CAPITAL REGION
CLIMATE READINESS
COLLABORATIVE

Quarterly Adaptation Exchange

Carbon Farming, Bio-Sequestration, and Food Security

Wednesday, December 13th | 2:00 – 5:00 PM

UC Davis International Center #3119 | Davis, CA

Welcome & Collaborative Updates

Julia Kim | Senior Project Manager, Local Government Commission

Kathleen Ave | Climate Program Manager, SMUD
| Chair, Capital Region Climate Readiness Collaborative

CAPITAL REGION
CLIMATE READINESS
COLLABORATIVE

Presentation from Our Host

University of California, Davis

Camille Kirk | Director of Sustainability, UC Davis

CAPITAL REGION
CLIMATE READINESS
COLLABORATIVE


29 LEED® Certified Buildings


Waste Heat to Energy

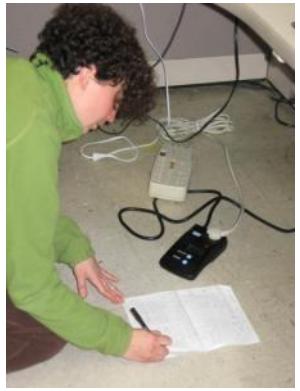

Water Conserving Landscapes


Sustainable Transportation

UC Davis Climate Action and the UC Carbon Neutrality Initiative

December 13, 2017
Capital Region Climate Readiness Collaborative
International Center, UC Davis

Camille Kirk
Director and Campus Sustainability Planner
UCDAVIS
OFFICE OF SUSTAINABILITY



Active Faculty and Student Research Projects on Sustainability


16.3 MW Large Solar Power Plant


Engaged Campus Community

Inspiring global curiosity, understanding, and engagement

ASIAN **INTERNATIONAL** PROGRAMS

BLUM CENTER FOR DEVELOPING ECONOMIES

CONFUCIUS INSTITUTE

FACULTY PROGRAMS

SERVICES FOR INTERNATIONAL STUDENTS AND SCHOLARS

SPONSORED **FELLOWSHIP PROGRAMS:** FULBRIGHT, HUBERT H. HUMPHREY, MANDELA WASHINGTON

STUDY **ABROAD**

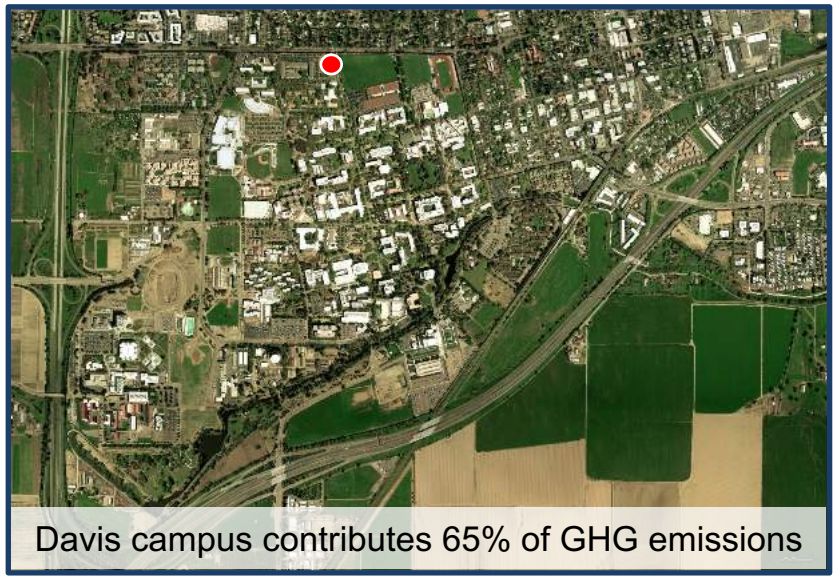
UC DAVIS ARAB REGION **CONSORTIUM**

UC DAVIS CHILE LIFE SCIENCES INNOVATION CENTER

UCDAVIS GLOBAL AFFAIRS

Context

- 2,145 hectares
- ~36,000 students
- ~25,000 employees
- 1,000+ buildings; over 1,207,740 m²
- UC Davis budget is ~$4.6 billion
- Large ag and fisheries research programs


Davis campus contributes 65% of GHG emissions


Sacramento campus contributes 34%

Outlying facilities contribute 1%


Self-contained utilities and services


Unique power supplies


Inland climate


Science intensive

Origins of Sustainability at UC Davis


Yolo Semi-Weekly Mail.

PUBLISHED TUESDAY AND FRIDAY

WOODLAND, CALIFORNIA, FRIDAY, APRIL 6, 1906.

THE STATE FARM FOR YOLO

Commissioners Select Davisville Site

Decision Reached at Midnight. Superiority of Our Soil Is Signally Recognized.

EXCITEMENT AT HIGH SCHOOL

Tomorrow's Field Meet Anxiously Awaited

CAPITALIZED FOR A MILLION

Forsman Fôes Articles in Nevada.

FIELD MEET NEXT SATURDAY

Four Schools To Contest on Local Field.

UC Davis started as the Farm School of UC Berkeley in 1906.

The Office of Sustainability was created in 2008.

- **Long-term commitment to stewarding natural resources**
- **Committed leadership**
  - UC Davis
  - UC Office of the President
  - Global Climate Leadership Council
- **Strong policies with stretch goals**

#1

Most Sustainable University
UI GreenMetric, 2016-17

#1

Cool School
Sierra Magazine, 2012-13

UC Sustainable Practices Policy

UC Sustainable Practices Policy Section	Year Added	Year Revised
Green Buildings	2004	2007, 2011, 2015, 2016
Clean Energy	2004	
Climate Protection (Carbon Neutrality Initiative)	2006	2007, 2011, 2015
Sustainable Transportation	2006	2016
Sustainable Building Operations	2007	2011, 2015, 2017
Recycling and Waste Management	2007	
Environmentally Preferable Purchasing	2007	2011
Sustainable Foodservices Practices	2009	2011, 2015
Sustainable Water Systems	2013	2016

- In July 2003, The Regents of the University of California approved sustainability policy principles, **after students across the UC campuses lobbied for a sustainability policy**.
- In June 2004, the President of the University of California formally issued the "Presidential Policy on Green Building Design and Clean Energy Standards." This Policy was subsequently renamed the Policy on Sustainable Practices.
- UC Systemwide Sustainability Steering Committee meets yearly to oversee the Policy.

