Central Coast Reach Code Policy Workshop

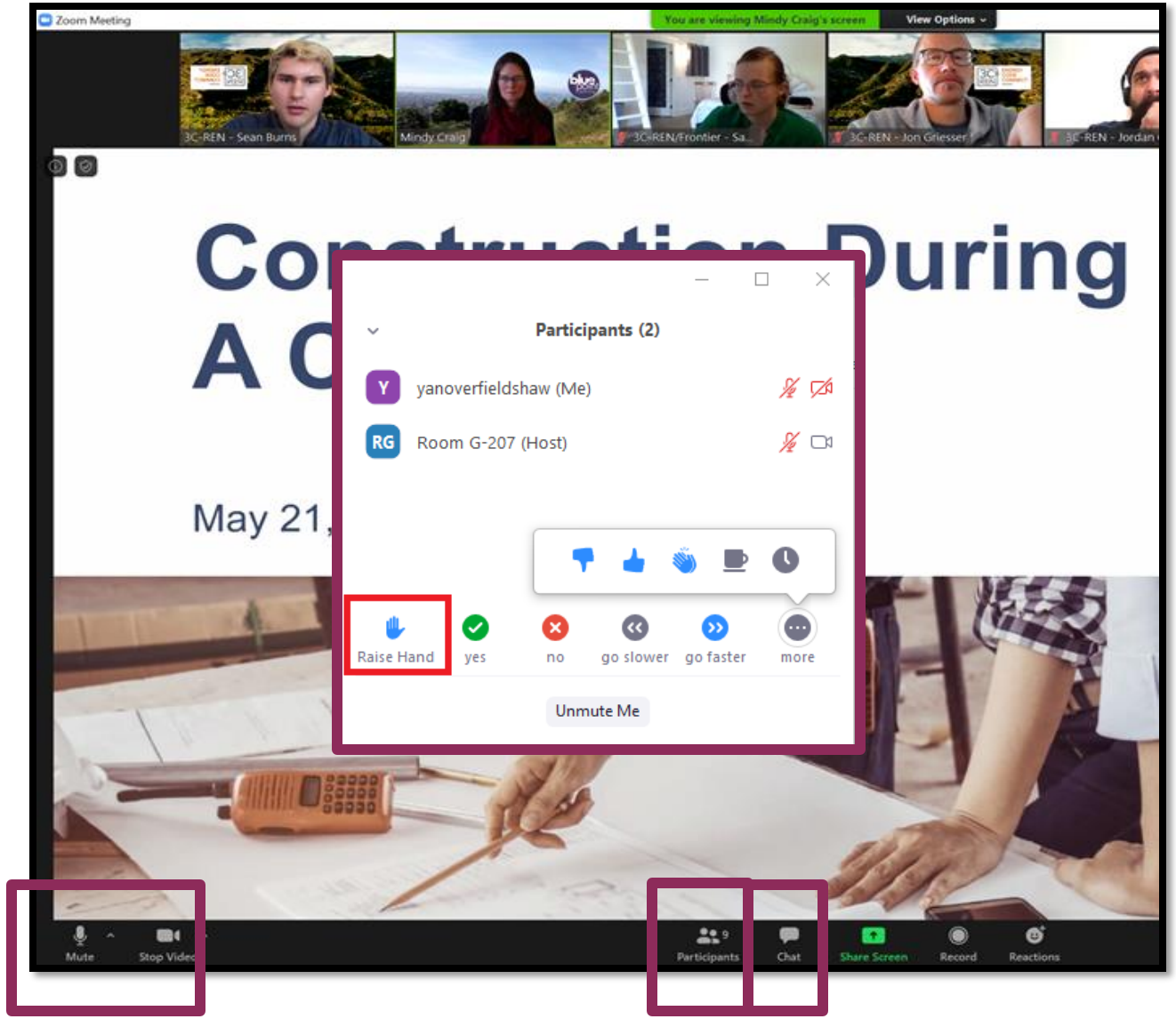
July 14th, 2022

Today's Agenda

1:05	3C-REN Intro/Meeting Orientation	Gray Gautereaux
1:10	Poll/s Who are you? What is your current level of familiarity with reach codes?	Gray Gautereaux
1:15	Context-setting and LocalEnergyCodes.com	Misti Bruceri – Statewide C&S
1:30	Central Coast Residential CZ Cost-Effectiveness results	Alea German – Frontier Energy
1:50	Central Coast Non-Res CZ Cost-Effectiveness results	Avani Goyal - TRC
2:10	**Break**	
2:20	IOUs and Reach Codes	Jay Madden
2:25	3C-REN Reach Code Support Program	Gray Gautereaux
2:30	Jurisdiction Presentations	Kristian Hoffland Steve Colome Theresa McClish
2:50	Roundtable	All Participants

Zoom Orientation

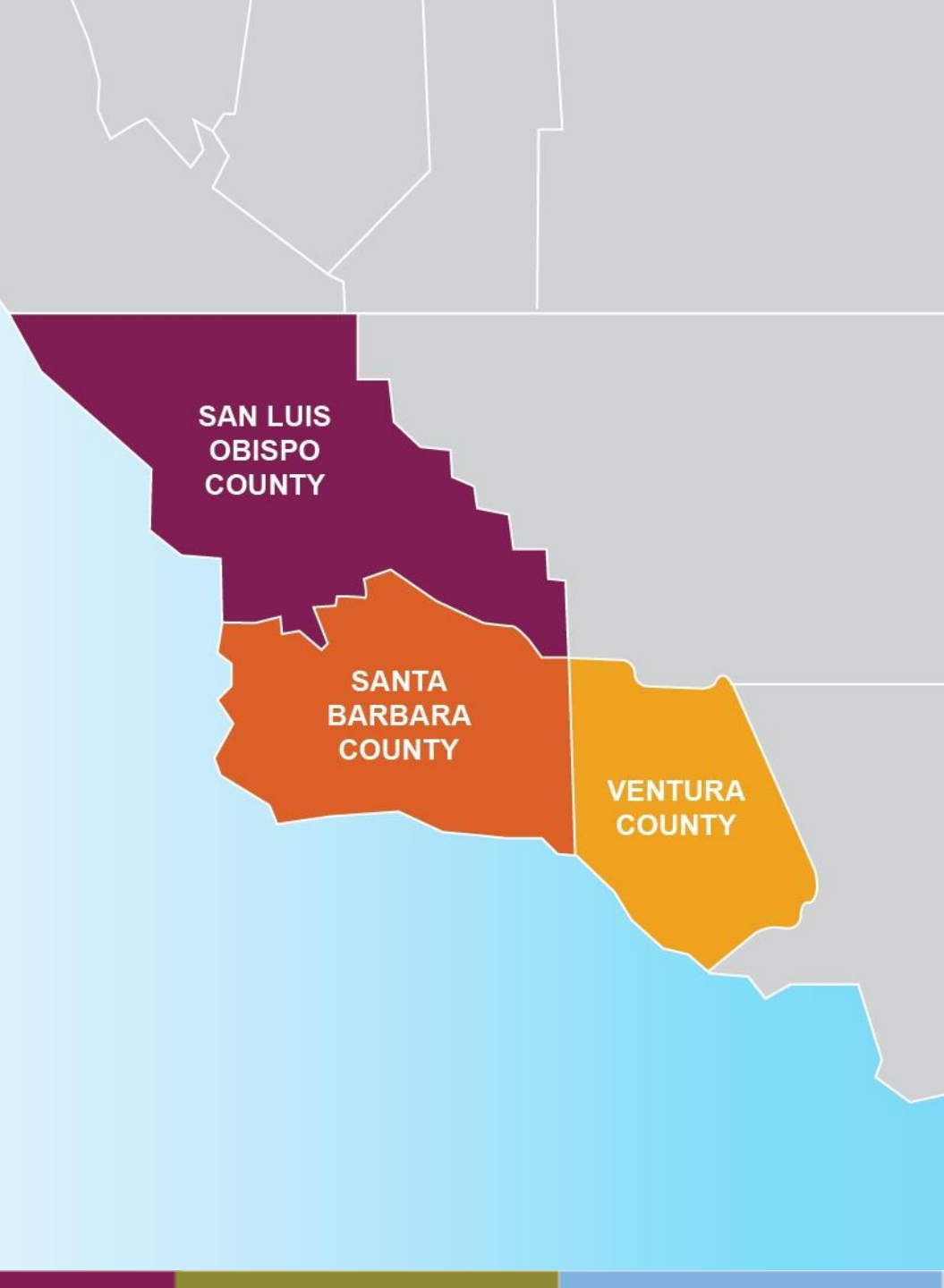
- Please be sure your full name is displayed
- Please mute upon joining
- Use "Chat“ box to share questions or comments
- Under "Participant" select "Raise Hand" to share a question or comment verbally
- The session may be recorded and posted to 3C-REN's on-demand page. Feel free to ask questions via the chat and keep video off if you want to remain anonymous in the recording.



Introduction to 3C-REN

3C-REN: Tri-County Regional Energy Network

- Three counties working together to improve energy efficiency in the region
- Services for –
  - **Building Professionals:** industry events, training, and energy code compliance support
  - **Households:** free and discounted home upgrades
- Funded by ratepayer dollars that 3C-REN returns to the region




3C
REN
ENERGY
CODE
CONNECT


3C
REN
BUILDING
PERFORMANCE
TRAINING


3C
REN
HOME
ENERGY
SAVINGS

3C
REN

3C REN ENERGY CODE CONNECT

- Serves all building professionals
- Three services –
  - **Energy Code Coach**
  - **Training and Support ←**
  - **Regional Forums**
- Makes the Energy Code easy to follow

Energy Code Coach:
3c-ren.org/codes
805.220.9991

Event Registration:
3c-ren.org/events

BUILDING PERFORMANCE TRAINING

- Serves current and prospective building professionals
- Expert instruction:
  - **Technical skills**
  - **Soft skills**
- Helps workers to thrive in an evolving industry

Event Registration:
3c-ren.org/events

3C-REN HOME ENERGY SAVINGS

Multifamily (5+ units)

- No cost technical assistance
- Rebates up to $750/apartment plus additional rebates for specialty measures like heat pumps

Single Family (up to 4 units)

- Sign up to participate!
- Get paid for the metered energy savings of your customers

Enrollment:
3C-REN.org/contractor-participation

Poll

- What industry are you coming from today?
- Current level of familiarity with reach codes?

2022 New Building Requirements

- Electric-ready is the requirement for ALL new single-family and multi-family residential dwellings starting Jan 1, 2022.
  - Space heaters, cooktops, and clothes dryers

Reach Codes

- Codes adopted by jurisdictions to “reach” beyond the energy efficiency and electrification standards set in Title 24.

Types of Reach Codes

- **Building Efficiency & Renewables:** whole building, equipment-specific
- **Electric Ready:** pre-wiring, panel upgrades, EV-readiness, EV charging
- **Energy Plus Water:** dual plumbing, on-site water reuse, water neutral development
- **Information Disclosure:** audits, benchmarking
- **Process Loads:** commercial kitchens, elevators, escalators, controlled environment, horticulture

Where to Site

- Title 24 Overlay – CEC Route
- Municipal Code – Jurisdictional Approval

Why now?

- Electrification reach codes are cost effective in Central Coast Climate Zones
- Adopt in time for implementation alongside 2022 Energy Code effective Jan 1, 2023

Is a Reach Code right for my city or town?

A reach code is a good fit for jurisdictions that are:

Interested in adopting electrification standards and cost savings

Working to achieve emissions reductions and improve indoor air quality

Pursuing a Climate or Community Action Plan

Context Setting and High-level Resources

Misti Bruceri – California Energy Codes & Standards

CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

Statewide Codes and Standards

Central Coast Reach Codes Workshop
July 14, 2022



SDGE A Sempra Energy utility
Southern California Edison Energy for What's Ahead
PG&E Pacific Gas and Electric Company

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 and Spa Heating

Some Important Energy Code Terms

Climate Zones

- 3C-REN: CZ 4, 5, 6, 9, 16

CEC Compliance Software

- (CBECC and CBECC-Res)

Basecase

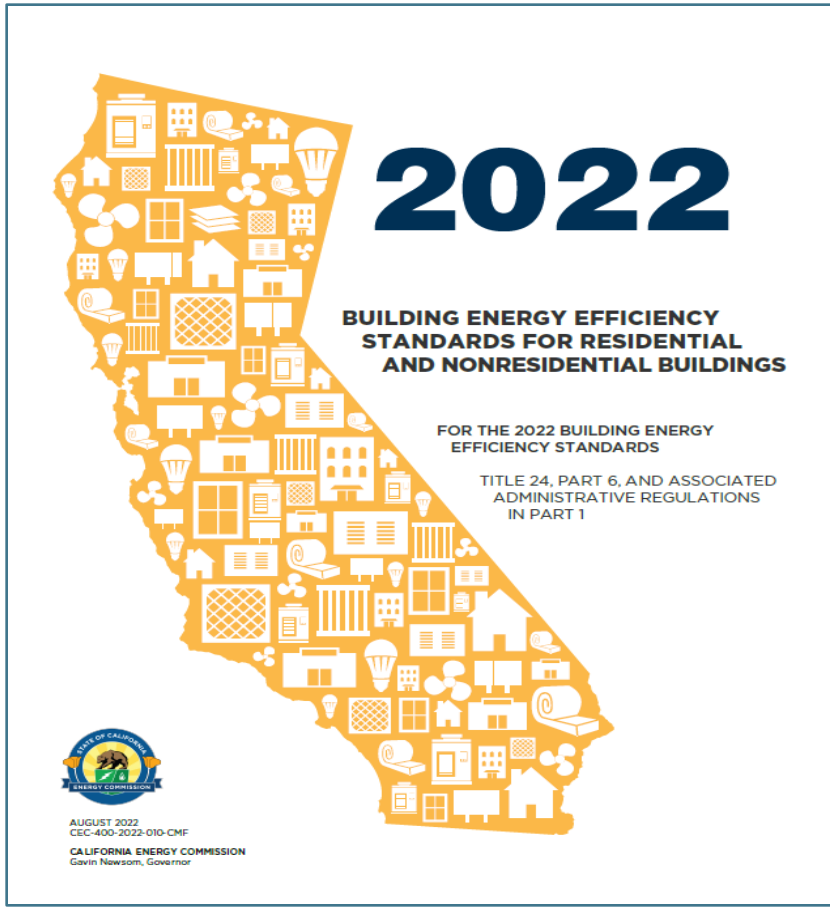
- Minimally-compliant design against which proposed building is compared

Compliance Margin

- May be expressed as points or percentage

Time Dependent Valuation (TDV)

- One of two compliance metrics (TDV and Source Energy)



Cost-effectiveness

Metrics

TDV (code/societal), and “on-bill” (customer)

Utility Tariffs

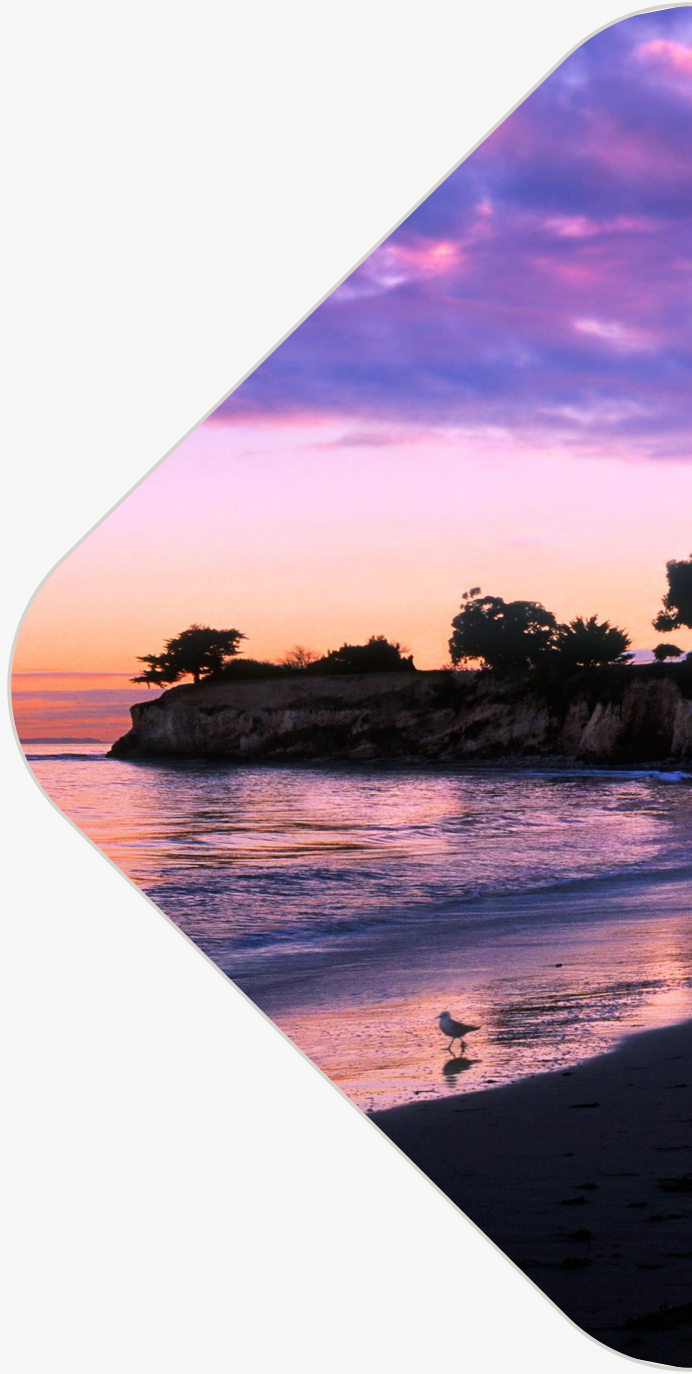
Most common rate for occupancy type, as provided by utilities.

All IOUs, plus SMUD and CPAU.

Others upon request.

Cost-effectiveness Results

Net Present Value (NPV) and Benefit to Cost (B/C) Ratio



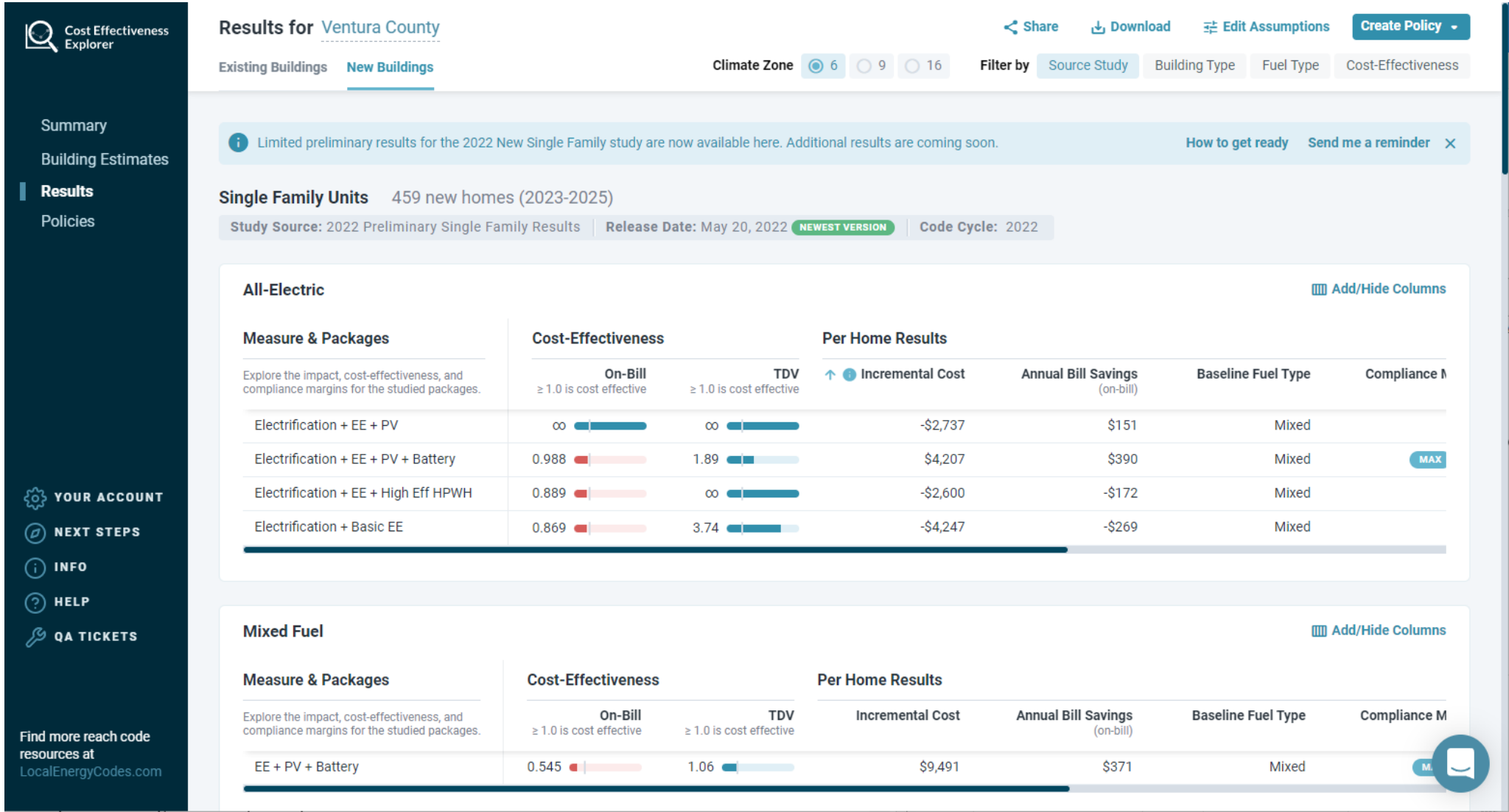
Some Considerations

- Analysis is intended to support widely applicable requirements potentially adopted anywhere in the state
  - Identify cost-effective, non-preempted path to support policy
- NOT intended to be an example of best design practices or efficiency/electrification solutions
- Generally conservative. Paper/electronic calculations tend to be easier than physical implementation

Cost Effectiveness Explorer

Explorer.LocalEnergyCodes.com

- Study results for your jurisdiction only
- Results per building and citywide
- Evaluate and develop cost-effective policy options
- Online help



Thank You!

