Statewide Codes and Standards

Cost-effectiveness Explorer
August 30, 2022

Agenda

- Welcome and Introductions

- Local Ordinances Overview
  - Cost-effectiveness
  - Optional Policy Structures

- Cost-Effectiveness Explorer
  - Explorer Introduction
  - New Features
  - Creating New Construction Policies

- Local Energy Codes Resources

- Questions

What is a Reach Code?

A reach code is an ordinance adopted by a local government that requires something in addition to the requirements of the state's building code.

2022

Reach Codes
2022 California Building Code

2023	2024	2025

Newly Constructed Building Ordinances - Considerations

Require all-electric?

- All occupancy types?
- Outdoor gas equipment (pools, barbeques, firepits, etc.)?
- Readiness?
- Exemptions?

Include efficiency above code?

- Mixed fuel and all-electric?
- Single family study supports additional efficiency
- Nonresidential and multifamily TBD
- Must be cost-effective

Include substantial remodels in new construction?

- Common definition for threshold?

New Construction Ordinance Approaches

	Efficiency	Electric-Preferred	Electric Only		High Efficiency Electric Only
			Natural Gas Moratorium	Electric Only	
Mechanism	Energy Code	Energy Code	Jurisdictional authority (e.g., Health and Safety)	CALGreen	(Jurisdictional authority or CALGreen) plus Energy Code
Requirements	All new construction exceeds minimum energy code	Only mixed fuel buildings exceed minimum energy code	No new gas infrastructure (Hookups or Piping)	All new construction is electric only	All new construction is electric only AND exceeds minimum
Considerations	Simplicity Preserves choice Specific measures	Preserves Choice Lower GHG Savings	Longest Lasting	Must be renewed	Biggest impact Must be renewed

Cost-effectiveness: Why and How?

Why is a Cost-effectiveness Study Necessary?

- Define range of feasible improvements within which one may craft policy
- Demonstrate available compliance pathways
- Document that proposed policy meets legal requirements
- Understand policy impacts to support informed decisions.

How is Cost-effectiveness Measured?

- Simple Payback
  - How long will it take to recoup incremental costs?
- Benefit- to-Cost Ratio
  - Benefits divided by Costs (>1.0)
- Net Present Value
  - Benefits minus Costs (positive)

Table 13: Multifamily Package Cost-effectiveness Results for the All-Electric Case[1,2]

