

DOCKETED

Docket Number:	17-HYD-02
Project Title:	Hydrogen Station Network Future Approaches
TN #:	223003
Document Title:	FirstElement Fuel Response to CEC Workshops on Hydrogen Refueling Infrastructure
Description:	N/A
Filer:	System
Organization:	FirstElement Fuel Inc./Tim Brown
Submitter Role:	Applicant
Submission Date:	3/19/2018 5:24:51 PM
Docketed Date:	3/20/2018

Comment Received From: Tim Brown

Submitted On: 3/19/2018

Docket Number: 17-HYD-02

FirstElement Fuel Response to CEC Workshops on Hydrogen Refueling Infrastructure

Additional submitted attachment is included below.



California Energy Commission
Dockets Office, MS-4
1516 Ninth Street
Sacramento, CA 95814-5512
docket@energy.ca.gov

Re: Docket Number 17-HYD-02, CEC Workshops on Hydrogen Refueling Infrastructure

Dear CEC Administrators,

To start with, FirstElement Fuel Inc. wishes to congratulate the CEC for its success in helping create the foundational hydrogen fueling network needed to initialize the commercialization of retail fuel cell vehicles in California. This was only made possible thanks to the solicitation and grant award process that you have established over the past 8 years for hydrogen fueling station development. We also wish to thank the CEC for a productive and efficient partnership.

Since FirstElement won its first grant awards from the CEC in 2014, our partnership has resulted in the fastest station development schedule, and most aggressive ramp up of retail hydrogen fuelings of any other region in the world. FirstElement alone has opened 18 hydrogen stations starting in December of 2015, all built with CEC grant dollars. These stations have completed over 126,000 fills and dispensed more than 414,000 kilograms of hydrogen. That translates into an estimated 27.8 million zero emission miles driven by fuel cell vehicles. Furthermore, the CEC-FirstElement partnership has already created an estimated 300 direct and indirect jobs in California¹.

However, we recognize that these successes were achieved only after several years of difficult learnings through grant solicitations that were undersubscribed and anemic efforts from retail hydrogen station developers. Through those eight years of learning, the CEC has created a more robust grant solicitation process that under PON-13-607 enticed 61 applications and under GFO-15-605, 72 applications. The results have been an increased number of hydrogen stations open to the public, an expansion of the hydrogen station network, and a dramatic reduction in the dollars invested by the CEC per installed capacity of retail hydrogen fueling.

These achievements are stated well in the Joint Agency AB 8 Report²:

¹ Estimates of Job Creation from the American Recovery and Reinvestment Act of 2009, EXECUTIVE OFFICE OF THE PRESIDENT COUNCIL OF ECONOMIC ADVISERS, May 2009

² Baronas, Jean, Gerhard Ahtelik, et al. Joint Agency Staff Report on Assembly Bill 8: 2016 Annual Assessment of Time and Cost Needed to Attain 100 Hydrogen Refueling Stations in California. California Energy Commission. Publication Number: CEC-600-2017-002

“As of December 5, 2016, 25 open retail stations are selling hydrogen for use as a transportation fuel and another 23 stations are under development to become open retail and sell hydrogen to the public. Combined with two additional California Air Resources Board-funded stations that are open non-retail (not selling hydrogen to the public), California’s hydrogen refueling station network is composed of 50 stations. This year has seen the greatest growth in the number of open retail stations in California since the AB 118 (Núñez, Chapter 750, Statutes of 2007) and AB 8 programs started. When the 2015 Joint Report was published, six stations were open retail.”

Furthermore, the report states:

“Significant progress – more than in any previous year – has been made in opening new stations in 2016”

And, as shown in Figure 1, the report states, “...average station development time for completed stations has been halved – from just over four years to two years – for stations funded under solicitation PON-13-607 compared to those funded under PON-09-608...”

