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Advancing Energy Efficiency to Support Our Carbon Neutrality Goal

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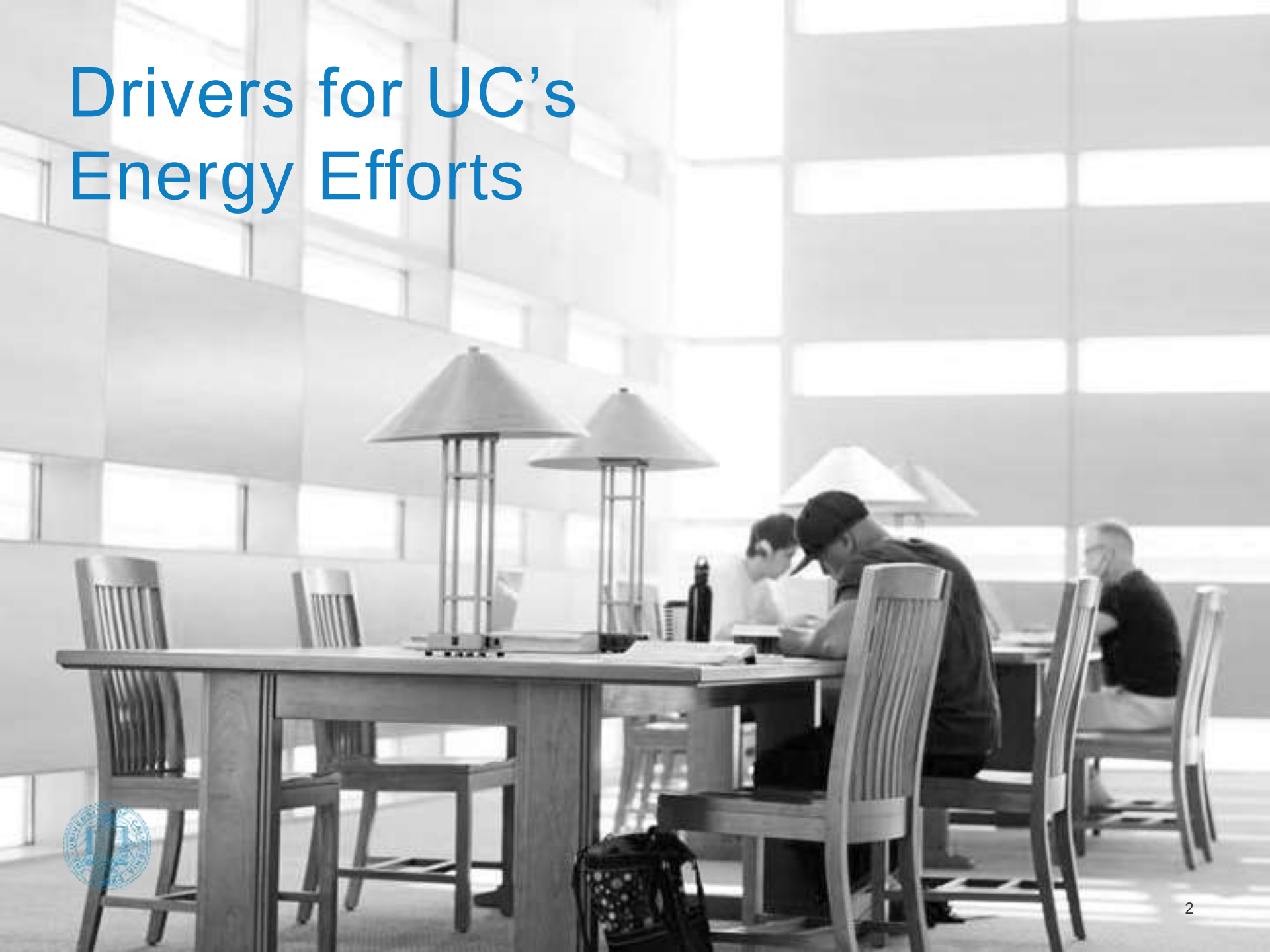
Drivers for UC's Energy Efforts



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President's Initiative:
The First Research University to Achieve Carbon Neutrality

The University of California is a national leader in sustainability and effective actions to reduce greenhouse gases to mitigate climate change. The University galvanized its position for environmental stewardship in 2007 when all ten Chancellors became signatories to the American College & Universities Presidents' Climate Commitment. To reach our next goal, which is to bring the University to carbon-neutrality in its operations by 2025, we will need to take bold efforts to change the fundamental profile of our energy sources. This initiative proposes four efforts that will enable us to become the first major university system to achieve carbon neutrality:

