
SENATE COMMITTEE ON ENVIRONMENTAL QUALITY

Senator Allen, Chair

2021 - 2022 Regular

Bill No: SB 697
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Version: 3/10/2021
Urgency: No
Consultant: Eric Walters

Hearing Date: 4/29/2021
Fiscal: Yes

SUBJECT: Cap-and-Trade Program: Green Hydrogen Credit Program

DIGEST: Tasks the California Air Resources Board with establishing a Green Hydrogen Credit Program, which would allocate 10 cap-and-trade allowances to an industrial facility for every 1 ton of green hydrogen, as defined, that it produces.

ANALYSIS:

Existing law:

- 1) Establishes the Air Resources Board (ARB) as the air pollution control agency in California and requires ARB, among other things, to control emissions from a wide array of mobile sources and coordinate, encourage, and review the efforts of all levels of government as they affect air quality. (Health and Safety Code (HSC) §39500 et seq.)
- 2) Requires, under the California Global Warming Solutions Act of 2006 (also known as AB 32), ARB to (1) determine the 1990 statewide greenhouse gas (GHG) emissions level and approve a statewide GHG emissions limit that is equivalent to that level to be achieved by 2020; (2) ensure that statewide GHG emissions are reduced to at least 40% below the 1990 level by December 31, 2030 (i.e., SB 32); and (3) adopt regulations, until December 31, 2030, that utilize market-based compliance mechanisms to reduce GHG emissions (i.e., the cap-and-trade program). (HSC §38500 et seq.)
- 3) Establishes the Greenhouse Gas Reduction Fund (GGRF) in the State Treasury, requires all moneys, except for fines and penalties, collected pursuant to a market-based mechanism be deposited in the fund. (Government Code §16428.8)
- 4) Defines “Green electrolytic hydrogen” to mean 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)

This bill:

- 1) Makes findings and declarations regarding the importance of hydrogen, the design of the state’s cap-and-trade program, and states that it is the intent of the legislature to augment the current cap-and-trade program to help bolster the production of green hydrogen by utilizing the allowances directly allocated to large industrial sources.
- 2) Defines “allowance”, “cap-and-trade program regulations”, and “compliance period” in line with the cap-and-trade regulations adopted under Title 17 of the California Code of Regulations.
- 3) Defines “green hydrogen” as having the same meaning as “green electrolytic hydrogen” set forth in Section 400.2 of the Public Utilities Code.
- 4) Requires ARB to, on or before December 1, 2023, develop and implement a Green Hydrogen Credit Program, which would provide industrial facilities that produce green hydrogen with an additional 10 GHG allowances for every metric ton of green hydrogen produced.
- 5) Permits ARB to adopt a declining GHG allowance allocation schedule through December 31, 2030 for the Credit Program.
- 6) Requires that the adoption and revision of the associated regulations are conducted pursuant to the Administrative Procedure Act.

Background

- 1) *Cap-and-Trade*. The original cap-and-trade program was recommended by ARB as a central approach to flexibly and iteratively reduce emissions over time. Pursuant to legal authority under AB 32, ARB adopted cap-and-trade regulations and those regulations were approved on December 13, 2011.

Beginning on January 1, 2013, the cap-and-trade regulation sets a firm, declining cap on total GHG emissions from sources that make up approximately 80% of all statewide GHG emissions. Sources included under the cap are termed “covered entities.” The cap is enforced by requiring each covered entity to surrender one “compliance instrument” for every emissions unit (i.e., metric ton of carbon dioxide equivalent or MTCO₂e) that it emits at the end of a compliance period.

Two forms of compliance instruments are used: allowances and offsets. Allowances are generated by the state in an amount equal to the cap and may be “banked” (i.e., allowing current allowances to be used for future compliance). An offset is a credit for a real, verified, permanent, and enforceable emission reduction project from a source outside a capped sector (e.g., a certified carbon-storing forestry project).

- 2) *Direct allowance allocations.* ARB distributes allowances to the cap-and-trade program market through two primary mechanisms: direct allocation to regulated entities and sale at auction to all market participants. While the sale of allowances at auction is the much more frequently discussed portion of the program (likely owing to those sales being the source of GGRF revenues), SB 697 uses the former mechanism: direct allowance allocation.

Direct allowance allocation was conceived of during the initial creation of California’s cap-and-trade program as a way to minimize leakage and ratepayer impacts. The initial statement of reasons that accompanied the cap-and-trade regulations discusses direct allocations, stating “Staff proposes to allocate allowances to the industrial sector for two purposes: (1) to provide transition assistance and (2) to prevent leakage. Transition assistance provides free allocation to the industrial sector at the outset of the program to avoid sudden or undue short-term economic impacts and promote a transition to a low-carbon economy. ... This transition assistance will decline as covered entities gradually adjust to the carbon price and adopt energy- and carbon-saving strategies. This level of free allocation will decline over time to settle at a level needed to prevent leakage.” Leakage refers to the scenario where, instead of reducing their emissions, an entity simply leaves California and emits GHGs elsewhere. Given that CO₂ is a pollutant with global impacts, leakage would mean California loses business without a real global reduction in GHGs.

