Date of Hearing: April 12, 2023

ASSEMBLY COMMITTEE ON UTILITIES AND ENERGY
Eduardo Garcia, Chair
AB 841 (Berman) – As Amended March 16, 2023

**SUBJECT**: State Energy Resources Conservation and Development Commission: Industrial Heat Electrification Roadmap

**SUMMARY**: Requires the California Energy Commission (CEC) to identify various subsectors of industrial emissions in California and their locations and identify barriers to industrial electrification, and submit to the Legislature an industrial heat electrification roadmap on or before June 30, 2024.

**EXISTING LAW**:

1) Requires the CEC to develop, and publish on the commission's internet website, guidance and best practices to help building owners, the construction industry, and local governments overcome barriers to electrification of buildings and installation of electric vehicle charging equipment. (Public Resources Code § 25233.5)

2) Requires the CEC to assess the potential for the state to reduce greenhouse gas (GHG) emissions from the state's residential and commercial building stock by at least 40%below 1990 levels by January 1, 2030. (Public Resources Code § 25403)

3) Requires the CEC to award funds to research and development projects that advance technologies critical to meeting the state's environmental and energy goals and benefit electricity ratepayers. (Public Resources Code § 25711)

4) Require the California Air Resources Board (CARB) ensures that statewide greenhouse gas emissions are reduced to 40% below the 1990 level by 2030. (Health & Safety Code § 38566)

5) Requires the CEC to establish various clean energy programs such as the industrial grid support and decarbonization program to provide financial incentives for the implementation of projects at industrial facilities to provide significant benefits to the electrical grid, reduce emissions of greenhouse gases, and achieve the state's clean energy goals. (Committee on Budget, AB 209, Chapter 251, Statutes of 2021, Public Resources Code § 25662-25665.1)

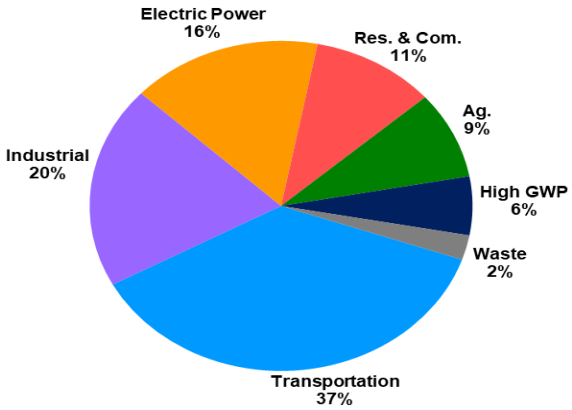
6) Reognizes seven GHGs as: Carbon dioxide ($CO_2$), Methane ($CH_4$), Nitrous oxide ($N_2O$), Sulfur hexafluoride ($SF_6$), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Nitrogen Trifluoride ($NF_3$). (Health and Safety Code § 38505)

**FISCAL EFFECT**: Unknown. This bill is keyed fiscal and will be referred to the Committee on Appropriations for its review.

**BACKGROUND:**

*SB 32 Climate Goal & Emissions in Industrial Sector*— California is a global leader on ground-breaking policies that combat climate change, drive innovation, and accelerate investments in the clean energy economy. SB 32 (Pavley, Chapter 249, Statutes of 2016), also known as the California Global Warming Solutions Act, requires CARB to ensure that statewide GHG emissions are reduced to 40% below the 1990 level by 2030.[1] To meet this climate goal, it is imperative that the state identifies sources of these emissions. In 2016, the Legislature passed AB 1803 (Committee on Budget, Chapter 77, Statutes of 2006) a budget bill that directs CARB to develop California's GHGs Inventory Program which provides estimates and monitors GHGs emissions from different sectors of the state.[2,3]

***Figure 1:*** *2020 GHG Emissions Categorized by AB 32 Scoping Plan Category*[4]




As illustrated in Figure 1, the industrial sector accounts for 20% of GHGs emissions in California, the second largest source after transportation. Emissions in the industrial sector are largely driven by fuel combustion from sources such as refineries, oil and gas production, cement plants and thermal energy used for heating and cooling.[5] Process emissions from cement and hydrogen production for refinery use also contribute significantly to the total emissions for this sector. Additionally, refineries and hydrogen production represent the largest individual source in the industrial sector, contributing 35% of the sector's total emissions.[6]

*2022 California Energy Code* – Adopted in 1976 and updated every three years by the CEC, the building energy efficiency standards for residential and non-residential buildings, otherwise known as the Energy Code, ensures new and existing buildings achieve water and energy efficiency and lower carbon footprints.[7] As the impact of climate change accelerates, CEC updated the 2022 Energy Code standards for newly constructed residential and commercial buildings, as well as additions and alterations to existing buildings set to go into effect January 1, 2023 with a focus on four primary areas:[8]

