

2015

THE STATE OF SUSTAINABILITY IN HIGHER EDUCATION

Emissions Metrics, Consumption Trends & Strategies for Success



Exploring the State of Sustainability in Higher Education 2015

Presented by Jay Pearlman

February 1, 2016

University of Vermont
University of Washington
University of West Florida
Vanderbilt University
Virginia Commonwealth University
Virginia Department of General Services
Wake Forest University
Washburn University
Washington University in St. Louis
Wellesley College
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West Chester University
West Liberty University
West Virginia Health Science Center
West Virginia Institute of Technology
West Virginia School of Osteopathic Medicine
West Virginia State University
West Virginia University
Western Connecticut State University
Western Oregon University
Westfield State University

Today's Presenter



Jay Pearlman

Associate Vice President, *Sightlines*

jpearlman@sightlines.com



Agenda



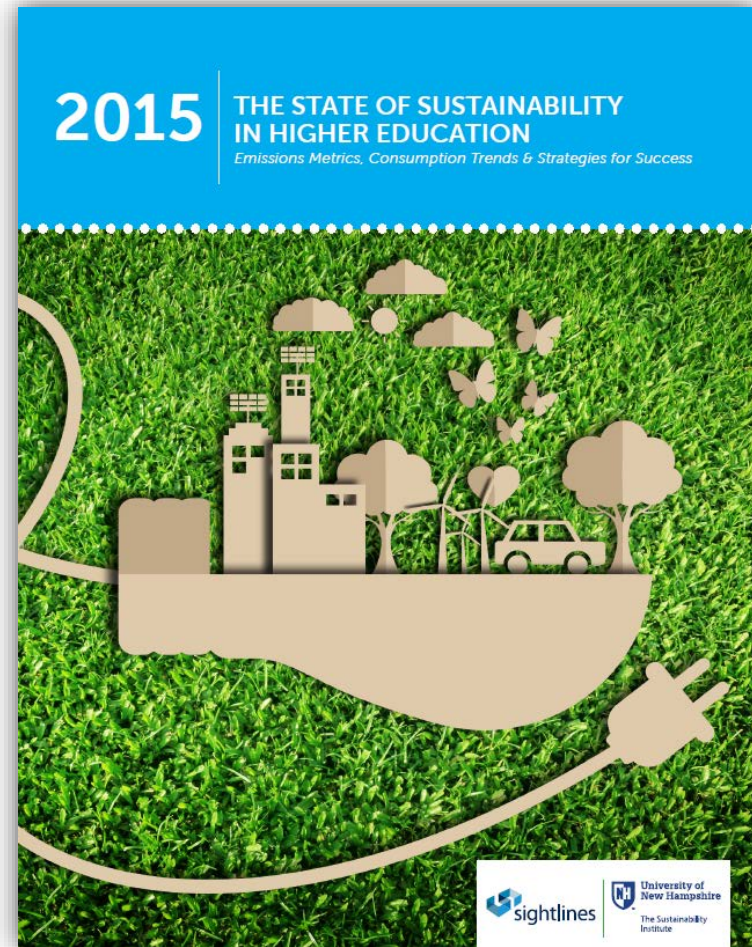
- Introduction and background – how we got here and why we conducted the study
- Detailed summary of findings
- Factors affecting energy consumption and emissions
- Which campuses are making progress and why?
- Conclusions and recommendations



“The State of Sustainability in Higher Education”

Report on emissions metrics, consumption trends, and strategies available now!

Visit www.sightlines.com to download your free copy today





Introduction & Background

Sightlines is a Facility Asset Advisory Firm

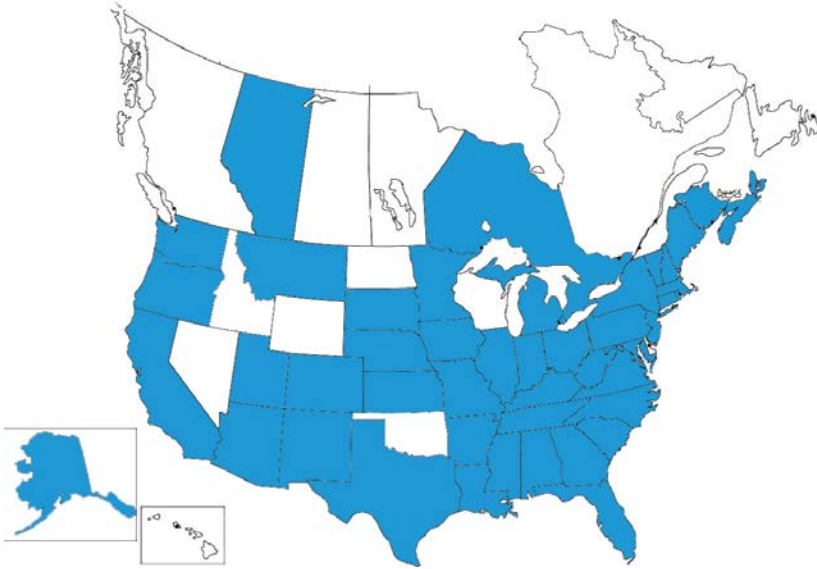
Analytical Rigor, Common Vocabulary, Consistent Methodology, Common Platform

- ✓ Separate fact from fiction on key issues – operational performance, annual funding needs, and project backlogs.
- ✓ Identify ways to use capital more strategically and identify opportunities to improve operational effectiveness.
- ✓ Document trends, provide consistent measurement, credible benchmarking and track progress to goals.



Who Partners with Sightlines?

Robust membership includes colleges, universities, consortiums and state systems



Serving the Nation's Leading Institutions:

- 70% of the Top 20 Colleges*
- 75% of the Top 20 Universities*
- 33 Flagship State Universities
- 13 of the 14 Big 10 Institutions
- 9 of the 12 Ivy Plus Institutions
- 7 of 12 Selective Liberal Arts Colleges

* U.S. News Rankings

Sightlines is proud to announce that:

- 450 colleges and universities are Sightlines clients including over 325 ROPA members.
- 93% of ROPA members renewed in 2014
- We have clients in 42 states, the District of Columbia and four Canadian provinces
- More than 100 new institutions became Sightlines members since 2013

Sightlines advises state systems in:

- Alaska
- California
- Connecticut
- Hawaii
- Maine
- Massachusetts
- Minnesota
- Mississippi
- Missouri
- Nebraska
- New Hampshire
- New Jersey
- Pennsylvania
- Texas
- West Virginia



Key Milestones in Higher Ed Sustainability

1997

- Kyoto Protocol

2000

- USGBC launches LEED standards

2001

- WRI introduces Greenhouse Gas (GHG) Protocol

2002

- Clean Air – Cool Planet and UNH develop Campus Carbon Calculator

2004

- Campus Carbon Calculator v4 publically released

2006

- Association for the Advancement of Sustainability in Higher Education (AASHE) formed

2007

- American College & University Presidents Climate Commitment (ACUPCC) launched

2008

- Sightlines introduces “Go-Green” Sustainability Solutions

2010

- AASHE STARS program is introduced



Campus Carbon Calculator™ and CMAP

Helping Campuses Track Their Carbon Footprints Since 2011



CarbonMAP



Why We Did the Study

To explore and take the first comprehensive look at key sustainability questions

- ❏ Are campus conservation and efficiency initiatives succeeding?
- ❏ How have changes in enrollment, and a national campus building boom, impacted carbon management efforts?
- ❏ How much does progress depend on the amount and type of campus capital investment?
- ❏ How much impact do external factors (e.g. public policies, energy costs, etc.) have?
- ❏ How can campuses be more strategic and effective in managing carbon and energy footprints?
- ❏ Is anything missing from the available set of campus sustainability metrics?



The Power of Aggregated, Standardized Data

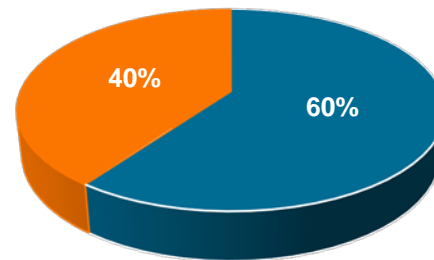
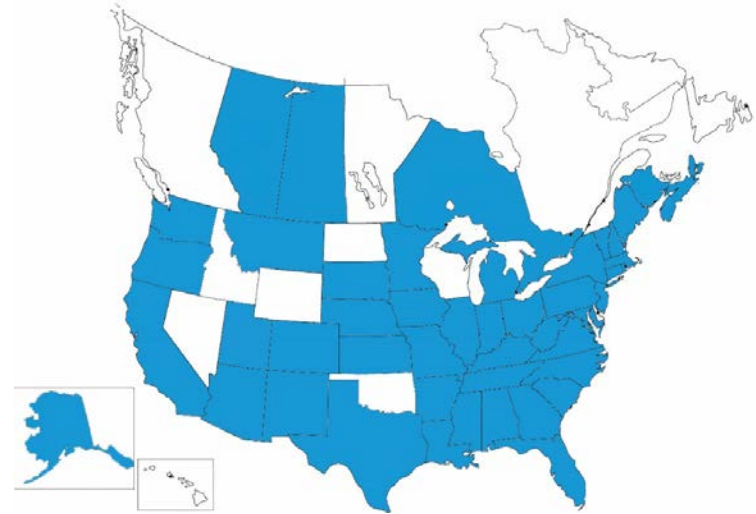
Study methodology

Data Sources

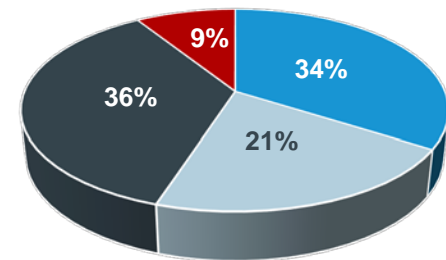
Sightlines Return on Physical Assets (ROPA) database, with the CCC calculation methodology overlaid. This database has extensive Quality Assurance/Quality Control (QA/QC) for its inputs.

CMAP database, with data from both inputs and outputs of campus GHG inventories. Primarily used for comparison and “reality-checking” the results of ROPA analysis.

Sightlines Database Distribution



■ Public ■ Private

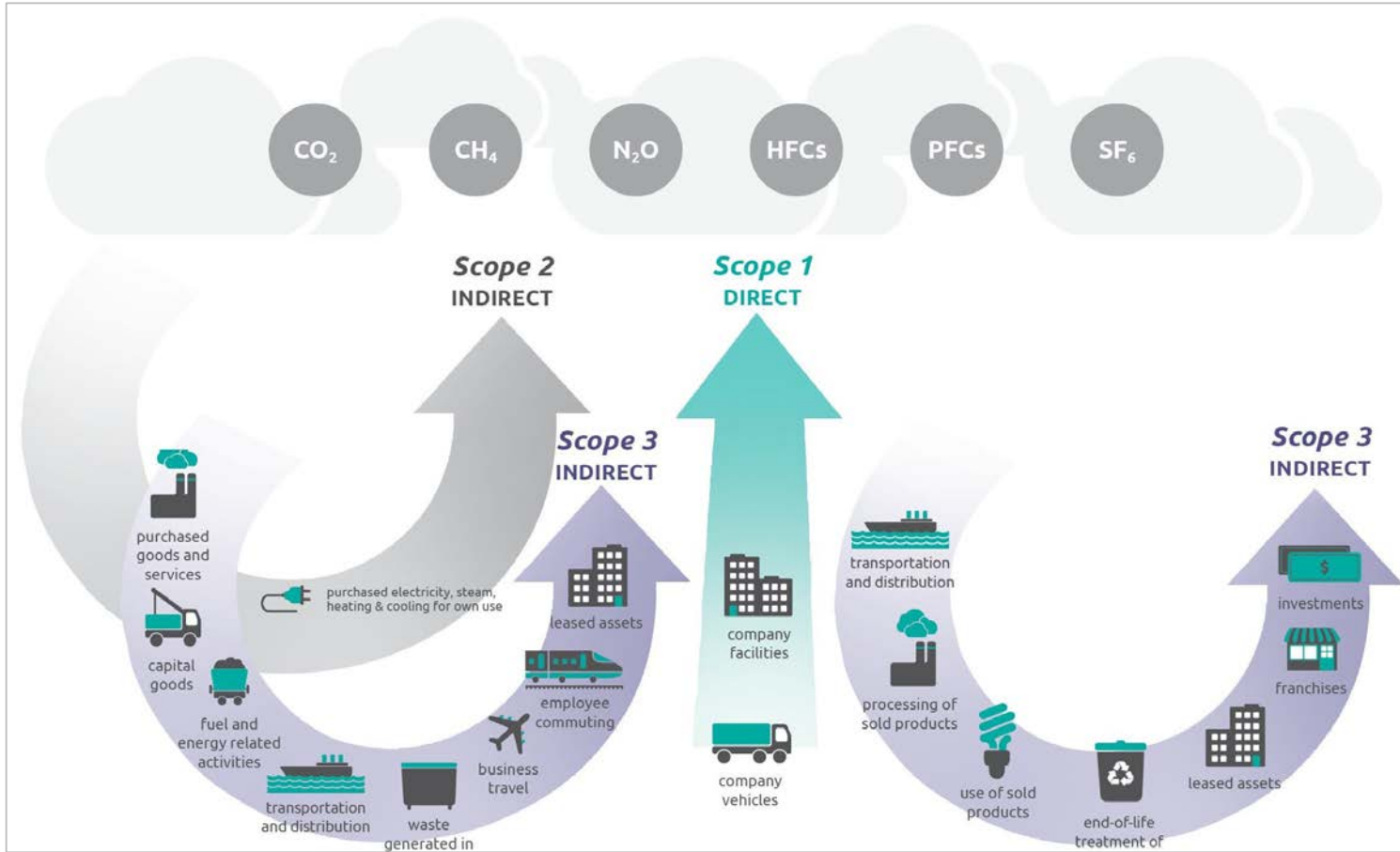


■ Comprehensive ■ Research
■ Small Institutions ■ Community Colleges



Operational Boundaries

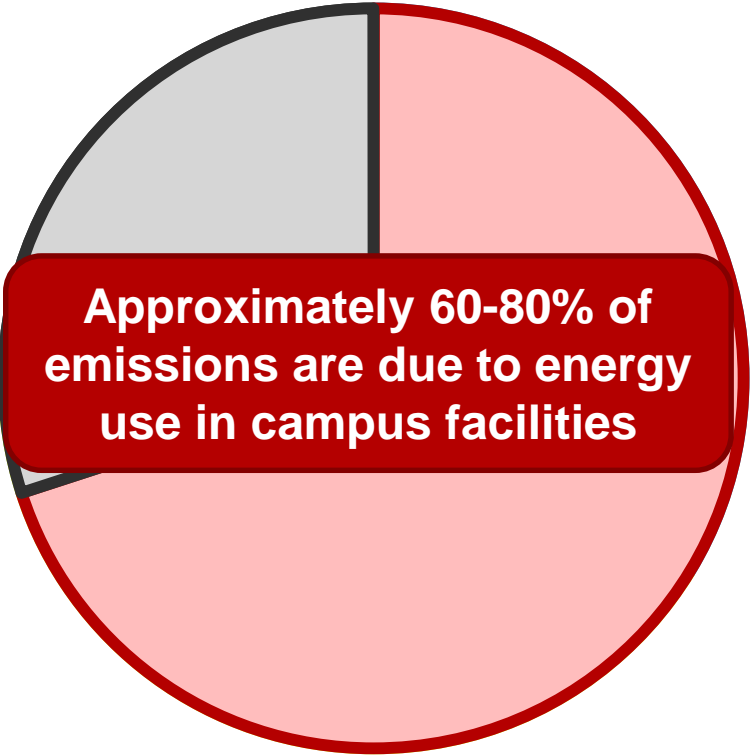
Boundaries Framework from the GHG Protocol