CZ	Utility	Efficiency Non-Preempted			Efficiency Equipment - Preempted			Target Efficiency EDR Margin	Efficiency & PV			Target Total EDR Margin	Efficiency & PV/Battery			Target Total EDR Margin
		Efficiency EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Efficiency EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio		Total EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio		Total EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	
01	PG&E	3.6	1.6	1.4	3.3	2.4	2.3	3.0	22.5	2.0	1.5	22.5	34.5	1.3	1.4	34.5
02	PG&E	1.9	1.7	2.1	3.2	1.6	1.6	1.5	17.5	2.4	1.8	17.5	30.9	1.4	1.7	30.5
03	PG&E	0.0	-	-	2.7	1.7	1.6	0.0	16.1	2.4	1.7	16.0	29.5	1.3	1.6	29.5
04	PG&E	1.4	1.4	1.5	2.2	1.2	1.1	1.0	15.0	2.4	1.7	15.0	28.9	1.3	1.8	28.5
05	PG&E	0.6	1.1	0.9	3.6	2.1	2.0	0.5	17.1	2.5	1.8	17.0	30.3	1.4	1.7	30.0
05	PG&E/SoCalGas	0.6	1.1	0.9	3.6	2.1	2.0	0.5	17.1	2.5	1.8	17.0	30.3	1.4	1.7	30.0
06	SCE/SoCalGas	1.0	0.7	1.3	2.2	1.6	1.9	1.0	13.8	1.2	1.7	13.5	27.5	1.2	1.6	27.5
07	SDG&E	0.6	0.6	1.0	1.9	1.6	1.7	0.5	12.8	2.1	1.8	12.5	27.1	1.2	1.6	27.0
08	SCE/SoCalGas	1.2	0.9	1.7	1.9	1.6	1.8	1.0	11.6	1.3	1.8	11.5	24.2	1.2	1.6	24.0
