Carbon Neutrality Initiative

Presentation by David Phillips
Associate Vice President, Energy & Sustainability
UC Office of the President

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The University of California has adopted policies to aggressively reduce greenhouse gases generated as a result of University activities. UC has committed to the following climate goals:

1. By 2014: Reduce greenhouse gas (GHG) emissions to year 2000 levels, per UC Presidential Policy.

2. By 2020: Reduce emissions to 1990 levels, per UC Presidential Policy and in compliance with California AB 32, the California Global Warming Solutions Act.

3. As soon as feasible: Achieve climate neutrality, per the American College and University Presidents’ Climate Commitment (ACUPCC), of which UC is a charter signatory

In 2013, “as soon as feasible” became “by 2025”
What’s Included in the 2025 Goal?

UC is committed to net carbon neutrality for our on-site natural gas use and purchased electricity by 2025.
UC’s Carbon Neutrality Initiative

Mission
The University of California’s operations will be 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.

Values
Our actions will:
• Reflect UC’s core mission of research, teaching, and public service
• Be financially responsible
• Provide tangible environmental and social benefits
• Optimize existing and future campus infrastructure
• Demonstrate the value of coordinated systemwide action
Assessing the Challenge

UC’s Current Emissions

The on-campus combustion of natural gas represents our primary challenge in reducing emissions.

- **Natural Gas**: 63%
- **Electricity**: 29%
- **Steam**: 4%
- **Fleet**: 2%
- **Refrigerants**: 1%
- **Other Scope 1**: 1%
Assessing the Challenge

Current Emissions by Campus

- **Direct Emissions** (natural gas, campus fleet and other small sources)
- **Indirect Emissions** (purchased electricity and UCB-purchased steam)
- Campuses with combined heat and power plants
- Campuses with medical centers

<table>
<thead>
<tr>
<th>Campus</th>
<th>Metric Tons CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCLA</td>
<td>250,000</td>
</tr>
<tr>
<td>Davis</td>
<td>200,000</td>
</tr>
<tr>
<td>San Diego</td>
<td>150,000</td>
</tr>
<tr>
<td>Irvine</td>
<td>100,000</td>
</tr>
<tr>
<td>San Francisco</td>
<td>50,000</td>
</tr>
<tr>
<td>Berkeley</td>
<td>10,000</td>
</tr>
<tr>
<td>Riverside</td>
<td>5,000</td>
</tr>
<tr>
<td>Santa Barbara</td>
<td>5,000</td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>2,500</td>
</tr>
<tr>
<td>Merced</td>
<td>2,500</td>
</tr>
<tr>
<td>UCOP</td>
<td>2,500</td>
</tr>
</tbody>
</table>

Assessing the Challenge
Systemwide Emissions and Goal

Direct Emissions
(natural gas, campus fleet and other small sources)

Indirect Emissions
(purchased electricity and UCB-purchased steam)

Current Path

2025 marks the start of UC’s carbon-neutral operations

Carbon Neutral

(Thousands of Metric Tons CO2e)
Carbon Neutrality Initiative Progress

• Global Climate Leadership Council established

• Summit on Climate Change and Carbon Neutrality

• “Bending the Curve” report and on-line course

• Student, staff and faculty engagement projects funded as part of CNI
Honorary Chair:
Art Rosenfeld, Professor Emeritus

Co-Chairs:
Rachael Nava, Chief Operating Officer (UCOP)
Wendell Brase, Vice Chancellor for Administration (UCI)

Members:
David Auston, Professor of Electrical & Computer Engineering (UCSB)
Jagdeep Singh Bachher, CIO, Vice President of Investments (UCOP)
Roger Bales, Professor of Engineering (UCM)
Matt Barth, Professor of Engineering (UCR)
Carl Blumstein, Director, California Institute for Energy & Environment (UCB)
Nathan Brostrom, EVP/Chief Financial Officer (UCOP)
Sandra Brown, Vice Chancellor for Research (UCSD)
Ann Carlson, Vice Dean and Professor, School of Law (UCLA)
Ron Coley, Vice Chancellor for Business and Administrative Services (UCR)
John J. Cook, Co-Chair, UC Climate Change Working Group (UCR)
Peggy Delaney, Vice Chancellor for Planning and Budget (UCSC)
John Elliott, Chief Sustainability Officer (LBNL)
Juan Gonzalez, Vice Chancellor for Student Affairs (UCSD)
Julie Henderson, Senior Vice President for Public Affairs (UCOP)
Glenda Humiston, Vice President for Agriculture and Natural Resources
Amy Jaffe, Director, CIO’s Senior Advisor, Energy & Sustainability (UCOP)

