

# The University of Alabama Go Green MB&A Presentation FY2011

*June 7, 2012*

*Presented by: Mike Anderson & Tom Gugert*

Sightlines



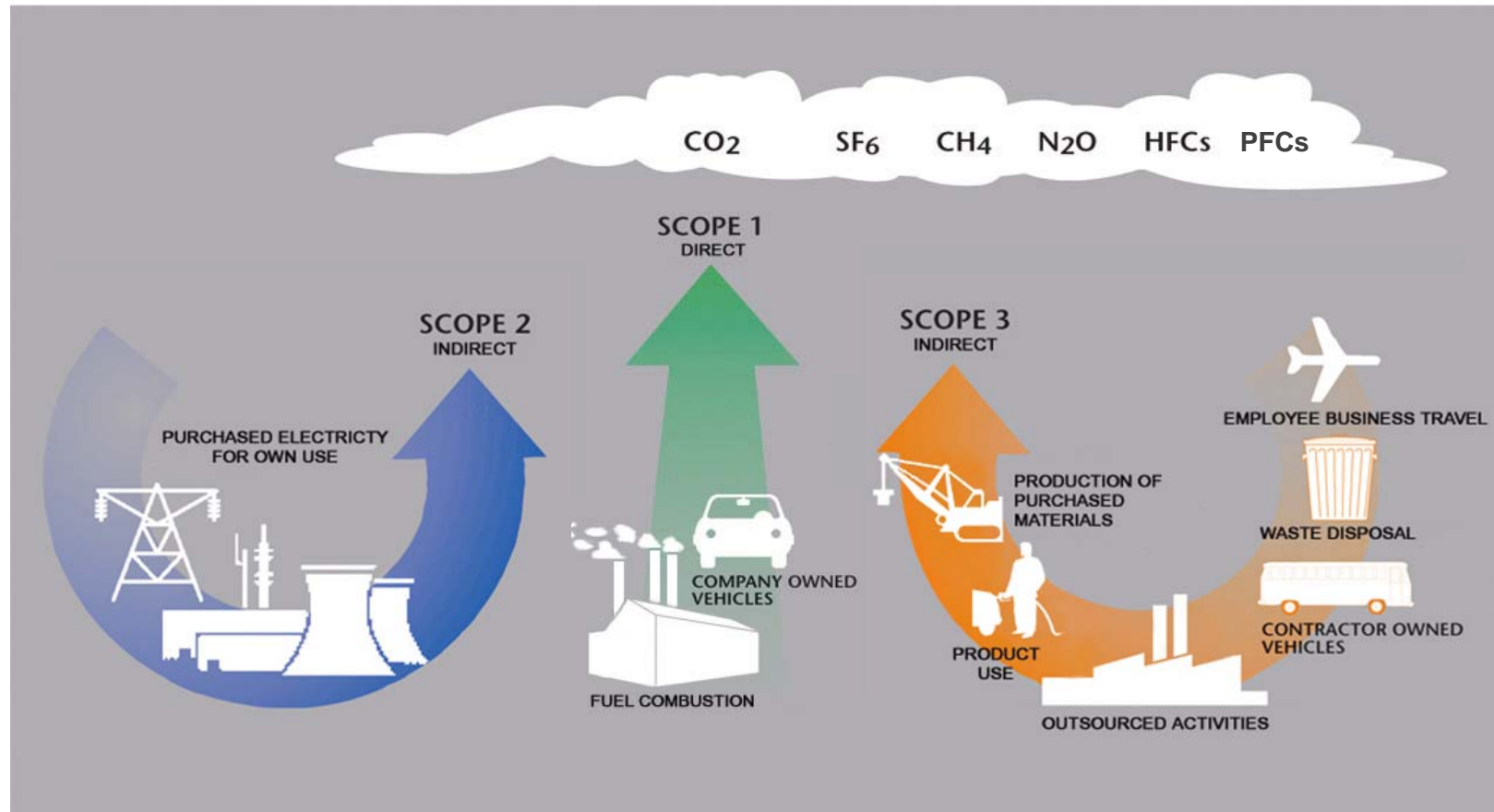
University of Illinois at Urbana-Champaign  
The University of Maine  
University of Maine at Augusta  
University of Maine at Farmington  
University of Maine at Machias  
University of Maine at Presque Isle  
University of Maine at Fort Kent  
University of Maryland  
University of Massachusetts Amherst  
University of Massachusetts Boston  
University of Massachusetts Dartmouth  
University of Massachusetts Lowell  
University of Michigan  
University of Minnesota  
University of Missouri  
University of Missouri - Kansas City  
University of Missouri - St. Louis  
University of New Hampshire  
University of New Haven  
University of Notre Dame  
University of Oregon  
University of Pennsylvania  
University of Portland  
University of Redlands  
The University of Rhode Island, Narragansett B  
The University of Rhode Island, Feinstein  
Providence  
The University of Rhode Island, Kingston  
University of Rochester  
University of San Diego  
University of San Francisco  
University of St. Thomas (TX)  
University of Southern Maine  
University of Toledo  
University of Vermont  
Upper Iowa University  
Utica College  
Vassar College  
Virginia Commonwealth University  
Virginia Department of General Services  
Wagner College  
Wellesley College  
Wesleyan University  
West Chester University of Pennsylvania  
West Virginia University  
Western Connecticut State University

# Simplifying GHG sources into scopes

All expressed as metric tons of carbon dioxide



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**Scope 2:** Emissions from utility production not at the institution

**Scope 1:** Emissions from the direct activities of the campus

**Scope 3:** Indirect emissions including transportation, waste disposal, etc.

*This slide courtesy of CA-CP*

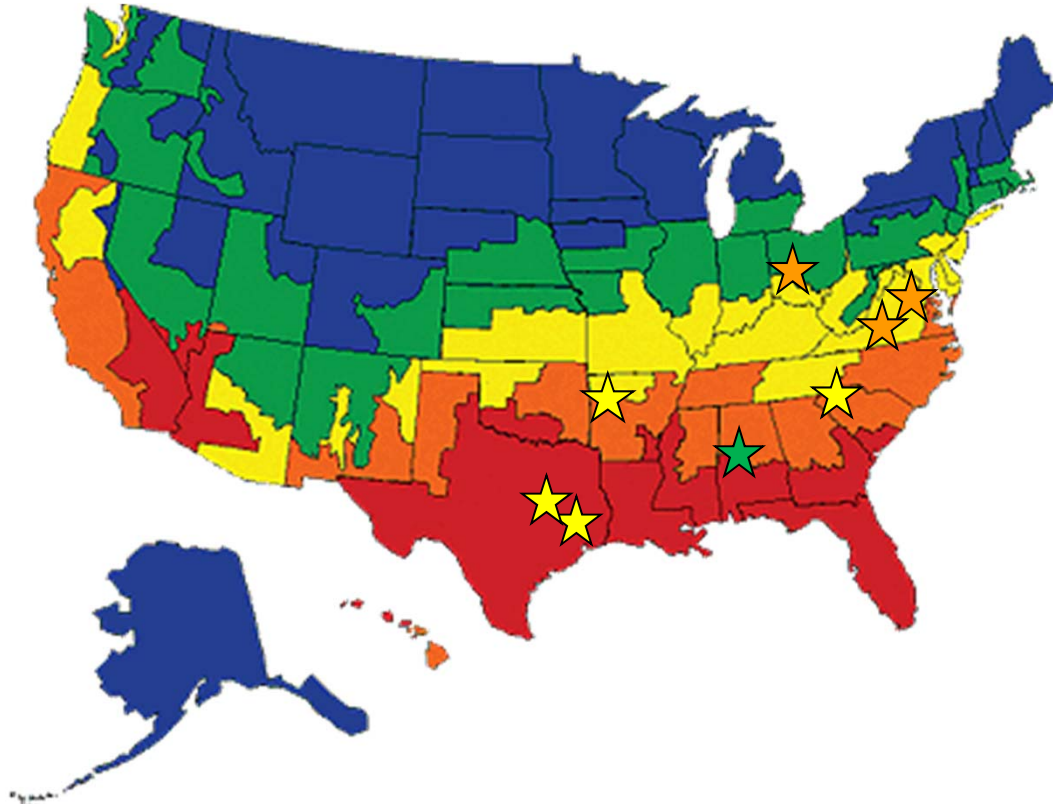


# Developing peer group

## Go-Green Measurement, Benchmarking and Analysis



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### Go-Green Peer Institutions

Clemson University

George Mason University

Southern Methodist University

Texas A&M University

The University of Dayton

University of Arkansas

Virginia Commonwealth University

### Go-Green Measurement and Analysis Members

- Sightlines has approximately 55 Members
- Approximately two-thirds are private
- Approximately one-third are public
- Approximately two-thirds have signed the ACUPCC
- Approximately forty percent are Charter Signatories

### Peer Group Based On

- Size
- Technical Complexity
- Climate Zone




# Go Green: Core Concepts

Impact of daily actions and strategic initiatives



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**Younger buildings =  
More energy efficient**



**Space becoming more  
efficient**



**Lower carbon footprint**



**Detailed project list:  
Choosing the right projects**

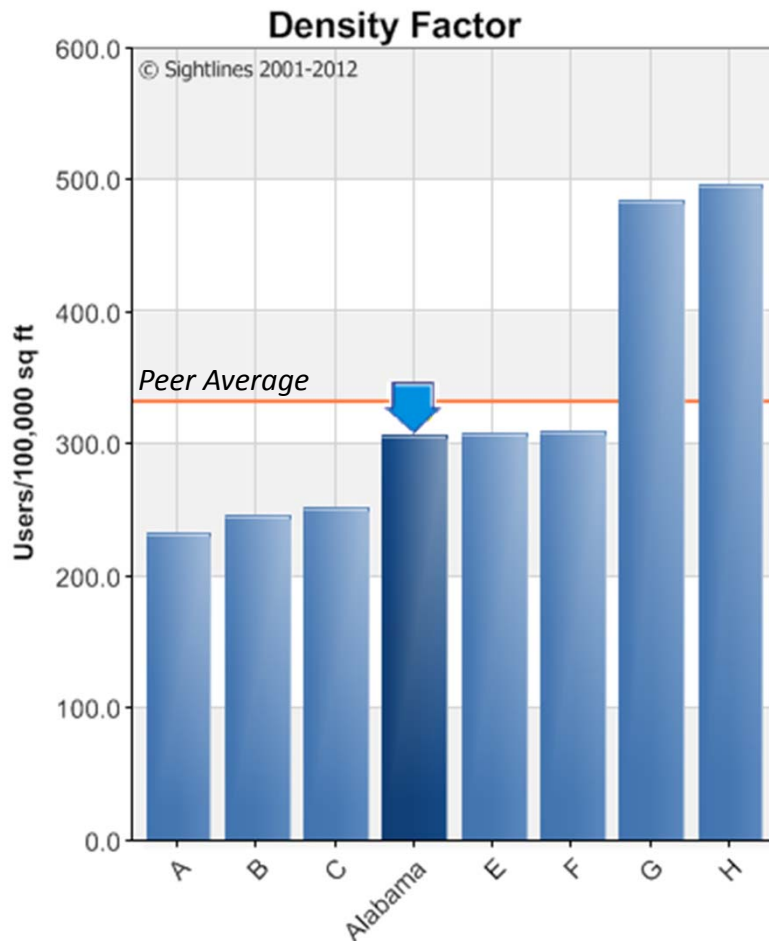




# Space Profile

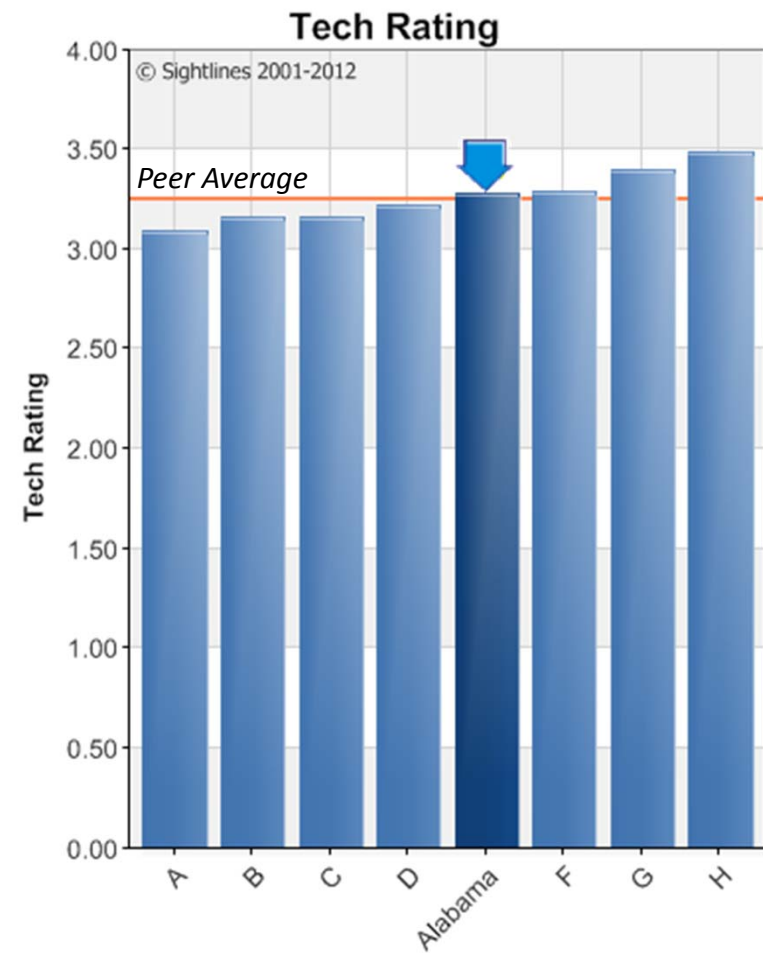


# Understanding your space profile



Campus is less crowded than peers:

- More residential = Less commuters
- Lower space utilization



Campus is complex:

- Spaces will require more energy
- Systems will be more expensive to upgrade

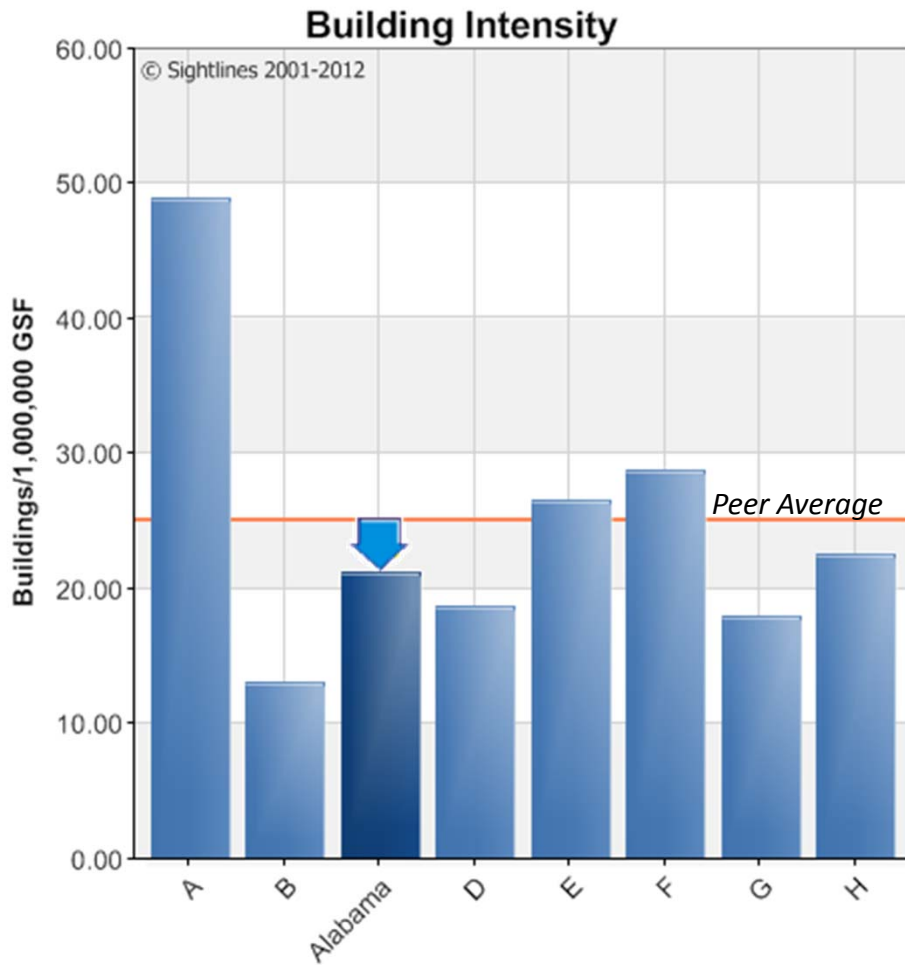


# Understanding your space profile

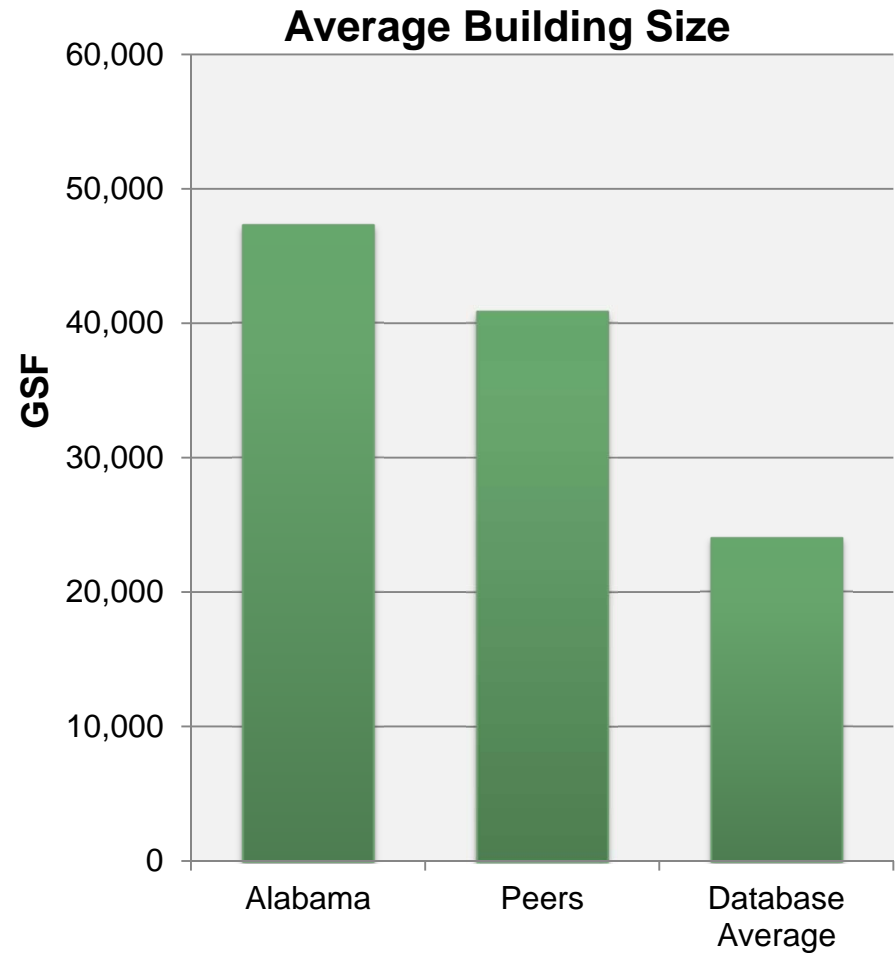
Buildings larger than peers, database average



