

GARDIAN[®]

**Chapman University
FY23/24 Greenhouse Gas Analysis**

March 2025

Duncan Ketel & Geoff Garcia

Effectively Manage the Entire Building Lifecycle



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



Sustainability Solutions Agenda

Scope of Gordian 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**





Components of Chapman's Emissions Profile

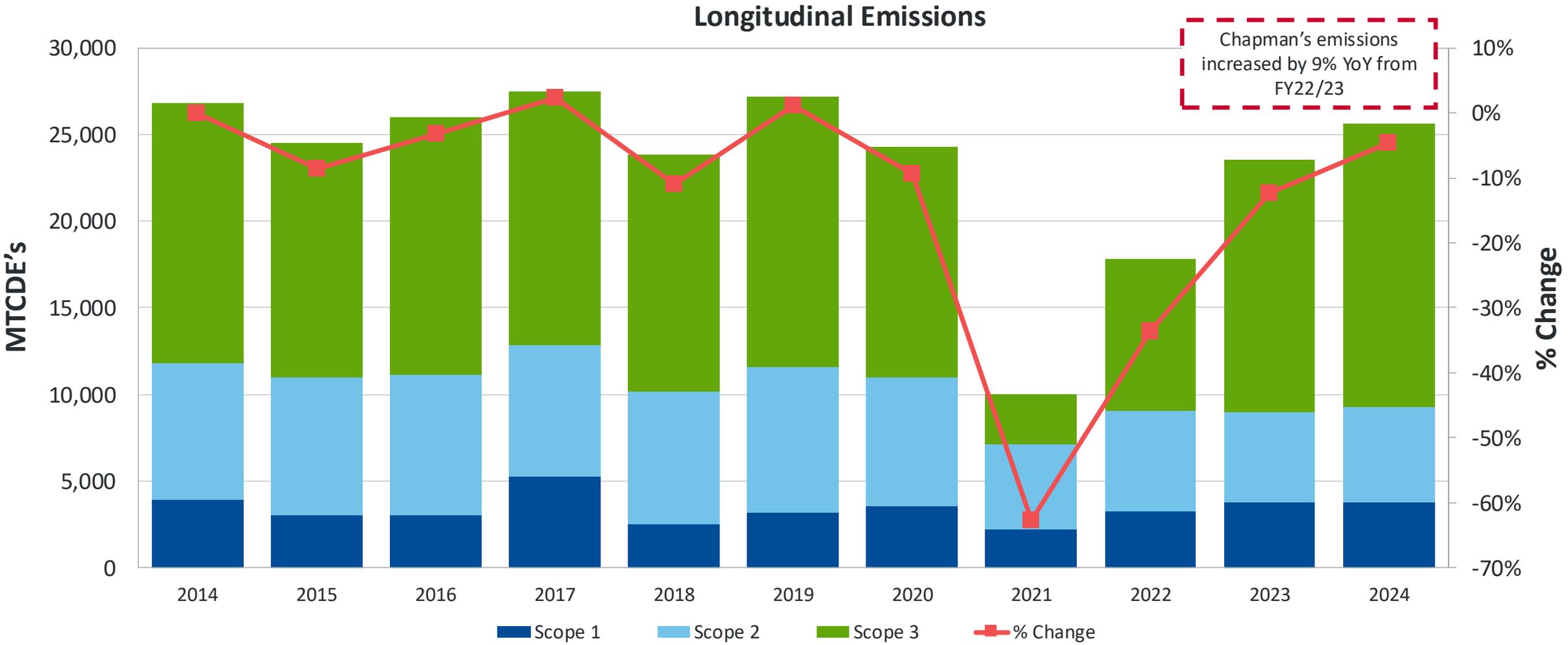
Scope 1 Direct GHGs	Scope 2 Upstream GHGs	Scope 3 Indirect GHGs
<ul style="list-style-type: none">• On-Campus Stationary• Vehicle Fleet Fuel• Refrigerants• Fertilizer	<ul style="list-style-type: none">• Purchased Electricity	<ul style="list-style-type: none">• Faculty/Staff/ Student Commuting• Directly Financed Air & Ground Travel• Study Abroad Travel• Solid Waste• Wastewater• Paper Purchasing• Transmission & Distribution Losses

Emission Summary

The background features a solid blue gradient. On the right side, there are several overlapping, semi-transparent geometric shapes in various shades of blue, including triangles and polygons, creating a modern, abstract design.



Longitudinal Emissions by Scope

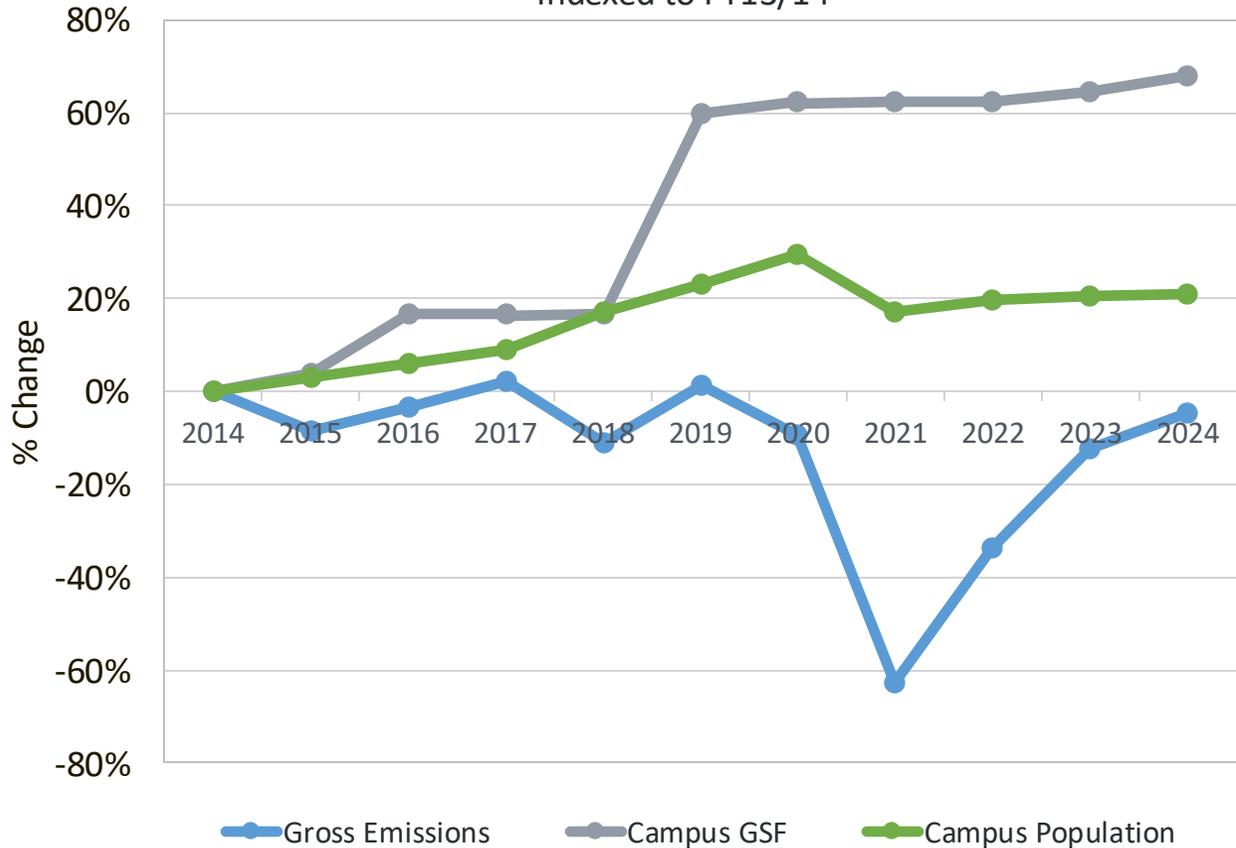




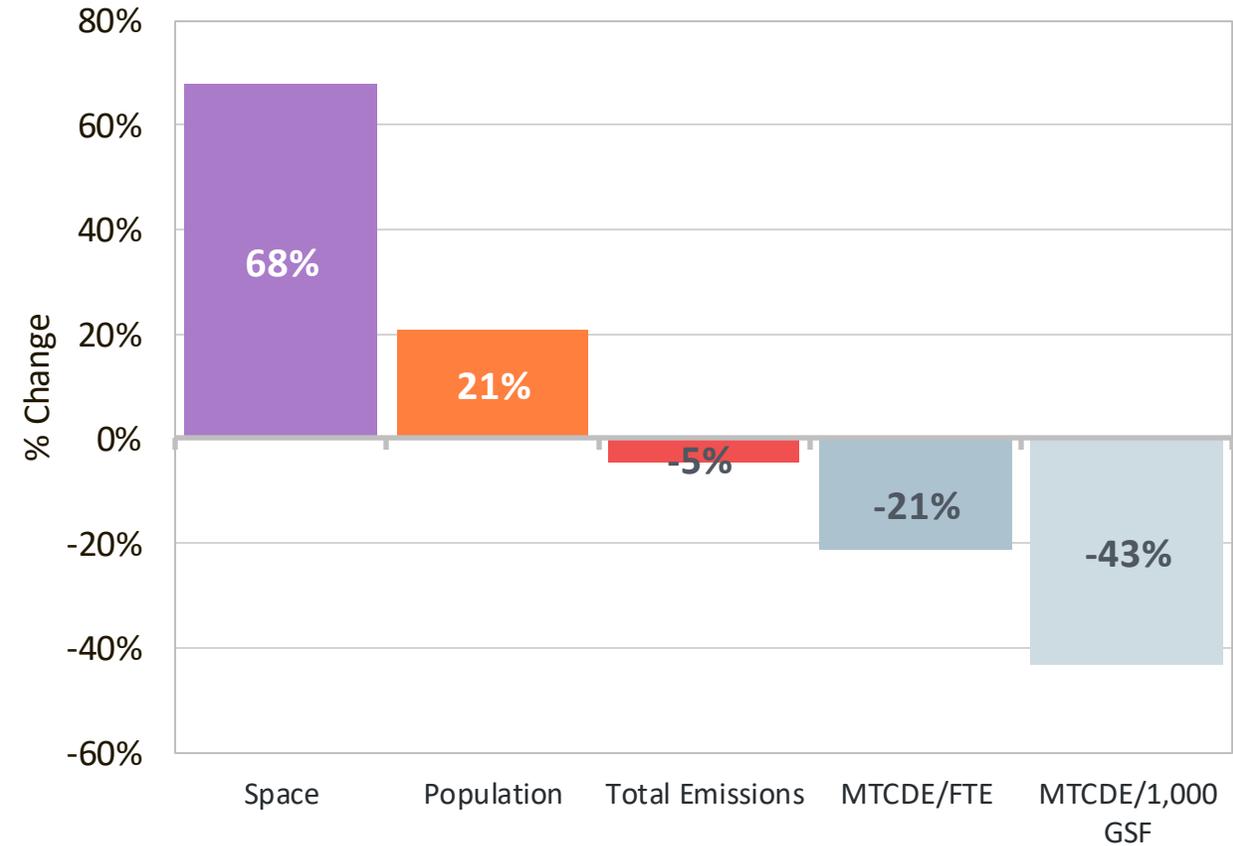
Progress Against 2014 Baseline

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

Change in Emissions (MTCDE) vs.
Campus Size and Population (FTE)
Indexed to FY13/14



Change in Space, Population, and Emissions
Indexed to FY13/14





Sustainability Peers

Peers determined using location, campus size, and population



Peer Institution	Location
American University	Washington D.C.
Catholic University of America	Washington D.C.
Idyllwild Arts Academy	Idyllwild, California
Loyola University of Maryland	Baltimore, Maryland
St. Mary's College of California	Moraga, California
University of San Francisco*	San Francisco, California
University of Denver	Denver, Colorado



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:

$$\text{EUI-AFA} = A + (2 * (B + C)) + D$$

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.

