

2020 Vision

Reach Codes Best Practices Workshop



CALIFORNIA
ENERGY
CODES & STANDARDS

A STATEWIDE UTILITY PROGRAM

BAYREN

Local Governments Empowering Our Communities

**Oakland, California
October 9, 2018**



Agenda

Welcome, Introductions, and Objectives

9:00 – 9:15

2019 Standards and State of the State

9:15 – 9:45

2019 Initial Analysis Status and Results

9:45 – 10:45

BREAK

10:45 – 11:00

Putting It All Together (Discussion)

- Reach Code Process
- Options for 2019 and What's Right for Your Jurisdiction

11:00 – 12:15

Wrap-Up

12:15 – 12:30

Workshop Objectives





Green Building Ordinances & Reach Codes





California Building Standards Code (Title 24)

Title 24 is Composed of 12 "Parts," Described Below:

- ◆ [Part 1 - California Building Standards Administrative Code](#)
 - ◆ [Part 2 - California Building Code - Vol. I & II](#)
 - ◆ [Part 3 - California Electrical Code](#)
 - ◆ [Part 4 - California Mechanical Code](#)
 - ◆ [Part 5 - California Plumbing Code](#)
 - ◆ [Part 6 - California Energy Code](#)
 - ◆ Part 7 - No longer published in Title 24; see Title 8 CCR
 - ◆ [Part 8 - California Historical Building Code](#)
 - ◆ [Part 9 - California Fire Code](#)
 - ◆ [Part 10 - California Existing Building Code](#)
 - ◆ [Part 11 - California Green Building Standards Code](#)
 - ◆ [Part 12 - California Reference Standards Code](#)
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Legal Requirements for Reach Codes

- Compliance with local requirements for ordinances
- Compliant with all state laws
- Updated for each new Building Code cycle
- Filed with the State
- Accessible to the public
- **More stringent than state requirements**
- **Cost effective**
- **May not preempt federal regulations**
(effectively, may not specifically require high efficiency HVAC and DHW equipment or any other appliances for which there is a federal standard)





2019 Standards

Initial (**DRAFT**) Analysis Results and Opportunities

2019
Standards
Analysis:
First, Some
Important
Terms and
Definitions



Performance and Prescriptive Methods



CEC Compliance Software (CBECC-Res, CBECC-Com)



Time Dependent Valuation (TDV)



Climate Zones

CZ 3 - San Francisco, Oakland, Richmond...

CZ 12 - Walnut Creek, Modesto, Sacramento...



High-rise residential (Part 6): Four or more habitable stories



Avoiding Preemption: High Efficiency Appliances and Equipment

- ▶ State and local governments may not “preempt” federal appliance standards (includes HVAC and water heaters)
- ▶ State and local building codes must meet seven conditions to avoid preemption (US Code 42, Section 6297)
- ▶ If the code includes one or more options to meet the objective:
 - ▶ for every option which includes a high-efficiency appliance or equipment, at least one option shall include the same equipment which is $\leq 5\%$ more efficient than the minimum,
 - ▶ At least one option which meets but does not exceed the minimum requirement.



DRAFT Analysis: 2019 Cost-effectiveness Studies

- ▶ Identify cost-effective, non-preempted measure packages
- ▶ New construction only (additions and alterations later)
- ▶ Mixed-fuel and all-electric designs and baselines

- ▶ Low-rise residential (single family and low-rise multifamily)
 - ▶ CALGreen Tier 1
- ▶ Nonresidential (office, high-rise residential)
 - ▶ PV only

