

**DOCKETED**

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<b>Document Title:</b>	Building Decarbonization Assessment Project Scope
<b>Description:</b>	This scope includes: categories, issues, and schedule, for the CEC implementation of Assembly Bill 3232 (Friedman, Chapter 373, Statutes of 2018).
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## **Building Decarbonization Assessment Project Scope**

This memorandum sets forth the scoping categories, issues, and schedule, for the California Energy Commission's (CEC) implementation of Assembly Bill 3232 (Friedman, Chapter 373, Statutes of 2018).

### **I. Background**

California is a national and international leader in advancing solutions to climate change and forward-looking energy policies. In 2018, the Legislature advanced building decarbonization as a key strategy to reducing greenhouse gas (GHG) emissions and achieving a carbon neutral California. As discussed in the 2019 Integrated Energy Policy Report (IEPR), optimal decarbonization of California's energy sector will require the balance of three key elements: clean energy supply resources, energy efficiency improvements in buildings and appliances (both gas and electric), and flexibility in electric demand.

The Building Decarbonization Assessment (Assessment) required by Assembly Bill 3232 will evaluate the potential to substantially reduce GHG emissions from residential and commercial buildings by 2030. In addition, the Assessment will include energy system and market impacts, identification of challenges, and recommendations.

The Assessment will be developed in a public, transparent process and in consultation with the California Public Utilities Commission (CPUC), the California Air Resources Board (CARB), and the California Independent System Operator (CAISO). The CEC will consider and align this effort with other relevant policies and proceedings.<sup>1</sup>

The Assessment will be delivered to the Legislature by January 1, 2021 and will be updated in future IEPR's beginning in 2023.

### **II. Key Policy Drivers**

Assembly Bill 32 (Nunez, Chapter 488, Statutes of 2006), the Global Warming Solutions Act of 2006, established an initial GHG reduction goal of 1990 emissions levels by 2020. Subsequent executive orders<sup>2</sup> pushed this goal further with directives for reductions of 40 percent below 1990 levels by 2030, 80 percent below 1990 levels by 2050, and statewide carbon neutrality by 2045. Senate Bill 32 (Pavley, Chapter 249, Statutes of 2016) codified the 2030 goal, and companion bill, Assembly Bill 197 (Garcia, Chapter 250, Statutes of 2016),

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<sup>1</sup> Including, but not limited to; Senate Bill 100 (De León, Chapter 312, Statutes of 2018); Senate Bill 1477, the low-emissions buildings pilot programs; Integrated Energy Policy Reports; the California Energy Efficiency Action Plan; *SB 350 Low-Income Barriers Study, Part A*<sup>1</sup>; and load management standards that are under development by CEC.

<sup>2</sup> Executive Orders [S-03-05](#), [B-30-15](#), and [B-55-18](#)

emphasized equitably implementing climate change policies such that benefits reach disadvantaged communities.

In 2015, Governor Brown signed Senate Bill 350 (De León, Chapter 547, Statutes of 2015), the Clean Energy and Pollution Reduction Act, which codified state goals of 50 percent procured renewable energy sources. SB 350 also included an assessment of the potential to double energy efficiency savings in electricity and natural gas end uses by 2030. Senate Bill 350 directed CEC to study barriers to energy efficiency and clean energy for low-income customers and disadvantaged communities, and offer recommendations to increase opportunities.<sup>3</sup>

In 2017, the Legislature expanded California's GHG reduction strategies to explicitly include decarbonizing buildings. Assembly Bill 3232 directed CEC to assess the potential of reducing GHG emissions from buildings 40 percent below 1990 levels by 2030. Senate Bill 1477 (Stern, Chapter 378, Statutes of 2018) directed the CPUC to establish programs incentivizing the installation of low or zero GHG appliances in homes.

In 2018, Senate Bill 100 established planning targets of 100 percent zero carbon electricity by 2045, and increased the 2030 renewables target from 50 percent to 60 percent. Governor Brown also issued Executive Order B-55-18, establishing a new statewide goal of carbon neutrality by 2045.<sup>4</sup>

### **III. Scope of the Building Decarbonization Assessment**

The Building Decarbonization Assessment is authorized by Assembly Bill 3232, and will be guided by input from state agencies, stakeholders, and the public.

