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University of Texas - Rio Grande Valley

FY20 Sustainability Benchmarking Analysis

March 2021

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

Emissions Sources at UTRGV

Scope 1:
From sources owned or controlled by UTRGV

- On-Campus Stationary
- Vehicle Fleet
- Refrigerants
- Agriculture

Scope 2:
From the generation of electricity purchased by UTRGV

- Purchased Electricity

Scope 3:
From sources not directly controlled by UTRGV

- Directly Financed and Study Abroad Travel
- Waste and Wastewater
- Student, Faculty, and Staff Commuting
- Paper Purchasing
- Transmission and Distribution Losses

Increasingly Difficult to Control and/or Mitigate

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Impact of COVID-19 on Sustainability Goals

Scope 1

From sources owned or controlled by UTRGV

- Less demand on campus buildings when classes went remote **decreased stationary fuel**
- Less staff on campus **decreased fleet fuel** consumed

Scope 2

From the generation of electricity purchased by UTRGV

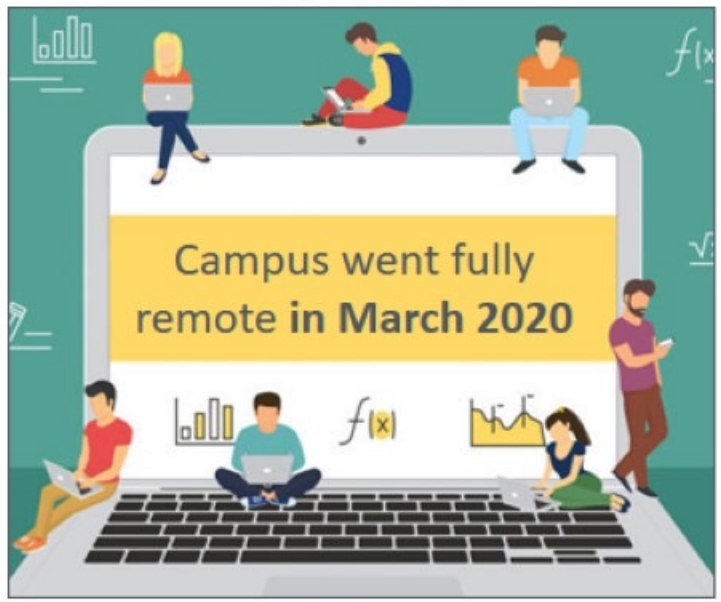
- Less demand on campus buildings when classes went remote

Scope 3

From sources not directly controlled by UTRGV

- Implementation of remote learning **decreased weeks commuting, decreased waste,** and **decreased paper purchased**
- COVID-19 **decreased employee/student travel** in Spring 2020

Nearly 1/2 of the fiscal year was impacted by Covid-19:



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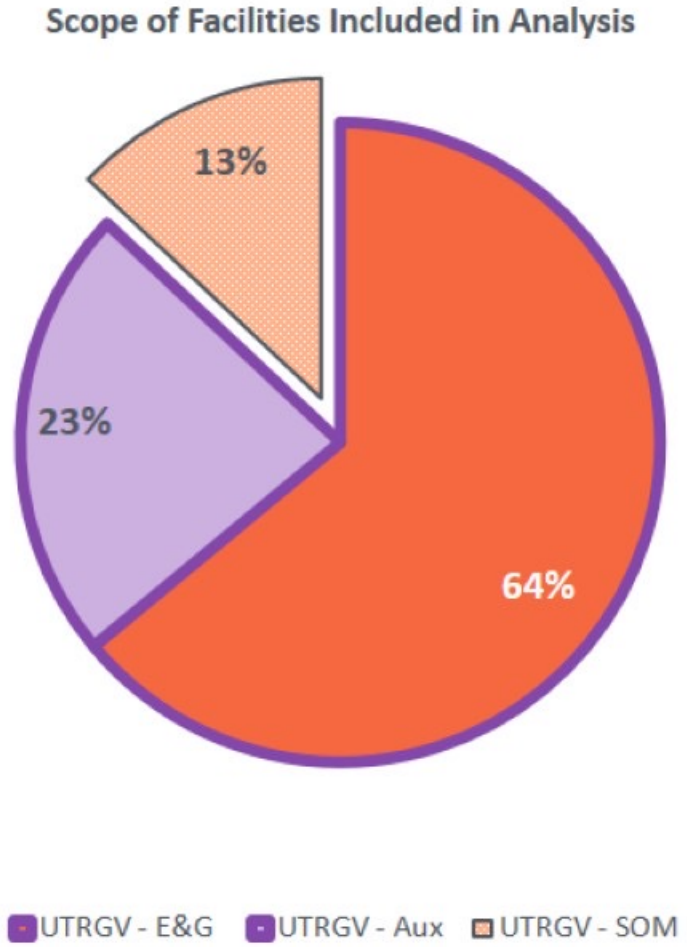
Scope of Analysis & Meeting Agenda

FY20 analysis is focused on all E&G and Auxiliary Space; excludes medical school



Scope 1

- Despite increases in fossil fuel over past several years due to new construction, FY20 saw a 9% decrease. Fuel consumption is well below peers.
- Fleet Fuel decrease of 19% is driven by less need for bus ridership on campus.

Scope 2

- Electricity consumption stayed steady from FY19 to FY20, and is highest amongst all peers.

Scope 3

- Reduction in emissions is seen in all components of scope 3 with the exception of wastewater.
- Commuting survey gives insight on the commuting habits of campus users pre and post-Covid, which shifts from primarily drive alone to carbon free.

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Vocabulary Used Throughout Presentation

Sightlines' Partnership with SIMAP Includes Updated Tracking Standards

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

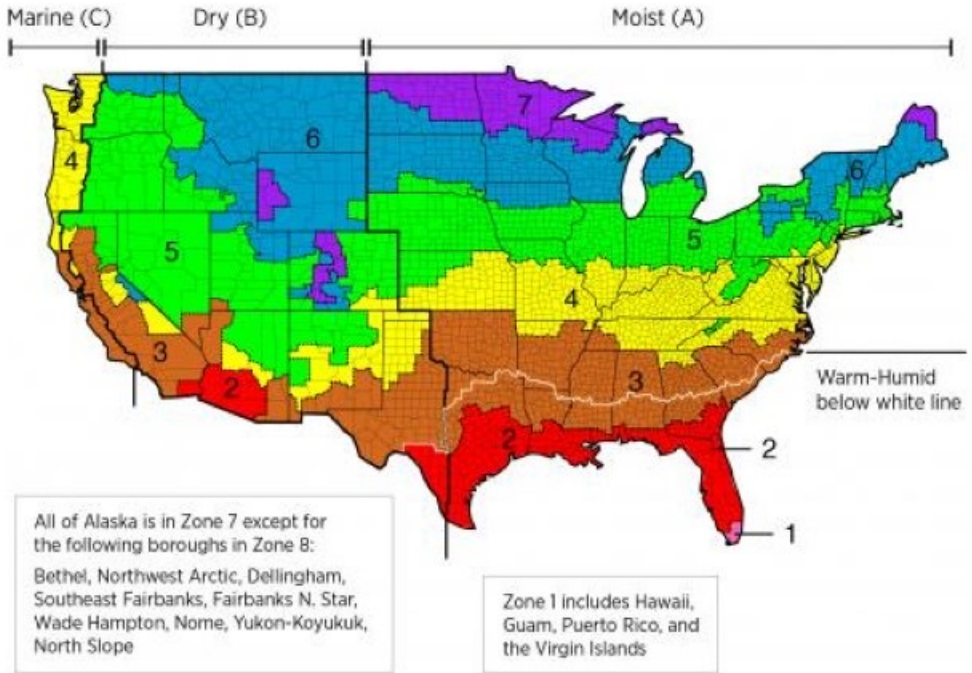
The Weighted Campus User metric is used more widely in campus sustainability in order to give more credence to onsite residents, and the energy use they require by being onsite full-time.

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

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

Sustainability Peer Comparison Group



Institution	GSF Range	Climate Zone	Enrollment Range
Arizona State University	Over 10M	3	Over 20,000
Clemson University	5-10M	3	Over 20,000
Texas A&M University	Over 10M	2	Over 20,000
★ The University of Arizona	5-10M	3	Over 20,000
The University of Alabama	Over 10M	3	Over 20,000
★ University of Arkansas	5-10M	3	Over 20,000
★ University of Tennessee	Over 10M	4	Over 20,000

Sustainability Solutions Measurement and Analysis Members

- Sightlines has approximately 50 Sustainability Solutions Members
- Approximately two-thirds are private
- Approximately two-thirds have signed the Carbon Commitment
- Approximately forty percent are Charter Signatories

Peer Group Based On

Institution Size

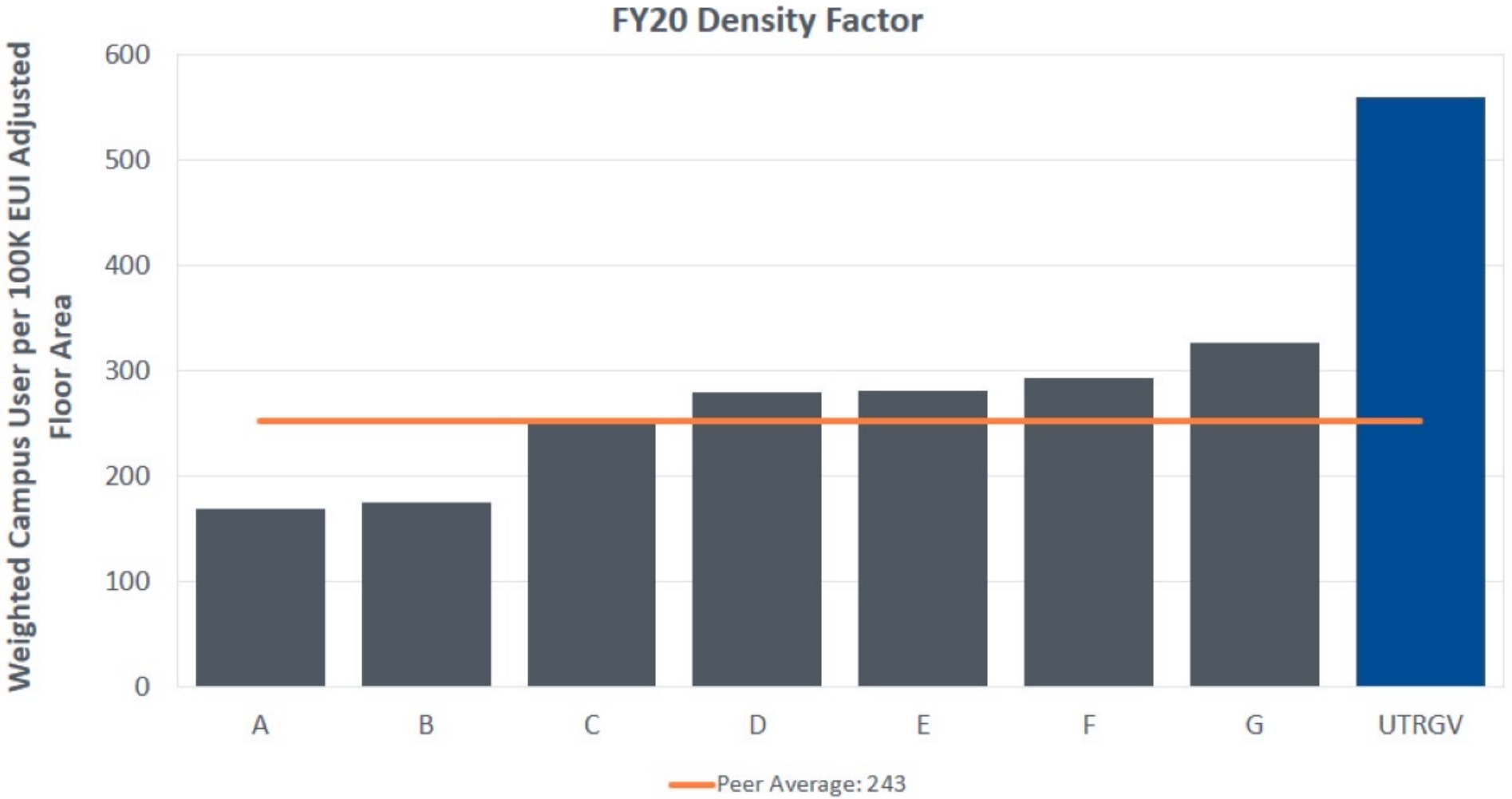
Technical Complexity

Climate Zone

Removed:
Towson, University of Chicago, University of Denver, University of San Diego, Virginia Commonwealth University

Physical Drivers: *Density Factor Compared To Peers*

UTRGV's high density factor continues to impact sustainability efforts



Density Factor Impacts:

- *Daily Operating Costs*
- *Maintenance & Custodial Operations*
- *"Wear and Tear" on Space*
- *Capital Replacement Timelines*

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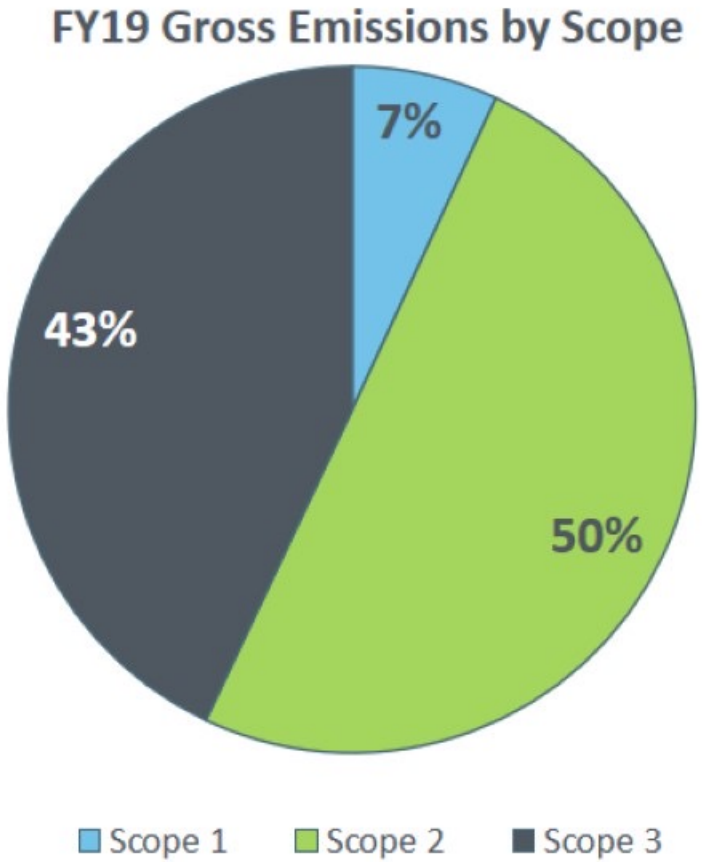
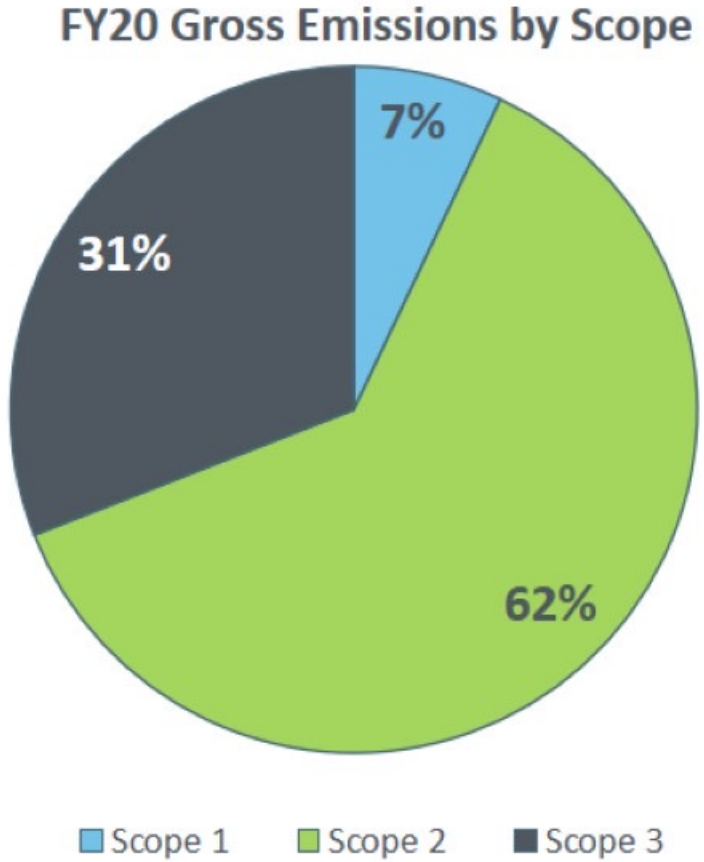
UTRGV Footprint Overview

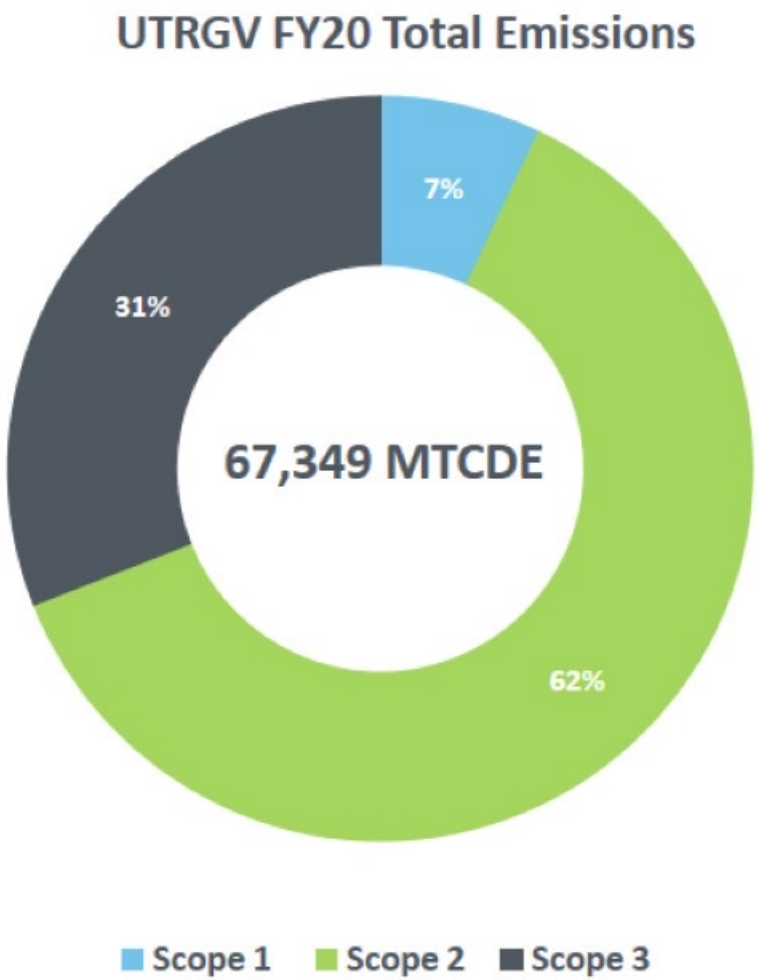
Distribution of Emissions Shift in FY20

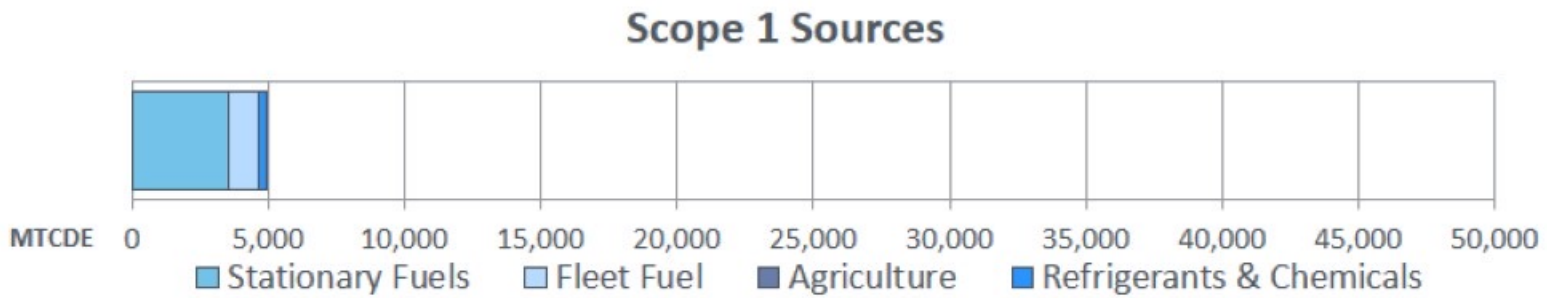
Less scope 3 emissions in FY20 compared to previous years

