Honda's View on H_2 Infrastructure Needs

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For Input to CEC AB118 Investment Plan

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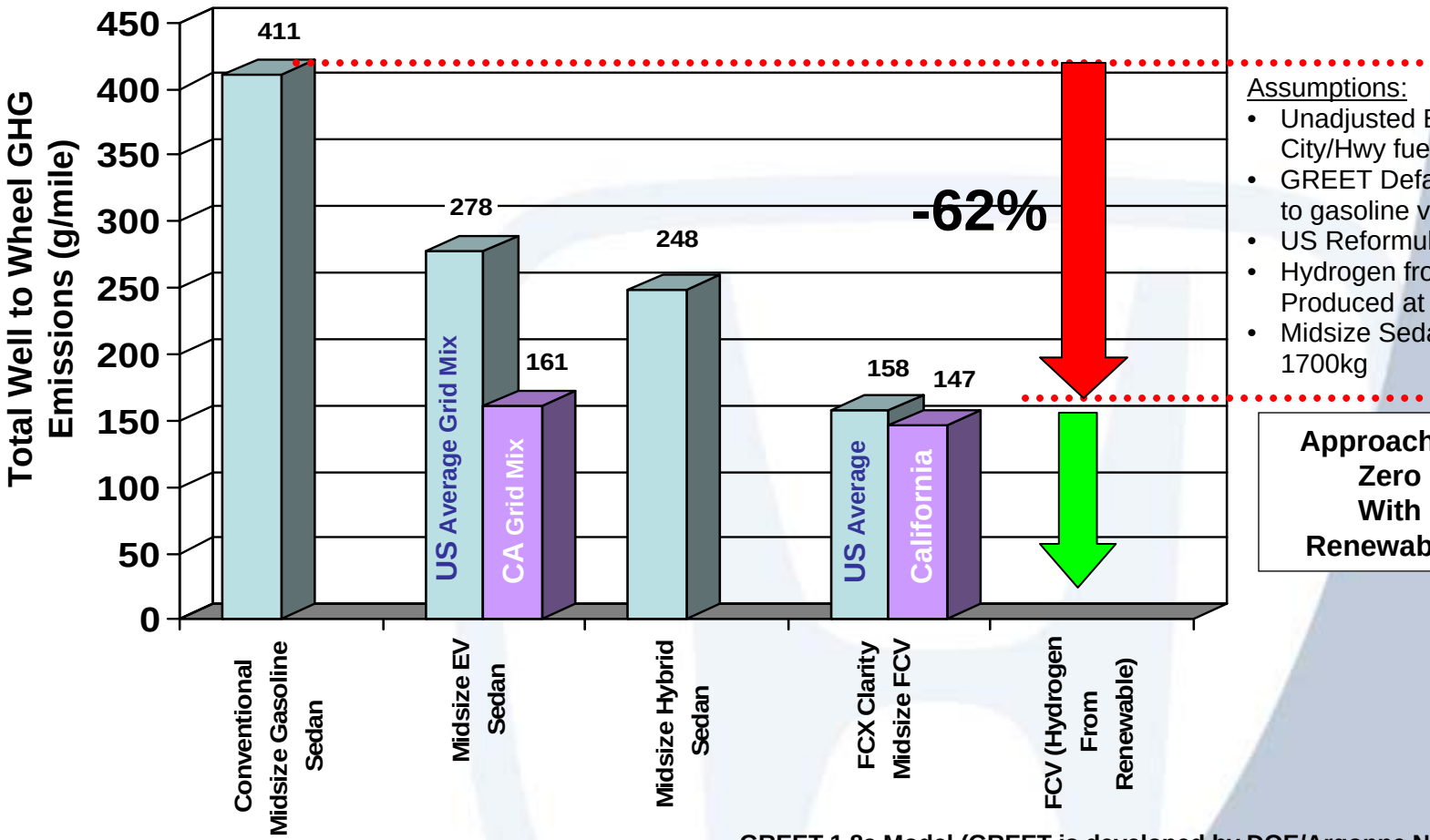
FCX Clarity

