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Chapman University
FY23 Greenhouse Gas Analysis

March 2024

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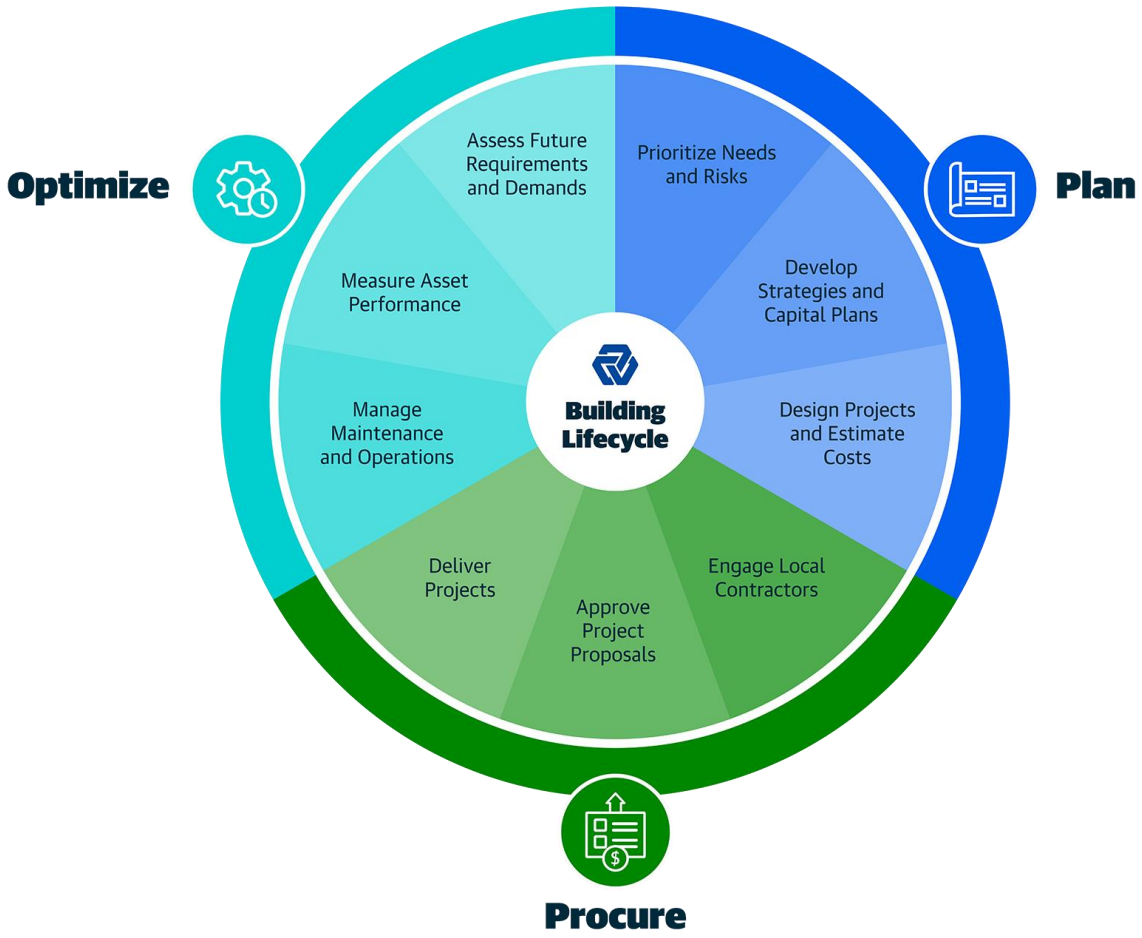
Effectively Manage the Entire **Building Lifecycle**



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Comprehensive Capital Planning Solutions

Return on Physical Assets (ROPA)

Benchmark key facilities metrics against peers and Gordian's database to improve efficiency and effectiveness of space, operation & investment

Space Utilization

Utilization analysis for teaching spaces to identify opportunities to match campus space with programmatic needs

Sustainability Solutions

Quantify GHG inventory, identify opportunities for carbon mitigation, satisfy reporting requirements

Facility Condition Assessments

Expert evaluation of facilities and site conditions to identify deferred needs, upcoming needs, critical issues and compliance considerations

Strategic Capital Planning

Develop, communicate and execute capital investment plans that are inclusive, credible, flexible, affordable and sustainable

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Sustainability Solutions Agenda

- Overview of Sightlines Data Analysis
- Summary of Emissions Profile
- Utility Specific Analysis
- Scope 1 Emissions Overview
- Scope 2 Emissions Overview
- Scope 3 Emissions Overview

SIMAP Partnership

At the end of 2017, Gordian entered into a partnership with the Sustainability Institute at the University of New Hampshire, ensuring our Sustainability Solutions are always based on the most up-to-date science and methods.

They host *Sustainability Indicator Management & Analysis Platform* (SIMAP). This is a carbon and nitrogen-accounting platform that tracks and analyzes campus-wide sustainability based on nearly two decades of work supporting campus inventories.

University of New Hampshire

SIMAP
SUSTAINABILITY INDICATOR MANAGEMENT & ANALYSIS PLATFORM

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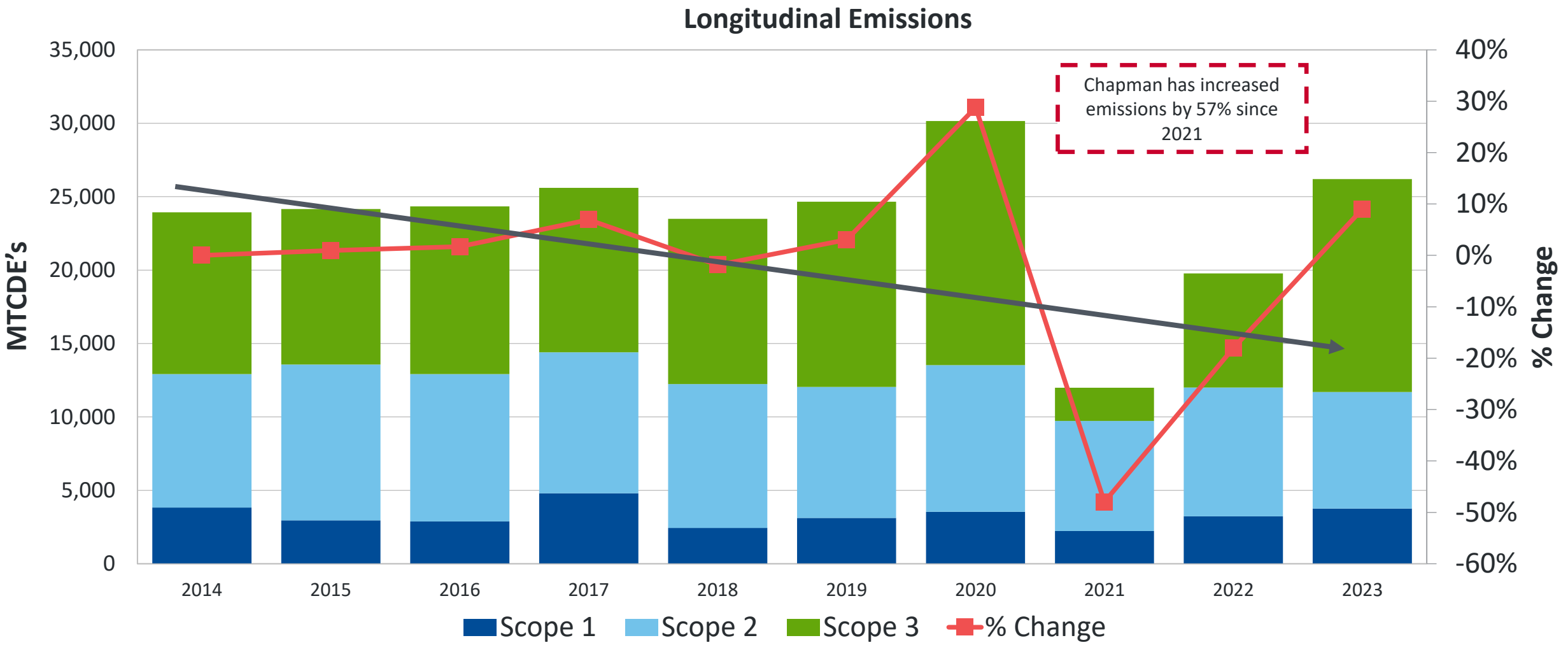
Components of Chapman's Emissions Profile

Scope 1 Direct GHGs	Scope 2 Upstream GHGs	Scope 3 Indirect GHGs
• On-Campus Stationary • Vehicle Fleet Fuel • Refrigerants • Fertilizer	• Purchased Electricity	• Faculty/Staff/ Student Commuting • Directly Financed Air & Ground Travel • Study Abroad Travel • Solid Waste • Wastewater • Paper Purchasing • Transmission & Distribution Losses

Emission Summary

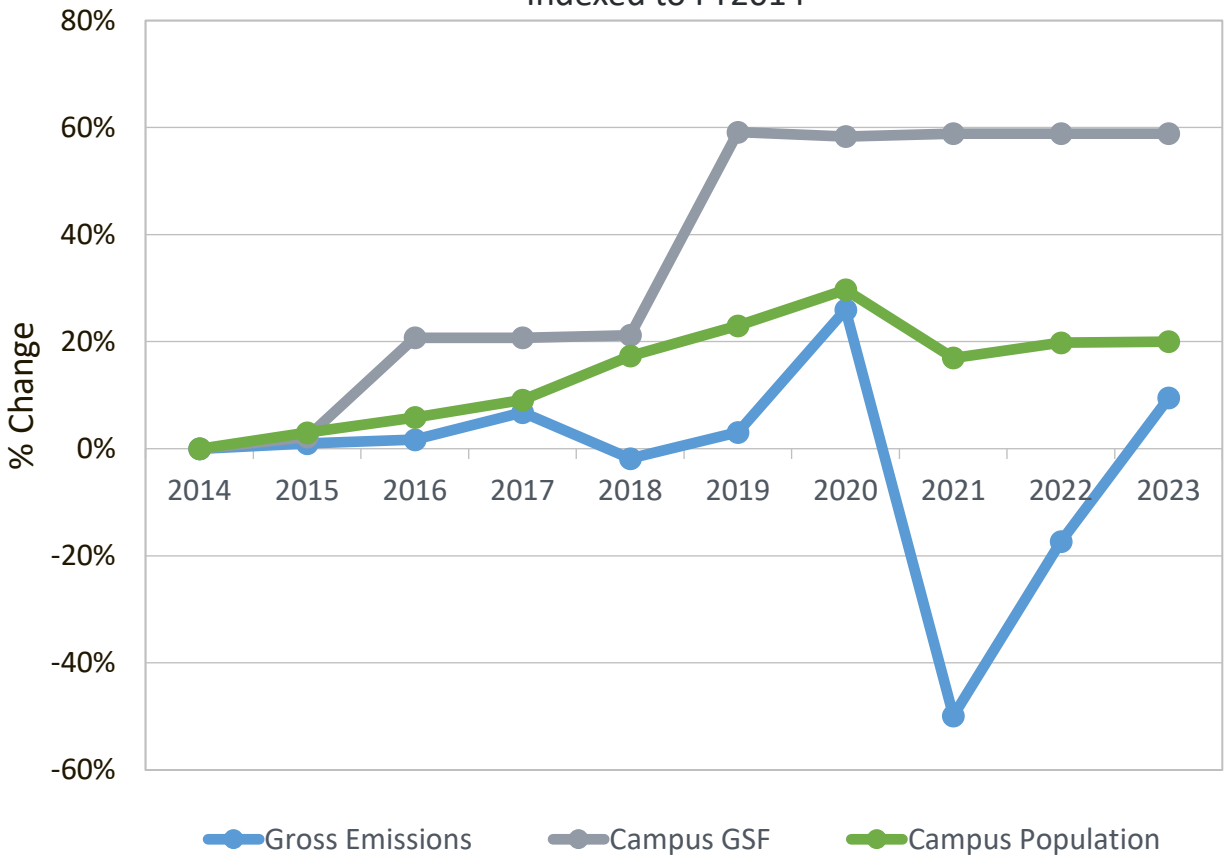
Longitudinal Emissions by Scope



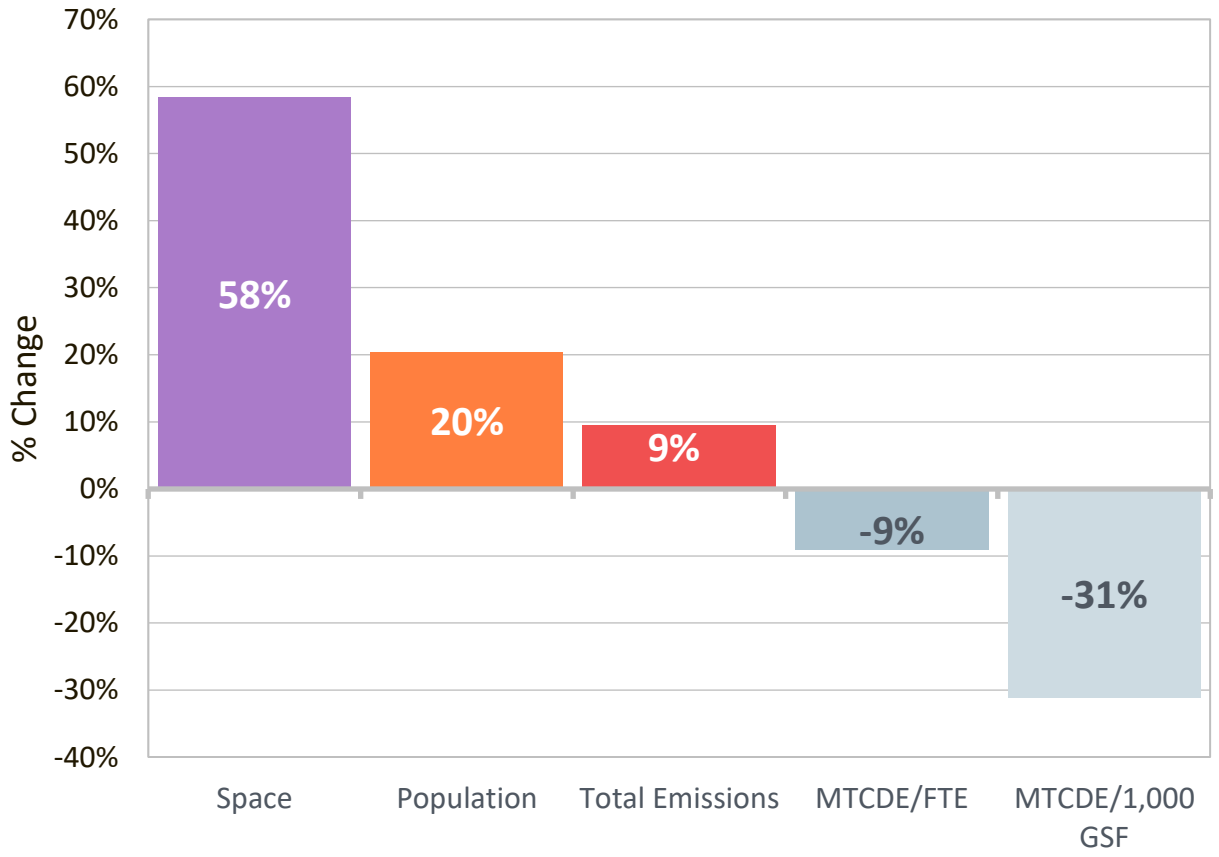
Progress Against 2014 Baseline

Chapman's emissions substantially decreased when normalizing by population and space

Change in Emissions (MTCDE) vs. Campus Size and Population (FTE)
Indexed to FY2014



Change in Space, Population, and Emissions
Indexed to FY2014



Sustainability Peers

Peers determined using location, campus size, and population

Peer Institution	Location
American University	Washington D.C.
Idyllwild Arts Academy	Idyllwild, California
St. Mary's College of California	Moraga, California
Stockton University	Galloway Township, New Jersey
University of San Francisco*	San Francisco, California
University of Denver	Denver, Colorado
University of Texas- Rio Grande Valley	Edinburg, Texas

**Chapman institutional peers*

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Two Ways to Normalize Emissions

GSF vs EUI-Adjusted Floor Area

Energy Use Intensity (EUI) is a unit of measurement representing energy consumed by a building relative to its size, per square foot.

