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Hydrogen Frontier Inc. appreciates the opportunity to voice our concerns for the CEC's funding framework for hydrogen infrastructure in California. As both a station operator and developer we intend to share our desires for all stakeholders to consider in the revision of PON structure. Also as a Fuel Cell car owner we would like to insist on the less often heard voice of the consumer to be considered, for consumer confidence will be the ultimate measure of success to commercialization of hydrogen as an alternate fuel.

We would like to commend the CEC in supporting these valuable workshops to allow all stakeholders to participate and have their concerns acknowledged. The CEC has a very difficult responsibility in determining the path we are to proceed on to the successful deployment of hydrogen infrastructure in the state. Without the initial funding for station development we as both developer and consumers would not be able to make a positive difference for the generations to follow.

With hopes of making a difference we offer these suggestions to focus on the following:

- Station Locations
- Station Performance Minimums
- Permitting & CEQA
- Fueling Protocols
- Incentives & Considerations

Station Locations)

After attending the workshops and listening to all stakeholders, the **only** thing we all generally agree on is that more stations are needed. While OEM's can express desired market deployment areas, and academia's exact station location using street studies provides a mechanism for future determination, both are irrelevant when it comes to the current need of any type of performing station located anywhere in California now. With so few operating stations and delays on funded stations, any station built in the next two years in any community will become a market for both local & commuter users. While both of these mechanisms are valuable and hopefully will be adopted once we reach a baseline of operating stations, currently seems premature as the only defining station location school of thought. At this point in time any station built will see growth in demand as consumer confidence grows with station reliability. Well performing stations no matter where they are built will be used by all consumers. So stations that are not exactly in the OEM and CAFCP determined areas should not be excluded from funding consideration, consumer confidence and acceptance will expand to all areas and stations will see high volumes of dispensed Hydrogen.

The best measure of future station location will be determined by market demand. As baseline stations near & reach capacity other nearby site or sites should be considered for funding. Private investors will be more inclined to invest in a location if they see fewer established stations in areas of consistent growth. These areas can mature into a potential expansive market with opportunity for private contribution. If we only fund cluster sites we have already saturated the area and there will not be any desire for future investment opportunity for private enterprise. Furthermore, Destination stations should not be split away from these networks but rather encouraged, these locations will also be new emerging markets that help expand ZEV technology.

The current mentality is to place two stations near to each other, to cover for unreliability and poor performing stations. With such a large capital investment per station, resources should be expanded to cover larger areas with less redundancy. We don't need two stations every 2 miles; we need better performing stations every 15-20 miles.

As a station developer the following are what we consider as additional important criteria for a potential station site.

Size of Available unused Station property

Often locations that are located near major thoroughfares are not always ideal for equipment layout. Parking requirements in general for all municipalities require that for every 200 sq. ft. of retail space there needs to be one 9'x18' parking space. Most ideal locations near major thoroughfares have already developed their site to maximize ROI on existing lot size. Municipalities will not allow this loss of parking for hydrogen equipment and furthermore handicapped Van access for parking is 18'x18'. This is often required in any proposed changes to any site. In short ideal locations designated by minimum miles might sound good; many times will not allow permitting & installation of equipment. Therefore sites

that may not be on major thoroughfares but perhaps a little farther often are better options. These locations tend to have larger lot sizes and while not exactly on major roads offer the best possibilities for success in dealing with permitting and subsequent installations. There isn't one formula to determine best station locations other than the lots with larger footprints seem to be more agreeable to the equipment footprint and permitting.

An additional important issue is car queue area. All local municipalities require a station to be able to accommodate a multiple car queue area that remains on the station property. Stations near major thoroughfares again predominantly have smaller size lots and/or more developed sites therefore do not have this ability to accommodate enough cars without overflow to major arteries causing undesired traffic congestion. It is most difficult to obtain permitting when the site has foot print issues for parking, equipment clearances and queuing of cars.

Station Performance Minimums)

Station performance minimums will have these four major concepts in order of importance:

- Back to Back fill quantity (peak before degradation)
- Fill type (A-70, B70 & D35)
- Scalability
- Capacity

All these above concepts weigh in heavily on total cost associated with station deployment. The better a station meets these criteria the more funding it should be allowed. I believe a fixed standard (one size fits all e.g. 100 kg/day 20kg/hr) limits the opportunity for competition in station design in an industry which needs innovation and continued commercialization. We feel a sliding scale of funding value for each concept based on a minimum. These minimums are still far from complete agreement on, or if at all with all stakeholders.

Back to Back fill quantity is the most important aspect in fueling station performance criteria. It is this ability to meet rush hour demand and what all stations should be measured by. It is known that most fuelling's happen 1 hour before morning and evening rush hours according to National Renewable Energy Laboratory CDP quarterly reports. Stations that can keep up with consumer demand earn

consumer confidence and ultimately more business. This is a direct relationship of cost per Kg dispensed vs. capitol expense for equipment.

Fill type would be the second most important criteria in station performance. Successful Type A 70Mpa fills at -40 degrees C means faster fueling times and therefore again gain consumer preference over slower Type B 70 Mpa -20 degree C fills. Non cooled D35 fills are least desirable for consumers and a majority of current Original Equipment Manufacturers.

Scalability has to do with overall hydrogen storage costs, which predominantly the most expensive piece of equipment on site. A station with less initial storage will be less expensive reducing capital costs; however this reduction is only beneficial if the existing system has the ability to be easily expandable to keep up with growing demand. The other advantage of smaller initial storage is the risk of larger expensive fixed station storage never being utilized to its intended throughput design, stranding capital assets.

Capacity is the balance of all the previous concepts. A Station design that incorporates a ratio of these concepts in direct correlation to its intended market demand area would be the most efficient application of funding monies.

