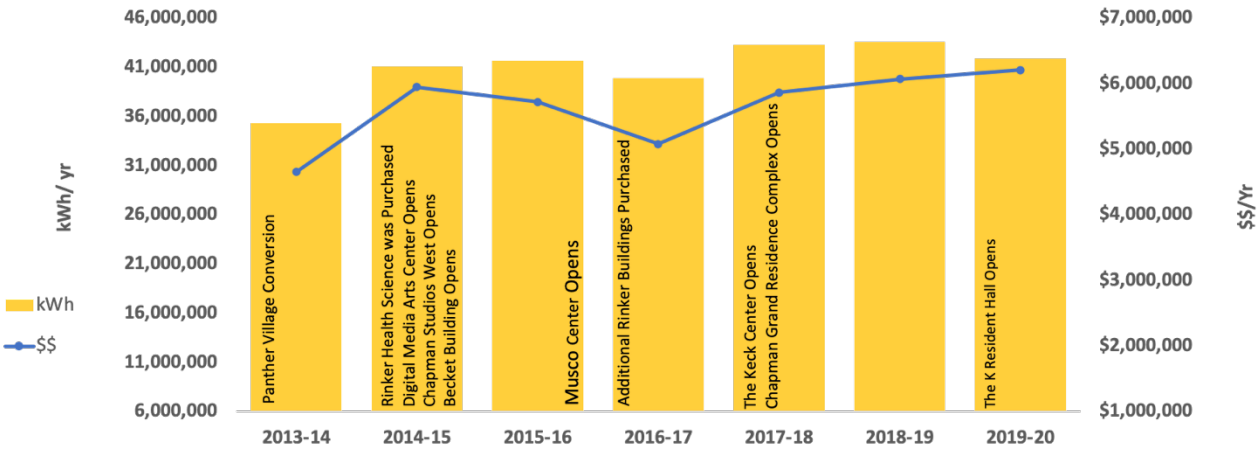
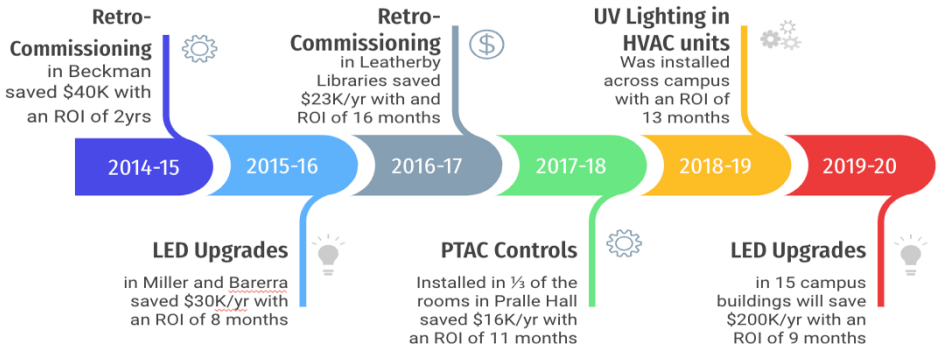
Chapman University Energy Use Profile

Energy Use Overview

Chapman University has held energy expenses relatively stable over the last six years despite the addition of approximately 1.4 million square feet, a 20% increase in the student body, and 11% blended rate increase in electric cost over the baseline year of 2013. Cost per square foot has fallen from $0.12 to $0.09 over the same period, despite an overall increase in cost of power. The Facilities Management Department and the Office of Sustainability have reduced real energy usage by 4% from 2018-19 to 2019-20. The 2018-19 year represents our highest year of consumption since data tracking began.

