

DOCKETED

Docket Number:	18-ALT-01
Project Title:	2019-2020 Investment Plan Update for the Alternative and Renewable Fuel and Vehicle Technology Program
TN #:	229343
Document Title:	Shell Hydrogen Comments Re. Proposed Clean Transportation Program - Revised Investment Plan 2019 - 2020
Description:	N/A
Filer:	System
Organization:	Shell Oil Company
Submitter Role:	Applicant
Submission Date:	8/9/2019 2:41:10 PM
Docketed Date:	8/9/2019

Comment Received From: Shell Hydrogen
Submitted On: 8/9/2019
Docket Number: 18-ALT-01

**Proposed Clean Transportation Program - Revised Investment Plan 2019 -
2020**

Additional submitted attachment is included below.



Shell Oil Company

910 Louisiana Street
Houston, TX 77002

Wayne Leighty

Hydrogen Business Development Manager, North America

Tel +1 (832) 680-9825

Email W.Leighty@shell.com

August 9, 2019

Patty Monahan
Lead Commissioner on Transportation
California Energy Commission
Docket Unit, MS-4 re: Docket No. 18-ALT-01
1516 Ninth Street
Sacramento, CA 95814-5512

Delivered via website

Subject: proposed "Clean Transportation Program – Revised Investment Plan 2019 - 2020"

Dear Commissioner Monahan:

Shell is submitting the below comments to the docket 18-ALT-01 for the "2019-2020 Investment Plan Update for the Alternative and Renewable Fuel and Vehicle Technology Program" and regarding the revised Lead Commissioner Report titled "2019 – 2020 Investment Plan Update for the Clean Transportation Program" (together the "*Investment Plan Update*").

Shell is the largest retailer of transportation fuels in the world, with over 100 years of experience working with automotive manufacturers for the development of fuels, and is now developing and investing across the full range of new fuels in markets around the globe. Our activities, including for hydrogen fuel in California, are made from this experienced, objective and global perspective. In California, Shell is developing hydrogen refueling stations to serve both light-duty, medium-duty, and heavy-duty vehicles and customers.

There are encouraging signs for hydrogen fuel in California. For example, the cost of refueling stations has reduced nearly half while capacity doubled from 2014 – 2017, and industry is now prepared to deliver another halving of cost while again doubling capacity in 2019.

In this letter we voice support for the Investment Plan Update, including the budget allocations of \$20 million for hydrogen refueling stations serving light-duty vehicles and \$30 million for heavy-duty zero emission vehicle infrastructure, and we suggest reasons to not emphasize co-location of light-duty and

heavy-duty hydrogen stations. Continuing these programs with certainty and without delay, including release of the innovative Draft Solicitation Concepts for Light-Duty Hydrogen Refueling Infrastructure (18-HYD-04) originally proposed on 23 January 2019, is important for the acceleration and scale in zero emission vehicles for which California policy calls.

Comments regarding the California policy goals as articulated in the Investment Plan Update

For the intent of the California Clean Transportation Program as stated in enabling legislation to “Transform California’s fuel and vehicle types to help attain the state’s climate policies”, we understand both a tipping point in customer adoption and an off-ramp in direct public funding will be necessary for the scale and private investment envisioned.

Two important innovations were created in 2018 that now await release with adoption of the Clean Transportation Program Investment Plan. The Draft Solicitation Concepts for Light-Duty Hydrogen Refueling Infrastructure (18-HYD-04) would enable cost reduction and scale with market certainty through a multi-year structure that would award the remaining funds as per the Clean Transportation Program Investment Plan and authorized under AB 8 legislation. The Hydrogen Refueling Infrastructure pathway in the Low Carbon Fuel Standard adopted by the California Air Resources Board will augment Clean Transportation Program funds by partially offsetting low initial utilization of hydrogen refueling stations, and increase the immediate incentive to develop renewable and low-carbon hydrogen production. These are important examples of “pivots” in policy that enable industry to deliver significant progress for California emission reduction and economic growth goals with hydrogen fuel cell electric vehicles: increasing capacity and coverage of hydrogen refueling to provide customers with the stations for convenient refueling, delivering the next halving of cost while doubling or performance, developing new hydrogen production that is renewable and low-carbon from the start, and supporting the increase in availability of vehicle makes and models that is essential for growing customer adoption.

The potential for economic development in California through private investment in new energies and new fuels infrastructure is significant. The recent 2019 Annual Evaluation of Fuel Cell Electric Vehicle Deployment & Hydrogen Fuel Station Network Development (California Air Resources Board, July 2019) shows 94% of investment in hydrogen infrastructure coming from private sector from 2020 - 2039, leveraging public funds along with renewable power toward the infrastructure and in-state energy industry for which California policy calls.

It is now nearly 30 years since the California Zero Emission Vehicle (ZEV) regulation created, leaving approximately 30 years remaining to achieve California policy objectives for 2050. Although the ability to act has been established – with technologies that have become products and industries ready to invest, and policies that have become investable markets – essentially no reduction in emissions from the transportation sector from level in the 1990s has been made. The question for California may then

aptly be framed as how to accelerate and scale for emission reduction and economic development, without economic harm from stranded assets.

It is therefore important for California's objectives to continue state programs with certainty and without delay to harness the momentum begun over the past decade into material results in scale and acceleration for California goals. It is similarly important to implement and continue innovative and enabling pivots in policy for electric mobility like those that have been made ready for hydrogen fueling infrastructure. For the expansion of emission reduction outside California, other jurisdictions in North America and beyond appear to be watching and replicating California's policy leadership.

