

DOCKET

09-ALT-1

DATE 9/29/2009

RECD. 9/30/2009

The Honda Clarity Program and Infrastructure Needs

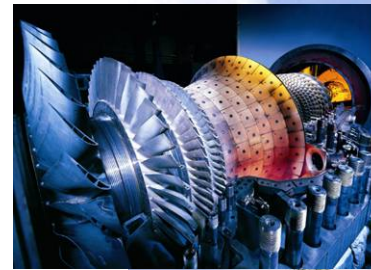
for CEC FY10-11 Investment Plan Research
September 29th, 2009, Sacramento, CA

Robert Bienenfeld
Sr. Manager, American Honda



Hydrogen FC is a great choice

- **Power Plant Efficiency**
 - Fuel Cells create electricity very efficiently
Greater efficiency than Natural Gas Combined Cycle power plant (used to make electricity)
- **Renewable fuel potential (solar, wind, etc.)**
- **Multiple pathways to make the fuel**
 - Methane Steam Reforming
 - Hydrolysis
 - Large and Small Scale potential
- **Zero Tailpipe Emissions**
- **Greenhouse Gas Reductions**
 - Large Short-term benefits
 - Near Zero long-term potential
- **Proven Safe Fuel**
 - Vehicles meet FMVSS

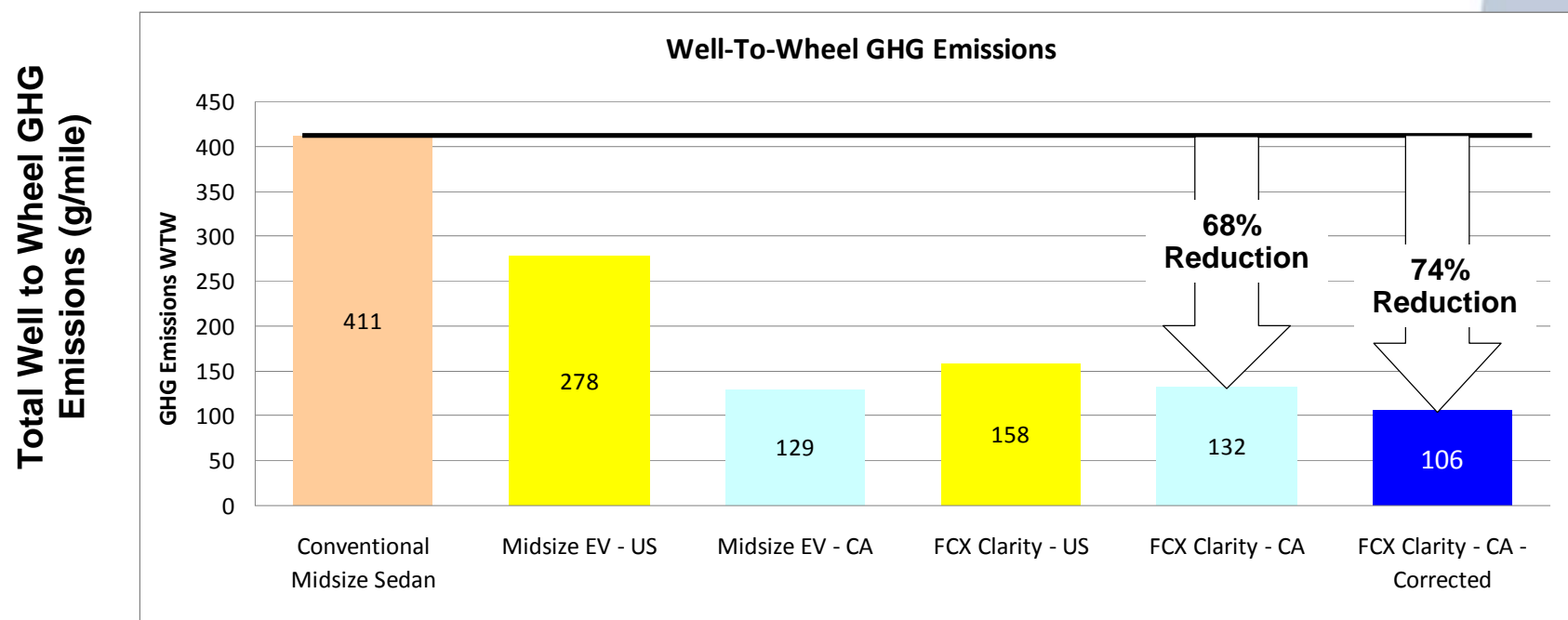


Natural Gas Combined Cycle Power Plant

Efficiency
Up

Well to Wheel Emissions for Midsize Sedan




- Midsize Fuel Cell Sedan can Significant GHG Reductions
 - 68% Using Natural Gas to produce Hydrogen
 - 74% Using Natural Gas and Renewables (33%) per SB1505



