

China's Next Revolution: Leading the Transition to Electric Cars

Presented to:

EUROPEAN CHAMBER



中国欧盟商会

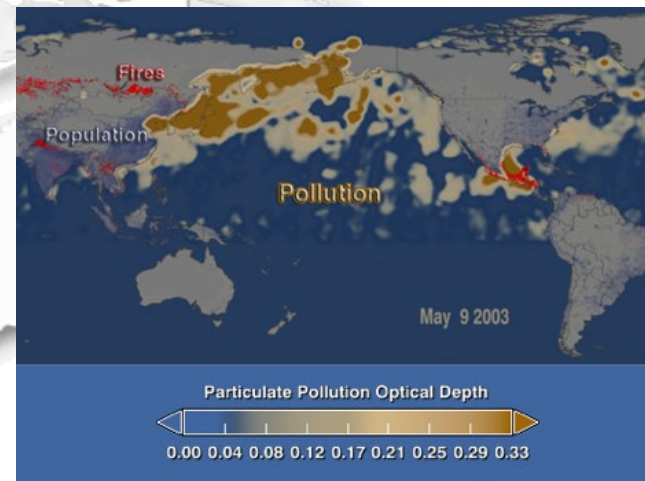
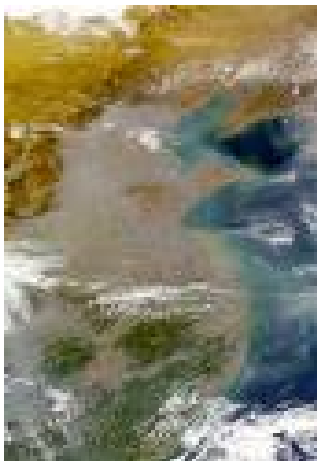
EUROPEAN UNION CHAMBER OF COMMERCE

July 2, 2009



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- 1. Driving the Revolution: China Becomes the Largest Car Market**
- 2. China's National Strategy to Reinvent Automotive Propulsion**
- 3. New Energy Vehicle Products and Applications in China**
- 4. Conclusions: Driving Market Acceptance**

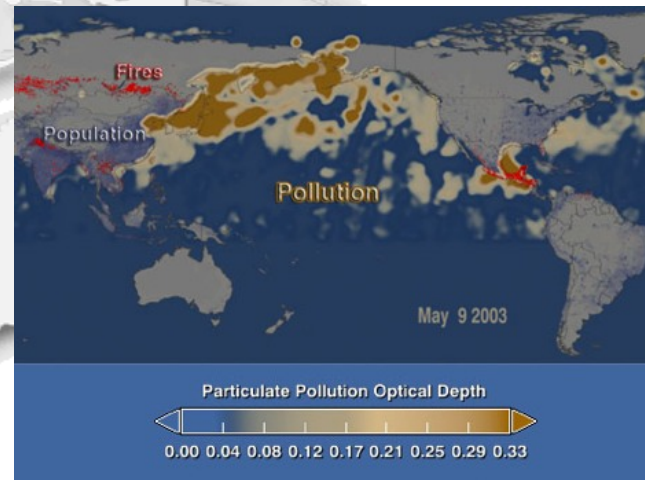


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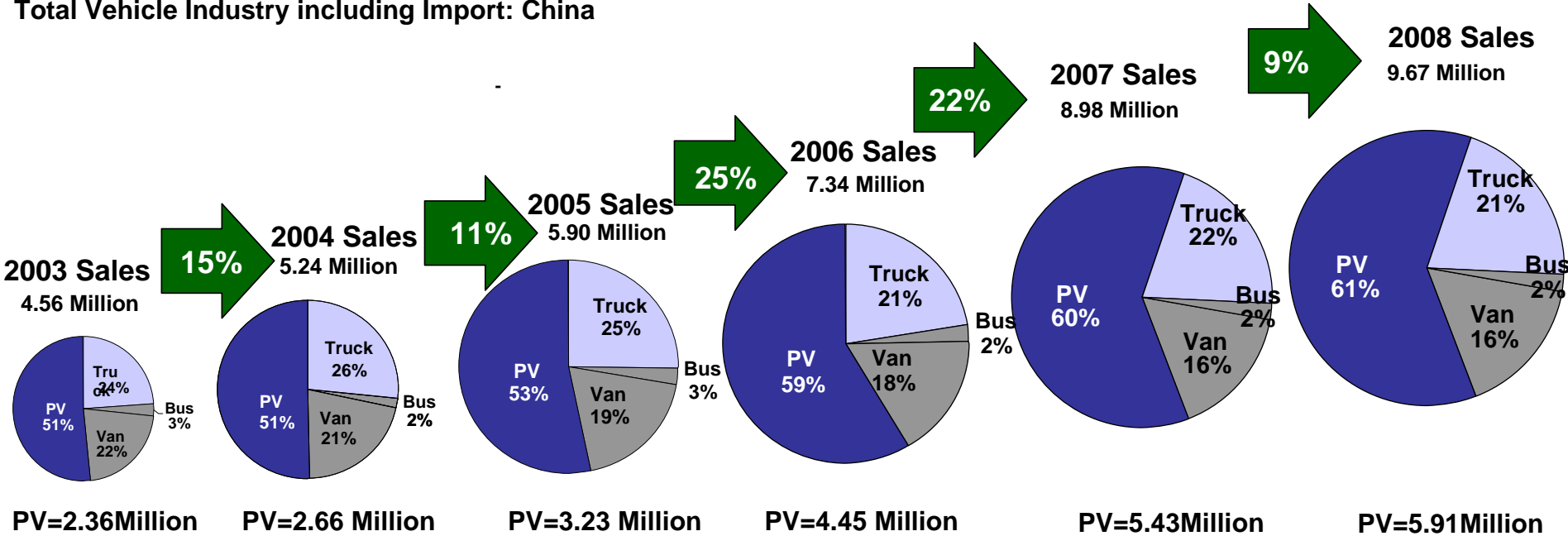
4. Conclusions: Driving Market Acceptance



China's Recently Explosive Automobile Market Growth Slowed Considerably in 2008

- Although 2008 2H growth has flattened, China PV sales are still up 9% YoY
- Passenger vehicles consistently represent the majority of total automobile demand
- China's compact segment is still the dominant force (i.e. 34% of total PV in 2008)