09	SCE/SoCalGas	1.6	1.3	2.7	1.5	1.6	1.6	1.5	11.3	1.3	1.9	11.0	23.3	1.3	1.7	23.0
10	SCE/SoCalGas	1.8	1.2	2.0	1.8	1.7	2.0	1.5	10.8	1.3	1.8	10.5	23.3	1.3	1.7	23.0
10	SDG&E	1.8	1.5	2.0	1.8	2.0	2.0	1.5	10.8	2.1	1.8	10.5	23.3	1.4	1.7	23.0
11	PG&E	3.5	1.4	1.6	3.9	2.0	2.3	3.5	13.4	2.2	1.8	13.0	25.3	1.4	1.8	25.0
12	PG&E	2.6	0.9	1.1	2.9	1.6	1.6	2.5	14.4	2.1	1.6	14.0	26.6	1.3	1.7	26.5
13	PG&E	3.3	1.3	1.6	3.8	2.0	2.3	3.0	12.2	2.1	1.7	12.0	23.9	1.4	1.7	23.5
14	SCE/SoCalGas	3.7	1.2	1.6	3.8	1.6	2.2	3.5	14.0	1.4	1.9	14.0	24.8	1.4	1.8	24.5
14	SDG&E	3.7	1.5	1.6	3.8	2.0	2.2	3.5	14.0	2.2	1.9	14.0	24.8	1.7	1.8	24.5
15	SCE/SoCalGas	4.4	1.5	2.3	6.4	1.2	1.7	4.0	7.1	1.4	2.1	7.0	16.9	1.3	1.8	16.5
16	PG&E	4.1	2.1	2.1	3.2	1.6	1.7	3.0	19.6	2.6	1.9	19.5	29.9	1.6	1.7	29.5

[1] ">1" indicates cases where there are both first cost savings and annual utility bill savings.
[2] Information about the measures included for each climate zone are described in Appendix F – Multifamily Measure Summary.
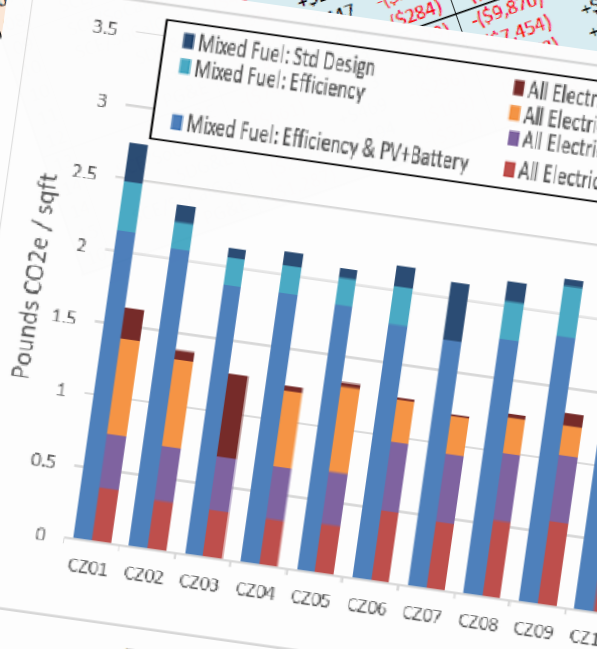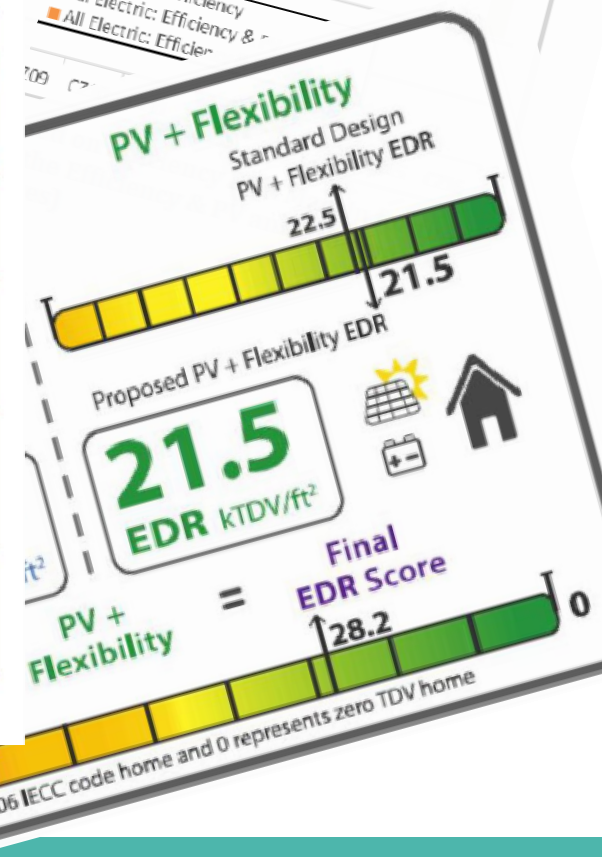
Table 1: Prototype Characteristics