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

A = student residents onsite

B = employee residents onsite

C = other residents onsite/staffed hospital beds

D = Total FTE student equivalent enrollment

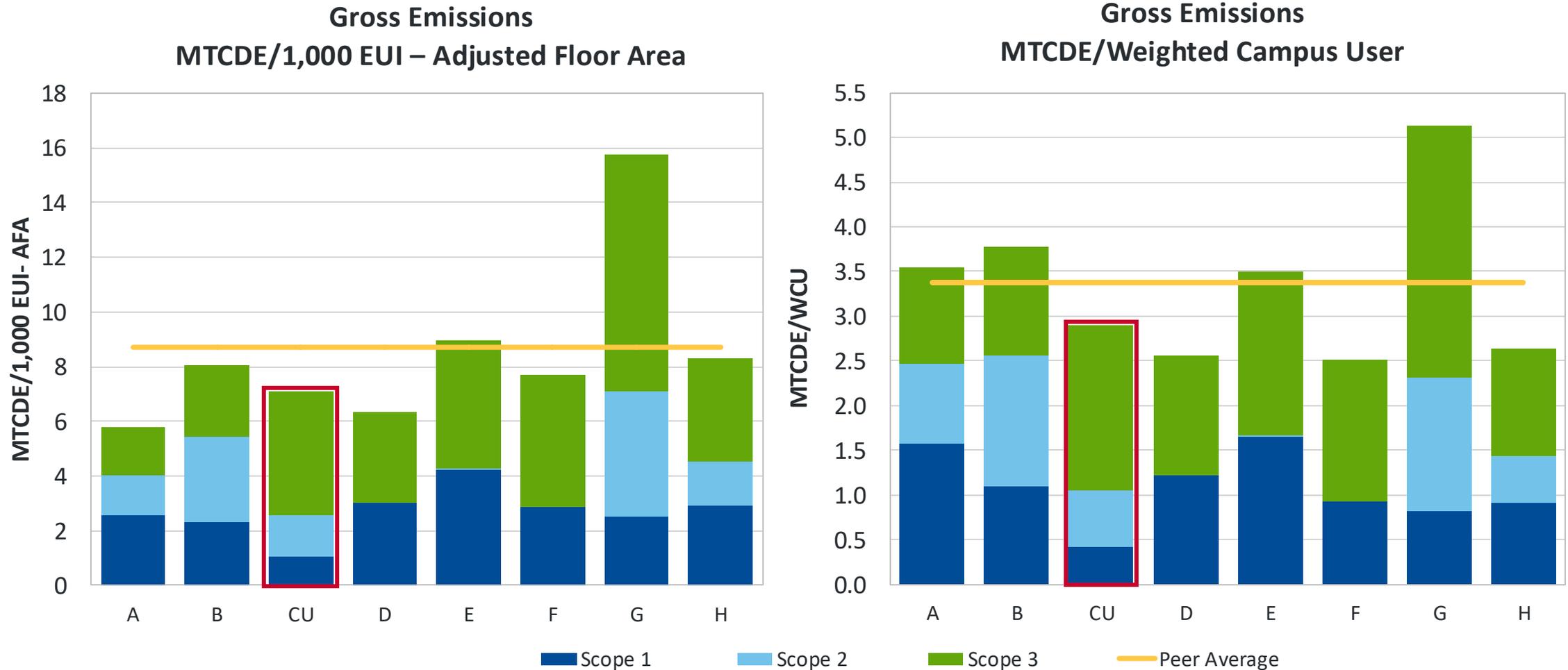
E = FTE of employees (faculty and staff)

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

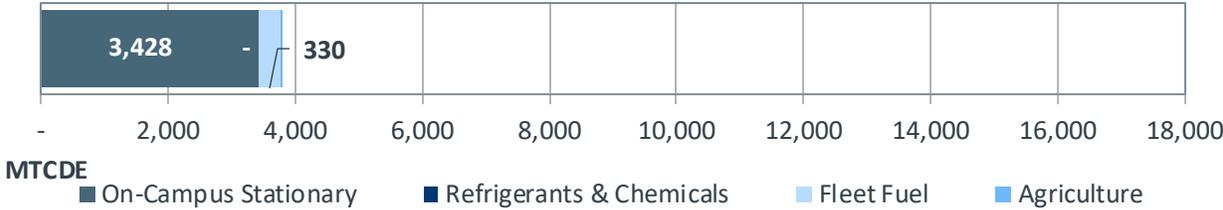




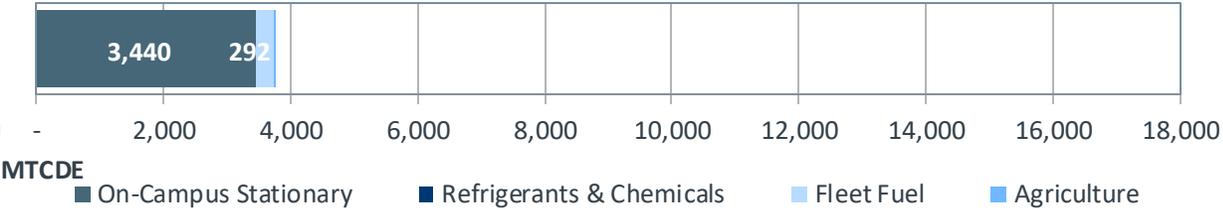
FY22/23 vs. FY23/24 Distribution of Emissions

Scope 3 continues to be Chapman's largest source of emissions in FY23/24

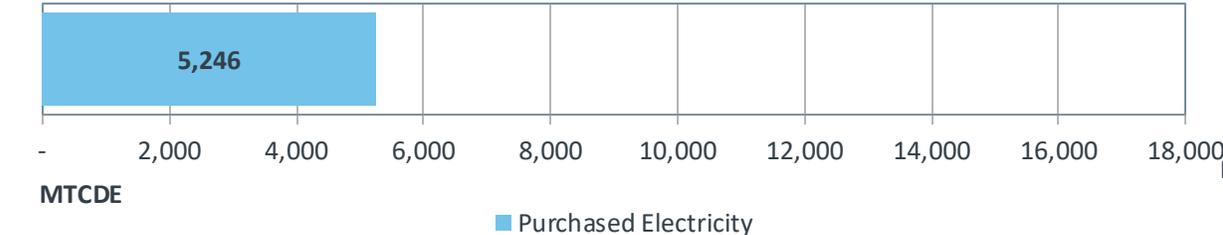
Scope 1 Sources – 16.0%



Scope 1 Sources – 14.6%



Scope 2 Sources – 22.3%



Scope 2 Sources – 21.5%



Scope 3 Sources – 61.7%



Scope 3 Sources – 63.9%



Utilities





ROPA Peer Institutions for Utility Analysis

Facilities Peers	
Institution	Location
Gonzaga University	Spokane, WA
Pepperdine University	Malibu, CA
Pomona College	Claremont, CA
Seattle Pacific University	Seattle, WA
Seattle University	Seattle, WA
University of San Diego	San Diego, CA
University of San Francisco	San Francisco, CA

Institutional Peers

Comparative Considerations

Size | Age | Region | Technical Complexity | Location

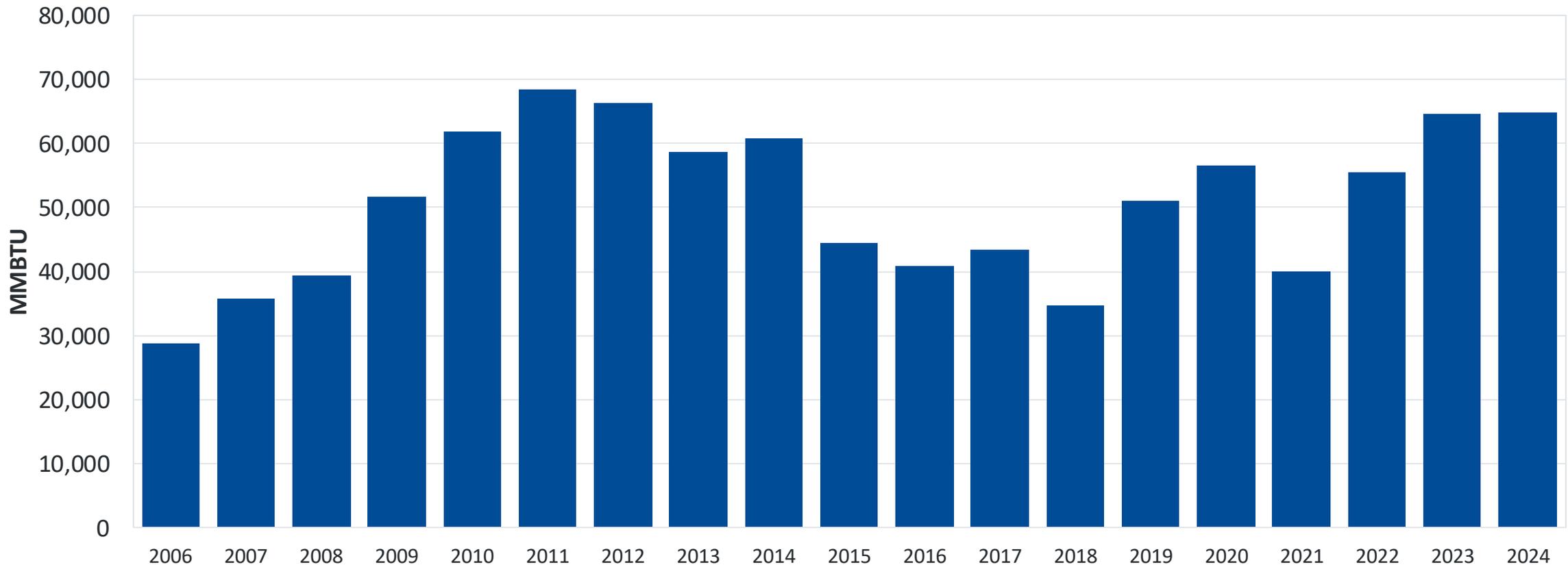




Trending Fossil Fuel Consumption

Natural Gas usage has fluctuated substantially at Chapman, but stabilized recently

Total Natural Gas Consumption

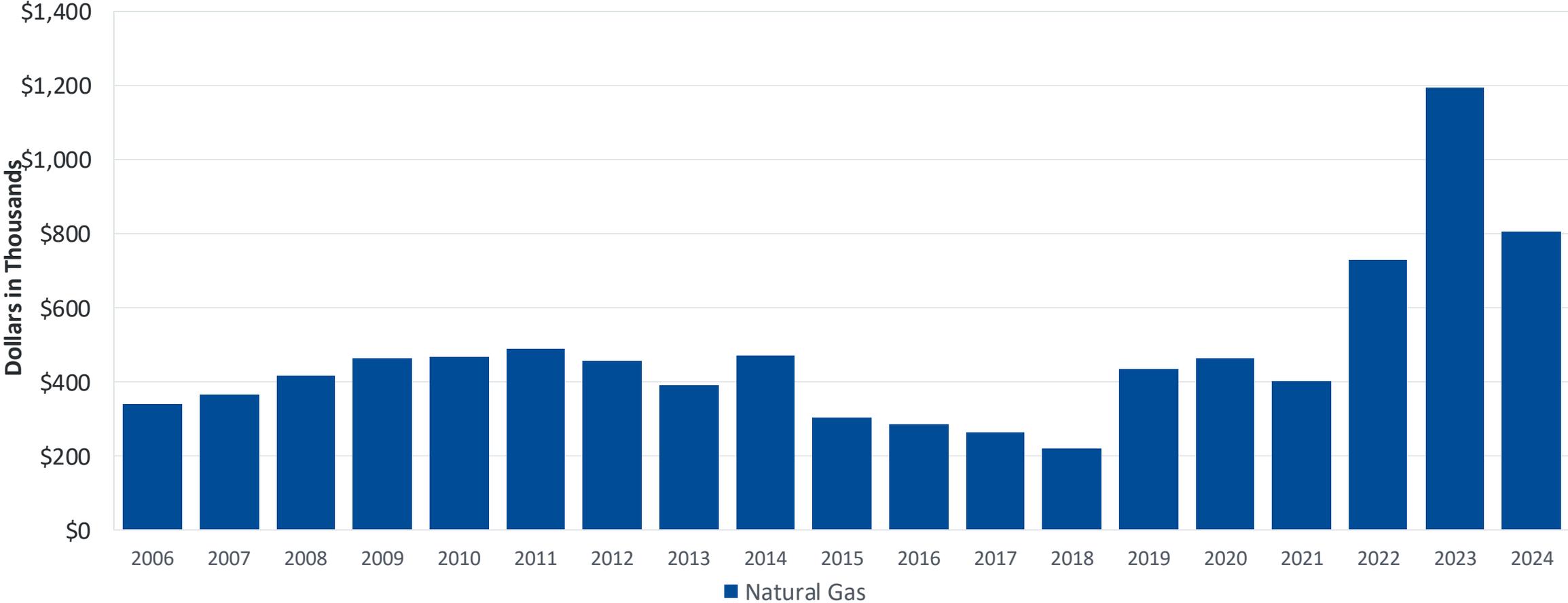




Fossil Fuel Expenditures

Natural Gas costs decreased by 33% in FY23/24, still higher than FY21/22 and prior years

Total Natural Gas Expenditures

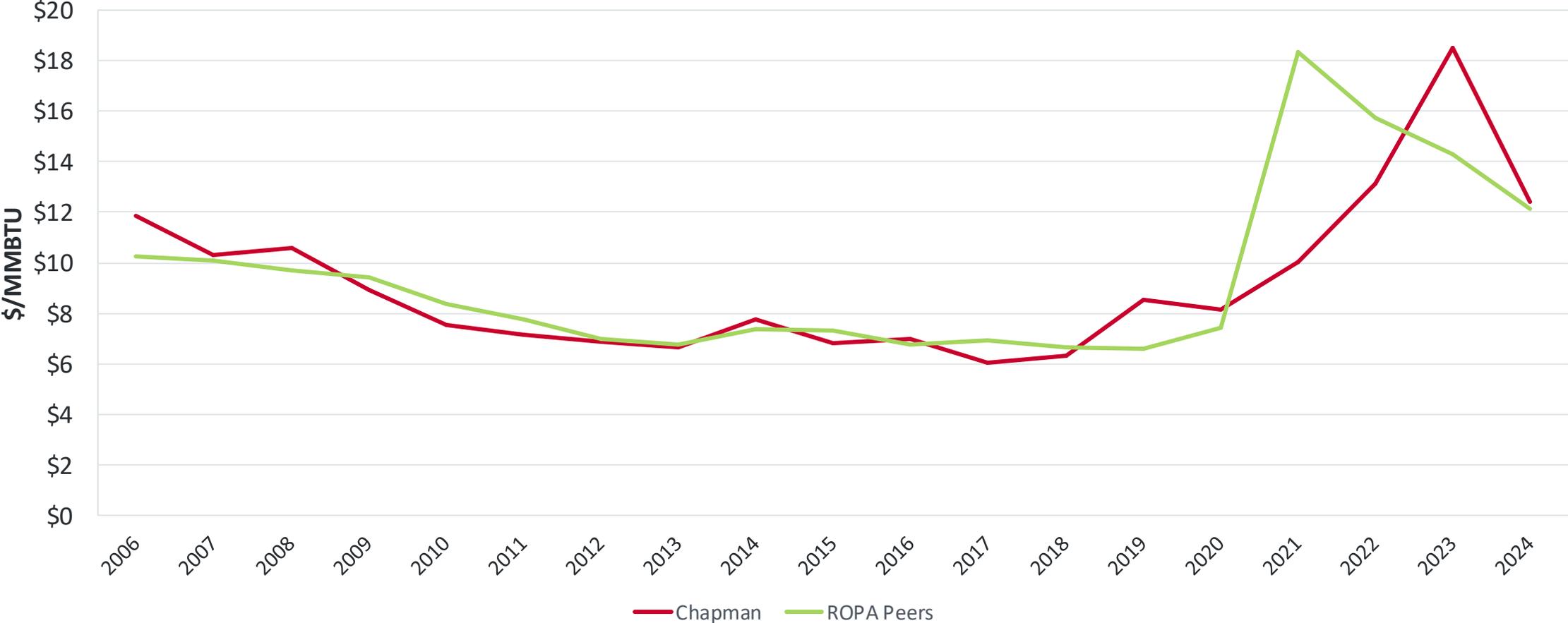




Differences in Unit Costs vs. Peers

While below peak costs, since FY19/20 costs have risen by 52% for Chapman, 63% for peers