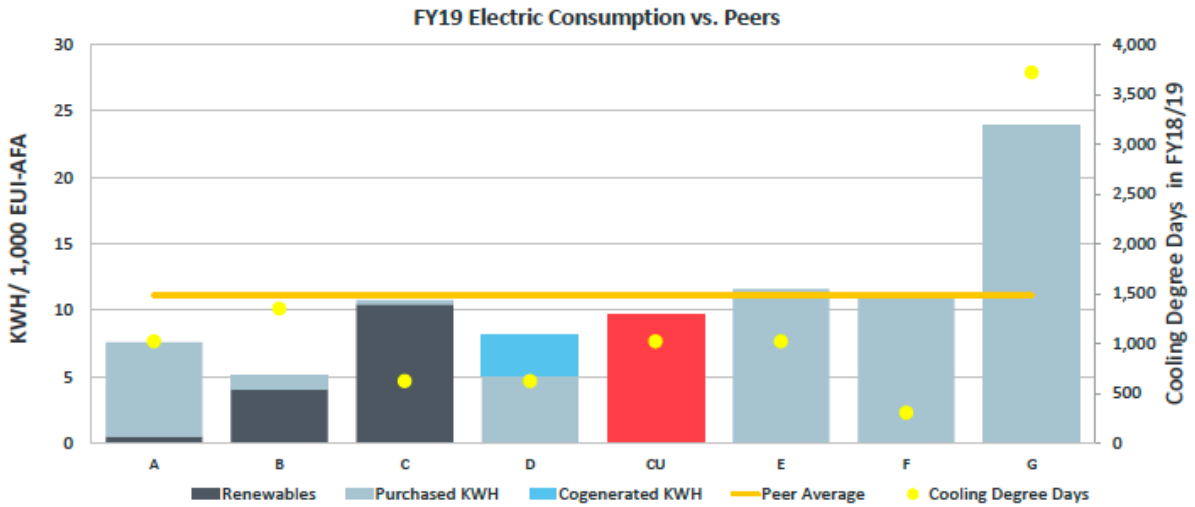
The university saw its most substantial increase in consumption between 2013-14 and 2014-15. This increase was the result of adding nearly 500,000 square feet to the campus footprint (primarily through the Rinker Campus, Digital Media Arts Center, Chapman Studios West, and the Becket Building). Cost and consumption reductions are primarily the result of energy efficiency measures such as HVAC improvements, building retro-commissioning projects, and lighting upgrades. A representative sample of these initiatives are included below.





How does Chapman Compare?

When comparing electric consumption with peer institutions for the 2019 fiscal year, Chapman had a lower energy use intensity (EUI) than our peers. The EUI is expressed as energy per square foot per year. It's calculated by dividing the total energy consumed by the buildings in one year (measured in kBtu or GJ) by the total gross floor area of the building. A low EUI signifies a good energy performance. Cooling days, represented by the yellow circle, are used for data normalization purposes and can be understood as the number of days the temperature was higher than 65F and therefore required buildings to be cooled.



Peers arrayed by technical complexity: The relative mechanical complexity of the campus on a scale of 1-5

Greenhouse Gas Emission

CU has seen significant energy savings despite aggressive growth since 2014. While energy conservation measures have resulted in greenhouse gas (GHG) reductions, GHG savings primarily result from the electrical mix of the University's primary energy provider SCE (see graph on the next page).

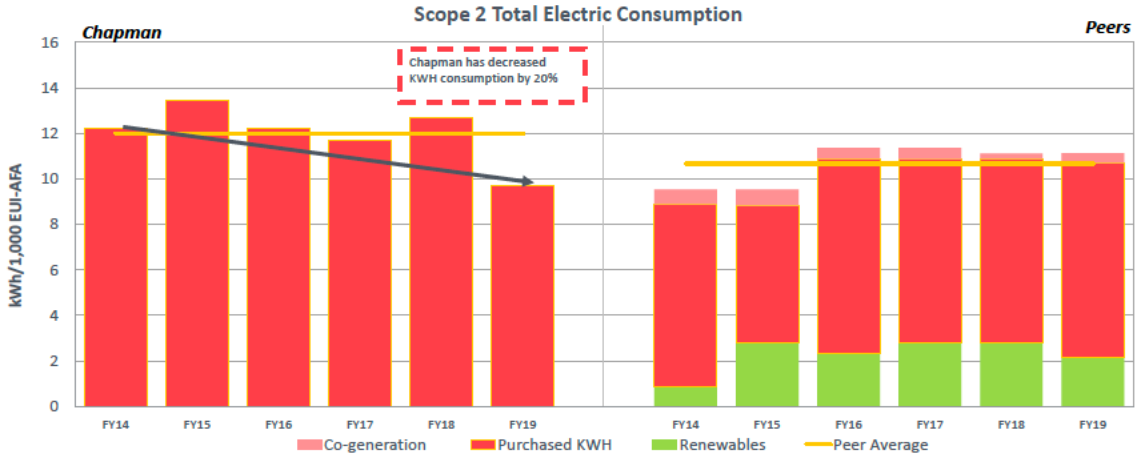
Version: July 2019

2018 POWER CONTENT LABEL				
Southern California Edison				
www.sce.com				
ENERGY RESOURCES	SCE Power Mix	SCE Green Rate 50% option	SCE Green Rate 100% option	2018 CA Power Mix**
Eligible Renewable	36%	68%	100%	31%
Biomass & Biowaste	1%	0%	0%	2%
Geothermal	8%	4%	0%	5%
Eligible Hydroelectric	1%	0%	0%	2%
Solar	13%	57%	100%	11%
Wind	13%	7%	0%	11%
Coal	0%	0%	0%	3%
Large Hydroelectric	4%	2%	0%	11%
Natural Gas	17%	8%	0%	35%
Nuclear	6%	3%	0%	9%
Other	0%	0%	0%	<1%
Unspecified sources of power*	37%	18%	0%	11%
TOTAL	100%	100%	100%	100%

