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

Bill No:	SB 1420	**Hearing Date:**	4/22/2024
Author:	Caballero		
Version:	4/8/2024 Amended		
Urgency:	No	**Fiscal:**	Yes
Consultant:	Sarah Smith		

SUBJECT: Hydrogen

DIGEST: This bill establishes a definition of renewable hydrogen and adds renewable hydrogen to the list of eligible renewable energy resources under the Renewable Portfolio Standard (RPS). This bill also establishes a definition of qualified clean hydrogen and adds both renewable hydrogen and qualified clean hydrogen into existing programs for consolidated permitting and California Environmental Quality Act (CEQA) streamlining.

ANALYSIS:

Existing law:

1) Defines a " renewable electrical generation facility" as a facility that uses biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts (MW) or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current. To meet the definition of a renewable electrical generation facility, the facility must be in state, have its first point of connection to the transmission network of a balancing authority area primarily located within the state, or has its first point of interconnection to the transmission network outside the state, within the Western Electricity Coordinating Council (WECC) and meets certain specified requirements. (Public Resources Code §25741)

2) Defines an "eligible renewable energy resource" as an electrical generating facility that meets the definition of a "renewable electrical generation facility" in the Public Resources Code, subject to specified conditions. (Public Resources Code §399.12)

3) Establishes the RPS program and establishes a goal of procuring at least 60 percent of total retail sales of electricity from renewable energy resources by December 31, 2030, with specified benchmarks up to that date. Existing law

requires the California Public Utilities Commission (CPUC) to oversee electrical corporations' compliance with renewable energy procurement mandates and requires the California Energy Commission (CEC) to oversee publicly owned electric utility renewable energy procurement compliance. (Public Utilities Code §399.11 et. seq.)

4) Defines a renewable energy credit (REC) and requires the CEC to design and implement an accounting system to verify electric utilities' compliance with the RPS, to ensure that electricity generated by an eligible renewable energy resource is counted only once for the purpose of meeting the RPS, to certify RECs produced by eligible renewable energy resources, and to verify retail product claims. (Public Utilities Code §399.25)

5) 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)

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

7) Establishes an "opt-in" framework for specified clean energy projects to seek consolidated permitting at the CEC by June 30, 2029, if they adhere to specified labor standards, including the use of skilled and trained workforce, and provide community benefits, as specified. Existing law specifies that this consolidated permitting process shall not supersede the authorities of the Lands Commission to require leases and receive lease revenues, if applicable, or the authority of the California Coastal Commission, the San Francisco Bay Conservation and Development Commission, the State Water Resources Control Board, or the applicable regional water quality control boards. Existing law specifies that the following types of facilities are eligible for this consolidated permitting:

   a) A solar or terrestrial wind facility with a generating capacity of 50 MW or more and associated facilities.

   b) An energy storage system capable of storing 200 MW or more of energy, as specified.

   c) A stationary thermal electrical generating powerplant, with a generating capacity of 50 MW or more, that does not use or rely on fossil or nuclear fuels.

d) Certain renewable energy component manufacturing facilities and transmission lines to certain renewable energy facilities. (Public Resources Code §25545)

8) Establishes a framework for providing certain infrastructure projects with expedited judicial review of appeals and litigation related to CEQA, subject to specified conditions. Existing law limits eligibility for these streamlining provisions to certain energy, transportation, water, and semiconductor projects. Existing law explicitly excludes projects that use hydrogen as a fuel from the list of eligible projects. (Public Resources Code §21189.80)

9) Requires CARB to evaluate by June 1, 2024, market barriers to accelerate the use of green hydrogen, potential beneficial uses of hydrogen, and an estimate of greenhouse gas (GHG) emissions reductions that can be achieved through deploying green hydrogen in various settings. Existing law requires CARB's evaluation to include an analysis of life-cycle GHG emissions from various forms of hydrogen, including green hydrogen. (Health and Safety Code §38561.8)

