

Project Driveway – HTAC Review



Fuel cell technology shifts into the next gear with Project Driveway. This is no concept car. It's a Chevrolet Equinox. It runs quick and quiet on hydrogen fuel, with zero harmful emissions. Starting in late 2007 and running through 2010, we're loaning out more than 1,000 vehicles for an average of three months in the world's first large-scale market test, Project Driveway. People in Los Angeles,

New York City and Washington, D.C., as well as in select Asian and European markets, will drive them, fuel them and wash them like any other SUV. But it's not just any SUV. It's an exciting glimpse at what could be the future of transportation. And for GM, it's real-world data and feedback that we'd never get at the proving grounds alone – information that will accelerate our drive to reinvent the automobile.



PUTTING THE FUTURE IN DRIVE(WAYS).



Don and Jackie Lee
Project Driveway participants
Barbark, California



Source: GM 2007 Annual Report

Project Driveway Field Service & Support (FSS)



February 12, 2008 update

FSS Facility: Ardsley, NY



- Fully operational for 30 vehicles
- 6 Bays, Office Space, Reception, Refueling Capability



New FSS Facility: Fort Belvoir, Virginia - WDC



- Fully Operational for 6-10 vehicles
- 4 bays, office space and refueling capability



FSS Facility: Burbank, CA



- 7 Bays, Offices, Parts Warehouse
- Refueling reception 60+ vehicles



FSS Facility: Lake Forrest, CA

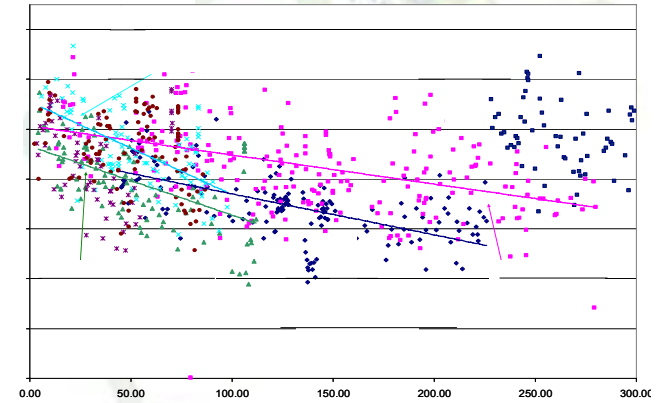
- Fully operational – space retention under negotiation
- 2 bays, office space and refueling capability
- 3-5 vehicles in area



HF, MK and Global Root Cause Team



Root Cause and QRD Trends



Diagnostics DTC
GMU Training
Owners Manual
OnStar
Dealerships
FSDMS – PDMA - PRTS

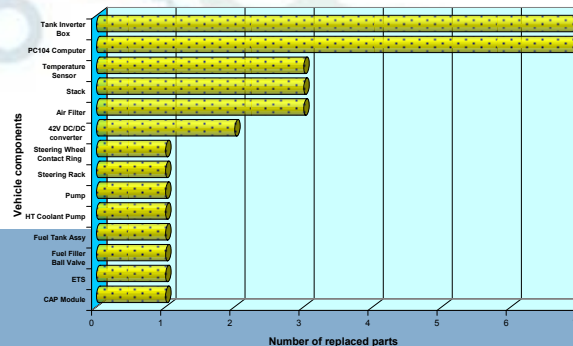
Monroe County
Vehicle Deployment



All Season
Data Acquisition

DoE Reporting

Q1 2006 - Maintenance Pareto by Part



Daily Vehicle Retrofit and Field Status

	Program	NY	CA	DC	MPG	MK	DPG	KAP	HF
Total	68	6	15	5	1	0	2	2	1
X	13	2	2	2	5	1	0	0	1
▲	19	1	1	1	15	1	0	0	0
●	36	3	12	2	7	8	2	2	0



First Responder Training

Over 1500
Trained in
3 Cities

Info available
On Web Site
Placards



Deployment Status

- First Mainstream - Ben and Jerry Lee
- First Business to Business – Disney
- First University - UCI



WDC and NYC First Mainstream Drivers



Support Celebrity and PR Events

- Fergie, Jonas Brothers, Oscars, Super Bowl, Chevy Rocks the Future, Herbie Hancock, Jay Leno, others



Project Driveway Partners

Business-to-Business



The **WALT DISNEY** Company



Federal



State



Local



Global Refueling

The background features a collection of stylized molecular structures. These structures are composed of circles of varying sizes connected by lines, representing atoms and bonds. The colors range from light blue to light green. One structure in the upper right quadrant is labeled with the chemical formula H_2 .

