Chapman University
Sustainability Solutions

FY20/21 GHG Benchmarking Update

April 2022

Duncan Ketel and Tiffany Smith
What We Do

Operations

Construction

Procurement

Planning

Design

Data

Software

Expertise

Data
Drive Meaningful Action

Software
Improve Workflows

Expertise
Deliver Results
Sightlines Solutions

**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
Overview of Sightlines Data Analysis

Summary of Emissions Profile

Scope 1 Emissions Overview

Scope 2 Emissions Overview

Scope 3 Emissions Overview
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.
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

© 2022 The Gordian Group, Inc. All Rights Reserved.
Longitudinal Emissions by Scope

Chapman’s FY21 emissions were dramatically impacted by Covid.
Progress Against 2014 Baseline

Chapman’s emissions substantially decreased when normalizing by population and space.

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

Change in Space, Population, and Emissions Indexed to FY2014

© 2022 The Gordian Group, Inc. All Rights Reserved.
FY21 Distribution of Emissions by Level of Control

Chapman’s emissions varied significantly within Scope 3, Scope 2 & 1 saw less fluctuation.
### Sustainability Peers
Peers determined using location, campus size, and population

<table>
<thead>
<tr>
<th>Peer Institution</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idyllwild Arts Academy</td>
<td>Idyllwild, California</td>
</tr>
<tr>
<td>St. Mary’s College of California</td>
<td>Moraga, California</td>
</tr>
<tr>
<td>University of San Francisco*</td>
<td>San Francisco, California</td>
</tr>
<tr>
<td>University of San Diego*</td>
<td>San Diego, California</td>
</tr>
<tr>
<td>University of Denver</td>
<td>Denver, Colorado</td>
</tr>
<tr>
<td>University of Texas- Rio Grande Valley</td>
<td>Edinburg, Texas</td>
</tr>
<tr>
<td>Stockton University</td>
<td>Galloway Township, New Jersey</td>
</tr>
</tbody>
</table>
Two Ways to Normalize Emissions for Comparison

**GHG Emissions per 1,000 GSF EUI Adjusted**

Stresses intensity of operations.

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

**GHG Emissions per Weighted Campus User**

Stresses efficient use of space.

\[
\text{Gross GHG Emissions} \times \frac{\text{Weighted Campus User}}{1,000}
\]
Total Gross Emissions per Space and Campus User

Chapman emits less than peers when normalized by GSF and population

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

**Gross Emissions**
MTCDE/Weighted Campus User

© 2022 The Gordian Group, Inc. All Rights Reserved.
Scope 1: Direct Emissions

Chapman’s scope 1 emissions are significantly below peer average.
Chapman’s decrease in Scope 1 lead by a decline in natural gas consumption.
Scope 2: Total Electric Consumption vs. Peers

Since FY19/20 Chapman’s electric consumption has been comparable to peers.
Scope 2: Total Electric Consumption vs. Peers

While total consumption is similar to peer average, peers diversify their electrical sources.

FY21 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

When normalizing by cooling degree days, Chapman consumed less than peer average.
Chapman’s decrease in emissions has been partially due to energy efficiency upgrades.

**Energy Emissions**

**Chapman**
- 43% decrease since 2014

**Peers**
- 3% increase since 2014
Scope 3: Indirect Emissions Overview

With decreases in commuting and travel, waste became largest Scope 3 source.

FY21 Scope 3 Emissions

- Commuting: 20%
- Travel: 4.8%
- Waste: 12%
- Peers: 61%
- T&D Losses: 2%
- Paper: 2%
- Wastewater: 4.8%

Scope 3 Emissions vs Peers

- FY21 Scope 3 Emissions: Paper data was extrapolated for all years from FY17.
Wastewater Production Similar to Peers

While wastewater is less than 5% of emissions, water reduction should be prioritized.

Wastewater Production vs. Peers

- A: 14,000 Gallons/WCU
- B: 8,000 Gallons/WCU
- C: 16,000 Gallons/WCU
- D: 4,000 Gallons/WCU
- E: 6,000 Gallons/WCU
- F: 2,000 Gallons/WCU
- G: 2,000 Gallons/WCU

Peer Average: 7,000 Gallons/WCU
A Closer Look at Waste

Chapman diverts more waste to recycling than peers, but produces more total waste.
Commuting Profile by Mode of Transportation

Chapman faculty/staff utilize alternative transportation methods less than peers.