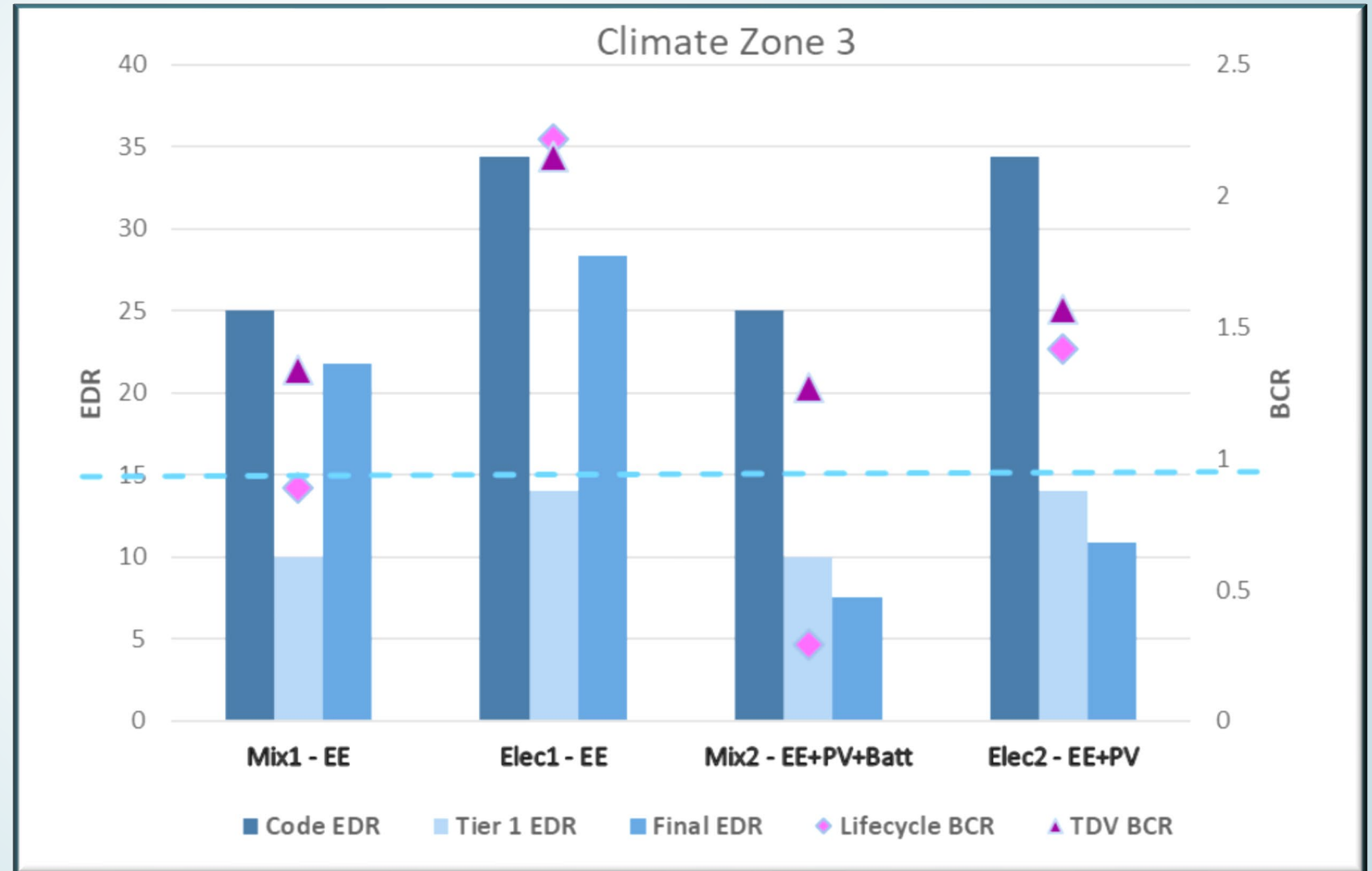
Low-rise Residential New Construction: Climate Zone 3 **DRAFT** Results

Energy Efficiency (EE) Package

- Mix1 - EE: PV size \leq annual usage (2.6 kW)
- Elec1 - EE: PV size $<$ Standard Design (2.7 kW)

EE + PV / EE + PV + Battery

- Mix2 - EE+PV+Batt:
PV size = annual usage (2.8 kW);
7.5 kWh battery
- Elec2 - EE+PV:
PV size = annual usage (4.2 kW)