- **First Customers**
  - First deliveries in July, 2008 (five to-date)
  - Customers include: H.S. Principal, D.A., Actress, etc.
  - 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

Well to Wheel Emissions for Midsize Sedan

- Midsize Fuel Cell Sedan can achieve over 60% reduction in CO_2 using Natural Gas to produce Hydrogen
- 40% less CO_2 than BEV Sedan on U.S. Avg. Grid Mix



Assumptions:

- Unadjusted EPA Combined City/Hwy fuel economy
- GREET Defaults for EV (3.5 EER to gasoline vehicle
- US Reformulated Gasoline used
- Hydrogen from Natural Gas Produced at Station Site
- Midsize Sedans ~1600kg to 1700kg

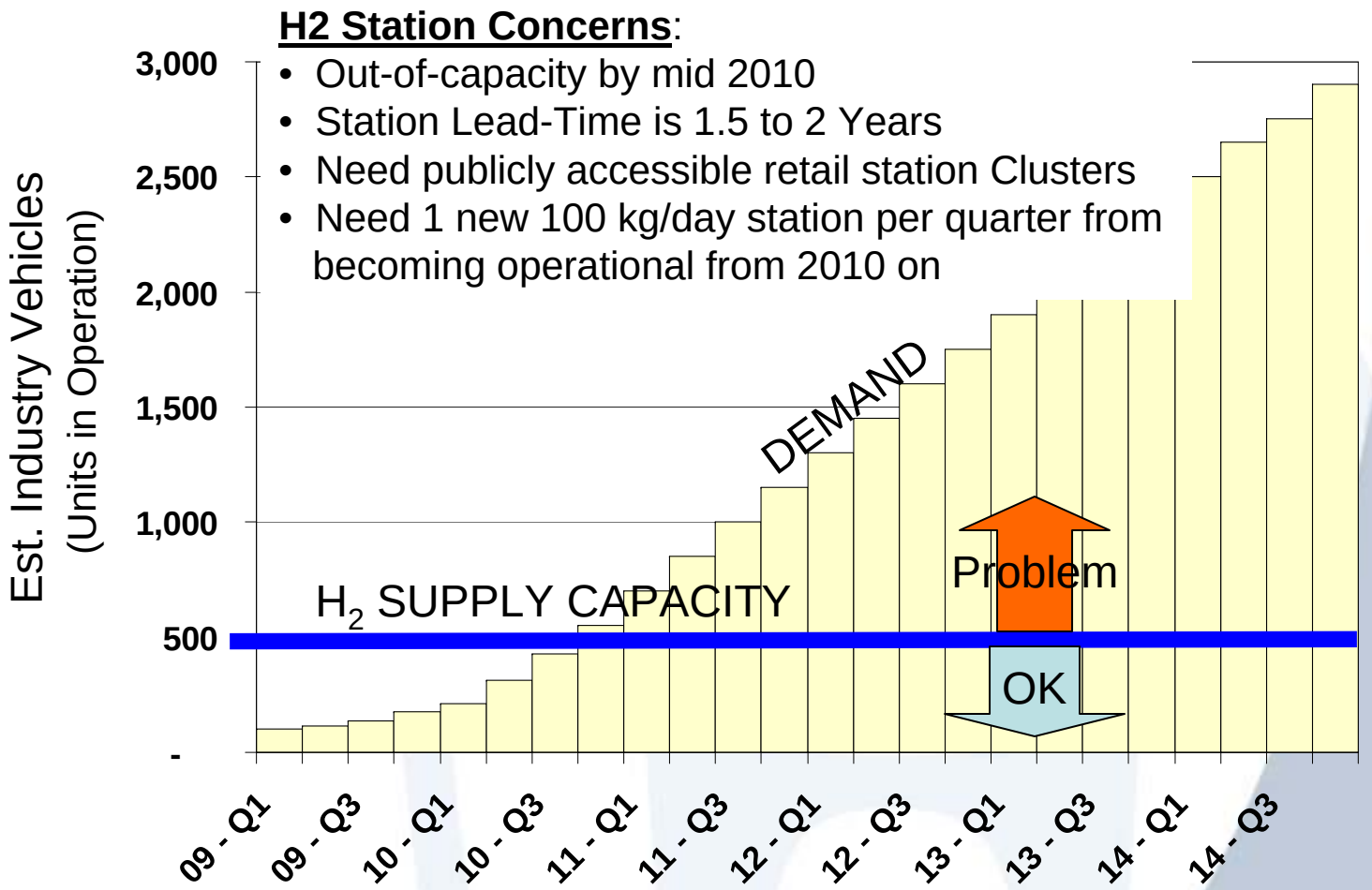
Approaching Zero With Renewables

GREET 1.8a Model (GREET is developed by DOE/Argonne National Lab/U.Chicago)

FC Vehicle – Estimated Industry Volumes

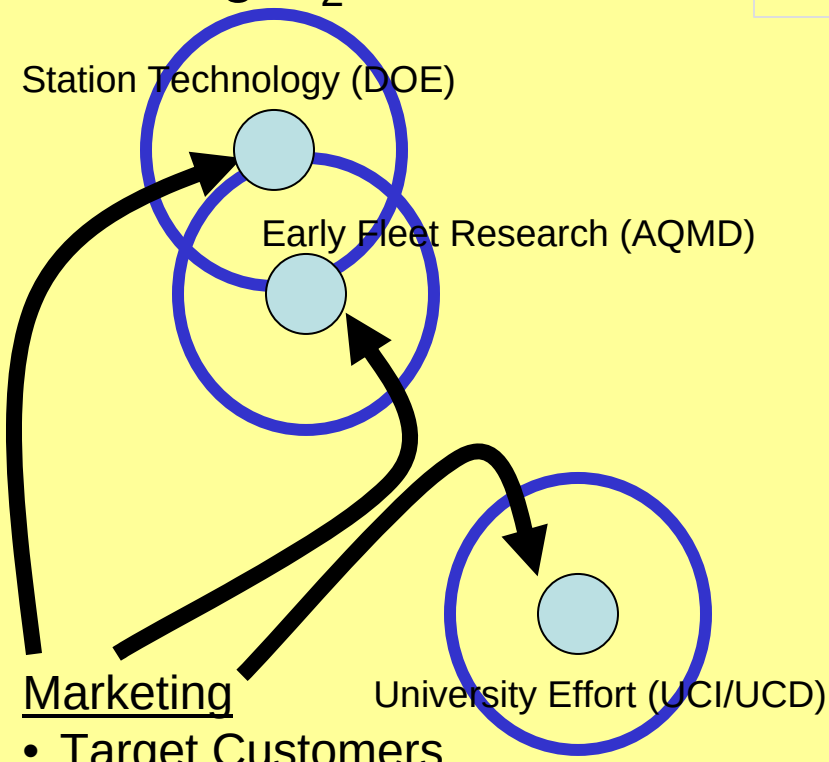
Calendar Year	New Vehicles	Units in Operation
2009	Hundred	Hundreds
2010	Hundreds	Hundreds
2011	Hundreds	Hundreds
2012	Hundreds	Thousands
2013	Hundreds	Thousands
2014	Thousand	Thousands
2015+	Thousands	Thousands