Chevrolet Equinox Fuel Cell Refueling Plant - US

Fourteen 700 Bar Refueling Sites with Expected Opening

Additional 5 main 350 bar sites (AQMD Burbank, Pendelton, Santa Monica, BP LAX, West Point)

California

	<u>Status</u>	<u>Pred Date</u>	<u>Fill Time</u>	<u>Att</u>
• University of CA at Irvine	Complete		7 min	N
• Lake Forest	Hardware at Burbank	March 15	30 min	Y
• Burbank (GM facility)	Temp Complete - Perm Install	May 1	15 min	Y
• Burbank (2nd location)	Seeking location	3Q08	5 min	?
• LAX Airport	Seeking location	3Q08	5 min	?
• Shell West LA	Construction – Permitting	June 1	5 min	?

New York

• Ardley (GM facility)	Temp Complete - Perm Install	March 15	5 min	Y
• Honeoye Falls (GM Facility)	Temp 350 – Temp 700	April 1	30 min	Y
• Shell White Plains	Complete	Feb 15	7 min	N
• Shell Bronx	Construction - Permitting	May 31	5 min	?
• Shell JFK Airport	Construction – Permitting	June 1	15 min	Y
• Rochester (Airport)	Construction – Permitting	May 1	30 min	Y

Washington, DC

• Fort Belvoir, VA (Military)	Temp Complete - Perm Install	Feb 19	15 min	Y
• Shell Benning Road, WDC	Construction – Permitting	March 15	8 min	N

