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The University of Alabama FY23 Sustainability Solutions

May 2024

Kevan Will and Mattie Meiklejohn

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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
Xavier University

Gordian Partners With SIMAP

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.

Distribution of Emissions by Level of Control

Scope 1 – Direct GHGs

- Natural Gas
- Vehicle Fleet
- Refrigerants
- Agriculture (Fertilizer)

Scope 2 – Upstream GHGs

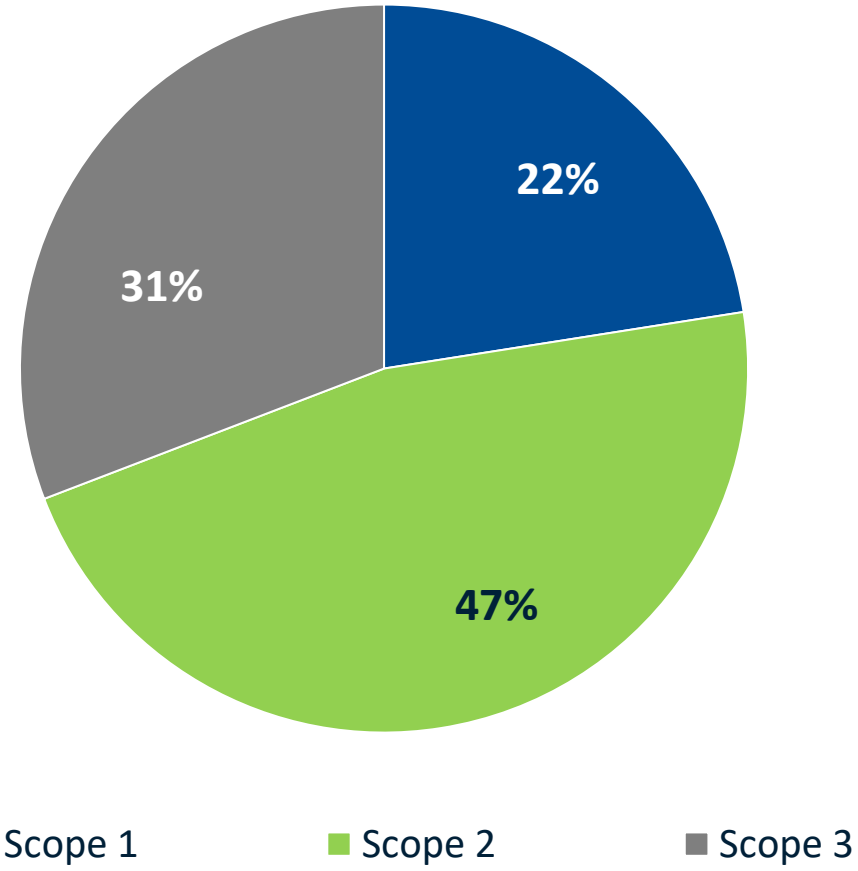
- Purchased Electricity

Scope 3 – Indirect GHGs

- Faculty/Staff/Student Commuting
- Directly Financed Travel
- Study Abroad Travel
- Solid Waste
- Wastewater
- Paper Purchasing
- Transmission & Distribution Losses

Less Control

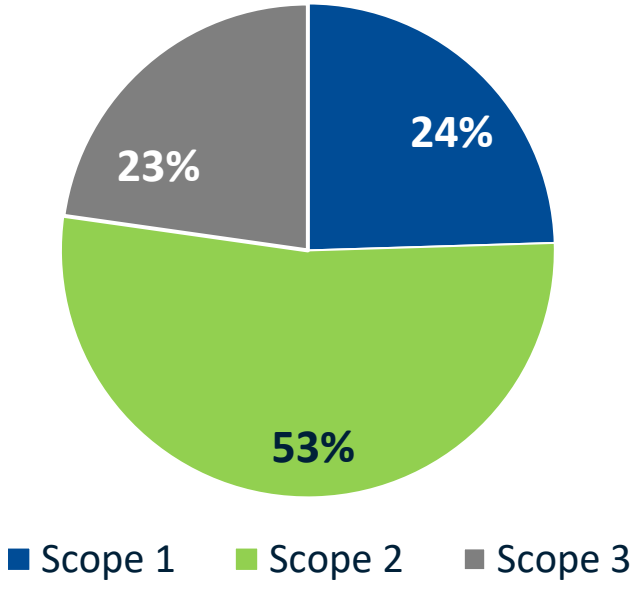
FY23 Emissions by Scope



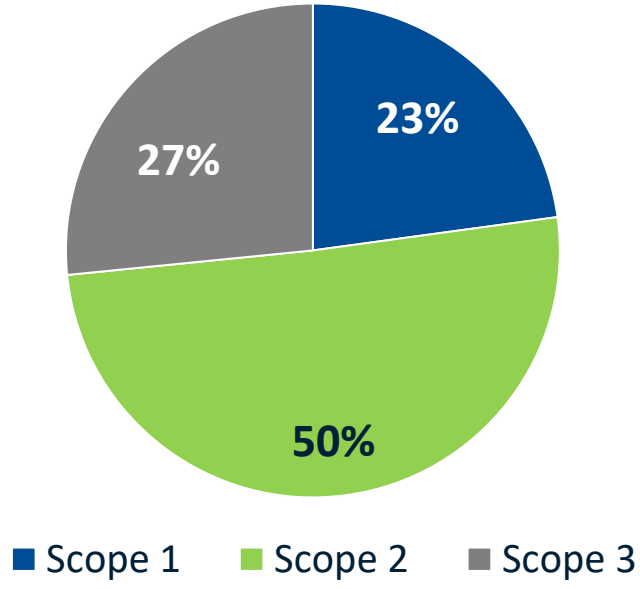
Consistent Distribution of Emissions Over Time

Scope 3 continues to increase as travel resumes post-COVID

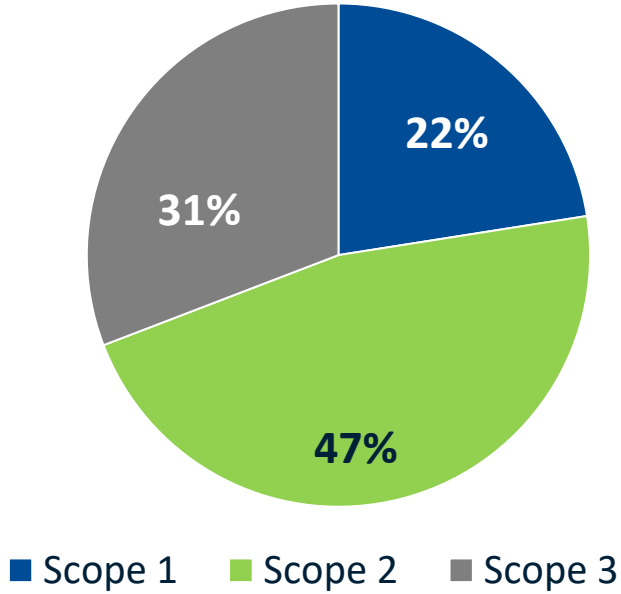
FY21 Emissions by Scope



FY22 Emissions by Scope

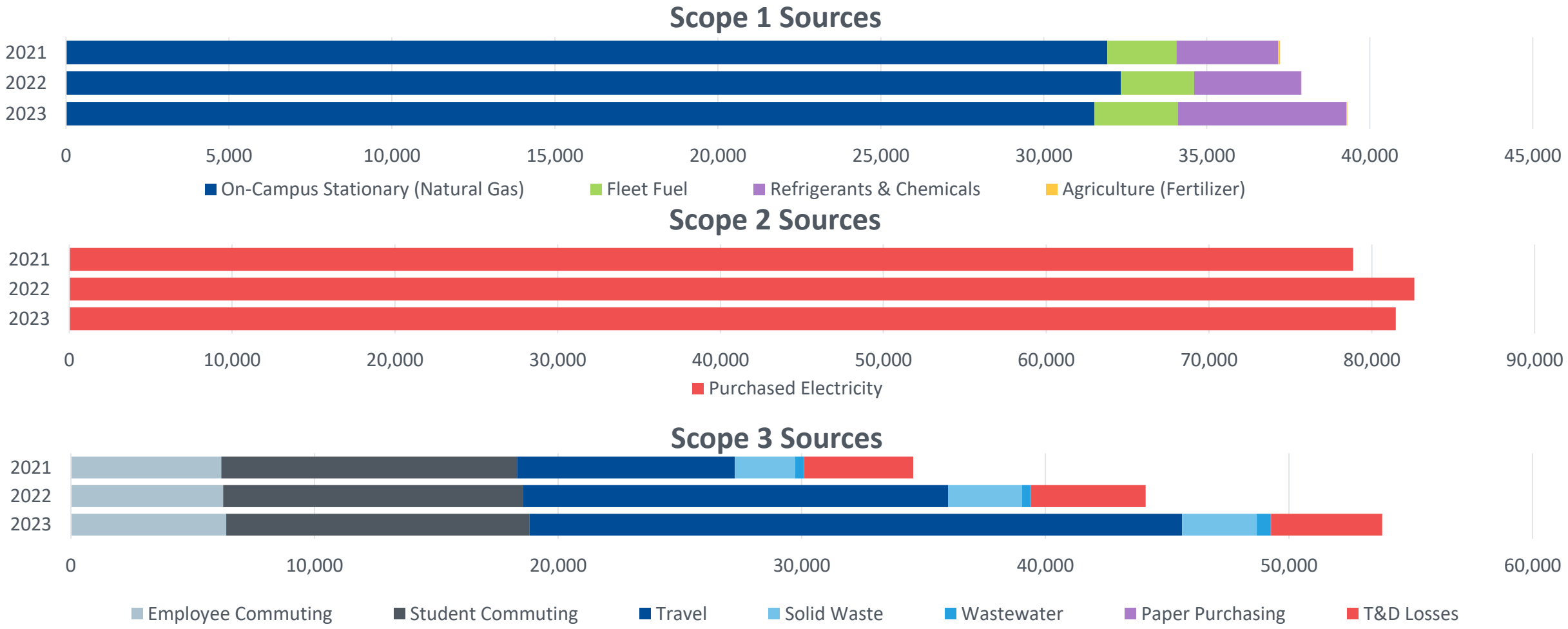


FY23 Emissions by Scope



Segmenting Emissions by Scope

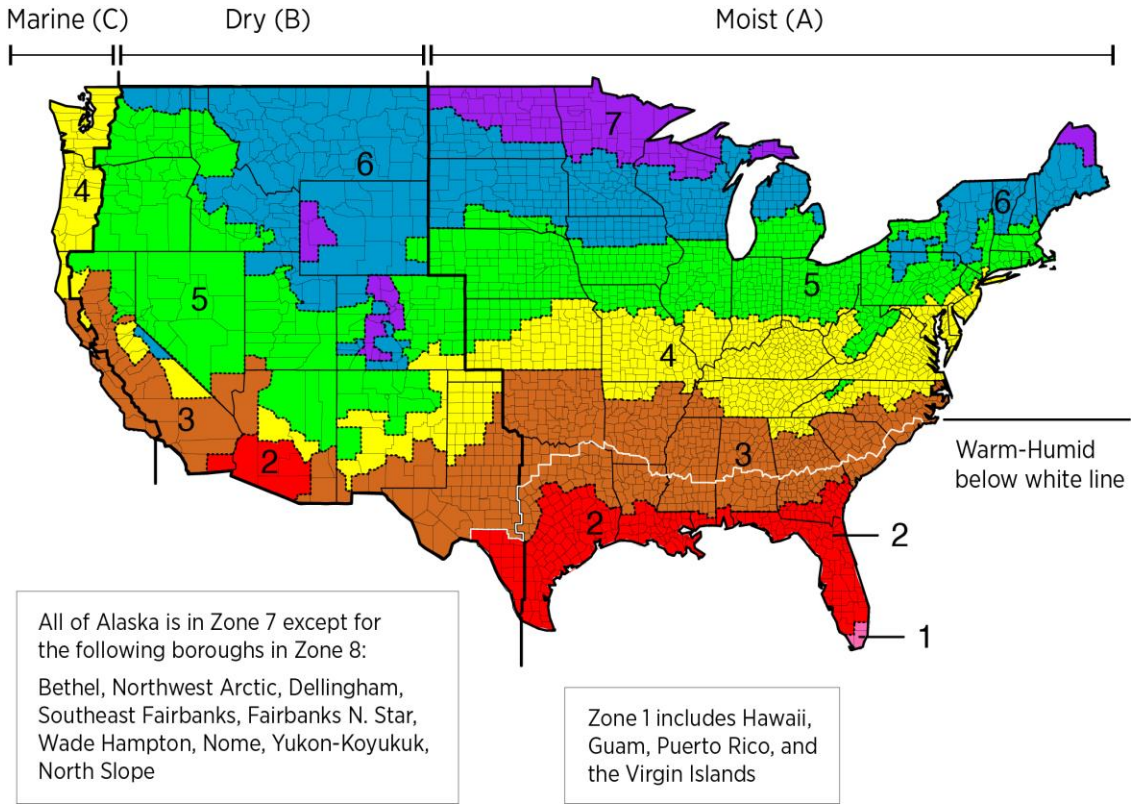
Scope 3 sees most significant increase since FY21



**Sources measured in MTCDE*

Comparative Peers

Peer Institutions	Location
Boston College	Boston, MA
Clemson University	Clemson, SC
Florida State University	Tallahassee, FL
Michigan State University	East Lansing, MI
Texas A&M University	College Station, TX
Towson University	Towson, MD
University of Arizona	Tucson, AZ
University of Arkansas	Fayetteville, AR
University of Tennessee	Knoxville, TN
University of Texas – Rio Grande Valley	Edinburg, TX



Comparative Considerations

Size, enrollment, technical complexity, geographic location, setting, and sustainability goals are all factors included in the selection of peer institutions.

Benchmarking GHG Emissions

Two ways to normalize: by Campus User & by GSF

GHG Emissions per 1,000 EUI Adjusted GSF

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

Stresses efficient use of space.

*EUI Adjusted GSF weighs Science Research and Medical Space more heavily

GHG Emissions per Weighted User

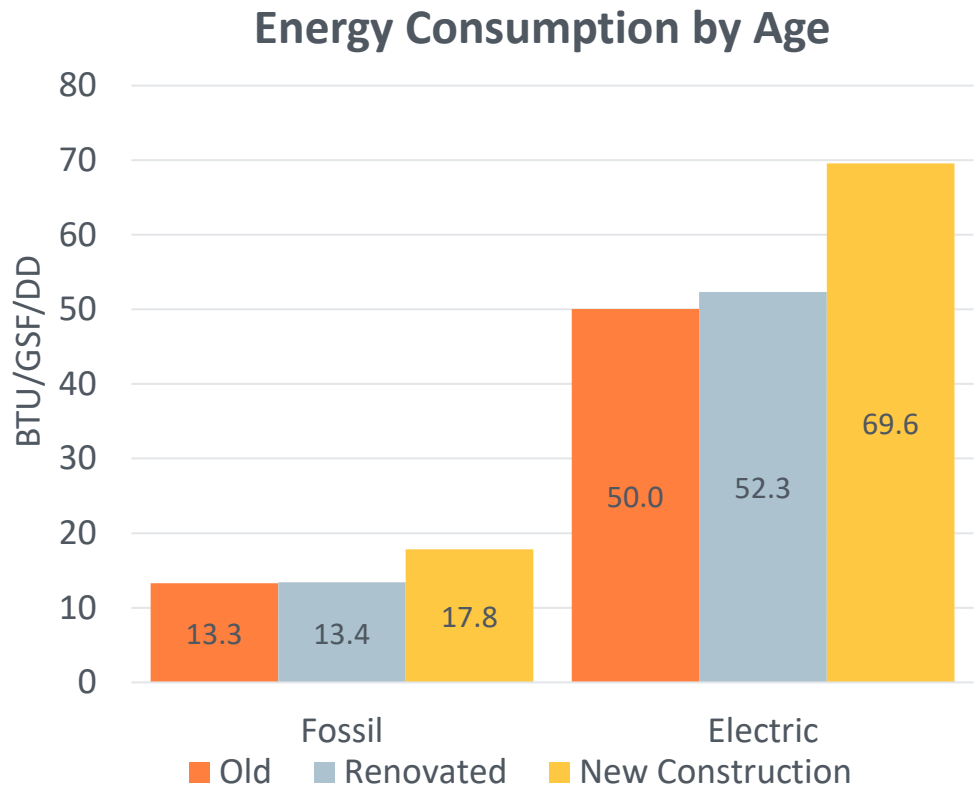
$$\frac{\text{Gross GHG Emissions}}{\text{Weighted User}}$$

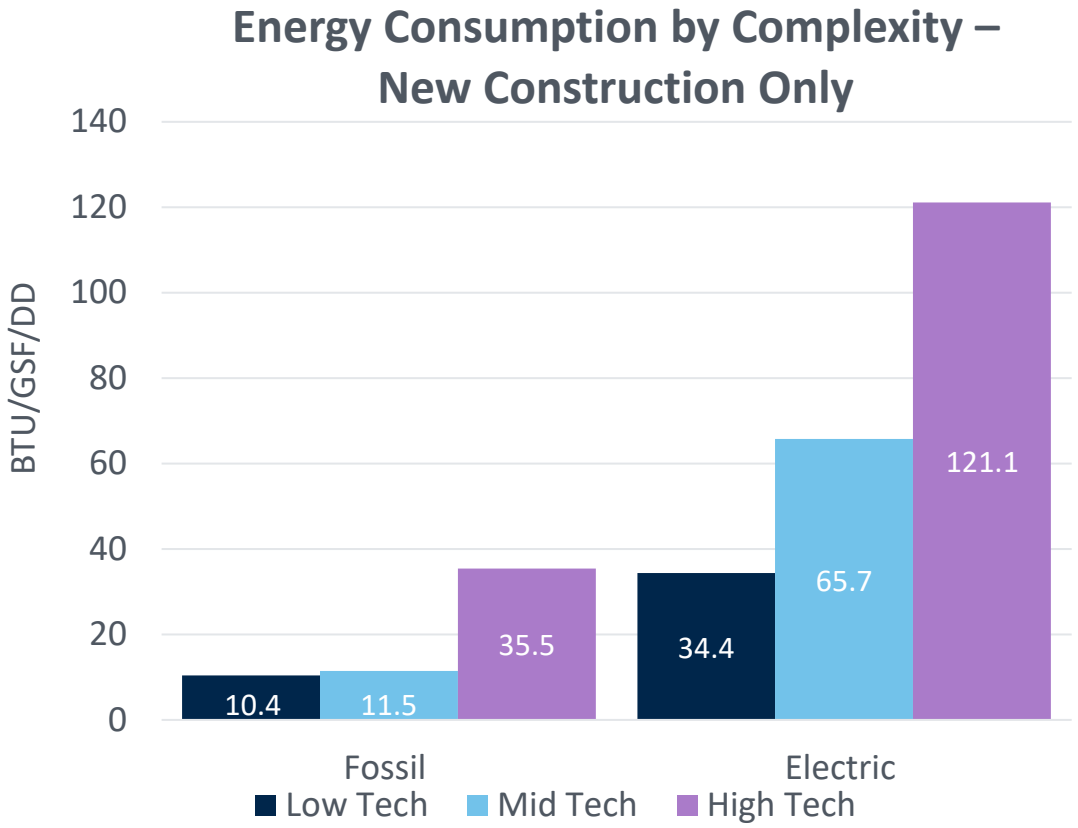
Stresses intensity of operations and commuting.

