

Chapman University Sustainability Solutions

FY19 GHG Benchmarking Presentation

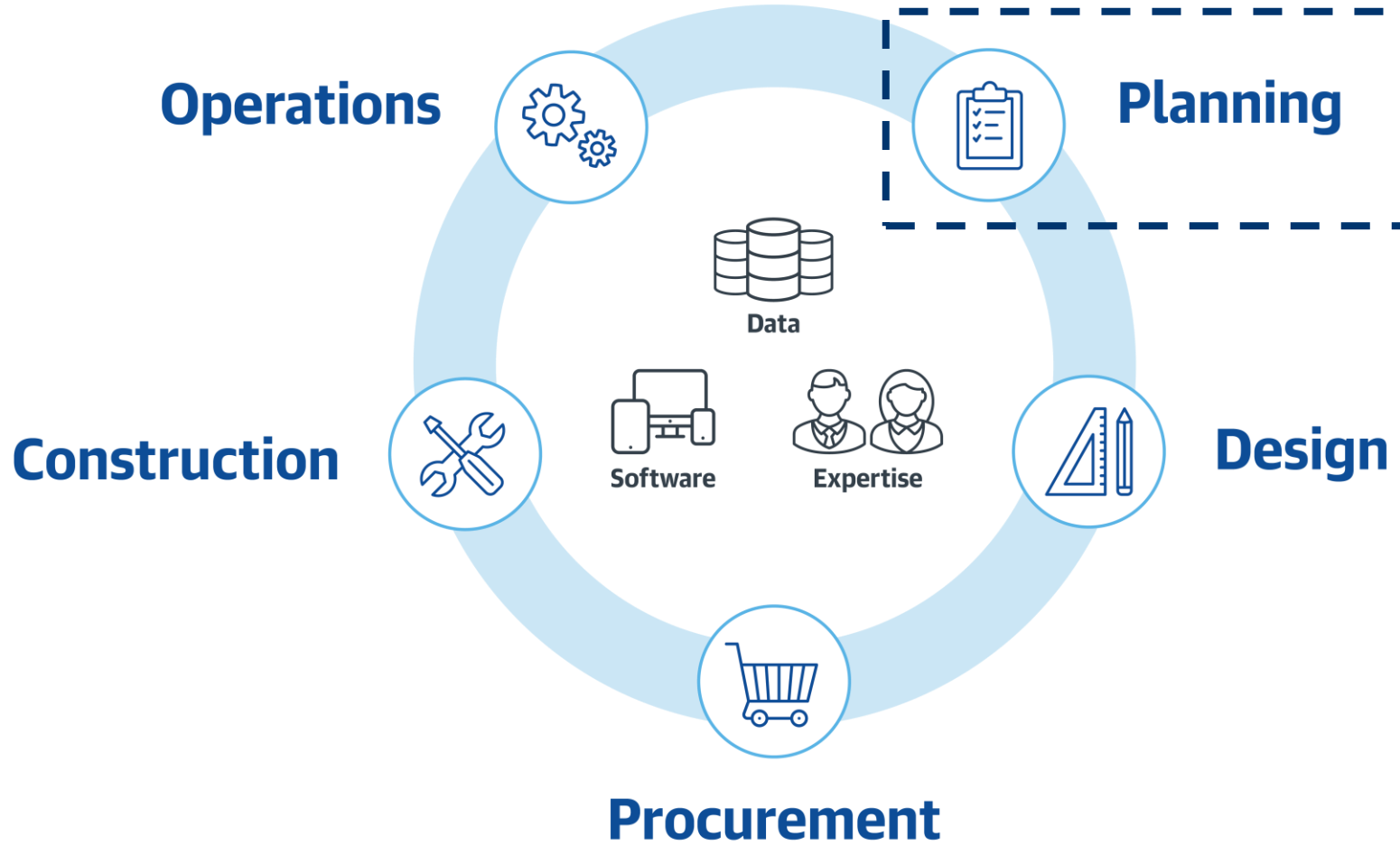
September 16th, 2020

Duncan Ketel and Tiffany Smith

University of the Sciences in Philadelphia
University of Toledo
University of Vermont
University of Washington
University of West Florida
University of Wisconsin - Madison
Vanderbilt University
Virginia Commonwealth University
Wake Forest University
Washburn University
Washington State University
Washington State University - Tri-Cities Campus
Washington State University - Vancouver
Washington University in St. Louis
Wayne State University
Wellesley College
Wesleyan University
West Chester University
West Virginia Health Science Center
West Virginia University
Western Oregon University
Westfield State University
Widener University
Williams College
Worcester Polytechnic Institute
Worcester State University



What We Do



Data

Drive Meaningful Action



Software

Improve Workflows



Expertise

Deliver Results



FACILITIES BENCHMARKING & ANALYSIS

Take control of your facilities and make the case for change without the guesswork



FACILITIES ASSESSMENT & PLANNING

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



SPACE UTILIZATION

Ensure your space is working up to its full potential



SUSTAINABILITY SOLUTIONS

Measure, compare and improve environmental stewardship

Sustainability Solutions Agenda



Overview of Sightlines Data Analysis

Summary of Emissions Profile

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 Emissions Profile



Scope 1: Direct GHGs



- On-Campus Stationary Fuel
- Vehicle Fleet Fuel
- Fertilizer
- Refrigerants

Scope 2: Upstream GHGs



- Purchased Electricity

Scope 3: Indirect GHGs

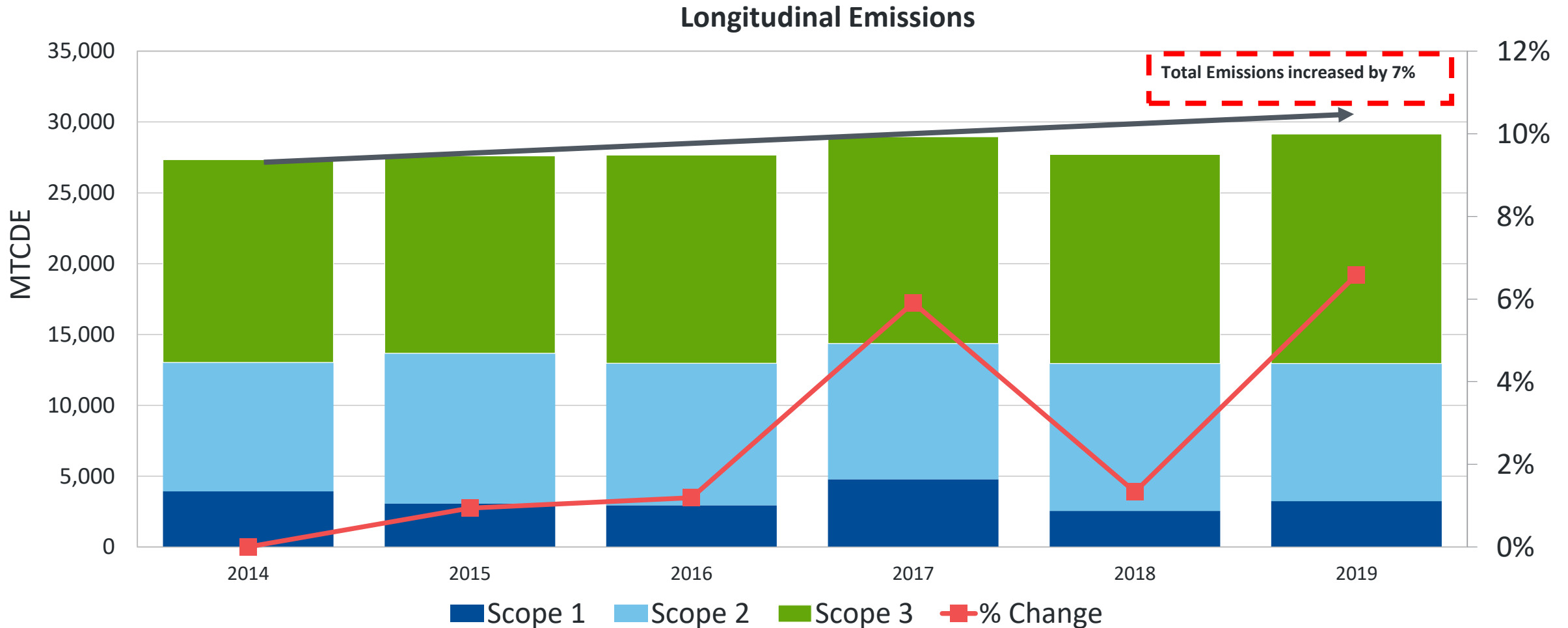


- Commuting
- Directly Financed Travel
- Solid Waste
- Paper Purchasing
- Transmission & Distribution Losses

Longitudinal Emissions by Scope



Prior to FY18/19 Chapman's emissions were relatively consistent.