6 Stations on line to date

2 more by Mid March

2 more in Mid May

Burbank #2 and LAX in process

10 Modular stations provided/sited by GM for NY and CA

Refueling Site Images



UCI – Irvine CA



UCI – Irvine CA



AQMD – Burbank CA



Ardsley - NY



HF Temp NY

Benning Road - WDC



Burbank - CA



Shell WP - NY



Plan to gain access and certify 30 current & planned 350 Bar stations

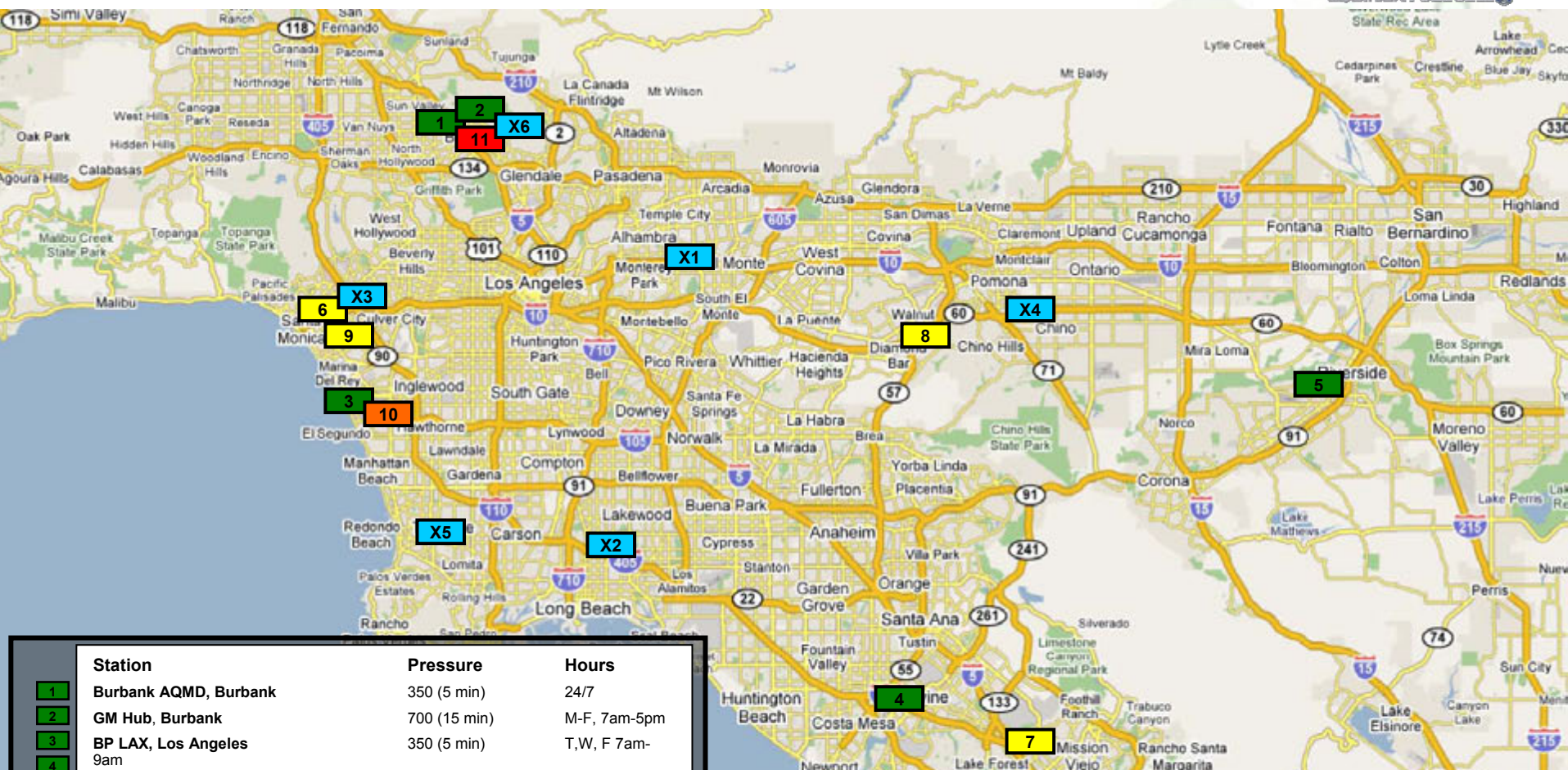
<u>Site</u>	<u>Site Operator</u>	<u>Address</u>	<u>Priority</u>	<u>Supplier</u>
Rosemead	Chevron	CA	1	Chevron - UTC Power
Long Beach	APCI	CA	2	APCI
Chino	Chevron	CA	3	Chevron - UTC Power
Santa Monica	City of Santa Monica	CA	4	APCI
EPA - Ann Arbor	EPA	MI	5	APCI
City of Chula Vista	City of Chula Vista	CA	6	Stuart Energy
UC Davis	UC Davis	CA	7	APCI
PG&E San Francisco	PG&E	CA	8	APCI
Sunline	Sunline Transit	CA	9	Hydrogenics
Ontario	City of Ontario	CA	10	APCI
Santa Ana	City of Santa Ana	CA	11	APCI
AC Transit Oakland	Chevron	CA	12	Chevron - UTC Power
Santa Clara Valley	Santa Clara VTA	CA	13	APCI
Taylor	BP	MI	14	
Energy Park Southfield	BP	MI	15	Stuart Energy
Selfridge Air National Guard	Chevron	MI	16	
Las Vegas	City of Las Vegas	NV	17	APCI
Orlando	Chevron	FL	18	
Arizona Public Service	Arizona Public Service	AZ	19	Proton
<i>Austin Texas</i>	<i>University of Texas</i>	<i>TX</i>	<i>20</i>	<i>GTI</i>
<i>Camp Pendleton</i>	<i>Dept of Defense</i>	<i>CA</i>	<i>21</i>	<i>Ztek</i>
<i>Burbank (BP Upgrade)</i>	<i>BP</i>	<i>CA</i>	<i>22</i>	
<i>Torrance</i>	<i>Shell</i>	<i>CA</i>	<i>23</i>	<i>APCI</i>
<i>San Carlos</i>	<i>PG&E</i>	<i>CA</i>	<i>24</i>	<i>Ztek</i>
<i>Sacramento Municipal</i>	<i>BP</i>	<i>CA</i>	<i>25</i>	<i>APCI</i>
<i>Next Energy</i>	<i>BP</i>	<i>CA</i>	<i>26</i>	<i>APCI</i>
<i>CSULA</i>	<i>CSULA</i>	<i>CA</i>	<i>27</i>	
<i>Town of Hempstead, NY</i>		<i>NY</i>	<i>28</i>	
<i>Vogelbilt</i>		<i>NY</i>	<i>29</i>	
<i>Albany Airport</i>		<i>NY</i>	<i>30</i>	



Project Driveway Hydrogen Fueling Locations (Additional) Metropolitan Los Angeles



SPRINT FUEL CELL



Station	Pressure	Hours
1 Burbank AQMD, Burbank	350 (5 min)	24/7
2 GM Hub, Burbank	700 (15 min)	M-F, 7am-5pm
3 BP LAX, Los Angeles	350 (5 min)	T,W, F 7am-9am
4 UC Irvine, Irvine	700 (7 min)	24/7
6 Riverside AQMD, Riverside	350 (5 min)	24/7
7 Shell Santa Monica Blvd, Los Angeles	350 (5 min)	24/7 (tbd)
8 GM Hub, Lake Forest	700 (30 min)	Call Ahead (tbd)
9 Shell Culver City (LAX) to be announced	700 (5 min)	24/7
10		
11		

	Additional 350bar Stations (Operating)	Pressure	RISK –
X1	Rosemead Chevron	350 (5 min)	Negotiating Access
X2	Long Beach Air Products Safety)	350 (7 min)	Negotiating Access (Mobile Fueler
X3	Santa Monica AQMD	350 (5 min)	Negotiating Access (Fleet Yard Property)
X4	Chino Chevron	350 (5 min)	Negotiating Access (Hyundai Property)
X5	Planned (non-GM) 700bar Stations	Pressure	RISK – “NO FIRM PLANS”
X6	Shell/CHIP Torrance	700bar (5-10 min)	Planned for 2+ years / Toyota Property



