



# CampusEnergy2024

BRIDGE TO THE FUTURE

February 20 – 23, 2024

Hilton San Francisco Union Square | San Francisco, CA



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# University of California System Decarbonization Planning

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IDEA Campus Energy Conference  
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# Problem Statement

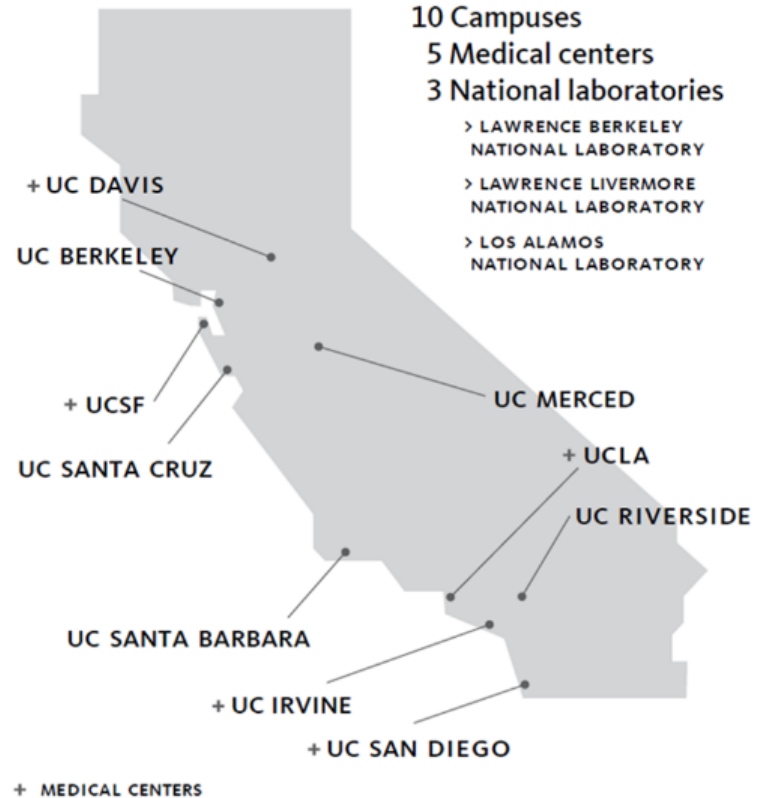
- The University of California's *Leading on Climate* mission is for UC's operations to become fossil free no later than 2045
- 80% of emissions come from campus and health center central heating and cooling plants, including 7 co-generation plants
- How as a system can UC reach this goal?