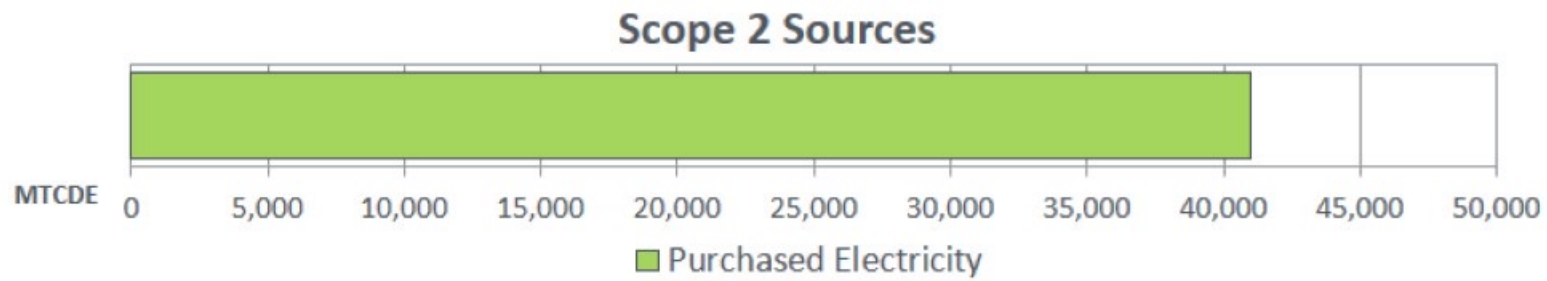


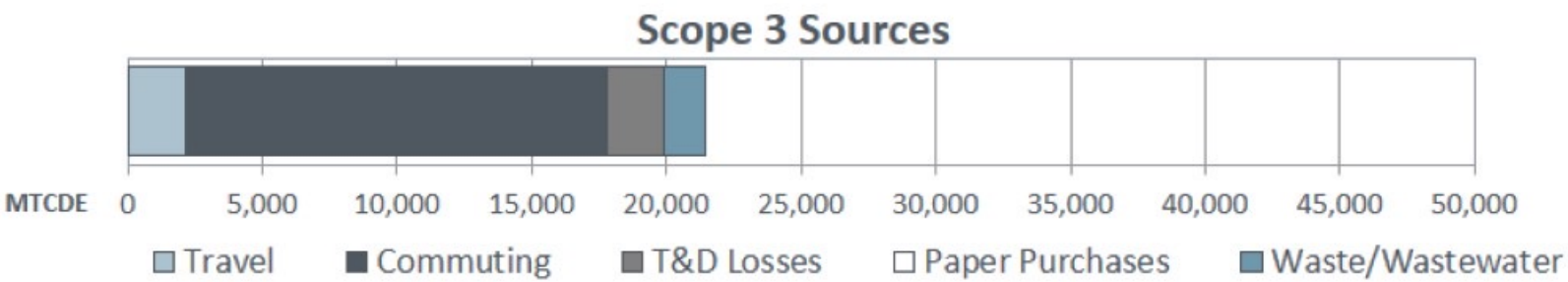


FY20 Reported Emissions Profile at UTRGV



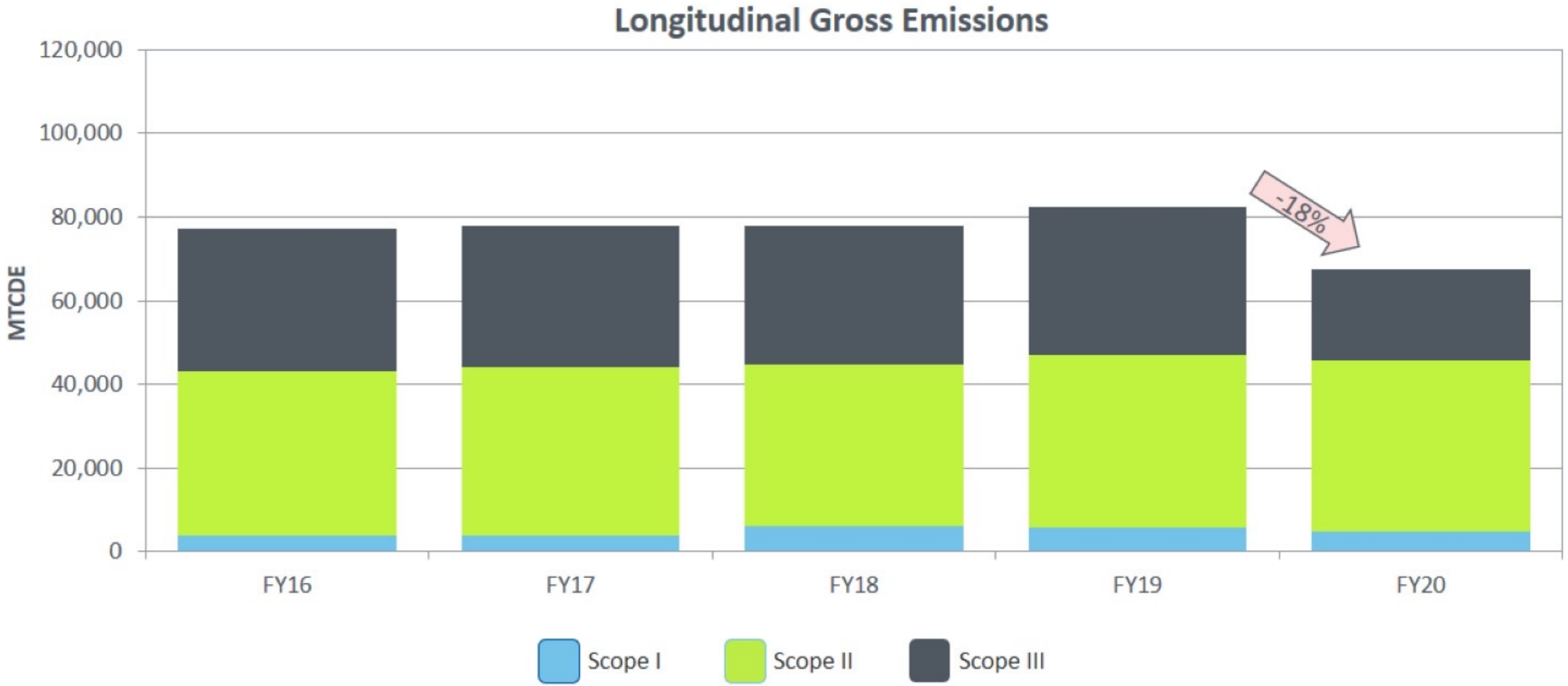






Total Emissions over Time at UTRGV

18% reduction in emissions from FY19 to FY20 primarily driven by Covid-19



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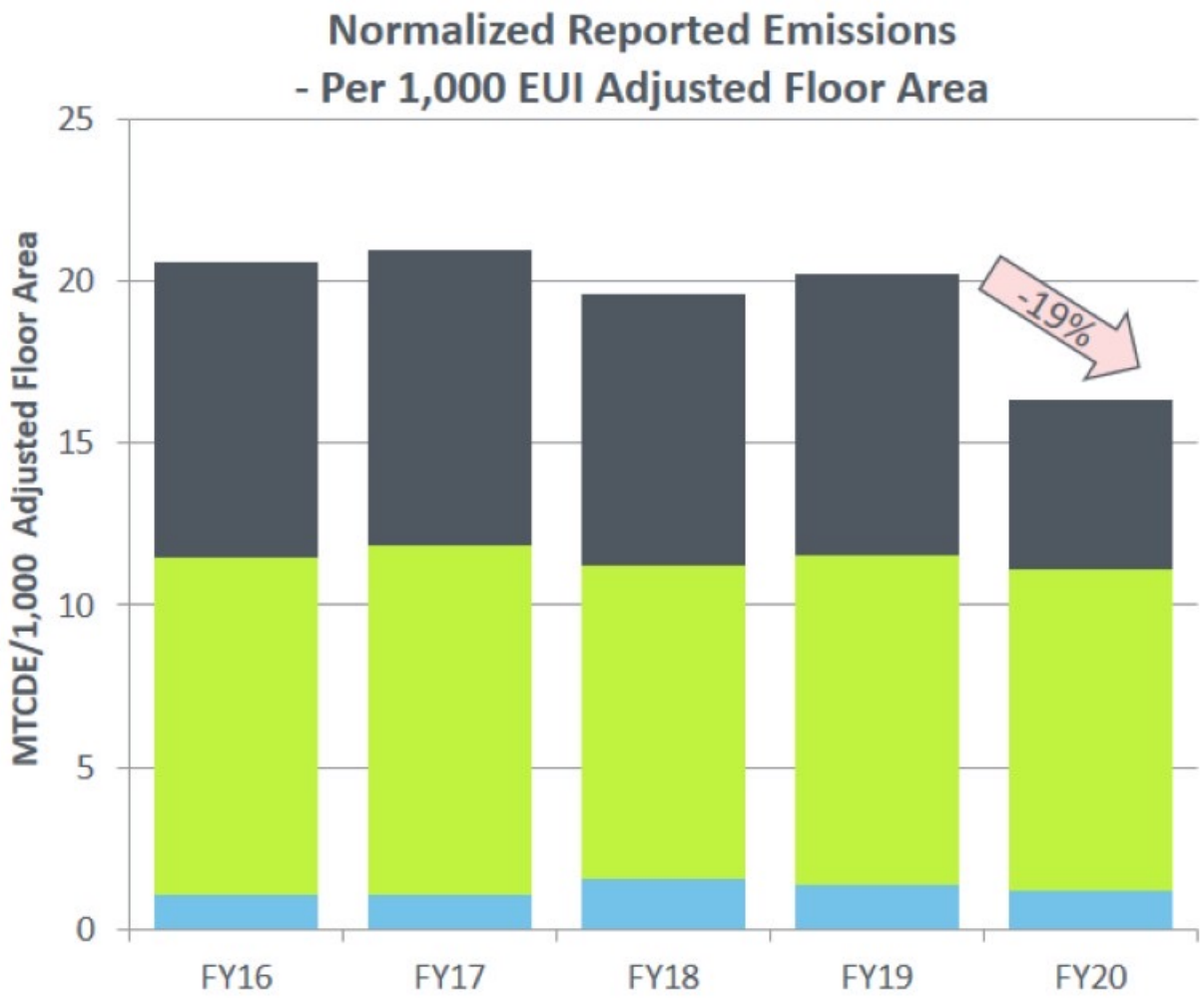
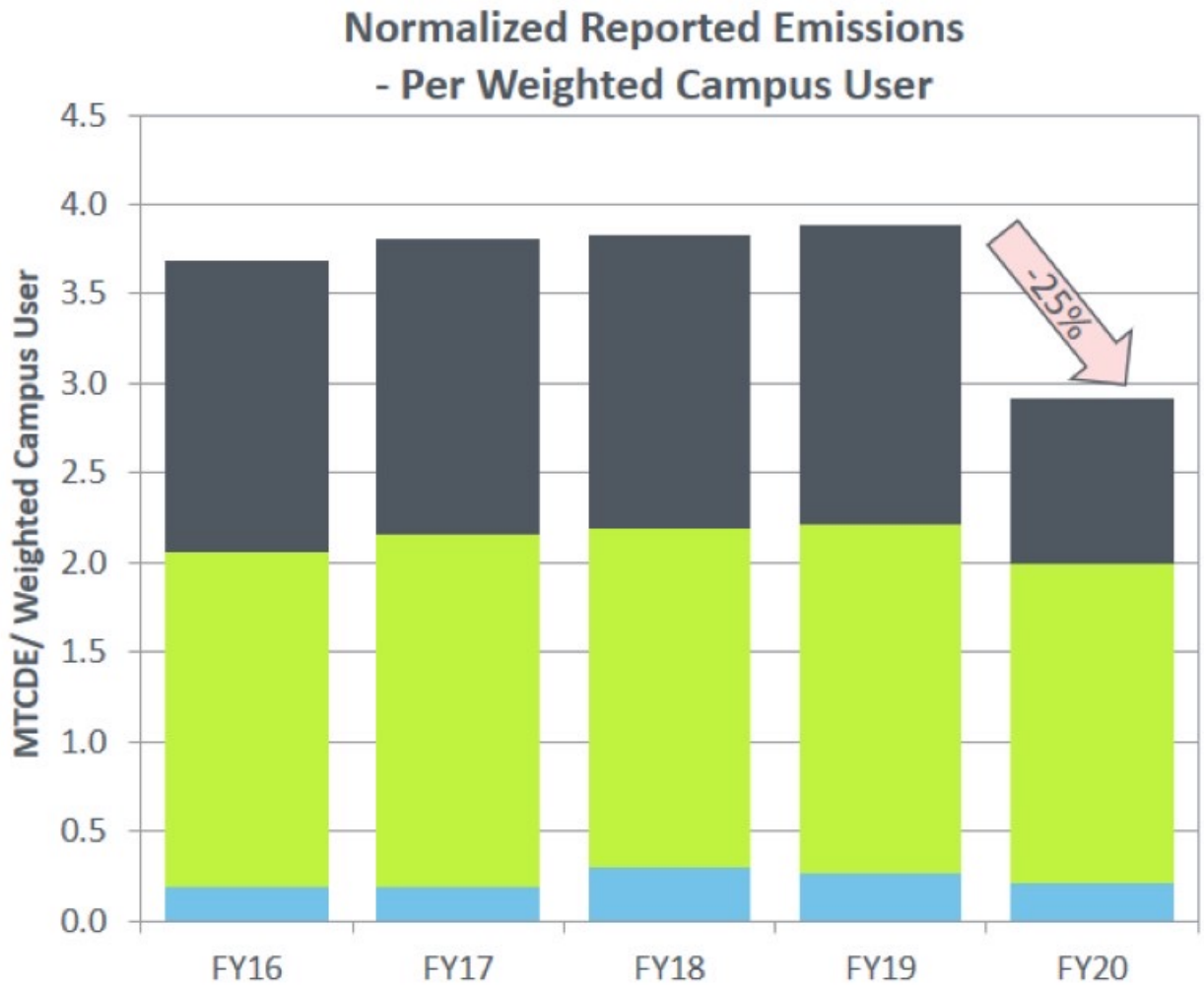
Normalized Emissions Follow Similar Trend as Total Emissions

With UTRGV's high density, MTCDE/Campus User is less than when normalized by campus footprint





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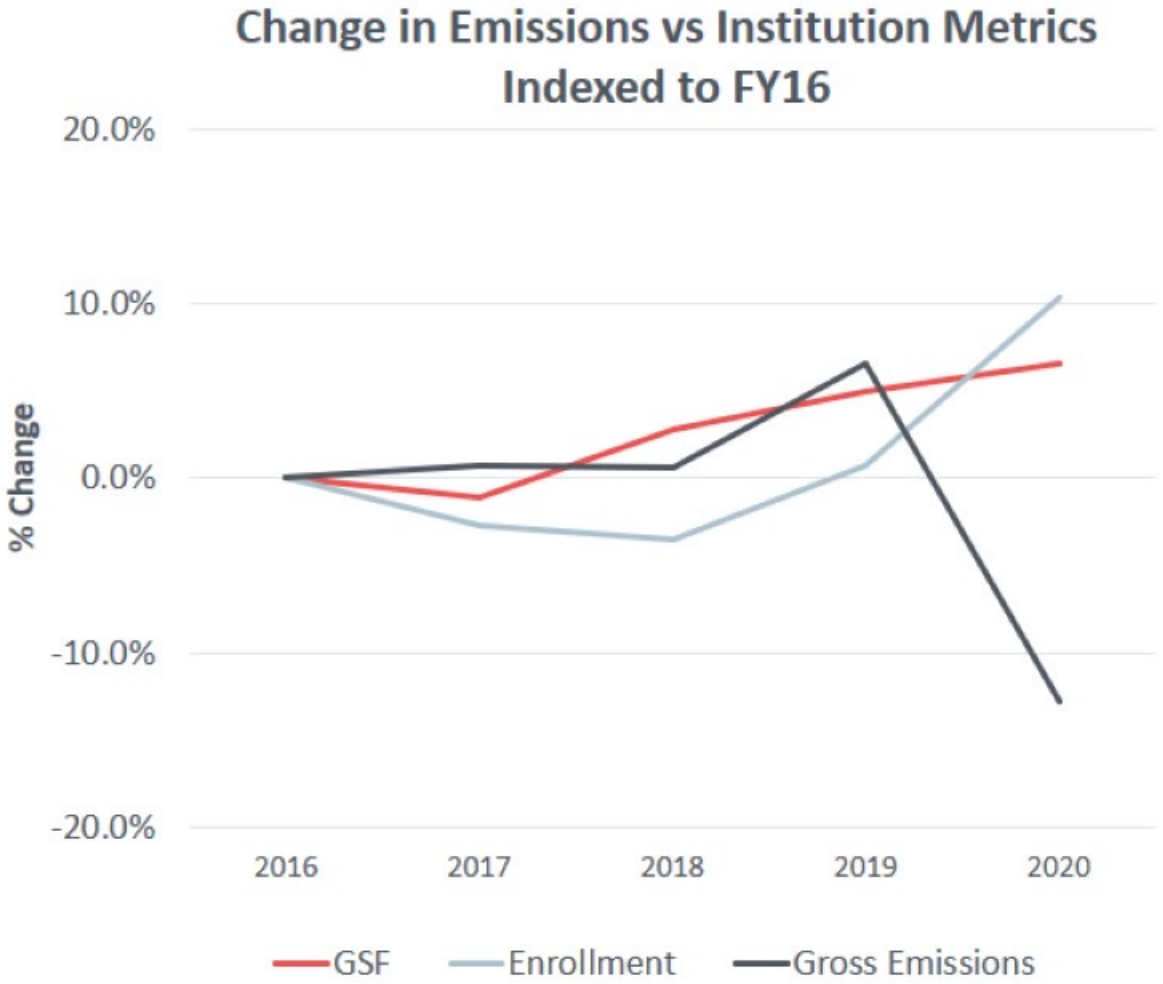
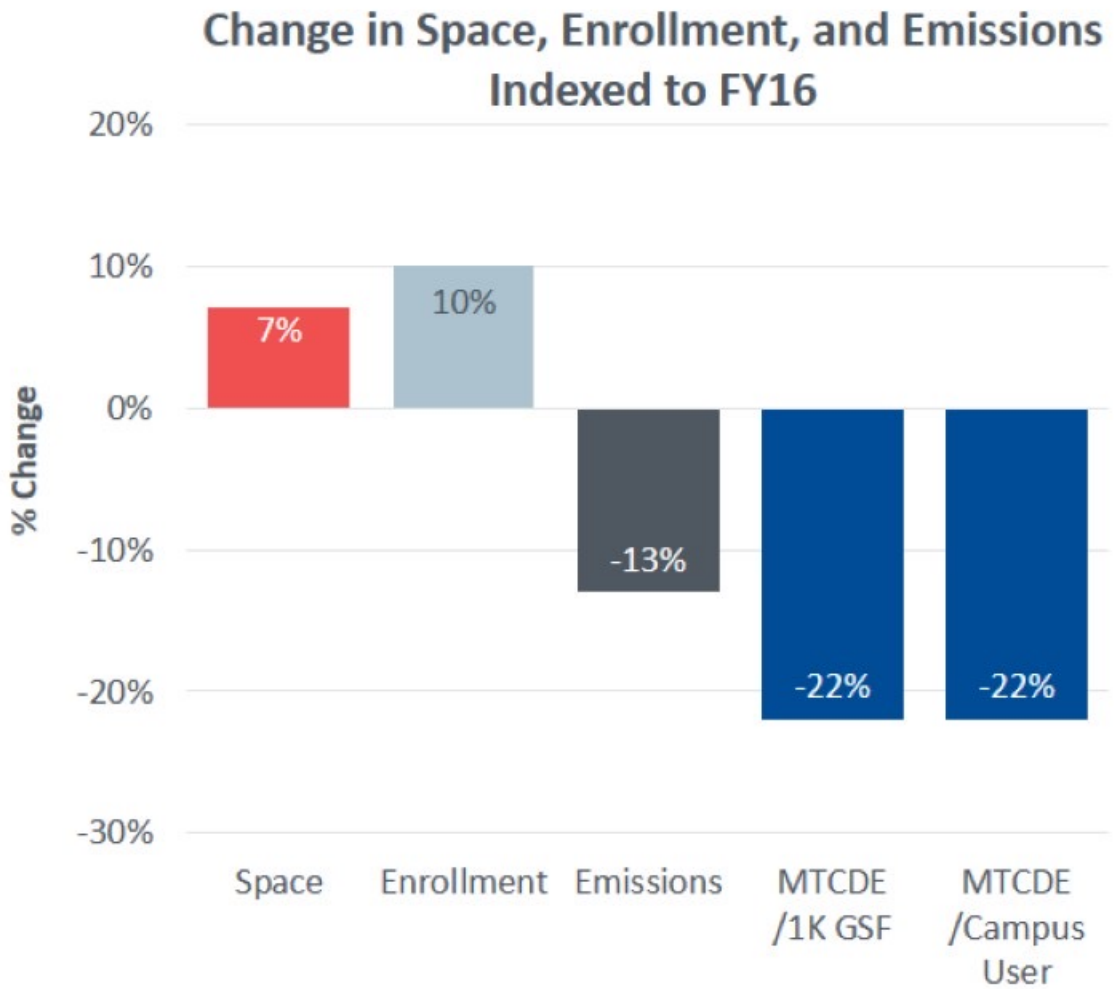
Scope I Scope II Scope III

Comparing Changes in Gross Emissions to Changes on Campus

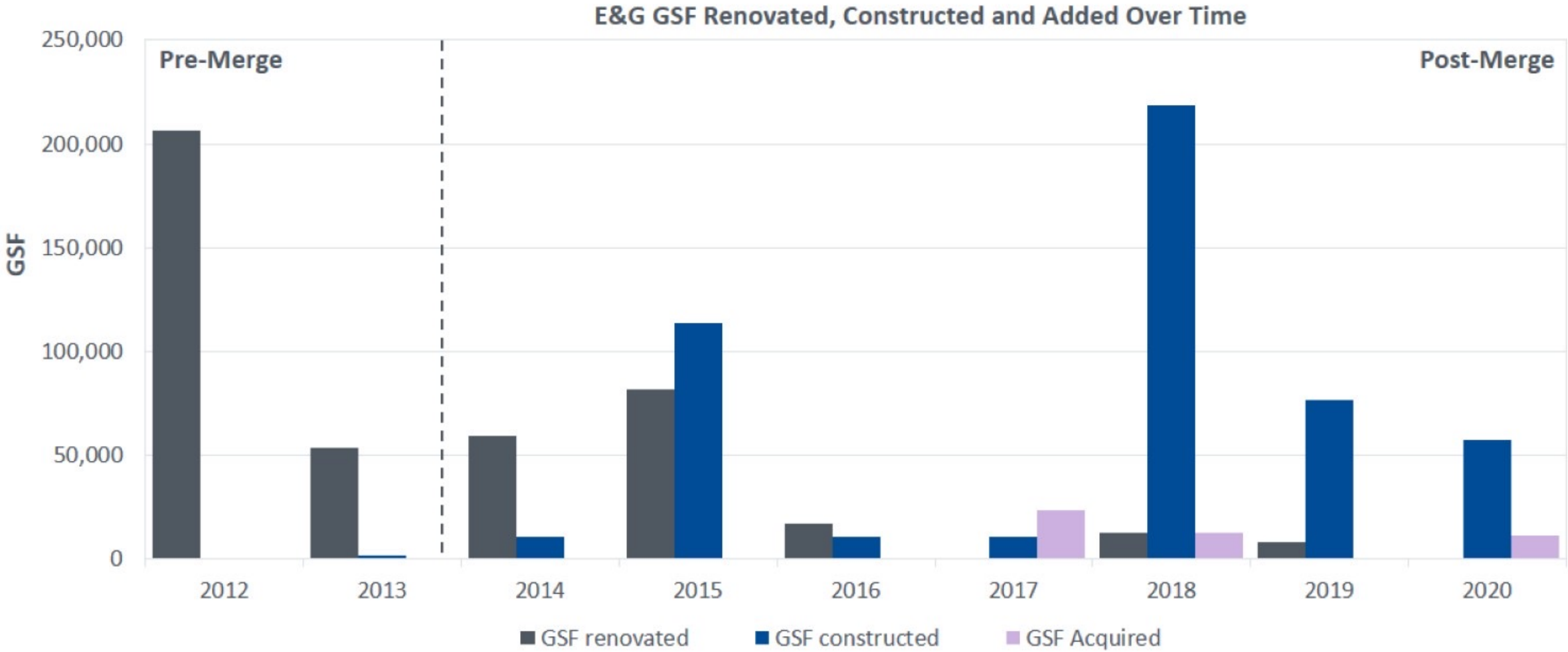
Space has increased by 7% since 2016; emissions increased in conjunction until FY20 with the Covid-19 impact