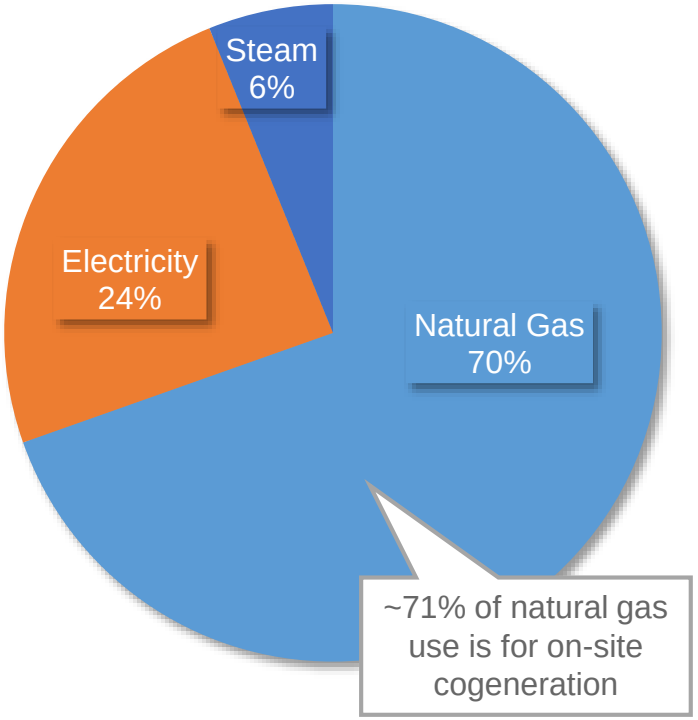
President Napolitano's 2025 Carbon Neutrality Initiative

Covers scope 1 and 2 emissions

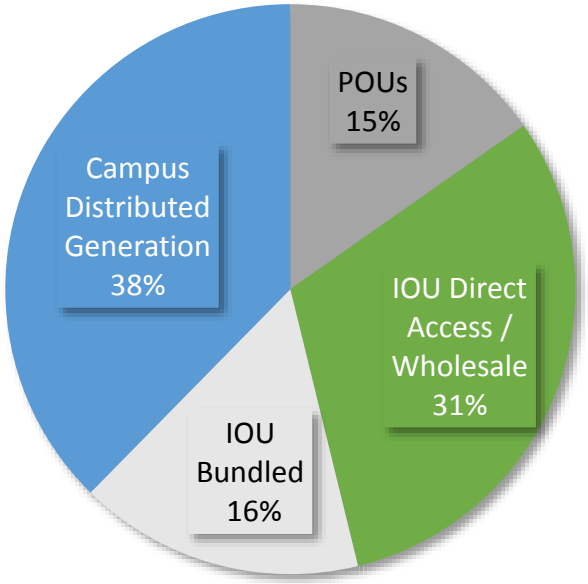
- Direct and indirect from purchased energy/steam