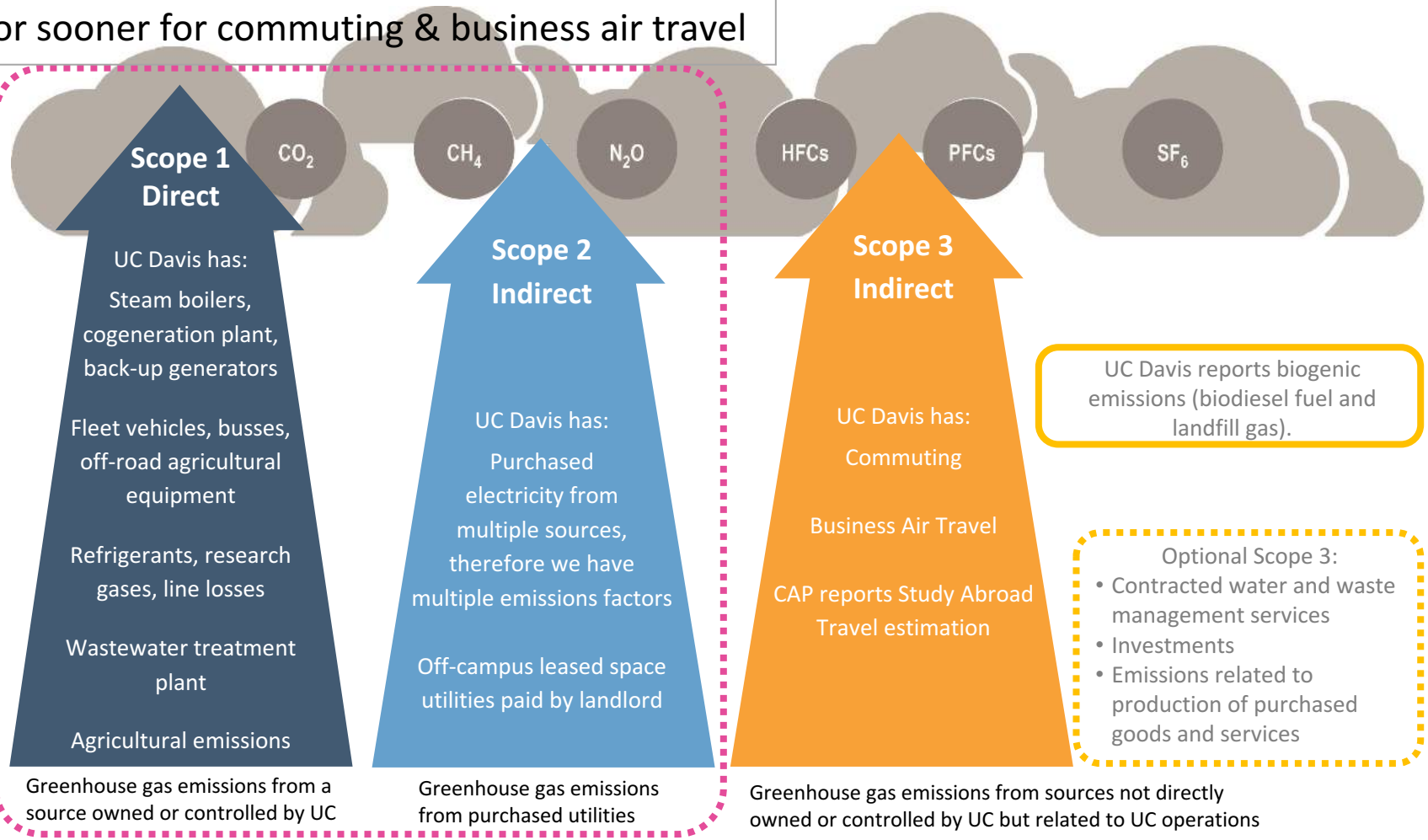
UC Policy: Climate Protection

Policy Goals

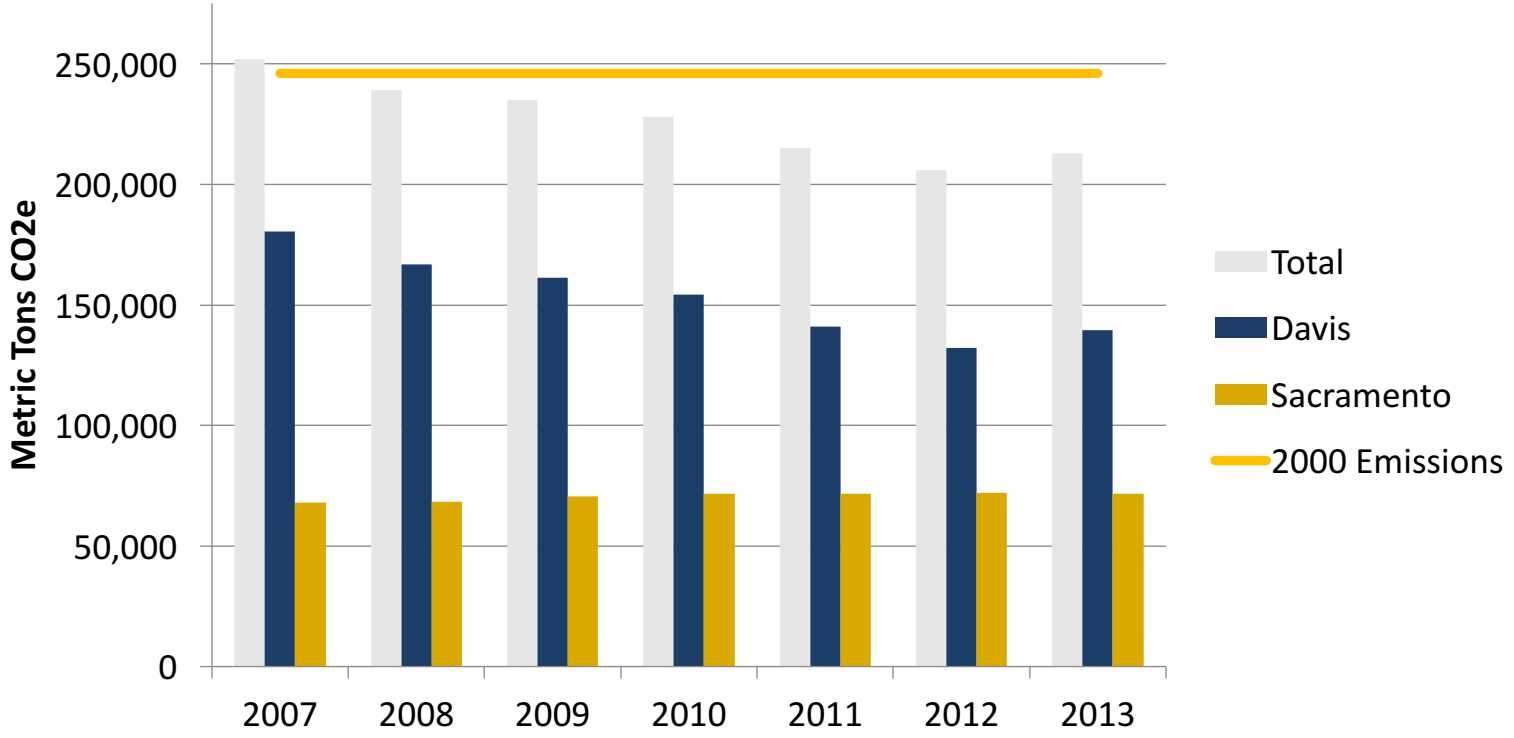
- Reduce GHG emissions to 1990 levels by 2020
- Climate neutrality by 2025 for business operations (Scopes 1 & 2)
- Climate neutrality by 2050 or sooner for commuting & business air travel

UC is committed to net carbon neutrality for these emission sources by 2025

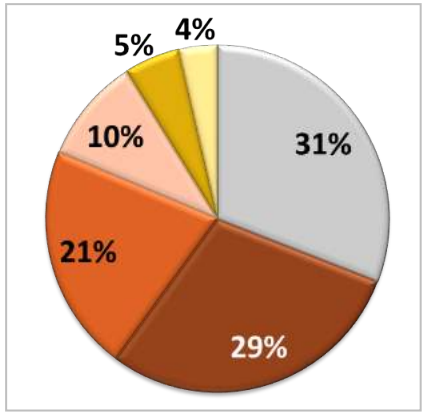
GHG Emission Scopes and UC Carbon Neutrality Initiative



GHG Inventorying and Climate Action Planning

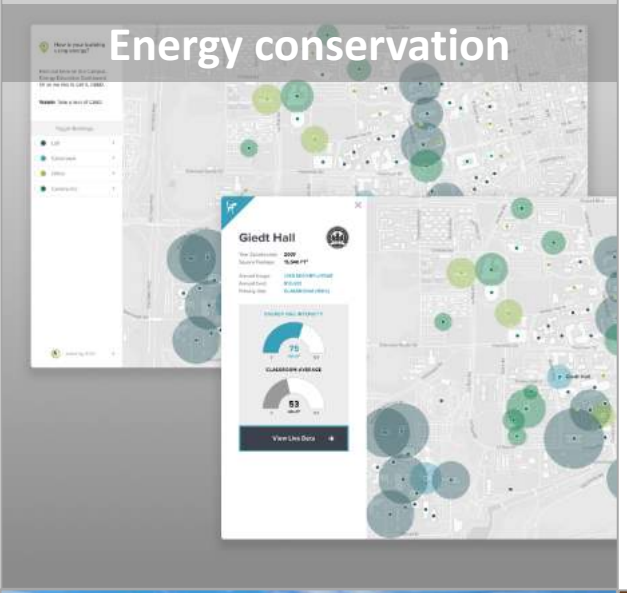


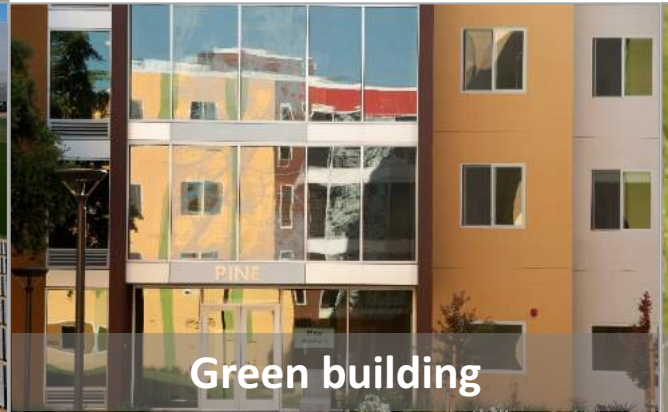
31% = Purchased electricity
29% = Sacramento co-generation plant
21% = Davis central heating and cooling plant
10% = Other stationary combustion (boilers, generators)
5% = Other (WWTP, fugitives, research gases)
4% = Mobile fleet (excludes commute)



A Daunting List of Challenges:

- Natural gas is 60% of GHG emissions
- California cap-and-trade regulation
- Financial costs of carbon neutrality
- Incorporating carbon costs into project planning and operations
- Campus growth – how will we grow and our emissions?
- Implementing space management strategies
- Involving outlying facilities
- Hard-to-solve GHGs (research gasses)
- Standards for commuting and air travel emissions
- Planning for resiliency and climate change adaptation
- Finding or developing good offsets





Updating the UC Davis Climate Action Plan

- Iterative process to incorporate various mitigation actions, as studies are completed
- Address campus growth planned in the Davis campus 2030 Long Range Development Plan
- Broad-based campus involvement: Staff experts lead on mitigations, faculty lead on academic elements, student teams learn in classes
- Small, collaborative work teams from different units
- Will incorporate UCOP actions, as well as state, federal and private sector actions

Order of Actions

- Reduce/eliminate growth of total campus energy use due to new facilities
- Reduce demand:
  - Improve energy efficiency at existing facilities
  - Reduce user demand through conservation behaviors
- Replace fossil fuels (high GHG emissions) with renewable energy
- Sequester or offset carbon, or otherwise mitigate remaining GHG emissions

UC Climate Neutrality Initiative: Support Structure

Purpose & Key Objectives

- Advise the President and Executive Vice President on actions needed to further our sustainability efforts and to achieve UC's goal of 2025 carbon-neutrality through an integrated, comprehensive, broadly-engaging, and successful effort.
- Connect implementation of carbon neutrality to UC's teaching, research, and public service mission
- Connect and coordinate the efforts of all relevant stakeholder groups

President's Global Climate Leadership Council

Sponsor
President Napolitano

Council
Co-Chairs
21 members including chairs/delegates from major UC leadership groups, faculty members, students, representatives from California State University and California Community College systems, and external advisors

Council Support
Council Staff
& Program Manager

Pillars

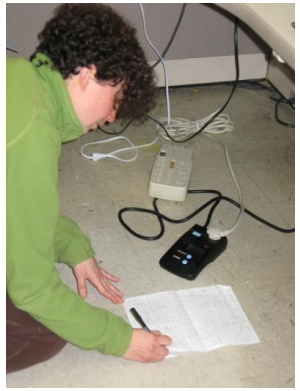
**Pillar with associated Working Group*

- Energy Services*
- Applicable Research*
- Financial*
- Health Sciences & Services
- Faculty Engagement*
- Student Engagement*
- Communications & Political Advocacy*
- Campus & Med Center Climate Action Plan & Staff Engagement*
- Policy*
- CA Environmental Leadership

Energy Conservation and Efficiency

1. Improve energy efficiency at existing facilities
2. Reduce growth in energy use from new facilities
3. Practice energy conservation (reduce user demand)

Do these in conjunction with faculty research partners and students



CLTC
CALIFORNIA LIGHTING TECHNOLOGY CENTER

TherMOOstat

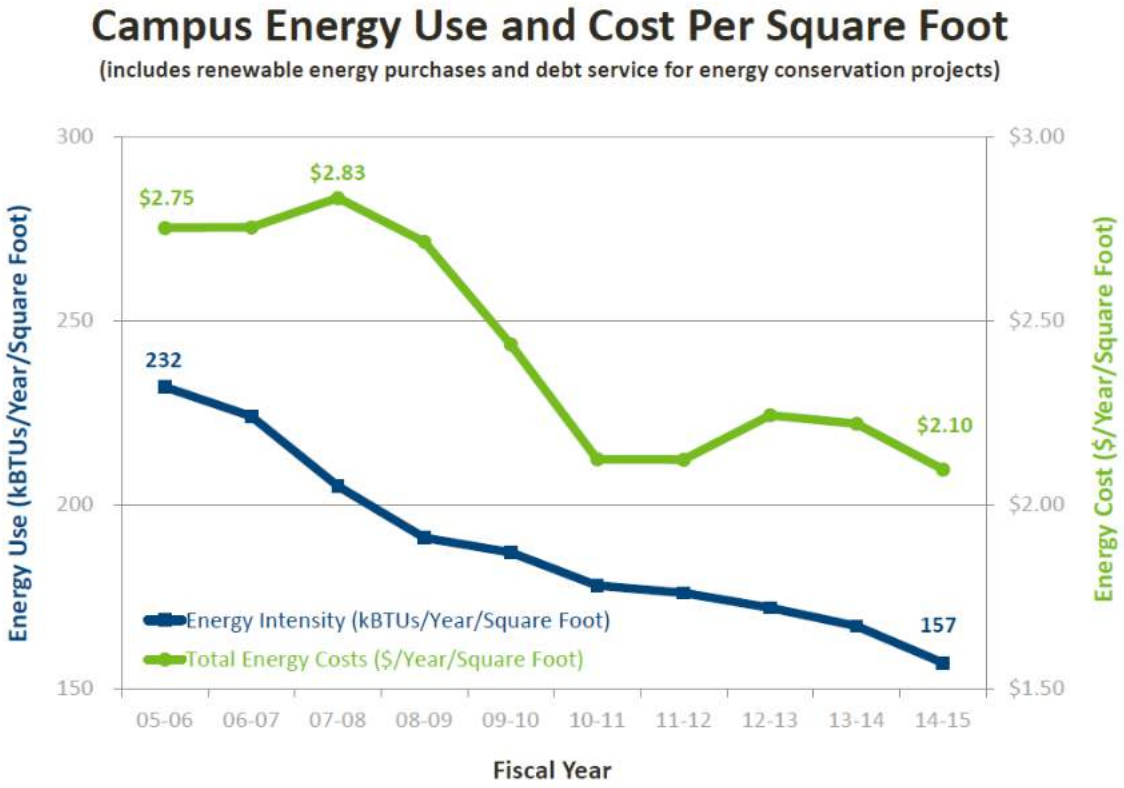
Energy Dashboard

Water Dashboard

Energy and Water Challenge

Energy Efficiency Projects – Davis Campus

Date	Electricity Savings		Natural Gas Savings	
	kWh/year	Percent	therms/year	Percent
2009-2013 (actual)	30.5 million	13%	1.9 million	17%
2014-2016 (planned)	24.7 million	11%	1.0 million	9%
2017-2025 (planned)	36.0 million	--	1.0 million	--
TOTAL	91.2 million	--	3.9 million	--