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Institutions Ordered By: Density Factor



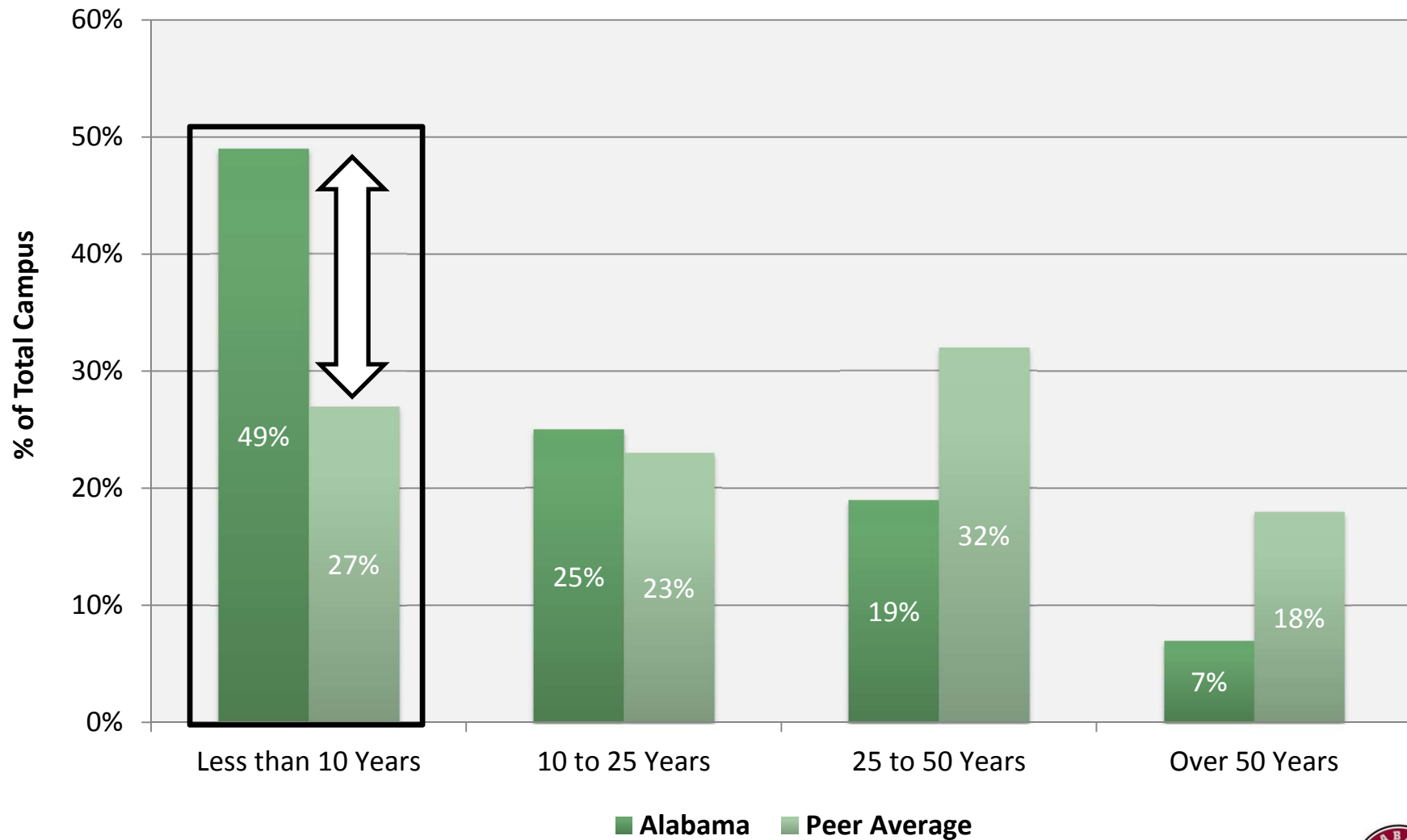
# Alabama has more younger space than peers

Dichotomy between buildings under 10 and over 10 years old



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## GSF by Renovation Age Category



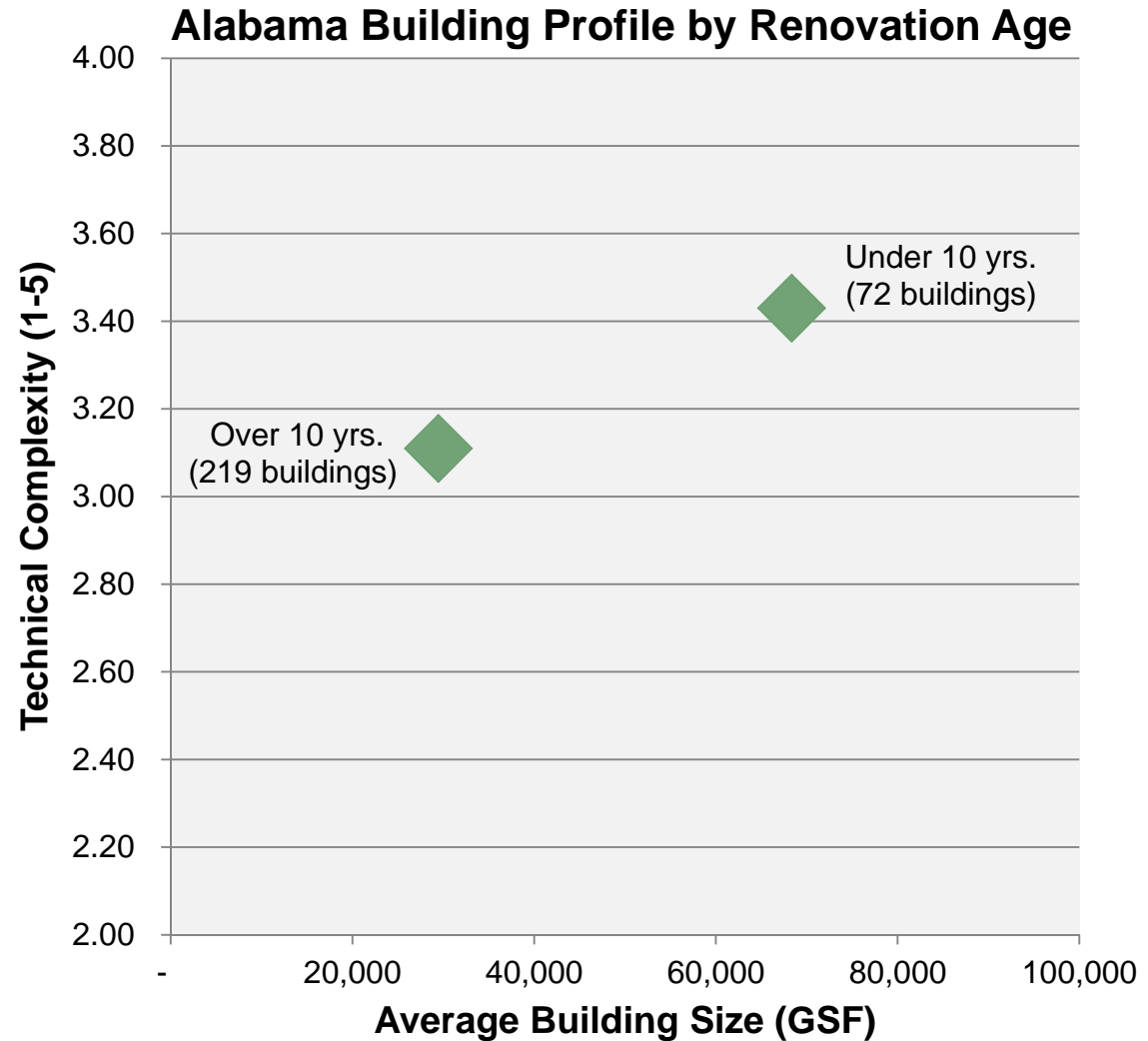
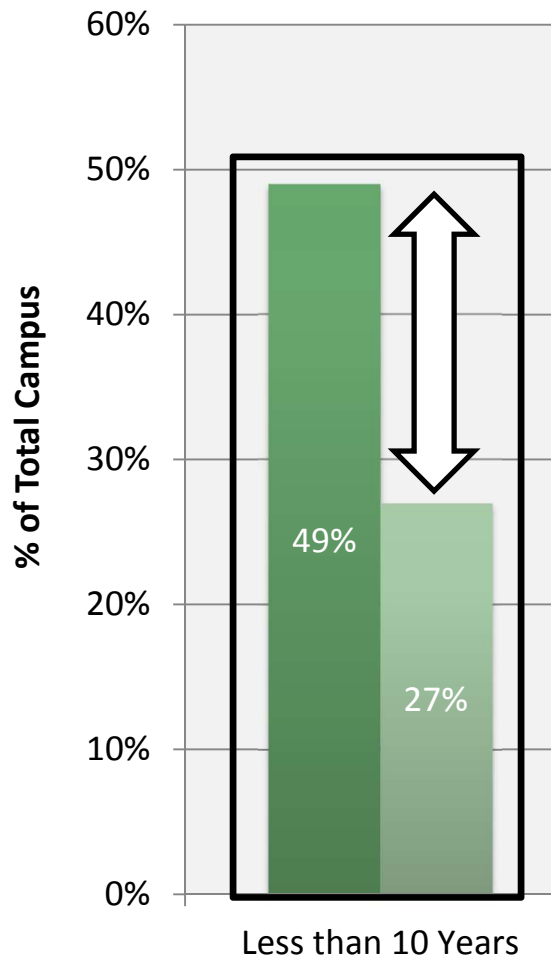


# Alabama has more younger space than peers

Dichotomy between buildings under 10 and over 10 years old



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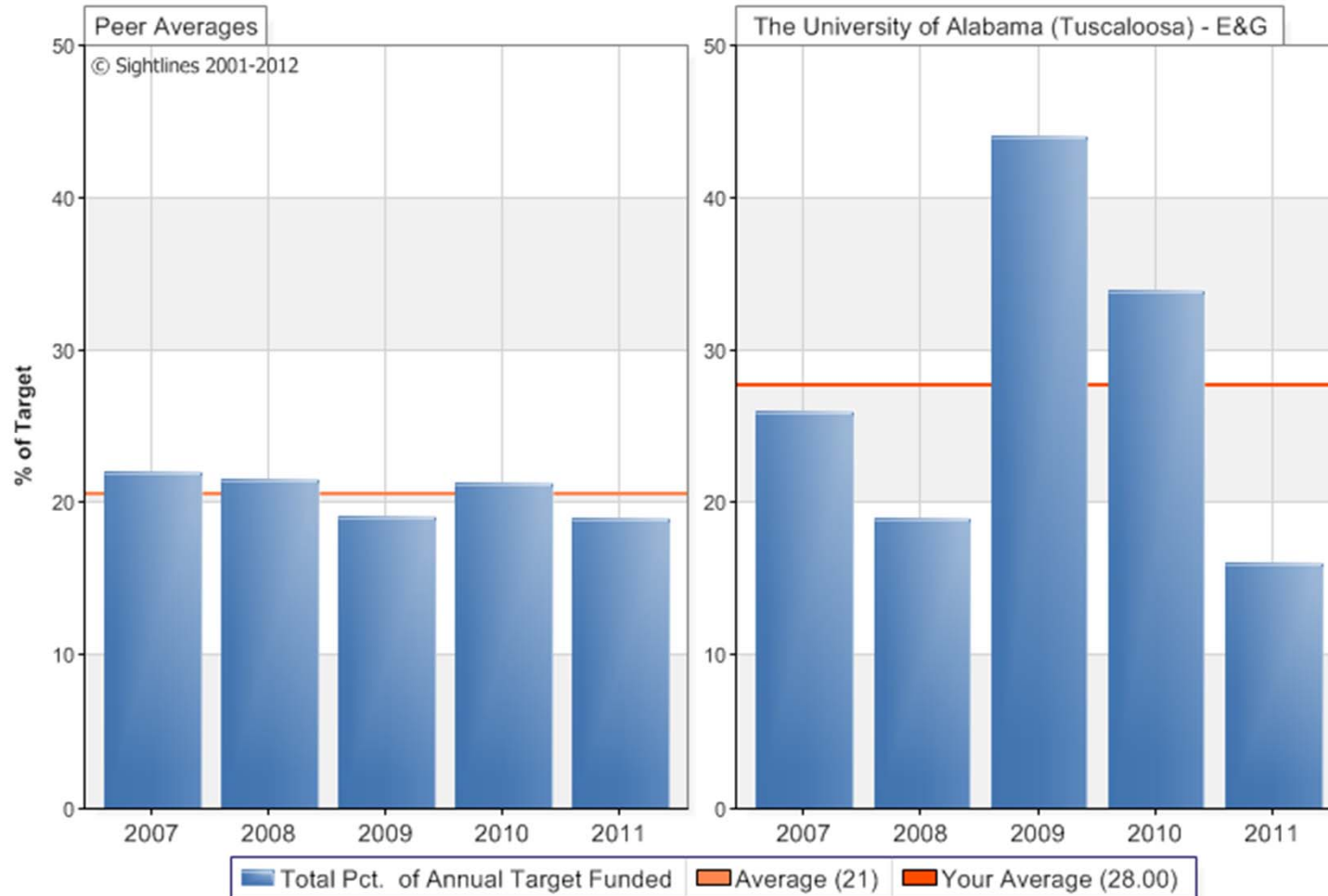
# Alabama reaches closer to target

74% of buildings under 25 years old, stewardship program vital moving forward



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## Total Annual Stewardship



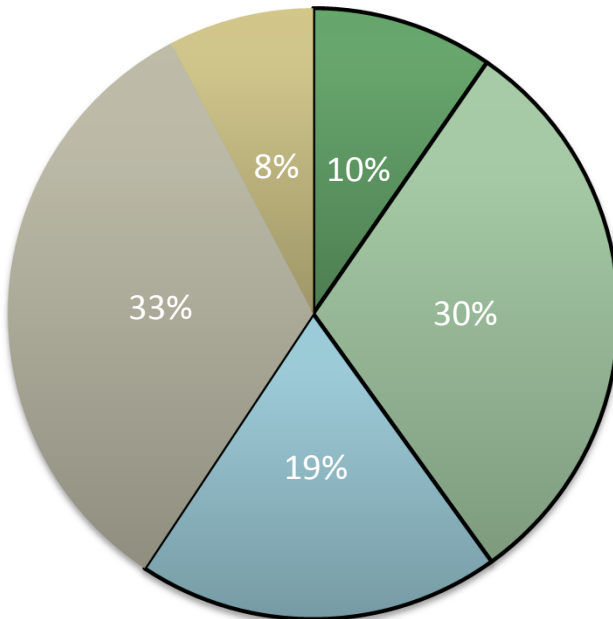
# Alabama has seen different funding mix

Higher percentage envelope projects vs. mechanical



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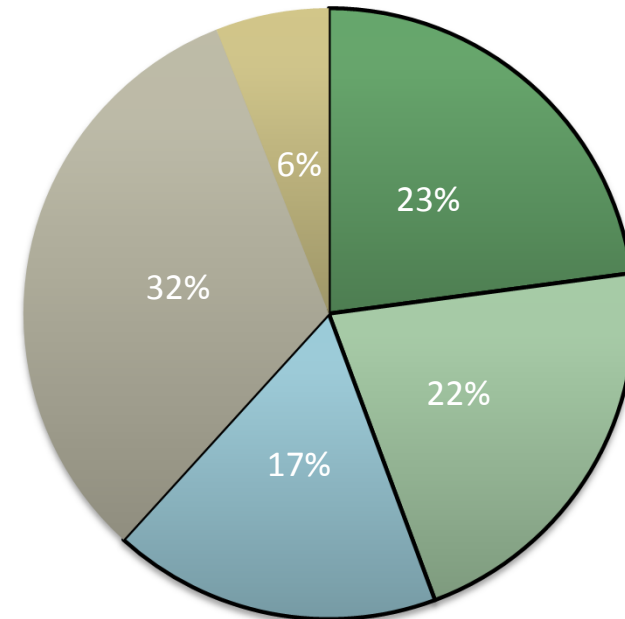
### Peer Total Project Spending By Package, FY03-11



- Envelope
- Building Systems
- Infrastructure
- Space
- Safety/Code

**Average annual investment: \$4.00/GSF**

### Alabama Total Project Spending By Package, FY03-11



- Envelope
- Building Systems
- Infrastructure
- Space
- Safety/Code

**Average annual investment: \$3.35/GSF**



# Important implications of your space profile

Connecting the physical profile of campus to your carbon inventory



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Avg. Bldg Size (GSF)	
Peer Average	40,900
Alabama	47,300

Larger buildings =  
**More energy efficient**

Weighted Reno. Age	
Peer Average	30.40
Alabama	18.20

Younger Buildings=  
**Efficient systems**

FY11 Backlog \$/GSF	
Peer Average	\$54.55
Alabama	\$42.14

Accumulated Backlog=  
**More flexible life cycle need**

FY11 Spending \$/GSF	
Peer Average	\$4.96
Alabama	\$4.21

Capital spending=  
**Improving physical assets**





# Carbon Emissions



# Two different ways to benchmark GHG emissions



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## GHG Emissions per Student



Stresses efficient use of space.