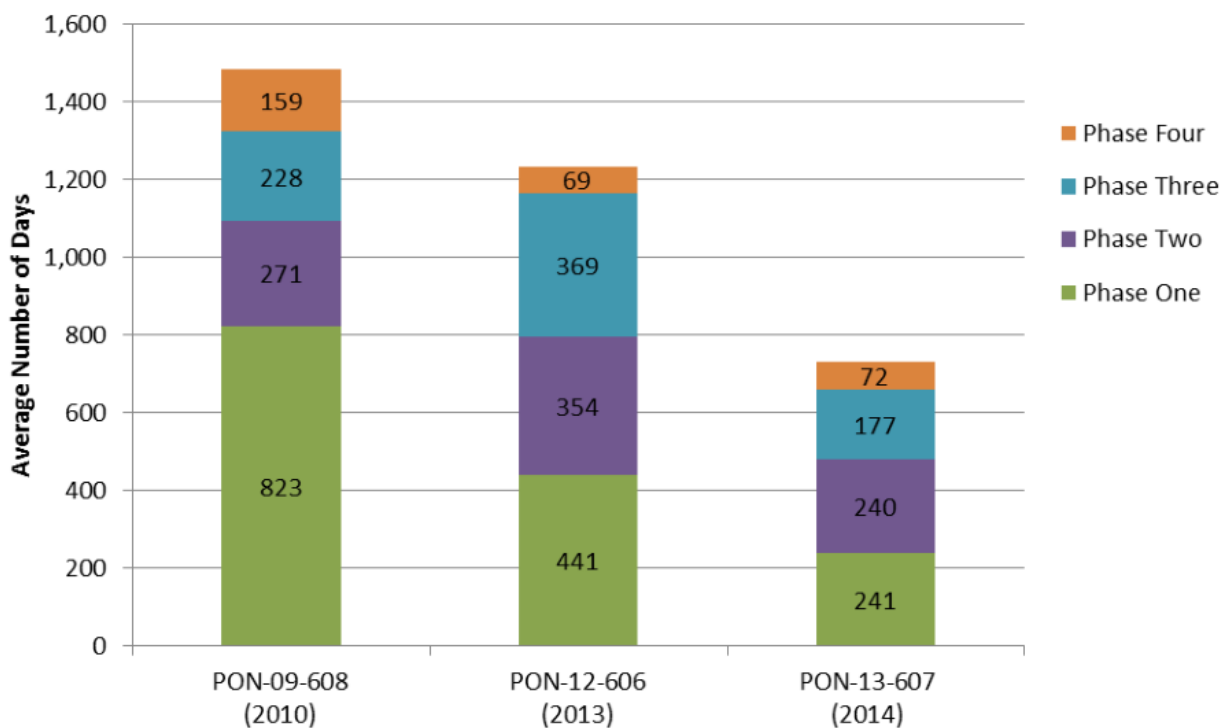


Figure 1. Average hydrogen station development times. Error! Bookmark not defined.



Fundamentally, FirstElement believes that the solicitation for Hydrogen Fueling Stations as it is currently structured is resulting in success and should remain largely unchanged to achieve the upcoming needs of the retail hydrogen fueling market (e.g., advancement of technology, reduction of cost, increased coverage for prospective fuel cell vehicle customers, and an overall improved customer experience for retail hydrogen fueling). **Therefore, FirstElement's recommendation is that the CEC does not drastically change the solicitation requirements or process from GFO-15-605.**

Scoring Criteria

FirstElement does not see a need to dramatically alter the scoring criteria used in the previous GFO. In general, we agree with the CEC's breakdown of key attributes. In particular, the Coverage, Capacity, and Market Viability section should continue to account for the largest portion of the scoring criteria. We believe this section addresses many key attributes of each proposed project.

Alternative Funding Mechanisms

Choice Between Cap-X and O&M

FirstElement is open to this approach. However, given the fact that we are a new company without access to large amounts of capital, we would almost certainly make the choice of Cap-X for every project that we propose.

Regional

While there are positive aspects of this alternative funding concept that are clever and potentially helpful to applicants, there are several troubling aspects that outweigh the positive. Therefore, FirstElement does not support the Regional Alternative Funding Concept.

On the positive side, this funding concept provides flexibility to the applicant on location of stations, as well as the ability to design station capacity for each location within the context of a regional network approach. This would ultimately be helpful to an applicant to adapt to market conditions and data, as well as to unpredictable circumstances that arise during the development process.



However, this concept is troubling because of the inherent monopolistic and anti-trust concerns that would arise from carving out territories for one single developer or another. There are both legal and market fairness implications of this strategy that would likely ultimately hurt the customer. Carving out an entire region for a single developer to receive grant awards would put that developer at an unfair advantage over their competition.

Loan Loss Reserve (LLR)

While a Loan Loss Reserve program would tackle one challenge of developing the early stations of a hydrogen refueling network, it does not help with some of the other challenges. Therefore, FirstElement recommends keeping the current grant funding mechanism intact rather than implementing a loan loss reserve.

FirstElement faces two major challenges to developing a hydrogen network during these very early stages of fuel cell vehicle commercialization. One of those challenges is access to capital - the Loan Loss Reserve program would help address this challenge. The other major challenge is the high expense of building and operating a hydrogen fueling network during the next 5-10 years relative to the low volumes of hydrogen cars in the very early market. A Loan Loss Reserve mechanism does not help with this second challenge and would likely result in higher hydrogen prices at the pump to offset these operating expenses.