We appreciate your time!

Misti Bruceri
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LocalEnergyCodes.com

Residential Cost Effectiveness Study Results

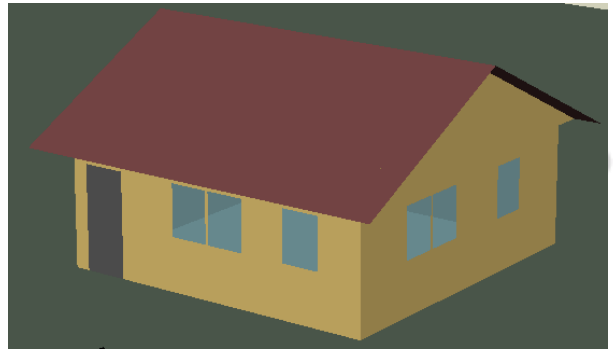
Alea German – Frontier Energy

Residential Methodology

Single Family Building Prototypes

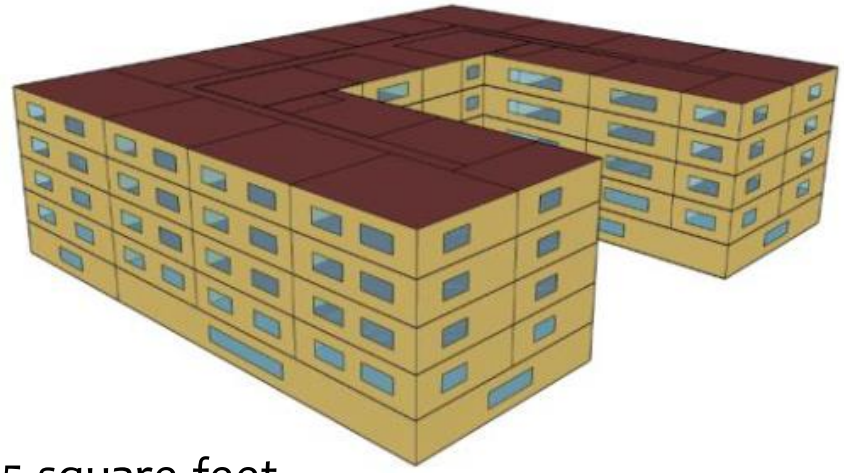
- **Single Family (SF):** Blended 2,400 ft²
  - 50% 1-story / 2100 ft²
  - 50% 2-story / 2700 ft²

- **Accessory Dwelling Unit (ADU):**
  - 625 ft² detached



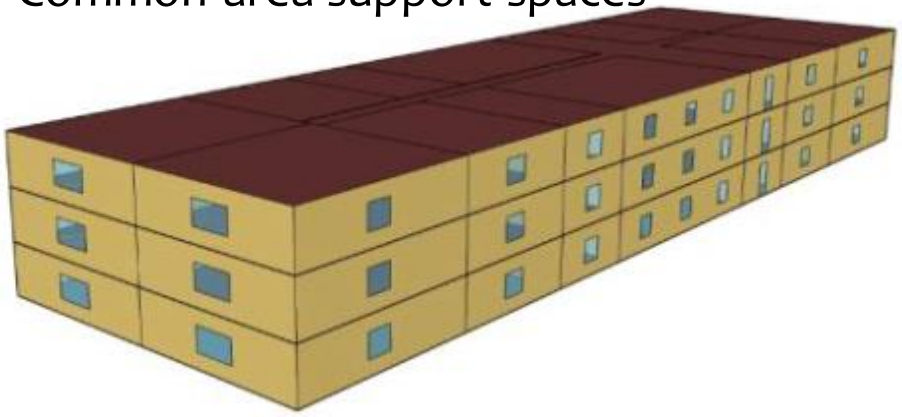
Multifamily Building Prototypes

- 2 of the 4 CEC multifamily prototypes
  - 3-story 36-unit loaded corridor
  - 5-story 88-unit mixed use



3-story

- 39,372 square feet slab-on grade
- Wood framed construction
- Individual HVAC systems, central water heating
- Common area support spaces



5-story

- 140,925 square feet
- 4 stories residential, 1 story commercial over parking garage
- Wood framed construction
- Individual HVAC systems, central water heating
- Common area support spaces

Analysis Baseline

2022 Prescriptive requirements as starting point

- Heat pump baseline
  - Single family
    - Heat pump water heater in CZs 1,2,5-12,15-16
    - Heat pump space heater in CZs 3,4,13,14
  - Multifamily
    - Heat pump space heating, except
      - CZ16 3-story protype has gas furnace
      - CZ 1 & 16 5-story protype has dual fuel heat pump
    - Gas central water heating with solar thermal
- Minimum efficiency equipment
- In-unit electric cooking and clothes drying
- PV prescriptive standard
- Battery prescriptive standard for 5-story multifamily building

Packages

All-Electric

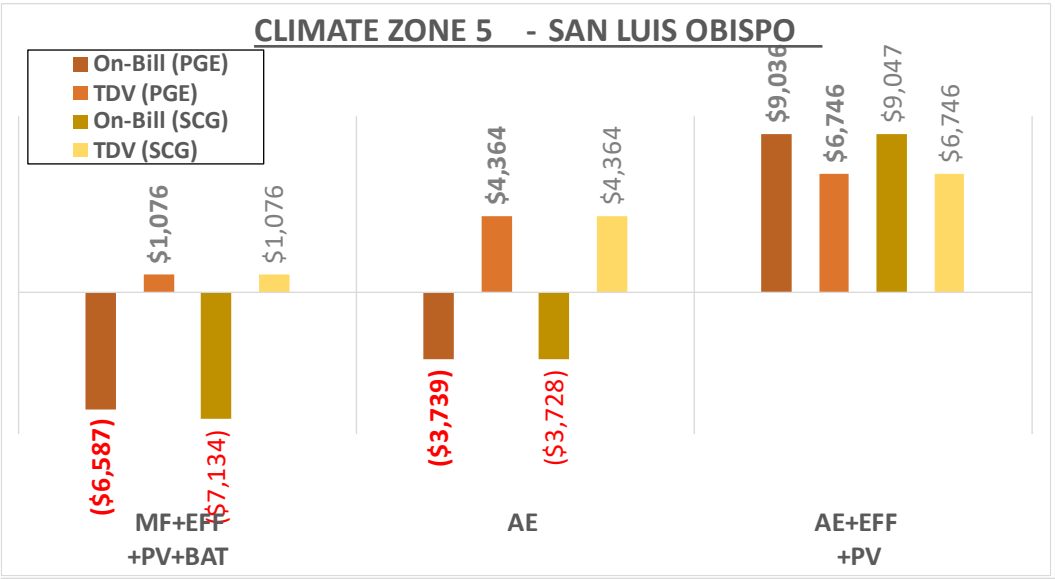
- Prescriptive
- Efficiency
- Efficiency
- Efficiency & PV
- Efficiency, PV, & Battery

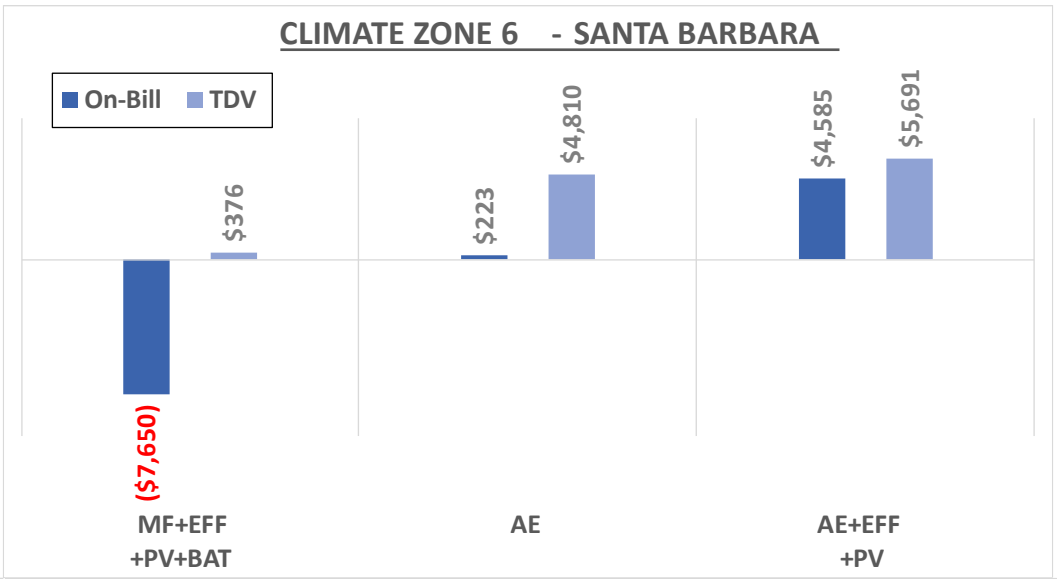
Mixed-Fuel (2022 Baseline)

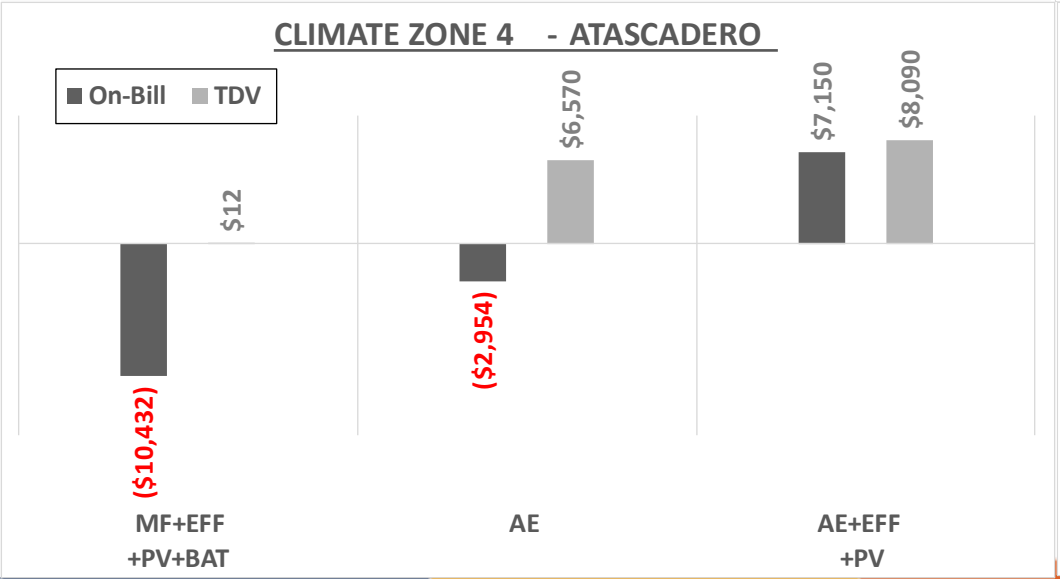
- Efficiency
- Efficiency & PV
- Efficiency, PV, & Battery

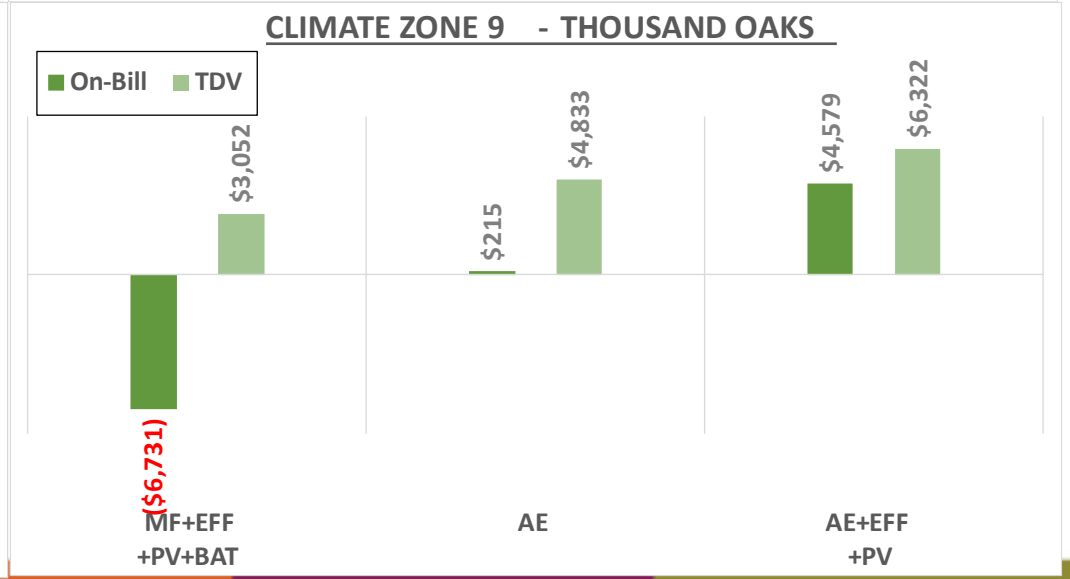
Residential Results

Single Family Results



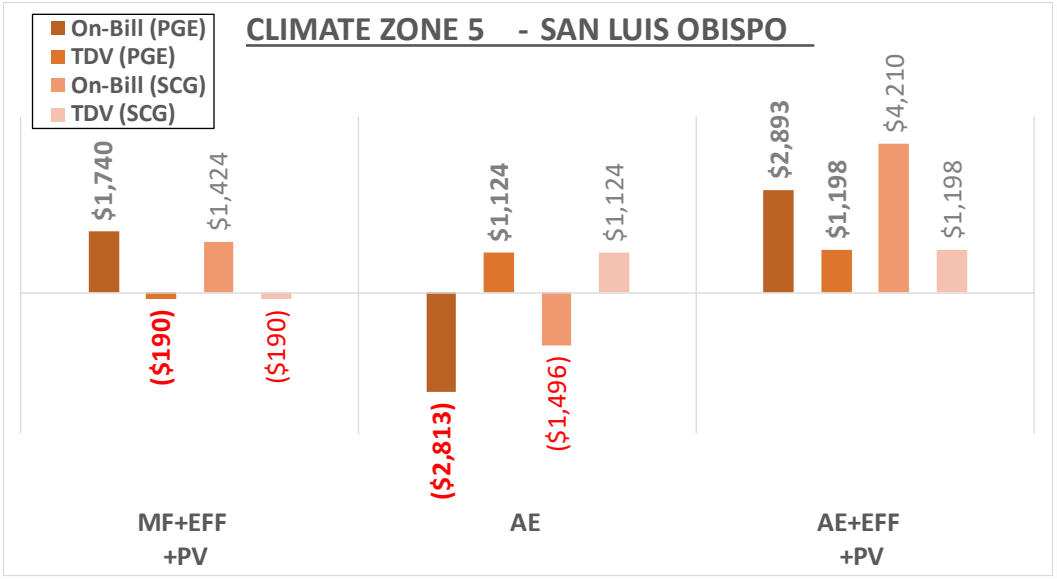


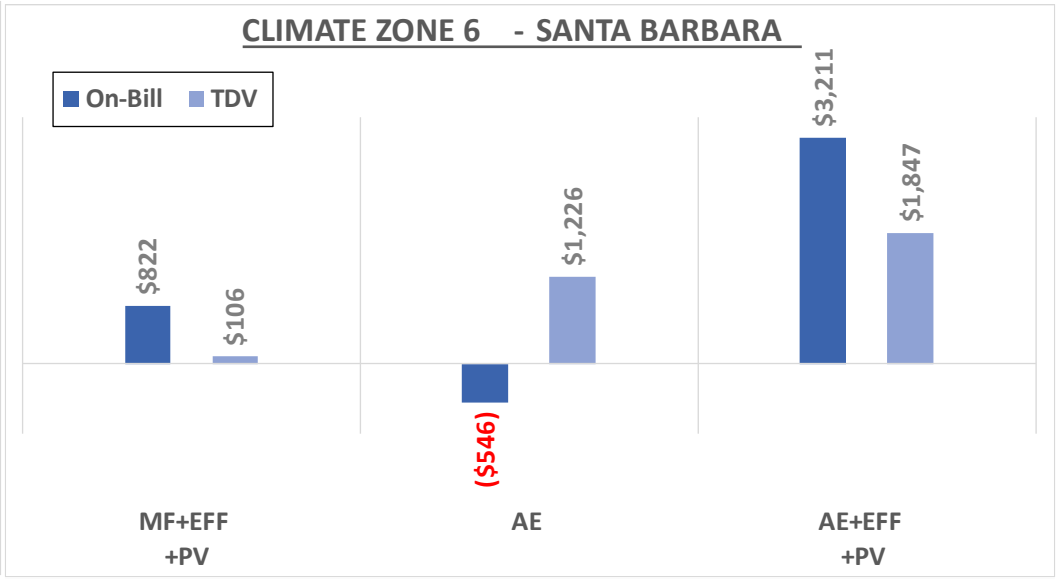


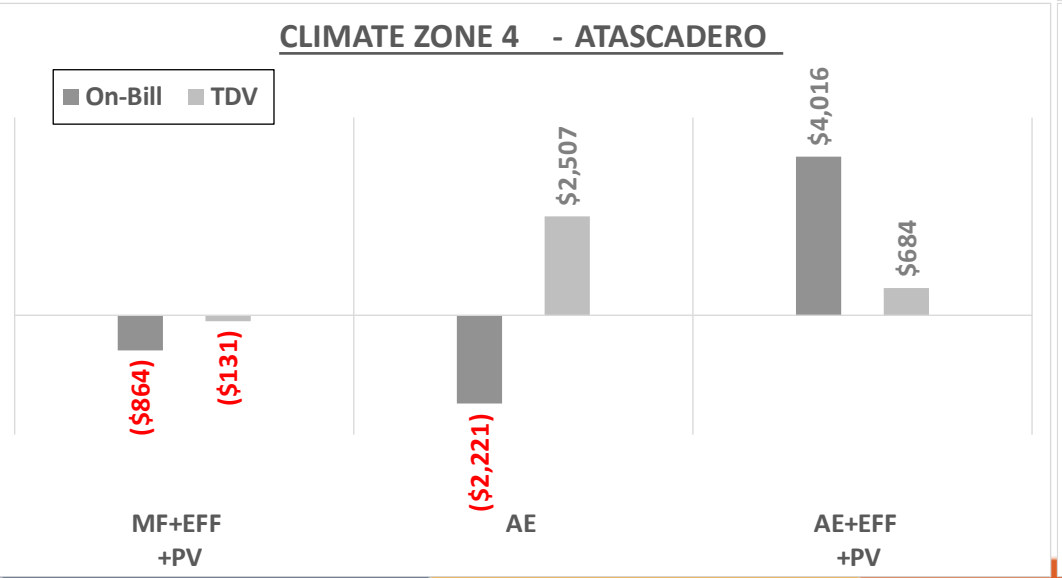


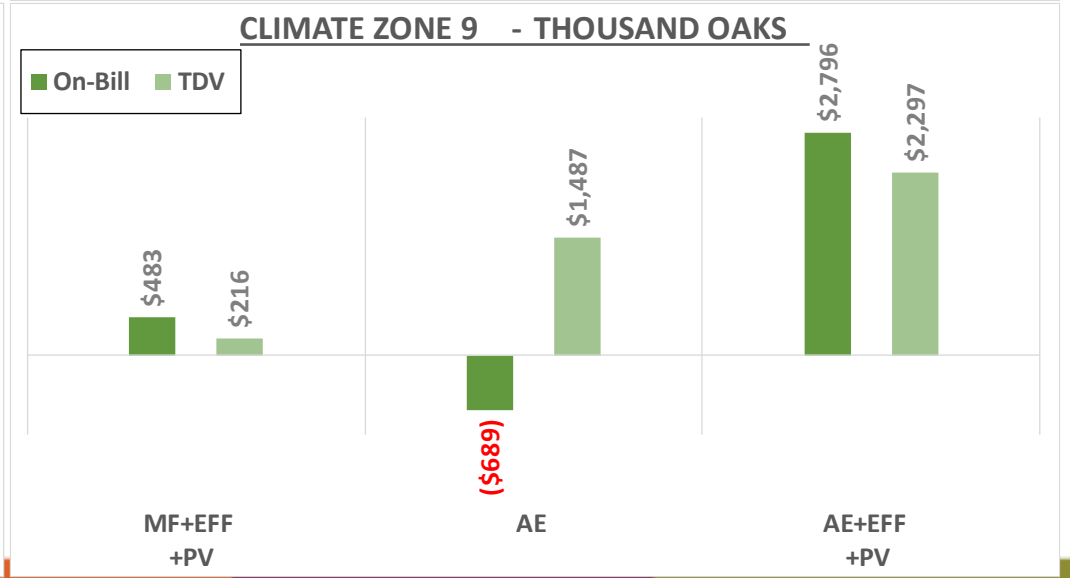
- All-electric c/e based on TDV
- All-electric c/e On-Bill in CZ 6 and 9
- All-electric + efficiency + PV c/e
- Mixed fuel package c/e based on TDV only