Characteristic	Single Family One-Story	Single Family Two-Story	Multifamily
Conditioned Floor Area	2,100 ft²	2,700 ft²	6,960 ft²: (4) 780 ft² & (4) 960 f...
Num. of Stories	1	2	
Num. of Bedrooms	3	2	
Window-to-Floor Area Ratio			

Source: 2019 Alternative...

Table 14: Single Family Electrification Results[1]

CZ	Utility	On-Bill Cost-effectiveness — Average Annual Utility Bill Savings — Electricity	Natural Gas	Net Utility Savings	Lifetime NPV — Utility Bill Savings	Equipment Cost Savings	On-Bill B/C Ratio
					2019 Code Compliant Home		
01	PG&E	($1,194)	+$712	($482)	($14,464)	+$5,349	
02	PG&E	($825)	+$486	($340)	($10,194)	+$5,349	
03	PG&E	($717)	+$391	($326)	($9,779)	+$5,34...	
04	PG&E	($710)	+$387	($322)	($9,671)	+$5,34...	
05	PG&E	($738)	+$370	($368)	($11,128)		
05	PG&E/SoCalGas	($738)	+$289	($149)	($11,034)		
06	SCE/SoCalGas	($439)	+$243	($171)	($4,476)	+$5,3...	
07	SDG&E	($414)	+$249	($97)	($5,134)	+$5,3...	
08	SoCalGas	($347)	+$271	($107)	($2,921)		
		($377)	+$280	($123)	($3,684)	+$5,...	
				($198)	($5,950)		
		($403)	+$297	($364)	($10,917)	+$5,...	
				($284)	($8,533)		
					($9,870)		
					($7,454)		

Figure 8: Multifamily greenhouse gas emissions comparison

Pounds CO2e / sqft

Legend:
- Mixed Fuel: Std Design
- Mixed Fuel: Efficiency
- Mixed Fuel: Efficiency & PV+Battery
- All Electric: Efficiency
- All Electric: Efficiency & ...
- All Electric: Efficiency & ...