Renewable Energy Sources

1. Increase on-site renewable energy generation
2. Increase purchase of “green power” from utilities

Onsite Renewables

Solar photovoltaics →

- 901 kWdc rooftop/parking lots
- 16.3 MWdc Large Solar Plant
- 4.0 MWdc UC Davis West Village

← Campus-owned biodigester

- 50 tons organic waste/day
- 5.6 million kWh/year (925kW cap.)
- Adjacent compost facility planned

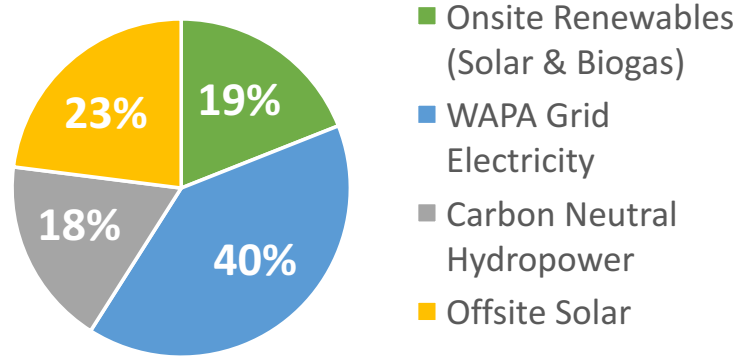
Green Power Purchases

Off-site

(Renewable Energy Certificates)

- 24% of an 80MW installation in Fresno
- SMUD Greenergy for Sacramento clinical facilities (2,066 MWh/yr)
- SMUD SolarShares for Health System (9,698 MWh/yr)

Davis Campus 2018 Electricity Mix



A Last Look at the 25 Hectare Plant

UC Policy: Green Building

Policy Goals

- Outperform Title 24 (California energy code) by at least 20% or meet whole-building energy performance targets; and strive to outperform Title 24 by 30% or meet the stretch whole-building energy performance targets
- Achieve LEED® Silver certification at a minimum; strive for Gold or higher

LEED Certifications

LEED	BD&C	CI	EBOM	Total
Certified	0	0	1	1
Silver	1	0	3	4
Gold	6	5	4	15
Platinum	9	0	0	9


29 LEED® Certified Buildings


Winery, Brewery & Food Science


Tahoe Environmental Center


West Village (third party project) –
the largest planned "zero net energy" community in the United States


Manetti Shrem Museum of Art

UC Policy: Sustainable Transportation

Policy Goals

- Reduce GHG emissions from campus fleet
- By 2025, strive to reduce percentage of employees and students commuting by single-occupancy vehicle (SOV) by 10% relative to 2015 SOV rates
- By 2050, strive to have no more than 40% of employees, and no more than 30% of all employees and students, commuting by SOV.
- By 2025 strive to have at least 4.5% of commuter vehicles be ZEV
- By 2050, strive to have at least 30% of commuter vehicles be ZEV
- Develop business-case analysis for any proposed parking structures to document how a parking investment aligns with campus Climate Action Plans and/or sustainable transportation policies

Challenges

- Campus growth and mitigations
- Regional growth
- Housing versus commute trade-offs
- Transit service levels and service areas

Next steps

- Underway with a Transportation Demand Management Plan
- Working towards bus electrification
- The parking implications of self-driven cars?

BICYCLE FRIENDLY UNIVERSITY
2011-2017
PLATINUM
THE LEAGUE OF AMERICAN BICYCLISTS

Resources:

Camille Kirk, Director of Sustainability
Phone: (530) 752-7954 | Email: cmkirk@ucdavis.edu
Sustainability website: http://sustainability.ucdavis.edu

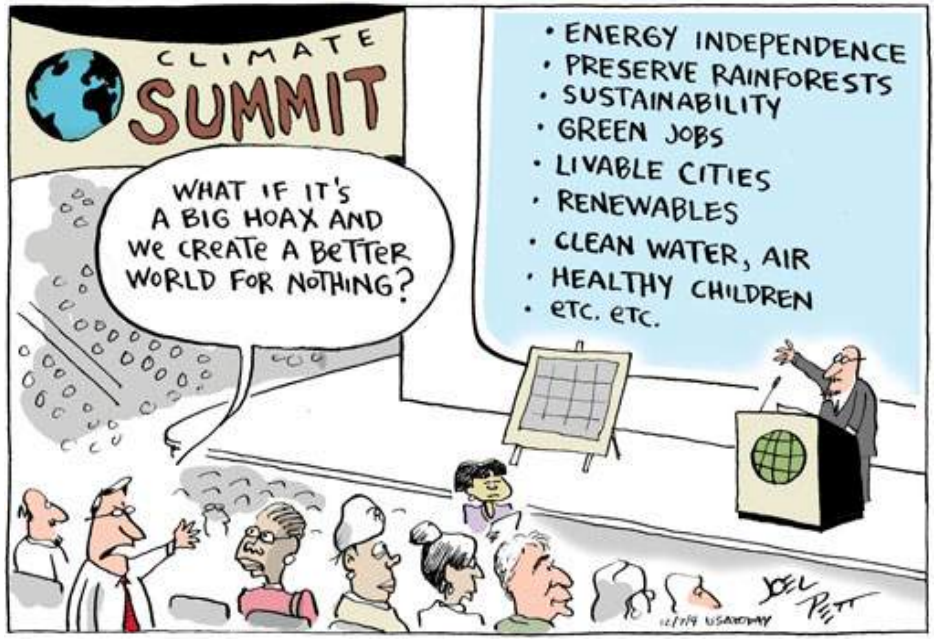
UC Davis Climate Action Plan:
http://sustainability.ucdavis.edu/progress/climate/index.html
(direct link) http://sustainability.ucdavis.edu/local_resources/docs/climate_action_plan.pdf

Carbon Neutrality Initiative at UC Davis:
http://sustainability.ucdavis.edu/about/carbon_neutrality_initiative.html

UC Sustainable Practices Policy:
http://ucop.edu/sustainability/policies-reports/index.html

UC Carbon Neutrality Initiative:
http://www.ucop.edu/initiatives/carbon-neutrality-initiative.html
http://ucop.edu/sustainability/programs-initiatives/index.html

UC Annual Report on Sustainable Practices:
http://ucop.edu/sustainability/policy-areas/annual-reports.html



UCDAVIS
OFFICE OF SUSTAINABILITY

SMUD Landscape Carbon Assessment for Sacramento County

Tim Kidman | Project Director, Sustainability and Energy, WSP

SMUD®

Sacramento Municipal Utility District

WSP

Sacramento County Landscape Carbon Assessment – Initial Study

December 13, 2017

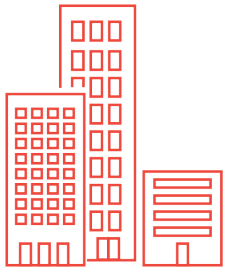
Presented to the

CAPITAL REGION CLIMATE READINESS COLLABORATIVE

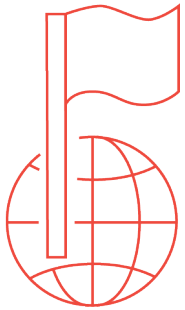
WSP Overview

- One of the world's leading engineering and professional services firms
- We develop creative, comprehensive, and sustainable design and engineering solutions for a future where communities can thrive
- We are future focused, questioning the predictable, standing for innovation, and changing the landscape
- Our multidisciplinary expertise
  - Engineers
  - Planners
  - Technical Experts
  - Strategic Advisors
  - Construction Management Professionals

37,000
Employees



500
Offices



40
Countries

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Sacramento Municipal Utility District

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SMUD's commitment to climate action

- Work aligns with state climate pillars, regional, and local efforts
- Sacramento Municipal Utility District supported the work and assembled the workgroup and other stakeholders

- Technical work delivered by
  - *WSP USA*
  - *Patrick Huber, PhD*
  - *Burleson Consulting*

- Input provided by workgroup members, technical reviewers, and experts
  - *Environmental Council of Sacramento**
  - *The Nature Conservancy**
  - *Sacramento Area Council of Governments**
  - *California Department of Conservation*
  - *California Climate & Agriculture Network*
  - *Climate Action Reserve*
  - *California Air Resources Board*
  - *Tukman Geospatial*
  - *United States Forest Service*

* *workgroup member*

"SMUD will provide leadership in the reduction of the region's total emissions of greenhouse gases through proactive programs in all SMUD activities and development and support of national, State, and regional climate change policies and initiatives." (Strategic Direction 7)

SMUD Sacramento Municipal Utility District

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- WSP
- **Background**
- Inventory and forecast
- Integration with land use planning
- Concepts
- Technical potential
- Conclusions

Photo: P. Huber

Introduction

- Carbon sequestered in biomass and soils (landscape carbon) represents a large pool of potential greenhouse gas (GHG) emissions
- Losses or additional sequestration are impacted by land use changes and management practices
- The outcomes from this assessment can be used to identify the locations most susceptible to conflict between the carbon goals of the region and the expansion of urban areas.