Project Driveway Hydrogen Fueling Locations (April-May)

Metropolitan New York City



CLIMATE FUEL CELL

Station	Pressure	Hours	Notes	Risk
GM Hub, Ardsley	700 (5 min)	M-F, 7am-5pm	Attendant	
Shell White Plains	350/700 (8 min)	M-F 6am-6pm	Self-serve*	
Shell Bronx, 1635 E. 233 rd Street, Bronx	700 (5 min)	24/7	Self-serve*	Permitting
Shell JFK Airport	700 (20 min)	24/7	Self-serve*	Equipment availability

* Common Training / Site Specific Walk-through necessary for public access

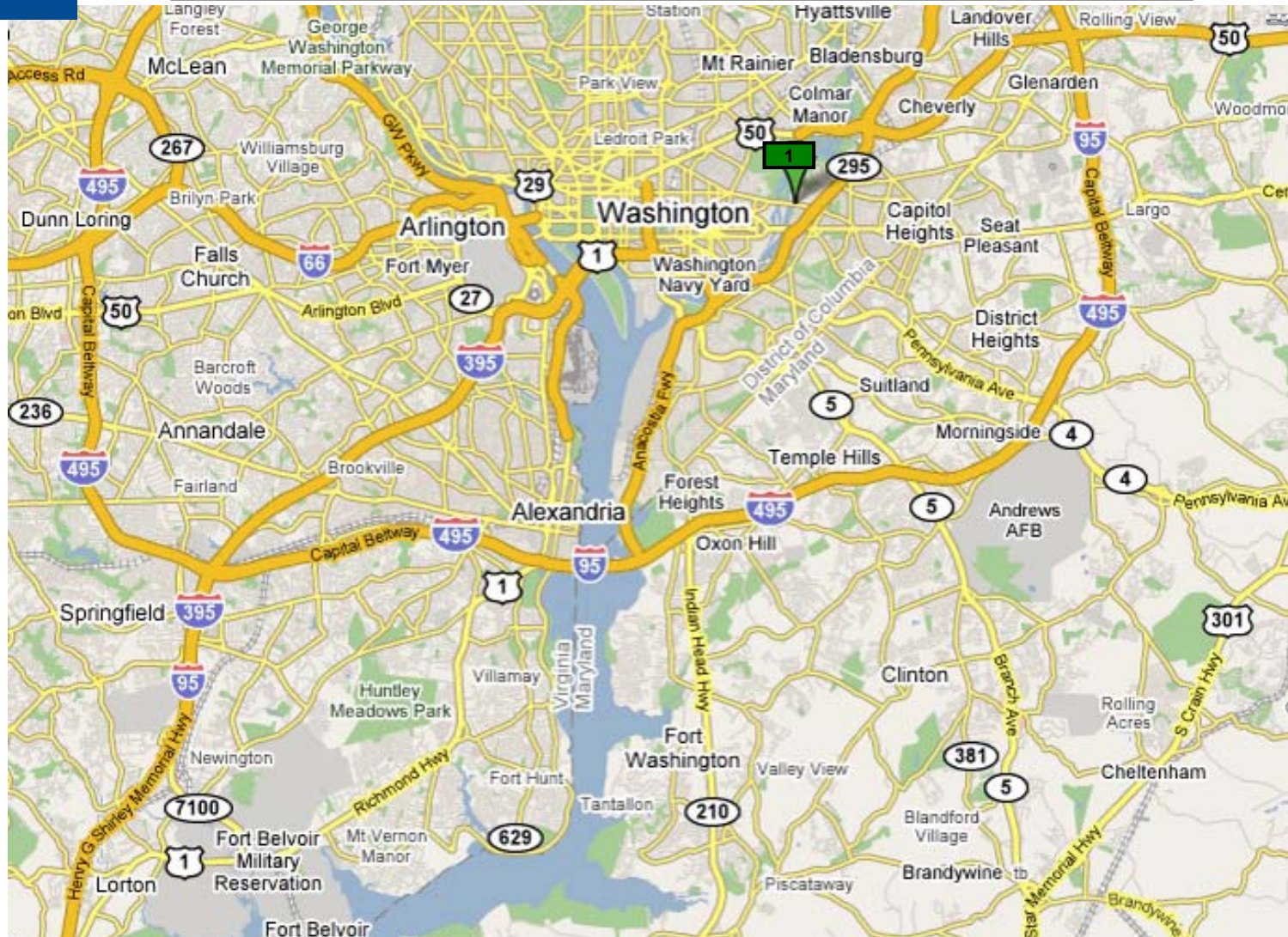


Project Driveway Hydrogen Fueling Locations (April-May)

Metropolitan Washington D.C.



