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# Hydrogen Station Requirements 2012

Robert Boyd - Boyd Hydrogen , LLC

The Hydrogen Cycle: fuel for electro-mobility

# BOYD Hydrogen

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|---|---|
| 2003-2004 | Developed Pacific Spirit Station for Ford, Fuel Cells Canada, Natural Resources Canada, NRC-IFCI and BOC |
| 2004-2005 | Developed City of Taylor fueling station for Ford, BP, BOC |
| 2004 to 2006 | Developed indoor fueling system to support FC fork lifts for BOC / Linde |
| 2002 to 2012 | Active support of developing codes and standards for H2 fueling at SAE, CGA, CSA, ICC, NFPA |

## The Hydrogen Cycle: fuel for electro-mobility

More info: Bob@BoydH2.com 925.330.6838 PO Box 2273 Orinda, CA 94563

# Top Priorities in 2012

* Need to build stations that are **installed and put into operation quickly**

* Stations must be publicly accessible : **public sale, no (or easy) user agreements.**

* Need stations that **dispense H70 with reasonable speed**: 1 to 2 kg per minute so that the consumer can experience 3 to 7 kg fills in about 5 minutes

* Consumers need lot of stations: options and places to fuel

# Station Capacity

| Station Size | Cars per day | Kg per day | Dispenser Revenue $1000 per year |
|---|---|---|---|
| Small | 5 to 10 | 25 to 50 | $37 to $140 |
| Medium | 10 to 30 | 50 to 150 | $140 to $400 |
| Large | 30 to 120 | 150 to 600 | $400 to $1,700 |

* Dispenser fills are average of 5 kg per fill
* Dispenser retail price of hydrogen : $10 per kg

# Fueling Performance

* 700 bar service pressure or H70 service is required: H30 is OK for buses and fork lifts, but fuel for 2015 FCVs is H70
* Dispenser must be capable of back to back fills with some flexibility on fueling time allowed for sequential fills and first fill of the day.
* Fast fueling requires cooling and use of a fueling protocol that meets intent of SAE J-2601.
* Alternative fueling protocols can be approved that meet requirements of CSA HVG-4.3

**Certify stations to CSA HGV-4.3 to validate compliance with the intent and performance requirements of SAE j2601**

# Dispenser Performance Certification
## retail sales and consumer protection

* to validate SAE j2601 compliance station operator must **certify station dispenser performance** to **CSA HGV-4.3**
* To certify the **dispenser meter accuracy** and allow for retail sales station operator must validate the dispenser accuracy using test vessels that meet **DMS and NIST** requirements.
* To **certify fuel quality** at the dispenser station operator must hire a third party test company to collect samples at the nozzle and analyze for compliance with **SAE J2719**

# Permitting Challenges

* NFPA-2 Hydrogen Technologies Code was just published in 2013 and has good (but not perfect) support for H2 vehicle fuelling. Target for good code: 2015
* ICC Model Fire and Building Codes are basis of CFC, CBC, and on a 3 year change cycle. Target for good code: 2015
* 2010 California Fire Code, Building and Mechanical codes are flawed with respect to support for H2 vehicle fuelling

**expect permitting challenges on each installation until about 2016 and require outreach to code officials (AHJ)**

# Renewable Hydrogen

* The use of renewable resources to manufacture hydrogen is a noble effort but adds unneeded cost to the early demonstration projects
* Large scale renewable hydrogen projects makes sense when the demand is large : 1 million cars = 1000 tons per day
* H2 produced from Natural Gas and water enable the FCV to operate at close to half the net (wells to wheels) GHG emissions of a comparable CNG vehicle
* Need to encourage renewable H2 production but not for small scale fueling projects where a renewable requirement is huge cost penalty
* It is unfair to burden H2 fueling project with a renewability requirement when CNG and BEV deployments have no equivalent

# Summary of key points for CEC 2012 Hydrogen Station workshop

* Need to build stations that are **installed and put into operation quickly**
* Stations must be publicly accessible : **public sale of hydrogen, easy (or no) user agreements.**
* **H70 fast fill** with dispenser certification for **CSA HVG-4.3 compliance**
* **expect permitting challenges** on each installation until about 2016 and plan for outreach to code officials (AHJ)
* Size of station may not be as important as **station performance** and **commitment of proponent** to deploy and operate station
* encourage renewable H2 generation, but **do not burden small fuel station projects with renewable requirements**