As directed by the bill, the Assessment must consider the following:

- (1) An evaluation, based on the best available data and existing analyses, of the cost per metric ton of carbon dioxide equivalent of the potential reduction from residential and commercial building stock relative to other statewide GHG emissions reduction strategies.*
- (2) The cost-effectiveness of strategies to reduce emissions of GHGs from space heating and water heating in both new and existing residential and commercial buildings.*
- (3) The challenges associated with reducing emissions of GHGs from low-income housing, multifamily housing, and high-rise buildings.*
- (4) Load management strategies to optimize building energy use in a manner that reduces the emissions of GHGs.*

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<sup>3</sup> The SB 350 Low Income Barriers Study was adopted in December 2016. [SB 350 Low Income Barriers Study](#)

<sup>4</sup> [Executive Order B-5-18](#)

- (5) *The potential impacts of emission reduction strategies on ratepayers, construction costs, and grid reliability. In assessing the impact on grid reliability, the commission shall account for both of the following:*
- a. *The commission's 2019 Building Energy Efficiency Standards, effective January 1, 2020, that propose to require solar energy systems on all new single-family and low-rise residential dwellings.*
  - b. *The increased load and impact on electrical infrastructure due to transportation electrification.*

CEC staff propose to define, discuss and analyze the following within the scope of the Building Decarbonization Assessment:

### **A. Building Sectors**

The focus of this Assessment is residential<sup>5</sup> and commercial<sup>6</sup> buildings, and does not include buildings used to manufacture products or complete industrial processes. Staff propose to use the building definitions in the CARB GHG inventory, sector, and activity<sup>7</sup> categories to provide consistent accounting between the Assessment and California's GHG inventory.

The scope of this Assessment includes discussion of the opportunities, benefits and challenges of reducing emissions in low-income, multifamily, and high-rise housing, as well as in disadvantaged communities.

### **B. Emissions Baseline**

The Assembly Bill 3232 GHG emissions baseline establishes building level emissions for the residential and commercial sectors as of 1990. This is the starting point to evaluate GHG emission changes until 2030. Please review the CEC Staff Baseline Recommendation for full details on this buildings GHG emission baseline, including methodology and assumptions.

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<sup>5</sup> The CARB GHG Inventory uses the residential buildings data from the CA. Department of Finance (DOF) that in turn utilizes the US Census definition for "Housing Unit". Exclusions to housing units include hotels, motels, general hospitals, and military installations. Visit the US Census [link to definitions and explanations](#).

<sup>6</sup> The CARB GHG Inventory uses the North American Industry Classification System (NAICS) code to identify, and define commercial sector buildings. In particular, "Retail Trade" codes 44-45. Excluded are NAICS coded industrial and agricultural sector buildings.

<sup>7</sup> See [CARBs GHG Inventory - Query Tool](#) and selections webpage to see how statewide economic sector and activity categories are separated. See the [AB 32 Scoping Plan](#) for reference on how CARB accounts for statewide GHG emissions by key economic sectors, and activities.

### **C. GHG Emission Modeling and Projections**

CEC will compare a 2030 business-as-usual or “reference” projection of building energy use with select GHG reduction scenarios. To develop the reference projections for direct emissions from the residential and commercial buildings sectors, the analysis will utilize existing CEC demand forecasts for fuel combustion emissions and adapt CARB emission inventory methods for other GHG components. GHG reduction scenarios will be developed using modeled estimates of low carbon building energy systems, equipment and appliances. Load shifting impacts will be assessed at varying levels within the GHG reduction scenarios.

To enable grid reliability assessments, the analysis will estimate hourly electric loads that result from building decarbonization for the largest utilities<sup>8</sup> within the state. The CEC will use production simulation methods to calculate GHG emissions resulting from increased electric generation to satisfy incremental electric loads. The assessment will use these models to estimate potential emission reductions and associated costs for each GHG reduction scenario.