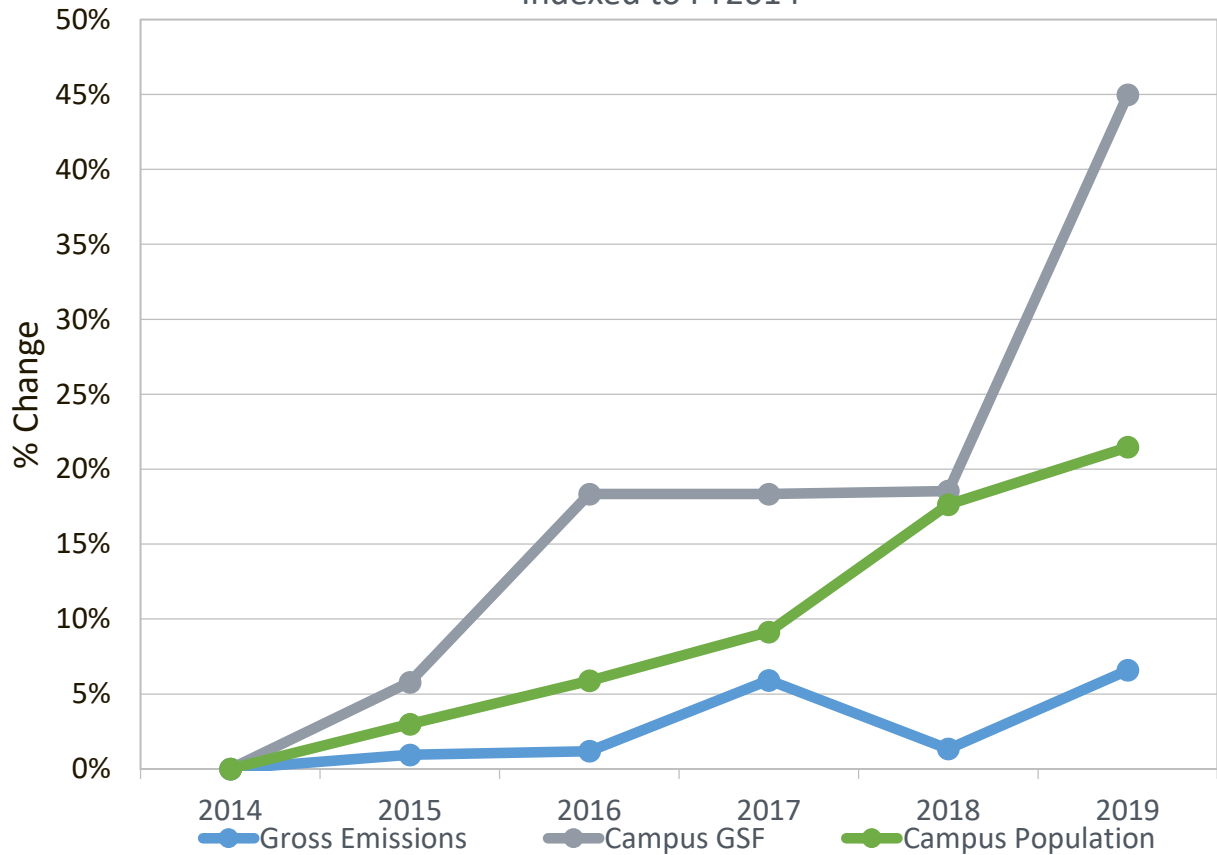


Progress Against 2014 Baseline

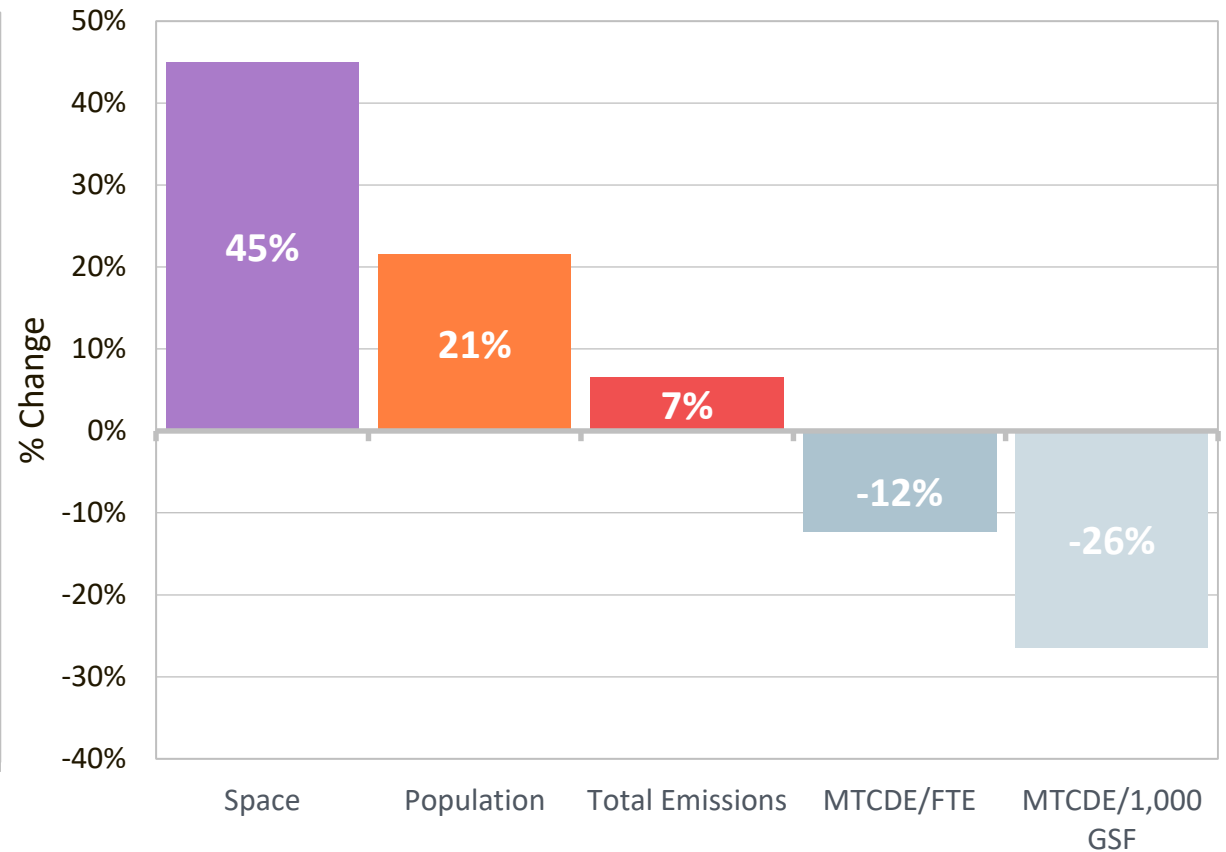


Chapman's total emissions have been minimally impacted by increases in space and FTE's

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



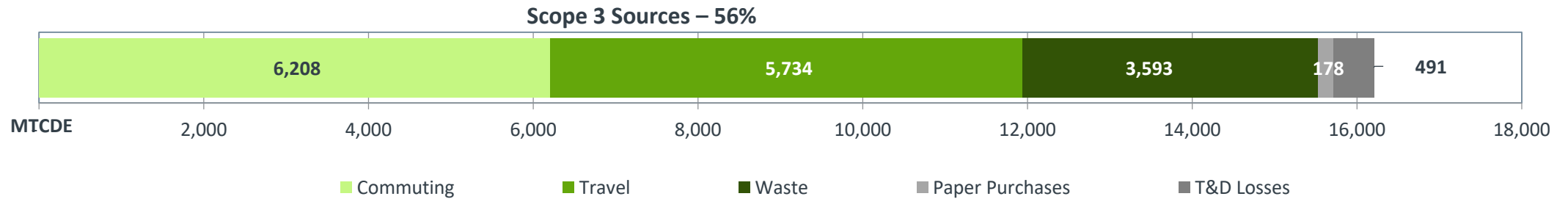
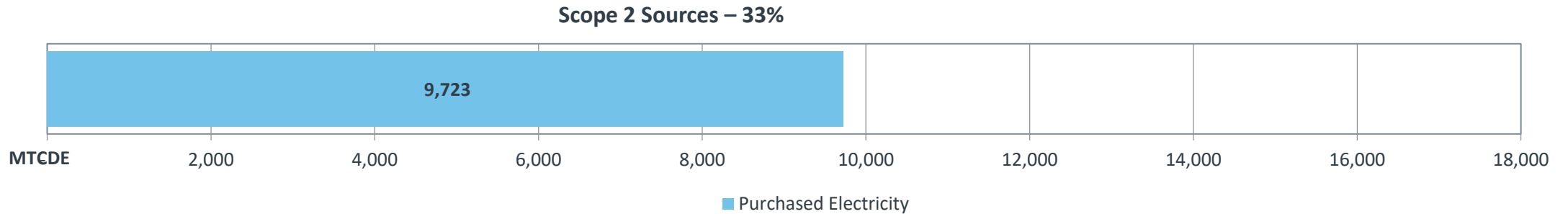
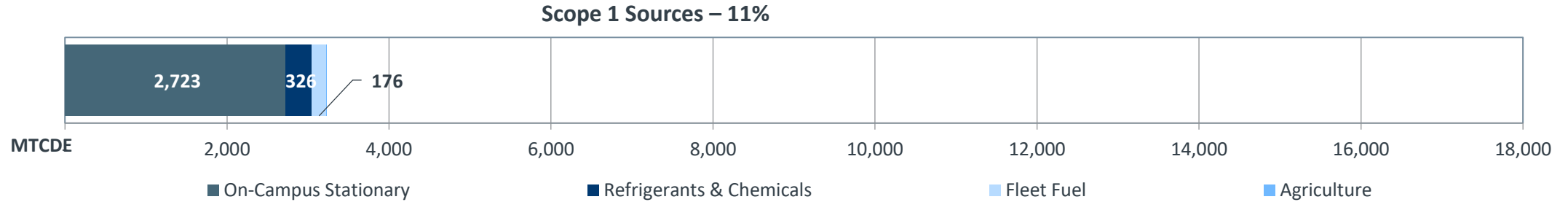
Change in Space, Population, and Emissions Indexed to FY2014



FY19 Distribution of Emissions by Level of Control



Purchased electricity, commuting and travel make up the majority of emissions



Sustainability Peers

Peers determined using location, campus size, and population



Peer Institution	Location
The Thacher School	Ojai, California
California Institute of the Arts	Santa Clarita, California
St. Mary's College of California	Moraga, California
University of San Francisco*	San Francisco, California
University of San Diego*	San Diego, California
University of Denver	Denver, Colorado
University of Texas – Rio Grande Valley	Edinburg, Texas

Two Ways to Normalize Emissions for Comparison



GHG Emissions per 1,000 GSF EUI Adjusted



Stresses intensity of operations.

$$\frac{\text{Gross GHG Emissions}}{\text{EUI Adjusted GSF}} \times 1,000$$

GHG Emissions per Weighted Campus User



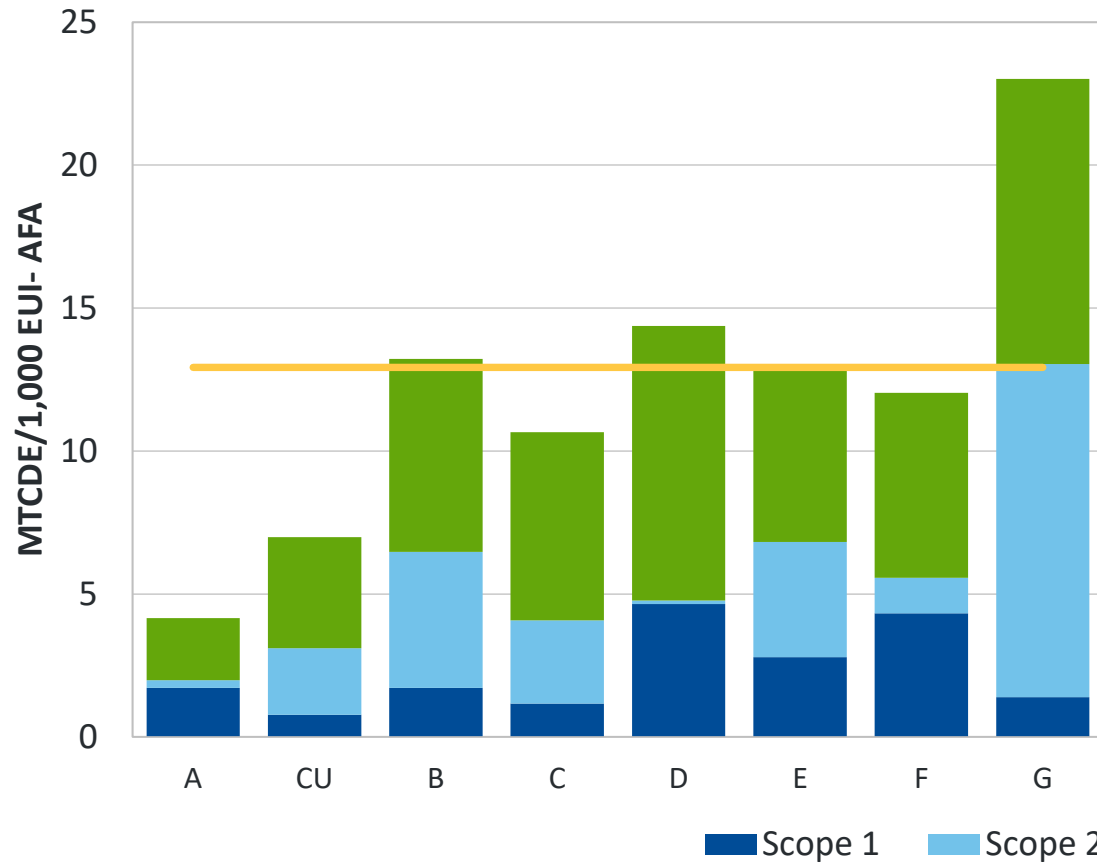
Stresses efficient use of space.