*Weighted User weighs full-time residential students more heavily

Campus Space Profile Impacts Sustainability Effort

Age and technical complexity of buildings on campus impact energy consumption and efficiency





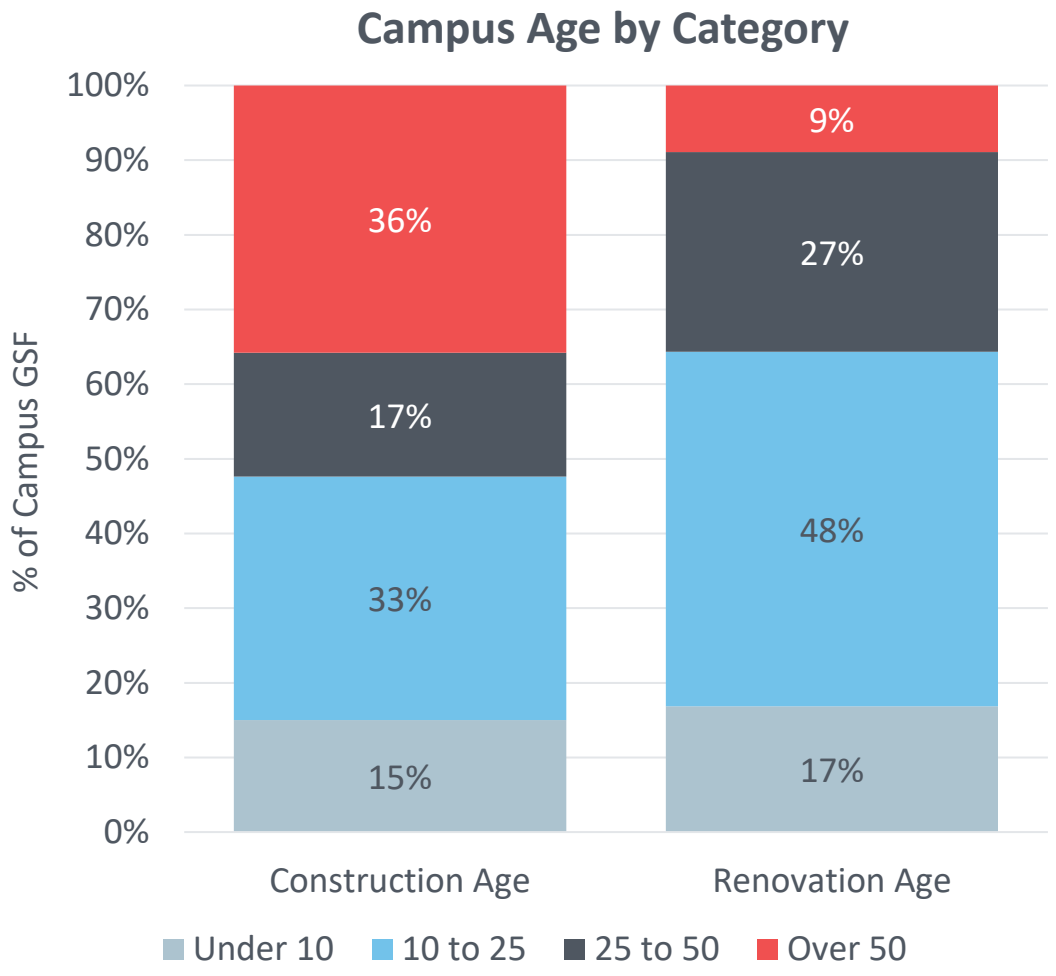
New construction systems can be more efficient, but high tech complexity increases energy consumption

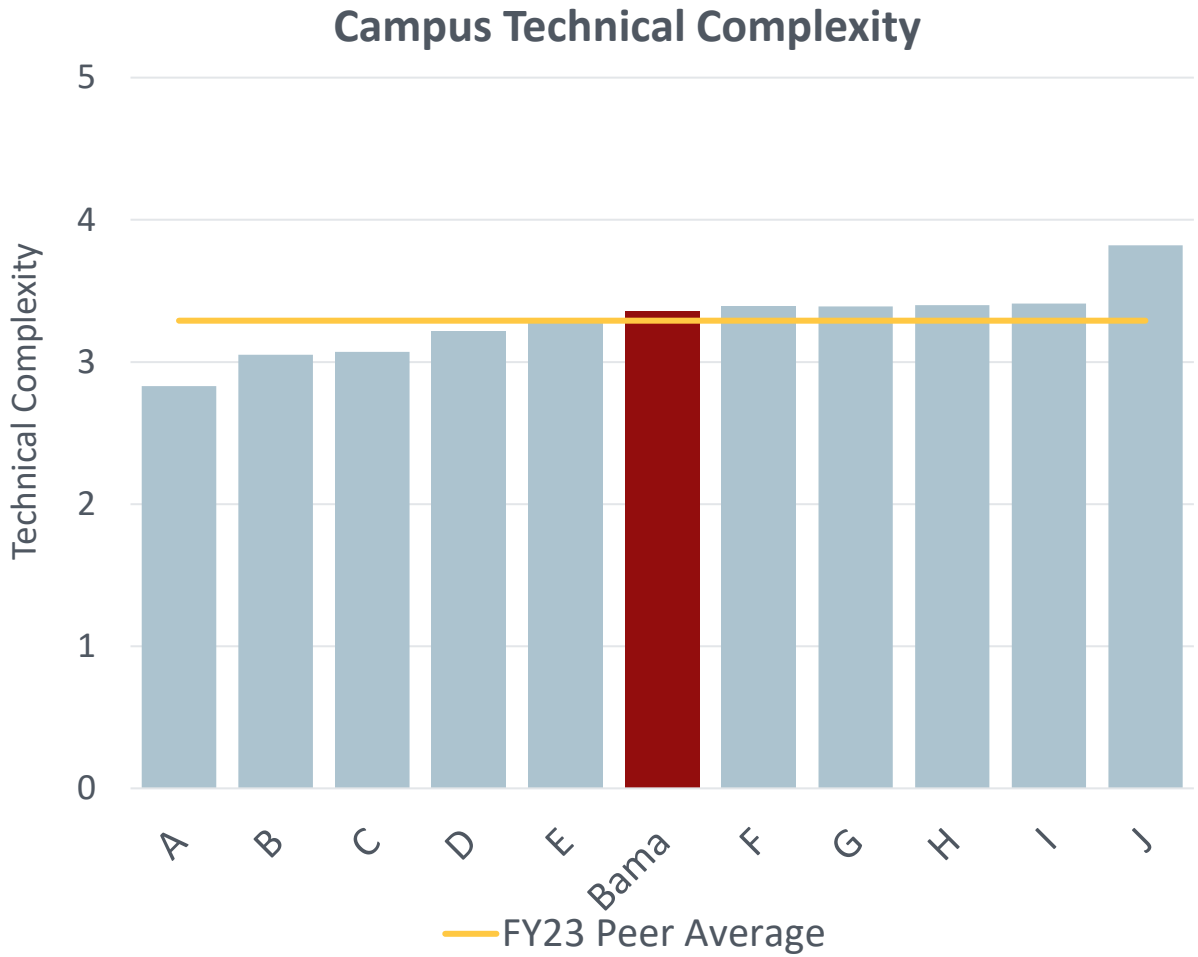
Technically complex (high tech) systems tend to consume more energy

**Graphs taken from Sightlines State of Sustainability FY17*

Age Profile Impacts Energy Consumption

Strategic renovations have offset high-risk space by 17%



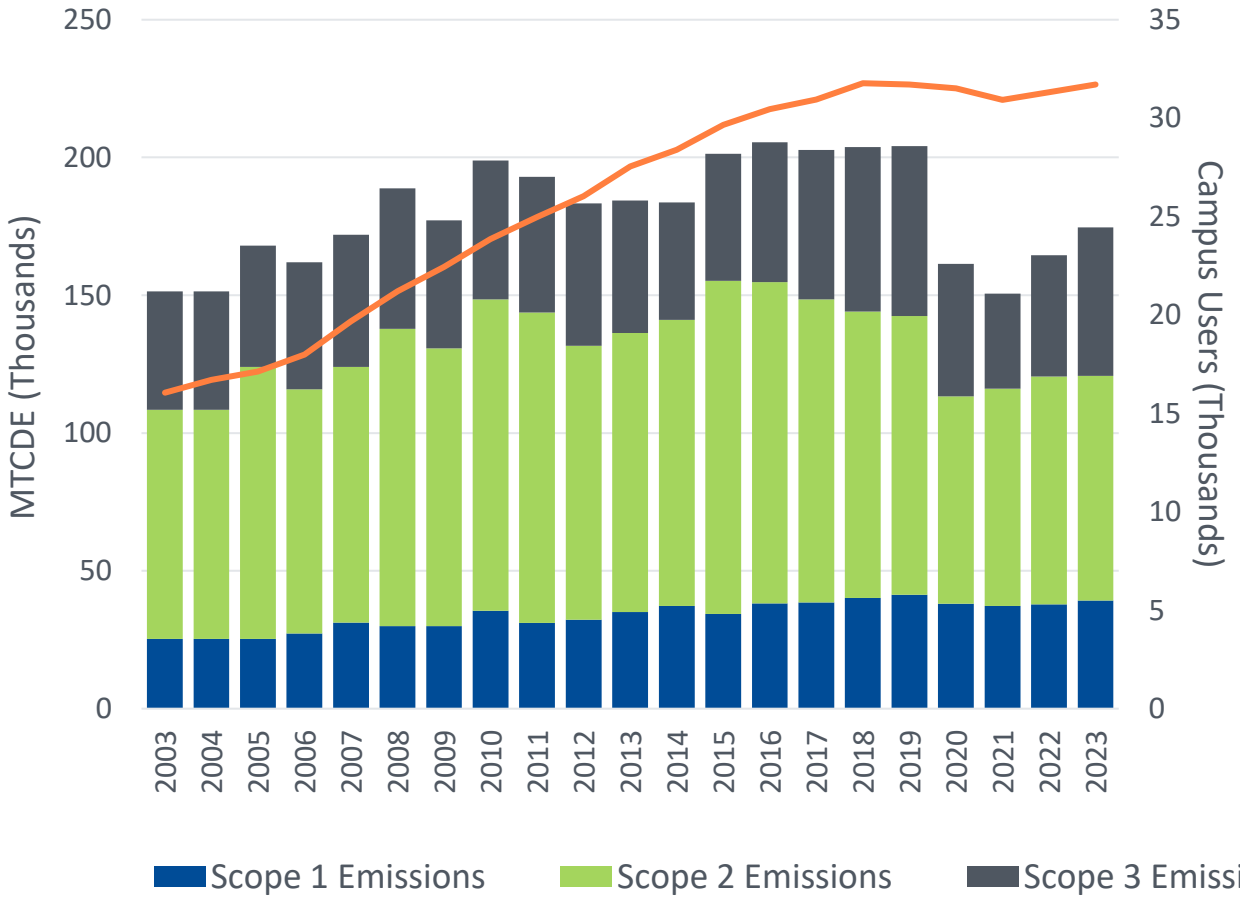


Ordered by Technical Complexity

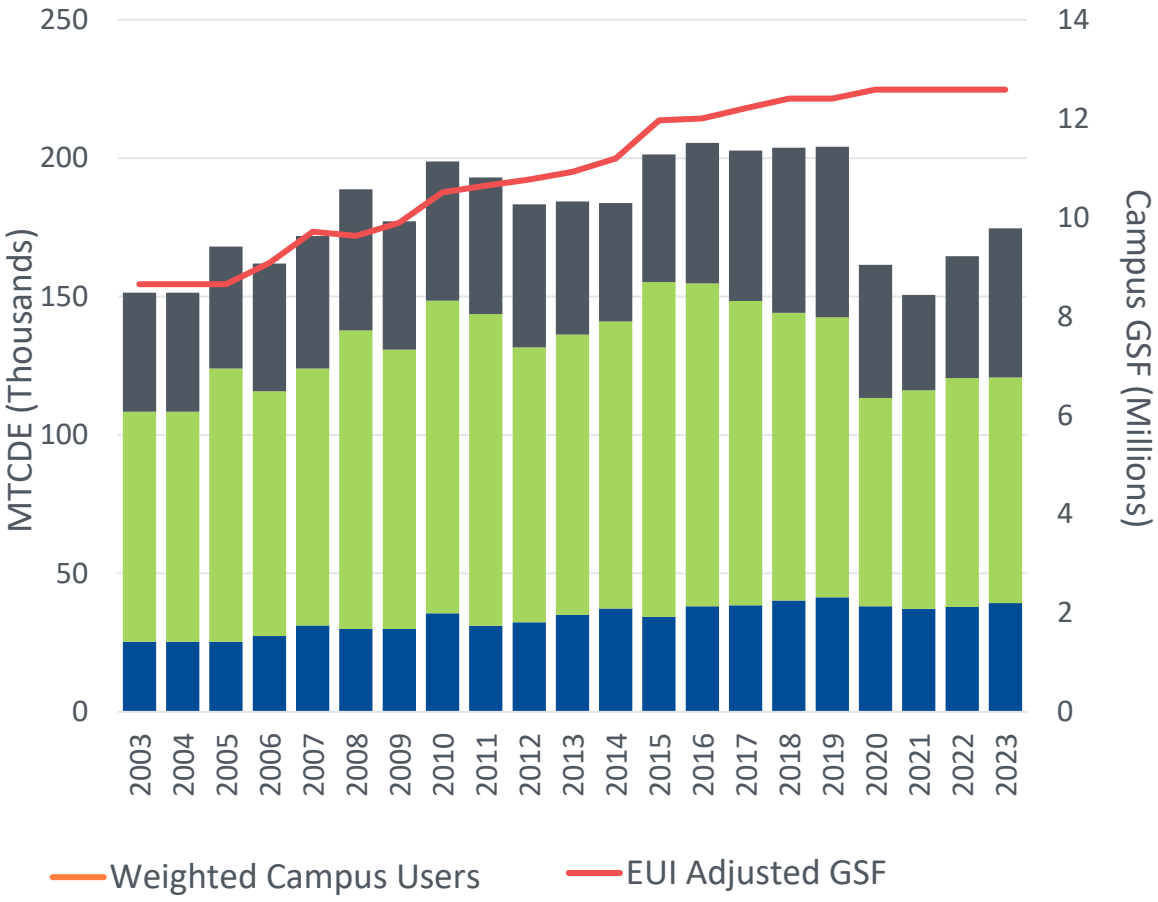
Longitudinal Tracking of Emissions by Scope