ADU Results









- Similar results to single family except…
- Efficiency measures added to all-electric to meet compliance
- Mixed fuel package not c/e with battery

Single Family/ADU Summary

All-Electric Required & All-Electric Preferred

- Slight lift for all-electric in some cases to preserve the 2019 envelope

All-Electric Preferred

- Significant reach for mixed fuel

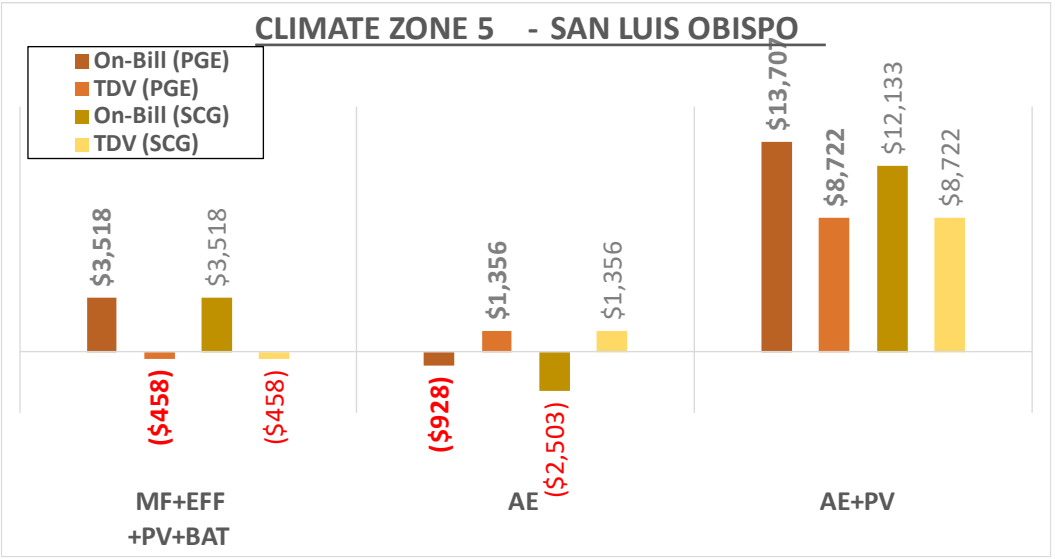
- Greatest greenhouse gas savings for all-electric cases

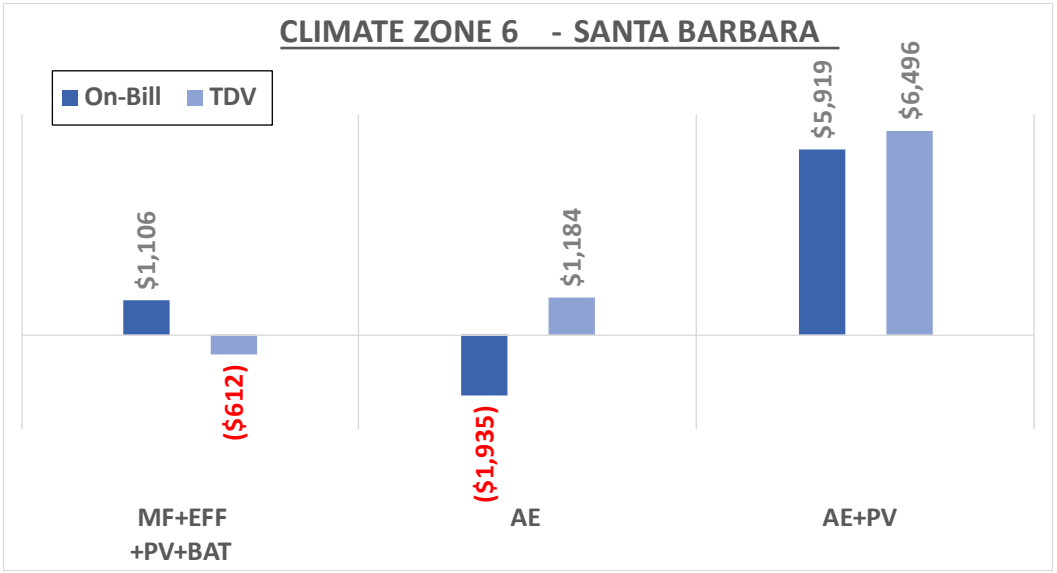
Efficiency EDR2 (TDV) recommendation

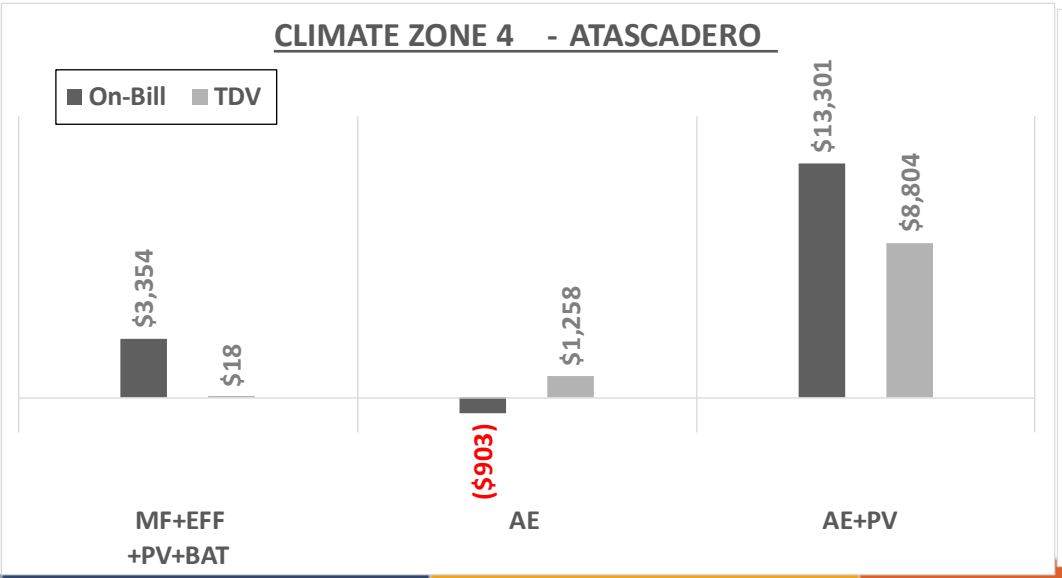
- **green** = positive compliance margin and cost-effective using both On-Bill and TDV approaches.
- **yellow** = positive compliance and cost-effective results using either the On-Bill or TDV approach.

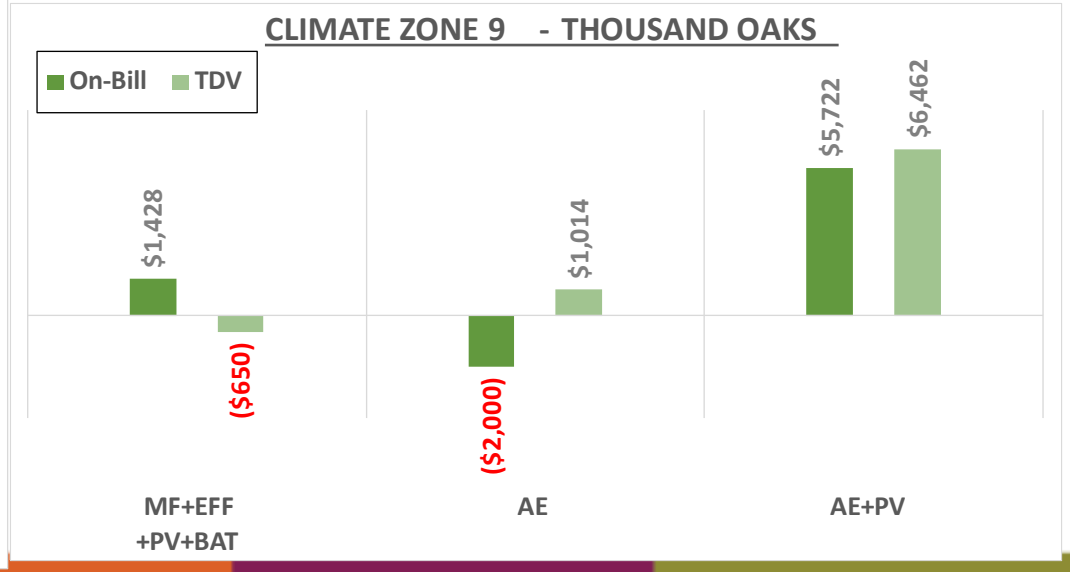
Climate Zone	Single Family			ADU		
	MF Eff+PV/Batt	AE Code Min	AE Eff+PV	MF Eff+PV	AE Code Min	AE Eff+PV
CZ04	9.6	3.7	8.6	6.7	2.3	6.7
CZ05	14.5	0.9	8.3	3.5	0	3.6
CZ06	9.2	2.5	7.8	6.0	0	6.0
CZ09	8.6	1.1	4.6	4.9	0.4	4.9

3-Story Multifamily Results



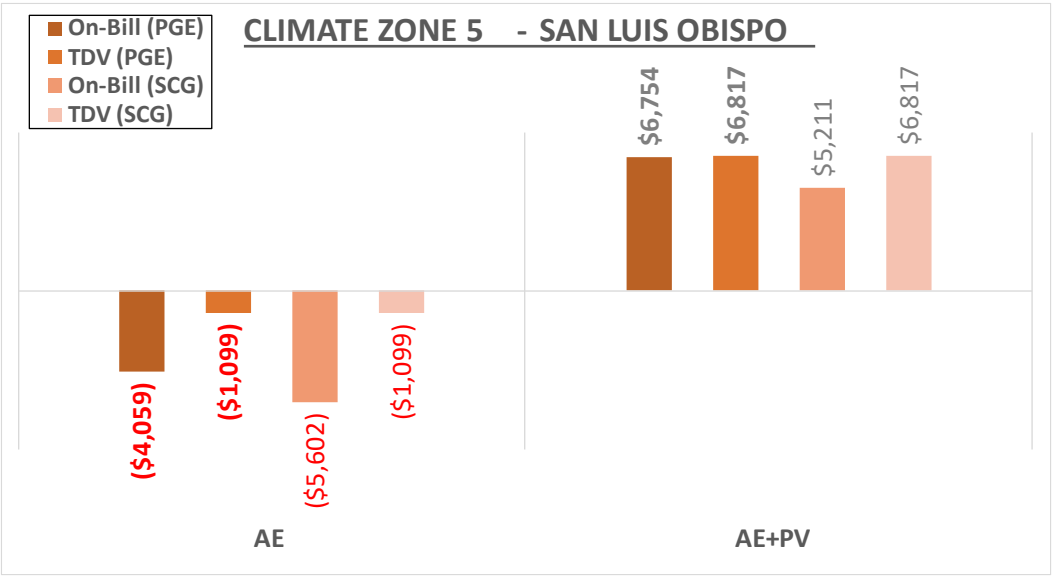


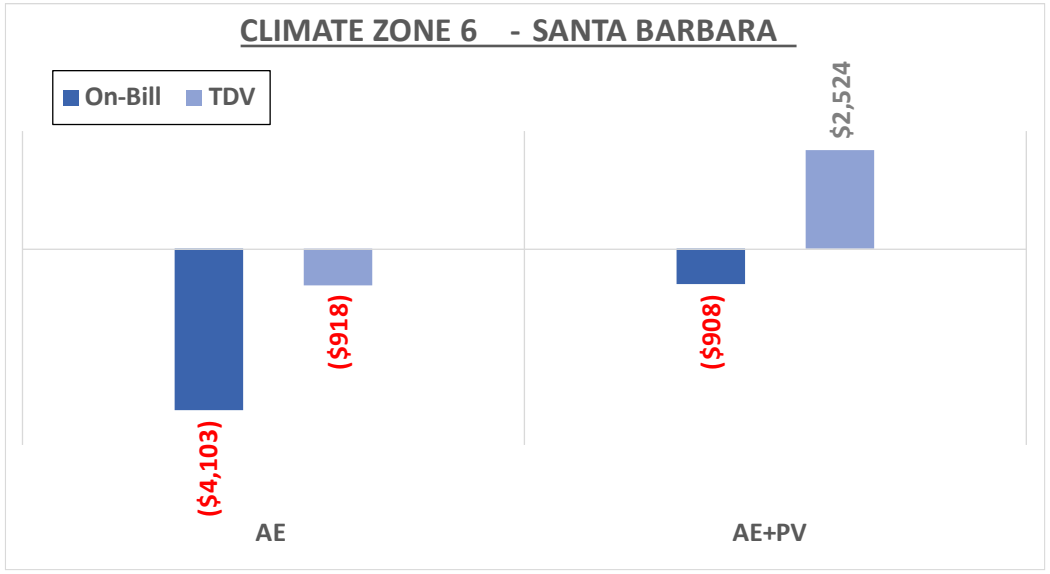


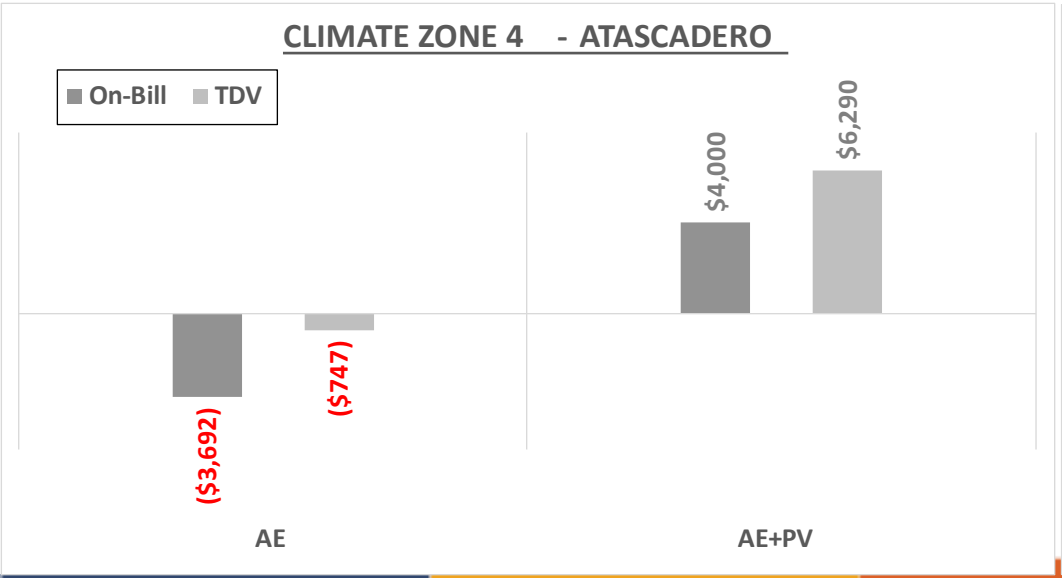


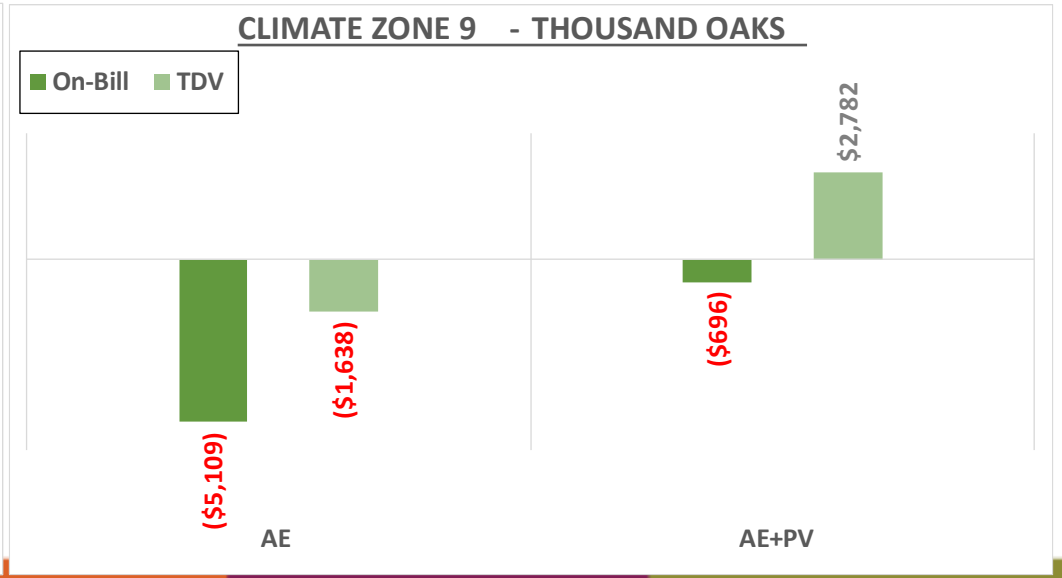
- All-electric c/e based on TDV, not On-Bill
- All-electric + PV c/e
- Mixed fuel package c/e On-Bill, not TDV

5-Story Multifamily Results









- Mixed fuel not evaluated yet
- All-electric not c/e
- All-electric + PV c/e on TDV, On-Bill in CZ4,5

Multifamily Summary

- Electrification of central water heating cost-effective in some cases, more challenging in others
  - More cost-effective based on TDV
- All-electric buildings are generally compliant with the 2022 code
- Adding PV to the packages improves On-Bill cost-effectiveness
- ~10% source energy savings are achievable cost-effectively for mixed fuel design

Next Steps

Next Steps

Single family/ADU

- Report out soon
- Includes additional package results, CARE rate results

Multifamily

- Update results to CBECC 2022.1.0 (or updated version)
- Investigate central HPWH options for larger multifamily buildings (5-story prototype)
- Evaluate efficiency packages for the 5-story prototype & the all-electric packages.

