

This document has been prepared as part of the implementation project of *Legal Pathways to Deep Decarbonization* (Michael B. Gerrard and John C. Dernbach, eds. Environmental Law Institute [2019]) (LPDD). For background information on the project, see <https://lpdd.org>

Streamlining Siting, Permitting, and Construction of Hydrogen Fueling Stations

Best Practices

By Frank A. Fritz, III, Senior Fellow & Adjunct Professor, UNLV William S. Boyd School of Law, on behalf of the Legal Pathways to Deep Decarbonization Pro Bono Implementation Project and the Sabin Center for Climate Change Law at Columbia Law School*

Introduction

“Because . . . hydrogen fuel cell vehicles require specific refueling infrastructure, state and local laws, regulations, and ordinances may require amendments to streamline infrastructure siting, permitting, and construction.”¹

Hydrogen Fuel Cell Vehicles and Deep Decarbonization

Hydrogen fuel cell vehicles are one of the most promising technologies for reducing greenhouse gas emissions from heavy-duty vehicles (e.g., trucks and buses).² They are powered by hydrogen fuel cells, which generate electricity from hydrogen and oxygen; electric motors turn the wheels. Hydrogen fuel cell vehicles emit only water vapor, no greenhouse gases or air pollutants. If we include emissions from conventional production and distribution of gaseous hydrogen and diesel fuel, hydrogen fuel cell trucks emit 20 to 45% less greenhouse gas than diesel trucks.³

* I am deeply grateful to Jessica Patton, UNLV William S. Boyd School of Law '21, for her invaluable help arranging interviews, researching, drafting, and cite-checking. I am also grateful to David Park & Jennifer Hamilton, Frontier Energy, Inc.; Keith Malone, California Fuel Cell Partnership; Suzanne Loosen, Zero Emission Vehicle and Clean Cities Coalition Coordinator, San Francisco Department of the Environment; Joe Gagliano & William Cook, United Hydrogen; and Dan Poppe, H2 Frontier, Inc., for speaking with us.

¹ Michael B. Gerrard & John C. Dernbach, *Legal Pathways to Deep Decarbonization in the United States* 422 (2019).

² *Id.* at 389 (“[H]ydrogen fuel cell technology offers the greatest potential for reducing the carbon intensity of HDVs [heavy-duty vehicles] . . .”).

³ Dong-Yeon Lee et al., *Life-cycle implications of hydrogen fuel cell electric vehicle technology for medium- and heavy-duty trucks*, 393 J. Power Sources 217 (July 31, 2018), abstract available at <https://www.sciencedirect.com/science/article/abs/pii/S0378775318304737?via%3Dihub>; see also Frontier Energy, Inc., *Air Climate Energy Water Security: A guide to understanding the well-to-wheels impact of fuel cell electric vehicles* 6, California Fuel Cell Partnership, <https://cafcp.org/sites/default/files/W2W-2016.pdf> (last visited May 27, 2020) (totaling emissions from “well to wheels,” fuel cell electric cars emit about 150

The Deep Decarbonization Pathways Project Technical Report calculates that greenhouse gas emissions from the U.S. transportation sector must be reduced by 76% to 104% by 2050.⁴ To meet those goals, the report models a scenario in which compressed natural gas, liquid natural gas, and hydrogen fuel cell heavy-duty vehicles are introduced in the mid-2020s, become the majority of new vehicle sales by the mid-2030s,⁵ and make up the majority of on-road heavy-duty vehicle miles travelled by the late 2040s.⁶ In another scenario, up to 50% of heavy-duty vehicles would be powered by hydrogen fuel cells by 2050.⁷

Hydrogen fuel cell vehicles face a number of barriers, including lack of an adequate network of hydrogen fueling stations. Hydrogen fueling stations face legal and economic barriers, as well as potentially time-consuming problems in siting, permitting, and construction. Changes in the law and careful advance planning can greatly reduce these barriers.

Overcoming Economic Barriers

The main barriers to widespread adoption of hydrogen fuel cell vehicles are economic, not legal. The market for hydrogen fuel cell vehicles, particularly medium- and heavy-duty vehicles, is in its infancy. The cost of vehicles is high, as is the cost to build an adequate network of hydrogen fueling stations. As a result, few vehicles are on U.S. roads, and there are few places to fuel them.