10) Requires the CEC to administer a program to provide financial incentives to hydrogen projects that produce, process, deliver, store, or use hydrogen. Existing law specifies that hydrogen projects are only eligible for these incentives if the hydrogen is derived from water using RPS-eligible energy resources, or hydrogen derived from RPS-eligible energy resources. Existing law specifies that the CEC may only provide these financial incentives to projects that help reduce sector-wide emissions, as determined by the CEC. (Public Resources Code §25664–25664.1)

11) Authorizes the Governor's Office of Business and Economic Development (GO-Biz) to take steps necessary to apply for federal regional clean hydrogen hubs funding. Existing law defines "clean hydrogen" for the purposes of the clean hydrogen hub funding as hydrogen produced from RPS-eligible energy resources and otherwise consistent with federal law for the clean hydrogen hub program. (Government Code §12100.161–12100.162)

This bill:

1) Defines "qualified clean hydrogen" as hydrogen produced through a process that results in a well-to-gate lifecycle greenhouse gas emissions rate of not greater than four kilograms of carbon dioxide equivalent per kilogram of hydrogen and that has a carbon intensity that is less than or equal to the annual

average carbon intensity of the electricity from the California electrical grid, as determined by CARB.

2) Defines "renewable hydrogen" as hydrogen derived from water using RPS-eligible electricity generation, or produced directly from RPS-eligible resources.

3) Adds renewable hydrogen into the list of renewable feedstocks for RPS-eligible electric generation.

4) Expands the conditions under which a facility operating before 2005 can gain RPS eligibility to include circumstances in which the facility is upgraded, enters into new contracts, or uses low-value renewable grid electricity to mitigate curtailment.

5) Specifies that electric generators using renewable hydrogen must comply with the following to meet RPS eligibility:

   a) The use of renewable hydrogen shall not result in a net increase in emissions of oxides of nitrogen or other air pollutants and GHG emissions from the electrical sector.

   b) The procurement and use of renewable hydrogen shall align with best practices regarding hydrogen production, distribution, storage, and use, including minimizing leakage risk, available at the time the facility applies for RPS certification.

6) Adds renewable and qualified clean hydrogen projects to the list of projects eligible for "opt-in" consolidated permitting at the CEC. This bill specifies that a renewable and qualified clean hydrogen project qualifies for this permitting process if the facility produces renewable or qualified clean hydrogen or is a renewable electrical generation facility using renewable or qualified clean hydrogen.

7) Deletes existing law excluding projects that use hydrogen from the list of projects eligible for specified CEQA streamlining provisions, and instead adds renewable and qualified clean hydrogen projects to the list of eligible projects. This bill specifies that a renewable and qualified clean hydrogen project qualifies for this permitting process if the facility produces renewable or qualified clean hydrogen or is a renewable electrical generation facility using renewable or qualified clean hydrogen.

8) Establishes targets for retail hydrogen sold for transportation refueling to be made from renewable or clean hydrogen resources. Specifically this bill requires CARB to adopt regulations that ensure the following:

   a) On a statewide basis, no less than 33.3 percent of the retail hydrogen produced for, or dispensed by, fueling stations that receive state funds is made from renewable hydrogen and has a well-to-gate carbon intensity that is less than or equal to the annual average carbon intensity of electricity from the California electrical grid.

   b) On a statewide basis, by December 31, 2030, no less than 60 percent of the retail hydrogen produced or dispensed in California for use in transportation is made from renewable hydrogen and has a well-to-gate carbon intensity that is less than or equal to the annual average carbon intensity of electricity from the California electrical grid, as determined by the state board.

   c) On a statewide basis, by December 31, 2045, no less than 60 percent of the retail hydrogen produced or dispensed in California for use in transportation is made from renewable hydrogen and has a well-to-gate carbon intensity that is less than or equal to the annual average carbon intensity of electricity from the California electrical grid, as determined by the state board, and the remainder of the retail hydrogen produced or dispensed in California for use in transportation is made from a mix of renewable hydrogen and qualified clean hydrogen.

