

IPHE Infrastructure Workshop



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California Fuel Cell Partnership

AUTOMOTIVE

Chrysler
Daimler
General Motors
Honda
Hyundai
Nissan
Toyota
Volkswagen

ENERGY

Chevron
Shell Hydrogen

TECHNOLOGY

UTC Power
AFCC

GOVERNMENT

CA Energy Commission
CA Air Resources Board
National Automotive Center
South Coast AQMD
US EPA
US DOE
US DOT

ASSOCIATE

AC Transit
Santa Clara VTA
SunLine Transit
Air Products
Linde
Proton Energy Systems
Praxair
Powertech
ITS – UC Davis
NFCRC – UC Irvine
CA Dept. of Food & Ag
NREL



Moving to commercial



Vehicles coming to California



	Hundreds	Thousands	Tens of Thousands
	Through 2012	2013-2015	2016-2018
Total passenger vehicles	450	4,200	54,300

	Field Testing	Full-scale demonstration	Commercial
	Through 2011	2012-2014	2015-2017
Total fuel cell buses	15 to 17	20 to 60	60 to 150

** Based on 2009 automaker survey and transit regulations and plans*

Stations in Development in California



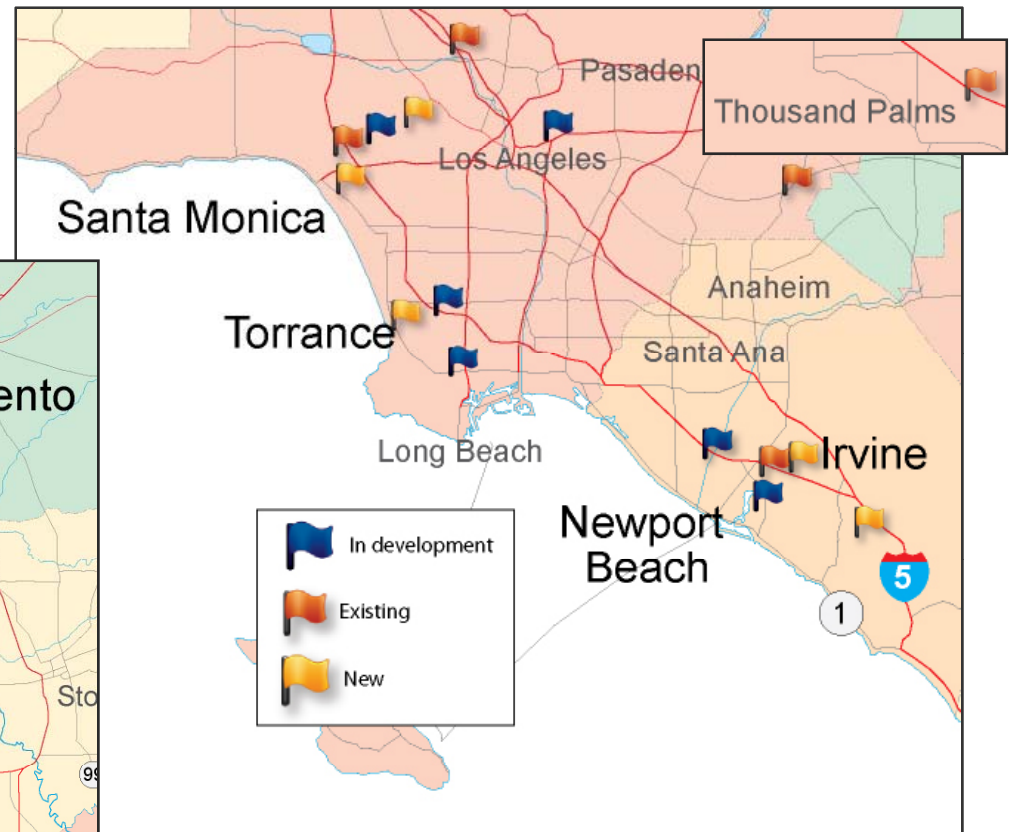
City	Operator	Capacity (kg/day)	Expected Date
Harbor City	Mebtahi	100	Q3 2010
Newport Beach	Shell	100	Q4 2010
San Francisco	SFO	120	Q2 2011
Torrance*	Shell	50	Q3 2010
Westwood	UCLA	140	Q2 2011
Emeryville	AC Transit	60 (passenger) 150 (transit)	Q4 2010
Fountain Valley	OCSD	100	Q3 2010
Los Angeles	CSULA	60	Q1 2011

* Funded by industry. Others funded up to 70% by CA government and others e.g. DOE

California H2 Station Needs through 2011



Northern California



Southern California

All must be public access stations;
yellow flags "proposed"

What motivates retailers to offer fuel when demand is low?