Typical GHG Profile for a 4 Year Institution

Focusing in on energy-related emissions

FY14 Emissions
by Scope



Approximately 60-80% of emissions are due to energy use in campus facilities

Scope 1 Direct Sources

- Stationary Combustion (Fossil Fuels and Biomass)
- Fleet Fuel
- Fugitive Emissions (Refrigerants and Agriculture)

Scope 2 Upstream Sources

- Purchased Electricity
- Purchased Steam/Chilled Water

Scope 3 Indirect Sources

- Daily Commuting (Faculty, Staff and Students)
- Outsourced Travel (Air and Ground Travel)
- Waste Products (Solid Waste and Wastewater)
- Paper Purchases
- Transmission & Distribution Losses

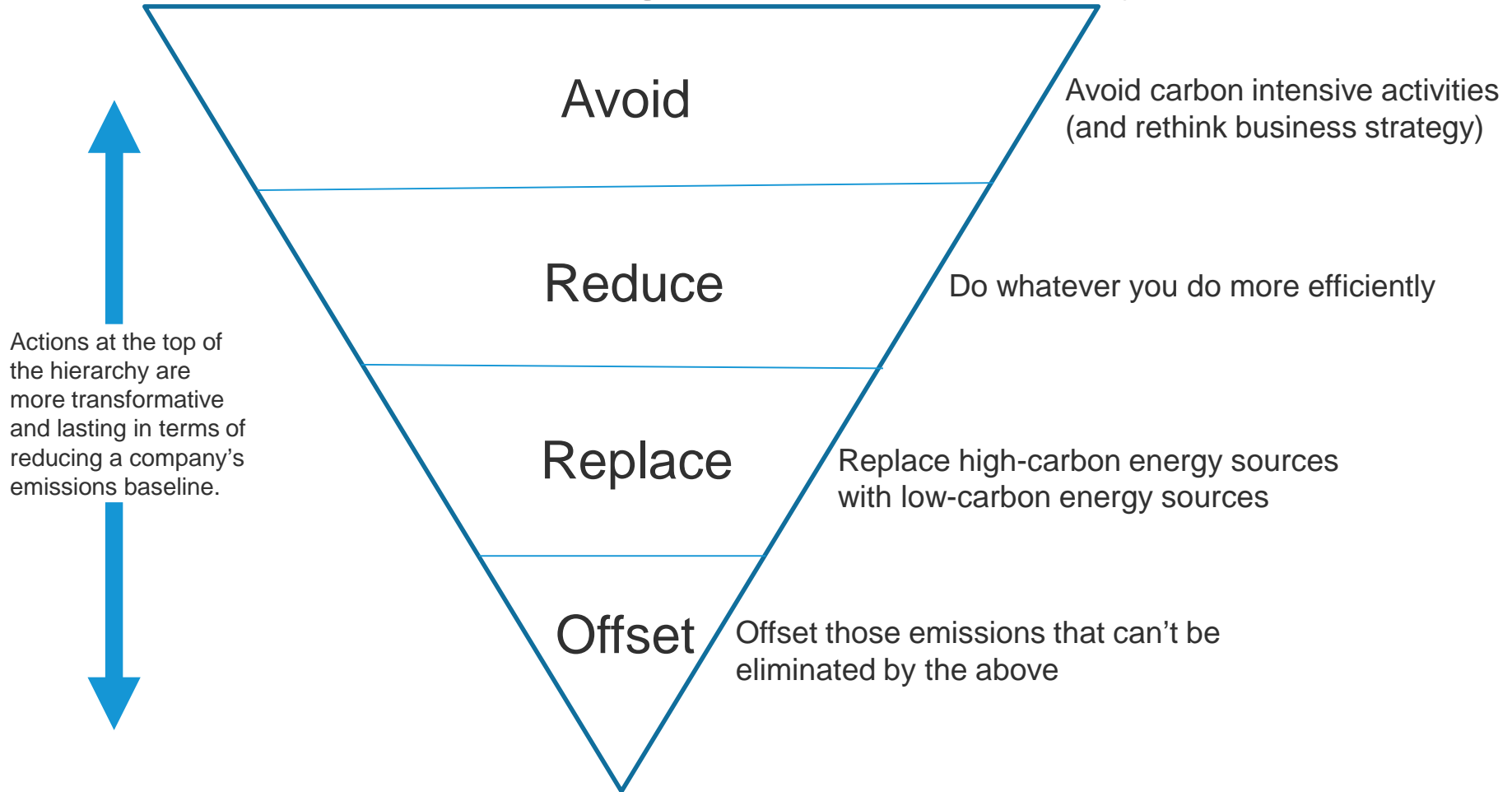
• Scope 1 Emissions • Scope 2 - Utilities Emissions • Scope 3



Carbon Management Hierarchy

“Best practice” approach

The Carbon Management Hierarchy





Detailed Summary of Findings

Waves of Facilities Growth

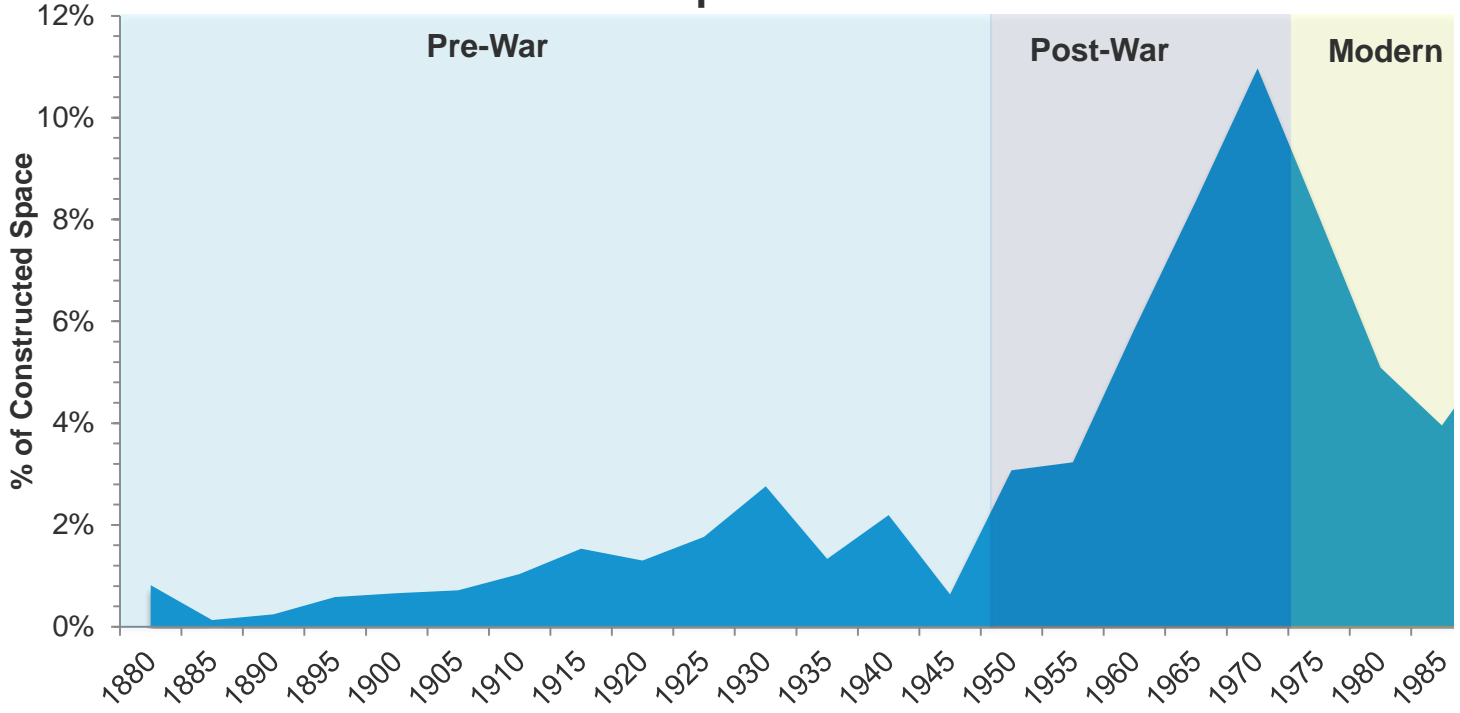
Pre-War
 Built before 1951
 Durable construction
 Older but typically lasts longer

Post-War
 Built between 1951 and 1975
 Lower-quality construction
 Already needing more repairs and renovations

Modern
 Built between 1975 and 1990
 Quick-flash construction
 Low-quality building components\

Complex
 Built in 1991 and newer
 Technically complex spaces
 Higher-quality, more expensive to maintain & repair