Energy intensive space includes “laboratory space”, “healthcare space”, and “other energy intensive space”.

AASHE STARS calculates the formula the following way:

EUI-AFA = A+(2*(B+C))+D

A = Gross floor area of bldg. space
B = floor area of lab space
C = floor area of healthcare space
D = floor area of other energy intensive space

Total Campus FTE vs Weighted Campus User

The Weighted Campus User metric is used more widely in campus sustainability in order to give more credence to onsite residents, and the energy use they require by being onsite full-time.

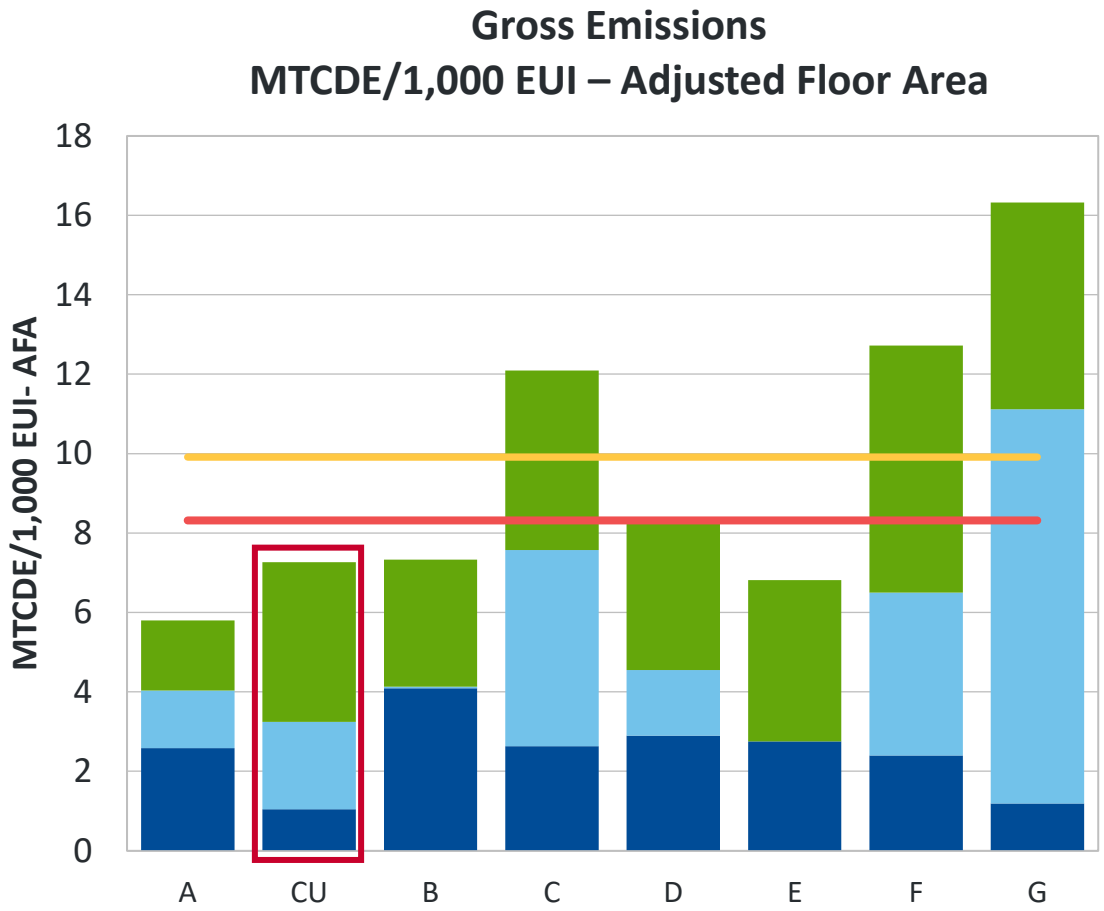
$$WCU = (A+B+C) + 0.75\ [(D-A) + (E-B) – F]$$

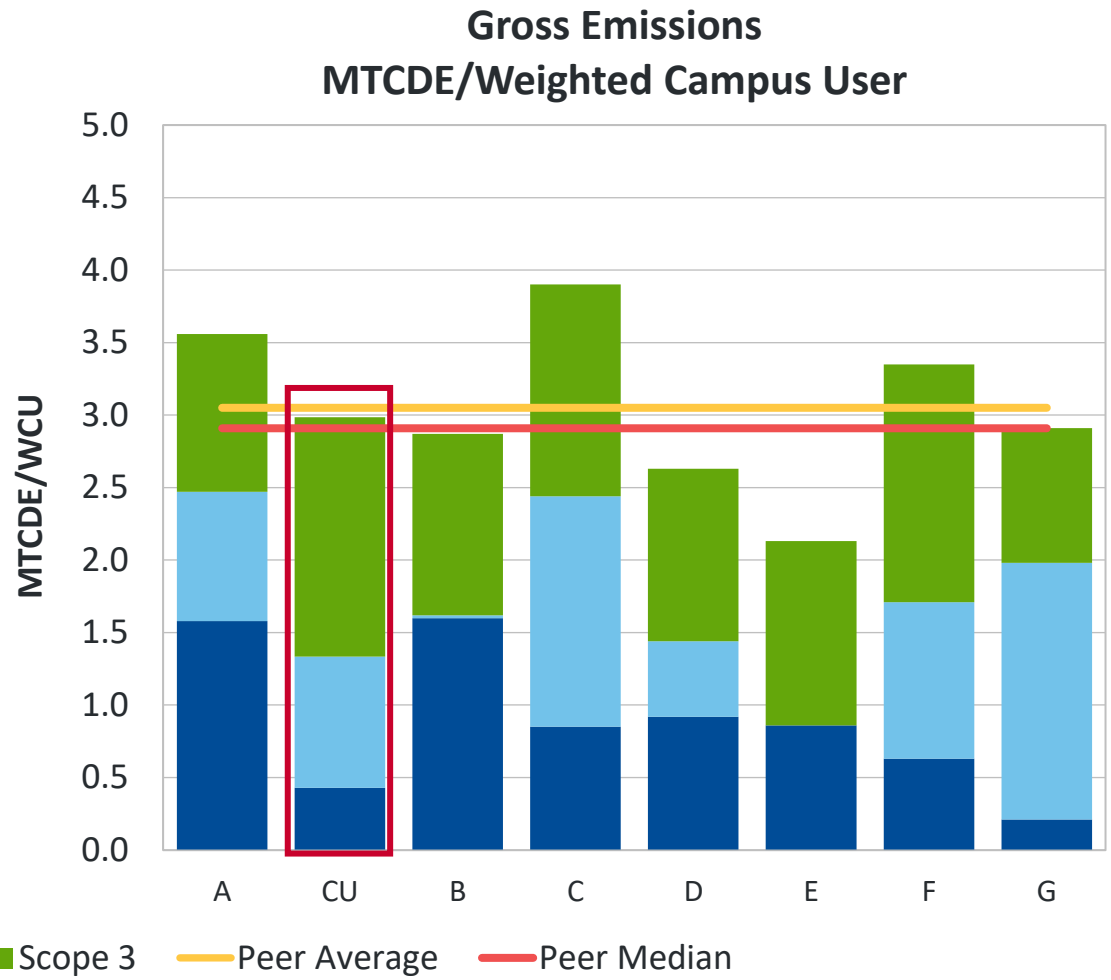
A = student residents onsite
B = employee residents onsite
C = other residents onsite/staffed hospital beds

D = Total FTE student equivalent enrollment
E = FTE of employees (faculty and staff)
F = FTE of students enrolled ONLY in distance education

Total Gross Emissions per Space and Campus User

Chapman emits less than peers when normalized by GSF and population





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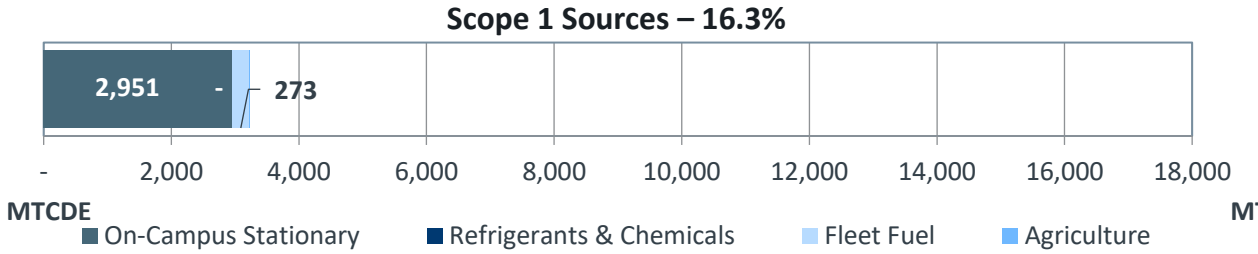
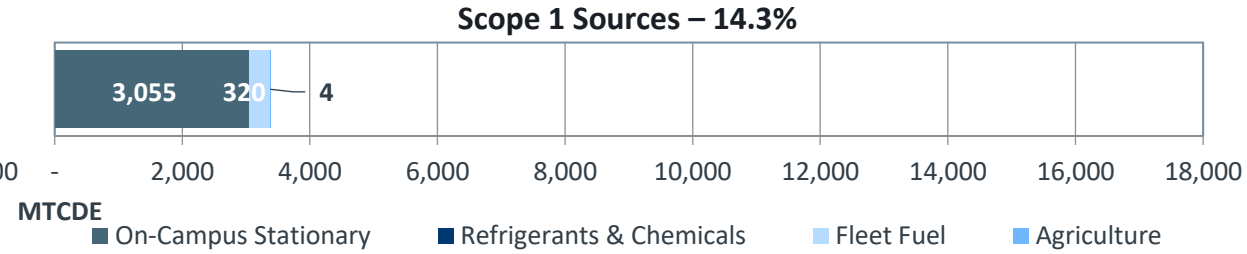
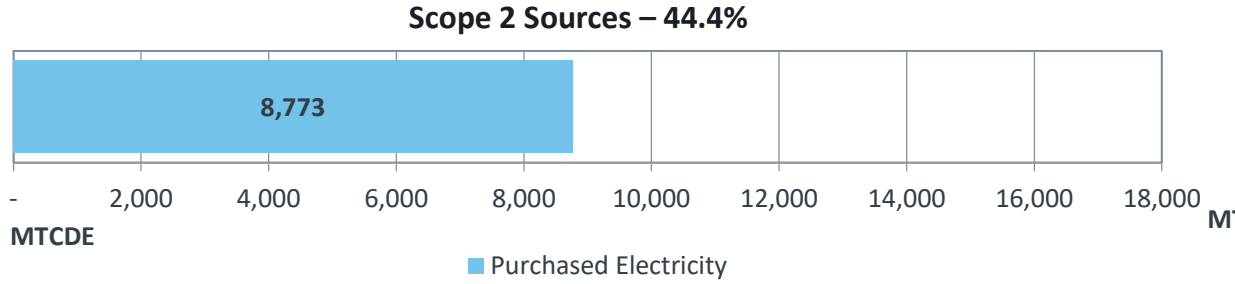
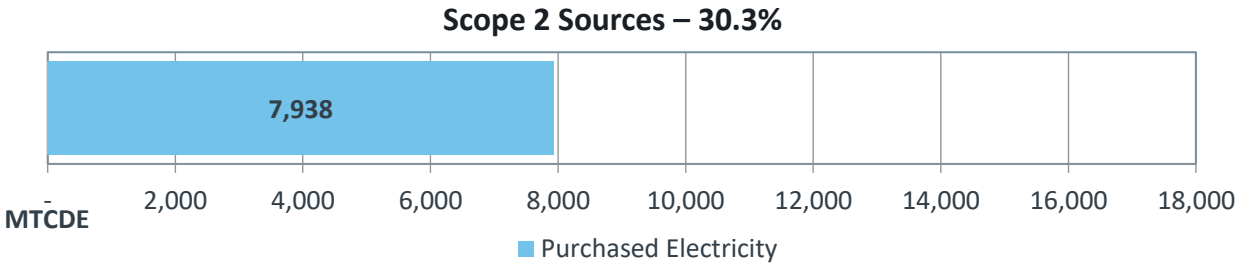
FY22 vs. FY23 Distribution of Emissions

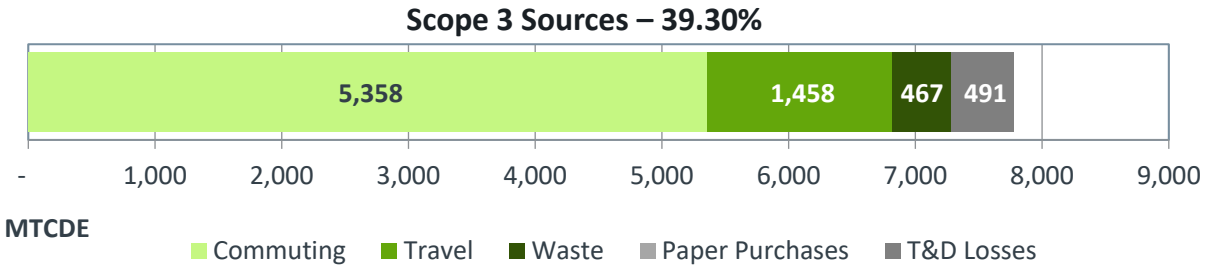
Scope 3 emissions increased due to a jump in directly financed travel and study abroad

