Study of Campus Decarbonization
UC Riverside

Kick-Off Meeting

February 21, 2024

Delivering a better world
Agenda

01 Introductions
02 Project Overview
03 Approach
04 Schedule
05 Stakeholder Engagement
06 Next Steps
Meet Our Team

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Project Overview
By 2025, campuses are expected to set interim Scope 1 reduction targets for 2030, 2035, and 2040.

By Summer 2024, decarbonization studies will be completed for all campuses.

By January 2026, reduction plans to meet targets are implemented.

By 2045, carbon emissions will be reduced by 90% from 2019 baselines. Residual emissions will be negated through carbon removal projects.

**Campus Goals**

**Statewide UC Locations**

**UC Riverside**

Create a plan focused on options for reducing Scope 1 emissions.

— Central Utility Plant / Steam
— Decentralized gas-fired boilers

Identify climate justice and equity considerations

Identify gaps for Net Zero Planning

Identify opportunities for a living laboratory
Scope of Services
Phase 1: Pre-Design

1. Produce a strategy for a 90 percent or greater reduction in scope 1 emissions from fossil gas use in campus energy systems from a 2019 baseline, which is defined to be full direct decarbonization for this study effort. The strategy will provide decision support for campus and health system leadership to commit to the earliest possible target date for full direct decarbonization, to be no later than 2045, and interim targets for the years 2030, 2035, and 2040 for the campus/health system central energy system, while maintaining resilience, electrical reliability, and regulatory compliance. Multiple scenarios (reflective of timing, fuel switching, etc.) are encouraged to provide richer decision support to leadership and to allow for flexibility.

Scenarios should include evaluation of what would be required to achieve electrification of main campus energy systems at the location. Additionally, scenarios may consider the role of biogas and/or green hydrogen for remaining systems that are not fully electrified. To align with proposed policy goals, the strategy must include interim scope 1 energy system greenhouse gas reduction targets for the years 2030, 2035, and 2040 if full direct decarbonization is not expected to be achieved before 2040.

2. Provide high level estimates of total capital and operational costs and savings, by phase if relevant, in sufficient detail to support funding requests to government and donors as well as inclusion in the campus or health system’s capital financial plan. This cost-benefit analysis should include high level estimates of avoided maintenance, renewal, biogas, carbon offsets, water, and the social cost of carbon.

3. Identify climate justice and equity considerations related to the transition of campus/health system energy systems to fossil fuel free and propose solutions or next steps to identify solutions. These considerations reference the UC Framework for Incorporating Environmental and Climate Justice into Climate Action and should:
   a. Assess vulnerability of labor and surrounding community to transition to fossil free
   b. Develop and evaluate equity indicators on transition impacts and opportunities
   c. Incorporate four major climate and environmental justice concepts:
      i. Procedural: fairness of the decision-making process
      ii. Recognition: respecting different values, cultures, opinions and structures within communities
      iii. Distributive: just allocation of resources, benefits, and burdens
      iv. Restorative: responsive to those impacted by the transition

4. Document knowledge gaps, and subsequent studies and analyses needed to conduct climate action planning that addresses the following:
   a. Interim reduction targets for years 2030, 2035, and 2040. If full direct decarbonization is not expected to be achieved before 2040, covering all applicable scope 1, 2, and 3 emissions, as defined in the Climate Action section of the UC Policy on Sustainable Practices
   b. All fossil fuel uses
   c. A comprehensive institutional boundary
   d. Climate and environmental justice
   e. Equity-centered climate resilience (people, assets, and services)
   f. Risk minimization (financial, operational, and reputational)

Note: This deliverable should list key components needed to conduct climate action planning. It is not intended to be a full Climate Action Plan.

5. Identify research, education, and other opportunities for collaborative involvement of students, faculty, and staff in campus fossil-free pathways that can contribute to UC’s core mission of research, teaching, and public service. The focus is on applied learning and the campus as a “living laboratory” for climate action and sustainability.
Approach
Decarbonization Planning Framework
Decarbonization Planning Framework

Where Are You?

- Kick-off meeting
- Data collection
- Facility interviews
- Decarbonization audit
- Infrastructure assessment
- Load mapping & modeling

Stage 1
Decarbonization Planning Framework

Where Do You Want To Go?

- Benchmarking & baselining
- Goals & commitments
- Future steam demand
- Campus development plan
- Impacts on infrastructure
Decarbonization Planning Framework

Where Do You Want To Go?
• Benchmarking & baselining
• Goals & commitments
• Future steam demand
• Campus development plan
• Impacts on infrastructure

Interim Deliverables
• Workshop #1
• Existing conditions PowerPoint
• Future loads projection
• Understanding of goals
• Other considerations
Decarbonization Planning Framework

Where Are Your Opportunities?

- Non-connected buildings
- Central utility plant
- Heat distribution alternatives
- Building interface improvements
- Costing analysis (Deliverable #2)
Decarbonization Planning Framework

Where Are Your Opportunities?
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Interim Deliverables
- Workshop #2
- Summary of opps. PowerPoint
- Equity analysis (Deliverable #3)

Where Are You?
- Historical Energy Demand
- Current Energy Demand

Where Do You Want To Go?
- Operations & Finance
- Future Development Plans
- Future Energy & Water Consumption

How Will You Get There?
- Building Mechanisms
- Operations Strategy
- Design Process

Stage 3
Decarbonization Planning Framework

How Will You Get There?