# Background

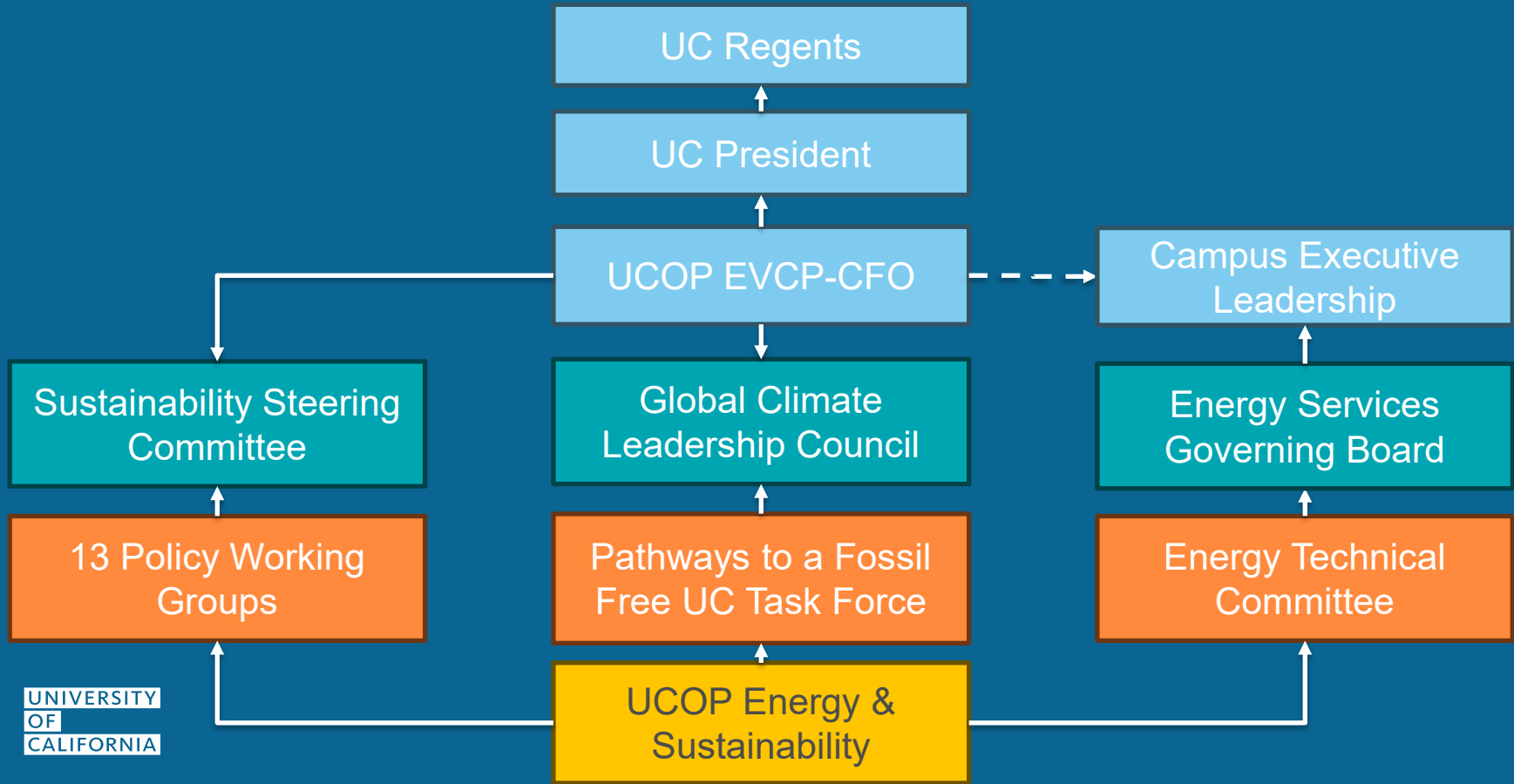


# Overview of University Of California

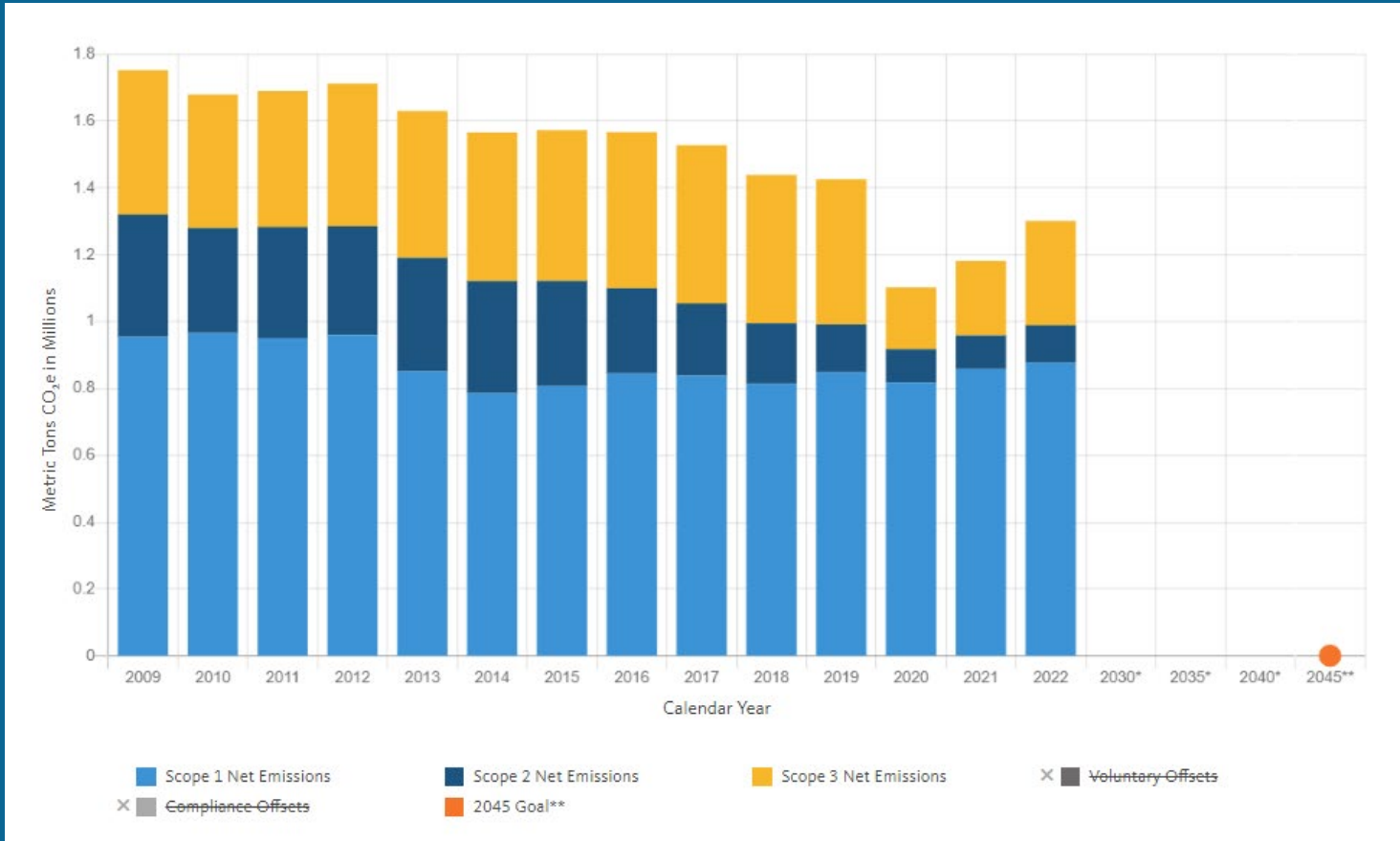
- 150M GSF
- 5,900 buildings
- 294,000 students
- 240,000 employees
- 1M CO2E/year (on-site + electricity)
- 160.8 MW cogeneration