Background

The path to 45v. In recent years, the concept of using hydrogen to decarbonize certain hard-to-abate sectors has gained greater attention. However, effectively using hydrogen as decarbonization strategy depends upon the ability to produce large quantities of hydrogen without relying on fossil fuels or increasing emissions through the hydrogen production process. Currently over 90 percent of the hydrogen used in the United States is produced from fossil fuels – specifically, using steam methane reforming.

Both California and the federal government have taken steps to encourage the development of clean hydrogen. In 2021, President Biden signed the Infrastructure Investment and Jobs Act (IIJA), which included $8 billion to the federal Department of Energy (DOE) to establish regional clean hydrogen hubs across the nation. In 2022, the Legislature passed AB 157 (Committee on Budget, Chapter 570, Statutes of 2022), which authorized GO-Biz to take steps to prepare and submit an application to receive funding from the regional clean hydrogen

hubs program. This legislation led to the establishment of California's clean hydrogen hub administrator, known as the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES).

In addition to funding provided under the IIJA, President Biden also signed the Inflation Reduction Act (IRA). The IRA provides a number of production tax credits for certain types of clean energy and manufacturing acceleration projects. The IRA tasked the federal Treasury Department with developing a federal tax credit to incentivize the production of clean hydrogen, otherwise known as the 45v production tax credit. The tax credit is structured to provide up to a $3 tax credit per kilogram of hydrogen produced, with higher credits granted to lower-carbon-intensive hydrogen. In December 2023, the Treasury Department released its draft proposal, which included a version of the "three pillars," which are principles intended to ensure that hydrogen production supports decarbonization and does not result in an increase in emissions. These pillars include the following:

- Additionality/Incrementality: the hydrogen must be produced from new units of renewable electric generation to prevent hydrogen from diverting clean energy resources away from the grid.

- Deliverability: the hydrogen must be regionally deliverable to ensure that the hydrogen is not being produced from dirty resources that cannot be verified or from far away resources that are never able to reach the facility.

- Hourly Matching: the hydrogen's production must match a clean power supply on an hourly basis to ensure that hydrogen production does not increase demand for fossil fuel generation.

The 45v tax credit has the potential to shape the growth of the hydrogen industry. However, even as this industry is drawing these incentives to scale up production, the development of the 45v tax credit has also elevated a debate about the hydrogen industry's ability and willingness to comply with the three pillars. Several researchers and environmental organizations have asserted that without the three pillars, hydrogen production could lead to substantial grid emissions and reliability impacts by increasing consumption of electricity generated from fossil fuels, including fossil electricity used to meet peak demand when renewable generation declines. To the extent that hydrogen increases fossil fuel consumption, decarbonization benefits associated with using that hydrogen may be limited.

Bill's inclusion of hydrogen in the RPS necessarily relies on deliverability. This bill establishes a definition of renewable hydrogen as electrolytic hydrogen produced from RPS-eligible resources and makes renewable hydrogen eligible for

the RPS. Electrolytic hydrogen differs from all other resources currently in the RPS by relying on large quantities of electricity for its production. As a result, electrolytic hydrogen's capacity to serve as a renewable resource depends on the emissions profile of the electricity used to produce the hydrogen. To ensure that hydrogen made for power generation complies with existing RPS prohibitions on resource shuffling, double counting of RECs, and environmental violations, a standard must be set for the production of electrolytic hydrogen added to the RPS. While this bill does not explicitly require renewable hydrogen to be made using resources that comply with the deliverability pillar in the "three pillars," deliverability is an inherent requirement in existing law for the RPS. Under existing law, a facility can only meet the definition of a renewable electrical generation facility by being located in-state, having its first point of connection to the transmission network of a balancing authority area primarily located within the state, or having its first point of interconnection to the transmission network outside the state, but within the WECC. By defining renewable hydrogen as electrolytic hydrogen produced from RPS eligible sources, this bill requires renewable hydrogen to be made with renewable electricity delivered within the WECC.