### **D. Impact Analysis and Strategies**

Staff evaluation will include, but not be limited to, GHG reduction impacts, challenges and opportunities on the following topics:

1. Building owners: This topic will encompass the technical and cost impacts of decarbonizing buildings. CEC will estimate the potential for decarbonization from fuel substitution and energy efficiency across building types and sectors. Staff will discuss barriers specific to building types, new and existing buildings, fuels and geographic areas.
2. Ratepayers: Staff will estimate potential cost impacts of decarbonization strategies on utility customers.
3. Low-income and disadvantaged communities: CEC will discuss the challenges faced by low-income and disadvantaged

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<sup>8</sup> Excluded are listed multi-jurisdictional, investor owned utilities (IOUs) that operate on a smaller scale to the three major IOUs. In addition for inclusion, aside from the major IOUs, are the publicly owned utilities, Sacramento Municipal Utility District (SMUD) and Los Angeles Department of Water and Power (LADWP).

communities pertaining to California's building decarbonization goals.

4. Low-income housing, multifamily, and high-rise buildings: CEC will discuss the technical and process challenges of reducing GHG emissions in low-income housing, multi-family and high-rise buildings.
5. Workforce: The Assessment will discuss the challenges and opportunities of the workforce involved in building decarbonization. Many workforce issues will need to be addressed to increase the building sector's readiness to specify, procure and install low carbon technologies at scale.
6. Grid reliability: CEC will estimate the potential to shift hourly electric demand for GHG reductions and grid stabilization. The Assessment will consider the potential grid impacts as well as the new demand flexibility opportunities of transportation electrification and distributed generation.

#### **E. Data Considerations**

As part of the Assessment, CEC will consider the best available science, data, and studies including, but not limited to:

1. GHG Emissions and Inventory. This statewide data is emissions-based. The data is informative to establishing the baseline and estimating future reduction targets.
  - CARB, [GHG Inventory Glossary of Terms](#)
  - CARB, [GHG 1990-2004 Inventory](#)
  - CARB, [GHG 2000-2017 Trends of Emissions and Other Indicators](#) (2019)
  - CARB, [Fuel Combustion data](#) (12<sup>th</sup> edition, updated 8/12/19)
  - CARB, 2018 HFC Rulemaking and [Appendix B: Emissions Estimates](#)
  - CEC, Assessment of Fugitive Emissions from the Natural Gas System – Commercial Buildings (Est. completion Jan. 2020)
  - CEC, Characterizing Methane Emissions from Commercial Buildings in California (Est. completion Jan. 2020)

- CEC, 2017 and 2019 California Energy Demand
2. Decarbonization Studies and Strategies: The studies listed contain information about strategic plans to reduce GHG emissions from the building sector. While the approaches vary on how and where to reduce emissions related to buildings, each study presents important policy, regulatory, and cost barriers for consideration.
- E3, [Residential Building Electrification in CA](#), (2018)
  - RMI, [Economics of Electrifying Buildings](#) (2018)
  - CEC, [2018 IEPR Update, Chapter 1: Decarbonizing Buildings](#) (2019)
  - Navigant, [Analysis of the Role of Gas for a Low-Carbon CA Future](#) (2018)
  - BDC, [A Roadmap to Decarbonize CA Buildings](#) (2019)
  - EFI, [Pathways for Deep Decarbonization in CA](#) (2019)
  - LBNL, 2025 CA Demand Response Potential Study (2017)
  - CEC, Fuel Substitution Study with Navigant (est. 2020)
  - CEC, 2019 California Energy Efficiency Action Plan (est. 2019)
  - CEC, 2019 California IEPR (est. 2020)
  - CEC, Load Management Standards Proceeding
  - Energy Equity
    - CEC, SB 350 Low-Income Barriers Study, Part A<sup>9</sup> (2016)
    - CEC, Clean Energy in Low-Income Multifamily Buildings<sup>10</sup> (2018)
  - Costs
    - [CA Dept. of Finance, Data on Housing estimates<sup>11</sup> 1990-2000, 2000-10, 2010-19](#)
    - CPUC, Basics of Cost-Effectiveness Analysis (presentation)

