



Hydrogen Fueling Station Business Cases

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Aug. 1938 San Antonio, Tx.

Station Brown Dealer

Dealers



Stores (hypermarketers)

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About the focus group

- Understand retailers' motivations for putting in low-volume H₂ stations
- Three-day moderated online discussion
- 14 respondents
 - 1 alternative fuel provider
 - 4 convenience store operators
 - 1 big box store
 - 1 European fuel provider
 - 7 traditional fuel retailers

General observations

- They are interested, but know very little
- Alternative fuel=biofuel
- Unsatisfactory E85 and biodiesel experience
- Retailers are very price sensitive
- Need a large station to survive, but want to start with a small station for a new fuel

Adding alternative fuels

Pros	Cons
<ul style="list-style-type: none">• Being seen as a green business• Customer loyalty• Get grant money for equipment• Use waste materials as a feedstock• Opportunity for an exclusive market• Tax credits• Generate new jobs• Increase traffic in the store	<ul style="list-style-type: none">• Capital cost• No ROI• Getting funding (loans)• Low demand for the fuel• Customer distrust of fuel• High cost (to customer) of alt fuels• Lack of approved devices• Big guys would dominate the market and control the price• Instability of auto industry• Reliability of supply• Price volatility• Home fueling steals customers

Why offer hydrogen?

- Opportunity to be the dominant player
- It has fewer drawbacks than ethanol
- 100% funding
- The ROI
- Demand for the fuel

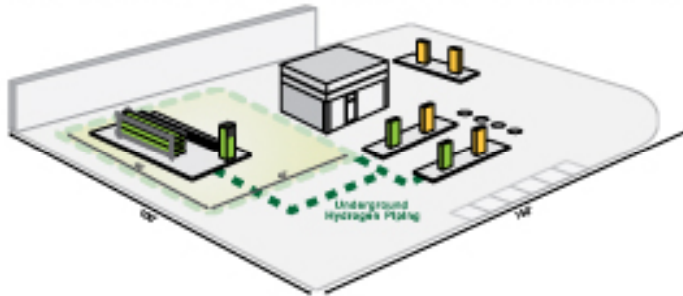
Effective incentives

Most	Some	Least
<ul style="list-style-type: none">• Subsidies• Tax credits• Co-funding	<ul style="list-style-type: none">• Government subsidies• Carbon credits• Regulation compliance	<ul style="list-style-type: none">• PR value• New business types

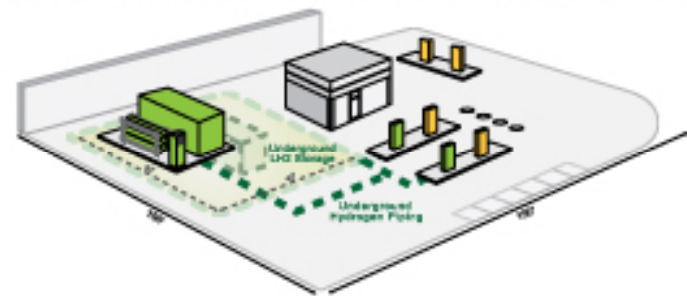
- ▶ *Nearly all offer biofuels and blends because they were regulated to do so.*

The business cases

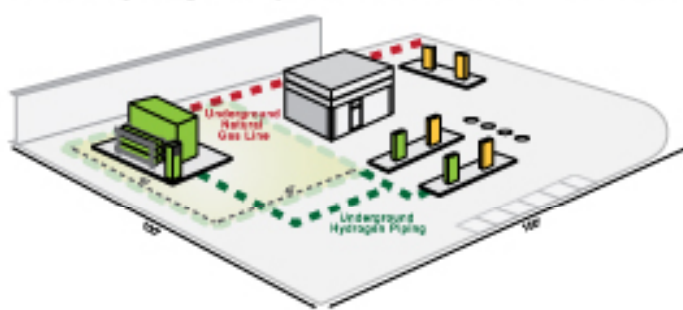
Station A: Hydrogen is delivered as a compressed gas



