



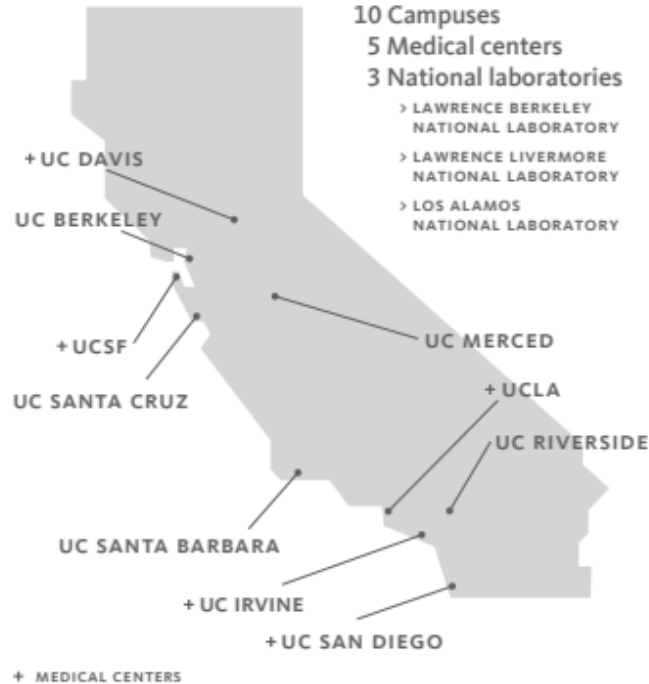
University of California, Berkeley (USA) Path to Zero Carbon

Kira Stoll

Chief Sustainability & Carbon Solutions Officer
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Berkeley is the flagship campus of the University of California public higher education system

UC SYSTEM



EDUCATION

Total enrollment	285,216
Undergraduate students	226,125
Graduate students	59,091



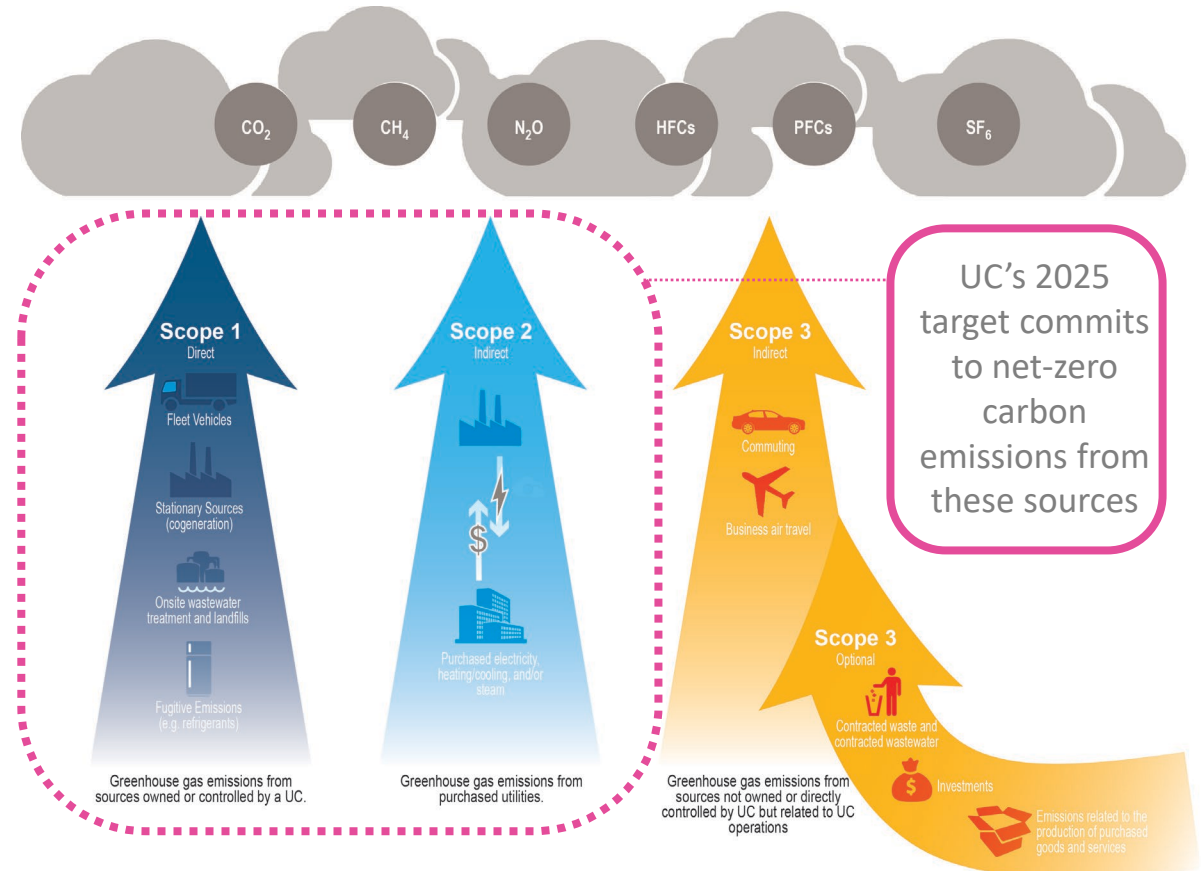
- UC Berkeley has a population of 57,000
- Has 644 buildings, large and small, totaling 16.5 million square feet
- Offers 5,000 courses a year, 600 are sustainability related.