Total Vehicle Industry including Import: China



Source: CAAM auto market press release

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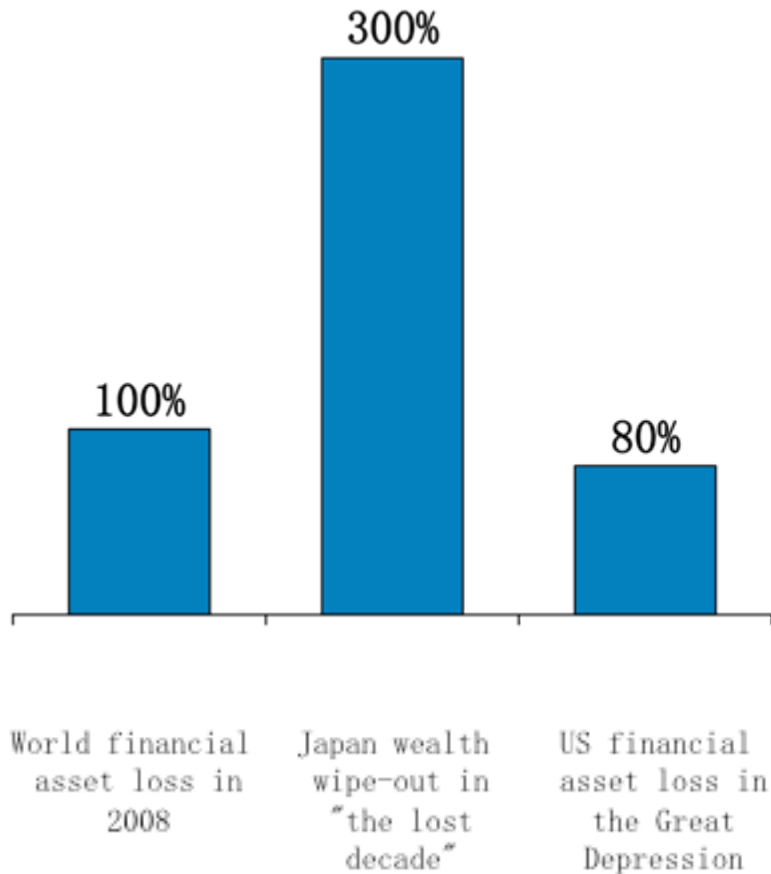
The Tsunami Struck



The Crisis Has Brought Major Losses In Wealth And GDP Growth

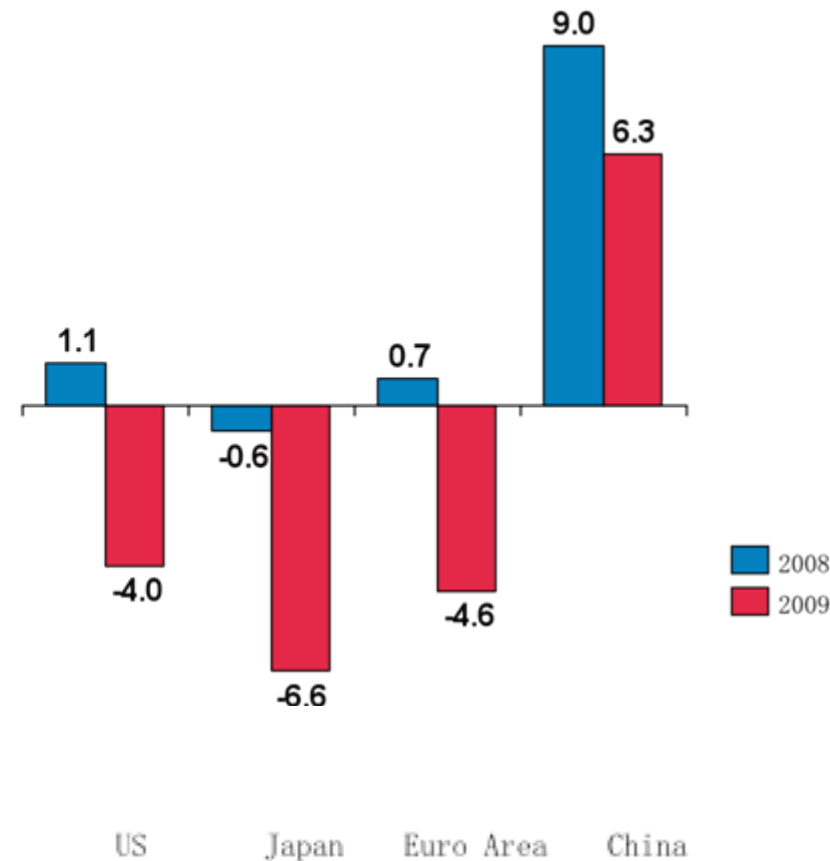
Wealth Destroyed by Crises

(As % of Corresponding Annual GDP)