Constructed Space 1880-2015



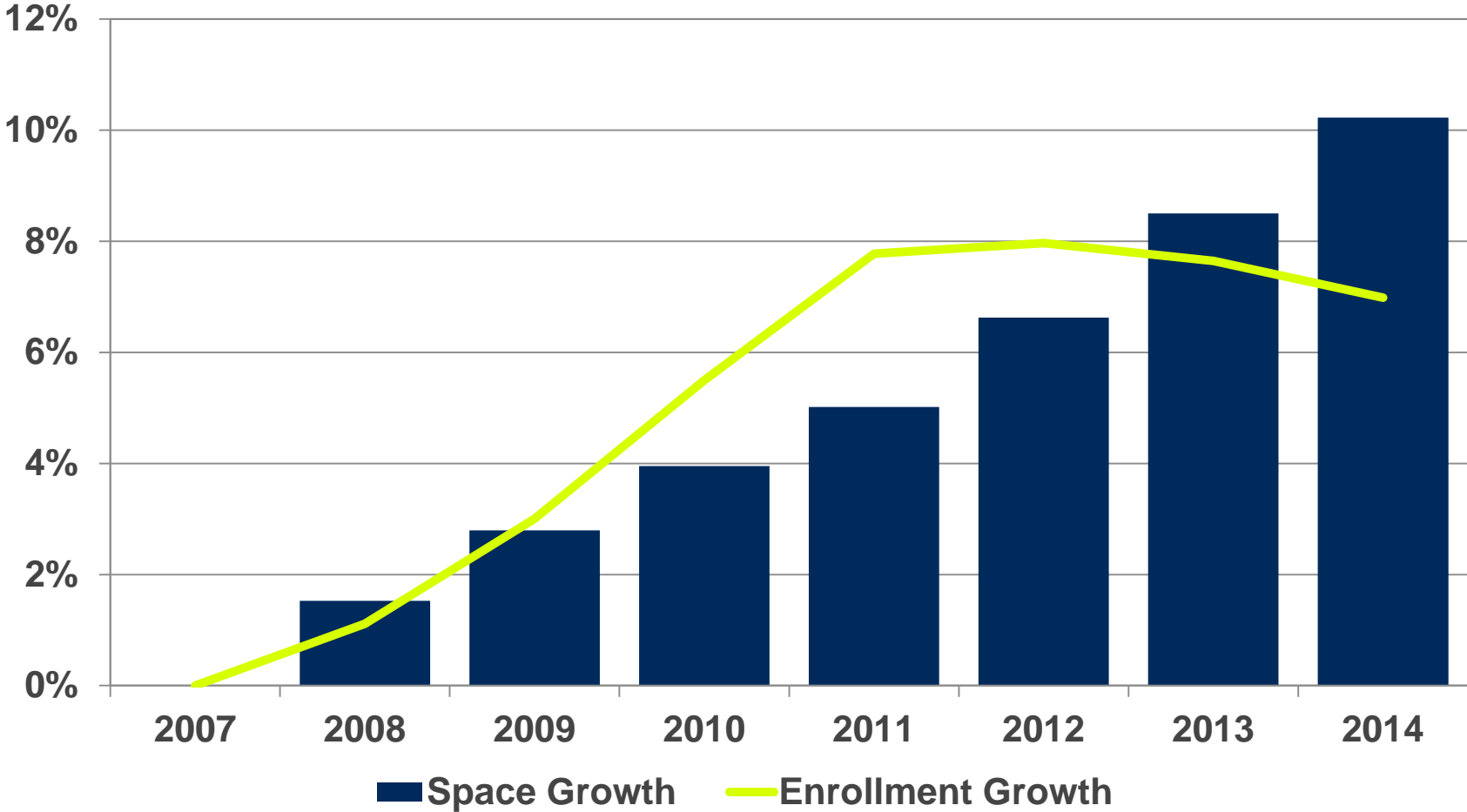
■ Sightlines Database



Campus Space & Enrollment Growth

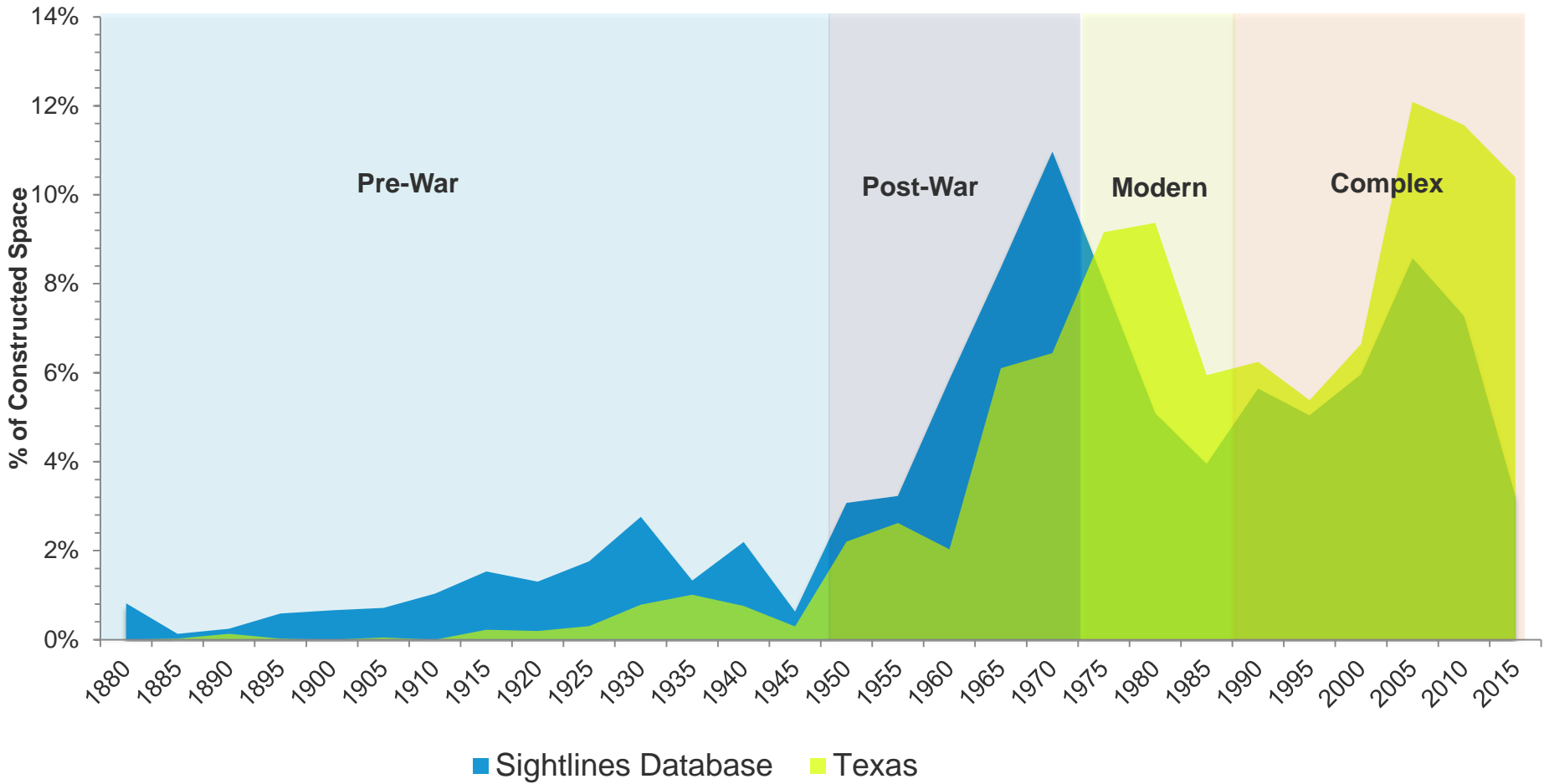
Space growth has outpaced growth in enrollment

Space and Enrollment Growth



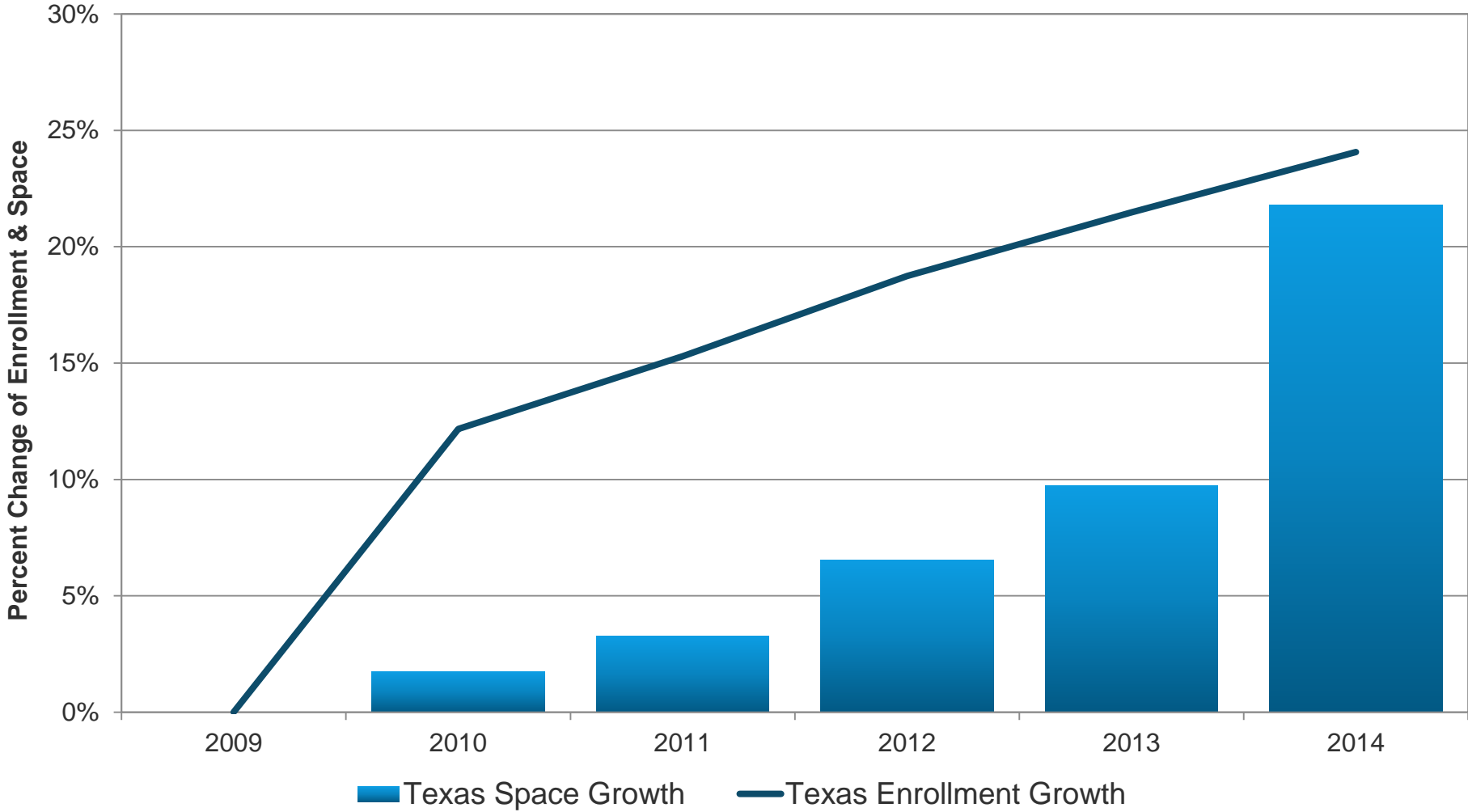
Texas – A Slightly Different Profile

Constructed Space 1880-2015

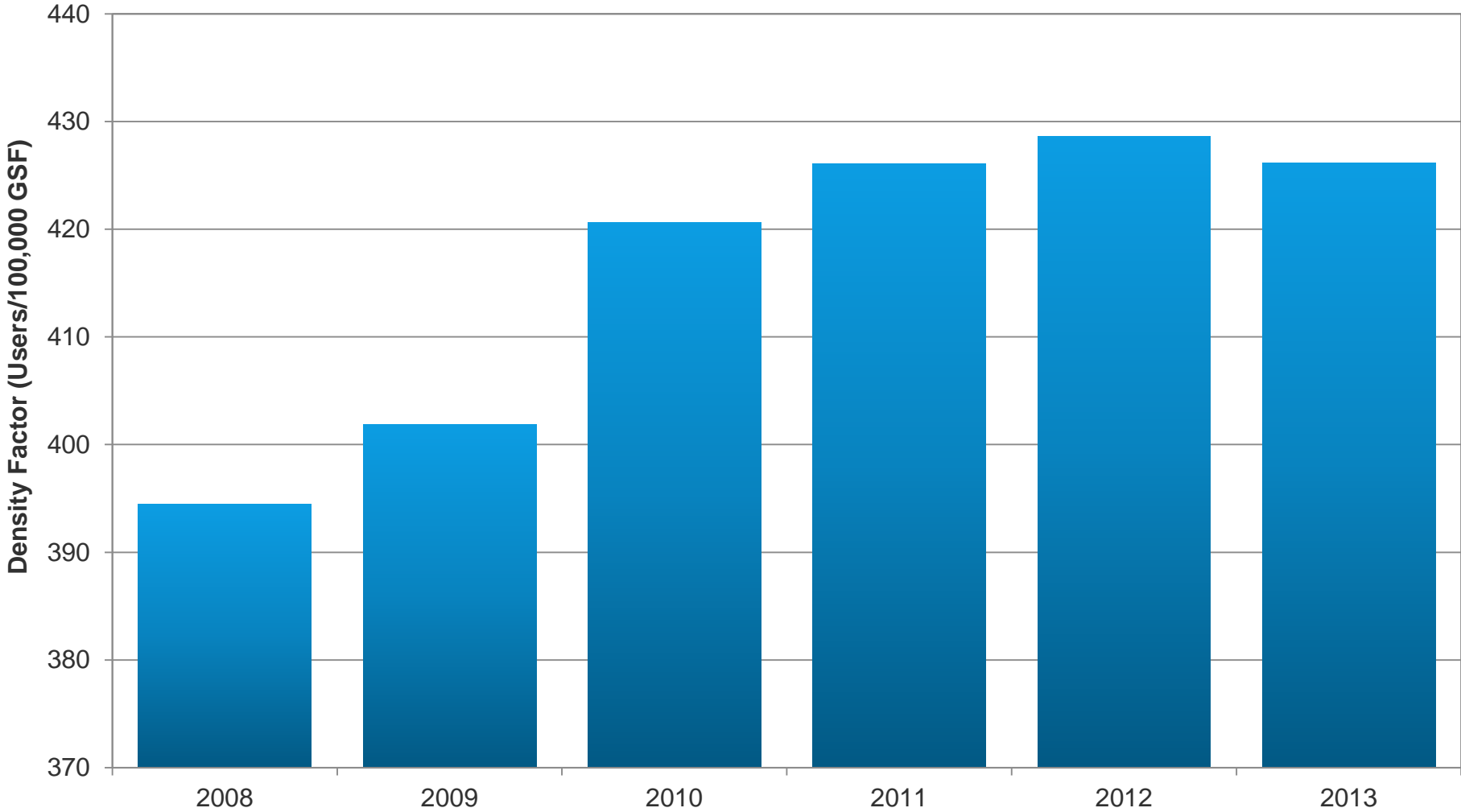


Texas - Campus Space and Enrollment

Texas average for enrollment and space growth



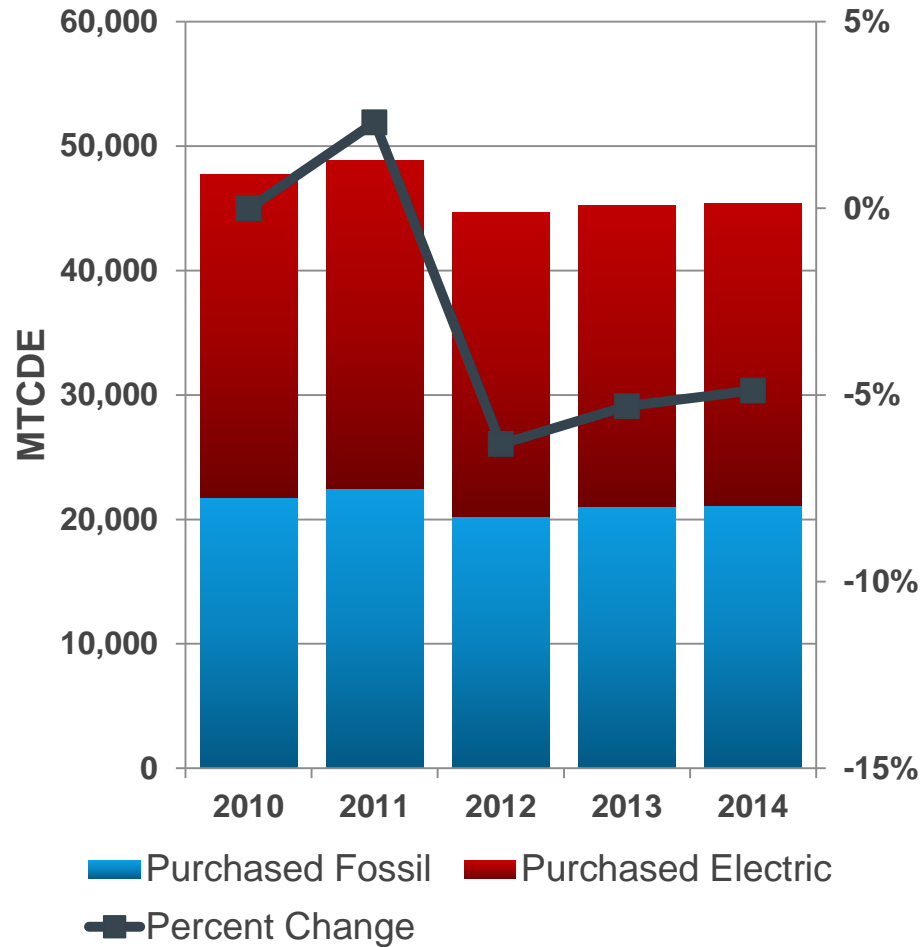
Texas – Density Factor is Increasing



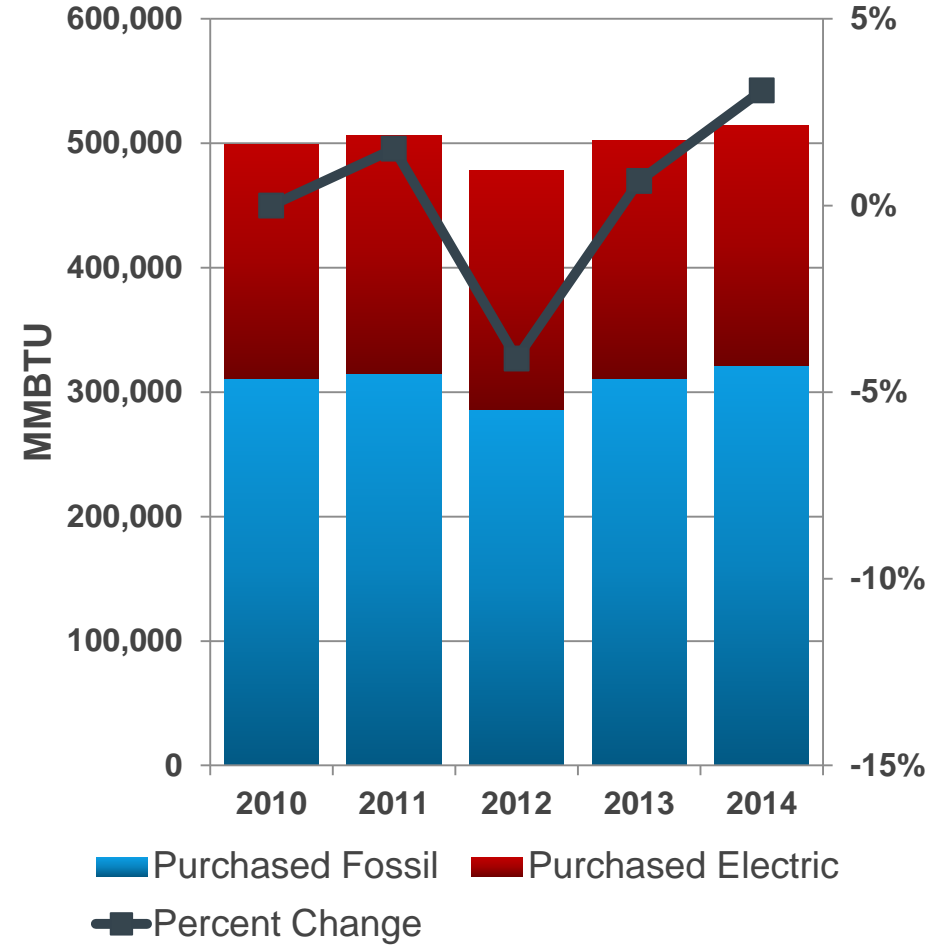
Scope 1 Stationary and Scope 2 Emissions & Consumption Since 2010