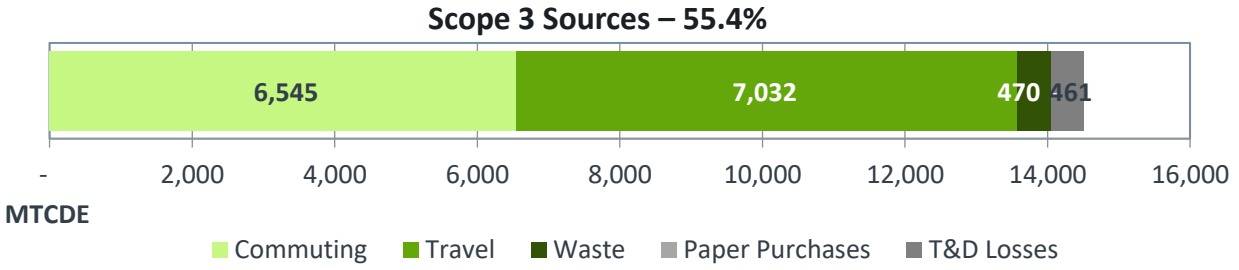








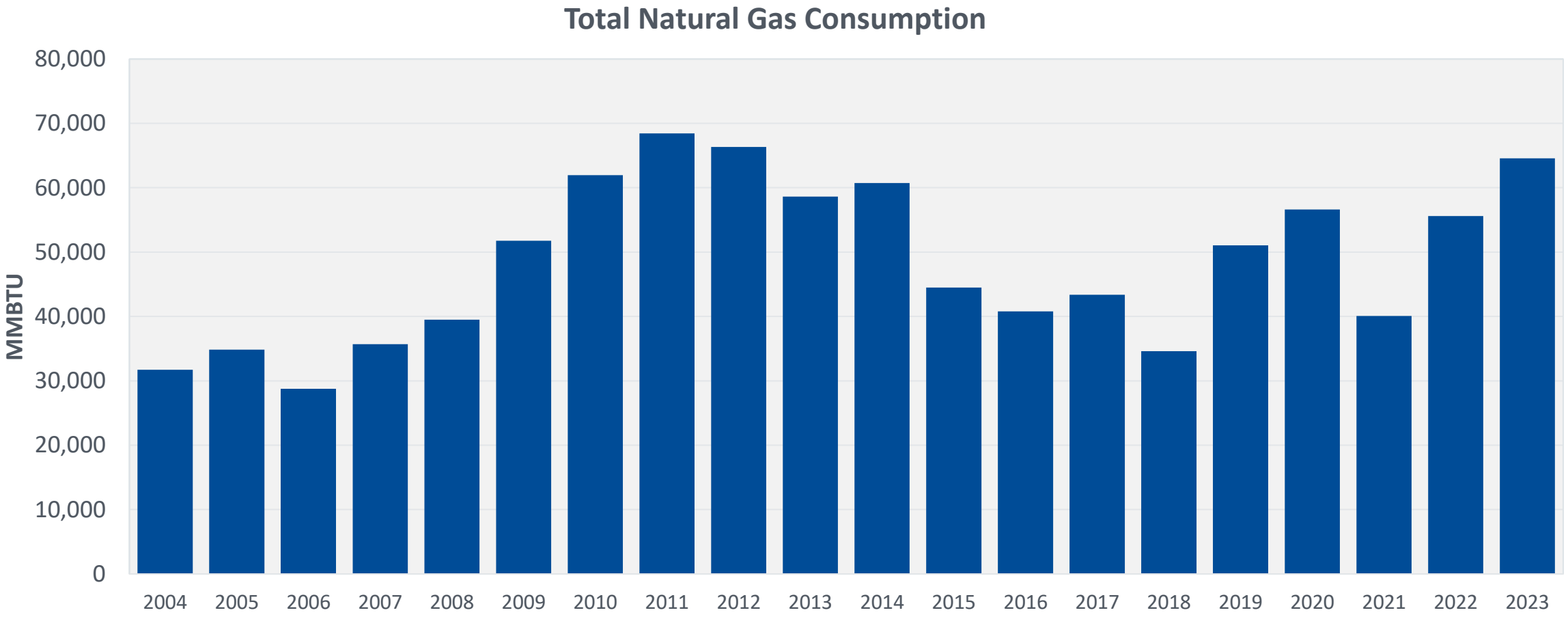




Utilities

Trending Fossil Fuel Consumption

Natural Gas usage has fluctuated substantially at Chapman



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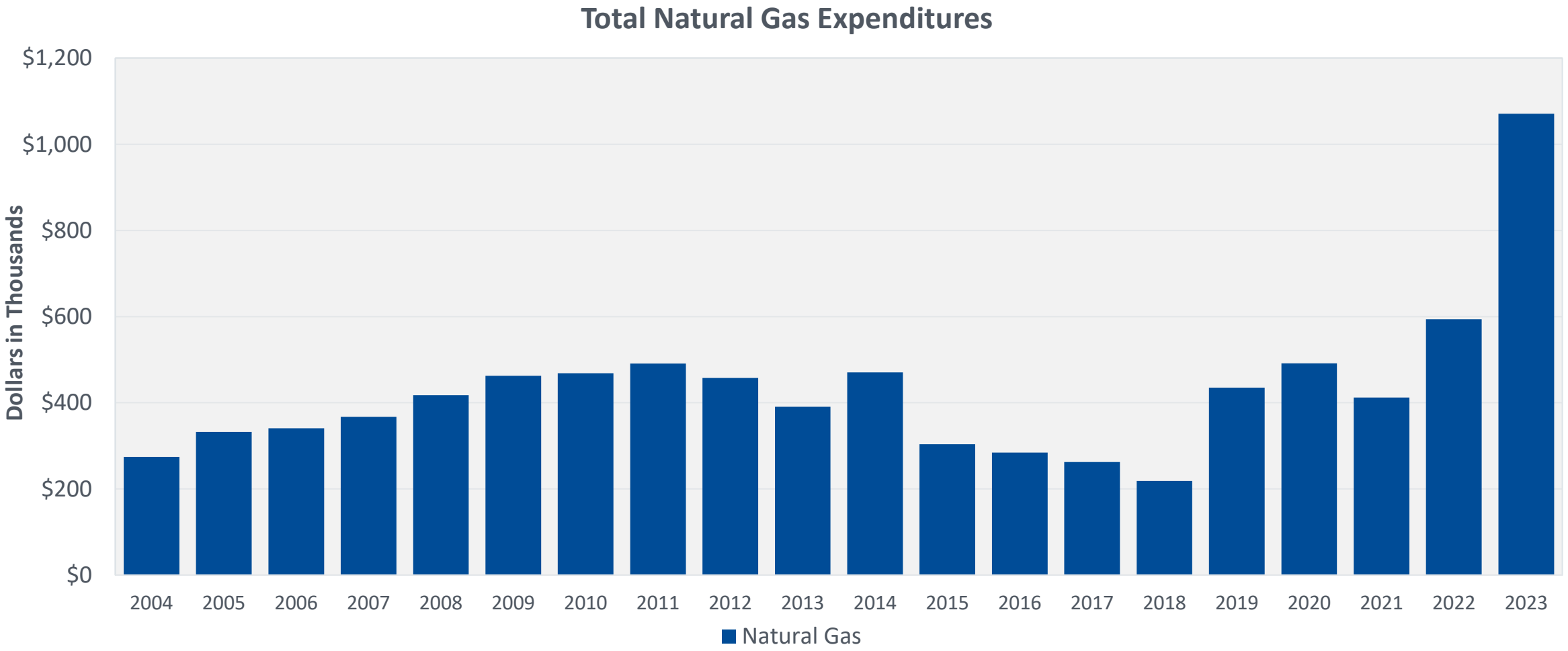
Fossil Fuel Expenditures

Natural Gas costs increased by 64% in FY23



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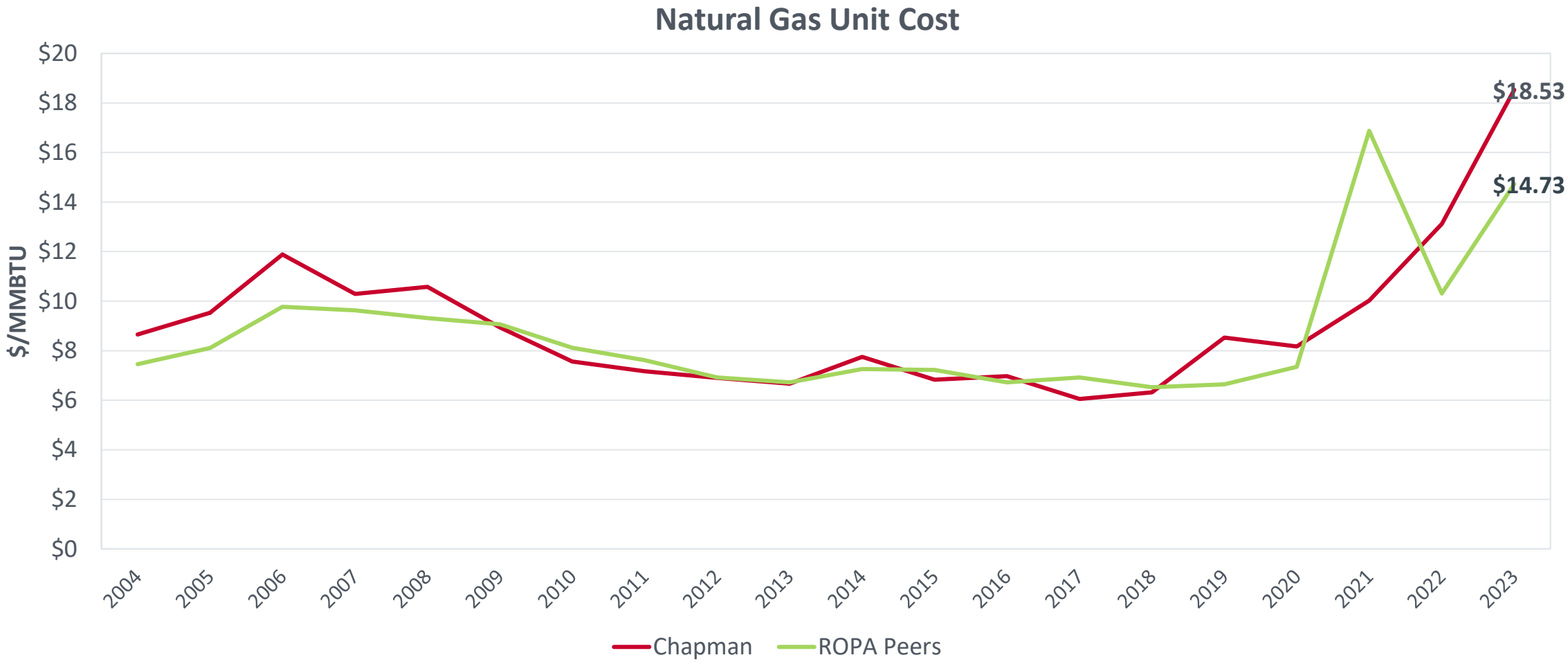
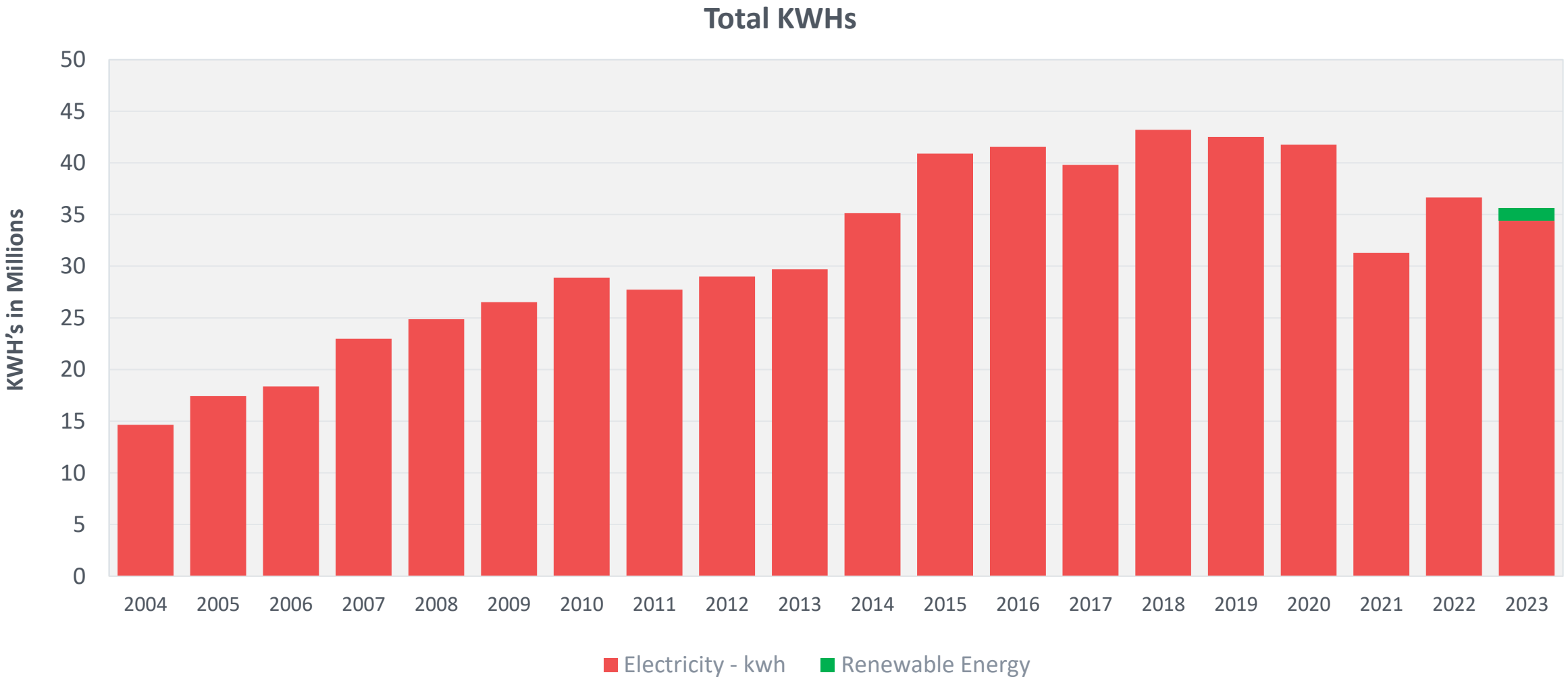
Differences in Unit Costs vs. Peers