LA Basin H_2 Station Capacity vs Demand



Shifting the Infrastructure Paradigm

Chasing H_2 Infrastructure



<u>Marketing</u>

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

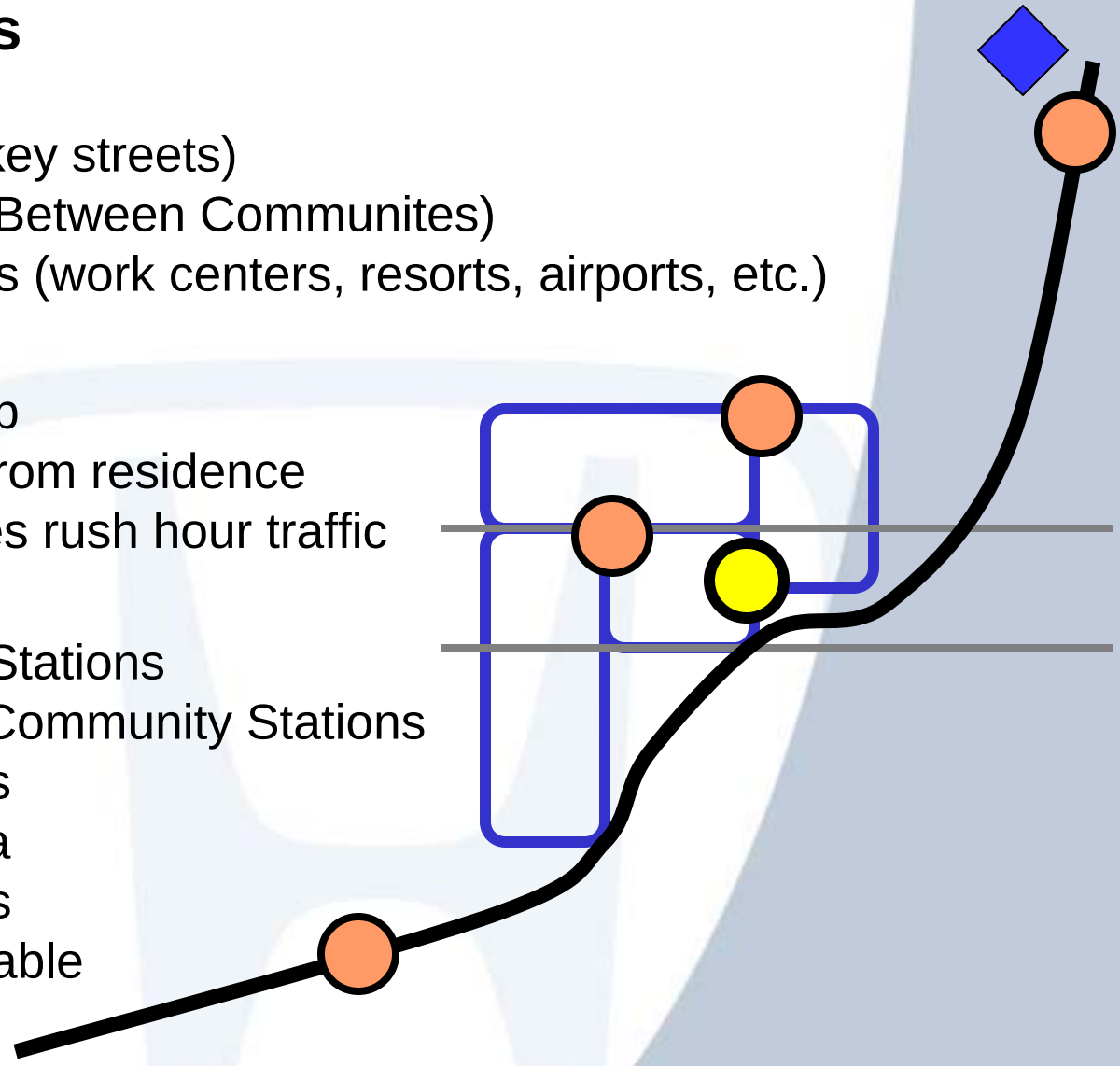
Market Driven

