

2013 Title 24 Local Energy Ordinances Residential Code Cost Effectiveness Analyses

Resources for Beyond Code Adoption & Implementation
BayREN Codes and Standards Regional Forum
24 February 2015

Purpose

Support locally adopted energy standards or “Reach Codes”

2013 Title 24 Part 6, Section 10-106

Consistent adoption of 2013 CALGreen

A4.203 Voluntary Measures, Energy Efficiency

A4.203.1.1 Tier 1 and Tier 2 prerequisites: lighting, QII

A4.203.1.2 Tier 1, 85% of Title 24 Part 6 Energy Budget

Reports available at <https://www.bayren.org/codes/resources>

Scope

Cost-benefit analysis for ~15 energy savings measures

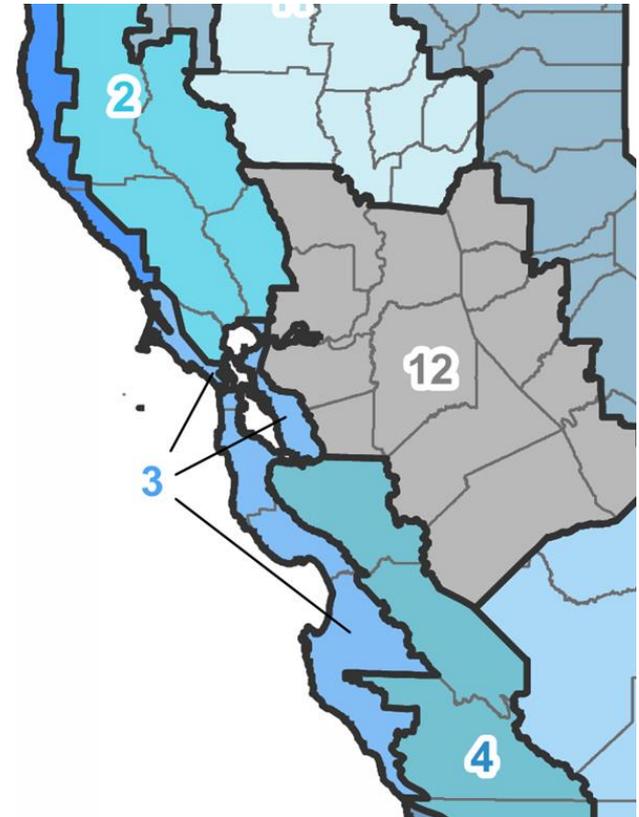
Two analysis prototypes

- Single family residence

- Low-rise multifamily residence

Four Bay Area locations

- Climate zones 2, 3, 4, 12



Constraints

Performance basis analysis

Measures not intended to be used as prescriptive list for local adoption

2013 Reach TDV (Time Dependent Value) kBTU metric

\$ / sq.ft. normalization

Measures not analyzed

Federally preempted measures

Measures not accounted for under Title 24 performance compliance method (ACM)

Residential New Construction only

Resources

IOU ZNE Tool (EnergyPlus engine) and ZNE Report

The Technical Feasibility of Zero Net Energy Buildings in California (2012)

Title 24 Codes and Standards Enhancement (CASE) reports for 2013 and 2016

Database for Energy Efficient Resources (DEER)

RS Means

Measures

	Single Family	Multi-Family
Covered by Residential ACM for Performance Compliance		
Improved Wall Insulation	x	x
Ceiling Insulation	x	x
DHW Heater Tankless	x	
HVAC Technology Change (Federal Minimum PTAC to Heat Pump)	x	
Ducts in conditioned space	x	
QII (Quality Insulation Inspection) *	x	x
Reduced Infiltration	x	x
Solar Water Heating	x	x
Not Covered by Residential ACM		
All LED High-Efficacy Lighting **	x	x
Showerheads 2.5 to 2.0 GPM	x	x
Kitchen Sinks 2.2 to 1.8 GPM	x	x
Plug Load Controls (Equivalency of 10% reduction)	x	
Domestic Hot Water Heat Recovery		x

* CALGreen Section A4.203.1.1.2, Tier 1 prerequisite

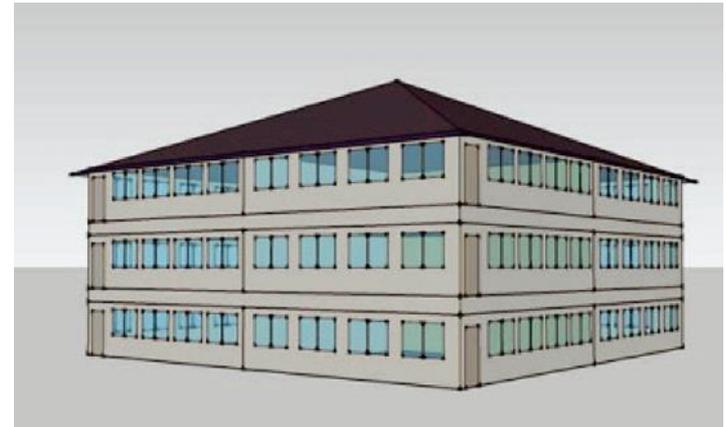
** Per CALGreen Section A4.203.1.1.3, Tier 1 prerequisite

Single Family Results



	CZ 2	CZ 3	CZ 4	CZ 12
Savings Reach TDV %	16.1%	16.8%	18.9%	19.3%
Savings Reach TDV \$/sq.ft.	\$2.51	\$2.16	\$2.42	\$3.78
First Cost \$/sq.ft.	\$2.18	\$2.18	\$2.18	\$2.18
B:C Ratio	1.2	1.0	1.1	1.7

Multi-Family Results



	CZ 2	CZ 3	CZ 4	CZ 12
Savings Reach TDV %	6.5%	9.3%	10.5%	6.1%
Savings Reach TDV \$/sq.ft.	\$0.92	\$1.04	\$1.23	\$0.93
First Cost \$/sq.ft.	\$2.73	\$2.90	\$2.75	\$2.19
B:C Ratio	0.3	0.4	0.4	0.4

Summary

A 15% performance energy savings target beyond 2013 Title 24 is cost-effective and feasible for single family buildings in all four Bay Area climate zones.

Thank you.

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