Chapman has seen dramatic increases in the commodity costs of Natural Gas



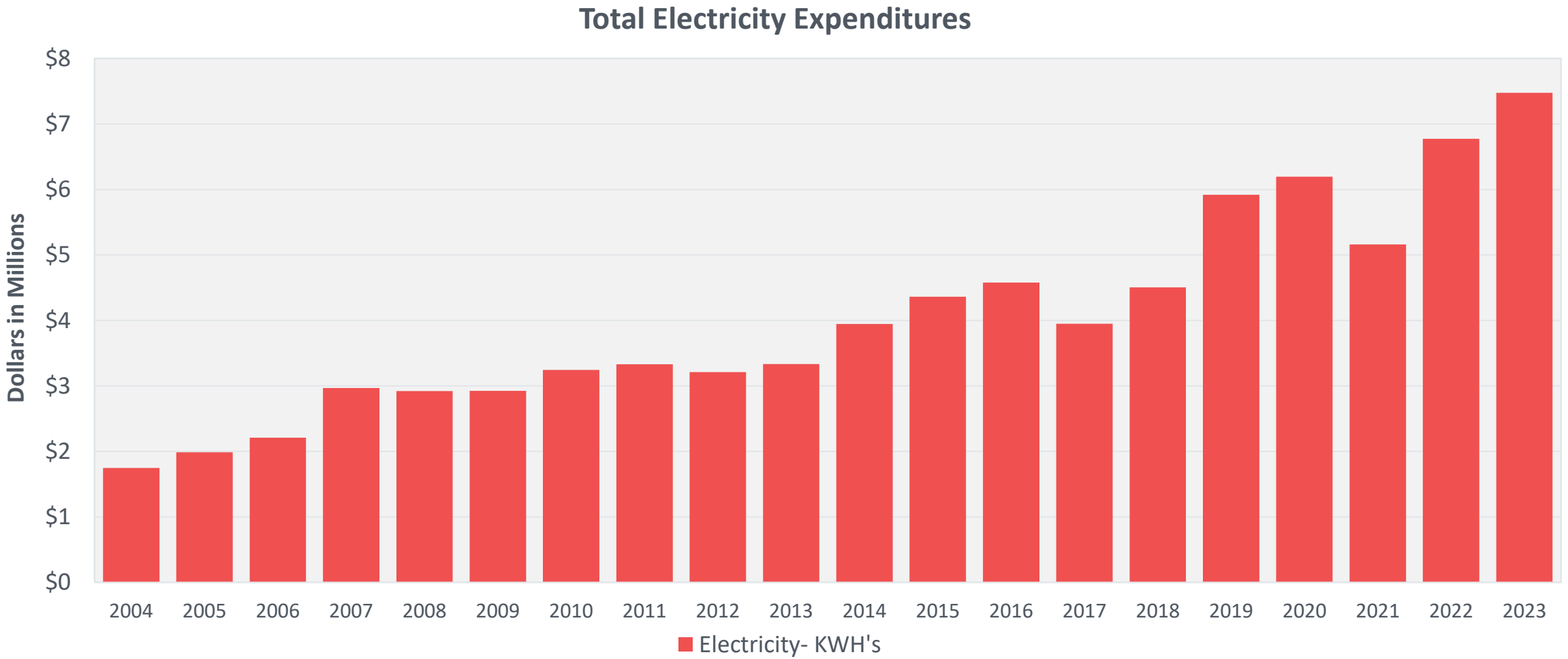
Electricity Consumed by Campus

Electricity consumption decreased even with addition of renewable energy



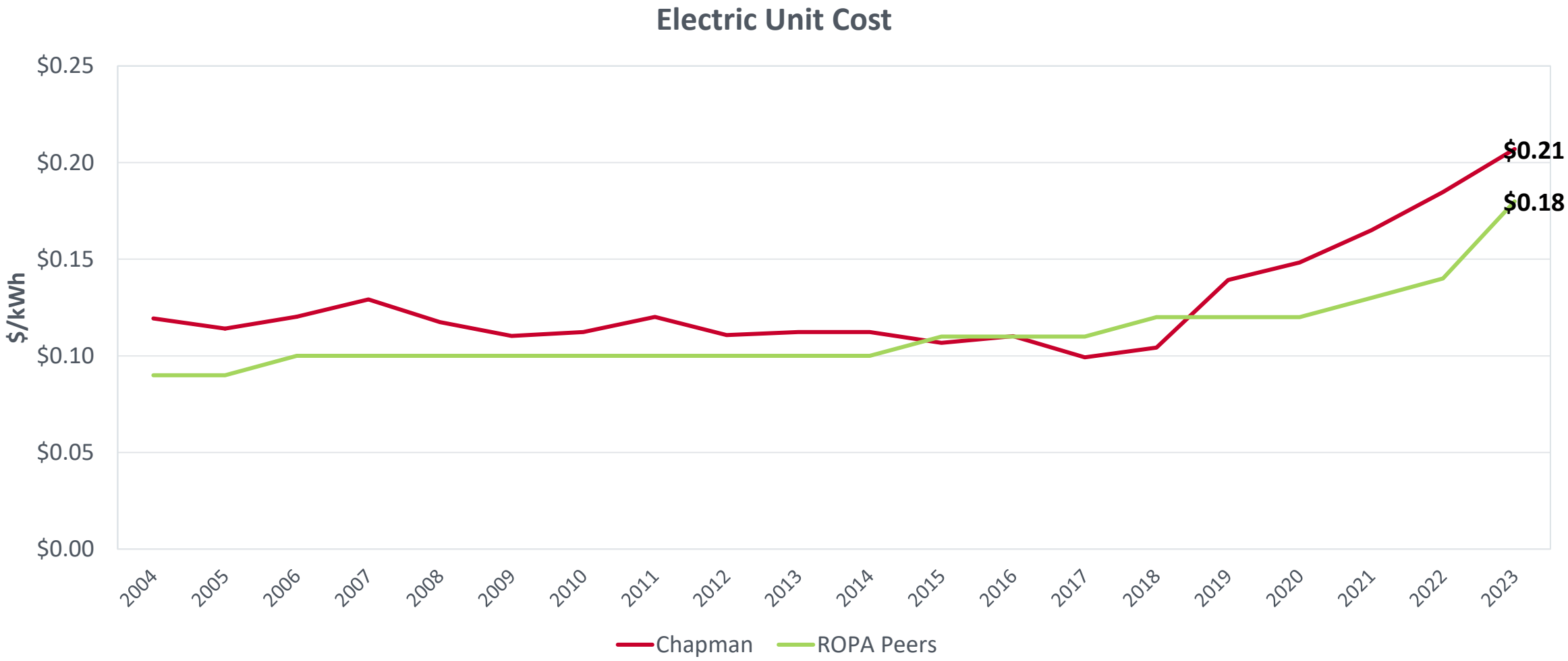
Electricity Expenditures

Similarly to natural gas expenditures, the cost of electricity outpaced consumption



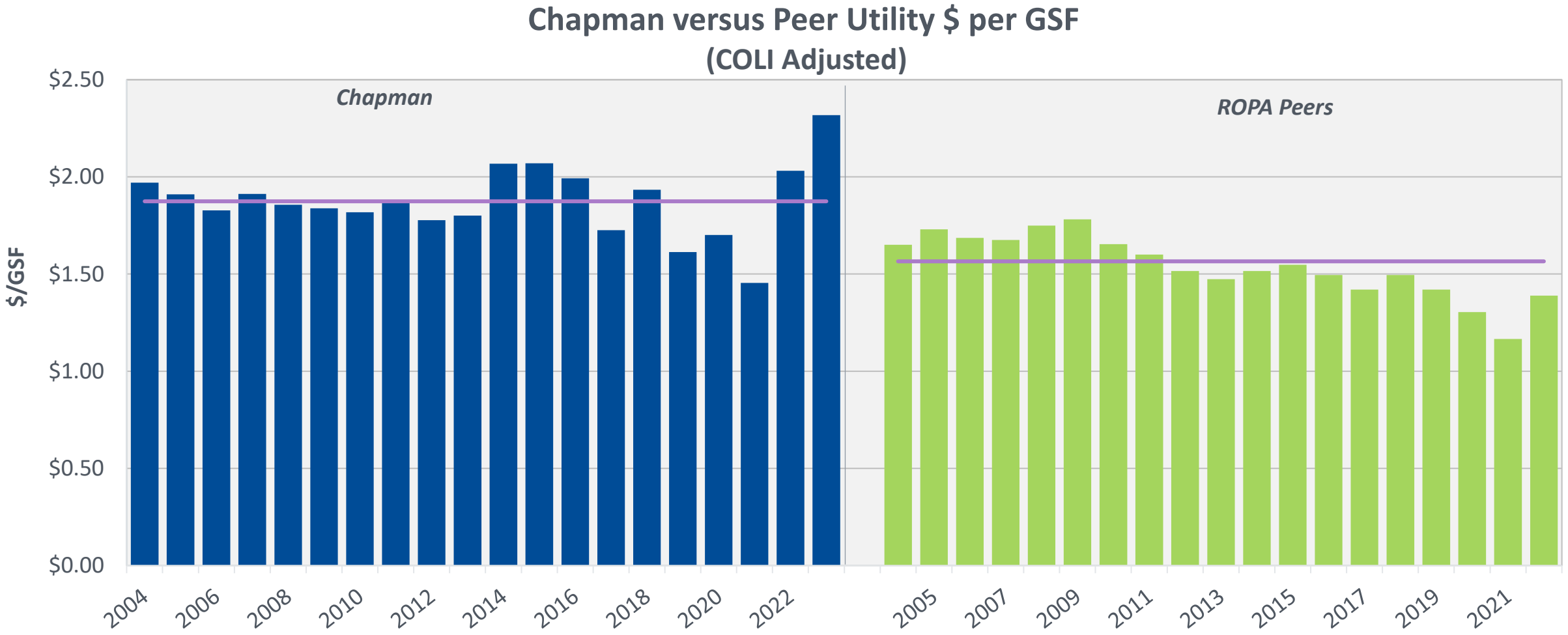
Differences in Unit Costs vs. Peers

While Chapman has consistently paid more than peers, gap has grown since FY19/20



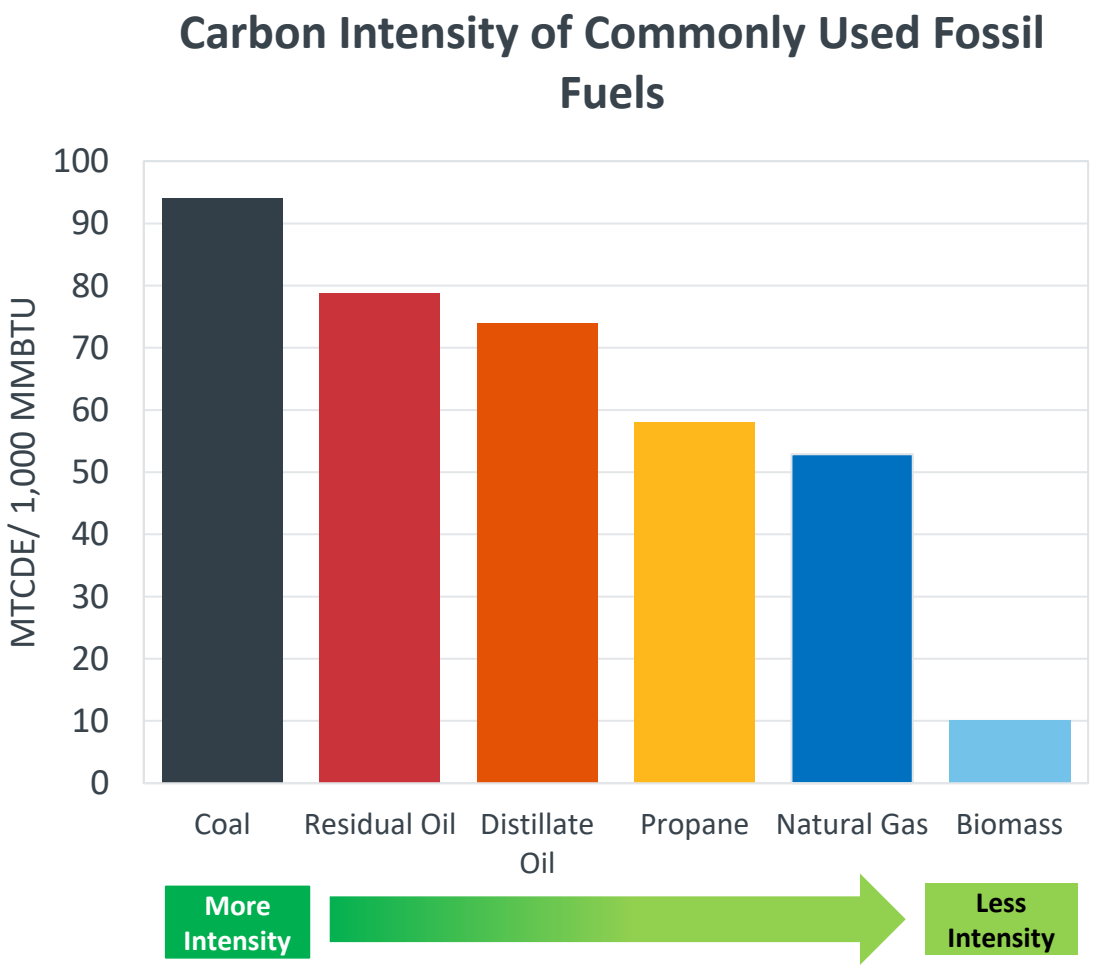
Utility Operating Expenditures Compared to Peers

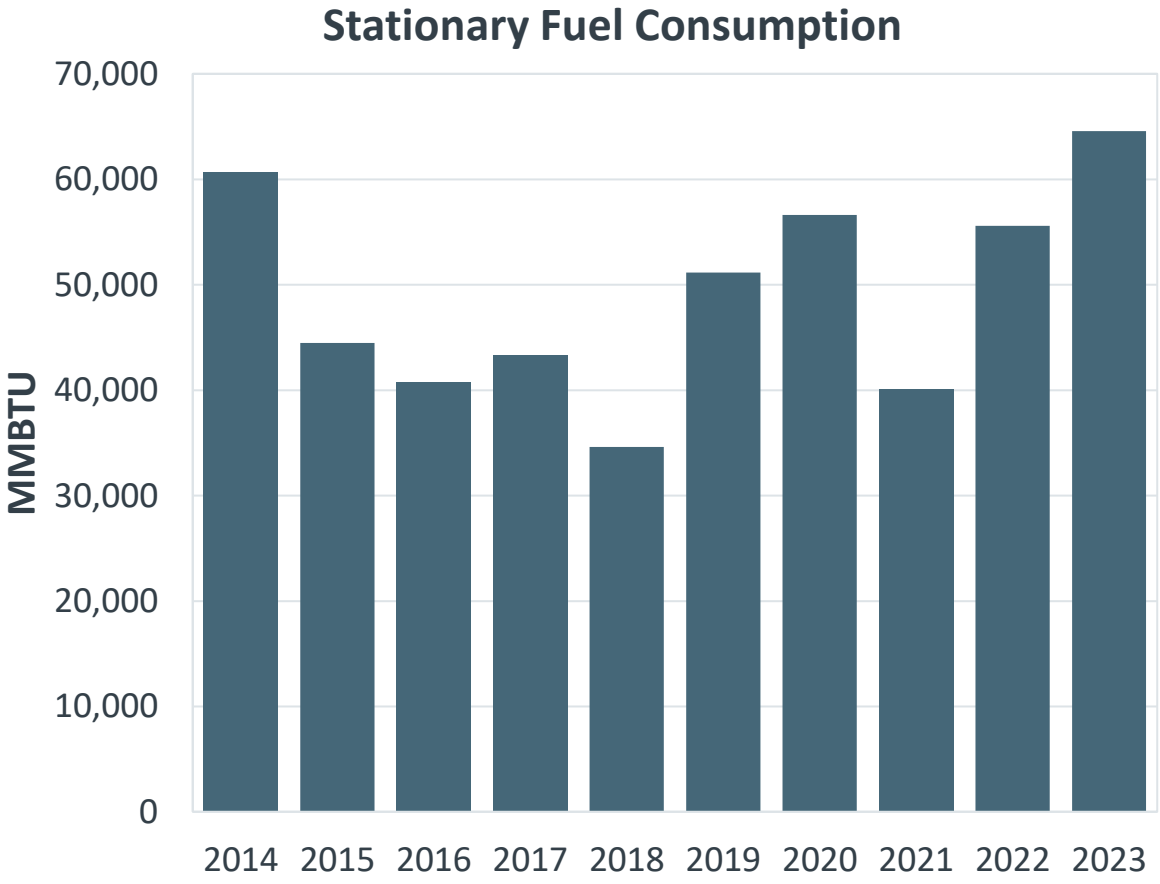
Chapman's utility expenditures are 17% above peer spending



Scope 1: Stationary Fuel Consumption

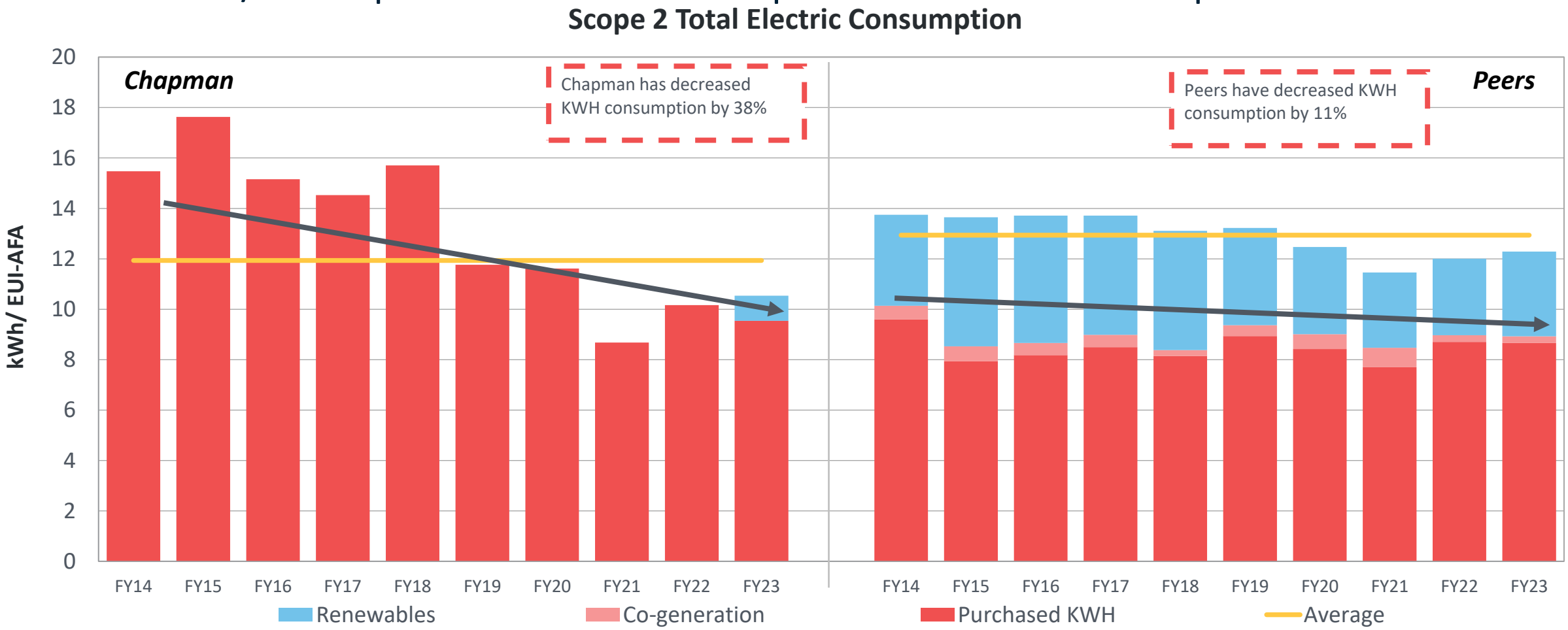
Chapman's FY22/23 Scope 1 emission increase caused by greater natural gas usage





