

Shell Hydrogen

Workshop on Facilitating Permitting of Hydrogen Fueling Stations

California Air Resources Board / DOE
Sacramento, CA

February 1, 2007

Presented by: Bradley Smith, Mgr Asset Dev. & Ops



Shell Hydrogen

Agenda

1. Shell Hydrogen US Permitting Activities
2. Demonstrating Safety
3. Challenges & Learnings

Washington DC

Permitted 2003 / 2+ Years Safe Operations

Retail Gasoline & Hydrogen - Industry First



Washington DC

Below-Grade Installation of LH2 Vessel - Industry First

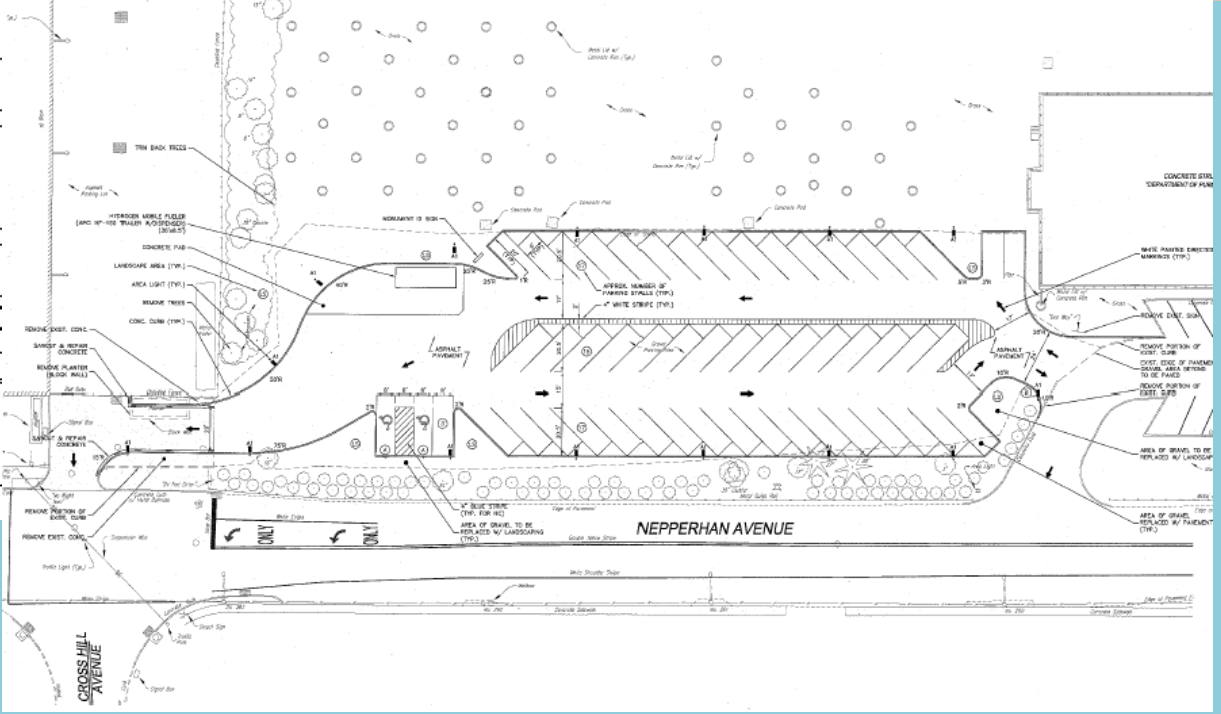
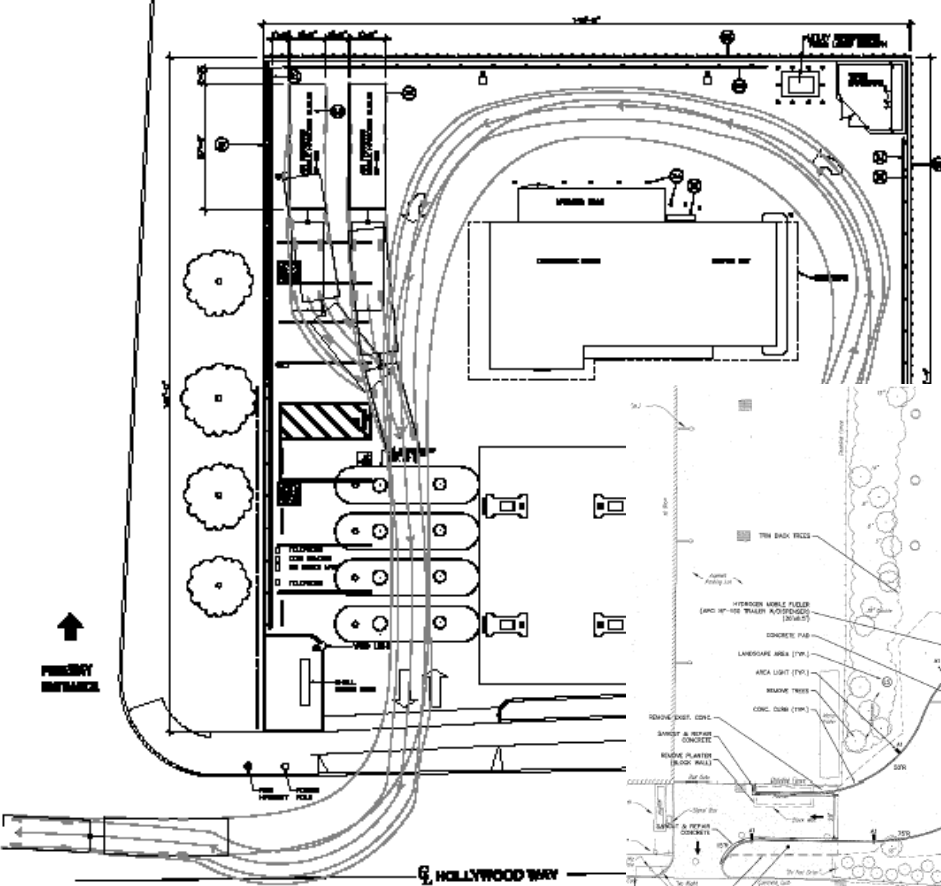