$$\frac{\text{Gross GHG Emissions}}{\text{Weighted Campus User}}$$

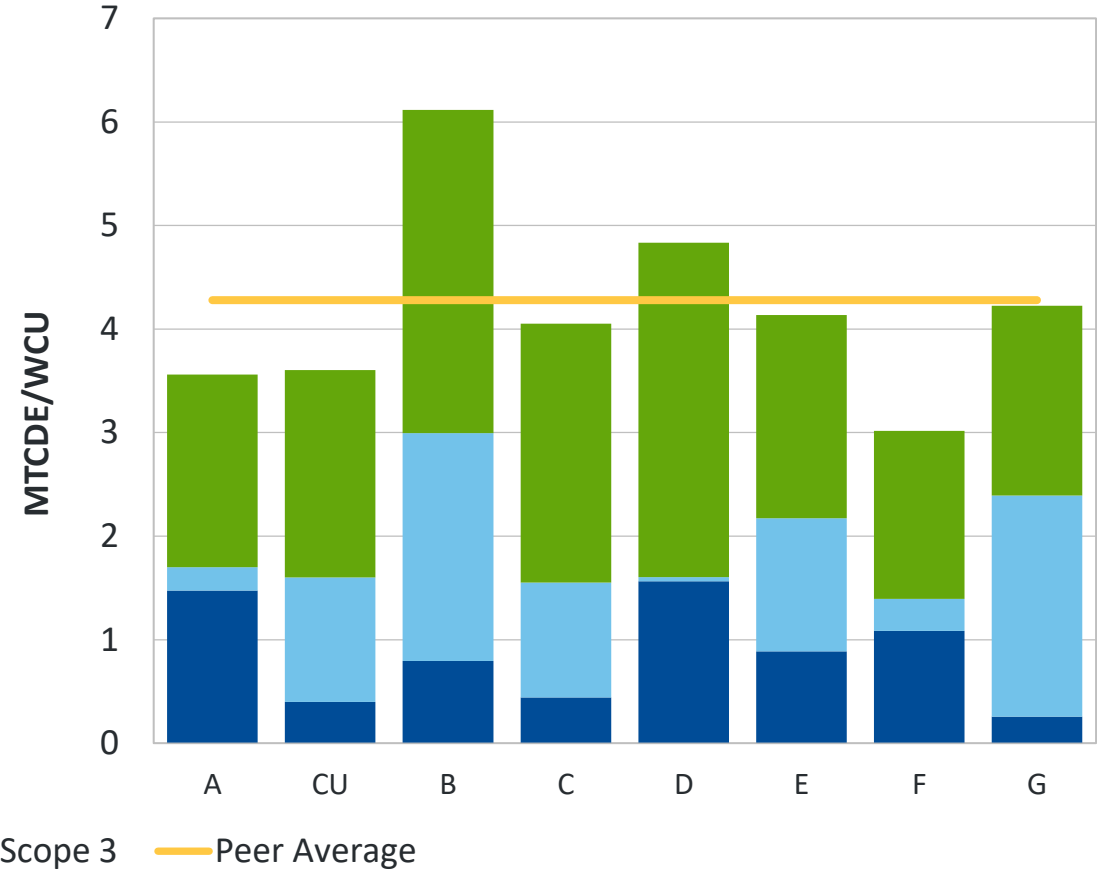
Total Gross Emissions per Space and Campus User



Gross Emissions
MTCDE/1,000 EUI – Adjusted Floor Area



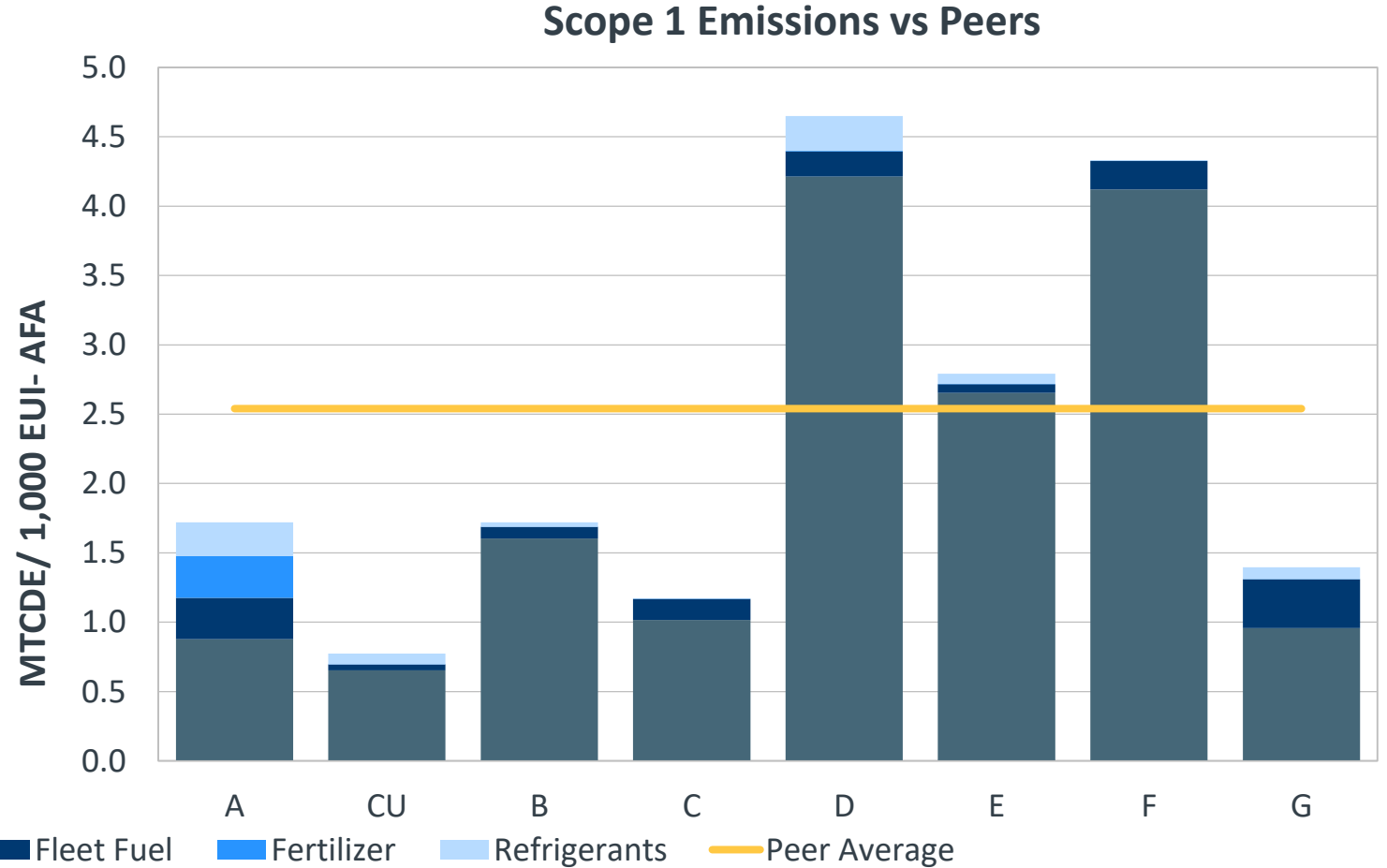
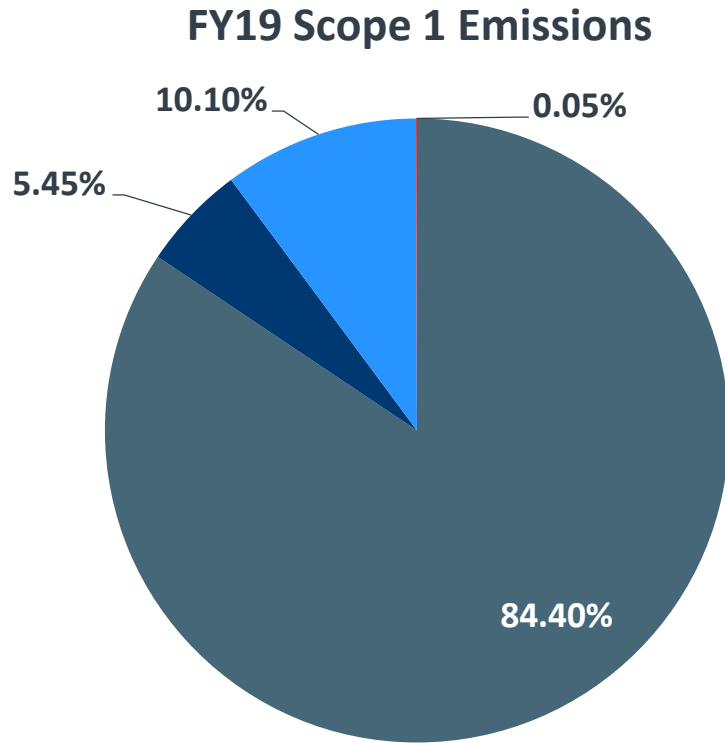
Gross Emissions
MTCDE/Weighted Campus User