OECD Economic Outlook - Impact on GDP⁽¹⁾

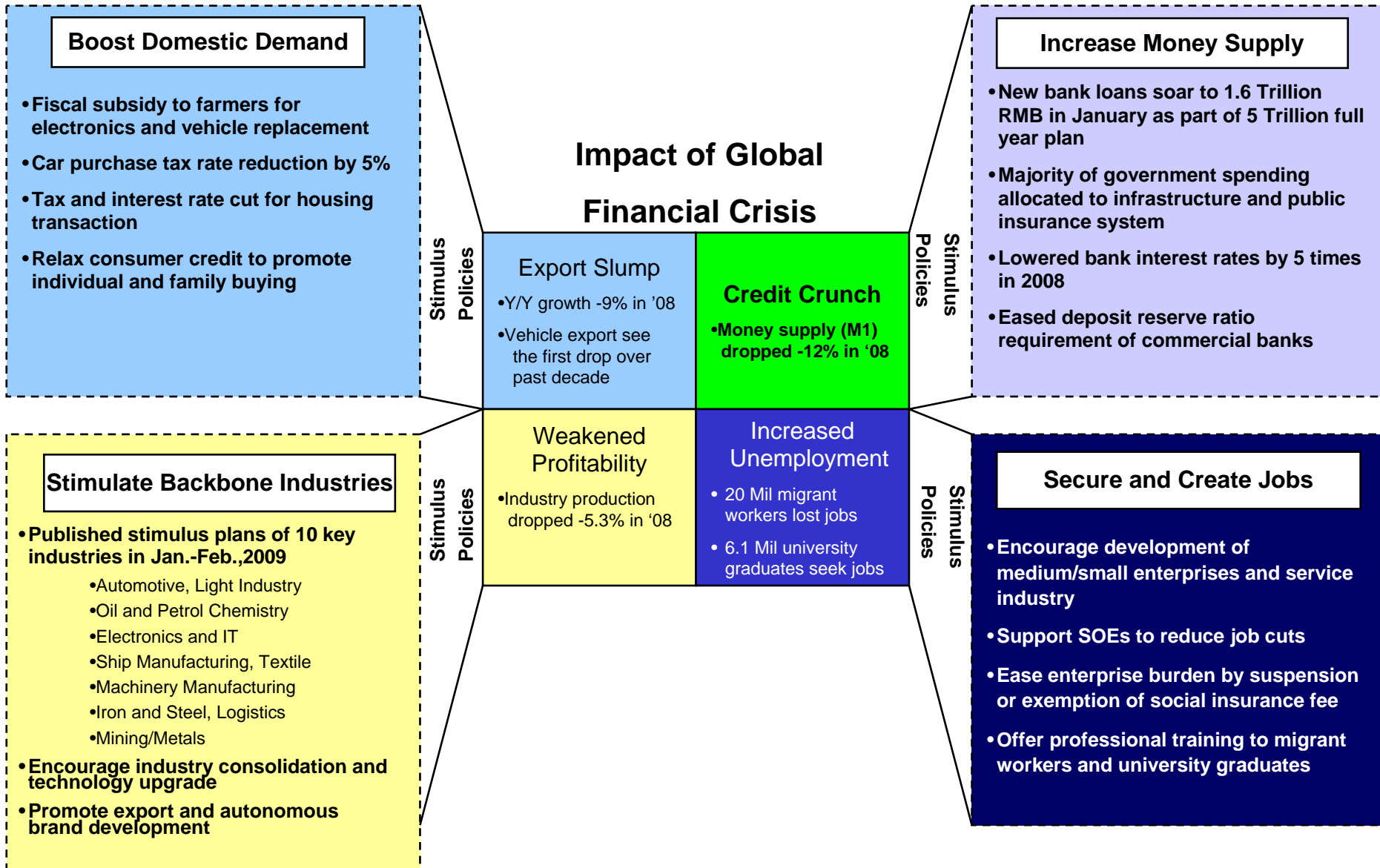
(GDP growth rate in percent)



(1) 2009 growth rate is March 2009 projection

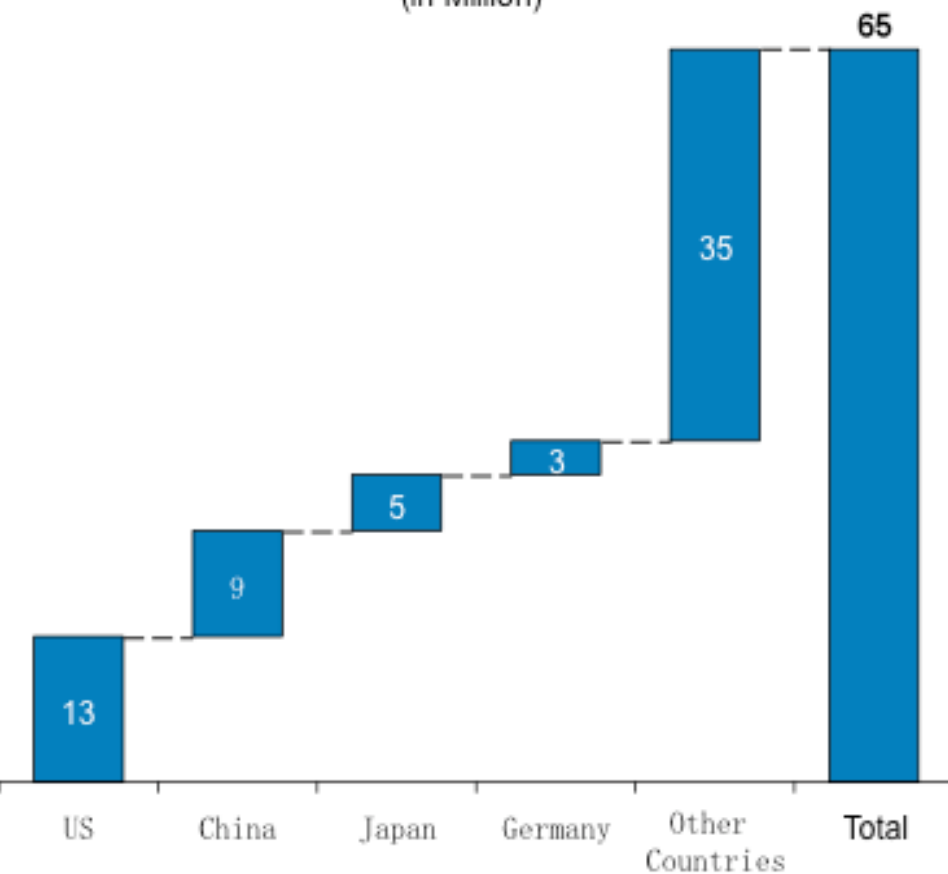
Source: Asian Development Bank; Federal Reserve; Japan Economic Statistics, OECD; Prospect Magazine; Booz & Company analysis

The China Government Has Made Strong Commitment To Achieving Its 8% GDP Growth Target