UTRGV Focusing More Heavily on New Construction in Recent Years

New construction typically has higher technical complexity, which often is more energy intensive



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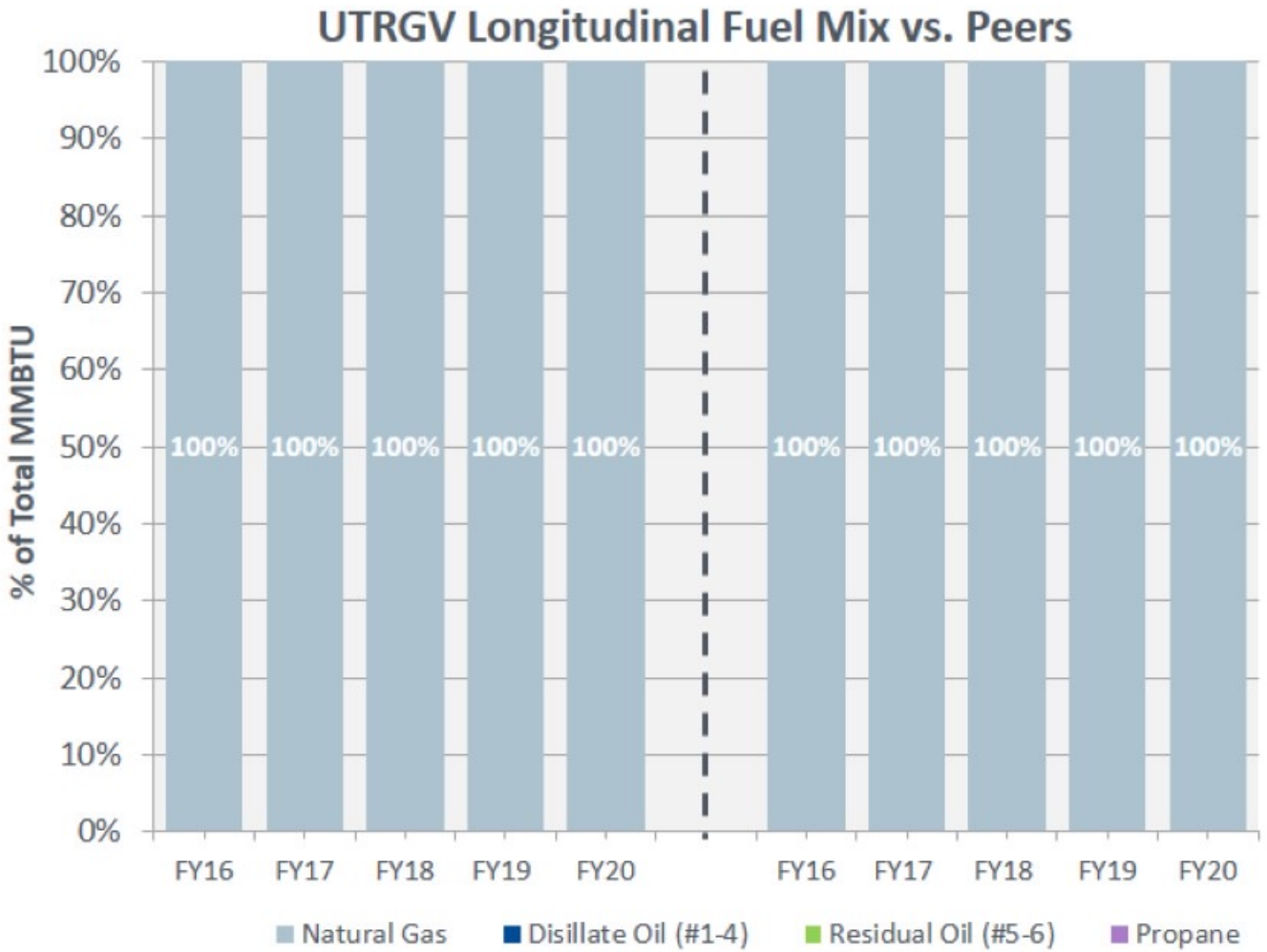
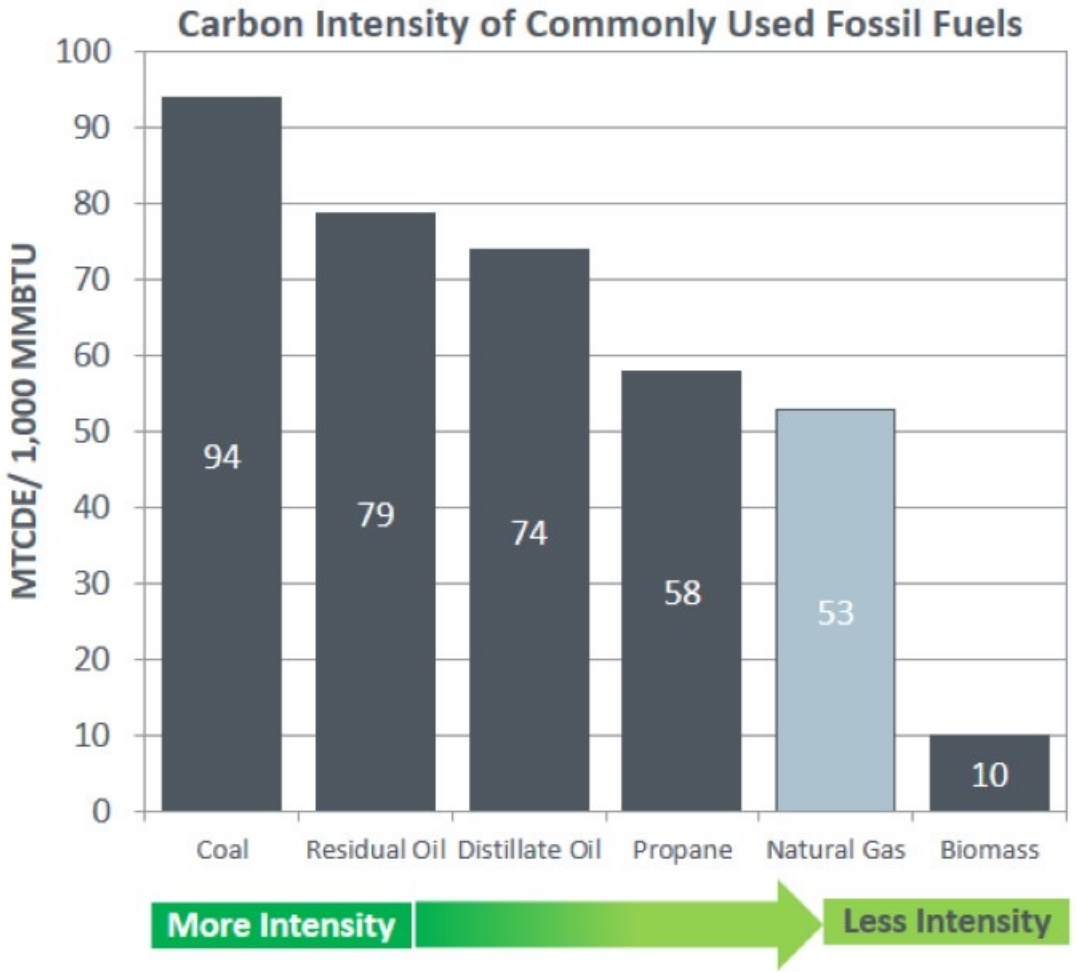
Scope 1

UTRGV Benefits From Using Natural Gas as Stationary Fuel Source

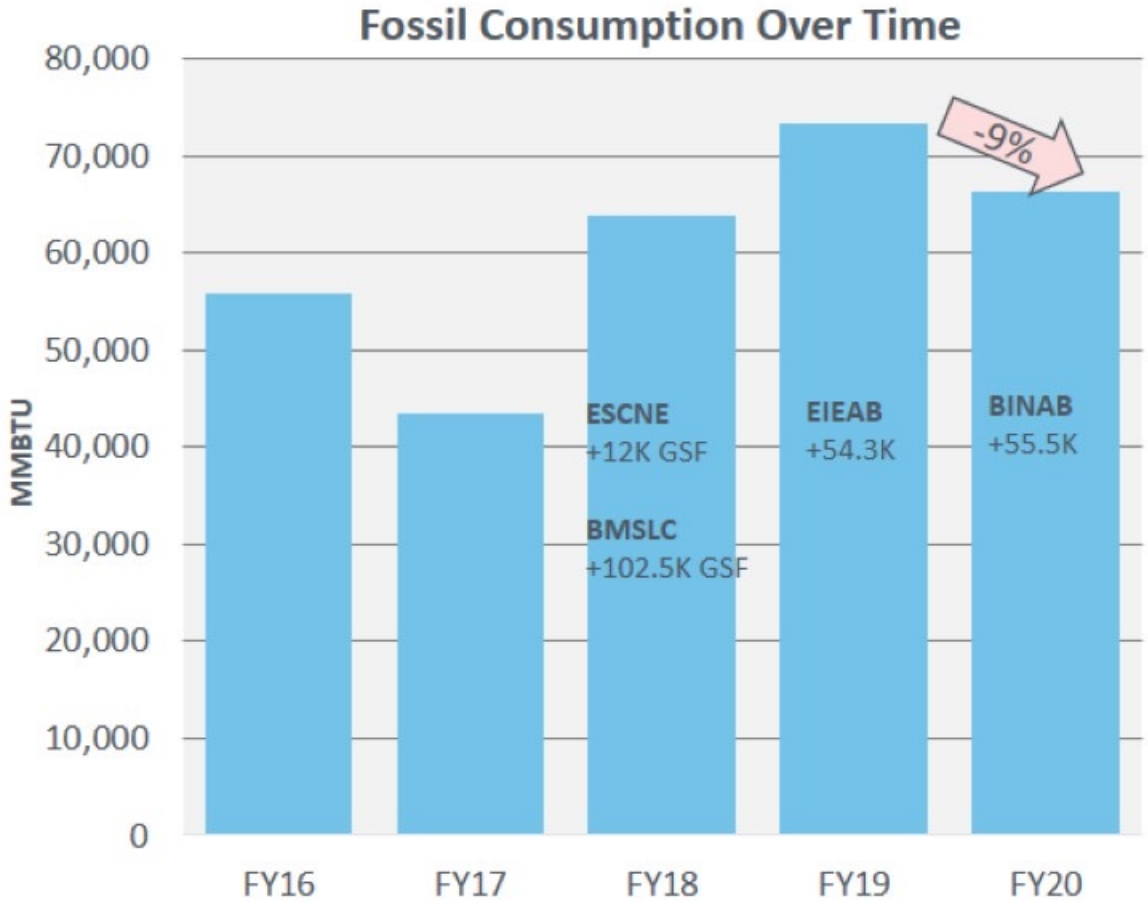
Natural gas has a lower carbon intensity compared to other commonly used fossil fuels

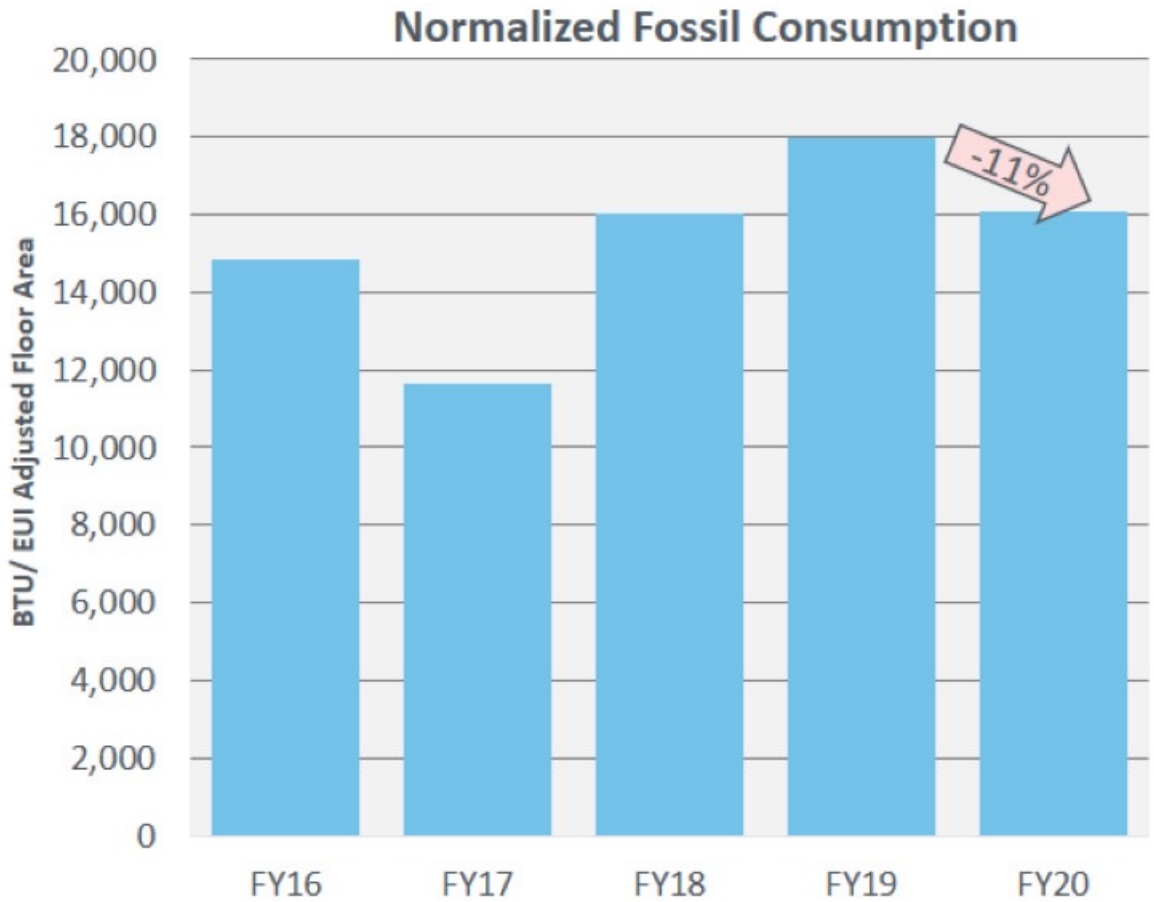




Total Fossil Consumption Decreases 9% in FY20

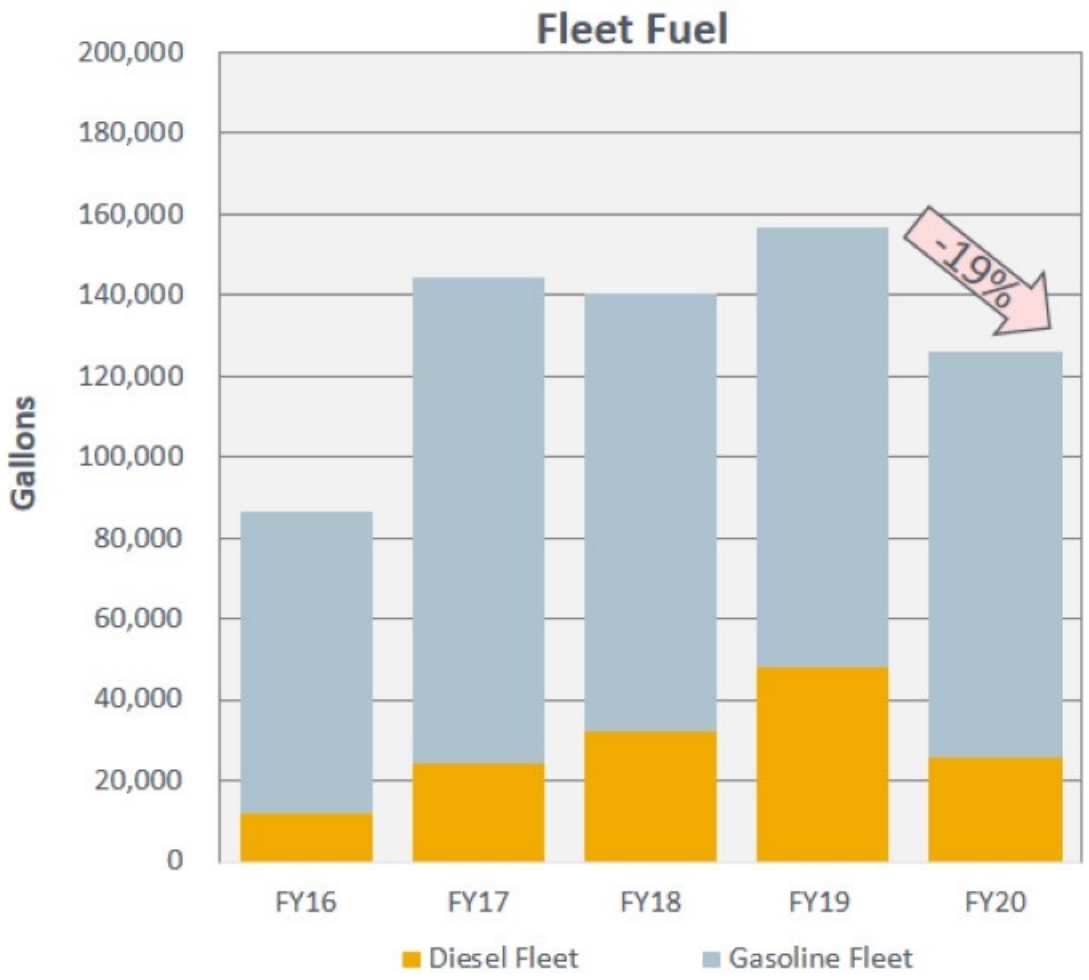
Construction drove increase in consumption from FY17-FY19; Covid drove decrease in FY20

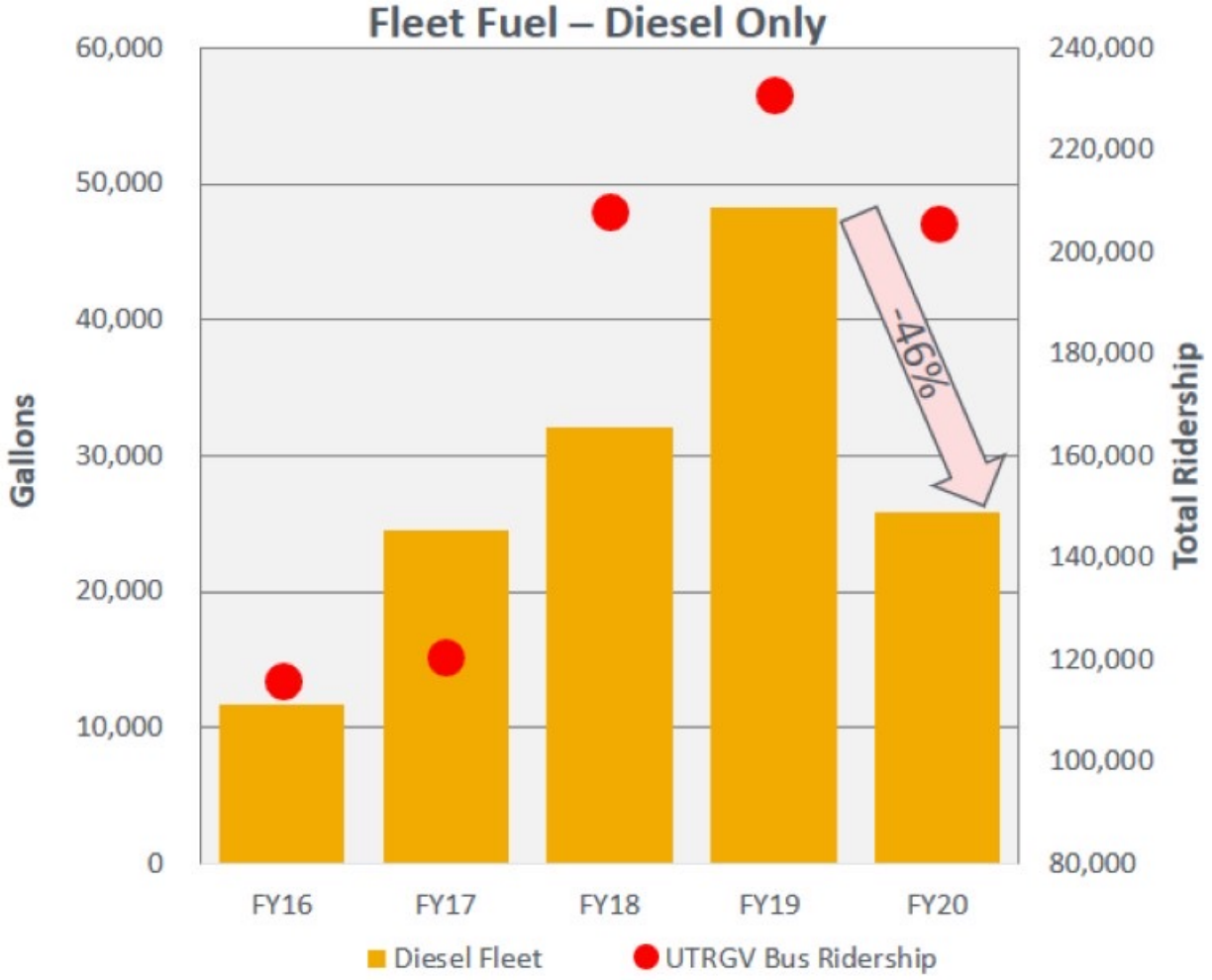




Fleet Fuel Consumption Increases FY16-FY19; Decreases 46% in FY20

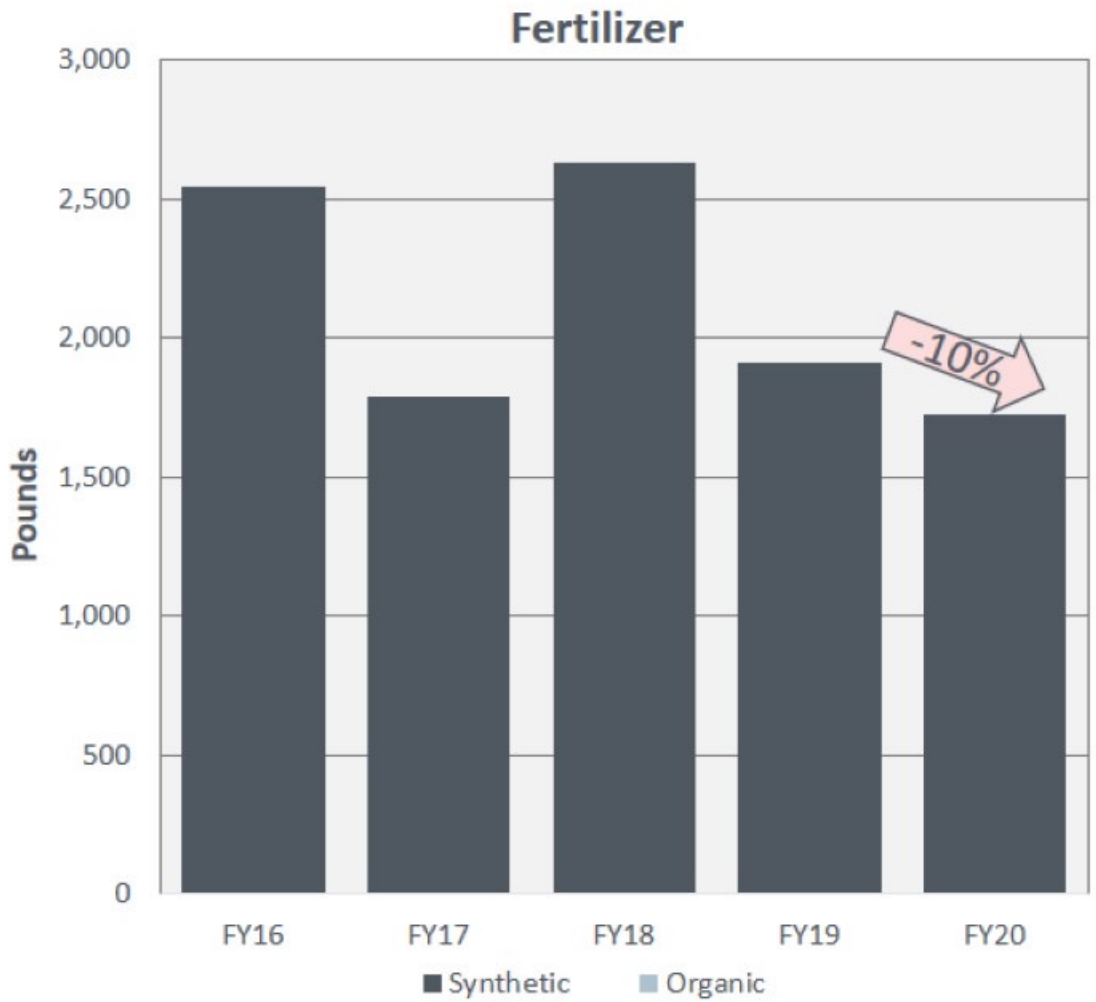
Historic increase driven by diesel fuel consumption, which is correlated with strategic initiative to increase bus ridership