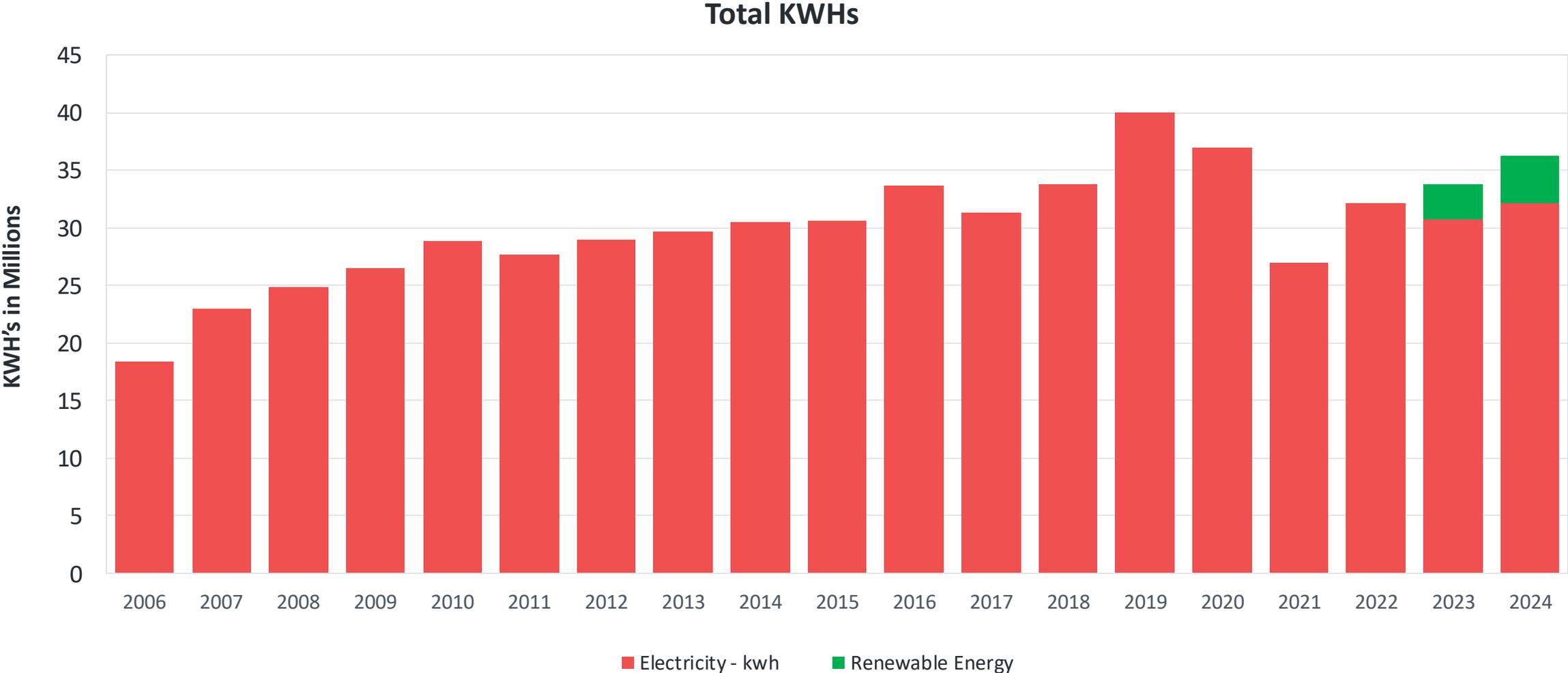
Natural Gas Unit Cost





Electricity Consumed by Campus

Total KWH's have increased since FY21/22 by 13%, but 11% is carbon neutral

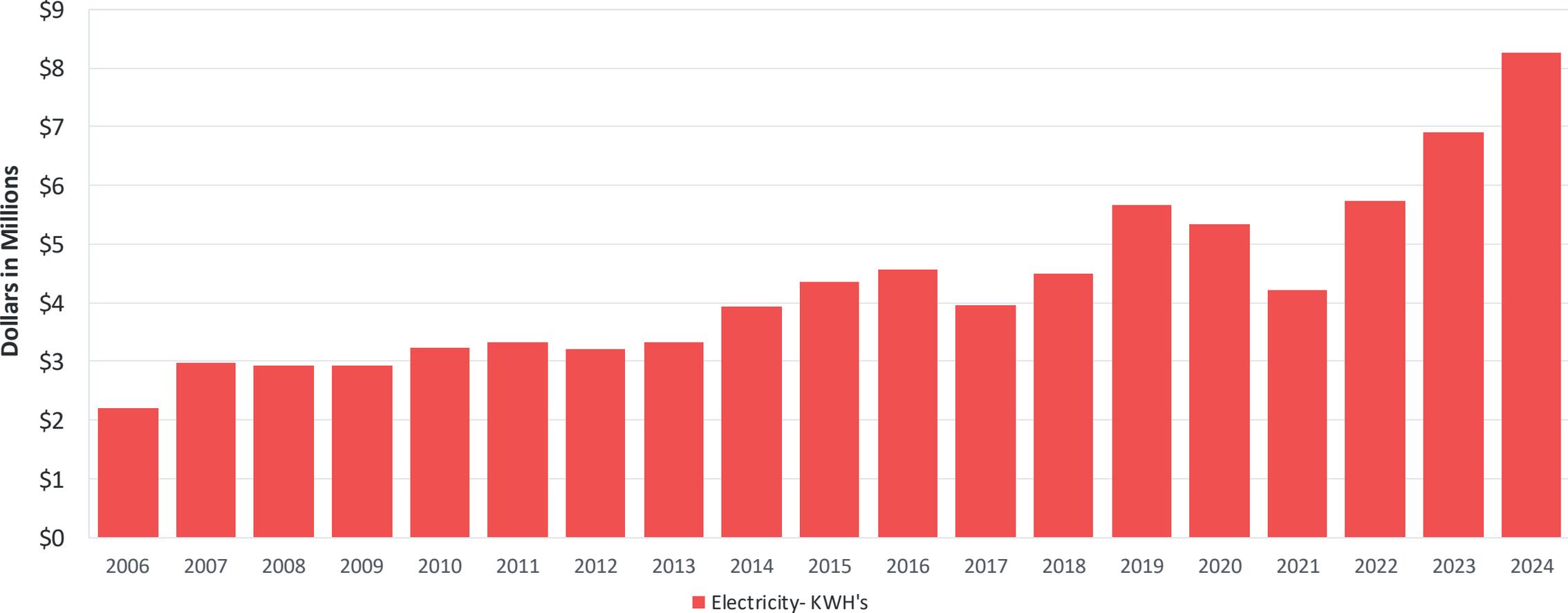




Electricity Expenditures

Unlike natural gas, electricity costs have continued to increase in FY23/24

Total Electricity Expenditures

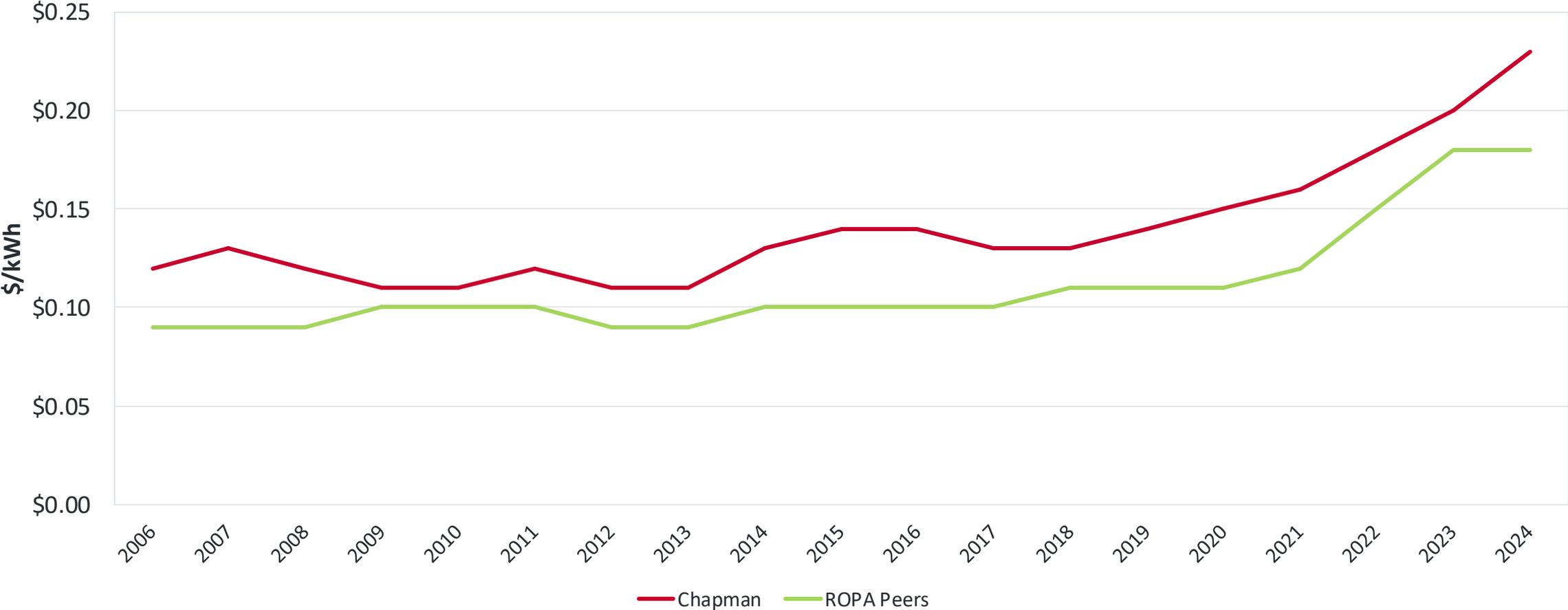




Differences in Unit Costs vs. Peers

Chapman's unit costs have increased by 15% since FY22/23, while peers have stabilized

Electric Unit Cost



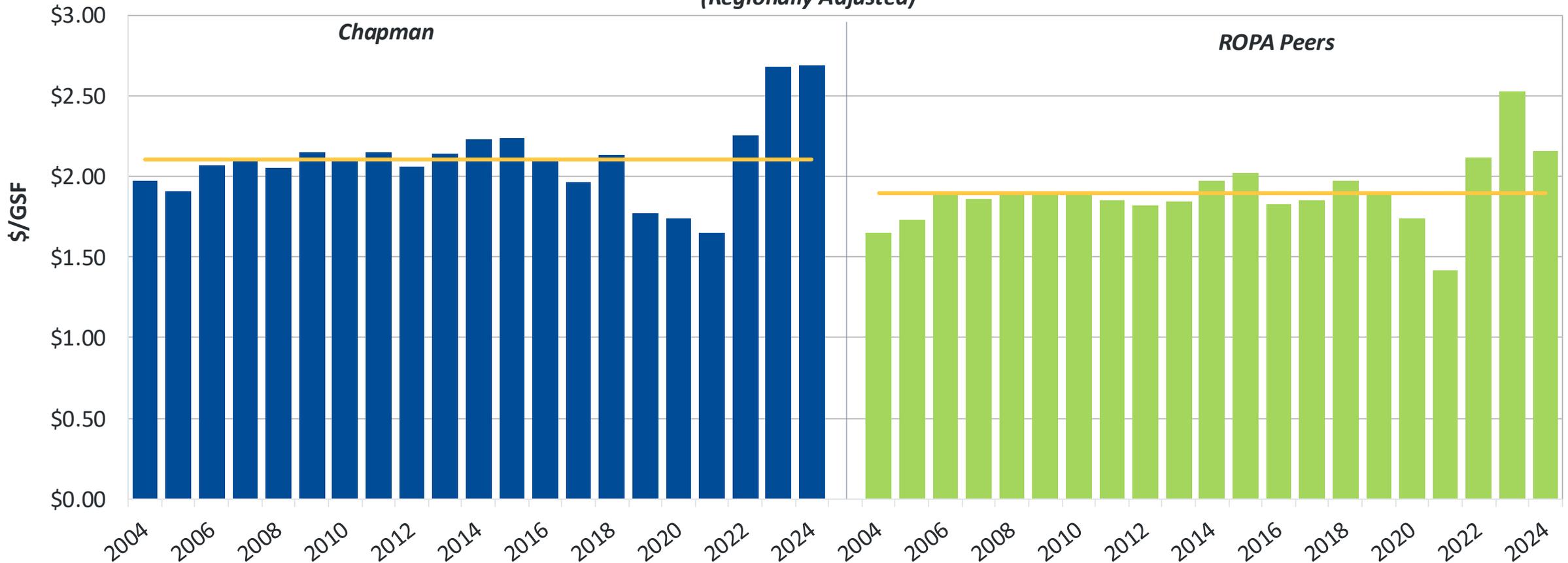


Utility Operating Expenditures Compared to Peers

Chapman's utility expenditures are 17% above peer spending

Chapman versus Peer Utility \$ per GSF

(Regionally Adjusted)