SPRING FUEL CELL

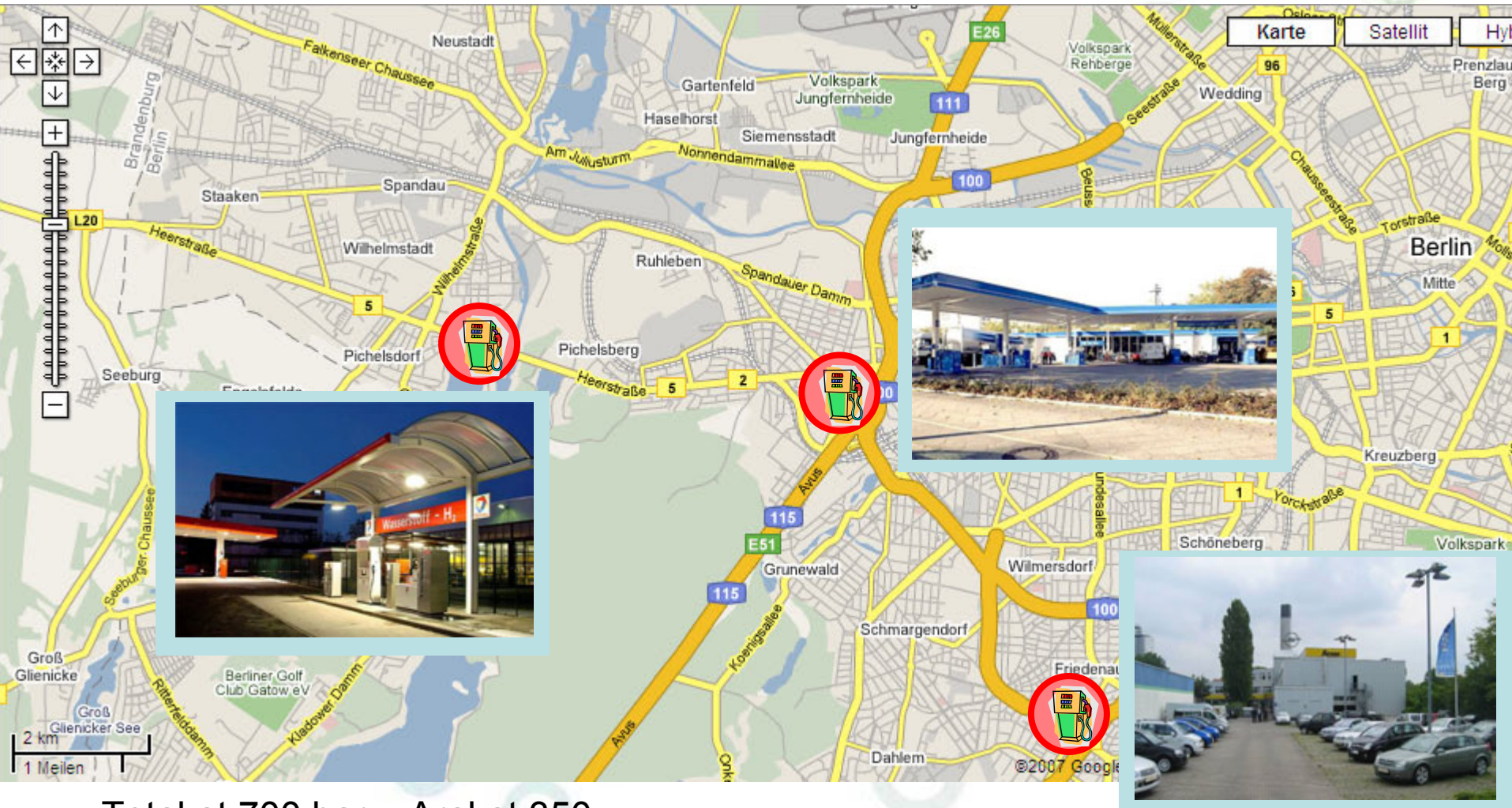


Station	Pressure	Hours	Notes	Risk
1 Shell Benning Rd: 3355 Benning Rd NE, WDC	700 (8 min)	24/7	Self-serve*	Permitting
2 Ft. Belvoir GM: 9901 Dalrymple, Ft. Belvoir	700 (20 min)	M-F, 7am-5pm	Attendant,	Power access 2/19/08

* Common Training / Site Specific Walk-through necessary for public access



Berlin - Service Site at Opel Dealership and Fueling OnTrack to Meet September Launch