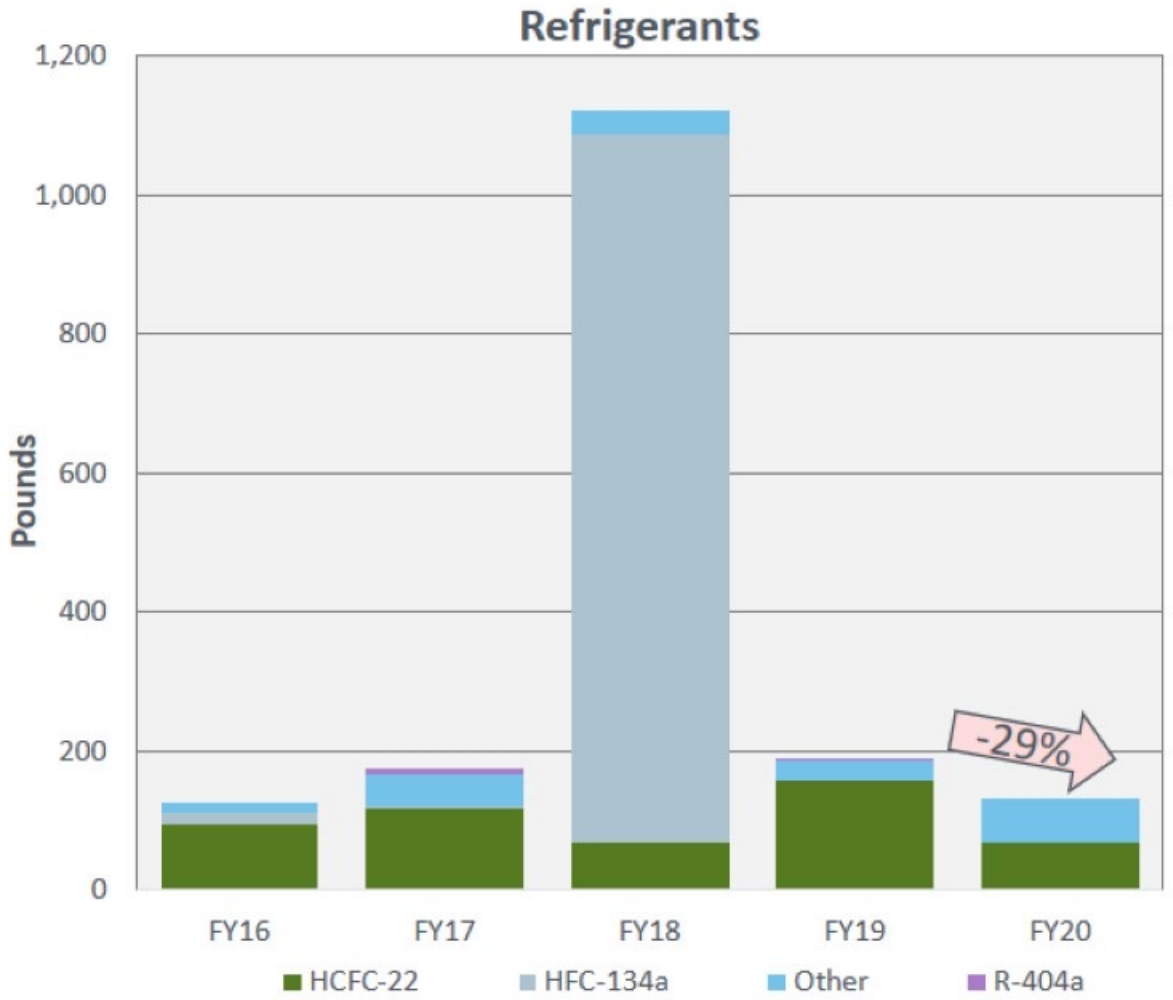




Fertilizer and Refrigerant Consumption Decrease in FY20

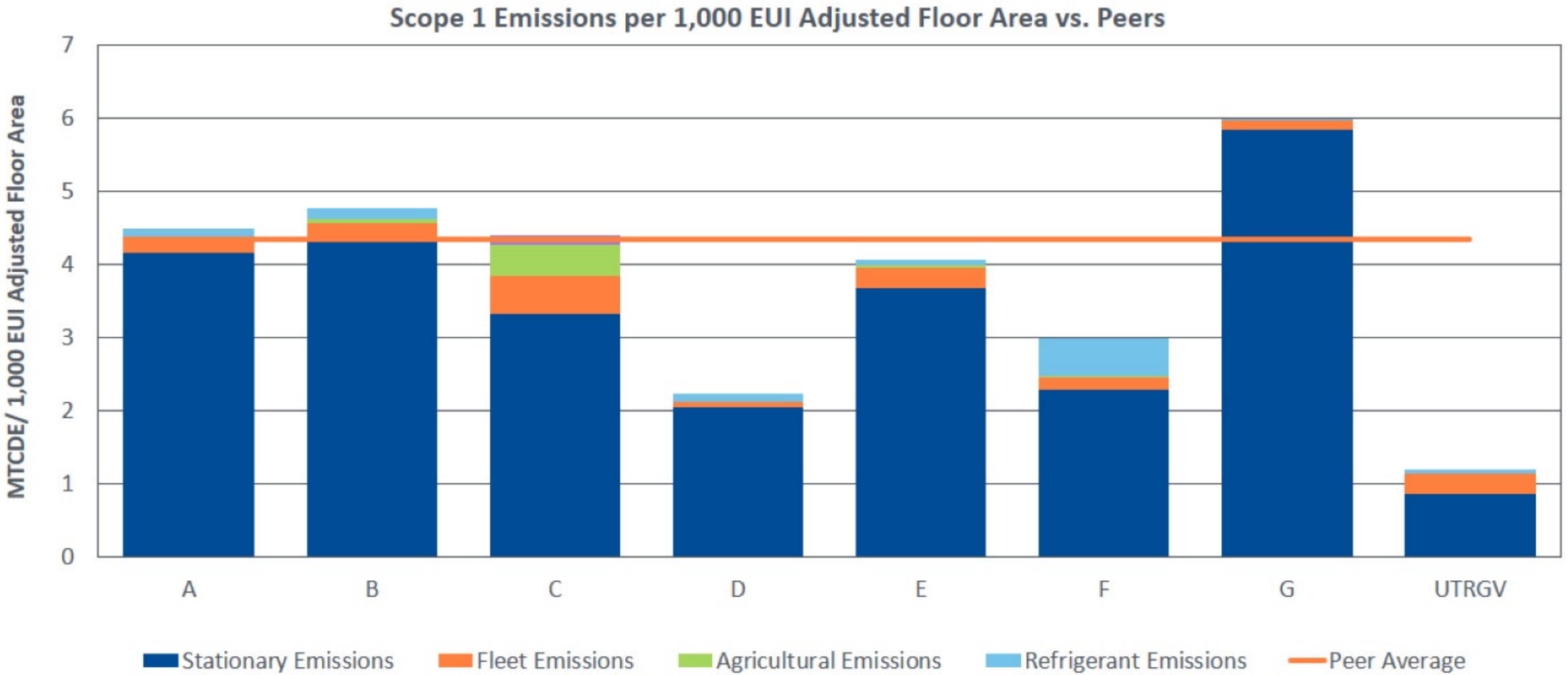
Spike in refrigerants in 2018 was caused by chiller repair on campus





Normalized Scope 1 Emissions Lower than Peers

Lower scope 1 is driven primarily by less stationary emissions at UTRGV



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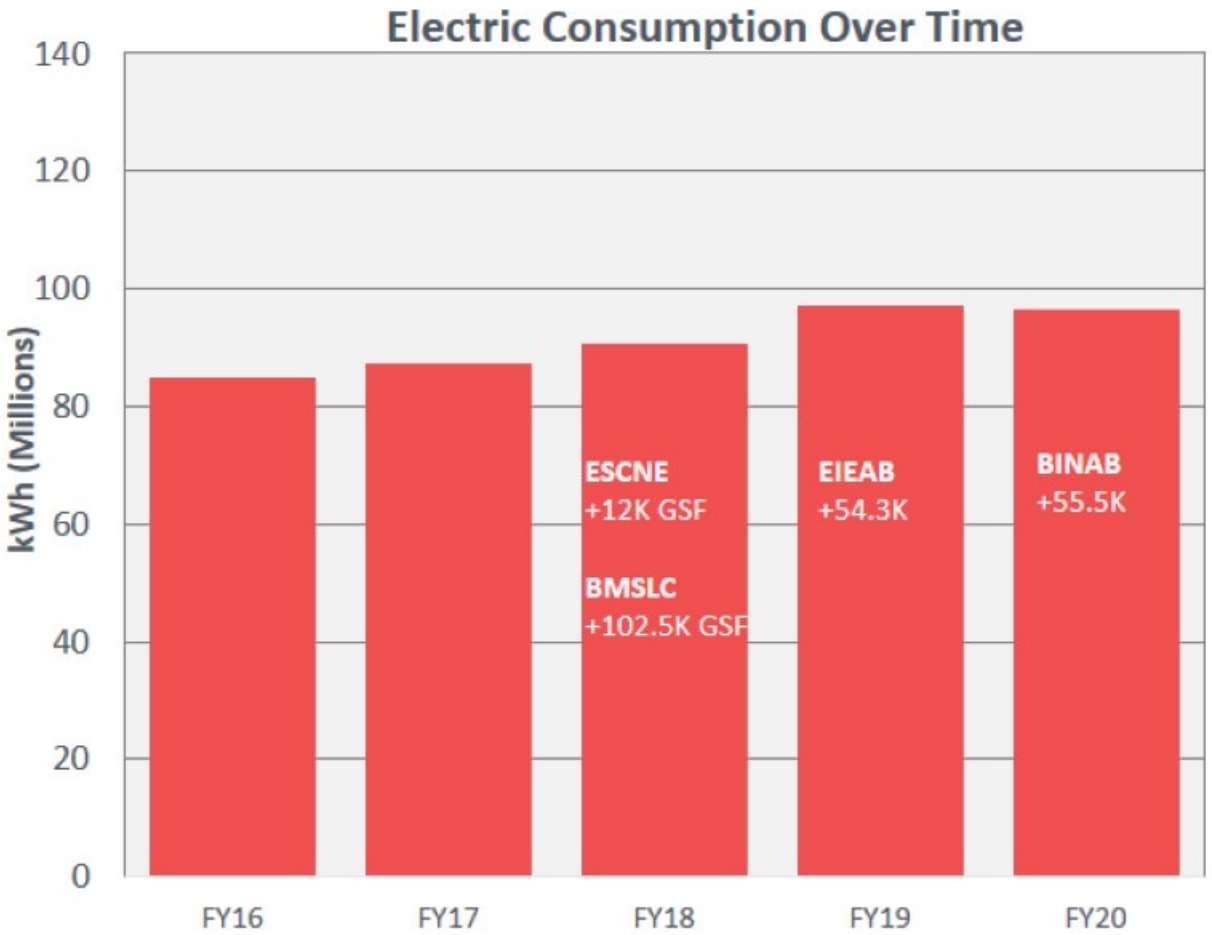
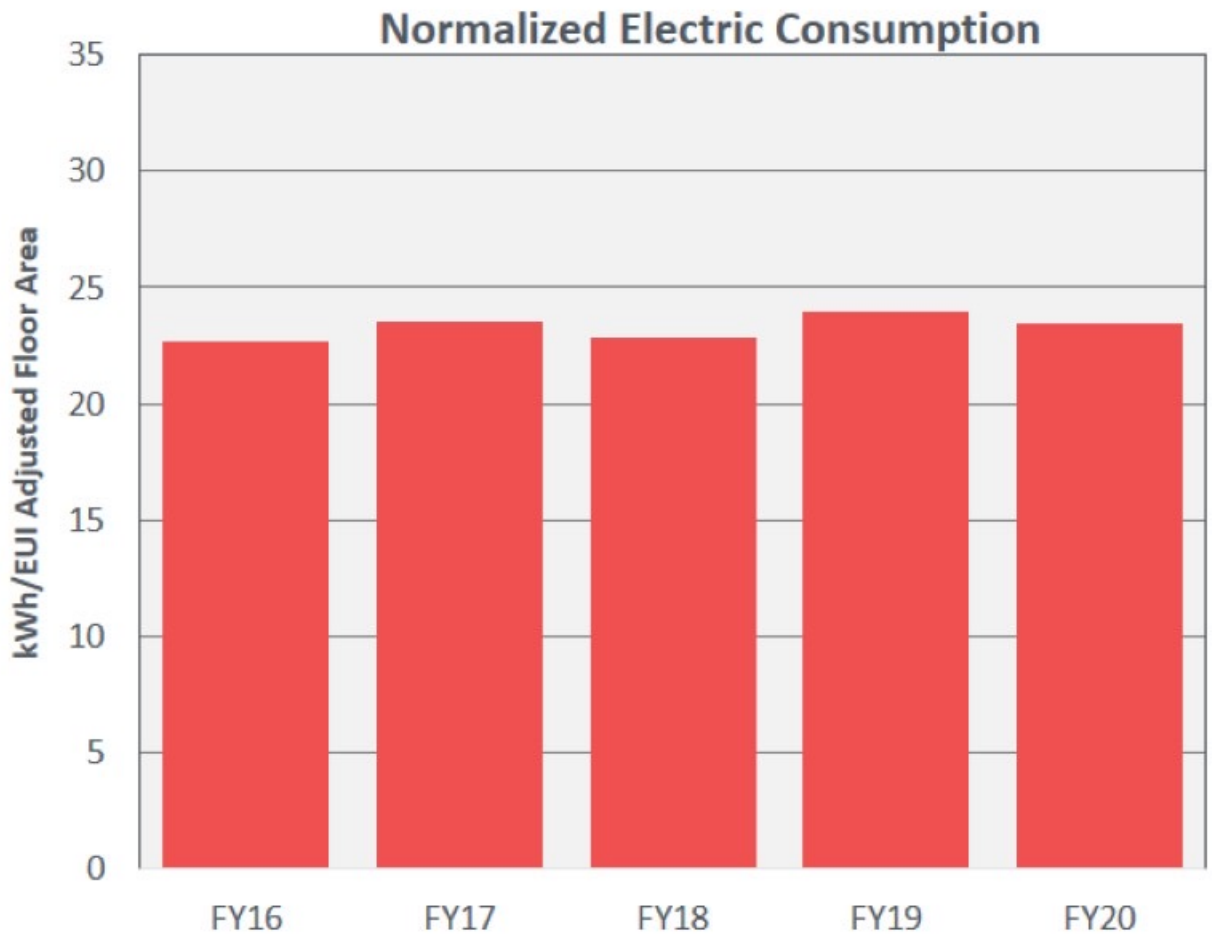
Scope 2

Electric Consumption Stayed Steady From FY19 to FY20

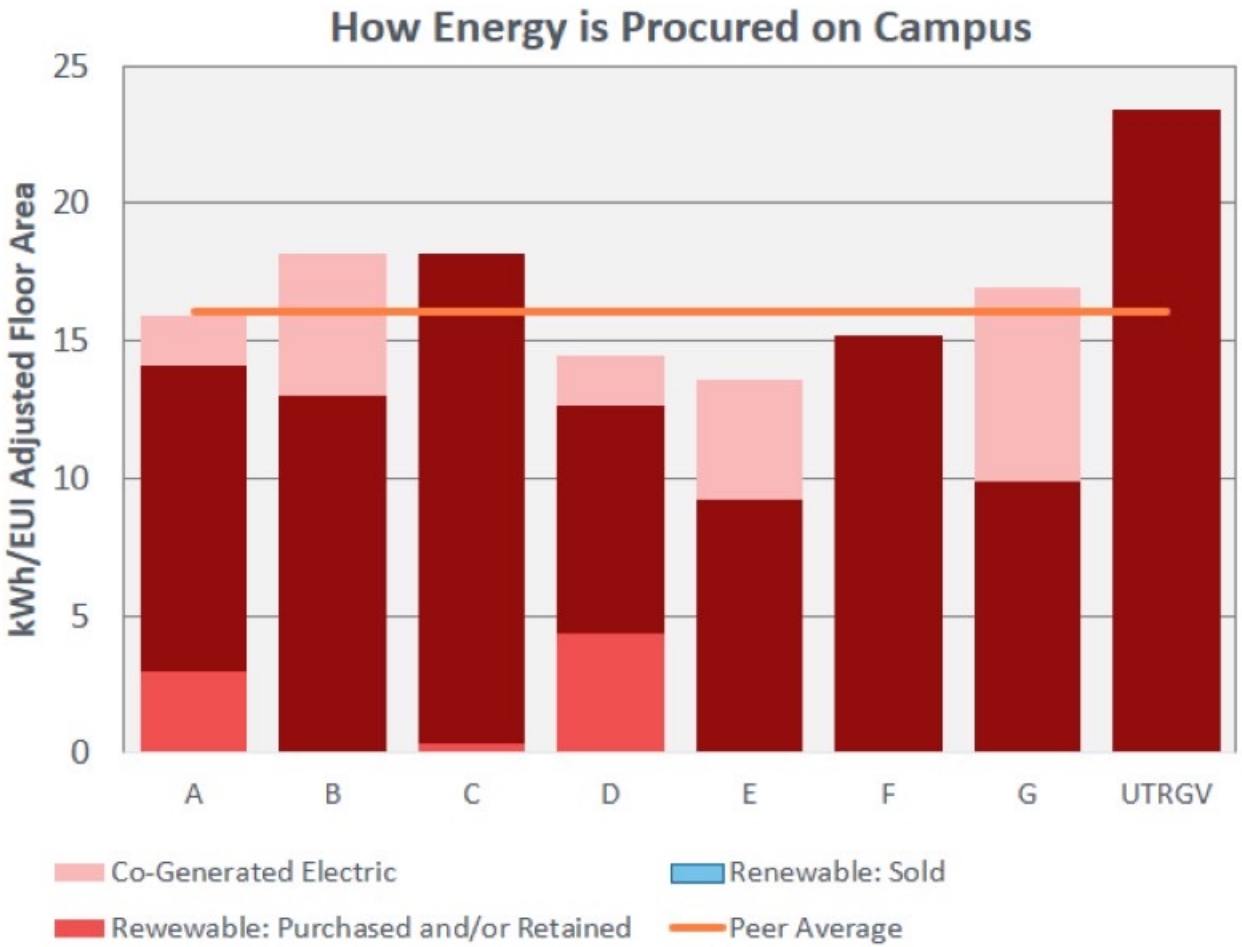
Buildings still needed electricity to run even when buildings were vacant