$$\frac{\text{Gross GHG Emissions}}{\text{Total Student FTE}}$$

## GHG Emissions per 1,000 GSF

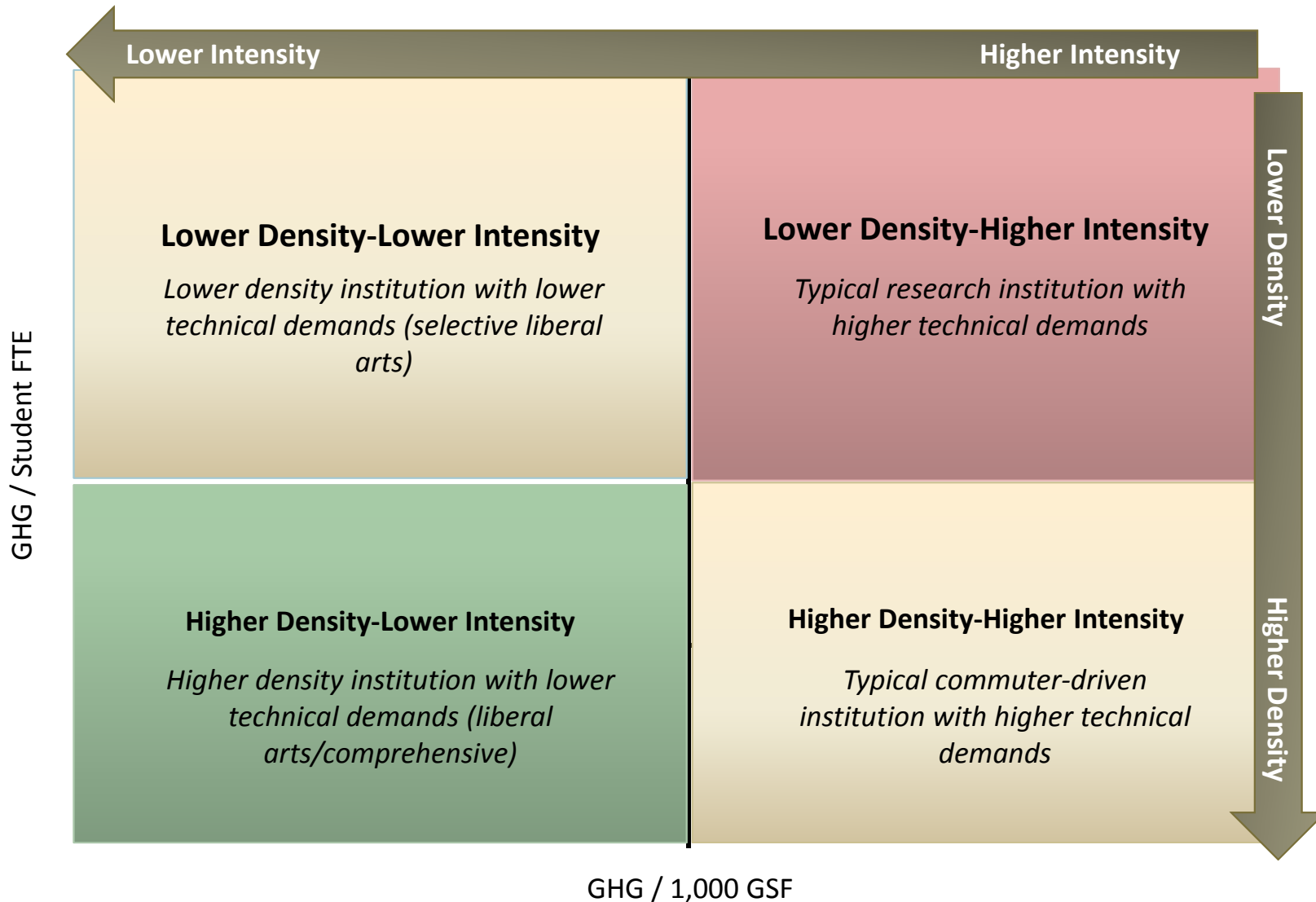


Stresses intensity of operations.

$$\frac{\text{Gross GHG Emissions}}{\text{Total GSF in Footprint}} \times 1,000$$



# Understanding “Performance Portfolios”

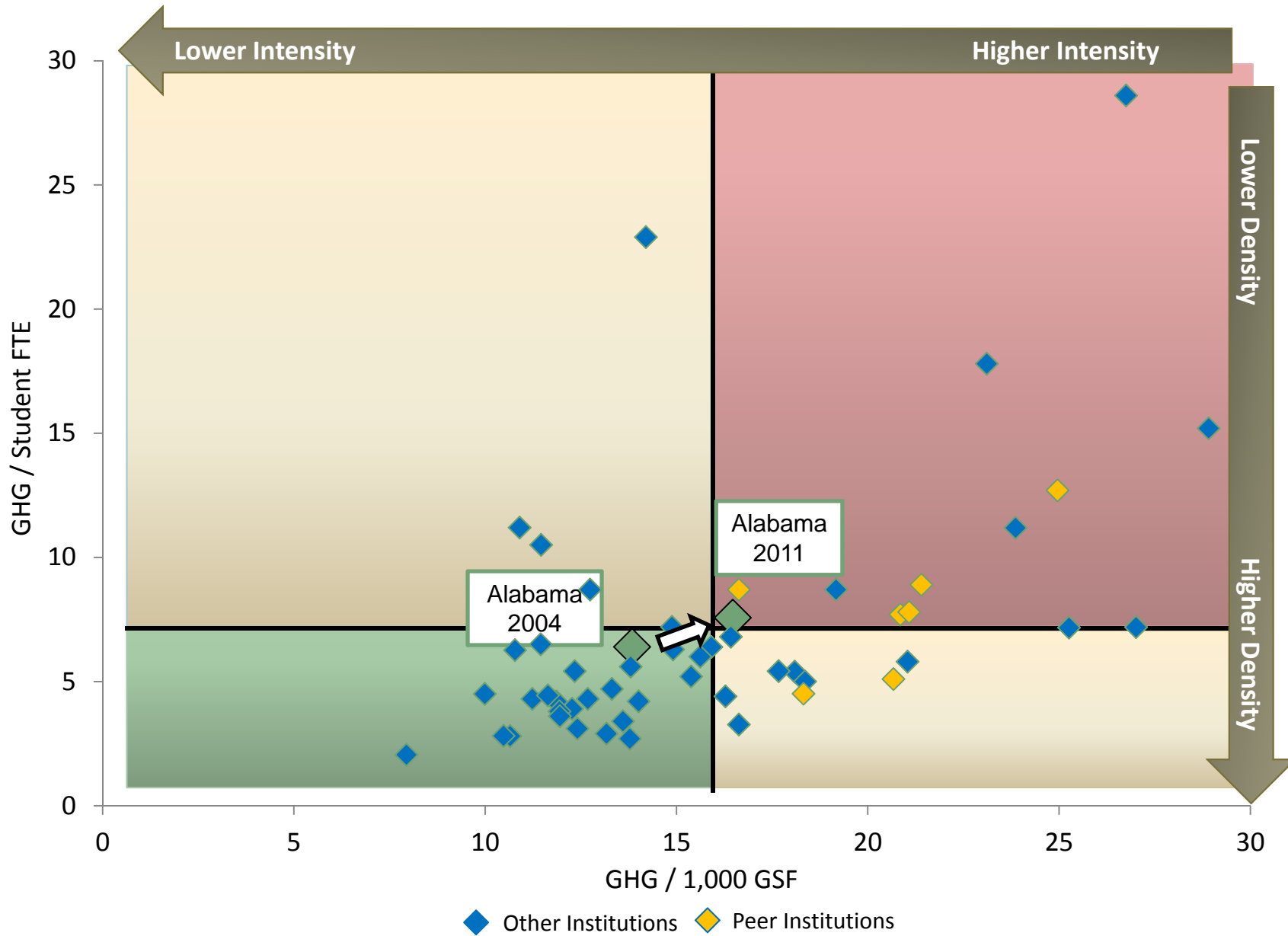


# Moving in the right direction

How will Alabama make progress?



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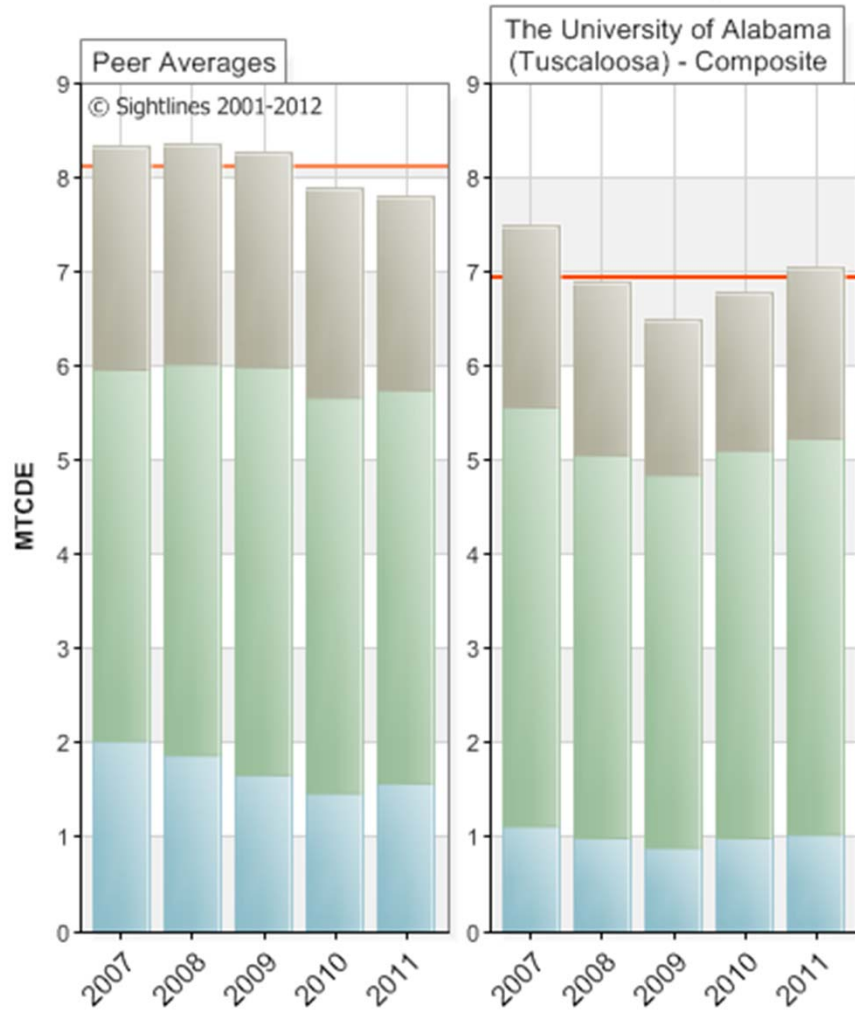




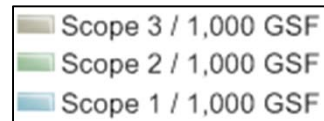
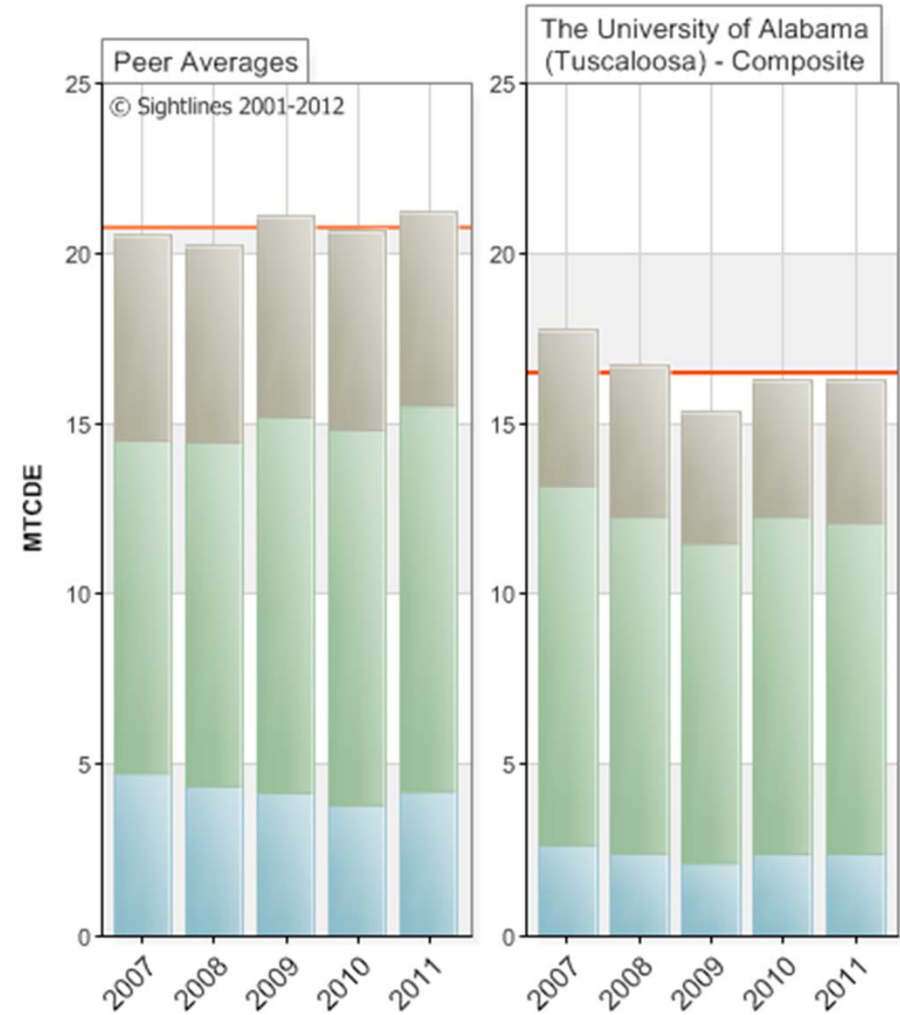
# Longitudinal emissions vs. peers



## Gross Emissions (per Student)



## Gross Emissions (per 1,000 GSF)



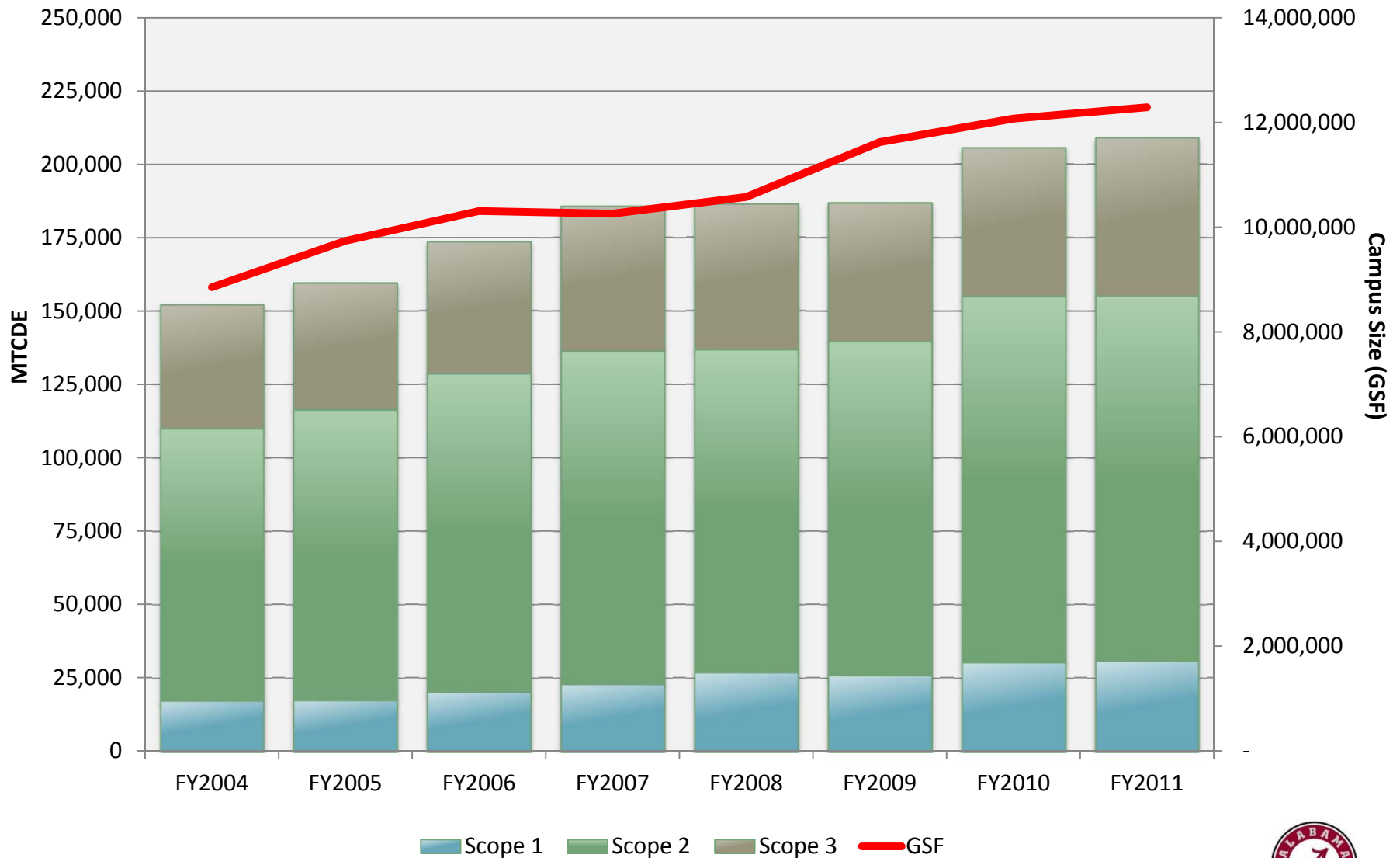
# Growth in FY11 emissions with additional GSF

40% growth in campus space, 37% growth in emissions



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## Longitudinal Gross Emissions