We support adoption of the Investment Plan Update, and release of a Grant Funding Opportunity aligned with the Draft Solicitation Concepts for Light-Duty Hydrogen Refueling Infrastructure (18-HYD-04).

Comments regarding support for hydrogen fuel as articulated in the Investment Plan Update

The Clean Transportation Program – Revised Investment Plan contains important allocations toward hydrogen mobility that should remain as proposed: \$20M/y recommendation for hydrogen refueling stations infrastructure and \$30M/y recommendation for heavy-duty zero emission vehicle infrastructure.

Specific to Chapter 3 on H₂ Refueling Infrastructure – on page 70 – *we encourage continued and separate support for both light-duty and heavy-duty fueling infrastructure, do not believe emphasis on co-location of heavy-duty and light-duty infrastructure would be likely to deliver the intended results in most cases, and can participate in workshops to contribute further information on this topic.* Rather, we recommend that such co-location is left to emerge naturally as the market develops, in the locations and situations where it makes sense to do so.

Co-location of hydrogen refueling for light-duty and heavy-duty vehicles likely will not help to enable cost reduction in most cases, and may inhibit it. This is because cost reduction in hydrogen refueling does not occur simply through “larger stations” or co-location but rather through a combination of factors including product design, sustained scale and pace in development, increasing utilization, and decreasing operational costs. Although sizing hydrogen stations is an important factor, building “larger stations” is not the simple answer. Refueling station equipment may be differently optimized for the requirements of a light-duty vehicle (e.g., ca. 5 – 8 kg/fill) versus a heavy-duty (e.g., ca. 50 – 80 kg/fill) and trying to accomplish a single set of equipment may inhibit cost reduction for either one individually. It is also important to recognize the many vehicle classes and use cases in the “medium-duty” range between light- and heavy-duty, that may fuel at either what is considered “light-duty” or “heavy-duty” refueling stations. Even for cost reduction in the supply of hydrogen to fueling stations, the benefits from scale in production occur through aggregate demand (i.e., supplying both light-duty and heavy-duty fueling stations) and thus does not likely improve with co-location of stations.

Locations for light-duty and heavy-duty refueling stations in California today are generally not co-located, with the light-duty retail fueling network providing convenience to these customers, depots

providing specific fueling to dedicated fleets, fueling stations along highways serving the vehicle types trafficking these corridors, etcetera. In fact, few existing light-duty retail sites can accommodate heavy-duty vehicles due to constraints in traffic flow, canopy height, turning radius, etcetera, which means an approach emphasizing co-location could mean site selection is based adding light-duty fueling to the existing heavy-duty fueling network. This would generally not serve light-duty customers well, and may not evolve in a similar manner to historical experience with diesel fuel because many of the fundamentals are different. To co-locate light-duty and heavy-duty will generally not serve either customer segment's needs as well as separate refueling, which could inhibit the customer adoption that California policy seeks.

The capacity of both light-duty and heavy-duty hydrogen fueling infrastructure will be needed for California's goals. Looking at the overall greenhouse gas inventory from the transportation sector, the importance of both light-duty, medium-duty, and heavy-duty vehicles using both electricity and hydrogen fuel for the State's goals is clear. The opportunity for hydrogen is clearly in both light-duty and heavy-duty vehicles, and is complementary rather than competitive with battery electric vehicles.

- The use cases for hydrogen fuel cell electric vehicles exist across vehicle classes where the capability for high-output and high-utilization are either needed as in the case of commercial fleet operations or desired as in the case of customer vehicle purchase decisions moving toward sport utility vehicles. Customer choice is important for large scale adoption.
- The customer service of "fast charge" via hydrogen refueling already offers approximately 3,000 kW fueling rate at a cost comparable to that of direct current fast charging at above 60 kW; as hydrogen cost in California reaches gasoline parity, it will also become competitive with charging below 60 kW while still offering the 3,000 kW fueling rate. Customer service is important for large scale adoption.
- The vehicle performance with an electrified drivetrain is complemented in hydrogen fuel cell electric vehicles with range, payload, and uptime with fast refueling. Vehicle performance is important for large scale adoption.

For the effective use of public funds, there may be similarities and differences for further innovations in the approaches to public support for medium- and heavy-duty hydrogen fuel cell electric vehicles and for uses in commercial fleets as compared to the light-duty vehicle market. We look forward to opportunities for providing input on things like the total cost of ownership, while seeking to also replicate for heavy-duty applications the recent innovations in multi-year funding and LCFS hydrogen refueling infrastructure pathway that apply to infrastructure serving light-duty vehicles.

Observations regarding information in the Investment Plan Update

For the effective use of public funds, it is informative to note the following based on the funding amount provided for zero emission vehicle infrastructure and the expected number of vehicles it can support as articulated in the Investment Plan Update:

- Investments to date in charging infrastructure show approximately \$6,500 to \$8,500 per vehicle
- Investments to date in hydrogen refueling infrastructure show approximately \$5,400 per vehicle

The relative cost effectiveness for reducing emissions would also be a function of the relative annual mileage of these vehicles.

The California goal for hydrogen refueling stations is recognized in the Investment Plan Update as being 200 by 2025. However, the pace for developing hydrogen refueling stations in the Investment Plan Update is noted as resulting in 110 hydrogen refueling stations by the end of 2024. This leaves a shortfall of 90 stations to be accomplished in just one year between 2024 and 2025.

Thank you for your work in the Alternative and Renewable Fuel and Vehicle Technology Program – now the Clean Transportation Program – and the Investment Plan Update. We appreciate the opportunity to collaborate toward California's emission reduction goals and to submit these comments for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Wayne Leighty". The signature is fluid and cursive, with a large, sweeping flourish at the end.

Wayne Leighty