SENATE COMMITTEE ON ENERGY, UTILITIES AND COMMUNICATIONS
Senator Ben Hueso, Chair
2021 - 2022 Regular

Bill No:	SB 1075	**Hearing Date:**	4/26/2022
Author:	Skinner		
Version:	4/7/2022 Amended		
Urgency:	No	**Fiscal:**	Yes
Consultant:	Sarah Smith		

SUBJECT: Hydrogen: green hydrogen: emissions of greenhouse gases

DIGEST: This bill establishes a fund in the California Infrastructure and Economic Development Bank (I-Bank) to finance clean hydrogen projects, requires the California Air Resources Board (CARB) and the California Energy Commission (CEC) to analyze options for using hydrogen as part of decarbonization strategies, and adds renewable hydrogen electric generation facilities to the list of renewable energy resources eligible for the California Renewable Portfolio Standard (RPS).

ANALYSIS:

Existing law:

1) Requires CARB to create a Climate Change Scoping Plan to achieve the maximum technologically feasible and cost-effective reductions in greenhouse gas (GHG) emissions from sources or categories of sources of GHG by 2020. The plan must identify and recommend direct GHG emissions reduction measures, alternative compliance mechanisms, market-based compliance mechanisms, and potential monetary and non-monetary incentives that the state board finds are necessary or desirable to meet the 2020 emissions reduction goals. CARB must update this scoping plan at least once every five years through a public workshop process. (California Health and Safety Code §38561)

2) Requires the California Public Utilities Commission (CPUC) and the CEC to take specified steps to support the state's clean energy and pollution reduction goals, including authorizing the procurement of resources to provide grid reliability services that minimize reliance on system power and fossil fuel resources. Existing law requires the CPUC and CEC to increase the use of large and small scale energy storage where feasible using a variety of technologies, including green electrolytic hydrogen, targeted energy efficiency, demand response, eligible renewable resources, and other technologies with

zero or the lowest feasible emissions and pollutants. (Public Utilities Code §400)

3) Defines "green electrolytic hydrogen" as hydrogen gas produced through electrolysis and does not include hydrogen gas manufactured using steam reforming or any other conversion technology that produces hydrogen from a fossil fuel feedstock. (Public Utilities Code §400.2)

4) Requires the CPUC, CEC and CARB to consider green electrolytic hydrogen an eligible form of energy storage and consider its potential uses. (Public Utilities Code §400.3)

5) Requires the CPUC to identify a diverse portfolio of resources needed to ensure reliability and integrate renewable energy resources in a cost-effective manner. The CPUC must direct each electrical corporation to develop a strategy for procuring best-fit and least-cost resources to satisfy the portfolio identified by the CPUC. (Public Utilities Code §454.51)

6) Establishes the integrated resource plan (IRP) process for load-serving entities (LSEs) to file plans with the CPUC detailing the resources that the LSE will use to meet the state's climate goals while ensuring reliability at just and reasonable rates. Existing law specifies the requirements for the IRP process and specifies that for any additional procurements authorized through an IRP or procurement process, the CPUC must ensure that costs are allocated in a fair and equitable manner with no cost-shifting among LSE customers. (Public Utilities Code §454.52)

7) Establishes a state goal of procuring 100 percent of electricity from eligible renewable energy resources and zero-carbon resources by December 31, 2045. Existing law also establishes a goal to procuring 60 percent of the state's electricity from resources eligible under the RPS. Existing law requires state agencies, including the CPUC, CEC, and CARB, to take certain actions to support the state's clean energy goals. Existing law also specifies that achievement of the state's clean energy goals shall not permit resource shuffling that would increase emissions elsewhere in the western grid. (Public Utilities Code §454.53)

8) Establishes the I-Bank in the Governor's Office of Business and Economic Development (GO-Biz) and specifies the I-Bank's membership and duties. (Government Code §63021 et. seq.)

This bill:

1) Establishes a California Clean Hydrogen Hub Fund, administered by I-Bank to provide grants for clean hydrogen projects using funds appropriated by the Legislature.

2) Defines "clean hydrogen" as hydrogen produced from renewable energy resources consistent with federal definitions that restrict clean hydrogen to hydrogen produced with a carbon intensity equal to or less than 2 kilograms of carbon dioxide-equivalent produced at the site of production per kilogram of hydrogen produced.

3) Requires the I-Bank to establish guidelines for the hydrogen grant program established by this bill and specifies that these guidelines must be consistent with requirements for hydrogen project funding established by the federal Infrastructure Investment and Jobs Act of 2021 (IIJA).