Space and users increase, aiding in increased emissions

Emissions by Scope Compared to Campus User Growth



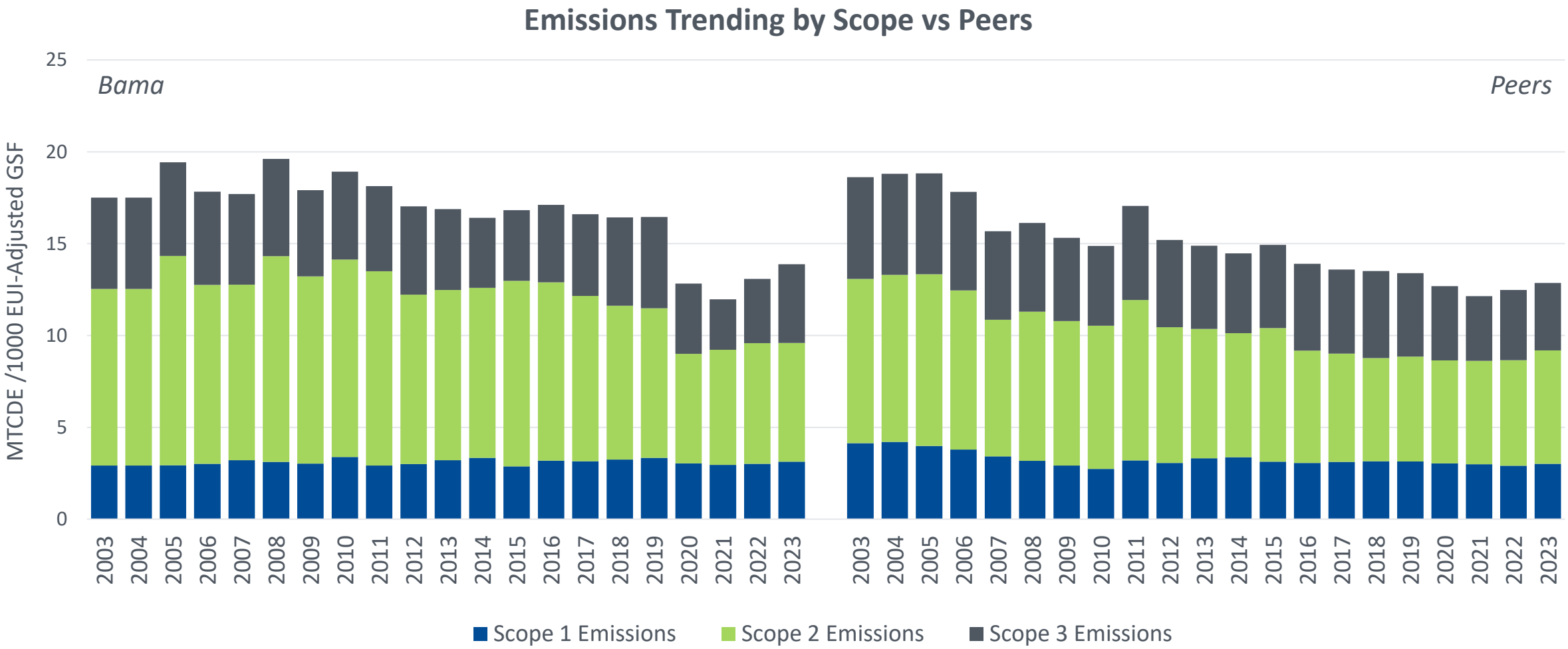
Emissions by Scope Compared to Space Growth



Scope 1 Emissions | Scope 2 Emissions | Scope 3 Emissions | Weighted Campus Users | EUI Adjusted GSF

Longitudinal Look Vs Peers

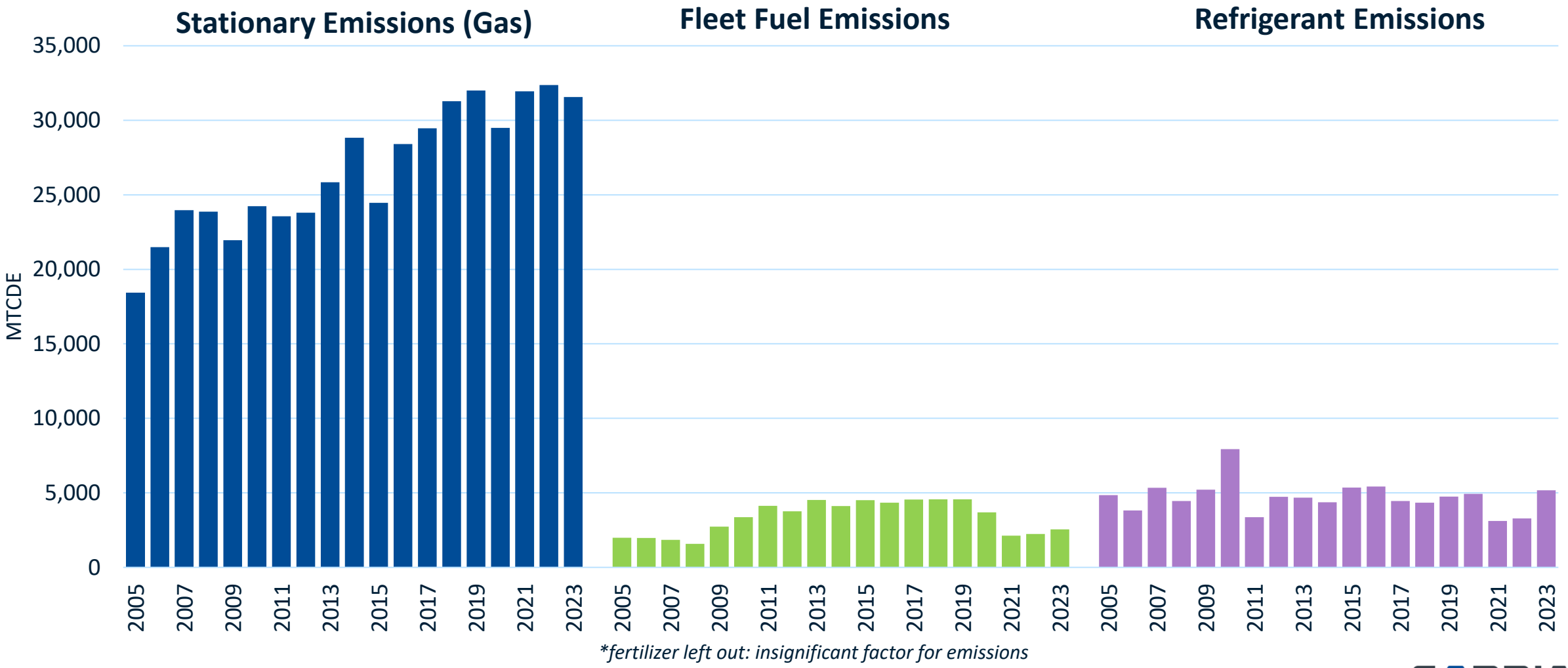
Bama and peers continue to bounce back from decreased emissions driven by COVID



Scope 1 Emissions: Natural Gas

Scope 1 Emissions By Source

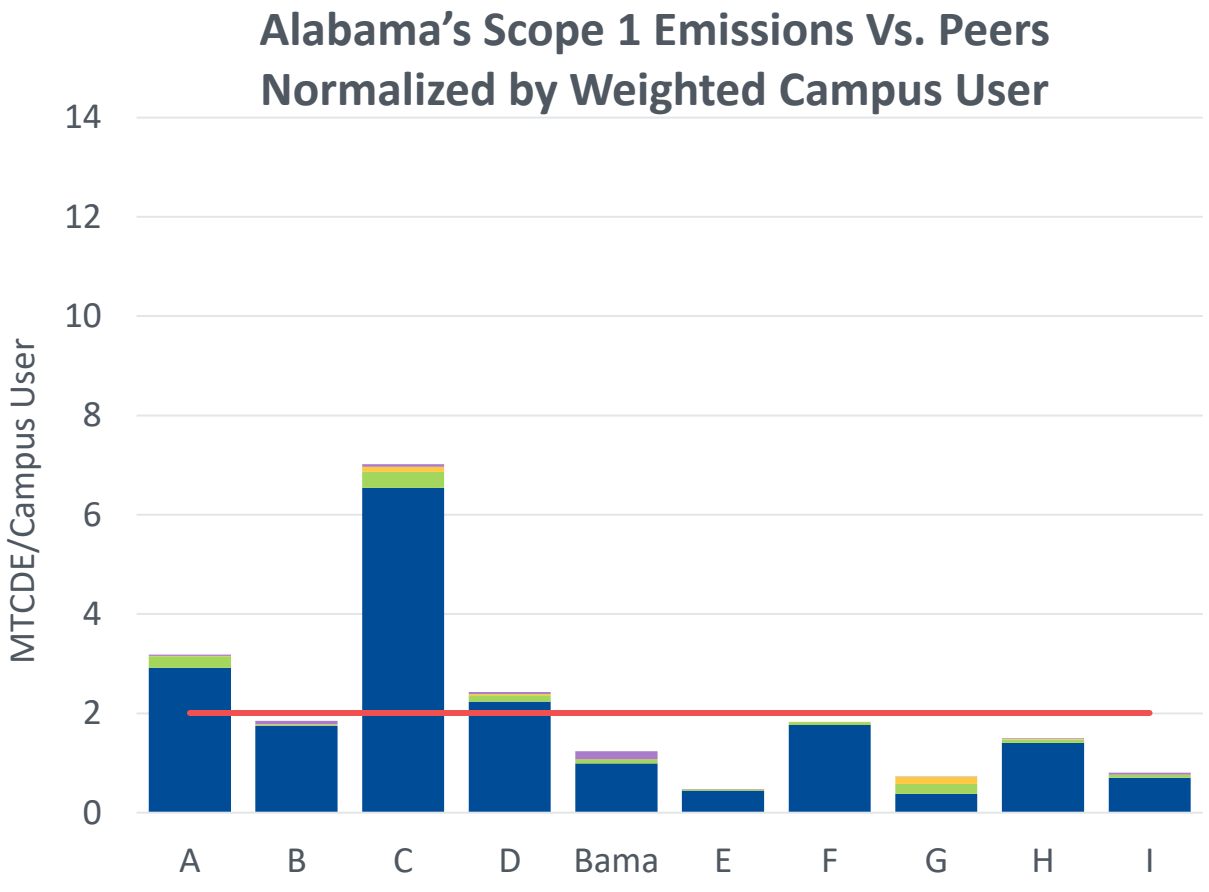
Natural Gas continues to occupy a majority of scope 1 emissions

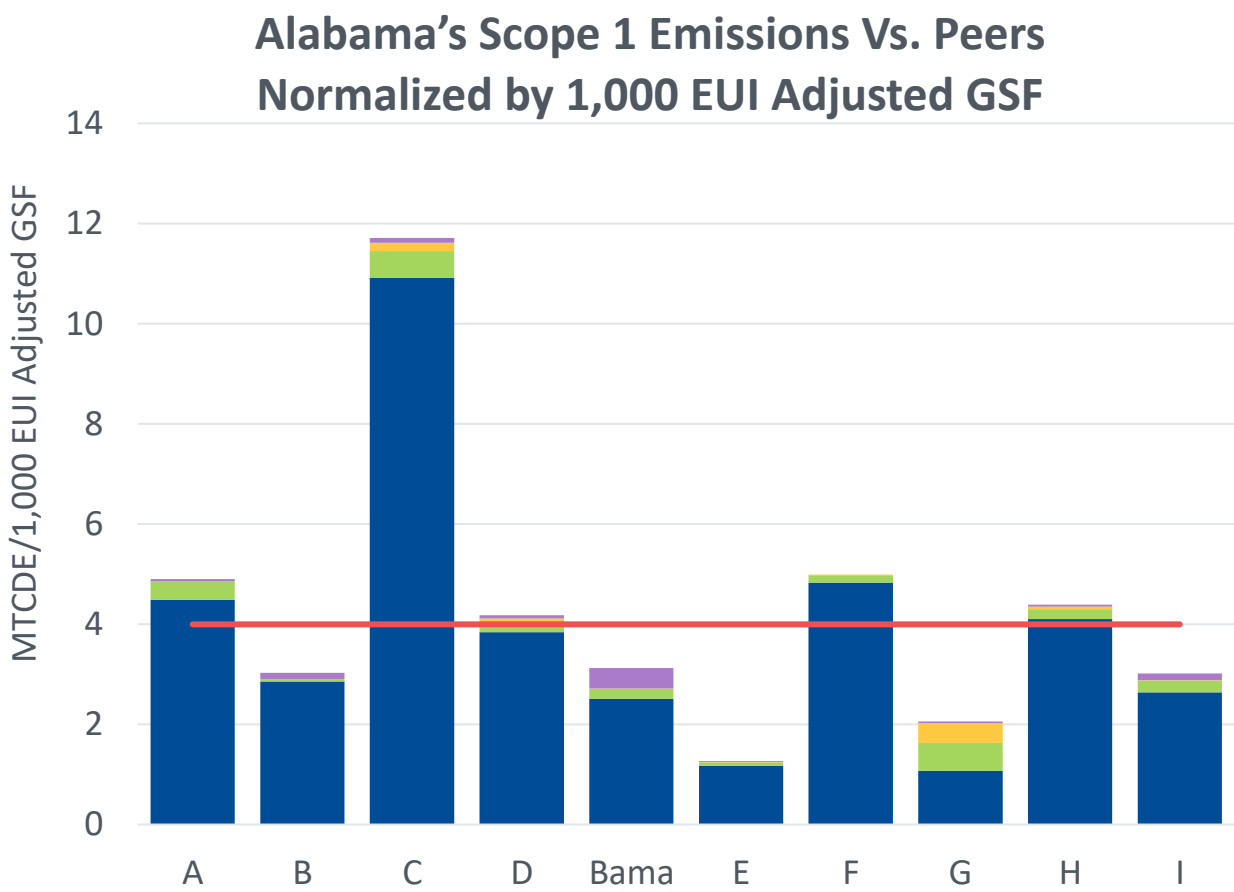


**fertilizer left out: insignificant factor for emissions*

Scope 1 Emissions by Source, Normalized

Alabama operating below peer averages when normalized



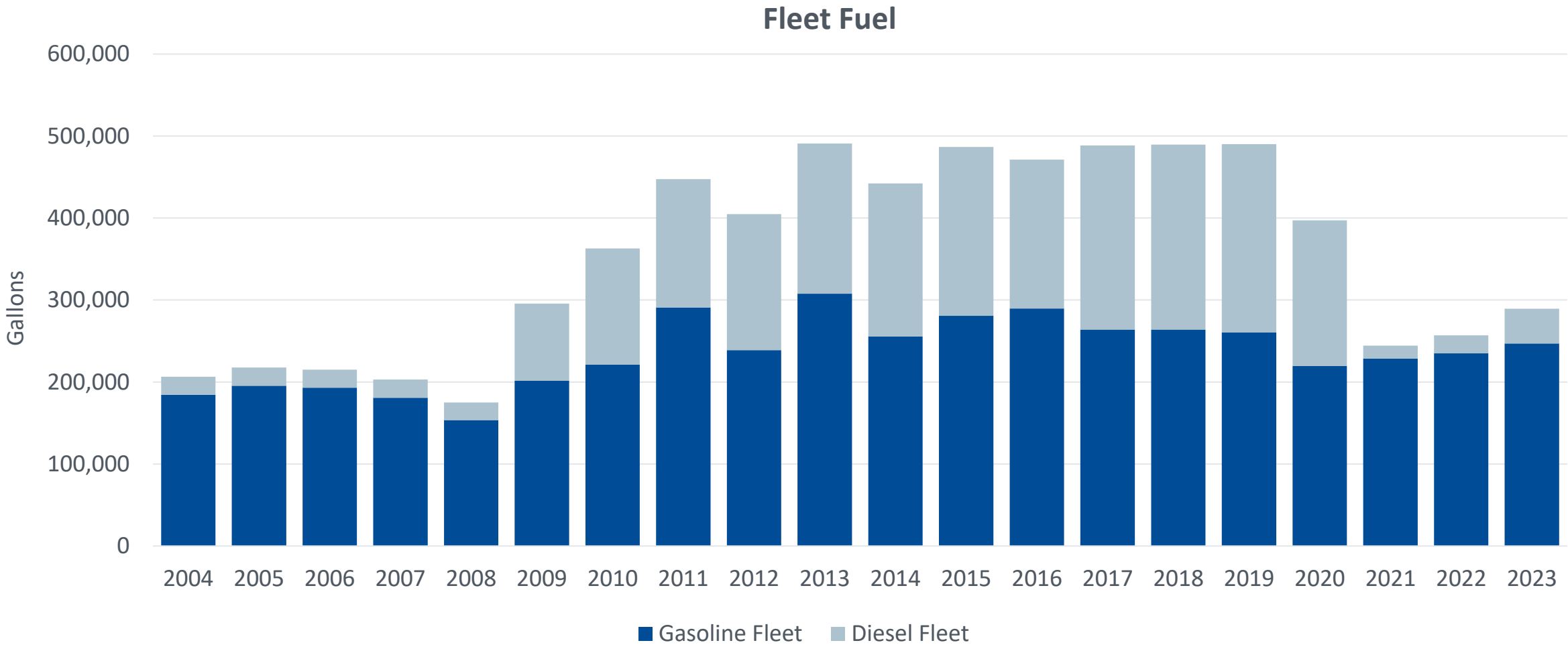


Refrigerant | Agriculture (Fertilizer) | Fleet | Stationary | Peer Group Member Average