UC Sustainable Practices Policy - Carbon Reduction Targets

- Carbon Neutral from building and fleet energy use by year 2025.
- Carbon Neutral from all sources by 2050 or sooner.

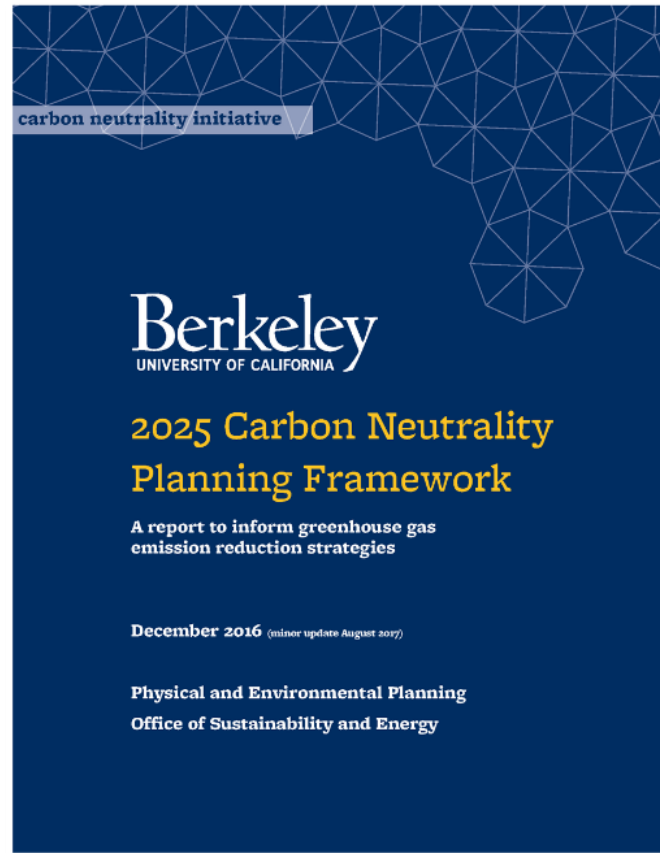
Carbon Neutrality: net zero climate impacts from greenhouse gas (GHG). This will be achieved by minimizing GHG emissions from as much as possible and using carbon offsets or other measures to mitigate the remaining.

What's Included in the 2025 Goal?



Carbon Reduction Plans & Performance

Berkeley has produced three climate action plans.