CZ01 CZ02 CZ03 CZ04 CZ05 CZ06 CZ07 CZ08 CZ09 ... CZ15 CZ16

PV + Flexibility

Standard Design PV + Flexibility EDR — 22.5

21.5

Proposed PV + Flexibility EDR

21.5 EDR kTDV/ft²

PV + Flexibility = Final EDR Score

28.2

100 represents 2006 IECC code home and 0 represents zero TDV home

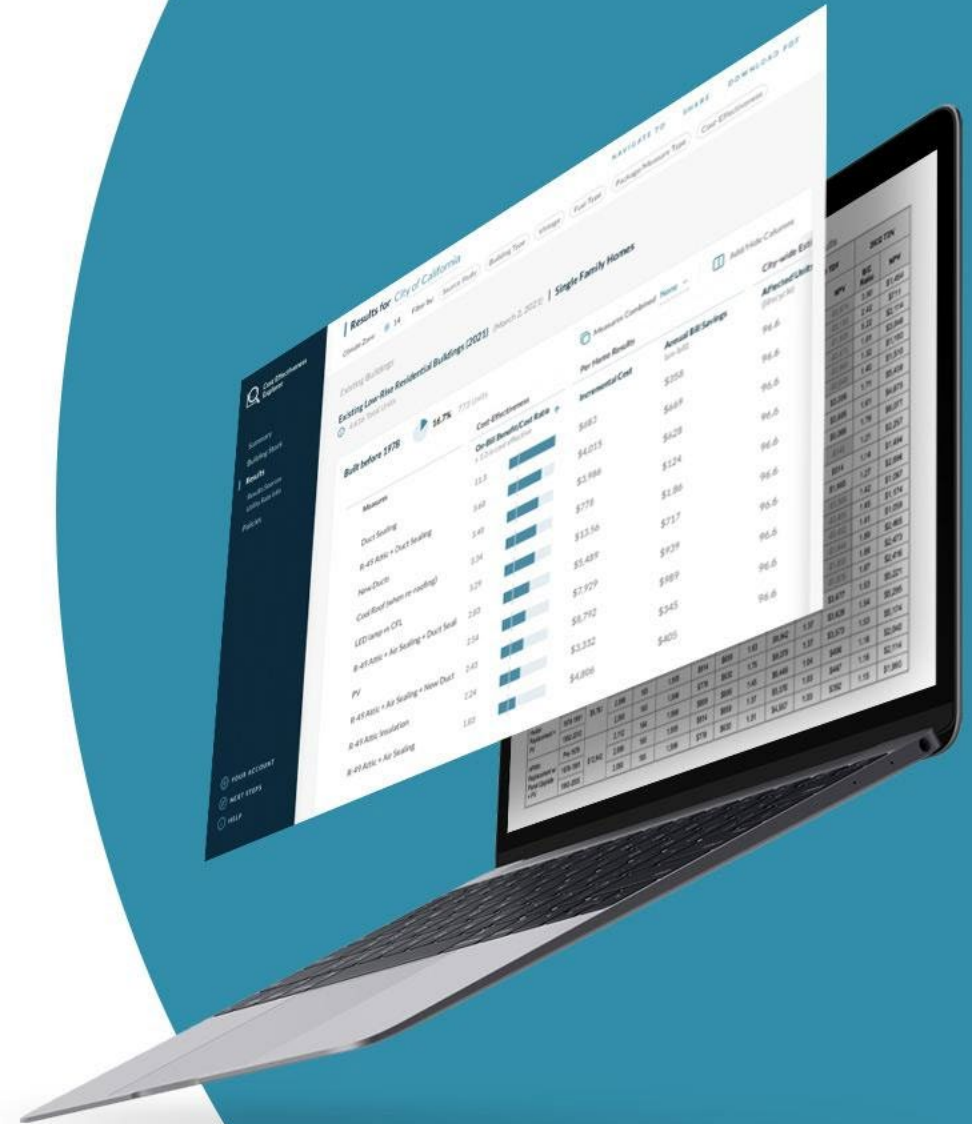# The Cost-Effectiveness Explorer

