

Carbon Neutrality is Puzzling-- The University of California is Developing Solutions

October 22, 2019

UC Davis Global Campus Energy Managers Workshop

David Phillips

Associate Vice President for Energy and Sustainability

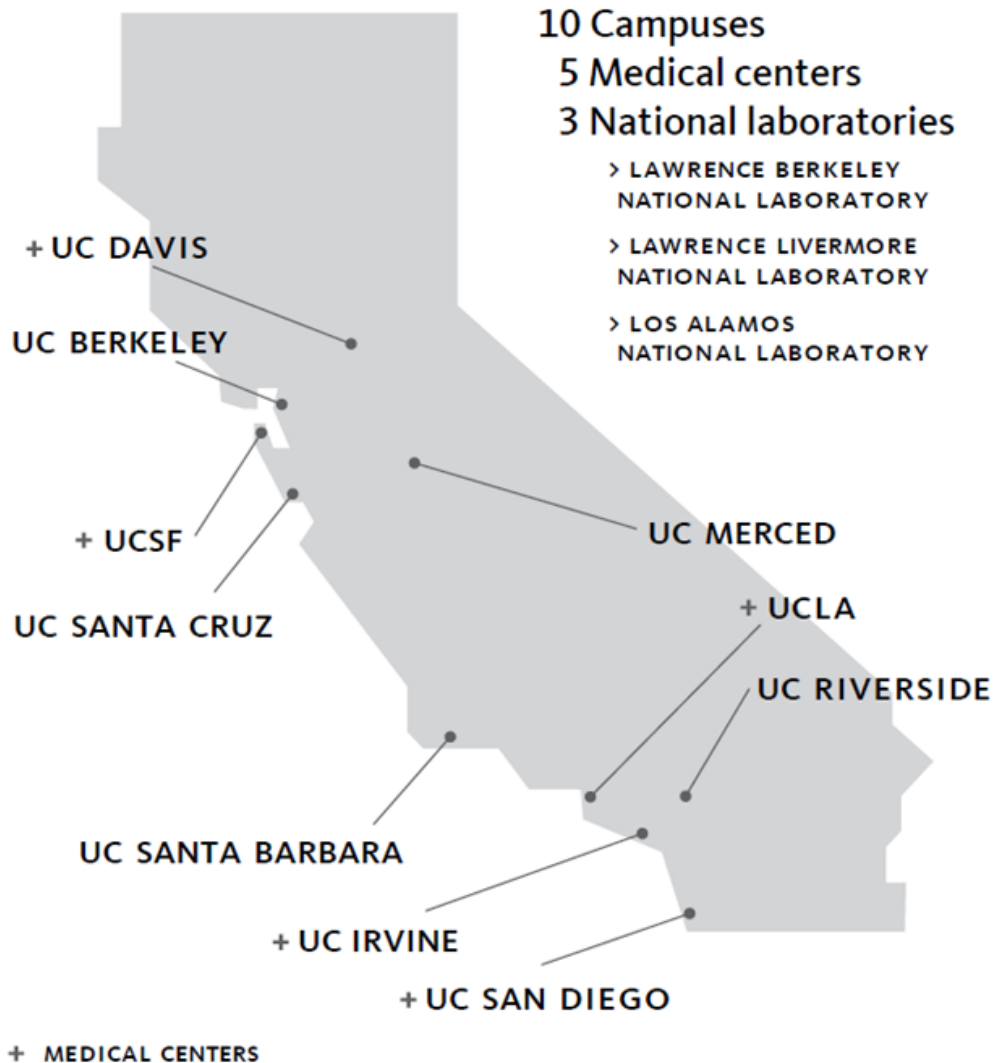
UC Office of the President



Carbon Neutrality
Initiative

The University of California

The University of California improves the lives of people in California and around the world through world-class educational opportunities, groundbreaking research, top-rated health care and agricultural expertise.