Emissions decreased 5%; consumption increased 3%

Emissions



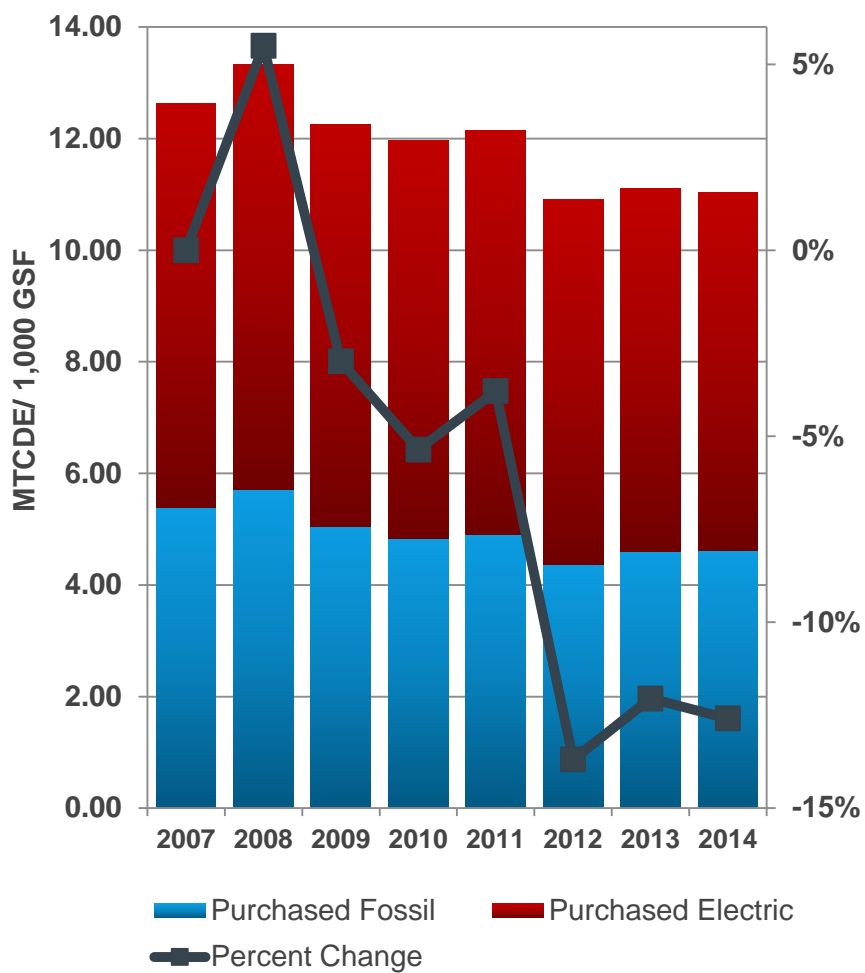
Consumption



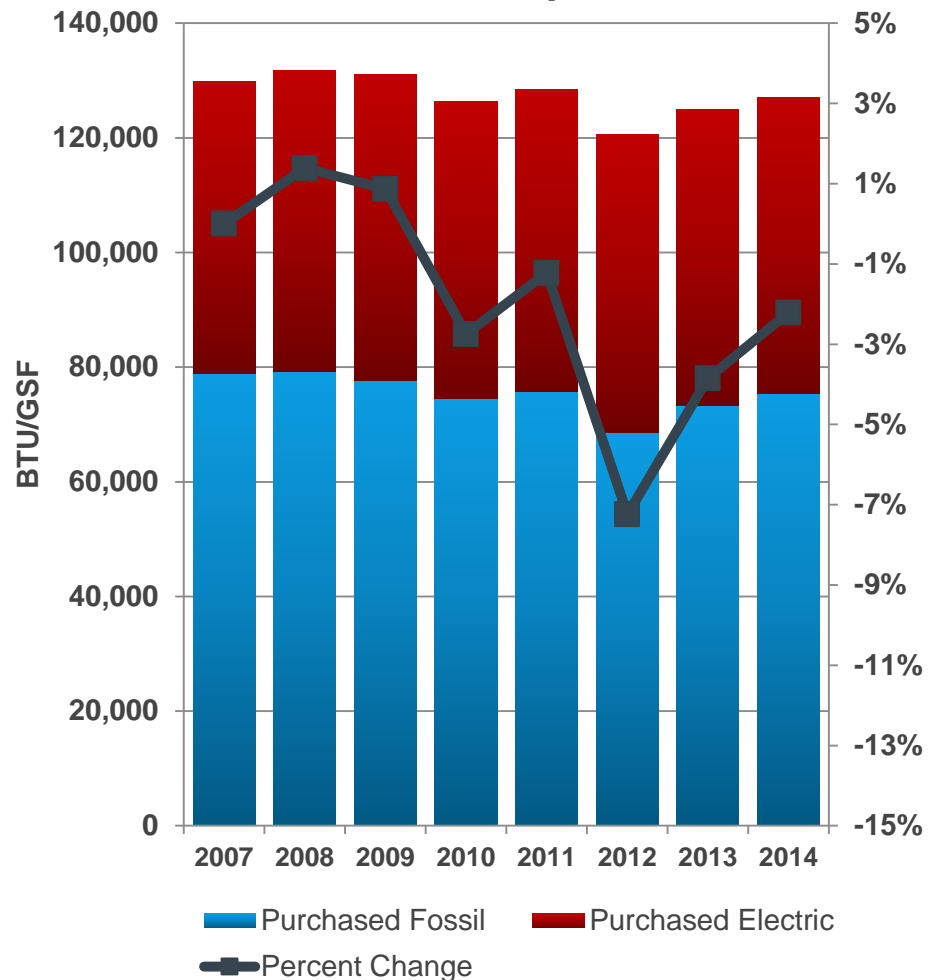
Normalized Scope 1 Stationary and Scope 2 Emissions & Consumption Since 2007

Emissions decreased 13%, consumption down 2%

Emissions



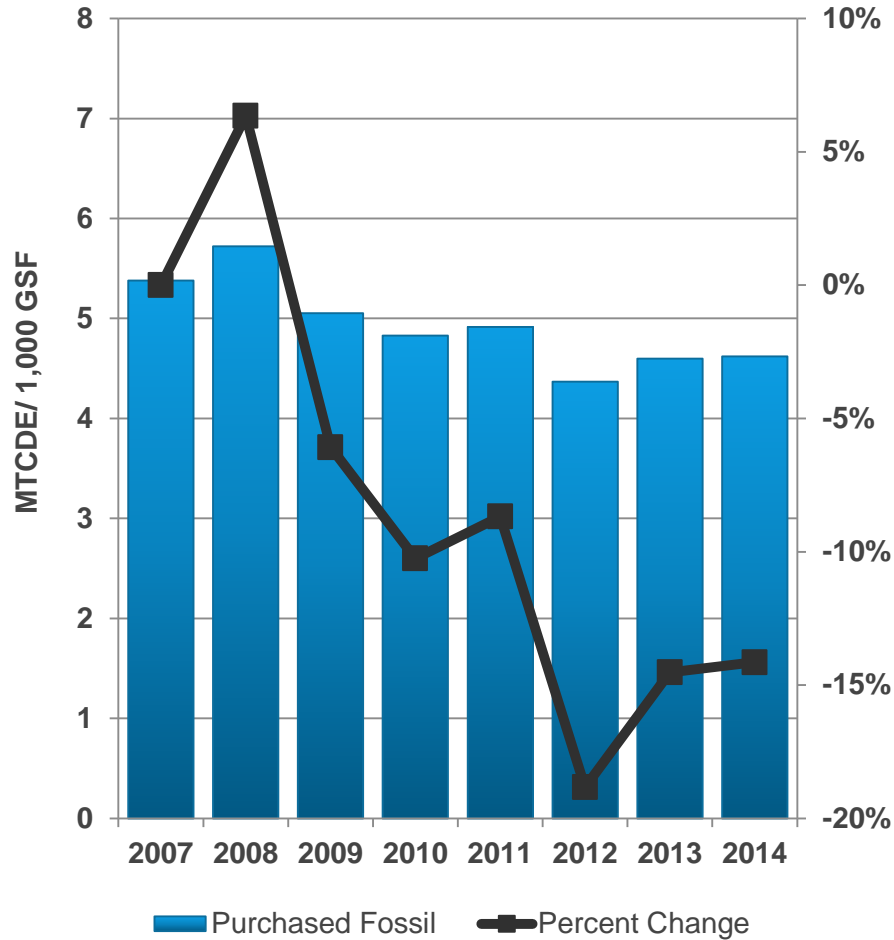
Consumption



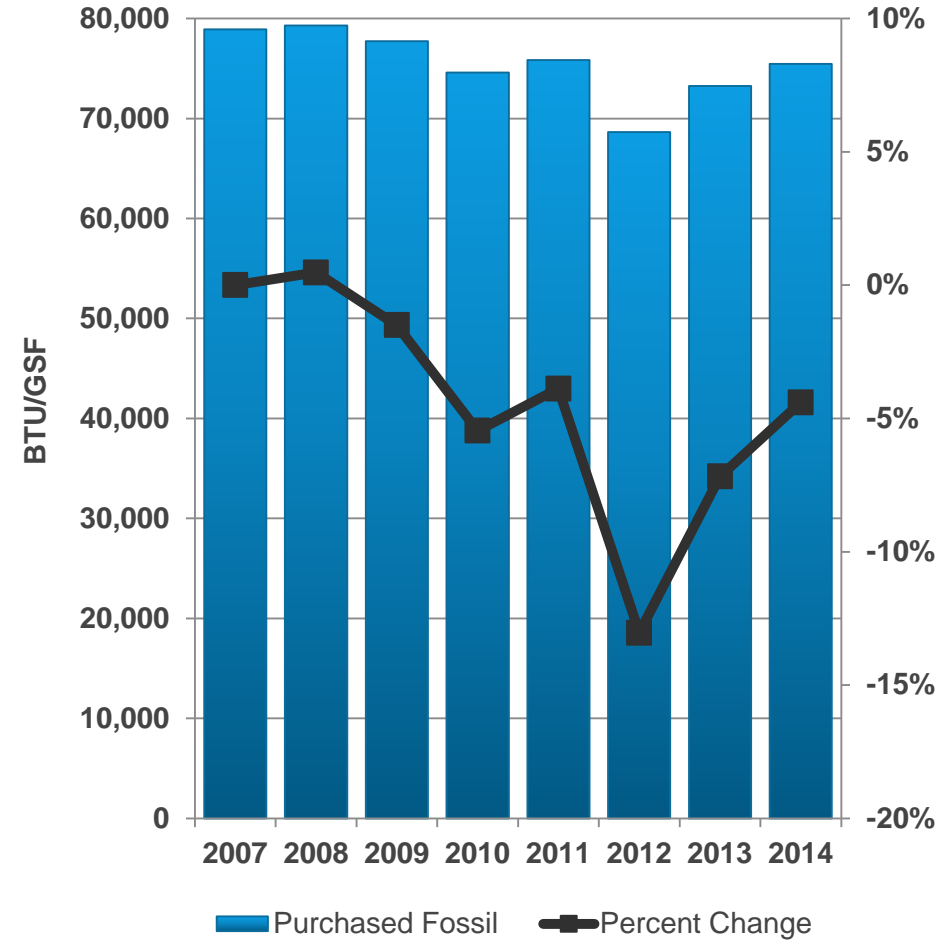
Purchased Fossil Emissions & Consumption