External Advisors:
Tamara “TJ” DiCaprio, Senior Director of Environmental Sustainability, Microsoft
Ramé Hemstreet, VP Operations/Chief Sustainability Officer, Kaiser Permanente
Ren Orans, Managing Partner, E3
Debbie Raphael, Director, Department of Environment, City of San Francisco
Energy Conservation Progress

Since 2004:
- $166 MM avoided cost net of debt service
- $80 MM awarded in utility company incentives
- 170,000 mtons GHG reduction (16%)

Current savings: $25 MM/year
UC’s Goal was 10MW of generation:

2014 UC-wide Solar PV Generation Capacity

- Generation from UCOP PPAs (kW)
- Generation from Planned On-site Projects (kW)
- Existing West Village Generation (kW)
- Existing On-site Generation (kW)
We far exceeded that goal:

2017 UC-wide Solar PV Generation Capacity

- Generation from UCOP PPAs (kw)
- Generation from Planned On-site Projects (kW)
- Existing West Village Generation (kW)
- Existing On-site Generation (kW)
Onsite Renewable Energy Progress

- Biogas in Planning
- Solar in Planning
- Biogas
- Solar

2014 Policy Goal
UCD has 3 on-campus solar projects...
UCD has 3 on-campus solar projects…
# UC Davis Solar Projects Summary

<table>
<thead>
<tr>
<th>Project</th>
<th>Developer</th>
<th>Location &amp; Type</th>
<th>Capacity (MWp)</th>
<th>Capacity (MWac)</th>
<th>Startup</th>
<th>Annual Production kWh/year</th>
<th>PPA Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rooftops &amp; Parking</td>
<td>Mainstreet Power</td>
<td>Core campus rooftops and parking lot, fixed.</td>
<td>0.76</td>
<td>0.6</td>
<td>12-Jan</td>
<td>1,290,000</td>
<td>20 years</td>
</tr>
<tr>
<td>2. West Village</td>
<td>Partners &amp; SunPower</td>
<td>West village rooftops and parking lots, fixed.</td>
<td>4</td>
<td>3.2</td>
<td>12-Jan</td>
<td>3,762,000</td>
<td>25 years</td>
</tr>
<tr>
<td>3. Large Solar Power Plant</td>
<td>SunPower</td>
<td>South campus, ground-mounted, single-axis tracking.</td>
<td>16.3</td>
<td>13.0</td>
<td>15-Sep</td>
<td>33,472,000</td>
<td>20 years</td>
</tr>
<tr>
<td>4. UC Davis' Share of UCOP Off-campus</td>
<td>Frontier</td>
<td>Fresno, ground-mounted, single-axis tracking.</td>
<td>27.9</td>
<td>21.4</td>
<td>16-Nov</td>
<td>52,900,000</td>
<td>25 years</td>
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UC Davis Large Solar Plant:
UCD’s solar power plant PPA was structured to achieve several goals
UC’s goals for solar have evolved:

<table>
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<tr>
<th>Sustainability</th>
<th>Financial</th>
<th>Reputational</th>
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<tr>
<td>• Earn points for LEED certifications</td>
<td>• Don’t pay a high premium</td>
<td>• Protect UC’s environmental reputation</td>
</tr>
<tr>
<td>• Help fulfill UC system-wide renewable energy generation goals</td>
<td>• Provide a long-term energy hedge</td>
<td>• Model a zero net energy future</td>
</tr>
<tr>
<td>• Reduce campus carbon footprint</td>
<td>• Implement without costs higher than business-as-usual</td>
<td>• Lead societal change by developing integrated academic/operational/business solutions</td>
</tr>
<tr>
<td>• Completely eliminate Scope 1 &amp; 2 GHG emissions by 2025</td>
<td>• Invest for future economic returns</td>
<td></td>
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Five Points Solar Park
- Size: 60 MWAC
- Location: Five Points, Fresno County, CA
- Point of interconnection: On-Site
- Fence line acreage - 500 acres

Giffen Solar Park
- Size: 20 MWAC
- Location: Cantua Creek, Fresno County, CA
- Point of interconnection: Giffen Substation On-Site
- Fence line acreage - 160 acres
Wholesale Power Program Progress

Greener, **less-expensive** electricity run by UC’s own electricity company and managed the Energy Services Governing Board.

The UC-funded 400-acre, 60-MW solar project in Five Points, CA is now on-line, supplying carbon neutral electricity to all 10 campuses.
We are the University of California, and there is no reason that UC can't lead the world in this quest, as it has in so many others.

UC President Janet Napolitano