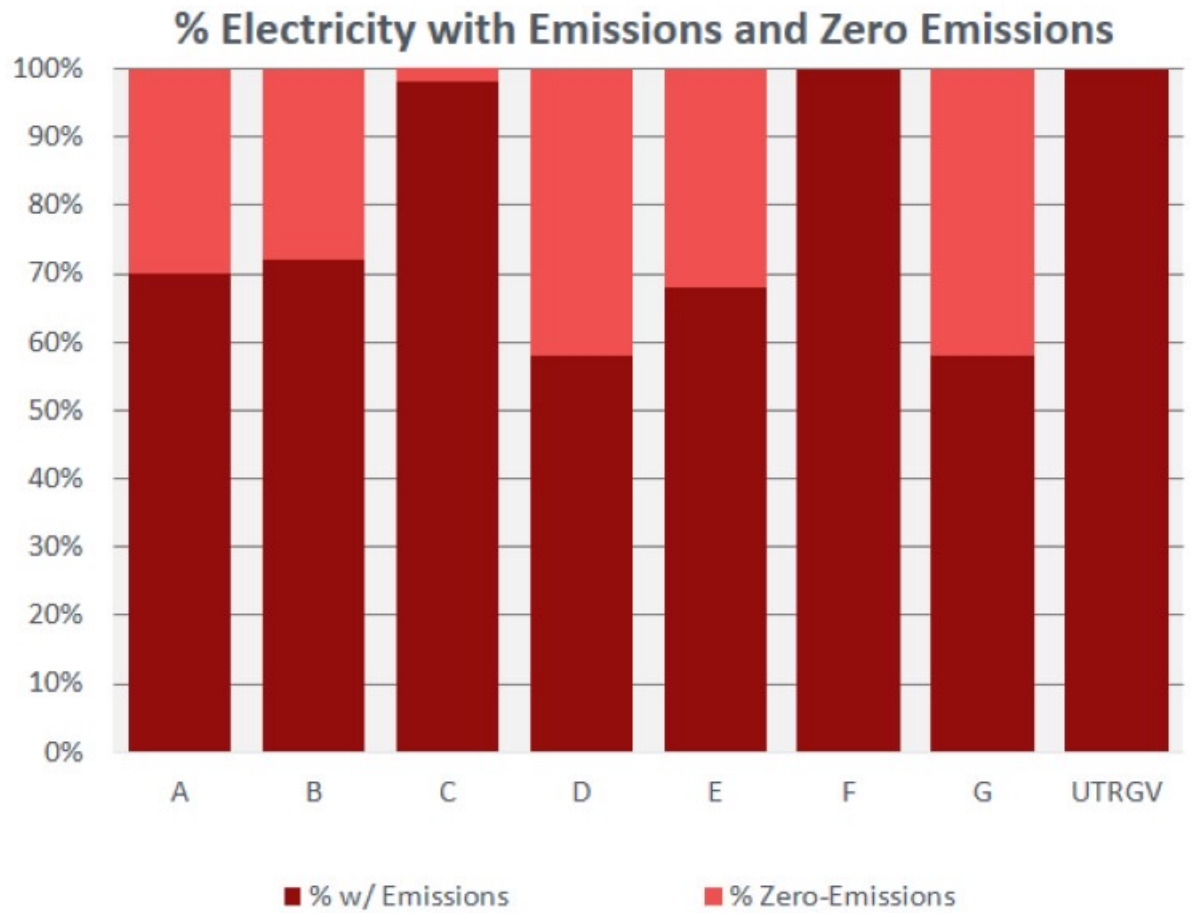




Electricity Consumption Highest Amongst Peers

UTRGV purchases electricity from the grid, which produces emissions

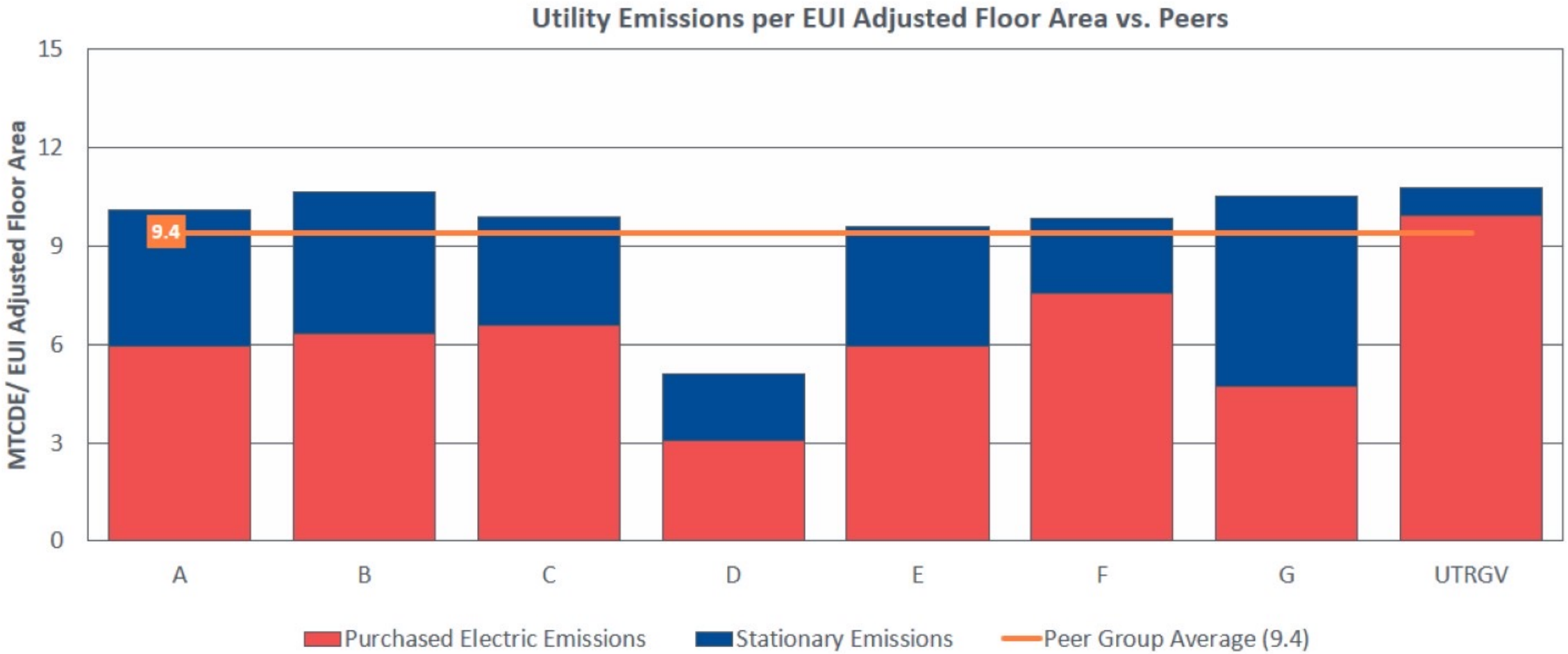




**UTRGV's solar panels at Stargate Building are not reflected here.*

UTRGV Consumed More Total Utilities Than Peers in FY20

Despite having less fossil consumption than peers, UTRGV has more electric consumption



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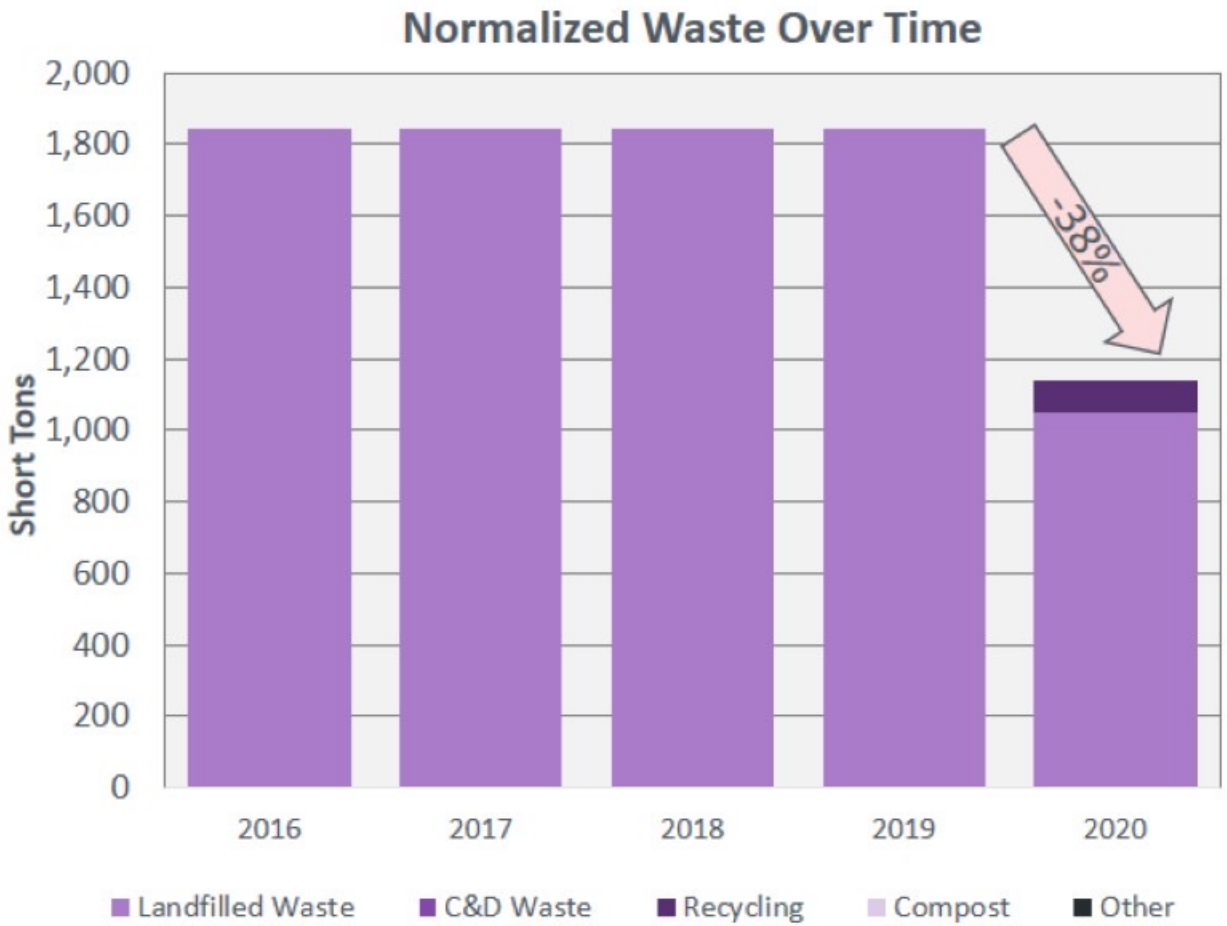
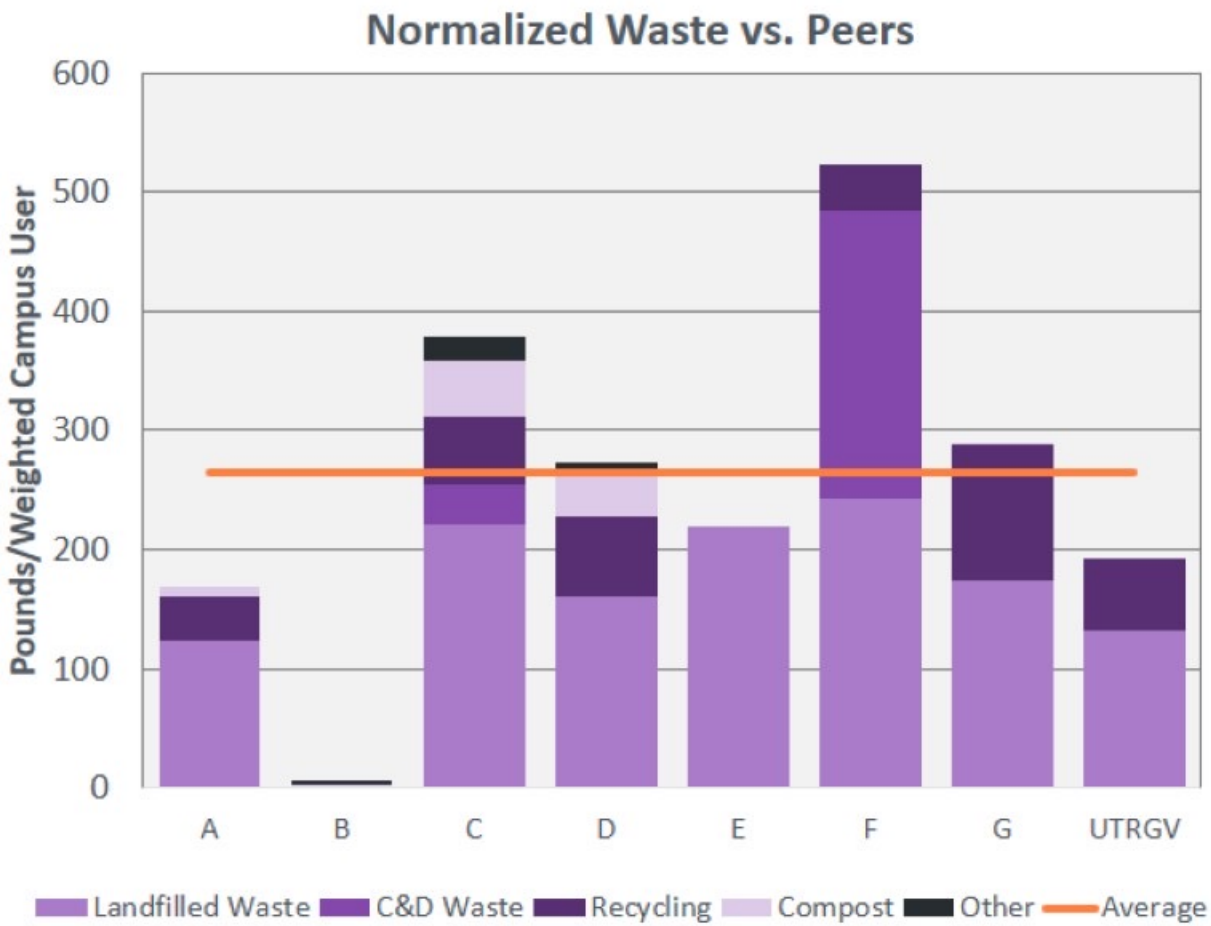
Scope 3

UTRGV Produces Less Waste Than Peers

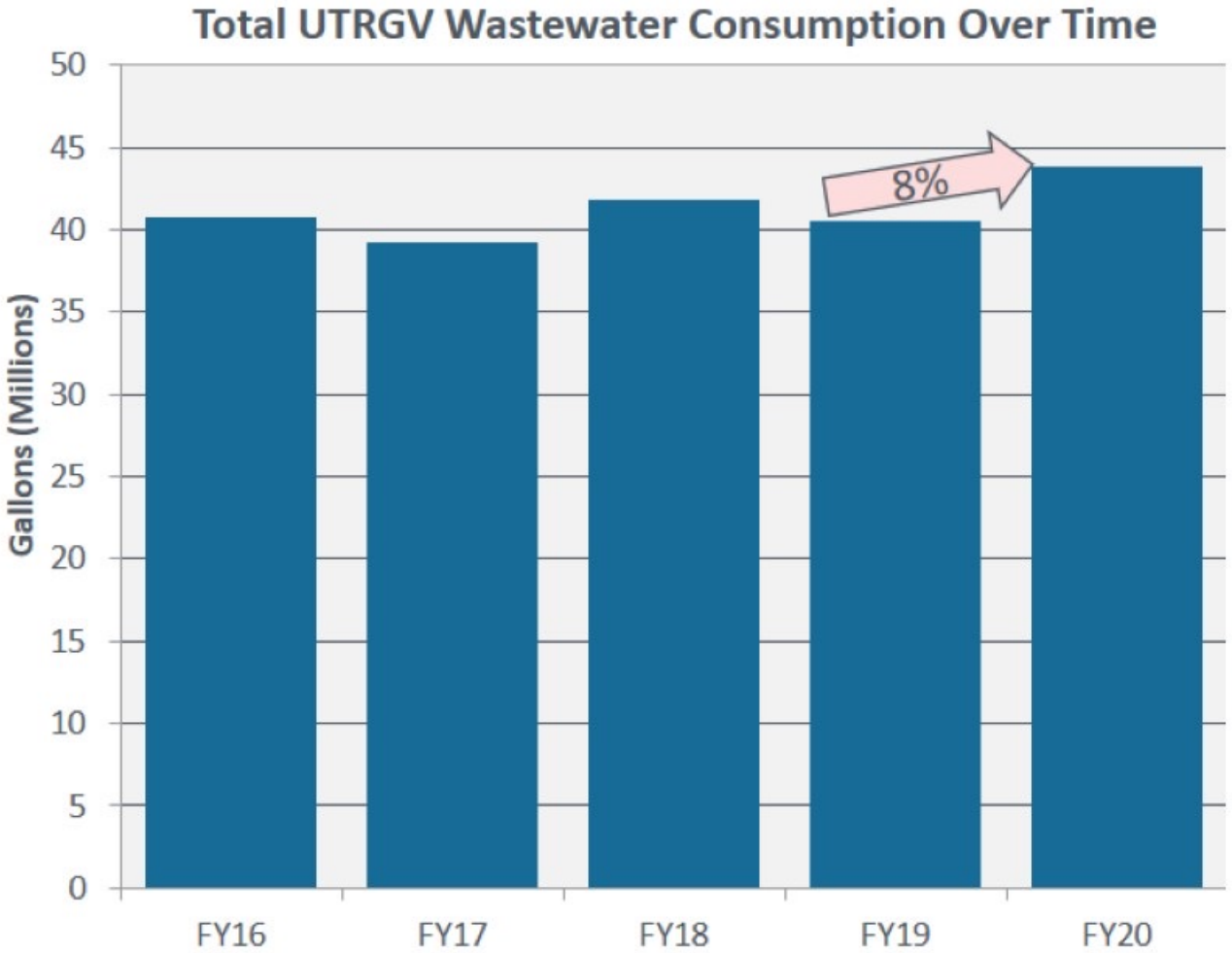
Recycling picked up for the first time in FY20; increased tracking will help increase data accuracy moving forward

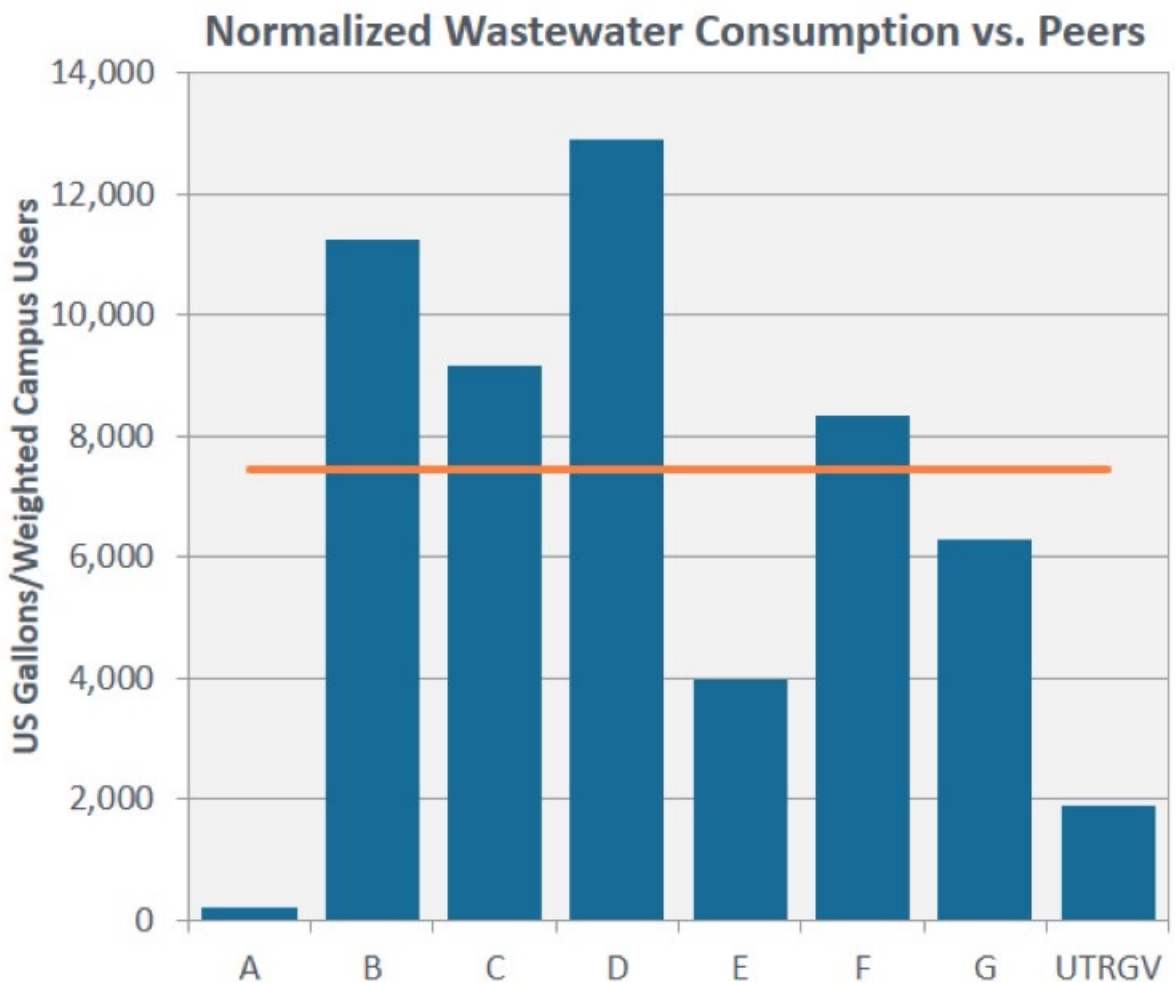




UTRGV is Below Peer Average For Wastewater

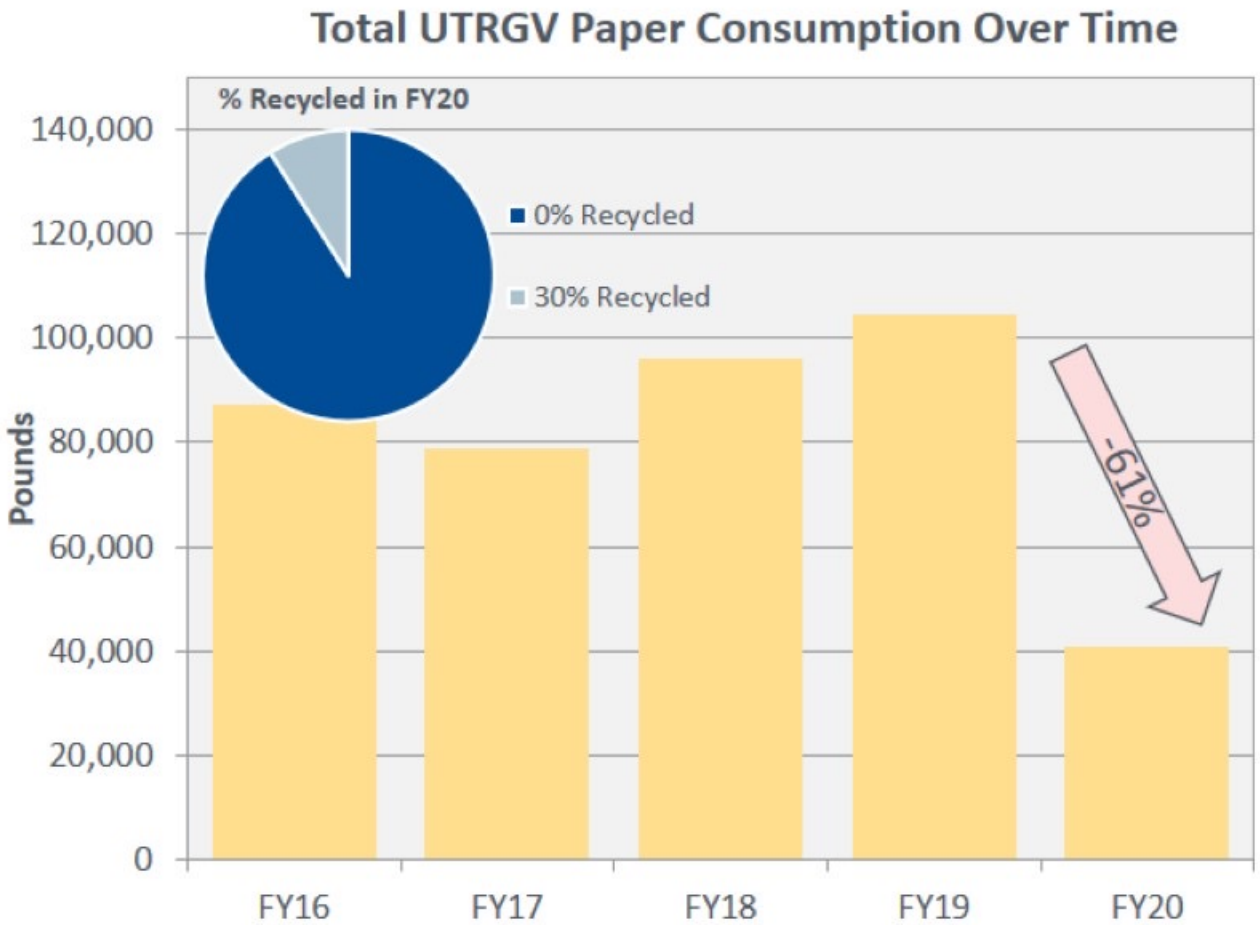
FY20 wastewater increase likely driven by more hand washing/cleanliness standards with Covid-19