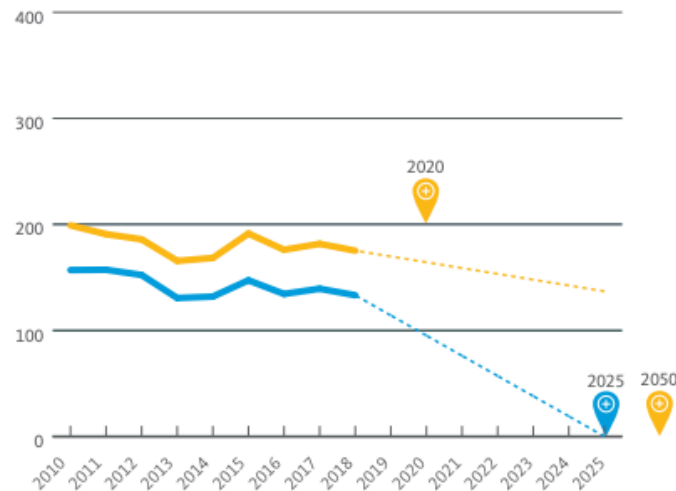


Berkeley met its first carbon reduction target, emissions are lower than they were 30 years ago.

UC Berkeley, By the Numbers 2018

GREENHOUSE GAS EMISSIONS

(1,000 metric tons CO₂e)



● Scopes 1 (natural gas, campus fleet, fugitive) + 2 (purchased electricity)

● Scopes 1, 2 + 3 (campus commute, business air travel)

Goals:

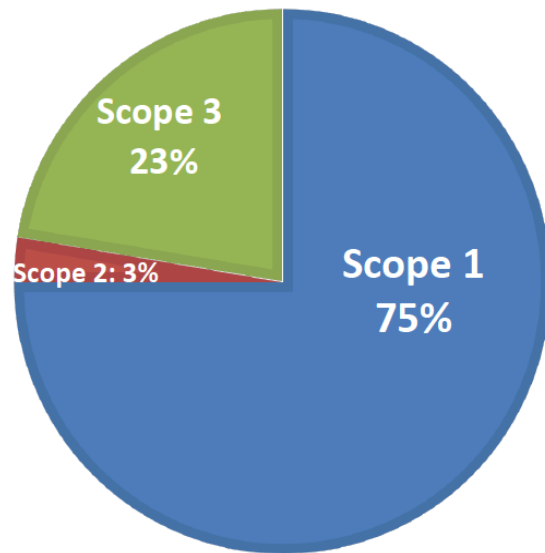
- 1990 levels by 2020 (scopes 1, 2 + 3)
- Carbon neutral by 2025 (scopes 1 + 2)
- Carbon neutral by 2050 (scopes 1, 2 + 3)

Progress:

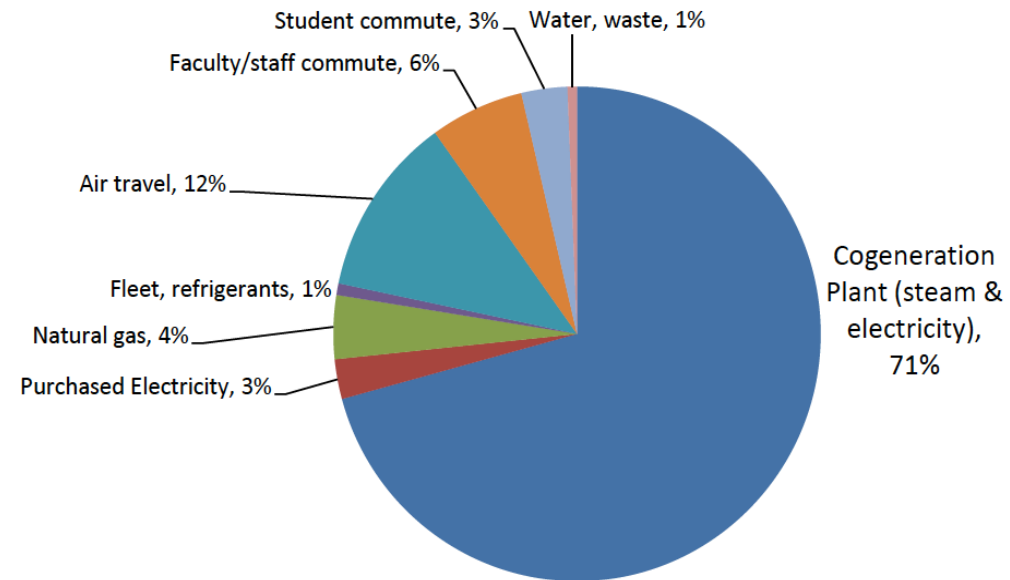
- 2020 goal met

UC Berkeley Greenhouse Gas Emissions Profile

2025 Carbon Neutrality = 80% emissions reduction



Scopes 1, 2 & 3:
190,000 metric tons CO₂e



Our Action: Green Building

Chou Hall: Berkeley's newest building is one of the greenest academic facilities in the country.