Commuting Mode by Demographic

- **Chapman Students***
  - Drive alone: 57%
  - Carpool/Mass Transit: 35%
  - Carbon Free: 8%

- **Peer Students**
  - Drive alone: 72%
  - Carpool/Mass Transit: 16%
  - Carbon Free: 12%

- **Database**
  - Drive alone: 70%
  - Carpool/Mass Transit: 22%
  - Carbon Free: 7%

- **Chapman Faculty/Staff**
  - Drive alone: 86%
  - Carpool/Mass Transit: 10%
  - Carbon Free: 5%

- **Peer Faculty/Staff**
  - Drive alone: 77%
  - Carpool/Mass Transit: 13%
  - Carbon Free: 10%

- **Database**
  - Drive alone: 82%
  - Carpool/Mass Transit: 15%
  - Carbon Free: 3%

*Chapman students did not commute in FY21*
Total Commuting Emissions

With more staff and classes remote, commuting emissions substantially decreased.
Total Travel Emissions

With almost no travel in FY21, emissions were close to zero
With fewer students on campus and most classes remote, paper usage dwindled.

**FY21 Paper Usage vs. Peers**

- A: 15 LBS./WCU (Paper Usage), 16 LBS./WCU (Peer Average)
- CU: 10 LBS./WCU (Paper Usage), 16 LBS./WCU (Peer Average)
- B: 30 LBS./WCU (Paper Usage), 16 LBS./WCU (Peer Average)
- C: 10 LBS./WCU (Paper Usage), 16 LBS./WCU (Peer Average)
- D: 10 LBS./WCU (Paper Usage), 16 LBS./WCU (Peer Average)
- E: 10 LBS./WCU (Paper Usage), 16 LBS./WCU (Peer Average)
- F: 10 LBS./WCU (Paper Usage), 16 LBS./WCU (Peer Average)
- G: 10 LBS./WCU (Paper Usage), 16 LBS./WCU (Peer Average)

**FY 21 Paper Emissions vs. Peers**

- A: 0.03 MTCDE/WCU (Paper Emissions), 0.04 MTCDE/WCU (Peer Average)
- CU: 0.03 MTCDE/WCU (Paper Emissions), 0.04 MTCDE/WCU (Peer Average)
- B: 0.05 MTCDE/WCU (Paper Emissions), 0.04 MTCDE/WCU (Peer Average)
- C: 0.03 MTCDE/WCU (Paper Emissions), 0.04 MTCDE/WCU (Peer Average)
- D: 0.03 MTCDE/WCU (Paper Emissions), 0.04 MTCDE/WCU (Peer Average)
- E: 0.03 MTCDE/WCU (Paper Emissions), 0.04 MTCDE/WCU (Peer Average)
- F: 0.03 MTCDE/WCU (Paper Emissions), 0.04 MTCDE/WCU (Peer Average)
- G: 0.03 MTCDE/WCU (Paper Emissions), 0.04 MTCDE/WCU (Peer Average)
Concluding Comments

Chapman’s Scope 1 emissions saw an overall decrease due to a suspension of traditional fleet activities (athletic travel, campus shuttles) and less MMBTU’s of natural gas consumed. Many of these decreases are most likely due to Covid-19 and distance delivery of education. Going forward, Chapman should electrify their vehicle fleet and prioritize energy efficiency projects.

Chapman will most likely see electricity consumption increase as larger buildings return to full occupancy and the Keck center continues to be built out. Beyond prioritizing energy efficiency projects, Chapman should consider on campus solar, or purchasing renewable electricity directly from SCE, to decrease Scope 2 emissions.

Scope 3 saw significant reductions due to the Covid-19 pandemic. Chapman should use this a learning opportunity for how to reapproach education. Can students and staff continue to work remotely in some instances to reduce commuting emissions? Additionally, as travel resumes, Chapman should begin the process of phasing in offsets for study abroad and departmental travel.