Scope 1: Direct Emissions



Chapman's scope 1 emissions are significantly below peer average when normalized



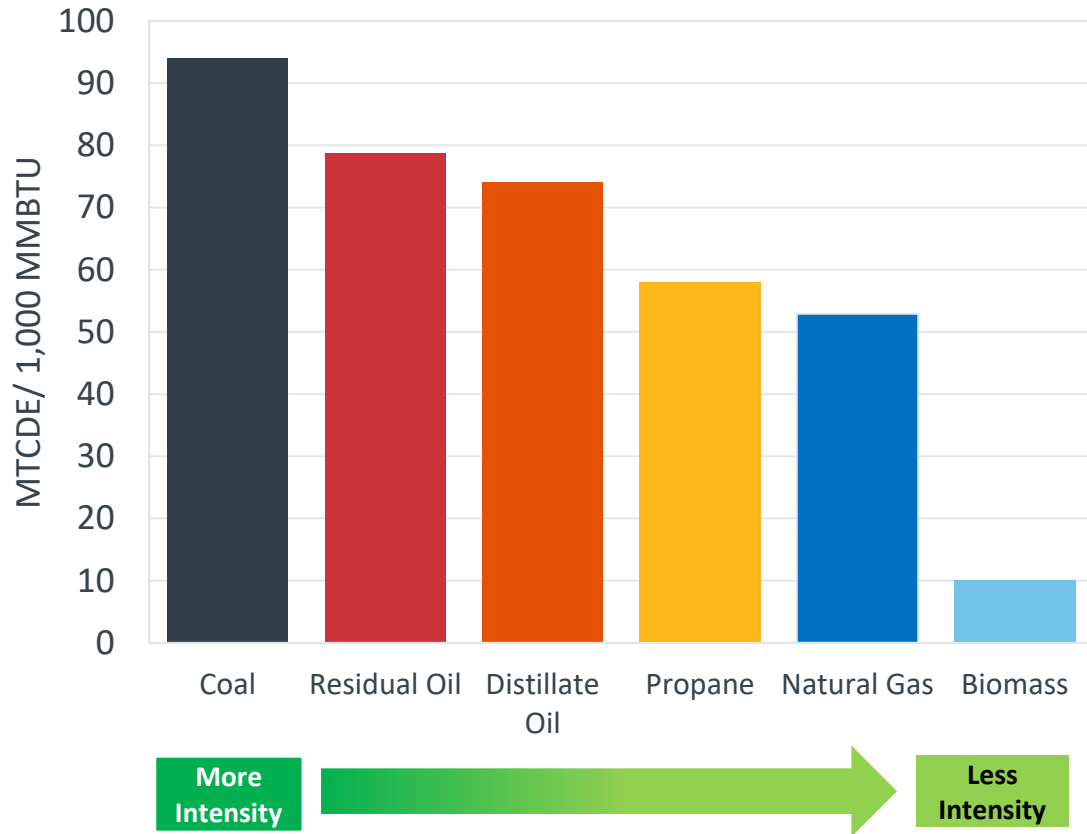
Stationary Fuel
 Fleet Fuel
 Fertilizer
 Refrigerants
 Peer Average

Scope 1: Stationary Fuel Consumption

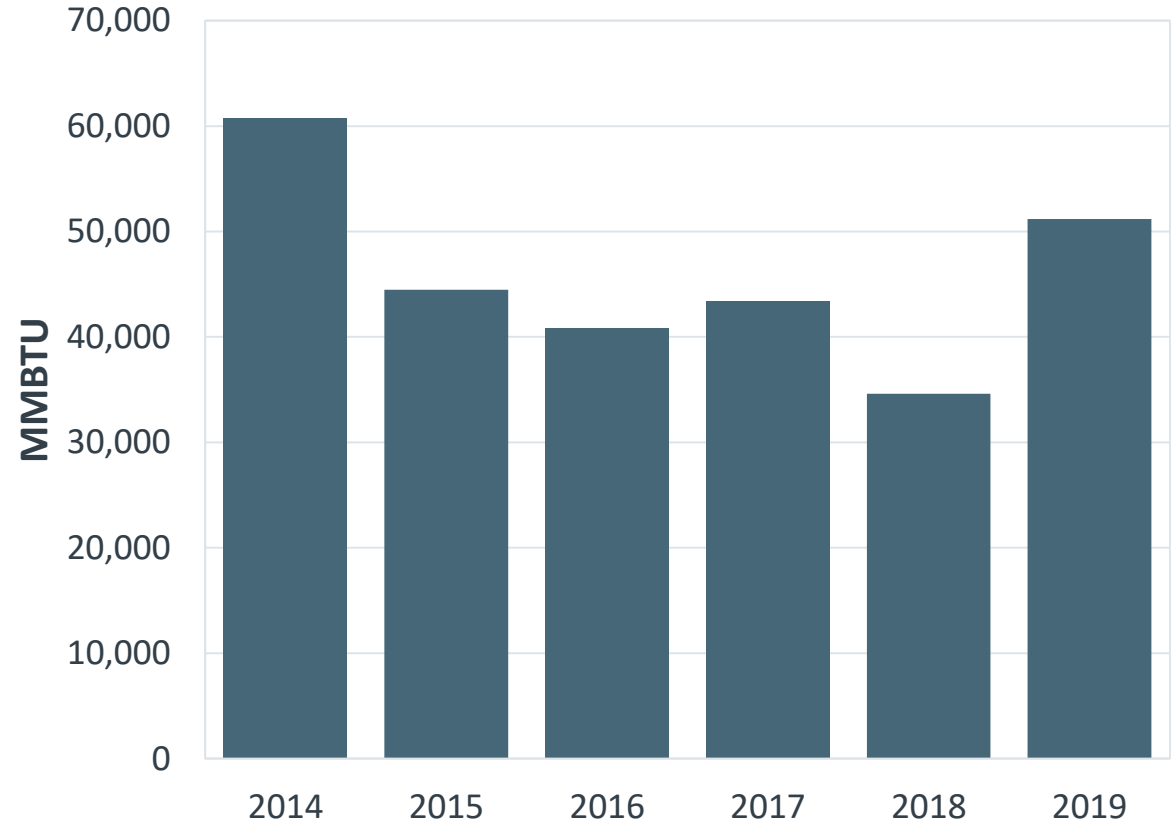


FY18/19 saw a 47% increase in natural gas consumption from prior year

Carbon Intensity of Commonly Used Fossil Fuels



Stationary Fuel Consumption



Scope2: Total Electric Consumption vs. Peers



Chapman relies on purchased KWH, while peers diversify their source of Scope 2 consumption

Scope 2 Total Electric Consumption

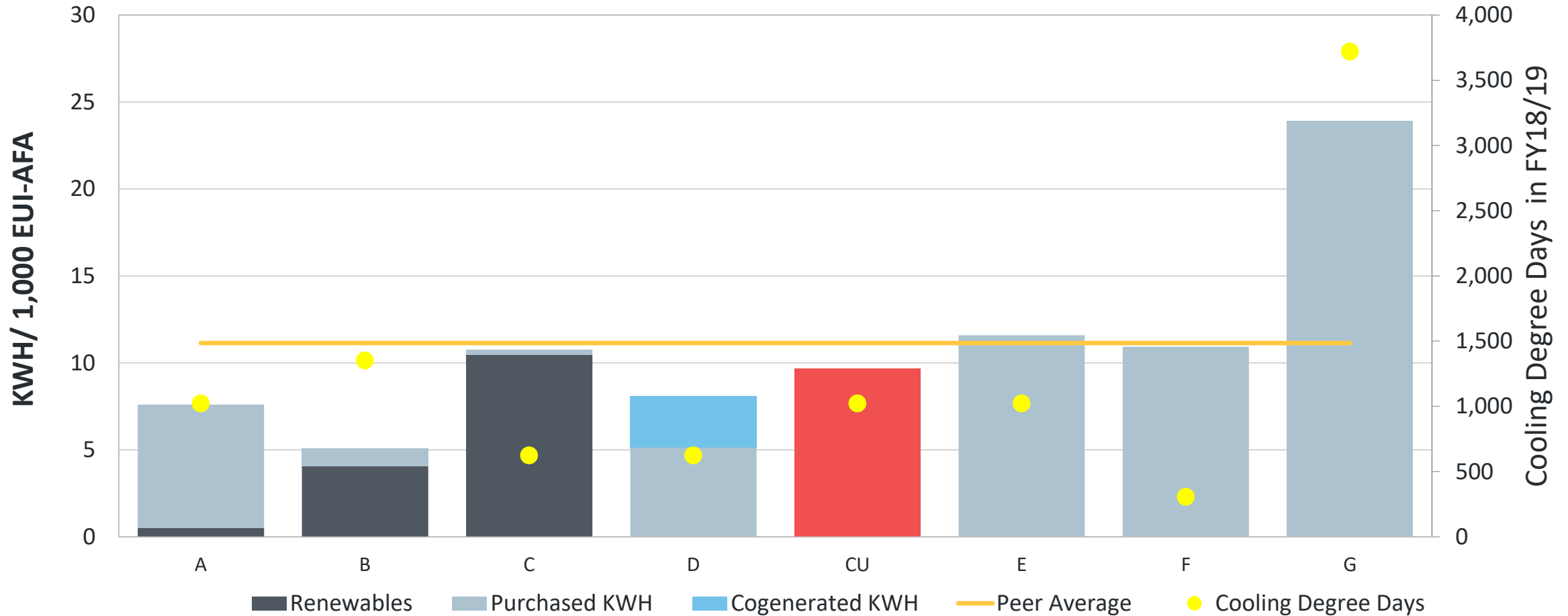


Scope 2: Total Electric Consumption vs. Peers



Chapman consumed less than peer average in FY18/19

FY19 Electric Consumption vs. Peers



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

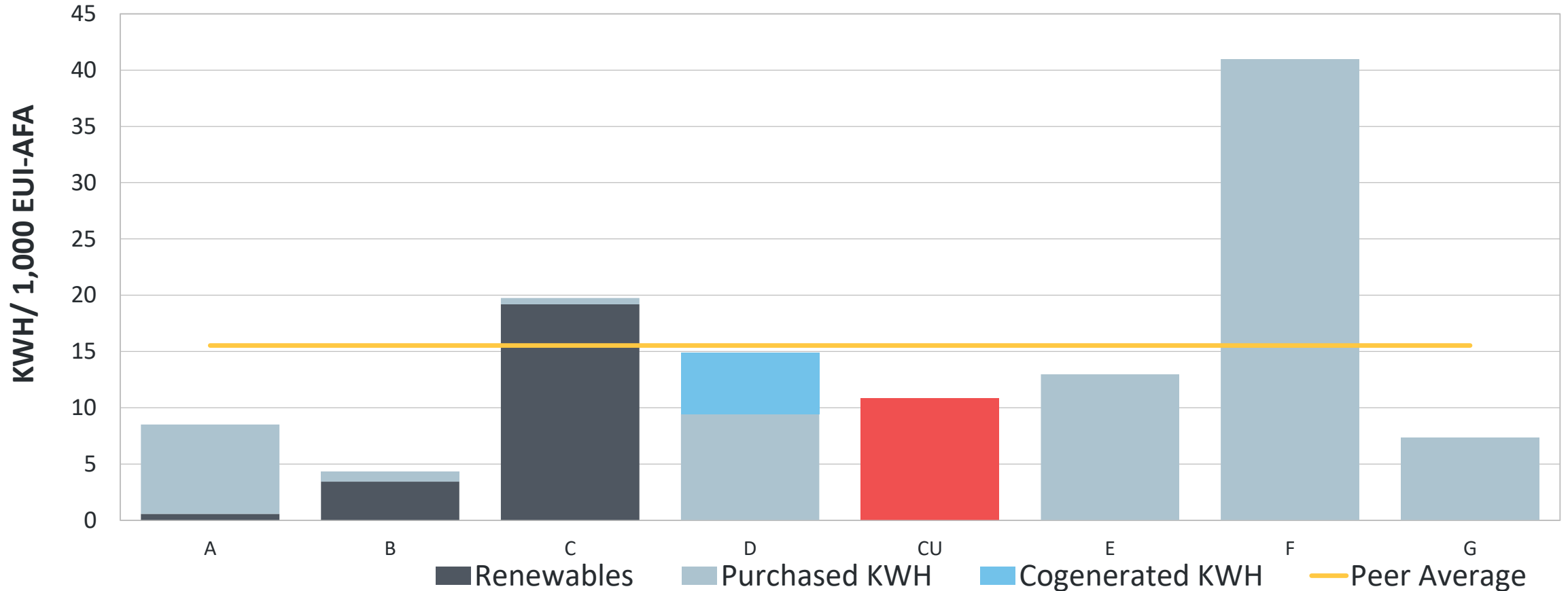
Scope 2: Total Electric Consumption vs. Peers