<u>Market-Driven Fundamentals:</u>

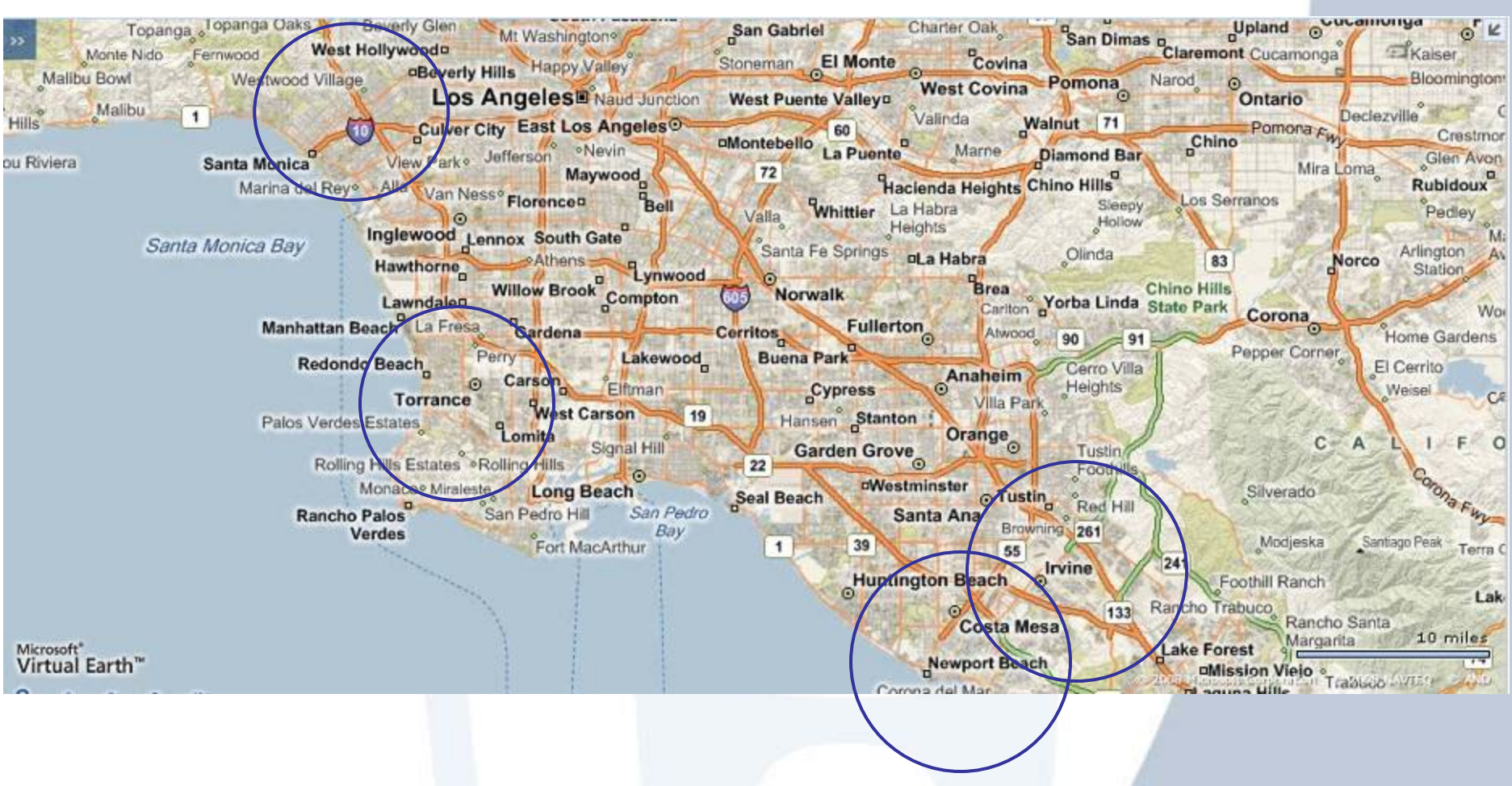
- Building Hydrogen Communities
- Target Customers
  - Demographics
  - Mind-Set
  - Emotional Appeal
- Sustainable Markets
  - “Neighbors tell neighbors”

