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**SENATE COMMITTEE ON ENERGY, UTILITIES AND  
COMMUNICATIONS**  
**Senator Steven Bradford, Chair**  
**2023 - 2024 Regular**

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**Bill No:** AB 841 **Hearing Date:** 7/3/2023  
**Author:** Berman  
**Version:** 6/21/2023 Amended  
**Urgency:** No **Fiscal:** Yes  
**Consultant:** Sarah Smith

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

**DIGEST:** This bill requires the California Energy Commission (CEC) to create a roadmap for electrifying industrial processes, including processes requiring heat, as specified.

**ANALYSIS:**

Existing law:

- 1) Establishes the Cap-and-Trade program, which is market-based compliance mechanism administered by the California Air Resources Board (CARB) to enforce greenhouse gas (GHG) emissions limits and achieve specified feasible, cost-effective emissions reductions. Existing law requires CARB to approve a scoping plan for achieving these emissions reductions and update that scoping plan at least once every five years. (Health and Safety Code §38500 et. seq.)
- 2) Requires the CEC to establish the Industrial Decarbonization and Improvement of Grid Operations (INDIGO) program to provide incentives for projects at industrial facilities that help achieve the following:
  - a) Enhance electrical grid reliability and enable effective industrial participation in certain load reduction programs.
  - b) Electrify processes using gas or fossil fuels.
  - c) Incorporate energy storage or renewable energy resources.
  - d) Increase energy efficiency.
  - e) Deploy novel decarbonization technologies and strategies. (Public Resources Code §§25662-25662.2)

- 3) Specifies that projects benefiting oil and gas processes are not eligible for INDIGO incentives. (Public Resources Code §25662.2)
- 4) Establishes preferences for INDIGO incentives and requires the CEC to consult with CARB to ensure that incentives provided by the INDIGO program are consistent with emissions reduction goals and Cap-and-Trade requirements. (Public Resources Code §25662.4)
- 5) Specifies that a project that receives an incentive from the INDIGO program is ineligible for incentives from the Food Production Investment Program. (Public Resources Code §25662.6)

This bill:

- 1) Requires the CEC to submit a roadmap for industrial heat electrification to the Legislature by January 1, 2025.
- 2) Specifies that the industrial heat electrification roadmap must do the following:
  - a) Identify industrial subsectors that use equipment to create heat at or below 1,000 degrees Celsius.
  - b) Using information from CARB, identify the emissions associated with each industrial subsector.
  - c) Assess the feasibility and costs associated with electrifying these industrial subsectors.
  - d) Identify industrial facilities in under-resourced communities that can be electrified by January 1, 2030.
  - e) Using information from CARB, quantify emissions reduction and health benefits from electrifying industrial subsectors.
  - f) Using information from the California Workforce Development Board, quantify the workforce necessary to support industrial electrification.
  - g) Estimate electrical load and impacts to net peak demand in scenarios where 25, 50, 75, and 100 percent of the industrial sector transitions to electric heat for processes occurring at 1,000 degrees Celsius.
  - h) Using information from the California Public Utilities Commission (CPUC), identify barriers to industrial electrification and solutions to reduce costs or delays of industrial electrification, including, but not limited to, expediting the direct connection of thermal energy storage facilities to renewable energy resources, facilitating wholesale market participation for dispatchable price-sensitive loads, and using distributed energy resources, infrastructure

upgrades, demand response programs, or accessing federal funding for industrial electrification.

- i) Calculate the effect of state and federal incentives, including tax credits, on industrial electrification to-date and estimate their effect through 2030.

## **Background**

*Bill emphasizes electrification as the pathway for industrial decarbonization.* Industrial facilities are the second largest source of California's emissions; however, existing programs aimed at lowering GHG emissions emphasize multiple pathways to decarbonizing industrial processes. This bill emphasizes electrification as a single pathway to decarbonizing the industrial sector, including industrial heat applications. According to CARB's 2022 update to the Scoping Plan, approximately 80 percent of the industrial sector's emissions come from combustion-based processes, and 20 percent of its emissions come from fugitive emissions associated with chemical transformations inherent in some industrial processes. Currently, it is unclear how many of these processes can be electrified. Some studies have indicated that a substantial portion of the industrial sector's processes can be electrified; however, these studies have acknowledged that electrification may only provide net emissions benefits where there is sufficient renewable generation to match the additional electrical load. To the extent that this bill enables better planning for the electrical resources needed to match industrial electrification, this bill could help utilities better plan long lead time resources and distribution needs.

*Scoping Plan vs. Electrification Roadmap: Who's on first?* California's Cap-and-Trade program is a key component of the state's strategy to reduce GHG emissions. The program is intended to provide an economic incentive to reduce emissions on a sector-wide basis. Under existing law, CARB sets annual caps on major sources of emissions, and these annual caps decline over time. CARB produces allowances for units of emissions under the cap, and entities covered by the Cap-and-Trade program can purchase these allowances at auctions or through trades with other covered entities. As the cap declines, fewer allowances are issued and the cost for allowances increases. As a result, covered entities pay progressively more to continue emitting under the cap, incentivizing investments in decarbonization. In addition to administering the Cap-and-Trade program, CARB also develops updates to the Scoping Plan, which identifies strategies to meeting the state's GHG emissions reduction goals. The Cap-and-Trade program and the Scoping Plan do not presume a single pathway to achieving emissions reductions.