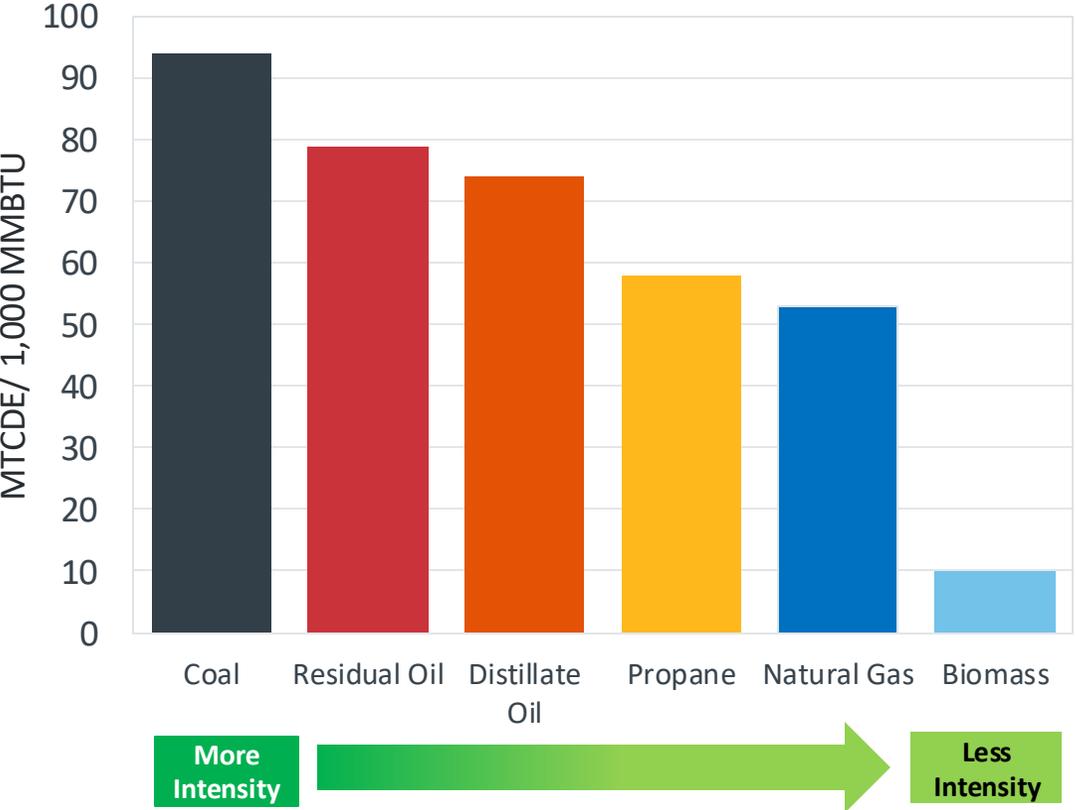
Utilities – Sustainability Analysis



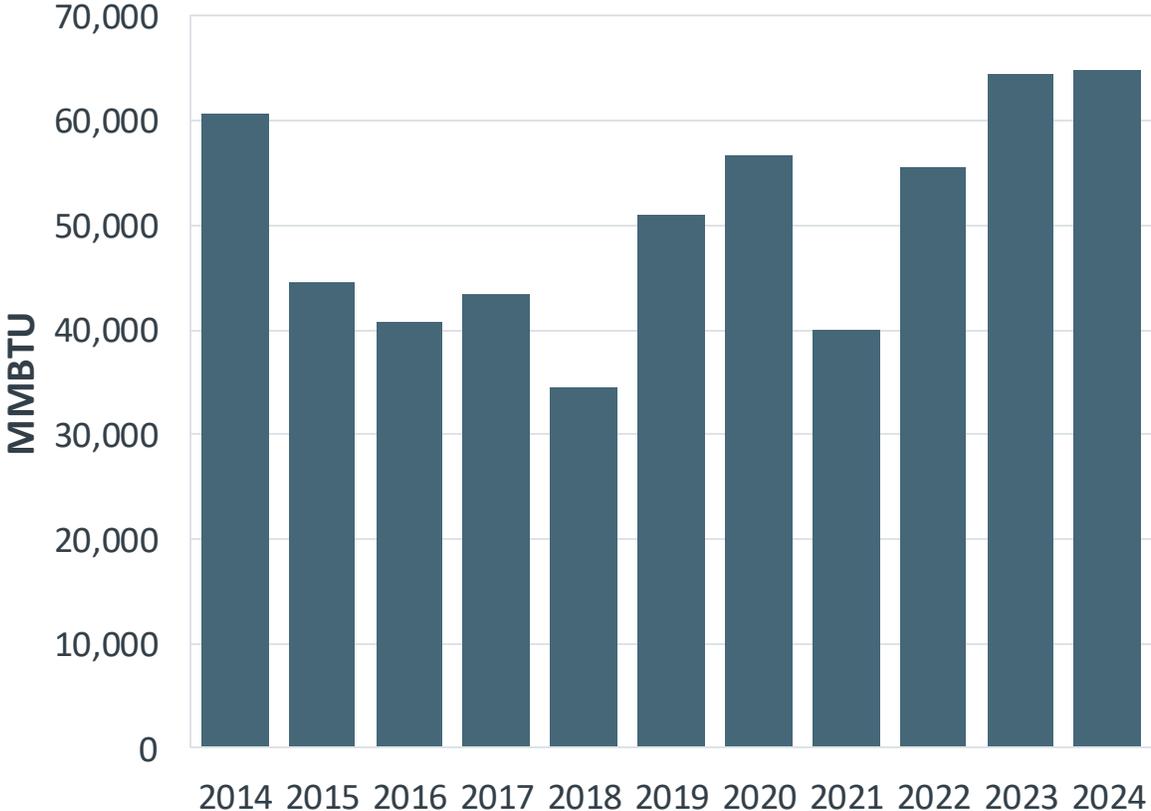
Scope 1: Stationary Fuel Consumption

Chapman's FY23/24 Scope 1 emission increases caused by greater natural gas usage

Carbon Intensity of Commonly Used Fossil Fuels



Stationary Fuel Consumption

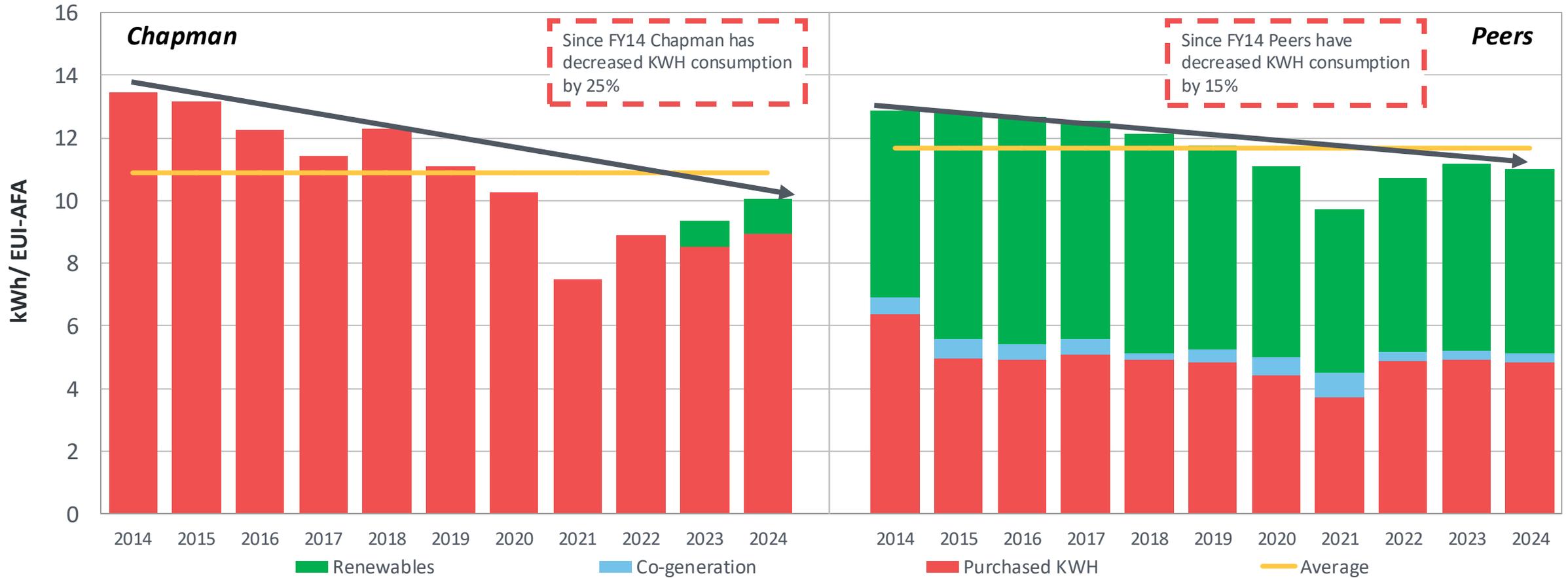




Scope 2: Electric Consumption vs. Peers

While Chapman consumes less than peers, a greater proportion of peer KWHs are renewable

Scope 2 Normalized Electric Consumption

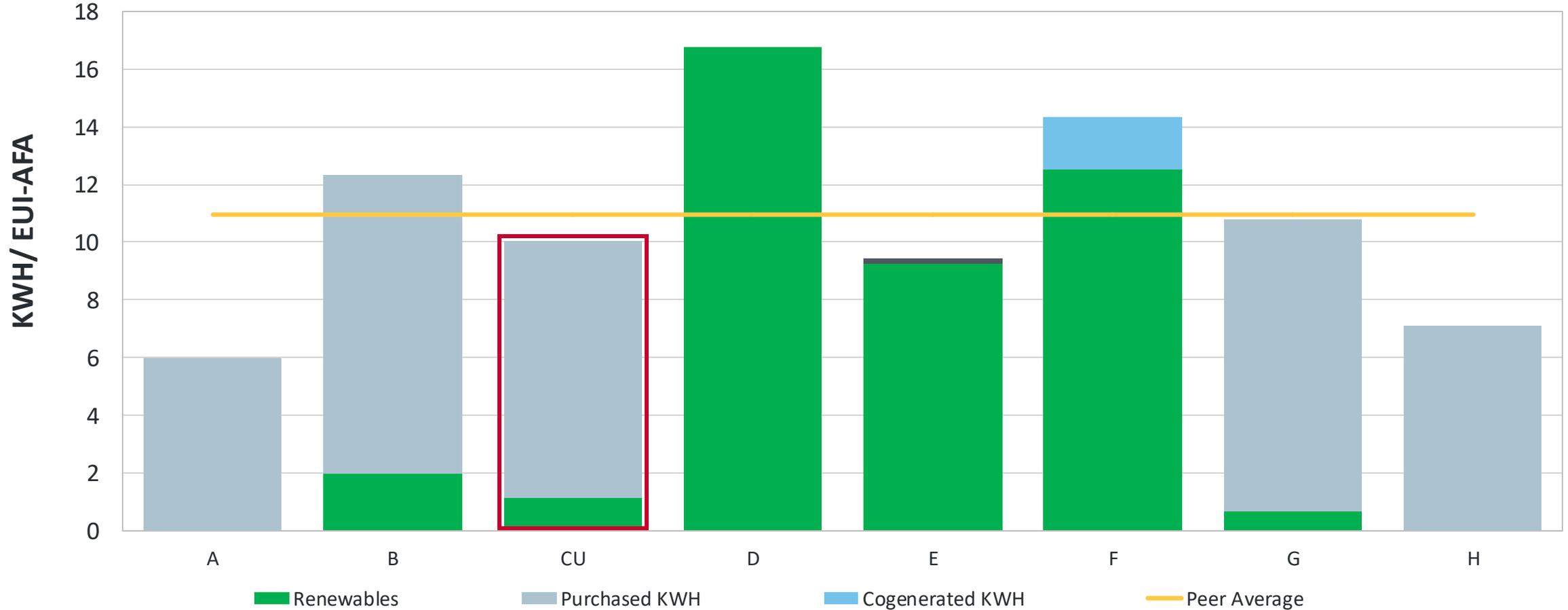




Scope 2: Total Electric Consumption vs. Peers

Chapman consumed 8% less KWH than peers when normalizing by GSF

FY23/24 Normalized Electric Consumption vs. Peers

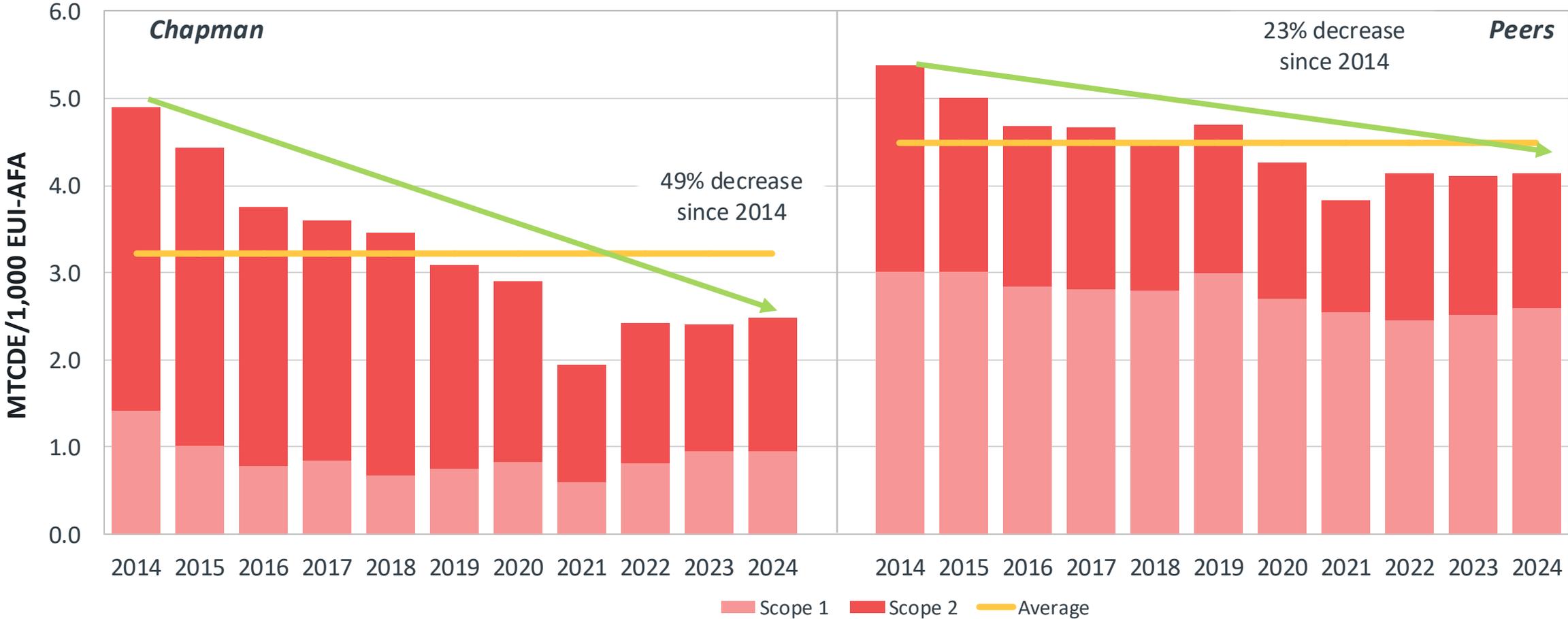




Energy Emissions vs. Peers

Overall normalized emissions have decreased, but emissions increased this past fiscal year