Chapman consumed less than peer average in FY18/19

FY19 Electric Consumption vs. Peers

Cooling Degree Day Normalized Using National Average for FY18/FY19

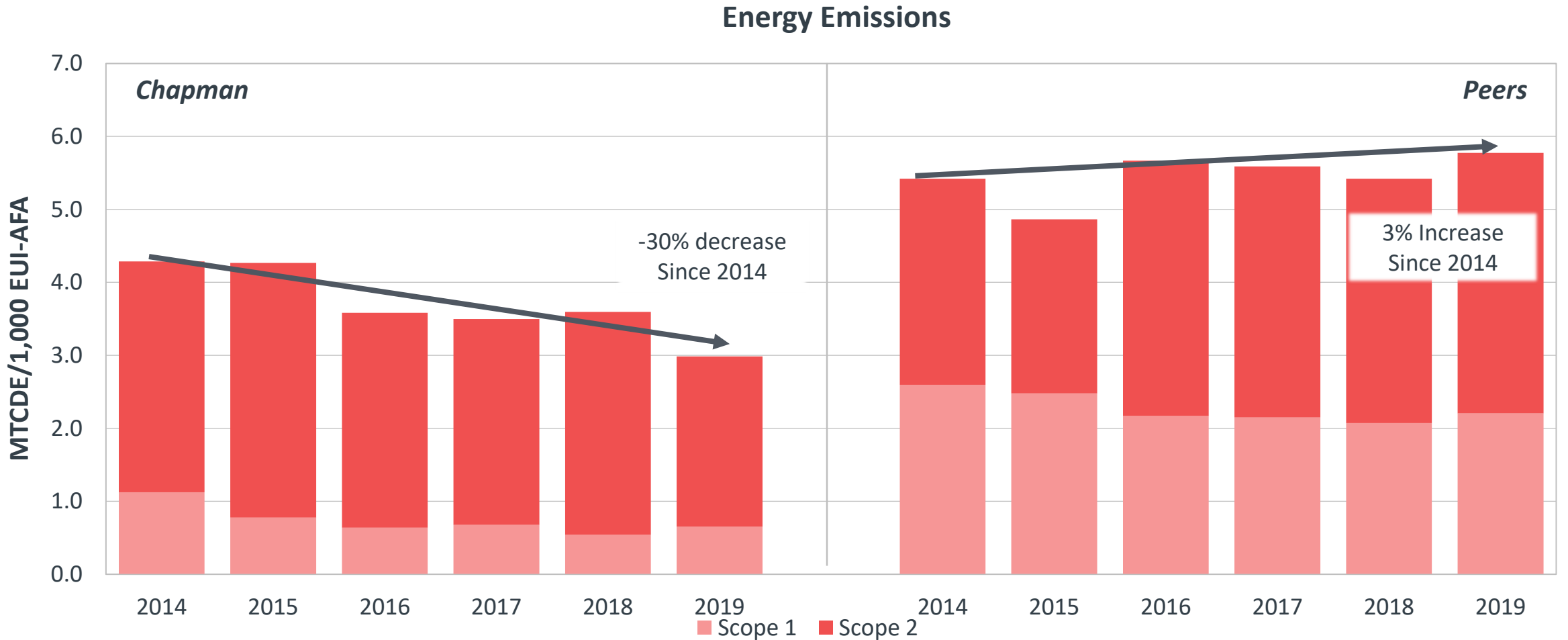


Peers arrayed by technical complexity; The relative mechanical complexity of the campus on a scale of 1-5

Energy Emissions vs. Peers



When normalizing by square footage chapman has seen energy emissions decrease

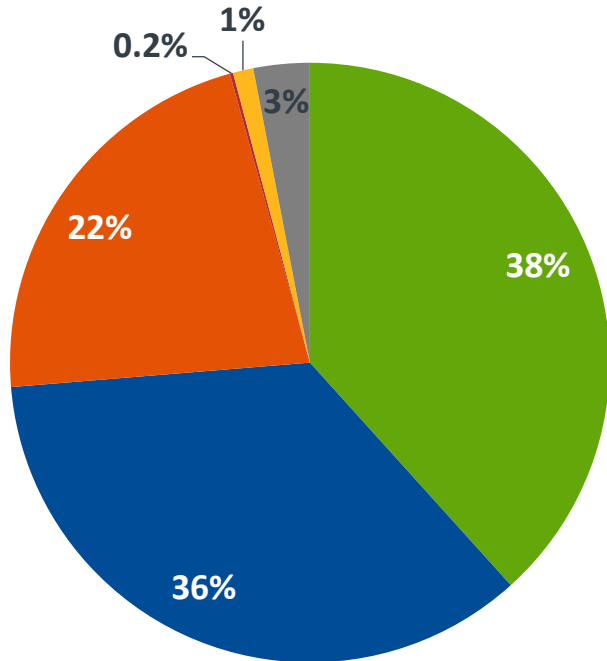


Scope 3: Indirect Emissions Overview



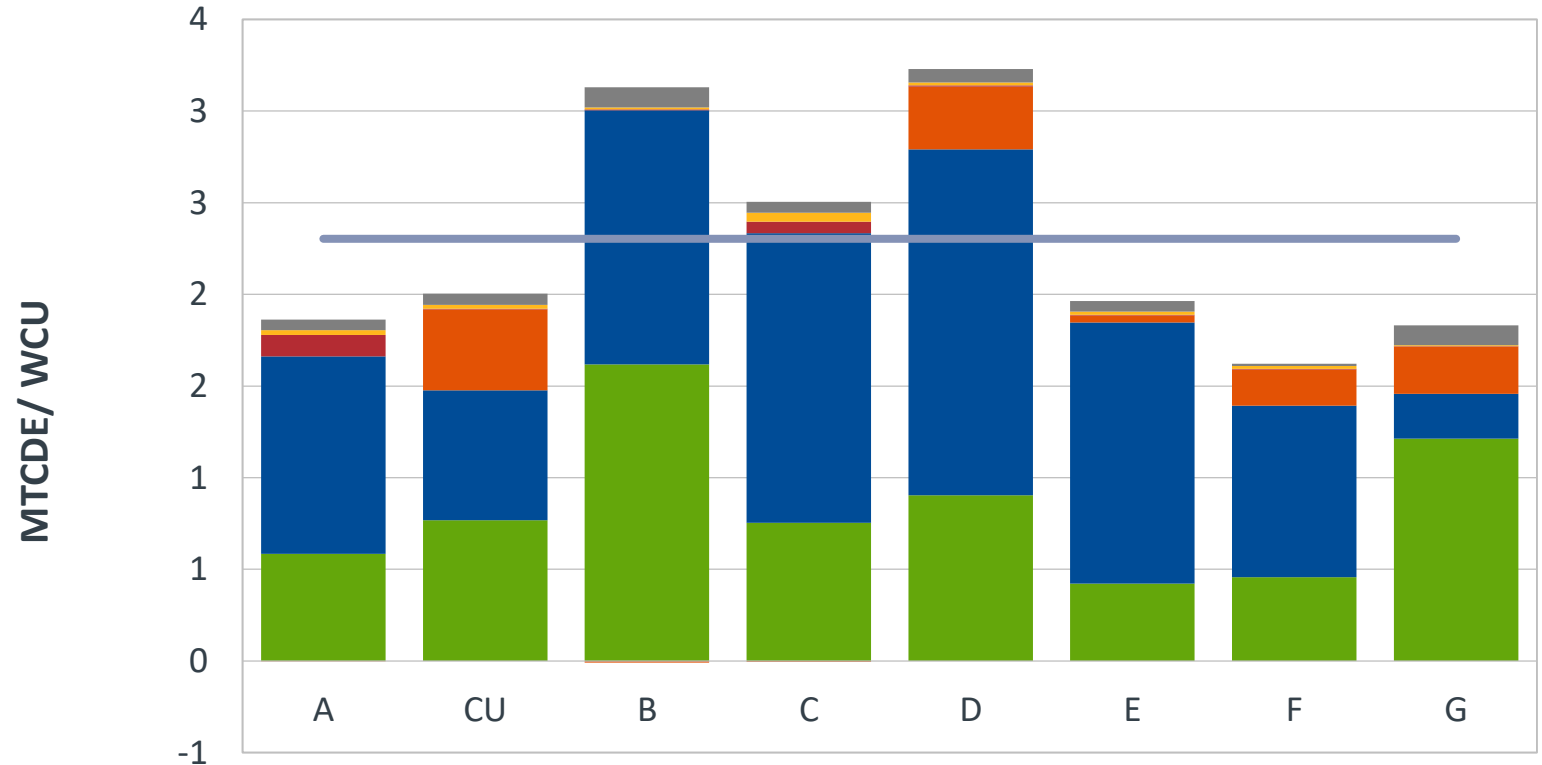
Commuting and travel are largest proportions of Scope 3 emissions

FY19 Scope 3 Emissions



- Commuting
- Travel
- Waste
- Wastewater
- Paper
- T&D Losses

Scope 3 Emissions vs Peers



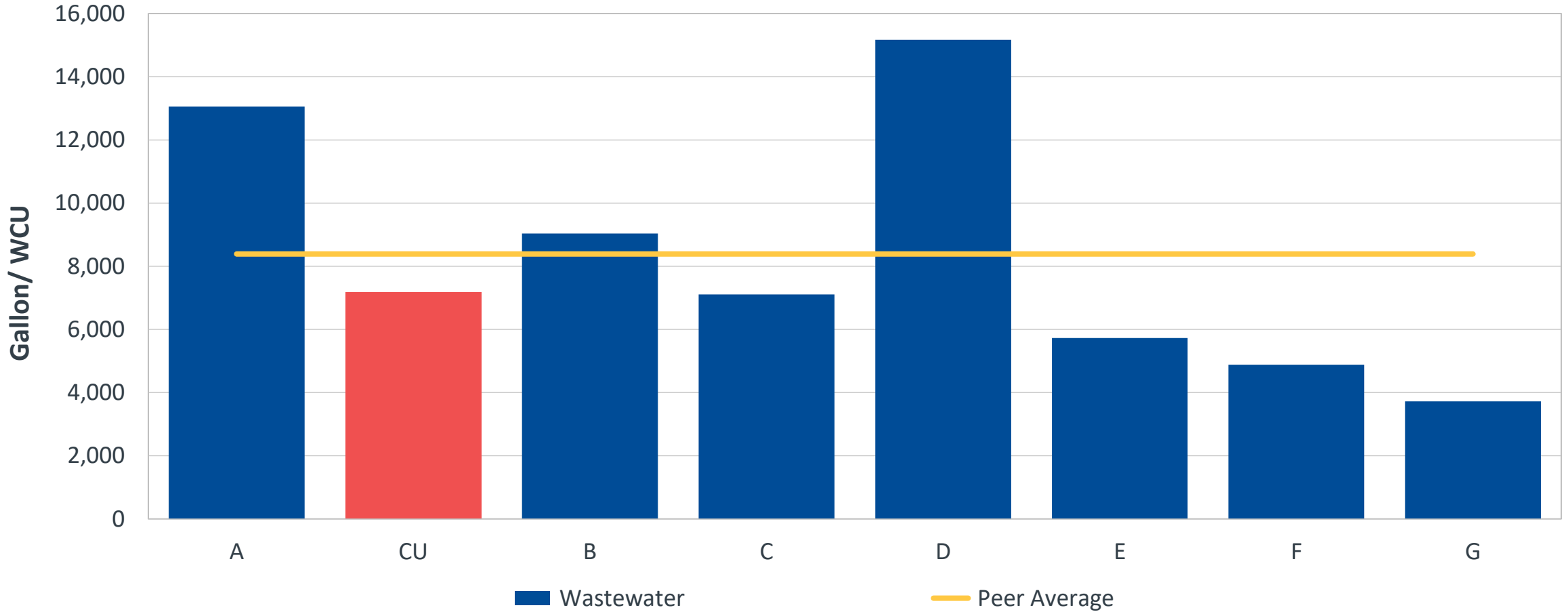
- Commuting
- Travel
- Waste
- Wastewater
- Paper
- T&D Losses
- Peer Average