UC's Carbon and Energy Profile

Carbon Footprint from Purchased Utilities



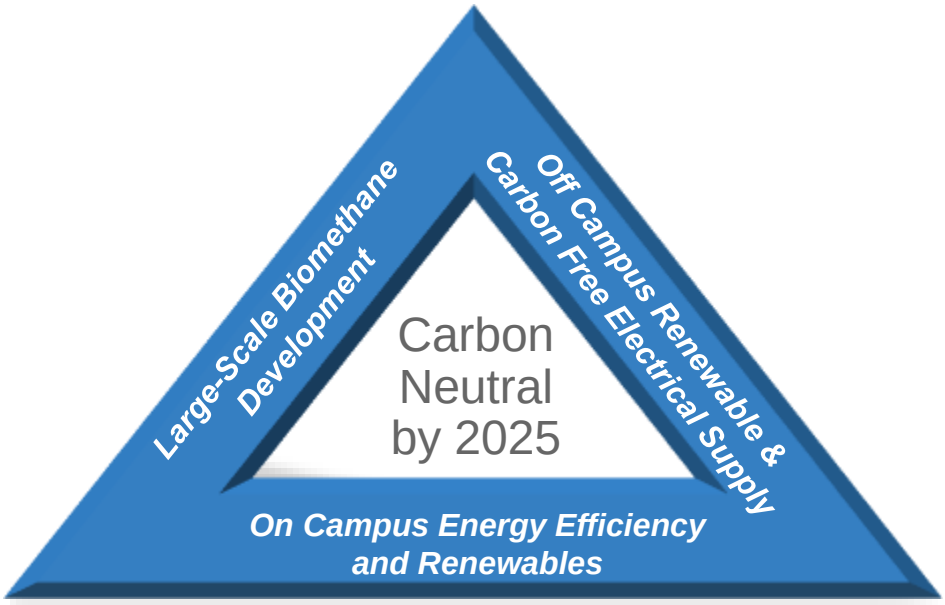
Purchased Electricity by Source

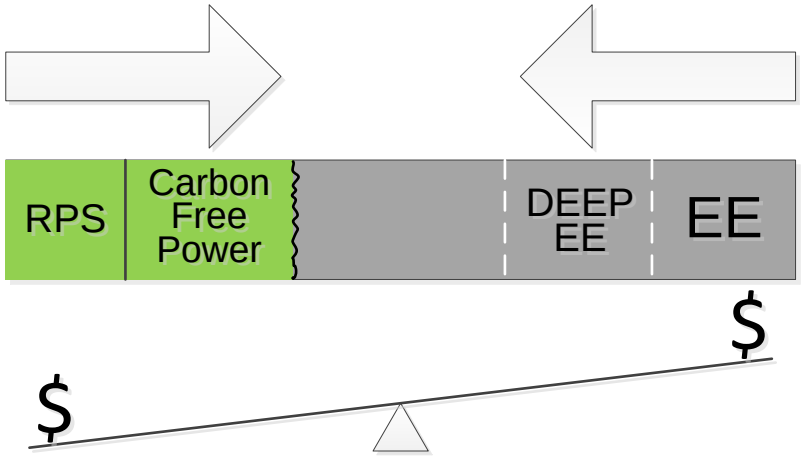


Total UC Scope 1 & 2 Emissions:

>1.1 Million mton/year

UC's Planned Approach





On-Campus Demand	Biomethane Development	Off-Campus Electrical Supply
Invest in energy efficiency and renewable generation to reduce campus load	*Transition from natural gas to biomethane to fuel UC's efficient electrical plant facilities*	*Enter the wholesale electrical market to control our supply*

Progress to Date

Started with Statewide IOU Partnership in 2004

Now an ESP serving load of 6 campuses

- Purchased 80 MW solar – will make served load 60% renewable, cost effectively
- Looking at 100% renewable very soon