About the focus group



Three-day moderated online discussion

🎯 14 respondents

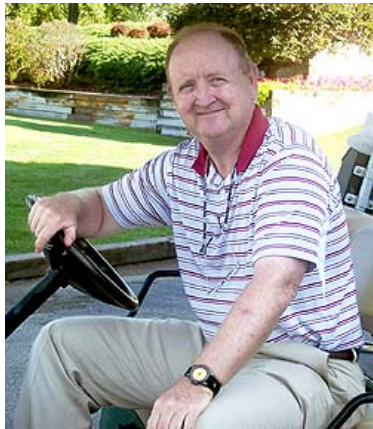
- 1 alternative fuel provider
- 4 convenience store operators
- 1 big box store
- 1 European fuel provider
- 7 traditional fuel retailers

What would encourage you
to add hydrogen to your
station when vehicle
numbers are low?

The short answer



The longer answer



Pro

- It's good for business
- It's good for the environment
- It's good for the economy



Con

- It's expensive
- It's unreliable
- There's no demand

Quotes...



"We are looking to improve our green footprint. The public has responded favorably to these efforts."

"We must take steps to preserve our planet for us and our children."

"The public is still very cautious about biodiesel fuels. The winter operability issues make them leery of fully accepting the product line."

"Businesses may be rewarded financially for offering alternative energies."

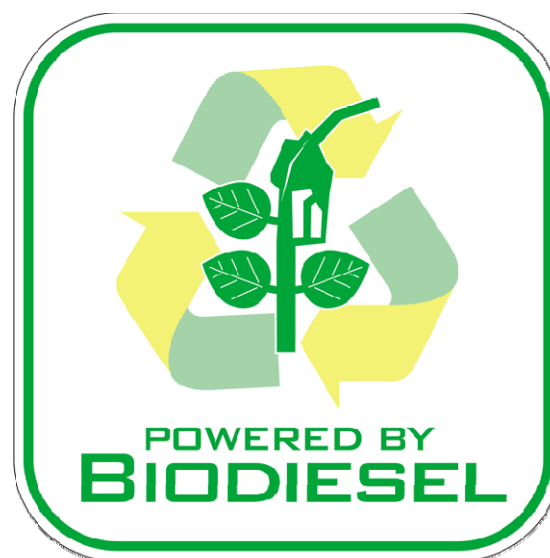
"People talk green, but only when there is an economic benefit directly to them."

"The motoring public tends to let their wallets do the talking, they won't buy bio when it is more expensive."

Lesson #1

We're not
speaking the
same language





Lesson #2

We forgot that
hydrogen is new



Quotes...



"Offering charging stations will make us a utility. We don't want to be regulated that way."

"I'm not completely sure how hydrogen is refueled other than you use water."

"Adding natural gas would require new staff to dispense the fuel."

"If the price for hydrogen or electricity is too high, people will fill with gas instead."

"Hydrogen would not require you to fill up at a station. Is it not just water?"

"Hydrogen is a natural gas in the air, so that's why I did not consider it."