The Power-to-Gas-to-Power Conundrum. This bill amends underlying provisions of law governing the RPS in a manner that makes this bill's definition of renewable hydrogen circular. Some of this bill's RPS provisions appear to conflict with the RPS's role in incentivizing the development of new units of renewable electric generation. These conflicts with the RPS may be the result of the manner in which some of this bill's provisions conflate standards for electricity used to produce hydrogen with standards for electricity produced from hydrogen. For example, under existing law, an electrical generation facility built before 2005 can obtain RPS certification by either completely re-powering its existing generation with new RPS-eligible generation units, or the facility can add incremental amounts of new RPS generation and obtain certification for those incremental amounts of new, renewable power. As written, this bill modifies these requirements to allow pre-2005 facilities to obtain RPS certification by conducting facility upgrades, recontracting, or using "low-value renewable grid electricity to mitigate curtailment." This bill does not define these terms, but these changes could enable pre-2005 generation facilities to use contracting and accounting mechanisms about their use of grid electricity to obtain RPS certification without adding any new units of renewable electricity. To the extent that this is feasible, it would likely eliminate incentives that the RPS provides to procure and build new renewable generation in the state, including projects that would use renewable hydrogen. This does not appear to be the intent of this bill. The inclusion of the term "low-value renewable grid electricity" appears to imply that these changes are intended to set qualifications for the electricity used to make hydrogen rather than

electricity produced from renewable hydrogen for which a generator would be seeking a REC.

Pulling the right levers for incentivizing clean hydrogen production. This bill makes various changes to existing law intended to incentivize increased investment in clean hydrogen production and use. These changes include the following:

- Making renewable and clean hydrogen production and uses eligible for opt-in consolidated permitting at the CEC.

- Making renewable and clean hydrogen production and uses eligible for certain CEQA streamlining.

- Adding renewable hydrogen as an RPS-eligible resource.

- Setting requirements for retail sales of hydrogen for transportation purposes to transition to clean or renewable hydrogen.

While there are clear benefits for hydrogen production associated from permit streamlining and mandates to transition to cleaner hydrogen in the transportation sector, the inclusion of renewable hydrogen in the RPS may not provide as substantial incentives. While CPUC reports indicate that the small and multi-jurisdictional utilities need to procure some additional resources to meet their RPS compliance targets, the large investor-owned electric utilities (IOUs) and most of the community choice aggregators (CCAs) are already on track to meet or exceed their RPS procurement goals. Most local publicly-owned electric utilities (POUs) are also on track to meet their procurement goals. Based on existing trends in RPS compliance, it is not clear that RPS procurement goals will provide substantial incentives for hydrogen production. By the time many facilities complete facility changes to incorporate renewable hydrogen and obtain RPS certification for any new units of renewable electrical generation, utilities may already have met their RPS procurement needs. Any incentive to scale hydrogen provided through RPS eligibility is unlikely to be as rich as those provided by the 45v tax credit.

Bill's expansion of opt-in permitting does not clearly exclude hydrogen derived from fossil fuels. In 2022, the Legislature passed AB 205 (Committee on Budget, Chapter 61, Statutes of 2022), which enables certain non-fossil energy projects to seek consolidated permitting through the CEC by June 30, 2029. This bill adds renewable and qualified clean hydrogen projects to the list projects that can use this consolidated opt-in permitting process. While renewable hydrogen must be sourced from RPS-eligible resources under this bill, qualified clean hydrogen must meet certain emissions limiting criteria. However, this definition of qualified clean

hydrogen does not expressly exclude hydrogen derived from fossil fuels. To the extent that hydrogen derived from fossil resources is included in the opt-in permitting process, this bill may conflict with the original intent of the non-fossil requirements in AB 205. While this bill specifies that a renewable electric generating facility using renewable hydrogen or qualified clean hydrogen is eligible for opt-in permitting, existing law from AB 205 expressly prohibits a thermal power plant that uses fossil fuel from qualifying for opt-in permitting. Currently, no known power plant turbines can run entirely on hydrogen. All thermal power plants incorporating hydrogen into their turbines will necessarily use a blend of hydrogen and another fuel, likely natural gas. As a result, it is not clear that power plants repowering with a hydrogen-natural gas blend would be eligible to use the consolidated permitting option.