EDUCATION	
Total enrollment	280,380
Undergraduate students	222,493
Graduate students	57,887
Alumni	2.0 M
More than 160 academic disciplines	
More than 800 degree programs	

MEDICAL CENTERS AND CLINICS	
Outpatient visits	4.7 M
Emergency room visits	375,104
Inpatient days by payer	174,839
Medicare patients	31%
Medi-Cal patients	36%

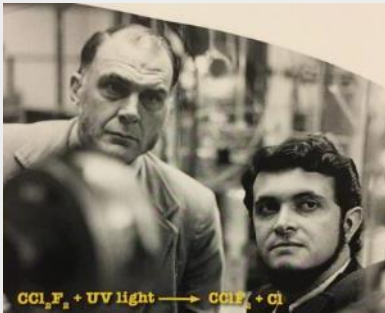
FACULTY AND STAFF	
Faculty	23,300
Other academic (postdocs, etc)	47,000
Staff	157,400

UC Carbon Neutrality Initiative

UC Research



Charles David Keeling



Sherwood Rowland
and Mario Molina

Mission

University of California's buildings and fleets will become **net carbon neutral by 2025**.

Vision

The University of California is developing **scalable solutions** to build the low-carbon future our research has proven to be imperative.







SWITCH

TO

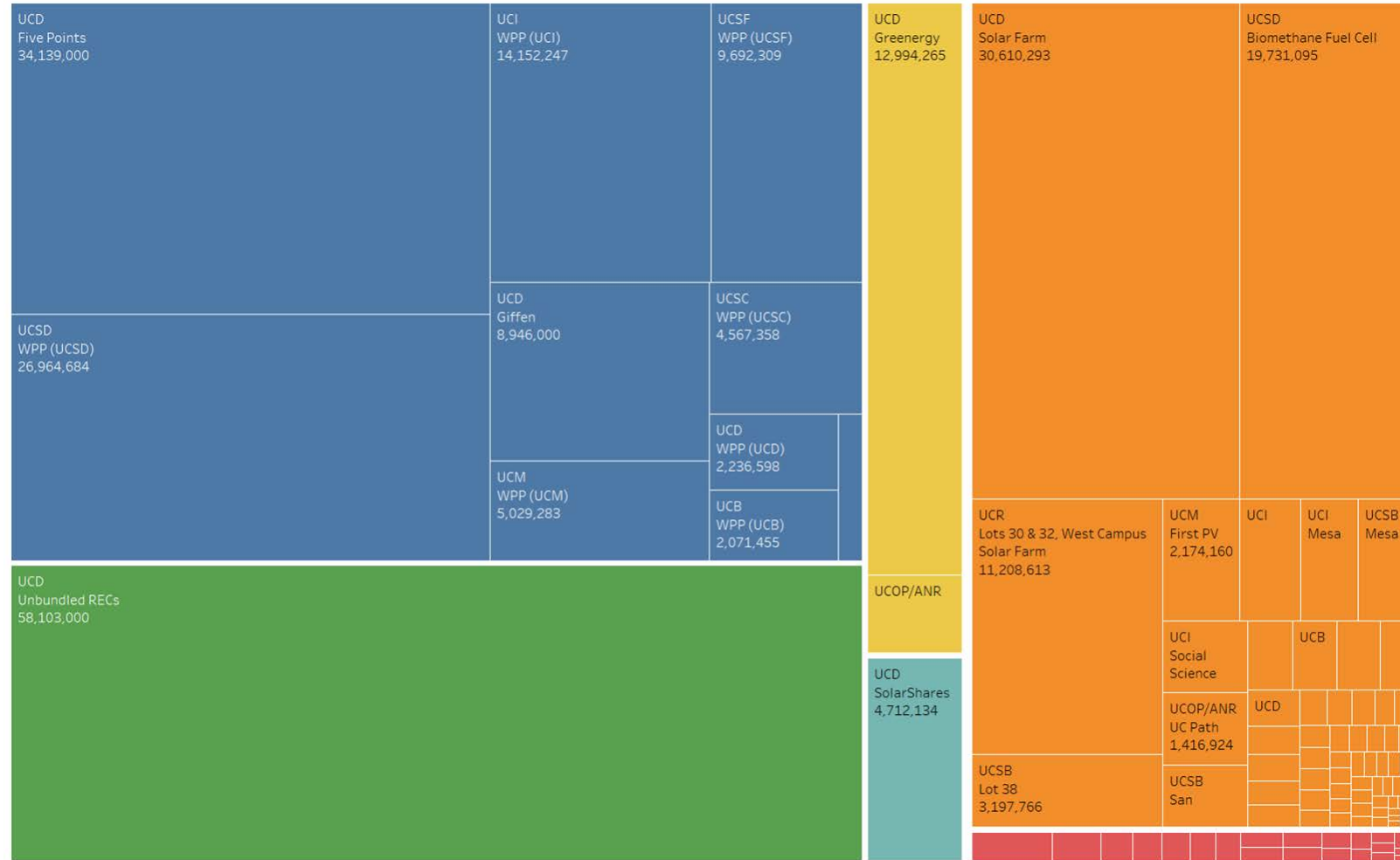


CLEAN
POWER

REDUCE

RECYCLE

UC now has over 100 renewable energy supplies on-line



Supply Option Type

- Financial PPA
- Physical PPA
- Self-Supply
- Shared Renewables
- Unbundled RECs
- Utility Product



Green Power Partnership Top 30 College & University

Partner Name	Annual Green Power Use (kWh)
1. University of California	273,347,222

UC San Diego “Solar Chill” (1.5kW)



UC Riverside Parking Lots (4.2MW)



UC Irvine Rooftop Systems (4.3MW)



UC Davis Solar Farm (16MW)



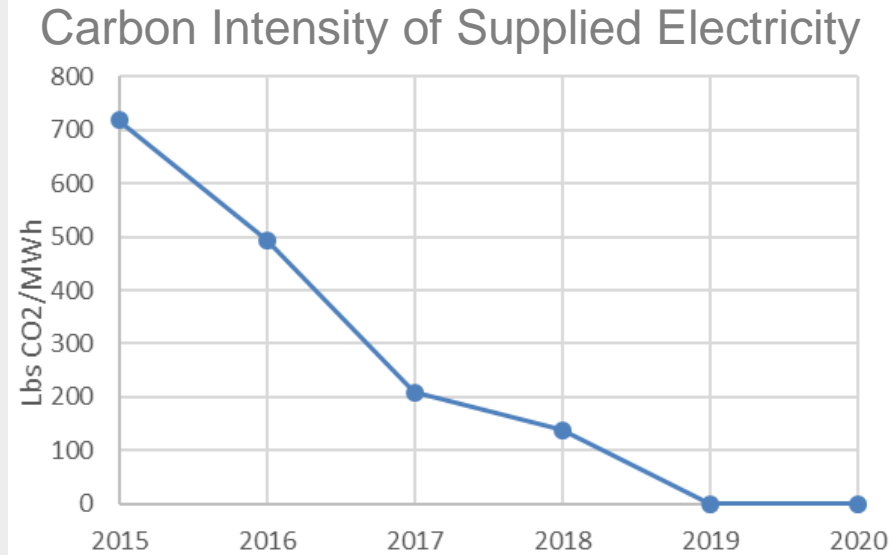
Utility-scale – Giffen (20 MW)



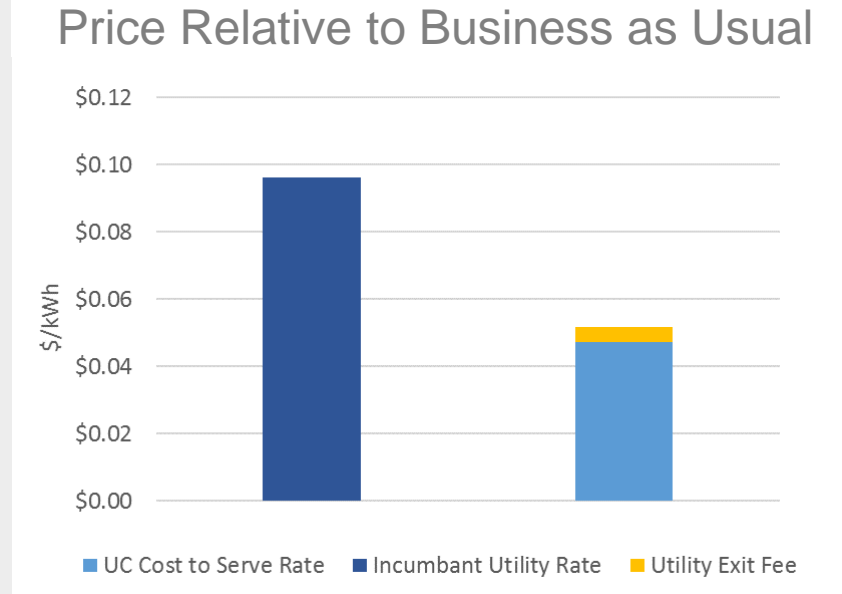
Utility-scale - Five Points (60 MW)



UC's Wholesale Power Program Results



UC's electricity supplies will be carbon neutral in 2019...