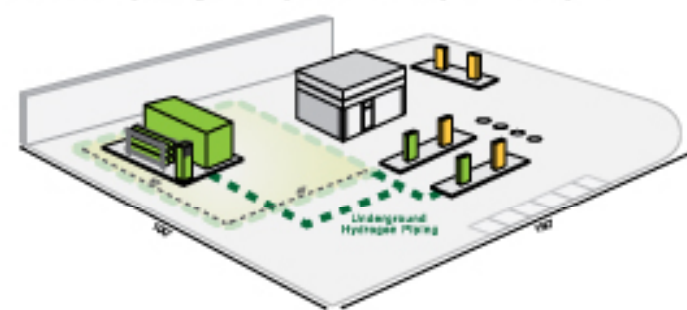
Station B: Hydrogen is delivered and stored as a liquid



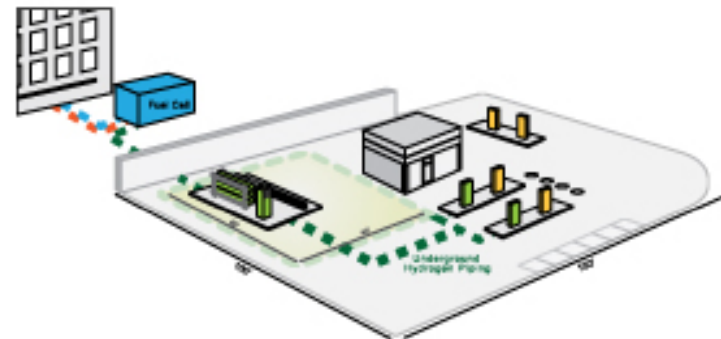
Station C: Hydrogen is produced onsite from natural gas



Station D: Hydrogen is produced by electrolysis



Station E: An offsite fuel cell uses natural gas to produce electricity, heat and hydrogen



Difficulties understanding

- They knew so little about hydrogen that they wouldn't consider any of the models
- Could not visualize the drawing in their business
 - Serve 20-50 E85 customers a day
 - Business is in a strip mall, not freestanding
 - Stations are mostly in rural areas
- FCVs are not FFVs—customers will not choose gasoline
- Hung up on profit margin

Design

- Smaller footprint
 - Most c-stores don't have a 40-foot parking lot
- Smaller capacity
 - A "starter station" to gain experience while demand is low
- Incorporate other alt fuels
 - An island with hydrogen and E85 or electricity
- Less obtrusive, yet visible
 - Underground or overhead storage and compression

Station A comments

- Cylinder exchange is fraught with problems—missed deliveries, tubes don't work
- An above-ground tank could be spotted more easily than underground tanks
- The compressed gas would have to be converted to liquid, which would be inefficient
- Like the drop-off nature of the tubes
- It makes a healthy profit after expenses
- The cylinders should be permanent and a truck refills the cylinders
- Smaller tube set up to better manage inventory levels
- Bury the tubes and offload like propane

Station B comments

- Like the underground tank, less effort to maintain
- Needs larger storage capacity and higher daily volume
- What's the reliability of the equipment that warms and compresses the H₂?
- Inventory management of a product delivered as a liquid, but dispensed as a gas
- Adding an new UG tank will force upgrade of all other underground equipment

Station C comments

- Limited amount of fuel you have to store without being concerned about being out of stock
- Like onsite production
- \$7MM is too expensive
- Our properties don't have a 40x40 footprint available
- This would be making CO₂, not reducing it
- Concerned about regulations and higher insurance for making fuel onsite

Station D comments

- For \$8MM we could build 4-5 large-format c-stores on high-traffic corners and strengthen our market presence. There are better ways to invest money than a single H₂ station with low initial demand.
- Should use wind or solar electricity
- Concerned about regulations and higher insurance for making fuel onsite

Station E comments

- Too risky to rely on another entity for the fuel supply
- If we could own and operate the fuel cell in a cost effective manner, this is an appealing option
- Need to store some of the H₂ in case something goes awry with the co-op program
- No controls on cost of H₂ from the provider
- Would we be regulated as a utility? Could we sell electricity to the utility?

General statements

- Costs
 - Capital costs too high, IRR is too long, margins are not realistic
 - Unexpected jump in fuel price and loss of incentives
- Inventory management
 - Shelf life of hydrogen, life of equipment
- Demand
 - Not enough customers

How many stations?

Year	2010-2012	2013-2015	2016-2018	2019-2022
# vehicles	450	3,500	45,000	500,000
# stations (per retailer)	1	1-3	8-10	100



Questions?

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