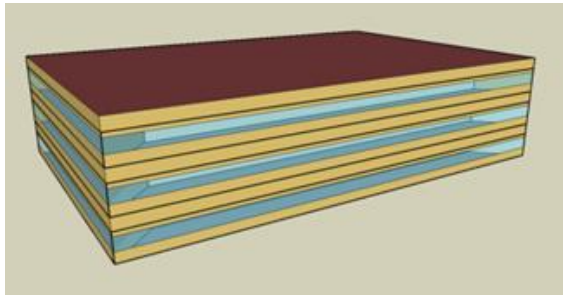
Non-Residential Cost Effectiveness Study Results

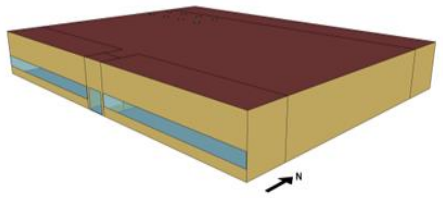
Avani Goyal– TRC

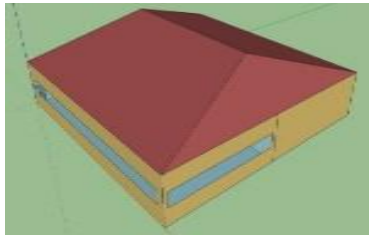
Nonresidential Prototypes

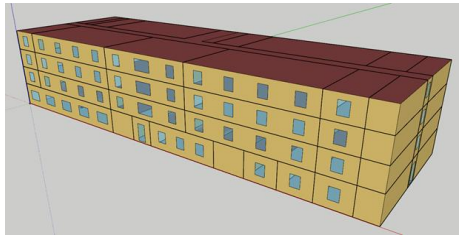
- Draft results (current) built in CBECC 2022.0.8 Beta software
- Final results will be updated with compliance software CBECCv1.0

	Medium Office (MO)	Medium Retail (RE)	Quick Service Restaurant (QSR)	Small Hotel (SH)
CFA	53,628 ft^2	24,692 ft^2	2,501 ft^2	42,552 ft^2
Stories	3	1	1	4
WWR	33%	7.1%	14%	11%
Thermal zoning	Large core, 4 perimeter zones	Large core, 4 very small zones	Dining, Kitchen	77 Guest rooms, laundry, NR areas









HVAC System Selection

- Baseline – Title 24 ACM System Map

	Medium Office	Medium Retail
Baseline (2022 T24 code) 	VAV reheat system: Packaged RTUs + VAV **hot water reheat boxes** fed by gas boiler	<u>Core zone (>30 ton):</u> Packaged SZAC + Gas furnace <u>Other small zones:</u> Single zone heat pump or dual fuel heat pump
All-electric 	VAV reheat system: **VAV electric resistance boxes**	Packaged SZ heat pump

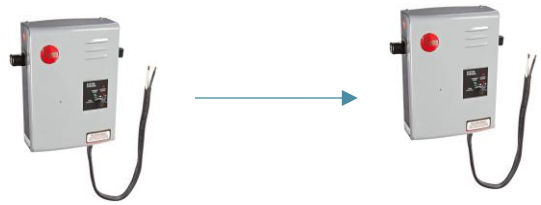
HVAC System Selection

- Baseline – Title 24 ACM System Map

	Quick Service Restaurant	Small Hotel
Baseline (2022 code) 	Packaged SZAC + Gas furnace	Guest Rooms: Packaged **SZAC** + Gas furnace Nonresidential: VAV reheat system: Packaged RTUs + VAV **hot water reheat boxes**
All-electric 	Packaged SZ heat pump	Guest Rooms: Packaged **SZ heat pump** Nonresidential: VAV reheat system: **VAV electric resistance boxes**

Water Heating System Selection

- Medium Office and Retail
  - limited water heating use
  - electric resistance POUs in both baseline and proposed.



- Restaurant and Small Hotel
  - Water heating electrification, HPWH

	Quick Service Restaurant	Small Hotel
Baseline (2022 code)	Gas storage water heater	**Guest Rooms:** Central boiler **On-site laundry:** Gas storage water heater
All-electric	Unitary heat pump water heater	**Guest Rooms:** Central heat pump single pass system **On-site laundry:** Split heat pump water heater

Reach Code Packages

- Efficiency measures added from 2025 CASE measure list – envelope, lighting, HVAC control
- Efficiency measures list varies by prototype
- Load Flexibility introduced for MO and QSR

	Mixed Fuel		All-Electric		
	Code Minimum Efficiency (Baseline)	Energy Efficiency (MF+EE)	Code Minimum Efficiency (AE)	Energy Efficiency (AE+EFF)	Energy Efficiency + Load Flexibility (AE+EFF+LF)
MO	Y	Y	Y	Y	Y
RE	Y	Y	Y	Y	
QSR	Y	Y	Y*	Y*	Y
SH	Y	Y	Y**	Y**	Y

* *Two scenarios: HVAC and water heating electrification only, mixed fuel cooking in both baseline and all-electric packages*

** *Includes electrification of laundry water heating and dryer*

LOAD FLEXIBILITY

MO: Smart Thermostat + Demand Response Lighting
QSR: HPWH Load shift

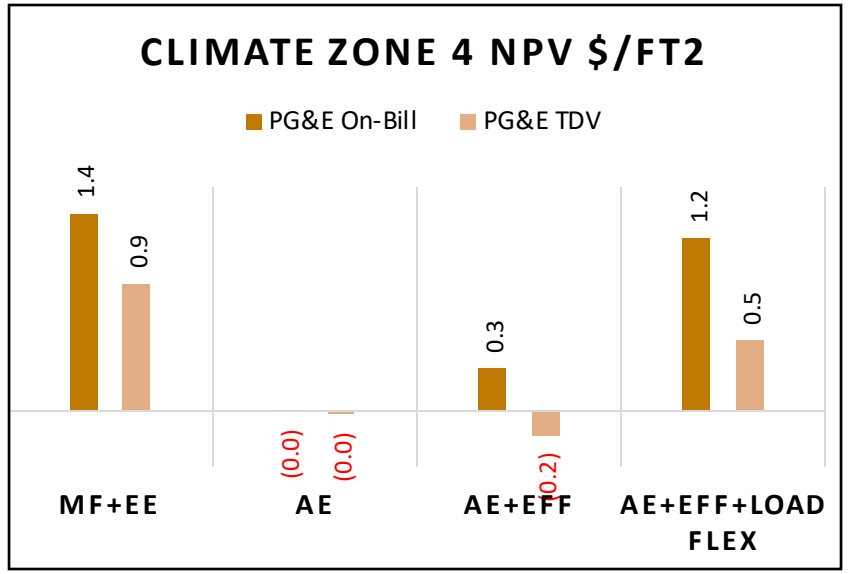
DRAFT Cost Effectiveness Results

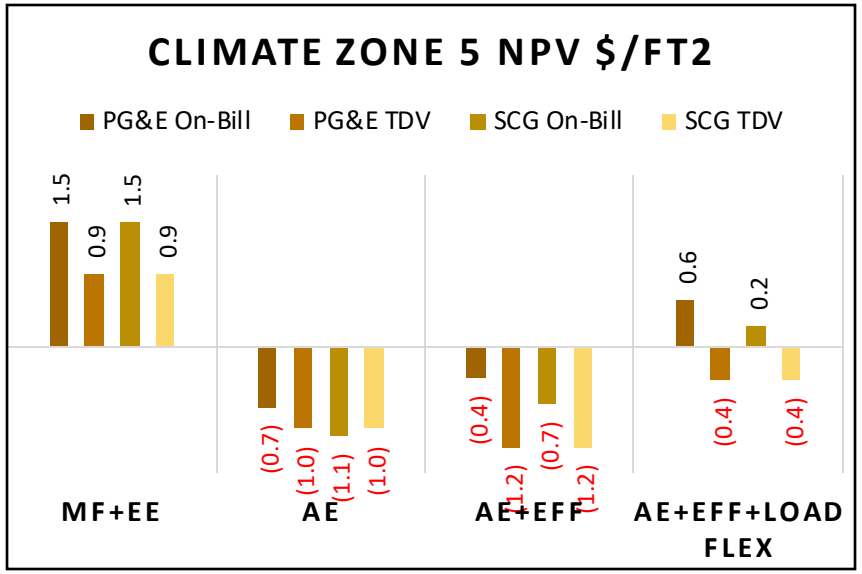
15-year lifecycle

Medium Office C/E Results

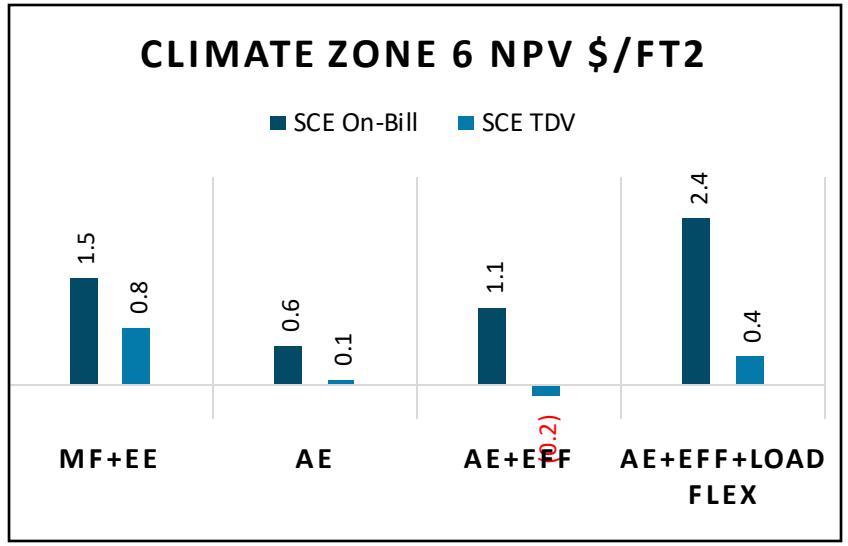
- MF+EE c/e in all CZs
- All-electric is cost effective in **SCE** territory CZ6 and 9, "almost" c/e in **PG&E** territory CZ4 as well
- All-electric with efficiency measures on-bill c/e in **SCE** CZ6 and 9 and **PG&E** CZ4
- Electrification in **PG&E** and **SCG** CZ5 c/e with efficiency and load flexibility measure.

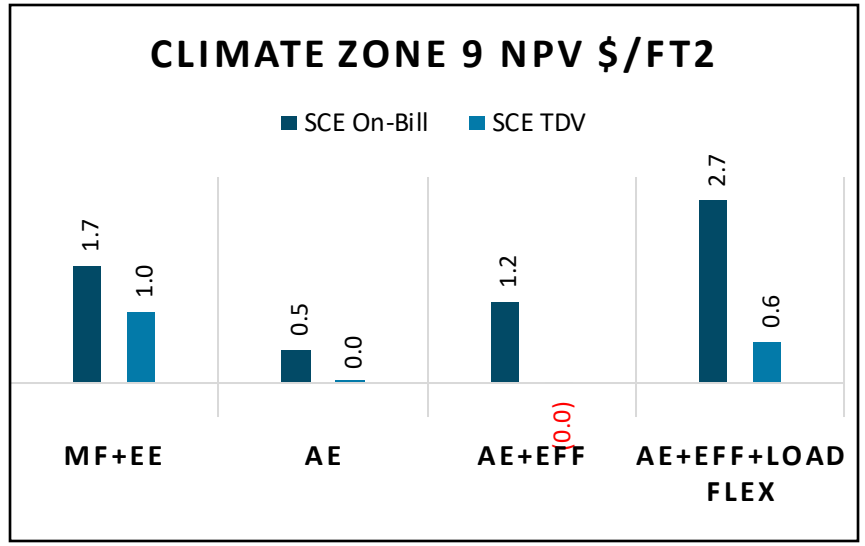
PG&E





SCE



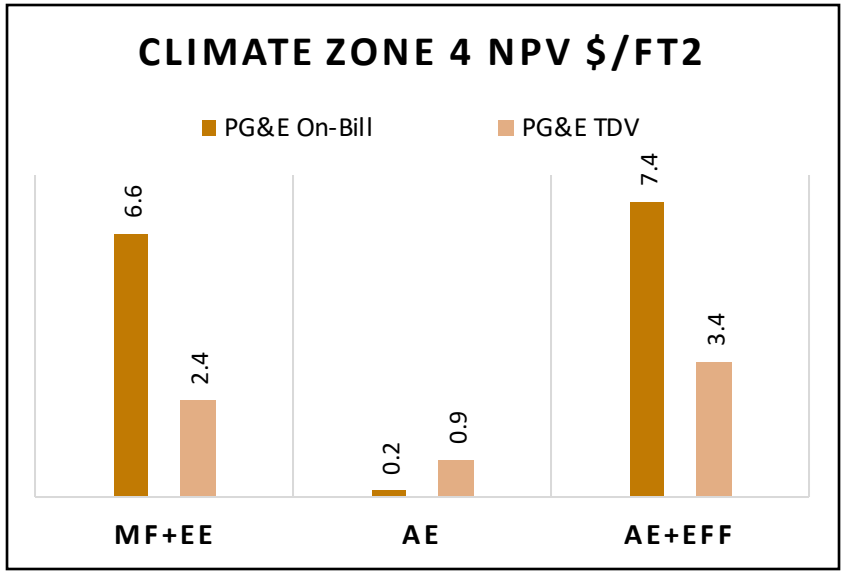


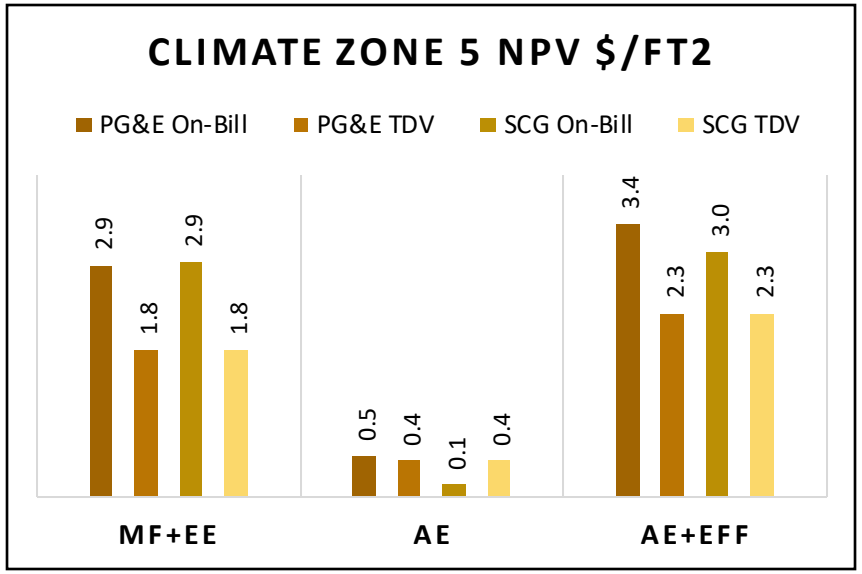
SCG – PG&E electricity with SoCalGas SCE – With SoCalGas

Medium Retail C/E Results

- MF+EE c/e in all CZs
- **All-electric c/e in all territories** CZs 4,5,6 and 9
- Improved c/e with efficiency measures
- Low incremental costs for packaged single zone heat pump (small zones <20 tons are reqd to be heat pump prescriptively)

PG&E





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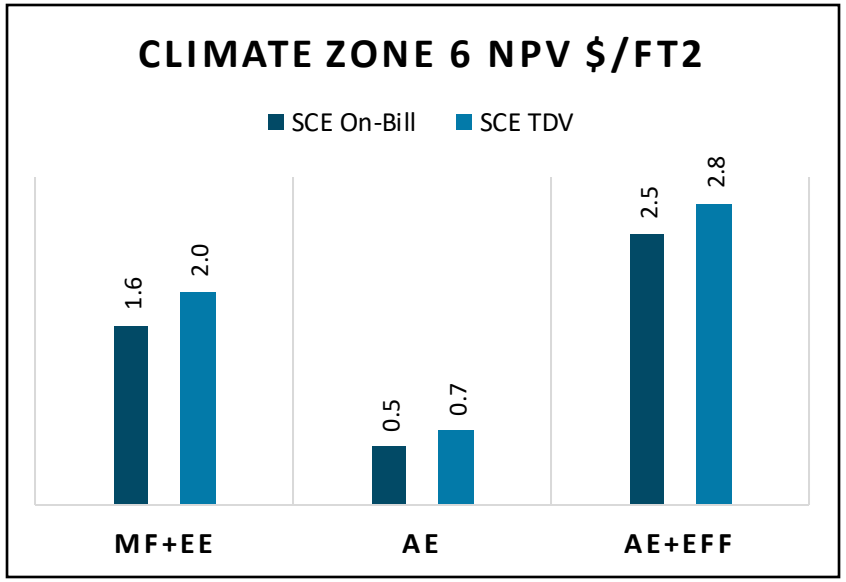
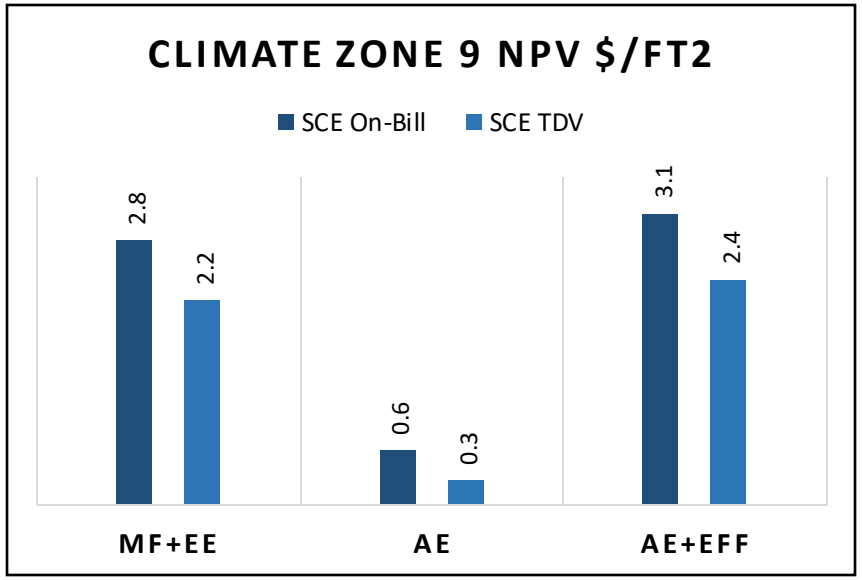


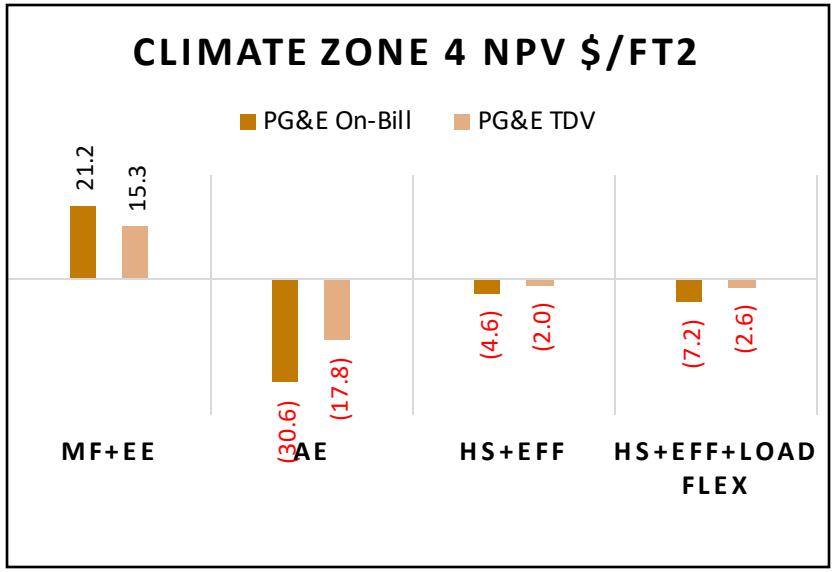


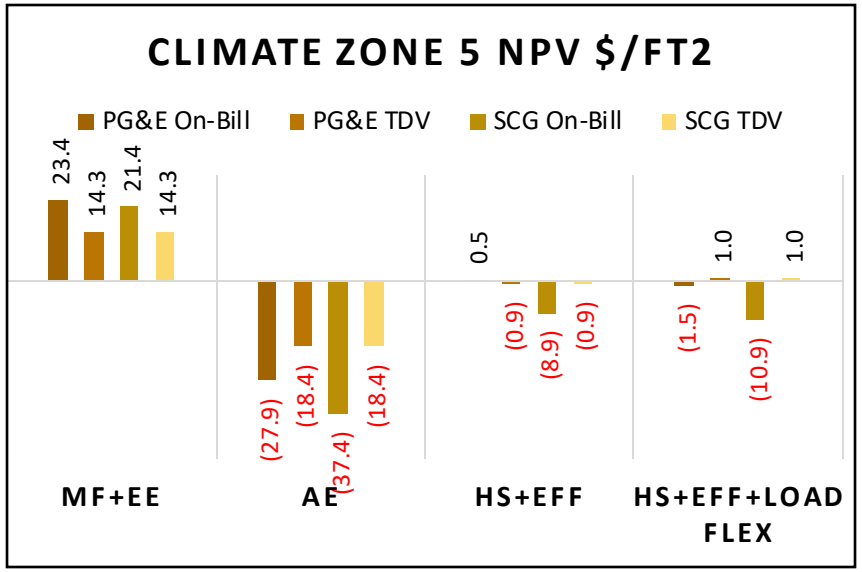
SCG – PG&E electricity with SoCalGas SCE – With SoCalGas