Fueling



Effective incentives



Most

- Tax credits
- Co-funding
- Being first



Some

- Subsidies
- Carbon credits
- Compliance



Least

- PR value
- New business types

Lesson #3

It s not that simple



Regulation compliance



One focus group scenario

Station A: Hydrogen is delivered in tubes as a compressed gas

700 kg/day station serving 200 vehicles a day (85% equipment utilization)

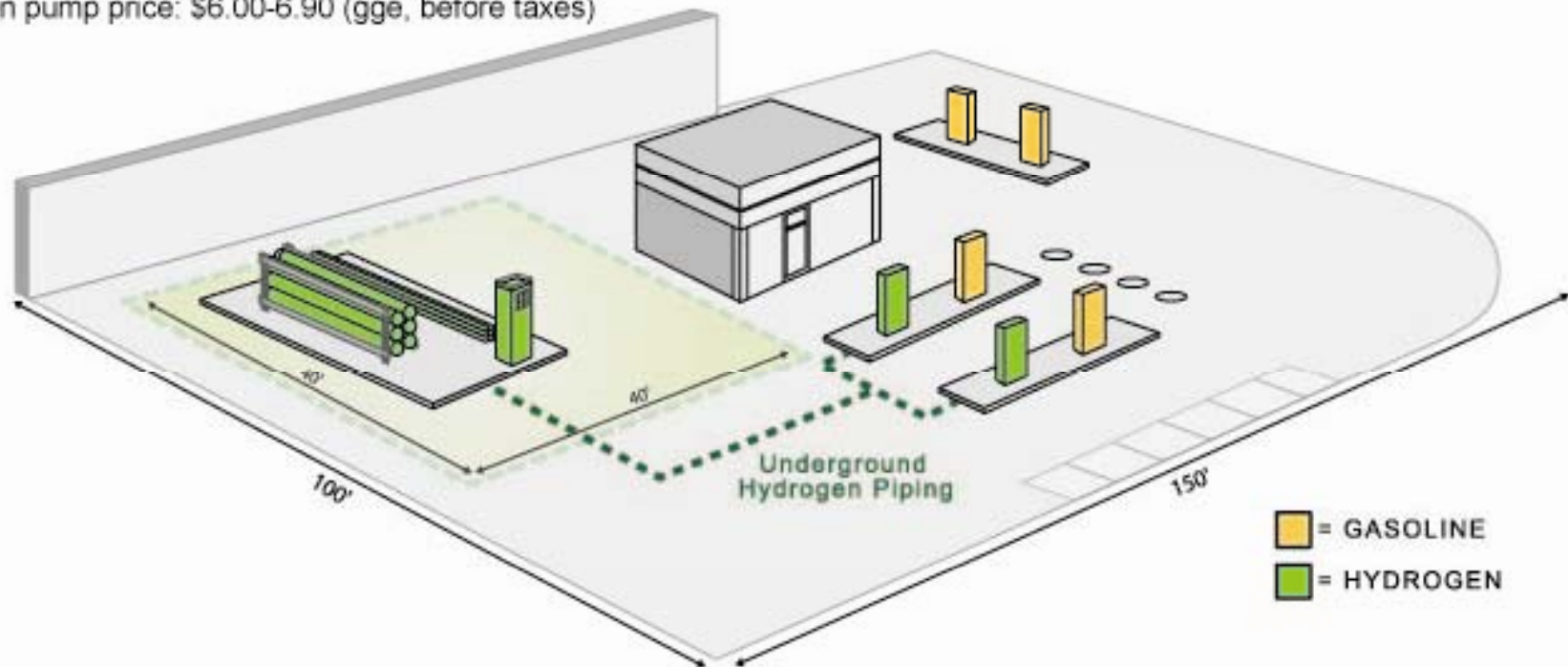
Filled tubes are delivered twice a day

Capital cost: \$3.7 million (equipment, site prep, installation)

Annual feedstock and O&M: \$940k

Annual anticipated revenue: \$1.45m

Hydrogen pump price: \$6.00-6.90 (gge, before taxes)



A dark, textured chalkboard serves as the background. On the left side, a silver whistle is hanging from a chain. The text is written in white on the right side of the board.

Lesson #4

We don't
understand
their business

Overall responses



- ▶ 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
- ▶ They think customers might choose gasoline over hydrogen if hydrogen costs too much
- ▶ Costs
 - Capital costs too high, IRR is too long, margins are not realistic

Lesson #5

We need to
understand their
pain



Quotes...



"The major automakers need to decide which technology they are backing. It doesn't make sense to jump in the water until then."

"Capital is hard to get. We need a quick payback because the market changes so fast."