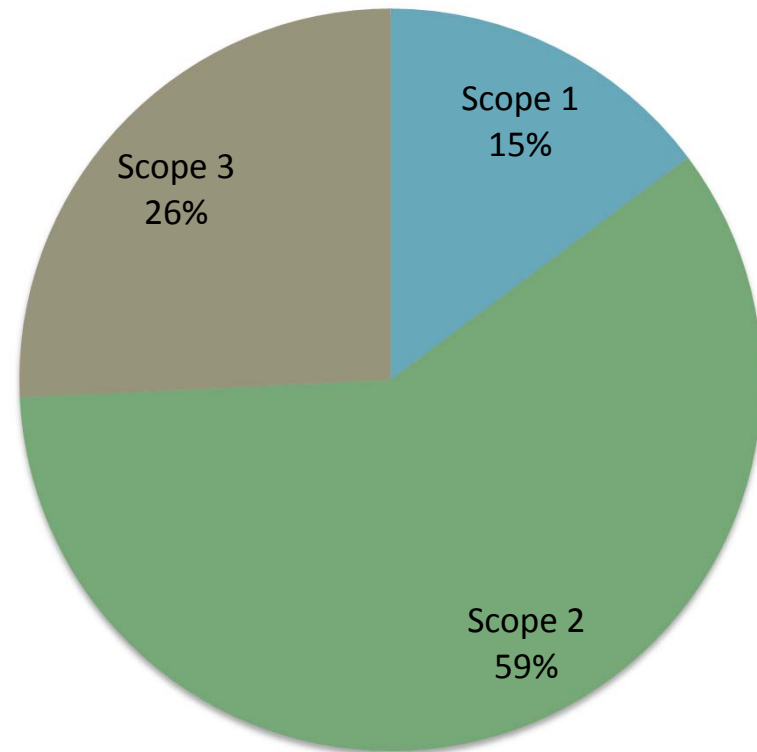
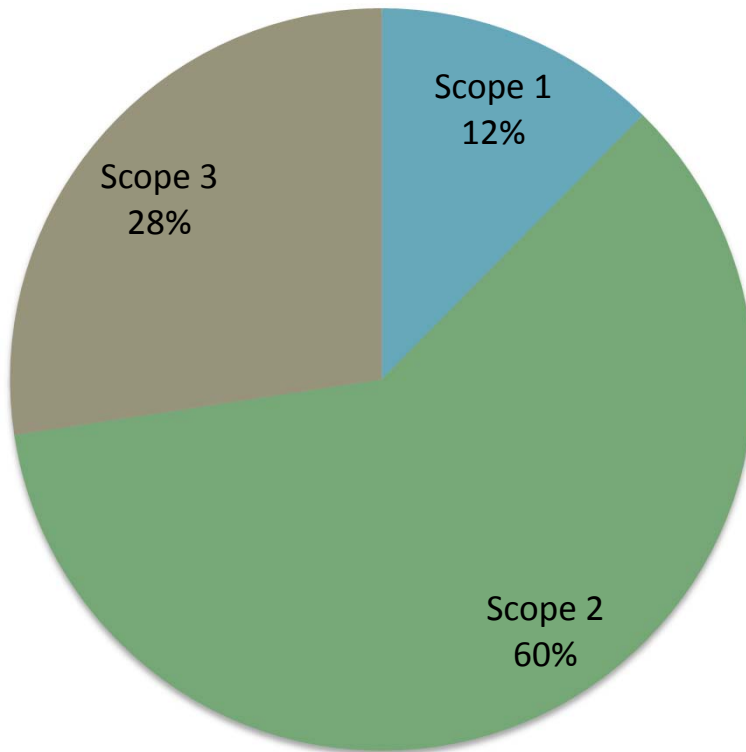


# Total FY11 Gross Emissions: 209,138 MTCDE

Proportional growth of sources with scope 3 decreasing slightly



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\* Other category represents agriculture and wastewater emissions- 0.1%



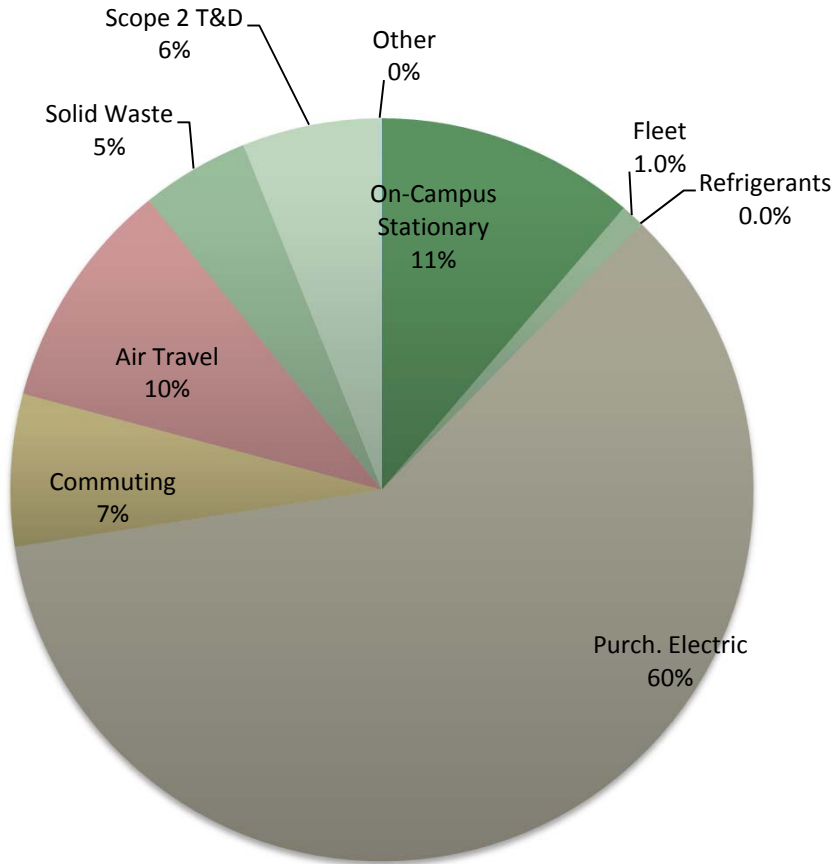
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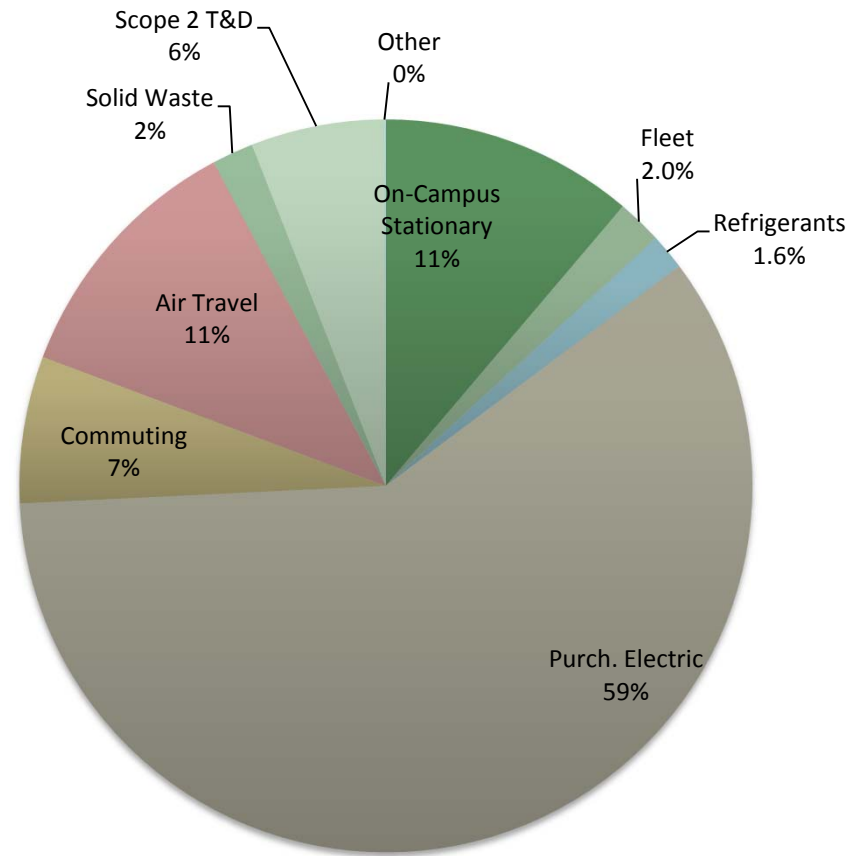


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### FY04 Carbon Emissions by Type



### FY11 Carbon Emissions by Type



\* Other category represents agriculture and wastewater emissions- 0.1%

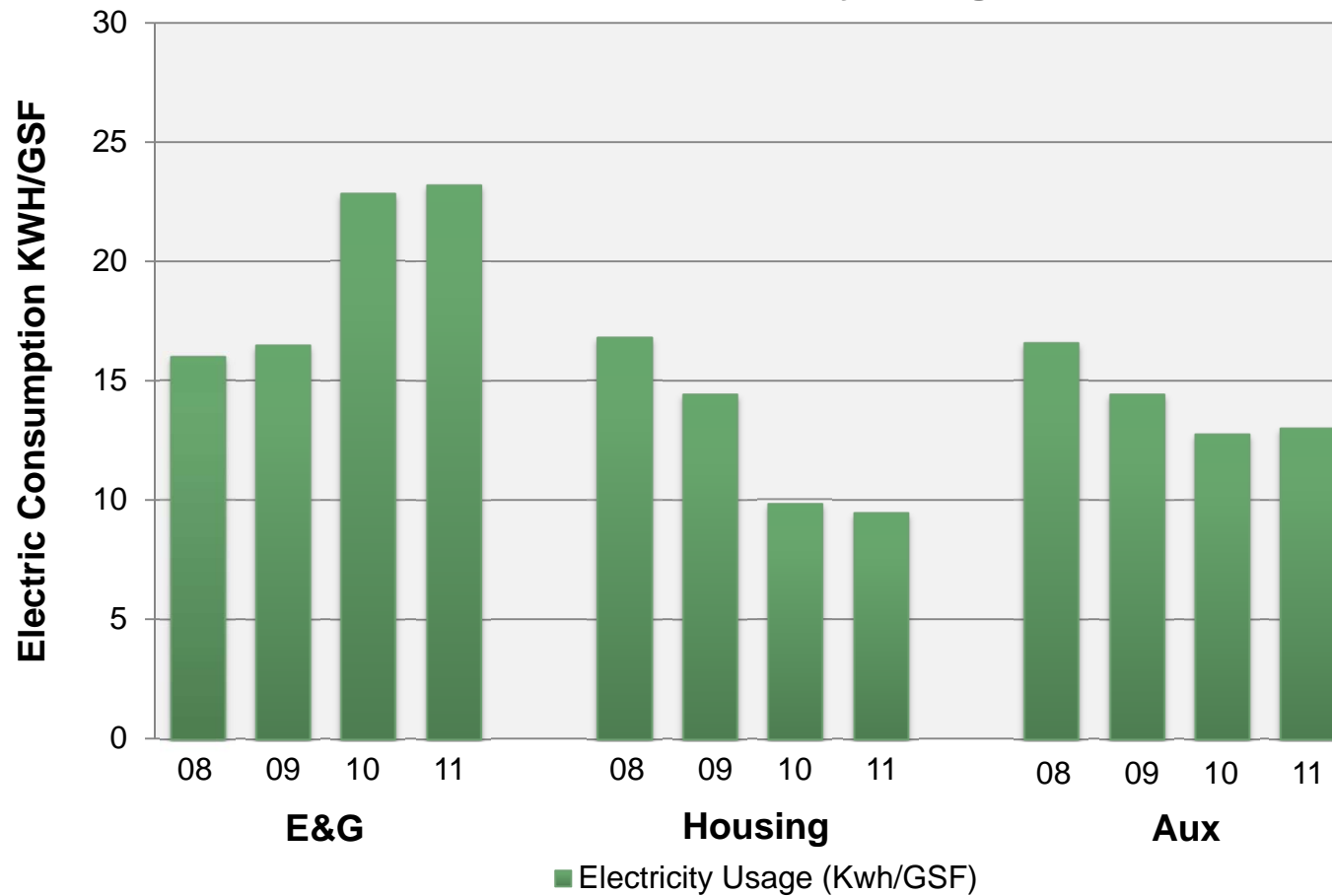




# Electricity Efficiency by function



## Campus Electricity Usage



-E&G buildings coming online are more complex and serve various programmatic needs

-Housing buildings tend to have simpler mechanical systems and less need for complex air changes

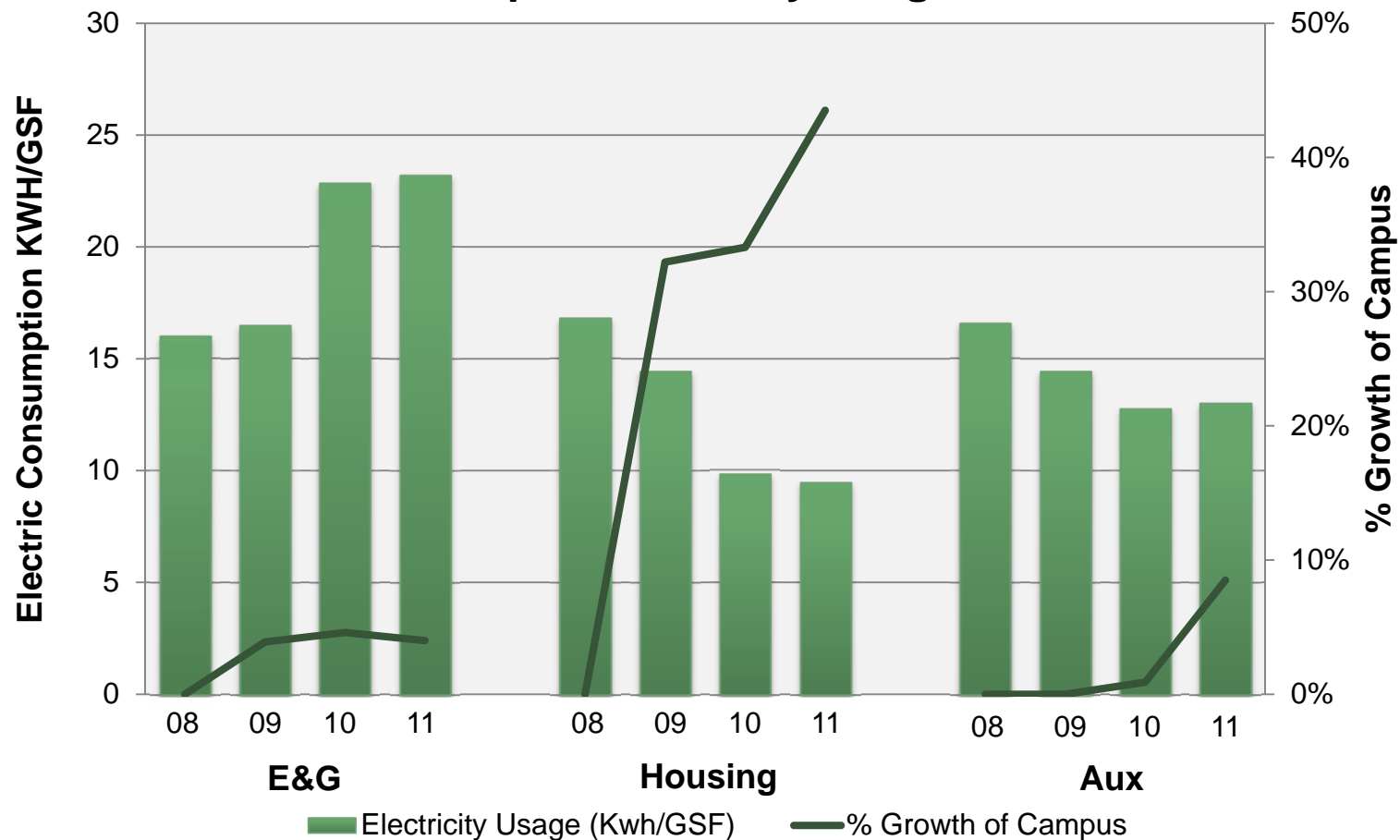


# Electricity Efficiency by function



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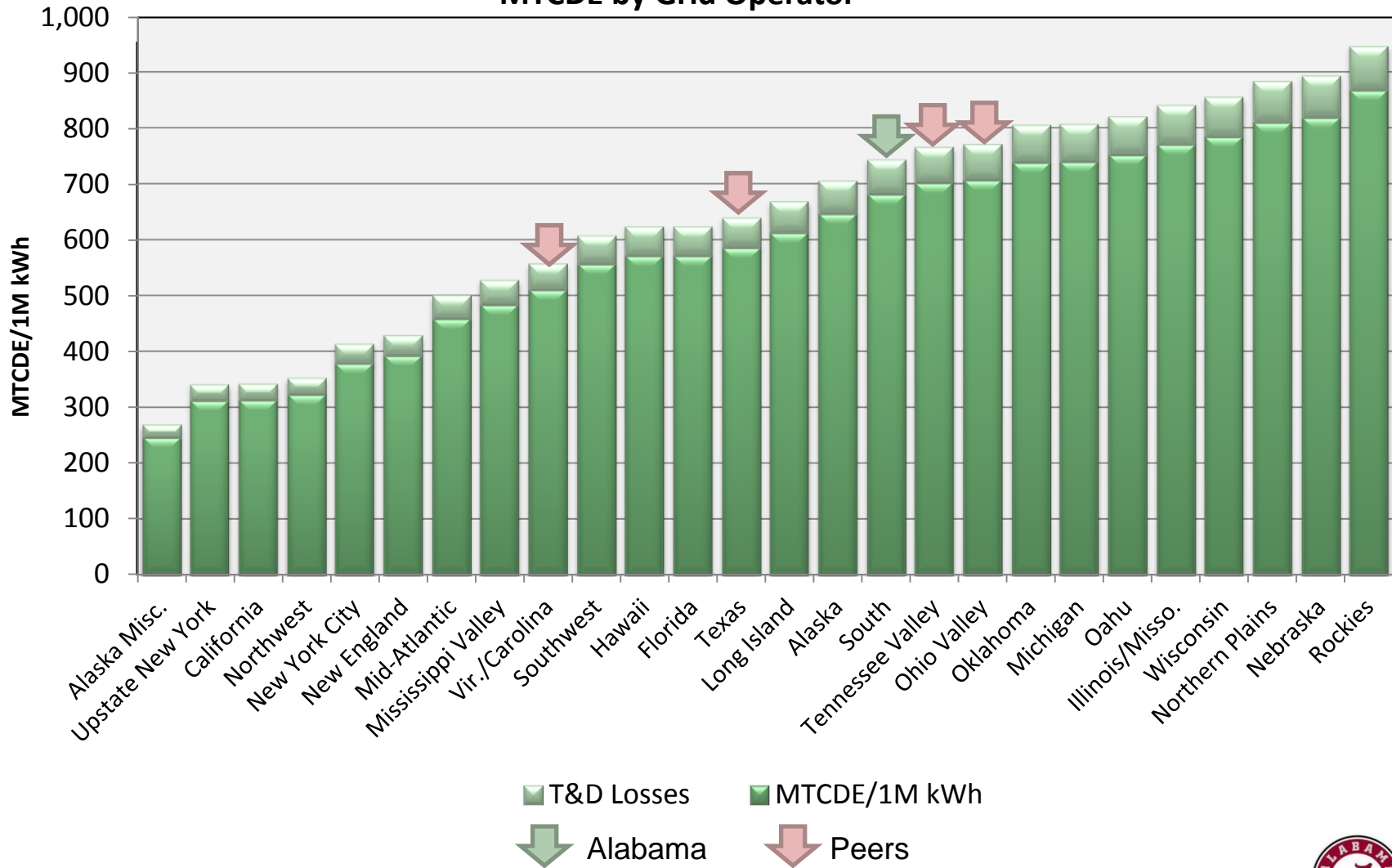
# Comparing Alabama's grid to other US regions