11 MW on-site solar installed, 23 MW in progress

Biogas – working to self-develop projects

- Close to executing first project
- Need ~20 additional of similar size

Partnership Accomplishments

29 MW demand reduction

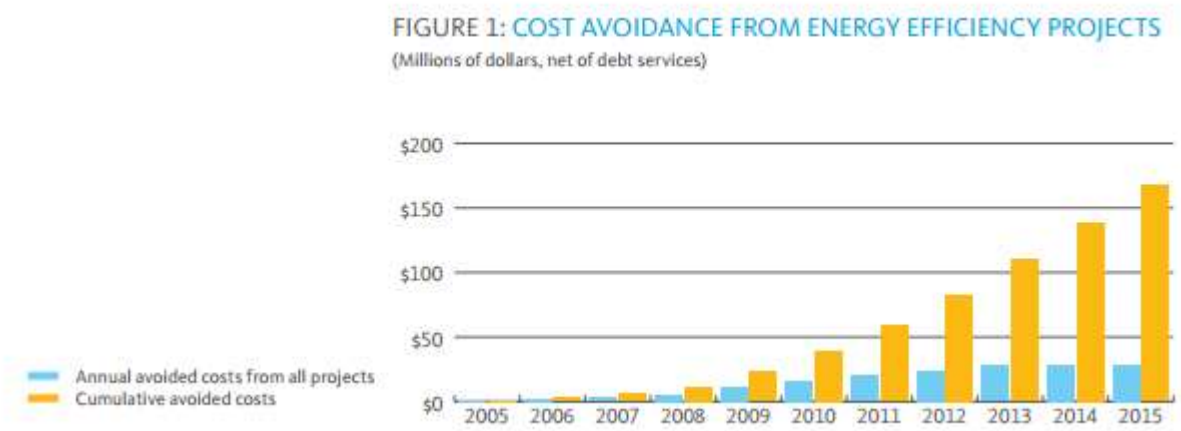
265 million kWh/yr electric savings

14 million therms/yr gas savings

$63 million awarded in IOU incentives

$230 million in UC investment for 700+ projects

150,000 mtons of Carbon per year



http://ucop.edu/sustainability/_files/annual-sustainability-report2014.pdf

UC/CSU/IOU Statewide Partnership

The Partnership is designed to

- Help identify energy savings opportunities
- Provide funding and support for energy efficiency projects
- Provide framework and mechanism to implement sustainability policy
- Provide outreach and education to partners

The Partnership comprises four key elements

- Retrofit projects
- Monitoring-Based Commissioning (MBCx) projects
- New Construction projects (Savings By Design)
- Training and Education

Partnership Background

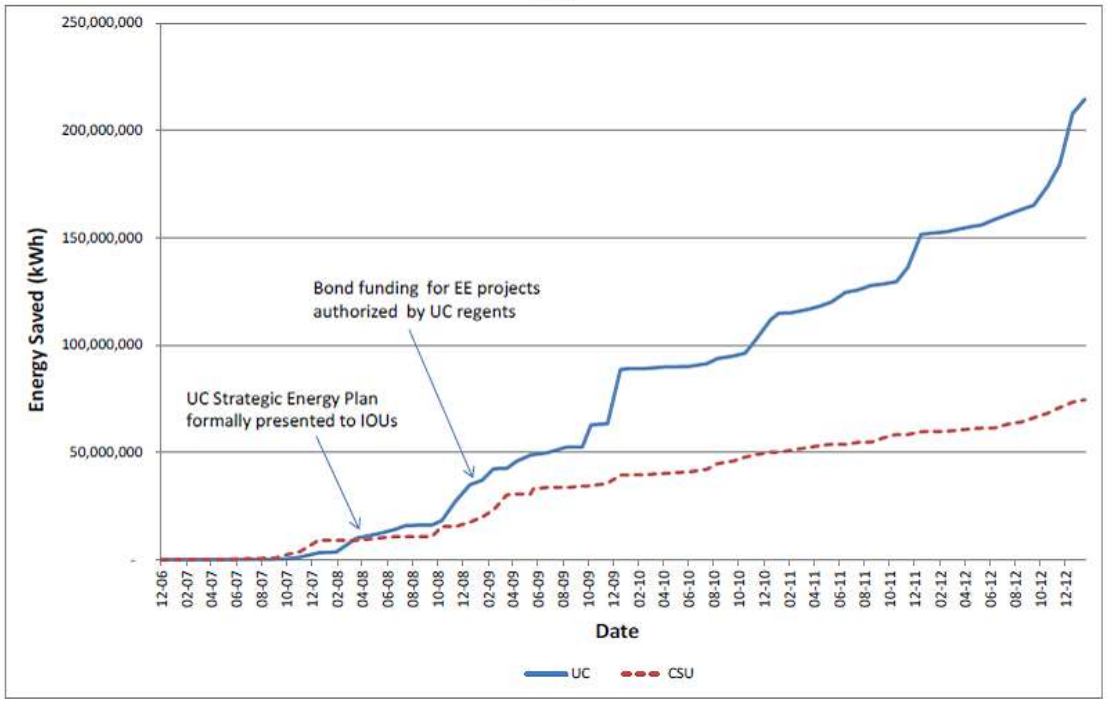
2004 Partnership began with four California IOUs

2008 Developed system-wide Strategic Energy Plan

2009 Regents approved financing for EE projects

Table 2.

Figure 1. Program Reported and Projected UC and CSU System Energy Savings for 2006 Through 2012



[1] http://www.universityofcalifornia.edu/news/article/20762

Partnership Funding Mechanism

UC internal financing available for EE projects

- Must meet 85% debt to savings ratio
- Utilize education code exception to fund energy project debt w/ state operational funds
- Typically request campus need based on CPUC funding cycles – every 2-3 years but transitioning to 10 year rolling cycle
- Impacts campus debt capacity
- Utility incentives buy down projects and provide third party savings verification

Partnership Current Challenges

At crossroads due to progress up “EE fruit tree”

- Deep EE is costly, complex and competes w/ capital needs

Gas incentivized lower based on carbon (~1:4)