A Cap-x and O&M grant program, on the other hand, tackles both of these challenges (access to capital and offsetting expenses) simultaneously. Therefore, it is the preferred mechanism from FirstElement's point of view.

Renewable Fuel Sales Reimbursement and Certificates of Guarantee

This approach does not help address one of the primary challenges of building hydrogen stations at this very early stage in the fuel cell vehicle market - access to capital to build hydrogen stations. Therefore, FirstElement does not recommend this approach.

Grant Amounts

FirstElement supports the current sliding scale approach that was presented in GFO-15-605.

Multi-year solicitations

One of the concepts that was discussed during the workshop by industry participants is that of a multi-year solicitation, whereby one more grant solicitation would be released for the remainder of AB8 funds between now and 2023. FirstElement's recommendation is NOT to go the route of multi-year solicitations at this time. However, we believe this is a strategy worth considering in future years once the industry is more mature and hydrogen station technologies and equipment have evolved into a more commercial phase with a competitive landscape.

FirstElement understands and appreciate the desire that several companies have shared publicly to allocate multi-year awards for large blocks of stations. Their belief is that certainty and guarantees of grant funding can help in equipment purchase negotiations and internal planning. Also, preparing proposals is a substantial effort for GFO responders to undertake.

However, FirstElement's lessons learned over the past 4 years have shown us that the timing is not right for a multi-year approach for the following reasons:

1. FirstElement believes that large, multi-year awards could limit innovation and cycles of learning. For example, FE expects our station projects from GFO-15-605 to be nearly equal in cost to the projects for the previous solicitation (PON-13-607), yet they will contain three times as much hydrogen storage, provide two simultaneous fueling positions (instead of just one), and have well over twice the daily capacity. The learning cycles and opportunity for technological and operations improvement year over year are tremendous in this embryonic industry. Multi-year block grants will fail to capture these learnings. We do not know enough today about what the technology costs and capabilities will be even 3 years from today.
2. Securing multiple sites over the course of several years will be exceedingly difficult. Site location is critically important to creating a functional network. The nascent hydrogen infrastructure has just dozens of stations and is attempting to provide levels of service that are competitive with nearly ten thousand gasoline stations in California. For better or worse, the CEC's hydrogen awards have been plagued by "site changes" due to a variety of reasons; all of these will be exacerbated by a multi-year award. And, if locations begin to change, how, and who, would manage and coordinate those changes in a fair and consistent way?
3. Even if multiple sites can be secured over the course of several years, the consumer market evolves rapidly. A well-planned network today based on demographics, consumer residences, and commuting patterns will likely end up being less than ideal 5 years from now because of shifting demographics, new developments, and evolving consumer choice of plug-in ZEVs, hydrogen-powered ZEVs, or other transportation alternatives. Even the best marketing experts in the world cannot predict exactly what these shifts will look like over time.



We believe the underlying rationale of the request for multi-year awards is the inherent uncertainty of the CEC's hydrogen grant process. In addition to uncertainty about the competitiveness of one's own application, there is additional uncertainty in the dollar amounts, timing, and frequency of grant cycles. As an alternative to alleviate the uncertainty concerns voiced by many stakeholders, FirstElement would suggest that perhaps the CEC consider a different solution:

Perhaps some of this uncertainty could be mitigated by a multi-year schedule of solicitation promulgation dates, NOPA dates, and dollar amounts. For example, it would be helpful for applicants if the Commission could commit to a solicitation for \$20 MM on XX/YY each year, and a NOPA 3 months later until the AB8 monies are exhausted. This could add certainty to the process while still allowing for an evolving network and advancements in technology.

Technical Requirements

Hydrogen Purity Testing Requirements

FirstElement currently tests the quality of hydrogen at all stations every 6 months per the governing grant requirements. In the hierarchy of potential contamination scenarios, stations with onsite generation would tend to be the most prone to problems, delivered gaseous hydrogen would be second, and delivered liquid hydrogen would be the least likely. For our delivered gaseous stations, our testing to date has not shown any problems with gas purity. Additionally, future FE stations should nearly eliminate contamination issues by using lubeless pumps and inherently pure liquid hydrogen. Consequently, FirstElement believes that testing more often than every 6 months is not required.

Inclusion of J2799 in the Technical Requirements

SAE J2799 is incorporated into J2601 (which is already required). Including J2799 seems redundant.

Requirements for H35/H70

All of FirstElement's stations currently have H35-T20 and H70-T40 fueling capability. In 2017, just 0.87% of our hydrogen was dispensed as H35-T20, while the remainder was dispensed as H70-T40. Therefore, we do not think that the CEC should require future stations to install H35 equipment, but we do believe that H70-T40 should be a requirement.