Fossil emissions decreased 14%; consumption down 4%

Fossil Emissions



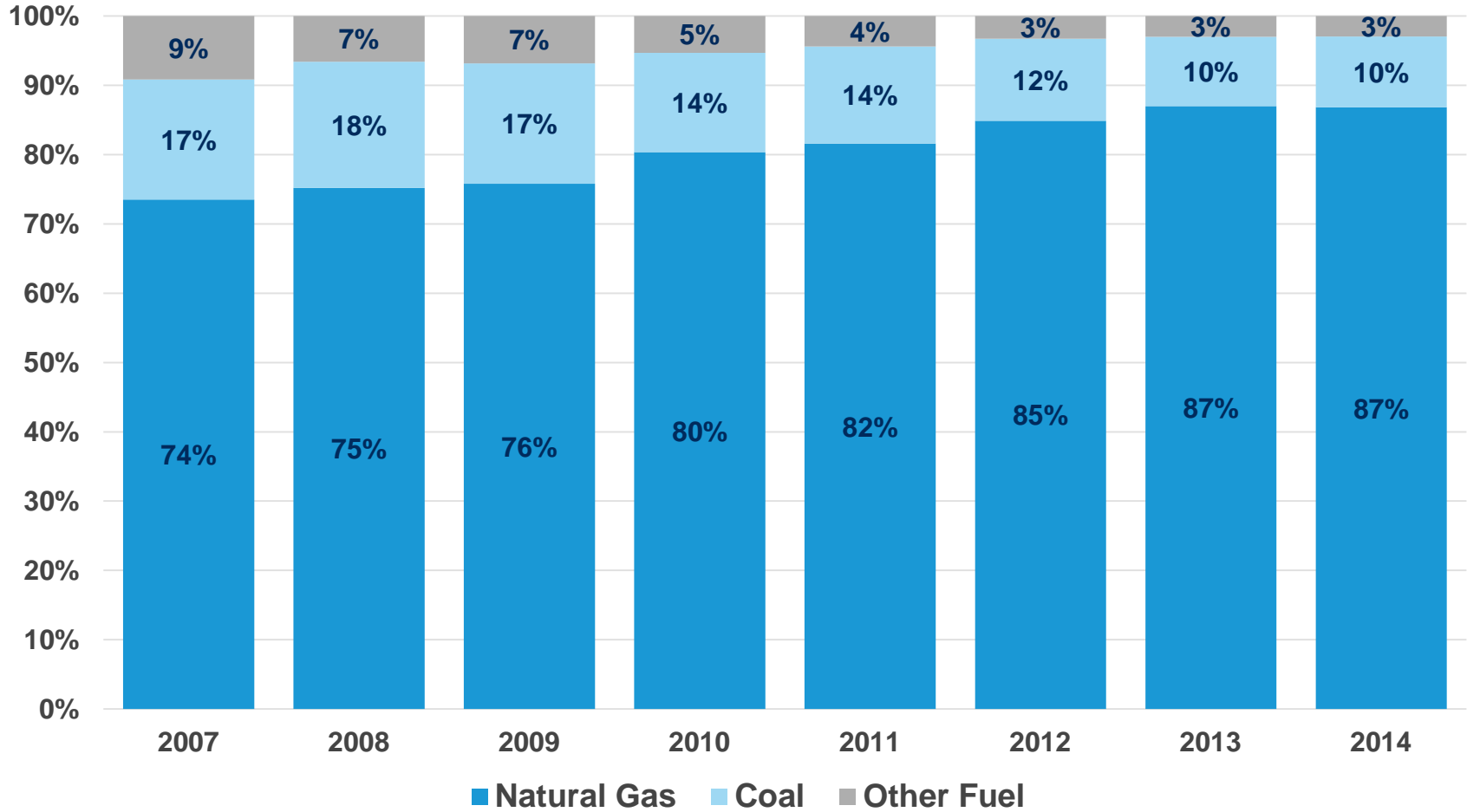
Fossil Consumption



Fuel Mix of Fossil Consumption

Rapid shift to natural gas since 2007

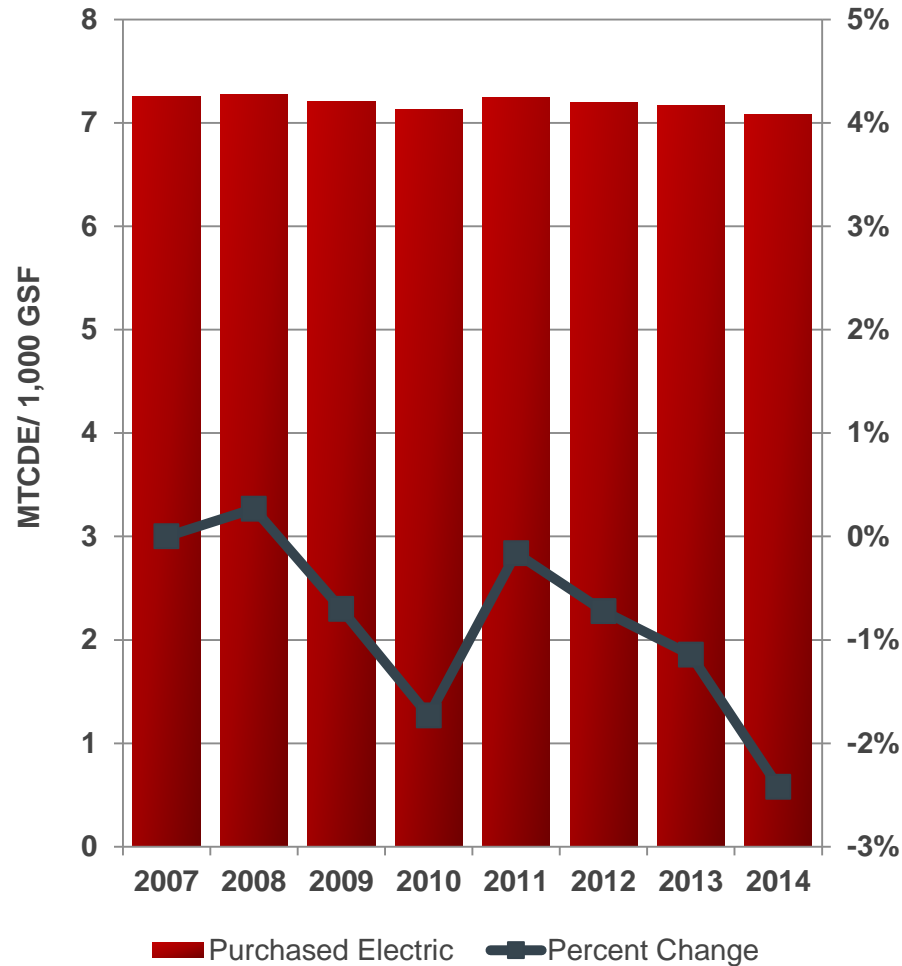
Fuel Mix



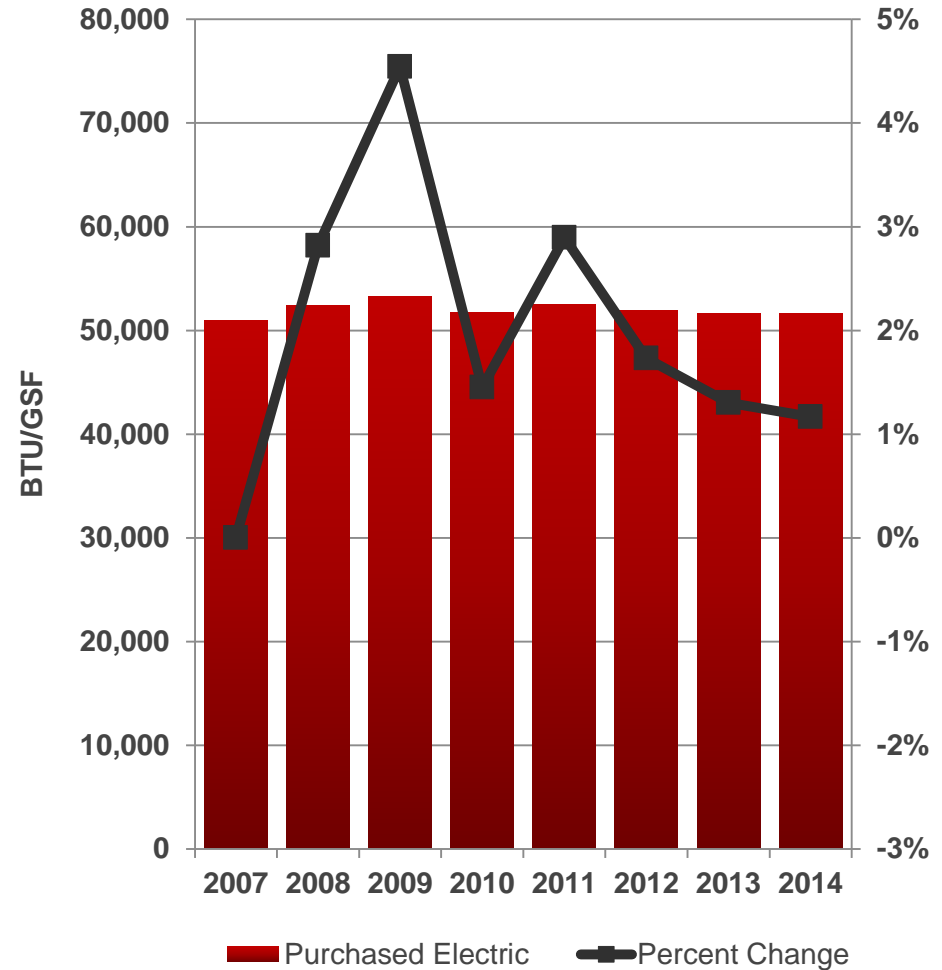
Purchased Electric Emissions & Consumption

Electric emissions decreased 2%; 1% increase in consumption

Electric Emissions



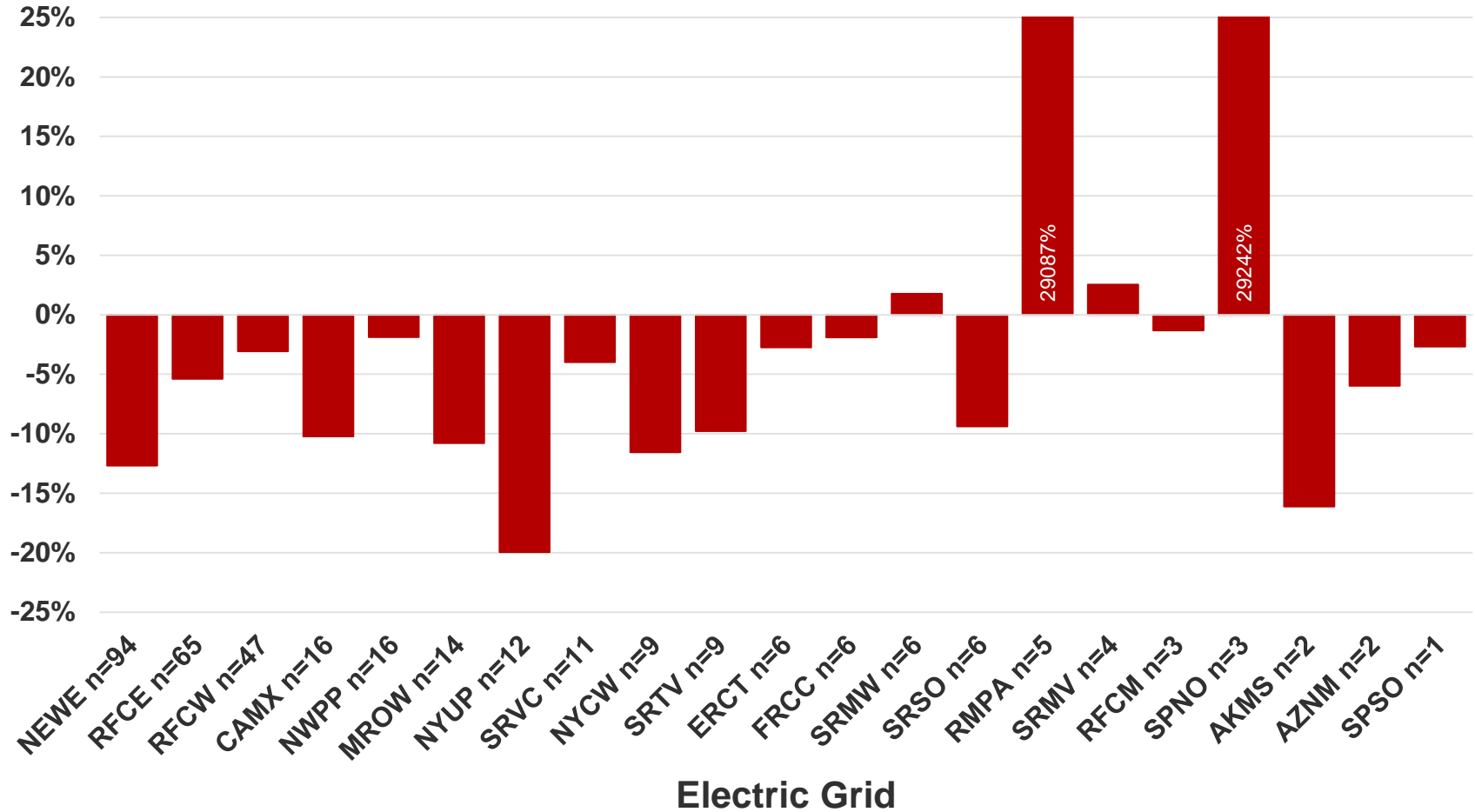
Electric Consumption



Electric Grid Emissions Impact

Overall improvements in grid emissions

Change in Electric Grid Emissions (2007 to 2014)