- Low gas prices create long payback periods

Uncertainty of CPUC program rules / incentives

- T24 as baseline for savings calculations
- Incremental measure cost limitations

Statewide consistency – 3 POU campuses on the outside

Deep EE and Cogen Study Overview

Potential Study

- Responsive to UC Carbon Neutrality Initiative and CPUC request to quantify opportunity
- All 15 Campuses and Medical Centers

Incorporated Actual Partnership Experience and Campus Input

Three Deep EE Project Types Identified

- Smart Labs
- Deep HVAC
- Deep Lighting

Deep EE Summary Findings

Exhibit 1-1 Deep Energy Efficiency Potential Summary Estimate

	Low Estimate	*High Estimate*	*Average Estimate*
Investment Needed	$535,620,000	$765,835,000	$650,727,500
Utility Savings ($/year)	$50,913,000	$67,750,000	$59,331,500
CO_2e savings (tonnes/year)	179,239	243,444	211,342
Energy Savings			
kWh/year	368,701,000	484,915,000	426,808,000
Therms/year	12,949,000	18,485,000	15,717,000

UC Needs Utility Support to Achieve Our Goals

UC Proposed Program for Utilities

Fill gap between DEE and EE

- Parallel push to reduce delta via cap & trade

Carbon-based incentives that accomplish DEE

- Provide project flexibility, align with UC/State goals

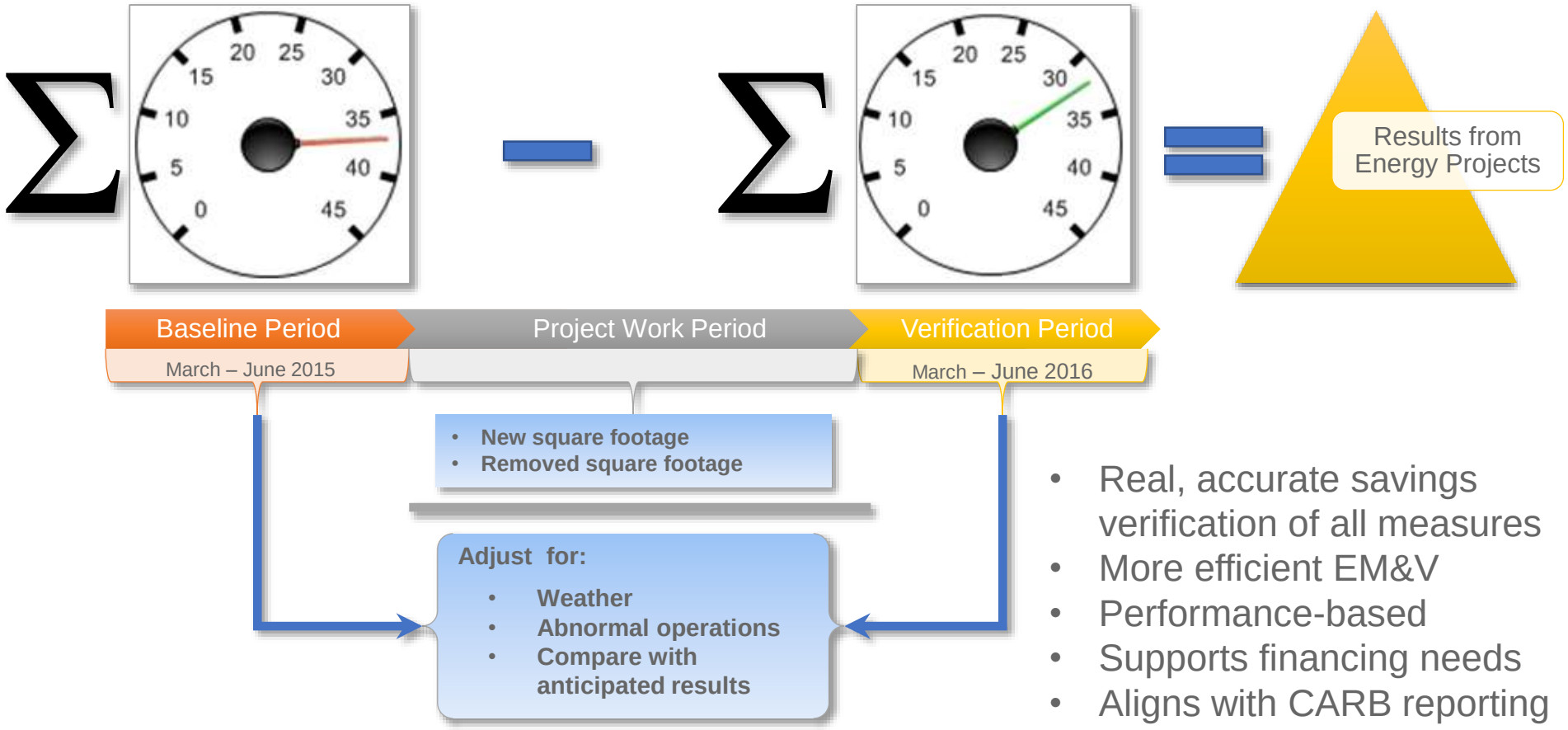
Performance-based incentives based on whole building approach