California is the only U.S. state with a significant number of hydrogen fuel cell vehicles⁸ and hydrogen fueling stations.⁹ It is also the only state that invests heavily to subsidize them. In response to Assembly Bill 8 (2013), the California Energy Commission (“CEC”) will allocate \$20 million per year to fund publicly available hydrogen fueling stations until there are at least 100 in California.¹⁰ The money funds grants to help developers of

grams CO₂ equivalent per mile (gCO₂e/mi) compared to about 400 gCO₂e/mi for gasoline cars).

⁴ Gerrard & Dernbach, *supra*, at 388 (citing James H. Williams et al., *Pathways to Deep Decarbonization in the United States, U.S. 2050 Report, Volume 1: Technical Report* (2015), available at <https://usddpp.org/downloads/2014-technical-report.pdf> [hereinafter “DDPP Technical Report”])

⁵ Gerrard & Dernbach, *supra*, at 388; DDPP Technical Report at 65.

⁶ Gerrard & Dernbach, *supra*, at 388.

⁷ Gerrard & Dernbach, *supra*, at 388; DDPP Technical Report at 30-31.

⁸ Nearly 7,000 in 2019. Jean Baronas et al., *Joint Agency Staff Report on Assembly Bill 8: 2019 Annual Assessment of Time and Cost Needed to Attain 100 Hydrogen Refueling Stations in California* iii (2019), available at <https://ww2.energy.ca.gov/2019publications/CEC-600-2019-039/CEC-600-2019-039.pdf>.

⁹ Forty-three as of December 2019. *Id.*

¹⁰ *Id.*

hydrogen fueling stations. The state also offers a rebate of up to \$4,500 (up to \$7,000 based on income) to purchase or lease a hydrogen fuel cell vehicle.¹¹

Grants and incentives like these, and their funding, are the subject of other recommendations in *Legal Pathways to Deep Decarbonization in the United States*. They are beyond the scope of this recommendation.

Little Need for Special Hydrogen Fueling Station Planning, Zoning, or Building Laws

Those we spoke to—members of the California Fuel Cell Partnership; hydrogen fueling station owners, operators and developers in California; and the Clean Cities Coordinator for San Francisco—uniformly said that typical municipal planning, zoning, and building laws were not a significant obstacle to hydrogen fueling stations. They did not recommend changing those laws. Instead, they recommended best practices to skillfully navigate existing laws. Planning, zoning, and environmental reviews may deserve changes (as has been recommended in other Legal Pathways chapters), but those changes need not be specific to hydrogen refueling.

Best Practices to Avoid Time-Consuming Pitfalls in Siting, Permitting, and Construction

The California Governor’s Office of Business and Economic Development has published an extremely useful guide, the *Hydrogen Station Permitting Guidebook* (“Guidebook”).¹² It distills best practices to streamline the siting, permitting, and construction of hydrogen fueling stations. Concise checklists help to spot issues and prepare for potential problems. Although written for California, much of the Guidebook’s advice will be equally valuable in other jurisdictions. Below are some highlights.

Choose the site carefully

Developers can choose sites that avoid or minimize delays from two potentially time-consuming processes: (1) assessment of adverse environmental impacts under state or

¹¹ *CVRP Eligible Vehicles*, California Clean Vehicle Rebate Project, <https://cleanvehiclerebate.org/eng/eligible-vehicles> (last visited June 19, 2020) (\$4,500 rebate for fuel cell cars); *Income Eligibility: Increased Rebate Levels for Low- and Moderate-Income Consumers*, California Clean Vehicle Rebate Project, <https://cleanvehiclerebate.org/eng/income-eligibility#income-limits> (last visited June 19, 2020) (standard rebate increased by \$2,500 for low- and moderate-income consumers).

¹² California Governor’s Office of Business and Economic Development, *Hydrogen Station Permitting Guidebook* (2015), <https://businessportal.ca.gov/wp-content/Documents/ZEV/Hydrogen-Permitting-Guidebook.pdf> [hereinafter “Guidebook”]. *Videos*, Hydrogen Tools, <https://h2tools.org/video> (last visited June 19, 2020) is another good resource on permitting hydrogen fueling stations.

local laws similar to the National Environmental Policy Act (“NEPA”) and (2) zoning variances.

Choose a site that is exempt under state and local NEPA-like laws

Many states and local jurisdictions have laws like NEPA, which require an assessment of the adverse environmental impacts of certain proposed actions, such as construction. The California Environmental Quality Act (“CEQA”) and New York City’s Environmental Quality Review are examples. Assessment under these laws can take a significant amount of time.