4) Specifies that the I-Bank may only provide grants to hydrogen projects that do both of the following:

5) Demonstrate and scale the production, processing, delivery, storage, and end use of clean hydrogen.

6) Advance progress toward a goal to produce or use 15,000 tons per day of clean hydrogen in California by 2030.

7) Requires CARB to report on three analyses regarding potential uses of hydrogen in various climate change policies. These reports must include the following:

    a) An analysis potential uses of hydrogen, including green hydrogen, as part of its Climate Change Scoping Plan by December 31, 2023. CARB must consult with specified labor and workforce organizations when conducting this analysis.

    b) A report published on its website regarding potential uses for hydrogen, including green hydrogen, in various decarbonization efforts by June 1, 2024. CARB must consult with relevant state agencies and labor and workforce organizations when conducting this analysis.

    c) Legislative recommendations developed in conjunction with the CEC and CPUC on categorizing different forms of hydrogen and recommended end

uses for those categories, environmental attributes of various forms of hydrogen production, requirements for incorporating hydrogen as an eligible renewable resource for RPS procurements. This bill specifies that these recommendations may be used as guidance for policies implemented under each agency's respective jurisdiction.

8) Specifies that hydrogen that meets CARB recommendations for RPS eligibility is an eligible renewable resource for the purposes of the RPS.

9) Requires the CPUC, CARB, and CEC to consider potential uses of green electrolytic hydrogen in their respective decarbonization strategies.

10) Requires the CEC to report on the potential uses for hydrogen in decarbonizing the electrical and transportation sectors as part of the 2023 and 2025 Integrated Energy Policy Reports (IEPRs).

11) Requires the Governor to appoint a Clean Hydrogen Hub Director by April 1, 2023, to consult with relevant stakeholders and coordinate clean hydrogen hub efforts across agencies.

12) Requires the I-Bank to submit a report on grant program activities to each house of the Legislature, the Legislative Analyst's Office, and the Governor on an annual basis, starting on October 1, 2023.

Background

Bill intends to help draw federal hydrogen funds to California. This bill is one of several pending legislative measures aimed at establishing a statutory framework enabling California to compete for federal infrastructure funding. The IIJA provided the federal Department of Energy (DOE) with approximately $9.5 billion to establish certain clean hydrogen programs. Of that $9.5 billion, approximately $8 billion is allocated to the Regional Clean Hydrogen Hub Program, which is intended to establish four clean hydrogen hubs that help improve the production, processing, delivery, storage and use of clean hydrogen. According to the DOE, these hubs should be networks of clean hydrogen producers, potential consumers, and associated infrastructure in close geographic proximity. This bill establishes a California Clean Hydrogen Hub Fund and tasks the I-Bank with administering the Fund to provide grants for hydrogen hub projects that meet requirements in the IIJA. This bill also contains various definitions and requirements intended to align the California Clean Hydrogen Hub Fund with IIJA goals for hydrogen production. To the extent that this bill makes California more competitive these funds, this bill

may enable California to obtain a substantial amount of non-state funds for hydrogen production.

Not all hydrogen hub projects are best suited for California and vice versa. Under the IIJA, hydrogen hubs must demonstrate the ability to scale different types of hydrogen generation from different feedstocks for different end uses. The IIJA requires DOE to fund one hub using fossil fuel feedstock, one hub from renewable energy, and one hub from nuclear energy. The IIJA further requires the establishment of hubs in regions with the greatest natural gas reserves. While California has substantial renewable energy resources, the state does not have the largest natural gas reserves or the types of fossil fuel generation, or nuclear generation contained in other states. As a result, hydrogen hubs aimed at using certain fossil fuels and larger amounts of nuclear generation may not match the resources most available in California.

Bill attempts to align the definition of clean hydrogen to federal requirements. Hydrogen production methods vary and the resources used in those processes can be fossil fuels. The vast majority of hydrogen currently used is "gray hydrogen," which is produced from steam methane reforming. This process uses methane and high temperature steam to produce hydrogen. However, it also creates carbon dioxide, which is released into the atmosphere. Other, cleaner forms of hydrogen production exist, including "blue hydrogen," (which captures the carbon emissions emitted from steam methane reforming), the emerging "turquoise hydrogen" (which can use natural gas to split methane gas into hydrogen and solid carbon) and "green hydrogen" (which is produced using only renewable forms of feedstock, including renewable electricity, solar energy, and biomass).