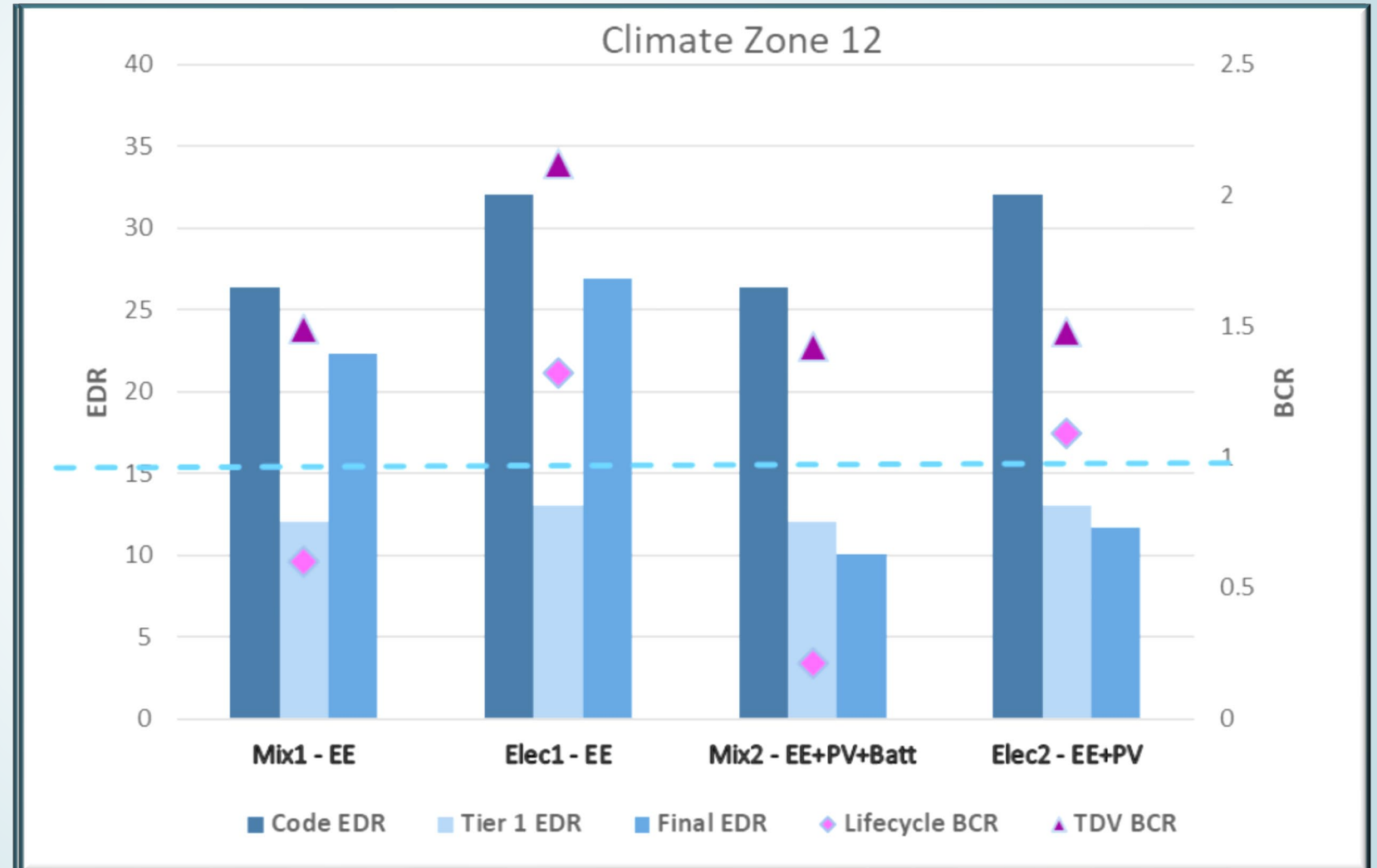
Low-rise Residential New Construction: Climate Zone 12 **DRAFT** Results

