Date of Hearing: April 30, 2025

ASSEMBLY COMMITTEE ON UTILITIES AND ENERGY
Cottie Petrie-Norris, Chair
AB 716 (Carrillo) – As Amended April 21, 2025

SUBJECT: Fire safety standards: hydrogen facilities

SUMMARY: Requires the Office of the State Fire Marshal (OSFM) to adopt the National Fire Protection Association Hydrogen Technologies Code as the statewide fire safety standards and guidelines for hydrogen production, storage, and distribution facilities, as specified. Specifically, **this bill**:

1) Requires OSFM to adopt the National Fire Protection Association Hydrogen Technologies Code (NFPA 2) as the statewide fire safety standards and guidelines for hydrogen production, storage, and distribution facilities.

2) Allows local governments, in consultation with OSFM, to adopt fire safety standards more stringent than the statewide fire safety standards.

3) Requires OSFM to appoint a hydrogen fire expert to answer questions and provide clarification on the implementation of NFPA 2 to ensure that hydrogen facilities comply with the most up-to-date fire safety standards.

4) Requires OSFM to provide ongoing training to local fire departments and building inspectors to ensure that hydrogen-related safety protocols are understood and enforced statewide.

EXISTING LAW:

1) Establishes OSFM, within the Department of Forestry and Fire Protection (Cal FIRE), to foster, promote and develop ways and means of protecting life and property against fire and panic. (Health and Safety Code §§ 13100-13100.1)

2) Requires OSFM to adopt hazardous liquid pipeline safety regulations that comply with federal law regarding hazardous liquid pipeline safety. Establishes certain recordkeeping and reporting requirements for hazardous liquid pipeline operators. (Government Code §§ 51010, et. seq.)

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 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 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)

5) 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)

6) 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)

7) Pursuant to federal law:

    a. Grants the United States Secretary of Transportation the regulatory and enforcement authority over gas and hazardous liquid pipelines, including H_2 pipelines. (49 United States Code § 60102)

    b. Prohibits the Secretary of Transportation from prescribing or enforcing safety standards and practices for an intrastate pipeline or intrastate pipeline facility to the extent that the safety standards and practices are regulated by a state authority, except as provided. (49 United States Code § 60105)

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

CONSUMER COST IMPACTS: Unknown, likely negligible.

BACKGROUND:

California's Hydrogen Future – As in most matters of long-term, deep decarbonization, there is a range of plausible futures for the use of hydrogen in California. CARB's 2022 Scoping Plan Update envisioned a mix of technologies providing California's burgeoning hydrogen supply.[1] Although it is not explicitly clear exactly which end-uses are expected to be powered by hydrogen, some sectors appear to be entirely reliant on hydrogen to decarbonize. Iron and steel production, ammonia synthesis, and some functions in oil refining will almost certainly require hydrogen, and supplying that hydrogen in a sustainable manner will require major scale-up of the paltry clean hydrogen production that exists today.

What is not as clear is where that clean hydrogen will come from. One of the scenarios in the draft scoping plan update considered using only electrolysis to meet the projected demand for hydrogen.[2] It found that doing so would require 40 gigawatts (GW) of renewable electricity

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[1] CARB, *2022 Scoping Plan for Achieving Carbon Neutrality*; December 2022; https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf
[2] See footnote 151, pg. 88, CARB *2022 Scoping Plan; Ibid.*

dedicated to electrolysis: an amount roughly equivalent to today's statewide summer peak grid demand. Instead, the final update prescribed a mix of steam methane reforming of biomethane, gasification of biomass with carbon capture, and electrolysis from (21 GW of) off-grid solar resources to produce the statewide hydrogen supply needed in 2045.[3]

Hydrogen Incentives – In recent years, the concept of using hydrogen to decarbonize certain hard-to-abate sectors has gained greater attention. However, effectively using hydrogen as a 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% of the hydrogen used in the United States is produced from fossil fuels – mostly using steam methane reforming.[4]

