



# CURBING CLIMATE CHANGE AND DRIVING ENERGY EFFICIENCY

## A Critical Analysis of Strategies for Implementing Carbon Neutrality at UCSB by 2025



**Project Members:** Charlie Diamond, Evan Ritzinger, Lydia Rudnick, Dawnielle Tellez, Emily Waddington

**Project Advisors:** Dr. David Auston, Dr. James Frew, Dr. Roland Geyer, Dr. Lisa Leombruni, Jordan Sager

### Introduction

In 2013, University of California (UC) President Janet Napolitano, instituted the **Carbon Neutrality Initiative (CNI)**, a commitment for all ten UC campuses and five medical centers to emit net zero greenhouse gas emissions by 2025. If successful, the UC system will be the first university system in the world to become carbon neutral.

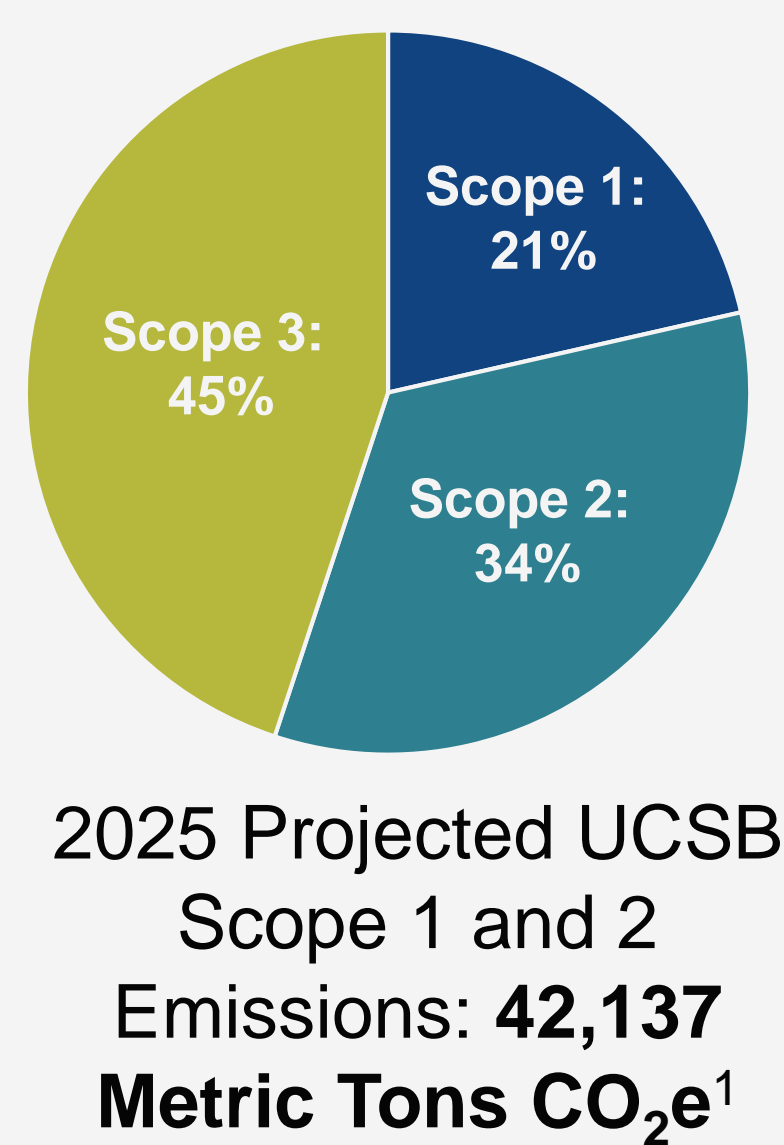
UC Santa Barbara (UCSB) has a history of green initiatives and student-driven sustainability efforts. Achieving carbon neutrality offers the institution an opportunity to further its sustainability and climate goals in its operations, teaching, and research. Our project addresses targeted solutions and recommendations for improving CNI implementation in three fundamental categories: solar project deployment, project financing, and strategies for communication and engagement.