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Sacramento Municipal Utility District

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Goals and Outcomes

Project Goals	Project Outcomes
1 Quantify the current landscape carbon storage in Sacramento County, prioritizing existing and available data	→ GIS-based model that incorporates soil and biomass carbon densities and quantifies landscape carbon storage
2 Forecast Sacramento County landscape carbon storage under varied land use projections	→ Model incorporating forecast data based on land use constraints and population dynamics
3 Develop and test method for incorporating carbon as an explicit conservation benefit in land use decision-making frameworks	→ Marxan-based model that optimizes conservation designs using carbon as an input variable
4 Explore the potential for landscape carbon sequestration projects in Sacramento	→ Three project concept reviews assessing suitability, carbon potential, and cost considerations
5 Expand understanding of the technical potential for increasing landscape carbon storage in Sacramento County	→ Quantified technical potential based on land use outcomes and incorporating conservation actions

SMUD Sacramento Municipal Utility District

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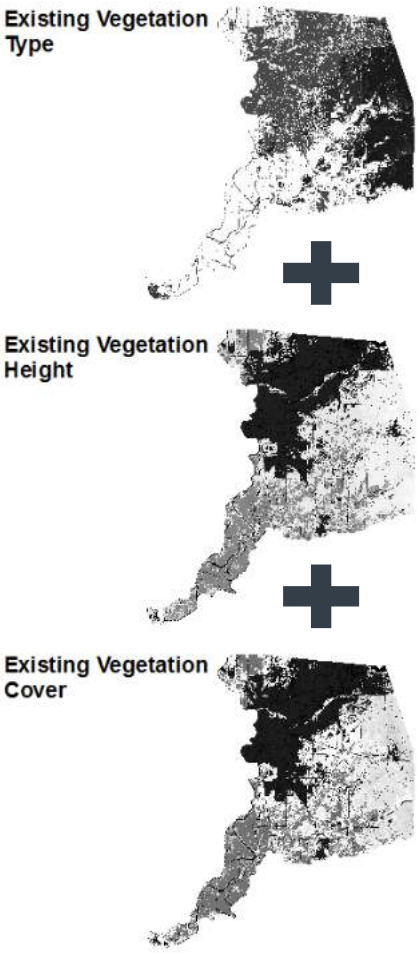
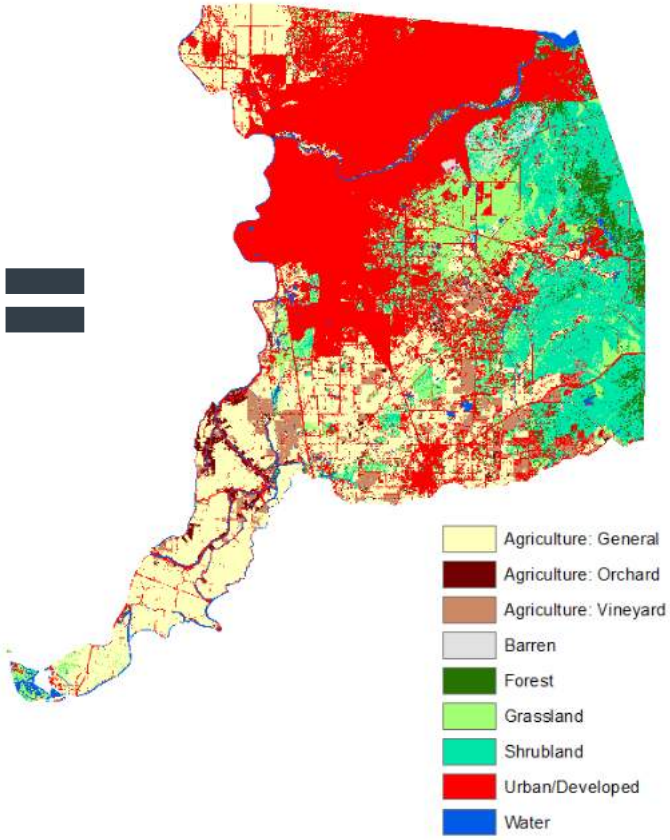
Inventory and Forecast

1. **CLASSIFY THE LANDSCAPE BASED ON SPECIFIC LULCs**
2. **IDENTIFY RELEVANT CARBON POOLS FOR EACH LULC**
3. **DEVELOP A PER ACRE CARBON DENSITY BASED ON LULC IN THE STUDY AREA**
4. **APPLY CARBON FACTORS TO CURRENT LULC LAYERS**
5. **OVERLAY FUTURE DEVELOPMENT SCENARIOS ON THE CURRENT LULC LAYER**
6. **APPLY CARBON FACTORS TO SCENARIO-BASED LULC LAYERS**





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Land Cover Classes

Carbon Pools ● = Included ● = Excluded	Forest	Grass-lands	Shrub-lands	Agri-culture	Urban	Barren Lands	Water
Soil organic carbon	●	●	●	●	●	●	●
Standing live and deadwood (trees)	●	●	●	●	●	●	●
Litter and duff	●	●	●	●	●	●	●
Lying dead wood	●	●	●	●	●	●	●
Shrubs (Forests)	●	●	●	●	●	●	●
Shrubs	●	●	●	●	●	●	●
Grasses	●	●	●	●	●	●	●
Crops and Pastures	●	●	●	●	●	●	●
Orchards	●	●	●	●	●	●	●
Vineyards	●	●	●	●	●	●	●
Harvested wood products and landfill	●	●	●	●	●	●	●

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Land Use or Land Cover	Biomass Carbon ($MTCO_2e$/Acre)	Soil Organic Carbon ($MTCO_2e$/Acre)
Agriculture: General	9	54
Agriculture: Orchard	27	36
Agriculture: Vineyard	6	30
Barren	3	4
Forest	145	25
Grassland	10	43
Shrubland	106	28
Urban/Developed	14	14
Water	0	0

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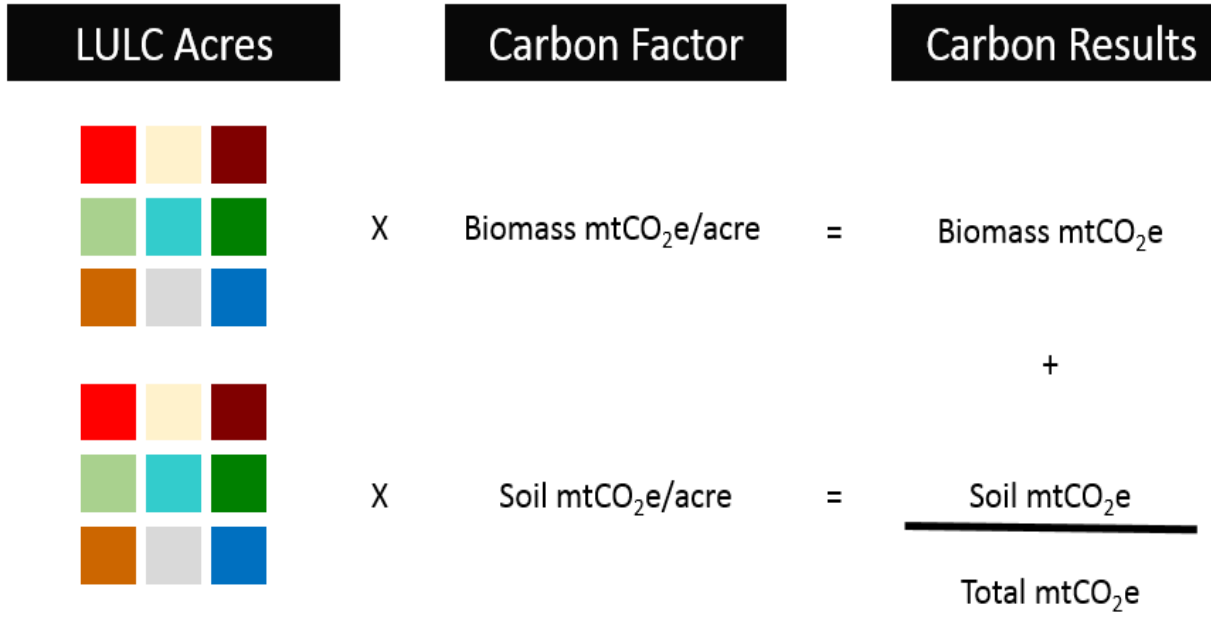