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[1] SB 32, Pavley& Garcia, Chapter 249, Statutes of 2016
[2]AB 1803,Committee on Budget,, Chapter 77, Statutes of 2006
[3] CARB; "Current California GHG Emission Inventory Data"; https://ww2.arb.ca.gov/our-work/programs/greenhouse-gas-inventory
[4] Pg.30, CARB; "California Greenhouse Gas Emissions for 2000 to 2020 Trends of Emissions and Other Indicators; October 2022; California Greenhouse Gas Emissions for 2000 to 2020 Trends of Emissions and Other Indicators
[5] Pg.19, CARB; "California Greenhouse Gas Emissions for 2000 to 2020 Trends of Emissions and Other Indicators; October 2022; California Greenhouse Gas Emissions for 2000 to 2020 Trends of Emissions and Other Indicators
[6] *ibid*
[7] CEC; "Building Energy Efficiency Standards - Title 24; https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards
[8] Pg. iv, CEC; " 2022 Building Energy Efficiency Standards for Residential and Nonresidential Buildings," August 2022

- Require the use of electric heat pumps for space heating and water heating.
- Establish electric-ready requirements for all buildings, including single-family homes.
- Requires solar photovoltaic (PV) systems and battery storage for newly constructed commercial buildings.
- Reinforce and strengthen ventilation standards to improve the quality of indoor air quality.

*Industrial Decarbonization and Improvement of Grid Operations (INDIGO)* – In 2022, the Legislature enacted AB 209[9] which created INDIGO under the CEC to provide incentives for projects that enhance electrical grid reliability, electrify processes that use fossil fuels, incorporate renewable resources, increase energy efficiency, or develop and deploy novel decarbonization technologies. Ineligible projects are those that benefit an oil or gas production, processing, or refining facility.[10] On April 11, 2023, the CEC will host a workshop to discuss the program's scope, project eligibility and requirements, and provide members of the public an opportunity to share feedback.

*Food Production Investment Program (FPIP)* – Originally established in 2018 under the California Climate Investment Program at the CEC, FPIP has already provided about $117.8 million in grants to help food producers reduce GHG emissions through the adoption of advanced energy technologies. In 2022, AB 209 (Committee on Budget, Chapter 251, Statutes of 2022) provided $25 million for the program for California food processors to accelerate the adoption of advanced energy and decarbonization technologies that enable the state meet its GHG reduction goals and support electrical grid reliability.[11] In April 18, 2023, CEC will host an implementation workshop to discuss program scope, project eligibility and requirements.

*2022 State Strategy for the State Implementation Plan* (2022 State SIP Strategy) – CARB has developed a Statewide plan that identifies the strategies needed to reduce emissions and reduce ground-level ozone, experienced as smog to meet the federal 70 parts per billion (ppb) ozone standard set by the U.S. Environmental Protection Agency (EPA).[12] The zero-emission space and water heater standard was approved as part of the 2022 State SIP Strategy, and sets a purchase standard that all new space and water heaters purchased in 2030 and beyond will be zero-emission. CARB will hold a public workshop on May 10, 2023 to guide staff's approach to developing standards to reduce GHGs and smog-forming nitrogen oxides (NOx) emissions from new space and water heaters sold in California to meet climate goals and federal air quality standards.

*CARB's Plan for Cement Decarbonization*– Cement is used as the binder in concrete, which is the most common manufactured product worldwide. The cement industry is energy-intensive and is considered one of the most "hard to decarbonize" industrial sectors because a majority of the GHG emissions from the cement manufacturing process result from the chemical process of limestone calcination (removal of carbon from limestone-calcium carbonate), not the

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[9] Committee on Budget, AB 209, Chapter 251, Statutes of 2021
[10] CEC; "Industrial Decarbonization and Improvement of Grid Operations (INDIGO); https://www.energy.ca.gov/programs-and-topics/programs/industrial-decarbonization-and-improvement-grid-operations-indigo
[11] CEC; "Food Production Investment Program; Food Production Investment Program | California Energy Commission
[12] Pg.1,CARB, "2022 State Strategy for the State Implementation Plan," September 2022

combustion of fossil fuels for energy use.[13] Cement plants are also the largest consumer of coal in the state.[14] Equally, California is the second-largest cement producing state in the United States after Texas, with many of the plants in California concentrated in low-income communities. CARB is currently initiating a stakeholder process to develop a comprehensive strategy that would require California's cement sector achieve a GHG intensity 40% below baseline levels by 2035 and net-zero GHG emissions by 2045 as required by SB 596, Becker, Chapter 246, Statutes of 2021.[15]

*Federal Actions & Investments*— In September 2022, the United States Department of Energy (DOE) released a road map to decarbonize the Industrial sector through innovation in American manufacturing. The pathways identified involve a) electrification of process such as advanced heat pumps; b) electrification of high-temperature range processes such as those found in iron, steel, and cement making; and c) replacing thermally-driven processes with electrochemical ones.[16] The Inflation Reduction Act and the Infrastructure Investment and Jobs Act provide over $10 billion in manufacturing tax credits for industrial facilities with low- or zero-carbon process heat systems.[17] Additionally, DOE is providing about $5 billion through the Advanced Industrial Facilities Deployment Program to assist states with industrial projects that implement advanced technology for reducing emissions.[18]