Need for amendments. As currently written, this bill establishes a definition of renewable hydrogen for the purposes of RPS eligibility; however, this bill's changes to the RPS may have negative unintended consequences while failing to adequately incentivize hydrogen production. Additionally, this bill establishes two different definitions of renewable and clean hydrogen for permit and CEQA streamlining, which may not be necessary. These definitions also do not clearly exclude fossil fuels, which may conflict with the intent of the CEC's opt-in permitting program. *As a result, the author and committee may wish to amend this bill to do the following:*

- *Delete Section 4 of this bill regarding the RPS.*
- *Consolidate the bill's two definitions of hydrogen into a single definition of qualified clean hydrogen projects eligible for CEQA and permit streamlining.*
- *Specify that this definition includes electrolytic hydrogen produced from RPS-eligible resources and hydrogen that is not derived from fossil fuels and meets certain emissions reduction limits, as determined by CARB.*
- *Align this bill's goals for increasing the use of clean hydrogen for retail hydrogen sales to the definitions of qualified clean hydrogen production.*
- *Make other conforming and technical changes.*

Dual Referral. This bill passed out of the Senate Committee on Environmental Quality on April 3, 2024 with a vote of 5-0.

Prior/Related Legislation

SB 993 (Becker, 2024) requires the CPUC, after making certain findings, to establish a tariff to encourage new, grid-responsive electricity consumption exclusively for electrolytic hydrogen production and electrifying industrial heat processes. The bill is currently pending in the Senate Appropriations Committee.

SB 1018 (Becker, 2024) exempts sellers of wind and solar generation from the definition of an “electrical corporation” if that generation is transmitted over private lines for electrolytic hydrogen production or industrial heat processes. The bill is currently pending in the Senate Appropriations Committee.

SB 149 (Caballero, Chapter 60, Statutes of 2023) extended the sunset on the Jobs and Economic Improvement Through Environmental Leadership Act of 202, made certain changes to CEQA, and established an expedited judicial review process for CEQA considerations pertaining to certain energy, transportation, water, and semiconductor projects.

SB 663 (Archuleta, 2023) would have defined renewable hydrogen and added renewable hydrogen as a renewable energy resource under the RPS. The bill would also have established criteria for renewable hydrogen acquired from a dedicated or on-site pipeline to meet RPS standards. The bill died in the Senate.

AB 1550 (Bennett, 2023) would have established a clean fuel requirement for all hydrogen produced or used in California for electrical generation or vehicle refueling, starting on January 1, 2045. The bill’s clean fuel standard would have required all hydrogen to be "renewable hydrogen of biological origin" or "renewable hydrogen of nonbiological origin," as specified. The bill would have added renewable hydrogen of biological origin and renewable hydrogen of nonbiological origin to the list of RPS-eligible resources. The bill died in the Assembly.

SB 1075 (Skinner, Chapter 363, Statutes of 2022) required CARB and the CEC to analyze options for using hydrogen as part of decarbonization strategies.

AB 157 (Committee on Budget, Chapter 570, Statutes of 2022) authorized GO-Biz to take steps to prepare and submit an application to receive funding from the regional clean hydrogen hubs program or to otherwise participate in the regional clean hydrogen hubs program. The bill also established a definition of clean hydrogen.

AB 205 (Committee on Budget, Chapter 61, Statutes of 2022) among other provisions, establishes a framework for specified clean energy projects to seek consolidated permitting at the CEC by June 30, 2029, if they adhere to specified labor standards, including the use of skilled and trained workforce, and provide community benefits, as specified.

AB 209 (Committee on Budget, Chapter 251, Statutes of 2022) among other provisions, establishes a hydrogen funding program at the CEC to support projects that produce, process, deliver, store, or use hydrogen.