“Market Driven” Infrastructure

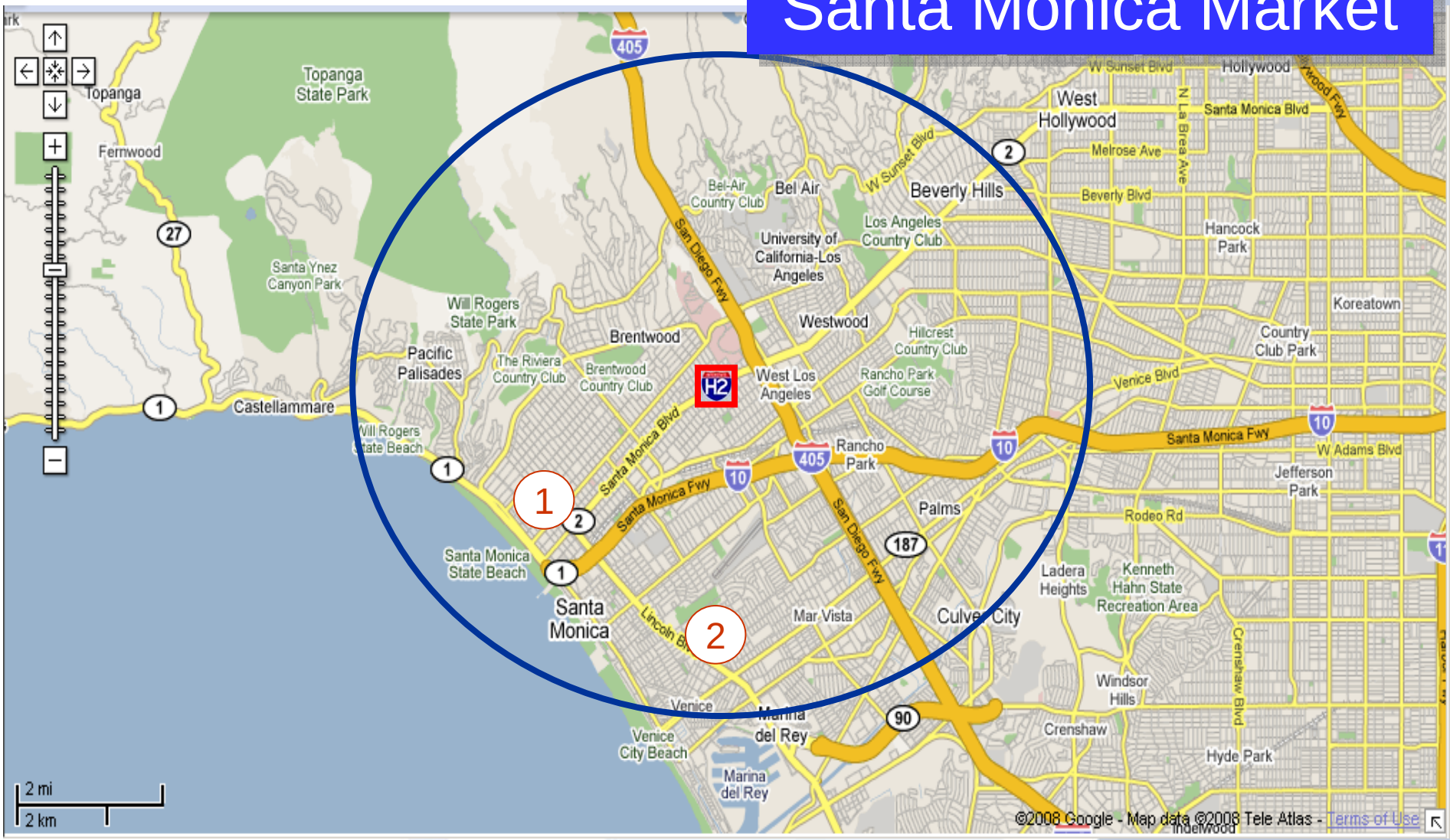
- **Begin with Markets**
  - Identify Communities
  - Consider Corridors (key streets)
  - Consider Highways (Between Communites)
  - Consider Destinations (work centers, resorts, airports, etc.)
- **“Cluster Concept”**
  - Redundancy / Backup
  - Primary - 5 minutes from residence
  - Backup - ≤ 15 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