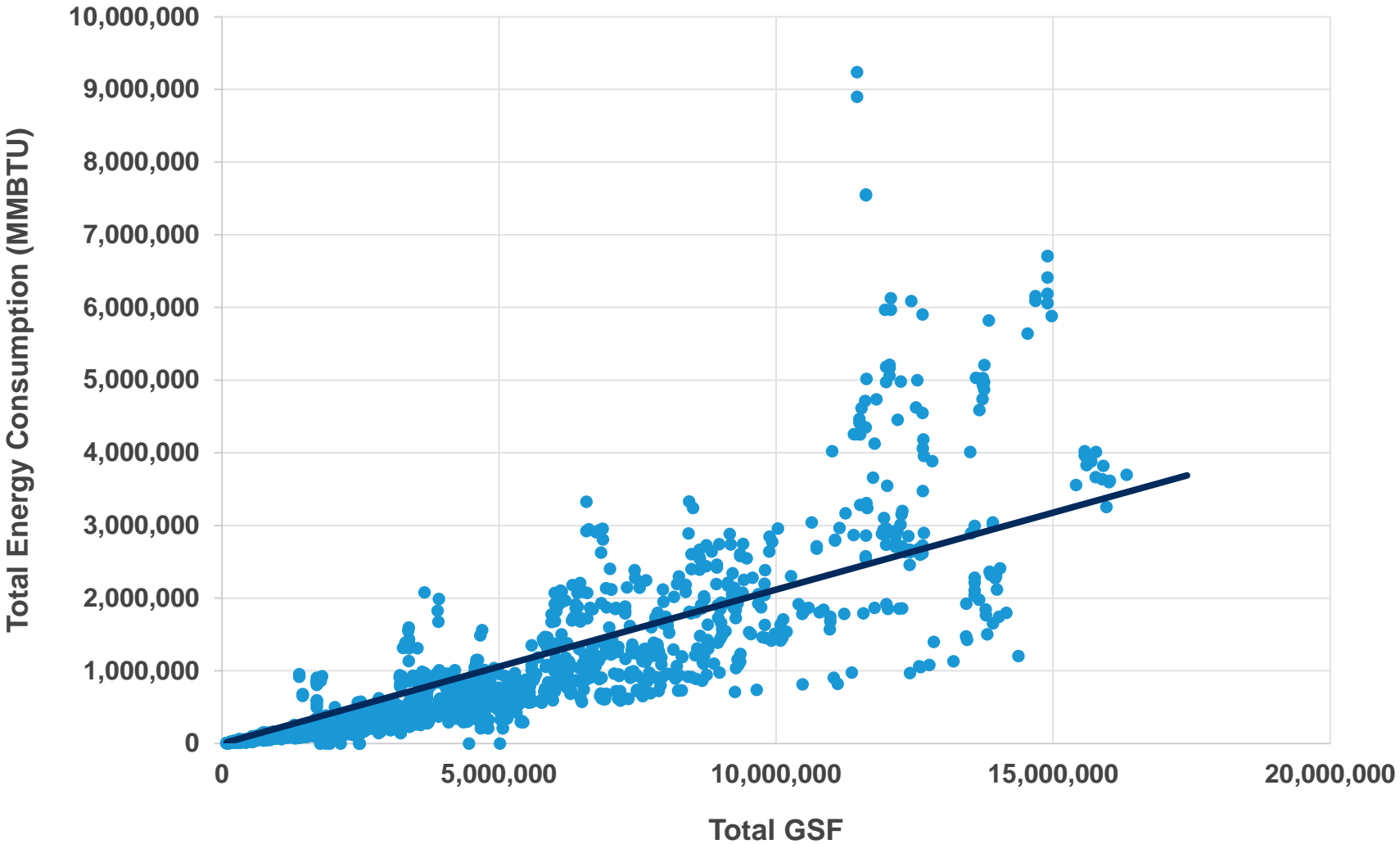




Factors Affecting Energy Consumption & Emissions

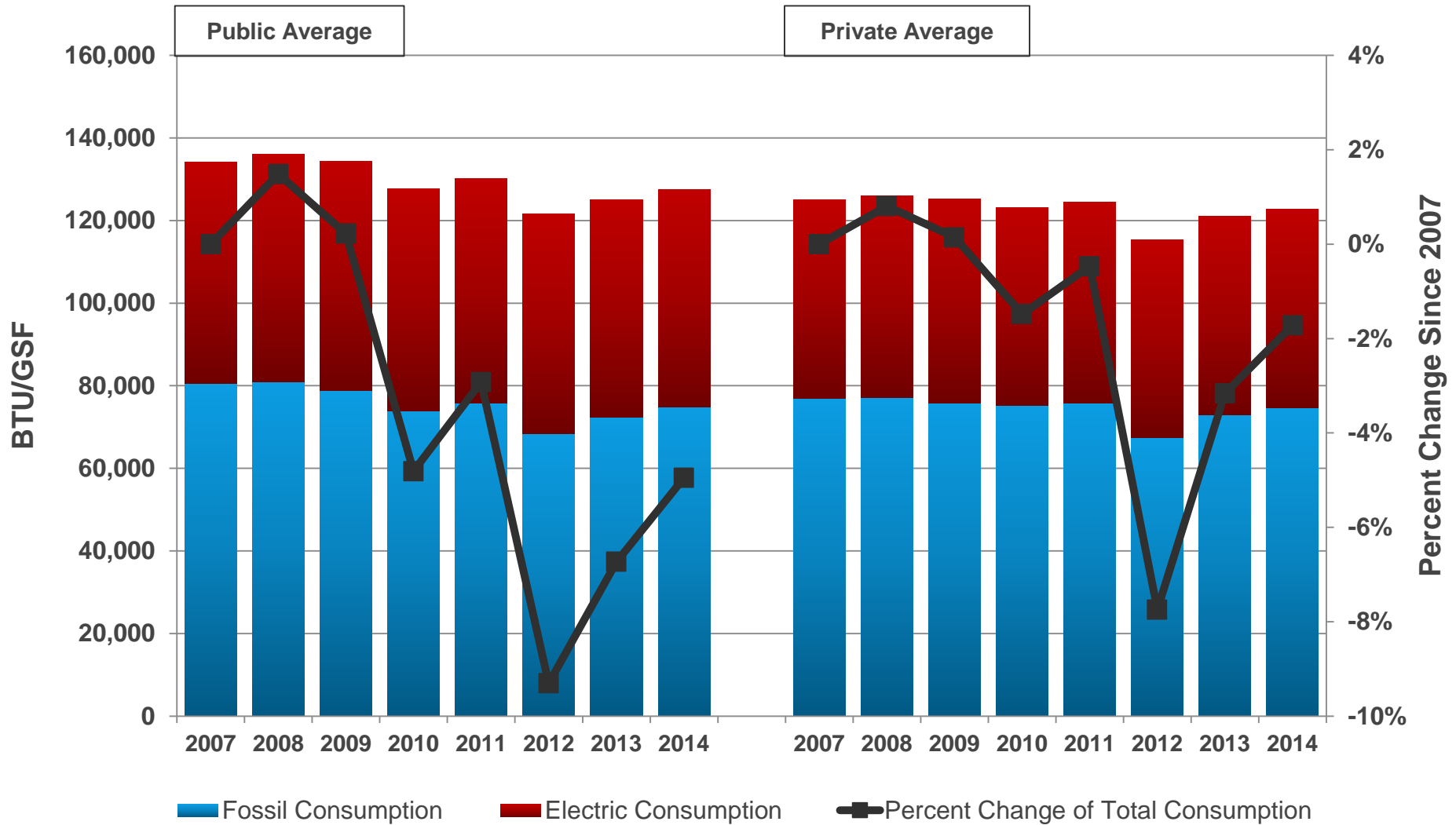
Total Energy Consumption & Campus Size

Generally, consumption increases with campus size



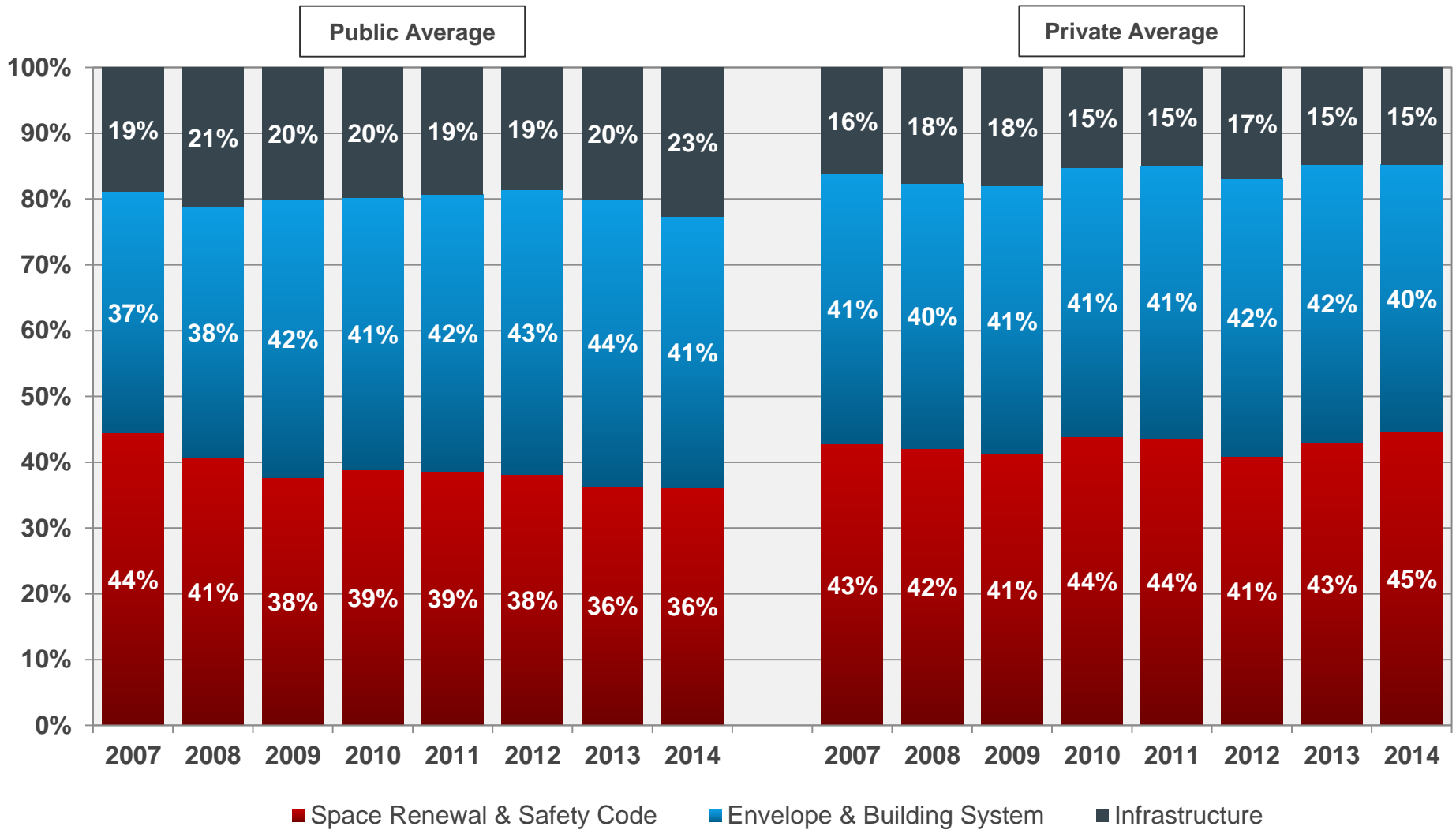
Focus on Energy Reduction

Public and private average for energy consumption



How Are Capital Dollars Being Spent?

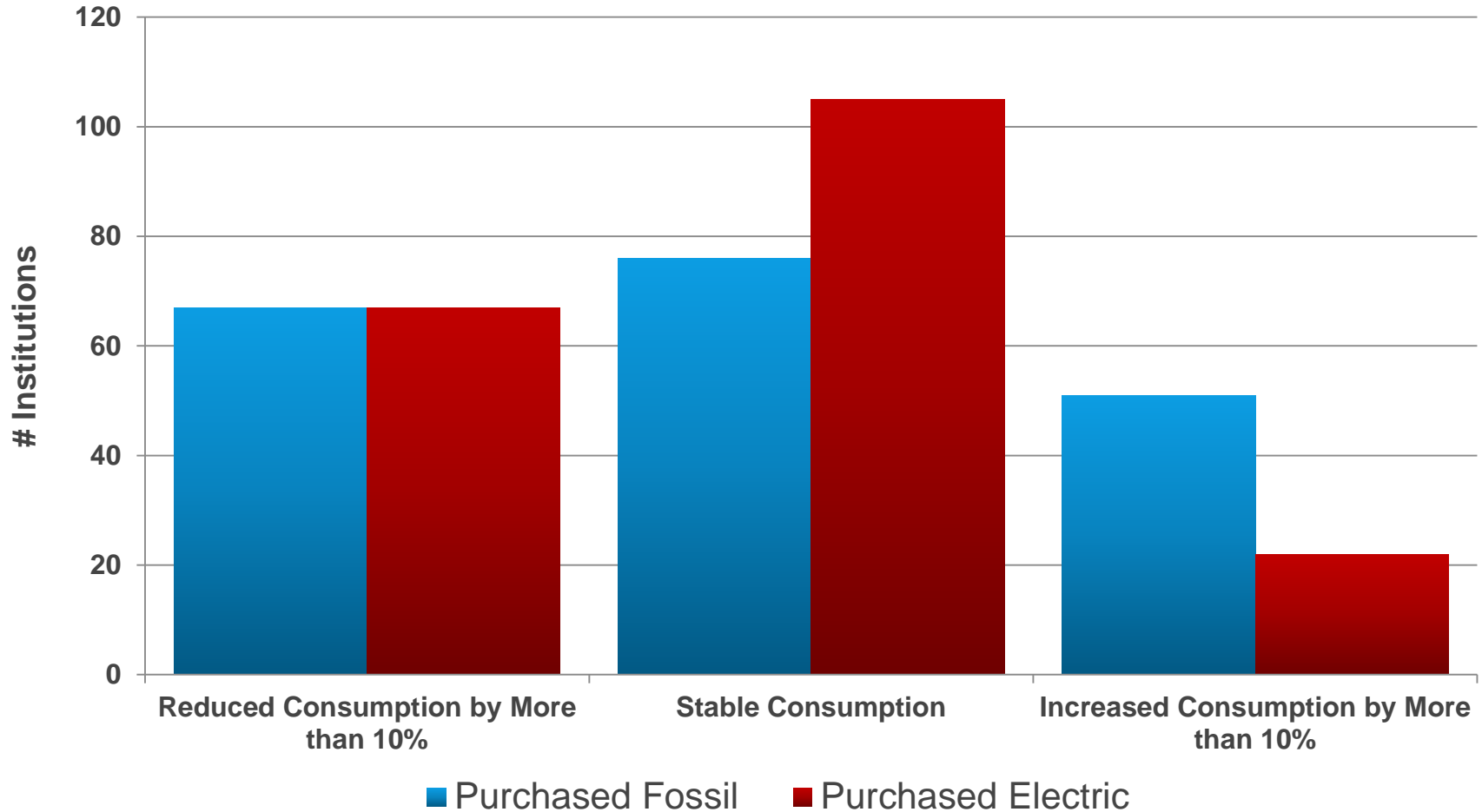
Higher investment into envelope/mechanical systems