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Scope 2

MTCDE by Grid Operator



# Factors that influence electricity emissions

## Regional carbon intensity vs. peers



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Scope 2

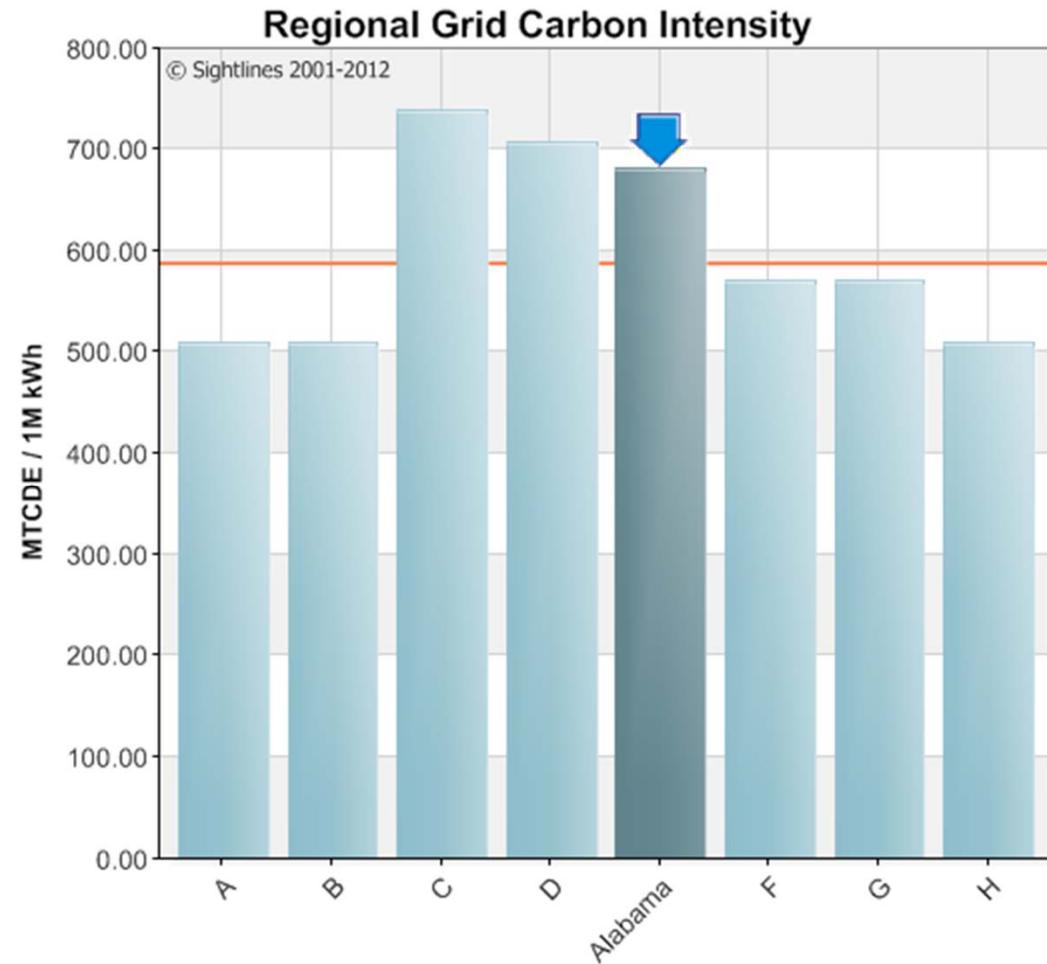
Regional  
Grid Carbon  
Intensity



Purchased  
electricity  
consumption



Purchased  
electricity  
Emissions



*Carbon intensity of purchased electricity higher than peers*



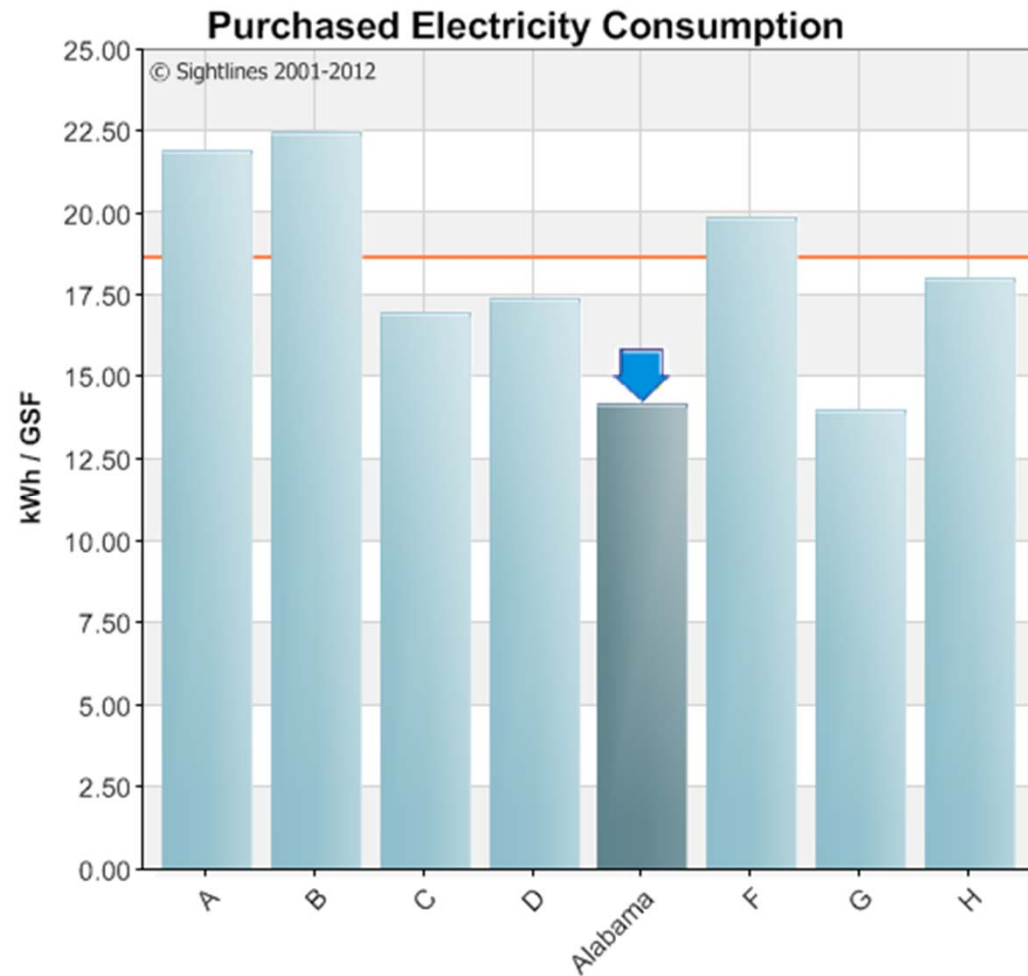
# Factors that influence electricity emissions

## Purchased electricity consumption vs. peers



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Scope 2



*Consuming less electricity than peers*



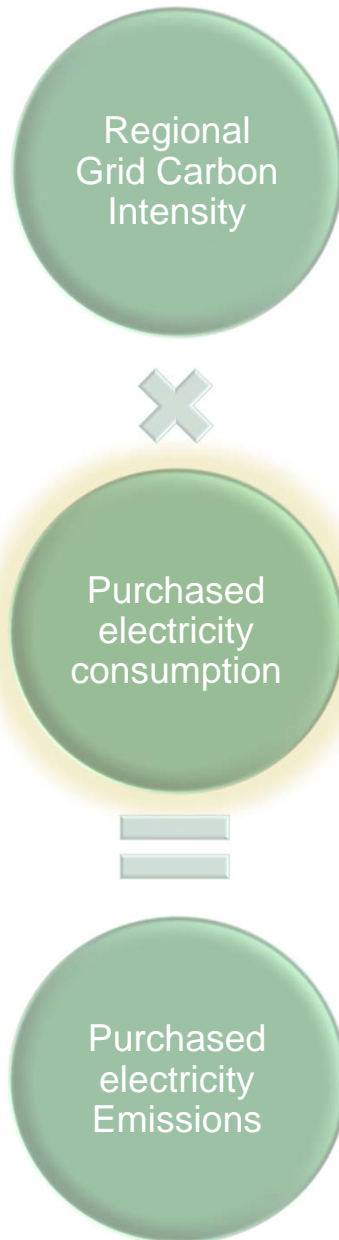
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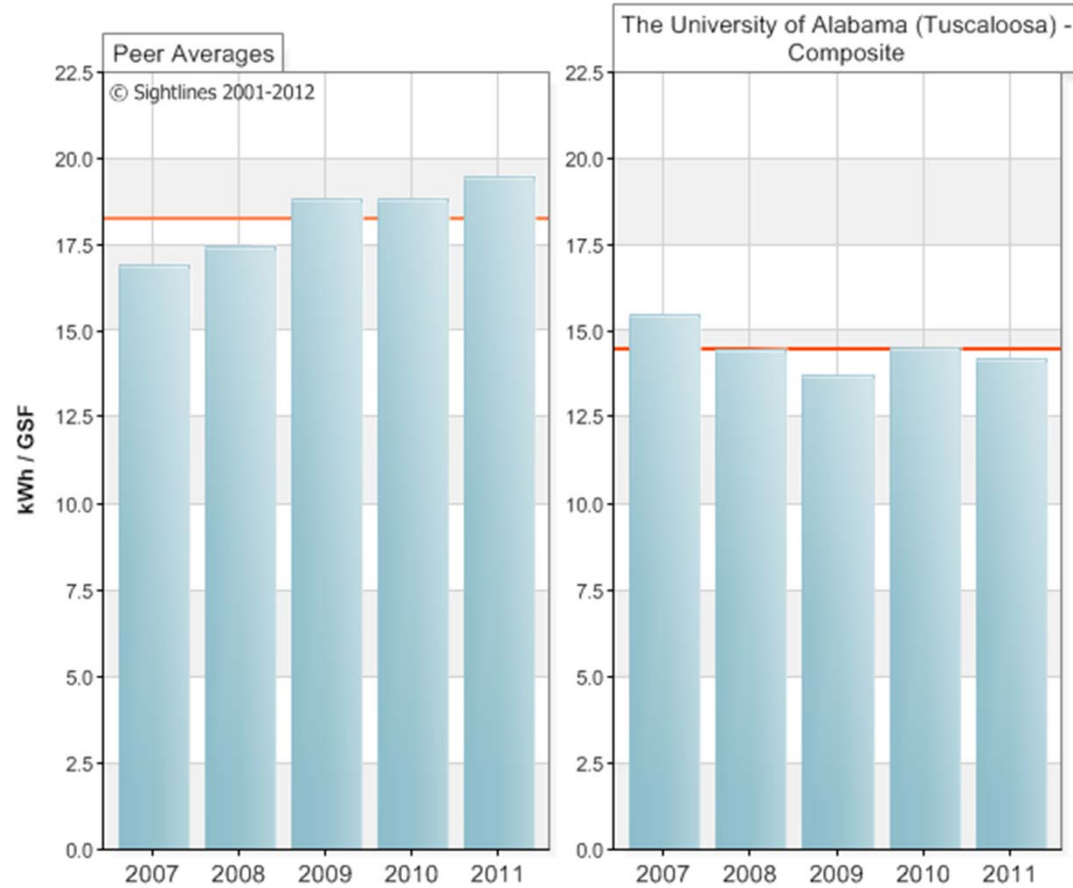


Sightlines  
© Sightlines 2010

Scope 2



### Purchased Electricity Consumption



*Consuming less electricity than peers*





# Effect of electricity consumption and intensity

Implications of grid and consumption offset with emissions output



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Scope 2

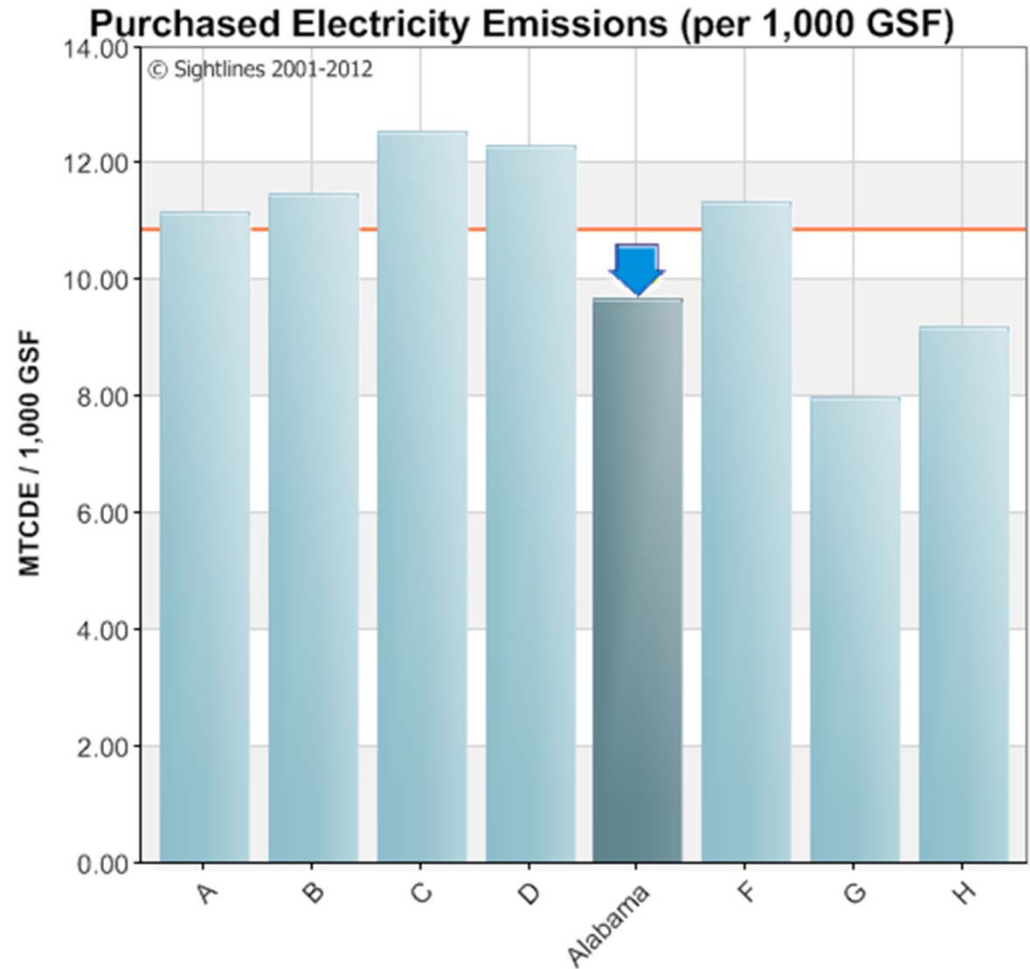
Regional  
Grid Carbon  
Intensity



Purchased  
electricity  
consumption



Purchased  
electricity  
Emissions



*Slightly lower carbon emissions than peers*



# Effect of electricity consumption and intensity

Implications of grid and consumption offset with emissions output



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Scope 2

Regional  
Grid Carbon  
Intensity

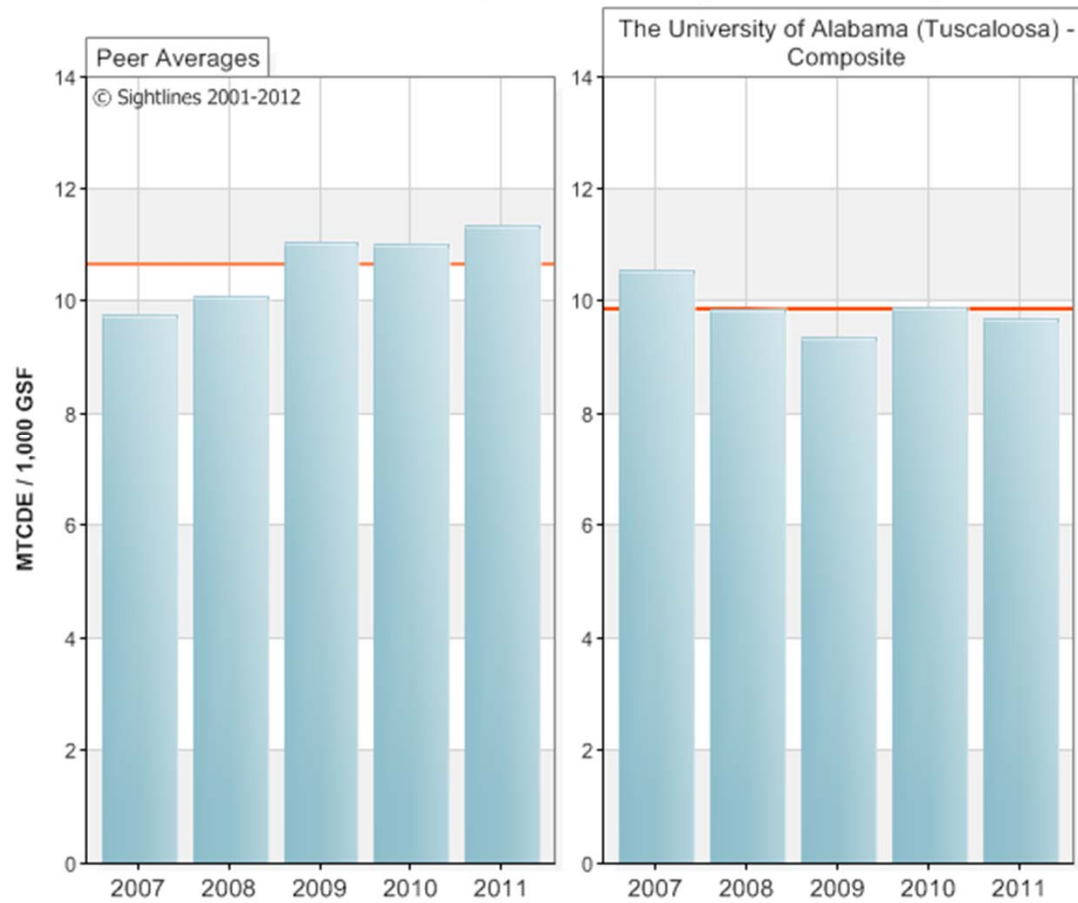


Purchased  
electricity  
consumption



Purchased  
electricity  
Emissions

Purchased Electricity Emissions (per 1,000 GSF)