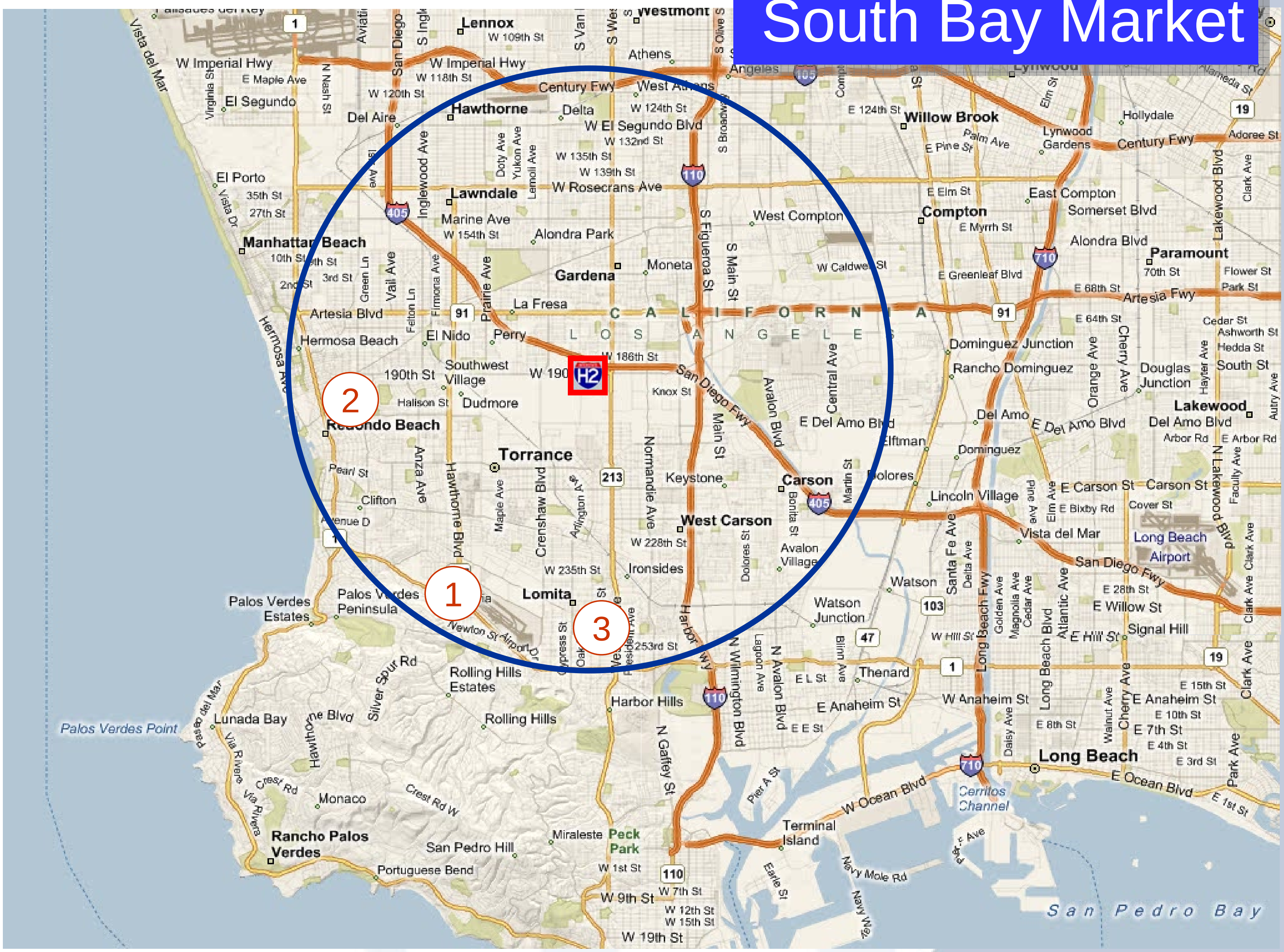
LA Markets with the highest H_2 / Clarity Interest