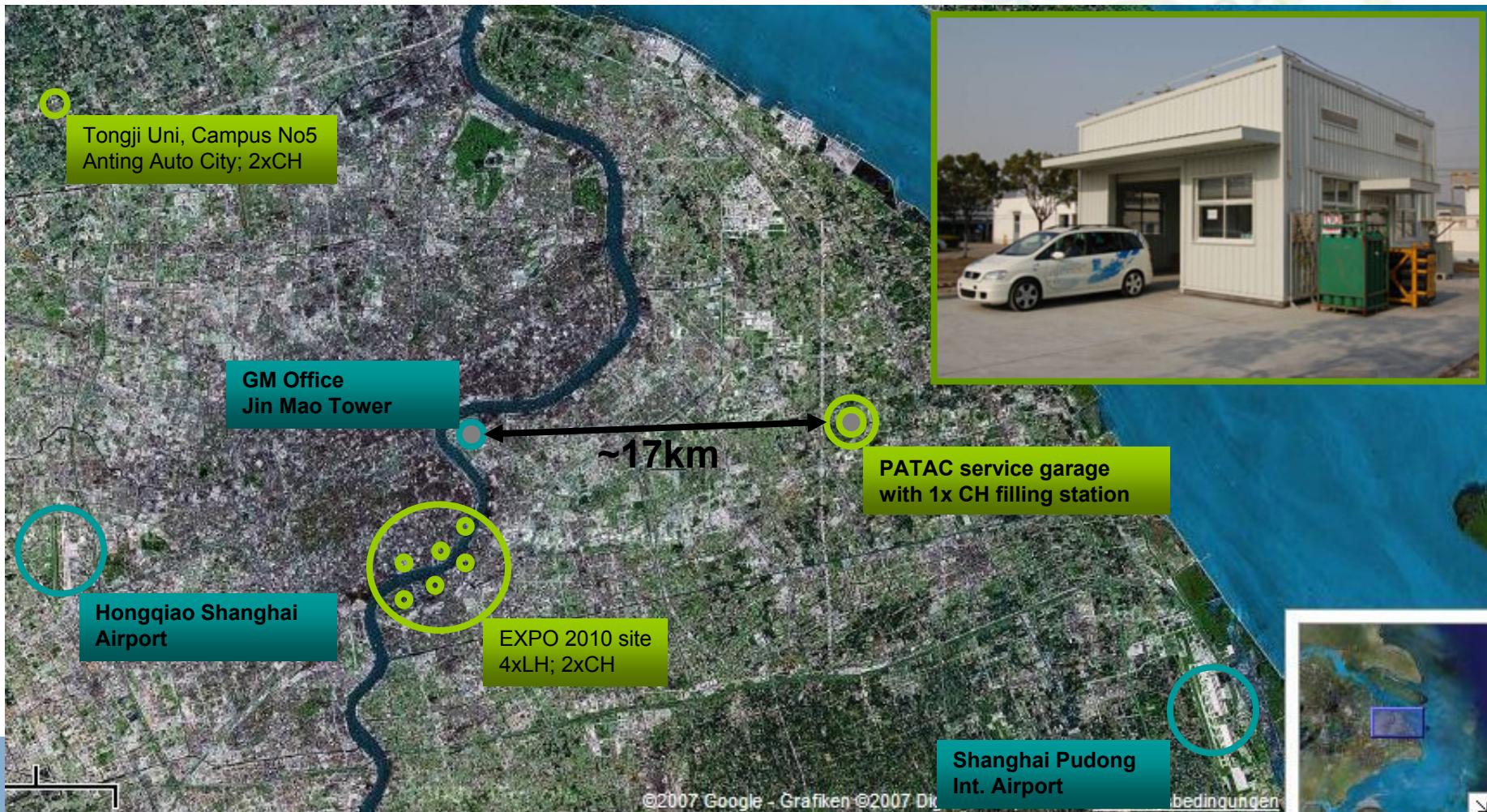
Total at 700 bar – Aral at 350

Shell will join the CEP project in 2008 - H2 station location TBD



China, Shanghai

- xx Vehicles in 2008 - Up to xxx for Expo in 2010
- Facility Plan changed – moving from PATEC Park
- Up to 15 filling stations available or planned within the next years