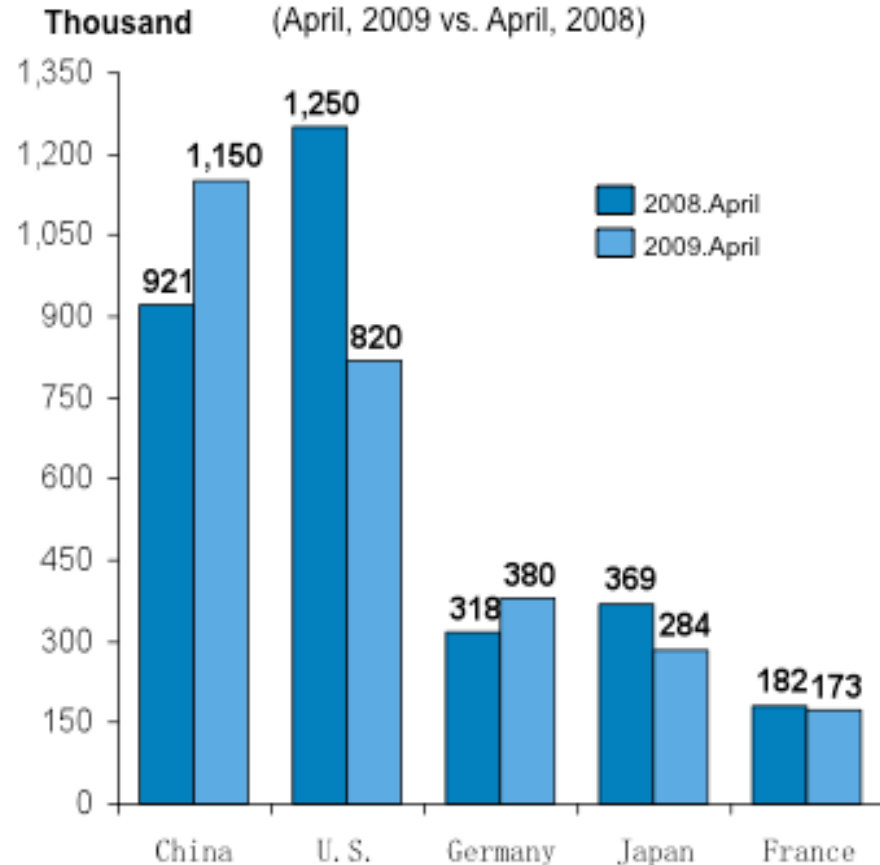


In 2009 China Exceeds US To Become The World's Largest Auto Market

2008 World Auto Sales
(in Million)



Auto Sales Change in Major Markets



Source: Bloomberg; Literature Research; Booz & Company analysis

As The Leading Automotive Market, China Has The Opportunity To Drive The Standards And Architecture For The Global Auto Industry



Shanghai: A Lean, Green Detroit



A Lean, Green Detroit

China is now the world's largest market for cars; Chinese leaders aim to own the biggest piece of it.

20- and 30-something Chinese. It's also why Chinese versions of the Fiesta come in sedan size, with four doors, rather than as hatchbacks, which are anathema in the Middle Kingdom.

The future of auto design was on dis-

Source: Newsweek; May 4, 2009



"... In acquiring a stake in BYD, Buffett broke a couple of his own rules. "I don't know a thing about cellphones or batteries," he admits. "And I don't know how cars work." But, he adds, "Charlie Munger and Dave Sokol are smart guys, and they do understand it. And there's no question that what's been accomplished since 1995 at BYD is extraordinary..."

Source: Fortune; Literature Research

China Has A Clear And Compelling Need To Reinvent The Propulsion Technology Of The Automobile

h Air Pollution

- Beijing, Xi'an, Shenyang, Shanghai and Guangzhou have been listed among the Top 10 cities with the worst air pollution. The massive growth of the automotive market only adds to the problem.
- The rapid growth of the automotive market worsens the problem. For example, Beijing's automobile industry contributed 73% of the overall pollution problem in 2003.



h Energy Consumption

- China imports two-thirds of its oil, and its ever-increasing thirst has had a dramatic impact on global energy prices.
- The gasoline and diesel consumption has accounted for half of the total consumption of petroleum products.



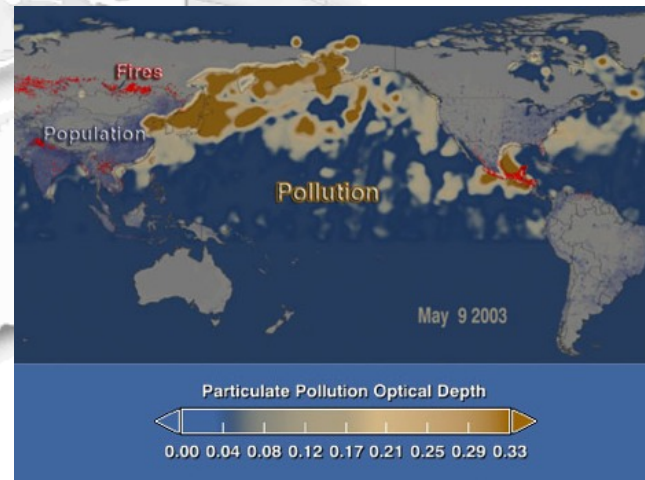
h Traffic Congestion

- In the light of the current rate of development and gas consumption level, China will have over 150 million vehicles and petroleum consumption will exceed 250 million tons in 2020.



For alternative propulsion technologies such as clean diesel, hybrid and electric vehicles, China does not lead the technological development

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Starting 10 Years Ago, CNG And LPG Vehicles Were Promoted, But It Was Not Considered A National Strategy

- h Milestone in Phase 1: *Clean Auto Action* (1999-2002)
- h Investment: **100 Million RMB**

Background

In 1999, Beijing, Xi'an, Shenyang, Shanghai and Guangzhou were listed in the **World Top 10 Cities with Worst Air Condition**

Main Tasks

Improving the air pollution in big cities by:

- Improving the emission of **fossil fuel** vehicles to meet Euro II Standard
- **CNG** and **LPG** vehicles' R&D and demonstration
- Other CAFV's R&D

- The government then did not put forward specialized requirement for new energy vehicles
- New energy vehicles did not serve for national strategy