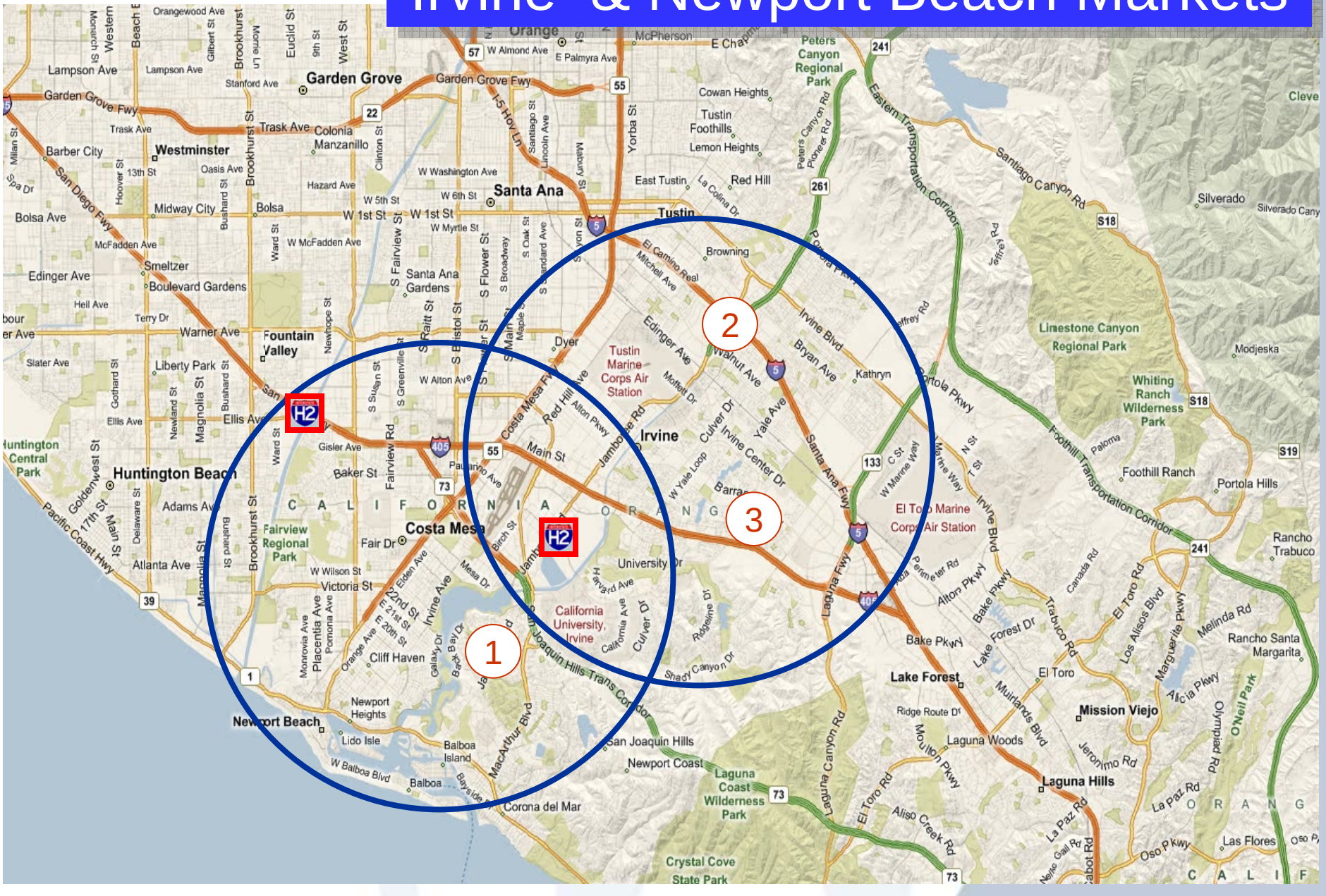
Santa Monica Market



South Bay Market



Irvine & Newport Beach Markets



H_2 Station Infrastructure Funding Needs

<u>H2 Station Funding Needs</u>:

- 1 new 100 kg/day station coming on-line per quarter beginning from mid-2010
- Stations need to be clustered in early "Hydrogen Communities" where demand is expected
- Stations need to be "Retail Oriented"
  - Good ingress, egress
  - Well Lit, Clean, visibility from the street
  - On Well-traveled Streets
- "Semi-Permanent" Stations are OK if:
  - "Mobility" is hidden
  - Separate Pump and Dispenser that is permanent is OK

HONDA

The Power of Dreams