Quick Service Restaurant C/E Results

- MF+EE c/e in all CZs
- All-electric **HVAC and SHW** package **non-cost-effective**.
- All-electric with efficiency measures on-bill c/e in **PG&E** territory CZ5
- All-electric with efficiency and load flex TDV c/e in **PG&E** and **SCG** territory CZ5
- No c/e all-electric HVAC and SHW package found in CZ6 and 9 **SCE** territory
- Mixed fuel cooking in all packages, gas infrastructure cost savings not applicable

PG&E





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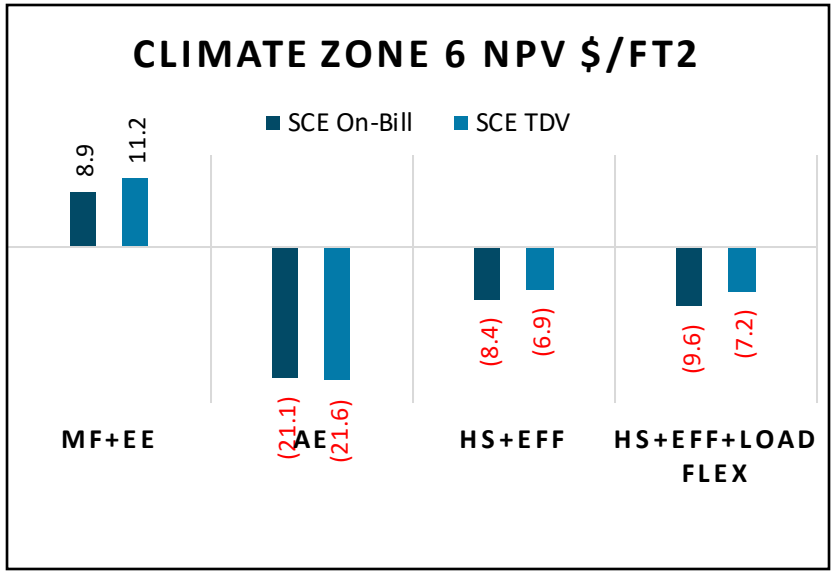
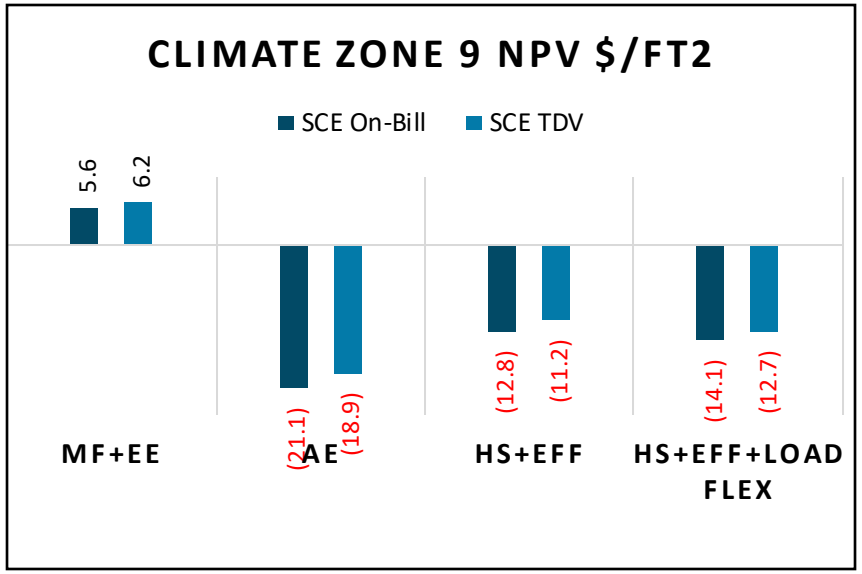


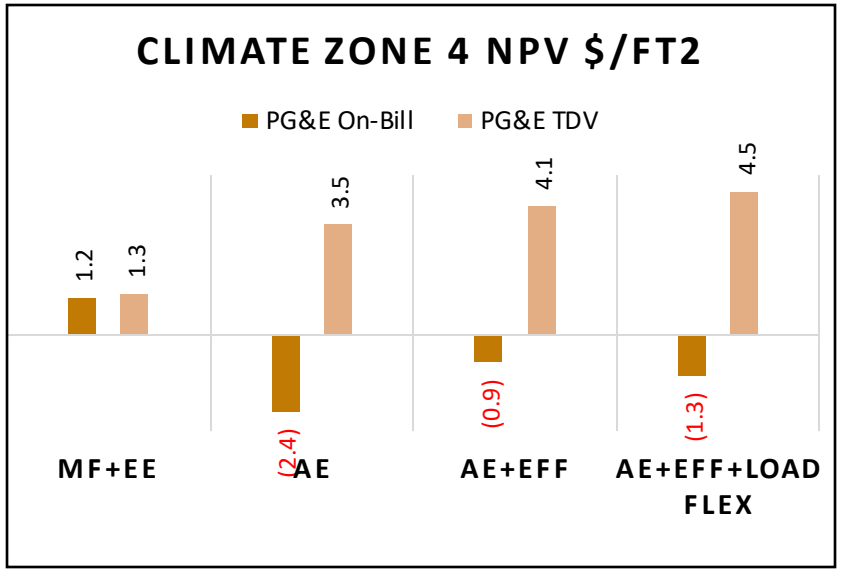


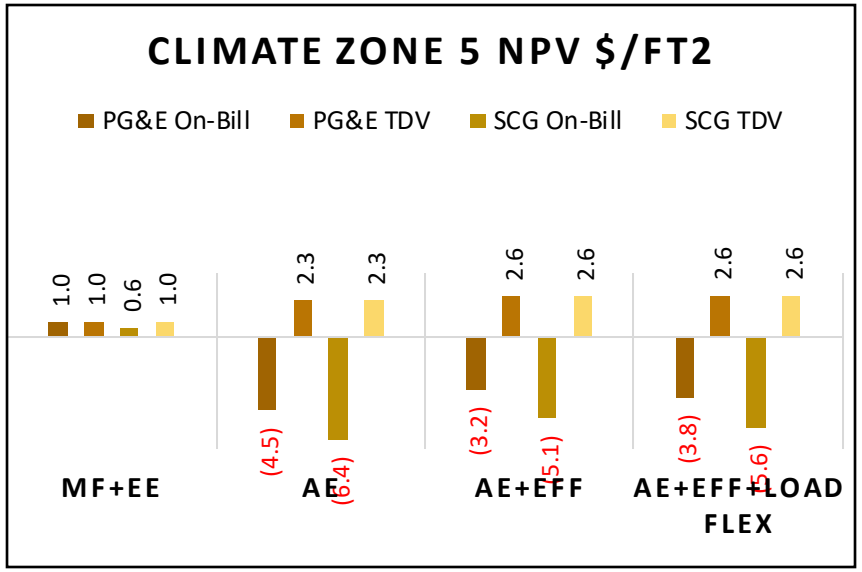
SCG – PG&E electricity with SoCalGas SCE – With SoCalGas

Small Hotel C/E Results

- MF+EE c/e in all CZs
- **All-electric alone TDV c/e** cost-effective in all CZs.
- All-electric with efficiency measures and/or load flex improves TDV c/e in all CZs
- Electrification is not cost effective on-bill in any CZ.

PG&E





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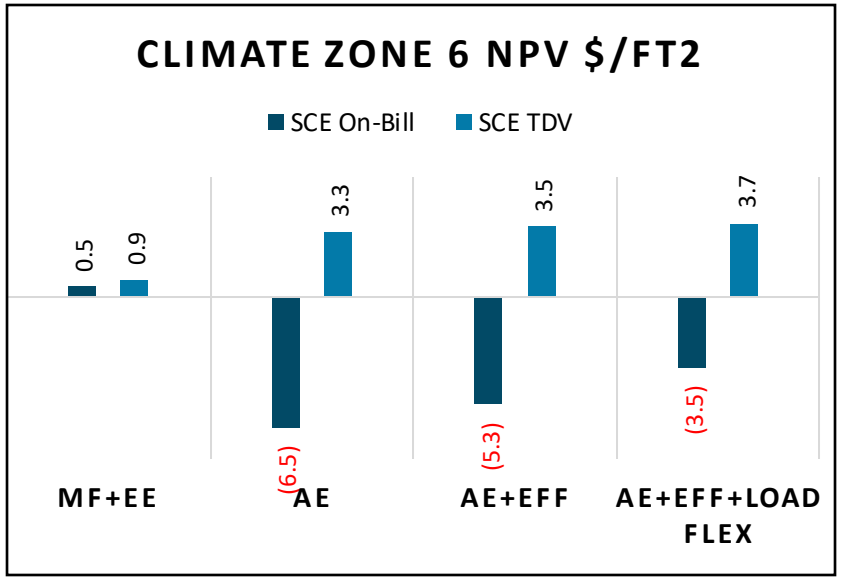
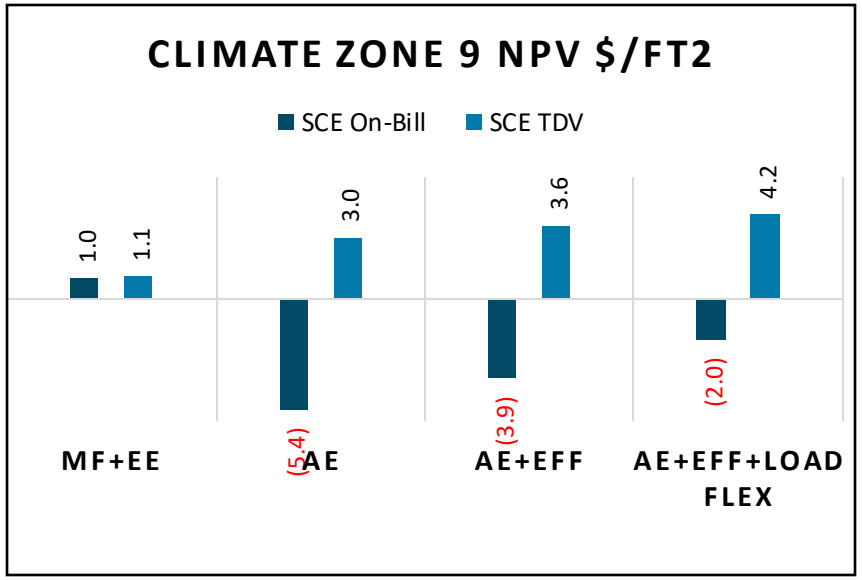




SCG – PG&E electricity with SoCalGas SCE – With SoCalGas

Conclusions

- High potential of mixed-fuel plus efficiency measures and/or all-electric policy adoption
- Electrification alone is challenging to be cost effective
  - Efficiency measures help
  - Fewer efficiency opportunities due to improvements in 2022 state code
- Load Flexibility improves cost effectiveness considerably for Medium Office
- TDV metric is generally more often cost-effective than On-bill (except small hotel)
- Many building types and climate zones can cost-effectively construct all-electric.
  - Small hotel, including central water heating and laundry, due to tremendous HVAC cost savings
- Restaurant all-electric cooking not yet cost-effective

Next Steps

- Improve on-bill cost-effectiveness by adding
  - Solar PV/battery above state code req's

- Report Source Energy Metric and TDV Compliance Margin
  - Currently testing the Standard Design in CBECC 2022 V1.0 Compliance version
  - Next iteration will include compliance metrics and c/e results based on CBECC V1.0 software update

Thank You!

Questions?

For further queries, please contact:

Avani Goyal: agoyal@trccompanies.com

OR

info@localenergycodes.com

10 Minute Break!!

Reach Codes and Utilities

Jay Madden – Southern California Edison

Technical Support for Reach Codes - Utilities

Speaker: Jay Madden, PE
Southern California Edison,
Energy Codes & Standards

Energy for What's Ahead℠

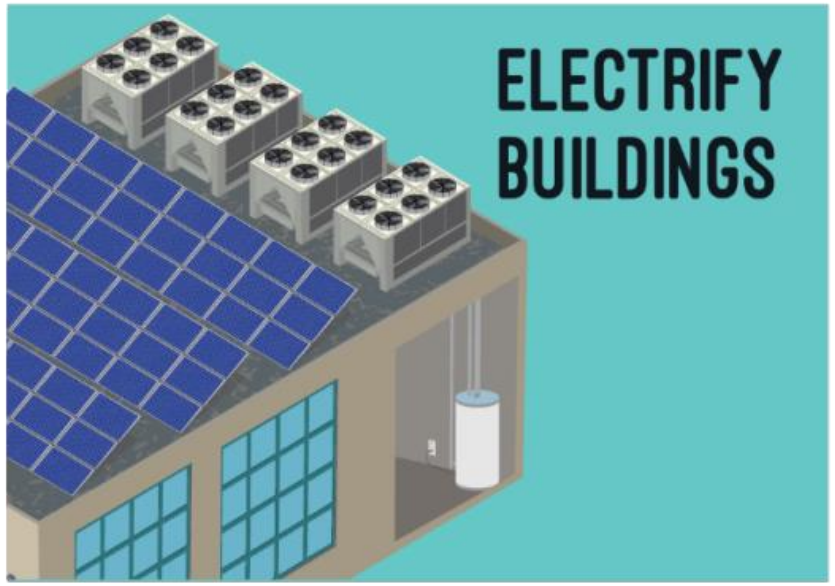
EDISON INTERNATIONAL®

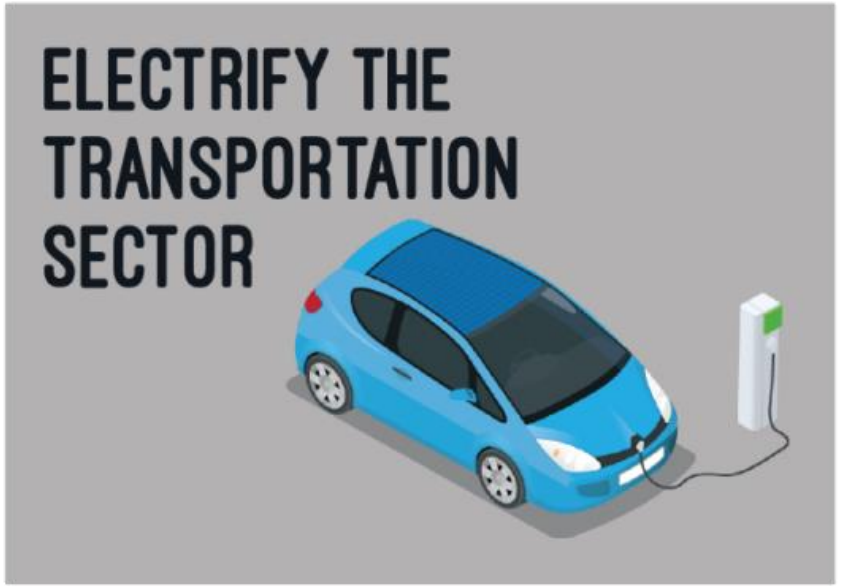
State GHG Goals and Clean Energy Policies

- SB 350
  - Reduce GHG to 40% below 1990 levels by 2030
  - Reduce GHGs to 80% below 1990 levels by 2050
  - Double statewide energy efficiency savings in electricity and natural gas end uses by 2030
- How?
  - California Air Resources Board (CARB)
  - California Public Utilities Commission (CPUC)
  - California Energy Commission (CEC)
- Other State Legislation and Executive Orders
  - SB 1477, AB 32, SB 100, Executive Order B-55-18

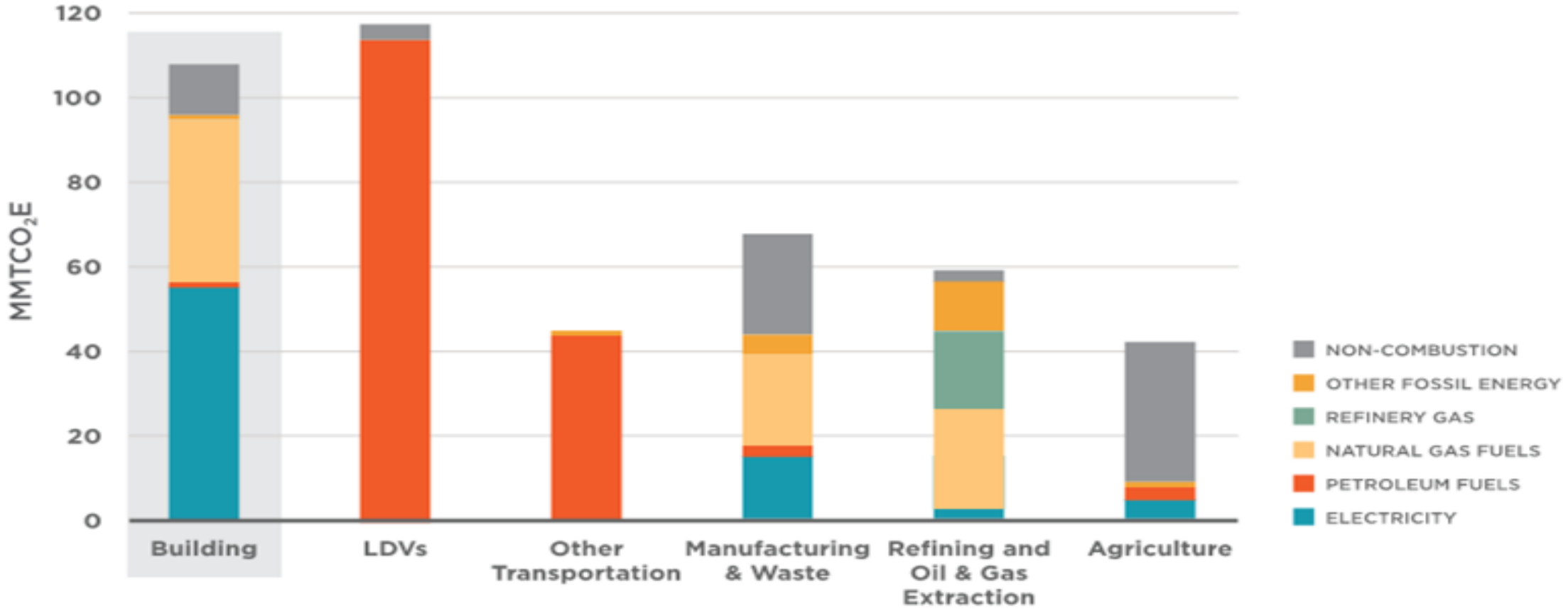
Utility Commitments to Carbon Neutrality

- Carbon neutrality by 2045 per SB 100 and Executive Order B-55-18
- SCE's Pathway 2045
  - Carbon-free electricity
  - Transportation electrification
  - Building electrification
  - Local governments are crucial partners
- PG&E's Climate Change webpage
- SDG&E's Path to Net Zero
- SMUD's 2030 Zero Carbon Plan





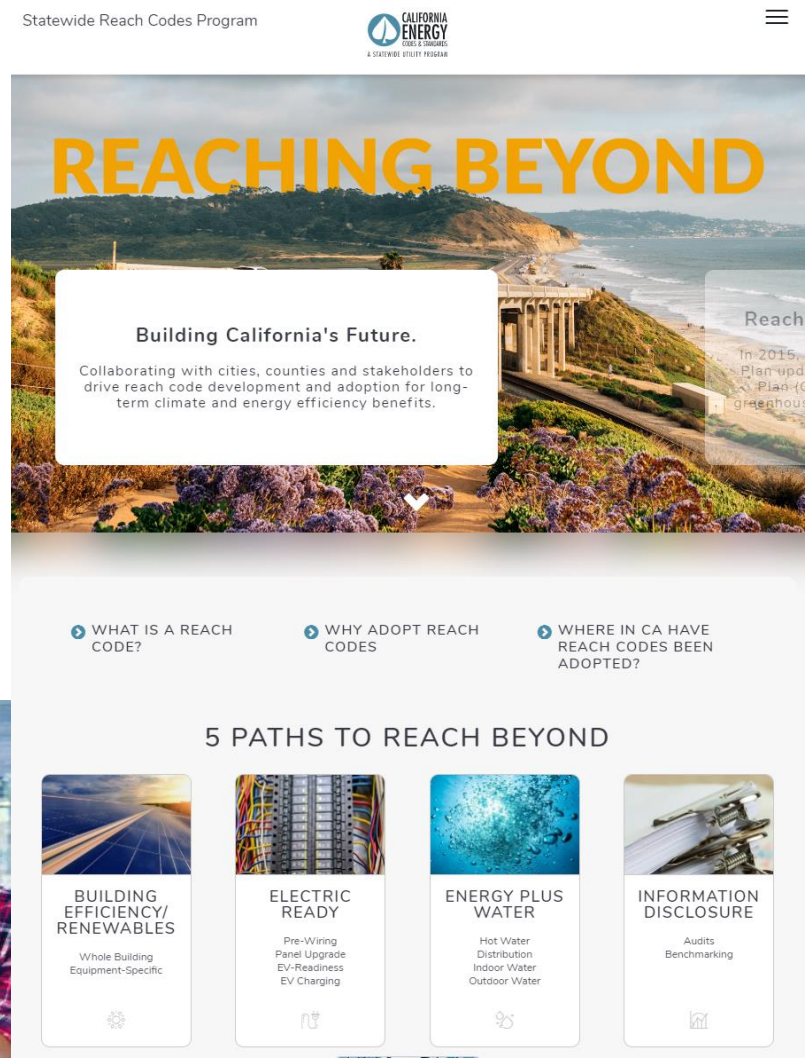
California's GHG Emissions Today – Buildings 24%