...and costs will be less-expensive than traditional utility services



Why electrifying new buildings makes sense for UC

- UC's own electricity company is already supplying 100% clean electricity.
- Other affordable mechanisms exist to procure clean electricity for those campuses not directly served by UC.
- Electrification of building systems is often technically feasible and cost effective.

UC's New Green Building Policy

“No new building or major renovation that is approved after June 30, 2019 shall use onsite fossil fuel combustion...”

...(except those projects connected to an existing campus central thermal infrastructure).



MAKE USE OF



BIOGAS

UC is developing Biomethane projects...



...and signing offtake agreements for Biomethane



Our latest project is under construction in Rialto, CA





INVEST

IN



OFFSETS

UC Offset Projects Evaluation Criteria

Our goal is to develop a diverse portfolio to achieve these priorities:

1. **Cost** and **quantity**
2. **Environmental** quality (additional, permanent, real)
3. Expands or applies **UC research**
4. Offers educational experiences to **students**
5. Improves or demonstrates **scalable climate solutions**
6. Improves **human health**
7. Has **social justice** benefits
8. Directly supports the local **UC community**
9. Has **low risk** of causing harm
10. Has other **co-benefits**

UC Offset Projects Recommended for Seed Funding

PROJECT NAME	SUBMITTED BY	PROJECT TYPE
Catalyzing Negative Carbon Emissions	Ben Houlton, Director, John Muir Institute of the Environment; Large team of from 3 UCs, LBL, & external partners.	compost, rock, & biochar land application
Unite to Light	John Bowers, Director, Institute for Energy Efficiency, UCSB	solar lanterns
Adopt a Cookstove	Sangwon Suh, Professor, Bren School of Environmental Science and Management, UCSB	cookstoves
Berkeley Darfur Stove Project	Jessica De Clerck, Managing Director, Potential Energy, Berkeley	cookstoves
Kawsak Sacha (Living Forest) Climate Project	Tracey Osborne, Associate Professor Department of Management of Complex Systems Director of the Climate Alliance Mapping Project, UCM	avoided deforestation
The Ebony Project	Virginia Zaunbrecher, Associate Director of the Center for Tropical Research, Institute of the Environment and Sustainability, UCLA	tree planting

UC Offset Projects Recommended for Seed Funding

PROJECT NAME	SUBMITTED BY	PROJECT TYPE
Production of Red Seaweed to Mitigate Methane Emissions in California's Livestock	Dr. Jennifer Smith, Associate Professor, Center for Marine Biodiversity and Conservation, Scripps Institution of Oceanography, UCSD	grow seaweed to feed to cattle
Climate & Conservation: Working Towards the SDGs	Robin Marsh, Senior Researcher, Institute for the Study of Societal Issues (ISSI); Cheryl Margoluis & Cara Honzak, Pathfinder	cookstoves, tree planting, and sustainable agriculture
Forest Restoration and Management in Central Mexico	Luz A. de Wit, PhD Candidate, Ecology and Evolutionary Biology; Lourdes Martínez, PhD Candidate, Ecology and Evolutionary Biology	tree planting
Mid-season Drainage in Flooded California Rice Systems	Henry Perry, Graduate Student, project director; Bruce Linqvist, Rice Specialist, PI-project mentor	agriculture
CO2Concrete	Gaurav Sant, Professor, Department of Civil & Environmental Engineering, UCLA	low-carbon concrete
Development of the Local Biochar Network in Mendocino County	Mr. John T. Bailey, Superintendent, UC ANR Hopland Research & Extension Center	biomass gasification and biochar application