Energy Efficiency (EE) Package

- Mix1 - EE: PV size \leq annual usage (2.6 kW)
- Elec1 - EE: PV size $<$ Standard Design (2.5 kW)

EE + PV / EE + PV + Battery

- Mix2 - EE+PV+Batt:
PV size = annual usage (2.6 kW);
7.5 kWh battery
- Elec2 - EE+PV:
PV size = annual usage (4.7 kW)





Low-Rise Residential: Additional Measures and Options Requested To-Date

Measures that require cost-effectiveness analysis

- CALGreen Tiers 1 and 2
- Storage
 - Including EV load
- Multifamily

Measures that do not require cost-effectiveness analysis

- Electric-ready measures: CBSC
 - Electrical Panel, Water Heating, Clothes Drying, Cooking
- EV-Ready (SF, MF)



Nonresidential and High-Rise Residential New Construction

- ▶ Compliance Plus PV scenarios only now
- ▶ PV System Sizing:
 - ▶ 80% of estimated load
 - ▶ 15W/sqft of solar zone (\geq 15% of roof area)
- ▶ Nonresidential Next Steps:
 - ▶ Analyze CALGreen Tiers
- ▶ High-Rise Residential
 - ▶ Continue work with CEC to develop new, more representative prototypes

Nonresidential and High-Rise Multi-Family: Climate Zone 3 **DRAFT** Results

Bldg. Type	PV Sizing Method	PV Size (kW)	Lifecycle Costs (\$)	Lifecycle Bill Savings (\$)	Bill Net Savings (\$)	Discounted Payback (years)	Approx. Area Required (sf)
Medium Office	80% Elec. Load	203	487,599	1,486,702	999,103	8	13,500
	15W/sf solar zone	40	96,472	397,438	300,966	6	2,700
High-Rise Multi-Family	80% Elec. Load	215	532,085	2,876,052	2,343,967	4	14,400
	15W/sf solar zone	19	47,297	382,937	335,640	3	1,300

Nonresidential and High-Rise Multi-Family: Climate Zone 12 **DRAFT** Results

Bldg. Type	PV Sizing Method	PV Size (kW)	Lifecycle Costs (\$)	Lifecycle Bill Savings (\$)	Bill Net Savings (\$)	Discounted Payback (years)	Approx. Area Required (sf)
Medium Office	80% Elec. Load	233	559,146	1,666,823	1,107,678	8	15,500
	15W/sf solar zone	40	96,472	406,503	310,031	6	2,700
High-Rise Multi-Family	80% Elec. Load	252	621,621	3,173,529	2,551,908	5	16,800
	15W/sf solar zone	19	47,297	382,937	335,640	5	1,300



Nonresidential Occupancies: Additional Measures and Options Requested To-Date

- ▶ CALGreen Tiers 1 and 2
- ▶ Efficiency plus PV packages
- ▶ Mid- and high-rise residential
- ▶ PV on Parking Garages
- ▶ Electric-Ready Construction (electrical code)
 - ▶ 240V for space heater, water heater, clothes dryer, cooktop, panel upgrade
 - ▶ Increased EV requirements in Parking Garages (electrical code)
 - ▶ EV-capable and EV-ready



Energy Plus Water Nexus

Some potential measures include:

- ▶ Preplumb for graywater
 - ▶ New construction and retrofits that affect relevant plumbing
- ▶ Drain water heat recovery
- ▶ Alternate / Dual plumbing for indoor use
- ▶ On-demand recirculation pump, thermostatic shutoff valve
- ▶ Controls for multifamily central water heating system retrofits
- ▶ Recycled water in nonresidential, common areas of multifamily or landscaping controlled by a Homeowner Association (HOA)
 - ▶ If available, or if planned within 5-10 years.