Campuses Grouped by Change in Consumption

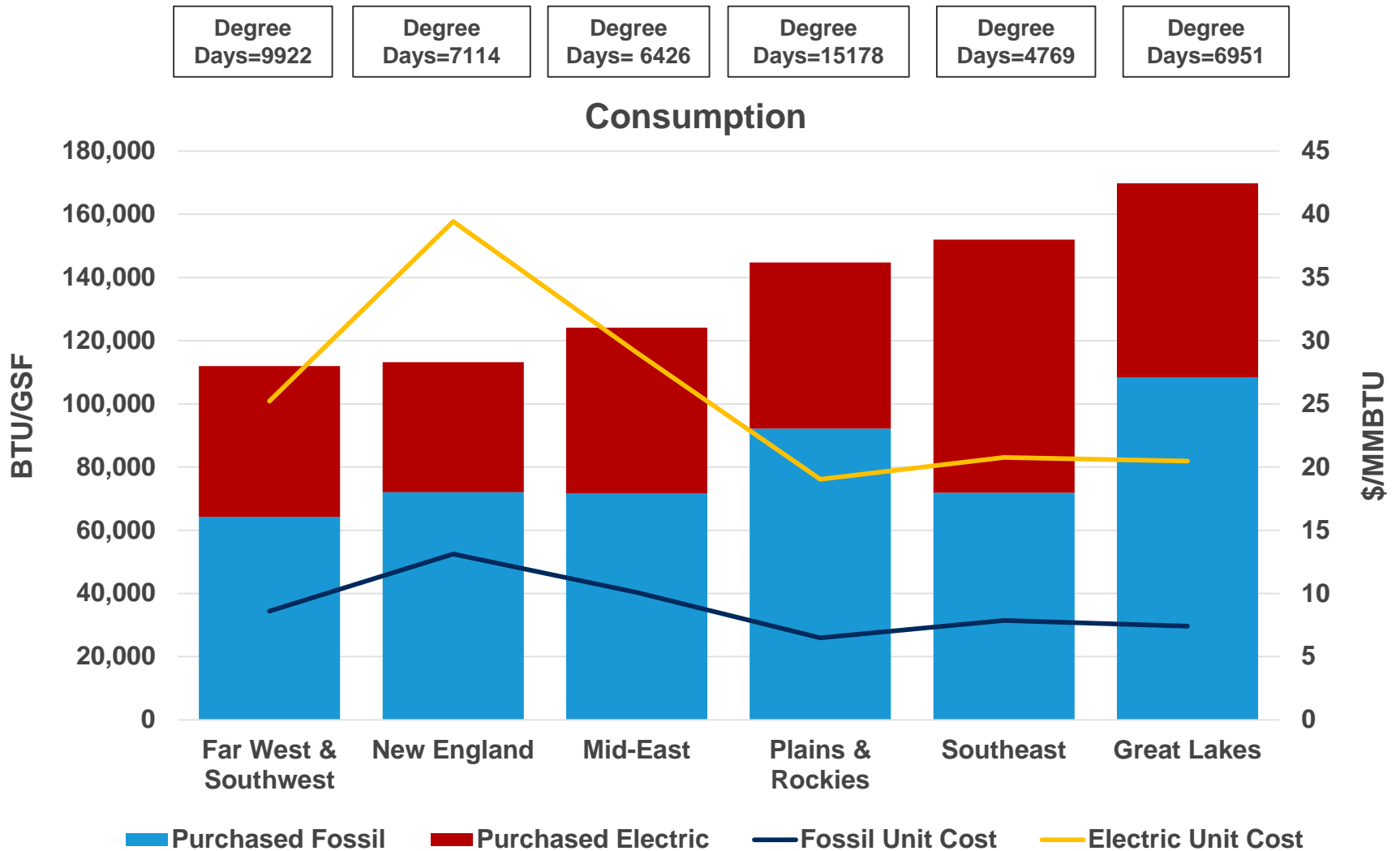
The majority are stable in their consumption