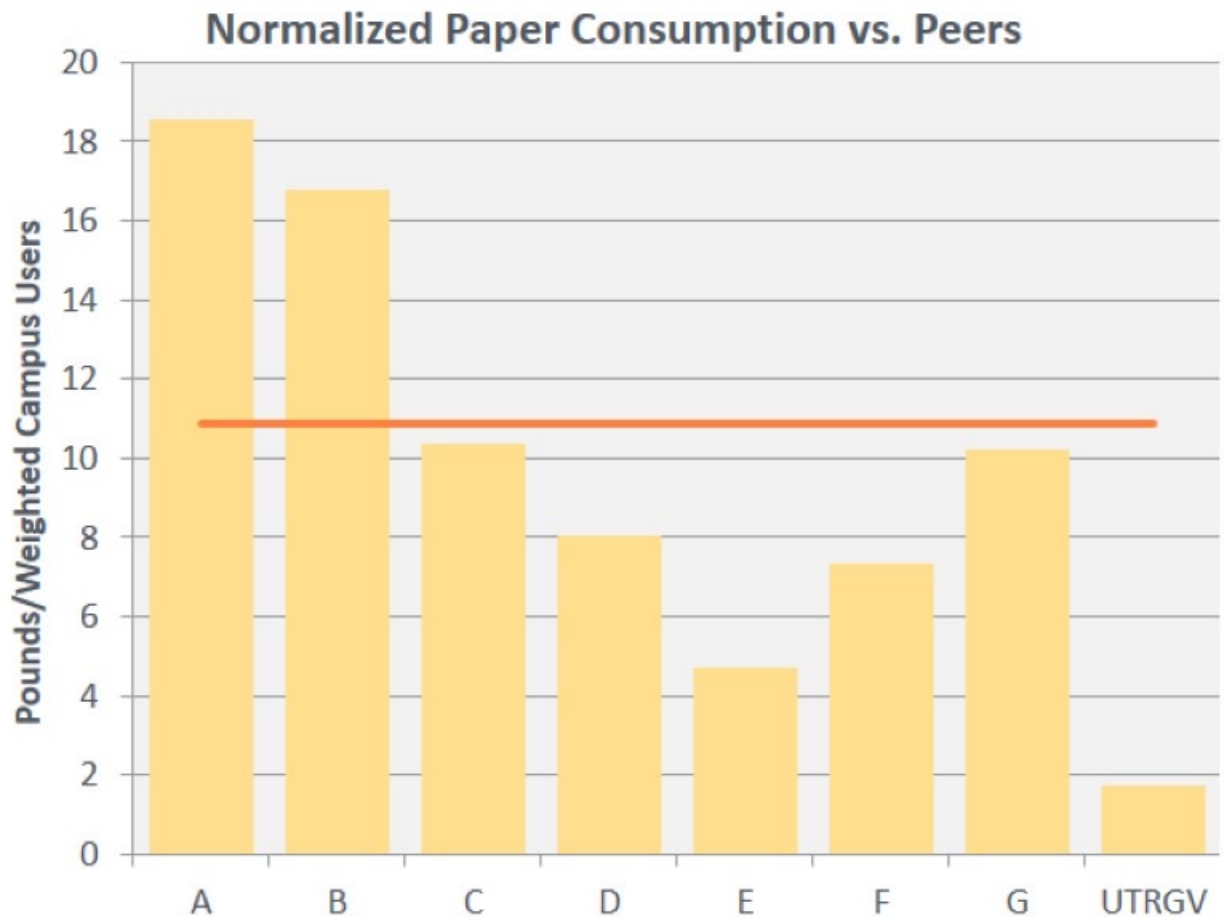




UTRGV Uses Less Paper Per Campus User Than Peers

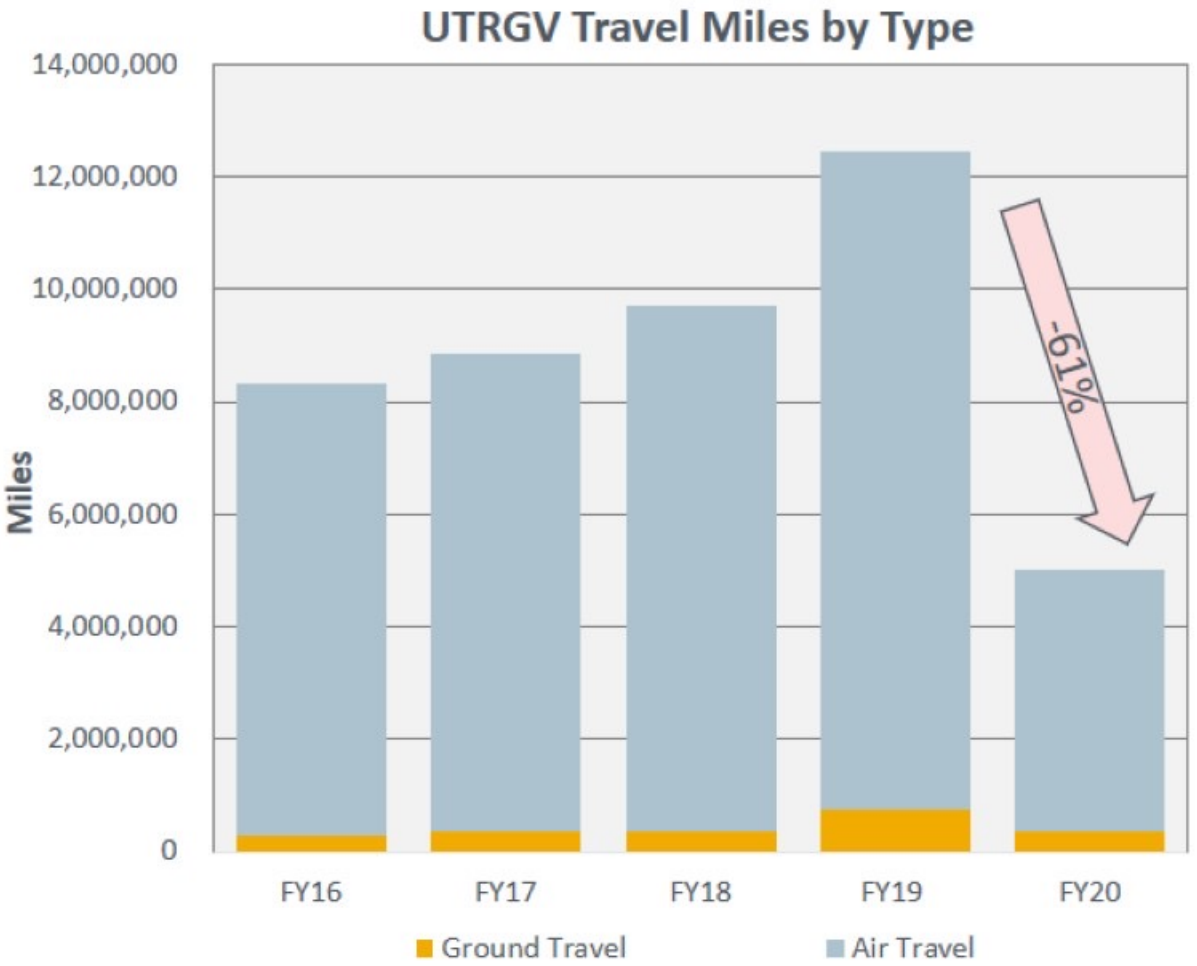
Opportunity for UTRGV to buy more recycled paper and increase tracking to better represent paper purchases

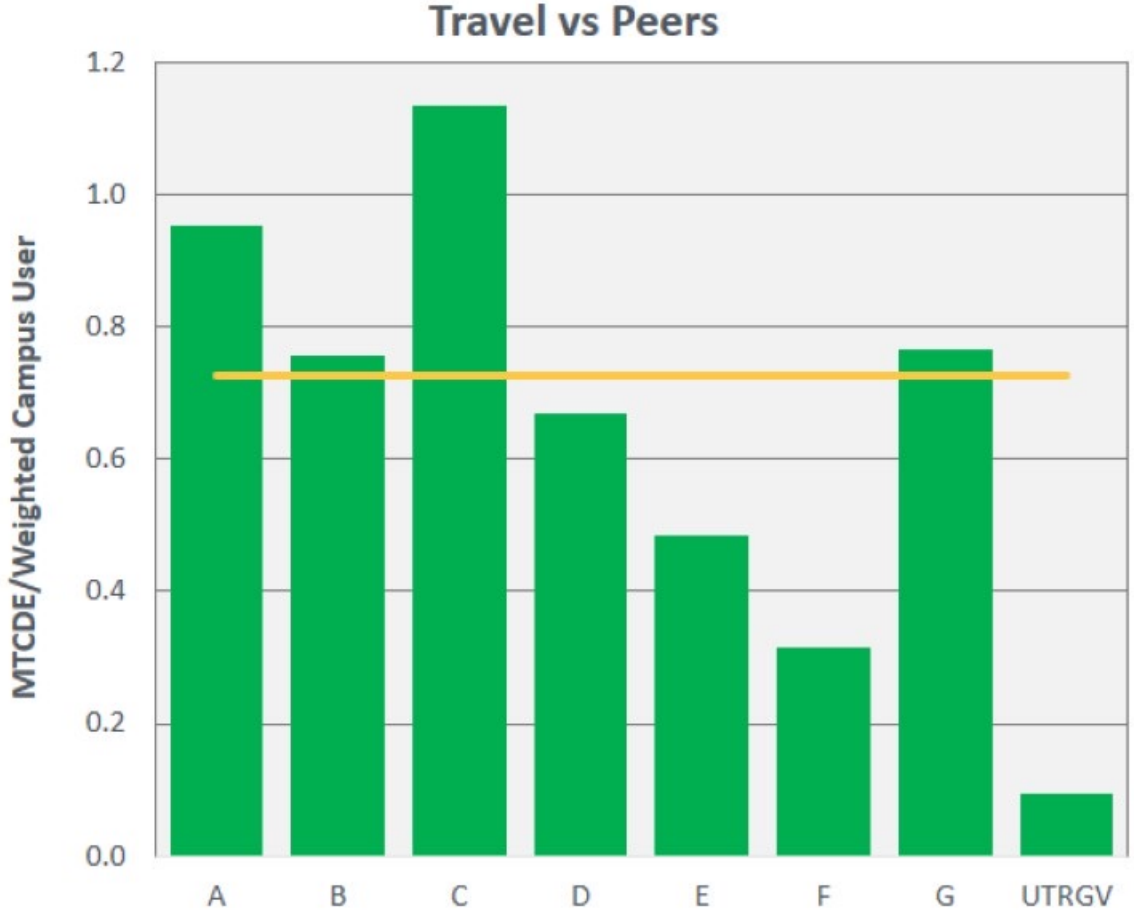




Significant Decrease in Directly Financed Air and Grounds Travel

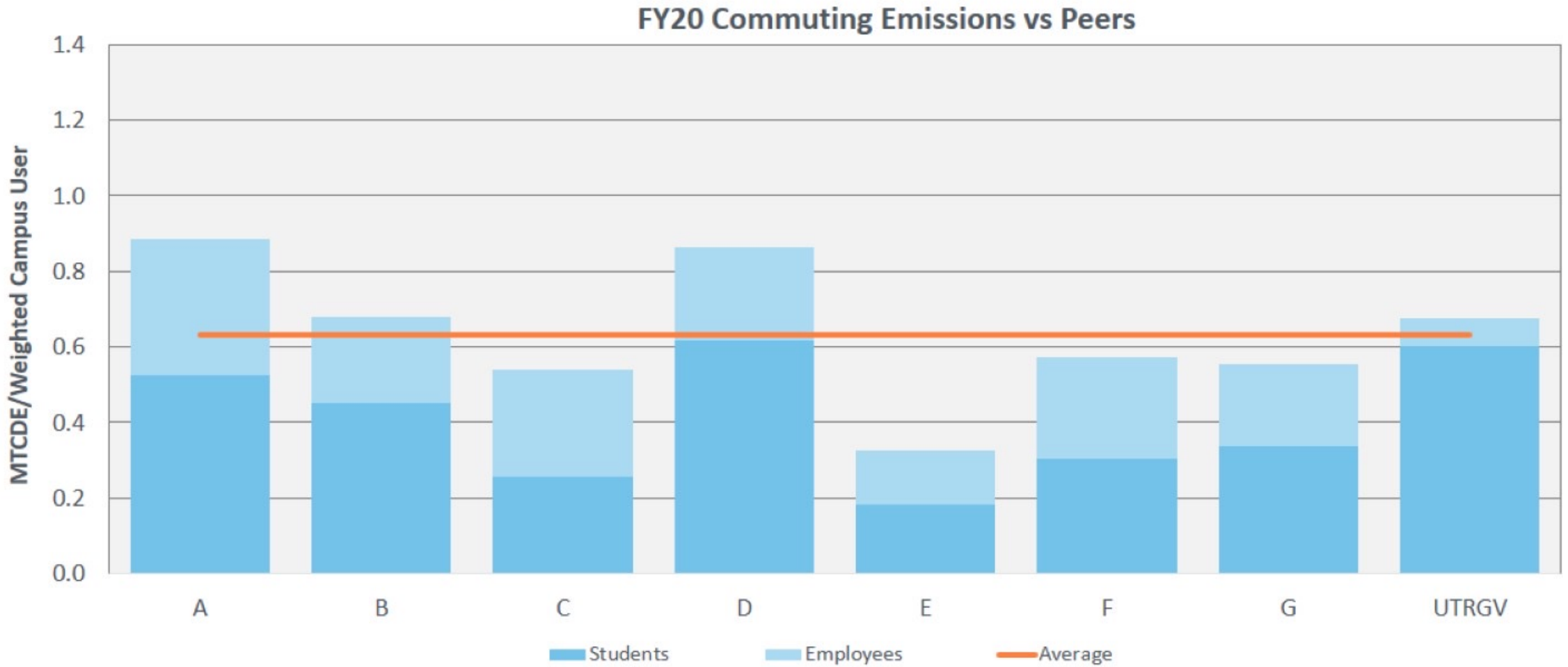
Travel at UTRGV is well below peers when normalizing per weighted campus user





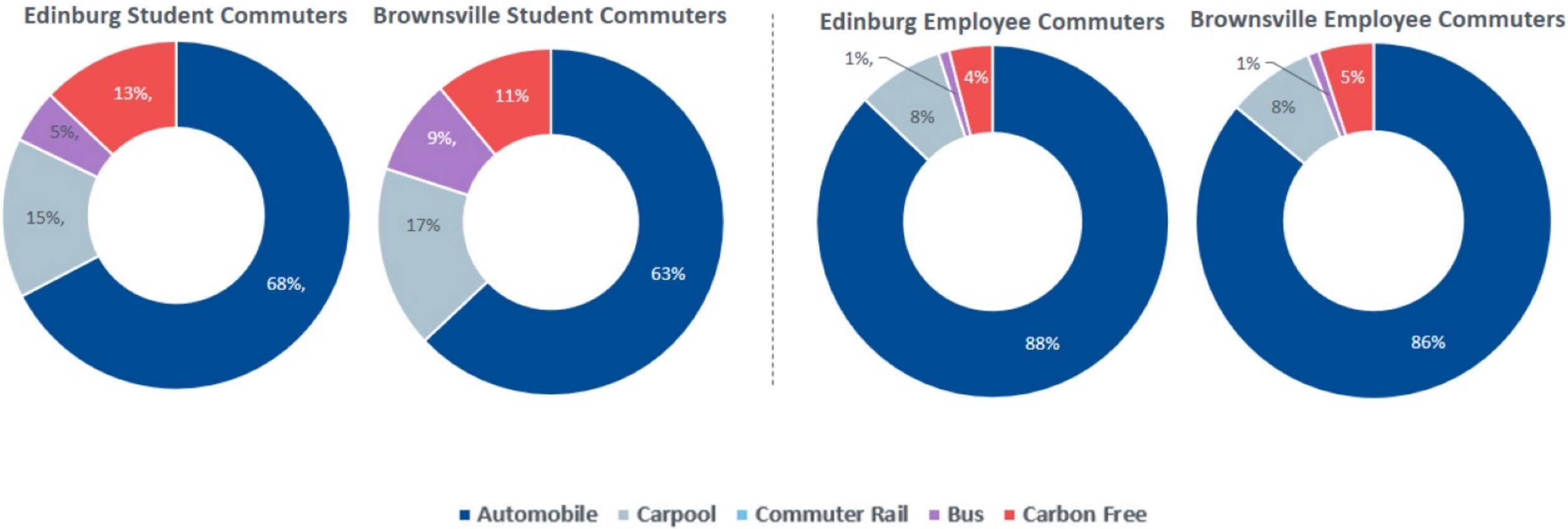
UTRGV Commuting Emissions Similar to Peer Average

Majority of UTRGV emissions are from students



Pre-Pandemic Commuting Habits

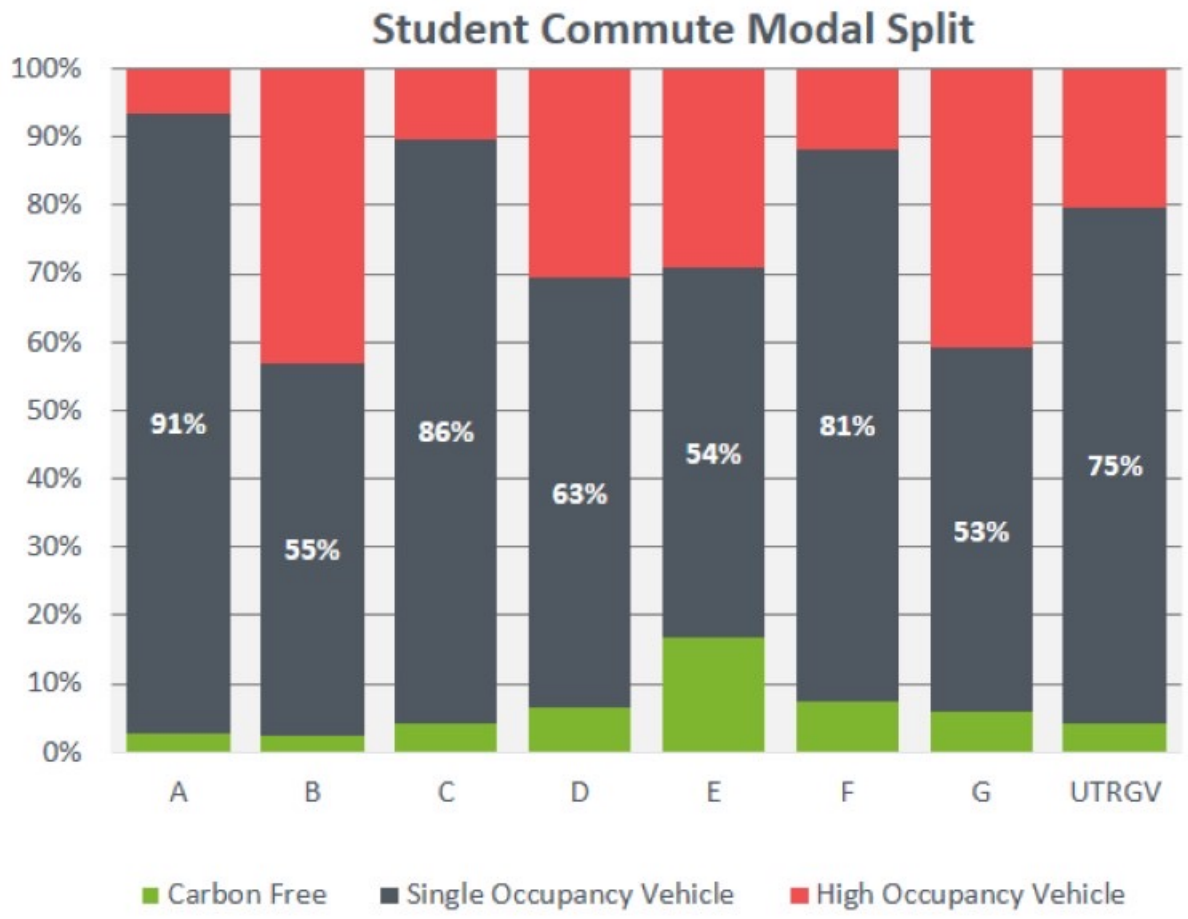
Pre-pandemic data is used to calculate FY20 commuting emissions