Berkeley's first electrified building is underway: a retrofit of the historic art museum into an innovation lab.

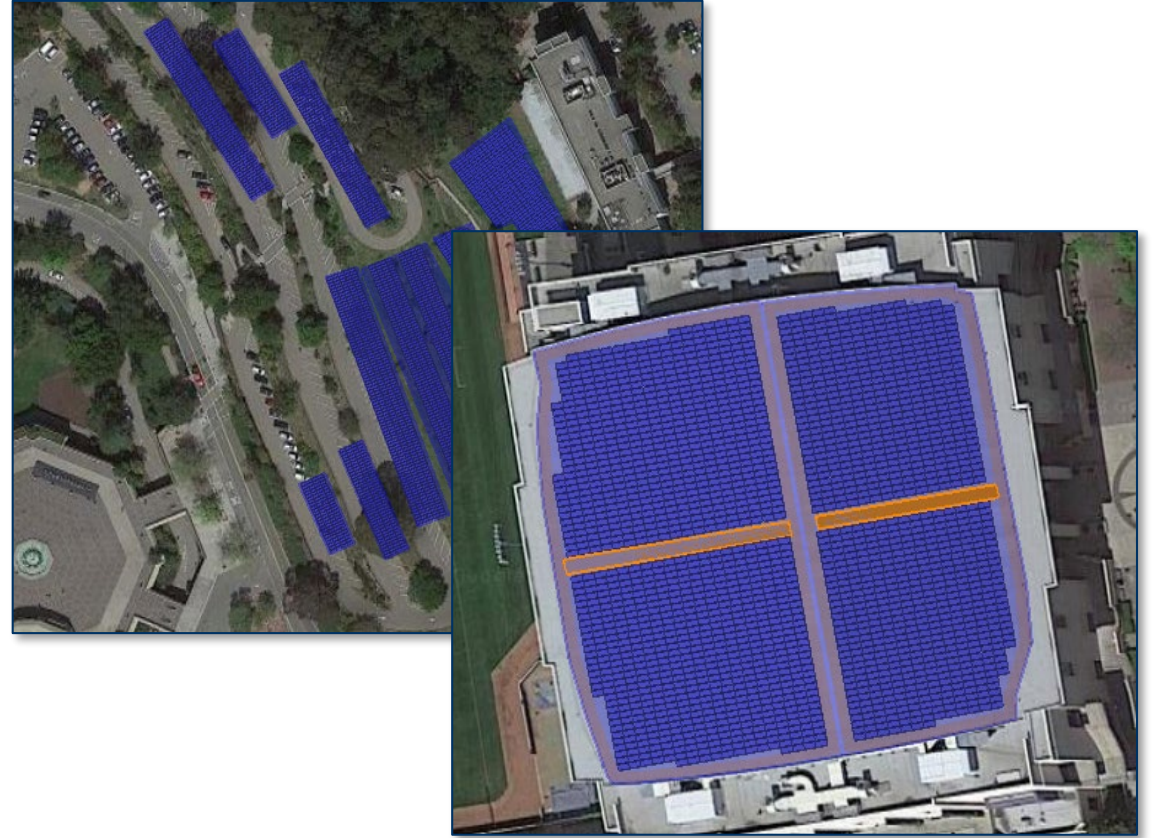


Our Action: Solar Powering Cal

Solar PV systems at six campus locations, generating 1 megawatt of power from the sun.



Underway for 4 megawatts more with options for microgrids and EV charging.



Our Action: Clean Energy

All eligible electricity accounts now 100% clean through Community Choice Energy.



Berkeley is the largest American university to fully commit to clean energy by 2050.