*Slightly lower carbon emissions than peers*

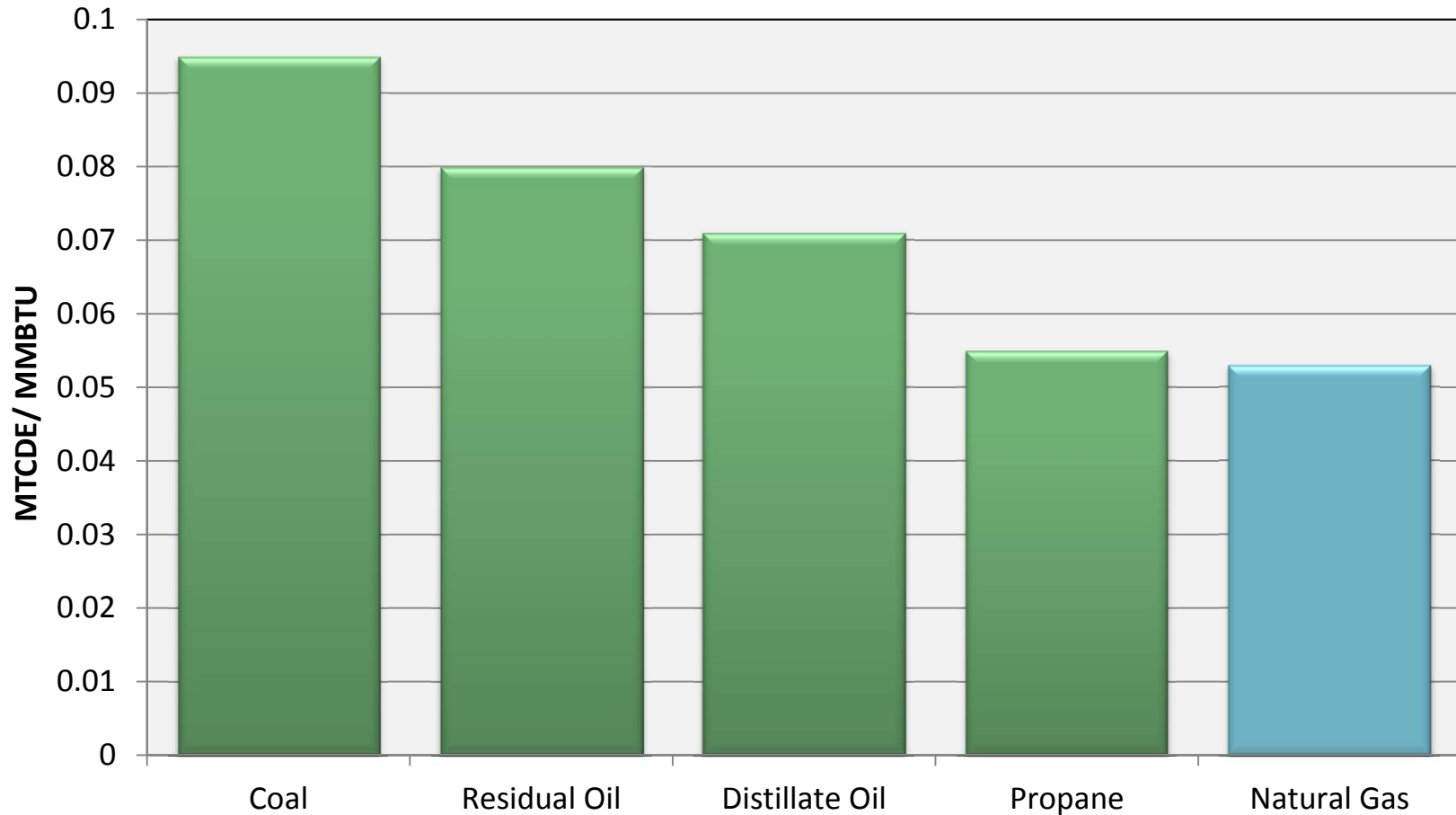


# Low carbon fuel mix



## MTCDE of Commonly Used Fossil Fuels

Scope 1



### On-Campus Fuel Mix

Alabama	0%	0%	0%	0%	100%
Peer Avg.	0%	0%	0%	0%	100%

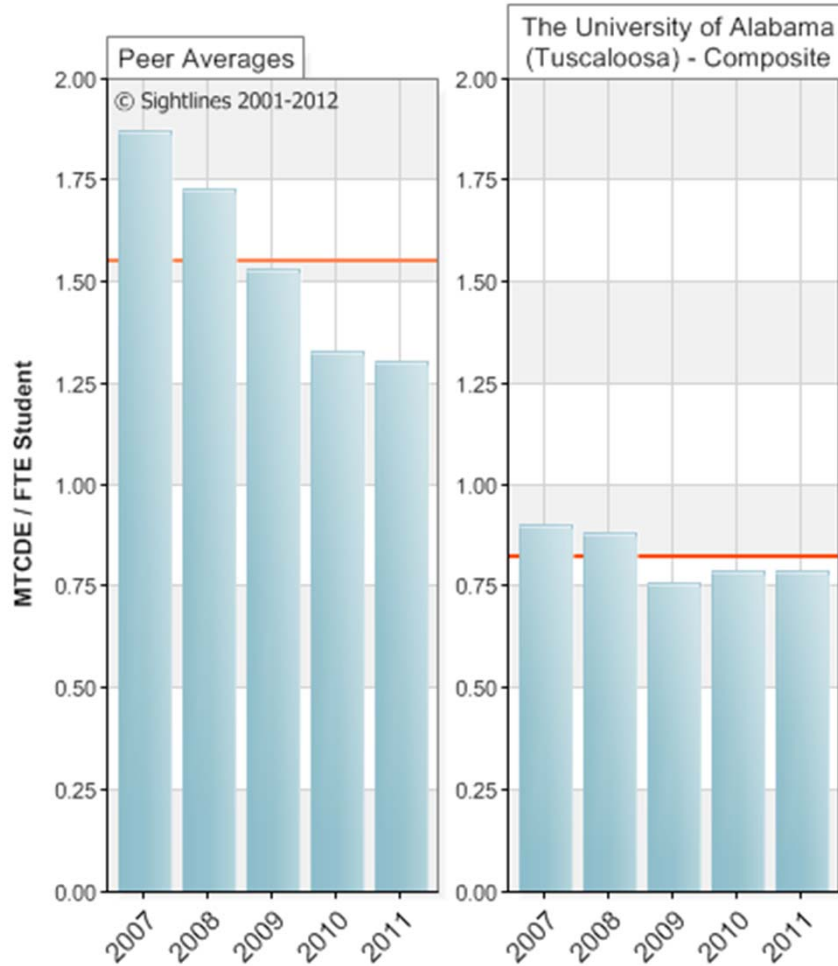


# Stationary emissions higher than peers

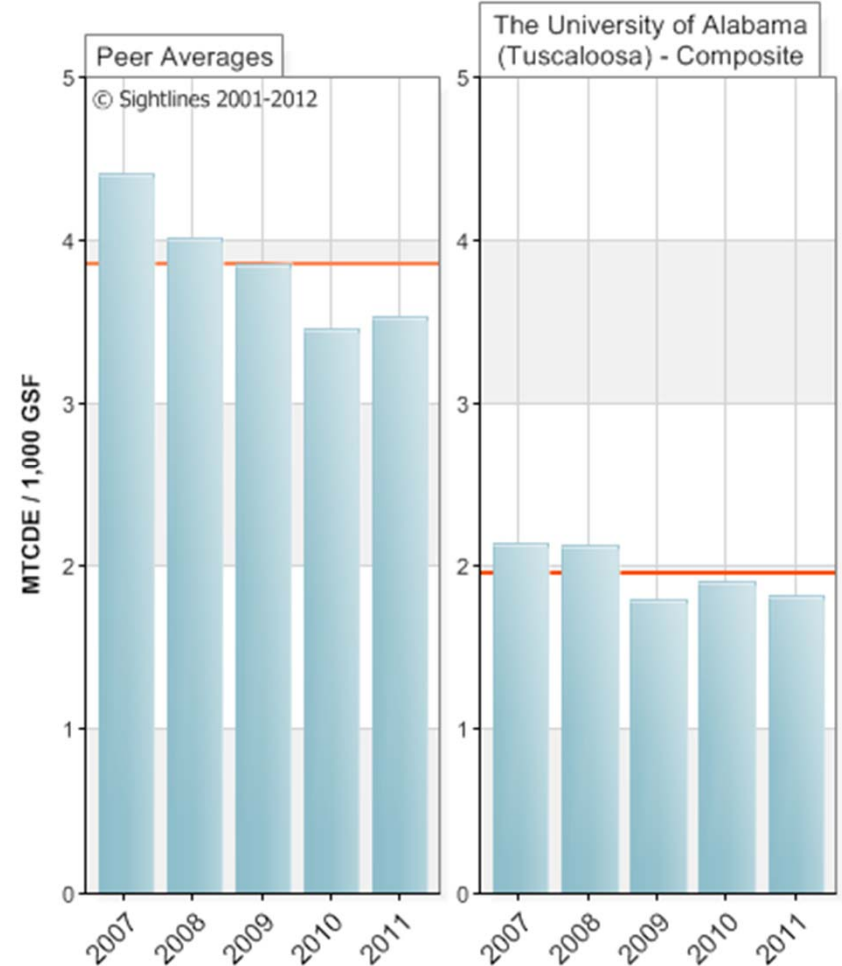


Scope 1

### Stationary Emissions (per Student)



### Stationary Emissions (per 1,000 GSF)

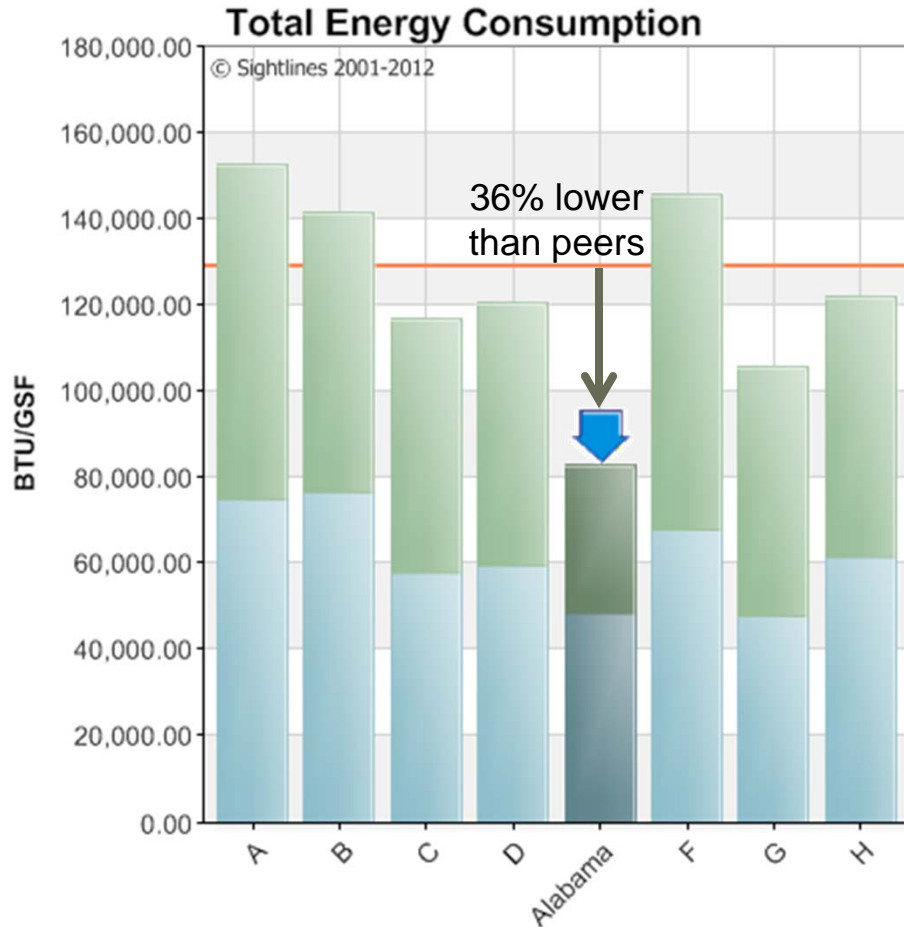


# Total utility usage vs. GHGs

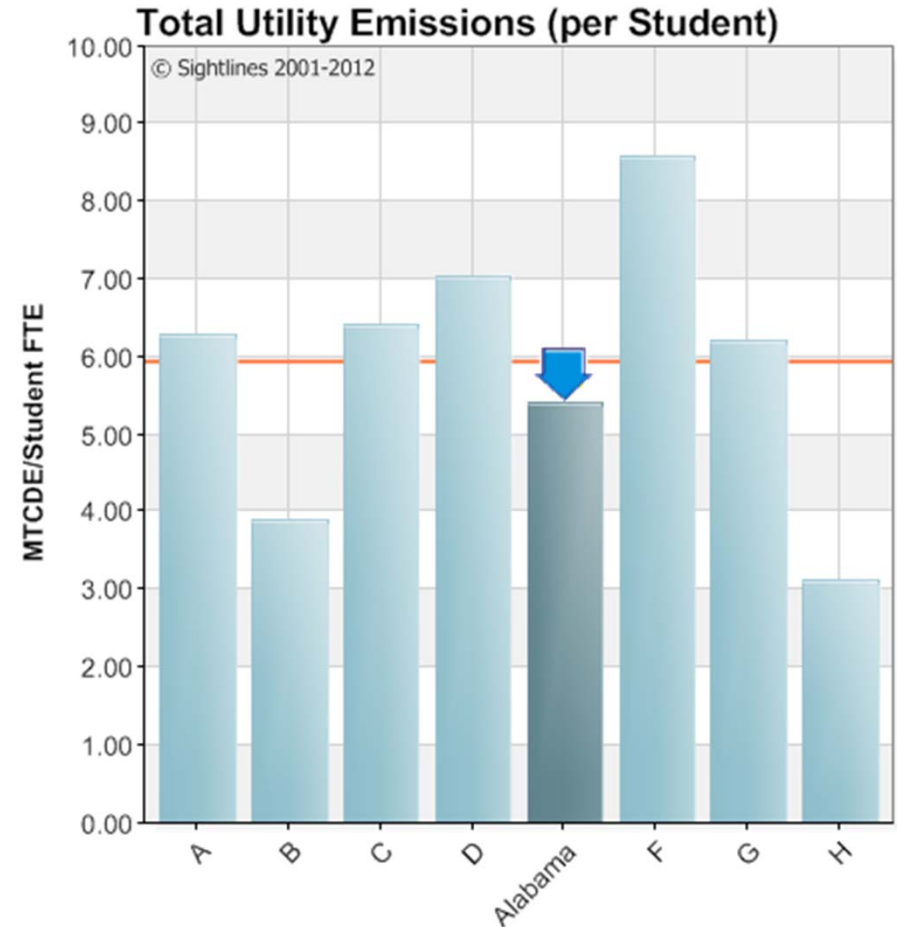
Sustainably operated campus compared to peers



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Institutions Ordered By: Tech Rating



Institutions Ordered By: Tech Rating

**Alabama "Greenness" vs. Peers:**

- consumes less total energy
- has a more intense carbon grid
- has a less dense campus community
- \*Still produces lower utility emissions per student**





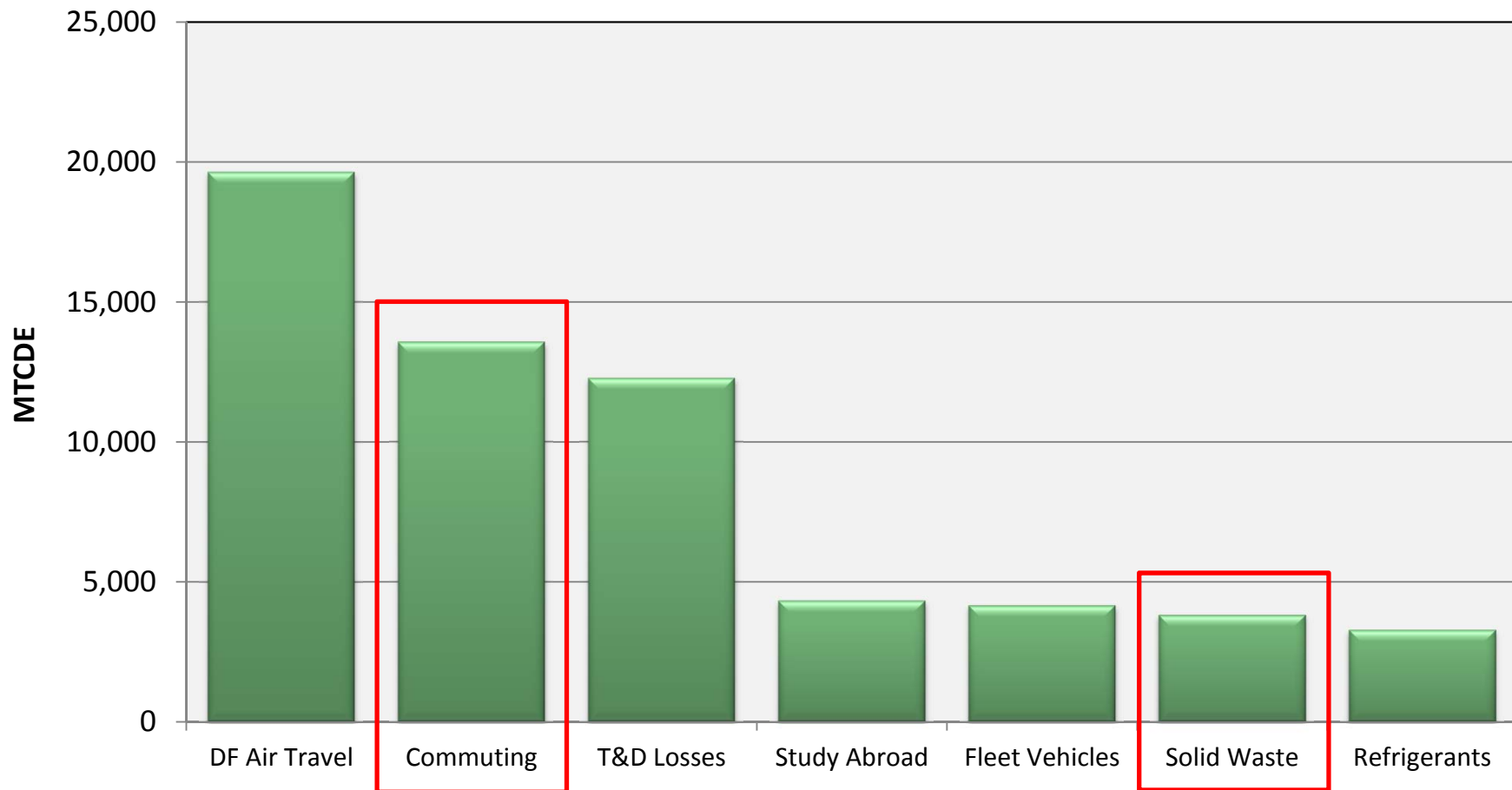
# Other GHG factors in profile

Accounts for 28% of total GHG emissions in FY2011



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## Other Historical GHG Factors