# Energy & Sustainability at UC



# UC'S GHG Emissions



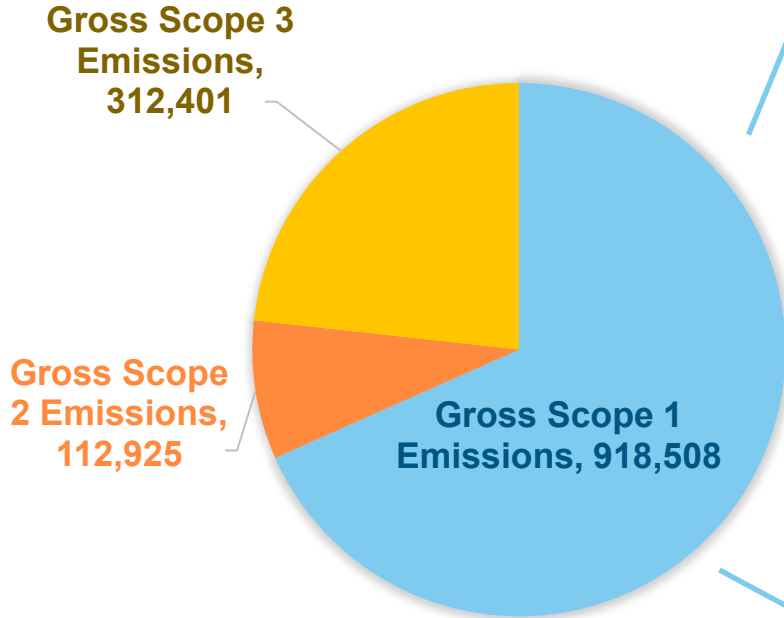
# Decarbonization Study Project



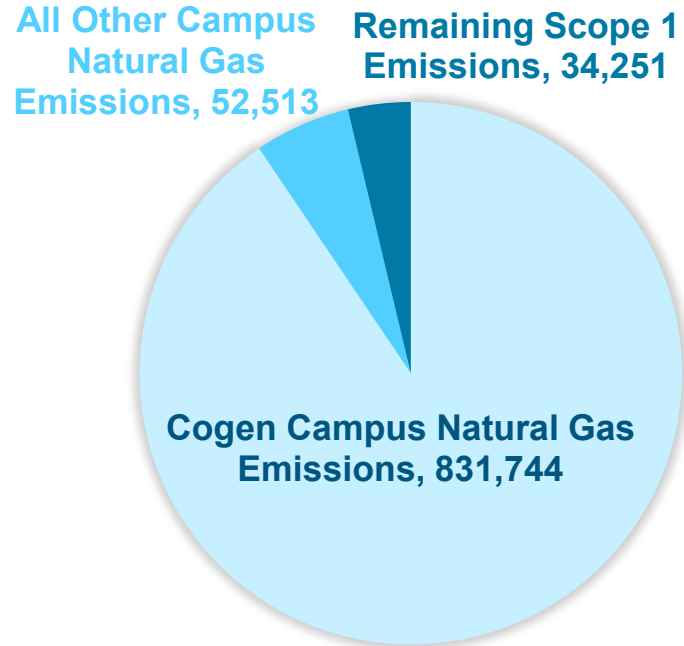


# UC'S Carbon Emissions

## UC SYSTEM 2022 GROSS EMISSIONS (MTCO<sub>2</sub>e)

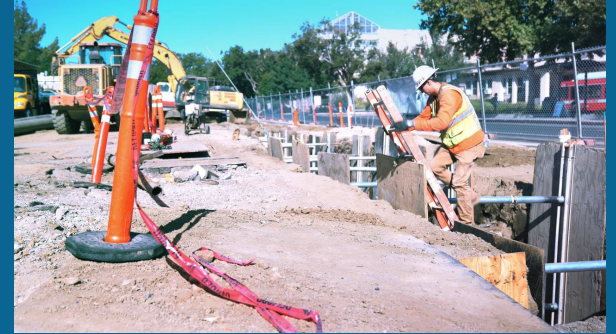


## UC SYSTEM SCOPE 1 EMISSIONS BREAKDOWN (MTCO<sub>2</sub>e)



# Pathways to a Fossil Free UC Task Force

- UC received \$12M from State
- UC System President formed Task Force in Oct. '22
- Charge summary:
  - Develop recommendations to eliminate use of fossil fuels in each location's energy system.
  - Assure recommendations overcome key barriers, with climate justice and equity as central considerations.



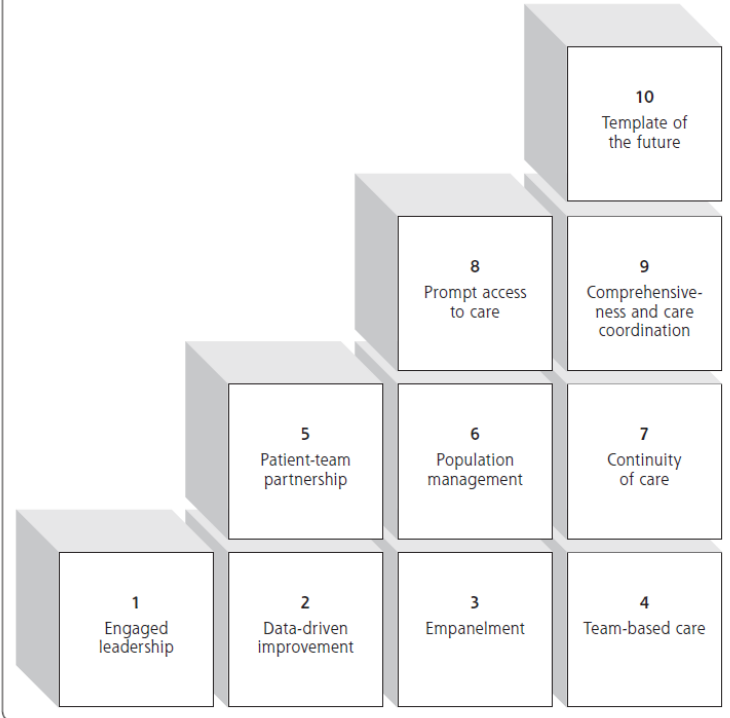
Credit: UC Davis Big Shift

# Moving from Research to Practice



Applying concepts from the field of public health: implementation science

Figure 1. Ten Building blocks of high-performing primary care.