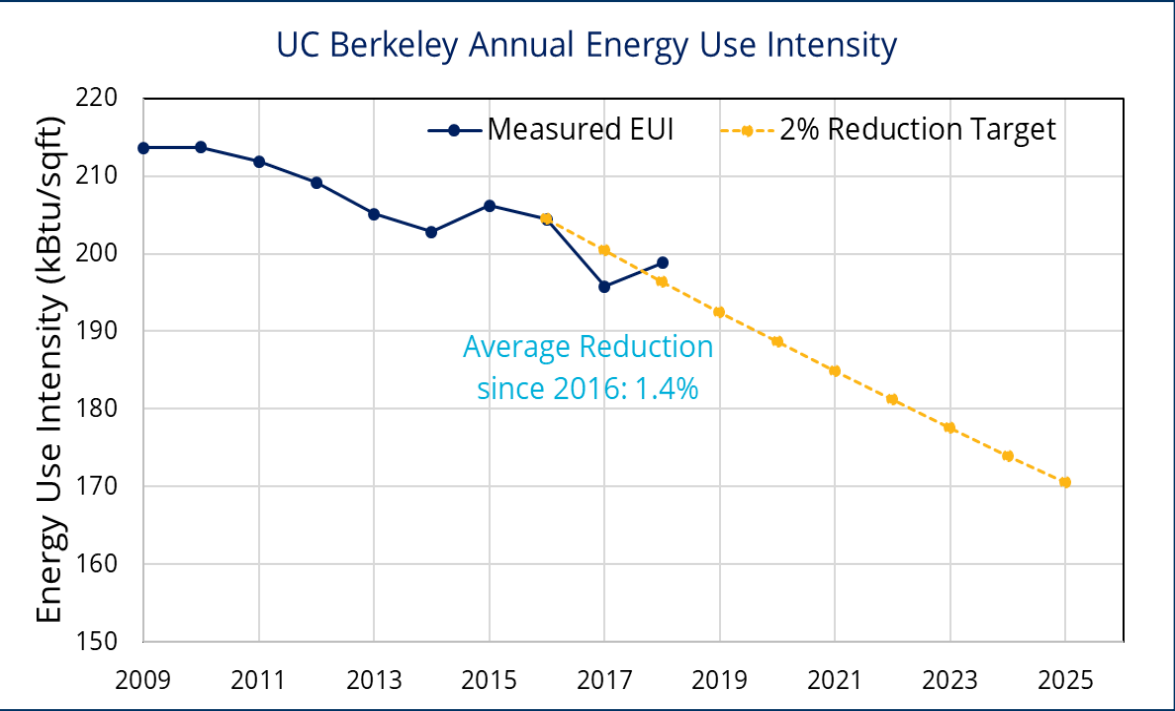


Solar-powered EV Charging & EV powered disability transportation.



Our Action: Energy Efficiency

Meeting the UC goal of 2% annual energy reduction is challenging.