Energy Emissions



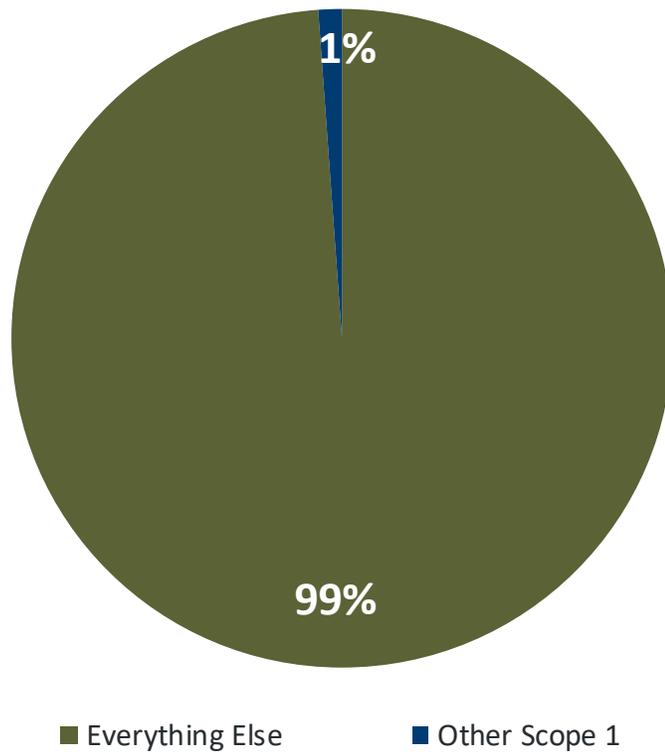
Non-Utility Emissions Sources



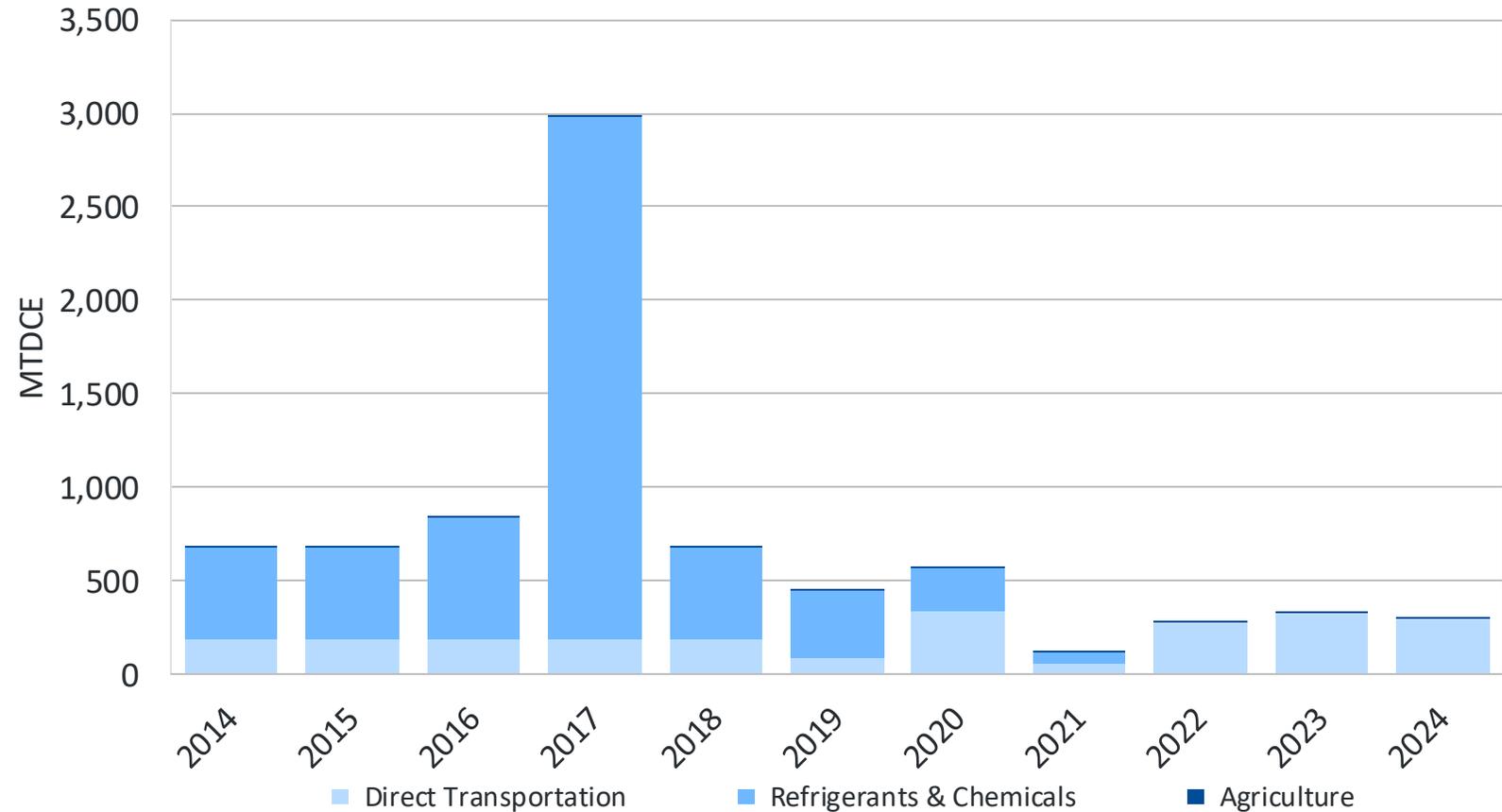
Other Scope 1 Emissions Are Small Portion of Total

Direct Transportation and fertilizer usage decreased reducing “other scope 1” emissions

FY23/24 Chapman



Other Scope 1 Emissions

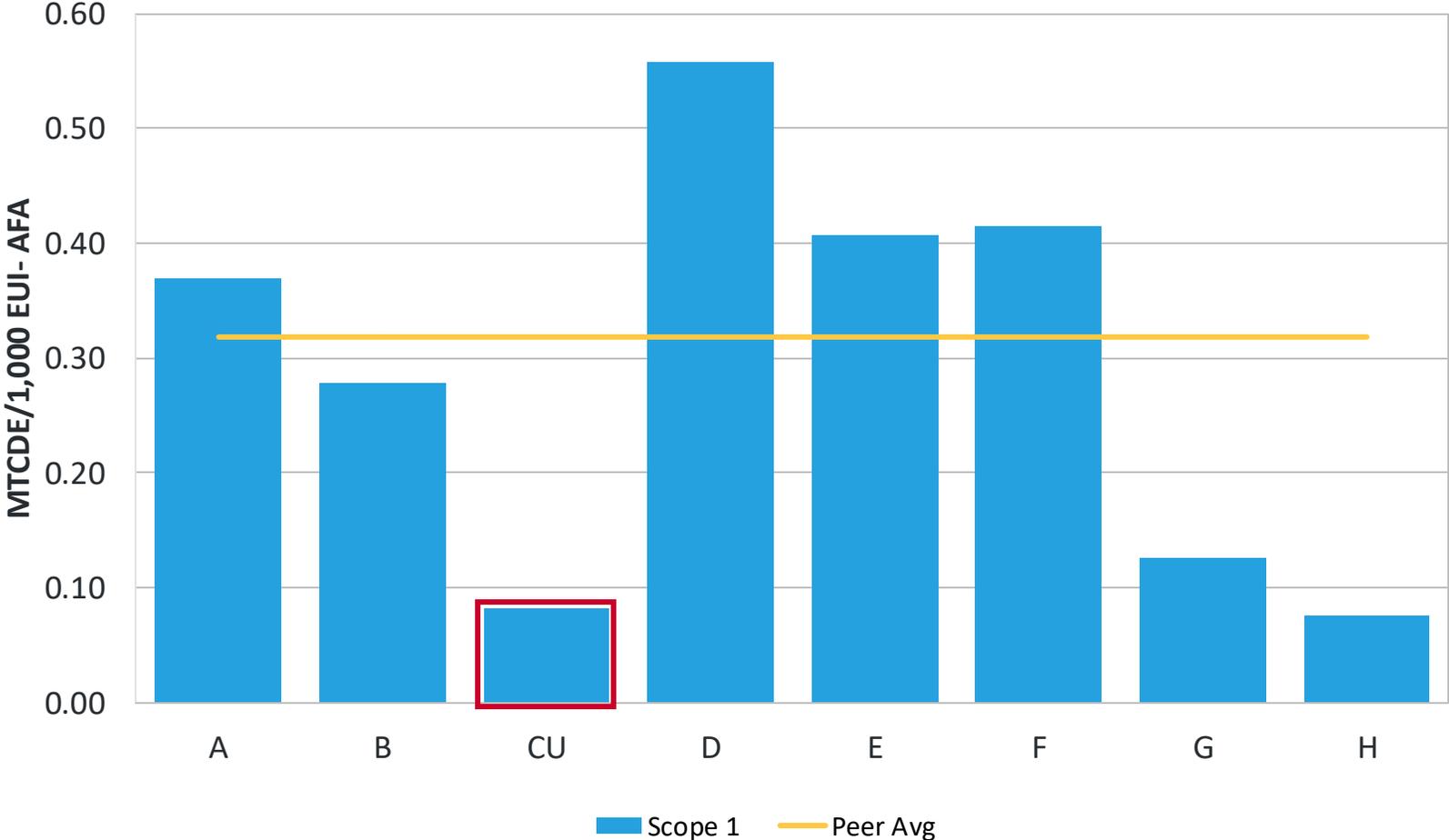




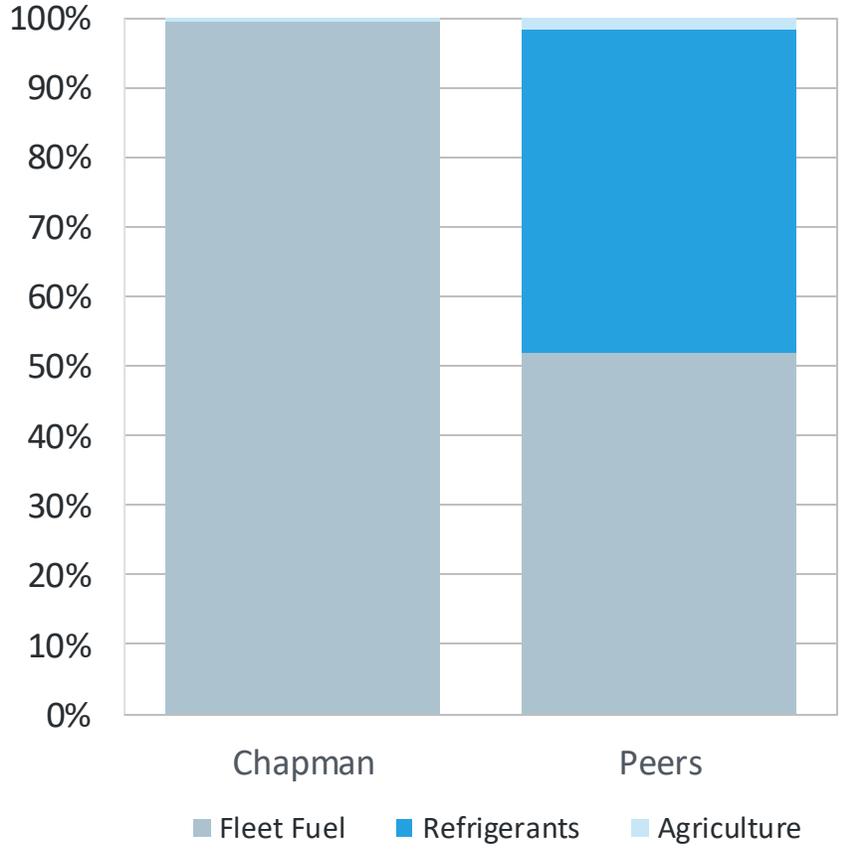
Other Scope 1 Emissions Compared to Peers