Many industrial facilities that would be assessed in this bill's roadmap are already covered entities for the purposes of the Cap-and-Trade program, and the Scoping Plan already discusses barriers to industrial heat electrification. Specifically, the 2022 Scoping Plan update notes that industrial sector electricity rates may provide an economic disincentive to electrification. The 2022 Scoping Plan update states: "Under current rate structures for industrial electricity and fossil gas in California, most projects to electrify a fossil gas-powered industrial process will face operating cost barriers and potential reliability concerns." By requiring the CEC to create a separate roadmap for industrial electrification, this bill could create a separate set of decarbonization recommendations outside the Scoping Plan.

*Some of the bill's requirements are unclear and may not support electrification.*

This bill requires the CEC to focus the roadmap on the electrification of industrial heat applications below 1,000 degrees Celsius. Many studies note that few electrification options exist for industrial heat applications above 1,000 degrees Celsius. These applications include steel, glass, cement, and ceramic processes. While these hard-to-electrify facilities use heat applications above 1,000 degrees, the heat of these processes may vary above and below the threshold contained in this bill. It is not clear how the roadmap will address facilities with processes that fluctuate across the 1,000 degree threshold.

This bill requires the CEC to make specific recommendations regarding bidding in the wholesale electricity market, interconnection of specific technologies, ratepayer-supported demand response programs, and other electrification incentives. However, some of this bill's terms for these recommendations are unclear. For example, this bill requires the CEC to work with the CPUC to identify solutions to reduce costs or delays in industrial electrification, including, "...the direct connection of thermal energy storage facilities to renewable energy resources, facilitating wholesale market participation for dispatchable price-sensitive loads." While it is unclear what thermal energy and wholesale market resources would meet these specifications, it is also unclear whether these resources or market changes would reduce costs and timelines for industrial electrification.

*Need for Amendments.* As currently written, this bill requires agencies to consider technologies and strategies that are not well-defined or widely deployed. This bill also requires the CEC to create a roadmap for electrifying high heat industrial processes as part of a strategy to reduce emissions from the industrial sector. However, these portions of the industrial sector are also entities covered under the Cap-and-Trade program administered by CARB. Existing law requires CARB to regularly update its Scoping Plan to identify strategies to decrease emissions on a

sector-wide basis. This bill would require a separate roadmap for electrification that is not incorporated into CARB's planning process and may not be linked to the state's sector-wide emissions reduction strategies.

As a result, the author and committee may wish to amend this bill to do the following:

- *Shift the bill's duties from the CEC to CARB.*
- *Consolidate the bill's reporting requirements into the next update to the Scoping Plan.*
- *Require CARB to work with the CEC to assess the feasibility of electrifying industrial heat processes under high-electrification scenarios and the impact of that electrification on electrical reliability and rates.*
- *Conform certain terms to those used in the Health and Safety Code.*
- *Strike subdivision (b)(8) from this bill.*

*Double Referral.* Should this bill be approved by this committee, it will be re-referred to the Senate Committee on Environmental Quality.

### **Prior/Related Legislation**

AB 209 (Committee on Budget, Chapter 251, Statutes of 2021) among other changes needed to implement the 2021 Budget Act, the bill required the CEC to establish the INDIGO program to provide incentives for projects at industrial facilities that provide significant benefits to the electrical grid, reduce emissions, and achieve the state's energy goals.

SB 596 (Becker, Chapter 246, Statutes of 2021) required CARB to develop a comprehensive strategy for the state's cement sector to achieve net-zero GHG emissions no later than December 31, 2045.

**FISCAL EFFECT:** Appropriation: No Fiscal Com.: Yes Local: No

### **SUPPORT:**

Earthjustice, Co-sponsor  
 Industrious Labs, Co-sponsor  
 350 Bay Area Action  
 350 Humboldt: Grass Roots Climate Action  
 Asian Pacific Environmental Network  
 Breathe Southern California

California Environmental Voters  
California Municipal Utilities Association  
Center on Race, Poverty & the Environment  
Central California Asthma Collaborative  
Climate Action California  
Community Environmental Council  
Green Latinos  
Menlo Spark  
Natural Resources Defense Council  
NextGen California  
Peoples Collective for Environmental Justice  
Rewiring America  
Rondo Energy  
Sierra Club California  
SoCal 350 Climate Action  
Southern California Edison  
Sunflower Alliance  
The Climate Center  
The Climate Reality Project

**OPPOSITION:**

California Manufacturers and Technology Association, unless amended

**ARGUMENTS IN SUPPORT:** 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.

**ARGUMENTS IN OPPOSITION:** In opposition, the California Manufacturers and Technology Association (CMTA) states:

CMTA fundamentally disagrees with the intent of the proposal as it relies heavily on industry-wide electrification which is not feasible. For a \$310 billion sector of California's economy that employs more than 1.2 million people, the challenges, opportunities, and technological capacity to achieve deep decarbonization will require a thorough analysis of how to achieve it. AB 841 is about a decade late for what the industry already attempts to incorporate. Still, California has an opportunity to minimize the regulatory, permitting, and financial hurdles that are stopping decarbonization projects today.

**-- END --**