Scope 2: Total Electric Consumption vs. Peers

Since FY19/20 Chapman's electric consumption has been less than peers



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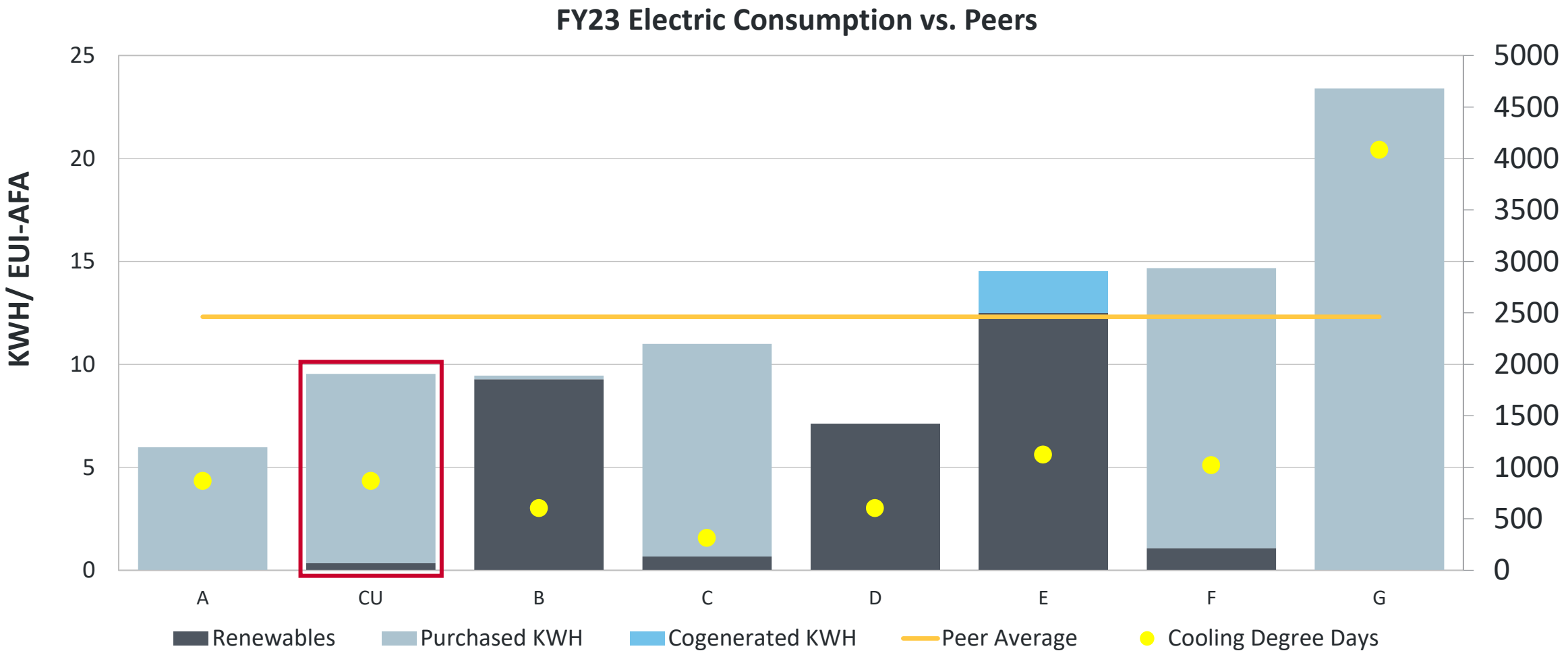
Scope 2: Total Electric Consumption vs. Peers

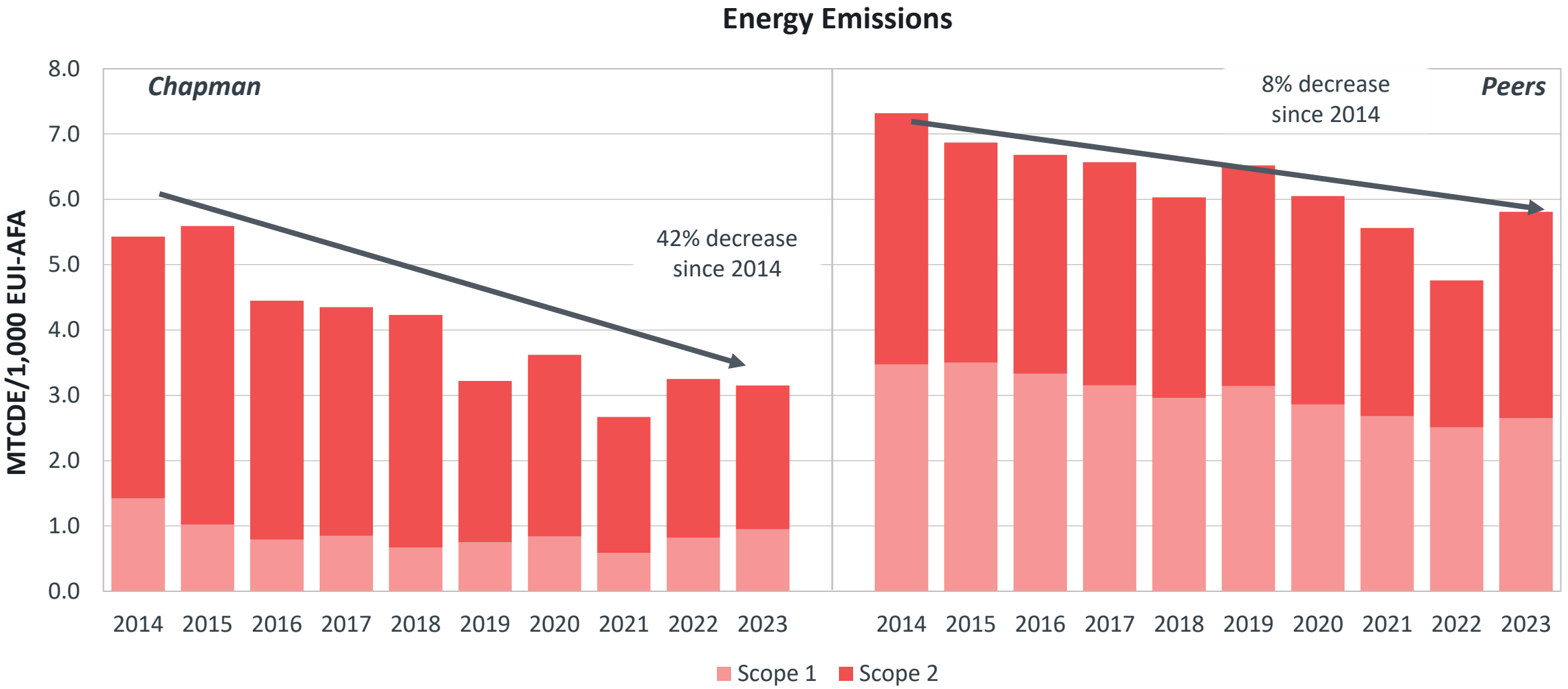
Chapman consumed 22% less than peers when normalizing by GSF



Peers arrayed by technical complexity; The relative mechanical complexity of the campus on a scale of 1-5

Energy Emissions vs. Peers

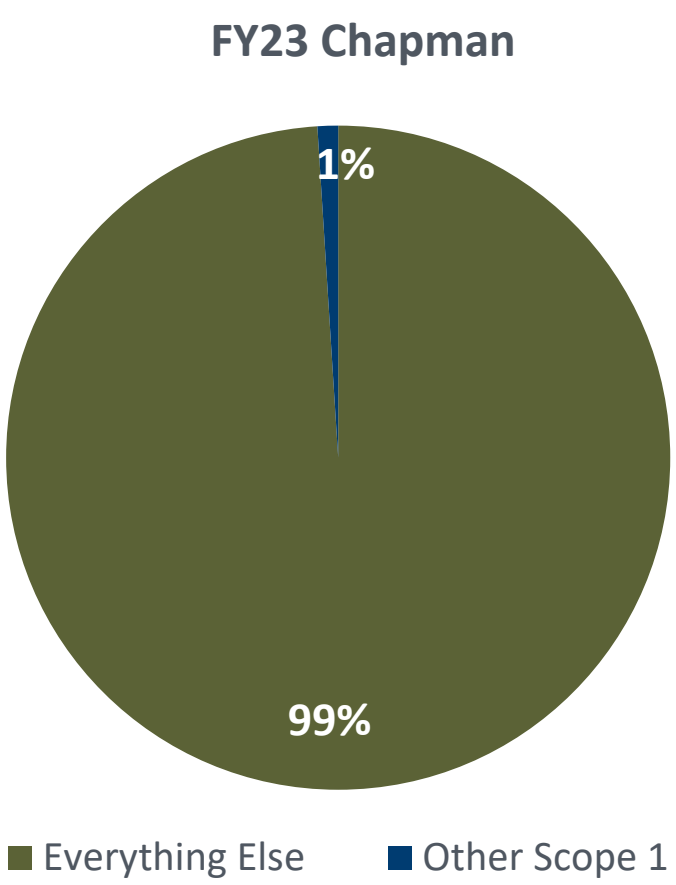
Chapman's decrease in emissions caused by renewable energy purchased, building efficiency

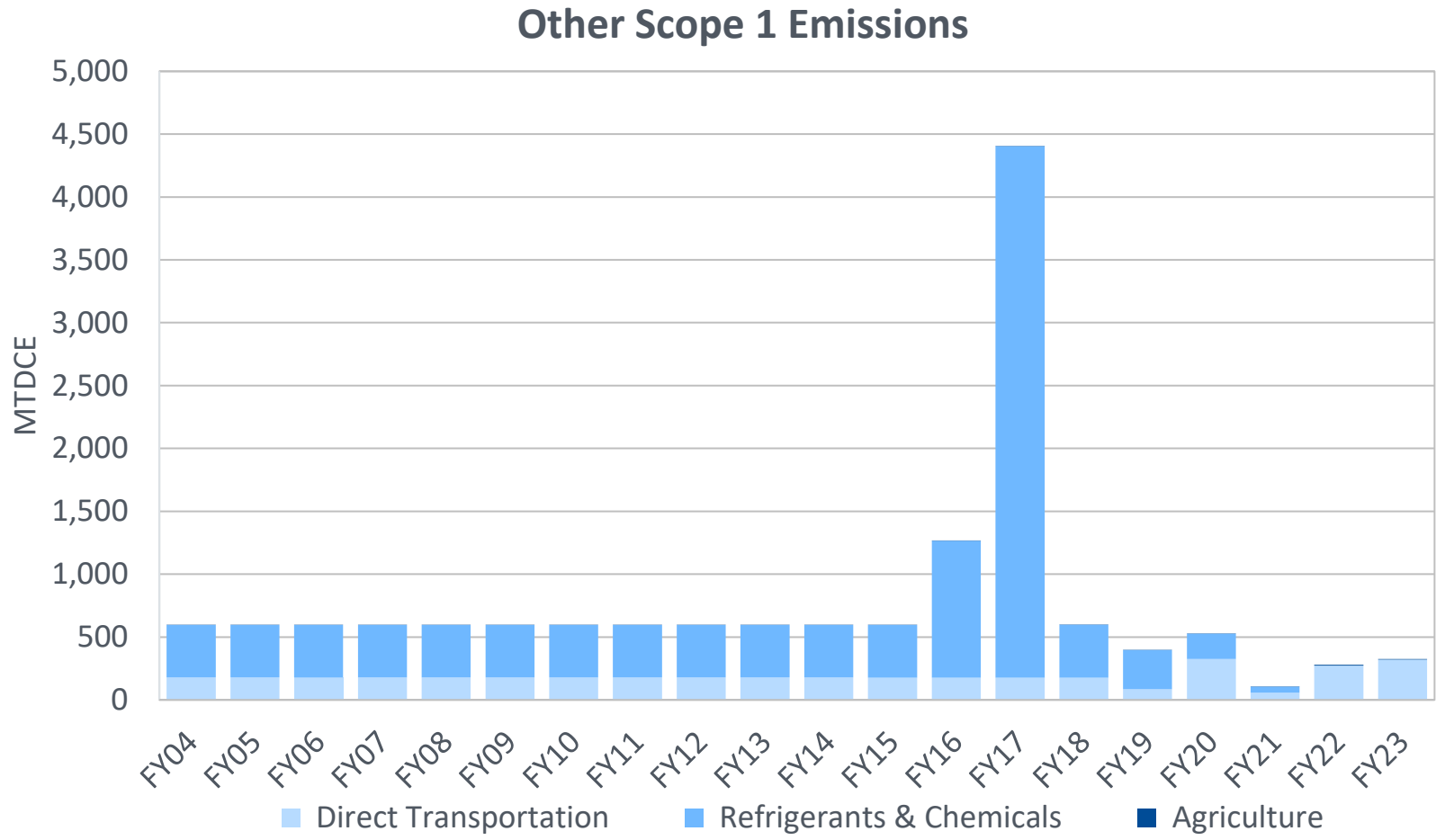


Non-Utility Emissions Sources

Other Scope 1 Emissions Are Small Portion of Total

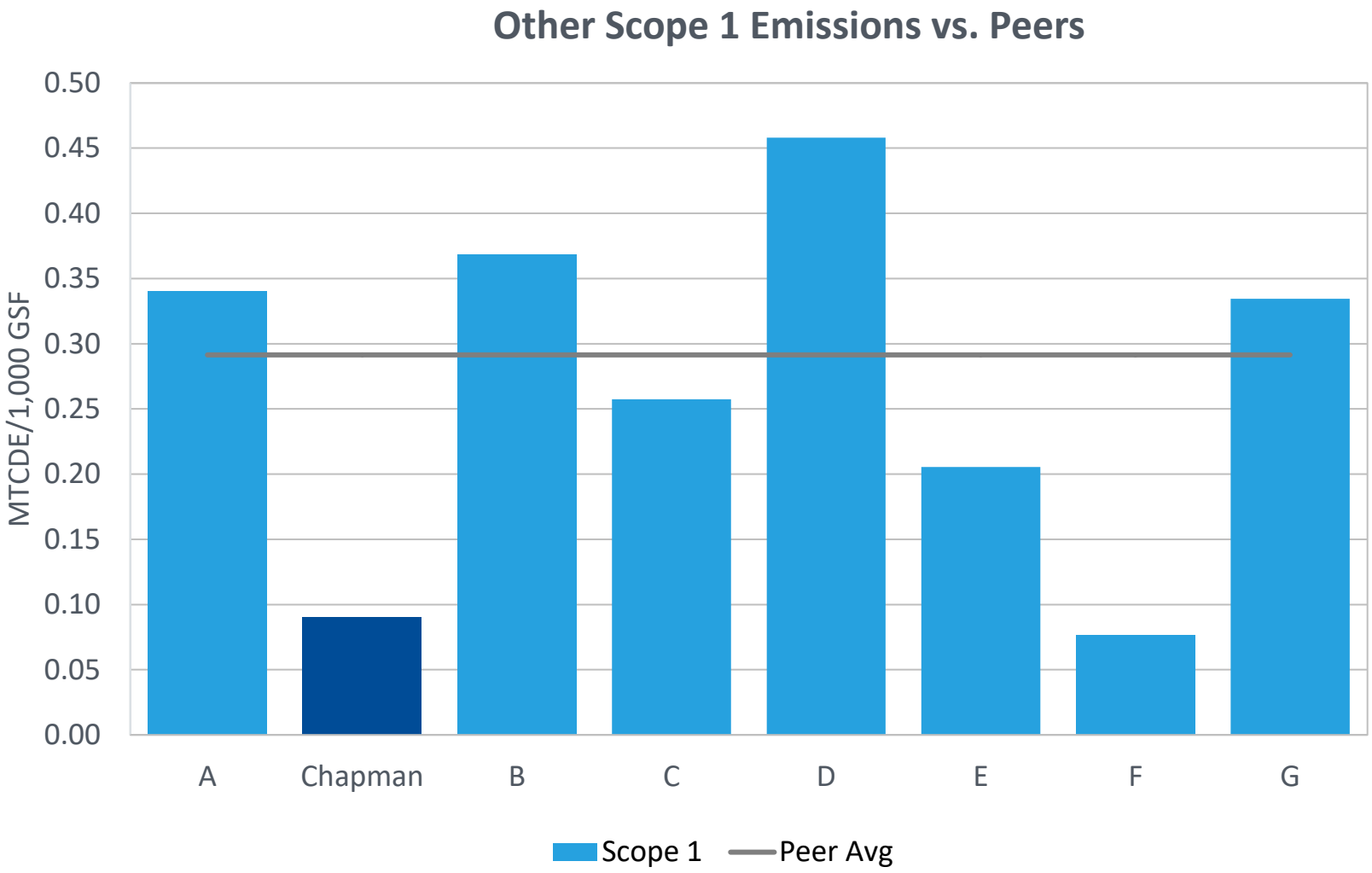
Direct Transportation increased as Refrigerants, Chemicals, and Fertilizer remained consistent