#### What is carbon neutrality?

To be carbon neutral is to have a net zero carbon footprint by balancing carbon released with carbon sequestered.

- Scope 1** Direct on-site emissions
- Scope 2** Purchased electricity
- Scope 3** Travel and commuting

The CNI pledges for the UC system to become carbon neutral for Scope 1 and Scope 2 greenhouse gas (GHG) emissions by 2025, and for Scope 3 emissions by 2050. This project focuses on the 2025 deadline.



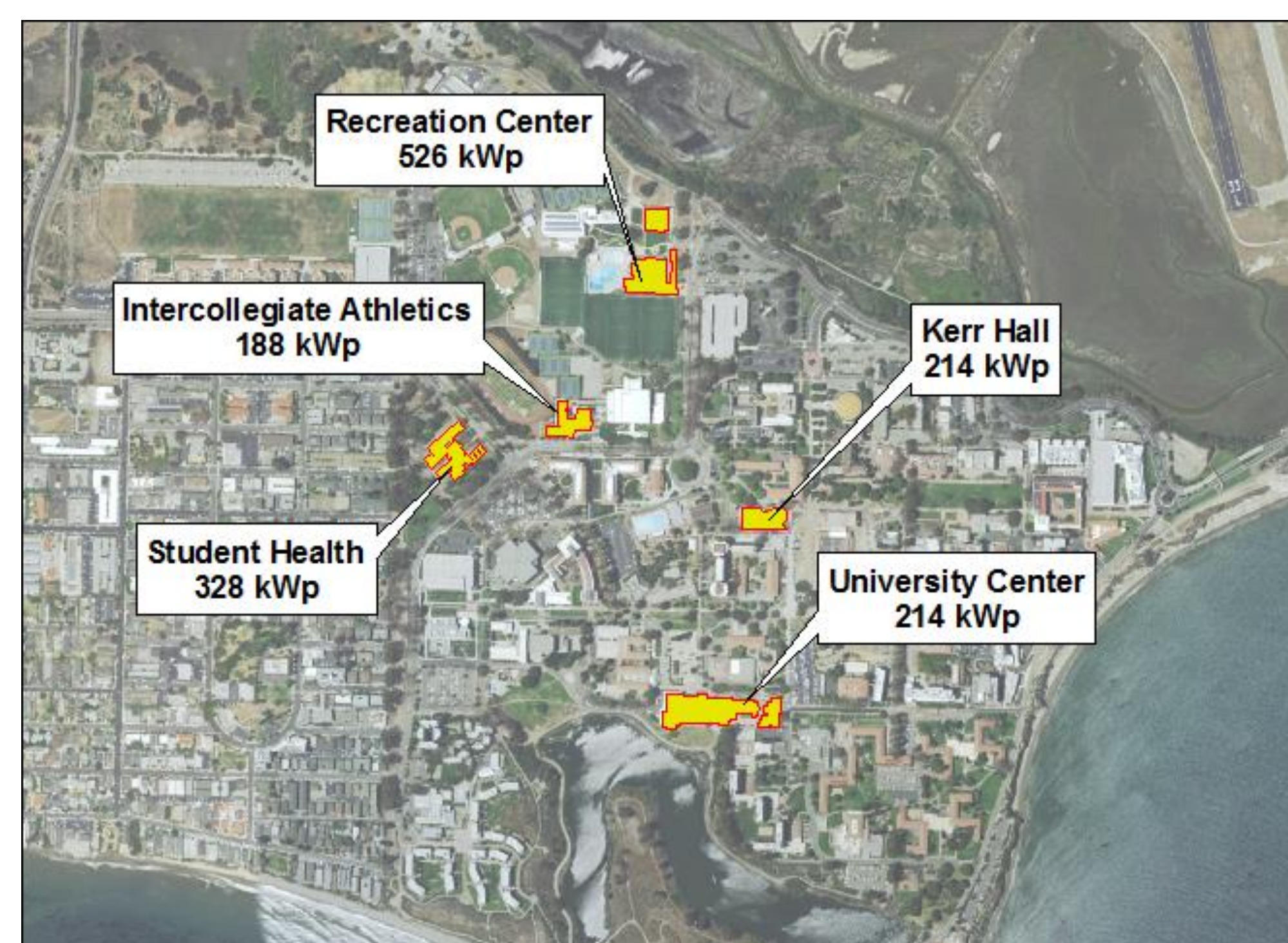
### Key Findings

#### Solar Project Deployment

##### How can UCSB prioritize rooftops for new on-campus solar installation?

UCSB plans to install an additional **5 MW**s of solar, but is unsure of site placement to maximize efficiency and power. We identified **1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> priority sites** to install solar PV. We analyzed each site for: total available capacity, total annual incoming solar radiation, and other critical site characteristics (slope, age, and roof material).

##### First Priority Sites



First priority sites had all preferred characteristics – new, flat roofs - and high energy generation potential totaling 1.6 MW, or 11% of UCSB's peak power demand.