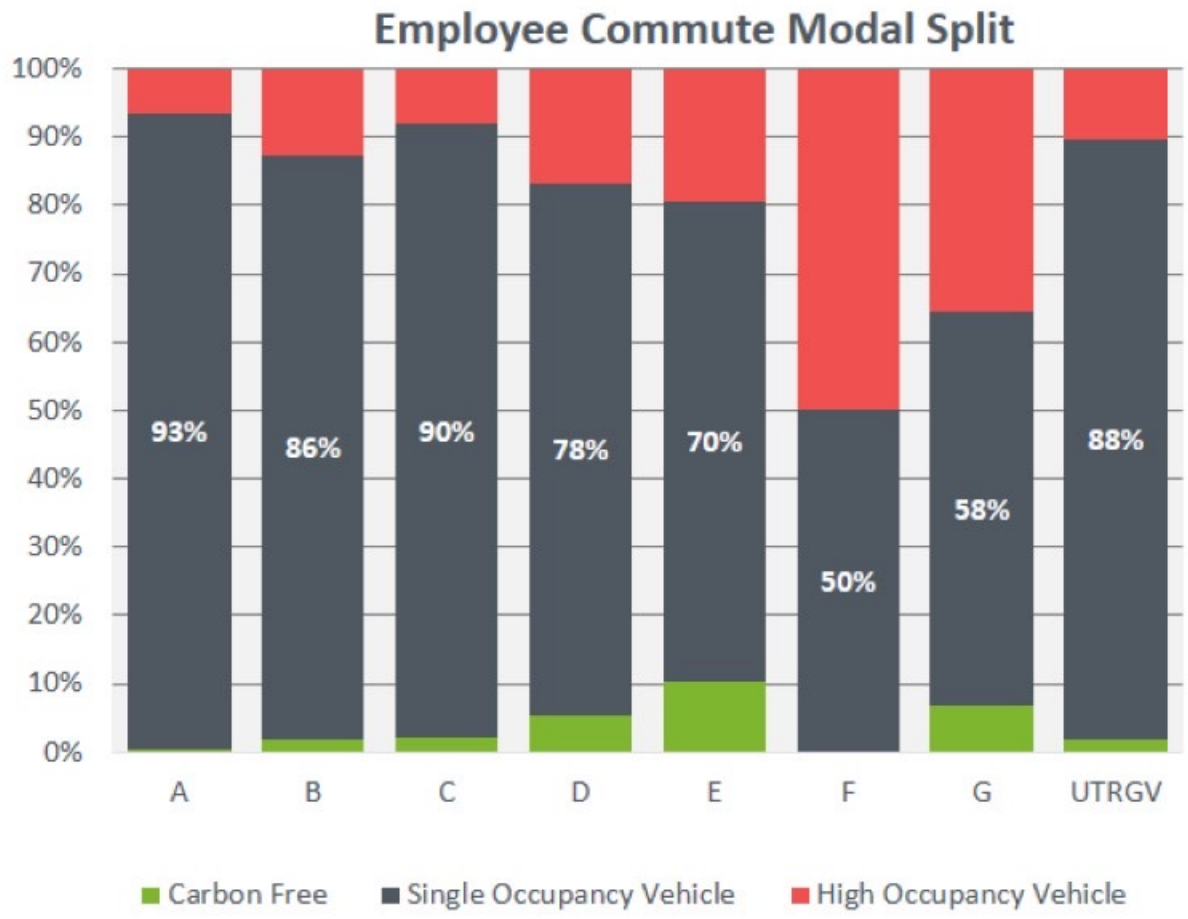


Carbon free includes biking, walking, and telecommuting

Peers Also Primarily Utilized Single Occupancy Vehicles

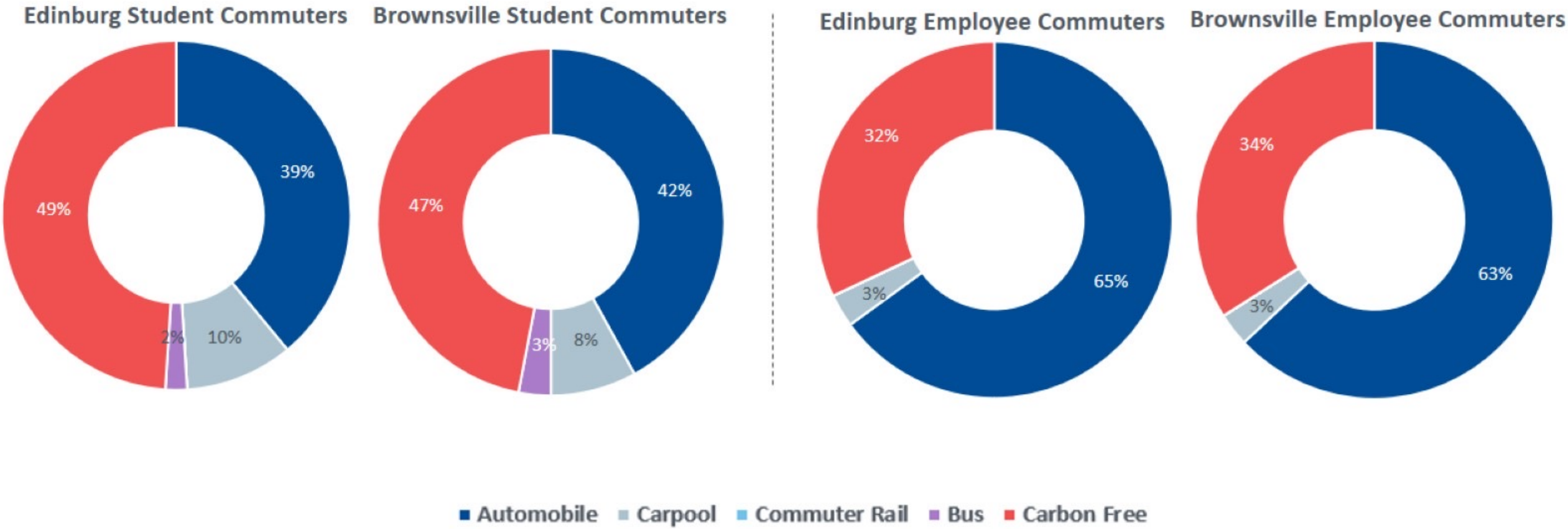
Students tend to utilize high occupancy vehicles more often than employees





Post-Pandemic Commuting Habits

With the shift to remote learning, FY21 will see a large shift to carbon free "commuting"

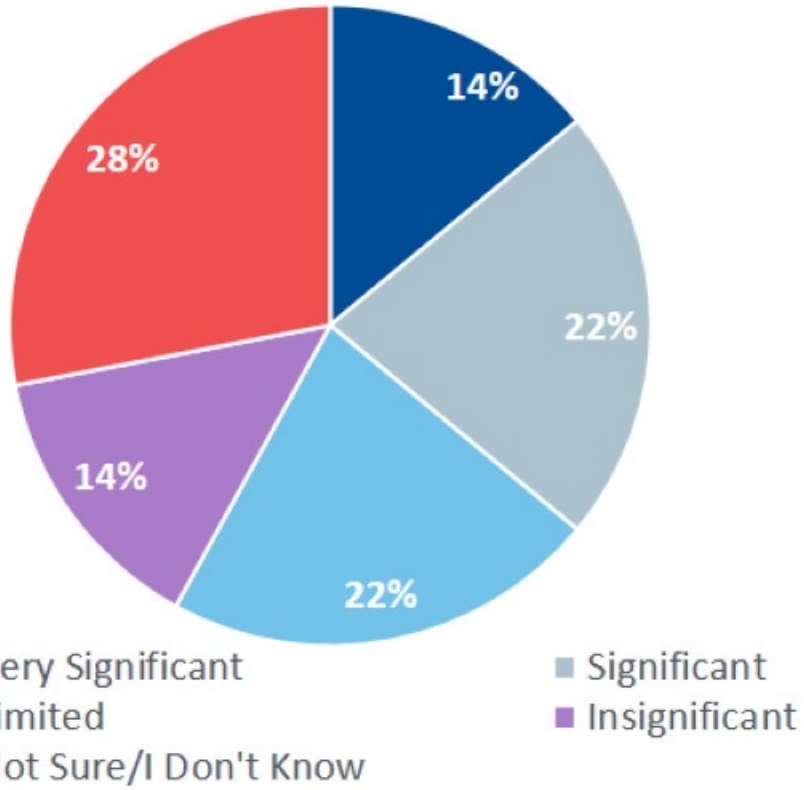


Carbon free includes biking, walking, and telecommuting

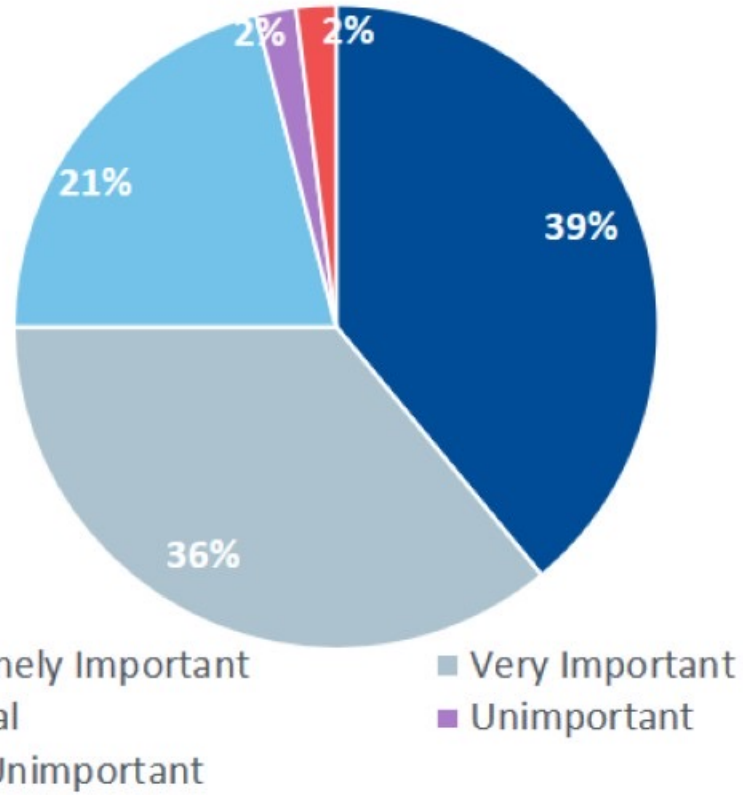
Impact vs. Importance of Reducing Carbon Footprint

36% of respondents feel like their commuting habits a significant impact on emissions; 75% feel it's important to reduce them

How Much Impact Does Your Commuting Habits Have on UTRGV's Carbon Footprint?

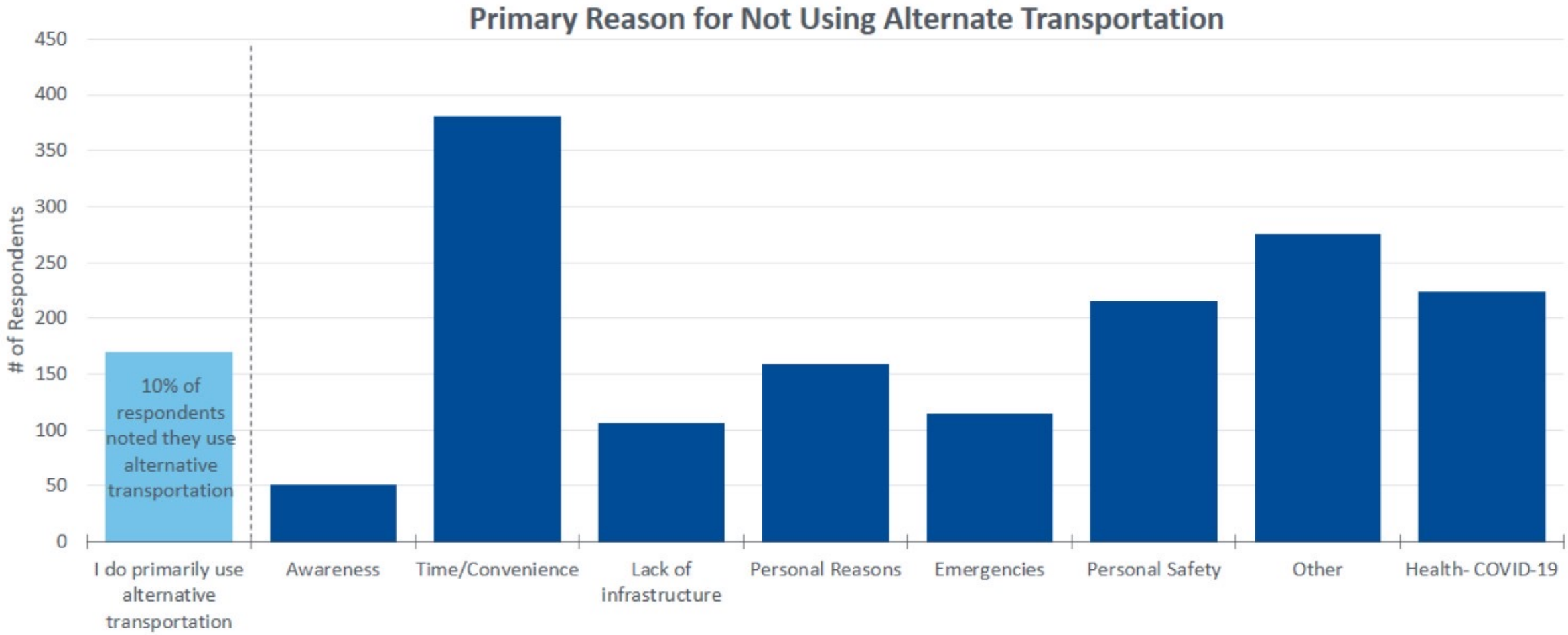


How Important is it for UTRGV to Reduce it's Carbon Footprint?



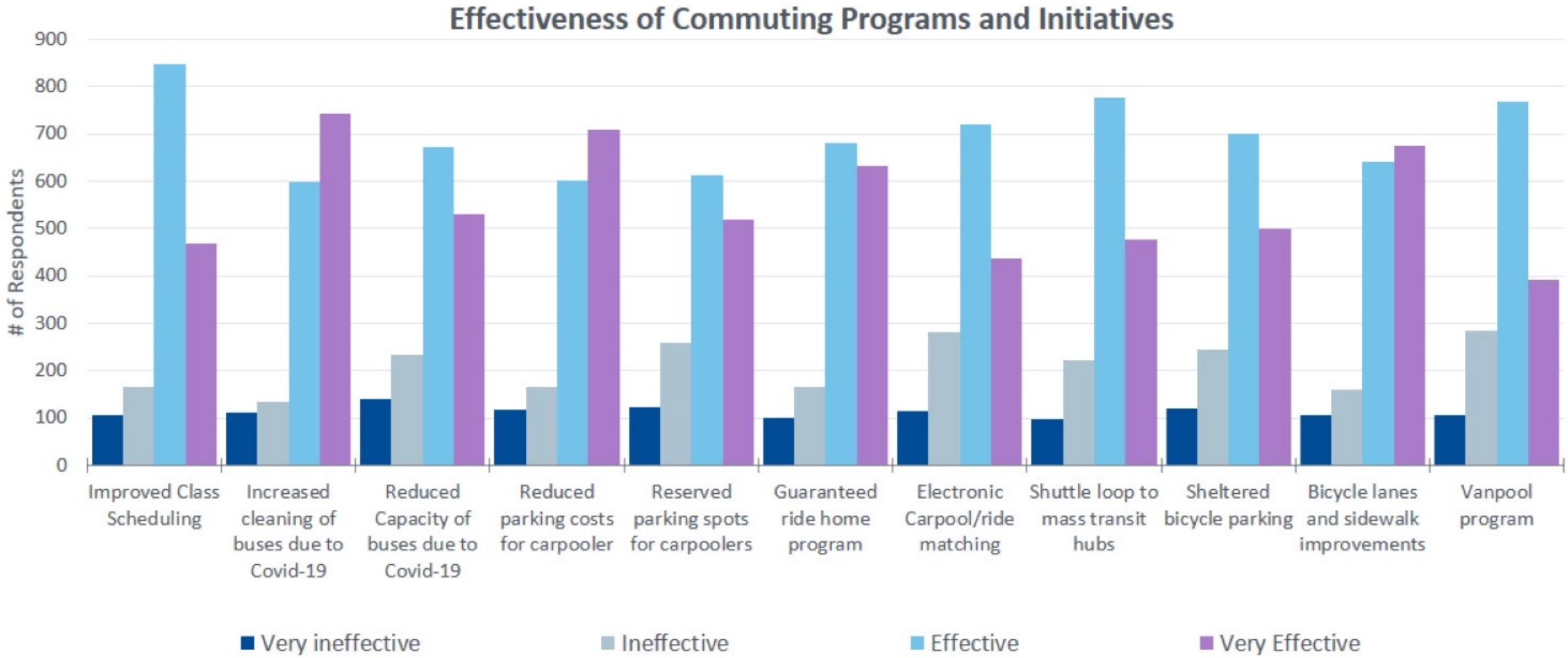
Primary Reasons Why Campus Users Don't Utilize Alternate Transportation

Majority of respondents do not use alternate transportation because of time/convenience – it would take too long



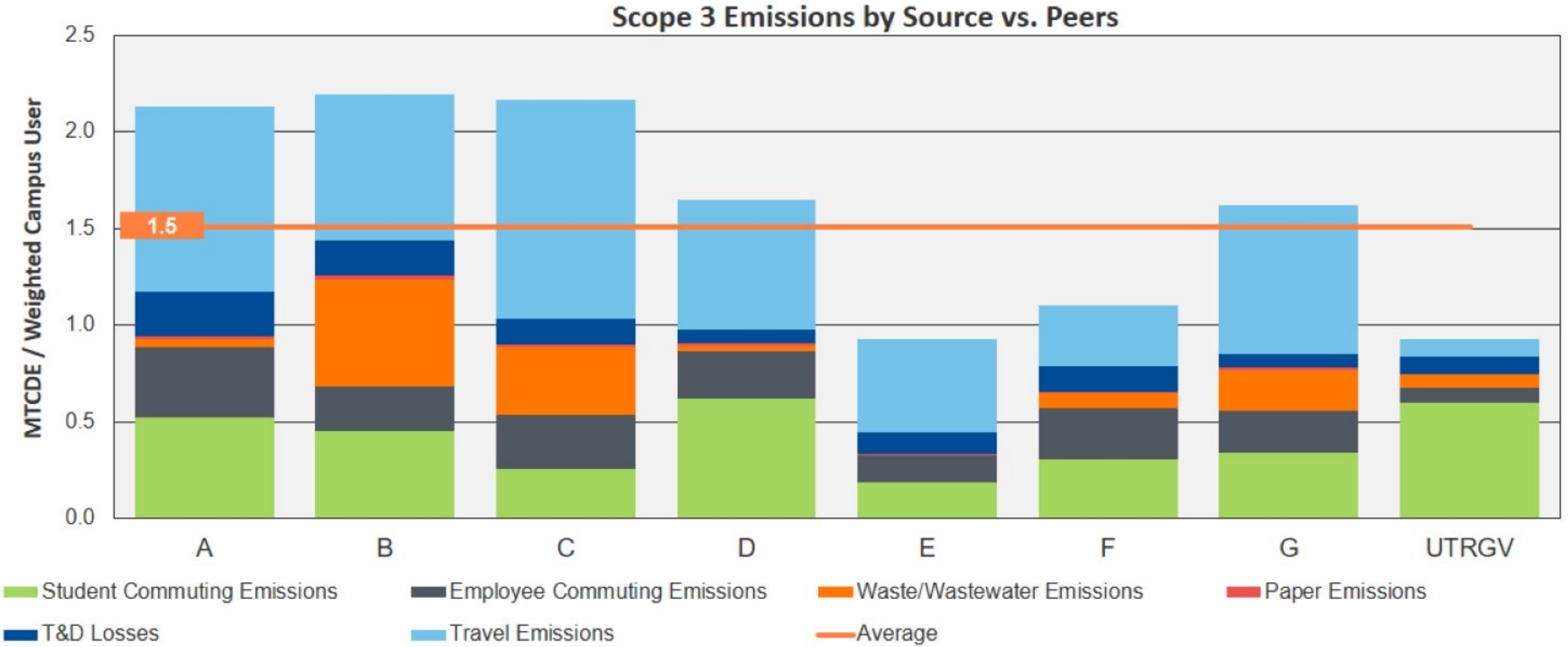
Commuting Programs & Initiatives That Would Make an Impact

Respondents feel that the programs and initiatives listed would be effective at encouraging alternate methods of transportation