"Stations have to continue to get bigger and better. We have to stay in front of the curve to compete."

"We need marketing and customer loyalty programs to counter the allure of the hyper marketers."

"We've heard these promises before with ethanol, methanol and CNG. You're asking us to invest again."

"Equipment upgrades and credit card fees are shrinking small operators."

IPHE Infrastructure Workshop

Workshop format



▶ Presentations

- Plenary presentations
 - US, Germany, Japan, Korea
- Business case scenarios - NREL
 - Five station configurations
- Focus group results

▶ Facilitated breakout sessions

- What actions, strategies, business models, or approaches should be implemented to motivate and enable hydrogen stations for near term FCVs?

Workshop topics



- ▶ Motivating business factors
- ▶ New business and technical approaches
- ▶ Policies, regulations, and incentives needed
- ▶ Opportunities for international collaboration

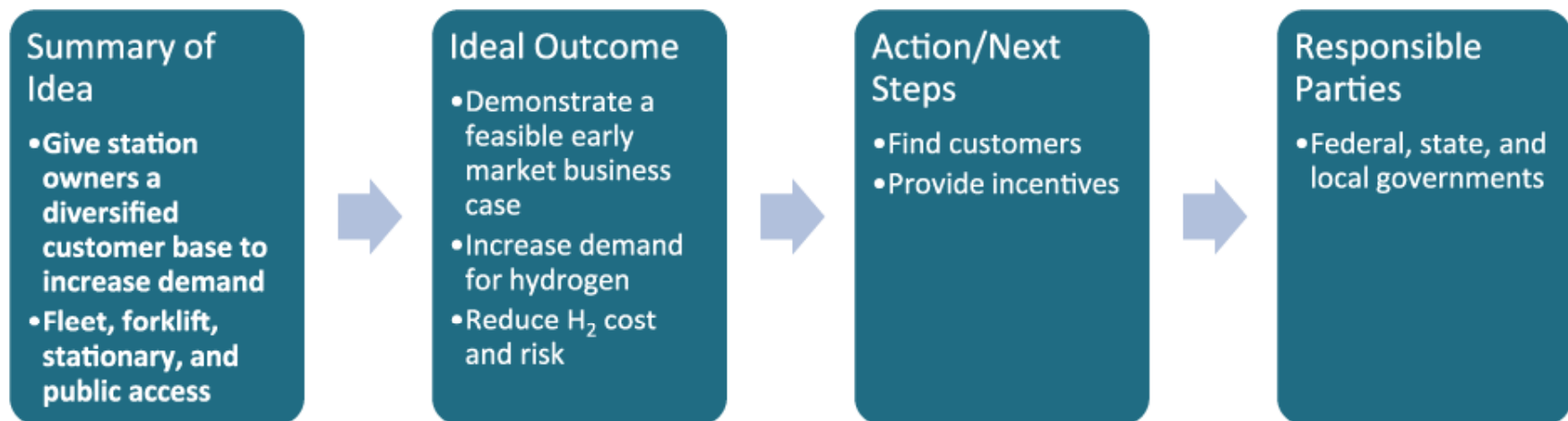
Workshop participants



- ▶ Energy companies
- ▶ Hydrogen equipment suppliers
- ▶ Auto companies
- ▶ Government agencies
- ▶ Non-profit organizations
- ▶ Academia
- ▶ Research & consulting



Example outcome



Ideas from workshop



▶ Starter stations

▶ Policies and incentives

- Tax incentives
- Gov't cost share
- Special financing
- Carbon tax

▶ Unbiased education and outreach

- Communities
- Media
- Public officials

▶ Other risk-reducing strategies

- Public/private partnerships
- Path to profitability
- Risk-sharing co-ops
- Vehicle commitments

▶ Increase demand

- Fleets
- Other applications
- Leverage CNG infrastructure
- Online marketplace

Ideas to SIGMA



- ▶ Starter stations
- ▶ Public/private partnerships
- ▶ Increase demand
 - e.g. fleets
- ▶ Leverage CNG infrastructure

This is the beginning of a conversation....

Acknowledgements





Thank you!

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