Looking at allowance totals for the year, according to ARB’s summary for the 2020 vintage of allowances, over 183 million allowances were allocated across 229 entities. These recipients are broadly categorized as either electrical distribution utilities, natural gas suppliers, industrial, or “other” (comprised of legacy contract generators, universities, public service facilities, public wholesale water agencies, and waste-to-energy facilities).

The number of allowances may make more sense in the context of total covered emissions. On the whole-market scale, the total number of allowances sold at (or in advance of) all quarterly auctions in 2020 was just over 215 million, compared to roughly 183 million that were allocated. **In other words,**

California issued permits allowing the release of just under 400 million tons of GHG emissions in 2020; 54% of those permits were auctioned off to all market participants, and 46% were allocated freely to 229 entities.

At the single facility scale, ARB provides an illustrative example of a single hypothetical industrial facility whose production and emissions efficiency remain constant over time. In that scenario, starting in 2013 the facility's allocated allowances would cover roughly 88% of its total emissions, leaving it to either cut emissions or buy allowances at auction to account for the final roughly 12%. This allocation reduces over time to eventually drop below 50% in 2029. Even by 2030 (the SB 32 deadline), directly allocated allowances would be expected to still cover roughly 46% of the hypothetical facility's emissions.

- 3) *Raising and spending climate funds.* As stated above, the sale of allowances at auction (54% of all 2020 vintage allowances) raises revenue for the state – the GGRF. The amount raised varies based on the number of allowances sold and at what price. The price in particular has been the focus of considerable policy debate. To, in part, bring more predictability and certainty to auction proceeds, the cap-and-trade program features a price floor, which the price of allowances at auction has either been at or slightly above since its inception.

The auction of cap-and-trade allowances has raised billions of dollars for the state annually for years. Over the last three fiscal years for which complete data is available, California's annual share of the proceeds was \$2.1B, \$3.2B, and \$2.9B. The Legislature annually appropriates money from GGRF to agencies to administer California Climate Investments (CCI) programs that facilitate GHG emission reductions and provide additional economic, environmental, and public health benefits, consistent with existing legislative guidance. As awareness of and access to CCI improves, demand for funding continues. On average, CCI's competitive solicitations in 2019 received applications requesting more than 200 percent of available funding.

Notably, advanced technology demonstration projects and incentives for shifting to cleaner-but-more-expensive technology are both established roles GGRF investments have played.

- 4) *Green hydrogen.* This bill defines “green hydrogen” by referring to Section 400.2 of the Public Utilities Code, which currently 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.” While the omission of fossil fuel feedstocks from “green hydrogen” does typically result

in a lower emission profile than so-called “gray hydrogen”, electricity can come from a number of sources with varying emission profiles.

Comments

- 1) *Purpose of Bill.* According to the author, “... Until costs decline through achieving economies of scale, state policy support/incentives for Green Hydrogen will be needed to level the playing field and recognize the significant climate, and environmental benefits of Green Hydrogen.

“Quite simply, Green Hydrogen is essential to reach California’s goal of economy-wide greenhouse neutrality by 2045 (EO B-55-18), as well as the renewable energy goals found in SB 100 (DeLeon, Statutes of 2018), and AB 32’s GHG emission reduction targets. California has an opportunity to continue its leadership on climate and position itself at the forefront of the future of Green Hydrogen and needs to act now.

“Senate Bill SB 697 seeks to accelerate the development, production and deployment of Green Hydrogen, by requiring on or before December 31, 2023, the California Air Resources Board to develop and implement a Green Hydrogen Credit Program.

“The program would provide additional allowances, from the pool of allowances consigned to auction, under the Cap-and Trade Program, as specified, for the production of Green Hydrogen, as defined. The state board is authorized to provide for declining allocation schedule through 2030.”

- 2) *What color is the hydrogen?* SB 697 has an internal inconsistency in how “green hydrogen” should be produced. The proposed amendments to the cap-and-trade regulations define it, through reference to existing statute, 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.” This definition encompasses hydrogen produced by an electrolyzer running on grid electricity. Depending on the time of day and other variables, the electricity on California’s grid can come from a range of sources; renewables are, at times, responsible for more than 80% of the state’s power, but at other times may supply only single-digit percentages.

The findings and declarations section of SB 697 makes repeated reference to “zero-emission photovoltaics.” Though this specific phrase does not seem to appear elsewhere, it seems the author’s intent is to only consider electrolyzers

powered exclusively by solar power.

It is left unclear what the author's intent is for what source or sources of electricity are used in the definition of green hydrogen. The definition referred to in PUC §400.2 is not limited to zero-emission photovoltaics, while the findings of the bill exclusively reference that technology.

- 3) *New avenue for market-based compliance.* SB 697 proposes to grant ten allowances to an industrial facility for every one ton of green hydrogen it produces. This introduces a new option for some industrial facilities to comply with their cap-and-trade obligations.