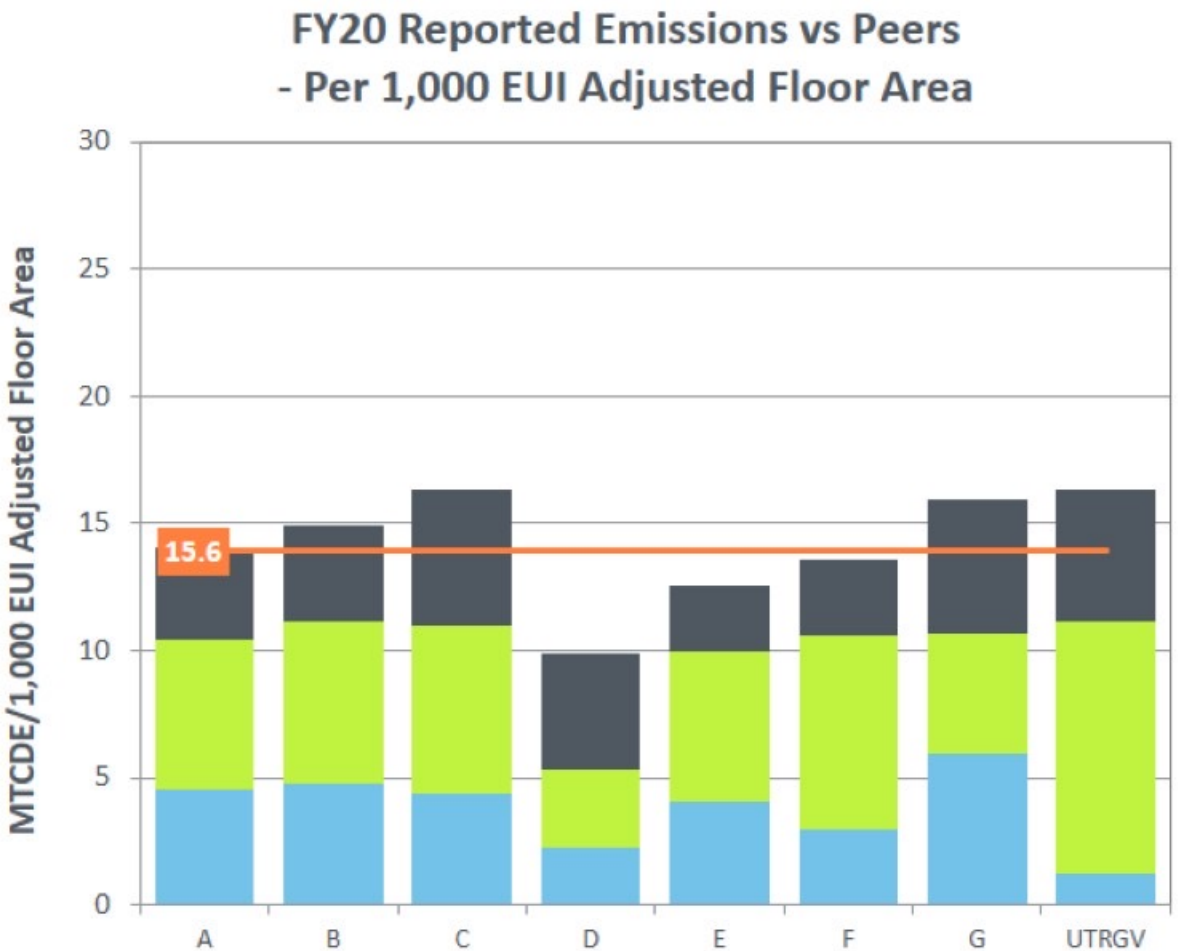


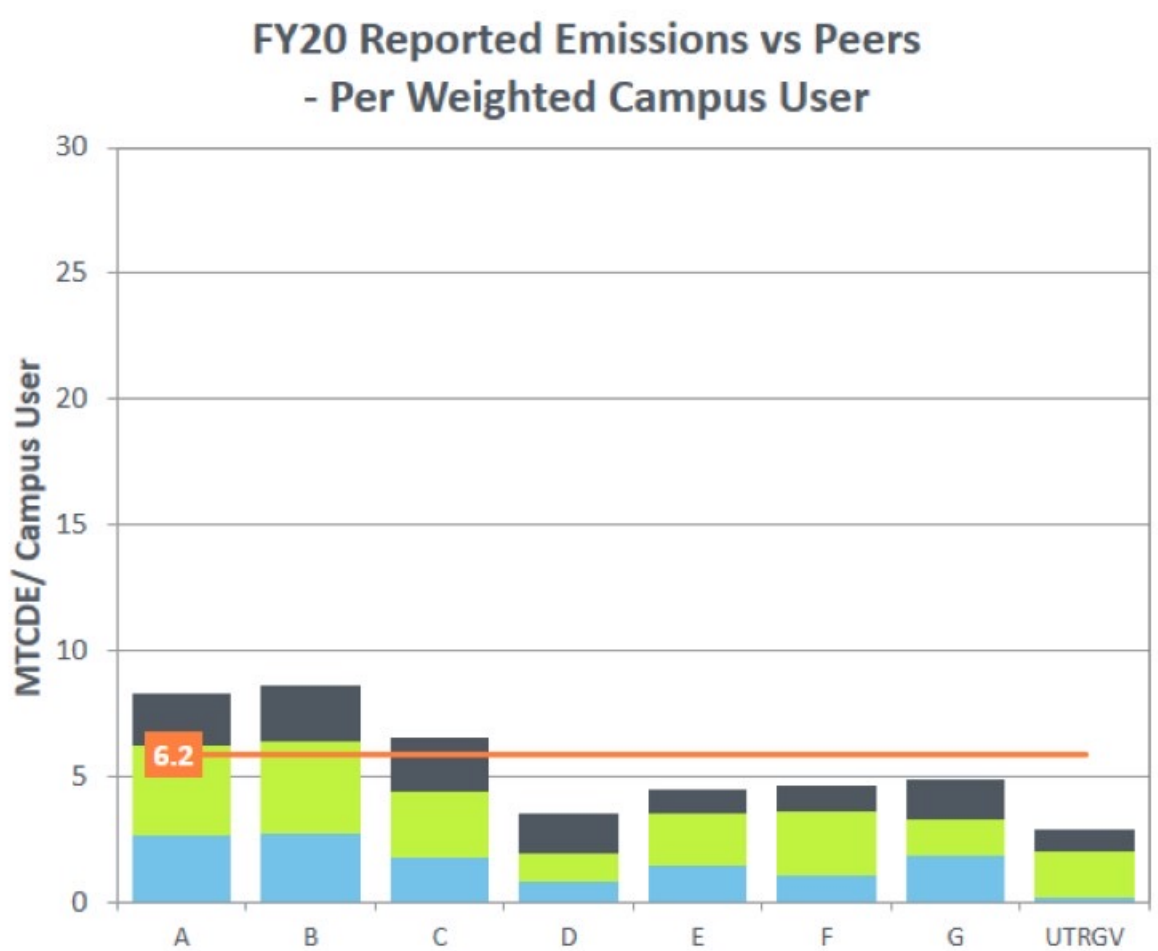
Total FY20 Scope 3 Emissions Lower at UTRGV Than Peers

High commuting emissions at UTRGV, offset by low travel emissions



Overall FY20 Emissions Compared to Peers





Scope I Scope II Scope III

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Reduction Strategies

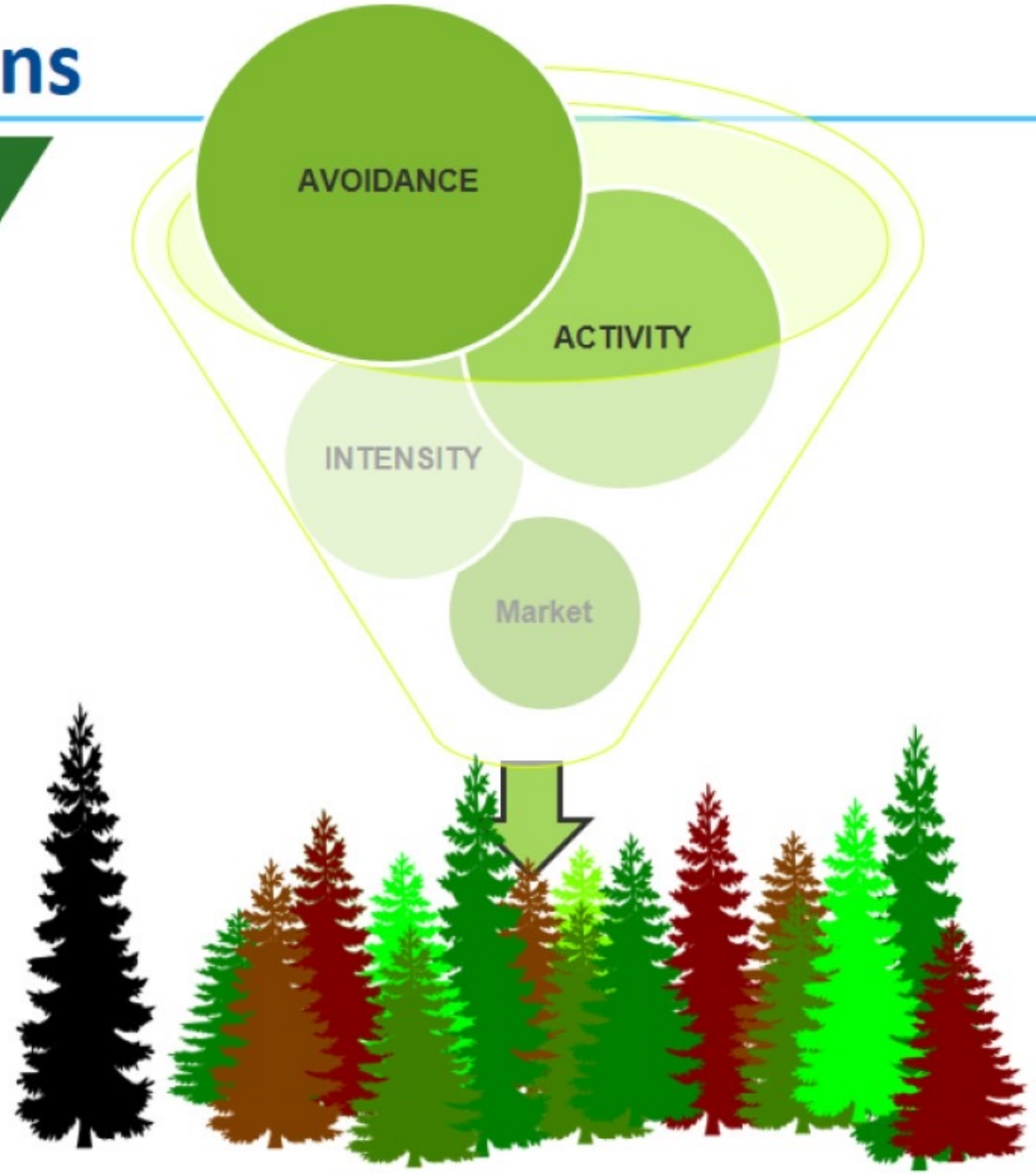
Strategies for Reducing Emissions

AVOIDANCE:
Prevent activities before they start
Example: Increase space utilization instead of building or acquiring new space

ACTIVITY:
Reduce the existing level of an activity
Example: Consume fewer BTUS' of energy/travel fewer miles

Intensity:
Lessening the carbon intensity of activities
Example: Fuel switching (coal to biomass)

Market:
Utilizing Market mechanisms to neutralize unavoidable GHGs



Tying Mission to Metrics

Mission

To transform the Rio Grande Valley, the Americas, and the world through an innovative and accessible educational environment that promotes student success, research, creative works, health and well-being, ***community engagement, sustainable development,*** *and commercialization of university discoveries."*

Reducing consumption *= seeing fossil consumption/gsf reduce*

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

Reducing consumption *= seeing electricity consumption/gsf reduce*

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

Using Benchmarks To Reach Reduction Goals

*Using building-level energy and financial data, **how can we create standards and strategies** to ensure future investments provide the highest ROI in terms of energy efficiency possible?*

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Engaging With Offset Purchasing

Prices vary dramatically depending on the project, but can be utilized for education

2020 Net Emissions

- Scope 1: **4,905**
- Scope 2: **43,317**
- Scope 3: **21,609**
- Total MTCDE: **69,831**

Offsets can be purchased to eliminate emissions

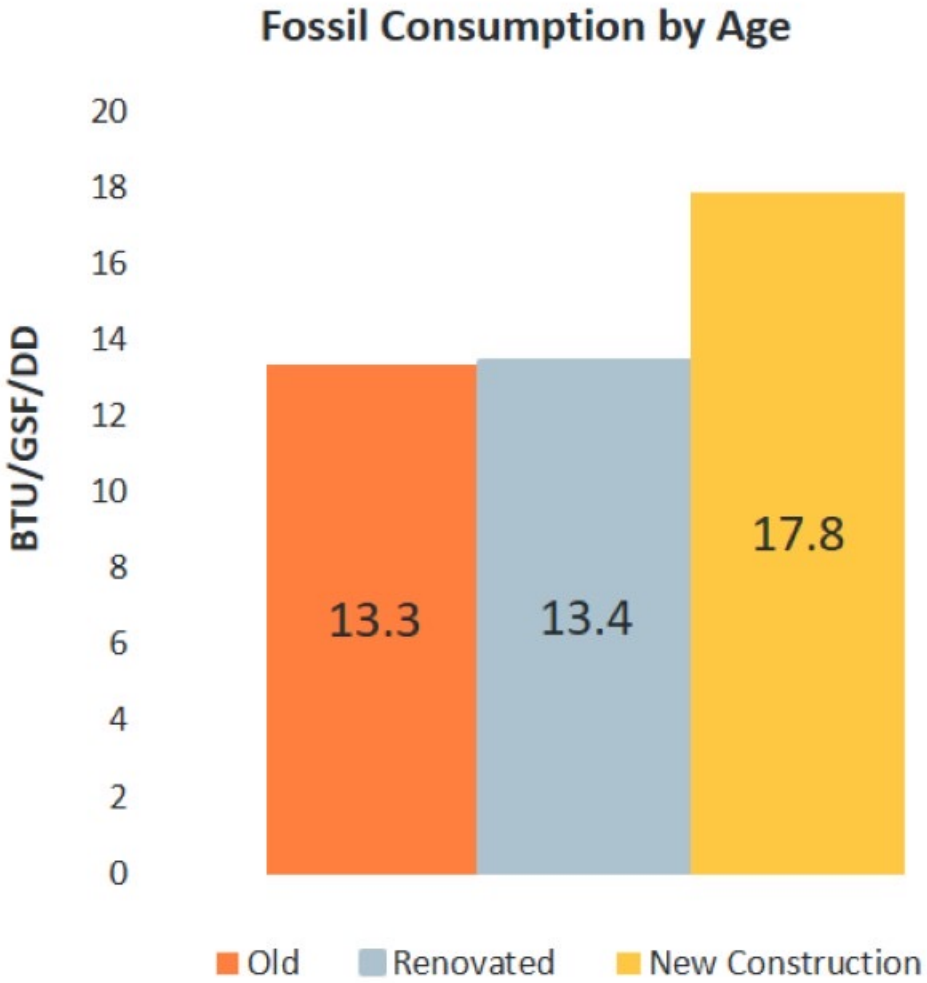
Industry Avg Price per Offset:
*$3-6 per Ton

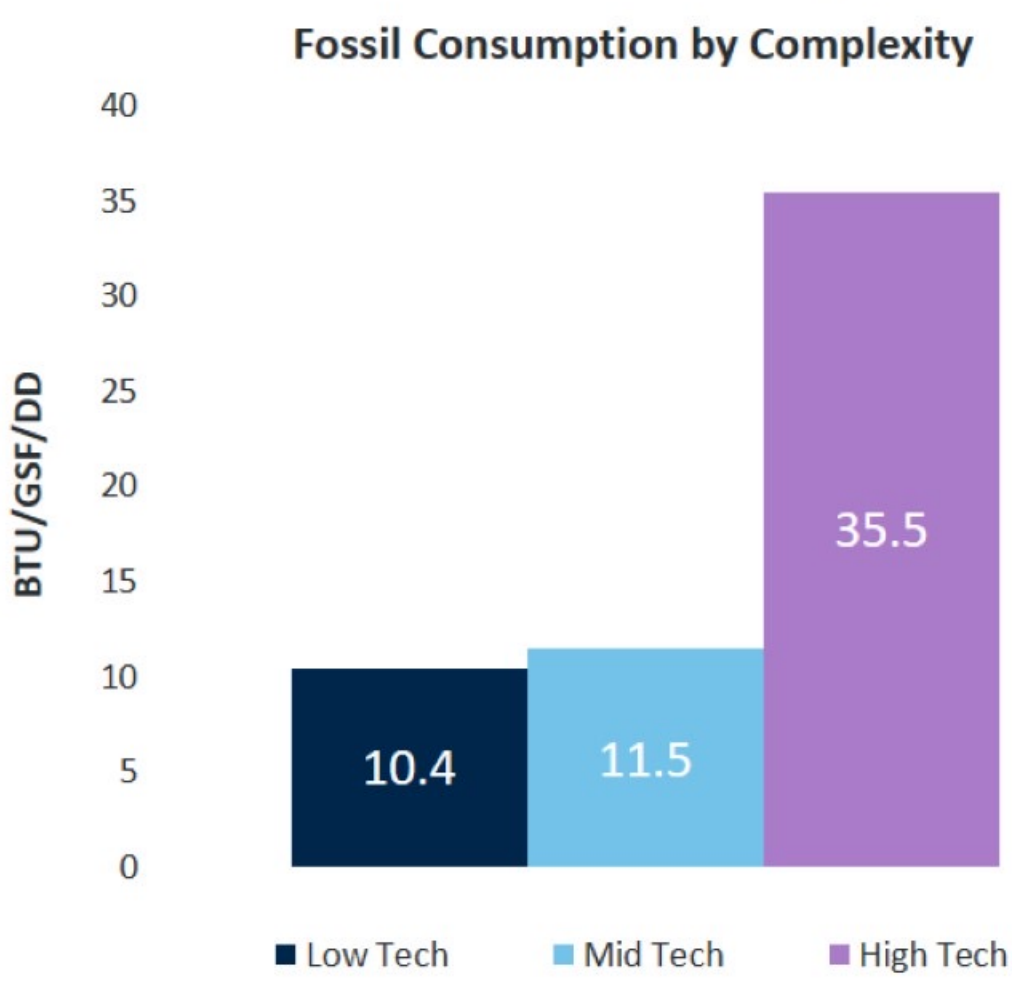
Estimated Annual Offset Investment:
$209,483 – $418,986

**Second Nature directs users to the Ecosystem Marketplace Yearly Report for up-to-date information on the Voluntary Offset Market. In 2020 they reported the average offset price to be $3-$6/tCO2e.*

State of Sustainability: New, High-tech Spaces Consuming More Energy

High-tech buildings consume 96% more fossil fuel than mid-tech buildings





High Tech
- Central cooling
- Dehumidification
- Frequent air changes

Mid Tech
- Central cooling; air handling system
- Seasonal heating and cooling only

Low Tech
- Small independent heating system
- No cooling or local cooling units

Information is based on Sightlines' database of sustainability institutions

State of Sustainability Findings and Recommendations

More complex is not always better; make tailored design choices to match occupant needs

- A nuanced approach to making construction and renovation choices in which complex is not always better and selected systems are tailored to occupant needs.
- When building operators and users cannot fully optimize complex modern systems, efficiencies are lost.

Residential Buildings:

- **If Possible, Renovate:** Renovations are often less costly than new construction and occupant satisfaction is not higher between low and mid-tech buildings.
- **If New Space Must Be Built:** Install central cooling, continue to avoid frequent air changes and limit apartment-style living.

Academic Buildings

- **If Possible, Renovate:** During renovations, central air conditioning is frequently installed, but sophisticated systems are avoided. Only construct new when there is a business case that new construction will improve educational outcome.
- **If New Space Must Be Built:** Install central cooling and tailor technical capacity to match needs. Often, buildings with high technical complexity do not house programs with a corresponding need for technical capacity.
- **If High Technical Capacity is Essential:** Emphasize sustainable design and operations throughout lifecycle of building

Sustainability Key Takeaways

Covid-19 Impacted Sustainability in FY20:

- Nearly half of FY2020 was impacted by the COVID-19 pandemic which caused a transition to remote learning in the Spring semester. With limited users on campus after March, UTRGV saw a reduction in emissions across scopes 1 and 3. This is due to several weeks of significantly reduced commuting, traveling, trash removal, and paper consumption.

Commuting Survey Gives Insight on Campus Commuting Behaviors:

- UTRGV distributed a committing survey in Fall 2020 which provided more accurate information on the mode of transportation utilized by campus users. Distributing this survey on a regular basis moving forward will help track how this shifts over time.

What's Next for UTRGV?

- New construction has been a priority for UTRGV over the past several years. Moving forward, align capital projects with energy efficient choices. New space is typically associated with higher costs and less efficiencies, and at the same time, existing space is continuing to age.
- UTRGV's mission statement includes having sustainable development on campus. To measure progress in this area, consider creating goals for utility reduction, educating the community on sustainability strategies, improving data tracking efforts, and utilizing market mechanisms to offset emissions such as purchasing offsets.
- The transition to remote/hybrid learning will continue to impact FY2021 and beyond. With less people anticipated on campus in the next few years, how will UTRGV keep the community engaged with sustainability goals?

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). 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
- **Transmission and Distribution loss (T&D Losses) -** The difference in the generated and distributed units of energy is known as Transmission and Distribution loss.

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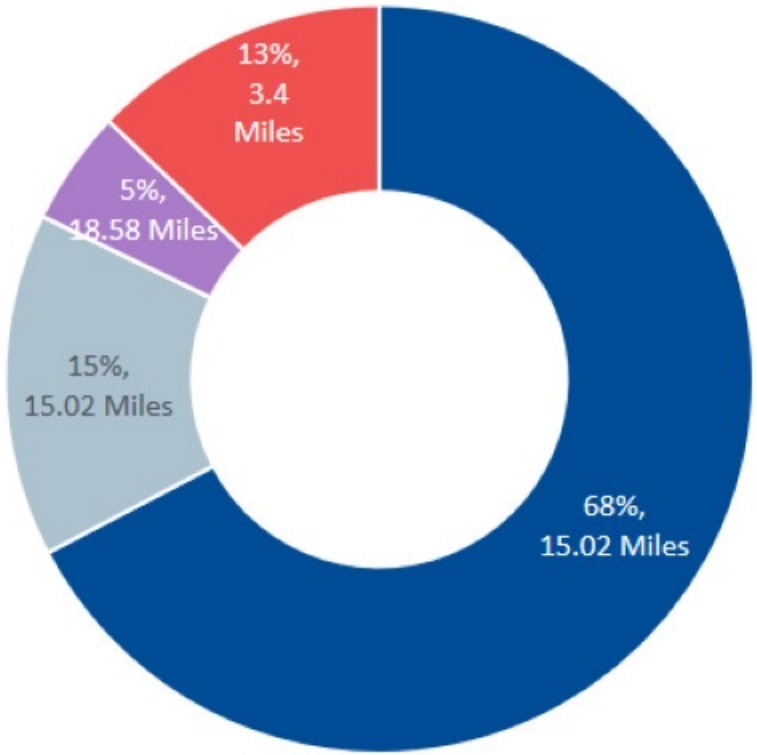
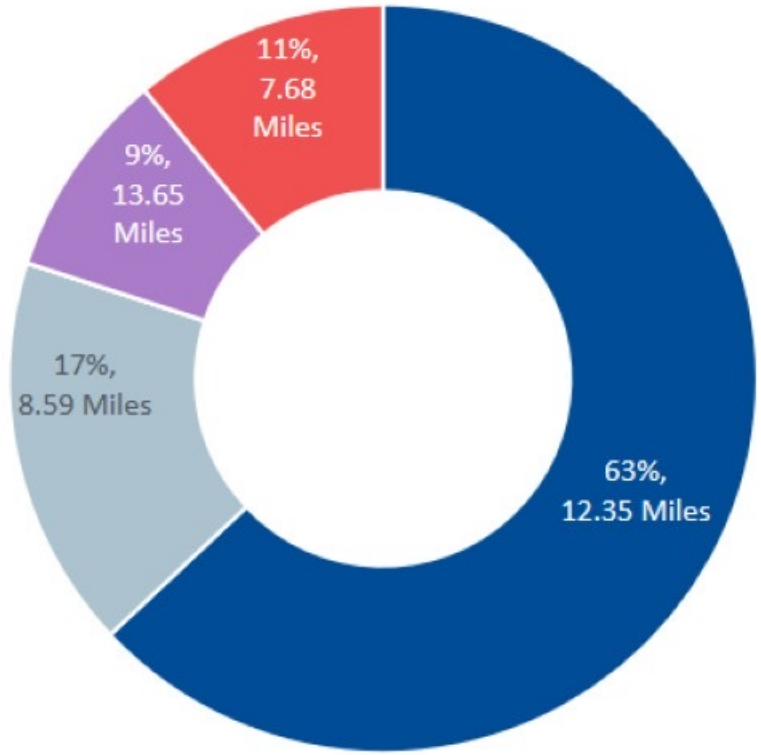
Pre-Pandemic Commuting Habits by Students

More than half of students traveled alone; 2nd highest method of transportation was carpooling

FY20 Student Commuters: Edinburg



FY20 Student Commuters: Brownsville



■ Automobile ■ Carpool ■ Commuter Rail ■ Bus ■ Carbon Free

Pre-Pandemic Commuting Habits by Employees

Majority of employees traveled alone to campus