Source: Building Decarbonization Coalition, Amy Rider, January 2021

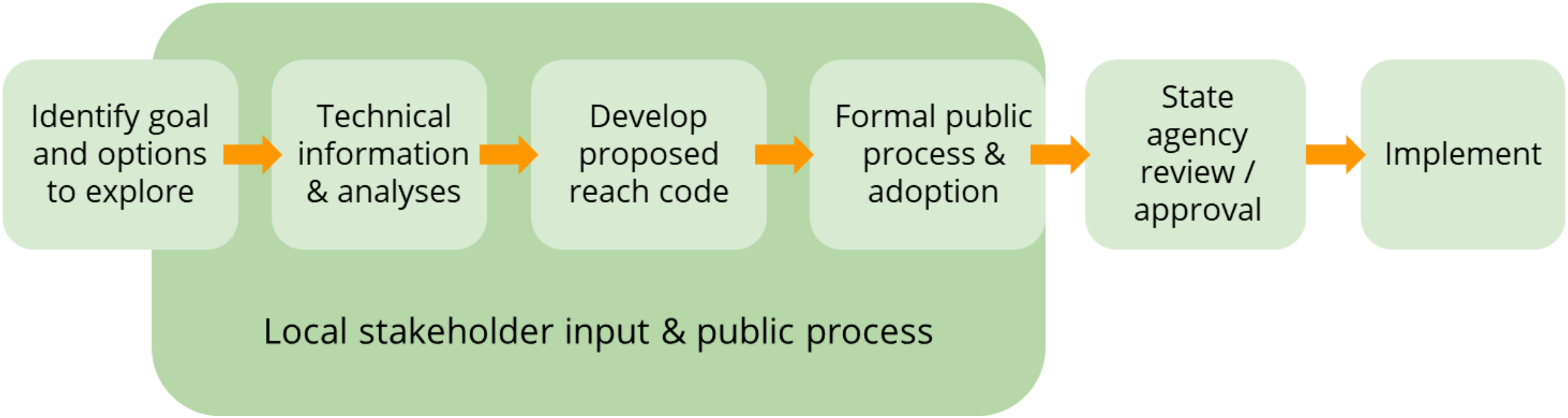
Resources

- Local Energy Codes' website and newsletter
  - Cost-effectiveness reports & web-based tool
- Technical Support
- SCE's newsletter & website
- Email updates from your local governments
- Twitter handles to follow
  - @CA_codes
  - @SCE_PublicAff
  - @SCE_JoshuaT
  - @BuildingDecarb



Reach Codes
Process

All-Electric Reach Codes – Process



Source: Statewide Reach Codes Program, Reach Codes Newcomers Webinar #1

All-Electric Reach Codes – California Energy Commission (CEC) Review (If Title 24 Part 6 is Modified)

- Once adopted, local governments need to submit reach codes, supporting materials, and findings to the CEC
- The CEC will have a comment period and consider the local reach code at a business meeting
- The CEC will approve the reach code if the local government demonstrated that it is **cost-effective** and finds that the reach code **will not allow buildings to use more energy** than the base code. *(2019 Building Energy Efficiency Standards, Section 10-106 and Public Resources Code Section 25402.1(h)2)*

Source: Statewide Reach Codes Program, Reach Codes Newcomers Webinar #1

All-Electric Reach Codes – Building Standards Commission (BSC) Review (If Any Part of Title 24 is Modified)

- Local governments also need to send adopted reach codes to the BSC for approval
- Must include finding that the amendment is **necessary because of local climatic, geological, or topographical conditions** (Health & Safety Code, Sections 17958.7 & 18941.5)
- More information can be found here

Source: Statewide Reach Codes Program, Reach Codes Newcomers Webinar #1

All-Electric Municipal Code Ordinance – No CEC or BSC Review (Title 24 Not Modified)

- Ordinance is not filed with CEC or BSC
- Not tied to the building code cycle and can be adopted indefinitely
- Must include finding that the amendment is **necessary because of local climatic, geological, or topographical conditions** (Health & Safety Code, Sections 17958.7 & 18941.5)
- Approximately 11 jurisdictions including Berkeley, San Jose, and Santa Cruz have pursued this route

Source: https://bayareareachcodes.org/

All-Electric Reach Codes
Recent Activity

Energy for What's Ahead℠

EDISON INTERNATIONAL®

New Construction Reach Codes

450+ local jurisdictions

Albany
Berkeley
Carlsbad
Davis
Hayward (non-res)
Marin County
Mill Valley
Milpitas
Palo Alto (non-res)
San Anselmo
San Luis Obispo
San Mateo
San Rafael
Santa Monica

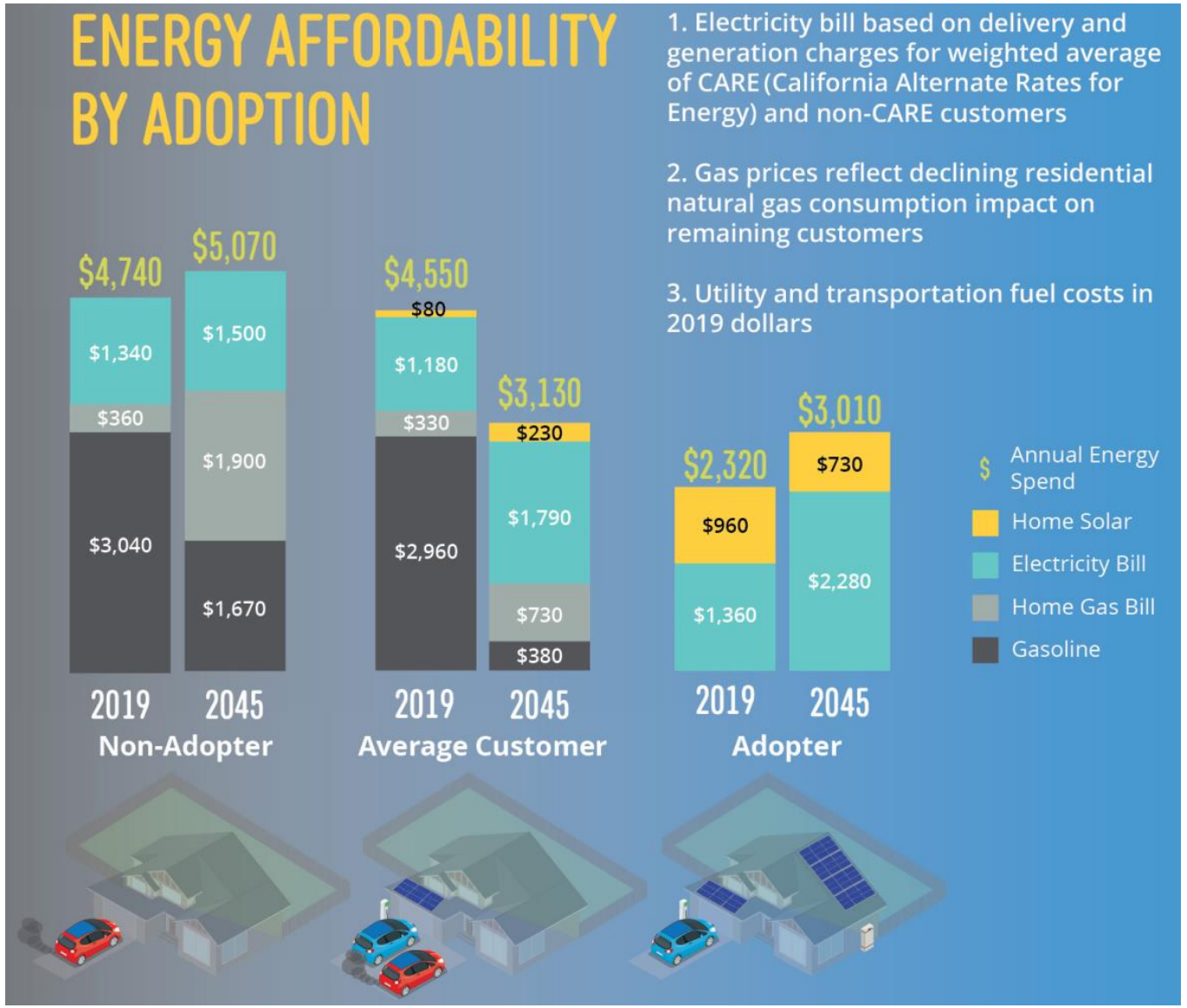
Campbell
Emeryville
Hayward (res)
Los Altos Hills
Los Gatos
Palo Alto (res)
Piedmont
Sacramento (2023)
Santa Rosa
South San Francisco

Alameda
Berkeley
Brisbane
Burlingame
Cupertino
Daly City
East Palo Alto
Encinitas
Fairfax
Healdsburg
Los Altos
Menlo Park
Millbrae
Milpitas (city owned)
Morgan Hill
Mountain View
Oakland
Ojai
Pacifica
Petaluma
Redwood City
Richmond
San Carlos
San Francisco
San Jose
San Mateo
San Mateo County
Santa Barbara
Santa Clara
Santa Clara County
Santa Cruz
Saratoga
Solana Beach
Sunnyvale
~~Windsor~~

Based on Approval Date (if required), or Adoption Date:

2019
2020
2021

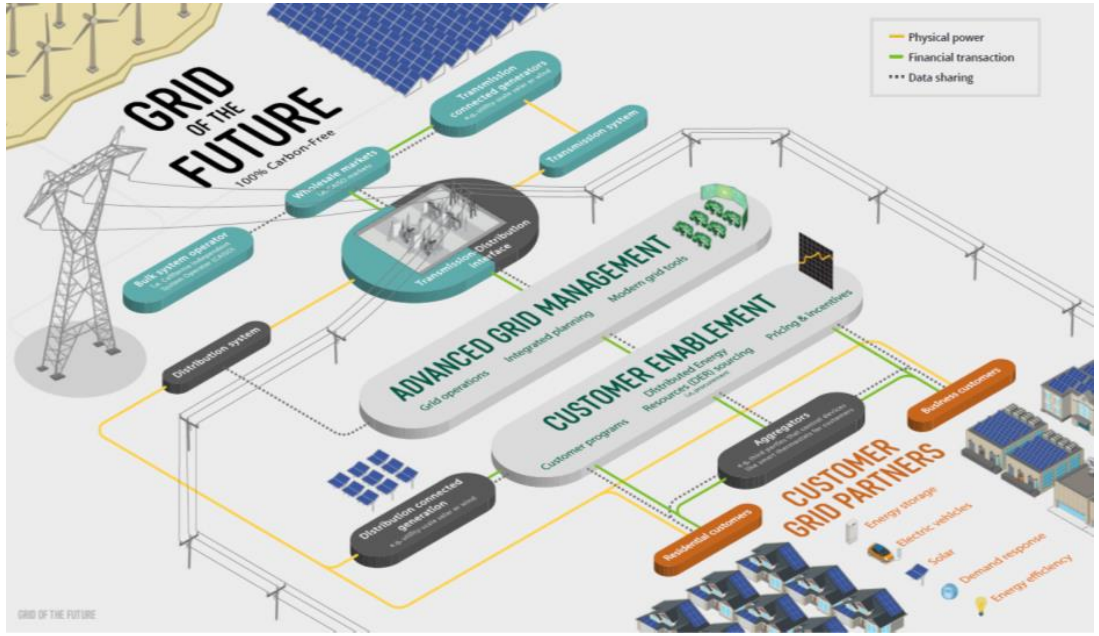
Annual Energy Costs for Residential Households



Source: [SCE Pathway 2045]

Increased Resiliency is One of Our Top Priorities

- Distributed Energy Resources
  - Solar, batteries, EVs
- Grid Investments
- Electric vs gas appliances
  - Heat pump water heaters: load shifting, demand response
- As we become more dependent on electricity as a fuel source, how we receive that electricity will diversify
- For more info, see SCE's Reliability Fact Sheet



Thank you

For more info, please contact Jay Madden at jay.madden@sce.com

3C-REN Reach Code Support Program

Gray Gauteraux – 3C-REN

Central Coast Jurisdictions with Reach Codes

City of San Luis Obispo

Clean Energy Choice Program (mixed-fuel + PV)

City of Santa Barbara

All-Electric New Buildings Requirement

Ojai

All-Electric New Buildings Requirement

Currently Considering or Developing Reach Codes with 3C-REN Partnership

City of SLO*
Morro Bay
Goleta
Carpinteria
County of Santa Barbara

County/Municipal Code Amendment Pathway

(Varies by jurisdiction code adoption procedure)

Direction from Council (start)

- Present and seek Council/BOS direction for an ordinance

Technical Development (2-3 months)

- Explore code scope options*
- Determine where to site*
- Review cost-effectiveness data*
- Draft ordinance*
- Legal review

Public Outreach (1-2 months)

- Create outreach campaign*
- Host forums for public comment*
- ID/Engage potential opposition*
- Record engagement and feedback*

Return to Council

- Develop staff report*
- Return to council for decision or further direction

Implementation (ongoing)

- Conduct workforce and household education and training*

*3C-REN supported

Reach Codes Support Program

- Launched in January 2022
- Purpose: To offer support to jurisdictions and counties that need outreach or technical assistance in order to adopt reach codes.
- Funding: Free to partners. Funded by 3C-REN. ~$10-12k/city
- Structure: 3C-REN (Outreach) + Franklin Energy (Technical)

Technical Support

- Exploring code types with recommendations tailored by city
- Drafting ordinance language
- Siting new reach codes within existing municipal code
- Conduct fact finding
- Connecting staff or the implementing workforce with educational resources and training opportunities

Outreach

- Develop public engagement plans
- Conducting public engagement and assisting with public comment periods
- Identifying potential opposition and create responsive marketing tactics
- Facilitate staff and stakeholder coordination meetings

Jurisdiction Presentation: City of Santa Barbara

Kristian Hoffland

SUSTAINABILTY & RESILIENCE DEPARTMENT

ENERGY & CLIMATE DIVISION

SANTA BARBARA PROHIBITION OF NATURAL GAS INFRASTRUCTURE REACH CODE

Sustainability.SantaBarbaraCA.gov

TOGETHER TO ZERO Santa Barbara JUNTOS A CERO

PROHIBITION OF NATURAL GAS INFRASTRUCTURE REACH CODE

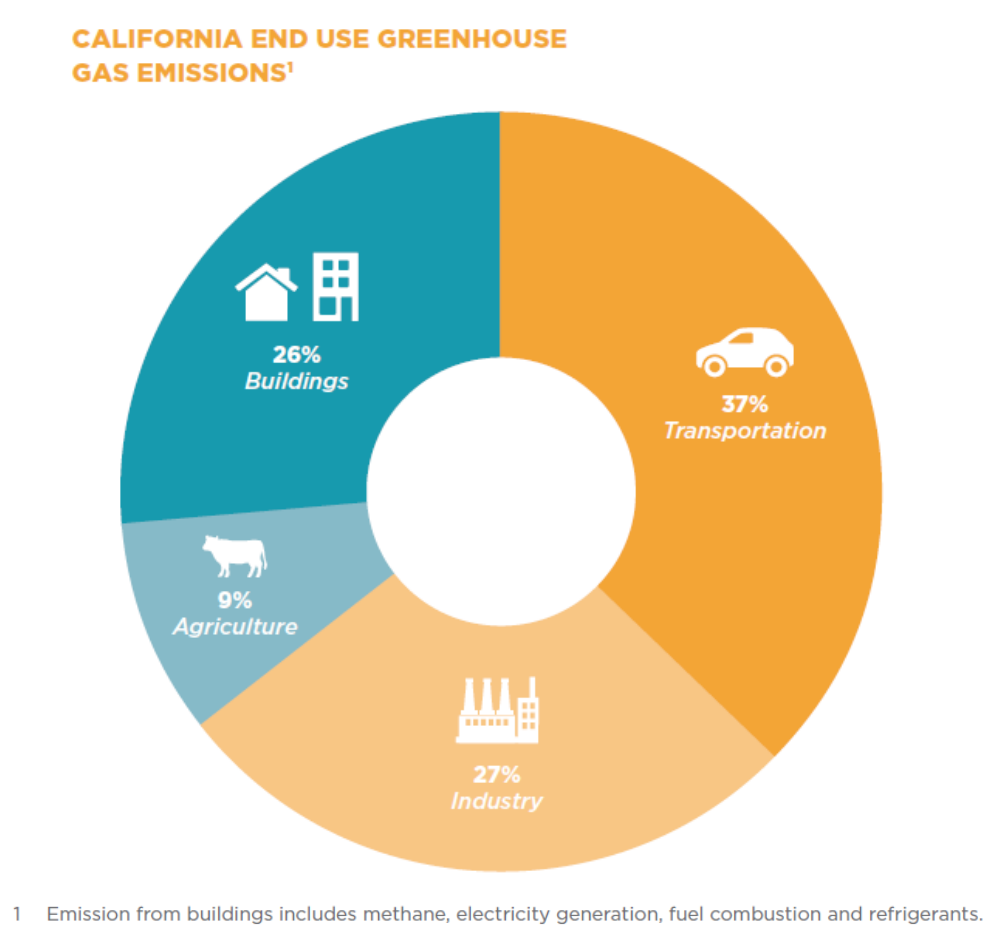
Central Coast Reach Code Policy Workshop: Lessons learned- July 14, 2022

Kristian Hoffland
Energy and Climate Analyst
CITY OF SANTA BARBARA, Sustainability & Resilience
(805) 564-5595 | khoffland@SantaBarbaraCA.gov

- Background
- Opposition
- Defining Scope & Exemptions
- Strategies for Implementation

California's Climate Goals

- 1990 Levels by 2020 – Accomplished!
- 40% below 1990 by 2030
- Carbon Neutrality by 2045

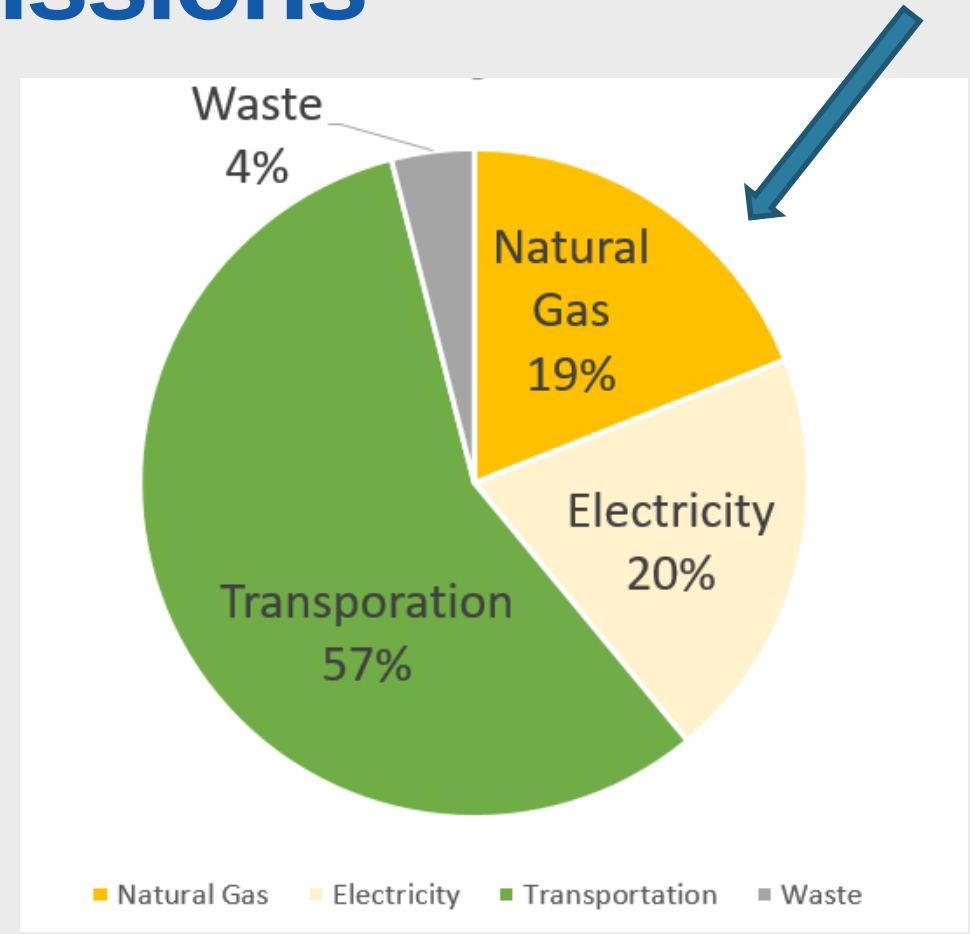


Santa Barbara city goals:

- Carbon Neutrality by 2035

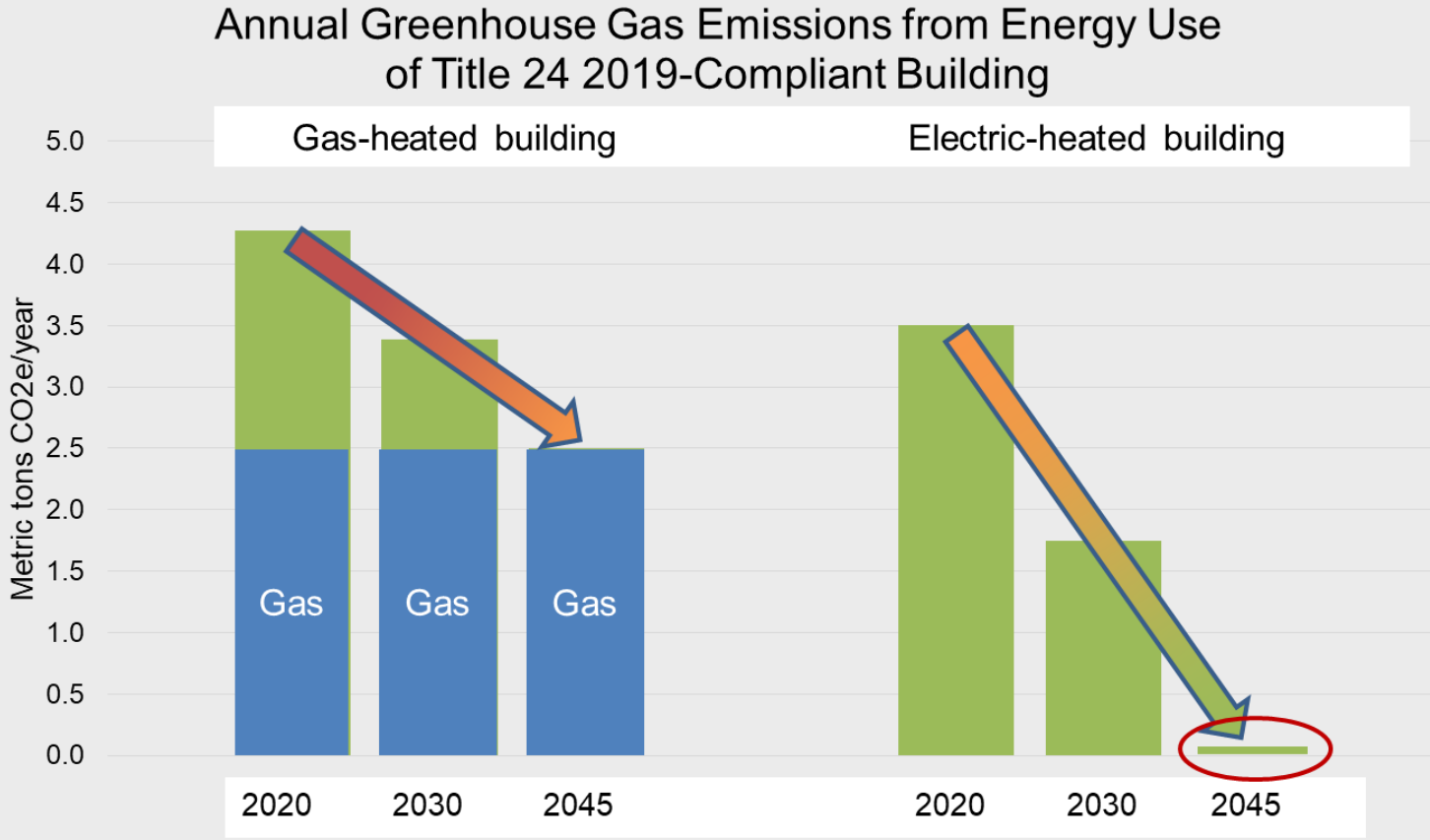
Santa Barbara GHG Emissions

- Buildings account for 25% of emissions in California
- Almost 40% in Santa Barbara!
  - *Buildings account for nearly all energy use in SB*



Benefits

- Climate
  - As electric grid becomes more renewable, increased reductions in GHG emissions



Timeline

- July 27 2021:Ordinance 6014 adopted by council
- January 1st 2022 the ordinance effective date for new building permit applications
  - *4:30 pm Dec 22 2021 building permit submission deadline*
  - *Submissions must be complete*
  - *No exemption for projects in planning process*

Opposition & Public Concerns

- Technology & Availability
- Alternative Technologies
- Cost
- Customer Choice
- Resilience
- Grid Capacity
- Union/jobs

Technology & Availability

Induction Cooktops

Electric Fireplaces

Air Source Heat Pump

Heat Pump Water Heater

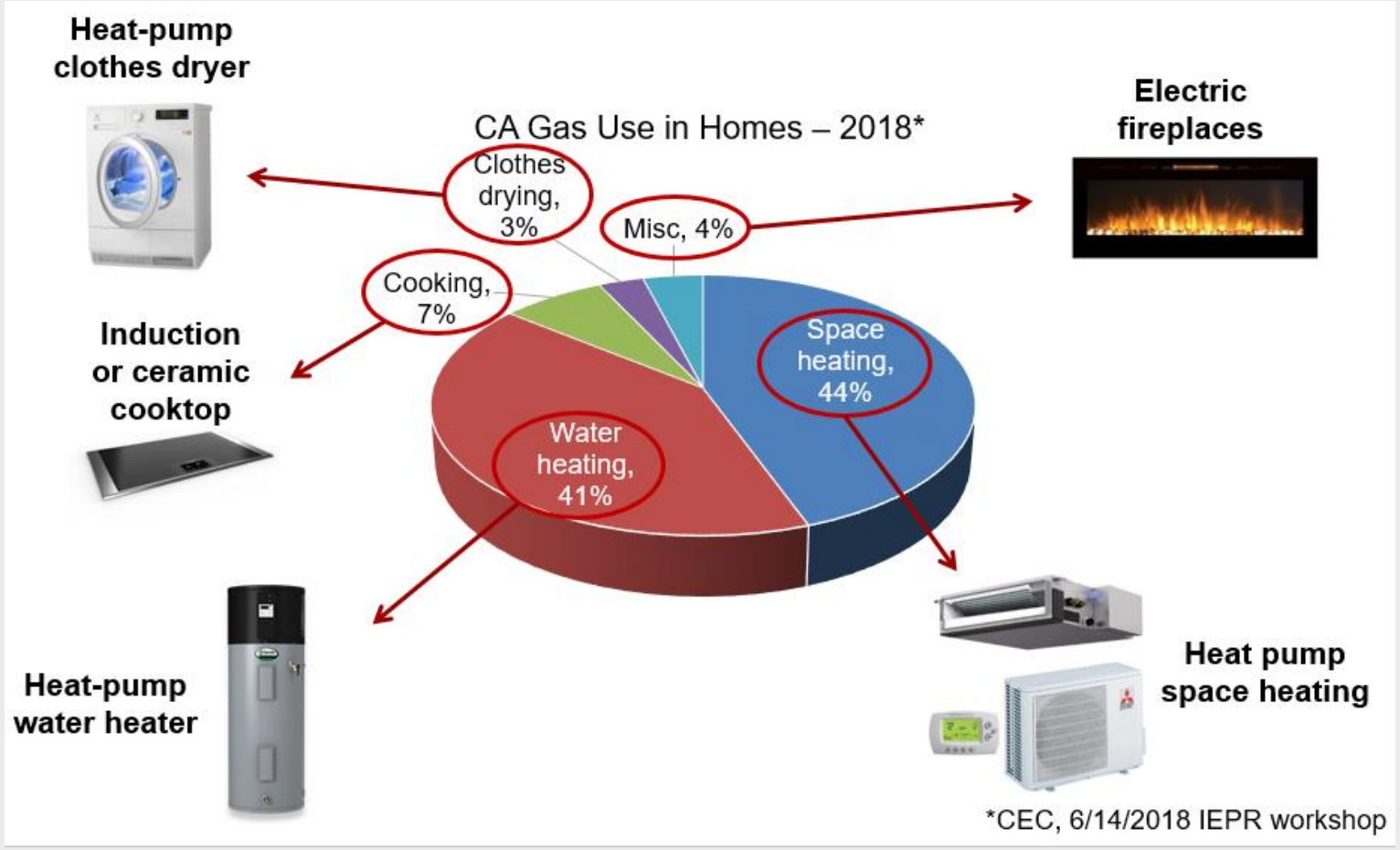
Alternative Technologies

- Renewable Natural Gas
  - *Supplies are extremely limited and mostly from out of state*
  - *Doesn't solve for pipeline leakage*
  - *Better for interim and hard to solve applications such as existing buildings, heavy industry and freight*
- Hydrogen
  - *Existing pipeline can only accommodate 5-15% hydrogen blend*
  - *Full transition to hydrogen would require massive infrastructure and appliance upgrades*

Costs

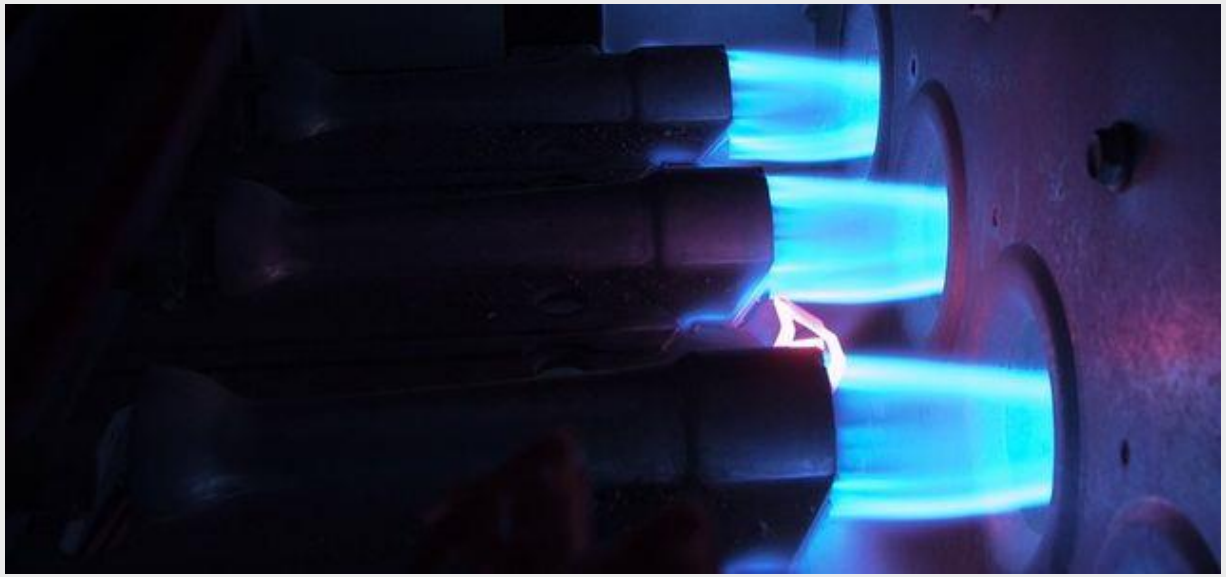
- NC eliminate cost of installing gas infrastructure and no costly panel/service upgrade
- Some efficiency savings
- Natural gas costs slated to increase in coming years
- Health & Safety

Customer Choice



Resilience

- Electronic Pilot lights in new equipment



Grid Capacity

- SCE white papers
- NREL, BEI, ICF, DOE studies

SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

REIMAGINING THE GRID

December 2020

EXECUTIVE SUMMARY

Expectations about the safety, reliability, affordability and environmental impact of the electricity that powers our lives continue to evolve. As we see more evidence of the impact of climate change daily, communities and consumers are adopting technologies to support a clean energy future and placing increasing value on decarbonization and resilience.

Pathway 2045 is Southern California Edison's (SCE) roadmap for enabling a clean energy future for California, laying out a path for the growth of carbon-free energy resources needed both on the generation (supply) and customer (demand) sides. Just as important as this blueprint to mitigate climate change is the need for an electric grid that enables the efficient integration of these clean resources while ensuring climate adaptation and broader resilience. Reimagining the Grid is SCE's vision of this future grid.

Technology advancements in grid software/hardware and new resources like energy storage have fostered continued progress in strengthening and modernizing the electric grid. However, the underlying design and architecture of the grid have not evolved at the same pace as its component technologies. Fundamental changes in how the grid is planned, designed, built and operated are necessary to meet future challenges.

The value of the grid goes beyond the commodity cost of the energy it delivers. The grid powers all aspects of society, especially as our dependence on electricity grows. As electricity becomes the fueling system for a larger part of the economy, we must reimagine what the future grid should look like at all levels and how it will need to function differently to meet expanded needs.

We expect major changes in how customers will use electricity, which will place unprecedented demands on the grid. Beyond an expected increase of 60% in electricity demand and 40% in peak load by 2045, electrification of mobility and mass adoption of distributed energy resources (DERs) like solar and batteries will make electricity demand more variable — yet increase customers' expectations for reliability and resilience.

- More than 20 million light-duty electric vehicles (EVs) are expected by 2045 in California, with each new vehicle's peak charging being roughly the equivalent of adding a new home to the grid
- For the first time since the electric grid was built, a significant amount of demand will come from devices that are not stationary, making load forecasting by location more difficult
- Connecting millions of inverter-based customer devices (e.g., solar, batteries) and electronics to the grid could cause widespread power quality impacts such as voltage distortions, which if left unmitigated, could shorten the life of customer and grid equipment alike

Power supply challenges will become more prevalent and complex to manage. Due to their variable nature, greater reliance on wind and solar resources will require the grid to manage a growing set of issues.

- Transmission and distribution systems will need to handle an increasingly variable power supply profile, posing challenges to safety, grid stability, asset condition, reliability and resilience
- The growth of inverter-based resources (i.e., solar, wind, storage) to replace conventional generation will lead to loss of system inertia and other grid services that ensure system reliability today
- Since the bulk of future renewable resources will be located far from customers, the uncertainty and cost of building transmission lines may stretch the grid's ability to deliver power to urban load centers

The grid will be exposed to growing climate change effects. The direct impact of climate change on assets and customers will be a key driver for the evolution of the grid. Both the frequency and magnitude of climate-driven disruptions will continue to increase. Recent wildfires and heat waves in California are early proof of the acceleration of these climate challenges.

- Acute events (e.g., wildfires, flooding, mudslides, storms, wind gusts) and chronic stressors (e.g., extreme temperatures, heavier rainfall, drought, sea level rise) will impact operating performance and put grid equipment under increased stress and risk of deterioration or failure

SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead

PATHWAY 2045

Update to the Clean Power and Electrification Pathway

November 2019

EXECUTIVE SUMMARY

By 2045, California will undergo a remarkable evolution. Supported by its residents, the state will achieve carbon neutrality to reduce the threat of climate change. This will require substantial decarbonization of all sectors of the economy and will necessitate rigorous planning to keep energy safe, reliable and affordable.

Pathway 2045 examines the energy implications of California's long-term decarbonization goals on both the economy and the electric sector and maps out a feasible and low-cost path to meeting these goals. Pathway 2045 builds on *The Clean Power and Electrification Pathway*,[1] Southern California Edison's 2017 analysis of what will be required to meet 2030 interim goals.

Pathway 2045 concludes that the changes required across California's economy are profound: Decarbonization is achieved through powering 100% of retail sales* with carbon-free electricity, electrifying transportation and buildings and using low-carbon fuels for technologies that are not viable for electrification.

The remaining carbon is sequestered to reach carbon neutrality (Figure 1). Emerging technologies and practices will be required to find the most economical method to remove carbon at this scale.

Electric sector: To economically meet both the 2030 and 2045 decarbonization goals, the electric sector needs to decarbonize more quickly than currently required. By 2045, significant electrification of the state's economy combined with population and economic growth will result in a 60% increase in electricity sales from the grid and a 40% increase in peak load.

Eighty gigawatts (GW) of new utility-scale clean generation and 30 GW of utility-scale energy storage will be required in the next 25 years. Energy storage will be essential because the most cost-effective, carbon-free generation sources — wind and solar — are intermittent. Thirty additional GW of generation capacity and 10 GW of storage will come from distributed energy resources (DERs) including up to 50% of single-family homes in California which, driven by improved economics, building codes and supportive but equitable policies, are projected to have customer-sited solar by 2045.

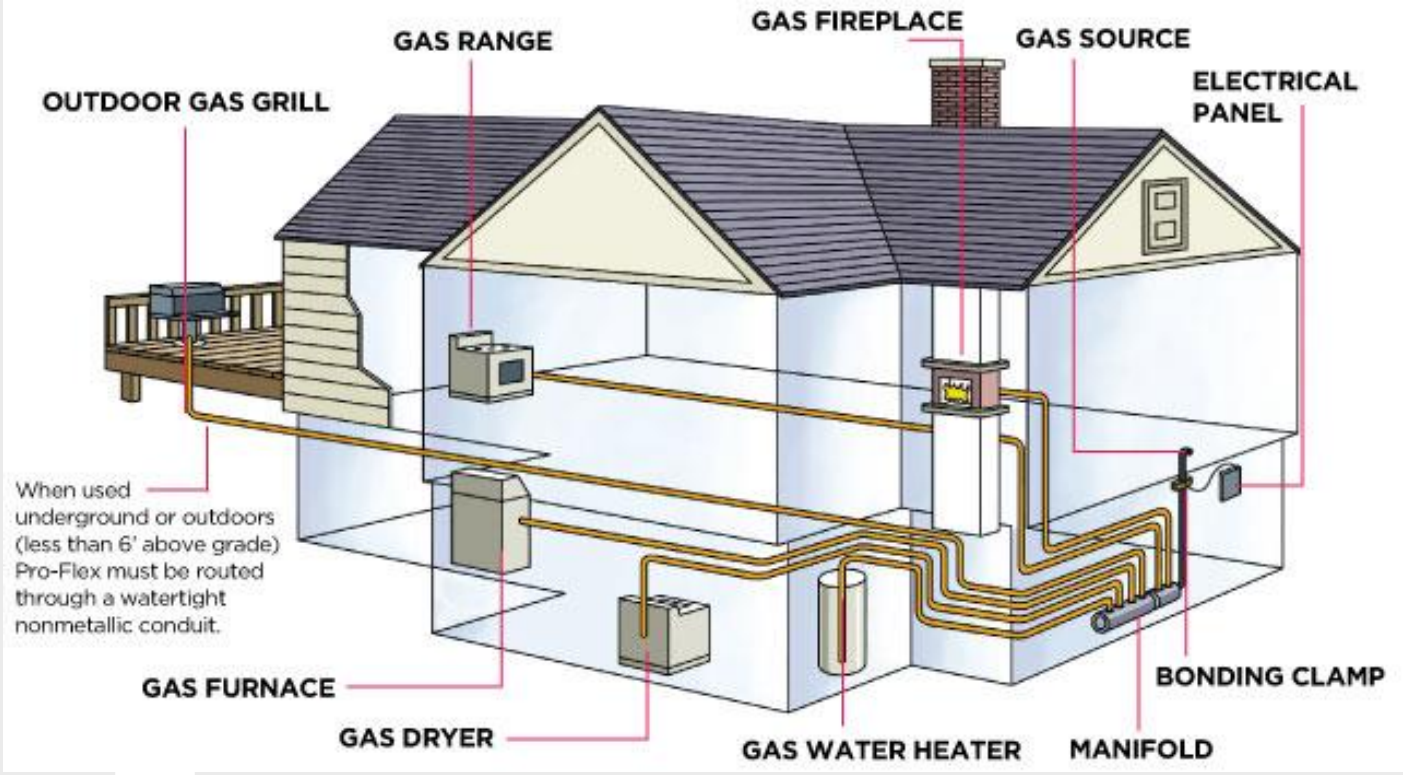
The grid: The grid must have sufficient capacity and continue to modernize to harness the full potential of DERs. Electrification will further increase customers' reliance on the grid, underscoring the need to build in additional resilience to withstand the more frequent and severe weather conditions due to climate change impacts. Grid hardening efforts today along with system designs that accommodate increasing flexibility and more monitoring should reduce these risks. At the same time, California's leadership in deep decarbonization can be a global model that helps mitigate the further threats of climate change.