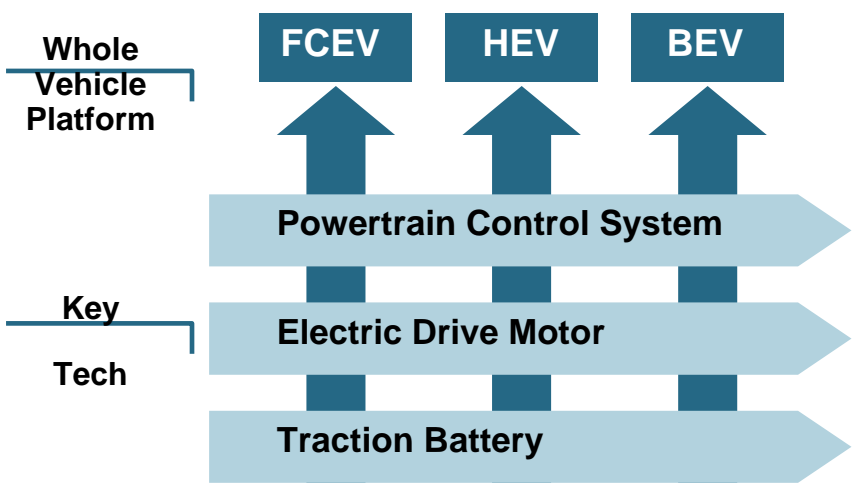
Since 2002, A 3×3 R&D Mechanism Was Initiated To Develop EVs Through The 863 Program



h Milestone in phase 2: *Electric Vehicle Key Project in 863 Program during 10th five-year Plan (2002-2006)*

h Government Investment: **880 Million RMB**

3×3 R&D Mechanism



Achievements

- Vehicle Development**
 - Prototypes of BEV, HEV and FCV developed
 - BEV and HEV are qualified to be produced
- Demonstration**
 - BEV and HEV started demonstration in 7 cities
- Others**
 - 26 national standards established
 - 796 patents applied

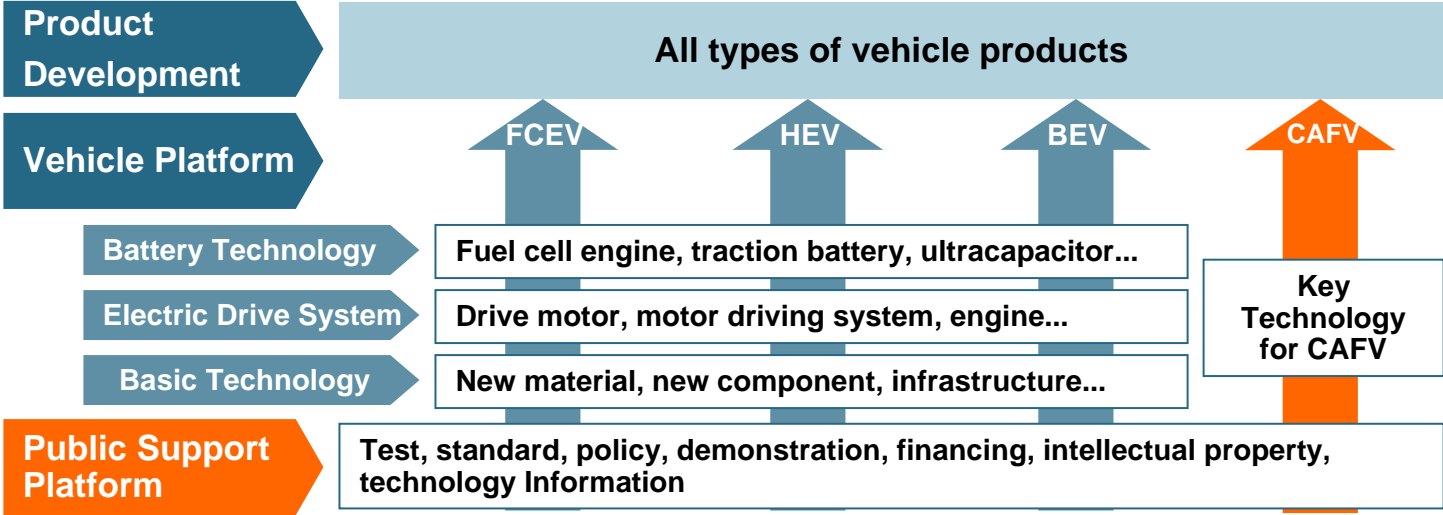
Source: MOST

Since 2006, All Types Of New Energy Vehicles Are Listed On The New Round Of 863 Program And A New R&D Mode Is Framed