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<sup>9</sup> [SB 350 Low-Income Barriers Study, Part A](#): Overcoming Barriers to Energy Efficiency and Renewables for Low-Income Customers and Small Business Contracting Opportunities in Disadvantaged Communities, TN #214830

<sup>10</sup> See, 18-IEPR-08, [Clean Energy in Low-Income Multifamily Buildings Action Plan](#) (CLIMB), TN# 224513

<sup>11</sup> See California, Department of Finance (DOF) Estimates [webpage for datasets on housing](#)

#### IV. Assessment Schedule

The due date for completing the building decarbonization assessment is January 1, 2021. Therefore, CEC and collaborating agencies are planning and preparing for all the different tasks necessary to complete the project and meet this deadline. We welcome your feedback on the following list of key project activities and dates that CEC is estimating for this project.

ACTIVITY	ACTION DATE
2019 IEPR Joint Agency Workshop on Building Decarbonization and Energy Efficiency	August 27, 2019
Project scope and baseline recommendation posted for public review	November 8, 2019
CEC workshop 1 re: Building Decarbonization Assessment scope and baseline recommendation	December 4, 2019
Public comment period closes	December 18, 2019
CEC public workshop regarding fuel substitution	February 13, 2020*
Additional public workshop, if needed	April 23, 2020*
Additional public workshop, if needed	June 18, 2020*
Draft Building Decarbonization Assessment released	August 14, 2020*
CEC public workshop regarding Draft Building Decarbonization Assessment	August 26, 2020*
Draft Assessment public comment period closes	Sept. 9, 2020*
Decarbonization Assessment adopted by CEC	Nov 11, 2020*

\*Denotes target dates and may be shifted

#### V. Public Process

The Building Decarbonization Assessment will be developed through a public process. The process includes steps on Scoping, Data Considerations and literature review, Public Workshops, Working Groups, Draft Report and feedback, before ending with a completed assessment. All proceeding records for the AB 3232 assessment project will accessible in the Building Decarbonization docket, #19-DECARB-01.



Stakeholders are encouraged to sign-up for the Climate Change, Existing Buildings, and/or (General) Natural Gas list serves at CEC's Mailing List Serves index webpage<sup>12</sup>. CEC staff will notice workshop dates in the docket, and directly through list serve emails.

## **VI. Scoping questions for stakeholder feedback and comments**

1. The legislation calls for a building decarbonization assessment for 2030. Should CEC staff also include a review of feasibility for California's 2045 zero-carbon goals?
2. Is the proposed baseline recommendation the best approach for the Assessment? Why or why not?
3. Staff has identified sectors and topics that will be assessed for impacts, challenges, and opportunities. Do you think this list is appropriate? What additional sectors or topics should be added to the scope of the Assessment?
4. Building costs from substituting end-use appliances include direct and indirect costs. One example of indirect costs are fuel infrastructure costs, such as gas piping to and within buildings, and electric distribution systems. Which indirect costs should be included in this Assessment and what are sources for this information?
5. The total costs to reduce or eliminate emissions from energy usage are uncertain. However, reducing or eliminating emissions will have cost impacts, at the individual and social level. Which cost-effectiveness tests should be included in this Assessment?
6. What additional data, analyses, or studies should be reviewed as part of the Assessment? Please specify sources, and include links or electronic copies, if possible. Also, include a brief rationale on the relevance to the Building Decarbonization Assessment.
7. What strategies or actions should be analyzed as options for reducing GHG emissions in the building sector?

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<sup>12</sup> To receive automated email and information about the Building Decarbonization Assessment project visit [CEC's Mailing List Servers webpage and subscribe to any of the associated listerv's, Climate Change, Existing Buildings, and/or \(General\) Natural Gas.](#)

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8. The CEC is planning to hold workshops on the Building Decarbonization Assessment in early 2020. Are there specific topics that you would like to have discussed at a workshop?