Both California and the federal government have taken steps to encourage the development of clean hydrogen. In 2021, the Infrastructure Investment and Jobs Act (IIJA) was signed; that Act 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 July 2024, DOE announced a $1.2 billion award for ARCHES, with $30 million for the first round of funding.[5] However, in April 2025, under a new federal administration, the funding for ARCHES was rumored to be targeted for cuts.[6]

In addition to funding provided under the IIJA, the Inflation Reduction Act (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 45V tax credit is structured to provide up to a $3 tax credit per kg of hydrogen produced, with higher credits granted to lower-carbon intensity (CI) 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.[7] Final regulations were released

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[3] CARB, 2022 Scoping Plan Appendix H, AB 32 GHG Inventory Sector Modeling; https://ww2.arb.ca.gov/sites/default/files/2024-01/nc-2022-sp-appendix-h-ab-32-ghg-inventory-sector-modeling.pdf.pdf

[4] Pg. 5, DOE, "Hydrogen Strategy: Enabling A Low-Carbon Economy;" July 2020; https://www.energy.gov/sites/prod/files/2020/07/f76/USDOE_FE_Hydrogen_Strategy_July2020.pdf

[5] DOE Office of Clean Energy Demonstration, "Regional Clean Hydrogen Hubs Program, California Hydrogen Hub (ARCHES) Awardee Fact Sheet;" 2024; https://www.energy.gov/sites/default/files/2024-07/H2Hubs%20ARCHES_Award%20Fact%20Sheet.pdf

[6] Hayley Smith, "Trump's Department of Energy targets California and other blue states for budget cuts, according to internal documents," *Los Angeles Times*; April 1, 2025; https://www.latimes.com/environment/story/2025-04-01/trumps-doe-cuts-target-california-blue-states-internal-documents-show

[7] These pillars include the following: 1) 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. 2) Deliverability: the hydrogen must be regionally deliverable to ensure that the hydrogen is not being produced from dirty resources that cannot be verified or are so far away as to never being delivered to the facility. 3) 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.

on January 3, 2025, and specified states with clean energy policies and emissions caps – like California – were considered meeting the requirements of one pillar (incrementality).[8] The future of these tax credits is also uncertain under the new administration.

H_2 General Safety – Hydrogen has unique physical and chemical properties, such as its small molecular size, low ignition energy, wide flammability range (4% to 75% in air), and tendency to cause material embrittlement, especially in metals.[9] These characteristics necessitate specialized engineering controls, materials, and safety standards to prevent leaks, detect incidents early, and ensure safe storage, transport, and use. Agencies like the Pipeline and Hazardous Materials Safety Administration (PHMSA) and the National Renewable Energy Laboratory (NREL) are actively researching and developing regulations to address these challenges, particularly as hydrogen use expands under initiatives like the Hydrogen Energy Earthshot.[10, 11] Ongoing efforts include updating codes and standards related to pipeline materials, advanced leak detection technologies, and emergency response protocols to ensure hydrogen can be safely integrated into the broader energy system. In addition to designing safety features into hydrogen systems, training in safe hydrogen handling practices and testing is a key element for ensuring the safe use of hydrogen.

H_2 Pipeline Safety – In 2018, the Legislature passed SB 1369 (Skinner, Chapter 567, Statutes of 2018), which defined green electrolytic hydrogen and required the CPUC, CEC and CARB to consider potential uses of green electrolytic hydrogen. As part of its duties to implement SB 1369, the CPUC commissioned a study with researchers from the University of California at Riverside on the operational and safety concerns associated with injecting hydrogen into the existing natural gas pipeline system at various percentages of hydrogen blended with natural gas. The CPUC published this study in July 2022. Among its findings, the study concluded the following:

- Blending up to 5% hydrogen into the natural gas stream is generally safe.
- Blending above 5% hydrogen into natural gas pipelines results in a greater chance of pipeline leaks and embrittlement of steel pipes.
- Hydrogen blends above 5% could require modifications of appliances such as stoves and water heaters to avoid leaks and equipment malfunction.
- Hydrogen blends of more than 20% increases the likelihood that blends will permeate plastic pipes, increasing the risk of gas explosions outside the pipeline.
- Due to the lower energy content of hydrogen gas, more hydrogen-blended natural gas will be needed to deliver the same amount of energy to users compared to pure natural gas.

