2025 California Building Energy Action Plan Second Public Workshop

Existing Buildings Branch, Energy Efficiency Division

January 29, 2026

Workshop Agenda

1:00	Logistics and Housekeeping	**2:00**	Major Issues in Building Decarbonization: Part 2
1:05	Opening Remarks by Commissioner McAllister	**2:30**	Questions and Answers
1:10	Overview of the California Energy Action Plan	**2:35**	Major Issues in Building Decarbonization: Part 3
1:20	Overview of the Draft 2025 California Building Energy Action Plan	**3:05**	Questions and Answers
1:30	Progress Toward Doubling Energy Efficiency Savings in Electricity and Gas by 2030	**3:10**	Overview of Recommendations
1:40	Major Issues in Building Decarbonization: Part 1	**3:25**	Public Comment
1:55	Questions and Answers	**3:55**	Closing Remarks

Housekeeping

Fully remote workshop

- Written Q&A via Zoom during the workshop
- (3) Q&A periods during workshop
  - Q&A periods are not for public comment

Public Comments

- Opportunity at end of workshop
  - Please also submit your comments in writing to the docket: **23-DECARB-03**
- Written comments due February 20, 2026

Opening Remarks

J. Andrew McAllister

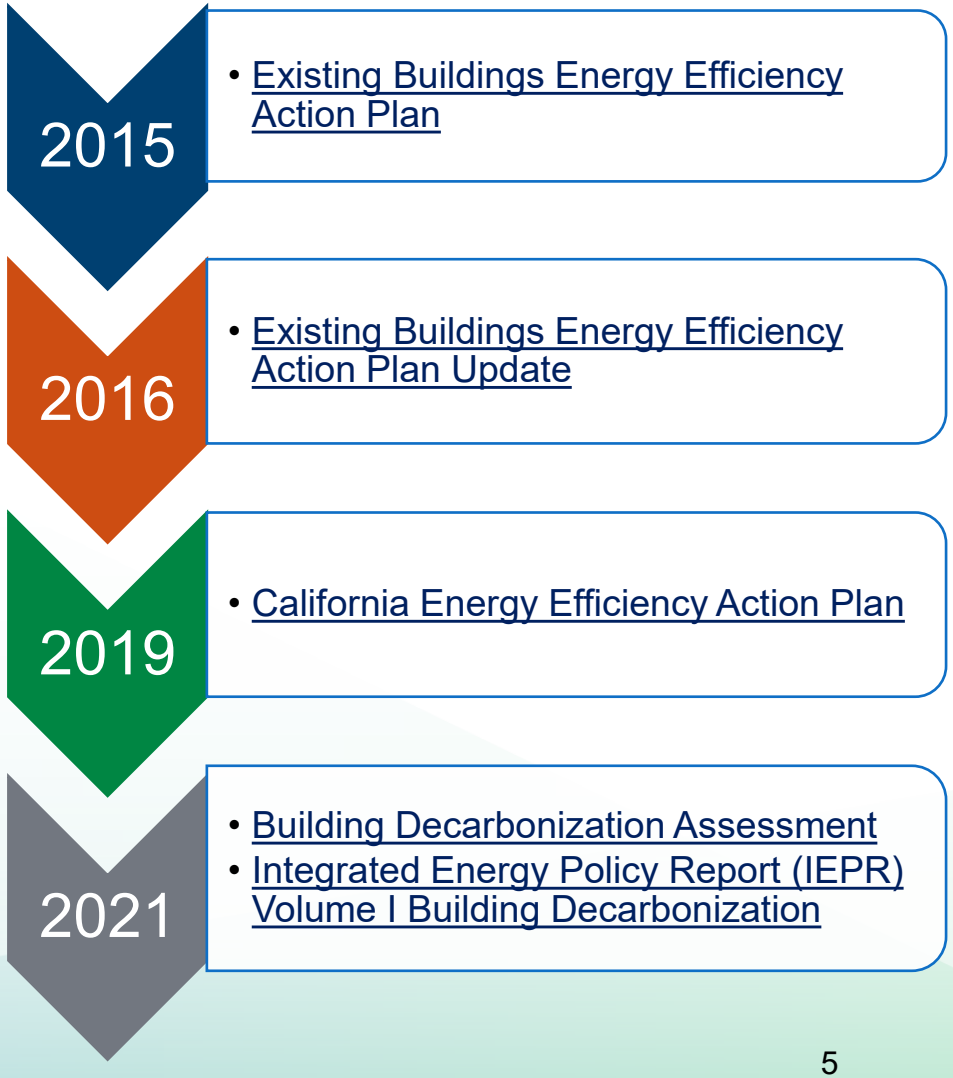
Commissioner
California Energy Commission

Overview of the California Energy Action Plan

Published every 2-3 years:

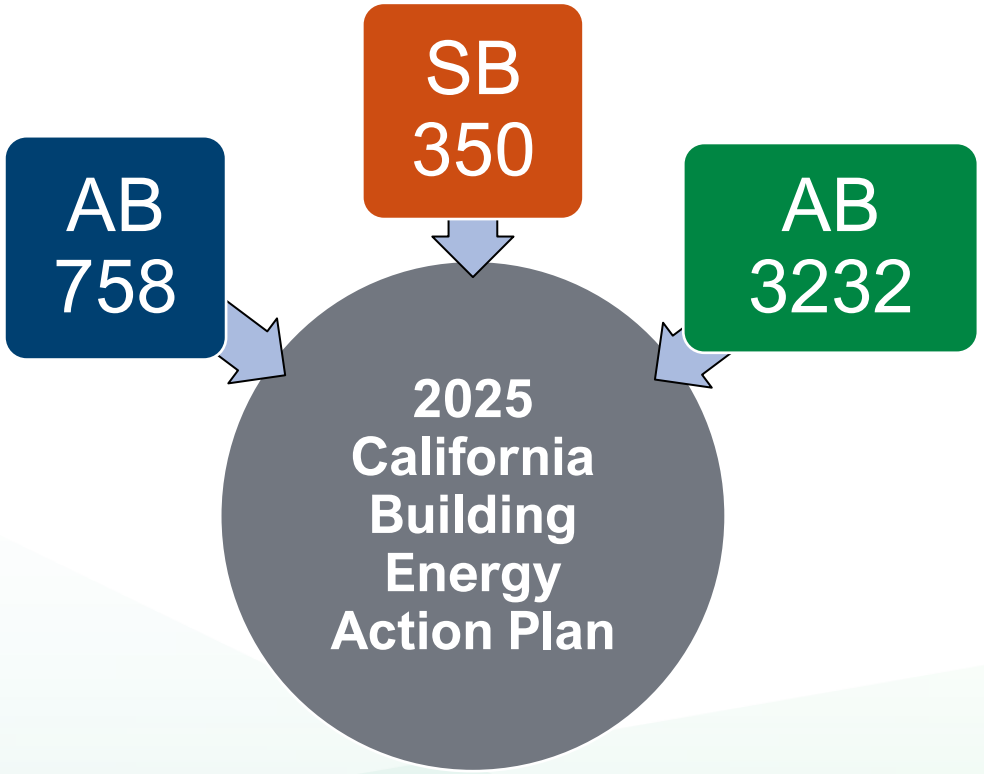
- Update on decarbonization progress
- Summary of major issues and challenges
- Recommendations focused on legislation, regulations, programs and research

Energy Efficiency in Existing Buildings | California Energy Commission



Statutory Authority

- **AB 758** (Skinner, 2009) required the CEC to:
  - Develop a comprehensive plan to advance existing building energy efficiency
  - Coordinate with agencies, utilities & other stakeholders
- **SB 350** (De Leon, 2015) required CEC to:
  - Periodically update and refine Action Plan
  - Focus on equity
  - Recommend and update on progress toward doubling energy savings
- **AB 3232** (Friedman, 2018) required CEC to:
  - Report on emissions from existing buildings
  - Assess the potential for a 40% reduction in GHG emissions from buildings by 2030



Progress on Previous Action Plan Recommendations

Recommendations	Subsequent Actions
"prioritize and fund decarbonization retrofits and supporting resources in low-income and disadvantaged communities"	• Statewide Equitable Building Decarbonization (EBD) Program, ≈$339M • Federal HOMES and HEEHRA funding, ≈$580M • TECH incentive expansion, ≈$50M
"Consider statutory changes to enable the CEC to... develop and establish building performance standards "	SB48 (Becker, 2023) authority to develop a strategy for using energy benchmarking data to track and manage energy use of covered buildings.
"explore regulatory and programmatic approaches to increase the adoption of low-GWP refrigerant technologies and minimize refrigerant leakage"	SB1206 requires CARB and CEC to develop a strategic approach to phasing out high-GWP refrigerants by 2035.

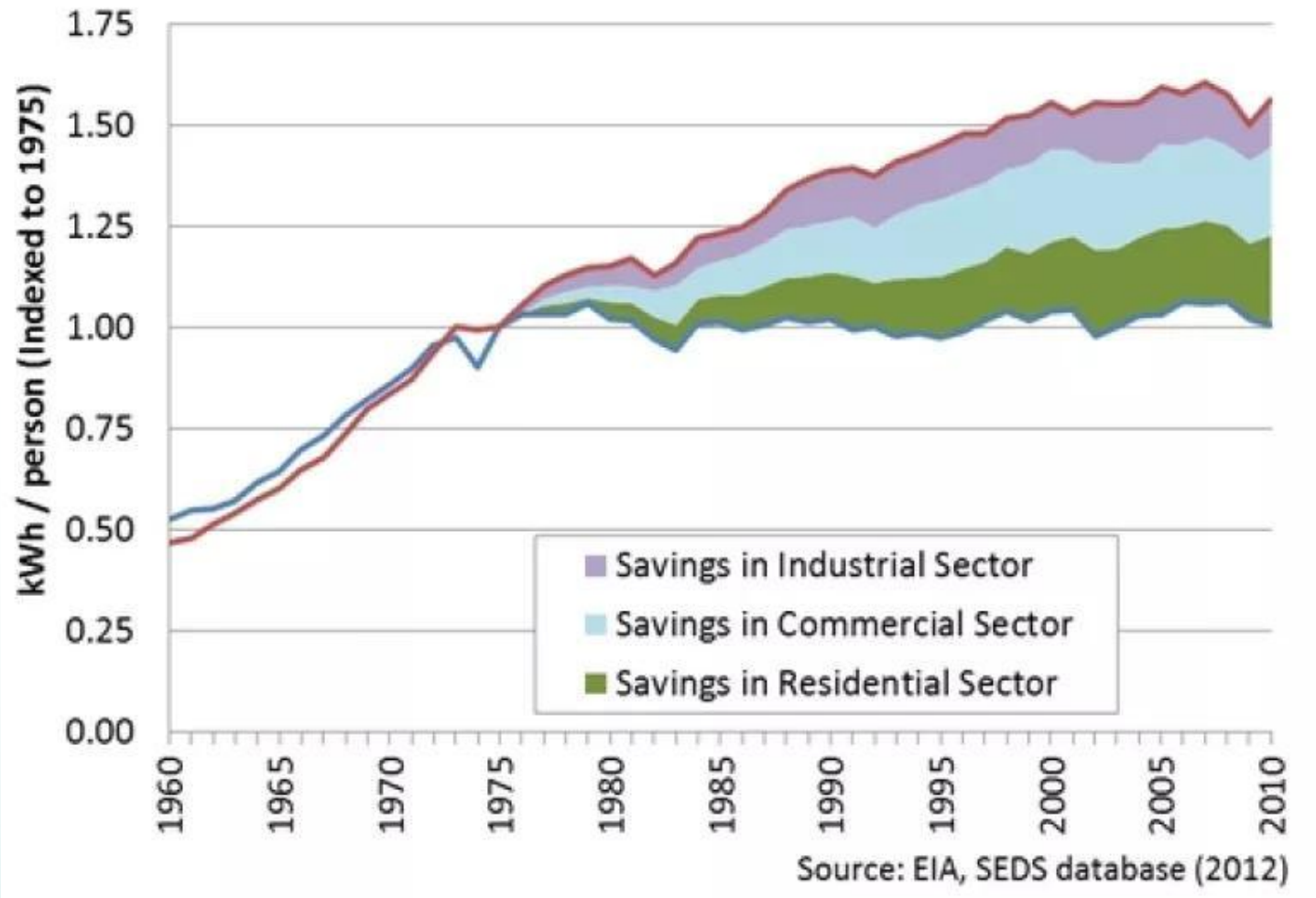
Six Million Heat Pump Goal and Public Private Partnership