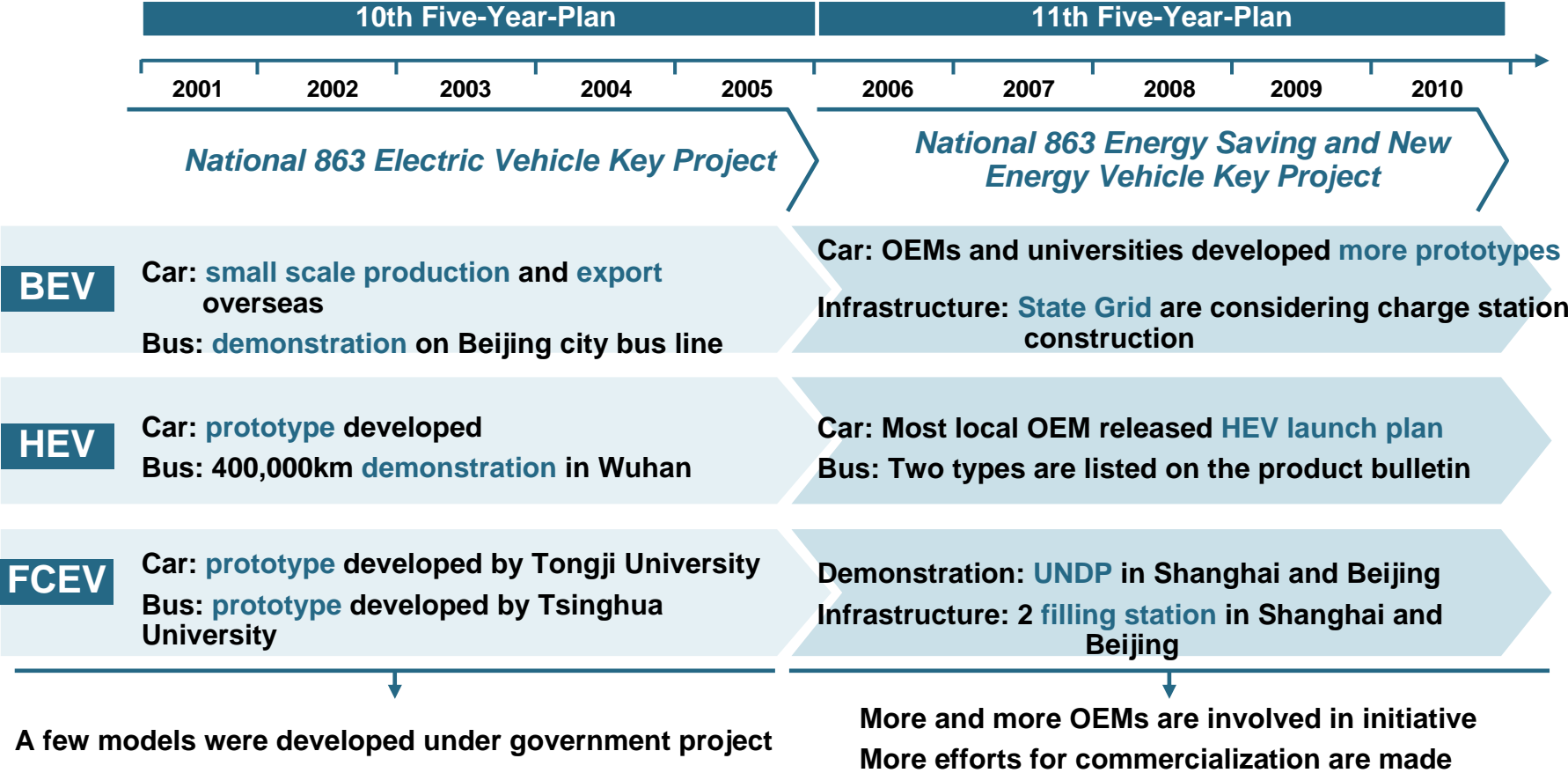
- h Milestone in phase 3: *Energy Saving and New Energy Vehicle Key Project in 863 Program* during 11th five-year Plan (2006-2010)
- h Government Investment: **1.1 Billion RMB** (for 2006-2008)

New R&D Mode of 863 Project in 11th Five-Year-Plan:



Source: MOST

With This Structure, China Has Made Progress In Development Of Key Technologies, But More Effort Is Needed On OEM Side



China's Ministry Of Science And Technology Is Driving A Plan To Support Development Of "New Energy Vehicles" (NEVs)



h In April 2009, Prof. Wan Gang announced an ambitious plan in Cooperation with the Ministry of Finance & the National Development and Reform Commission:

- to **promote the use of NEVs** initially targeting **13 pilot cities**, including Beijing, Shanghai, Chongqing, Changchun, Dalian, Hangzhou, Jinan, Wuhan, Shenzhen, Hefei, Changsha, Kunming, and Nanchang.
- to **support the development of energy-saving technology** for use in government fleets, including buses, postal, and sanitation vehicles.
- to **deploy 60,000** energy saving vehicles in China by 2012

h **Key Objectives of Ministry of Science & Technology:**

- to promote industrial development and expansion of 863 project and HEV & EV development plan.
- to technically support the development of NEV, R&D for NEV, and their promotion and industrialization.

h **Tenth Five Year Plan introduced goal to commercialize and industrialize EVs**

- 3 Vertical Plans: force assembly, driving electric motor and dynamic battery
- 3 Horizontal Plans: FCEV, HEV and EV



National Governments And Global OEMs Must Take Note Of China's Commitment To Fund The Development Of Its NEV Infrastructure



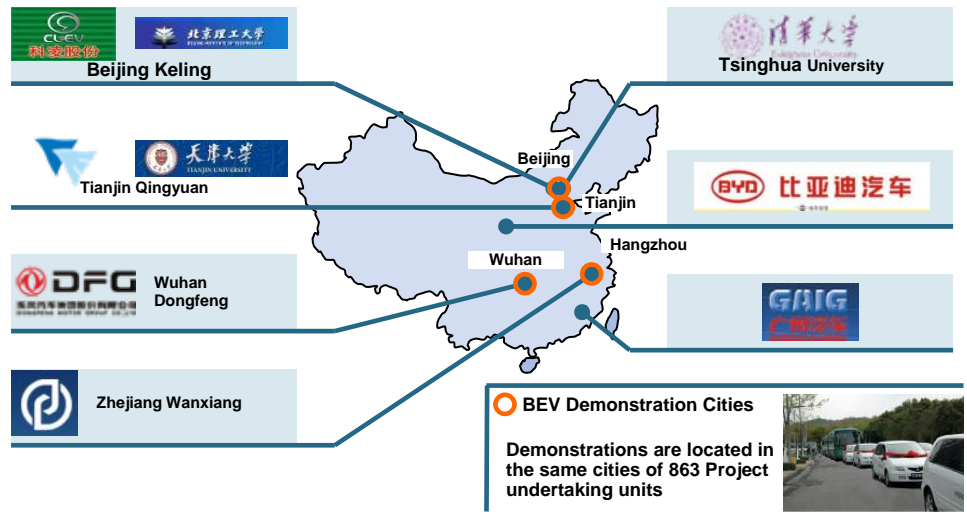
- h **About 45% of China's \$588 billion USD stimulus plan is to be invested in projects related to developing China's infrastructure, which includes support for a variety of clean car technologies.**
- h **Therefore, local governments**
 - support the development of energy-saving tech for use in government fleets, incl. buses, postal, and sanitation vehicles,
 - give priority to the EV, and
 - promote collaborations with business to develop infrastructure in NEV.