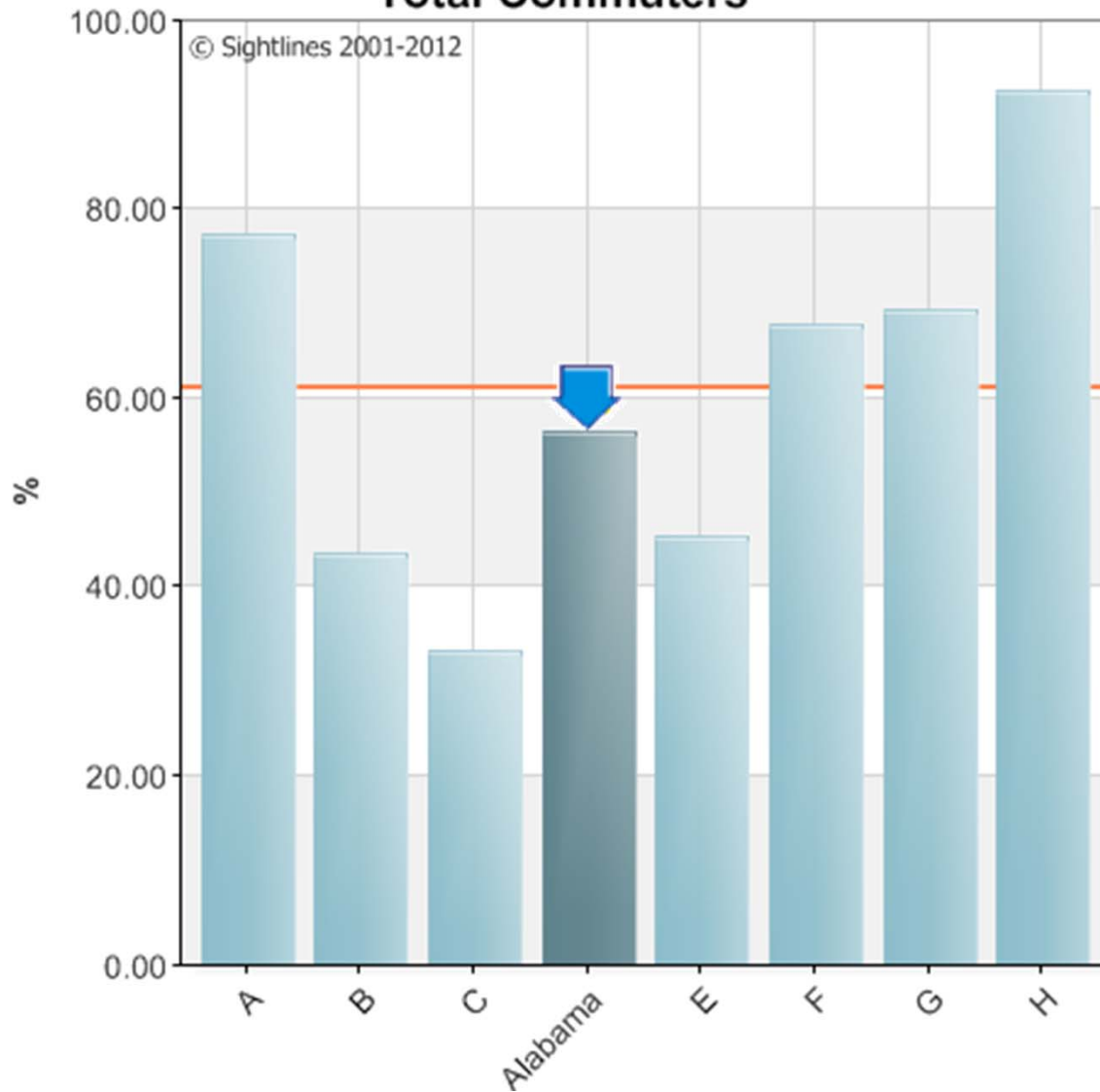
# Campus commuting profile

Commuting profile defined by shorter trip distance and drive alone habits



Sightlines  
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## Total Commuters



## Major Impacts for Commuting Emissions

How Many?

	% of Users Commuting
Alabama	56%
Peer Average	61%

Note: Information from Alabama 2010 commuting survey



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Commuting profile defined by shorter trip distance and drive alone habits



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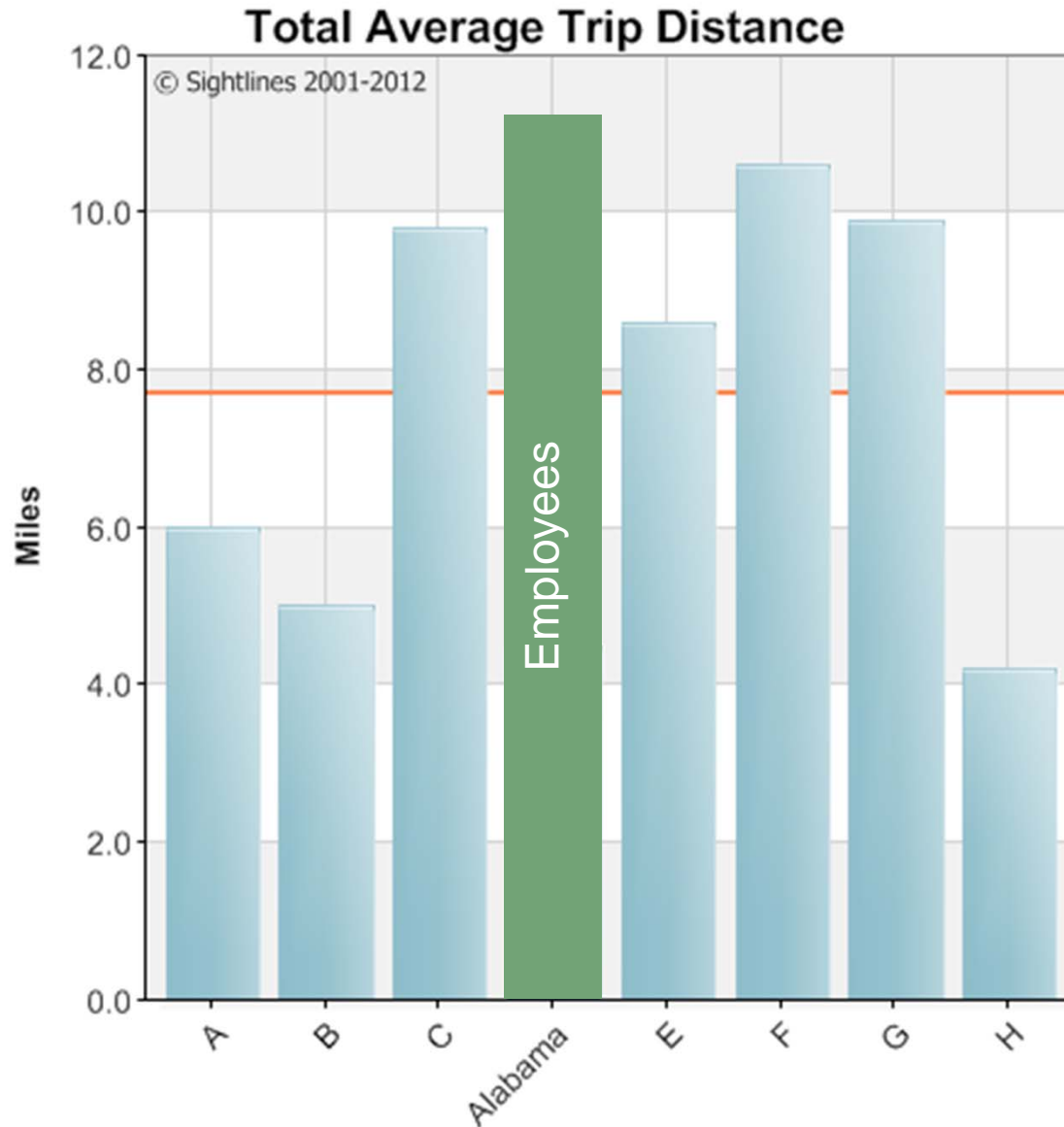
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	% of Users Commuting
<b>Alabama</b>	<b>56%</b>
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### How Far?

	Average One-Way Trip
<b>Alabama</b>	<b>4.5 Miles</b>
Peer Average	7.7 Miles



Note: Information from Alabama 2010 commuting survey



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Commuting profile defined by shorter trip distance and drive alone habits



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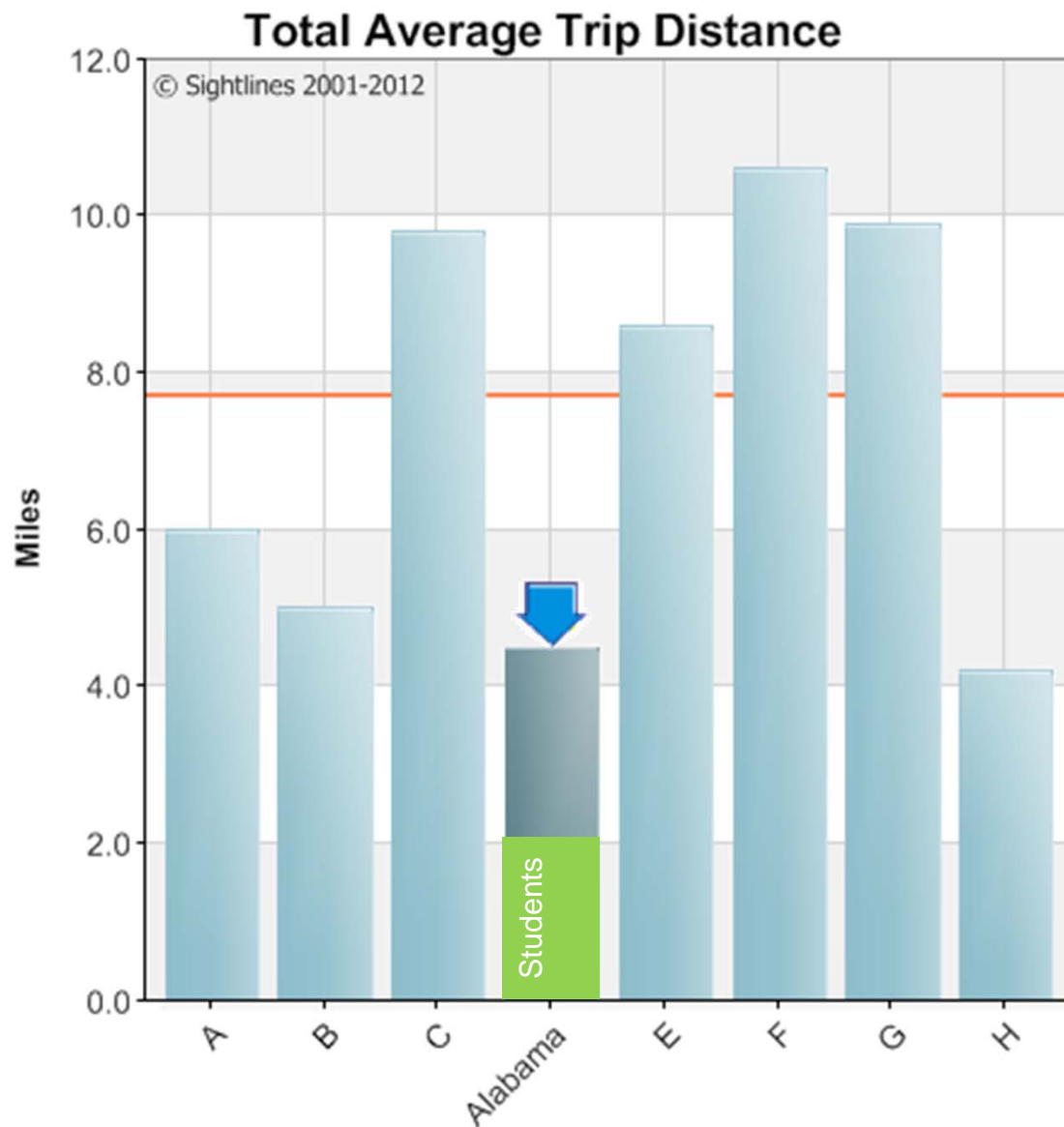
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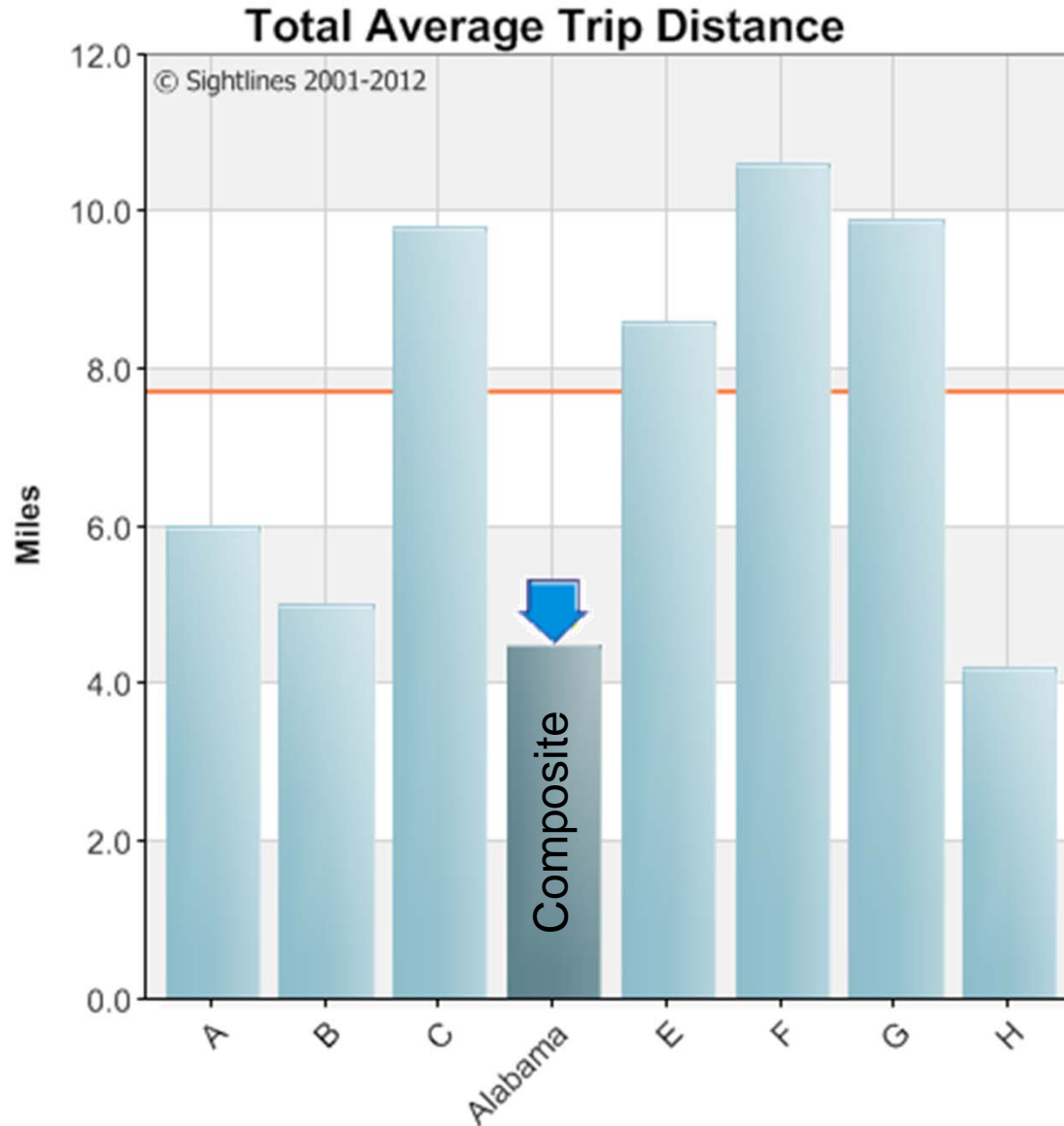
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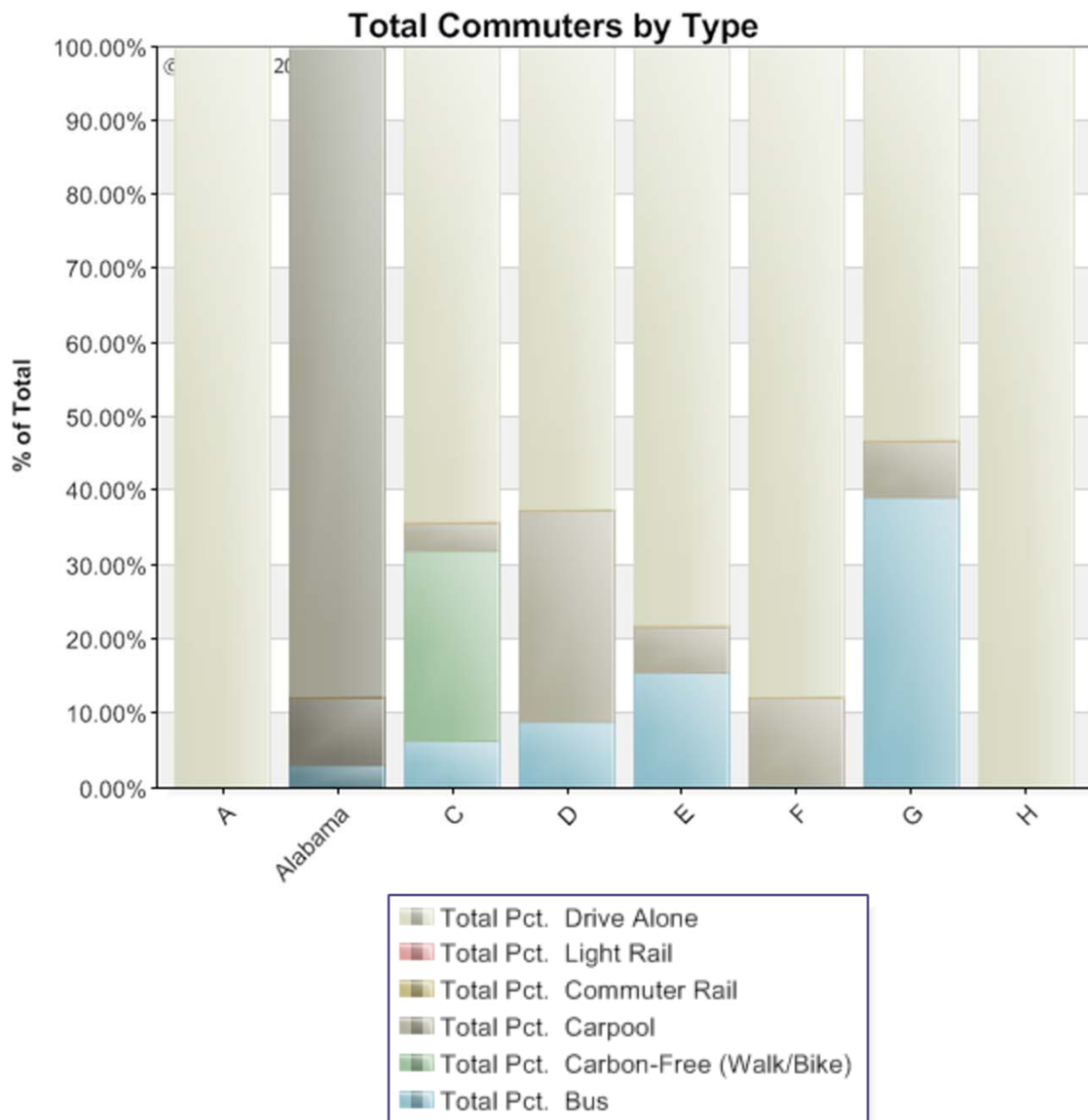


