signing of renewed GHG reduction

commitments. It is imperative that both the results of this GHG inventory and the forthcoming climate action planning process be transparent, accessible, graphically engaging and interactive. By making use of open source tools and web-based integrations, bringing the planning process into the public eye and gaining public buy-in from institutional leaders, the ASCP can increase the effectiveness and implementation of climate action on campus.

⁴Note: The library array actually offsets ~2.5% of campus electricity consumption (670 MT CO₂e) or ~2% of building emissions. However, until 2040, Auraria only owns 35% of the environmental attributes. For more information, reference footnote 21 in the associated full report.

⁵IPCC (2018).

⁶This data was taken from the current ASCP Campus Sustainability survey that currently has 170 responses and will continue collecting responses through the end of the year.