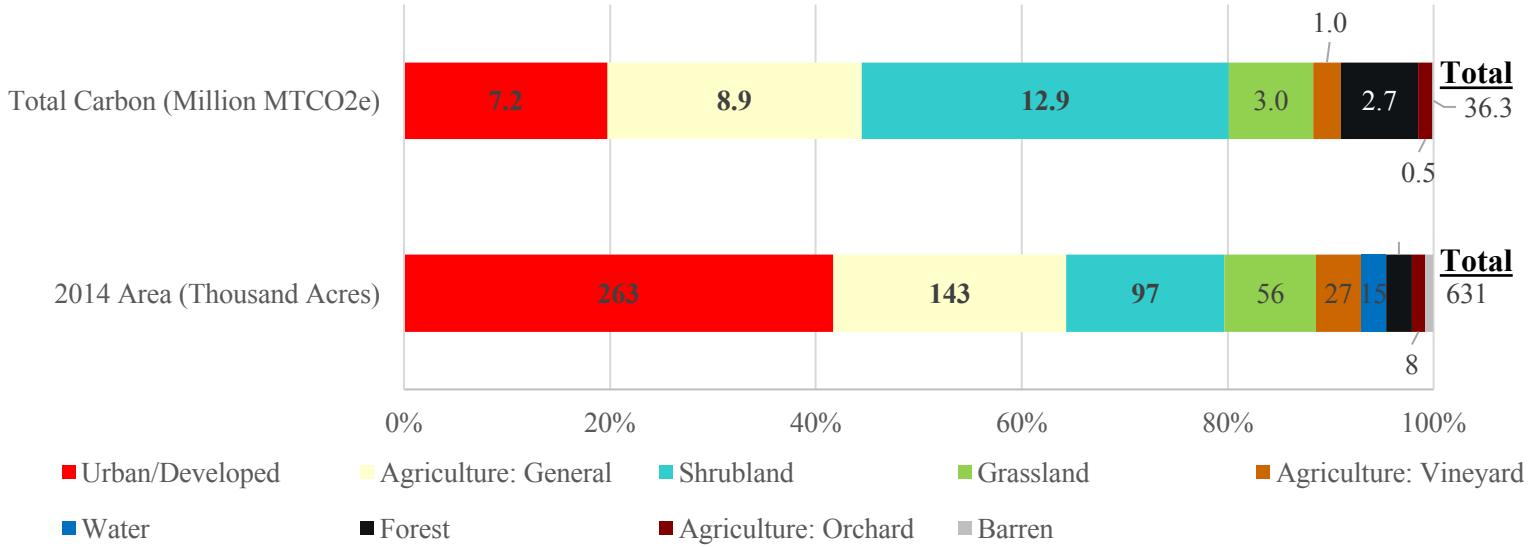

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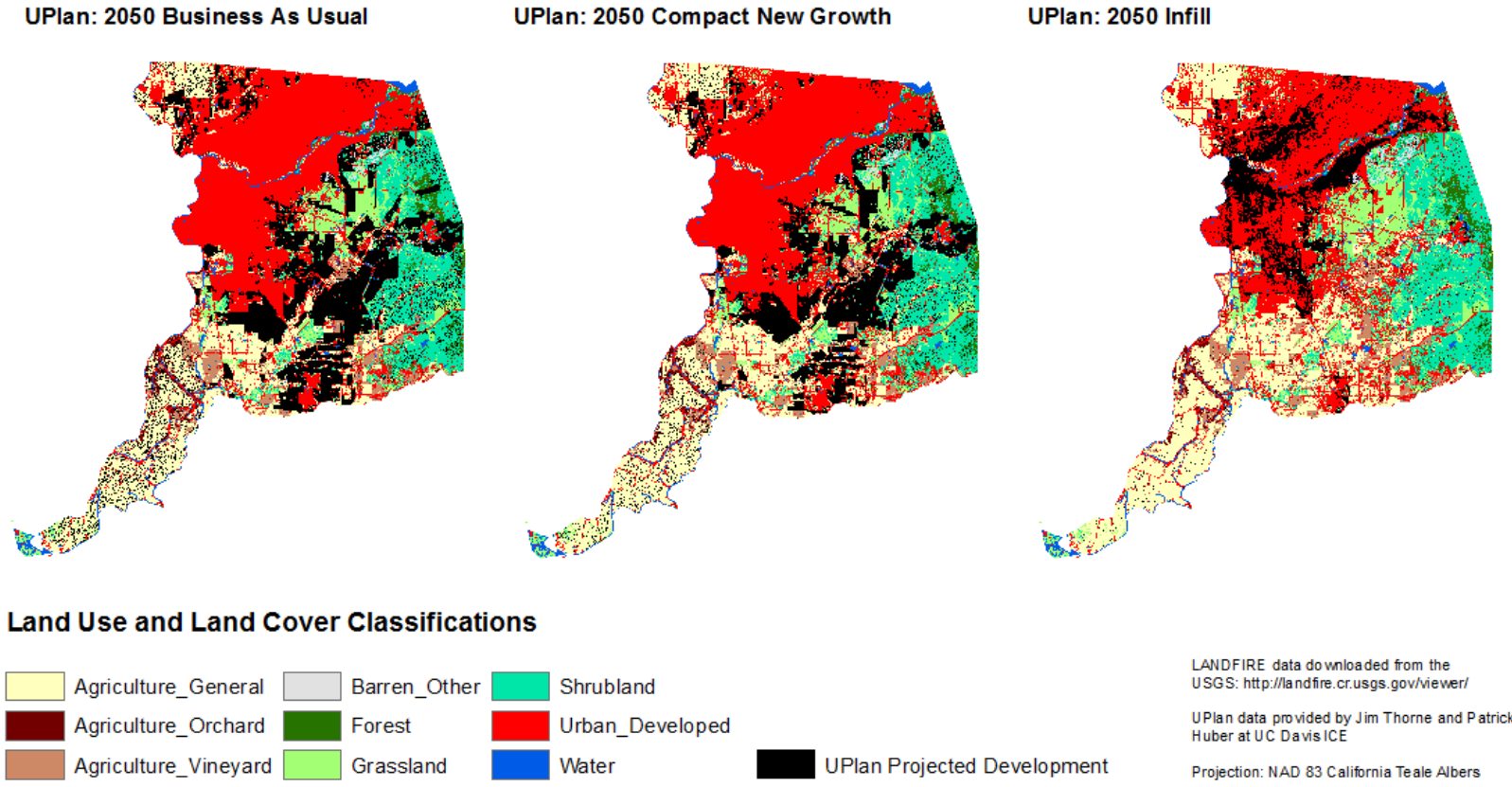

- **Business as Usual:** Simulates legally permissible urban sprawl
- **Compact New Growth:** Increases the density of new growth and situates it closer to existing urban centers
- **Infill:** Redevelopment scenario that places a proportion of new growth inside existing urban boundaries

SMUD Sacramento Municipal Utility District

wsp

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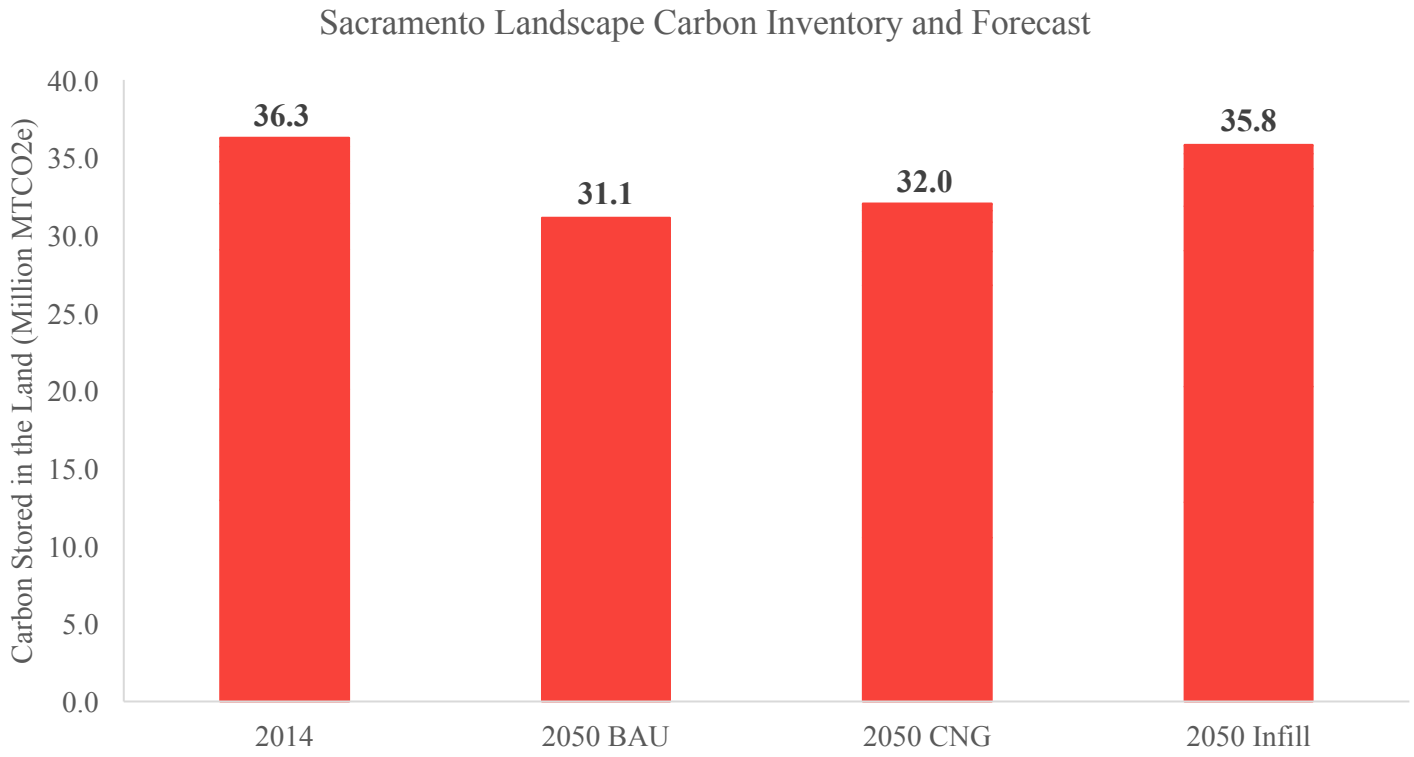

- BAU forecast results in 5.2 million MTCO2e loss by 2050
- Driven by conversion to urban/developed with lower carbon density

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Marxan conservation planning tool

- Finds efficient solutions for meeting multiple spatially-explicit conservation goals
- Adapted to incorporate carbon forecasts and prioritize carbon
- Proof-of-concept and precursor to an active policy discussion,
  - *Used to demonstrate how landscape carbon can inform conservation and land use planning*
  - *Using Marxan in a policy-informative manner requires extensive stakeholder input to set priorities and targets.*

- WSP
- Background
- Inventory and forecast
- **Integration with land use planning**
- Concepts
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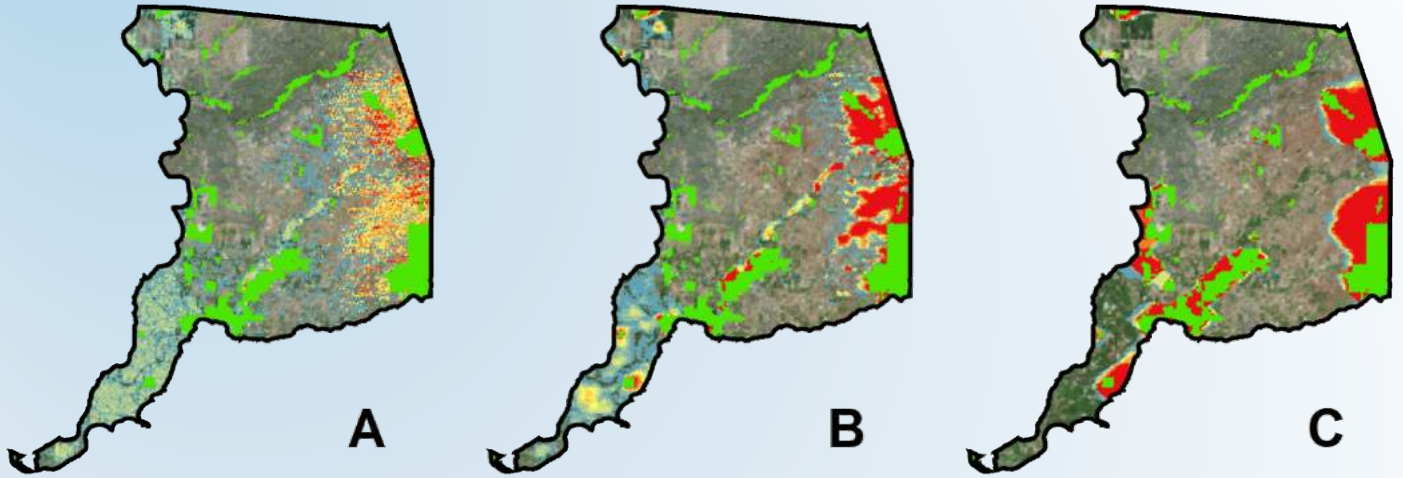
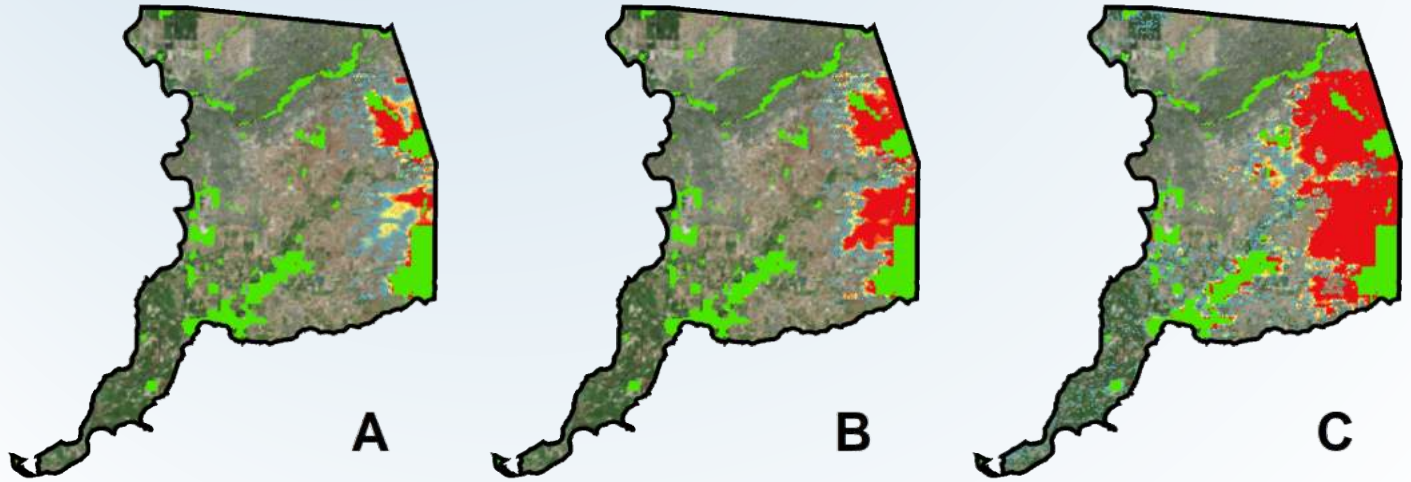
- Conclusions

Boundary effects: 0-0.01



Changing goals (carbon): 25-50%



Marxan findings

- Successfully identified high priority areas based on the input conditions.
- Removes a significant barrier to integrated, multi-variable planning
- Outputs themselves should not be construed as recommendations or used to inform any planning decision at this time, and were intended only to:
  - *Demonstrate the capability,*
  - *Assess sensitivity to parameter variability*