Los Angeles *Permitting in Process*

Electrolyzer System on Canopy – Industry First



California & New York Mobile Fueler Applications



Greenburgh, NY *In Planning Review*

Electrolyzer System @ Shell Gasoline Station



Permitting Challenges

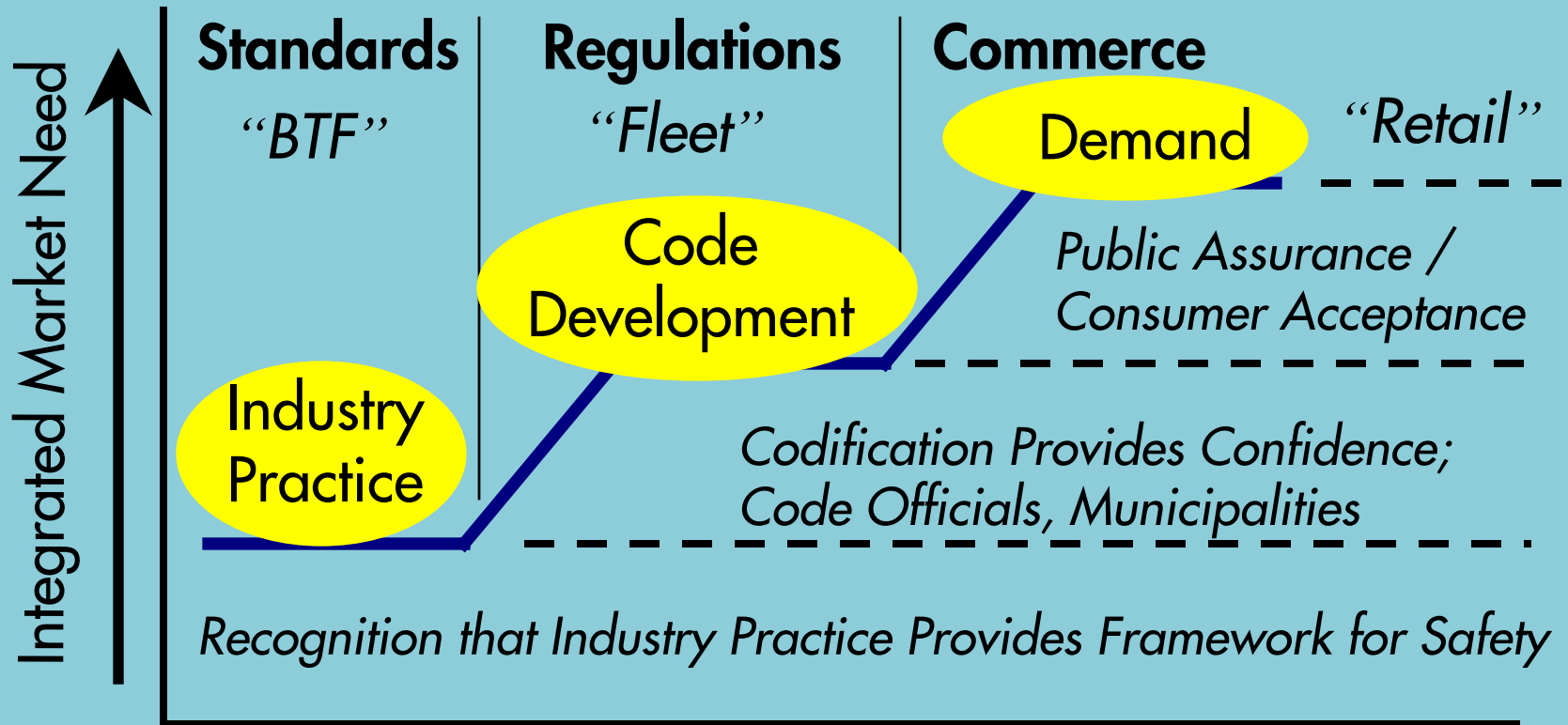
- Community / Public Assurance Concerns
- Regulator / AHJ Confidence Concerns
- Awareness & Education – all areas
- FCV Safety is Widely Accepted but HFS Safety is Not
- WIIFM (what's in it for me) is Hard to Overcome
- NIMBY ("Not in My Back Yard")
- Pace of New Code & Standard Adoptions
- Multiple "BTF" Non-Retail Stations Not Always Seen as Evidence of Safety to Enable Support of Retail Stations

Permitting Learnings

- Technical Reviews can Satisfy Technical Issues but Technical Reviews do not Satisfy Emotional Issues
- Pre-Permit Meetings with Local Fire Office are Key to:
 - 1) Confirm Codes & Standards to Apply,
 - 2) Confirm Engineering to Satisfy Code Intent if Current C&S do not Match Solutions Available
- Pre-Permit Meetings with Local Officials/Leaders to:
 - 1) Confirm Interest / Support / Obtain Advice
 - 2) Confirm Zoning Code Applicability for HFS
- Permit Process w/ Fire Officials:
 - 1) Regular Communications to Answer Questions,
 - 2) Provide HazOp & Technical Data

Demonstrating Safety

Getting to Retail



Continuous & Increasingly Visible Activity
Available---Affordable---Sustainable



www.shell.com/hydrogen