- Move toward real, measured, persistent savings

Flexible program allows additional fund sources

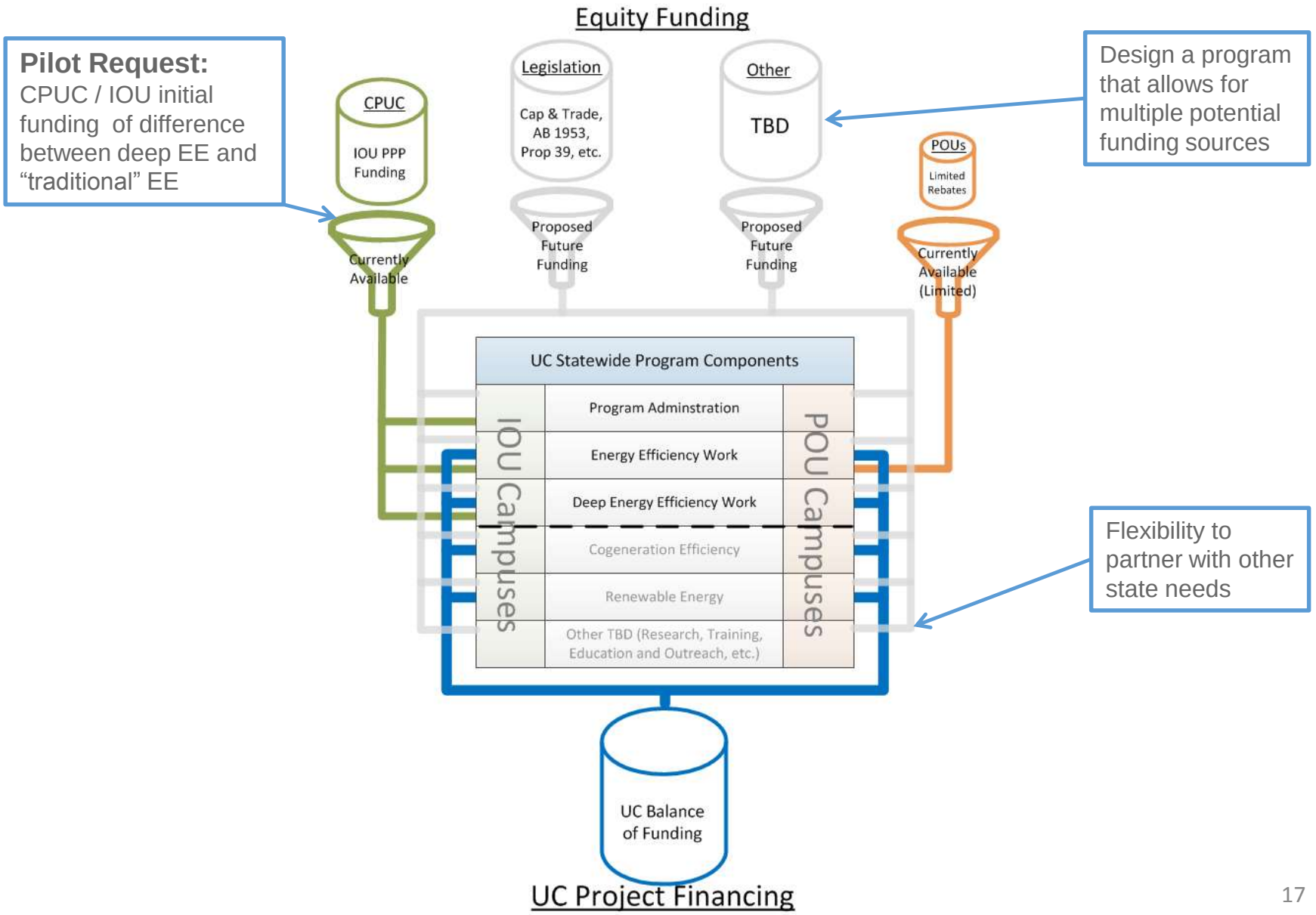
- Firewalls to protect IOU ratepayers
- POU campuses participate when funding identified