JHFC-Program in Japan Tokyo / Yokohama

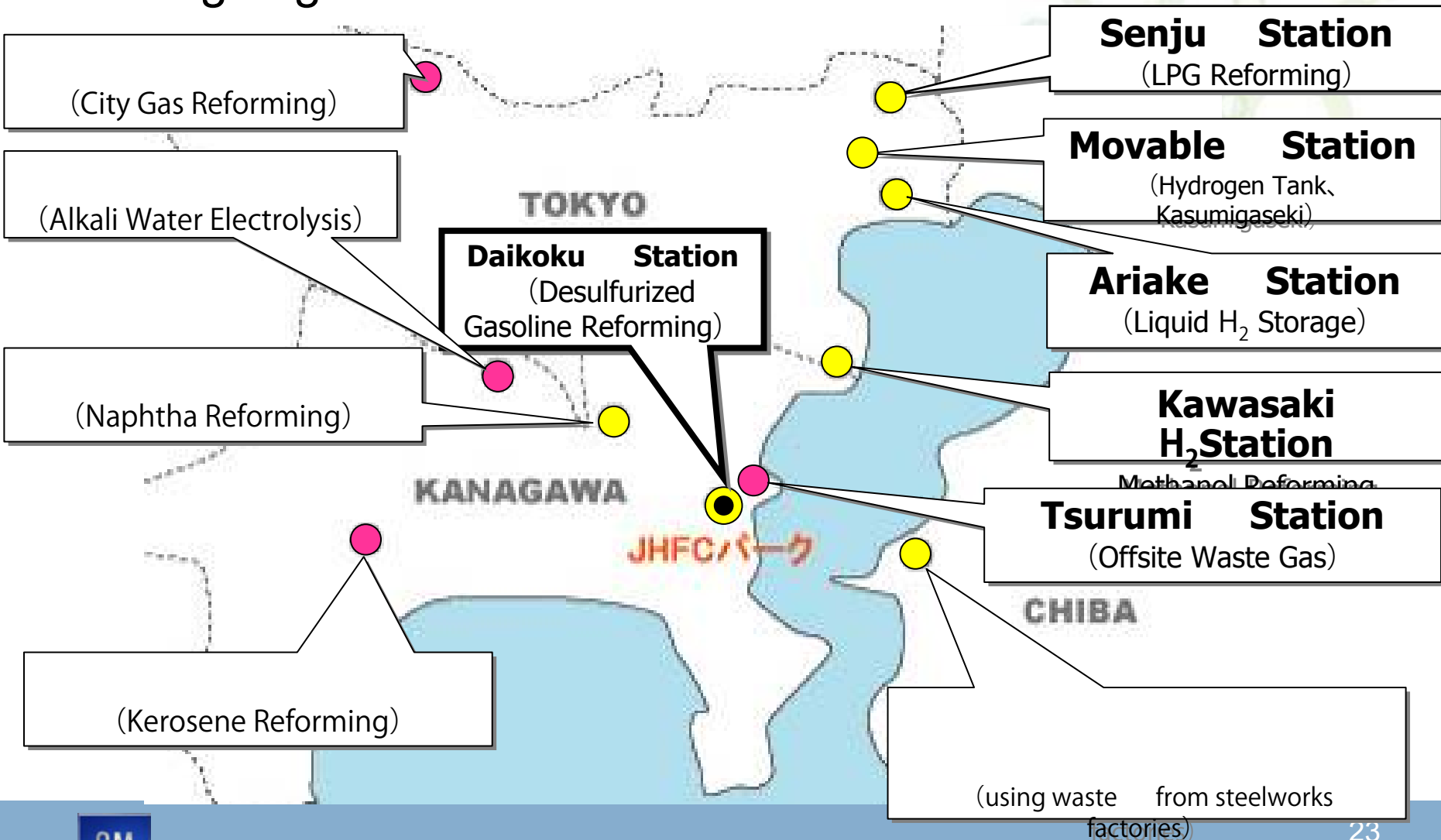
- 1 vehicle to start with pending import restrictions
- Service Facility operational
- 13 filling stations available (all are at 350 bar)
 - 10 in Kanto Tokyo/Yokohama area (shown on map)
 - 3 in Chubu (EXPO and Centrair)



Hydrogen Refueling Facilities - Current Greater Tokyo

All are 350 bar, one with additional LH2
3 are going to 700 bar in 2008

- : 2002 establ.
- : 2003 expansion, establ.