Ordered by Density Factor

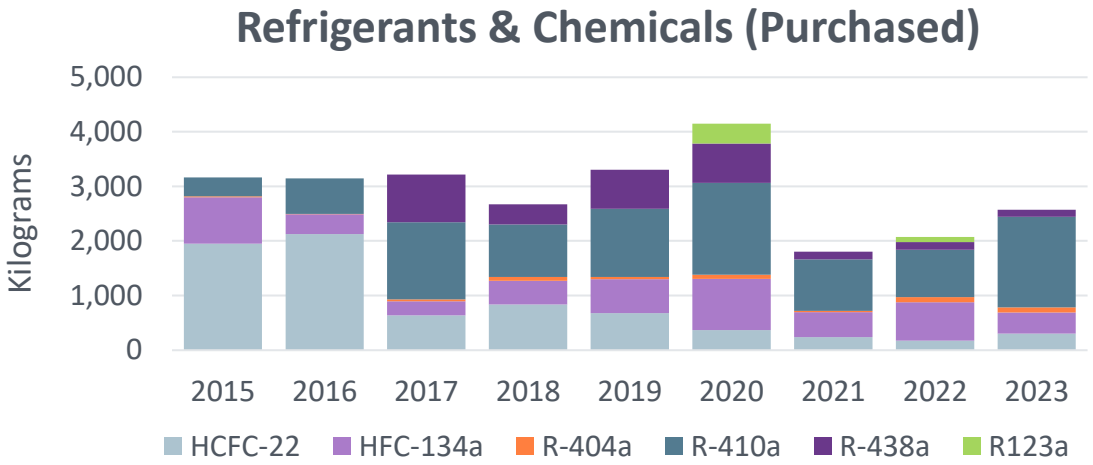
Fleet Fuel – Additional Scope 1 Sources

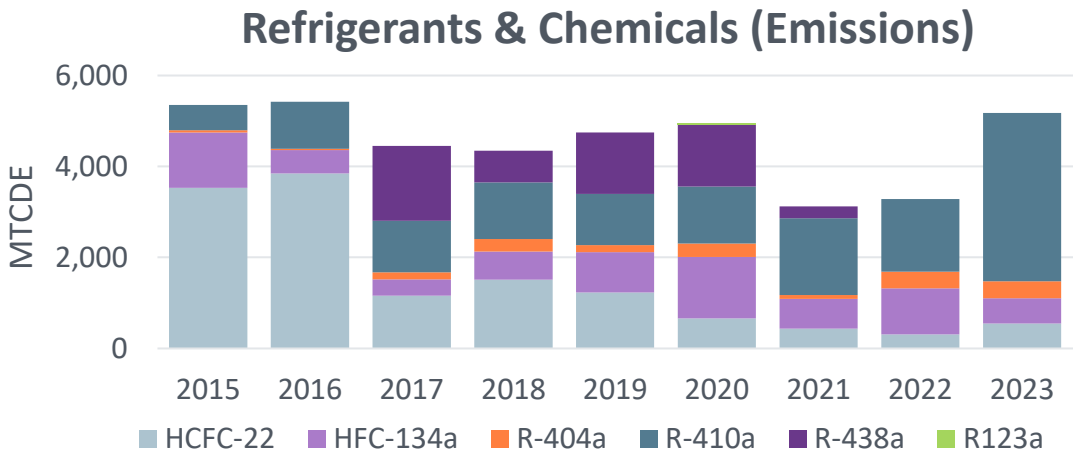
Fleet fuel increased by 13% from FY22 to FY23

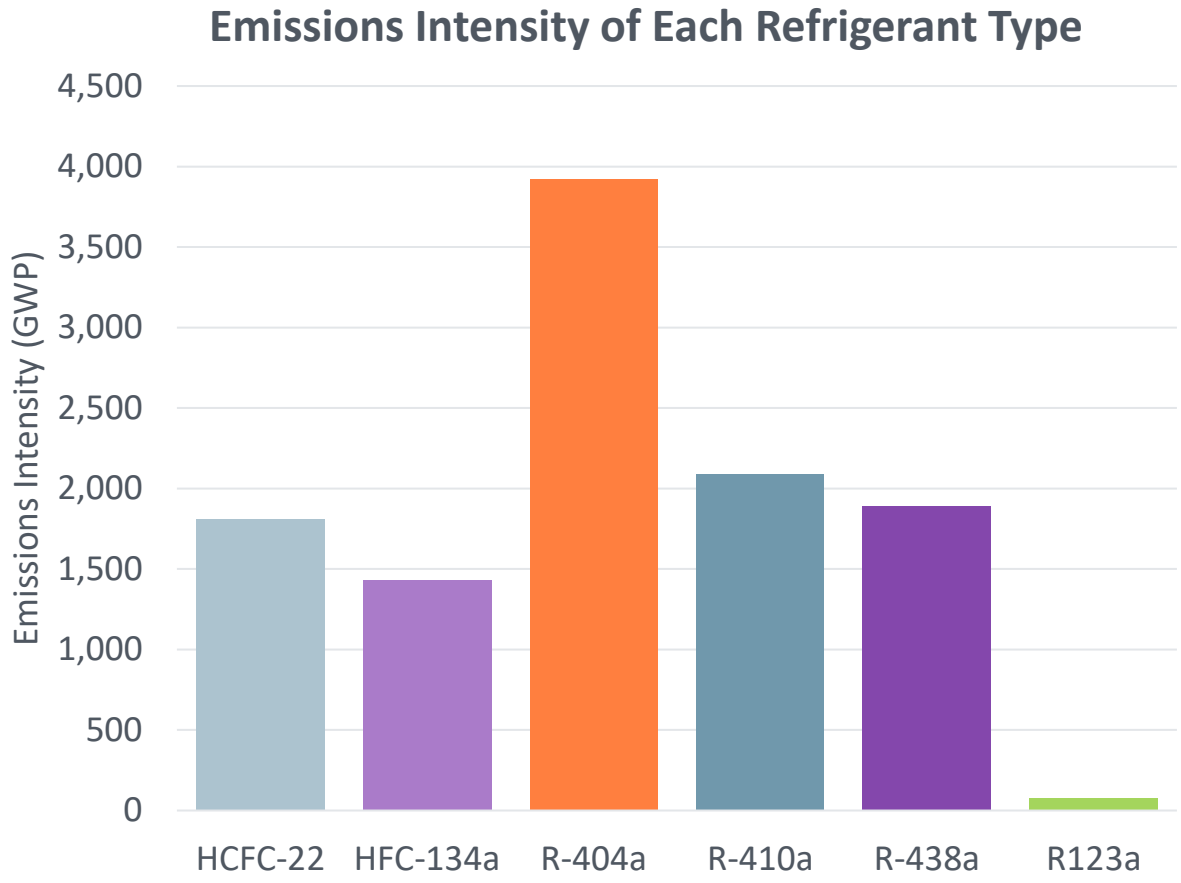


Refrigerant & Their Emissions Factors

FY23 saw greatest increase in R-410a, the refrigerant with the second-highest GWP



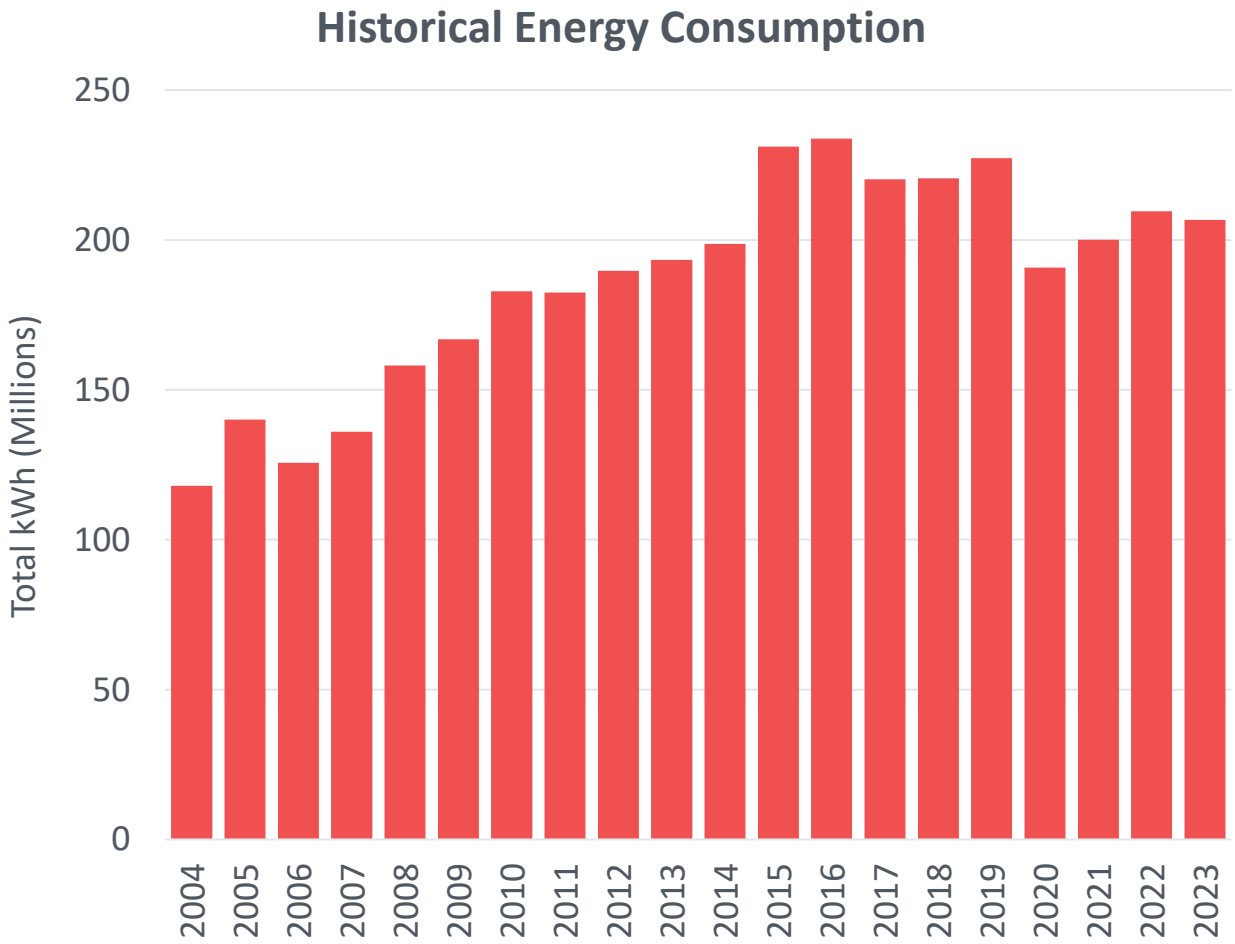


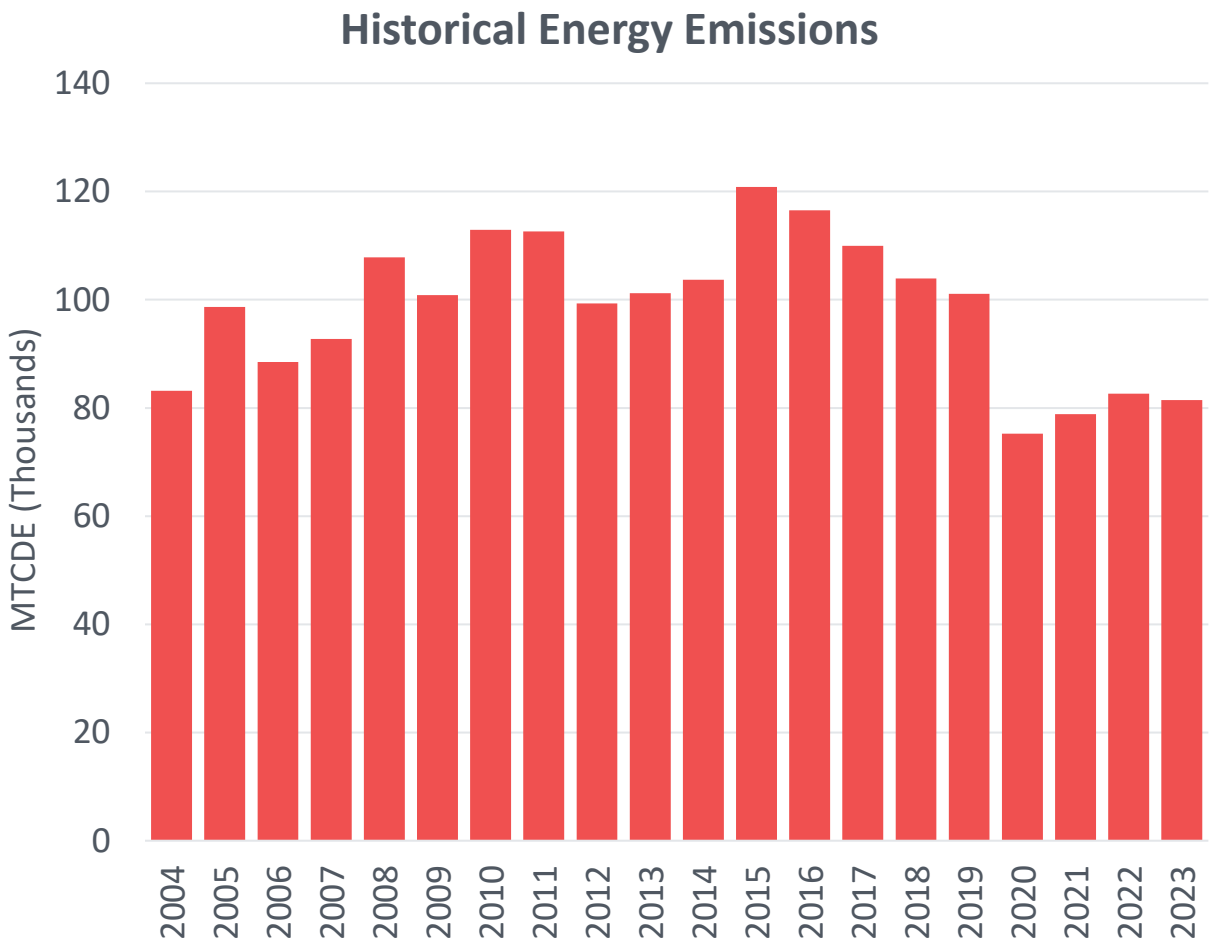


Scope 2 Emissions: Purchased Electricity

Scope 2: Bama Electricity Consumption vs Emissions

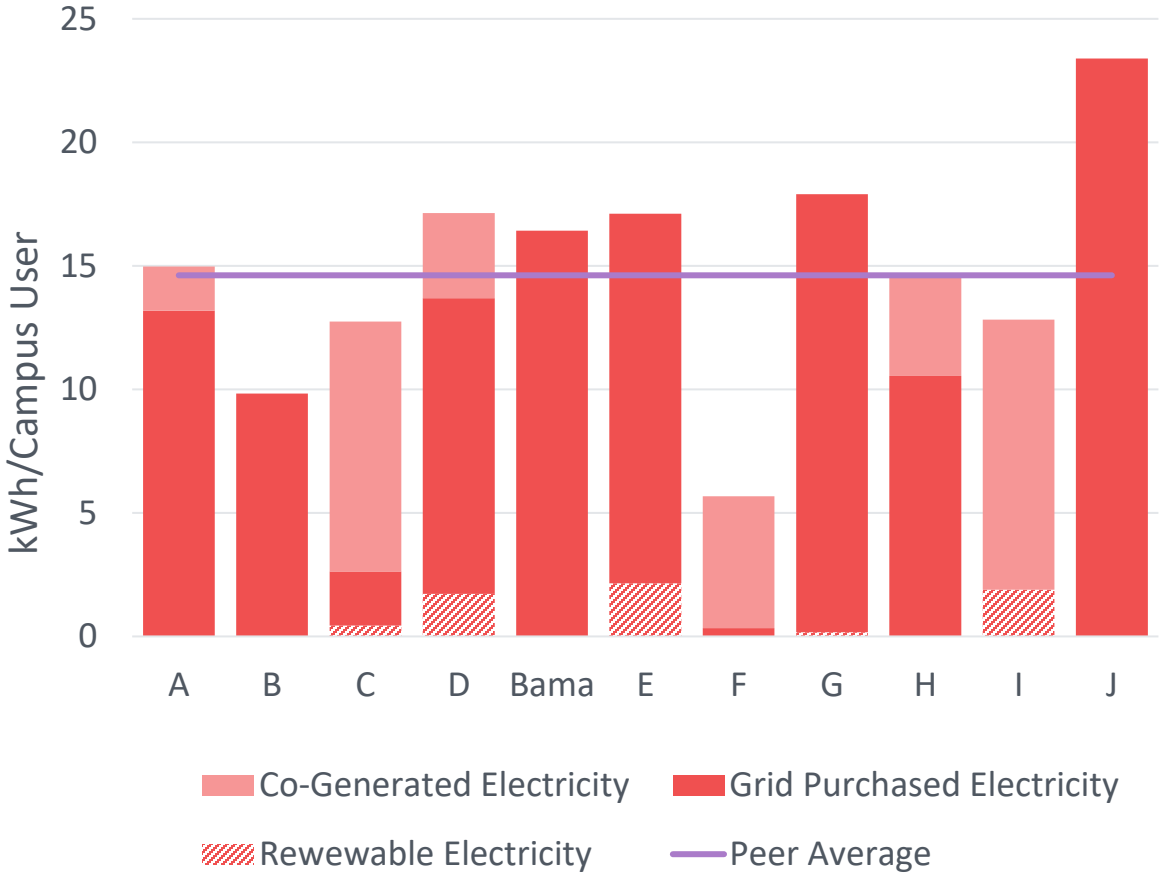
Electricity consumption and emissions decrease from FY22