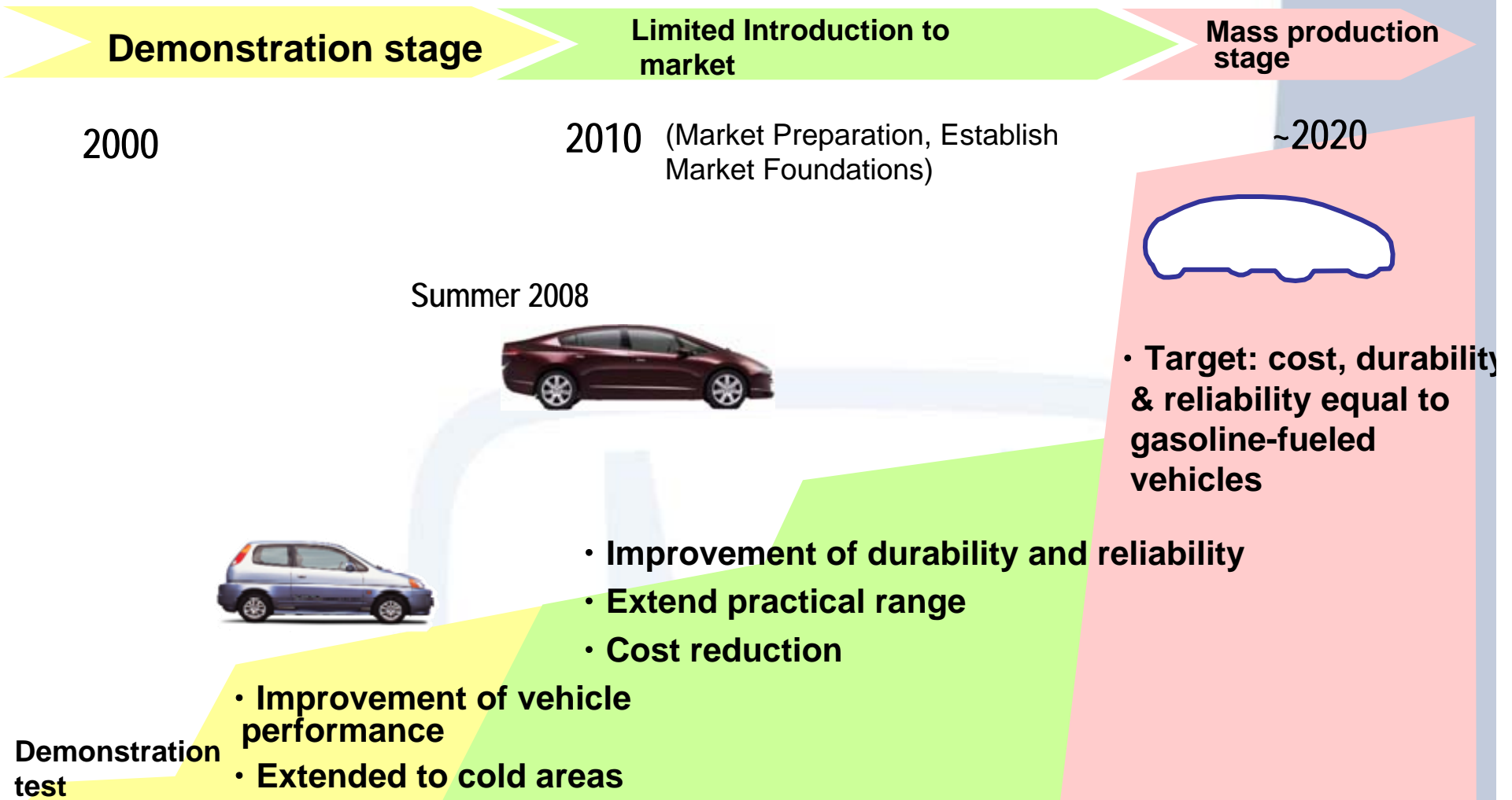
CA Grid @ 378g/kWh; EV includes 21.3% Renewable, 78.7% NG
FCX Clarity is corrected to assume 33% Renewable for Hydrogen per SB1505
Other GREET Modeling...

Smaller, More Compact, More Powerful Stack

Improvements In Seven Years:
4X in Power/Volume! 5X in Power/Weight!