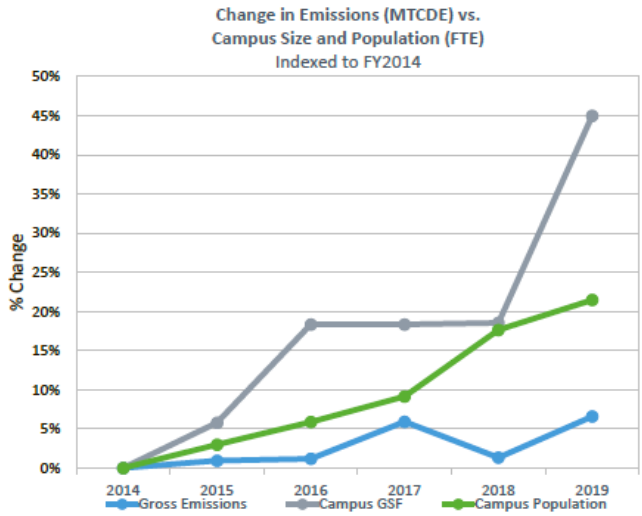
* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.

** Percentages are estimated annually by the California Energy Commission based on the electricity generated in California and net imports as reported to the Quarterly Fuel and Energy Report database and the Power Source Disclosure program.

CU has reduced GHG emissions by 20% over the baseline year of 2014, and remained under the average emissions of our peers. However, peer institutions are utilizing renewable energy and cogeneration plants. Cogeneration is not an option for CU, but there are ways to utilize renewable energy through increased purchase of renewable energy for select campus accounts, the purchase of renewable energy credits, supporting Community Choice Energy, or the addition of on-sight generation at the Rinker Campus, Chapman Grand, MKS, and/or West Campus.



The graph below outlines the change in GHG emission in comparison to the increase of the campus population and the addition of square footage. Seeing a moderate climb in GHG emissions with a 20% increase in campus square footage, and a nearly 45% increase in the campus population (student, faculty, and staff) is noteworthy.



Peer Institutions	Location
The Thacher School	Ojai, CA
California Institute of the Arts	Santa Clarita, CA
St. Mary's College of California	Moraga, CA
University of San Francisco	San Francisco, CA
University of San Diego	San Diego, CA
University of Denver	Denver, CA
University of Texas – Rio Grande Valley	Edinburg, TX

Recommendations for future savings

It is possible to further decrease energy consumption and therefore achieve further financial savings and carbon emission reductions associated with energy efficiency. The biggest savings can be achieved through behavior change and increased investment in retro-commissioning and mechanical system modifications. The following strategies are suggested:

- Energy usage commitment which would allow more stringent temperature settings in classrooms, offices, and common areas across campus.
    - Chapman University is committed to a comfortable, energy efficient study and work environment for all community members. As such, spaces will be kept at a

temperature between 66-78, in accordance with building occupancy and mechanical systems ability.

- Comprehensive, automated lighting controls
    - Currently the campus lighting control systems are not connected to the building control system and therefore not fully utilized. Facilities does not have the ability to reduce lighting loads in unoccupied areas remotely, and as a result cooling loads are needlessly increased, and money is wasted.
- Heat blocking window film
    - Solar ray blocking window film can be applied to areas where solar radiation increases the need for additional cooling. We have piloted this is a few areas with success and the window film is not obvious from the exterior or interior.
- Expansion of PTAC Controls
    - Currently, the staff has little ability to control temperature settings in residential areas. Expanding the ability to control units remotely allows the staff to set temperature bands, shut off units when no one is present, and has the added bonus of preventing leaks.
- LED Upgrades
    - The University has seen significant savings resulting from LED upgrades across campus. To expand this into Chapman Grand could reduce energy usage in that residence life facility by nearly a third.
- Community Choice Energy
    - Supporting the city of Orange in exploring Community Choice Energy is another way to reduce utility costs across the city as a whole and increase access to renewable energy and clean power, which reduces the University's GHG emissions and cost of power.
- Renewable Energy
    - Installing renewable energy generation on site is a challenge for the Orange Campus, particularly the historic areas. However, West Campus, the Film School, Rinker Health Sciences, and Chapman Grand all offer possible suitable sites for solar power.
- Sustainability Tracking Assessment & Rating System (STARS)
    - STARS is a transparent, self-reporting framework for universities to measure their sustainability performance. The framework encompasses long-term sustainability goals for already high-achieving institutions, as well as entry points of recognition for institutions that are taking first steps toward sustainability. By participating in this reporting process the university can find areas for improvement and capitalize on existing university-wide programs.
- Energy Savings Marketing Campaign
    - One crucial area where the university it seeing many unrealized savings is through education and marketing of energy savings strategies that can be employed by all members of our campus community. A targeted education campaign around the value of energy saving measures could see significant savings.