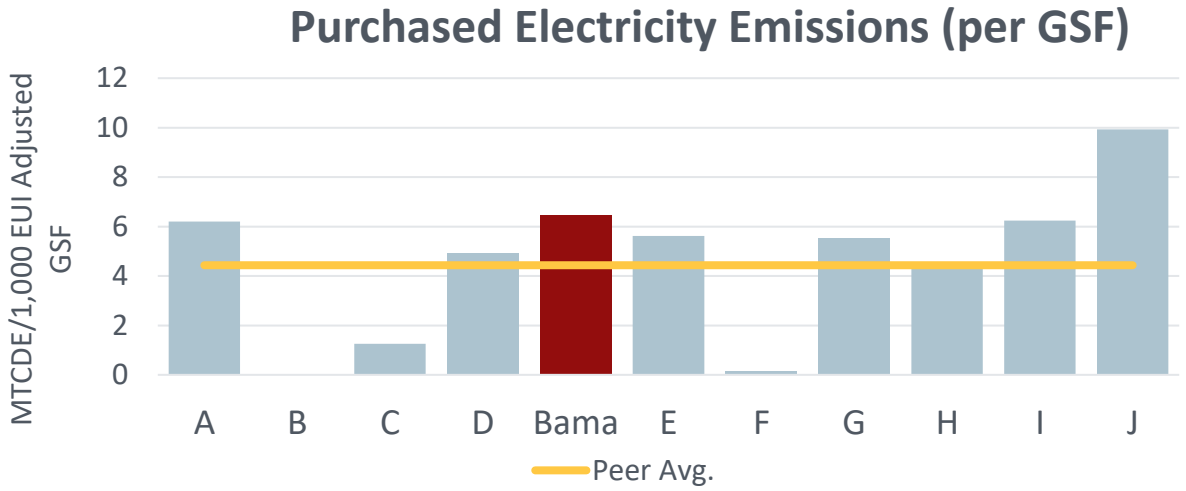


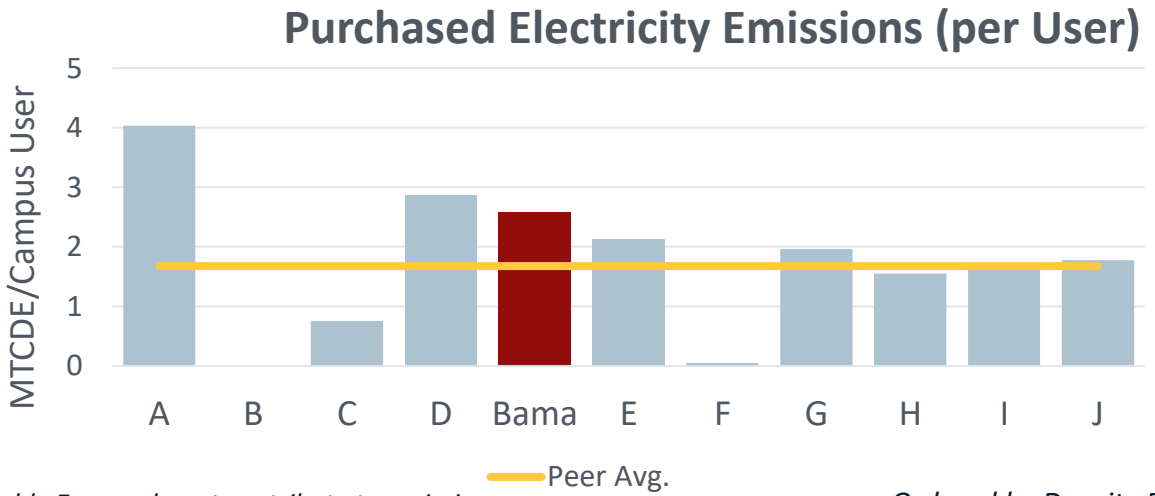


Comparing Emissions from Electricity

Alabama falls above peer averages for normalized consumption and emissions







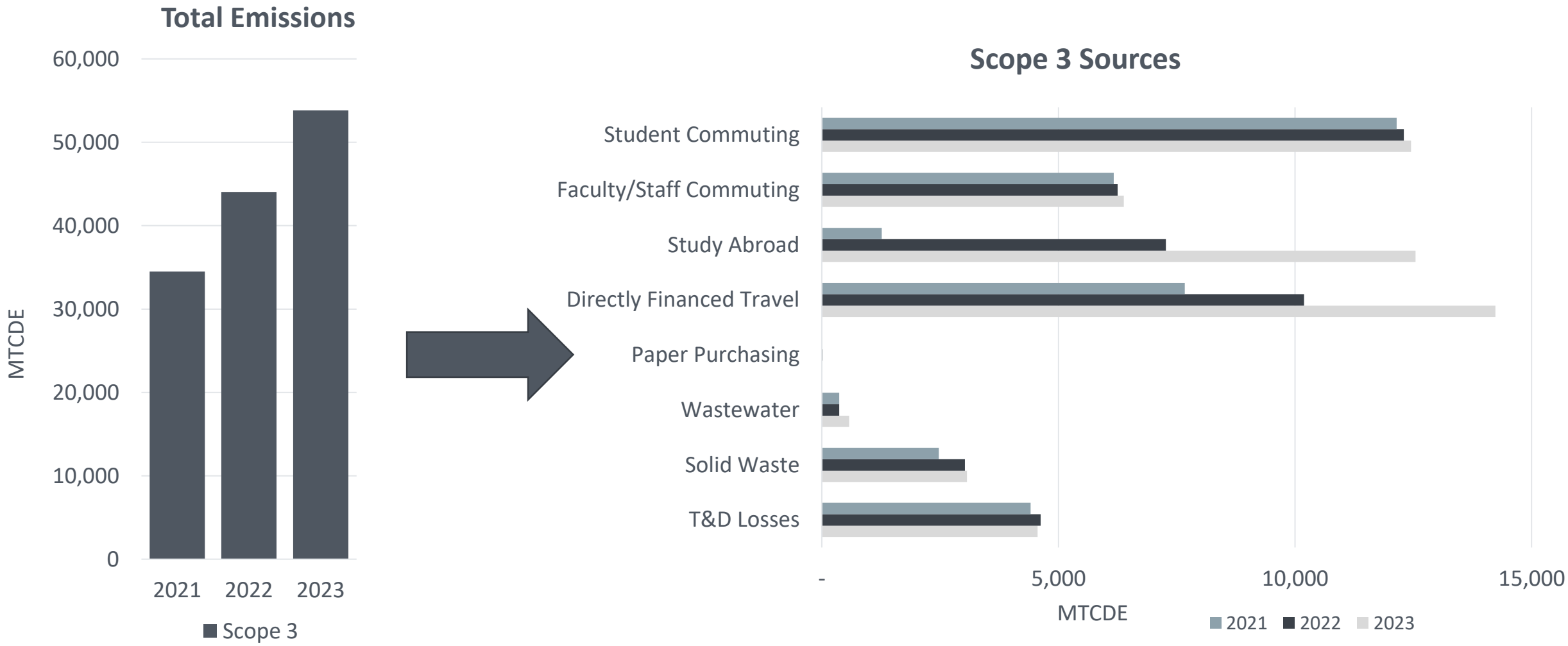
** Co-Generated Electricity and Renewable Energy do not contribute to emissions*

Ordered by Density Factor

Scope 3 Emissions

Scope 3 Distribution by Source

Study Abroad and Directly Financed Travel drive emissions increase in scope 3



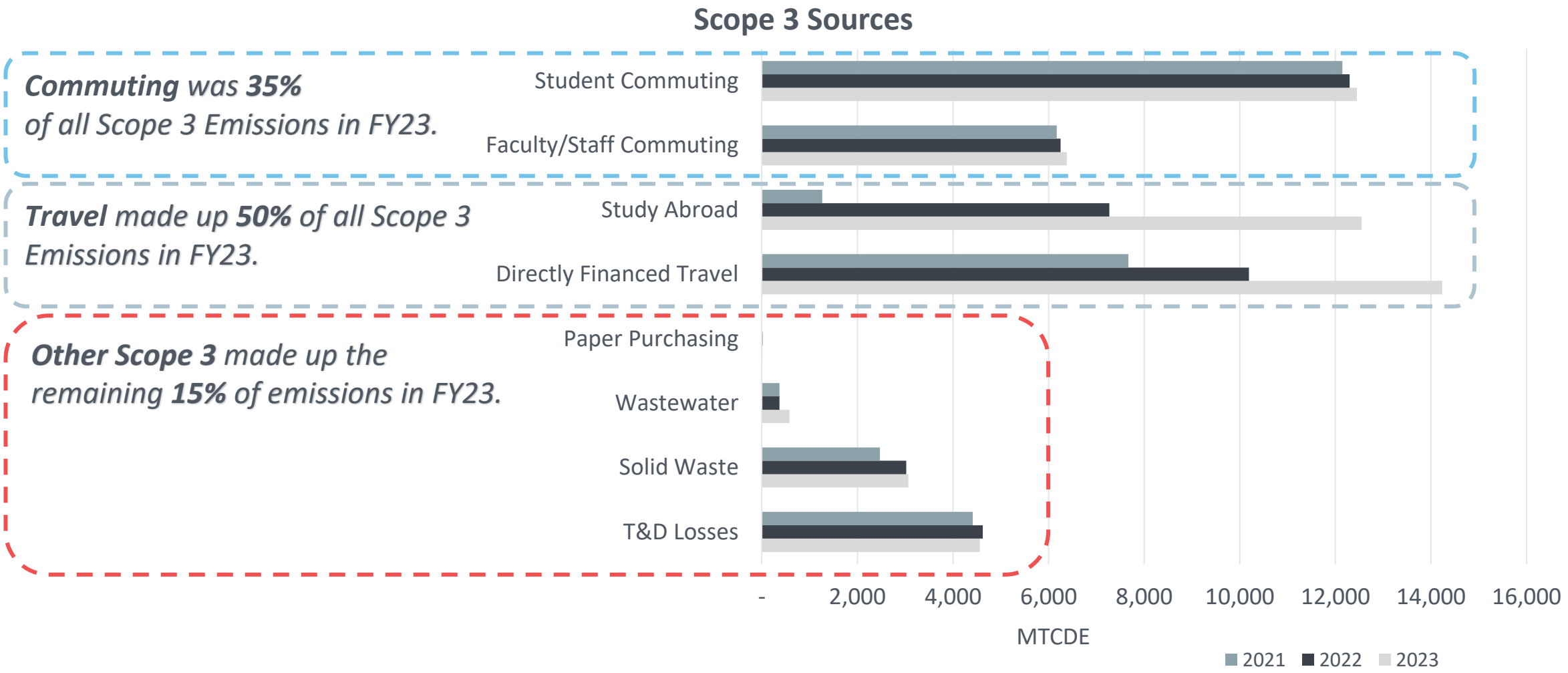
Scope 3 Emissions Increasing Over Time

As a whole, scope 3 increased 22% from FY22 to FY23

***Commuting** was **35%** of all Scope 3 Emissions in FY23.*

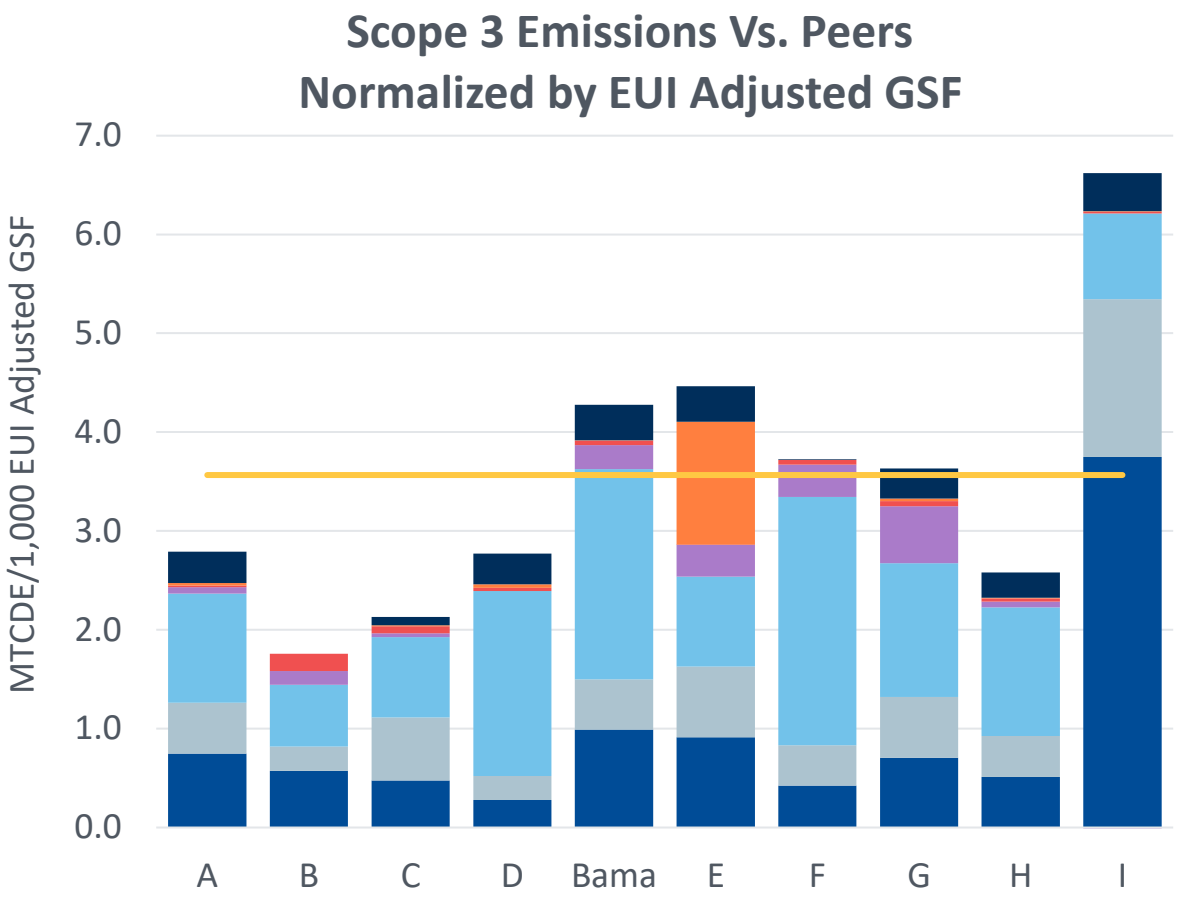
***Travel** made up **50%** of all Scope 3 Emissions in FY23.*

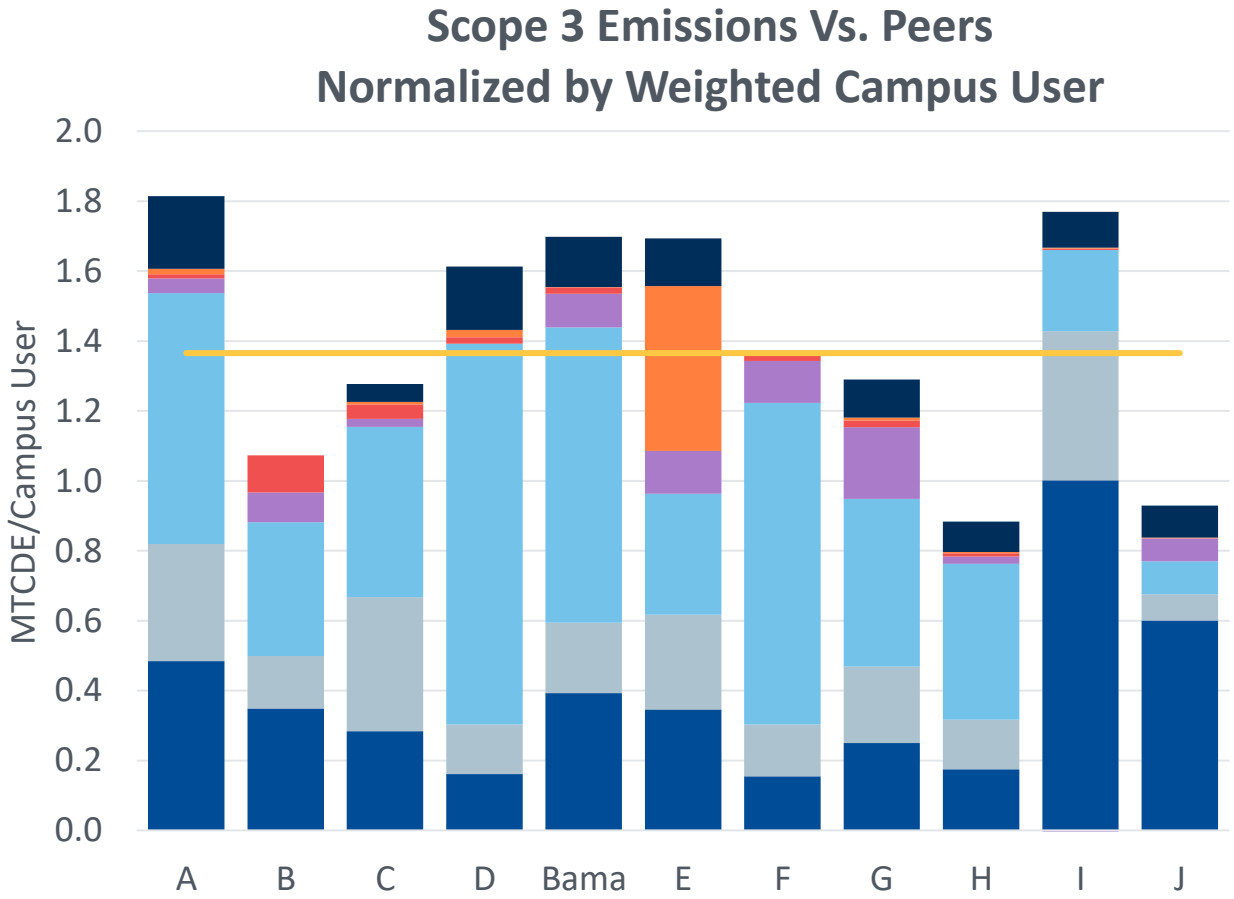
***Other Scope 3** made up the remaining **15%** of emissions in FY23.*