EXAMPLES

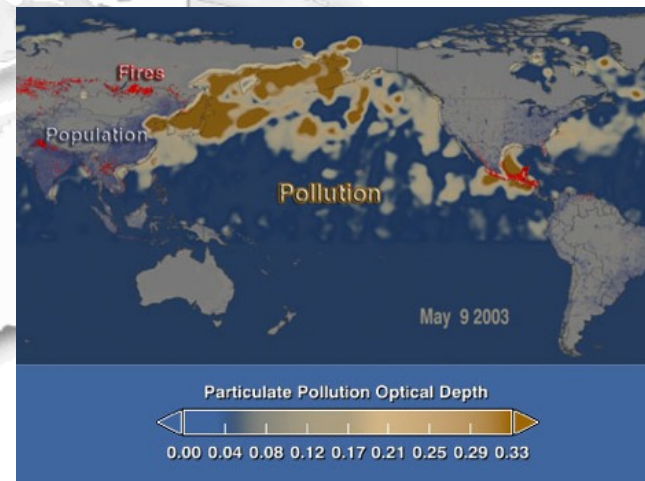
- h **Beijing:** purchased 800 HEV buses from Beijing Foton.
- h **Shanghai:** hydrogen fuel cell car project was initiated by Shanghai Major Project Promotion Office as 2008 Olympics project.
- h **Jinan:** promotes NEVs and plans to use HEV buses to replace some of the old bus system to meet the requirement of National Sports Meeting in the fall.
- h **Shenzhen:** is going to establish a charging station in the downtown area for NEVs and F3DM dual mode EV was first launched in Shenzhen which is the first mass produced dual mode EV in the world.
- h **Wuhan:** becomes new energy resource experimental unit for Nissan, and Nissan will contribute 300 HEV buses in the city.
- h **Chongqing:** bought 10 HEVs from Changan Group
- h **Changchun & Dalian:** Partnered with FAW

863 Projects Undertaking Units

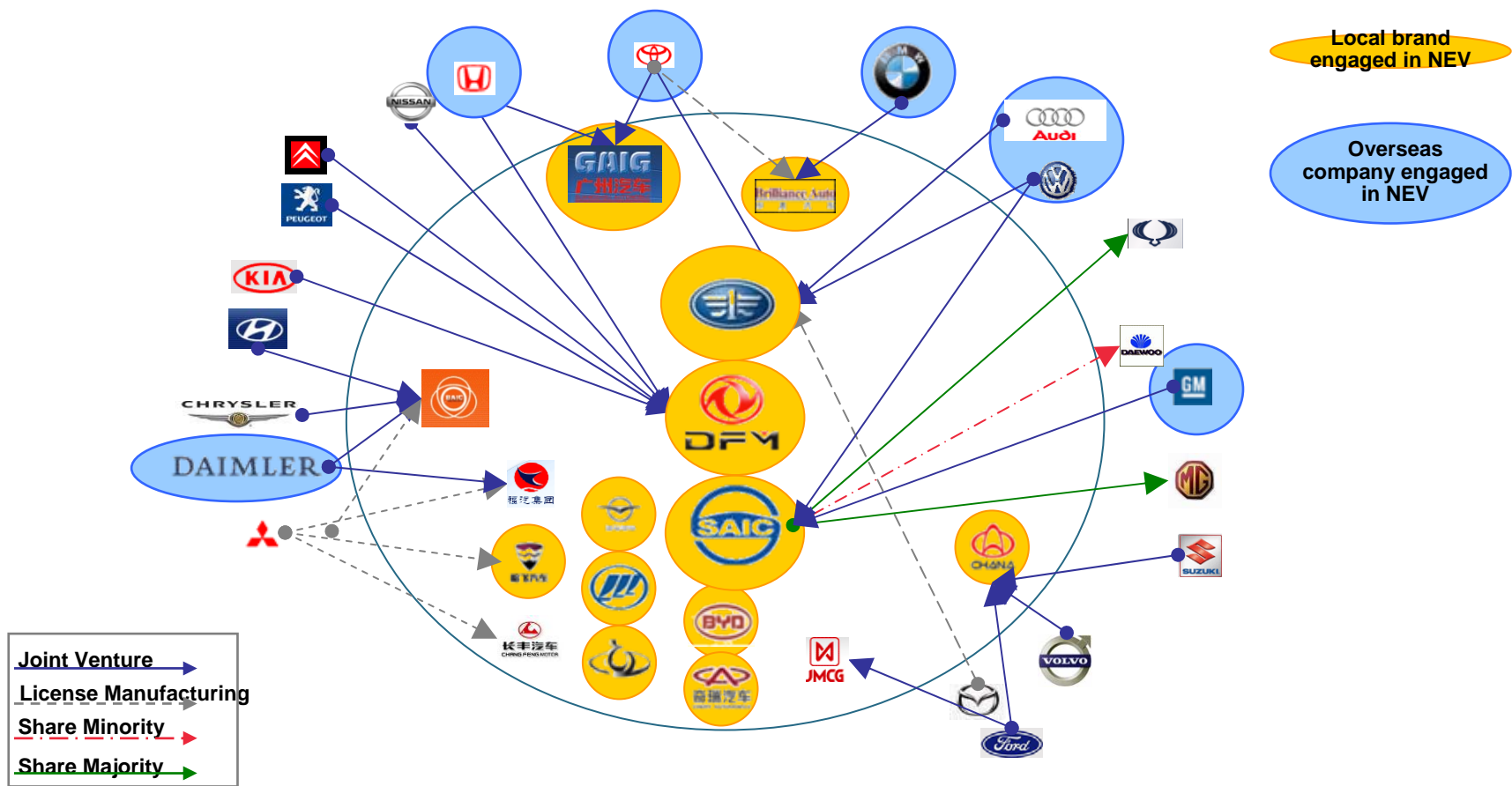
Initiative BEV R&D Units



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In Line With Government Mandate, Many Local Brands Participate In NEV Development, Some With Support Of Foreign Partners