A developer can avoid this delay by choosing a site that falls within an exemption in the law. For example, adding a hydrogen dispenser at an existing retail gasoline station may fall under CEQA categorical exemptions for (i) expansion of existing facilities, (ii) new construction or conversion of small structures, or (iii) minor alterations to land.¹³ While adding a single dispenser at an existing retail gasoline station might be helpful for passenger cars and other light-duty vehicles, it might not be very useful for heavy-duty vehicles, which require different refueling structures with, for example, more space and fuel storage.

We spoke with some hydrogen fueling station developers who want to build large facilities that can store and sell large quantities of hydrogen to large numbers of cars or heavy-duty vehicles, like tractor-trailers. Such facilities may require assessment of adverse environmental impacts under a state or local NEPA-like law. A developer may decide the opportunity to sell large quantities of fuel justify the added time and effort.

Choose an appropriately zoned site

A developer can save months of time by choosing a site that is already zoned appropriately. For example, in some jurisdictions, hydrogen dispensers can be added at existing gasoline stations by right or entitlement.¹⁴ No zoning variances or hearings are necessary. Again, this might be more useful for light- rather than heavy-duty vehicles.

On the other hand, as noted above, we spoke with some hydrogen fueling station developers who want to build large facilities that can sell large quantities of hydrogen. Such facilities may need to be located at sites that require zoning changes. Again, the opportunity to sell large amounts of hydrogen may justify the added time and effort. Nevertheless, choosing a site that requires less time-consuming zoning changes will save money and effort.

¹³ Karen J. Nardi et al., *Hydrogen Fuel Stations in California: A Practical Guide to Permitting and CEQA Review* 5 (2015), available at <https://www.arnoldporter.com/-/media/files/perspectives/publications/2015/04/ebookhydrogen-fuel-stations-in-california/ebookhydrogen-fuel-stations-in-california.pdf?la=en>; Guidebook, *supra*, at 24.

¹⁴ Guidebook, *supra*, at 22-23.

Meet with local authorities early

Local governments usually have ultimate authority to approve or deny construction projects. It is critical for hydrogen fueling station developers to meet early with local authorities, long before a permit application is drafted.¹⁵ The Guidebook recommends starting with a city or county planning agency, which can connect developers with other relevant departments.¹⁶ Early meetings can clarify many issues, including:

- issues with the intended site that the developer should know about;
- how the intended site and hydrogen fueling fit with the local master or general plan;
- whether a state or local NEPA-like law may apply;
- whether the intended site requires zoning changes;
- whether the site is in an aesthetically sensitive area;
- issues with traffic flow;
- applicability of codes, standards and local variations (e.g., building and fire codes, including National Fire Protection Association 2, *Hydrogen Technologies Code*);
- ways to reduce the permitting timeline;
- how to structure the permit application to facilitate review;
- possibilities for meeting early with relevant departments (e.g., building) and members of political bodies (e.g., planning board); and
- how the construction process works and how to anticipate typical issues.¹⁷

Involve experienced fire experts

The importance of fire approval, or an identified pathway to fire approval, cannot be over-stressed, especially in communities new to hydrogen fueled transportation. . . . Experience shows that fire official engagement gives decision makers who have not been exposed to hydrogen use the comfort they need to approve a proposed station. In general, local fire marshals have been very supportive . . . once the marshals gain comfort that stations comply with all relevant codes and standards.¹⁸

The Guidebook recommends hiring an experienced fire protection engineer to communicate with local fire marshals.¹⁹ Station developers we spoke to highly recommended connecting the local fire marshal with a fire marshal who has approved a hydrogen fueling station before. If none is available in your state, one from California may be.

¹⁵ Guidebook, *supra*, at 17.

¹⁶ Guidebook, *supra*, at 21.

¹⁷ Guidebook, *supra*, at 1-3, 21.

¹⁸ Guidebook, *supra*, at 27.

¹⁹ Guidebook, *supra*, at 27.

Reach out to Clean Cities Coalition Coordinators

The U.S. Department of Energy sponsors Clean Cities Coalition Coordinators in many cities throughout the United States.²⁰ The coordinators work with local fleets to advance affordable, domestic transportation fuels and technologies. They provide a variety of help for alternative fuel projects, like hydrogen.

For example, the Clean Cities Coalition Coordinator in San Francisco connected the developer of a hydrogen fueling station with a variety of city officials, who were able to quickly answer questions and overcome problems that could have delayed the station by months.

²⁰ *Coalition Contact Directory*, U.S. Dept. of Energy, Clean Cities Coalition Network, <https://cleancities.energy.gov/coalitions/contacts/> (last visited 5/22/2020).