Governor's Goal of 6 million heat pumps by 2030

- Letter to CARB in 2022, based on IEPR 2021 & California Building Decarbonization Assessment
- Today there are more than 2.3 million heat pumps in California
- Public Private Partnership established Fall 2023
- To hit this goal, it will require heat pump retrofits

Affordability: Efficiency is Essential

- Energy efficiency - core mission of the CEC since 1975
  - Over $200 billion in customer savings
- Efficiency is critical to reducing customer cost
  - Appliance standards
  - Envelope improvements
- Energy efficiency helps reduce and right-size
  - Distribution investments
  - Building equipment



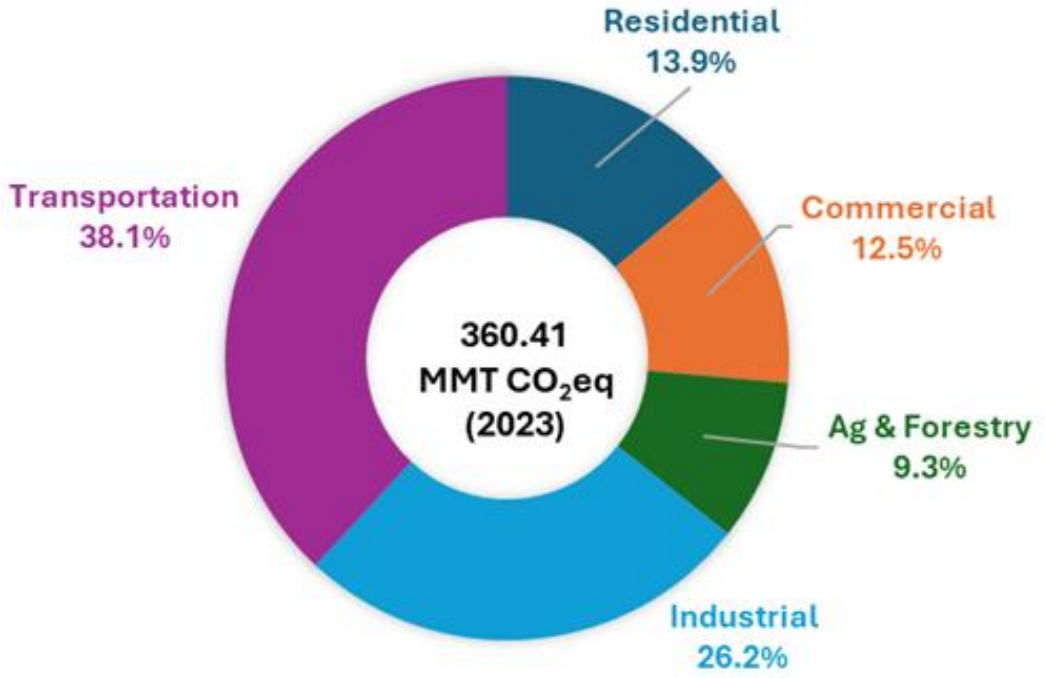
2021 California Building Decarbonization Assessment

2021 California Building Decarbonization Assessment:

Seven approaches for statewide building GHG emissions building decarbonization:

1. Building end-use electrification
2. Decarbonizing electricity generation
3. Energy efficiency
4. Refrigerant leakage reduction
5. Distributed energy resources
6. Decarbonizing the gas system
7. Demand flexibility

Residential and commercial buildings account for ~25% of the state's GHG emissions



Source: CEC staff analysis of CARB emissions inventory, 2023.

2025 California Building Energy Action Plan Structure

Executive Summary

- Introduction
- Purpose and Format
- Summary of Findings
- Summary of Recommendations

Chapter 1: History and Scope

- Statutory Authority
- Progress on Previous Action Plan Recommendations
- Six-Million-Heat-Pump Goal and Public-Private Partnership
- Technical Scope

Chapter 2: Major Issues in Building Decarbonization

- 21 technical sections addressing major issues in building decarbonization, barriers, and potential opportunities

Chapter 3: Progress Toward Doubling Energy Efficiency Savings in Electricity and Gas by 2030

- Updated targets towards SB 350 goal to achieve a cumulative doubling of energy-efficiency savings by 2030

Appendix A: Senate Bill 306: Equitable Building Decarbonization Program Status Report

- Progress achieved in establishing Equitable Building Decarbonization Program

Timeline & Milestones

Date	Milestone
March 12, 2024	First public workshop (scoping workshop) on the 2025 California Building Energy Action Plan
December 2025	Draft report released
January 29, 2026	**Second Public workshop on draft Action Plan**
February 20, 2026	Deadline for public comment from workshop
June 2026*	Adoption at CEC Business Meeting

**Subject to change*

Executive Summary - Summary of Findings

Efficient Electrification of Existing Buildings is the Primary Pathway to GHG Reduction	Building Decarbonization Presents Opportunities to **Expand California's Clean Energy Workforce**
Maximizing Equity in Building Decarbonization Investments Is Key	**Health Benefits** of Building Decarbonization
Financing is Essential to Achieving Overall Market Transformation	**Increased Standards Compliance** is an Important Pathway to Building Decarbonization
New Policy Approaches are Needed to Tackle Existing Buildings	**Strengthened Building Standards** Continue to Support Decarbonizing New Buildings
Bill Impacts Must be Carefully Considered	**Increasing Load Flexibility** Will Reduce Costs
Programs Must **Balance Considerations**	**Increased Use of Data** Will Allow for More Effective Building Decarbonization Programs
Equity Considerations Require an Emphasis on **California Native American tribes and Justice Communities**	**Other GHG Emission Sources** From Buildings, Including Refrigerants and Embodied Emissions, Must be Addressed

Executive Summary – Summary of Recommendations

1. Continue to prioritize funding for incentives to achieve GHG targets	8. Strengthen alignment across agencies and levels of government to maximize the benefits of building decarbonization for all Californians
2. Maintain focus on Equity	9. Enhance Energy Code compliance strategies
3. Prioritize energy efficiency investments to improve affordability	10. Design building performance standards for large commercial and multifamily buildings
4. Continue investing in technology innovation	11. Implement an accessible home energy rating and labeling program
5. Increase equitable access to low-cost and zero-cost financing	12. Develop automated load flexibility programs to support grid reliability and energy affordability
6. Expand the decarbonization workforce with well-paid jobs	13. Collect and analyze actionable data to guide the energy transition
7. Empower homeowners and building owners with decision-making resources	14. Create market conditions that position heat pumps as the leading technology for decarbonizing buildings

Chapter 1: History and Scope – Technical Scope

- Increased focus on financing
- Legislation for the EBD Program:
  - Manufactured housing
  - Hard to reach communities
  - Tenant protections
  - Remediation costs
  - Tribal buildings and communities
  - Bill impact estimation
- Reducing costs and increasing equitability:
  - Bill impact estimations
  - Equity metrics
  - Residential panel optimization and sizing
- Health benefits
- CEC and CARB proceedings and rulemakings:
  - Building energy performance strategies for large commercial and multifamily buildings
  - Refrigerant use, recovery, and recycling
  - Voluntary whole-house home energy rating and labeling
  - Electric vehicle supply equipment (EVSE)
- Status update on the EBD Program

Chapter 2: Major Issues in Building Decarbonization

Affordable Building Decarbonization Financing	Voluntary Whole-House Home Energy Rating and Labeling
CEC Building Decarbonization Incentive Programs	Embodied Carbon
Bill Impact Estimation and Electricity Rates	Benchmarking and Building Performance Standards
Health Benefits of Building Decarbonization	Building Energy Efficiency Standards
Remediation Costs for Residential Buildings	Regulatory Standards for Existing Buildings
Tenant Protections	Code Compliance for Existing Building Retrofits
Decarbonizing Manufactured Housing	Advancing Load Flexibility
Hard to Reach Communities	Electric Vehicle Supply Equipment Retrofits
Building Local Workforces	Data Standardization and Sharing
Residential Panel Optimization and Sizing	Refrigerant Use, Recovery, and Reclamation
Equity Metrics	

Progress Toward Doubling Energy Efficiency Savings in Electricity and Gas by 2030

Ingrid Neumann, Ph.D.
Decarbonization Principal, Advanced Electrification Analysis Branch
January 29, 2026

2015 SB 350 Statute

SB 350 (De Leon, Chapter 547, Statutes of 2015) was passed in 2015.

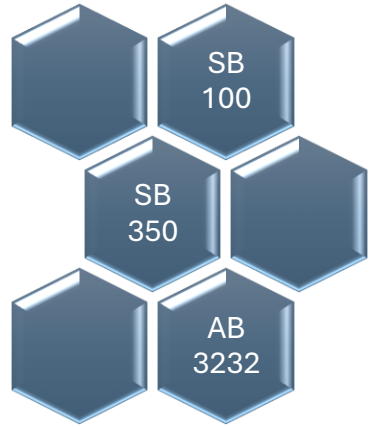
- Establishes an aspirational goal for the state to double statewide energy efficiency savings in electricity and natural gas end-uses by 2030.
- May include programs that save energy in final end-uses by using cleaner fuels to reduce greenhouse gas emissions as measured on a lifecycle basis from the provision of energy services.
- Must be cost-effective and feasible and will not adversely impact public health and safety.

Goal Set & Past Projections

2017 Initial SB 350 Report & Goal Set: doubling of mid-mid 2015 Energy Efficiency Forecast Scenario; target of 0.4 Quadrillion Btu of energy savings

2017 Projections: narrowly did not meet the doubling goal

- ***SB 350 exists in the broader policy context of building decarbonization***



2019 Projections reported in 2019 CA BEAP: did not meet the doubling goal in BAU case, aggressive scenario developed that showed goal could be met under certain conditions

2021 Projections reported in 2021 IEPR: did not meet the doubling goal in BAU case even in a High Electrification Future where FS was favored over gas EE (reached 90%); an aggressive scenario was developed that showed the goal could be exceeded in a very high electric EE and HE future

2023-2024 Tracking & Projection Updates

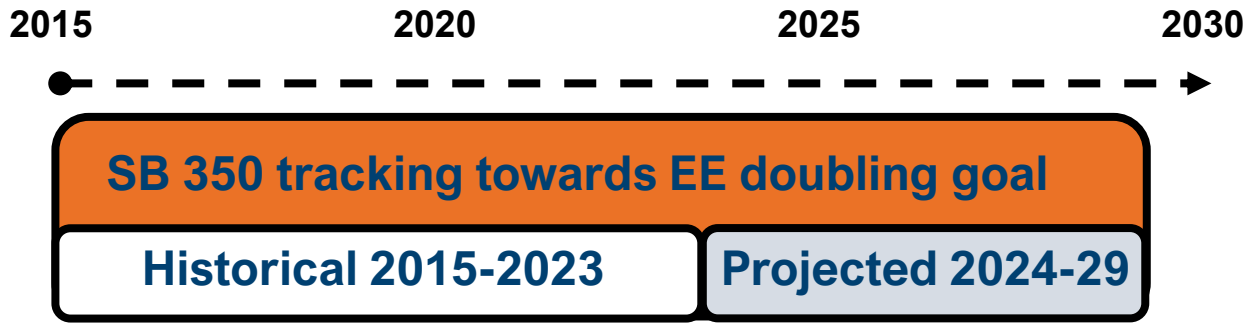
- Added modeling for new programs:
  - California EBD Programs — Direct install and incentives
  - IRA — HEEHRA and HOMES rebate programs
  - Locally targeted electrification impacts driven by local government ordinances
  - Load-serving entity decarbonization programs
  - California Electric Homes Program
  - Wildfire and Natural Disaster Resiliency Rebuild Program
  - Affordable Housing and Sustainable Communities

- Updated analysis to include compliance with T24 by either 1) enhanced energy efficiency measures via a performance calculation or 2) electrification measures based on building climate zone as delineated in the Title 24 Building Energy Efficiency Standards analysis (2022 & proposed 2025).