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Project concepts

Urban Forestry

Storage of atmospheric CO_2 in aerial and subterranean tree biomass

- Co-benefits include reduction of urban heat island, indoor heating and cooling, and improvement of air quality and runoff
- Existing tree programs and General Plan support urban forestry
- Doubling canopy (consistent with General Plan) could sequester an additional 1.9 million $MTCO_2e$

Nutrient Management

Optimizing nutrient application can increase carbon sequestration and reduce nitrous oxide emissions (change rate, source, timing, placement)

- Co-benefits include improved groundwater and ag runoff quality
- Various practices that can sequester ~0.21 MTCO2e per acre per year
- 50% of agricultural land converted to manure ~ 280 thousand MTCO2e sequestered by 2050

Biochar

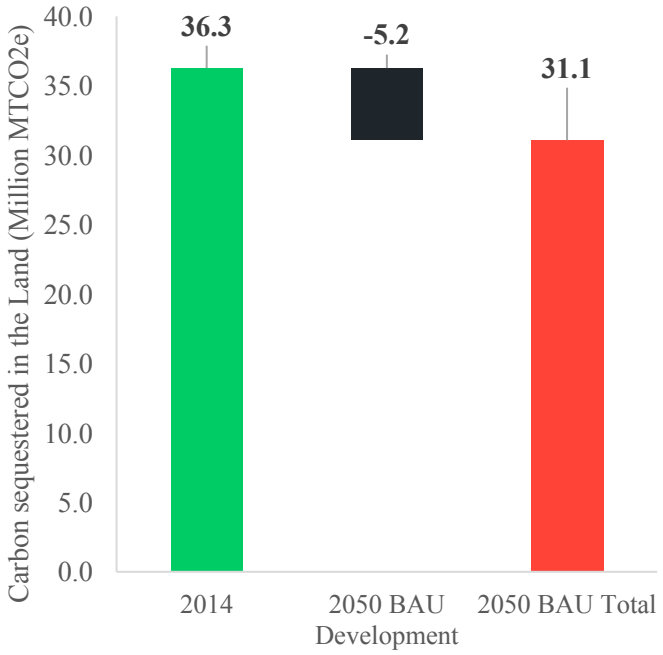
Partially combusted biomass that results in stabilized carbon (charcoal), and can be integrated into agricultural soils as a soil amendment

- Co-benefits are highly variable but include increased water holding capacity and improved soil health, and studies are not conclusive as to whether biochar affects crop yield in Sacramento County
- More research is needed in the region prior to implementing a biochar program

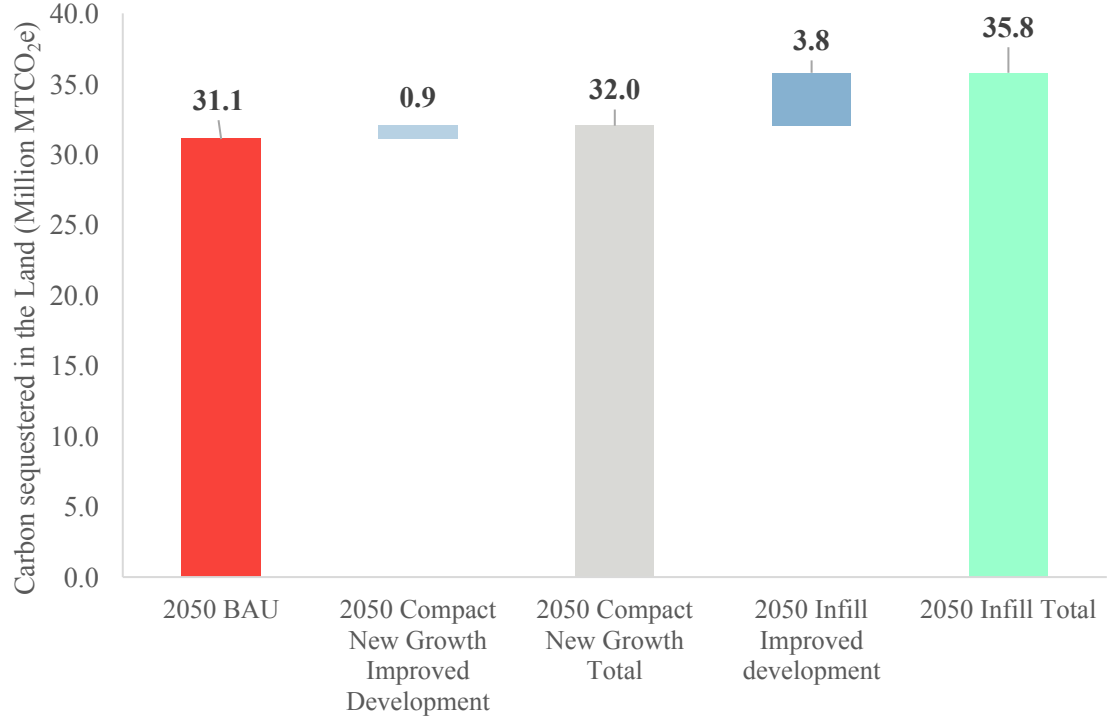
Technical potential from development

- For the purposes of this study, the technical potential is defined as the difference between the BAU scenario and alternative outcomes.
- It represents the carbon value that can be generated from the landscape, either to supplement or allow tradeoffs with alternative climate mitigation alternatives.

Loss from BAU development: **-5.2 million $MTCO_2e$**



Technical potential from development: **+4.7 million $MTCO_2e$**



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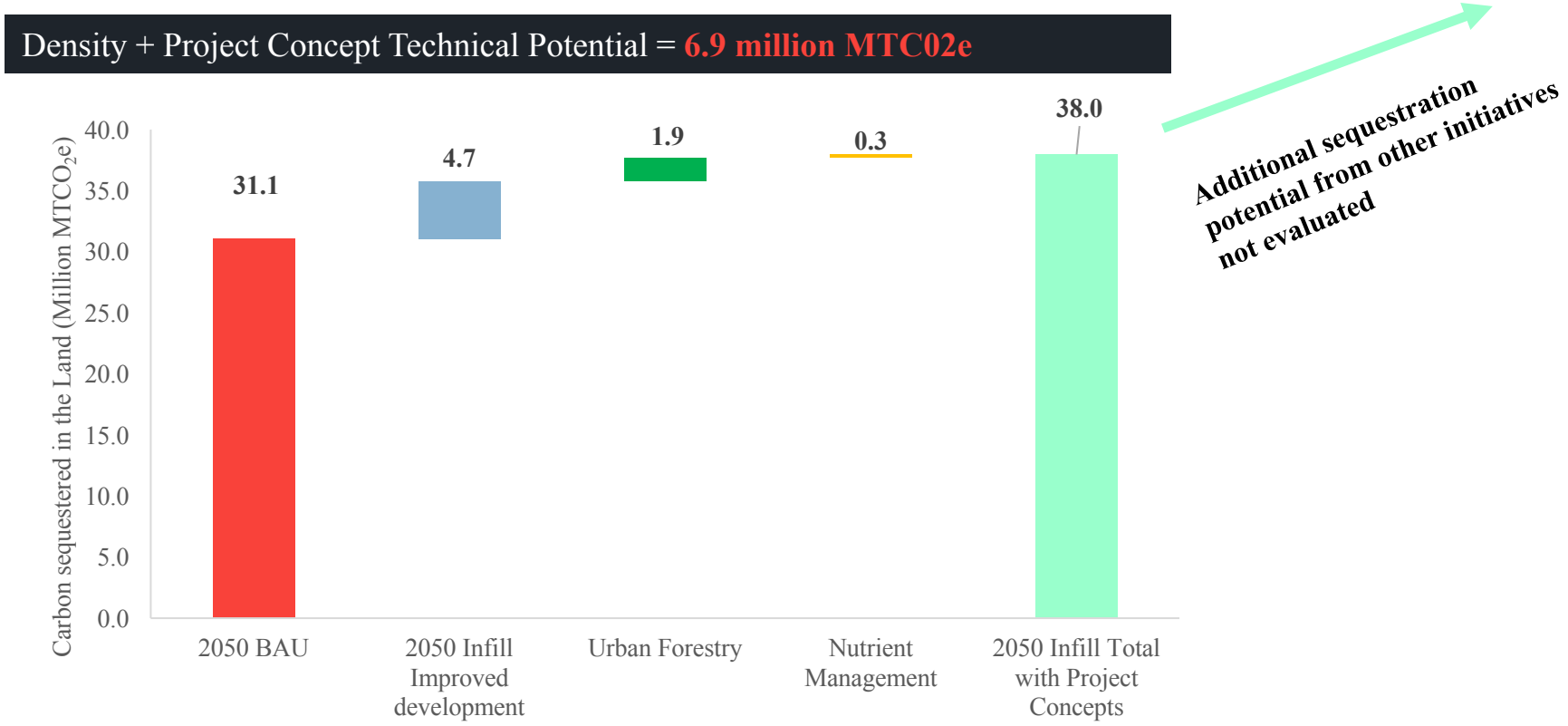
Technical potential from activities

- Combining density with activity-based opportunities can result in net increase in landscape carbon
- Multiple additional opportunities can further drive up landscape carbon



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Conclusions

- Findings
  - *Landscape carbon can be estimated using existing data*
  - *The sequestered carbon in the landscape and potential losses are significant, and justify proactive planning*
  - *Carbon can be integrated into multivariable conservation and land planning frameworks in a spatially explicit manner*
  - *Projects and activities can sequester additional carbon*
  - *There are multiple opportunities to evolve the methodology*

- Recommended next steps
  - *Expand study region, evolve methodology, and incorporate economic metrics*
  - *Coordinate outreach and engagement alongside the analytical framework*
  - *Integrate carbon as a priority in land use planning*
  - *Coordinate as California utilities to share findings, expand dialog, and explore policy and other initiatives that support the energy sector's carbon objectives*

Thank you!