- Implementation pathways
- Cost-to-benefit scenario(s)
- Proposed pre-design concept
- Implementation phasing plan
Decarbonization Planning Framework

**Deliverables**
- Workshop #3
- Phasing workshop PowerPoint
- Phasing plan (Deliverable #1)
- Next steps for Deliverable #4
- Next steps for Deliverable #5

**How Will You Get There?**
- Implementation pathways
- Cost-to-benefit scenario(s)
- Proposed pre-design concept
- Implementation phasing plan

Stage 4
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<th>Deliverables</th>
<th>Assumptions</th>
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| 3 • Review of UC framework, and applications to UCR climate planning process and outcomes  
  • Labor Vulnerability Assessment  
  • Define Equity Indicators | • **Memo** summarizing application of UC’s EJ&CJ framework for UCR’s climate action planning activities, a labor vulnerability assessment and equity indicators. | • Deliverable #3 informs approach and methodology for Deliverable #4.  
  • Need to discuss what the indicators will be used to measure (success of Deliverables #1, 2, 4, or 5) |
| 4 • Review of state, regional, local and campus plans & GHG emissions inventory that inform climate action planning for UCR for scope 1,2,3 emissions  
  • Gap analysis that identifies further studies/ actions required to support decarbonization by 2040 and community resilience and environmental justice  
  • Recommendations for implementation process that will foster equitable outcomes | • **Memo** summarizing GHG emissions targets, primary contributors and sectors subsequent studies, assessments and research areas to focus on. | • Deliverables #4, 5 run in parallel  
  • Survey undertaken in Deliverable #5 informs this deliverable |
| 5 • Survey Design, dissemination and analysis  
  • Workshop design, facilitation and integration | • **Survey** – Baseline of student and faculty research, capabilities and areas of interest  
  • **Stakeholder Workshop** – Integrating deliverable 4 into campus curriculums and activities  
  • **Memo** summarizing potential research, education and other opportunities aligned with climate action planning. | • Stakeholder Identification would occur in Deliverables #1, 2 and be leveraged for this task |
Stakeholder Engagement
Key Stakeholders

Project Team
Facilities Services
Planning, Budget, & Administration
Planning, Design, & Construction
Real Estate Services
Transportation & Parking Services

Faculty
Student Organizations
Center for Environmental Research & Technology
Center for Healthy Communities at UCR
Office of Diversity, Equity, & Inclusion
Office of the President, University of California
Environmental Health & Safety
Employee and Labor Relations
Office of Governmental & Community Relations
Risk Management
Dining Services
JLL

Riverside Public Utilities
Southern California Gas
Shell Energy
City of Riverside
Workforce Development Agency
Workshop #1
Where Are You? Where Do You Want To Go? (3-Hour Hybrid)

- Review existing conditions
- Review future growth plans
- Finalize goals and commitments
- Discuss other considerations

Content

Attendees

Project Team
- Facilities Services
- Planning, Budget, & Administration
- Planning, Design, & Construction
- Real Estate Services
- Transportation & Parking Services

Faculty
- Student Organizations
- Center for Environmental Research & Technology
- Center for Healthy Communities at UCR
- Office of Diversity, Equity, & Inclusion
- Office of the President, University of California
- Environmental Health & Safety
- Employee and Labor Relations
- Office of Governmental & Community Relations
- Risk Management
- Dining Services
- JLL
Workshop #2
What Are Your Opportunities? (2-Hour Hybrid)

• Discuss Central Utility Plant load
• Review preliminary opportunities for decentralized buildings, Central Utility Plant & heating alternatives
• Present costing options
• Prepare for equity analysis

Content

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Dining Services
JLL
Workshop #3
How Will You Get There? (2-Hour Hybrid)

Content

• Review implementation pathways
• Define scenario parameters
• Discuss considerations for pre-design concept
• Discuss next steps for Net Zero Gap Analysis & Engagement Strategies

Attendees

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Planning, Design, & Construction
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Schedule
Schedule Details

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**Project Setup**
- **KO**
  - Kickoff

**Stages 1 & 2**
- **SV**
  - Site Visit
  - Workshop #1: Where Are You? Where Do You Want To Go?
- **WS**
  - Workshop #2: What Are Your Opportunities?

**Stage 3**
- **WS**
  - Workshop #3: How Will You Get There?

**Stage 4**
- **WS**

**Outcomes**
- **FL**

**Final Deliverables**
- #1 – Phasing Plan
- #2 – Cost-Benefit Analysis
- #3 – Climate Justice / Equity Analysis
- #4 – Next Steps: Climate Action Planning
- #5 – Next Steps: Collaborative Involvement

[aeecom.com]
Next Steps
Pre- Site Visit Interviews

Amid conducting analysis of available data, AECOM will interview select points of contact:

• Facilities Services
• Planning, Design, & Construction

To best inform:

• Understanding of existing conditions
• Central Utility Plant
Site Visit
February 26 – March 1

Following analysis of available data, AECOM will conduct ground truthing of buildings on campus.

- 2 x Concurrent Field Teams
- Central Utility Plant and campus buildings

Outputs of the site visit include:
- Operational model of the Central Utility Plant
- List of existing heating interface by building
- Heating/cooling interfaces by building
- Infrastructure condition summaries
- Network steam/heat flow mapping
- Campus heat maps
- Site spatial and operational limitations