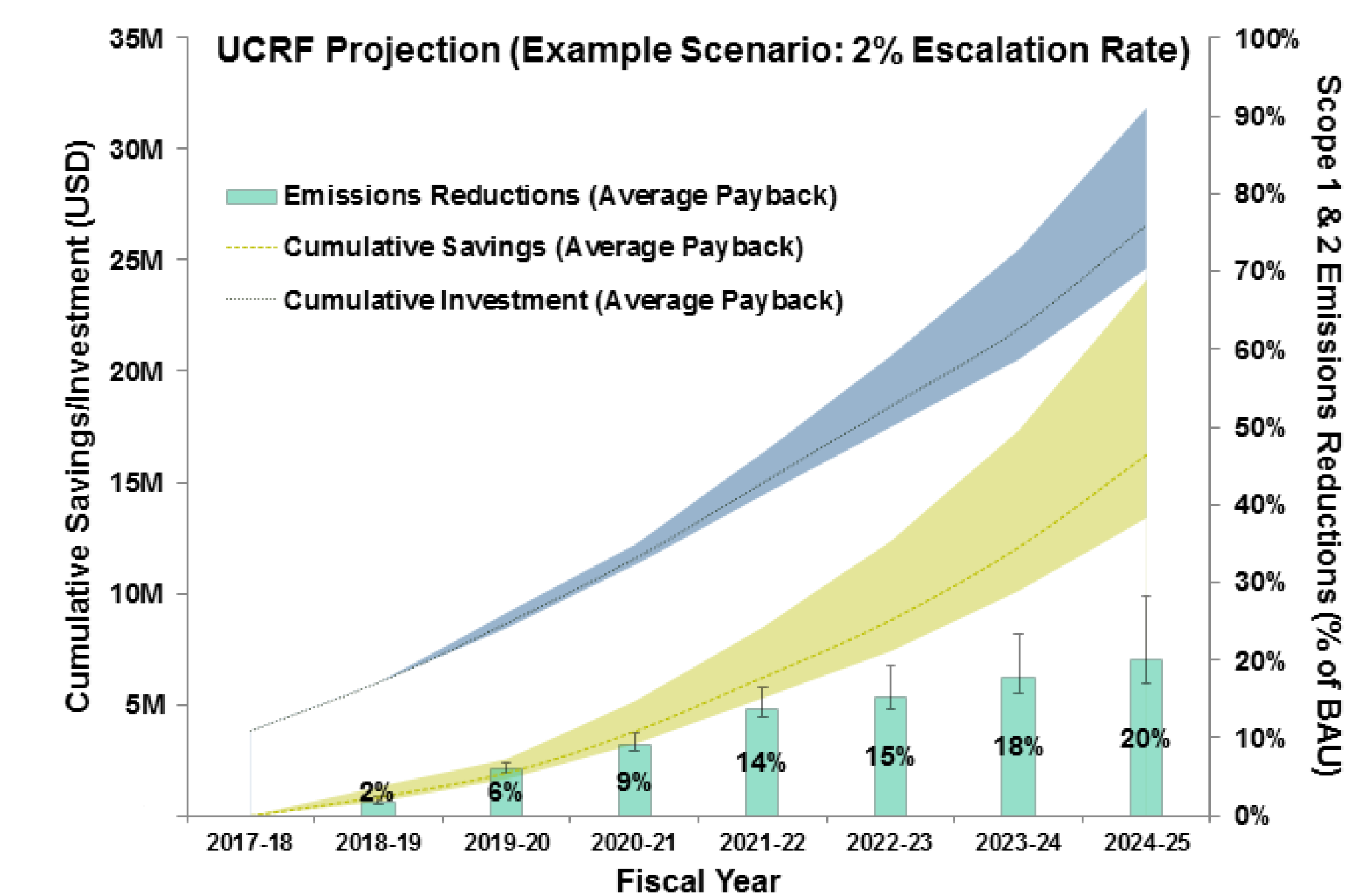
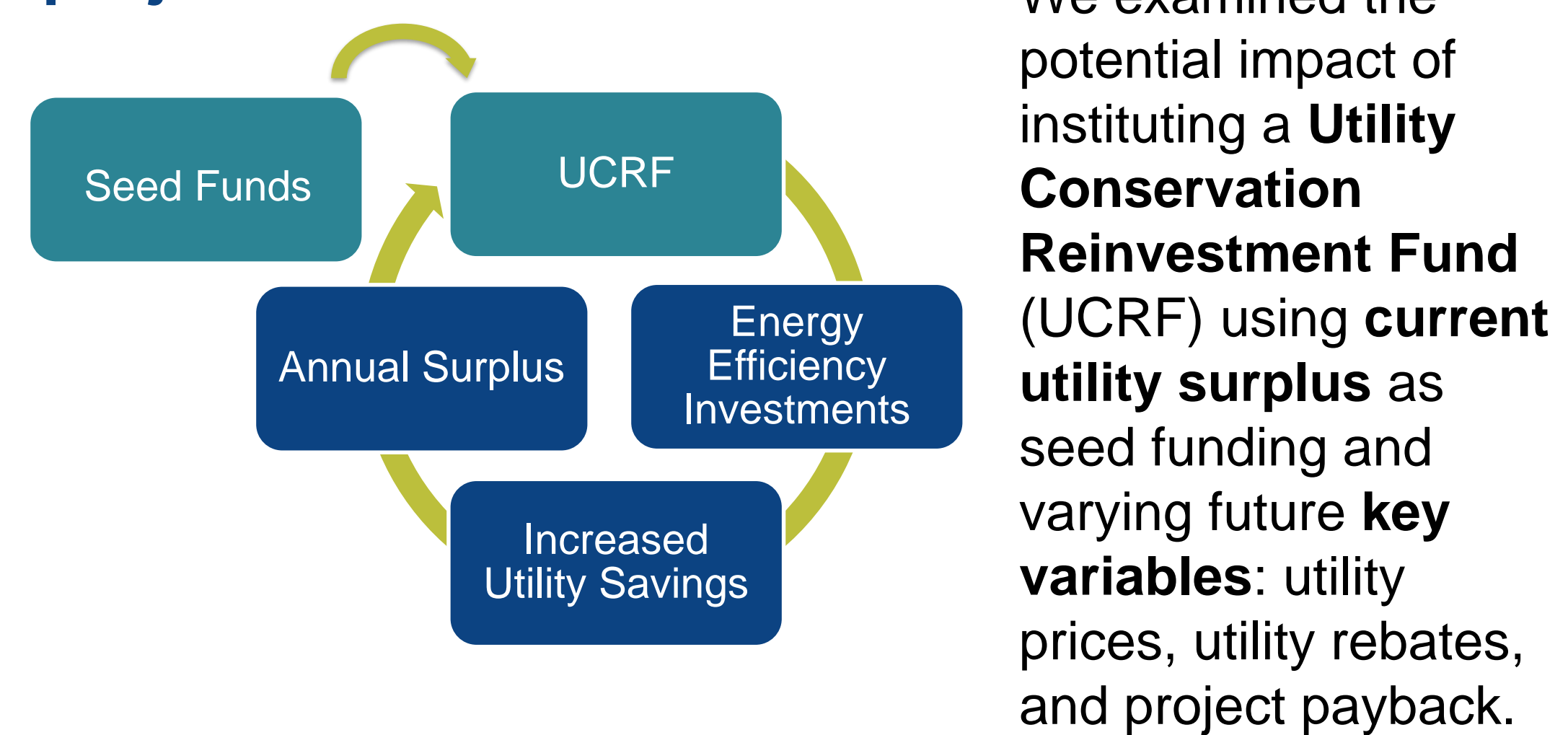
- 1<sup>st</sup> Priority Sites:** 1.6 MW
- 2<sup>nd</sup> Priority Sites:** 2.4 MW
- 3<sup>rd</sup> Priority Sites:** 0.8 MW
- Total Capacity of Preferred Sites :** 4.8 MW