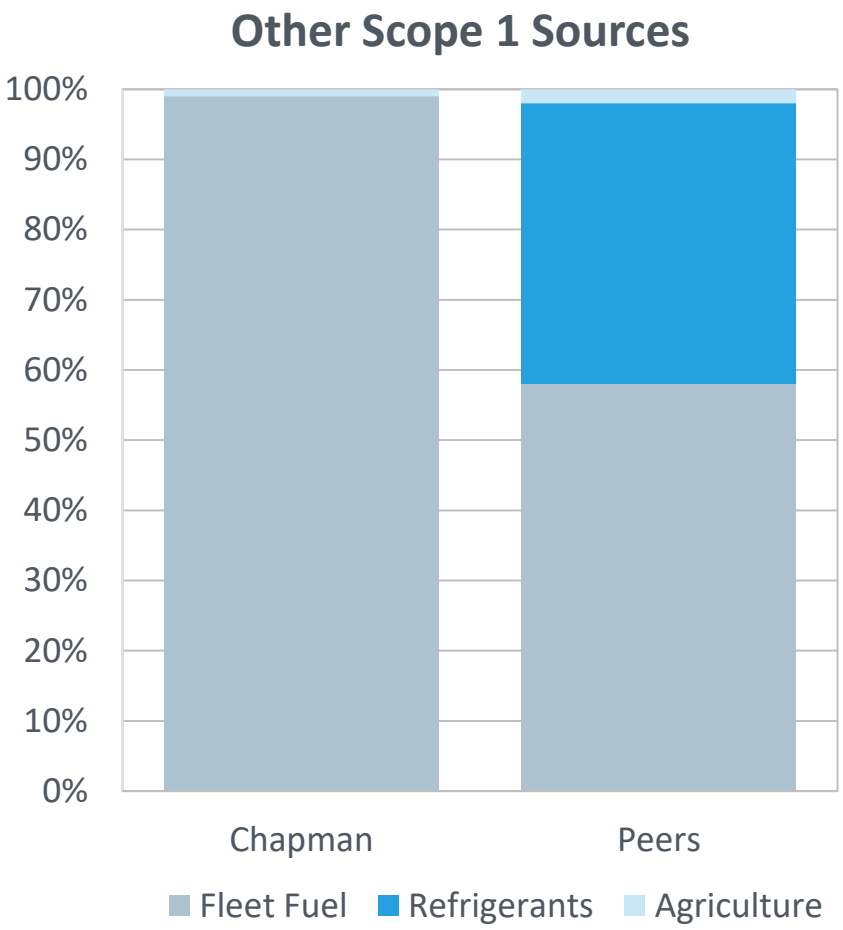




Other Scope 1 Emissions Compared to Peers

Chapman other scope 1 sources remain below peers, peers have a more diversified split





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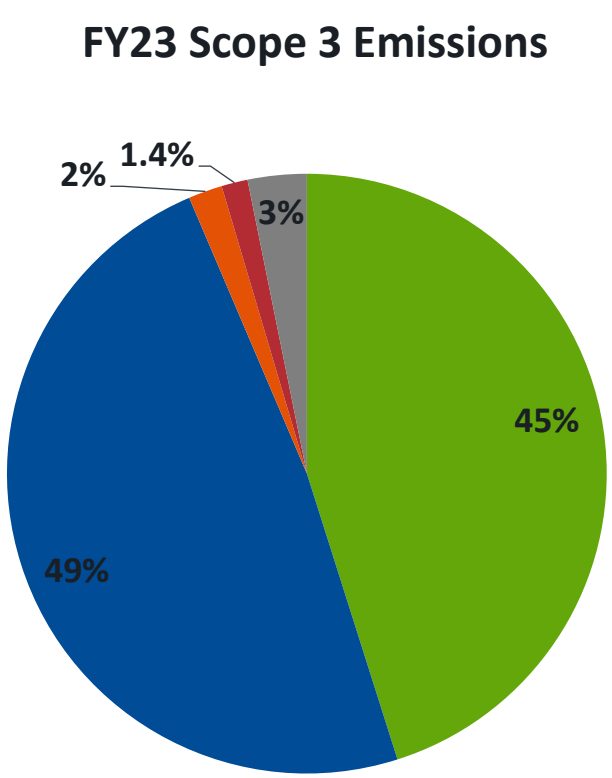
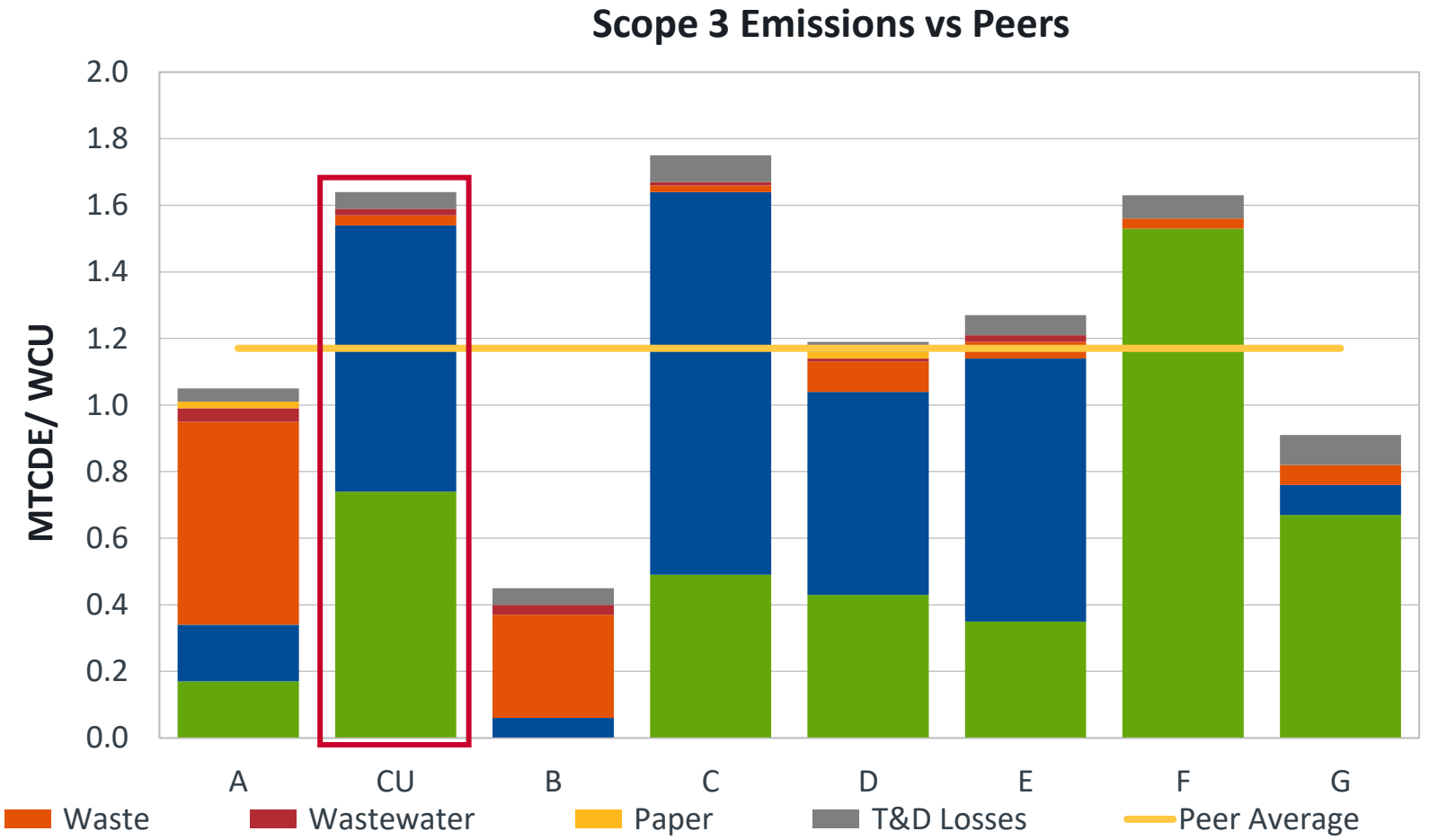
Scope 3: Indirect Emissions Overview