Chapman other scope 1 emissions remain below peers, fleet fuel is main source

Other Scope 1 Emissions vs. Peers



Other Scope 1 Sources

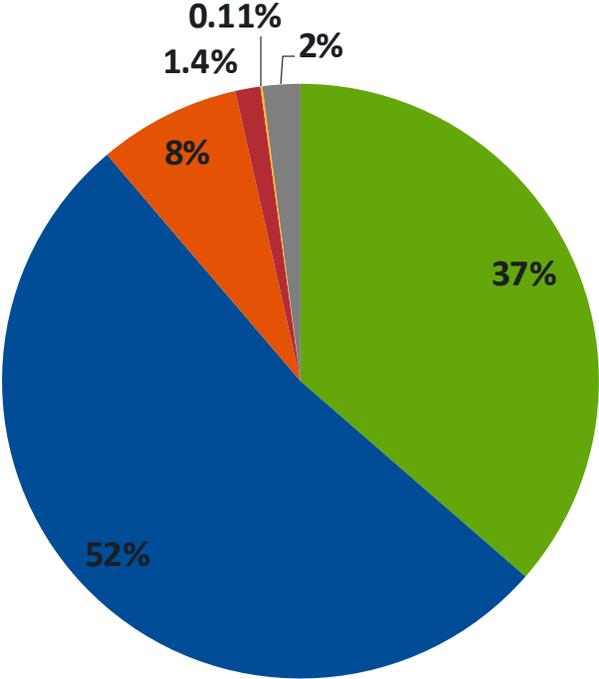




Scope 3: Indirect Emissions Overview

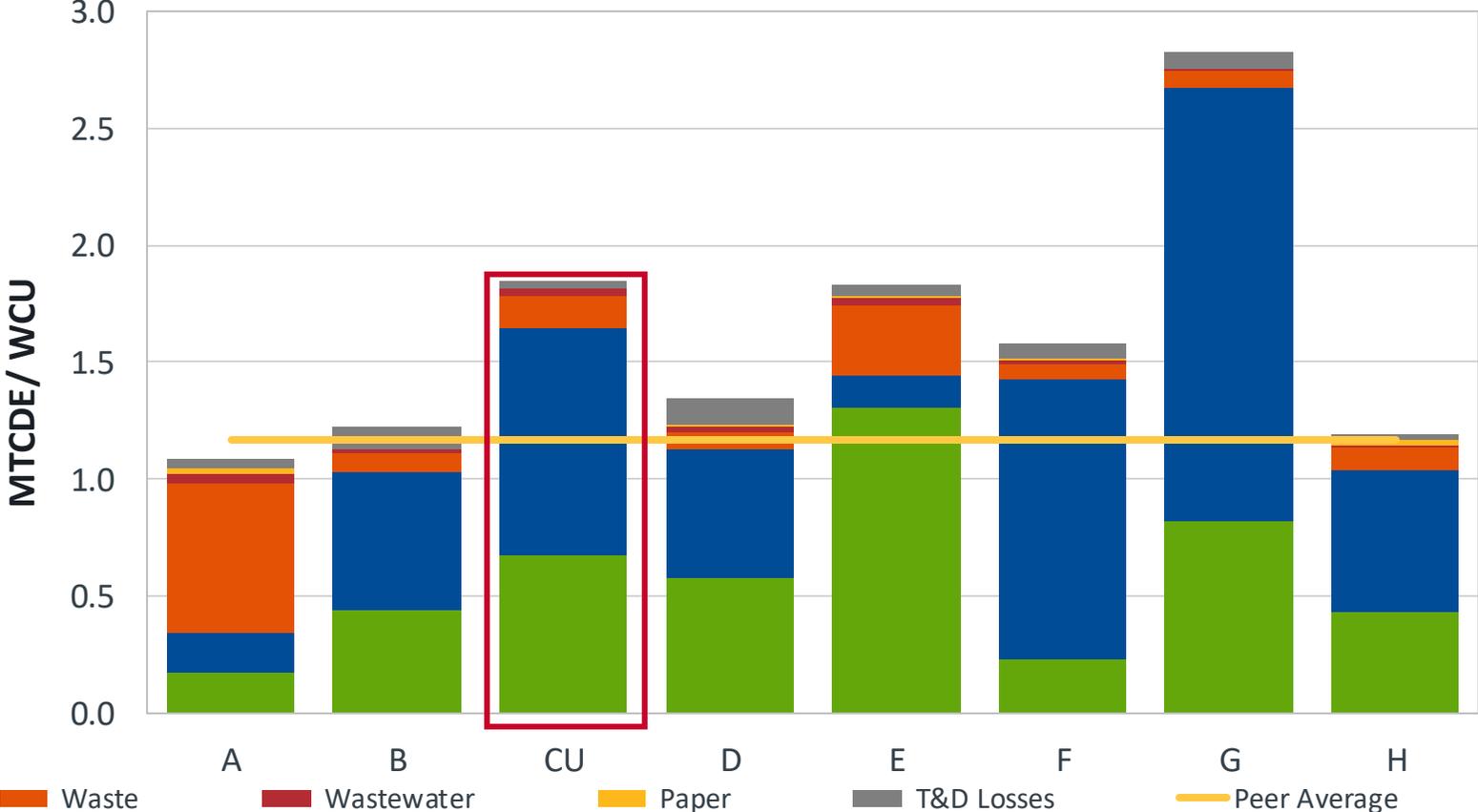
When normalizing by user, Chapman has the 2nd highest emissions in peer group

FY23/24 Scope 3 Emissions



Commuting Travel

Scope 3 Emissions vs Peers



MTCDE/WCU

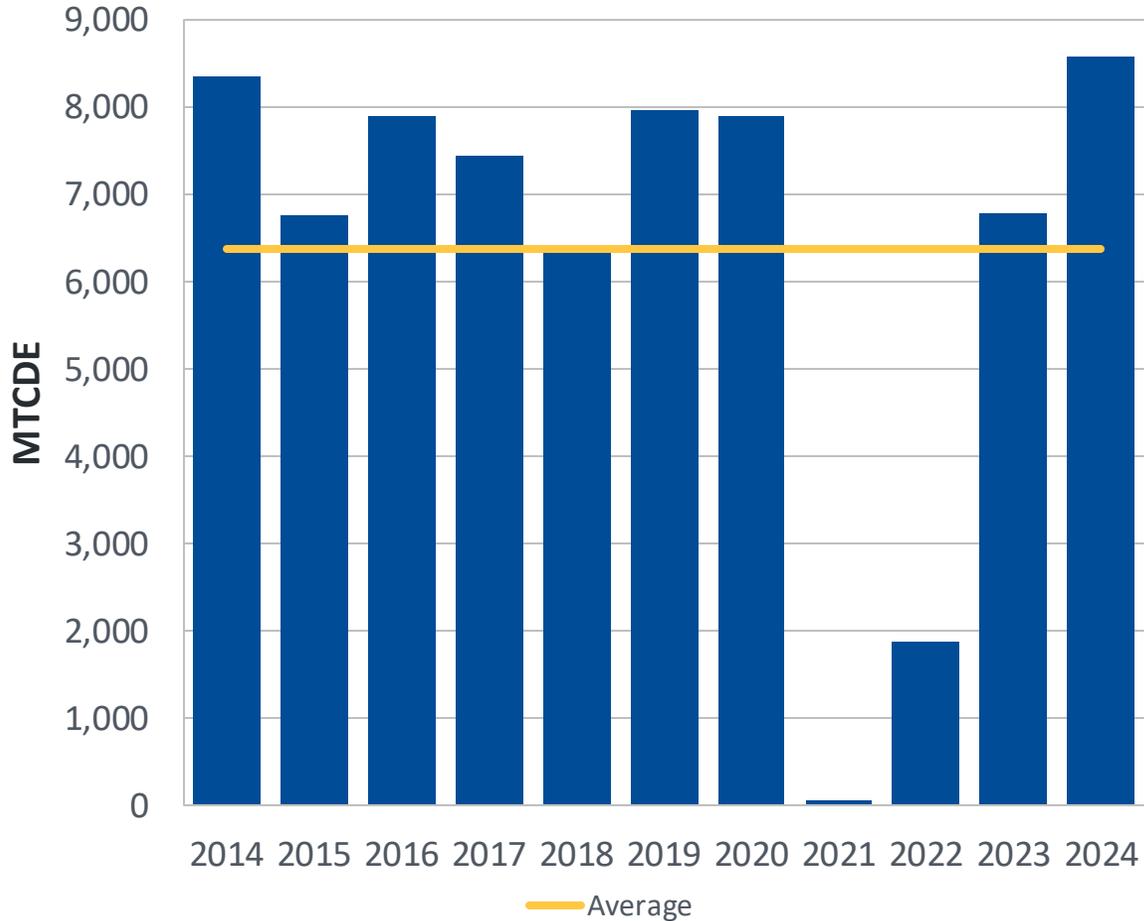
Waste Wastewater Paper T&D Losses Peer Average