Normalized Wastewater Production



Chapman produces less wastewater than peers

Water Emissions vs. Peers

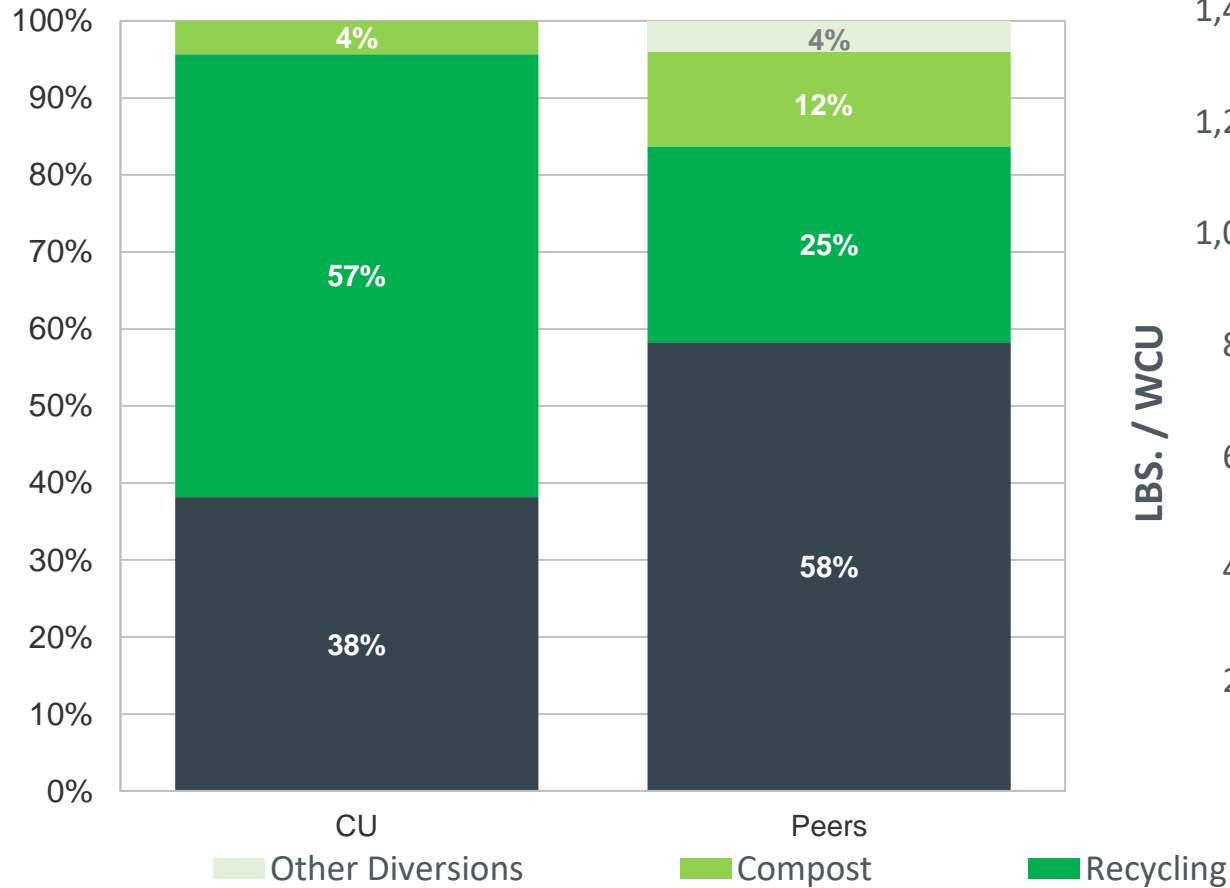


Scope 3: A Closer Look at Waste

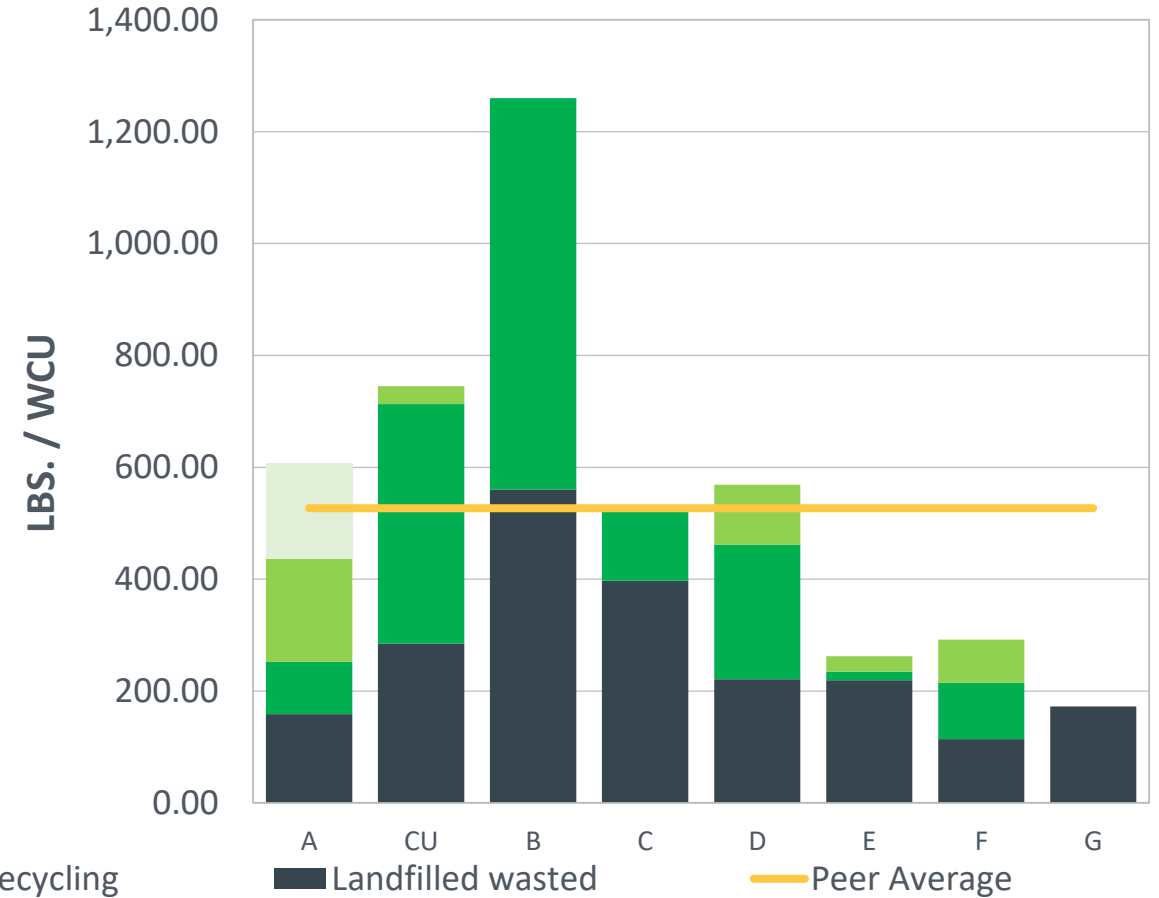


Chapman produces more waste, but diverts more than peers

Waste Diversion Rates vs. Peers



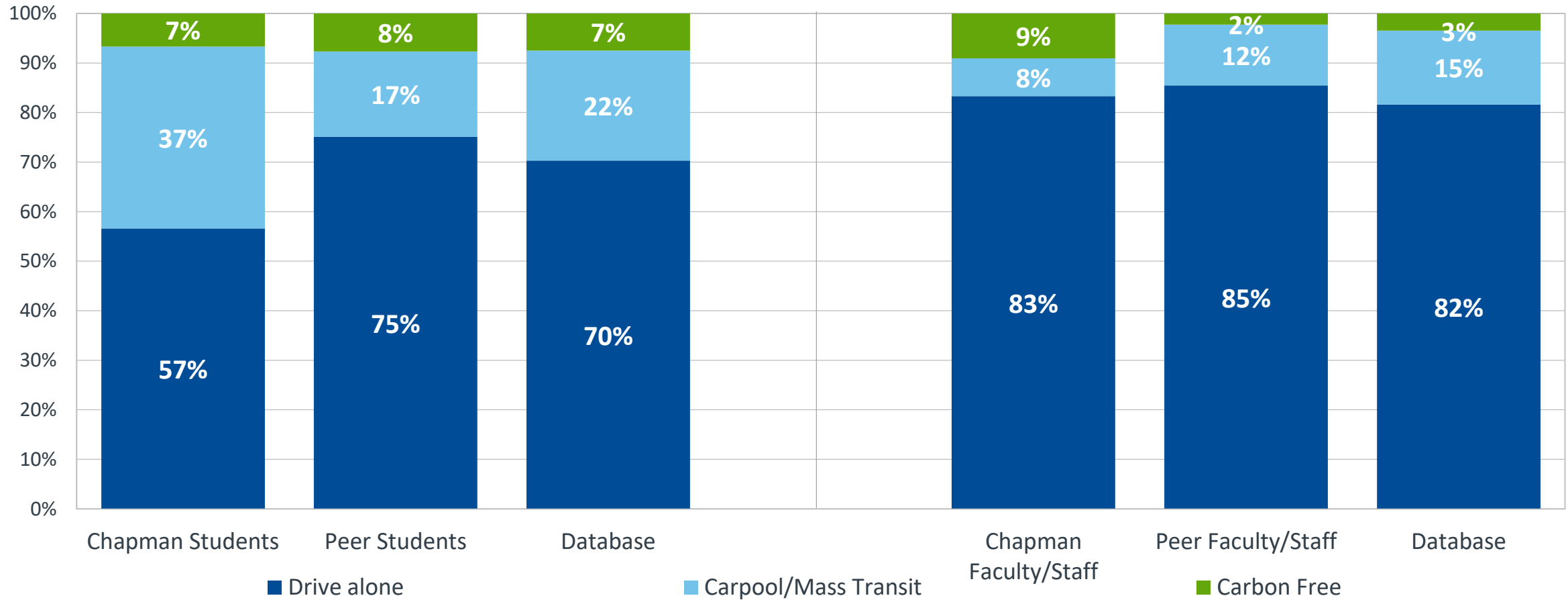
FY19 Waste vs Peers



Scope 3: Commuting Profile

Comparing Chapman commuting modes to peers and database

Commuting Mode by Demographic

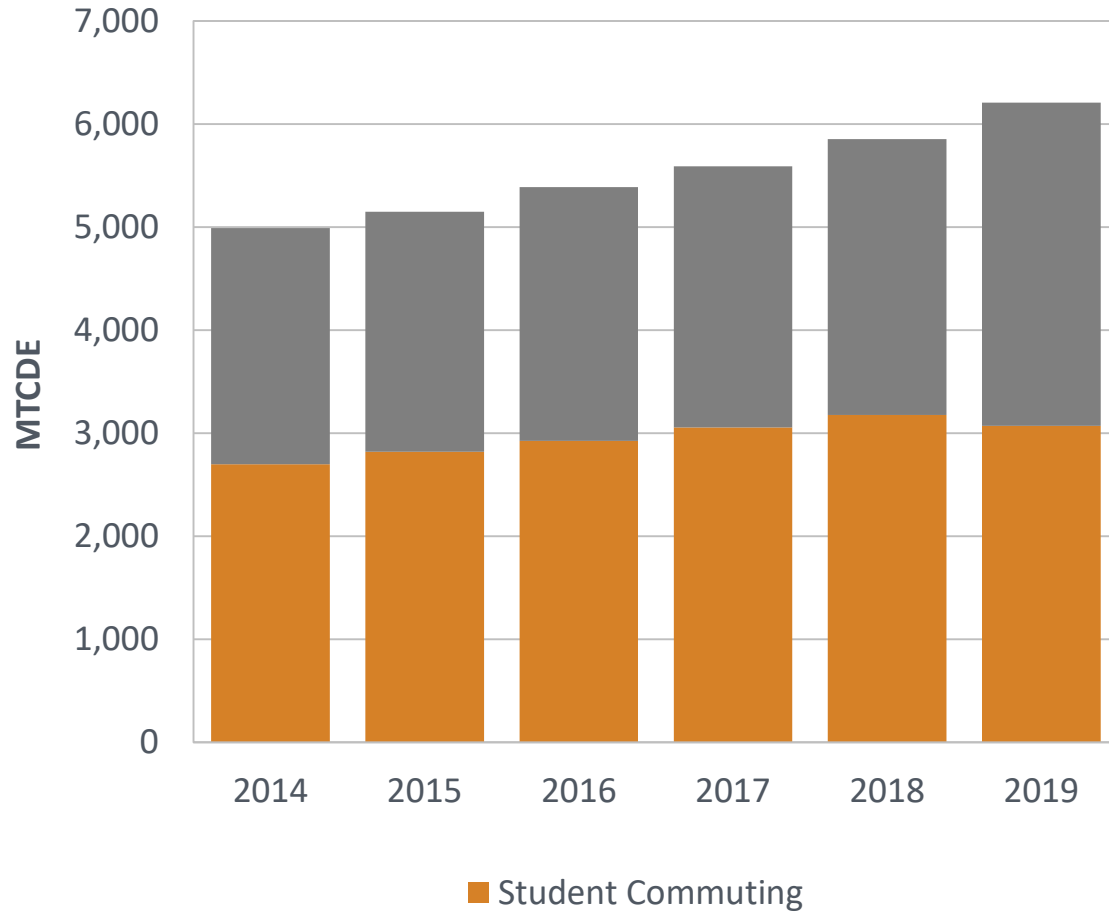


Scope 3: Total Commuting Emissions

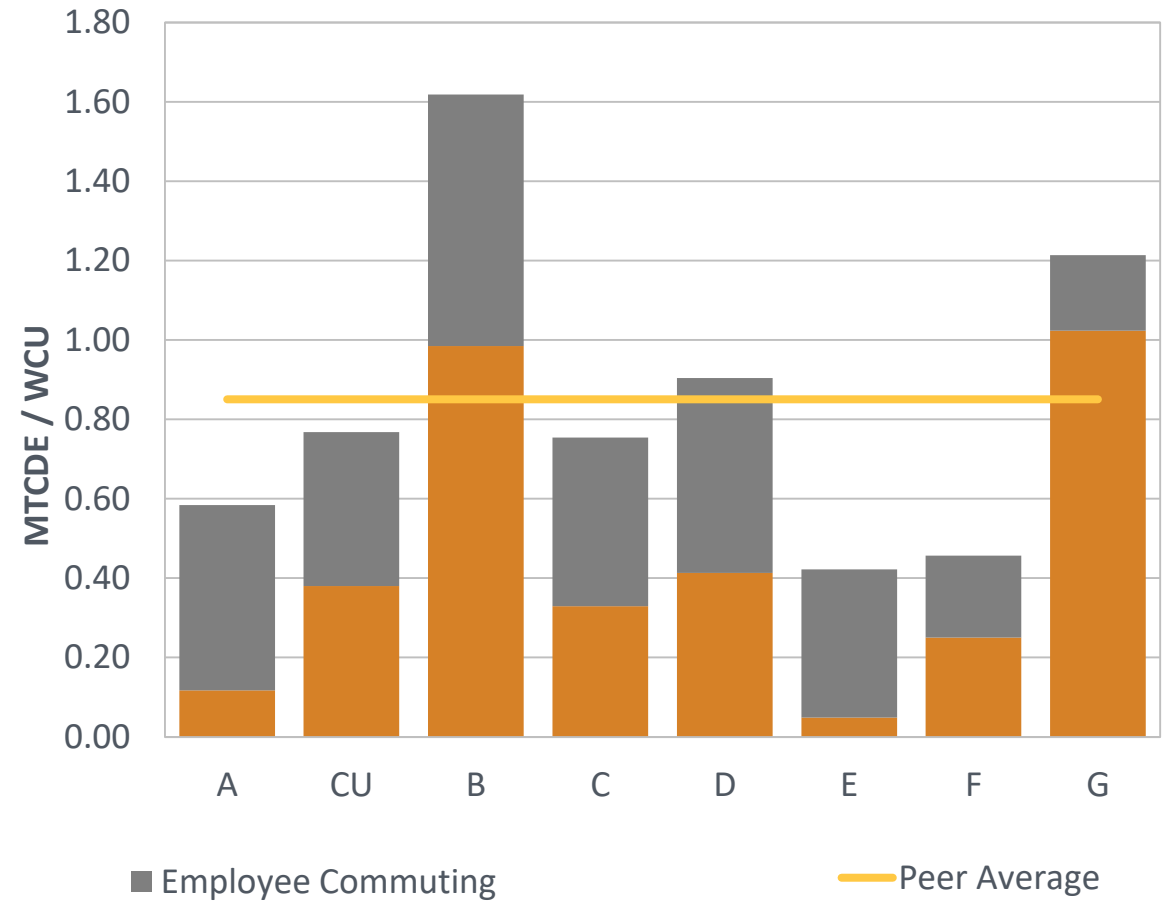


Chapman's commuting emissions continue to rise, but remain below peer average