While many different colors of hydrogen exist, existing state law only defines green electrolytic hydrogen, which includes hydrogen produced through the use of electricity to split water into hydrogen and oxygen. The relative environmental benefits of different forms of hydrogen depend on which fuels are displaced by the hydrogen and the economy-wide emissions reductions associated with different feedstocks. This bill defines "clean hydrogen" as hydrogen produced from renewable energy resources consistent with requirements specified in the IIJA. The IIJA initially defines clean hydrogen as hydrogen produced with a carbon intensity equal to or less than 2 kilograms of carbon dioxide-equivalent produced at the site of production per kilogram of hydrogen produced. However, the IIJA requires DOE to work with the Environmental Protection Agency (EPA) to establish a standard for the carbon intensity of clean hydrogen and enables DOE to revise the definition of clean hydrogen based on the standard developed with the EPA. This bill's definition of clean hydrogen aligns with the initial definition established in the IIJA; however this bill does not specify the types of hydrogen

production that would meet the definition. While hydrogen production from fossil fuel feedstocks would not be eligible for grants under this bill, a number of other hydrogen production methods may meet the initial definition of clean hydrogen. This bill also does not address how DOE revisions to the definition of clean hydrogen may affect grant eligibility at the state level.

Bill requires CARB and CEC to report on potential uses for hydrogen while requiring agencies to incorporate hydrogen into decarbonization efforts. This bill requires CARB to report on potential uses of hydrogen in a 2023 update to the Climate Change Scoping Plan, which provides a multi-year plan for targeting climate investments. Existing law requires CARB to update the Scoping Plan at least once every five years. CARB is currently in the process of conducting workshops to complete the 2022 Scoping Plan, and CARB is not required to update the Scoping Plan again until 2027. This bill also requires CARB to create a separate report focusing solely on hydrogen in 2024. The hydrogen reporting requirements for the 2023 Scoping Plan update and the 2024 CARB report are substantially similar. As a result, this bill may establish duplicative reporting requirements CARB to complete in a 24-month period.

Bill adds "renewable hydrogen" to the RPS, but it does not define renewable hydrogen. This bill requires CARB to work with the CEC and CPUC to develop legislative recommendations regarding the use of hydrogen in various decarbonization and energy procurement policies, including RPS procurement requirements. This bill requires the three agencies to develop recommendations for different categories of hydrogen, which may include green hydrogen, zero-carbon hydrogen, renewable hydrogen, and low-carbon hydrogen. This bill also expands the definition of RPS eligible renewable energy resources to include renewable hydrogen that meets the recommendations contained this multiagency report. While hydrogen can be made using feedstocks that are already eligible under the RPS, it is not clear what types of hydrogen could be eligible for the RPS when used to repower electric power plants. While this bill adds renewable hydrogen meeting agency recommendations to the list of RPS eligible renewable energy resources, this bill does not require the CEC to develop a definition of renewable hydrogen or specify the types of hydrogen production that would be classified as renewable.

Triple Referral. The Senate Rules Committee referred this bill to the Senate Committee on Environmental Quality, but that referral was rescinded due to the ongoing health and safety risks of the COVID-19 virus. The Senate Committee on Environmental Quality provided the following information regarding this bill:

The complex supply chains and processes that produce hydrogen can have significant life cycle GHG emission impacts. The vast majority of hydrogen today is derived from natural gas converted through steam methane reforming. However, cleaner and more nascent technologies are paving the way for lower- or zero-emission hydrogen production, which is likely to play a major role in decarbonizing California's economy. Depending on the feedstock and process used to make the hydrogen and the energy source being replaced, hydrogen can either be much better or even potentially worse than conventional fossil fuel-derived energy. Considering carbon intensity fully and consistently across pathways will be essential to determine which sources merit further support.

In this bill specifically, there are several details pertaining to the CARB's role that the Senate Committee on Environmental Quality would like to flag for consideration. Firstly, the timeline for including one of this bill's several reports in the scoping plan in section 3 of this bill does not comport with CARB's timelines. The scoping plan is expected to be approved in 2022, and the next update is not expected until 2027. The author should consider whether this section of this bill's contents may be better addressed elsewhere, or are strictly necessary given the other reports necessitated here.

Secondly, the definition of "eligible renewable energy resource" being determined primarily by CARB is outside of CARB's typical jurisdiction. Moreover, a question arises as to whether this bill might be putting the cart before the horse by simultaneously both tasking CARB (in consultation with CEC and CPUC) with recommending categorization for hydrogen and acting upon those categories without first assessing those CARB recommendations.