explorer.localenergycodes.com
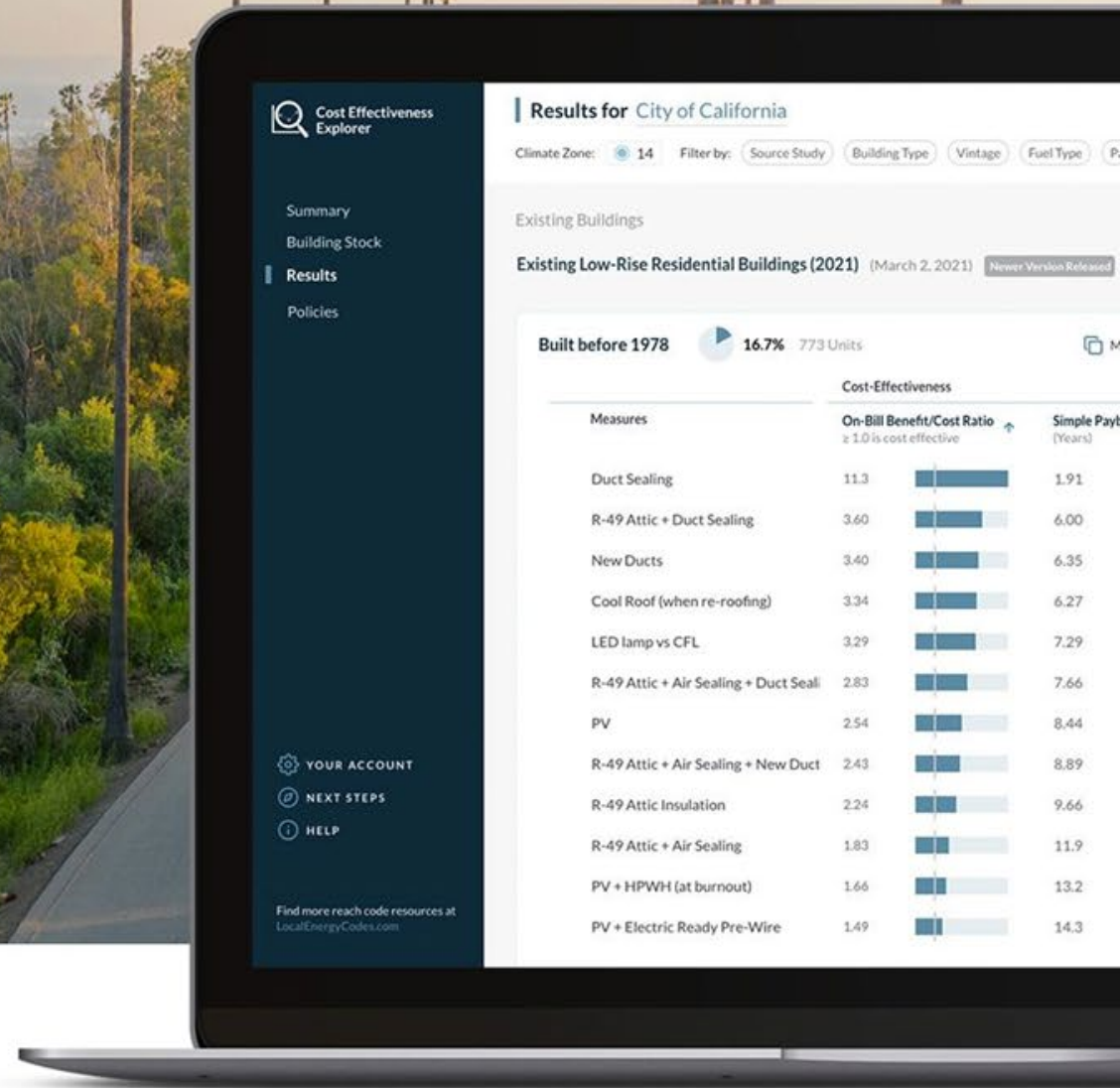
Cost-Effectiveness Explorer

explorer.localenergycodes.com

✓ Free web-based software for California local
  government energy policy makers

✓ Designed to help accelerate reach code adoption
  and support data-driven decision making