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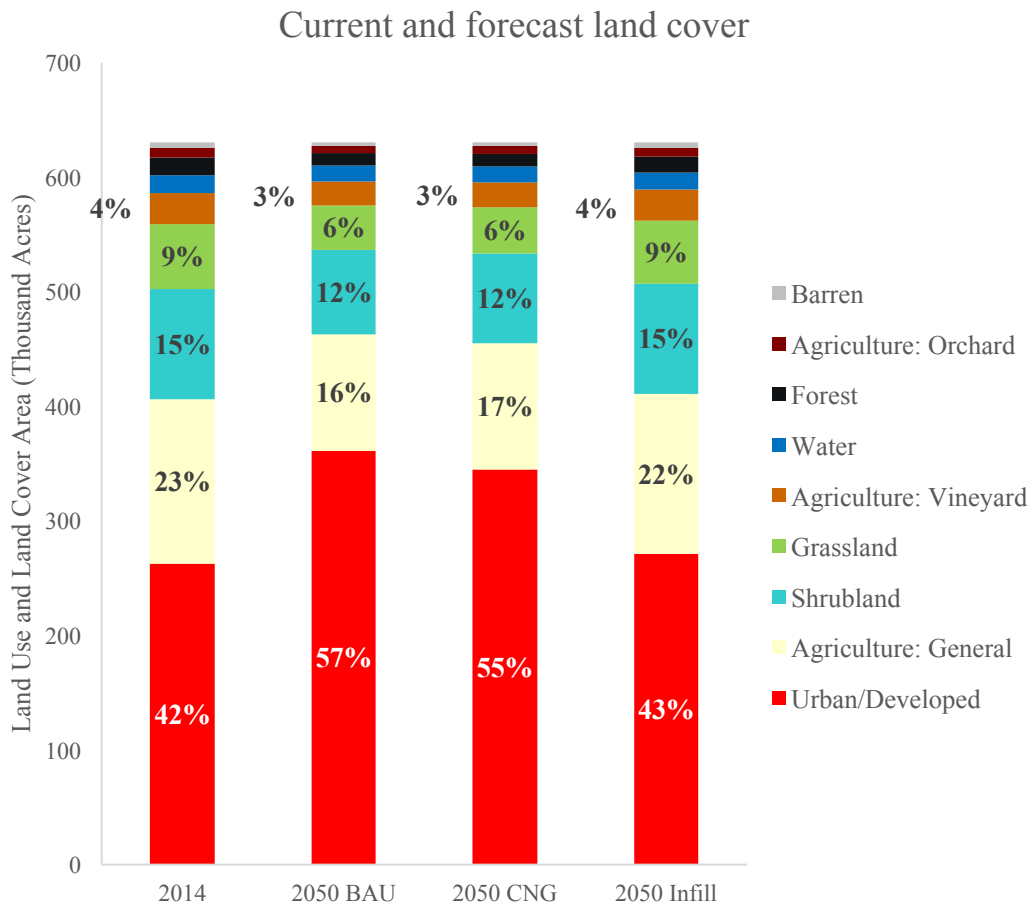
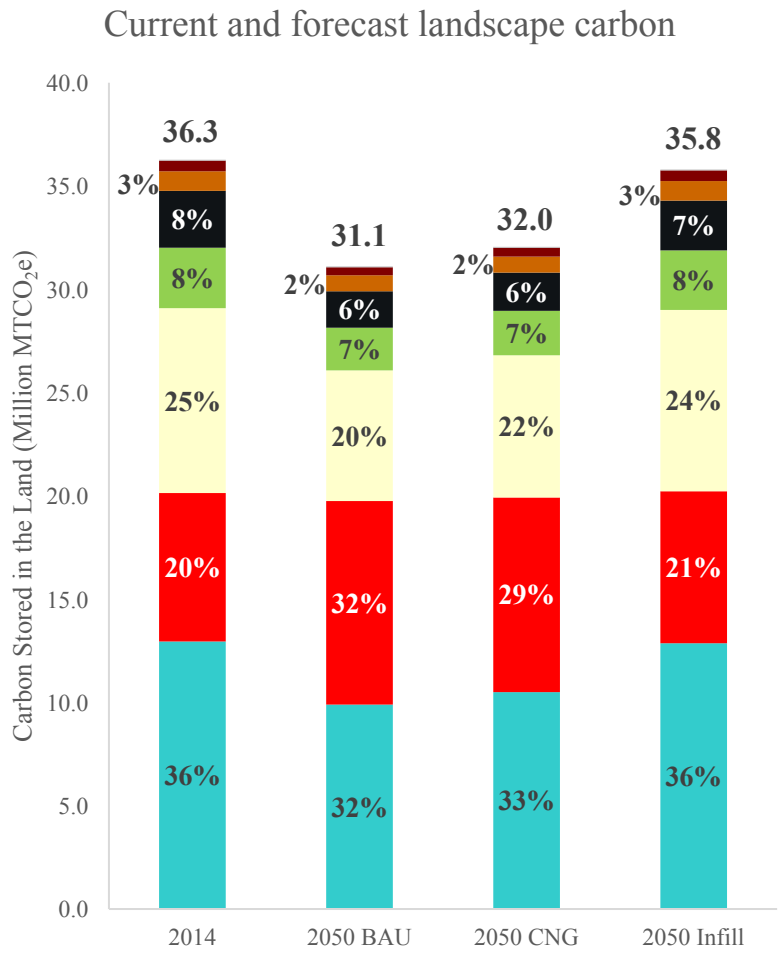
Appendix

Inventory and forecast findings

- BAU forecast results in 5.2 million $MTCO_2e$ loss by 2050
- Driven by conversion to urban/developed with lower carbon density





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Project Concepts

	Urban Forestry	Nutrient Management	Biochar
Definition	Storage of atmospheric CO_2 in aerial and subterranean tree biomass	Optimizing nutrient application can increase carbon sequestration and reduce nitrous oxide emissions (change rate, source, timing, placement)	Partially combusted biomass that results in stabilized carbon (charcoal), and can be integrated into agricultural soils as a soil amendment
Co-benefits	• Reduce urban heat island effect • Reduce indoor heating and cooling costs • Improve air quality (ozone and particulate matter) • Reduce stormwater runoff	• Improve agricultural runoff water quality • Improve groundwater quality	Highly variable: • Improve soil health of poor soils • Increase crop yields • Increase water holding capacity of the soil
Sacramento County suitability	• Existing urban forestry organizations • 2030 General Plan supports urban forestry expansion • CARB greenhouse gas offset program	Agriculture is the second largest land cover type in the county California Department of Food and Agriculture programs Proximity to chicken and cattle manure	• Agriculture constitutes 2nd largest land cover type • Local biochar suppliers • Limited published studies of biochar in region, which indicate a neutral or negative effect on crop yield
Sacramento County sequestration potential	• Current tree canopy cover constitutes 22% of Sacramento County land • 1.9 million MTCO2e = Current estimate of carbon sequestration • Urban Forestry Management Objective (2030 General Plan) • 3.8 million MTCO2e = 2050 estimate of carbon sequestration	• Various practices that can sequester ~0.21 MTCO2e per acre per year • 50% of agricultural land converted to manure ~ 280 thousand MTCO2e sequestered by 2050	• Biochar can sequester carbon for decade-millennia • Stability is dependent on biomass type, combustion process, and ash content
Costs & maintenance	Planting, purchasing, pruning, irrigation, pest management	Variable based on crops, soil chemistry, and soil history Must factor in crop price and effect on crop yield, though objective is to have no impact on yield	Cost of obtaining, transporting, and applying biochar varies significantly, averaging $1,360/ton in 2014 Wind and water erosion concerns No consistently demonstrated benefits to crop yield in Sacramento Valley

Panel Discussion

Carbon Farming, Bio-Sequestration, and Food Security

Benjamin Houlton | Professor of Global Environmental Studies, UC Davis

William Horwath | Professor of Soil Biogeochemistry, UC Davis

Campbell Ingram | Executive Officer, Sacramento-San Joaquin Delta Conservancy

Tim Kidman | Project Director, Sustainability and Energy, WSP

CAPITAL REGION
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3:30 – 3:45

Networking Break

Food for Thought:

With the holiday season fast approaching, how are you planning to engage your family members and friends around the climate change dialogue?

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New Member Presentation

REGIONALSAN
TAKING THE WASTE OUT OF WATER
Sacramento Regional County Sanitation District

SACRAMENTO AREA SEWER DISTRICT
SERVING YOU 24/7

Bernie Creelman | Business Citizen Assistance Representative, Sacramento Regional Sanitation District and Sacramento Area Sewer District

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SACRAMENTO AREA SEWER DISTRICT
SERVING YOU 24/7

REGIONALSAN
TAKING THE WASTE OUT OF WATER

Climate Change: Preparing for the Future, Today

Bernie Creelman, Policy & Planning Dept.

Dec. 13, 2017

Who are we?

SASD (Sacramento Area Sewer District)

- 4,400 miles of 6”-36” collector and trunk sewers
- 107 pump stations
- 66,000 manholes!

Regional San (Sacramento Regional County Sanitation District)

- 169 miles of 36”-144” conveyance “interceptor” pipeline
- 11 pump stations
- Sacramento Regional Wastewater Treatment Plant in Elk Grove: Treats about 150 MGD

General Resiliency Efforts--Energy

Solar array: 4.2 MW, single axis tracking with over 13,000 panels provides approximately 8 percent of current energy use at SRWTP, enough to power 750 homes. Mitigates greenhouse gas emission impacts related to EchoWater Project construction and future operational emissions.

General Resiliency Efforts--Energy

SolarShares Agreement with SMUD

- Allows Regional San to purchase solar energy from SMUD in lieu of installing further solar panels. SMUD will provide up to half of Regional San electricity with solar power for 20 years.
- SolarShares will cover nine qualifying SMUD accounts that currently serve the wastewater treatment plant, the Biosolids Recycling Facility (BRF), and seven of the interceptor pump stations.

General Resiliency Efforts--Biogas

Biogas/methane recycling:

Provides enough energy for about 5,800 households annually. Regional San buys back steam from Carson Ice-Gen to heat wastewater digesters and buildings and serve as back-up energy supply in event of a local power failure

Biogas Enhancement Facility at Regional San's treatment plant

General Resiliency Efforts--Biosolids

About 30 percent of the 26,000 dry tons of biosolids processed each year is beneficially recycled at our Biosolids Recycling Facility and turned into a Grade A fertilizer, a natural alternative to chemical fertilizers.

The Regional San/Syna
iosolids Recycling Facility

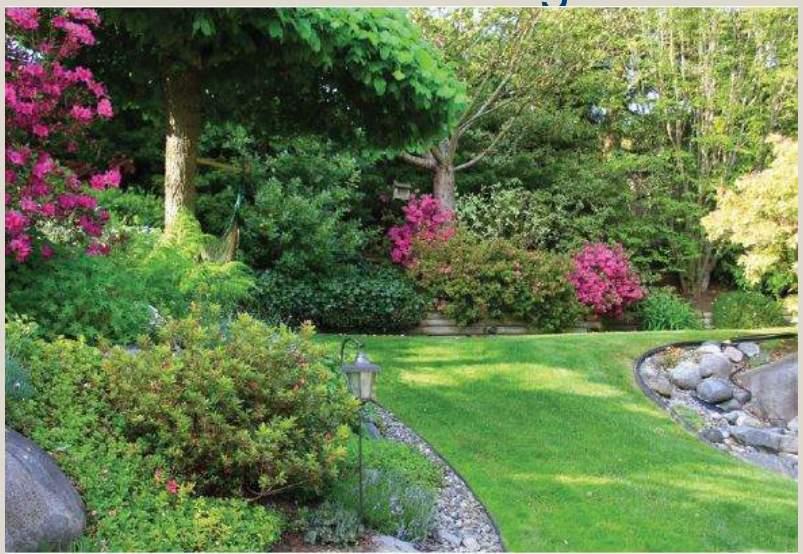
General Resiliency Efforts--Water Recycling

Water Recycling Goals:

- Increase water recycling throughout the Sacramento region by up to 30 to 40 million gallons per day by 2024.
- Increase utilization of recycled water to expand Regional San's treated wastewater management options beyond continued discharge to the Sacramento River.
- Increase recycled water use to reduce demands on existing and future potable supplies.
- Use our water assets in an environmentally-responsible manner.