Need for amendments. As currently drafted, this bill adopts an initial definition of clean hydrogen from the IIJA; however, this bill does not specify whether California's definition of will evolve as the DOE revises its definition. This bill also adds renewable hydrogen to the list of RPS eligible renewable energy resources without specifying a definition of renewable hydrogen or requiring the CEC to establish a clear definition. This bill requires CARB to report on potential uses for hydrogen as part of the CARB's 2023 Scoping Plan and a separate report in 2024; however, CARB is not scheduled to produce another Scoping Plan update until 2027. *For these reasons, the author and committee may wish to consider amending this bill to do the following:*

- *Clarify that the definition of clean hydrogen shall conform to the definition of clean hydrogen in the IIJA as subsequently defined or revised by the DOE.*
- *Require the CEC to define renewable hydrogen for the purpose of RPS eligibility.*

- *Remove the requirement that CARB report on potential hydrogen uses in the Scoping Plan.*

Prior/Related Legislation

SB 18 (Skinner, 2021) would have required CARB, CPUC and the CEC to incorporate green electrolytic hydrogen into various decarbonization strategies, and would have required CARB to analyze and provide recommendations regarding potential uses of hydrogen to reduce economy-wide emissions. The bill was held in the Assembly Committee on Appropriations.

SB 697 (Hueso, 2021) would have required CARB to establish a Green Hydrogen Credit Program to provide industrial facilities that produce green hydrogen with an additional Cap-and-Trade GHG allowance of 10 tons for every metric ton of green hydrogen produced during a compliance period. The bill was held in the Senate Committee on Appropriations.

SB 1122 (Skinner, 2020) would have required CARB to incorporate planning and recommendations for green electrolytic hydrogen into the scoping plan. The bill contained provisions substantially similar to some of those contained in this bill. The bill died in the Senate.

SB 1369 (Skinner, Chapter 567, Statutes of 2018) established a definition of green electrolytic hydrogen, required the CEC and CPUC to incorporate green electrolytic hydrogen as a resource that may be considered for procurement to reach state clean energy goals, and required the CPUC, CEC, and CARB to consider green electrolytic hydrogen an eligible form of energy storage.

SB 100 (De León, Chapter 312, Statutes of 2018) raised the RPS procurement requirement from 50 percent to 60 percent by 2030. The bill also established a goal of procuring 100 percent of the state's electricity from zero-carbon resources by December 31, 2045.

SB 433 (Mendoza, 2017) would have authorized the CPUC to allow a gas corporation to procure zero-carbon hydrogen and recover through rates the reasonable cost of pipeline infrastructure developed to transport the hydrogen to end users. The bill died in the Assembly.

SB 350 (De León, Chapter 547, Statutes of 2015) the Clean Energy and Pollution Reduction Act of 2015, established new clean energy, clean air and GHG reduction goals and established the IRP process through which IOUs file electricity sector procurements, including transportation electrification investments. The bill also

required the CEC and CPUC to take certain steps to support the state's clean energy and pollution reduction goals.

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

SUPPORT:

350 Humboldt: Grass Roots Climate Action
350 Silicon Valley
8minute Solar Energy
Air Products and Chemicals, unless amended
Ambient Fuels
Ameresco
American Clean Power Association
AquaHydrex
Bloom Energy
California State Pipe Trades Council
CALSTART
Daroga Power
Elders Climate Action, NorCal Chapter
Elders Climate Action, SoCal Chapter
Electric Hydrogen
Fortescue Future Industries
Green Hydrogen Coalition
H Cycle
Hy Stor Energy LP
Hyperion Companies
Innergex Renewable Energy USA
Leyline Renewable Capital
Marin Clean Energy
Mitsubishi Power Americas
NovoHydrogen
Planet Power Finance AG
Port of Oakland
Raven SR
ReCarbon
Republic Services - Western Region
San Diego Gas & Electric
Silicon Valley Leadership Group
Southern California Gas Company
State Building & Construction Trades Council of California
The Coalition for Renewable Natural Gas

The Utility Reform Network
Universal Hydrogen Co
University of California
ZeroAvia

OPPOSITION:

None received

ARGUMENTS IN SUPPORT: According to the author:

> Green Hydrogen, made from renewable sources, is a multifaceted energy and fuel source that has the potential to help decarbonize otherwise difficult sectors such as long-haul trucking, our ports, and air travel. It can also be used to generate power or store renewable energy for later use.
>
> SB 1075 advances green hydrogen by creating a fund that will help California compete for a federal Hydrogen Hub grant, and requiring state agencies to include green hydrogen in all of California's plans for a climate safe future.

-- END --