Commuting Emissions



FY19 Commuting Emissions vs. Peers

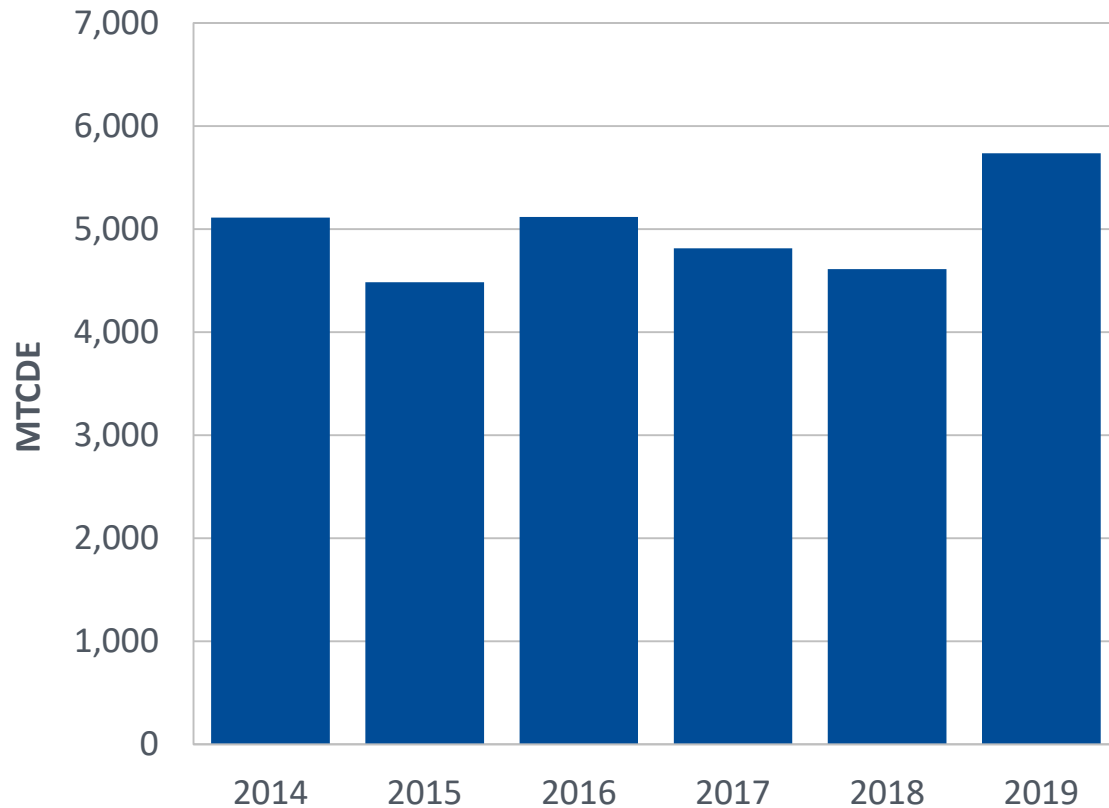


Scope 3: Total Travel Emissions

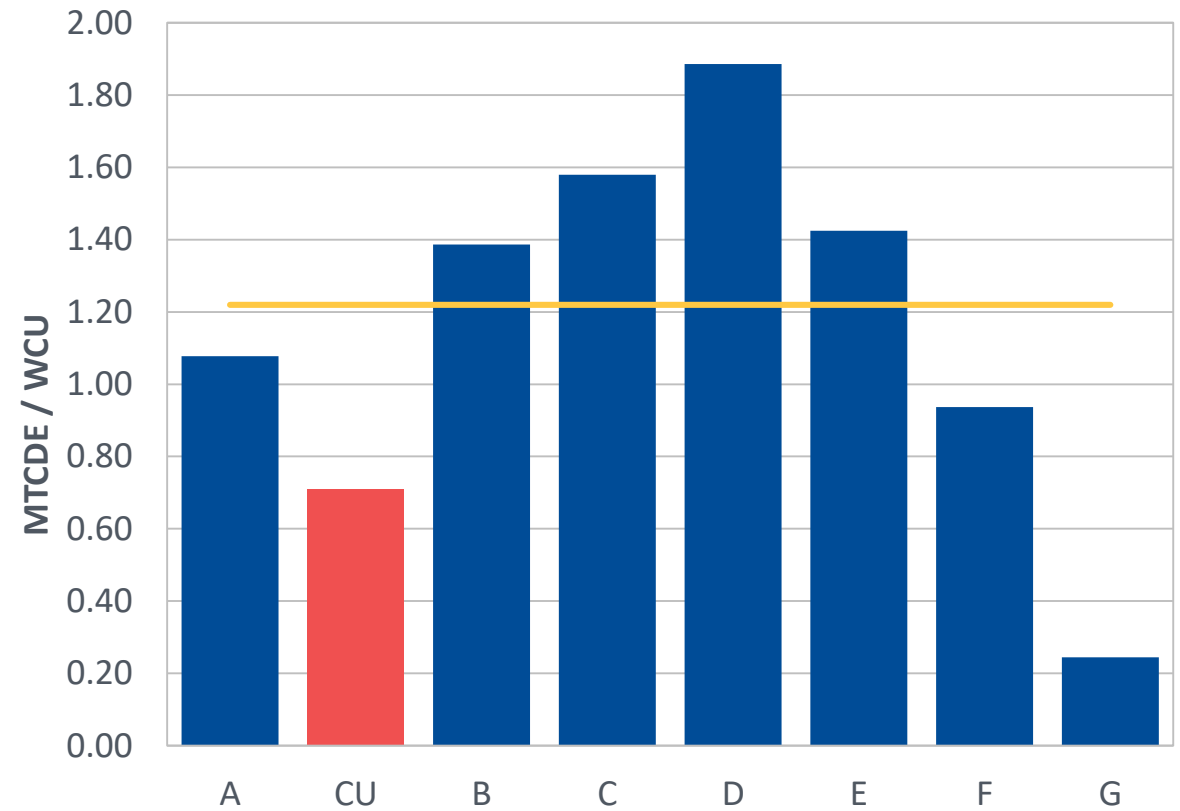


Chapman's travel emissions continue to rise, but remain below peer average

Travel Emissions



FY19 Travel Emissions vs. Peers



■ Travel Emissions

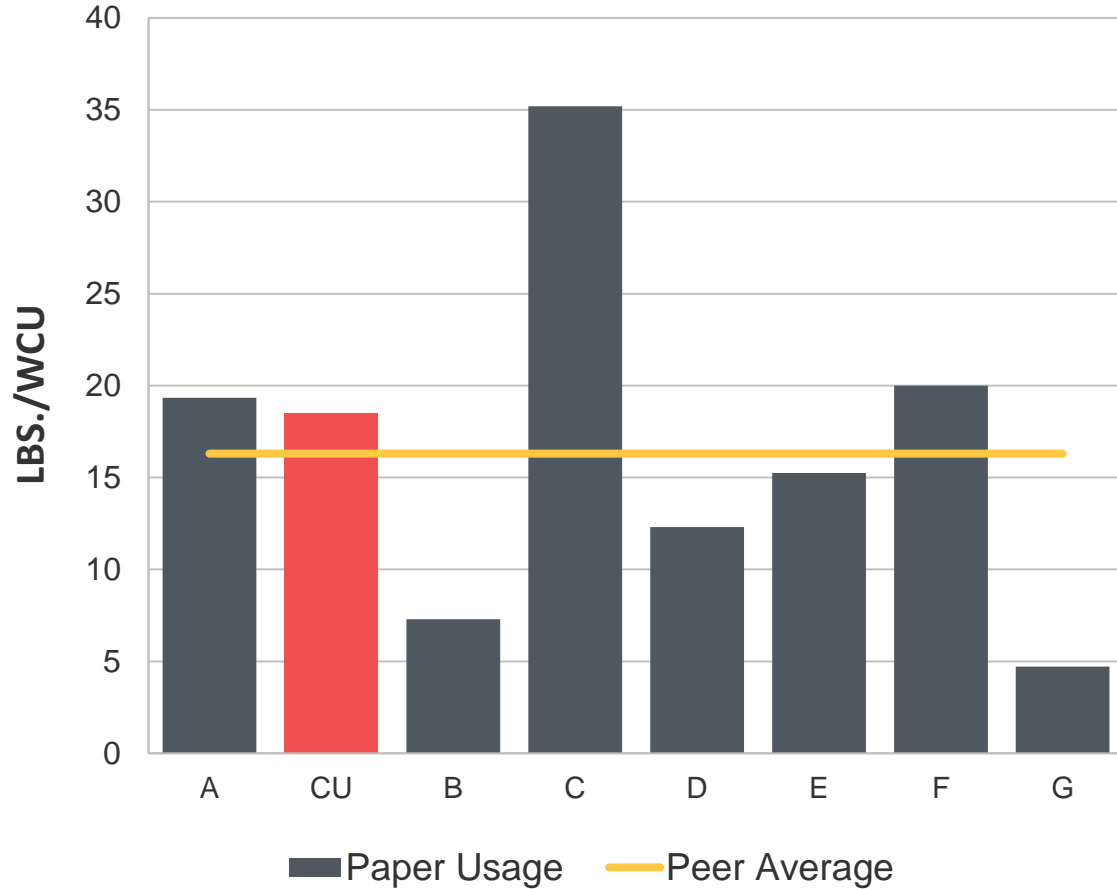
— Peer Average

Paper Profile

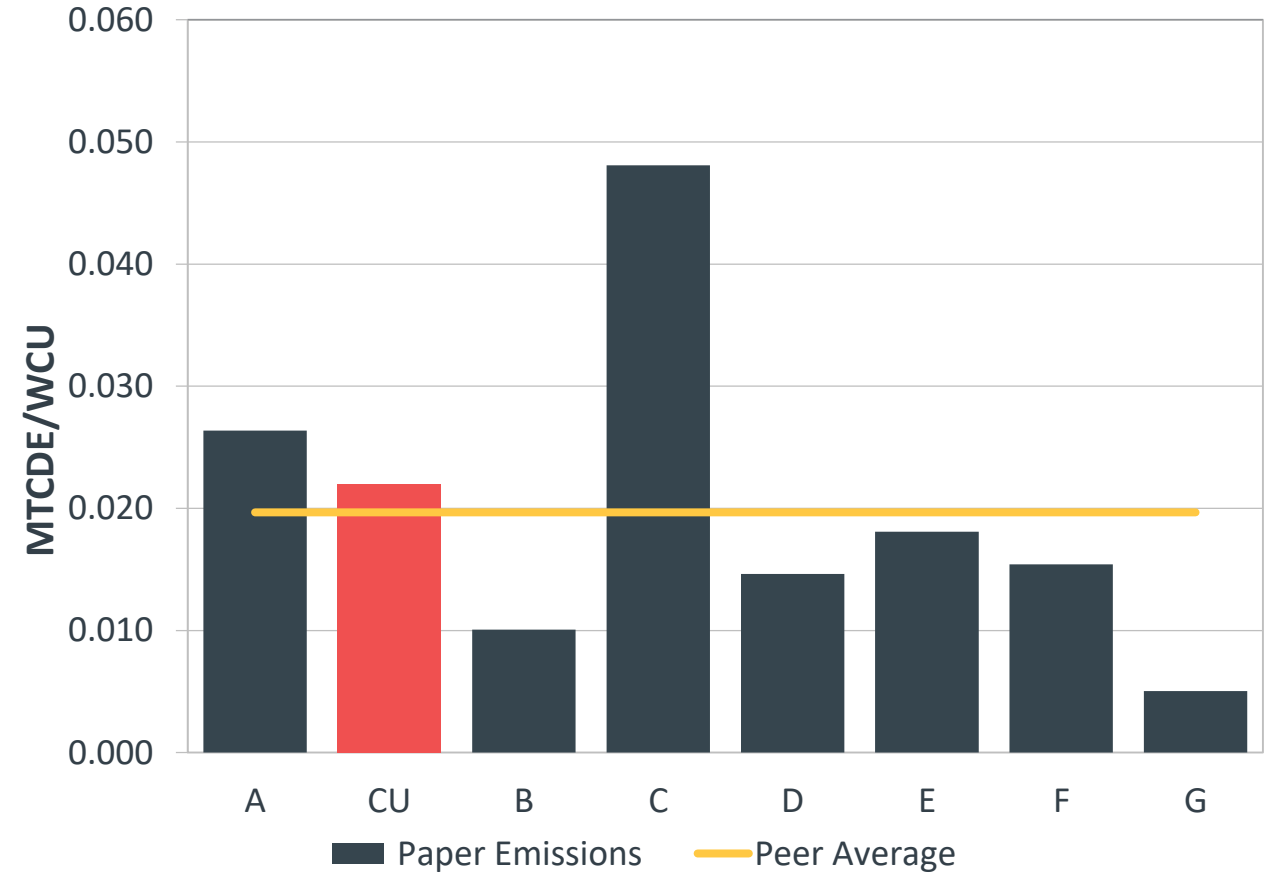


Chapman consumes more paper and emits more than peer averages

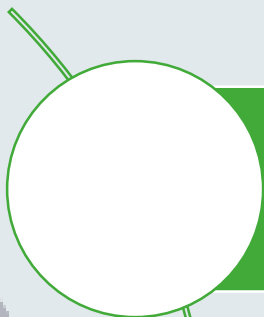
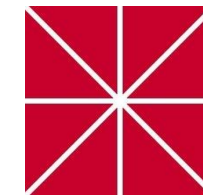
FY19 Paper Consumption vs. Peers



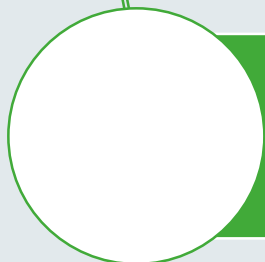
Paper Emissions vs. Peers



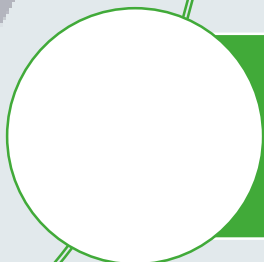
Key Takeaways/Recommendations



Scope 1: Chapman should continue to prioritize energy efficiency upgrades and continue to use aggressive thermostat set points. Additionally, improve internal policies to track refrigerants



Scope 2: Chapman should diversify their electricity sources by investing in solar and continue to invest in energy efficiency upgrades



Scope 3: Instituting a carbon offset strategy for study abroad and directly financed travel and sending out an annual sustainability survey to track student commuting and opinions around campus sustainability