Scope 3 – Emissions by Source

Alabama produces emissions above normalized peer averages for scope 3



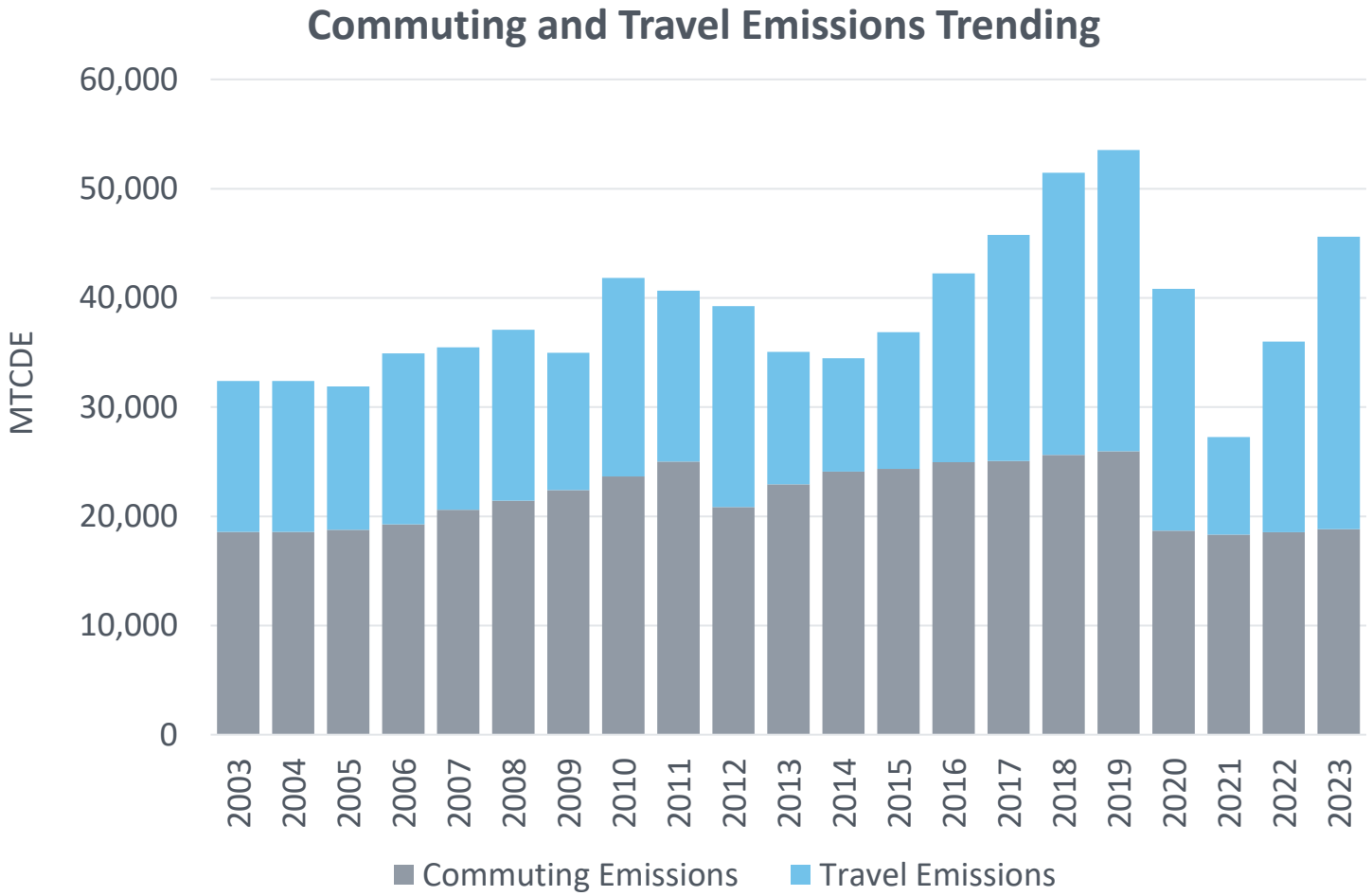


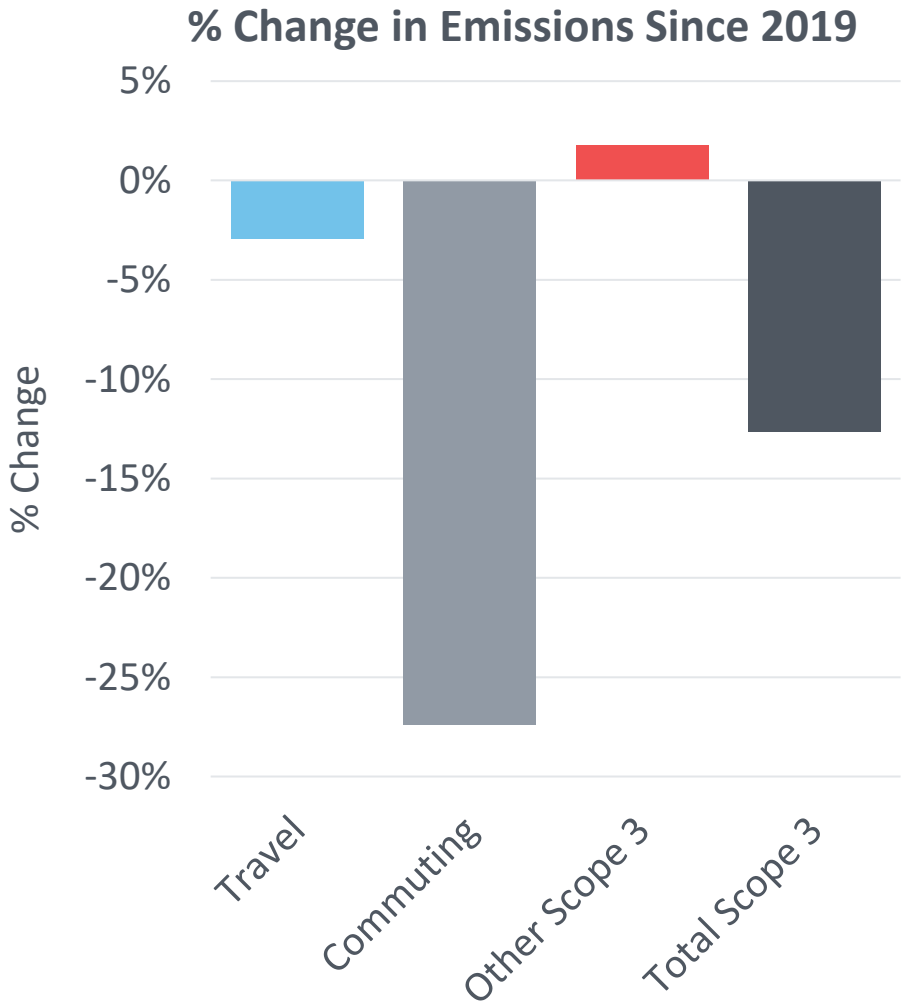
T&D Losses | Paper Emissions | Wastewater Emissions | Waste Emissions | Other Travel Emissions | Employee Commuting | Student Commuiting | Peer Average

Ordered by Density Factor

Scope 3 Emissions Increasing Over Time

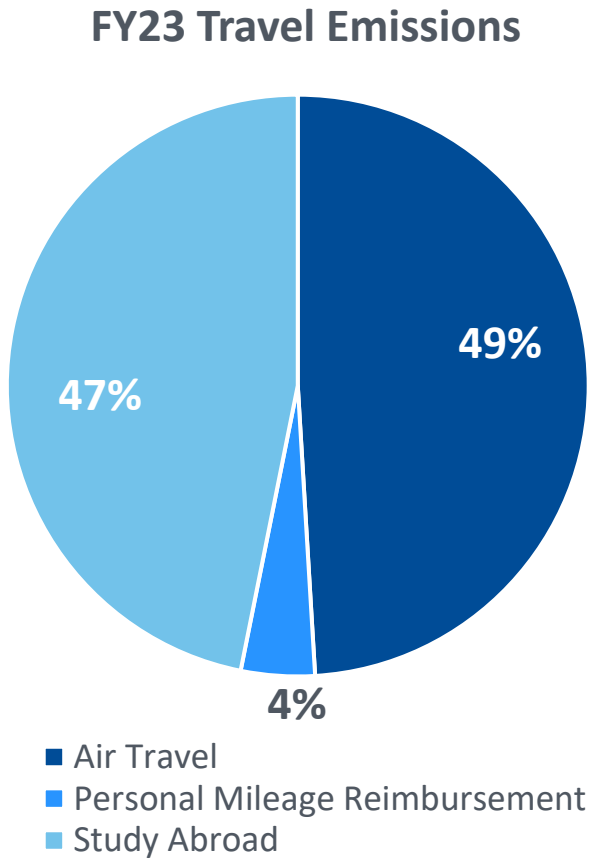
Compared to FY19, commuting and travel emissions are down a total of 30%

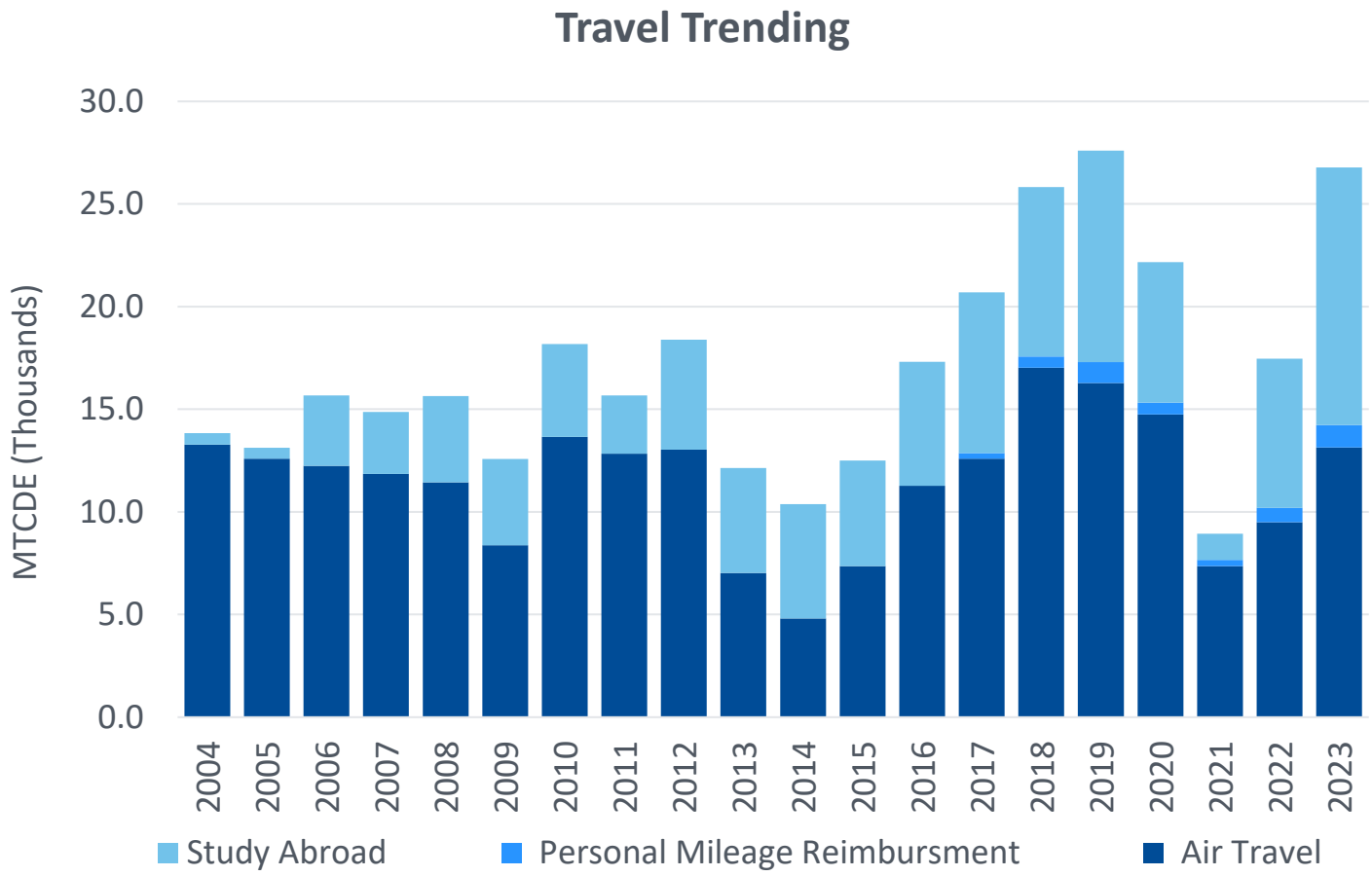




Emissions Increasing Over Time

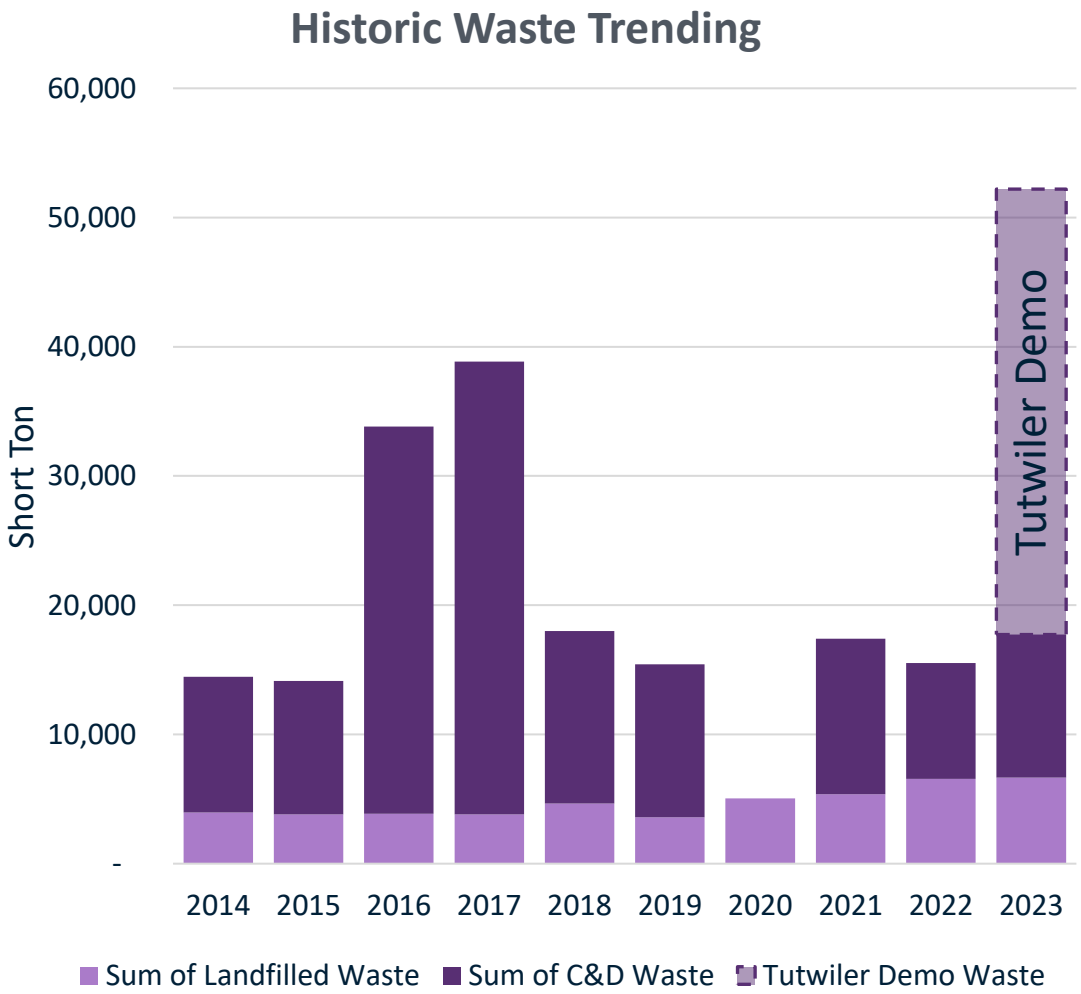
Study abroad reaches largest MTCDEs since 2004