Year stack technology announced	1999	2003 ('05 FCX)	2006 ('08 FCX Clarity)
Stack appearance			
Output	60 kW	86 kW	100 kW
Volume	134 L	66 L	52 L
Weight	202 kg	96 kg	67 kg
Electrolytic Membrane	Fluorine	Aromatic	Aromatic
Operating Temperature Range	0 - 80 °C	- 20 - 95 °C	- 30 - 95 °C
Stack Construction	Bolt-fastened construction	Panel box construction	1-box construction
Cell Structure	Machined carbon separators Separate seals	Stamped metal separators with unitized seals	Vertical flow cell structure Wave flow channel separators

Prospect of FCV Commercialization



Aim at mass production by progressive efforts

FCX Clarity



○ First Customers

- Delivered ten vehicles to customers
- First deliveries in July, 2008
- Selection process: geography, driving patterns, access to infrastructure

○ First Fuel Cell Vehicle Dealership Network

- Three Official Clarity/FCX dealerships: Santa Monica, Torrance, and Costa Mesa
- Clarity dealership responsibilities:
 - Sales, Service, Parts, Customer Relations



○ Fuel Cell Production

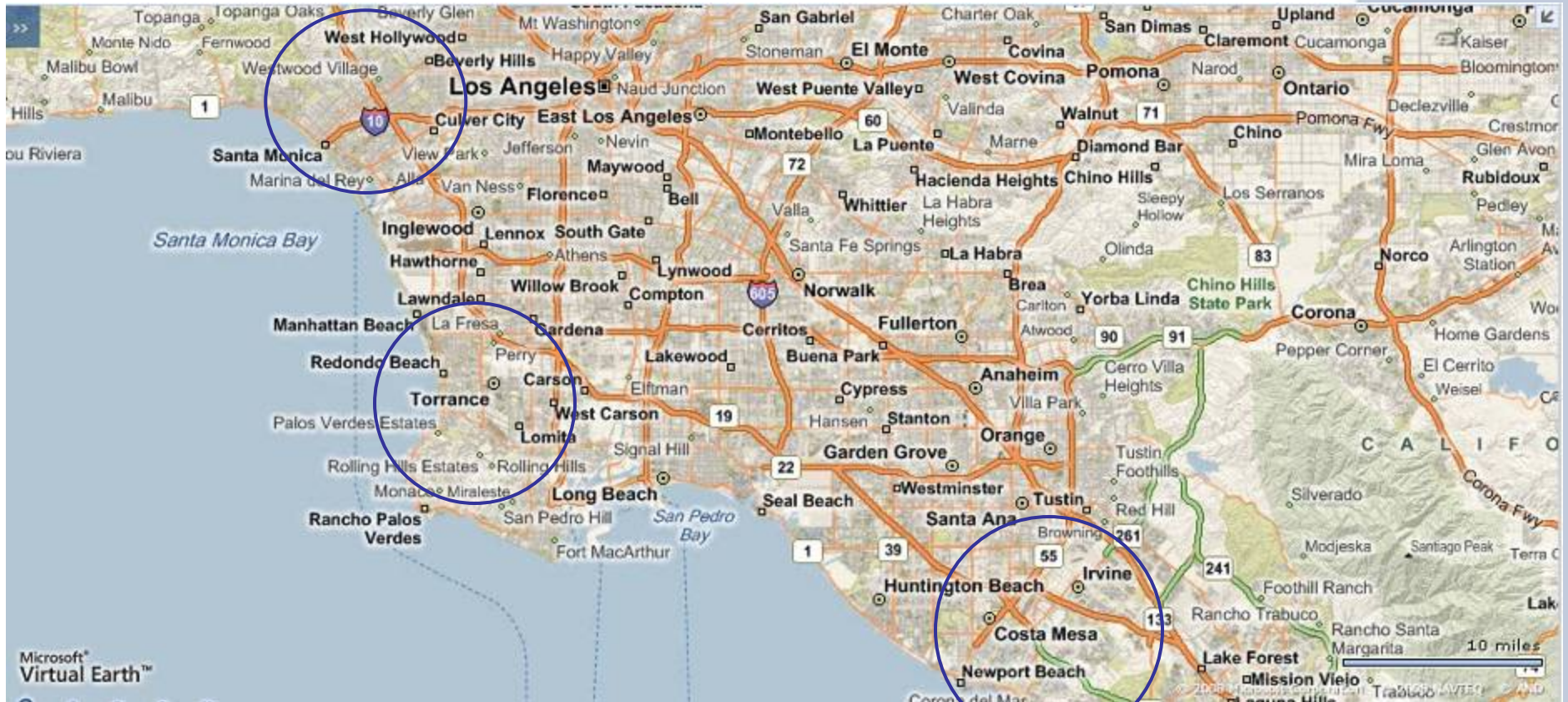
- Dedicated FC Production: Exclusive Clarity factory
- Dedicated FC stack production, with Honda-unique manufacturing equipment