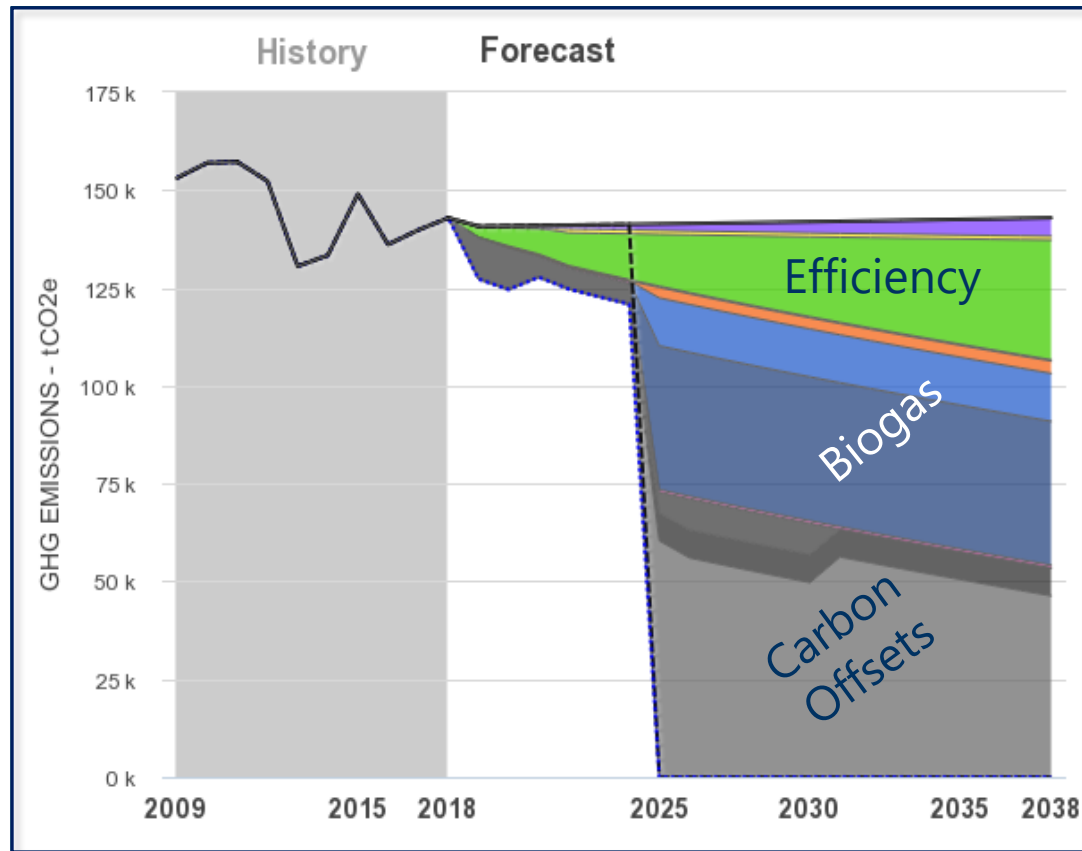


Sampling of diverse energy efficiency projects (2018-19) saving over 2M kWh and \$1M US dollars a year.

Project Building	Project Type	Utility Savings per Year	Cost Savings per Year	Incentive Amount
Koshland	New Chiller + Commissioning	1,000,000 kWh	\$227,000	n/a
Li Ka Shing	Exhaust Fans Optimization	612,500 kWh	\$122,500	\$147,000
Life Sciences Addition	CT Water Waste Prevention	80,742 ccf	\$550,000	n/a
Latimer & Tan	LED Lighting Retrofit	500,000 kWh	\$100,000	\$35,000
Berkeley Way West	New Construction	201,000 kWh; 66,966 therms	\$136,900	\$136,700
Total		2,313,500 kWh; 66,966 therms; 80,742 ccf water	\$1,136,400	\$318,700

Our Action: 2025 Carbon Neutrality Strategies

Current strategy achieved primarily by biogas and carbon offsets.



UC System is developing carbon offset projects.