Whole Building Approach



- Real, accurate savings verification of all measures
- More efficient EM&V
- Performance-based
- Supports financing needs
- Aligns with CARB reporting
- Measure persistence
- Study shows a fit for UC

UC Statewide Program Structure



CPUC Policy and Strategic Plan Alignment

		Equity Contribution for Deep Retrofits	Carbon-Based Incentive	Performance Guarantee	Whole Building Savings Verification	Statewide Flexible Program Structure
CPUC Energy Efficiency Policy Manual	**Energy Savings Goals**: "encourage a focus on long-term savings and be based on the best available information"	●	●	●	●	
	Energy Efficiency Program Design: "achieve economies of scale and employ industry best practices ... including collaboration with Publicly Owned Utilities (POUs)"	●	●	●	●	●
	Program Portfolio Development, Balance and Management: "develop and manage statewide programs ... and promote innovation and good program management"	●	●	●	●	●
	Pilot Programs : "enabling IOUs to achieve deeper savings"	●		●	●	
	Cost Effectiveness Adjustments : "redesign the incentive structure to encourage deeper and more comprehensive activities"	●	●	●	●	
CPUC Energy Efficiency Strategic Plan	"will need to greatly expand those (current) efforts to meet our greenhouse gas emisison reduction goals"	●	●			●
	"There has been little incentive for utilities to engage in measures with a longer-term orientation"	●		●		
	"This Plan does not specifically address three important elements of engery efficiency. These are the evlaluation and measurement and verification of energy savings; ..."			●	●	
	"Aligning this planning effort with related ... greenhouse gas mitigation"		●			●
	"... and obtaining commitments from key participants willing to fund, lead, or implement strategies."	●	●	●	●	●
	"...reach deep levels of energy efficiency improvements and clean, distributed generation through whole building approaches."	●			●	
	"Target financing and incentives to support meeting commercial sector goals... Will likely require increased availability and use of innovative and expanded financing and financial incentives"	●	●	●		
	"Support targeted research and development and promotion of emerging technologies"	●			●	
	"strategies to use information and behavioral stragtegies"			●	●	
	"usher in the next generation of high-efficiency lighting"	●				●
	"Utilty program parameters that can be at odds with industry practice"	●	●	●	●	●
	"... integrate with CARB requirements so that industrial facilities use energy efficiency to meet or exceed regulatory requirements for GHG emission reductions"		●		●	●
	"... a coordinated regulatory framework could be coupled with incentives to actively promote and reward measured performance improvements across energy, ..., GHG emissions, ..."	●	●			●
	"legally binding agreements ... as a policy mechanism to promote energy efficiency in industry and corresponding reductions in GHG emmsissions."		●	●	●	

CPUC Key Alignment

- Deep energy savings
- Reward measured performance
- Integrate CARB requirements
- Project financing
- Statewide coordination
- Economies of scale
- Customer commitment

Alignment with President Picker Comments

- Accountability
- Enable deep retrofits
- 'To-code' baseline
- Value GHG reductions
- Verifiable, persistent, cost-effective savings
- Real-time EM&V

UC / Utility Partnership

Some utilities are ambitious w/ EE & GHG reduction

- Allow UC to be a living laboratory for energy initiatives

UC can be truly considered a “public good”

- Not leaving CA, buildings/measures in place for duration

UC is unique (energy profile and capabilities)

- Leadership
- Policy/commitment
- Centralized management
- Financing ability
- Technical resources & proven track record
- Large not for profit public Energy User
- Supports performance-based incentives