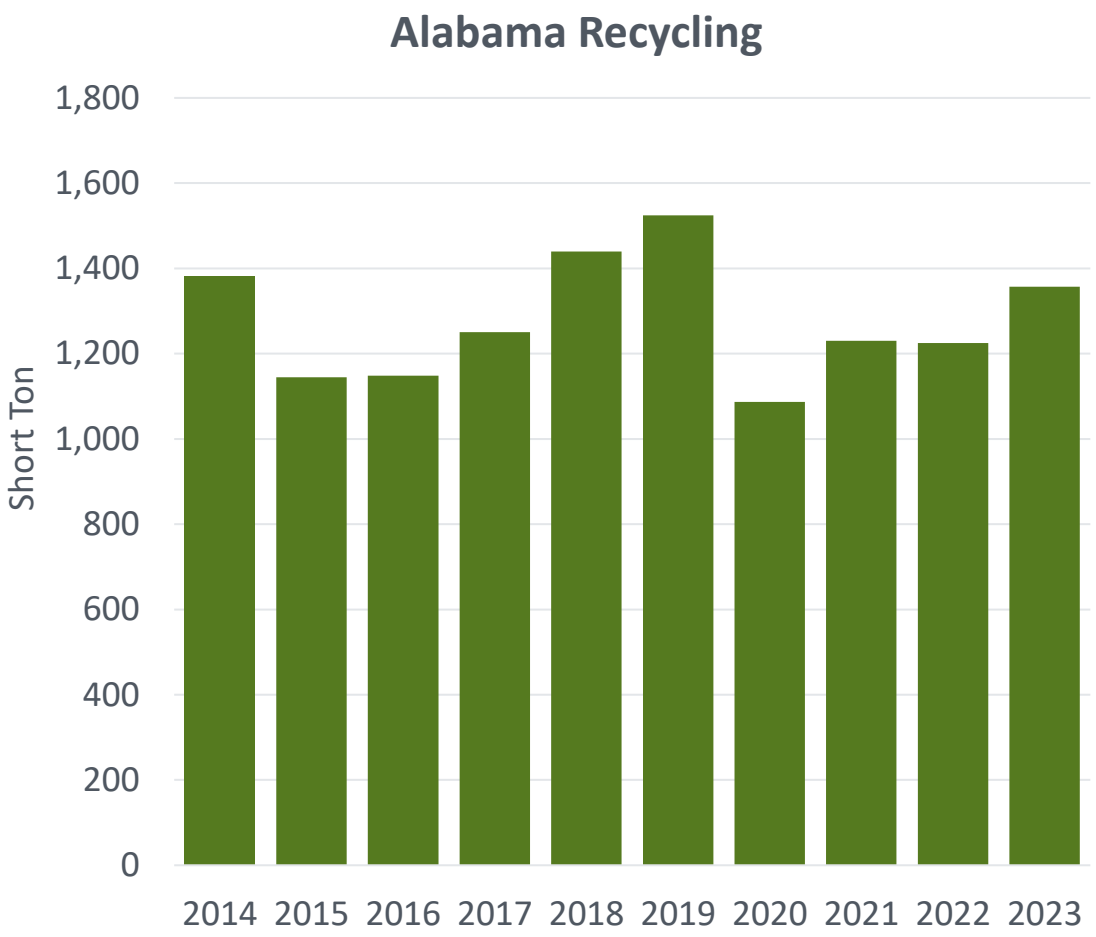




Measuring Campus Waste

Without Tutwiler Demo, waste trending resembles FY21



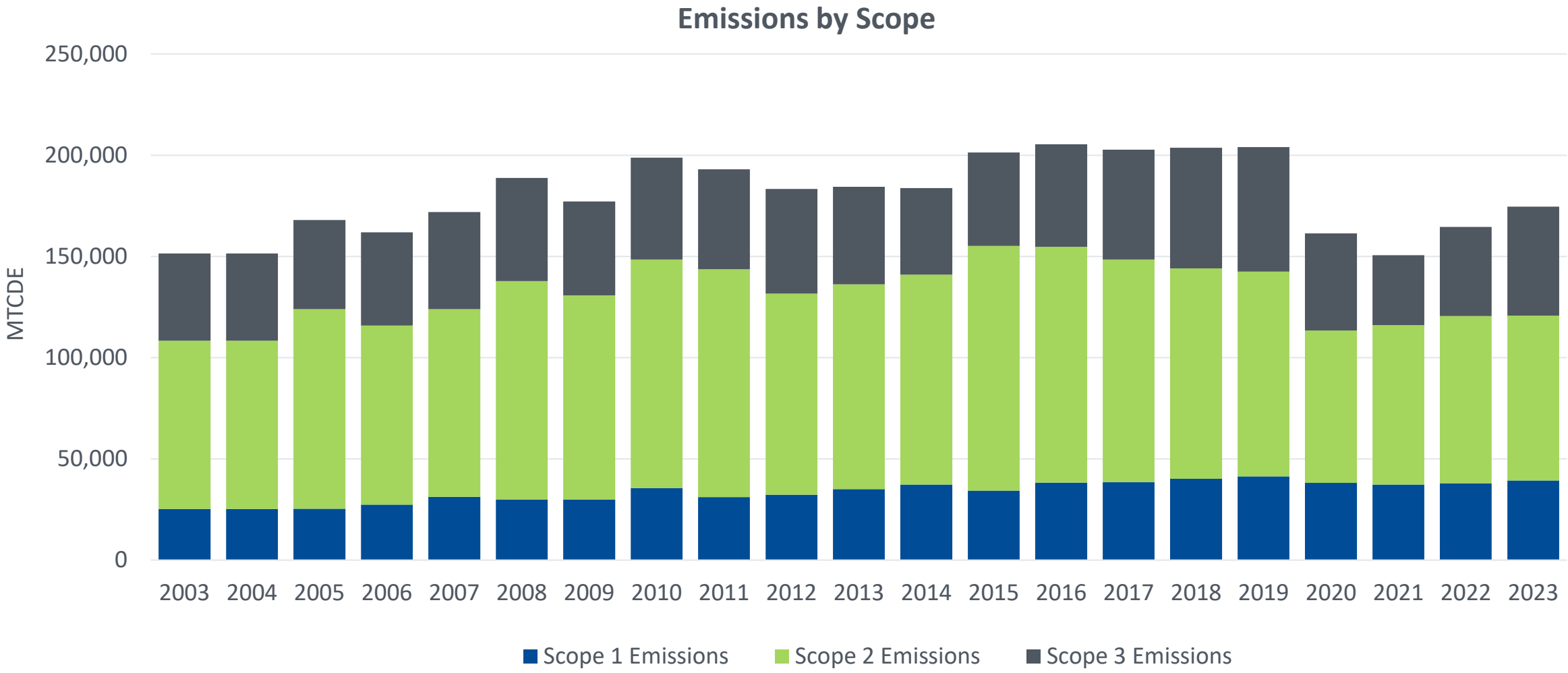


Tutwiler Demo: 11.8k tons debris; 33.7k tons reused

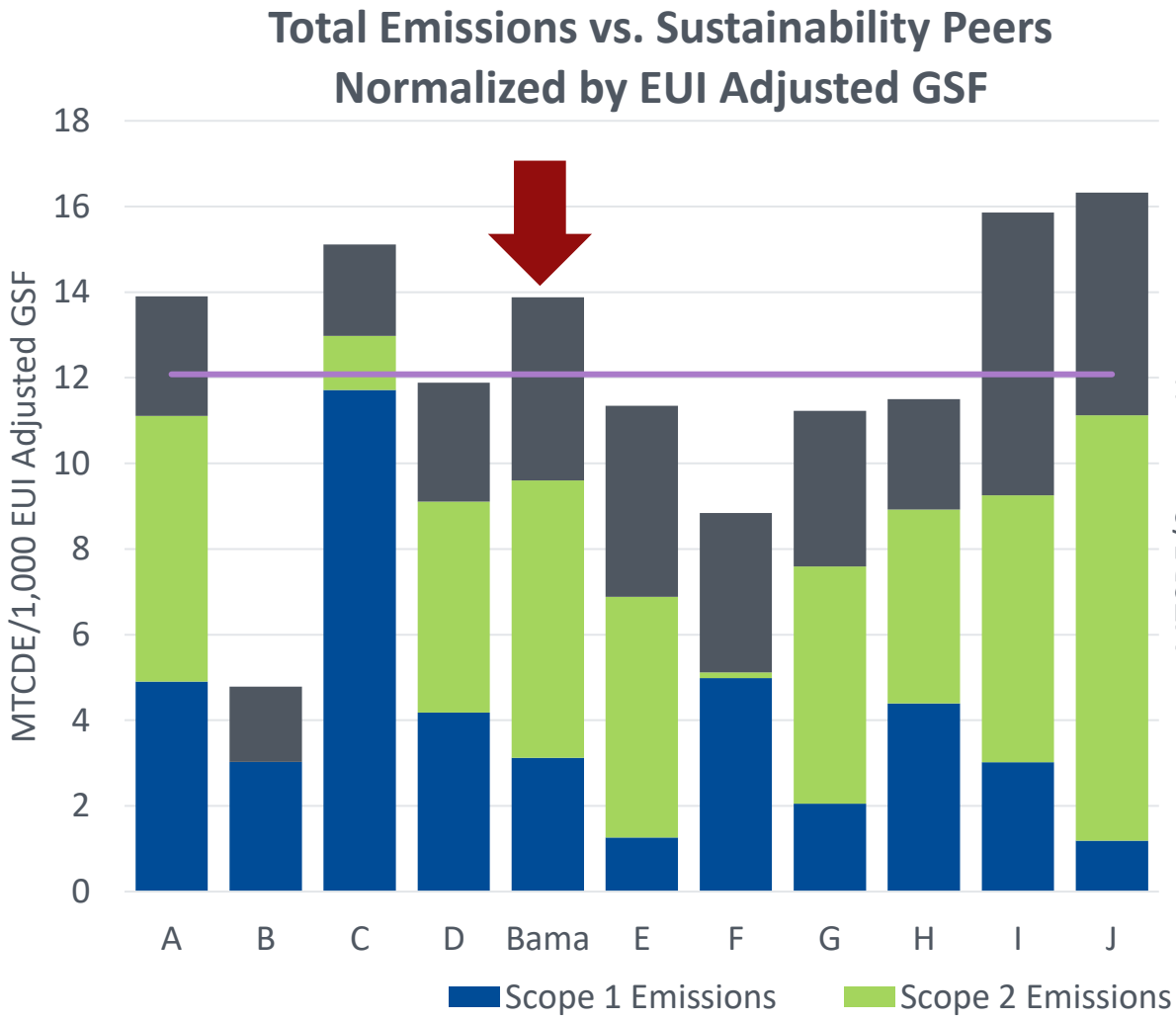
Total Emissions Profile

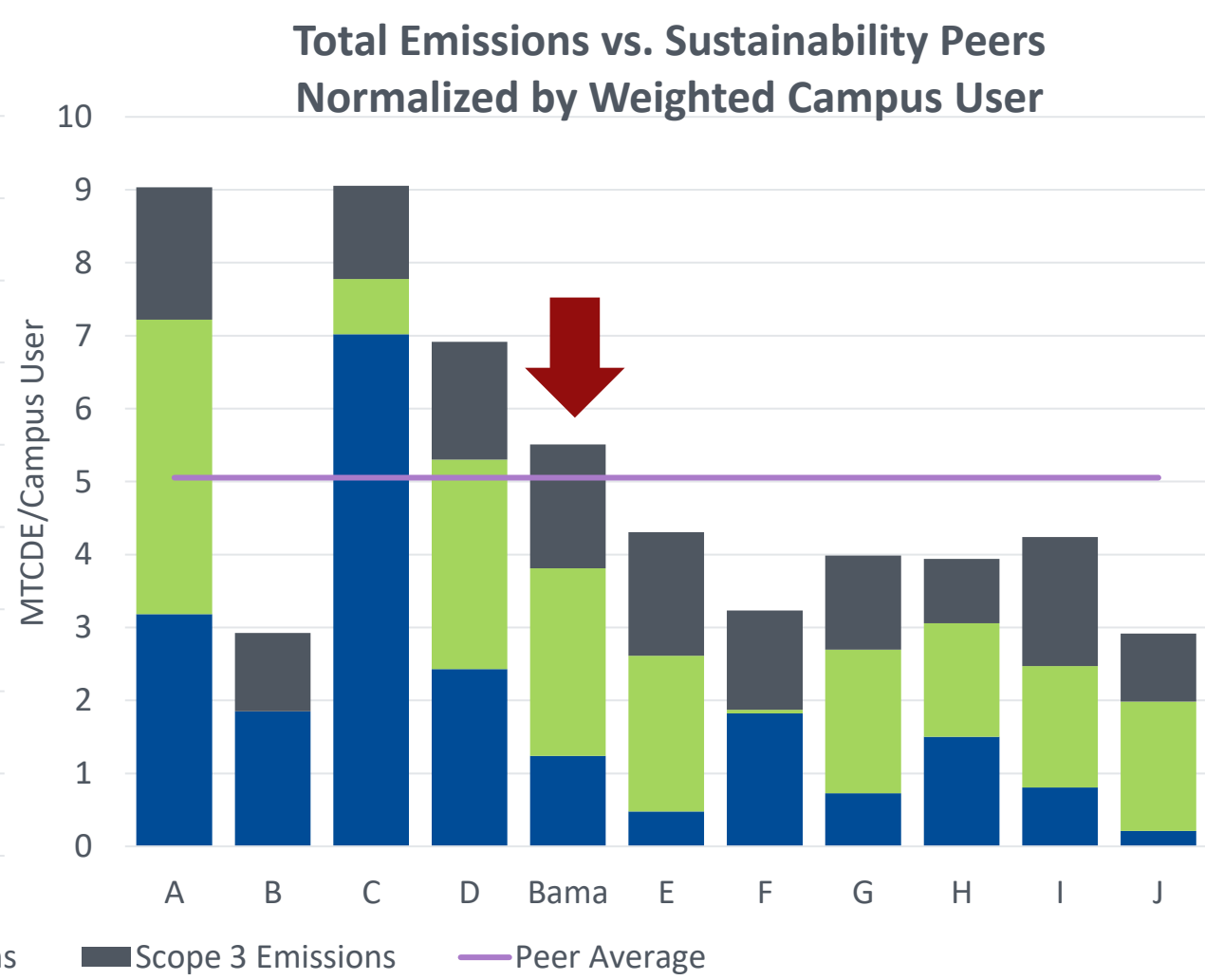
Longitudinal Tracking of Emissions by Scope

Despite having a fully operational campus post-COVID, total emissions are down 14% since FY19



Tracking Alabama's Total Carbon Footprint





Ordered by Density Factor

What's Next for Alabama Sustainability- Revisited

"To create a more sustainable tomorrow through research, teaching and promoting green initiatives and services within the University and surrounding communities."

Strategy at Alabama:

- *New Construction Design Standards*
- *Energy management strategies*

What are Alabama's short- and long-term sustainability goals?

Who does Alabama report those goals and progress to?

Tying Mission to Metrics- Revisited

Mission

The Office of Sustainability will create a more sustainable tomorrow through research, teaching and promoting green initiatives and services within the University and surrounding communities. We will focus on the importance of recycling, reducing consumption, educating others on the importance of sustainability and providing sustainable solutions while being more aware of our environment in our local community as well as regionally, nationally and globally.