SB 350 Projection Updates Presented in 2025 BEAP

Progress Toward Doubling Energy Efficiency Savings in Electricity and Gas by 2030

- Data used to update the state's progress towards the EE doubling goal set forth by SB 350 utilized historical savings from 2015-2023 and projected values for EE and FS/electrification as described in the 2023 IEPR Forecast

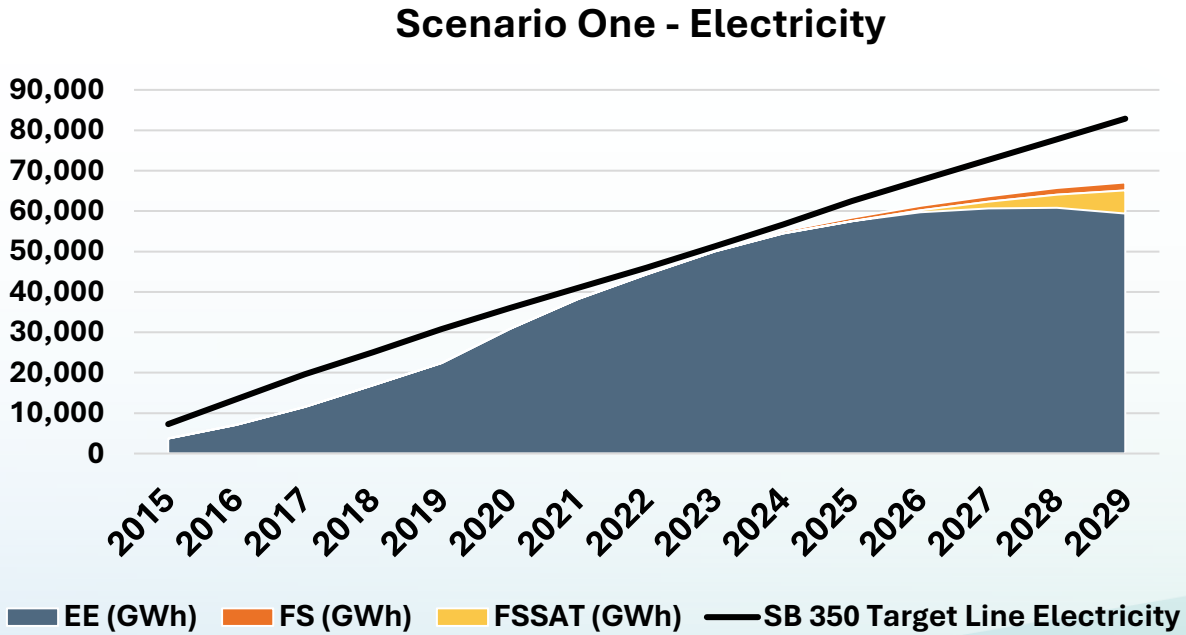


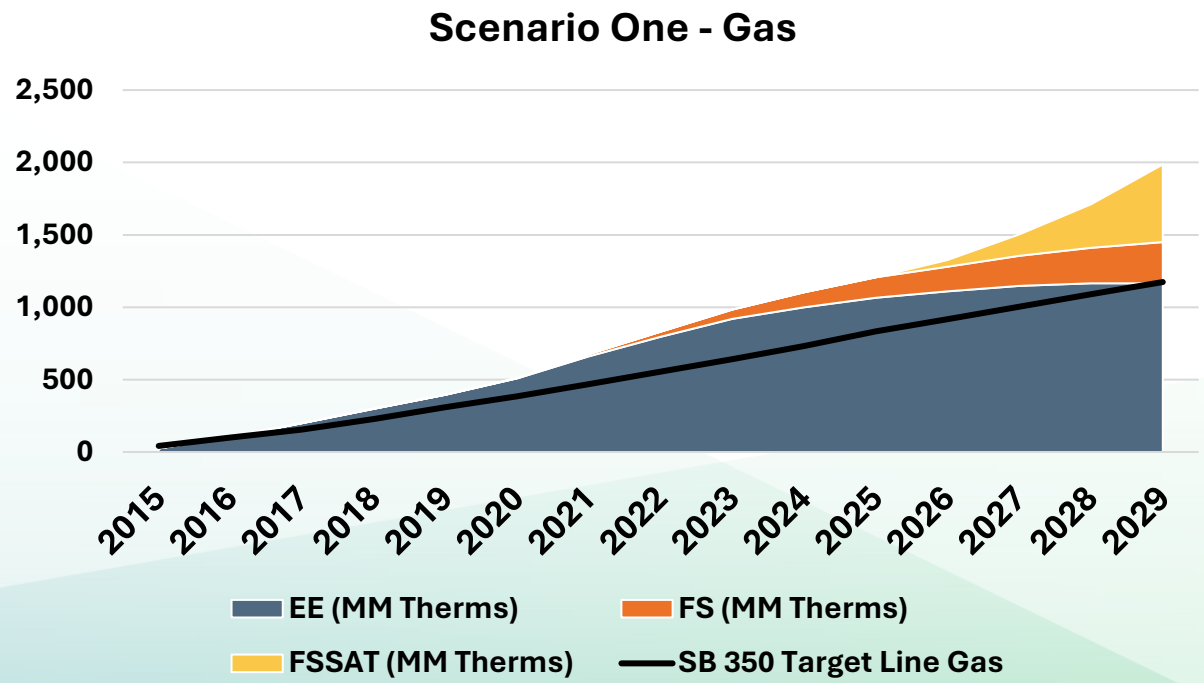
Included Element	Scenario One "BAU in HE Future"	Scenario Two "Aggressive EE in a Very HE Future"
Historical EE savings & FS Impacts	Committed Savings	Committed Savings
Projected Electric EE savings	Business-As-Usual (BAU) EE	Aggressive Energy Efficiency
Projected Gas EE savings	BAU EE	BAU EE
Projected Programmatic Electric & Gas FS Impacts	BAU FS	Aggressive Fuel Substitution
Projected Zero Emissions Appliance Standards (ZEAS) Electric & Gas FS Impacts	BAU FS	Aggressive Fuel Substitution (including local AQMD's)

Scenario One “BAU in HE Future”

- Modeled EE electricity and gas savings are shown in the blue areas
- Incremental electricity that is added by BAU FS is shown in solid orange for programmatic fuel substitution and yellow for ZEAS FS contributions; the additional gas displaced by BAU FS efforts is shown in solid orange for programmatic FS and yellow for ZEAS FS contributions

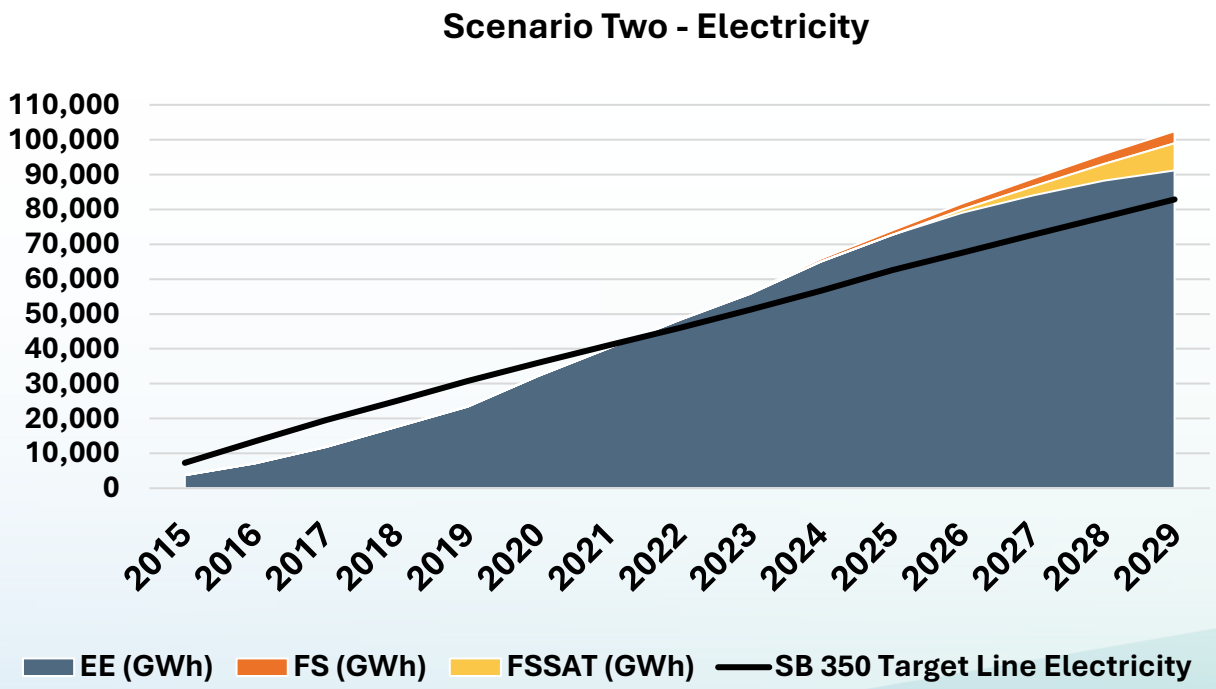
➢ **The combination of BAU EE and BAU FS makes electricity savings/impacts flat after 2026; however, gas savings grow more than projected in the 2021 SB 350 update because of the emphasis on fuel substitution (138% here vs. 126 % in the 2021 SB 350 update)**

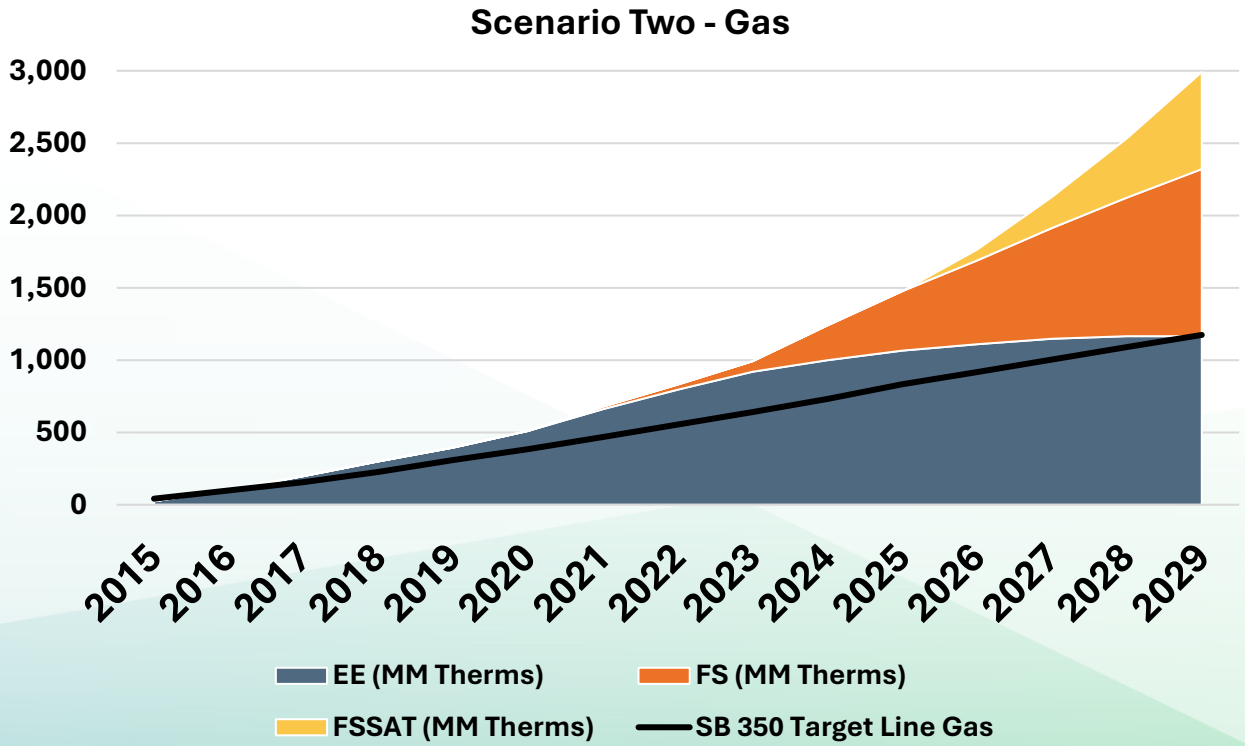




Scenario Two “Aggressive EE in a Very HE Future”