#### Recommendations:

- Target high priority sites first. Employ Power Purchase Agreements, which allow UCSB to lease out panels and avoid upfront costs.
- Incorporate solar rooftop potential in building standards.

#### Financial Tools & Strategies

##### How can UCSB finance energy efficiency projects?



Assuming a 2% annual increase in utility prices, with utility rebates, and a 9.5 year average project payback, the UCRF will generate:

- 20% GHG reductions**
- \$16M in utility savings**
- \$27M in project investments**

#### Recommendations:

- Institute Utility Conservation Revolving Fund to fund energy efficiency projects.
- Develop strategies to overcome staffing constraints.

#### Strategic Communication

##### How can UCSB move the CNI through the UCSB decision-making process given current attitudes and challenges?

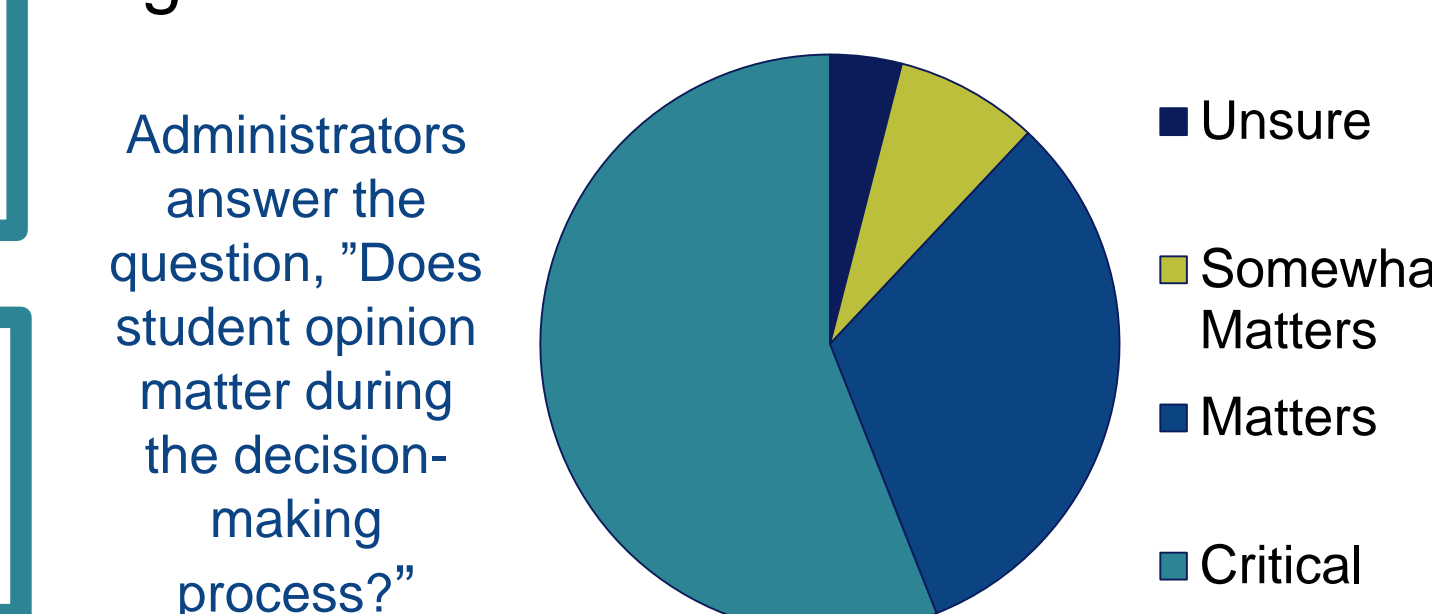
We researched the impact of the social, cultural, and decision-making process on implementation of the CNI via **administrator interviews, student focus groups, and a campus-wide student survey**. Key themes researched included:

- Attitudes
- Solutions
- Challenges & Barriers
- Student Engagement

#### Administrators

- Top Solutions:**
- Green Buildings
  - Increased Engagement
  - Financial Resources
- Top Challenges:**
- Financial Resources
  - Unclear Value to UCSB
  - UCSB Governance

We interviewed **25 decision-makers** on campus and found that students hold significant influence:



**"when students speak, it carries a lot of weight...we recognize that they are the future. it's their future."**

#### Students

We recorded 900 responses from our survey and found that students care and want to take action but are unsure how to get involved:

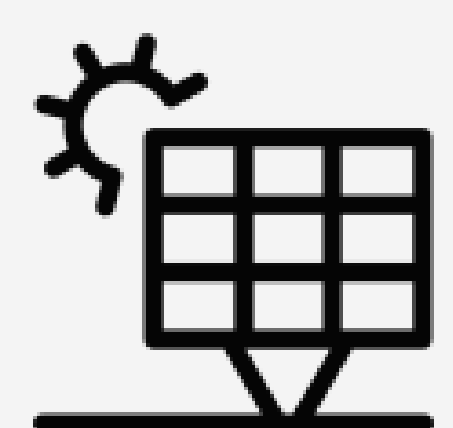
- Interests in Carbon Neutrality Topics:**
- Solar Power
  - Energy Efficiency
  - Divestment
- Students most willing to take action:**
- Environmental Studies
  - Students involved in sustainability organizations
- Most popular actions to show support:**
- Sign a petition
  - Attend an informal event
- Least Popular:**
- Serve as a student representative

#### Recommendations:

- Administrators: Recruit and retain more students on campus committees. Align UCSB's core mission of teaching and research with topics of the CNI that resonate with students, such as solar or energy efficiency.
- Students: Utilize known pathways to make change, such as committees, to influence the decision-making process.

### Approach

Working with our client, UCSB's Institute for Energy Efficiency, we identified three distinct areas at UCSB where we could find ways to effectively implement carbon neutrality:



#### Solar Project Deployment

**Goal:** Streamline information to increase pace of new on-campus solar installation

**How:** Prioritize rooftop sites through a multi-criteria solar assessment



#### Financial Tools & Strategies

**Goal:** Assess available financial resources and potential impact

**How:** Scenario analysis of UCSB's Utility Conservation Reinvestment Fund (UCRF)



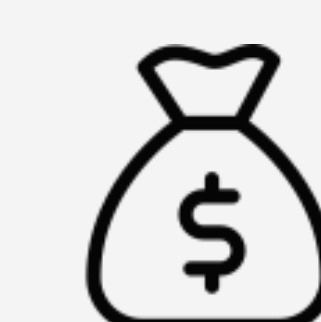
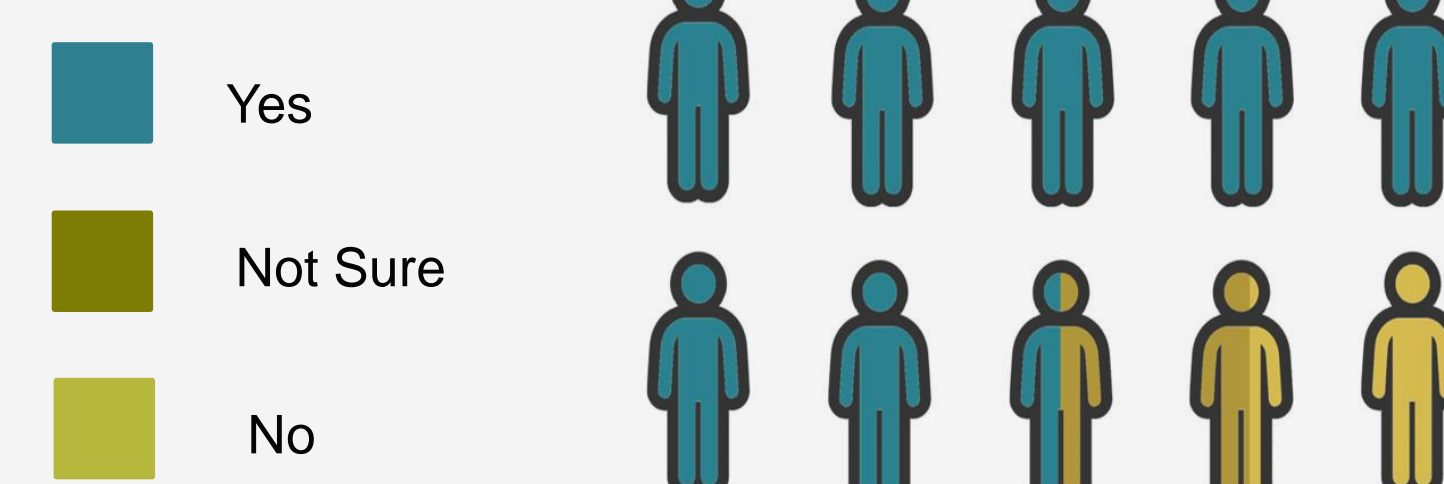
#### Strategic Communication & Engagement

**Goal:** To understand and recommend how to move CNI through the UCSB decision-making process given current attitudes and challenges

**How:** Administrator interviews, student focus groups, student survey

### Conclusion

Students answer, "Does sustainability add value to your experience at UCSB?"



We identified 18 rooftops as priority sites for solar panel installations, with the top buildings including: **the Recreation Center, University Center, and Student Health**. Installing solar panels to the maximum capacity will reduce GHG emissions by almost **2000 metric tons annually**.

The recommended UCRF structure, with approximately \$6M in seed funding, will deliver between **\$10.4 to \$24.2M in cumulative utility savings**, \$17 to \$35M in project investments, and a **15 to 31% reduction in annual GHG emissions** at UCSB by 2025.

We developed a set of recommendations for campus administrators and students to improve collaboration during the decision-making process for the CNI. Administrators should **target students willing to take action** and students should **leverage the unique role and influence they hold**.

### Acknowledgments

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<sup>1</sup> UCSB Office of Sustainability. 2015. Climate Action Plan 2016 Draft. Santa Barbara, CA.

For further information please visit [carbonzeroucsb.wordpress.com](http://carbonzeroucsb.wordpress.com) or send an email to [carbonzero@lists.bren.ucsb.edu](mailto:carbonzero@lists.bren.ucsb.edu)