Figure 1: Decarbonization is required across the California economy

* Retail sales is electricity used by individual customers (as opposed to wholesale electricity that is bought, sold and traded in markets).

Union/Jobs

- Pipe Fitters Union
- Estimated ½ job lost
- Explore a green job training program



Who else is Doing it?

- Approved Reach Codes:
  - Bans: Alameda, Berkeley, Morgan Hill, San Jose
  - All-Electric Reach: Windsor, Carlsbad, Menlo Park
  - Electric-Preferred: Santa Monica, San Mateo, Davis, Marin
- 50+ are somewhere in the process of developing

What is included? New Construction:

- A new structure that has never before been used or occupied for any purpose or removal and replacement of an existing.
- Includes detached ADU's, not attached ADU's.
- Does not include additions
- Includes a complete demolish and rebuild
- Includes major demolition and rebuild

What is major demolition and rebuild????

Removing more than 75% of any two of the following:

- Structural roof or roof framing
- Structural exterior walls (or are no longer an integral structural component)
- Foundation (or are no longer an integral structural component)

Exemptions

- Cooking appliances in commercial kitchens
- Medical building laboratory equipment or clean-rooms
- When in the public interest or infeasible

Resources: pre-ordinance passing

- Webinars-public
- Webinars-targeted
  - *AIA*
- Workshops & Feedback
- Key stakeholders support/champion effort.

Resources: post-ordinance passing

- Press Release & Webinars
- Website w/ FAQ's, product resources, webinar recordings, links
- Info Flyer-shared w/ construction, design & permitting professionals
- Notification Letters to current building permit applicants
- Exemption Application & info sheet with substantial Demolition submission guide
- Library: Induction cooktop loaner program

QUESTIONS?

Kristian Hoffland
khoffland@santabarbaraca.gov
Sustainability.santabarbaraca.gov/climate-actions/

Jurisdiction Presentation: City of Ojai

Steve Colome

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF OJAI AMENDING THE CITY OF OJAI MUNICIPAL CODE TO AMEND THE 2019 CALIFORNIA ENERGY CODE AS LOCALLY ADOPTED THROUGH ARTICLE 10 OF CHAPTER 1 OF TITLE 9 OF THE OJAI MUNICIPAL CODE REQUIRING ELECTRIC FACILITIES FOR NEW CONSTRUCTION RESIDENTIAL AND NON-RESIDENTIAL BUILDINGS

Jurisdiction Presentation: City of San Luis Obispo

Theresa McClish

CITY OF SAN LUIS OBISPO

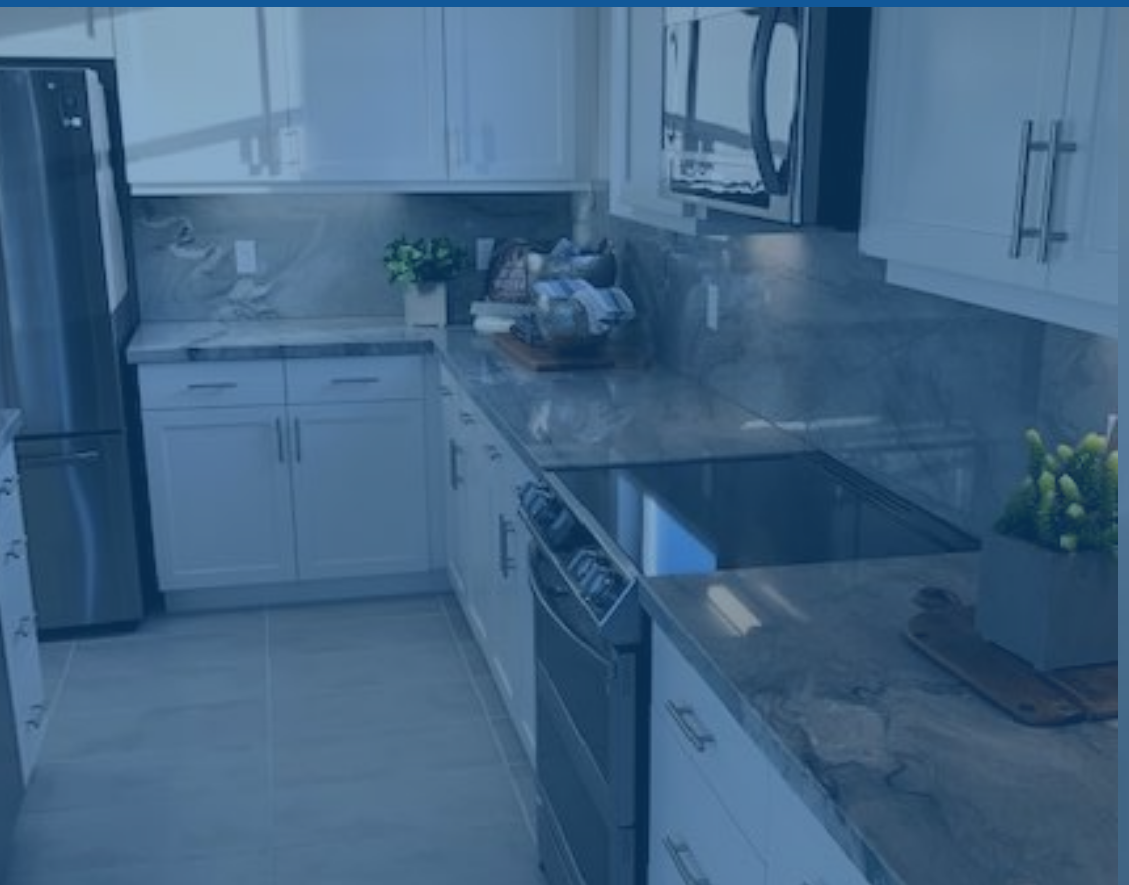
Clean Energy Program for New Buildings

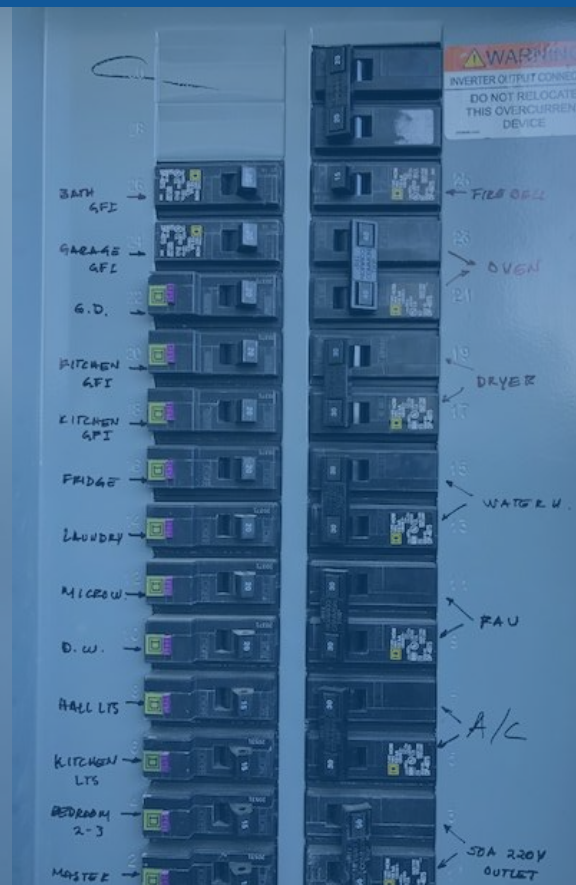
2022 UPDATE | DEVELOPERS ROUNDTABLE

Path Forward

1. 2020 policies and program
2. Approach to 2022 update
3. July 2022 Council Hearing
4. Next steps

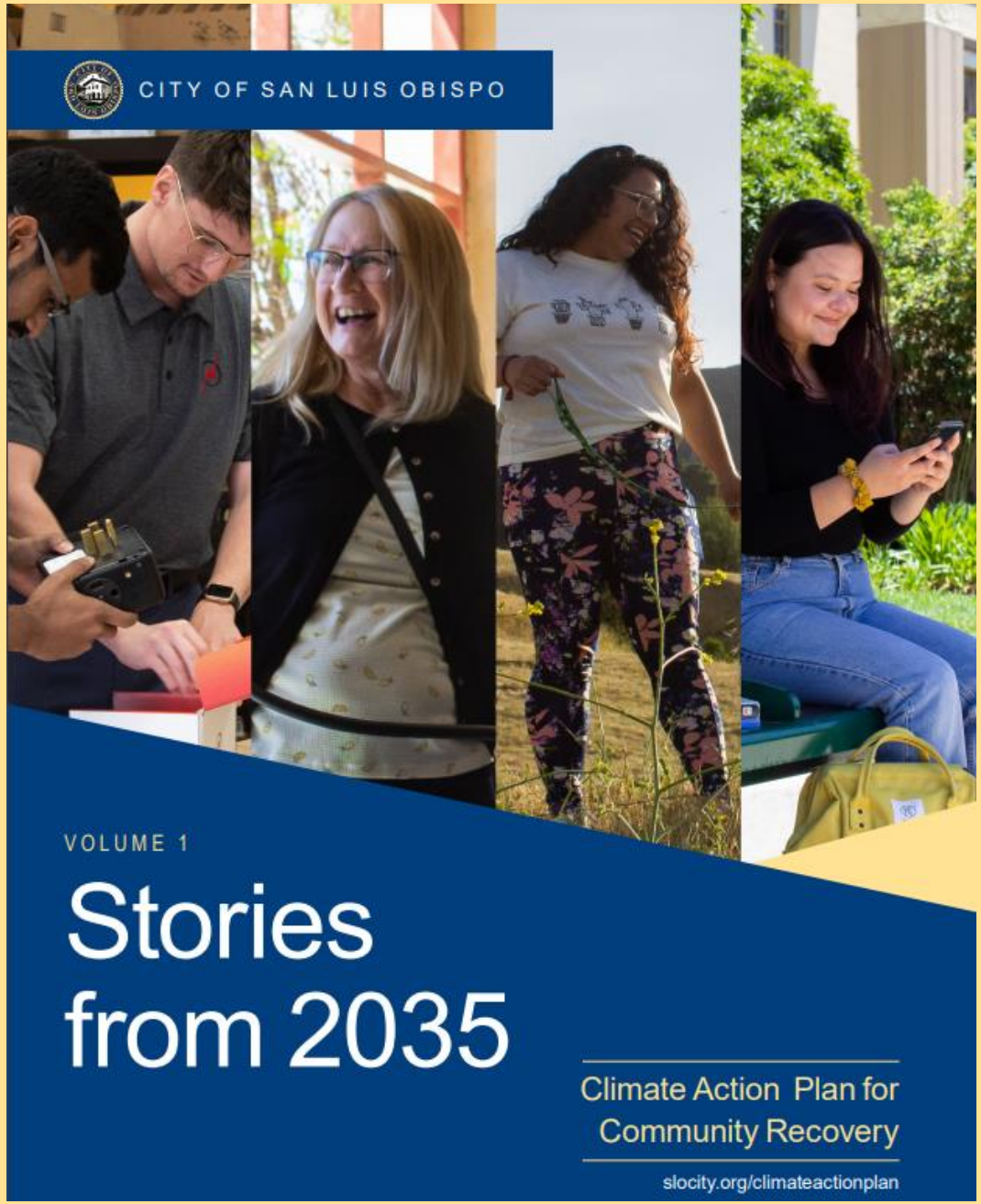
Current Policies and Program





2020 Climate Action Plan

Council approved Climate Action Plan establishing the goal of citywide carbon neutrality by 2035.



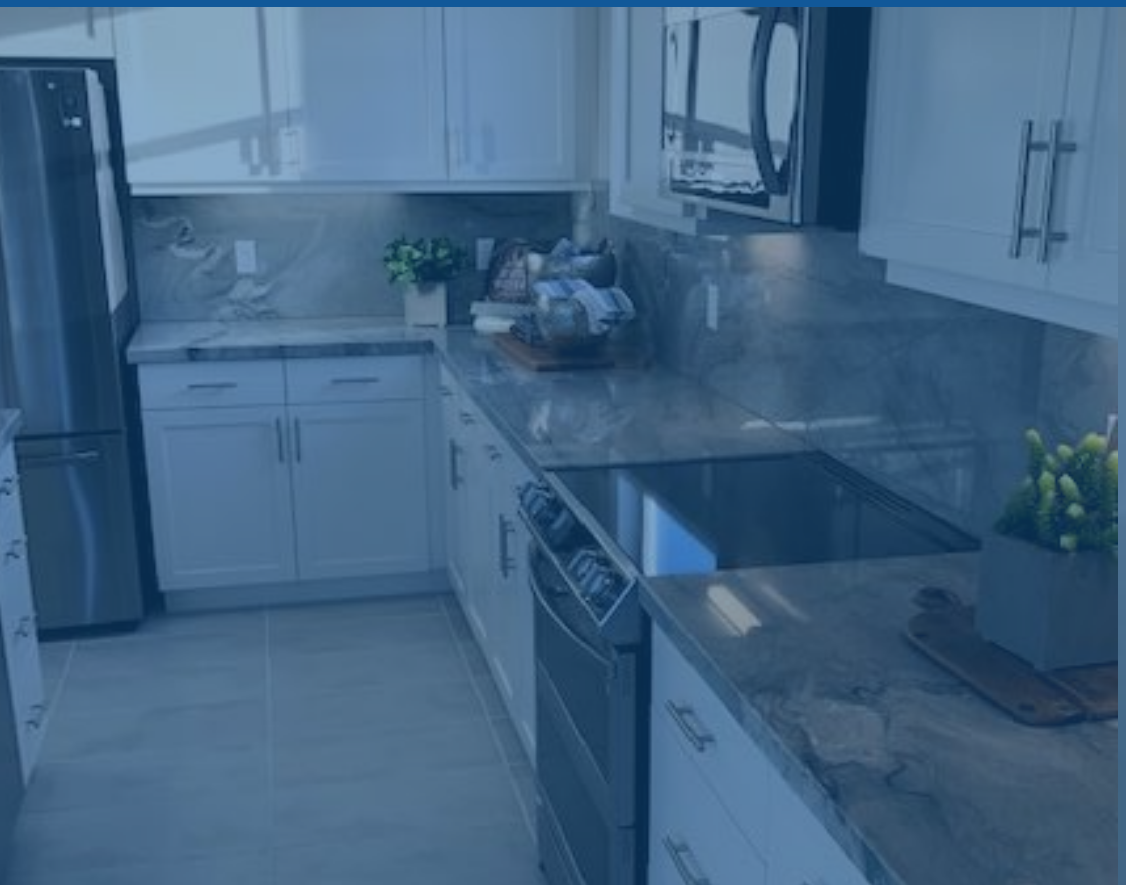
Current Program

1. All-electric: build to code, or
2. Mixed fuel:
    - increased performance/efficiency
    - pre-wiring
- Solar on all buildings
- Supported with technical assistance, regulatory flexibility, and incentives

Heat Pump Condenser

Rooftop Solar

Approach to 2022 Program Update



Program Performance

- New projects are selecting a “mixed-fuel” option about half of the time.
- This rate is not sufficient to accomplish City-wide objectives for greenhouse gas reductions.
- Local Incentives are useful tools for supporting all-electric new buildings

Statewide Trends and Emerging Health and Safety Findings

Local Action

California Building Code

Health and Safety Findings

State Regulation/Budget

Clean Energy Program for New Buildings (2022 Update)

1. Avoids new onsite emissions consistent with the Climate Action Plan, adopted policy, and statewide trends.

2. Allows a focused approach to existing buildings.

3. Supported with resilience considerations and delivers healthier and safer new buildings.

4. Supported with Outreach.

2022 Update

Clean Energy Program for New Buildings (2022 Update)

- On July 5, 2022, the SLO City Council introduced an ordinance to require all-electric new buildings starting January 1, 2023, with reasonable exemptions; and
- An ordinance providing regulatory flexibility through December 31, 2025 in support of the Clean Energy for New Buildings Incentive Program

2022 Program Component #1: Ordinance Requiring All-Electric New Buildings

- **Technical Exemptions**

1. Back-up power for Critical Infrastructure necessary to protect public health and safety in the event of an electric grid outage (ongoing).
2. Process Loads in a Newly Constructed Manufacturing and Industrial Facility (ongoing).
3. Commercial Kitchen Equipment in a Newly Constructed Eating and Drinking Establishment (through December 31, 2025).
4. Water heating and space heating in an attached Accessory Dwelling Unit where equipment in the existing building is serving the attached Accessory Dwelling Unit. (through December 31, 2025).
5. A swimming pool that is provided as a public amenity (through December 31, 2025).

- **Public Interest Exemption**

2022 Program Component #2:
Incentive Program Including Ordinance Extending Regulatory Flexibility

Extended Regulatory Flexibility

The draft ordinance (Attachment B) amends Municipal Code Section 17.70.095 to extend the provision of temporary incentives in the application of site development standards for new all-electric buildings.

- **Adds "parking requirements"**
- **Extends the incentive term from December 31, 2022, to December 31, 2025.**

Other Incentives

- **Technical Assistance**
- **California Energy Code Training**
- **Community Forum**
- **Public Interest Exemption**

Public Health and Safety Findings

Climate Change. Drastic reductions in greenhouse gas emissions from all sectors, including buildings, are necessary to prevent increasingly hazardous climate disasters. A rapid reduction in natural gas is particularly important.

Seismic Safety. Buried gas pipelines are vulnerable to earthquakes and can leak or break due to strong shaking, ground transformation, or liquefaction, which can cause explosions and fires if ignited.

Indoor Air Quality. Natural gas combustion produces toxic byproducts that accumulate indoors and has been linked to an increase in respiratory diseases

Resilience Considerations

Nearly all contemporary natural gas appliances require electricity to ignite and operate safely.

A resilient electrical grid is critical to community well being regardless of Council's action.

Organizations at all levels of government and scale are aggressively pursuing grid resilience efforts.

Equity & Cost Effectiveness

Met with local affordable housing providers and developers on their experience building and managing all-electric projects

Promote access to Central Coast Community Energy's all-electric affordable housing unit incentive program

Evaluation of existing and initial future cost-effectiveness studies to confirm that all-electric buildings are expected to be cheaper to build than mixed-fuel buildings

Public Engagement

1. Staff conducted public engagement for the Clean Energy Program for New Buildings Program update from December 2021 through June of 2022.

2. Met with builders and developers, building organizations, energy utilities, and community organizations.

3. Provided a community webinar and hosted an Open City Hall public survey.

4. Community feedback shaped the ordinance and exemptions.

Next Steps

1. Adoption of Ordinances
2. Implementing the Program
3. Ongoing community conversations
4. Return to Council by December 2025 to Report on Program Effectiveness of Exemptions and Incentives

THANK YOU!

(tmcclish@slocity.org)

Round Table – All Participants

Conversation Prompts

- Cost-Effectiveness
- Triggering CEC requirements
- Regional Collaboration Opportunities/Coordination
- Exploring additional resource needs
- Navigating public outreach and public comment
- Identifying opposition
- Reach Codes vs Existing Building approaches

Upcoming 3C-REN Events

Closing

- **1.5 AIA LU's Available**
- **1.5 ICC LU's Available**
  - Contact ggauteraux@co.slo.ca.us for any questions regarding LUs
- **Coming to Your Inbox Soon!**
  - Slides, Recording, & Survey – Please Take It and Help Us Out!
- **Upcoming Courses**
  - 7/19 – Passive House Windows
  - 7/20 - Electrification Incentive Opportunities and Resources in the Central Coast
  - 7/21 – 2022 California Energy Code Regional Forum (*IN PERSON*)
  - 7/26 – Whole House Assessment: The Home Energy Audit Explained
  - 7/28 – Save Money & Go Green: How to Bring Clean Energy to Affordable Multifamily Housing

Thank you!

For more info:
3c-ren.org

For questions:
info@3c-ren.org

3C-REN

TRI-COUNTY REGIONAL ENERGY NETWORK

SAN LUIS OBISPO • SANTA BARBARA • VENTURA