UNIVERSITY
OF
CALIFORNIA

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CARBON
TRAL

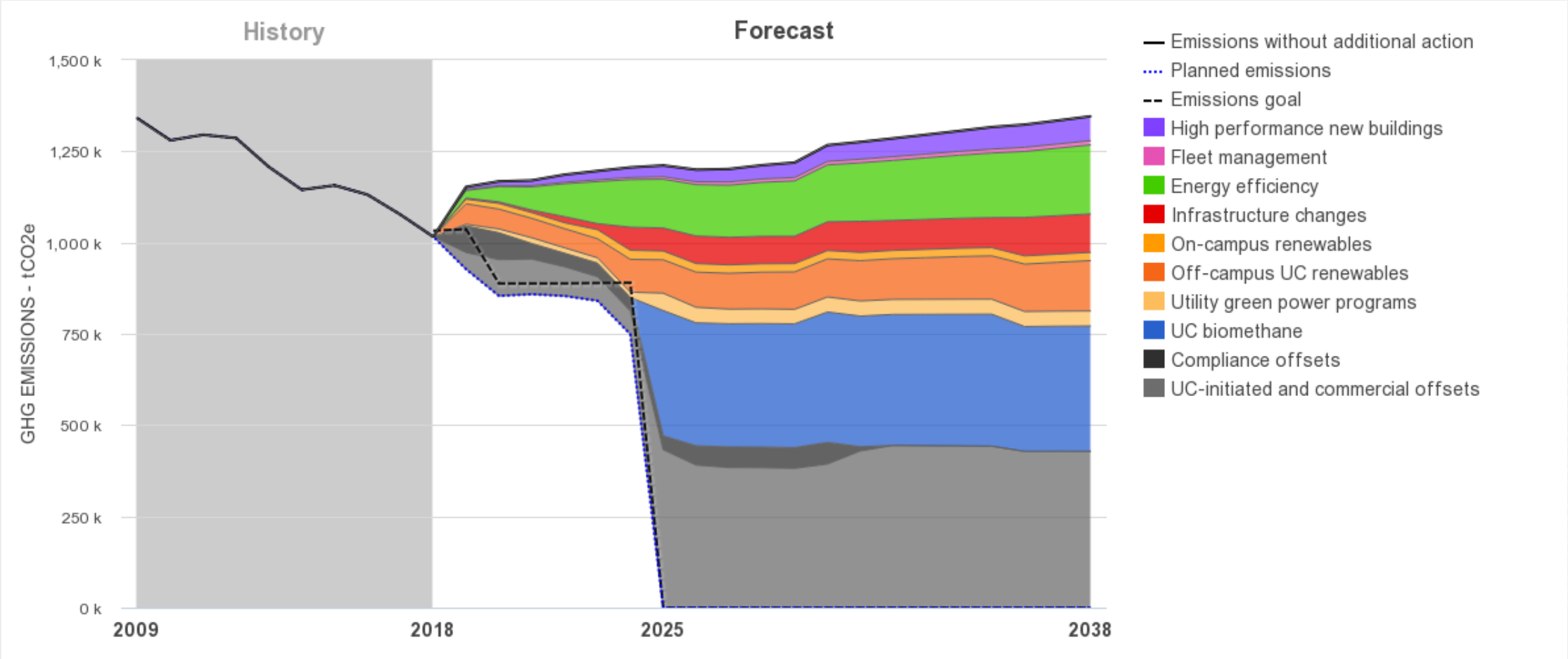
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CARBON
NEU

Systemwide Roll-up of Planned Actions



UC'S CLIMATE SOLUTIONS



REFERENCES

- David Phillips' email:
david.phillips@ucop.edu
- UC's Carbon Neutrality Initiative
<https://www.ucop.edu/carbon-neutrality-initiative/>
- Clean Energy Optimization Pilot
<https://energized.edison.com/stories/fighting-climate-change-through-higher-education>
- *UC Strategies for Decarbonization: Replacing Natural Gas*
https://www.nceas.ucsb.edu/files/research/projects/UC-TomKat-Replacing-Natural-Gas-Report_2018.pdf
- *Annual Sustainability Report*
<https://www.ucop.edu/sustainability/files/annual-sustainability-report2017.pdf>
- *Sustainable Practices Policy*
<https://policy.ucop.edu/doc/3100155/Sustainable%20Practices>