The goal is to fund and build as many stations as soon as possible and still work to a formula to evaluate future desired station performance vs. cost. With so few operating stations Hydrogen Frontier feels any *well* performing station design would gain consumer confidence no matter what capacity it was built to and still achieve immediate success. Subsequently allowing market demand to dictate future locations and capacity as needed. It is only after we have an initial viable network of stations without redundancy will we know positively where to build the next station without risk of stranding underutilized assets.

Permitting & CEQA)

We have found that each AHJ has their own processes and timelines in the permitting process, with this in mind Hydrogen Frontier strongly disagrees with any fixed timeline for completion of permitting or loss of grant funding. Perhaps a more transparent reporting of progress towards permitting completion should be used to evaluate and then potential discontinuance of funding for projects that are stalled and/or not moving forward on to final permitting.

Until local AHJs are better educated on the Hydrogen fueling station infrastructure we can only expect slow progress at first. We need to award developers who do have their "Agreements with AHJs" to get those funded locations online as soon as possible. Perhaps this co-operative relationship could be disclosed at time of proposal showing what is required for a complete permitting package and estimated timeline for completion.

Another matter that needs to be addressed is the California Clean Water Act. It requires processing all runoff from newly remodeled sites to install various water clarification units to treat water runoff. These Water Quality Management (WQM) Reports often require extensive work to prepare and implement. This creates the possibility of prolonging the permitting process and increased site development costs.

Fueling Protocols)

We all agree that safety when fueling a vehicle is of utmost importance in acceptance of this technology. Guideline SAE J2601 attempts to provide an overly conservative safe guideline which is only one method available today. We think it would be a premature mistake if SAE J2601 would be put into law as the only fueling protocol available. We feel there is still room for continued innovation and subsequent OEM approval for other methods. By restricting station design funding to this so far unobtainable guideline would have a negative effect on continued innovation and the advancement better station performance. With major stakeholders claiming patents associated with this J2601 protocol, we need to make sure we will not be held hostage thru expensive licenses fees to use this method. Before the CEC goes any farther in this direction we need to define these fees. In CEC awarded PON- 09-608 to Air Products submitted Project Narrative on page 14 of 28 "Air Products shall license a patent portfolio referenced by the J2601 Protocol under terms and conditions consistent with SAE's requirement to make license available "to all applicants...under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination." License packages are available upon formal request."

We believe the CEC could say station design should attempt to implement the intent of J2601 and not make it a strict requirement. Currently all OEM's test at all new stations before allowing there consumers to use these stations this won't change now or in the future, so restricting ingenuity severs no purpose in the advancement of this technology. If you ask all OEM's in one room they will all respond yes to the intent of J2601. However asked separately all would prefer their own custom fuel protocols which usually are faster than J2601.

Hydrogen Frontier supports the MC method applicable fueling protocol. It allows for continued fueling after back to back fueling degradation.

Incentives & Considerations

Hydrogen Frontier supports any and all incentives to help offset capital costs in developing hydrogen fueling infrastructure. As a developer we will do the extra work to the best of our ability while taking advantage of these additional funds. As station development and installation costs are currently a sizeable investment any assistance is greatly appreciated. In an attempt to commercialize this technology; thru education of AHJs, growing consumer confidence and unsaturated market areas we can make an appealing business model for private enterprise to get involved.

Thank you for considering Operating and Maintenance money of 50K a year. However with the generous funding of past and potentially this time around, perhaps some of the capital funding could be used to increase the 50k baseline to a larger number of 75k/yr. We believe that an immediate response time when a station goes down is needed to gain consumer confidence and guarantee technology

acceptance. One issue a lot of station operators face is that most suppliers currently do not stock many spare parts due to costs; many of these parts need to be ordered from the manufacturer directly and have a 6-8 week lead time in ordering. We need to be able to stock more critical and long lead components for rapid replacement and guarantee better station uptime.

We also see the need to possibly support existing and new sites till car companies rollout acceptable quantities of FCEVs. We need this influx of support for greater success of these early stations until dispensed volumes increase and stations are able to standalone on sales to support activities. Furthermore stations that do show early success should in turn contribute to help support under-utilized stations for the remainder of the three year funding period. In essence anyone who is willing to enter into a contract for funding should also be held to transparency of sales volumes and monies collected by either POS or fueling agreements with OEMs.

To support these Ideas, contract agreements with OEM's need to be made transparent to document the degree that OEM's are willing to purchase Hydrogen until Department of Weights and Measures (DMS) and Point of Sale issues are resolved and implemented. Cost of hydrogen dispensed should be made known by station and estimated retail price as well to better estimate which stations will be able to support themselves. These potentially nearer term successful stations should score higher for they will be the business model that attracts private investors.

It our vision that private enterprise take over the responsibility of commercializing station deployment and build many reliable smaller stations and not rely on the State government to funded expensive larger underutilized sites. This also leads into station size, what we need today and what we need in 2017 will be different. These early sites will not see large numbers of cars until perhaps after funding period of three years has expired. So it is our opinion that many stations vs. few large stations are what we need now! As an operator I would rather have five 100 kg/day sites rather that one 500 kg/day. For when this site goes down I have only 50 disgruntled customers versus 250.

It is great concern that previously funded stations have yet to break ground. We would like to see disclosure of what caused these delays in hopes of avoiding a repeat for future PONs. However the greatest area of concern would be the lack of uniformity and an agreeable common direction we as stakeholders need to be taking to make this technology accepted by consumers and embraced by private enterprise.

It is not our intent to define the exact numbers to evaluate each criteria mentioned in the workshops, but to have you consider all the concepts in your decision making process. While no procurement will please everybody we will be happy to contribute on any topic requested.