***Reducing consumption** = evaluating our steam management policies, seeing fossil consumption/gsf reduce*

***Focusing on the importance of recycling** = ratio of recycled to landfilled waste*

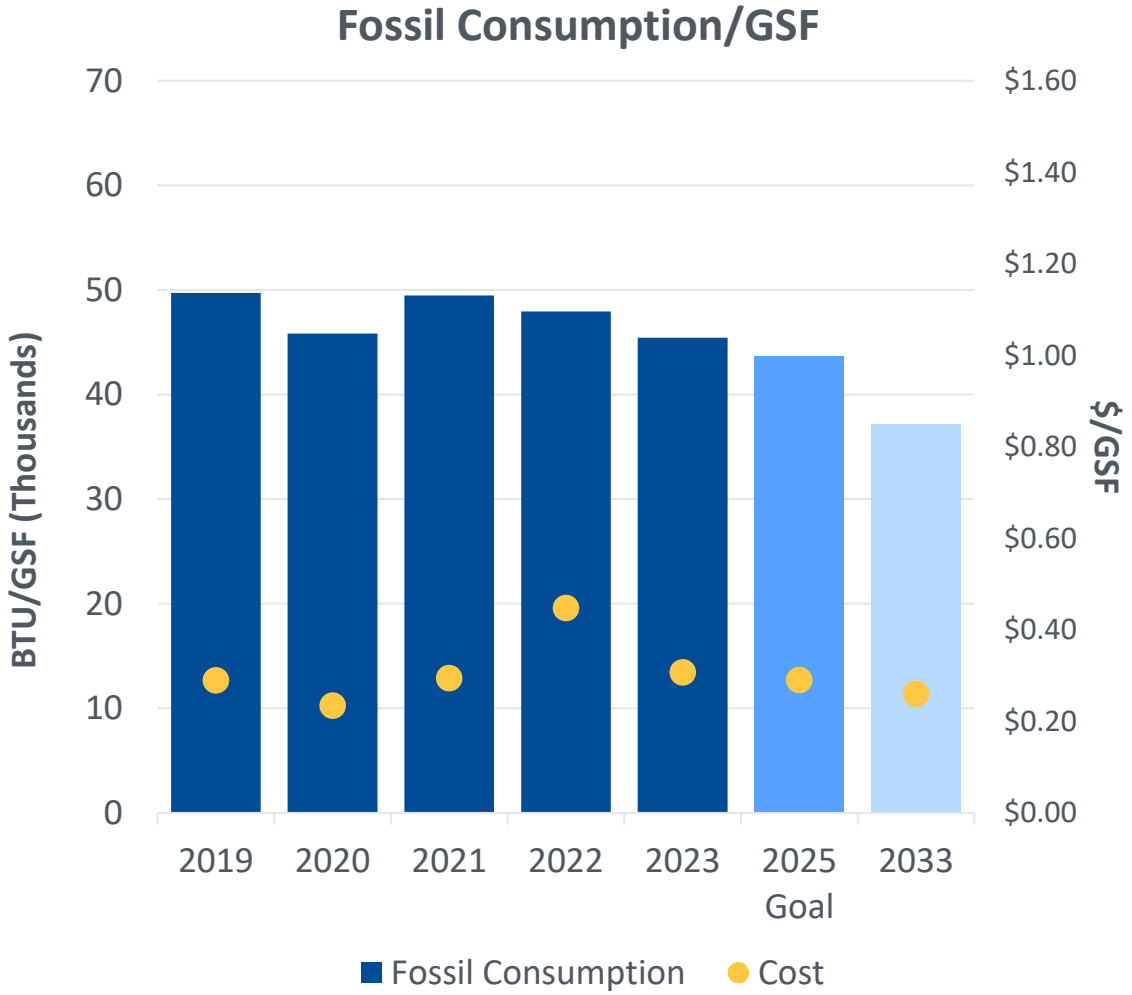
***Reducing consumption** = evaluating our energy policy, seeing electricity consumption/gsf reduce*

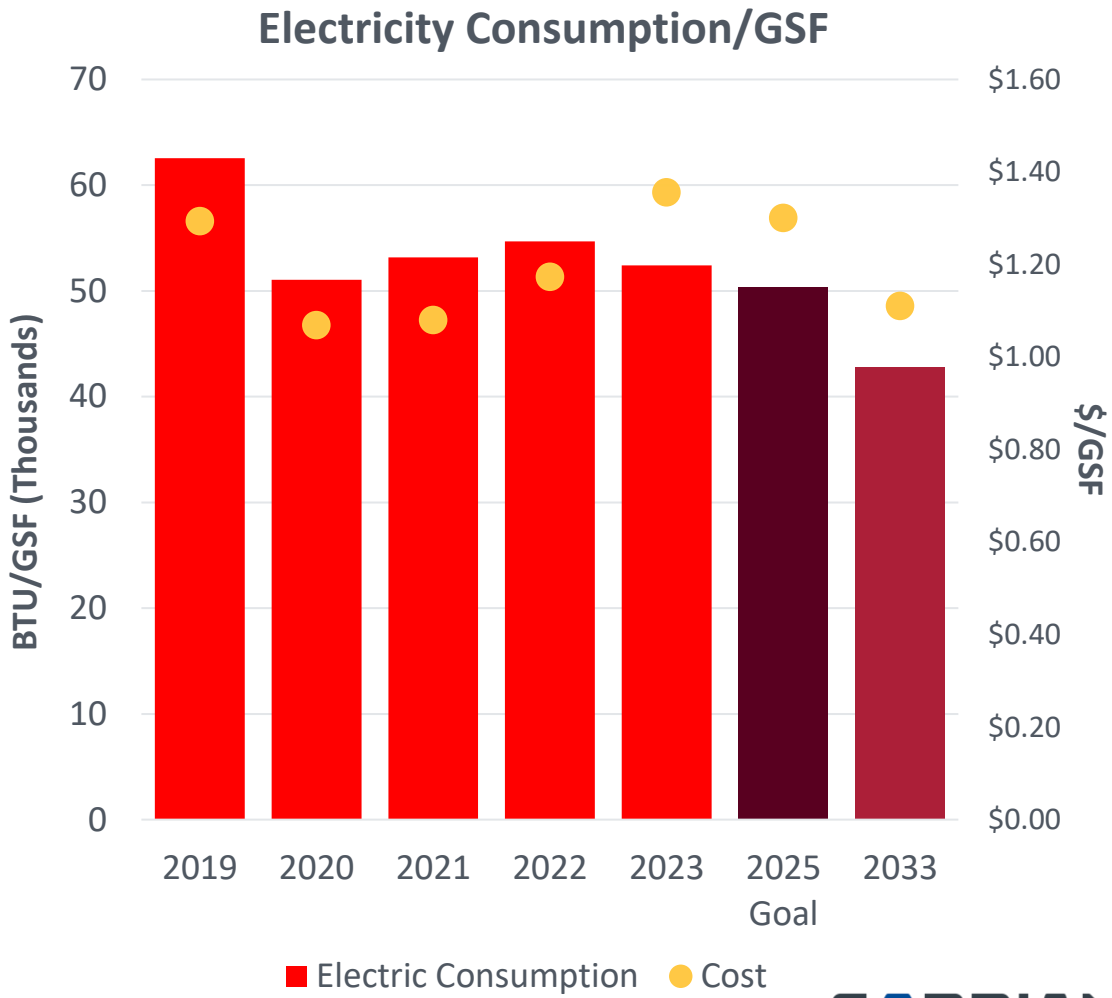
***Ensuring progress =** learn from building-level data in the past in order to inform future energy efficiency strategies.*

Mission taken from: http://sustainability.ua.edu/

Alabama Energy Goals: 2% Annual Decrease Through FY25

Projecting from FY23: Using FY23 unit costs and comparing to FY23 total cost, decreasing consumption by 2% annually through FY25 results in cumulative savings; Fossil: $250k, Electric: $1.1M





Alabama Energy Goals: https://uafacilities.ua.edu/energy-management/

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Building knowledge

Questions & Discussion

Appendix I: Glossary of Terms

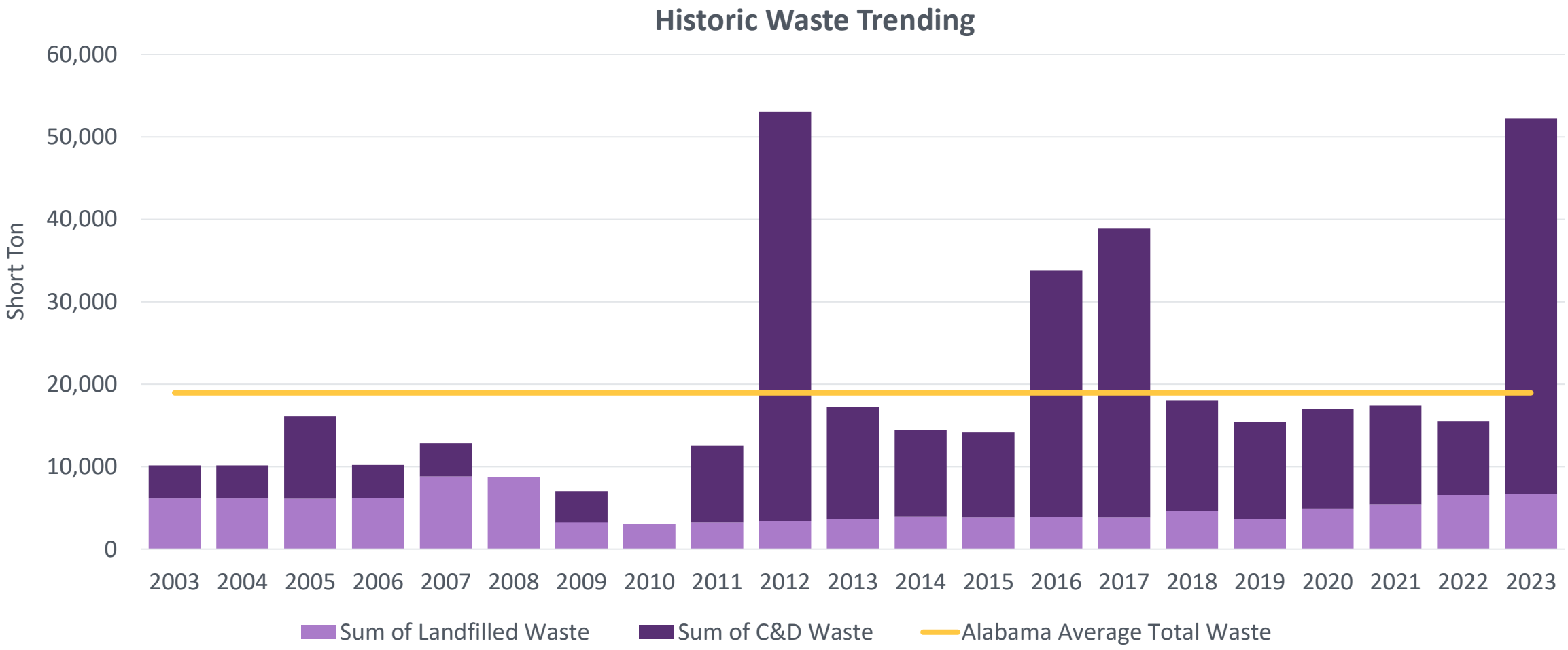
Glossary of Terms

- **Scope 1 (direct)** – Emissions from the power sources owned or controlled by the institution, including on-campus stationary fossil fuel sources; mobile sources, such as the vehicle fleet; and fugitive sources, such as refrigerants and fertilizer
- **Scope 2 (indirect)** – Indirect emissions from sources that are neither owned nor operated by your institution but whose products are directly linked to on campus energy consumption. This includes purchased energy: electricity, steam, and chilled water.
- **Scope 3 (indirect)** – Any other indirect emissions, including commuting by faculty, staff and students, air travel by faculty, paper, solid waste, wastewater, research animals and scope two transmission and distribution losses
- **Global Warming Potential (GWP)**- a relative measure of how much heat a greenhouse gas traps in the atmosphere. It compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide.
- **MTCDEs (Metric Tons of Carbon Dioxide Equivalent)**- The carbon footprint is reported in metric tons of carbon dioxide equivalents (CO2e)5. This measure includes all six greenhouse gases, which are converted to CO2e based on their 100-year global warming potential
- **Density Factor-** A measure of the amount use the campus buildings receive on a daily basis/The number of campus users per 100,000 GSF
- **Technical Complexity-** the relative mechanical complexity of the campus on a scale of 1-5

Appendix II: Additional Slides

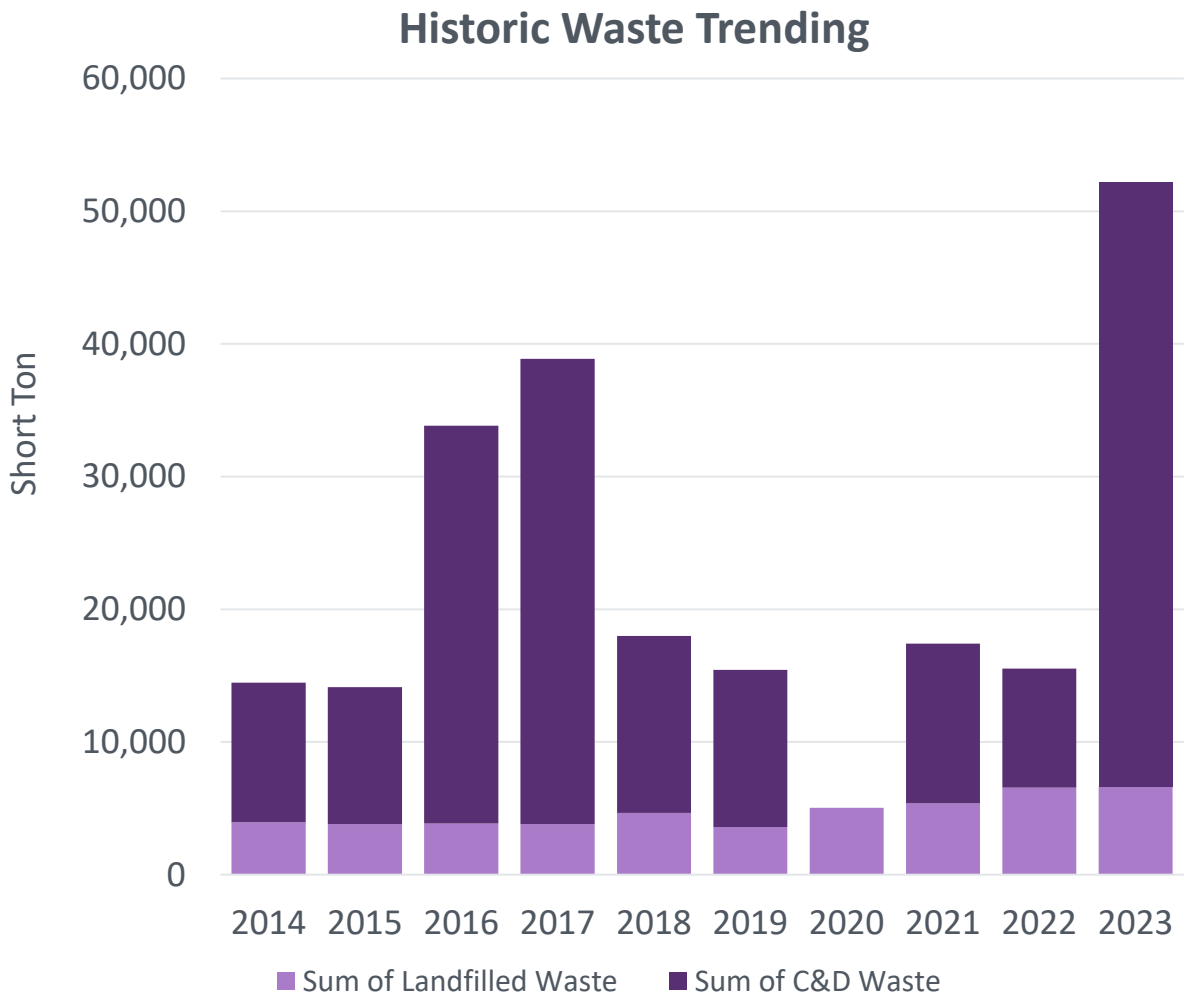
Measuring Campus Waste

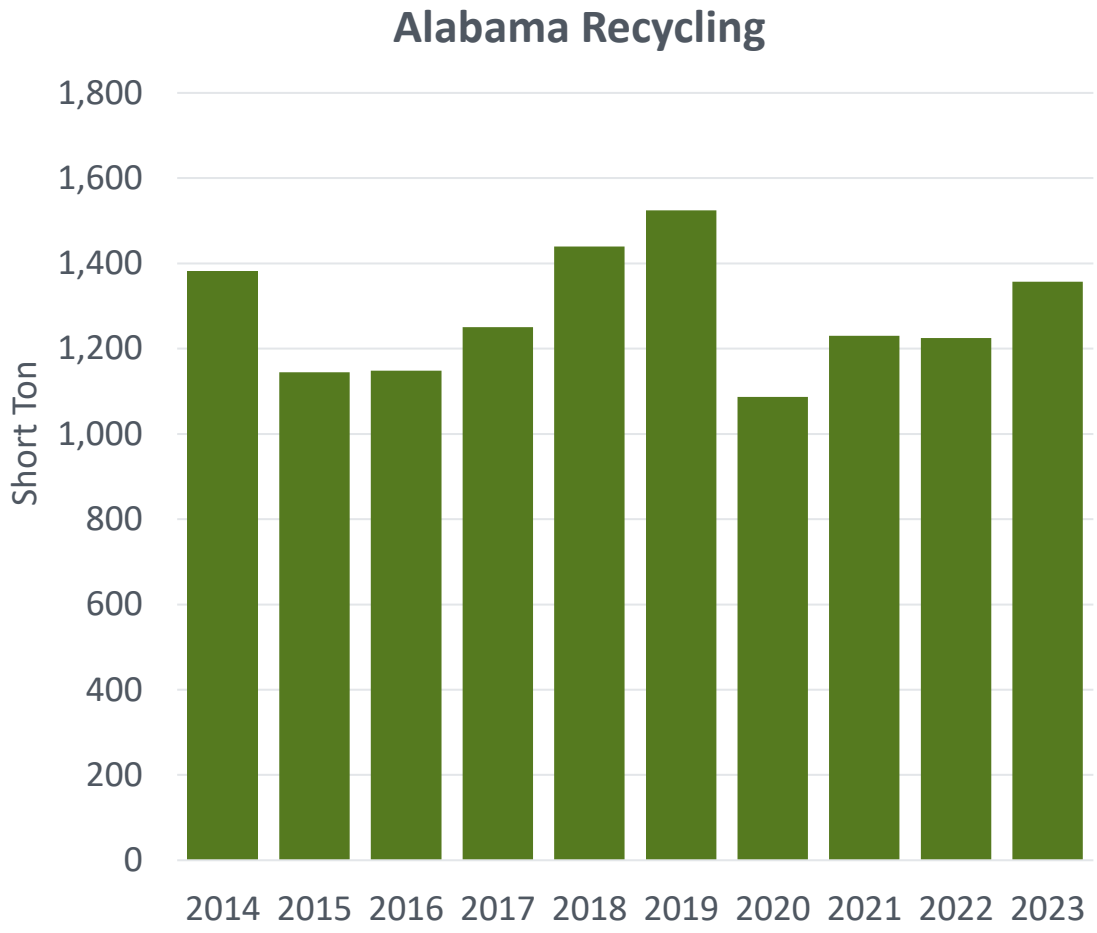
C&D waste sees significant increase in FY23



Measuring Campus Waste

Waste increases significantly since 2019 while recycling decreases by 11%





Tutwiler Demo: 11.8k tons debris; 33.7k tons reused