Certification of SAE J2601 Protocol Compliance



FirstElement agrees with others that the one HyStEP unit operated by the state could be a bottleneck to station openings in the future. Moving to a NRTL certified station is a great idea, but it has not been proven yet. A requirement for NRTL certification of J2601 is premature until multiple equipment suppliers and compliance agencies can meet and certify. As a backup to HyStEP if necessary, automakers can verify station operation.

Minimum Daily Capacity Specification

FirstElement will pursue larger stations in the future with capacities over 400 kg/day and at least 2 fueling positions because we think this best serves our customers and is our best path financially. However, if technological advances or unique economic situations enable smaller stations to be successful, we do not believe they should be automatically precluded.

Redundancy

As the operator of 18 stations with proven availability of over 98.5%, FirstElement understands the importance of uptime to customers as well as the universe of problems that can cause a station to go offline. It is important to understand that the concept of “redundancy” is complicated.

For example, the existing 18 FE stations each have one compressor, one refrigeration system, one dispenser, and one point-of-sale system. Doubling each of these systems would appear to offer “redundancy”, and hence, enable higher uptime. If FE installed two identical 200 kg/day systems at one location, would the station be more reliable? Should such a station be classified as 200 kg/day capacity with redundancy, or 400 kg/day, without redundancy? Also, regardless of the number of compressors, the station would likely still have just one electricity connection, one internet feed, and one maintenance team. And, from a safety standpoint, if a hydrogen leak in one system causes it to shutdown, should the other system located directly next to it continue to operate? When a single station with no “redundancy” can continuously maintain availability of 98.5% or better, is it justified to invest literally double the amount of money to raise that uptime slightly, particularly when additional coverage and additional capacity are critical to the success of zero emission hydrogen cars?

Redundancy is a means to an end. The goal for hydrogen customers is to have a station that works when they show up; this is defined as availability. Redundancy may help to increase availability. But, excellent maintenance, response time, and high quality equipment can all improve availability too. Availability is the only metric that a customer sees; they do not care how it is achieved.



Number of Refuelings per Hour

Based on usage patterns at FirstElement stations, we regularly see 5 fills and roughly 20 kgs dispensed in one hour. As a result, five, 4 kg fills per hour appears to be a logical minimum requirement for new CEC funded stations (per fueling position). We have supplied refueling data to the CEC via the NREL fueling logs. We are happy to provide additional data or our interpretation of these data to help address this question and any others that apply.

Customer Payment Requirements

FirstElement is excited about future possibilities of easy payment solutions for customers. But, regardless of payment processes in the future, we want to enable fuel sales to as many customers as possible with stations that were ultimately paid for by the public. Therefore, we think that credit card payment should be a requirement.

Hydrogen Safety Plan

FirstElement believes that safety is the most important issue for our customers, our company, and our industry. There can be no compromise or lapse by anyone in the industry. Therefore, we encourage the CEC to pursue rigorous safety screening criteria for future solicitations.

SOSS

FirstElement believes that SOSS is a valuable service for our customers and we think that communication to SOSS should remain a requirement.

Station Locations

We believe that FirstElement Fuel is in a unique position to comment on the selection, and scoring, of station locations because FE has built more hydrogen stations and executed more hydrogen station leases than any other entity in the United States, because key personnel at FirstElement previously led the development of station location modeling tools and led the marketing of every kind of automobile, and because of FirstElement's close relationship with the automakers currently selling FCVs.

Two fundamental ideas must be maintained, regardless of how station sites are selected: 1) new stations must complement the existing network and ultimately serve to expand FCV adoption, and 2) the California Energy Commission has responsibility for allocating public funds.



We encourage the CEC to seek input from automakers, station operators, fuel providers, academic institutions, and any other stakeholders who have opinions on locations. But, all of these stakeholders, FirstElement included, have varying biases that may detract from a cohesive, efficient, robust statewide infrastructure network. And, the world of hydrogen stakeholders is pretty small; there are very few secrets. We feel that any attempt to create a blind screening process would be anything but “blind.”

Therefore, we strongly encourage the CEC to continue developing, improving, and using the CHIT tool to aid in station location selection. Without a strong, central entity guiding the network with a repeatable and transparent method, precious public dollars will be spent inefficiently.

As one final note, we believe that both the *coverage* and *capacity* functions of CHIT are valuable tools for stakeholders.

Sincerely,

Dr. Tim Brown
Founder and COO
FirstElement Fuel Inc.