Summary of Initial **DRAFT** Analyses

Residential New Construction

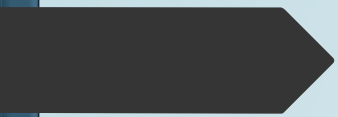
- Can likely achieve 10-15% reduction in EDR with efficiency-only package
- Tier 1 requires additional efficiency plus:
 - PV to offset load in All-Electric design
 - PV to offset load plus Battery in Mixed-Fuel Design

Nonresidential New Construction

- PV appears cost-effective across range of occupancies, building and system sizes
- Tier 1 analysis next

Energy Plus Water

- No cost-effectiveness study required for most measures.
- Supporting analysis available



Break

Local Reach Code Process

**Acquire
Cost-
Effectiveness
Study**

**Conduct
Outreach
and Refine
Scope**

**Prepare
Staff Report
and
Supporting
Documents**

**Introduce
Ordinance:
First
Reading**

**Adopt
Ordinance:
Second
Reading**

**Obtain
CEC
Approval**

**File with
CBSC and
Prepare to
Implement**

Sample Timeline for January 1, 2020 Effective Date

Task	2018				2019												2020
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Develop idea for draft ordinance	█	█															
Compliance software completed	█	█	█	█													
Develop cost-effectiveness study			█	█	█	█											
Work with stakeholders			█	█	█	█	█	█	█	█	█	█	█				
Develop & draft ordinance						█	█	█	█	█	█	█					
Review by local committees									█	█	█	█					
Public process & revisions									█	█	█	█	█				
First reading of ordinance (introduction)												█	█				
Second reading of ordinance (adoption)													█	█			
Application to CEC (submit by 9/30)																	★
CEC public comment period															█	█	
Approval from CEC (December meeting)																	█
File with BSC																	█
Reach code takes effect (1/1/20)																	★



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Reach Code Process: Hearing from the Experts (you!)

- ▶ What has worked well?
- ▶ What has not worked well?
- ▶ What do you wish you had known?

Potential Reach Codes Opportunities

Scope / Measure		C/E Study Required	New	Existing	Single Family	Multifamily			Non-Residential
						Low-Rise	Mid-Rise	High-Rise	
Efficiency and/or Renewables	Whole Building (mixed-fuel and all-electric)	Yes	X		X	X	X	X	X
	Solar PV	Yes	X	X			X	X	X
	Single Measures	Yes	X	X	X	X	X	X	X
	Rental Property	Yes		X		X	X	X	
Energy Plus Water Efficiency	Hot Water Distribution	Yes	X	X	X	X	X	X	Some
	Indoor Water	No	X	X	X	X	X	X	X
	Outdoor Water	No	X	X	X	X	X	X	X
Process Loads (Equipment)	Commercial Kitchens	Maybe	X	X					X
	Elevators	Maybe	X	X			X	X	X
	Escalators	Maybe	X	X					X
Electric-Ready	240 V Pre-wiring	No	X		X	X	X	X	
	Panel Upgrade	No	X	X	X	X	X	X	X
	EV Readiness	No	X		X	X	X	X	X
	EV Charging	No	X		X	X	X	X	X
Information Disclosure	Audits	No		X	X	X	X	X	X
	Benchmarking	No		X		X	X	X	X



Reach Code Options: Interests and Priorities

- ▶ What is your jurisdiction interested in exploring?
- ▶ What are your jurisdiction's priorities?



Three Ways to Start Reach Code Work

- ▶ Begin Internal Research
 - ▶ Existing policy documents
 - ▶ Construction Types and Volumes
- ▶ Develop Initial Ordinance Scope
- ▶ Begin Informal Outreach
 - ▶ Within Jurisdiction
 - ▶ Within Community
 - ▶ Neighboring Jurisdictions



Wrapping Up

Takeaways

- Start now to have a reach code in effect January 1, 2020
- Options to consider

Next Steps

- Provide all information from today to you electronically
- Complete cost-effectiveness studies
- Best Practices Guide: Early 2019
- Re-Convene First Quarter, 2019



Thank you!

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