# Building Blocks of Fossil Free Planning

## FACILITATORS

## MAJOR CONSIDERATIONS

## RESULT

## Actionable pathways to fossil free

Engaged  
leaders & co-  
executive  
sponsorship

Financial  
barriers &  
opportunities

Stakeholder-  
engaged  
policy  
development

Inclusive  
comms &  
engagement

Living  
laboratory  
approaches

Technical &  
project  
management  
support

Best practices  
sharing

Energy  
reliability &  
resilience

Equitable &  
just transition

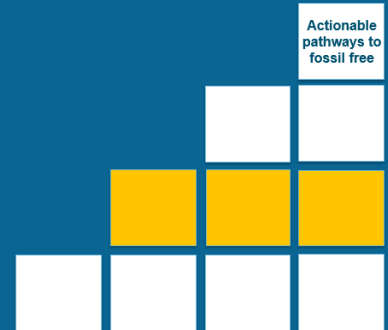
# Foundations for Fossil Free Pathways

- Engage leadership and obtain co-executive sponsorship
- Identify financial barriers and opportunities
- Stakeholder-engaged policy development
- Communicate and engage early and often



# Facilitators to Achieving the Goal

- Facilitate faculty and research knowledge sharing
- Provide technical & project management support
  - Peer-to-peer knowledge sharing
  - Technical advisor & workshops
  - Consistency in presentation of results
- Share best practices
  - Sprints on key topics

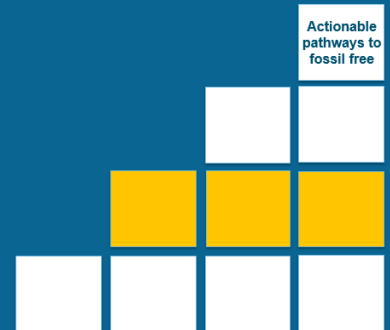


# Sprints - Best Practice Sharing on Key Topics



# Sprint 1 - Decarb Study Scoping Guidance

1	Strategy for 90% or greater reduction in scope 1 emissions from fossil gas use in campus energy systems
2	Provide high level estimates of total capital and operational costs/savings
3	Identify just transition and other equity considerations
4	Document gaps/studies/analyses needed for Net-Zero planning
5	Identify opportunities/gaps/analyses/engagement activities for research, education and broader climate action and resiliency planning



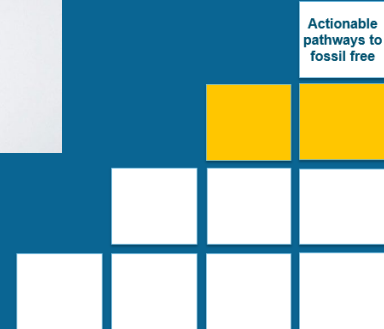
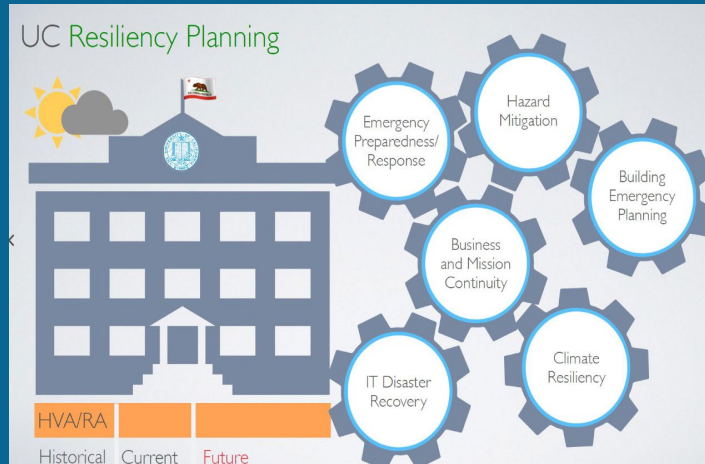


# Major Considerations

- Equity and climate justice
- Energy reliability and resilience

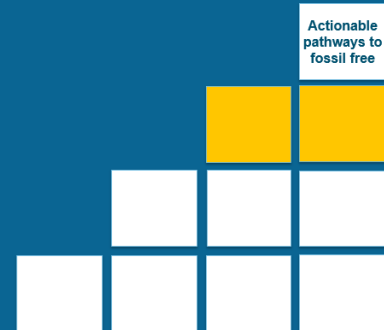


UCSC staff and students table at a Decarbonization & Electrification Town Hall. Credit: Alessandra Alvares