Travel saw the largest increase in FY23 following lifted restrictions

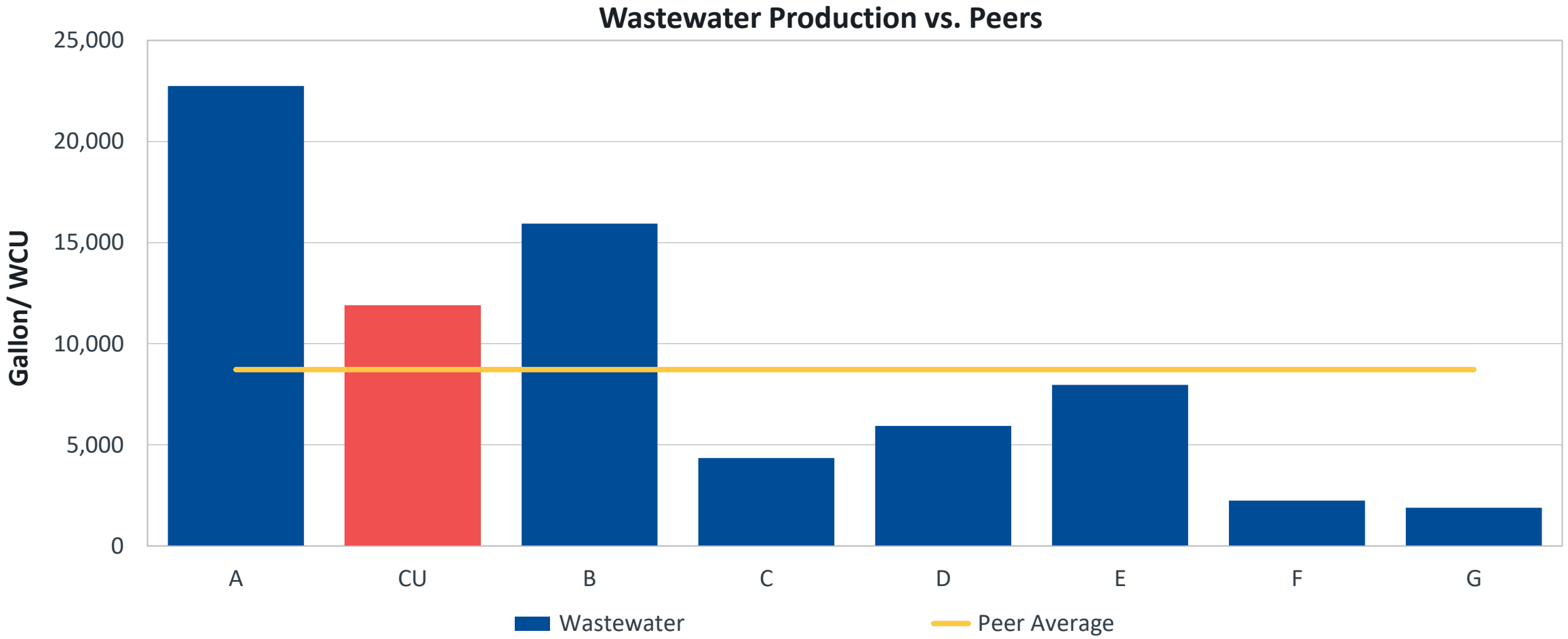




Paper data was extrapolated for all years from FY17

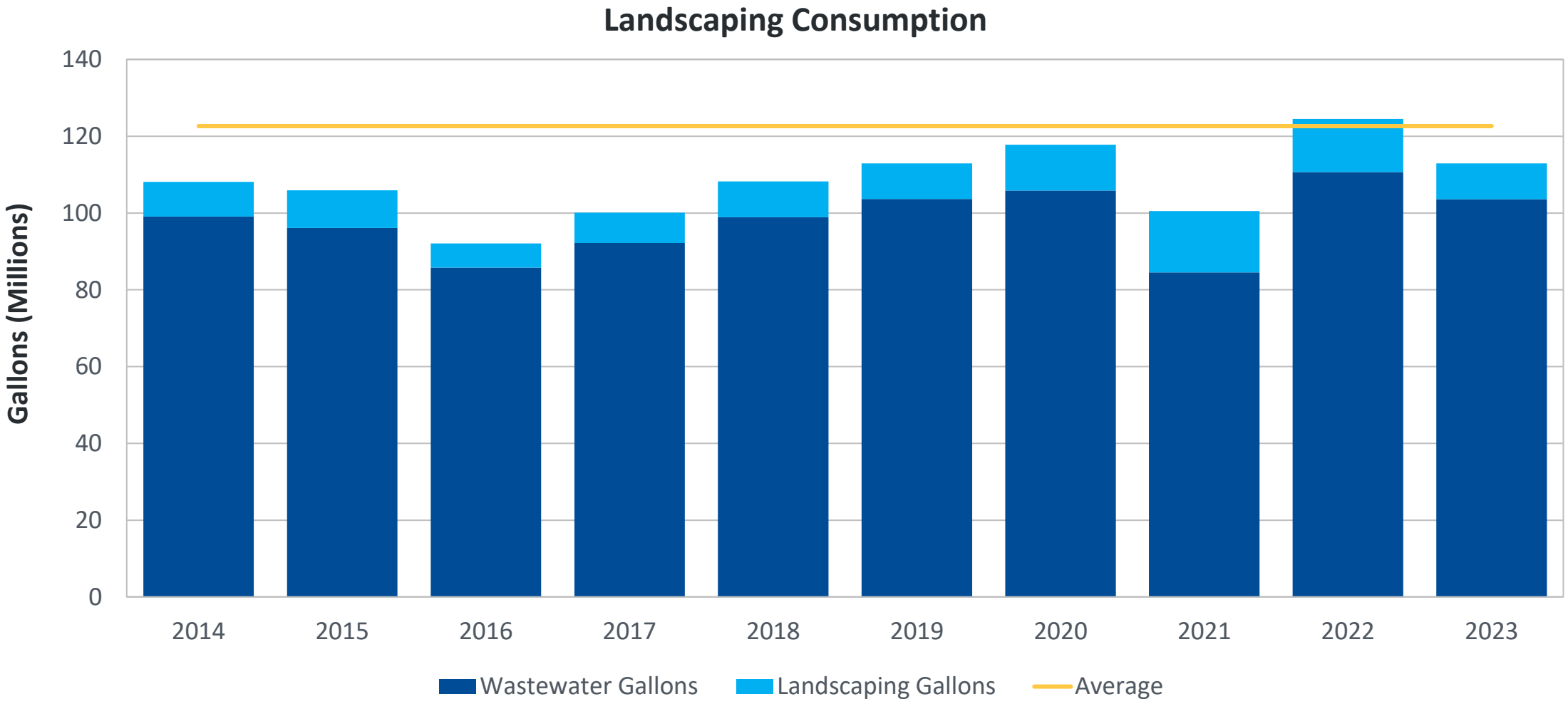
Wastewater Production Similar to Peers

While wastewater is at 2% of emissions, water reduction should be prioritized



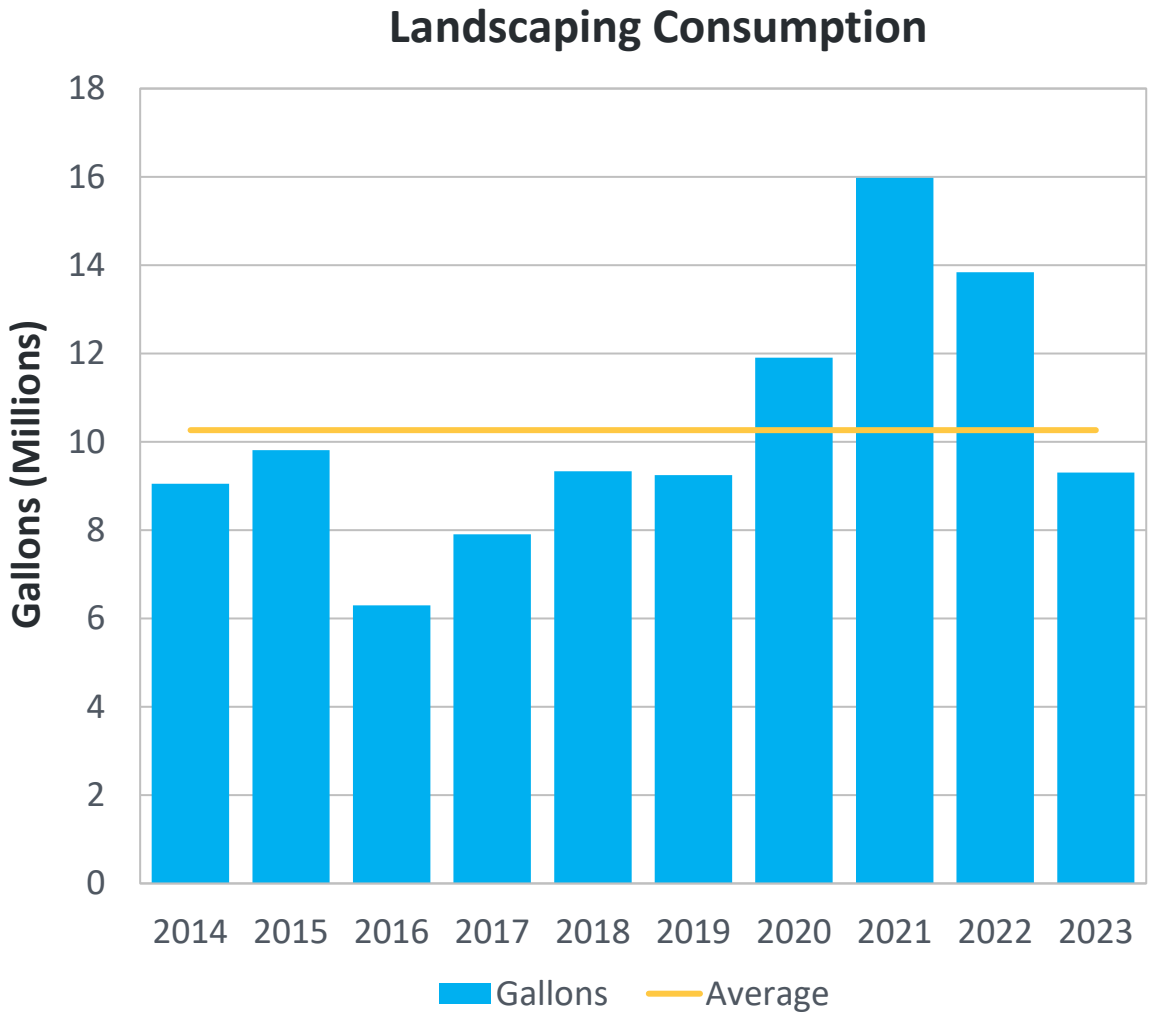
Total Water Consumption

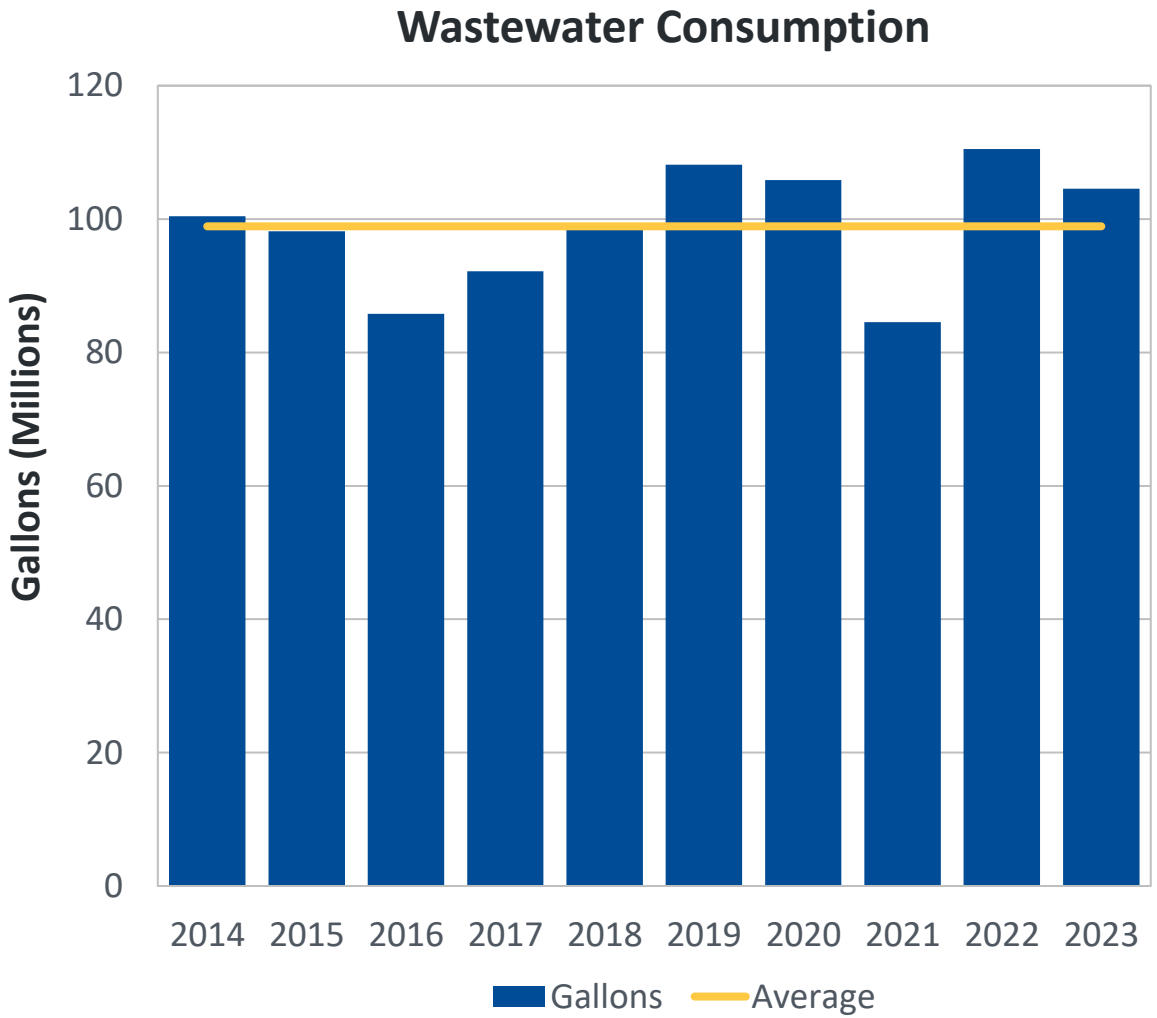
Total water consumption remains consistent despite declining irrigation consumption



Total Water Consumption

Irrigation water consumption has decreased by 42% since FY21





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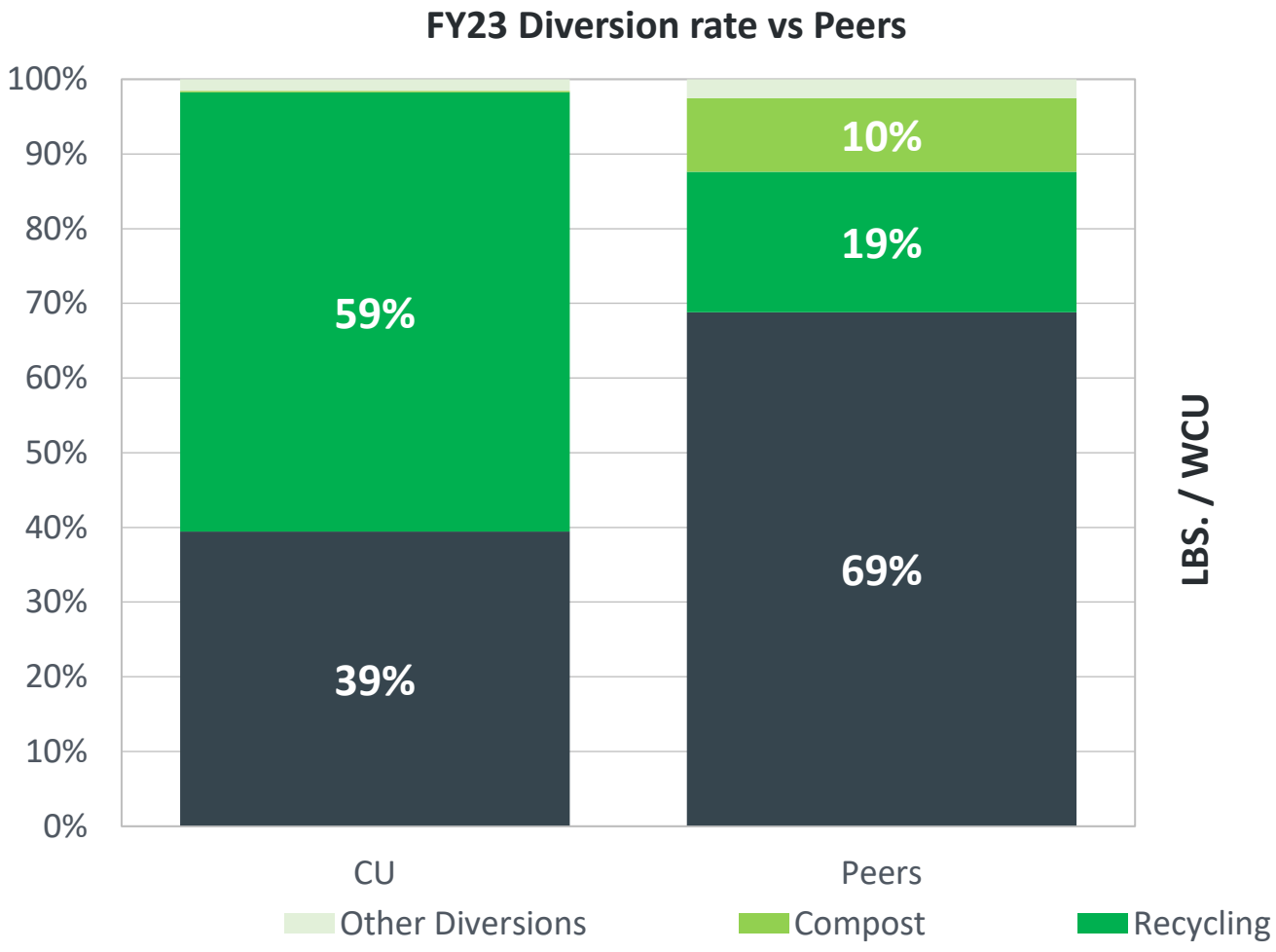
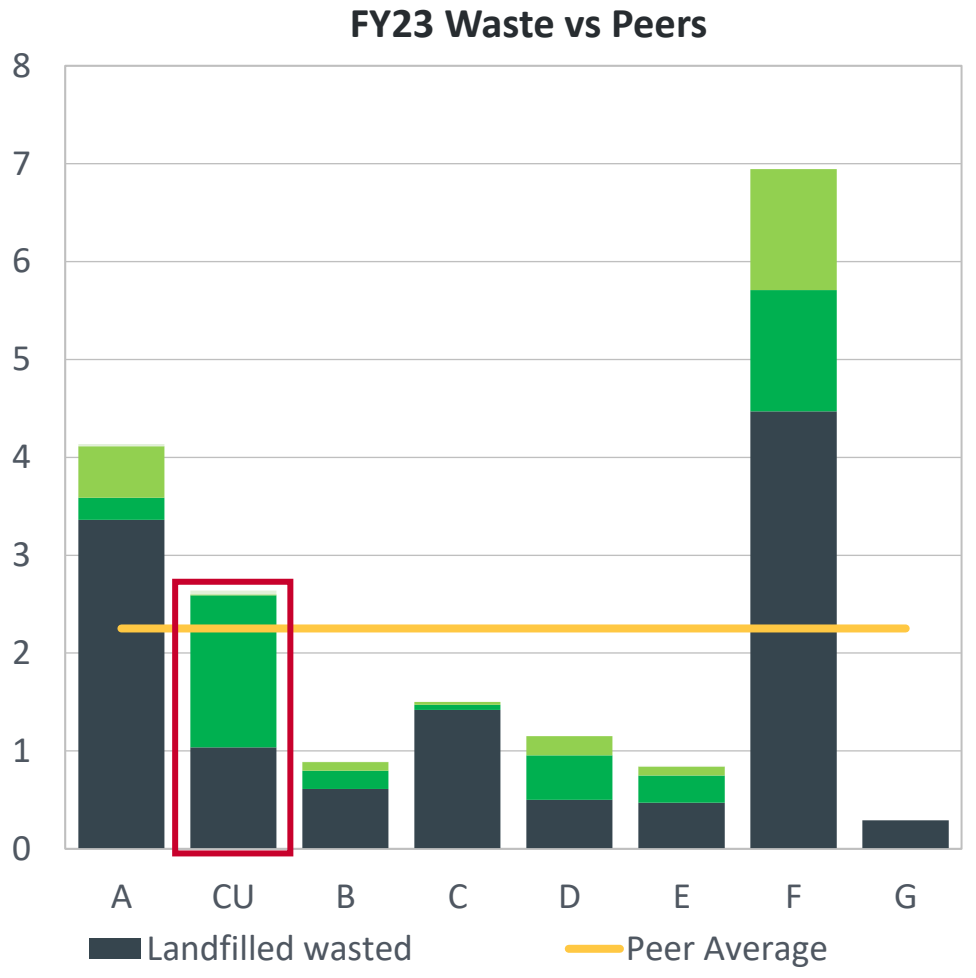
A Closer Look at Waste