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Commuting profile defined by shorter trip distance and drive alone habits



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## Major Impacts for Commuting Emissions

### How Many?

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<b>Alabama</b>	<b>56%</b>
Peer Average	61%

### How Far?

	Average One-Way Trip
<b>Alabama</b>	<b>4.5 Miles</b>
Peer Average	7.7 Miles

### What Mode?

	% Drive Alone
<b>Alabama</b>	<b>87%</b>
Peer Average	78%

Note: Information from Alabama 2010 commuting survey

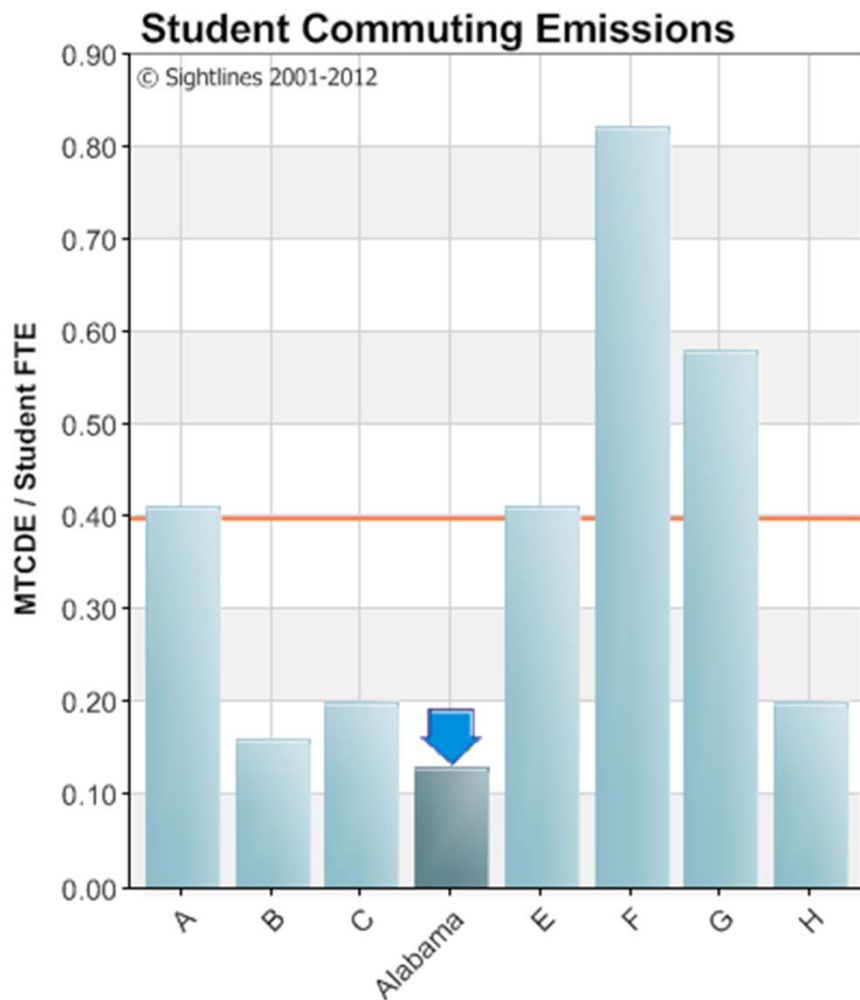


# Campus commuting emission

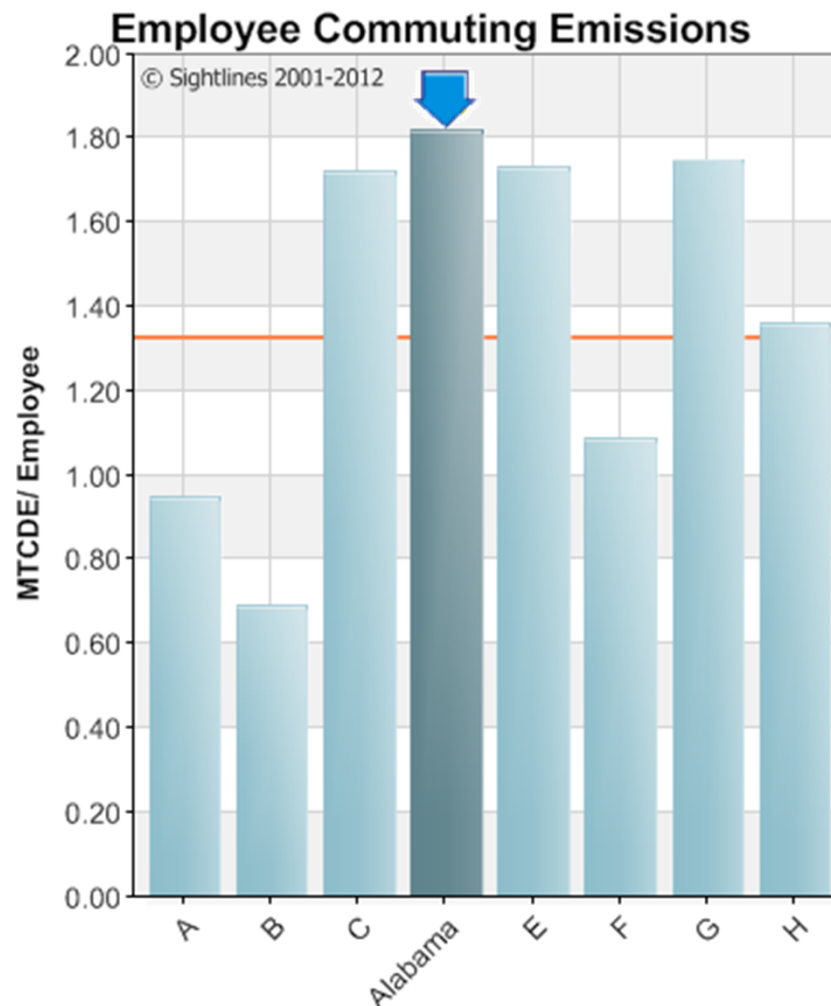
Student and employee commuting GHGs lowest and highest of peer group



Sightlines  
© Sightlines 2010



Alabama vs. Peers  
 % Commuting – Less  
 How Far – Shorter Distance  
 Mode – Same (Drive Alone)



Alabama vs. Peers  
 % Commuting – Same  
 How Far – Longer Distance  
 Mode – Same (Drive Alone)

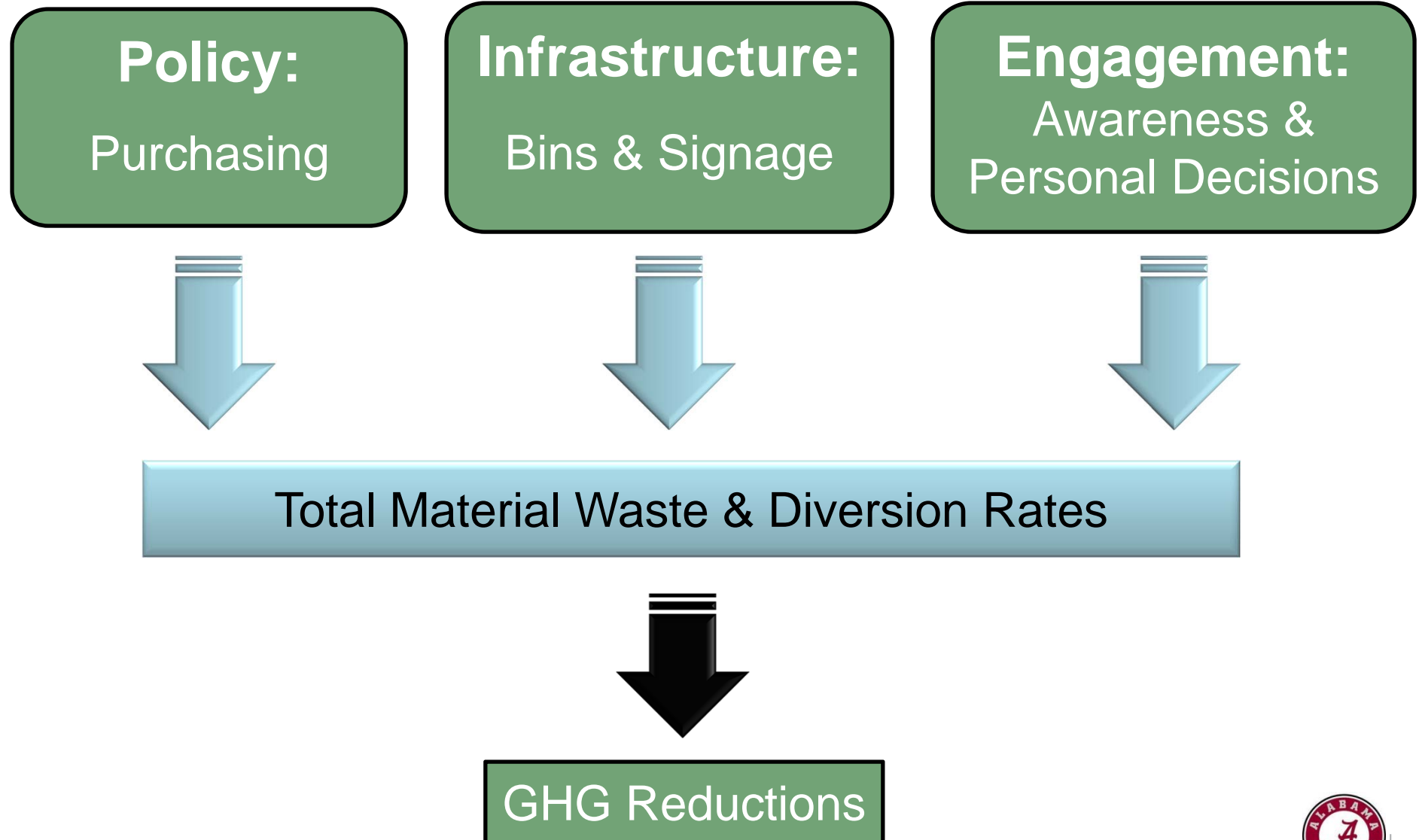


# Waste reduction strategies

Waste management is the intersection of policy, infrastructure and engagement



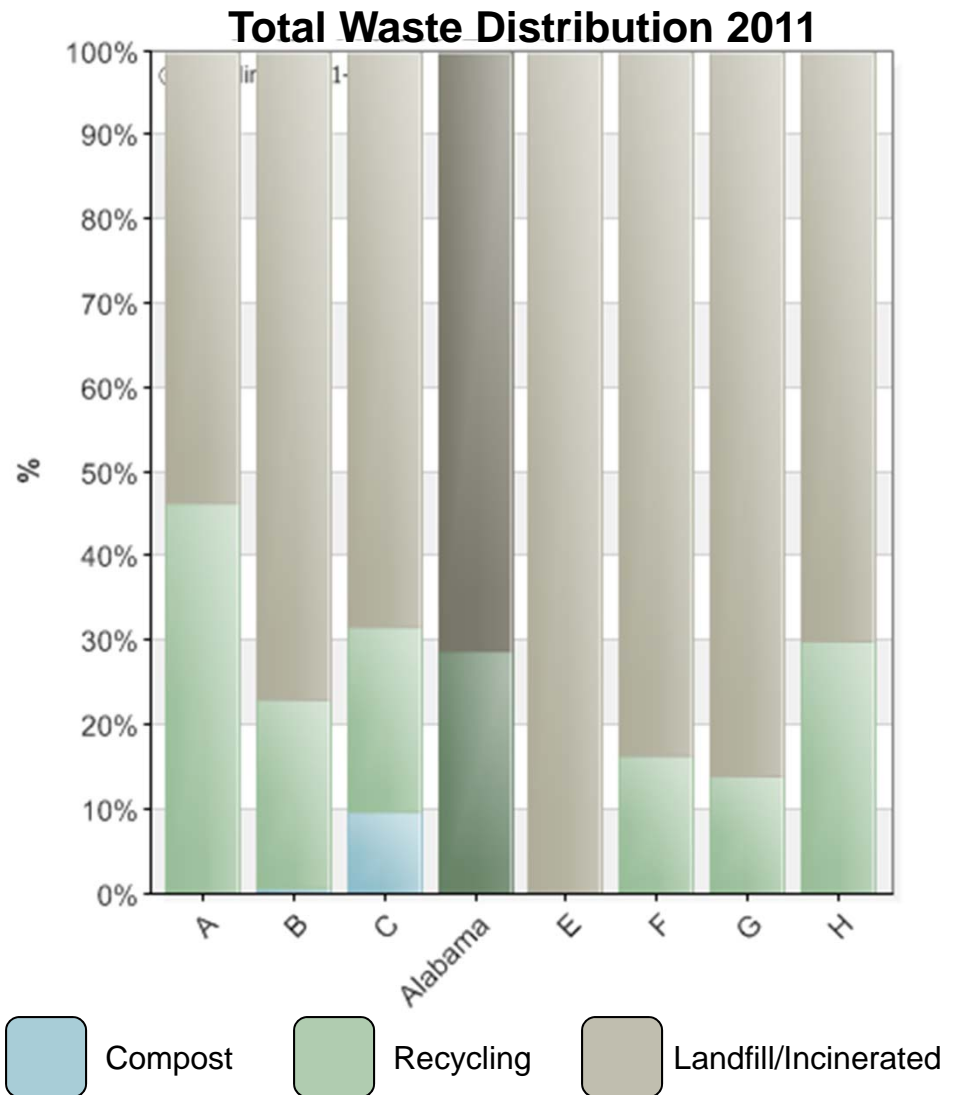
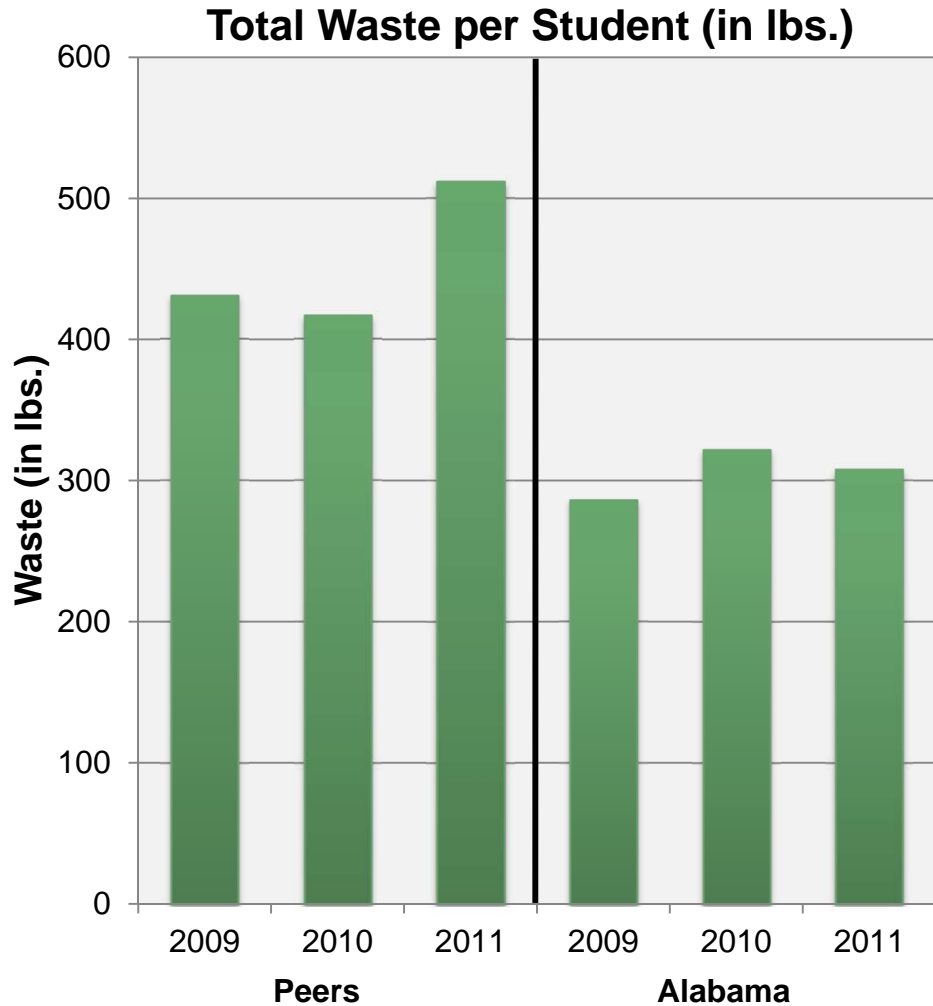
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# Producing less waste in FY11, recycling similar to peers



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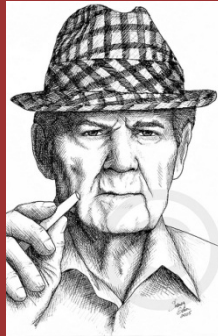
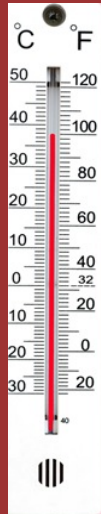


# Perception vs. Performance



## Perception

### The University of Alabama



### “Green” Schools

- George Mason University
- Oregon State University
- Rensselaer Polytechnic Institute
- University of Oregon
- University of Vermont



## Performance

	Alabama	“Green” Schools Avg.
<b>BTU/GSF</b>	83,020	132,800
<b>GHG(MTCDE)/GSF(1,000)</b>	16.3	15.6
<b>GHG(MTCDE)/Student</b>	7.1	6.2
<b>Waste Pounds/Student</b>	308	360
<b>Gallons of Water/Student</b>	8,800	8,500

\*“Green” Schools selected from Sierra Club Top 100 Green Schools.





The University of Alabama

# Questions and Discussion