# Sprint 3 - Equity and Climate Justice

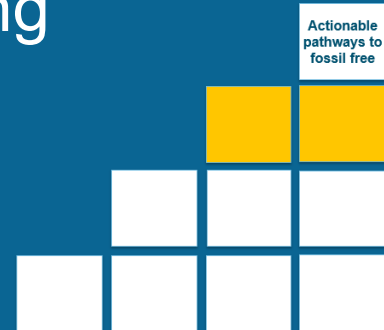
- Campuses locally assessing equity and just transition considerations, e.g.:
  - Campus labor transition
  - Impact of transition away from fossil fuel usage on communities
- Systemwide support:
  - Best practices sharing
  - Clean energy procurement
  - Guidance for equitable implementation



# Sprint 4 – Energy Reliability and Resilience

## Common findings from campus interviews:

- Electrical reliability is a key concern
- Cogen: cost savings and resilience for longer term outages
- Most sites served at transmission level voltage, 50% have multiple utility feeds
- Most campuses experienced few recent long duration grid outages



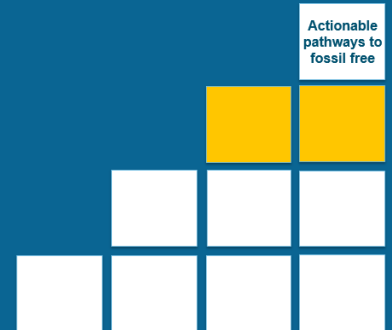
# Sprint 4 – Energy Reliability and Resilience

## Potential Solutions:

- HHW and CHW thermal storage
- Expand loads on individual EDGs
- Swap out EDGs for battery backup over time
- Potentially retain newer cogen plants for emergencies
- Bring redundant feeds from utilities



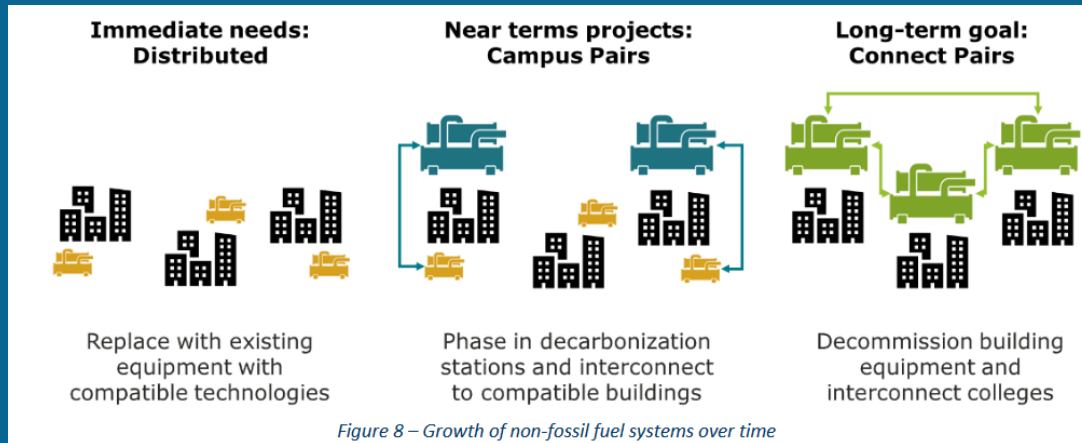
From <https://sustainability.ucsd.edu/focus/energy.html>



# Results: Pathways in Progress

## 3 campuses have already selected major decarbonization strategies and are implementing

UC SANTA CRUZ



<https://sustainability.ucsc.edu/initiatives/decarb-electrific.html>

UNIVERSITY  
OF  
CALIFORNIA



# Lessons Learned from Program

- **Coordinate efforts**
  - Build leadership support
  - Request funding on a grand scale to unlock transformational opportunities
  - Share learnings & cross-pollinate
- **Engage all stakeholders early**
  - Go beyond facilities operations to all aspects of mission

# Lessons Learned from Program

- **Apply equity and justice** lens to each step
  - Siloing will amplify issues down the line
  - Focus on **practical aspects** of implementation
    - Balance short-term wins with uncertainties
- **Transition is expensive but shift is central to mission**

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# Q&A



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# Thank you



In 2023, UC signed its first-ever wind energy contract in support of campus decarbonization.