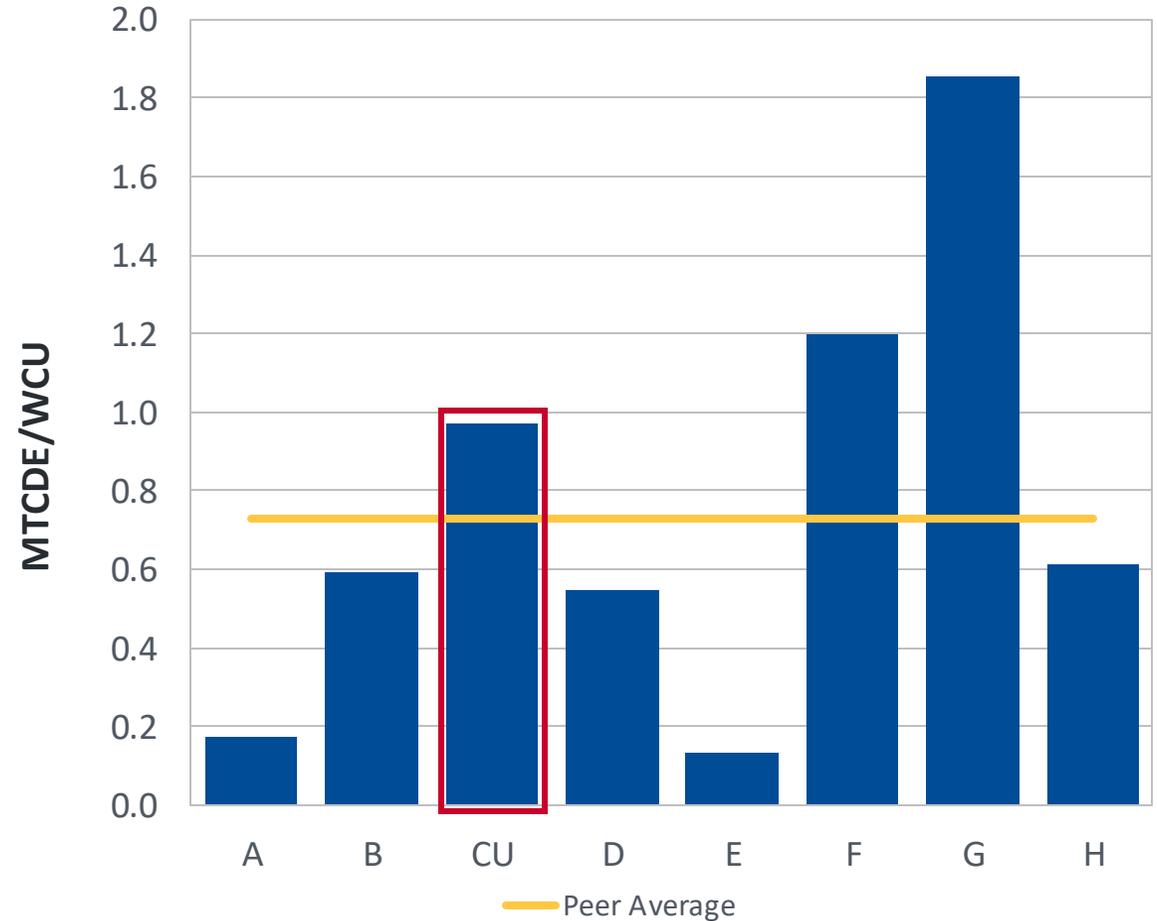
Travel Emissions

Chapman has 3rd highest travel emissions among peers

Travel Emissions



FY23/24 Travel Emissions vs. Peers

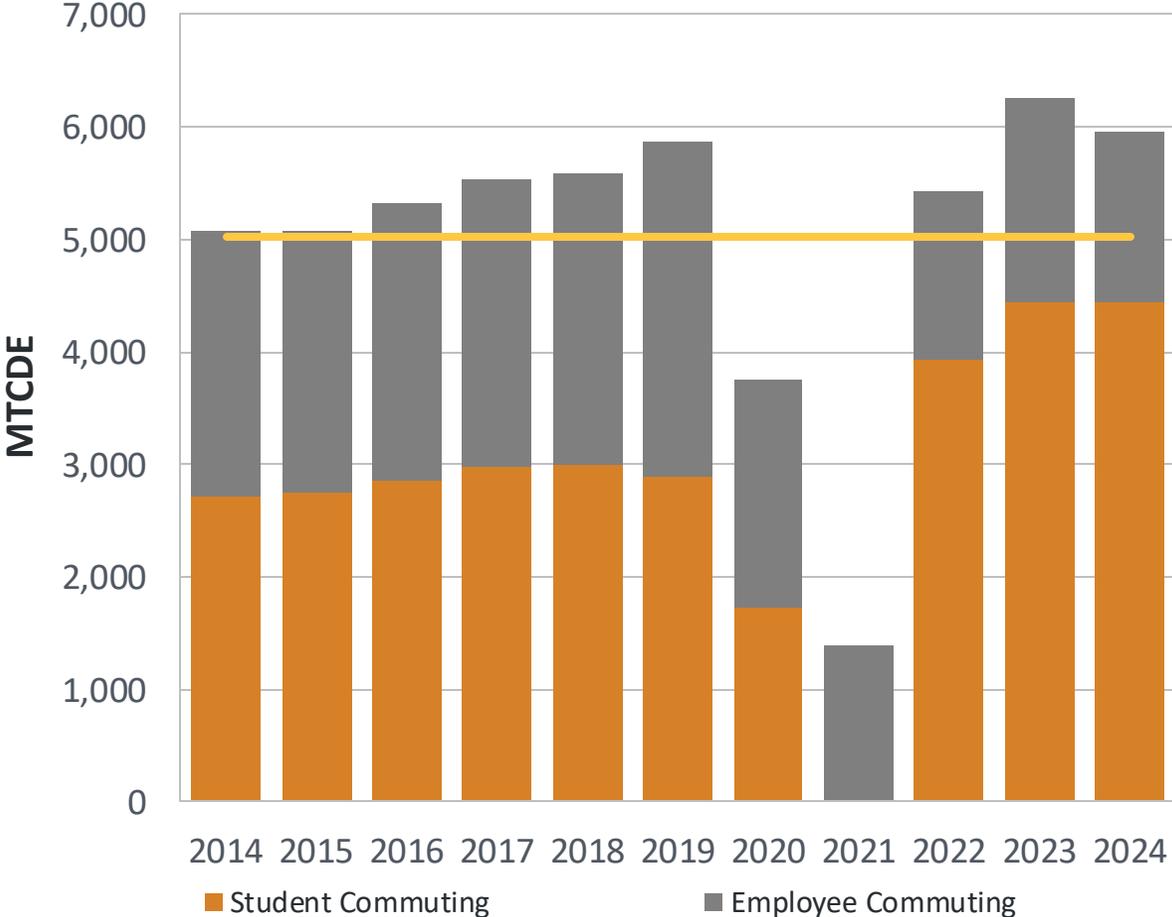




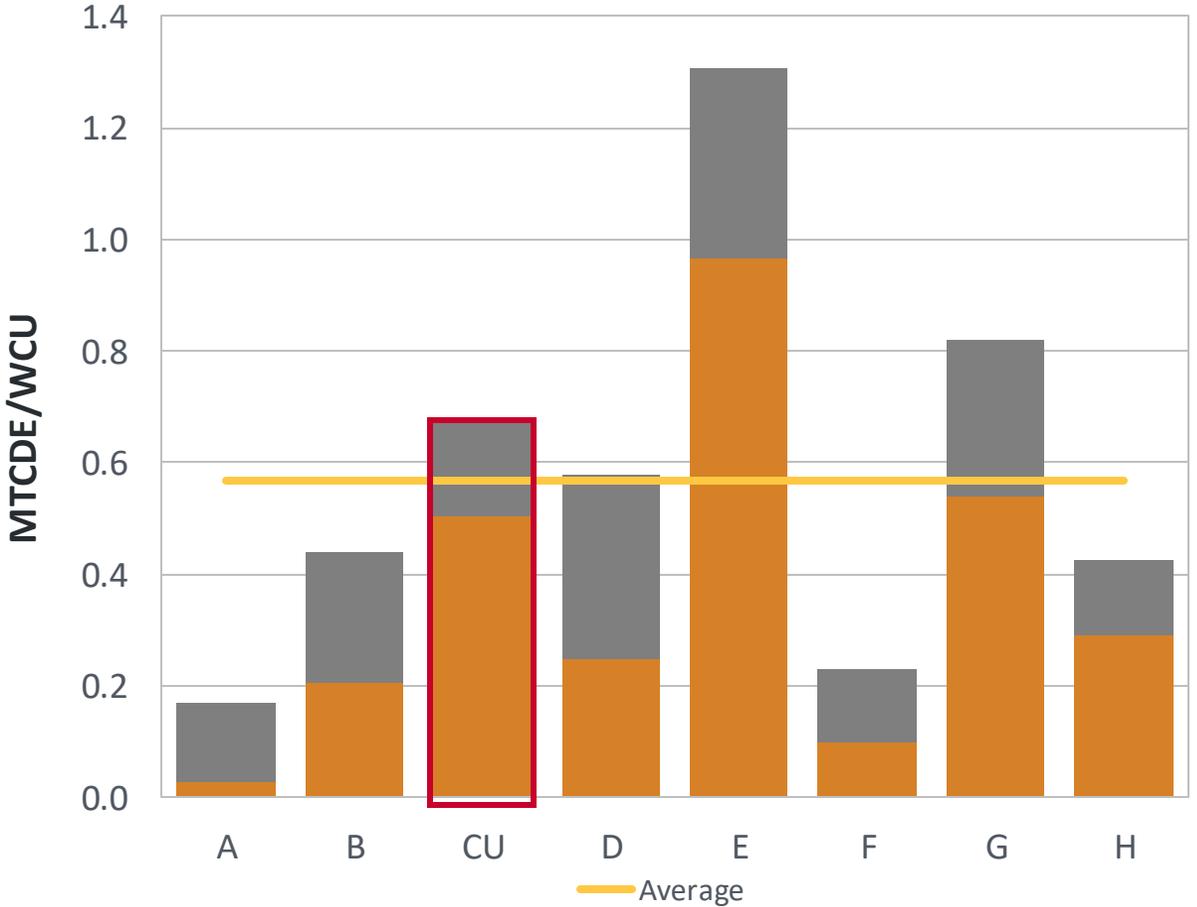
Commuting Emissions

Chapman has the third highest commuting emissions in peer group

Commuting Emissions



FY23/24 Commuting Emissions vs. Peers

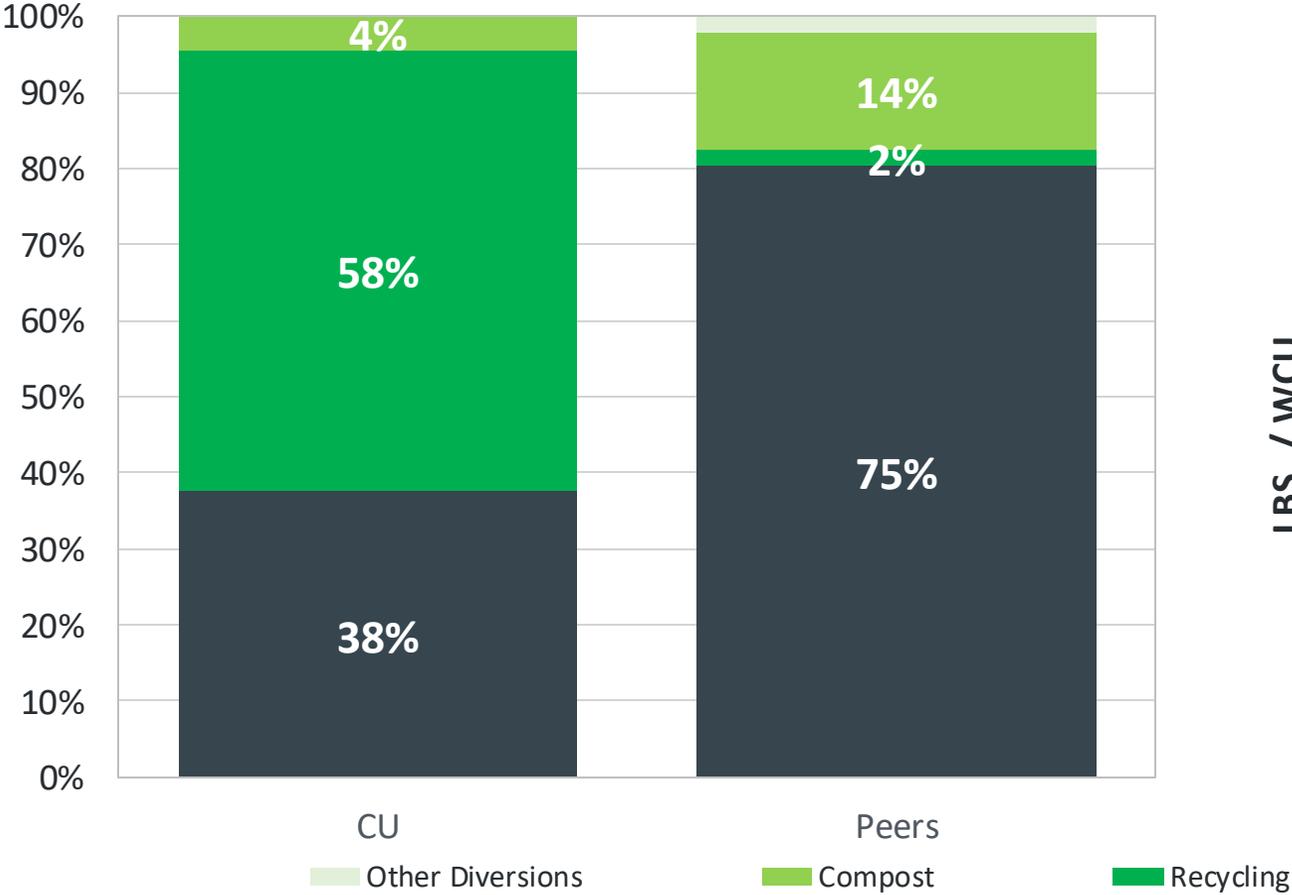




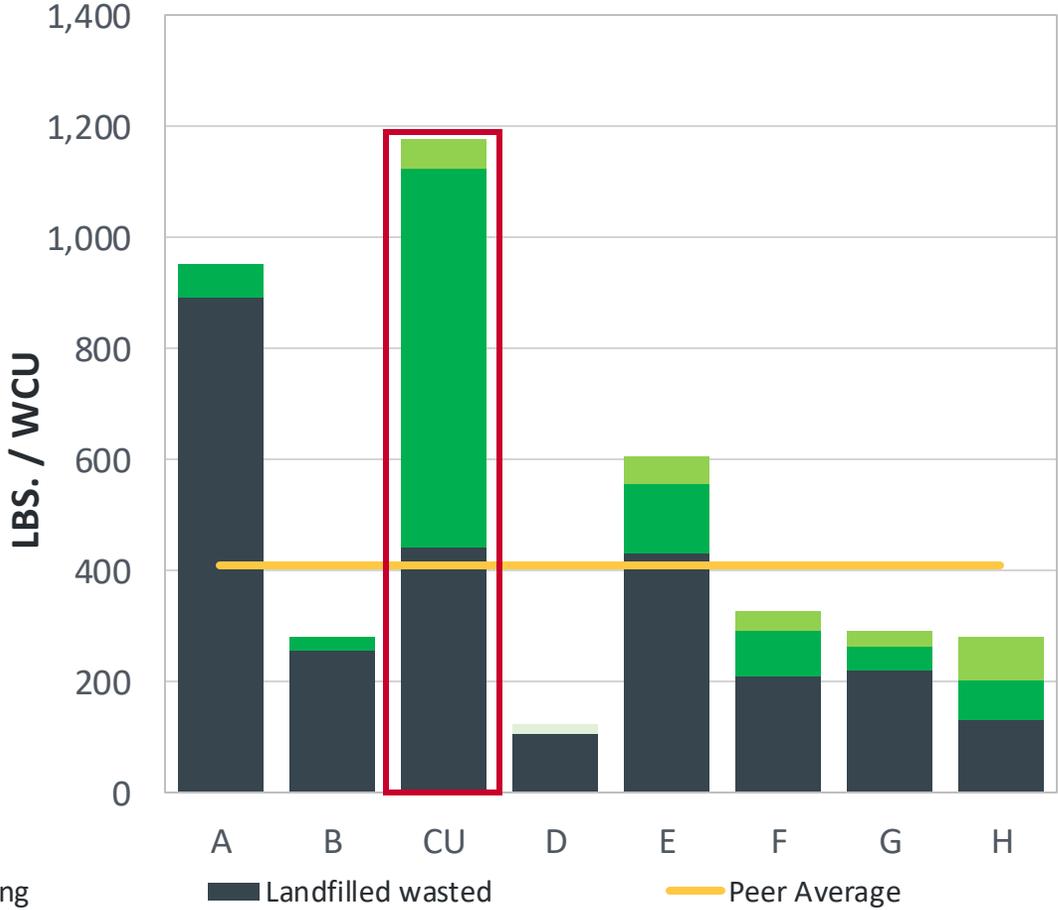
A Closer Look at Waste

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

FY23/24 Diversion rate vs Peers



FY23/24 Waste vs Peers

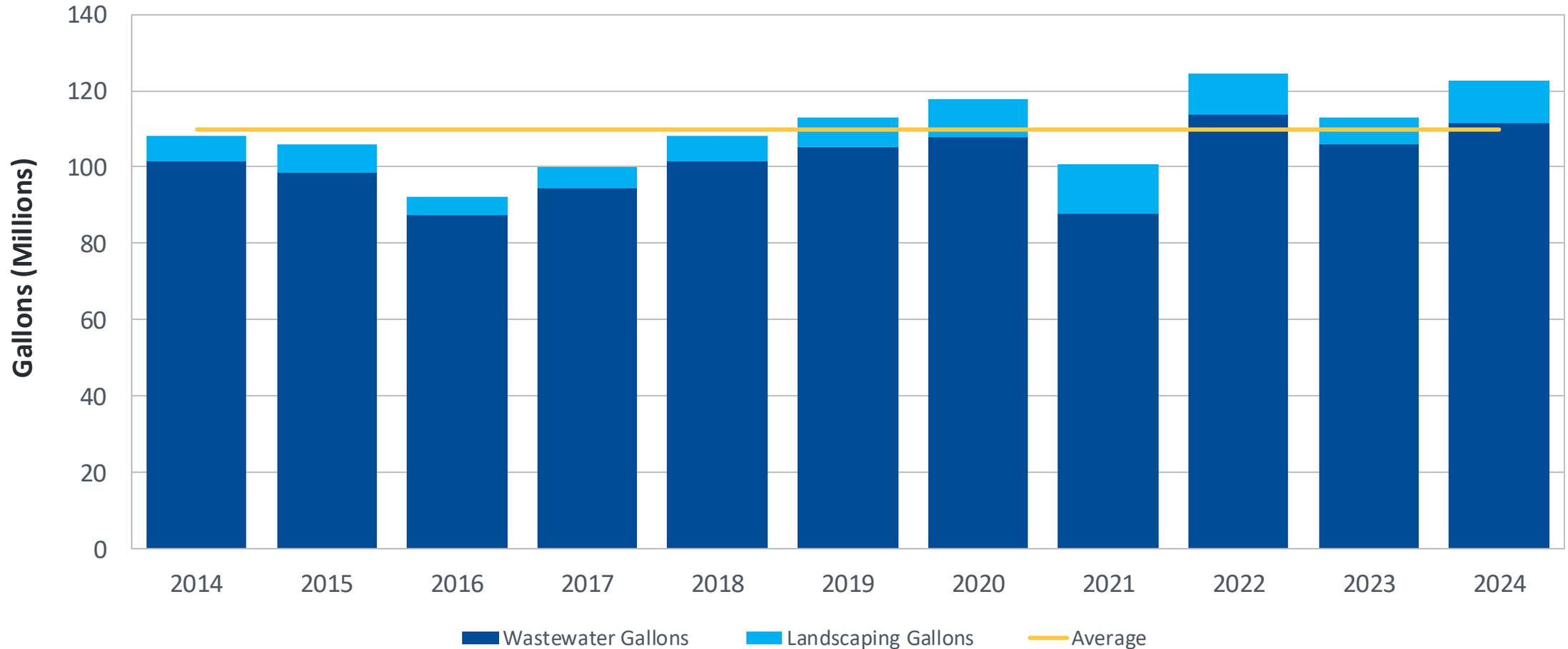




Total Water Consumption

Landscaping and building water consumption increased by 9% YoY

Water Consumption Overtime

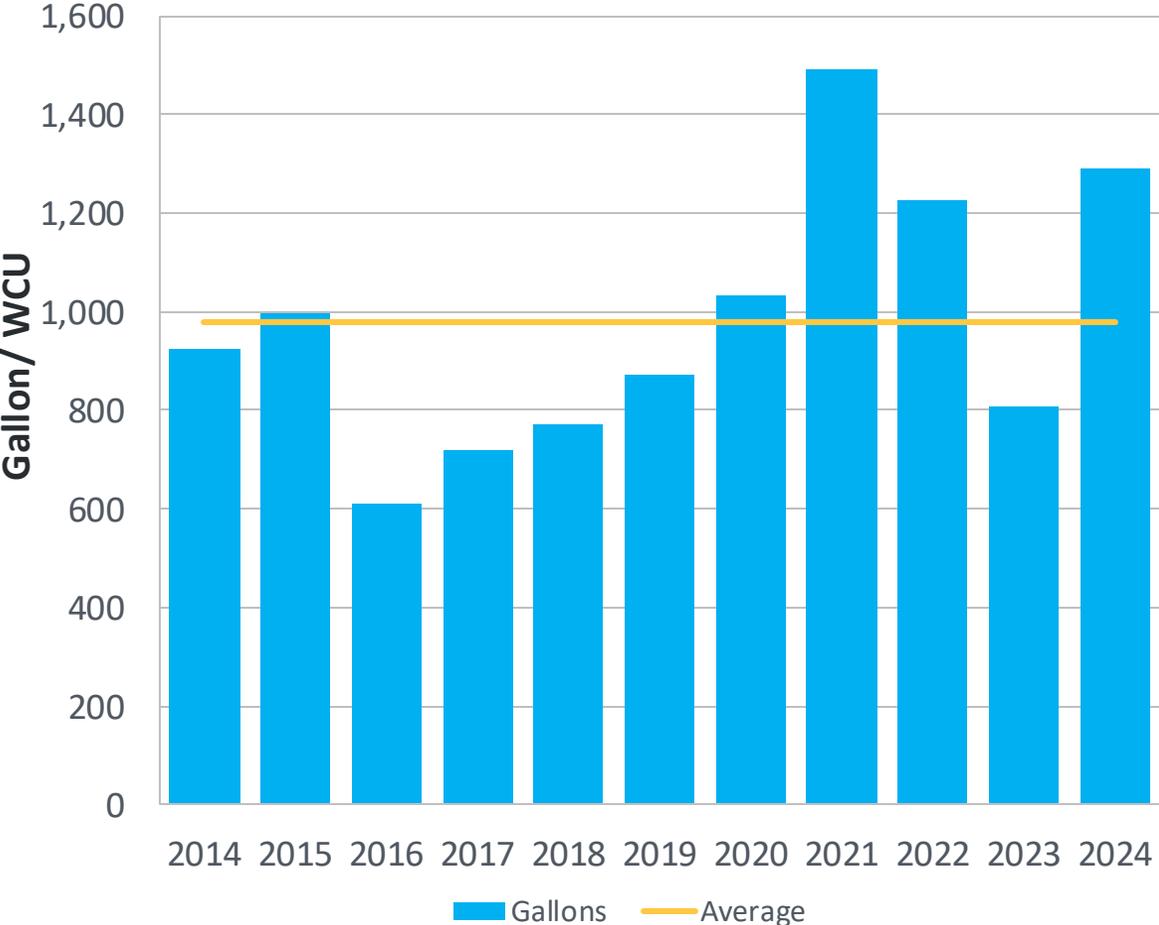




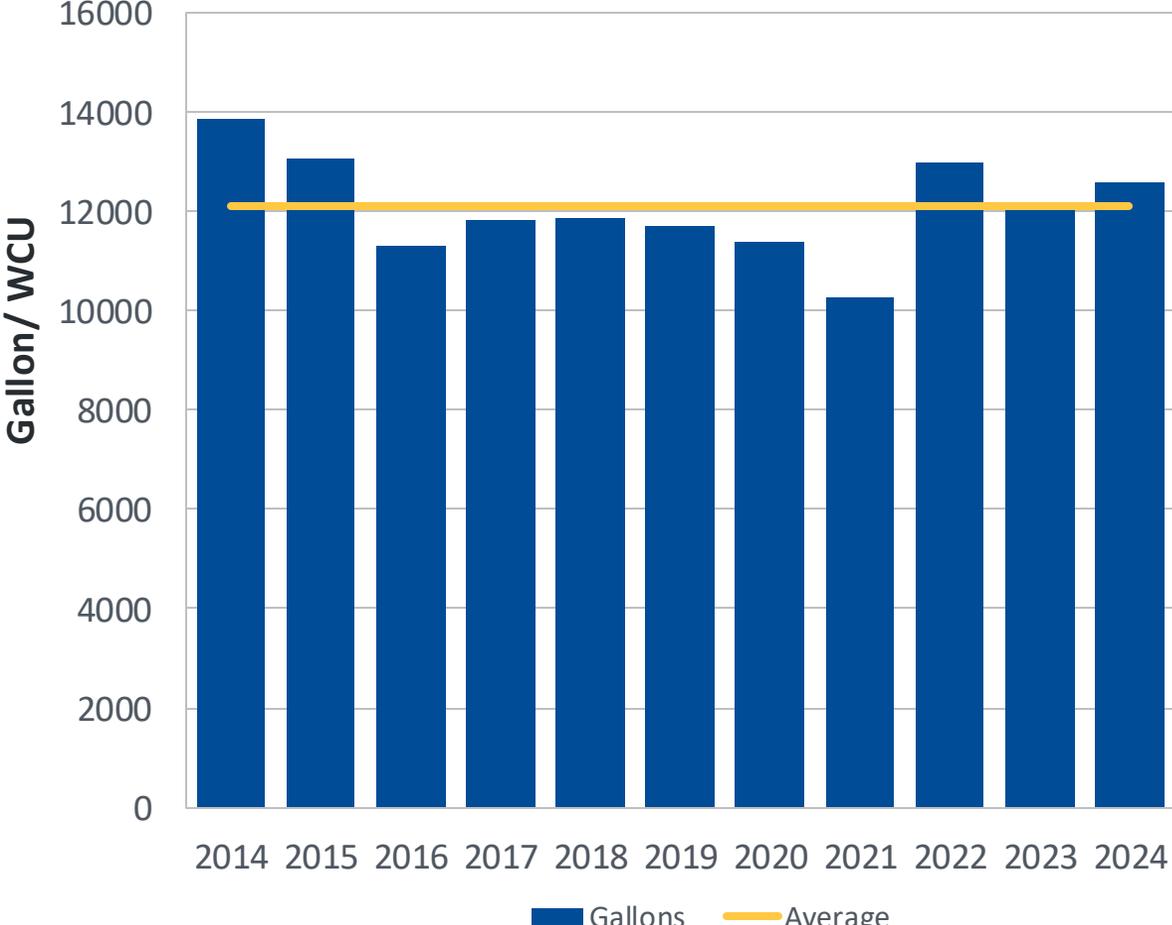
Total Water Consumption Normalized

When normalizing by user, both irrigation and wastewater increased

Normalized Landscaping Consumption



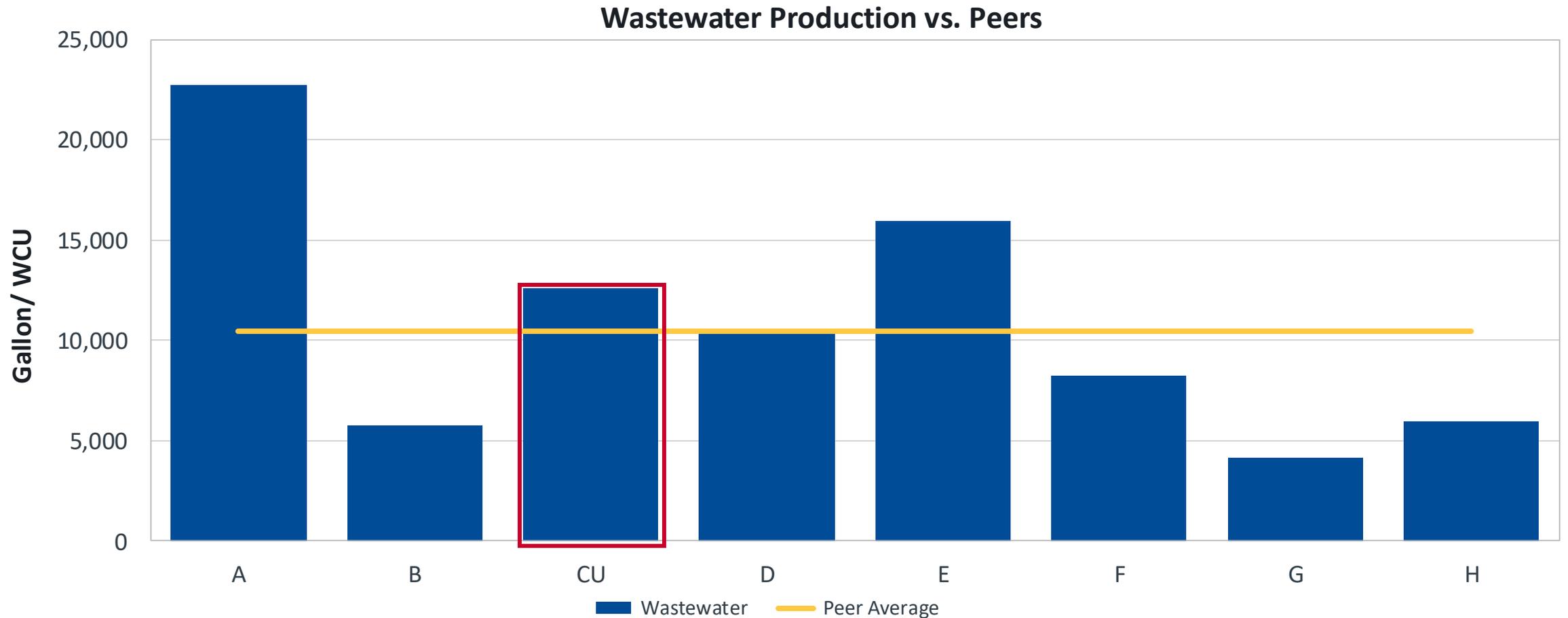
Normalized Wastewater Consumption





Wastewater Production Above Peers

While wastewater is at 1.4% of emissions, water remains a scarce resource in Southern California





Concluding Comments



Scope
1:

Chapman's Scope 1 emissions decreased due to reductions of the consumption of fleet fuel and fertilizer. However, natural gas usage rose from the prior year. To continue to offset potential future natural gas increases, Chapman should focus on electrifying the fleet and reducing natural gas usage through targeted deferred maintenance updates.



Scope
2:

Chapman's scope 2 electricity will continue to increase as residence halls are occupied and online for an entire fiscal year. Chapman can offset this by renovating existing spaces to LEED standards and by continuing to purchase renewable energy, which will reduce their emissions.



Scope
3:

Scope 3 remains Chapman's largest proportion of emissions, currently over 60%. Prior to purchasing offsets, Chapman must focus on behavior change, by discouraging single occupancy vehicles and minimizing waste through targeted outreach.

Questions? Comments?