Dealership Delivery – Market Advancement



LA Markets with the highest H_2 / Clarity Interest



Shifting the Infrastructure Paradigm

Chasing H₂ Infrastructure

Station Technology (DOE)

Early Fleet Research (AQMD)

University Effort (UCI/UCD)

Marketing

- Target Customers
 - Demographics
 - Mind-Set
 - Station proximity

Market Driven

Market-Driven Fundamentals:

- Building Hydrogen Communities
- Target Customers
 - Demographics
 - Mind-Set
 - Emotional Appeal
- Sustainable Markets
 - “Neighbors tell neighbors”

“Market Driven” Infrastructure

- **Begin with Markets**

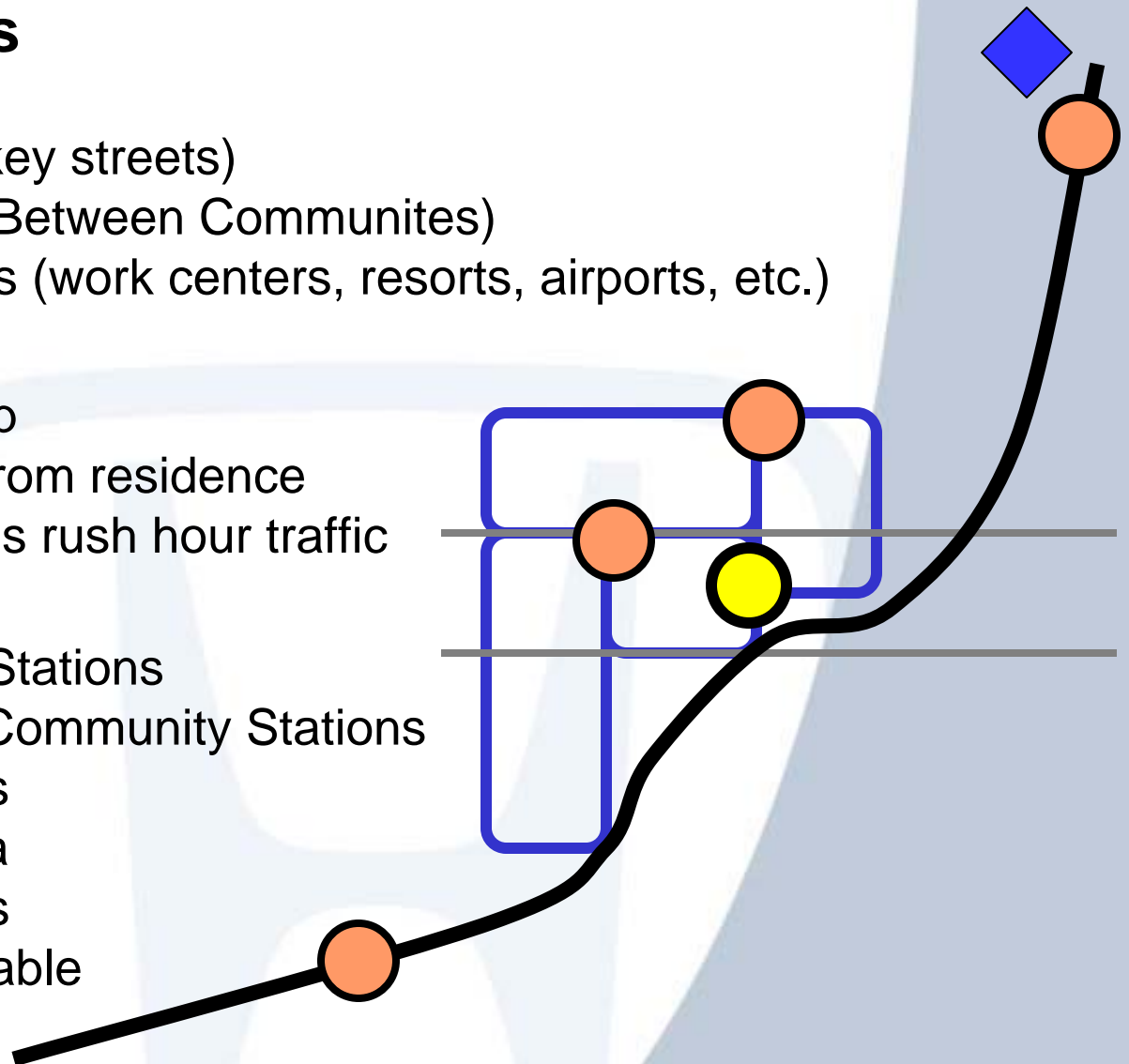
- Identify Communities
- Consider Corridors (key streets)
- Consider Highways (Between Communities)
- Consider Destinations (work centers, resorts, airports, etc.)