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Questions

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Appendix / Reference

References

UC Prospectus for a Sustainable Future

http://ucop.edu/sustainability/_files/climate-report.pdf

President's Carbon Neutrality Initiative

http://www.sustain.ucla.edu/wp-content/uploads/carbon-neutrality2025.pdf

UC Deep Efficiency and Cogeneration Study

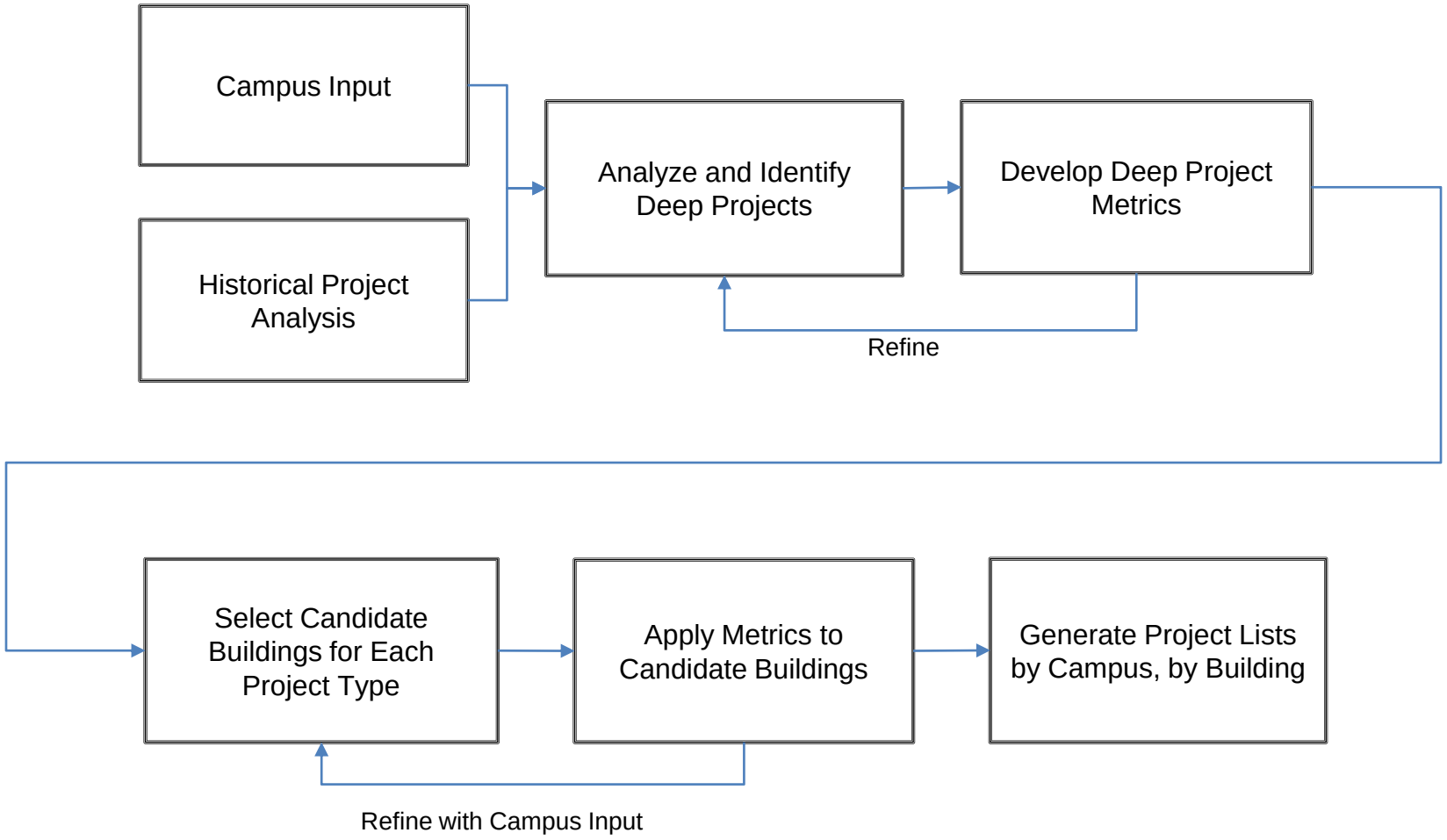
http://www.ucop.edu/facilities-management-services/_files/deep-efficiency-and-cogen.pdf

Whole Building Studies

http://www.etcc-ca.com/sites/default/files/reports/ET12PGE5312_EMIS_SoftwareBaselineModeling_ModelAnalysis_0.pdf

http://www.ucop.edu/facilities-management-services/_files/whole_building_study.pdf

Overall Deep EE Study Methodology



Cost of Reducing Carbon Relative to EE Costs