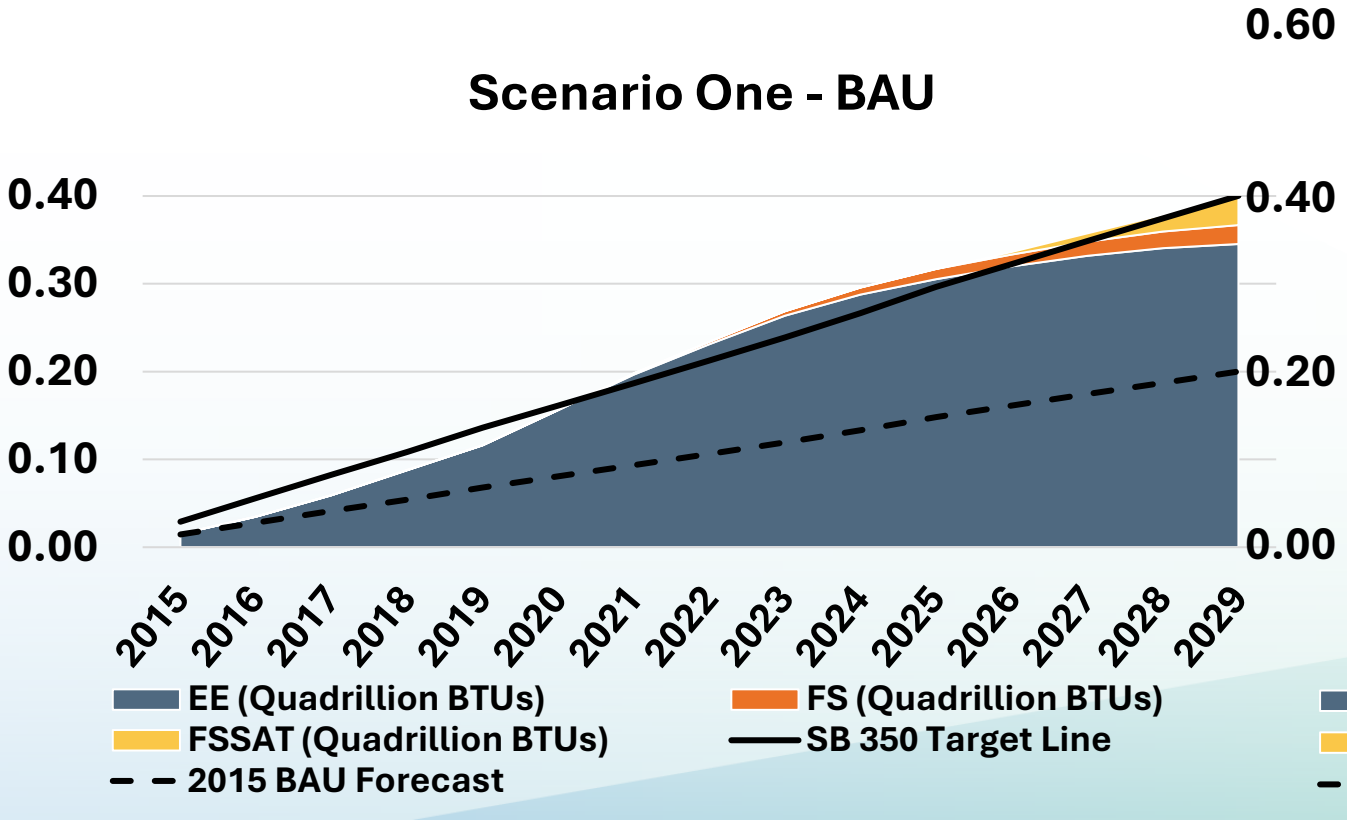
- **In the aspirational Scenario Two 110% of targeted electricity savings are expected to be met and the gas target is expected to be exceeded at 255 %.**
- The difference between the business-as-usual Scenario One and the In the aspirational Scenario Two is that Scenario Two assumes a more aggressive level of electric energy efficiency and electrification

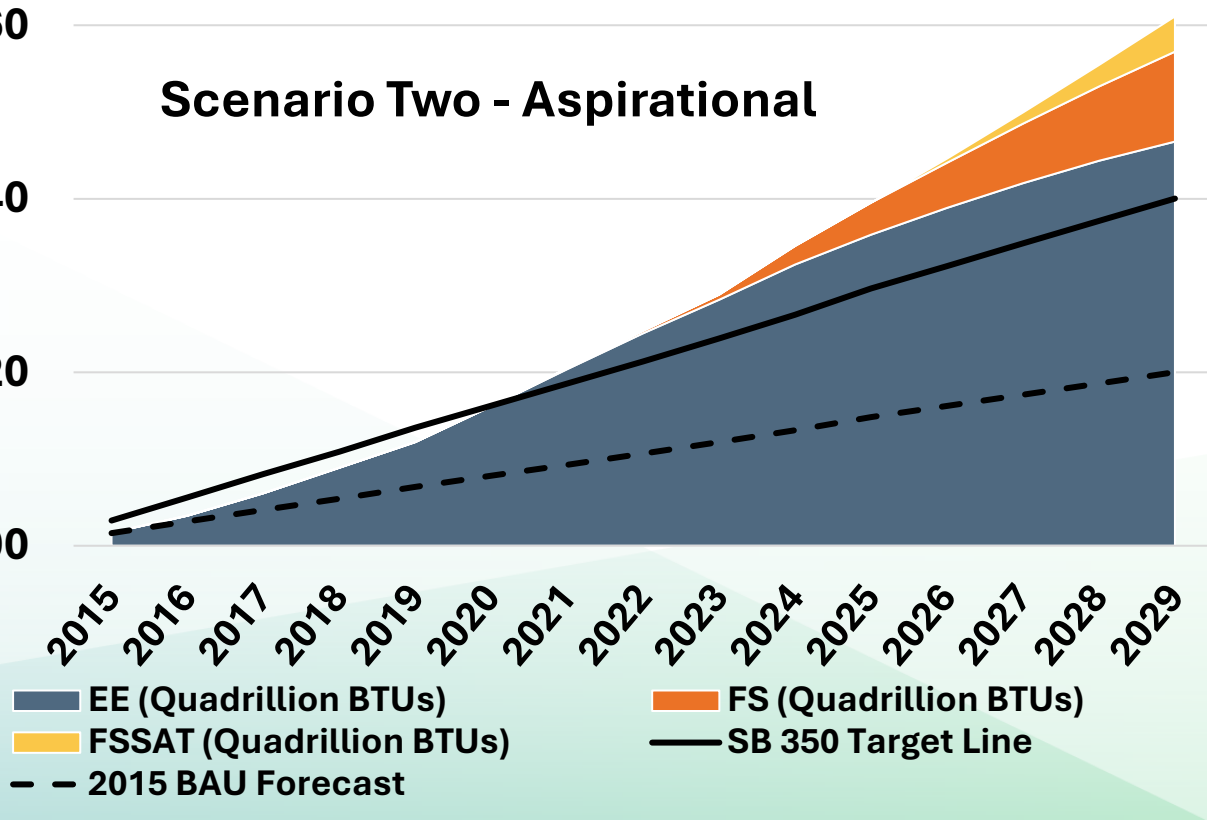




Combined Energy Impacts for Scenarios One & Two

- **SB 350 Scenario One BAU meets 100% of combined SB 350 target savings by 2030.**
- Scenario Two (aggressive energy efficiency in a very high electrification future) exceeds the combined SB 350 target savings at 152% by 2030. (This projection exceeds the aggressive SB 350 scenario from 2021 because of the addition of new electrification programs and local Zero Emission Appliance Standards.)



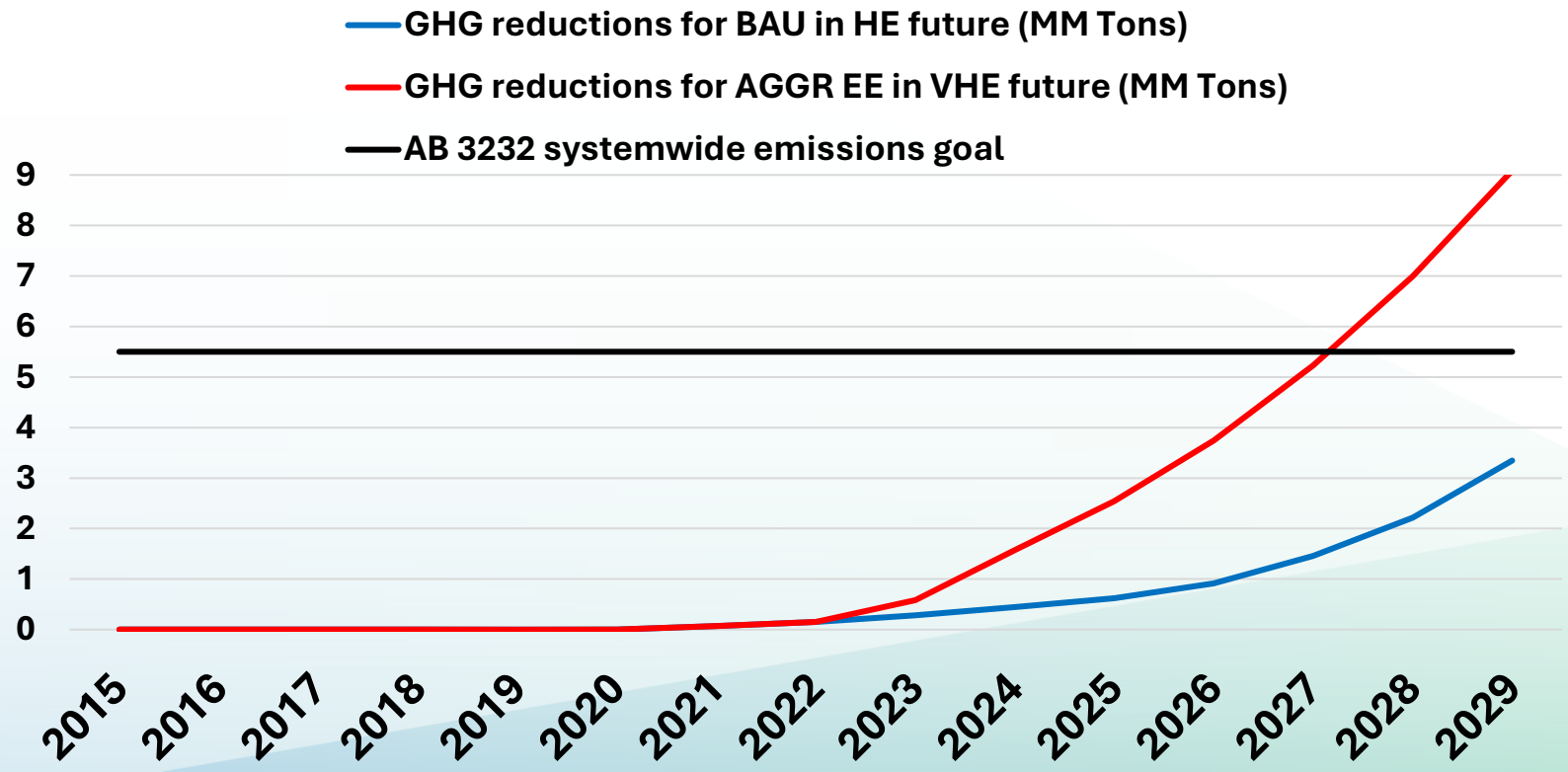


GHG Impacts for Scenarios One & Two

- Considering only Residential & Commercial Sectors to compare the SB 350 scenarios to the AB 3232 systemwide emissions goal; 40% reduction from 1990 baseline is 5.5 MM Tons CO_2e