Change In Consumption from 2007 to 2014



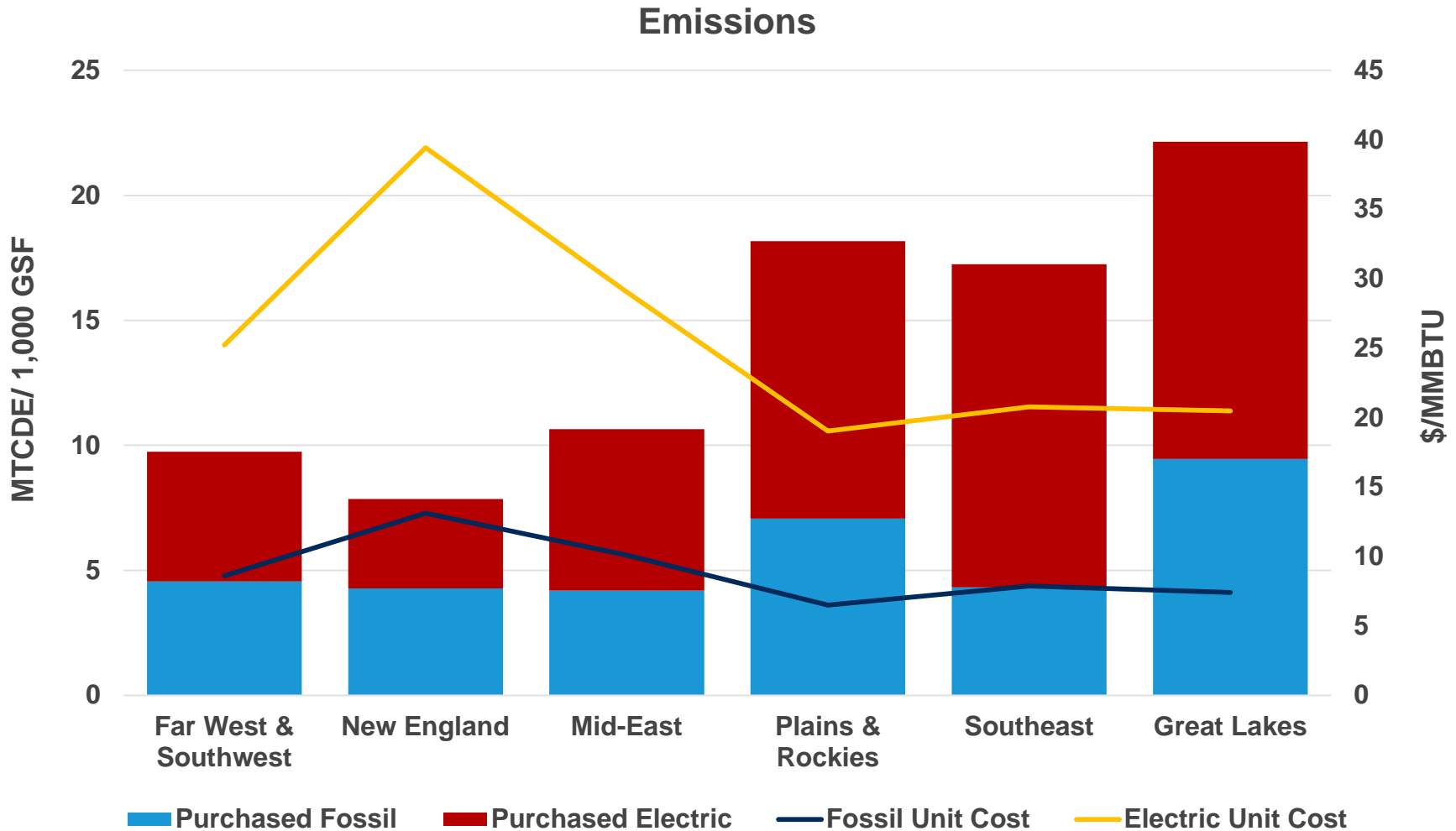
Energy Consumption & Unit Costs

Consumption is higher where unit cost is lower



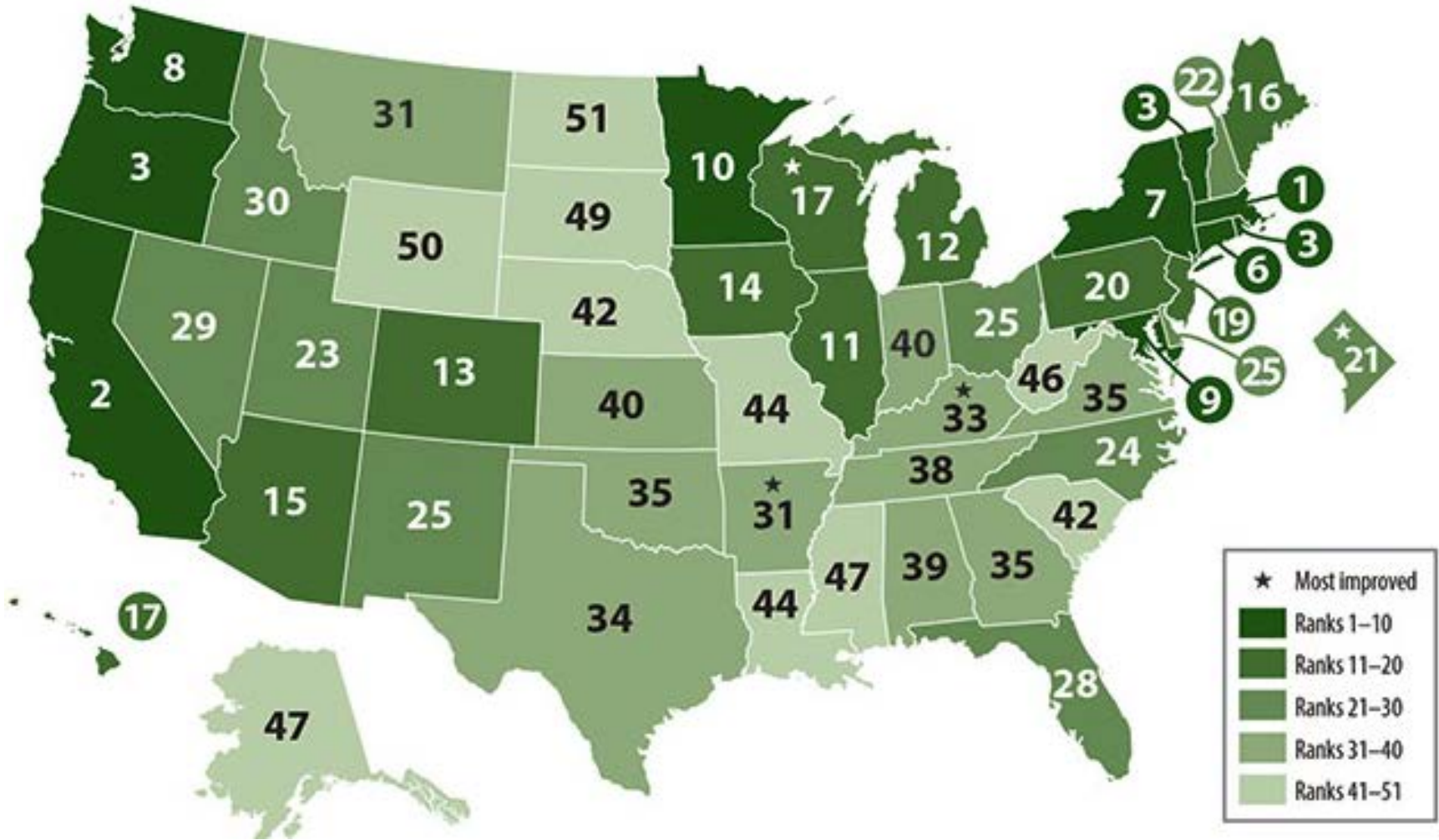
Emissions & Energy Costs by Region

Regions with lower costs have higher emissions



States Ranked by Strength of Energy Efficiency Policy

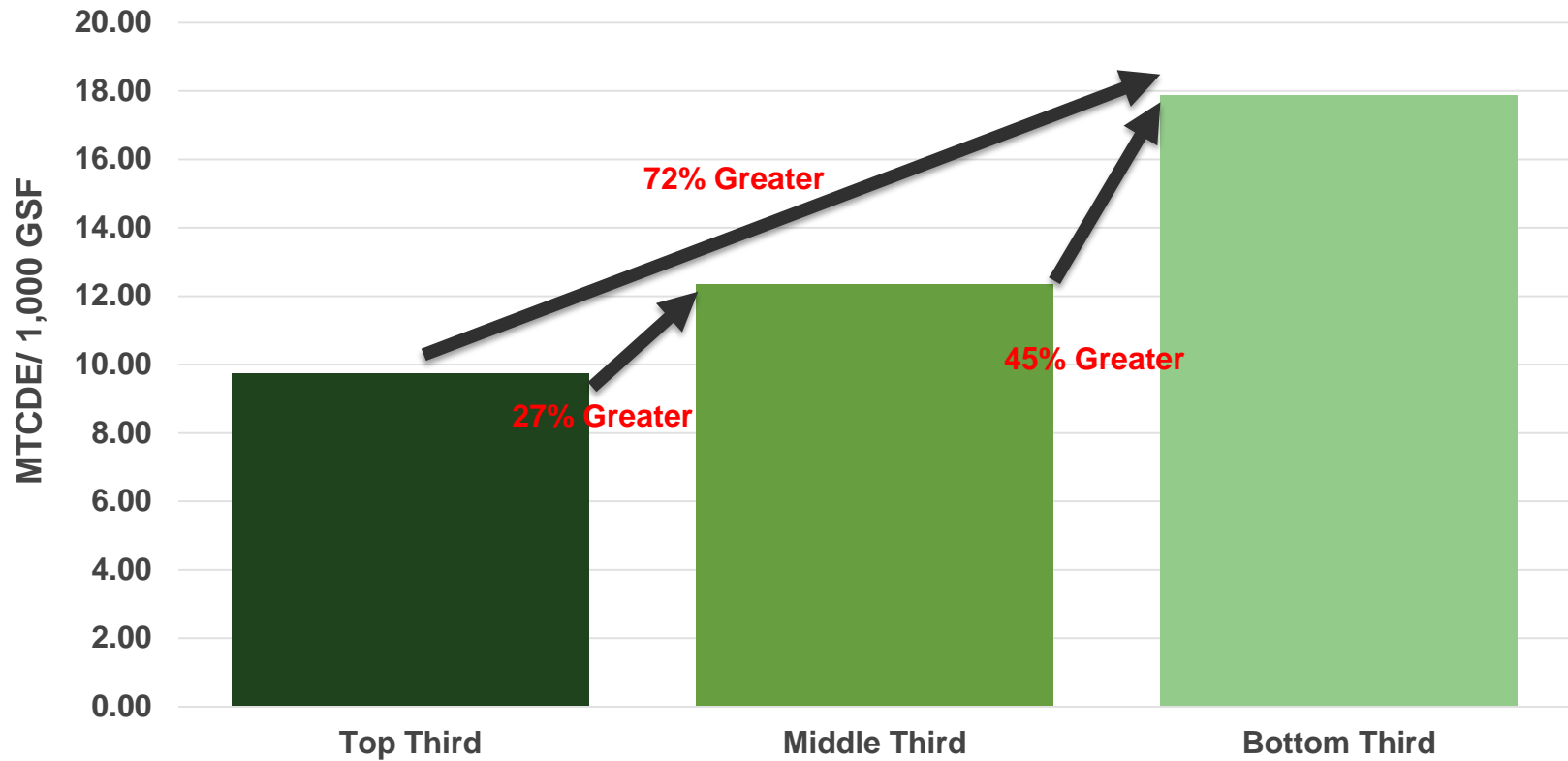
ACEE annual rankings



State Policy Rank & Emissions

States with strong policy have lower emissions

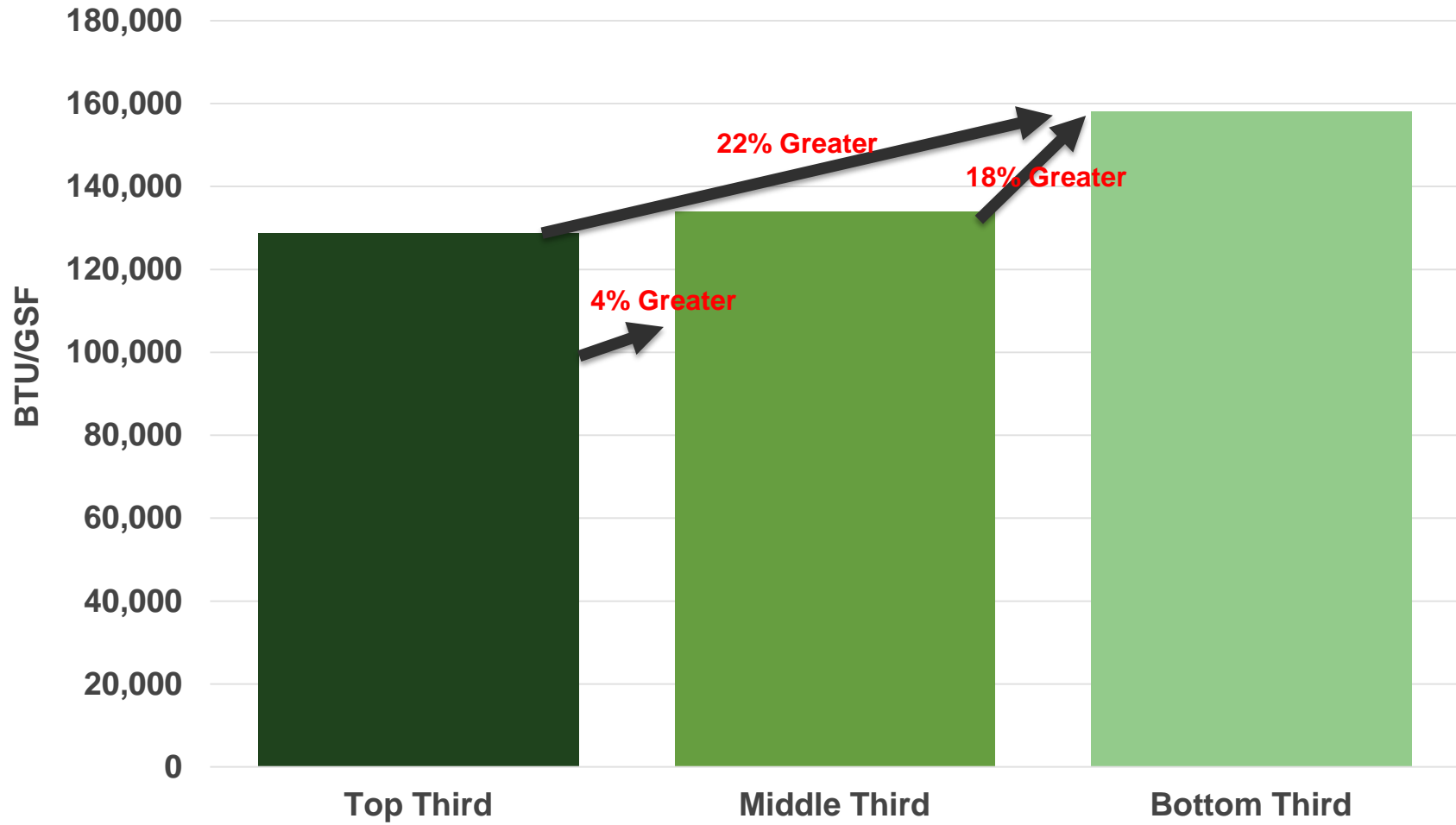
Emissions - ACEEE Energy Efficiency Scorecard



State Policy Rank & Consumption

States with strong policy have lower consumption

Consumption - ACEEE Energy Efficiency Scorecard



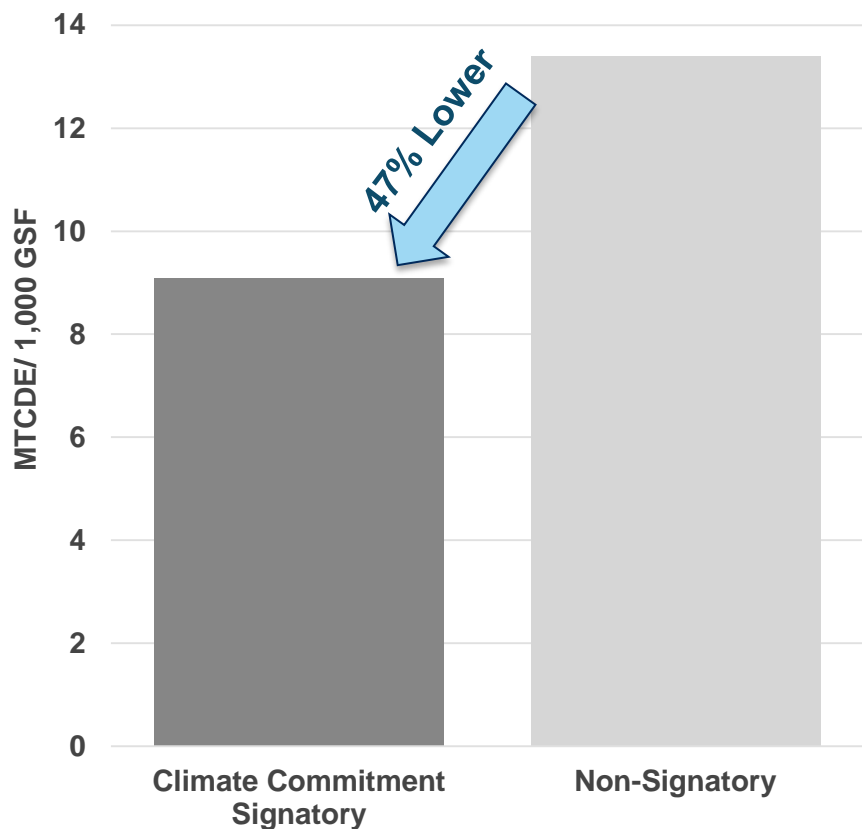


Which Campuses Are Making Progress and Why?

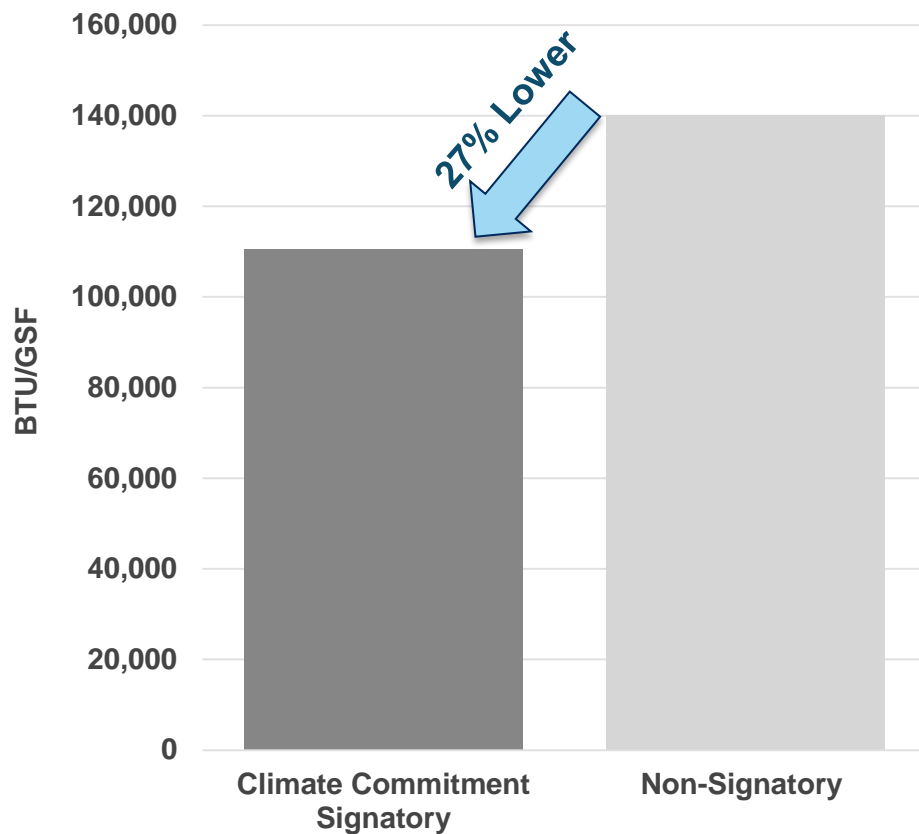
Emissions and Consumption of Signatories vs. Non-Signatories

Climate Commitment Signatories have 47% lower emissions; 27% lower consumption

2014 Emissions

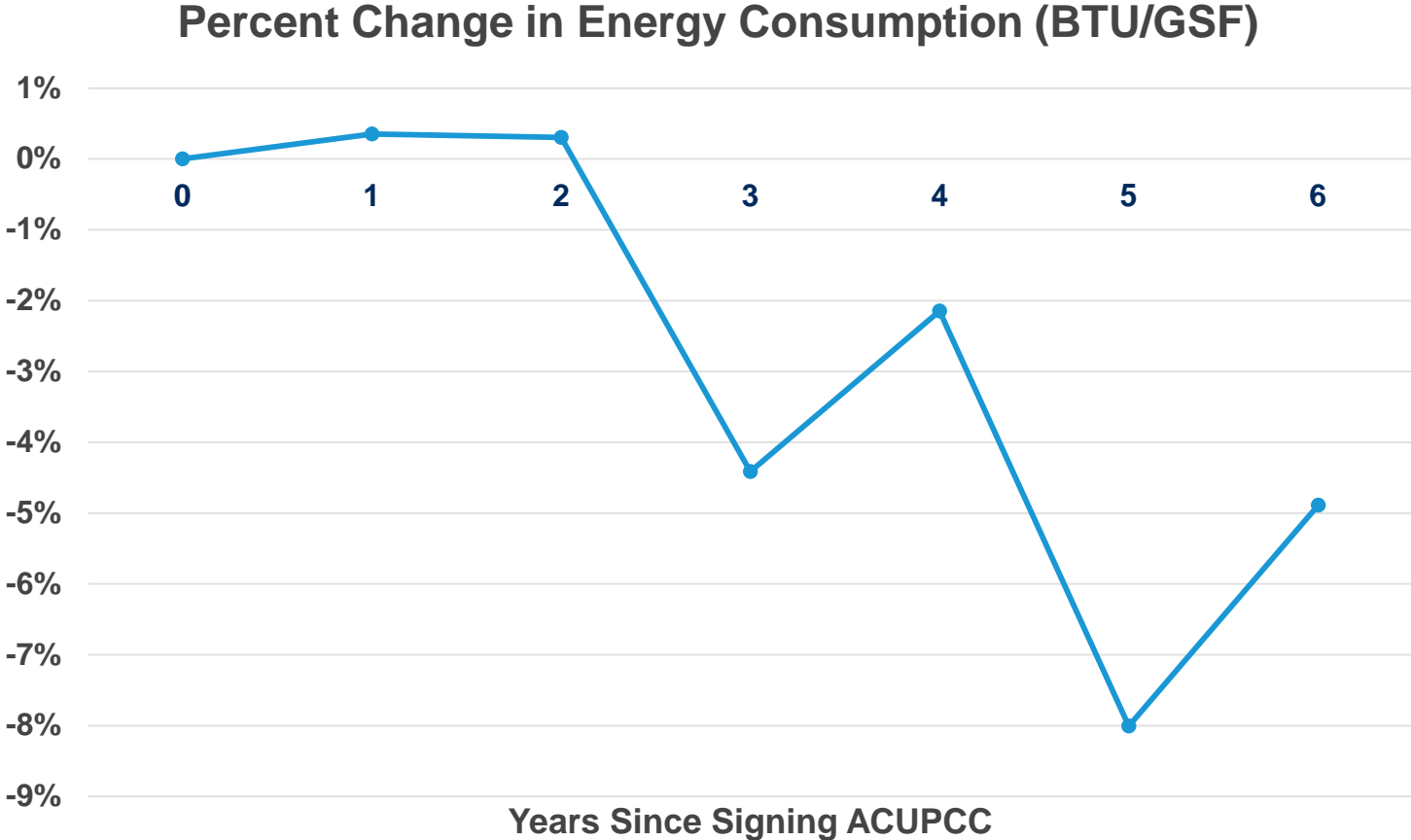


2014 Consumption



ACUPCC Signatories Energy Consumption Over Time

Sustaining consumption reductions is difficult



Number of Years Since Signed	0	1	2	3	4	5	6
Institution Count	94	92	88	86	83	78	76





Conclusions & Recommendations

Conclusion and Key Takeaways

- ❏ Gross emissions from Stationary Scope 1 and Scope 2 sources are down a modest 5% from 2010-2014, with consumption slightly up. Emissions per square foot were down 13% between 2007 and 2014, with usage only down 2%.
- ❏ Progress in reducing campus carbon footprints came primarily as a result of fuel switching.
- ❏ Campuses that have shifted capital investments to envelope and mechanical systems have made more progress in reducing GHG emissions and reducing energy use, while schools with older buildings had to spend more just to keep consumption stable.
- ❏ Campus size, density, age profile, and capital investment portfolios are key drivers of GHG emissions and energy consumption.
- ❏ Institutional commitment from leadership will be a key driver in sustainability outcomes.
- ❏ Energy cost has a big impact on energy consumption.
- ❏ Public policy and incentives are critical.



Strategic Questions

Offering higher education institutions a path to lower emissions and consumption

- ❏ How important is institutional commitment from campus leadership to improve carbon emissions and drive successful sustainability outcomes?
- ❏ What role does strategic capital investment play in reducing carbon emissions and how can facilities challenges be turned into sustainability opportunities?
- ❏ What opportunities exist to implement renewable energy strategies and what would a large-scale adoption of this strategy require?
- ❏ What public sector-based incentives and regulations would you recommend?
- ❏ Do the current tools and platforms for collecting and reporting out sustainability metrics fully support the movement and its progress? What opportunities for improvement exist?





Questions?