The study also indicated that additional research, including real-world demonstrations in utility infrastructure, is needed to ensure that hydrogen pipeline injection is safe for the conditions specific to California.

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[8] Department of the Treasury; "U.S. Department of Treasury Releases Final Rules for Clean Hydrogen Production Tax Credit;" Press Release; January 3, 2025; https://home.treasury.gov/news/press-releases/jy2768
[9] U.S. Department of Energy Hydrogen Program; https://www.energy.gov/eere/fuelcells/safety-codes-and-standards
[10] https://www.phmsa.dot.gov/research-and-development/hydrogen-safety-research
[11] https://www.nrel.gov/hydrogen/hydrogen-safety.html

Overlapping Oversight – PHMSA, under the Department of Transportation, has exclusive federal authority over ***inter***state pipeline facilities.[12] An interstate pipeline is one used in the transportation of hazardous liquid or gas in interstate or foreign commerce. Typically, these lines cross state borders or begin in federal waters. As of 2015, there were 1,188 miles of interstate pipeline in California.[13] State agencies may regulate portions of interstate pipelines located within the state, if there is an agreement between PHMSA and the agency. For hazardous liquid pipelines, that agreement is with OSFM; for gas pipelines, it is the CPUC. These agencies are only allowed to enter into an agreement with PHMSA if given all regulatory and enforcement authority of the pipelines subject to the agreement. PHMSA maintains these agreements as certifications through the Office of Pipeline Safety, which are updated annually.[14]

OSFM and the CPUC share the regulation over ***intra***state pipeline facilities. OSFM regulates intrastate hazardous *liquid* pipelines pursuant to the Elder California Pipeline Safety Act of 1981.[15] Whereas the CPUC regulates intrastate *gas* pipelines (both natural gas and liquid petroleum gas). An intrastate pipeline is defined as a pipeline that is located entirely within state borders, including offshore state waters. As of 2015, there were 4,500 miles of intrastate pipeline in California, although that number was predicted to grow.[16] The vast majority of pipelines in California carry petroleum based hazardous liquids.[17]

The federal definition of "gas" for purposes of the Pipeline Safety Act includes "natural gas, flammable gas, or toxic or corrosive gas."[18] As such, hydrogen pipelines are included in PHMSA jurisdiction. The pipelines are regulated under the general gas pipeline safety regulations, similarly to natural gas pipelines,[19] due to PHMSA not yet having a hydrogen-specific rule. In 2023, PHMSA started developing new regulations specific to hydrogen pipelines in response to the Biden Administration's Hydrogen Energy Earthshot Initiative and the scaling up of "clean hydrogen" industries.[20] While PHMSA issued a final rule on gas pipeline leak detection and repair in January 2025, which enhances safety measures for gas pipelines in general, specific regulations tailored exclusively for hydrogen pipelines are still under development.[21]