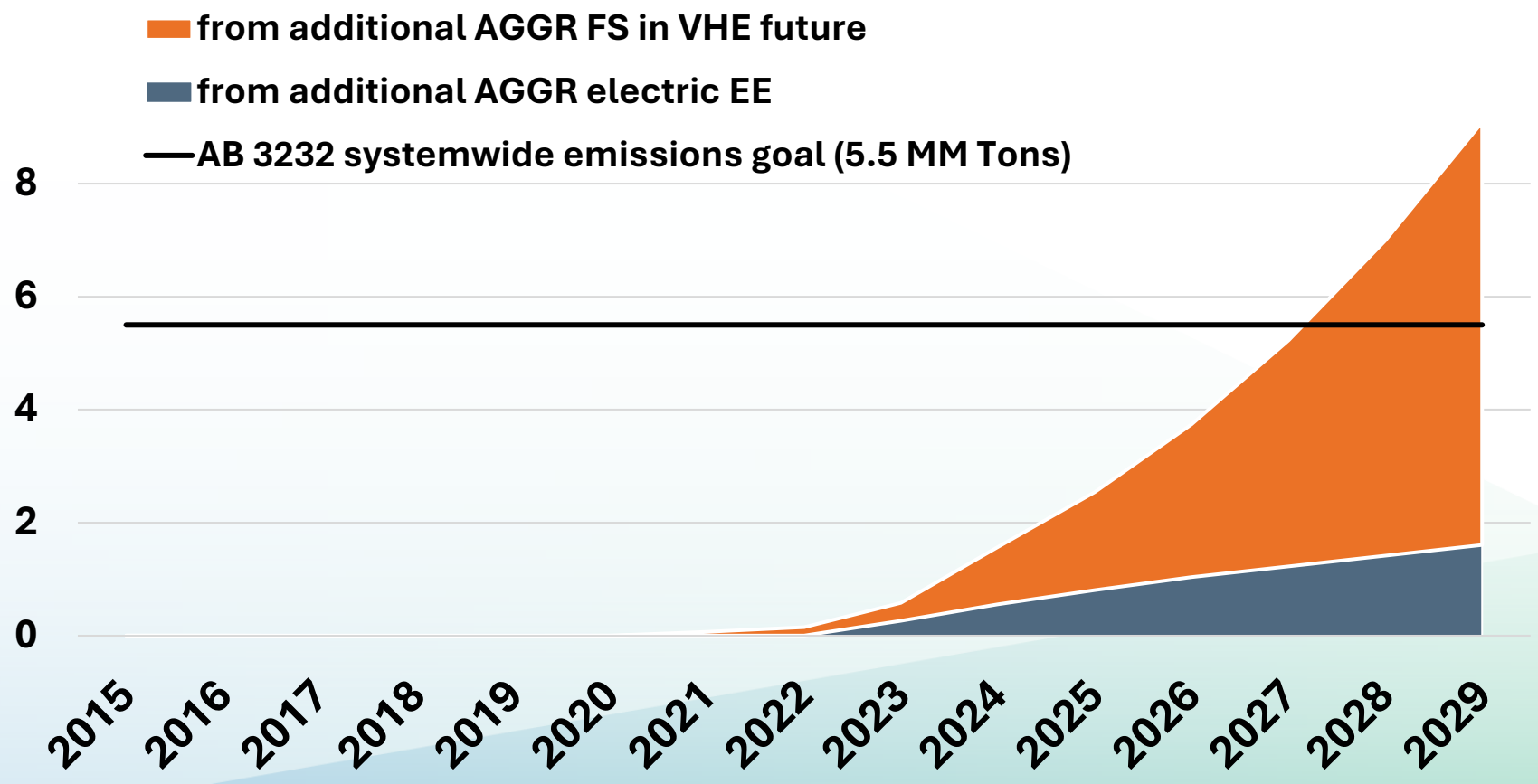
➢ **Scenario One BAU attains a 3.35 MM Tons CO_2e reduction or 61% of the emissions goal**

➢ **The aggressive Scenario Two attains 9.10 MM Tons CO_2e reduction or 165% of the goal**



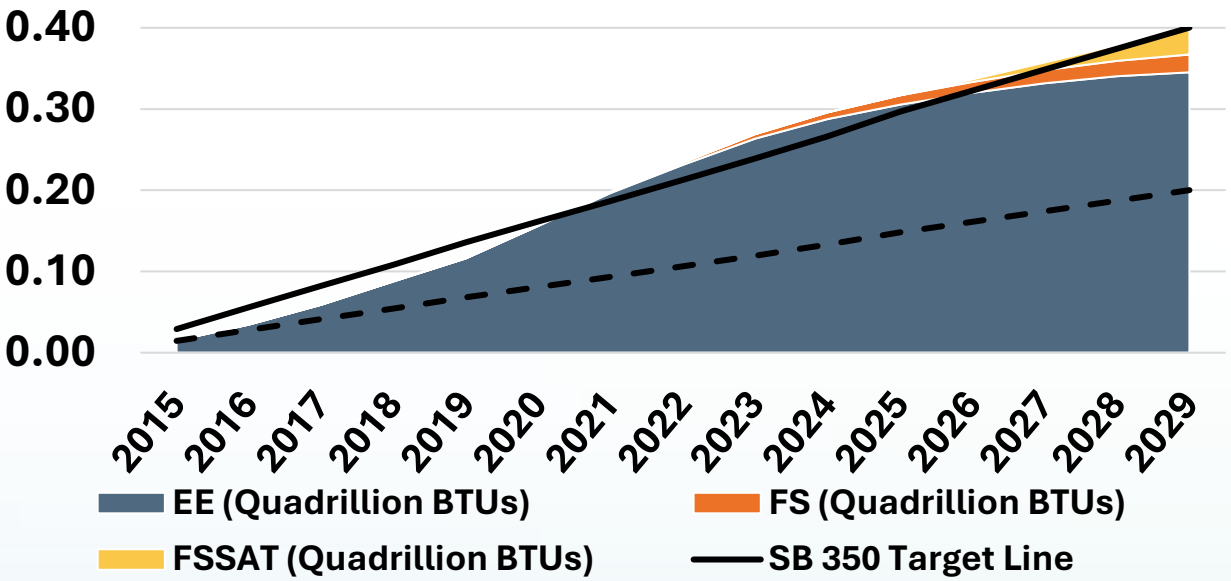
GHG Impacts are Larger for FS Than for EE

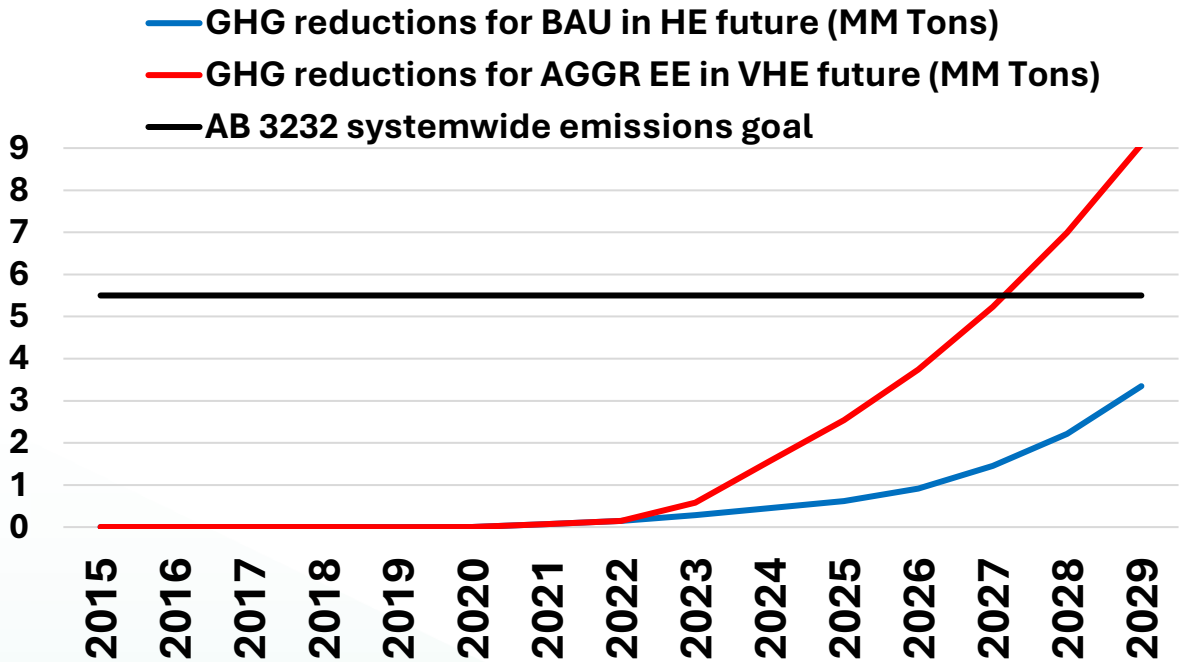
- The aggressive Scenario Two attains 9.10 MM Tons CO_2e reduction or 165% of the goal
  - **136% are from aggressive FS**
  - 29% are from aggressive electric EE



Conclusions: SB 350 Goal Will Be Met by 2030

- However, AB 3232 emissions goals for 2030 will not be attained in the BAU scenario





- More aggressive FS/electrification is the most effective path towards meeting GHG reduction goals…

Thank You!

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Chapter 2: Major Issues in Building Decarbonization

Affordable Building Decarbonization Financing	Voluntary Whole-House Home Energy Rating and Labeling
CEC Building Decarbonization Incentive Programs	Embodied Carbon
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Equity Metrics	

Chapter 2: Major Issues in Building Decarbonization –Technical Analysis, Barriers and Opportunities

Technical Topics

- First public workshop March 12, 2024
  - Scope out 2025 Action Plan
- Expands on major issues and added topics
  - Increased importance
  - Highlighted in legislation
- Summarizes current major issues
- Recommendations from relevant reports
  - CARB Scoping Plan
  - IEPR
  - Building Decarbonization Assessment

Barriers

- Challenges to achieving objectives for each technical topic
- Need to be resolved to meet California's goals

Opportunities

- Existing or upcoming activities, policies, or programs
- Used to develop Summary of Recommendations

Chapter 2: Major Issues in Building Decarbonization - Affordable Building Decarbonization Financing

Context

- Financing is important for middle income homeowners to afford decarbonization retrofits

Analysis Highlights

- On-bill financing (IUI) is currently under development by CPUC, but available funds will likely be limited by small bill savings from heat pumps
- California already has GoGreen that buys down interest rates on EE loans to 4.4% vs. 10.1%
- HVAC contractors typically do not offer financing to customers
- Major lenders need loans to be standardized and tradeable

Barriers

- Financing is currently not available to at least 30% of Californians, because they are deemed too risky by investors

Opportunities

- CA can expand statewide financing programs to bring down interest rates and remove qualification barriers

Relevant Recommendations

- #5: Increase access to low-cost and zero-cost financing

Chapter 2: Major Issues in Building Decarbonization - Building Energy Efficiency Standards

Context

- Decarbonizing buildings during construction is much less expensive than doing it once they are built.

Analysis Highlights

- The 2022 Energy Code is projected to generate $1.5B in net savings and 10 metric tons of GHG reduction
- The 2025 Energy Code is projected to generate $4.8B in net savings
- Residential new construction strongly incentivizes all electric under 2025 code

Barriers

- Nonresidential buildings require complex analysis

Opportunities

- New construction costs and savings data to inform code
- Include non-energy benefits such as health impacts
- Improve energy performance with A2L and future refrigerants

Relevant Recommendations

- #13: Collect and analyze actionable data to guide the energy transition

Chapter 2: Major Issues in Building Decarbonization - Regulatory Standards for Existing Buildings

Context

- Regulations and building standards are the least-cost way to achieve GHG reductions. Data analysis and pilots are needed to determine which are the most cost-effective and feasible options.