**COMMENTS**:

1) *Author's statement.* According to the author, "California is a leader in transitioning from combustion to zero-emission technologies in the electricity and transportation sectors, but industrial emissions have largely remained unaddressed. Industrial emissions make up 23 percent of greenhouse gas emissions in California, which is the second largest source behind transportation. Unfortunately, emissions reported from industrial sources have remained flat or even risen in recent years. Moreover, these same sources also emit large quantities of criteria air pollutants and toxic air contaminants that contribute to the heavy air pollution that burdens primarily under-resourced communities. It is time for California to begin electrifying the state's industrial sector—a critical economic contributor to our state. AB 841 is a key first step for California to push the transition of our industrial sectors to zero-emission. This bill achieves this by tasking the California Energy Commission to prepare an Industrial Heat Electrification Roadmap. Planning for electrification will bring sustained economic growth to our industries and reduce heavy air pollution that burdens our most vulnerable communities.

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[13] NRDC; "California Enacts Legislation to Slash Cement Emissions," https://www.nrdc.org/bio/alex-jackson/california-enacts-legislation-slash-cement-emissions-0
[14] Pg.2, Global Efficiency Intelligence; "DEEP DECARBONIZATION ROADMAP FOR THE CEMENT AND CONCRETE INDUSTRIES IN CALIFORNIA; February 2019; California Greenhouse Gas Emissions for 2000 to 2020 Trends of Emissions and Other Indicators
[15] SB 596, Becker, Chapter 246, Statutes of 2021
[16] DOE; "DOE Industrial Decarbonization Roadmap," https://www.energy.gov/eere/doe-industrial-decarbonization-roadmap
[17] See Cory R. Wendt, "Section 48C: the $10 Billion in Investment Tax Credits Every Manufacturer Should Know About" (Mar. 14, 2023) https://www.bakertilly.com/insights/section-48c-10-billion-in-investment-tax-credits.
[18] BlueGreen Alliance, A User Guide to the Inflation Reduction Act (Oct. 2022), at 20 https://www.bluegreenalliance.org/wp-content/uploads/2022/10/BGA-IRA-User-GuideFINAL-1.pdf.

2) *Clarification for Reporting Needed.* While, the industrial sector is among the most difficult to decarbonize, the goals of the industrial heat electrification roadmap as proposed by the bill seem reasonable and align with statewide industrial decarbonization efforts. This bill could provide guidance to the state as it does not have a comprehensive industrial decarbonization approach despite current program initiatives. *As such, the author and committee may wish to consider amendments that will clarify the author's intent of having the CEC consult with various regulatory agencies as specified in section 25216.9(b)1-8 to identify the emission profile of the industrial subsector for various California facilities, identify barriers, and develop solutions to industrial electrification. Due to various responsibilities proposed in the bill for the CEC, the author and committee may also wish to consider amendments that will extend the date for the CEC submitting the industrial electrification roadmap to the Legislature.*

3) *Prior Legislation.*
SB 596 (Becker) would require the state board to establish interim targets for reductions in the greenhouse gas intensity of cement used within the state relative to the average greenhouse gas intensity of cement used within the state during the 2019 calendar year, with the goal of reducing the greenhouse gas intensity of cement used within the state to 40% below the 2019 average levels by December 31, 2035. Status: Chapter 246, Statutes of 2021.

SB 68 (Becker) directed the CEC to gather and develop guidance and best practices to overcome barriers to the electrification of buildings and installation of electric vehicle charging equipment. This project implements the requirements of that bill to help commercial and residential building owners, the construction industry, and local governments. Status: Chapter 720, Statutes of 2021.

AB 3232 (Friedman) requires the CEC, by January 1, 2021, to assess the potential for the state to reduce GHG emissions from the state's residential and commercial building stock by 40% below 1990 levels by January 1, 2030. Status: Chapter 373, Statutes of 2018.

SB 1477 (Stern) requires the CEC to develop a statewide market transformation initiative to transform the state's market for low-emission space and water heating equipment for new and existing residential and nonresidential buildings, and to develop an incentive program to fund near-zero emission technology for new residential and commercial buildings. Status: Chapter 378, Statutes of 2018.

SB 32 (Pavley) requires the CARB to ensure that statewide GHG emissions are reduced to 40% below the 1990 levels by 2030. Status: Chapter 249, Statutes of 2016

4) Double Referral. This bill is double-referred; upon passage in this Committee, this bill will be referred to the Assembly Committee on Natural Resources.

**REGISTERED SUPPORT / OPPOSITION**:

**Support**

350 Bay Area Action
350 Humboldt
Breathe Southern California

California Environmental Voters
California Environmental Voters (formerly Clcv)
Climate Action California
Climate Center; the
Community Environmental Council
Earthjustice
Edison International and Affiliates, Including Southern California Edison
Greenlatinos
Industrious Labs
Menlo Spark
National Resources Defense Council
Nextgen California
People's Collective for Environmental Justice
Sierra Club California
Socal 350 Climate Action
Sunflower Alliance

**Opposition**

None on file.

**Analysis Prepared by**: Lina V. Malova / U. & E. / (916) 319-2083