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[12] 49 USC § 60101, et seq.
[13] Cal FIRE-OSFM Pipeline Safety Division "Information Sheet"; October 21, 2015; https://antr.assembly.ca.gov/sites/antr.assembly.ca.gov/files/Pipeline%20Hearing%20%2810%2021%2015%29_CALFIRE%20FactSheet%20.pdf
[14] U.S. Department of Transportation, PHMSA website; "Regulatory Fact Sheet: California;" https://primis.phmsa.dot.gov/comm/FactSheets/States/CA_State_PL_Safety_Regulatory_Fact_Sheet.htm?nocache=1716; accessed April 16, 2025.
[15] Gov. Code, § 51010, et seq.
[16] Cal FIRE-OSFM Pipeline Safety Division "Information Sheet"; October 21, 2015; https://antr.assembly.ca.gov/sites/antr.assembly.ca.gov/files/Pipeline%20Hearing%20%2810%2021%2015%29_CALFIRE%20FactSheet%20.pdf
[17] According to a 2015 background paper prepared by the Assembly Committee on Natural Resources for "Joint Informational Hearing: Oil Pipeline Safety: Testing Methods and Frequency;" Santa Barbara, CA; October 21, 2015.
[18] 49 United States Code § 60101(a)(2)
[19] 49 United States Code § 192
[20] Vincent Holohan, PHMSA presentation, "2024 DOE HFTO Workshop: Hydrogen Infrastructure Strategies to Enable Deployment in High-Impact Sectors;" January 18, 2024; https://www.energy.gov/sites/default/files/2024-02/h2-infrastructure-strategies-workshop-holohan.pdf
[21] PHMSA Final rule; 4910-60-W; "Pipeline Safety: Gas Pipeline Leak Detection and Repair;" RIN 2137-AF51; https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2025-01/PHMSA%20Final%20Rule%20-%20Gas%20Pipeline%20Leak%20Detection%20and%20Repair%20-%20As%20submitted.pdf

COMMENTS:

1) *Author's Statement.* According to the author, "As California continues to lead the fight against climate change and towards a green economy, hydrogen infrastructure will likely play a key role in hard to decarbonize sectors. Some of hydrogen's unique properties require additional engineering and safety considerations to ensure and enable its safe use. Local jurisdictions across California are required to enforce fire safety standards across all development and AB 716 will provide much needed resources, and guidance as the hydrogen economy continues to grow."

2) *NFPA 2.* As noted above, hydrogen properties require additional engineering controls and proper training to enable its safe use. Specifically, hydrogen has a wide range of flammable concentrations in air and lower ignition energy than gasoline or natural gas, which means it can ignite more easily. In addition, some metals can become brittle when exposed to hydrogen, so selecting appropriate materials is important to the design of safe hydrogen systems. This bill requires OSFM to adopt the National Fire Protection Association Hydrogen Technologies Code (NFPA 2)[22] as the statewide fire safety standards and guidelines for all aspects of the hydrogen supply chain. The NFPA 2 is a comprehensive standard that provides safety requirements for the production, storage, transfer, and use of hydrogen in both gaseous and liquid forms. It applies to various applications, including stationary, portable, and vehicular hydrogen systems, and is widely adopted by jurisdictions, fire officials, and industry stakeholders to ensure safe hydrogen infrastructure development.

3) *Who's the Boss?* The bill's focus seems to be on fire safety, yet the NFPA 2 code required by this bill outlines broad aspects of hydrogen safety, including design and construction standards for hydrogen storage and pipeline systems; ventilation and leak detection requirements to prevent accumulation of hydrogen gas; separation distances to minimize risks from potential releases or fires; and pressure relief and overpressure protection measures. In this way, it is a comprehensive document covering all aspects of the hydrogen supply chain. This bill requires OSFM to adopt NFPA 2, appoint a hydrogen fire expert to help implement NFPA2, and train local fire departments and building inspectors on NFPA2 protocols. The bill captures everything from hydrogen fueling stations to hydrogen electrolyzer facilities that produce hydrogen. However, both this bill and the NFPA 2 standards also involve hydrogen pipelines. As noted above, PHMSA has exclusive jurisdiction over hydrogen pipelines, while the CPUC regulates intrastate gas pipelines and OSFM regulates intrastate liquid pipelines. Currently, the state regulator for hydrogen pipelines is unclear or unspecified. While hydrogen pipelines are not explicitly mentioned as an existing authority, the CPUC's jurisdiction over gas utilities positions it as a potential regulator for hydrogen infrastructure as the industry evolves. Certainly, in circumstances where existing utility pipelines would be used, such as hydrogen blending in a natural gas pipeline, the CPUC would regulate. This bill, in requiring OSFM to adopt standards for hydrogen facilities (including pipelines), grants OSFM regulatory authority over hydrogen pipelines. How OSFM's regulations would complement or integrate with activity at the CPUC is unclear.