Analysis Highlights

- BAAQMD rules 9-4 and 9-6
- Title 24 Part 11 (CALGreen) voluntary standard for heat pump retrofits
- CARB zero emissions standards

Barriers

- Initial cost of systems, market segmentation, low volume
- New circuit costs, possible panel costs
- Split incentive in rentals

Opportunities

- CALGreen voluntary measures
- Nonres AC replacement in 2028 code
- Heat pumps technically suited to AC replacement

Relevant Recommendations

- #8: Strengthen alignment across agencies and levels of government

Chapter 2: Major Issues in Building Decarbonization - Code Compliance for Existing Building Retrofits

Context

- Low compliance with permitting requirements may create safety and performance risks and tilts the playing field against incentive programs

Analysis Highlights

- Permits obtained for only 10 - 30% of HVAC replacements
- HPWH permits take 6 days in TECH program, gas permits are same-day
- Biggest costs of compliance are contractor time and risk, not fees
- Some jurisdictions outside CA have stepped up enforcement significantly

Barriers

- Permit requirements for new technologies vary by jurisdiction
- Contractors and homeowners have little incentive to comply
- No way to identify noncompliance

Opportunities

- CEC research on noncompliance
- Alternative compliance, streamlined permitting, enhanced enforcement

Relevant Recommendations

- #9: Enhance energy code compliance strategies

Q&A Session 1 of 3

Zoom:

- Use the Zoom Q&A Dialog to submit a written question

Telephone:

- Dial *9 to raise your hand
- *6 to mute/unmute your phone line. You may also use the mute feature on your phone.

Zoom/phone participants, when called upon:

- Your microphone will be opened
- Unmute your line
- State your name and affiliation (optional)

5 minutes

Chapter 2: Major Issues in Building Decarbonization - Remediation Costs for Residential Buildings [1 of 2]

Context

- Costs are prohibitive for low-income homeowners
- Do not always help programs meet carbon goals

Analysis Highlights

- Data on costs is limited, needs vary
- Program set asides and eligible measures vary

Remediation Costs in California Energy Programs

Program	Cap
DOE Weatherization Readiness Funding	$13,000 average
San Joaquin Valley Pilot Program (2018–2024)	Max $5,000/unit with program funds. Up to $20,000 with ext. funding
Equitable Building Decarbonization Program	$6,000 avg for SF and MF $7,200 avg for MH
Energy Savings Assistance Program	Max $2,500/unit (or 150% of avg cost) $1,700 avg cost (avg cost adjustable)

Chapter 2: Major Issues in Building Decarbonization - Remediation Costs for Residential Buildings [2 of 2]

Barriers

- Limited data on costs of remediation, which makes it difficult for programs to budget
- Categorizing and predicting costs is challenging

Opportunities

- Learn from existing programs that include flexibility in expenditure cap
- Collect data from programs on costs and deferrals

Relevant Recommendations

- #1: Continue to prioritize funding for incentives to achieve GHG targets
- #13: Collect and analyze actionable data to guide the energy transition

Chapter 2: Major Issues in Building Decarbonization–
Decarbonizing Manufactured Housing [1 of 3]

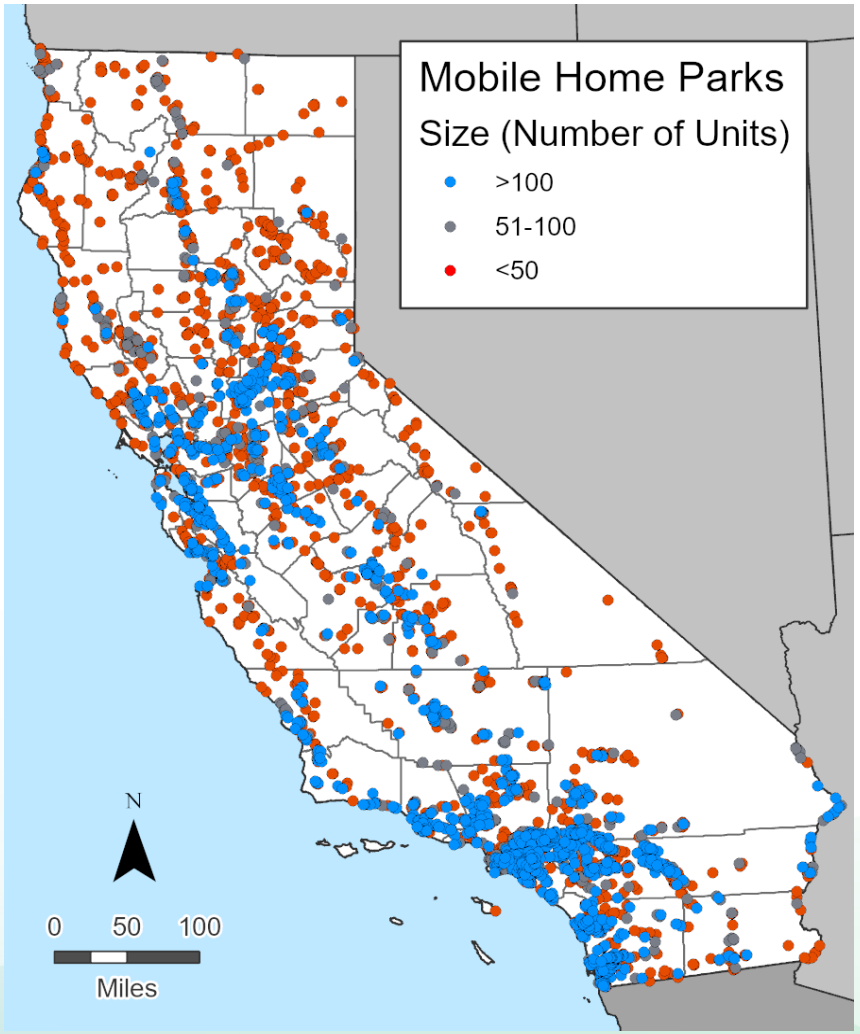
Context

- 4% of the state's housing stock
- Underserved by energy programs

Analysis highlights

- Distinct physical characteristics
- Electric capacity limitations
- Varied ownership structures
- Unique regulatory environment

Distribution of Mobile Home Parks in California



Source: Homeland Infrastructure Foundation-Level Data, U.S. Department of Homeland Security

Chapter 2: Major Issues in Building Decarbonization–
Decarbonizing Manufactured Housing [2 of 3]

California Manufactured Home Occupant Demographics

Characteristics	MH	All Housing
2021 Median Household Income	$48,000	$80,000
Median Age of Primary Resident	60	48
Resident With Permanent Disability	34%	12%
Social Security or Railroad Retirement Income	40%	24%
Energy Insecurity in 2020	47%*	27%*
Foregoing Food and Medicine to Pay for Energy in 2020	37%*	20%*

***Indicates this value is for the United States**
Source: Compiled by CEC staff from Residential Appliance Saturation Study (RASS), data from the California Department of Finance, U.S. Energy Information Administration, and U.S. Census Bureau

Barriers

- Lower-income population, less discretionary spending for improvements
- Technical challenges:
  - Small utility closets do not fit equipment
  - Electric panel capacity limitations
- Different regulatory standards

Chapter 2: Major Issues in Building Decarbonization–
Decarbonizing Manufactured Housing [3 of 3]

California Manufactured and Single-Family Home Propane Use

Building Type	Primary Heating Fuel Propane	Primary Water Heater Fuel Propane
Single-Family	3.4%	4.4%
Manufactured Home	14.1%	18.5%

Source: 2019 California Residential Appliance Saturation Study

Opportunities

- Propane replacement
- Concentrated housing provides opportunity for efficient upgrades
- Contractor incentives, earmarked funding
- Improve coordination among programs
- Manufactured housing specific technology

Relevant Recommendations

- #1: Continue to prioritize funding for incentives to achieve GHG targets
- #2: Maintain focus on Equity

Chapter 2: Major Issues in Building Decarbonization - Tenant Protections [1 of 2]

Context

- Decarbonization can be in opposition of tenant interests, by increasing rent and displacement. This could impede the progress of decarbonization.

Analysis Highlights

- 44% of California households live in rental housing, almost half of which are low income
- 21% of renters in the Pacific region of US have high energy burden
- Inconsistent protections in existing programs

Barriers

- Landlord-tenant split incentive
- Decarbonization projects could increase rent and displacement
- Patchwork of local tenant protection laws
- Protections may discourage landlords from making decarbonization upgrades
- Programs lack resources/authority to enforce

Chapter 2: Major Issues in Building Decarbonization - Tenant Protections [2 of 2]

Opportunities

- Consistent protection requirements & enforcement across programs
- Statewide guidance on best practices could improve programs
- Conduct research into building owner perception of decarbonization related
  - Benefits
  - Barriers
  - Tenant protections

Relevant Recommendations

- #2: Maintain focus on equity
- #7: Empower homeowners and building owners with decision-making resources
- #8: Strengthen alignment across agencies and levels of government to maximize building decarbonization benefits

Chapter 2: Major Issues in Building Decarbonization - Hard to Reach Communities

Context

- Hard to reach communities face numerous barriers to decarbonization.

Analysis Highlights

- 6% Rural Households
- California Native American Tribes require government-to-government outreach
- 19% have limited English

Barriers

- Limited contractor availability and higher costs in rural areas
- May lack capacity to apply to programs
- Messaging not always appropriate or effective

Opportunities

- Tailor programs in partnership with community-based organizations to meet specific needs
- Establish ongoing outreach efforts independent of specific programs
- Centralize funding and ensure funding continuity for engagement and outreach

Relevant Recommendations

- #2: Maintain focus on equity
- #6: Expand the decarbonization workforce with well-paid jobs
- #7: Empower homeowners and building owners with decision-making resources
- #8: Strengthen alignment across agencies and levels of government

Chapter 2: Major Issues in Building Decarbonization - Health Benefits of Building Decarbonization

Context

- Quantifying the health benefits of decarbonization could influence cost-effectiveness and public perception, and make widespread decarbonization easier

Analysis Highlights

- Building energy codes create healthier and safer indoor environments
- Quantification of benefits of improved air quality has influenced the relationship between indoor air quality and energy use
- Research on indoor air quality (IAQ) currently focusing on SO_2

Barriers

- Difficult to access a representative sample of homes in justice communities
- Modeling tools struggle to quantify health impacts of indoor air quality

Opportunities

- Epidemiological research could provide an improved scientific foundation for policy and programs
- Metrics and improved modeling could help predict health benefits from building electrification, even on the per-building level

Relevant Recommendations

- #8: Strengthen alignment across agencies and levels of government

Chapter 2: Major Issues in Building Decarbonization – Data Standardization and Sharing

Context

- Innovative methods based on data shared between agencies and integrated with other datasets such as health and equity data will help to track and improve decarbonization.

Analysis Highlights

- Data collection about home energy use, residential energy systems, and housing characteristics
- Enabling innovations and improvements in program targeting, delivery, follow-up, and evaluation

Barriers

- Challenges in data aggregation to protect Personally Identifiable Information (PII)
- Funding needed for more frequent survey data collection

Opportunities

- CEC data repository can support private and public sector innovation
- Improve program design and identify problems during implementation faster
- Use data to track developments in the decarbonization market

Relevant Recommendations

- #13: Collect and analyze actionable data to guide the energy transition.

Chapter 2: Major Issues in Building Decarbonization - Refrigerant Use, Recovery, and Reclamation

Context

- Refrigerants make up ~5.5% of the state's GHG emissions. Contractors servicing or disposing of HVAC systems creates an opportunity to reduce refrigerant emissions.

Analysis Highlights

- SB 1206 requires the use of reclaimed refrigerants for existing equipment based on a phased schedule based on the global warming potential (GWP) of refrigerants.
- The reclaimed refrigerant market is only 1-2% of the refrigerant market
- CARB and the U.S. EPA require lower-GWP refrigerants in space-conditioning heat pumps

Barriers

- Cost to recover refrigerant is higher than its economic value
- Recovering used appliances does not guarantee refrigerant recovery and reclamation

Opportunities

- Educating contractors and technicians, and requiring continuation of education and evaluation of technicians' knowledge
- Increase compliance with CARB's Refrigerant Management Program
- A tracking system for specific refrigerants can create traceability from HVAC technicians to reclaimers

Relevant Recommendations

- #4: Continue investing in technology innovation.
- #6: Expand the decarbonization workforce with well-paid jobs.