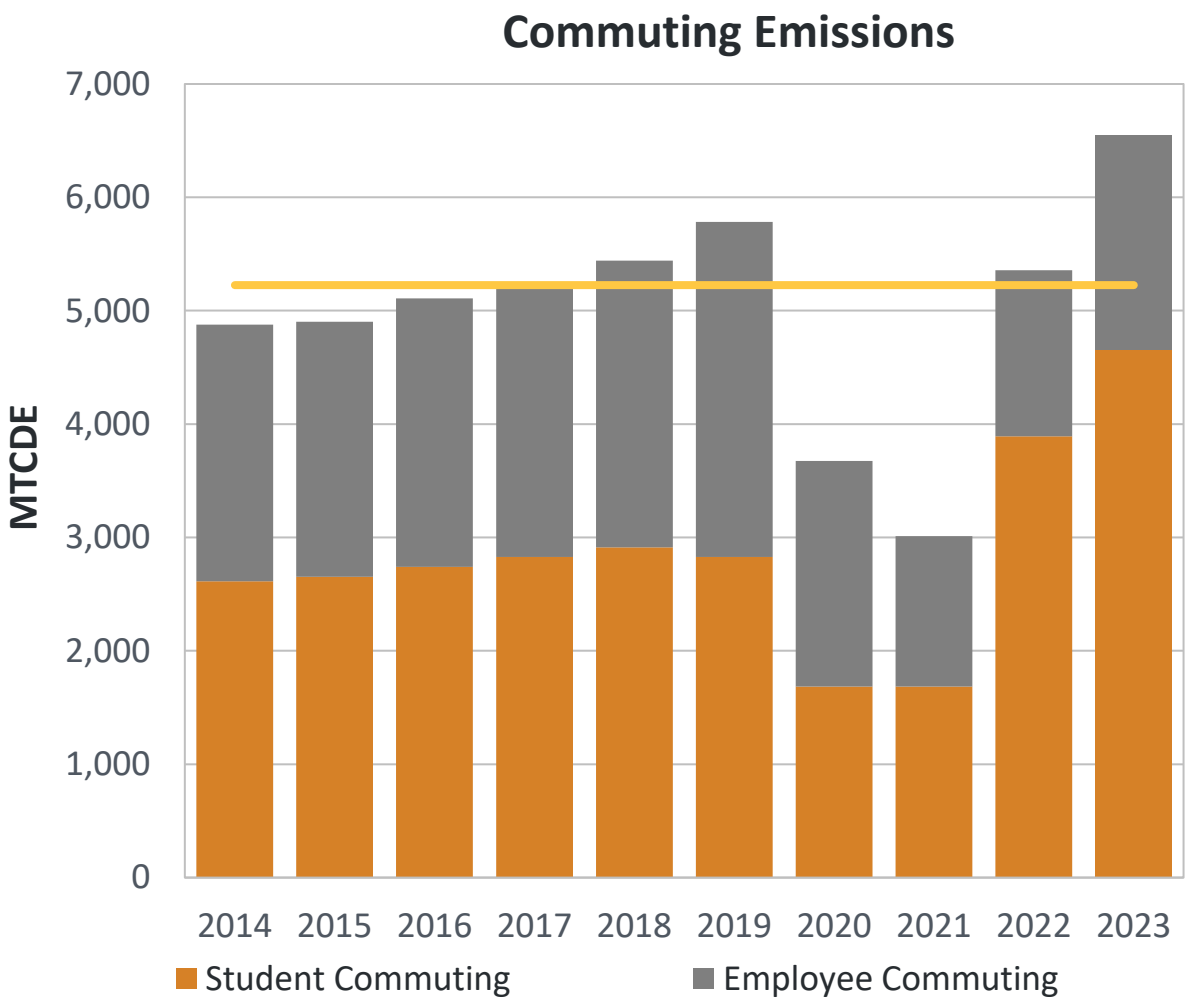
Chapman diverts more waste to recycling than peers, but produces more total waste

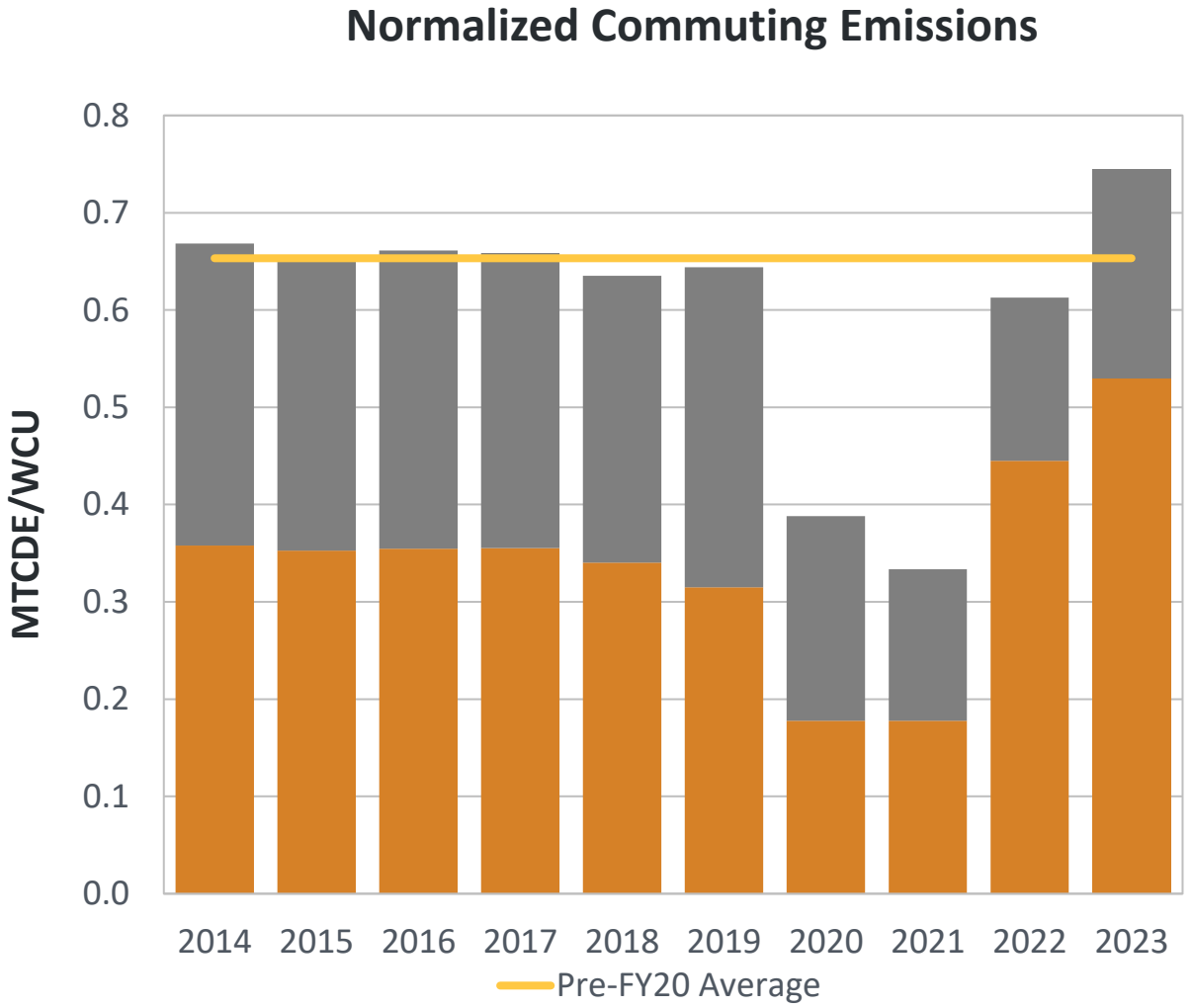




Total Commuting Emissions

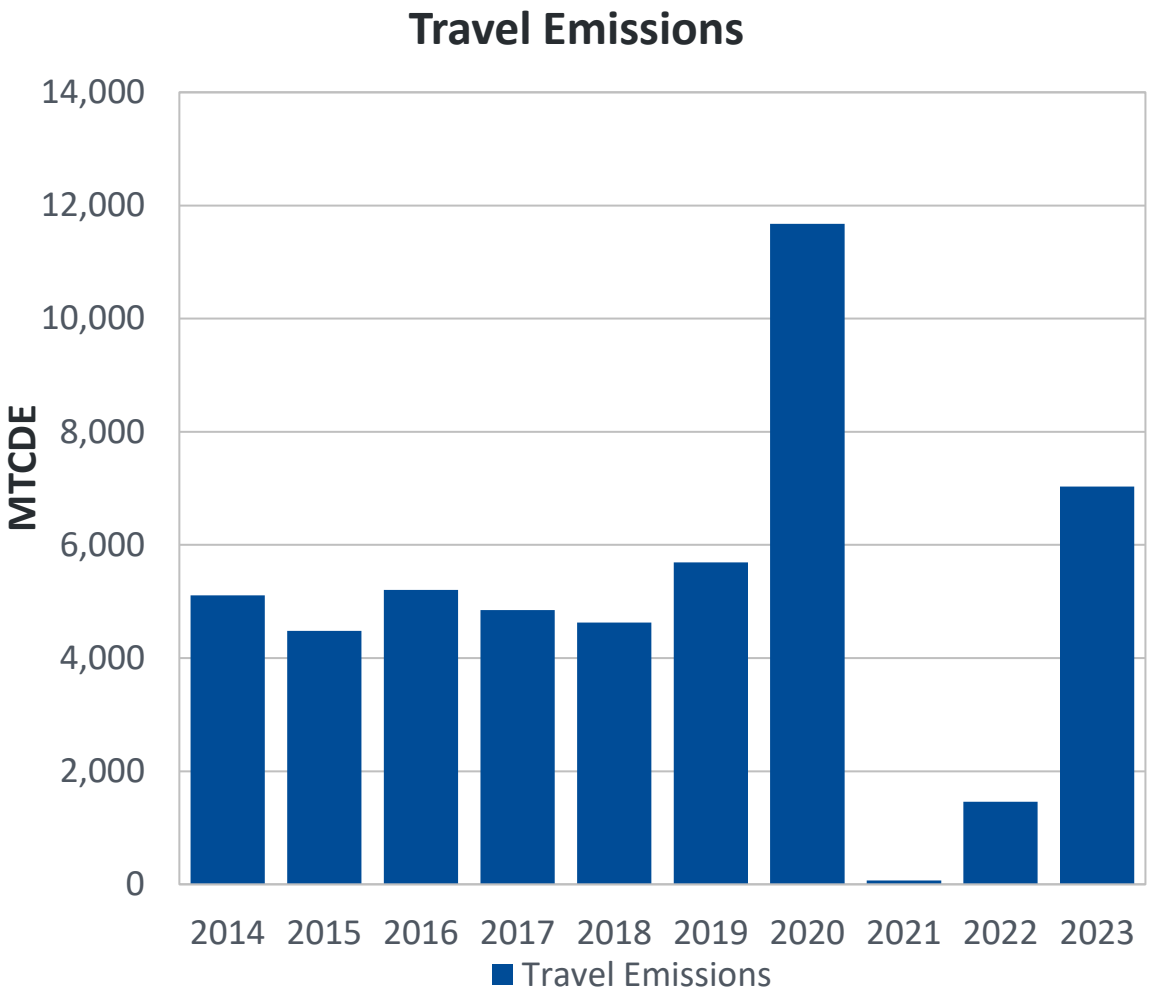
With more users commuting, overall emissions rose above pre-Covid average

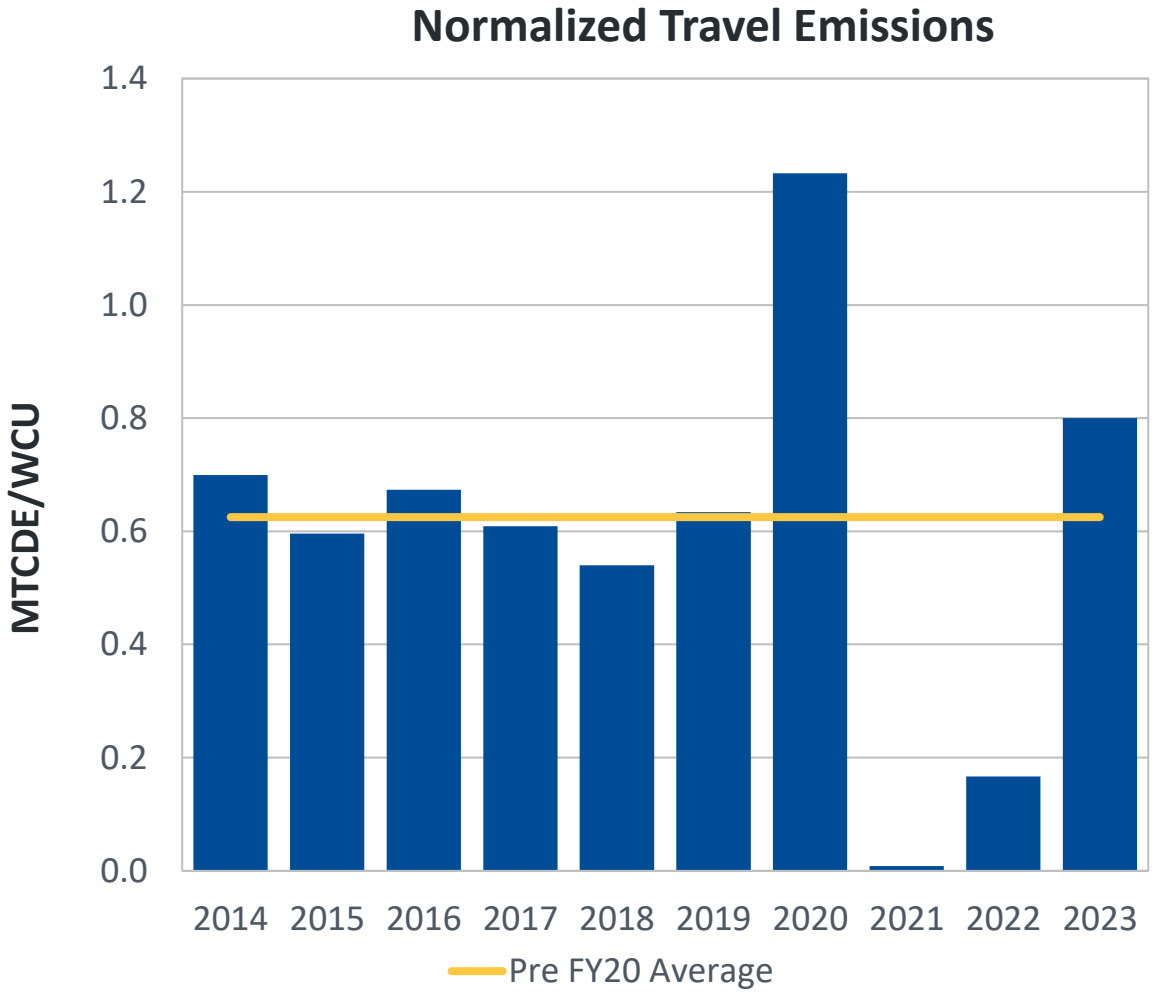




Total Travel Emissions

Travel increased nearly 400% following easing of restrictions





Concluding Comments

Scope 1: Chapman's Scope 1 emissions rose due to greater usage of natural gas and fleet operations increasing from the prior fiscal year. Going forward, Chapman should electrify the campus fleet and invest in major building remodels to increase overall energy efficiency. If commodity costs continue to increase buildings may need to be electrified.

Scope 2: Chapman's future plans for expansion will increase Scope 2 emissions based on total building need. Chapman can offset this by renovating existing spaces to LEED standards and by continuing to purchase renewable energy, which will offset future emissions associated with expansion.

Scope 3: Scope 3 remains Chapman's largest proportion of emissions, currently over 50%. Chapman should explore offsetting directly financed travel and attempt to modify user behavior to limit commuting emissions.

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Building knowledge

Questions? Comments?