Berkeley-Darfur stoves project, Kampala Uganda

Working Lands Innovation Center, California



Our Action: New Electrified Energy System Strategies

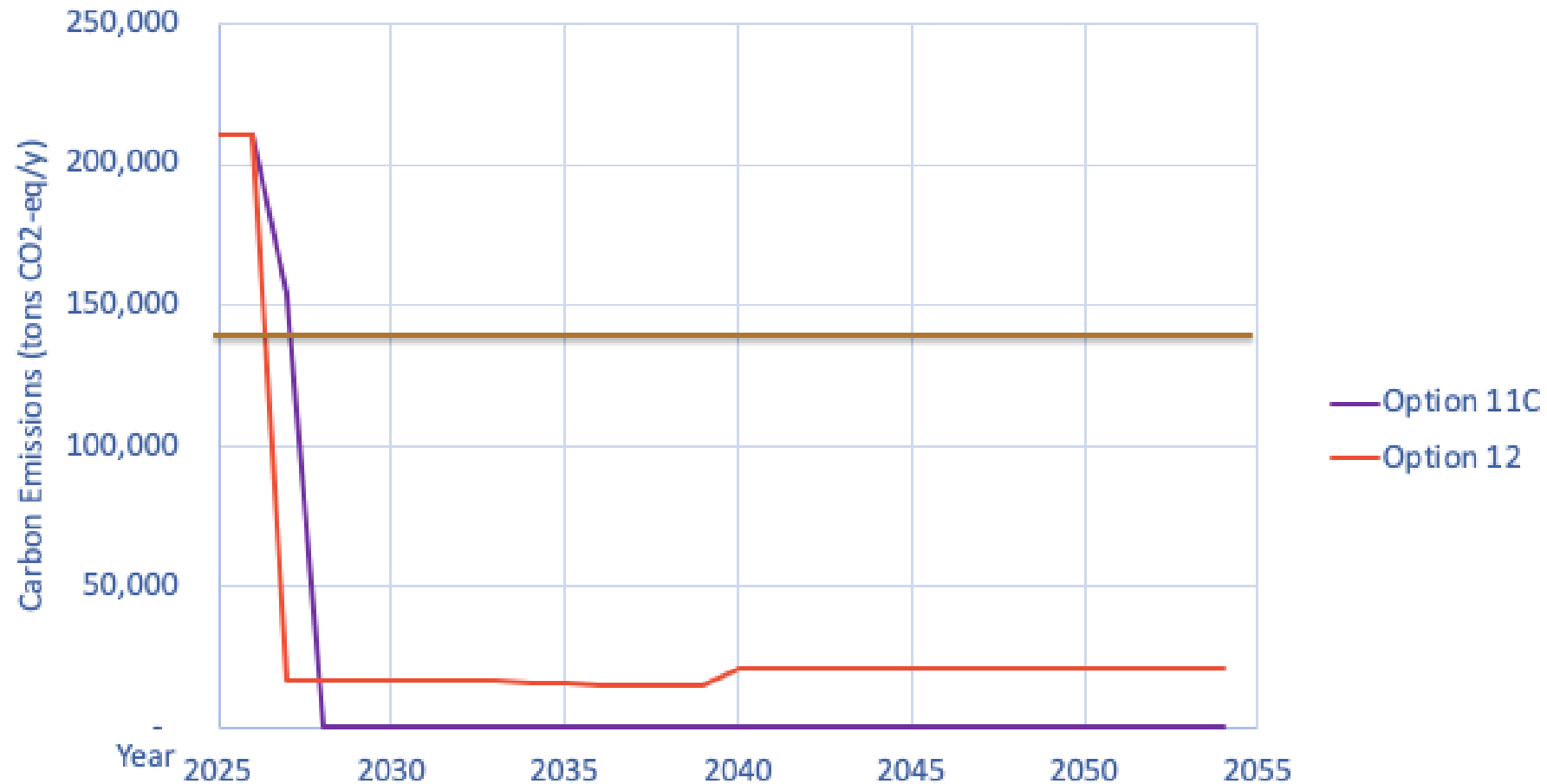
- **Option 11c: New Central heat recovery.** Replace existing plant with new central electric heat pump plant supplying hot and chilled water. This is a central electrified plant assumed to be powered through utility with 100% clean electricity.
- **Option 12: New Hybrid Nodal Heat Recovery.** Replace north-side of campus with one or two electric heat pump plants supplying hot and chilled water. These are electrified small energy plants. The existing plant will continue to provide the south-side of campus through gas cogeneration and to serve as a power plant for the whole campus in emergencies. Gas use will be reduced by 85% and fully phased out as more on site renewables can be added for resilience.



#	Description	Heating layout	Heating distribution	Heating generation	Cooling	Electricity
0	BAU-upgrade existing gas central cogeneration plant, in-building cooling					
2	New gas central cogeneration plant, in-building cooling					
11C	New central electric heat recovery chillers and heat pump heating					
12	Hybrid nodal electric heat recovery plants on north-side of campus. South-side served by gas cogeneration.					

Our Action: Zero-Carbon Strategies

Major carbon emissions reductions possible with the new energy system – taking us to zero-carbon operations



A high-angle photograph of a falcon in flight, wings spread wide, flying over a dense urban landscape. The falcon is in the foreground, slightly to the left, with its wings and tail feathers clearly visible. Below it, the city of Berkeley is spread out, with numerous buildings, trees, and streets. In the background, the San Francisco Bay Area is visible, including the Golden Gate Bridge and the city of San Francisco. The sky is blue with some light clouds. A dark blue rectangular box with yellow text is in the top right corner.

Berkeley is in flight to a
carbon free future.