Q&A Session 2 of 3

Zoom:

- Use the Zoom Q&A Dialog to submit a written question

Telephone:

- Dial *9 to raise your hand
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Zoom/phone participants, when called upon:

- Your microphone will be opened
- Unmute your line
- State your name and affiliation (optional)

5 minutes

Chapter 2: Major Issues in Building Decarbonization – CEC Building Decarbonization Incentive Programs

Context

- CEC operates both incentive and direct install programs, which create opportunities for research, analysis, and piloting

Analysis Highlights

- Equitable Building Decarbonization (EBD) program includes
  - $567M statewide direct install
  - $30M tribal direct install
  - $30M statewide incentive program

Barriers

- Variable funding streams with differing requirements
- Difficulty tailoring outreach to low income and disadvantaged communities

Opportunities

- Trialing of new technologies and approaches
- Pay-for-performance program
- Training for Residential Energy Contractors (TREC) program

Relevant Recommendations

- Multiple

Chapter 2: Major Issues in Building Decarbonization - Whole-House Home Energy Rating and Labeling

Context

- A system to boost home valuations by quantifying the bill reductions from decarbonization measures could increase homeowner willingness to install efficiency measures and heat pumps.

Analysis Highlights

- National Association of Realtors
- Estimated $1,000+ for in-home assessment. More for complex homes.
- 0.4% increase in sales price for each $100 reduction in bills

Barriers

- Seller's agent has no incentive to communicate poor report to buyer
- Cost of conducting assessments

Opportunities

- Learn from other countries
- Same scale for new vs. existing homes

Relevant Recommendations

- #7: Empower homeowners and building owners with decision-making resources
- #11: Implement an accessible home energy rating and labeling program

Chapter 2: Major Issues in Building Decarbonization - Electric Vehicle Supply Equipment Retrofits (EVSE)

Context

- Building programs and EVSE programs are trying to reach the same decision-makers in the same buildings

Analysis Highlights

- More than 200,000 public and shared private chargers in CA
- Significant financial and logistical barriers due to panel upgrades in multifamily
- Utilities and state agencies have taken few steps to integrate building and EVSE programs

Barriers

- Permitting and interconnection are inefficient

Opportunities

- Identify specific opportunities for aligning EV and building programs, such a data sharing and planning for future upgrades

Relevant Recommendations

- #8: Strengthen alignment across agencies and levels of government

Chapter 2: Major Issues in Building Decarbonization – Advancing Load Flexibility

Context

- At a time when decarbonization savings are marginal, load flex is an important source of bill reductions, reduced grid stress and avoided rate increases.

Analysis Highlights

- Flexible Demand Appliance Standards (FDAS) now requires pool controls to have scheduled operation and two-way communication
- Market Informed Demand Automation Server (MIDAS) database is now populated with pilot dynamic rates and accessible via API
- Utilities are developing and approving dynamic rates

Barriers

- Limited consumer awareness
- Few load flex devices deployed

Opportunities

- FDAS rulemakings for water heaters, thermostats, EVSE, Battery Energy Storage Systems
- Pre-enrollment from incentive programs
- Evaluate impact on grid costs

Relevant Recommendations

- #12: Develop automated load flexibility programs

Chapter 2: Major Issues in Building Decarbonization - Residential Panel Optimization and Sizing

Context

- The electric panel is the connection between the building and grid.

Analysis Highlights

- Barrier to Decarbonization
- Most Panels are Underused

Barriers

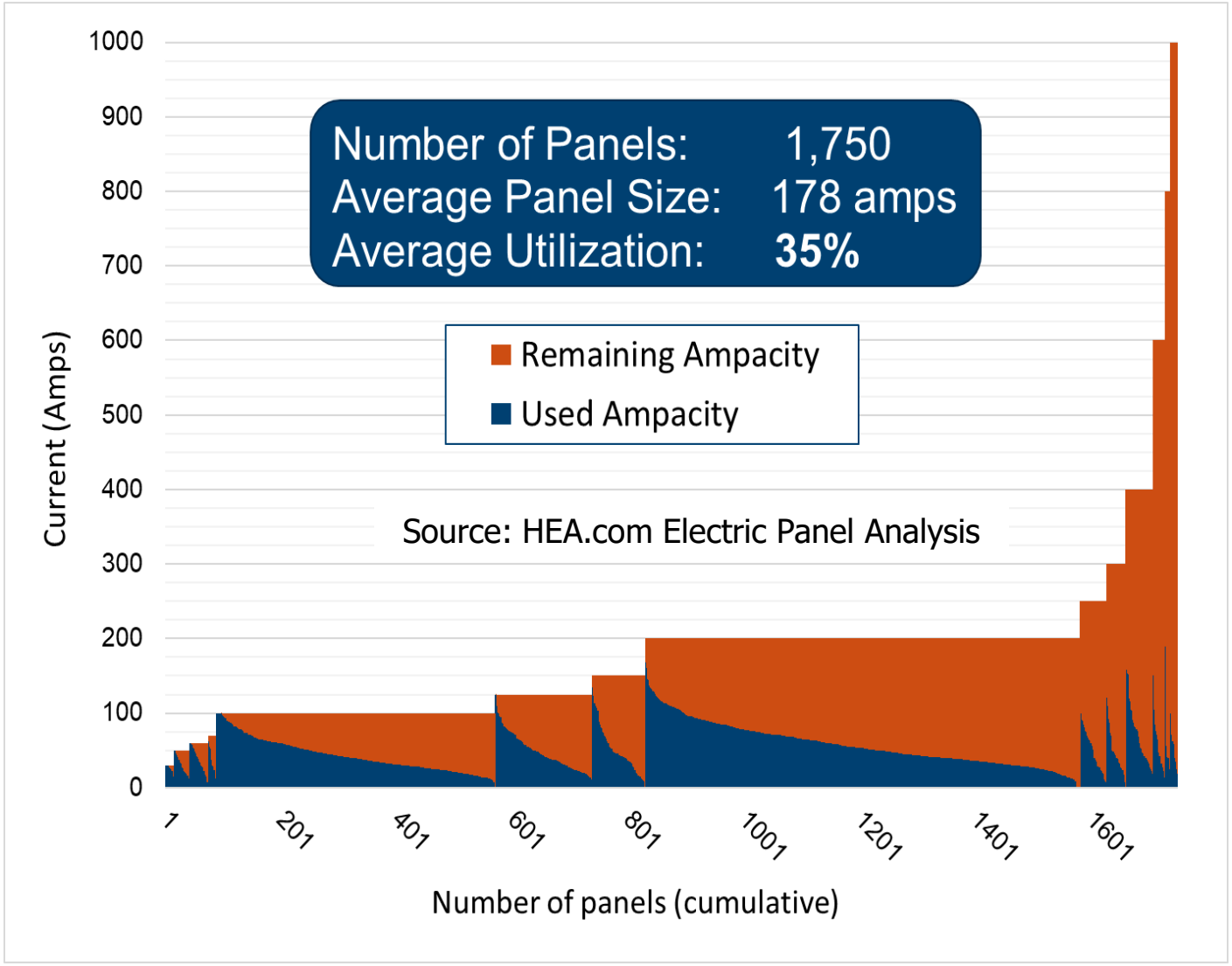
- Unnecessary Upsizing
- Project Delays
- Increased Expense

Opportunities

- Electrify Without Upsizing
- Efficiency & Resiliency

Relevant Recommendations

- #4: Continue investing in technology innovation



Chapter 2: Major Issues in Building Decarbonization - Benchmarking and Building Performance Standards

Context

- Benchmarking collects building operational data.
- Performance standards are a flexible framework for long-term progress toward targets.

Analysis Highlights

- Buildings emit more than 25% of statewide GHGs
- Minimum maintenance and improvement of buildings
- Flexible compliance pathways
- Technical and economic support

Barriers

- Covered Building List
- Enforcement
- Tenant Equity

Opportunities

- GHG Emissions Reductions
- Energy Efficiency
- Lessons learned from other jurisdictions

Relevant Recommendations

- #10: Design building performance standards for large commercial and multifamily buildings.

Chapter 2: Major Issues in Building Decarbonization – Bill Impact Estimation and Electricity Rates

Context

- Accurate estimates of the impacts to utility bills from electrification can encourage customers to decarbonize their buildings

Analysis Highlights

- Electrification can lead to bill savings or increases depending on climate zone, building type or vintage
- California's high ratio of gas to electric rates are an important factor for home and building owners when considering decarbonization
- More research into customer perception of bill impacts and bill impact tools are needed

Barriers

- Tools to estimate bill impacts are not tailored to users' individual homes and usage patterns

Opportunities

- Market Informed Demand Automation Server (MIDAS)
- CEC's energy data repository
- CPUC customer electrification estimator tool

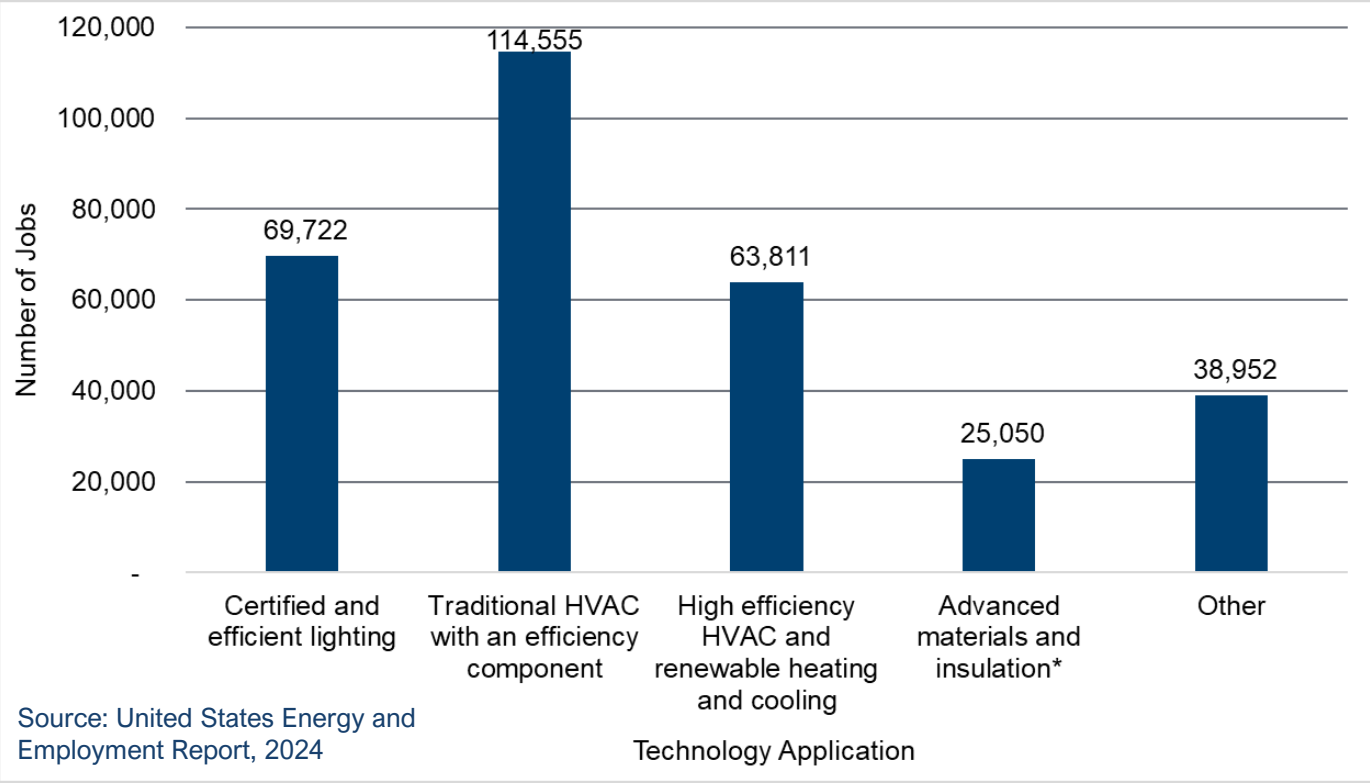
Relevant Recommendations

- #7: Empower homeowners and building owners with decision-making resources
- #13: Collect and analyze actionable data to guide the energy transition