Examples of Allowable Uses for Recycled Water

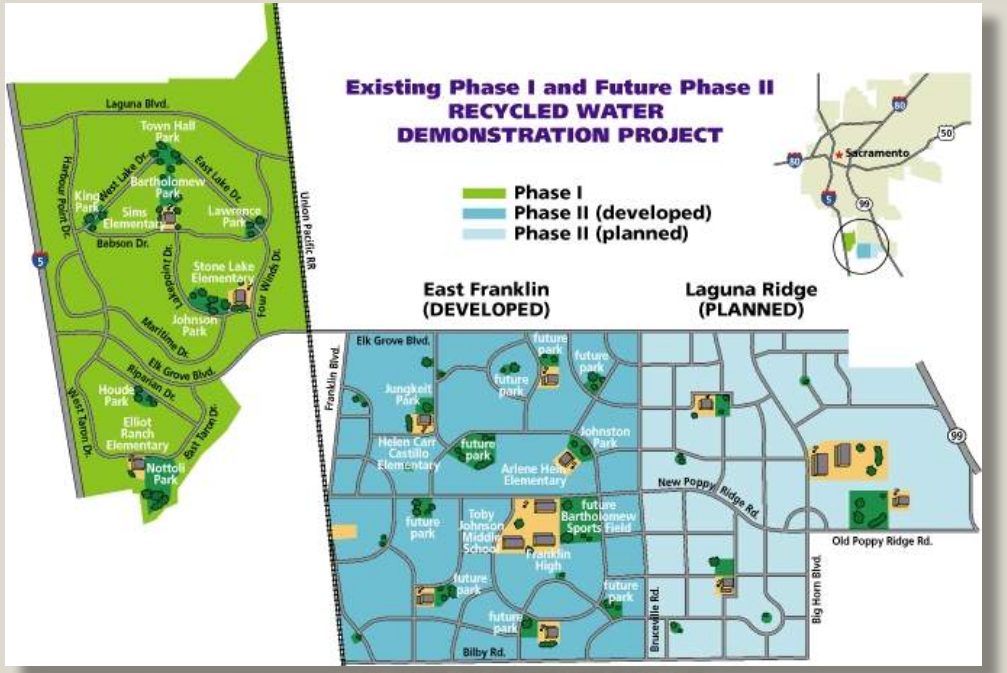
- Dust control
- Soil compaction
- Street-sweeping
- Landscape irrigation
- Agricultural irrigation
- Sewer cleaning



Recycled Water Fill Station Located at SRWTP

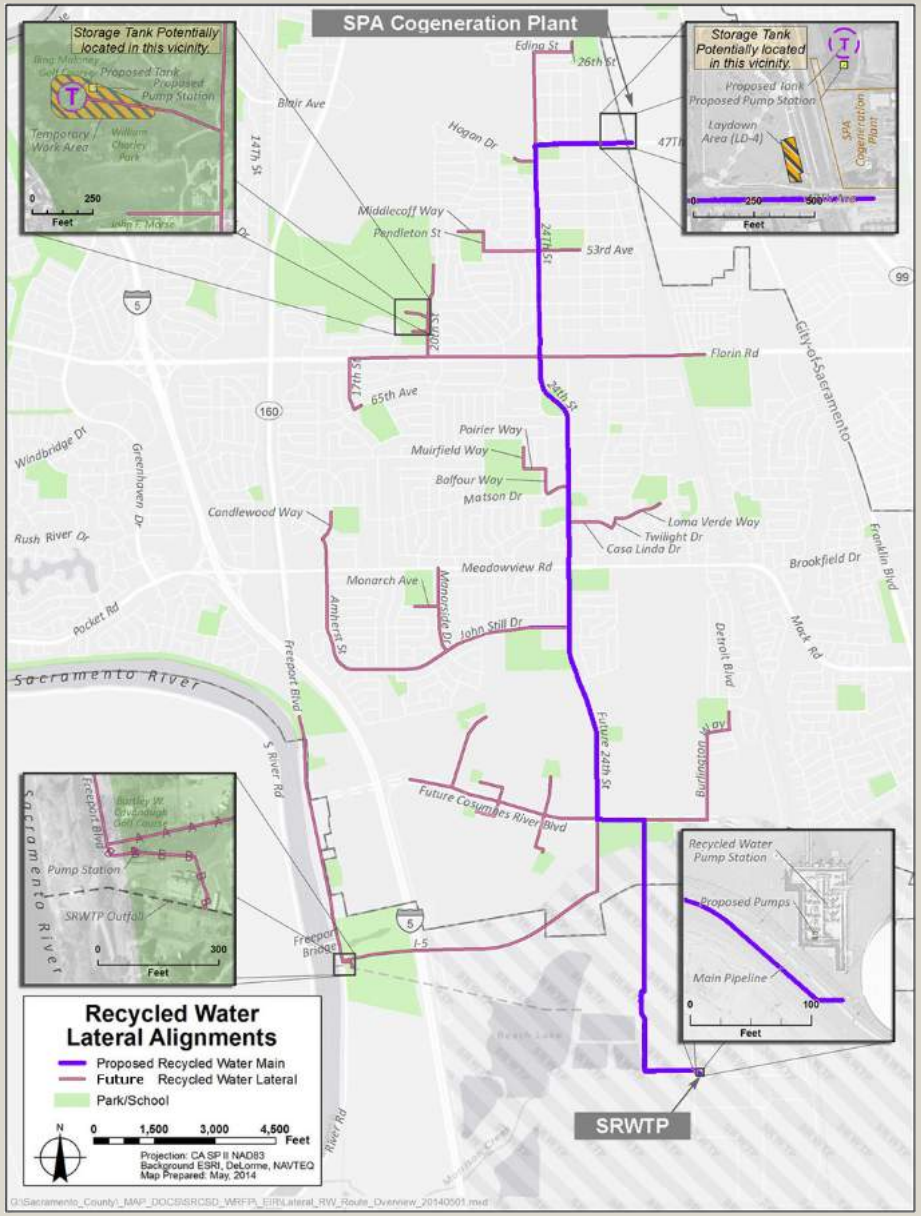
Existing & Future Expansion Projects in the City of Elk Grove – Landscape Irrigation

- Regional San and SCWA
- Phase I in service since 2003 (~2 MGD)
- Phase II Expansion (~4 MGD) expected to be in service by 2023
- Phase II still requires a transmission pipeline. May be served by South County Ag transmission pipeline.



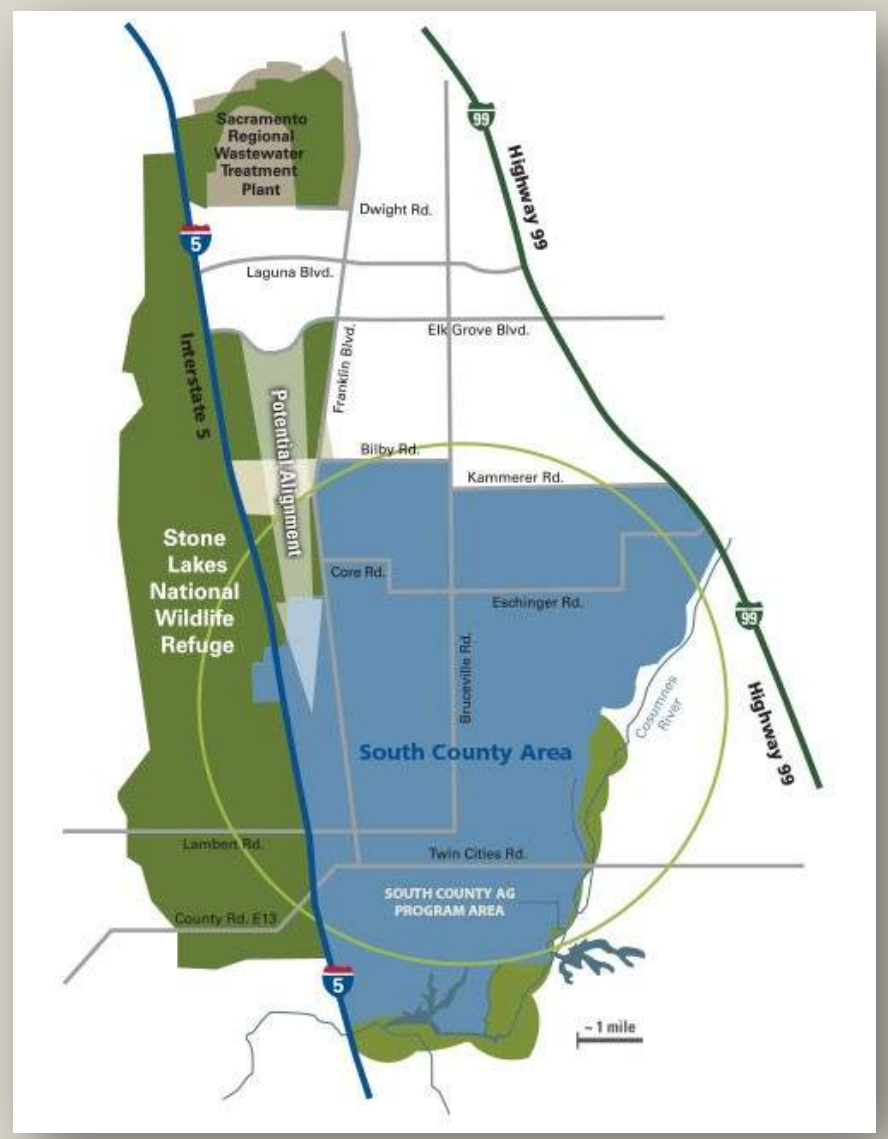
SPA Cogen Project and Future Expansion Projects in the City of Sacramento – 44+ Users

- Southwest portion of the City of Sacramento
- Additional recycled water demand: ~3,855 AFY
- Approx. 562 acres irrigated
- Phased approach to expand program with future grants
- Recycled water for landscape irrigation uses at schools, parks, golf courses, etc.
- Recycled water for industrial use at Cogeneration Plant—I MGD
- Sacramento Power Authority Cogeneration Facility



South County Ag Program Concept

The program would provide up to 50,000 acre-feet per year of recycled water to irrigate up to 16,000 acres of permanent agriculture and habitat conservation lands located in south Sacramento County.



Resiliency/Readiness: Regional San/SASD

Continuity of Operations Plans

- Emergency response plans for climate-change-related natural disasters such as droughts, fires, flooding, etc.

Partnerships with CalWARN (California Water/Wastewater Agency Response Network)

- Support and promote statewide emergency preparedness, disaster response, and mutual assistance processes for water and wastewater agencies.

And finally…Regional San/SASD

Going Green Employee Education Program:

An educated workforce is a prepared workforce!

- Monthly events on environmental topics.
- Environmentally-themed bulletin boards.
- Employee recommendation boxes.
- Farmers' market onsite.
- Overhaul of Districts' recycling practices.
- Onsite E-waste events (employees and public).
- Winter "recycled-clothing" collection for homeless.
- Community partnering for improved commuter options.

Regional Adaptation Priorities

1. Awareness, education, and outreach
2. Financing and funding
3. Planning and regional coordination
4. Implementation and pilot projects

Regional Adaptation Priorities

1. What are the 3 actions that your group identified that could be pursued over the next 1-3 years?
2. How can we leverage regional collaboration in pursuit of these actions?

Thank You!

Julia Kim | Senior Project Manager, Local Government Commission

Kathleen Ave | Climate Program Manager, SMUD
| Chair, Capital Region Climate Readiness Collaborative

Interested in joining the collaborative?

- Contact Julia at jkim@lgc.org
- Learn more at ClimateReadiness.info

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