JHFC Hydrogen Stations Players

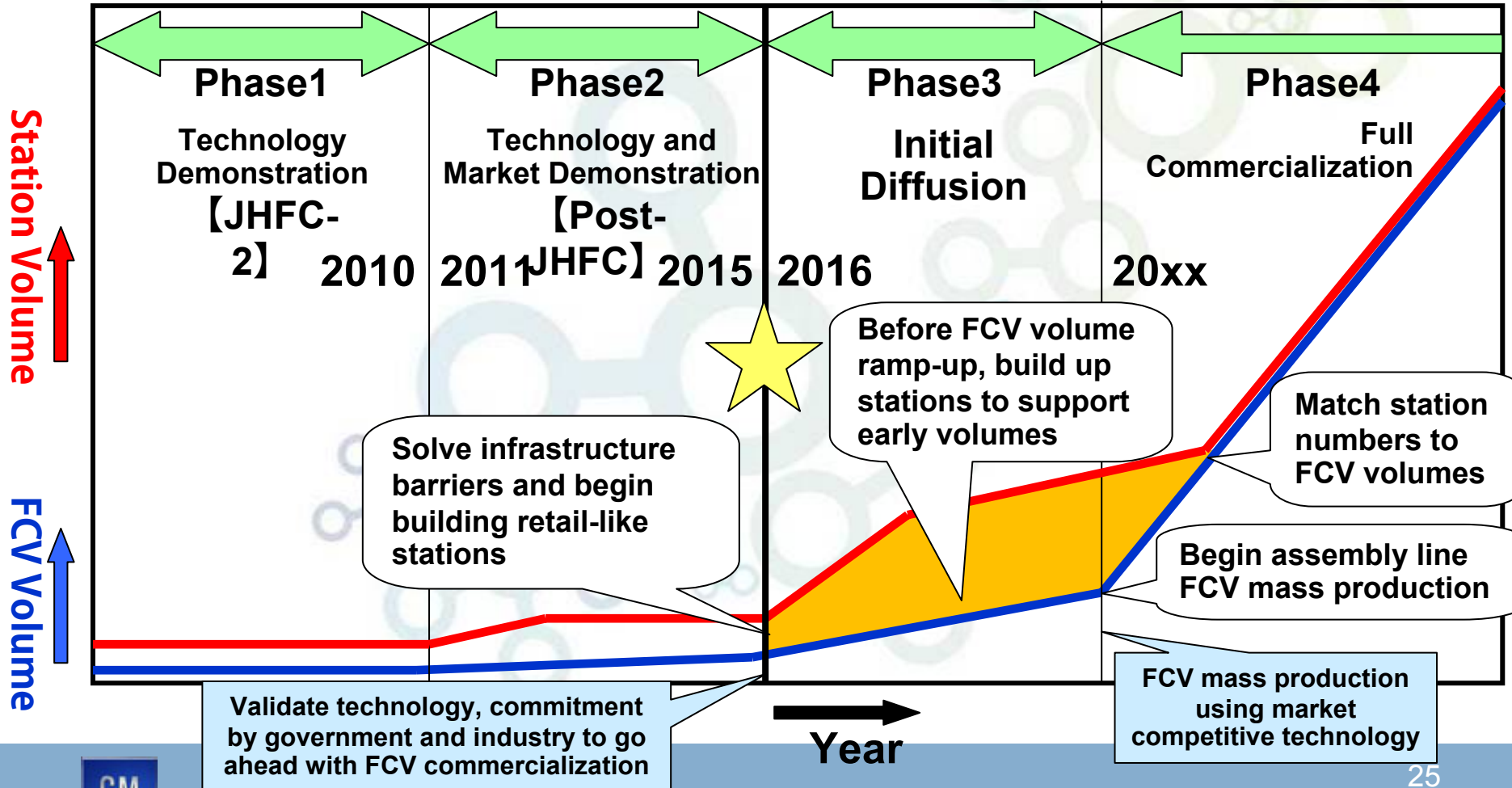
Note: not only oil co's

H₂O

	Station Name	Hydrogen Origin	Constructed By
①	Daikokufuto 大黒ふ頭	Desulfurized Gasoline	Cosmo Oil コスモ石油
②	Asahi 朝日	Naphtha	新日本石油
③	Senju 千住	LPG	Tokyo Gas, Japan Oxygen 東京瓦斯、日本酸素
④	Ariake 有明	Liquid Hydrogen	Shell Oil 昭和シェル石油、Iwatani Industries 岩谷工業
⑤	Kawasaki 川 崎	Methanol	Japan Air Gases
⑥	Kasumigaseki 霞ヶ関	Compressed Hydrogen (movable)	Japan Oxygen 日本酸素
⑦	Hadano 秦野	Kerosene	Idemitsu Industries 出光興産
⑧	Sagamihara 相模原	Alkali Water Electrolysis	Kurida Factory 栗田工業、Shinanen シナネン、 Itouchu Energy 伊藤忠
⑨	Oume 青梅	City Gas	Babcock Hitachi バブコック日立
⑩	Tsurumi 鶴見	Waste Gas	Tsurumi Soda 鶴見ソーダ, Iwatani Industries 岩谷工業

FCV Diffusion Scenario

- The FCCJ committee has committed to 2015 as the target for FCV commercialization and is striving to solve the barriers towards this goal.
- To reach full commercialization, rapid ramp-up of FCV volumes will be required but infrastructure is needed beforehand to support initial volumes.



Note: Commitment to build stations ahead of vehicles now in place

Korea, Seoul GM DAT Incheon

- Begin in 2008
- Service Center moved to Proving Grounds
- 3 filling stations in Seoul available
 - 1 GS Caltex Yeon-se University (350bar)
 - 1 GM DAT Incheon (700bar)
 - 1 Kogas Incheon (350bar)



Questions ?