Chapter 2: Major Issues in Building Decarbonization - Building Local Workforces [1 of 2]

Context

- A skilled workforce with “high-road” jobs is needed to install decarbonization measures for CA to meet climate and energy goals



Source: United States Energy and Employment Report, 2024

Analysis Highlights

- Decarbonization will reduce jobs in gas but increase jobs in electricity sector
- Contractors and installers are needed for decarbonization retrofit work
  - Sheet metal workers
  - Electricians
  - Plumbers
  - Pipefitters
  - HVAC
- Upskilling and reskilling are needed for quality installations

Chapter 2: Major Issues in Building Decarbonization - Building Local Workforces [2 of 2]

Barriers

- Shortage in workforce needed for decarbonization retrofits
  - Licensed contractors and tradespeople

Opportunities

- Electrification and decarbonization anticipated to create 42,000—81,000 additional jobs by 2045
- California has many workforce programs and apprenticeships
  - Can be leveraged by creating partnerships with decarbonization programs

Relevant Recommendations

- #6: Expand the decarbonization workforce with well-paid jobs

Chapter 2: Major Issues in Building Decarbonization - Equity Metrics

Context

- Important to measure and address disparities in energy resources and programs to ensure all Californians can participate in the energy transition

Analysis Highlights

- Energy equity metrics are used to:
  - Evaluate and monitor effectiveness of energy programs and policies
  - Guide the creation of new energy programs and policies
  - Assess the effectiveness of community engagement
- Evaluating and monitoring equity metrics is still in early stages of development
  - CPUC Affordability Ratio
  - CEC Energy Equity Indicators tool

Barriers

- Energy equity metrics are challenging to measure because data on the effects of the equitable distribution of program benefits is limited
- Lack of agreement on standardized metrics to assess the equity of outcomes

Opportunities

- Can use existing program metrics to develop equity metrics
- Can compare outcomes among different program types by creating metrics about equity outcomes that can be used by any program

Relevant Recommendations

- #2: Maintain focus on Equity

Chapter 2: Major Issues in Building Decarbonization - Embodied Carbon

Context

- Embodied carbon is making up a higher percentage of GHG emissions
  - Energy efficiency and electrification = decline in operational carbon levels

Analysis Highlights

- Buy Clean California Act (BCCA)
  - Global warming potential limits on:
    - Structural steel
    - Concrete reinforcing steel
    - Flat glass
    - Insulation
- Assembly Bill 43
- Assembly Bill 2446

Barriers

- Challenging to meet requirements of BCCA
  - Environmental Product Declarations (EPD)
  - Product Category Rules

Opportunities

- CEC can collect data and monitor the impacts of CARB's embodied carbon regulation
  - Evaluate compliance rates/levels
  - Assess indirect consequences on building design, operational energy use, or material transportation
  - Recommend improvements

Relevant Recommendations

- #8: Strengthen alignment across agencies and levels of government to maximize the benefits of building decarbonization for all Californians

Q&A Session 3 of 3

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5 minutes

Executive Summary: Recommendations

1. Continue to prioritize funding for incentives to achieve GHG targets	8. Strengthen alignment across agencies and levels of government to maximize the benefits of building decarbonization for all Californians
2. Maintain focus on Equity	9. Enhance Energy Code compliance strategies
3. Prioritize energy efficiency investments to improve affordability	10. Design building performance standards for large commercial and multifamily buildings
4. Continue investing in technology innovation	11. Implement an accessible home energy rating and labeling program
5. Increase equitable access to low-cost and zero-cost financing	12. Develop automated load flexibility programs to support grid reliability and energy affordability
6. Expand the decarbonization workforce with well-paid jobs	13. Collect and analyze actionable data to guide the energy transition
7. Empower homeowners and building owners with decision-making resources	14. Create market conditions that position heat pumps as the leading technology for decarbonizing buildings

Recommendation #1

Continue to prioritize funding for incentives to achieve GHG targets. Targeted direct install and incentive programs have played an essential role in energy use reductions in California and remain essential for market transformation and increased equity. Programs should retain a focus on electrification and heat pump installation, coupled with energy efficiency, as the primary pathway to decarbonize buildings. If funding is available, programs should expand to include new approaches to contain overall costs, such as panel optimization. Data from programs are needed to guide future regulatory changes, and continued commitment to program support provides market certainty that enables private companies to invest and scale building decarbonization initiatives over time.

Recommendation #2

Maintain focus on Equity. Programs should focus the majority of funding on low-income and disadvantaged communities, which face the highest energy cost burdens, may not be able to afford the costs associated with building decarbonization, and may not have access to financing. Tenant protections should be a strong consideration in decarbonization programs. Low-income homeowners and landlords need broad access to low-cost financing to support projects and alleviate residents' energy burden. The CEC should continue developing targeted programs that focus on tribal needs, such as the Equitable Building Decarbonization Tribal Direct Install program.

Recommendation #3

Prioritize energy efficiency investments to improve affordability. Programs should combine electrification measures with energy efficiency to ensure energy affordability and strategic peak demand reduction. State agencies and program administrators should use data from decarbonization programs and the CEC's energy data repository to identify and recommend effective, low-cost solutions across various building types, climate zones, and utility territories. Reducing energy use through energy efficiency measures such as insulation, air sealing, and energy management and controls is essential for affordability. In addition, energy efficiency measures improve the performance of heat pumps by eliminating or reducing the need for backup heat sources which also reduces first costs and operating costs.

Recommendation #4

Continue investing in technology innovation. Reducing first costs of heat pump installations and operating costs requires technology innovation. For example, 120 Volt indoor air handlers can eliminate the cost of running electrical wiring to attics. Dual fuel heat pumps can also reduce the cost of installations by avoiding the need for new electrical capacity for backup resistance heating, while providing customers with heat at the lowest operating cost. Innovative thermostatic controls that minimize the use of gas in dual fuel systems reduce GHG emissions. Technologies such as low-voltage appliances, circuit-sharing devices, and meter socket adapters, as well as educating field technicians on panel-optimization strategies, should be used to minimize electrical panel and service upsizing and electric grid infrastructure upgrades.

Recommendation #5

Increase equitable access to low-cost and zero-cost financing. The CEC and other agencies should further explore barriers and opportunities to capital mobilization such as fostering private sector partnerships, reducing the cost of capital, and ensuring geographical availability of affordable financing products. Financing options should not burden low- and moderate-income homeowners excessively, and should be easily accessible at convenient times and places for customers. Standardizing reporting and performance assessments for loans will increase market confidence. Contractor education can improve the quality, transparency and appropriateness of the financial products offered to homeowners.

Recommendation #6

Expand the decarbonization workforce with well-paid jobs. Develop a better understanding of the business barriers contractors face to expanding their decarbonization services, including training and upskilling needs along with business issues such as customer acquisition and project pipeline management. If funding is available, decarbonization programs could support contractors in overcoming these barriers, reward competence in refrigerant management and recovery, and focus on bringing in workers from California Native American tribes and justice communities. Workforce development boards already provide funding and wrap-around support for trainees and apprentices which could be expanded if funding is available. Continue to invest in training for high-road jobs such as the Training for Residential Energy Contractor Program.

Recommendation #7

Empower homeowners and building owners with decision-making resources. The state should enhance its outreach and education offerings for decarbonization best practices, data, and tools through resources such as the Building and Home Energy Resource Hub and the Heat Pump Public-Private Partnership. Ensure that programs meet the needs of building owners while protecting tenants by understanding tenant outcomes and researching the barriers to program participation among landlords, such as long-term limitations on the ability to recoup the costs of decarbonization projects. Ensuring that California's most burdened communities benefit from decarbonization requires prioritizing disadvantaged and low-income communities and supporting building owners and occupants to choose to decarbonize even for an emergency replacement.

Recommendation #8

Strengthen alignment across agencies and levels of government to maximize the benefits of building decarbonization for all Californians. Thoughtfully integrating a portfolio of building decarbonization strategies, including strong alignment across incentive programs and regulatory actions, offers the greatest potential to achieve the benefits of building decarbonization while uplifting California's most burdened communities. Local leadership and innovation is needed for the energy transition, so the state should continue to empower local governments to take actions that exceed statewide minimum standards and policy targets. If state or federal funding is available, the CEC should provide incentives for targeted local planning projects, support local program evaluations, and ramp up technical assistance for local code enforcement.

Recommendation #9

Enhance Energy Code compliance strategies. The CEC should continue to improve the usability of the Energy Code compliance systems, track heat pump installations and rates of compliance in new construction and existing buildings, and increase stakeholder awareness of the potential impacts of noncompliance. The CEC can address these tasks by collecting datasets in the field that are more representative of a state as large and diverse as California. State agencies should coordinate technical assistance and support for local enforcement agencies. The CEC should quantify unpermitted and noncompliant retrofit work.

Recommendation #10

Design building performance standards for large commercial and multifamily buildings. Building performance standards are an established method for achieving decarbonization. The CEC is developing a strategy for using benchmarking data to track and manage the energy usage and greenhouse gas emissions of large commercial and multifamily buildings, in accordance with Senate Bill 48 (Becker, Chapter 378, Statutes of 2023). This strategy should balance affordability with achieving the state's GHG reduction goals. The strategy must reflect the needs of California’s diverse building types, geography, and citizenry, with particular focus on minimizing adverse outcomes for the most needy Californians.

Recommendation #11

Implement an accessible home energy rating and labeling program. The CEC should continue revamping California's voluntary Home Energy Rating and Labeling Program (Public Resources Code Section 25942) in coordination with other state, local, and federal agencies. An effective home energy rating and labeling program could inform building owners of potential upgrades and convey the value of decarbonization measures to the market. Home energy rating and labeling programs have been implemented in jurisdictions inside and outside the United States and have driven market differentiation around building performance. Consider how California's program may be expanded from voluntary to mandatory applications once it is implemented.

Recommendation #12

Develop automated load flexibility programs to support grid reliability and energy affordability. Automated demand flexibility within appliances and buildings is an effective way to reduce consumer bills, support grid reliability, reduce GHG emissions, and avoid costly upgrades to the grid and building infrastructure. The CEC should continue to expand the Load Management Standards and Market Informed Demand Automation Server toward these objectives while developing additional flexible demand standards for appliances. Utilities and community choice aggregators should ensure electricity rate information or tariffs are kept up to date in the Market Informed Demand Automation Server and implement automatic load-flex programs. The CEC should engage with stakeholders to explore how to ensure interoperability across a range of DERs.

Recommendation #13

Collect and analyze actionable data to guide the energy transition. Data on the costs and impacts of decarbonization are still limited. The CEC should address data gaps and update its data collection authority as needed. The CEC should collect more detailed data on the costs of measures and building remediation and the impacts of decarbonization on energy use and bills, and analyze this information to guide program and policy development. The CEC should develop program metrics that quantify the impacts on equity and augment the approach, timing, and categories of field data for surveys such as the Residential Appliance Saturation Survey, while considering the availability of interval meter data. The glossary at the end of this report provides a definition for “interval meter data.”

Recommendation #14

Create market conditions that position heat pumps as the leading technology for decarbonizing buildings. The state should create productive relationships with heat pump manufacturers and other market actors, including through the Heat Pump Public-Private Partnership, to leverage the resources of private companies to develop new products, reduce costs, ensure installation quality, and support contractors in the development of heat pump business models.

Public Comment

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- Use the “raise hand” feature

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Zoom/phone participants, when called upon:

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- State your name and affiliation
- Spell your name for the record, begin comments
- Please also submit your comments in writing to the docket

Limited to 1 representative per organization.

3-Minute Timer

Closing Remarks

- Program Webpage: Energy Efficiency in Existing Buildings at https://www.energy.ca.gov/programs-and-topics/programs/energy-efficiency-existing-buildings

- Subscription List: Energy Efficiency Program for Existing Buildings at: https://public.govdelivery.com/accounts/CNRA/signup/31719
  - Submit written comments to Docket: **23-DECARB-03**
  - Comments are due **February 20, 2026**

- Staff Contact: ExistingBldgDecarb@energy.ca.gov