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AB 802 Workshop

Policy Considerations in Implementing Existing Conditions Baseline

Panel 1: Assessment of Stranded Potential in Existing Buildings

What energy efficiency is currently occurring in the building stock, and what is stranded?

Agenda

- Codes and Standards Impact Evaluation
- Evaluation of Alteration Projects in Commercial Buildings

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Codes and Standards Impact Evaluation

- With DNV GL, the Cadmus team has conducted three impact evaluations of the statewide program
  - Appliance standards: Title 20 and federal
  - Title 24
    - 2006-2008: res and nonres new construction
    - 2010-2012: nonres new construction and alterations
    - 2013-2015: work in progress, includes nonres new construction, nonres alterations, and residential construction

C&S Savings:
Title 24 alterations are a substantial component

Net Savings for All IOUs. Includes Interactive Effects		GWh	MW	Mtherms
Previously Evaluated	2005 Title 24	171	44	5.6
	2008 Title 24	497	122	11.3
	Total Previously Evaluated	**668**	**166**	**16.9**
2013-2015 Phase One (IOU Estimate)	2013 Title 24 Nonresidential Alterations	417	107	-0.5
2013-2015 Phase Two (IOU Estimate)	2013 Title 24 Nonres New Construction	271	56	1.9
	2013 Title 24 Residential	26	27	1.6
	All Phase Two C&S	**297**	**83**	**3.5**

- For 2008 and 2013 Title 24, nonresidential alterations to existing stock represent more than 50% of all Title 24 savings
  - For 2013 Residential, alterations are ~11% of total residential

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Energy Efficiency in Existing Buildings

- In the 2010-2012 evaluation of 2008 Title 24, the Cadmus team conducted site visits to projects completed in existing nonresidential buildings
  - 68 Lighting alteration projects
  - 29 Re-roof / insulation projects

- Challenges to measure the total volume of alteration projects in the existing building stock
  - No statewide database exists
  - Various private data vendors have partial information
  - Impractical to collect permit data from all jurisdictions
  - CPUC Roadmap includes research into total alteration volume

What baseline did we use and why?

Previous Title 24 code (2005) was used as the baseline for savings calculations since a project would have had to meet that code in the absence of the 2008 code.

- Pre-alteration conditions were not within the scope of our research
- There was no prior code study with sufficient sample points; or a market baseline characterization study to rely on for establishing a market baseline

Lighting Alteration Projects

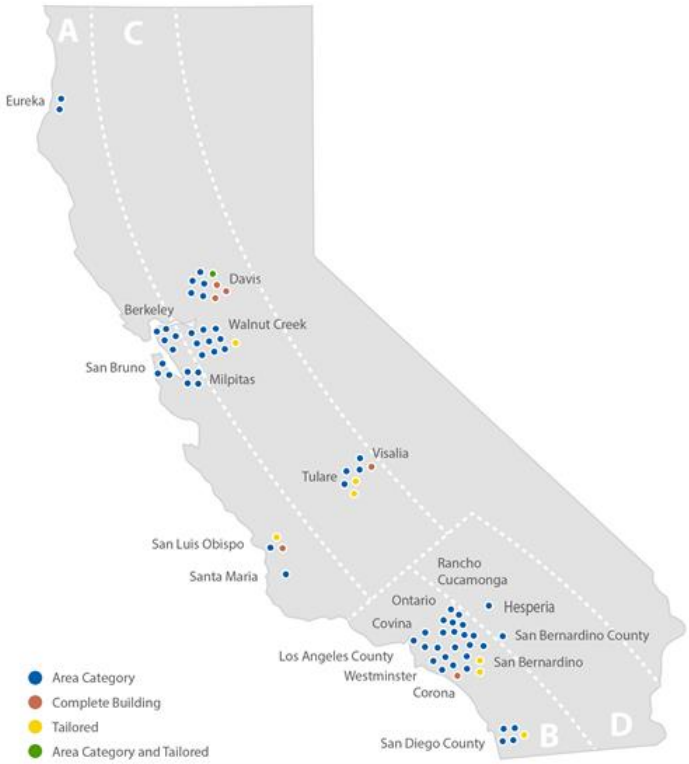
The team analyzed 75 interior lighting sites.

We determined the compliance method from Title 24 compliance forms:

- Complete Building
- Area Category
- Tailored

Energy Consumption Analysis

Category	Type	Energy Consumption		As-Built/2008 Code
		2008 Code	As-Built	
Lighting Alterations	kWh	14,213,347	13,168,667	93%
	kW	4,627	4,322	93%



Cool Roof / Re-Roof Alteration Projects

Cadmus analyzed primary data collected for 18 reroof and 11 cool roof projects using a binary compliance approach by calculating the percentage of sites complying with or exceeding requirements of 2008 Title 24 divided by the total number of sites.

Compliance

Category	CF
B17 Envelope Insulation (Re-Roof) (18 Sites)	83%
B31 Cool Roof Expansion (Re-Roof) (11 Sites)	82%

Cadmus created whole-building energy models for eight sites to assess the magnitude of the impact of the roofing measures on the energy consumption of the buildings. We used the data collected in the field to inform the input values required in the whole-building energy model.

Simulated Electricity Savings for Roofing Alterations

	# of Sites	Percent of Sites in Compliance with 2008 Title 24	Average Per-Site Reduction in Energy Consumption (kWh) Relative to 2005 Code		
			Cool Roof	Roof Insulation	Total
Cool Roof	3	100%	10,535	NA	10,535
Reroof	5	80%	2,211	2,397	4,608

* One reroof site was noncompliant with 2008 code and incurred high penalties, overriding savings from the remaining four sites. This site did not have a cool roof installed.