- **“Cluster Concept”**

- Redundancy / Backup
- Primary - 5 minutes from residence
- Backup - ≤ 15 minutes rush hour traffic

- **Consider Stations**

- “Marquee” or Image Stations
- Smaller Convenient Community Stations
- Destinations & Nodes
- Mix of 35 and 70 mpa
- Diverse Technologies
- Diverse Sizes, Scaleable



Fuel Cell Policy Issues

Fuel Cells are under attack:

- DOE proposed funding cuts to their Hydrogen program
- Auto Industry facing financial trouble
- CA Budget: CEC Funding for hydrogen
- Result: Infrastructure progress has been slower than anticipated

Why Fuel Cells have been attacked?

- EV advocates
- “Technology du Jour”
- Zero sum game / Resources

Growing recognition:

- 80 in 20 Goal
- Portfolio Approach
- Diversification (too much risk)
- Real progress with fuel cells
 - Milestones met!

Continuous, long-term support is crucial to the successful deployment of fuel cell vehicles.

Honda's Fuel Cell Program Support

- Honda, with industry, pushing to restore DOE funding
 - Meetings with Congress
 - Meetings with White House
 - Meetings with DOE
 - This seems to be bearing fruit. We expect funding to be restored.
- Full commitment to continue the program
 - Clarity is functioning well
 - Program is going well
 - “Surpassing Expectations”
- Slowing down volumes to match:
 - Infrastructure deployment uncertainties (see following page)
 - Global economic realities
 - Other challenges

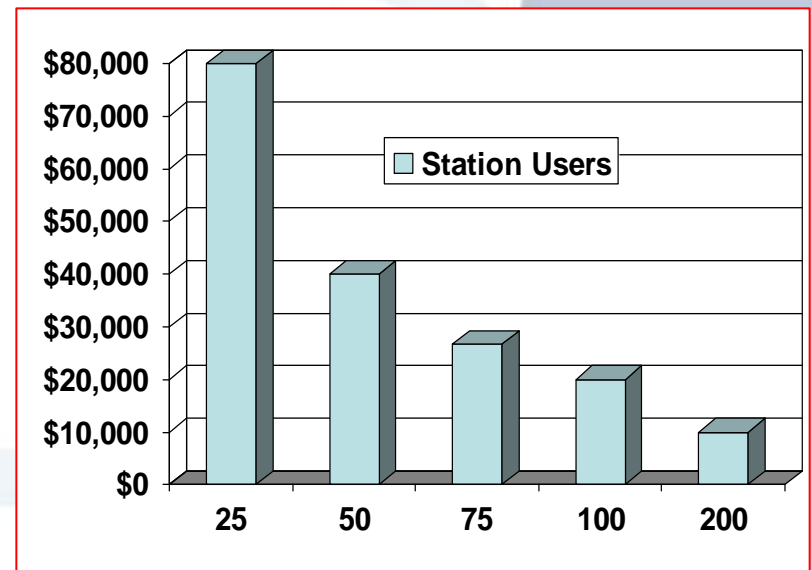
Infrastructure Issues Challenges

- No industry standard for station capacity
- Long delays between contract award and station opening
 - CEC's aggressive action to open stations could take? 1 ~ 2 years?
- Station "opening" often includes production ramp-up issues
 - First fill at the press conference does not mean "open for routine business"
- Station Partnerships lack leadership & commitment:
 - Weak/Uncertain**
 - Retailer
 - Distributor
 - Energy Partner
 - Strong**
 - Equipment Providers
 - Public Funders/Investors
 - OEMs

Commitment of these parties is highly variable, lacks leadership

A Proposal for Infrastructure Development

- Investor's & OEMs need
 - Greater certainty
 - Reduced risk of stranded investments
- Moving Forward:
 - OEM's identify target market areas:
 - 25+ customers per location (collaborate through CaFCP)
 - Very specific station locations
 - Timeframe for deployment (e.g. 18+ months)
 - Infrastructure investors:
 - Target OEM locations
 - Investment/incentive declines as customers increase
 - Risk of station disuse is lowered
 - Incentive goes to Infra instead of OEM or Consumer directly



HONDA

The Power of Dreams