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

SUPPORT:

California Hydrogen Coalition, Sponsor
Agricultural Energy Consumers Association
Bioenergy Association of California
California Association of Sanitation Agencies
California Biomass Energy Alliance
California Hydrogen Business Council
California Renewable Transportation Alliance
Center for Transportation and The Environment
Clean Energy
Clean Energy Institute, University of California Irvine
Green Hydrogen Coalition
Iwatani
Los Angeles County Sanitation Districts
Monarch
National Fuel Cell Research Center, University of California Irvine
Resource Recovery Coalition of California
Terraform Industries
Toyota
Yosemite Clean Energy

OPPOSITION:

1000 Grandmothers for Future Generations
350 Bay Area Action
350 Humboldt
350 Ventura County Climate Hub
Active San Gabriel Valley
Asian Pacific Environmental Network
California Environmental Justice Alliance Action
California Environmental Voters
California Nurses for Environmental Health & Justice
Catholic Charities of Stockton
Center for Biological Diversity
Center on Race, Poverty, & the Environment

Central Valley Air Quality Coalition
CleanEarth4kids.org
Climate Action California
Climate Hawks Vote
Communities for a Better Environment
Earthjustice
Environment California
Environmental Justice Coalition for Water
Environmental Working Group
Friends of the Earth
Glendale Environmental Coalition
Leadership Counsel for Justice & Accountability
Natural Resources Defense Council
Oil & Gas Action Network
Physicians for Social Responsibility, Los Angeles
Physicians for Social Responsibility, San Francisco Bay Area
Planning and Conservation League
Protect Playa Now!
Sierra Club California
Sustainable Rossmoor
The Climate Center
The Climate Reality Project, California
Vote Solar

ARGUMENTS IN SUPPORT: According to the Author:

> As the author of SB 149, a Senate representative of California's worst air quality regions, and a strong supporter of California's Hydrogen Hub: the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES), SB 1420 provides a pathway for a sustainable transition to a clean energy economy coupled with the co-benefits of better air quality and lower energy costs for all consumers.
>
> SB 1420 would create the world's first renewable and clean hydrogen production mandate modeled largely after California's own Renewable Portfolio Standard and allows all renewable and clean hydrogen production facilities to qualify for the two most recent energy project permitting bills passed and signed by the Governor, AB 205 (2022) and SB 149 (2023).
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> The California Air Resources Board has made clear in its 2022 scoping plan that without the production and consumption of clean, renewable hydrogen, California will not achieve its 2045 carbon-neutrality goal. The scoping plan

projects the need to scale California's clean, renewable hydrogen market 1,700 times by 2045. SB 1420 will help ensure California can meet its hydrogen production goals and help California achieve its overall climate change goals.

ARGUMENTS IN OPPOSITION: Opponents argue that this bill does not set a sufficiently clean standard for hydrogen production qualifying for its various provisions. Certain opponents also object to extending CEQA streamlining. Opponents argue that certain feedstocks like biogases and biomass should be excluded from any definition of renewable or clean hydrogen. Opponents also argue that hydrogen production in California should be required to meet the "three pillars," and they argue that without this requirement, hydrogen production will increase emissions from electricity generated by fossil fuels. In opposition, the Natural Resources Defense Council (NRDC) states:

> …Our fundamental concern with SB 1420's definition of "clean hydrogen" is that neither of the current definitions in the bill—for renewable hydrogen nor clean hydrogen—have adequate criteria or guardrails to ensure that the hydrogen is truly renewable or clean. "Clean" hydrogen could be as polluting as 4 kg CO2 per kg hydrogen, far from the zero emissions hydrogen we should be aiming for. Truly green, clean, renewable hydrogen is produced by electrolysis of water using clean electricity that meets the three pillars of incrementality, hourly temporal matching, and geographic deliverability. Without explicitly requiring the three pillars, there is no current regulation in California to prevent the load of grid-powered electrolyzers from driving increases in greenhouse gas emissions and air pollution from fossil fuel generators.

-- END --