✓ Launched in late 2020

✓ Aggregates findings from 6 statewide
  cost-effectiveness studies

✓ Estimates residential building stock for each of
  500+ California cities and counties

✓ Helps users evaluate and develop cost-effective
  policy options

Let Us Build a Policy For You

Type "Yes" in the chat box

Cost-Effectiveness Explorer

Demonstration

Summary

Study Results

Building Stock

Build a Policy
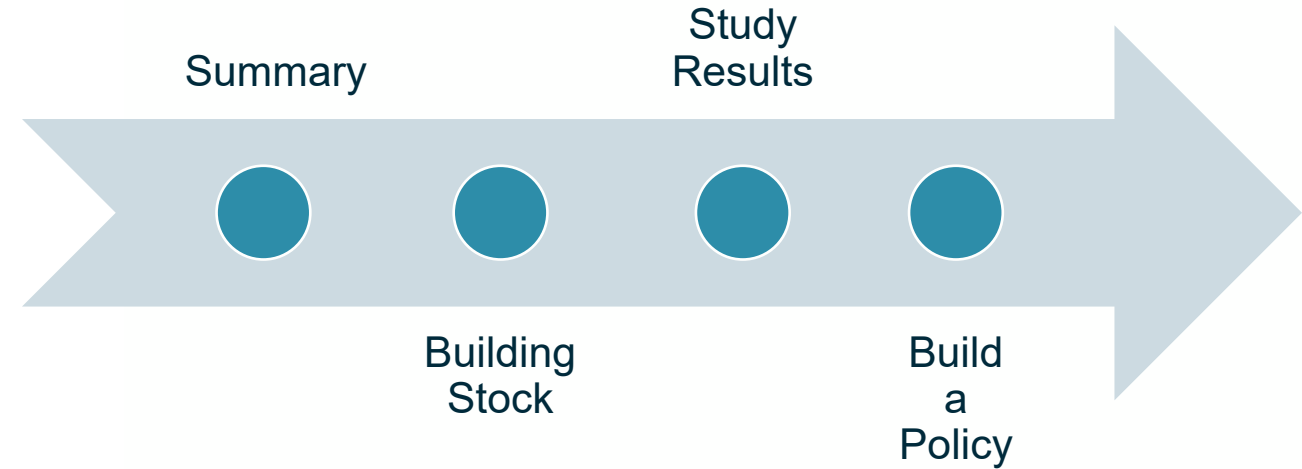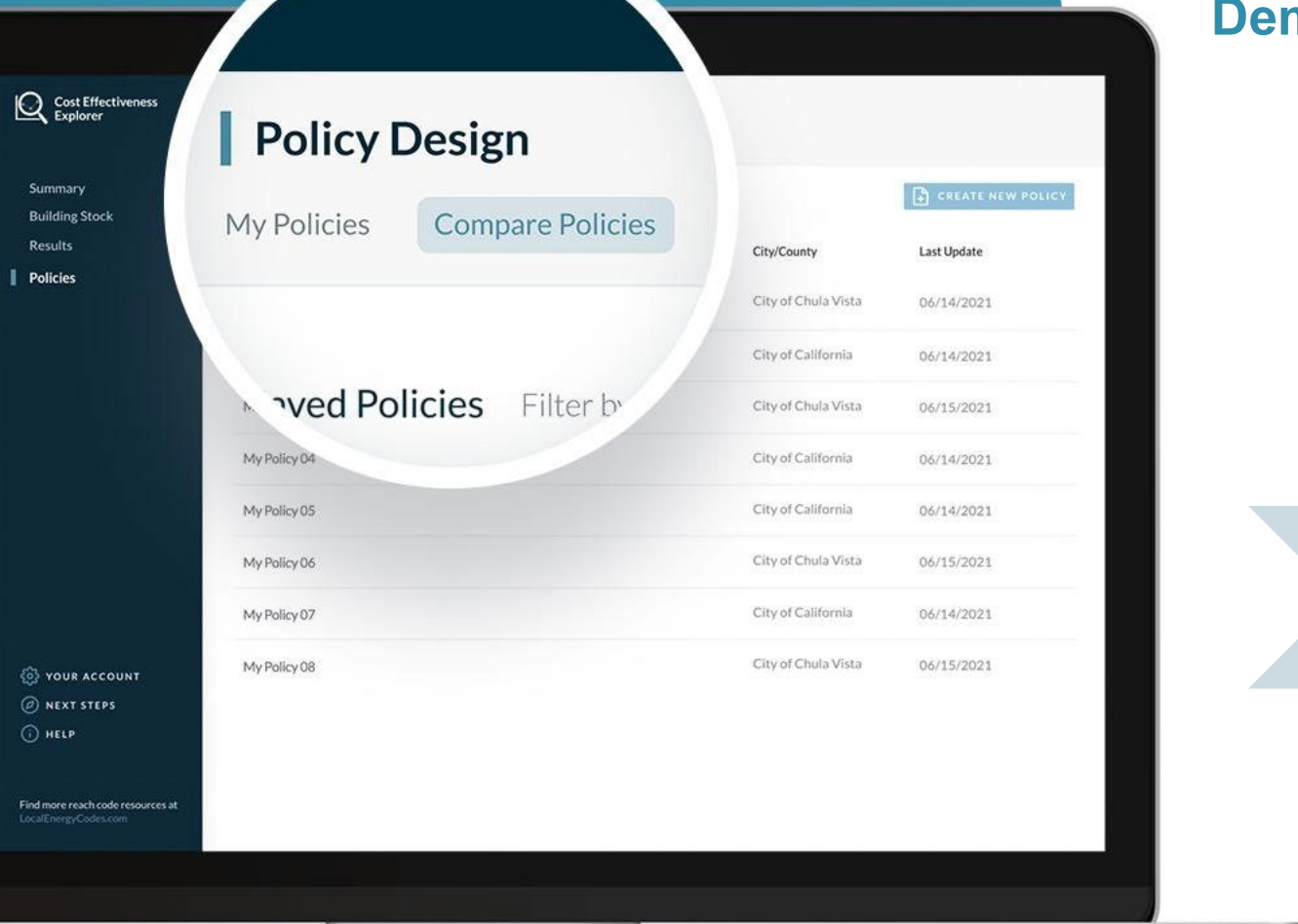
Cost-Effectiveness Explorer