Consider a hypothetical covered industrial entity that typically emits 100 tons of GHGs every year and receives freely allocated allowances. In order to comply with cap-and-trade, the entity needs one allowance for every ton of GHG it emits. Under current industrial allocation schemes, for the year 2022 the entity would get roughly 70 allowances for free. Beyond that, the entity has several options to comply.

- a) They could reduce their GHG emissions (by 30 tons) to 70 tons; their allocated 70 allowances would then cover all of their obligations.

- b) They could leave their emissions unchanged and purchase 30 allowances at auction; they would then cover all of their obligations.

- c) Under SB 697, they would have a new option as well: they could leave their emissions unchanged and simply produce 3 tons of green hydrogen. The 3 tons of hydrogen would entitle them to 30 allowances, and they would cover their entire obligation. That green hydrogen likely *would* go towards displacing GHG emissions, but the amount, location, and any other details of those GHG emission reductions are no longer linked to that allowance.

Given the importance of the cap-and-trade program having a firm and declining cap of GHG emissions, and the statutory requirement created by SB 32, allocating allowances without a clear understanding of the associated GHG emission reductions does not align with the program's broader goals. Whether the green hydrogen producer receives 10, 1, or 100 allowances, it is disconnecting the concept of an allowance from the reality of 1 ton of CO₂-equivalent emissions.

- 4) *Why do we allocate allowances?* CARB allocates allowances to certain covered industrial facilities for two reasons: to minimize industrial emissions

leakage, where industrial emissions reductions in California are counterbalanced by emissions increases outside the State, and to provide transition assistance to smooth the change to an economy with GHG costs.

SB 697 proposes to allocate allowances for a new reason: to incentivize installation of a specific technology (water electrolyzers) in an industrial setting. If the author seeks to incentivize the use of cleaner technology by directing state resources, that is well within the established purview of CCI. The allocation mechanism is intended to minimize unintended consequences on businesses from implementing cap-and-trade; its contemplated use here as a pseudo-continuous appropriation of GGRF revenue to incentivize a single technology is inappropriate.

It should also be noted that there is a single “cap” on the state’s emissions, and that both allocated and auctioned allowances are within that. SB 697 would not affect the cap. However, by virtue of potentially shifting more allowances into allocation pathways, it could reduce the number of allowances available for auction. Given that the auctioned allowances are already only 54% of the total, a question arises as to whether the Legislature wants to direct ARB to put even more allowances towards allocation.

- 5) *Why not just use money?* Despite the fact that an allowance may be auctioned for \$16, an allowance is more than just a piece of currency worth \$16, it is a fungible authorization for an entity to emit 1 CO₂-equivalent ton of GHG. As such, the proposal to grant 10 allowances for producing 1 ton of green hydrogen is more than just a \$160 incentive, it is giving green hydrogen producers (or whoever owns the allowance ultimately) the authorization to emit 10 tons of GHGs. A question arises as to why those green hydrogen producers would need or want that authorization.

With the goal of SB 697 being, as the author states, “to accelerate the development, production and deployment of Green Hydrogen,” it is unclear why a new mechanism for incentivization is necessary. Using the allowance allocation mechanism erodes the definition of an allowance as being equivalent to one metric ton of CO₂-equivalent GHG emissions. Moreover, it would create an entirely new mechanism of providing ongoing financial support derived from the cap-and-trade program while circumventing the annual GGRF appropriation process, or even the reliance on auction proceeds that all GGRF-funded programs have. Staff notes that the bill’s goals could be achieved with greater alignment to existing cap-and-trade practices by incentivizing green hydrogen production with GGRF monies.

Related/Prior Legislation

SB 18 (Skinner, 2021) establishes a new definition for green hydrogen, requires the ARB to include a strategic plan for green hydrogen in the Climate Change Scoping Plan, requires the California Public Utilities Commission (CPUC) to consider green hydrogen in resource adequacy requirements, and it classifies green hydrogen as a zero-carbon resource for electric utility procurement plans. It also requires the California Energy Commission (CEC) to submit a report to the Legislature on the uses of green hydrogen for transportation and energy decarbonization. SB 18 is currently before the Senate Environmental Quality Committee.

SB 662 (Archuleta, 2021) requires the CPUC to approve or amend investor-owned utility applications for ratepayer-funded investments in green electrolytic hydrogen production and infrastructure, and it incorporates green electrolytic hydrogen into various definitions of transportation electrification related to state agency duties to address GHG emissions reduction goals. SB 662 is currently before the Senate Appropriations Committee.

SB 1369 (Skinner, Chapter 567, Statutes of 2018) requires the CPUC, ARB, and CEC to consider green electrolytic hydrogen, as defined, an eligible form of energy storage, and consider other potential uses of green electrolytic hydrogen.

SOURCE: Author

SUPPORT:

Innergex Renewables USA

OPPOSITION:

None received

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