[22] https://www.nfpa.org/codes-and-standards/nfpa-2-standard-development/2

Moreover, the NFPA 2 are proprietary safety codes. As noted above PHMSA standards for pipeline safety are not specific to hydrogen and do not consider hydrogen's unique nature. As a result, PHMSA has been developing new regulations specific to hydrogen pipelines since 2023. The integration between NFPA (or any standard) and PHMSA standards is often achieved through the incorporation of consensus-based codes into federal regulations. PHMSA often references standards developed by organizations like NFPA to enhance their safety framework. This collaborative approach ensures adherence to consistent safety principles. It is unclear how this collaborative approach may materialize between OSFM – who will adopt these codes pursuant to this bill – and the CPUC – who has yet to develop gas pipeline requirements for hydrogen.

4) *Related Legislation.*

AB 388 (Rogers, 2025) provides two exemptions – one from state and one from federal law regulating utilities – for entities that sell electricity from solar and wind generation if those entities provide electric generation exclusively for electrolytic hydrogen production and electrifying industrial heat processes. Status: *Set for hearing* on April 30, 2025, in this committee.

SB 804 (Archuleta, 2025) requires the California Public Utilities Commission (CPUC) to adopt hydrogen pipeline safety standards by January 1, 2028, and requires the CPUC to adopt requirements that meet or exceed specified requirements. This bill also requires the California Energy Commission (CEC) to enforce hydrogen pipeline safety standards for private hydrogen pipelines in the state. Status: *Set for hearing* on April 29, 2025 in the Senate Committee on Energy, Utilities, and Communications.

5) *Prior Legislation.*

AB 2204 (Bennett, 2024) establishes a goal, by an unspecified date, for all in-state hydrogen production, and specifically excludes any fossil fuel use as either a feedstock or energy source in the production process. Also requires the hydrogen to show the use of new and incremental renewable generation, temporal matching, and geographic deliverability. Status: *Died* in the Assembly Committee on Utilities and Energy.

SB 1418 (Archuleta) requires every city and county to adopt an ordinance to create an expedited, streamlined permitting process for hydrogen-fueling stations. Status: Chapter 607, Statutes of 2024.

SB 1420 (Caballero) provides for expedited California Environmental Quality Act (CEQA) and California Energy Commission (CEC) review for hydrogen production facilities that have received state or federal funding. Status: Chapter 608, Statutes of 2024.

AB 1550 (Bennett, 2023) required, on and after January 1, 2045, all hydrogen produced and used in California for either the generation of electricity or the fueling of vehicles be "renewable hydrogen of biological origin" or "renewable hydrogen of nonbiological origin." Status: Died on the Assembly Floor.

SB 414 (Allen, 2023) required CARB, upon appropriation, to complete an assessment of the use of hydrogen in specified applications. Status: Died in the Assembly Committee on Appropriations.

SB 1075 (Skinner) directs CARB, in consultation with the CPUC and CEC, to develop an evaluation by June 1, 2024 which includes, among other topics, policy recommendations regarding the use of green hydrogen in the state, an estimate of reduced GHG emissions achievable through the use of green hydrogen. Status: Chapter 363, Statutes of 2022.

AB 157 (Committee on Budget) 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. Status: Chapter 570, Statutes of 2022.

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

6) *Double Referral.* This bill is double referred. It will be heard in the Assembly Committee on Emergency Management on Monday, April 28, 2025. Upon passage in that committee, it will be referred to this committee for its review.

REGISTERED SUPPORT / OPPOSITION:

Support

California Hydrogen Coalition

Other

Rural County Representatives of California (RCRC)

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