Upcoming Features For New Buildings

- Template Policies

- Impact Tab

- Compare Policies

- Additional Studies

- Requirements Tables

CALIFORNIA ENERGY
CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM
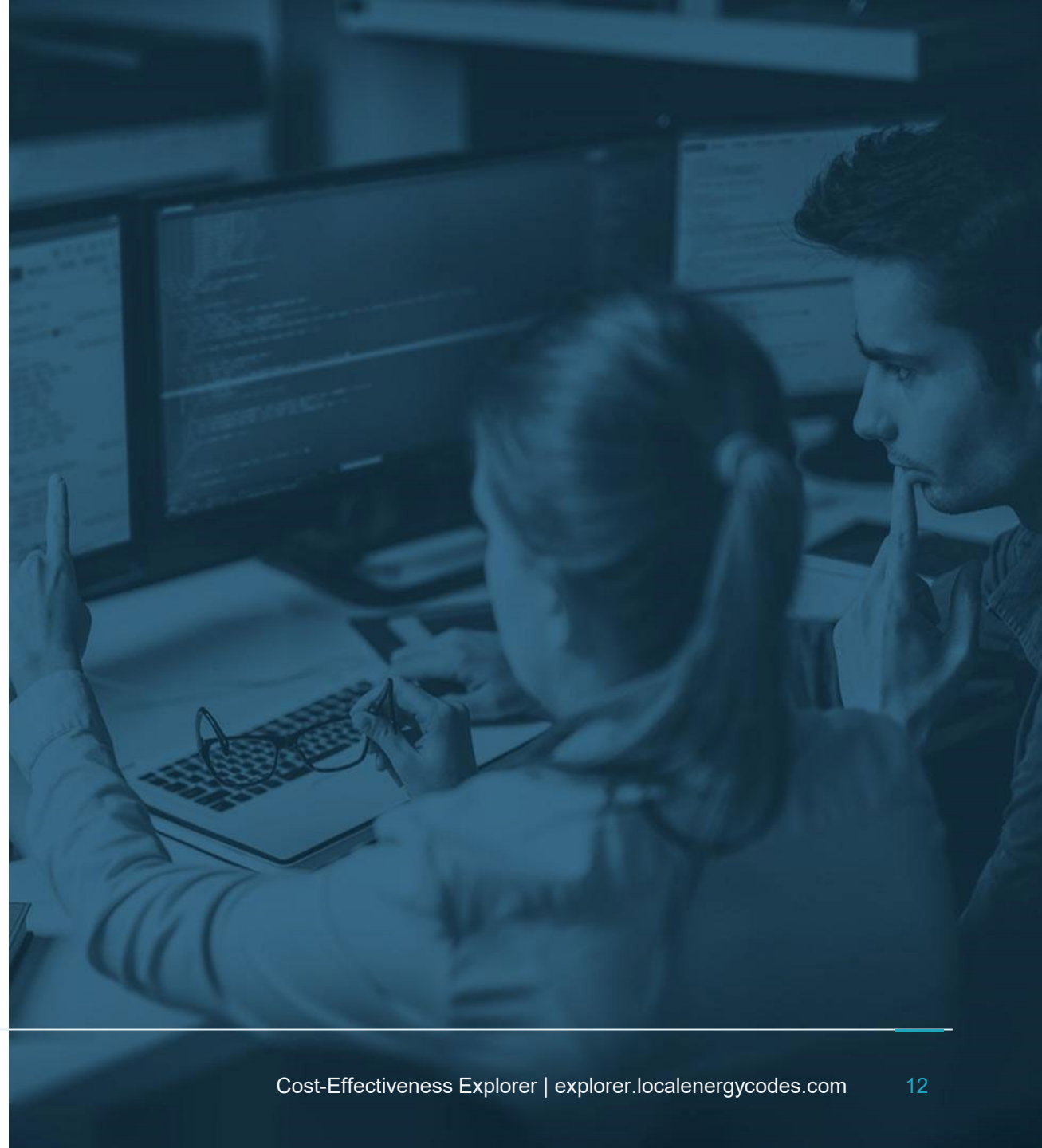
Thank you.

Try the Cost-effectiveness Explorer as explorer.localenergycodes.com and share your feedback

Get in touch touch with us at explorer@localenergycodes.com with feedback, questions, ideas

Contact info@localenergycodes.com for no-charge assistance from expert Reach Code advisors

Additional Reach Codes Program Resources

Program Objective:
Facilitate Adoption of Reach Codes

Prepare	Prepare cost-effectiveness analyses
Draft	Draft model language
Develop	Develop adoption and implementation resources and tools
Provide	Provide technical support to staff
Communicate	Communicate study results to stakeholders
Publish	Publish reach codes newsletter

Studies Underway for 2022 Code Cycle

Newly Constructed Buildings

- Single Family & ADUs
- Multifamily (three-story and five-story prototypes)
- Non-Residential (office, retail, hotel, restaurant)

Existing Buildings (renovation/additions)

- Single Family
- Low-Rise Multifamily

Electric Pool Heating (residential and commercial)

Additional 2022 Code Cycle Resources

- Ordinance Tracking

- Interactive Map

- Model Ordinance Language

- Fact Sheets

- C/E Study Executive Summary

- Implementation materials

- Webinars and Training

- Local Energy Codes YouTube Channel

Questions?

Thank You!

We Appreciate your time!

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