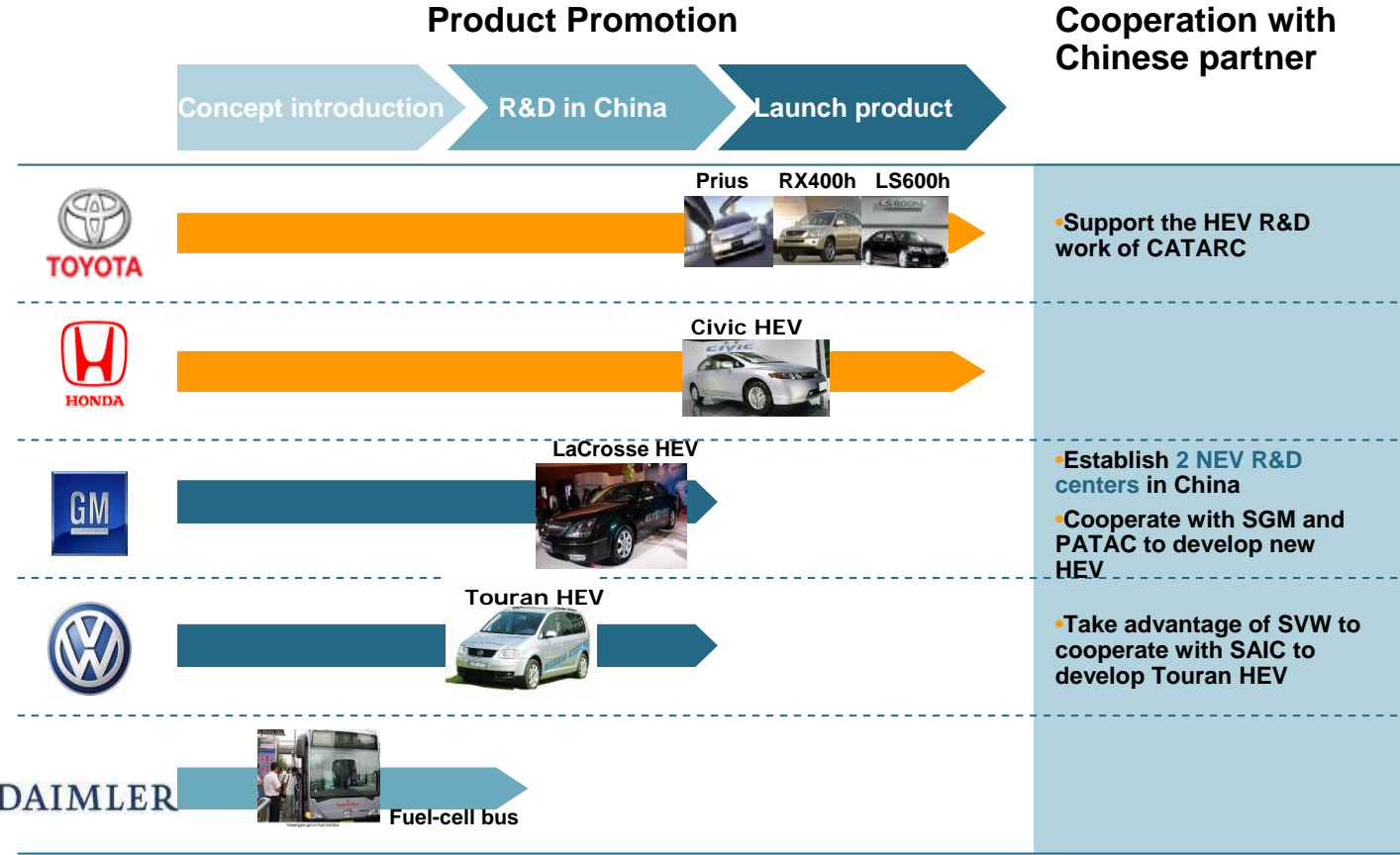
Initially Required By Government, Now Developing NEV Is Gradually Integrated Into OEMs Long-term Strategy

	BEV	HEV
	BEV Bus under Research	
 东风汽车集团股份有限公司 DONGFENG MOTOR GROUP CO., LTD		
 奇瑞汽车 CHERY AUTOMOBILE		
 广州汽车		

	BEV	HEV
 华晨汽车		
 哈飞汽车		

Covered Area
 Focus Area

In View Of The Large Market Potential In China, Foreign OEMs Are Prioritizing NEV Development In China



China's Push for Electric Cars Was Clearly on Display at This Year's Shanghai Motor Show



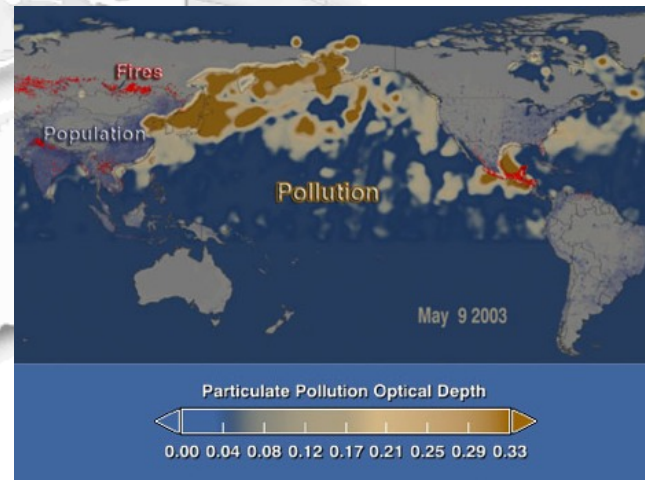
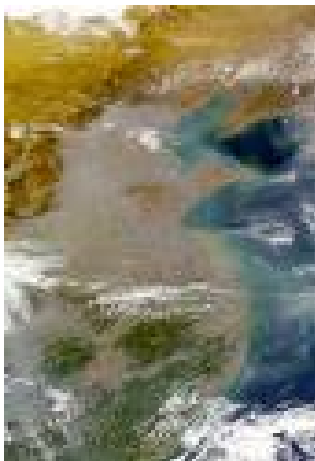
BYD Has Introduced The First Mass Produced Plug-in EV To Use A Home Outlet, Yet Market Acceptance Remains Challenging

h BYD F3DM & F6DM

- Convertible between EV and HEV modes
- Market launch in 12/2008 (Fleet orders only)
- Retail sales to begin in 9/2009
- MSRP: RMB 149.8K
- Combined total power output: 125kW
- Acceleration 0-100km/h: 9 sec.
- Charging time: 7 hours with normal household power outlet
- Max. distance for one charge: 100 km
- Sales available in 14 1st-tier and 2nd-tier cities in China



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Conclusions: Driving Market Acceptance

h Consumer acceptance of new energy vehicles is major challenge

- While the infrastructure investments already described will help tip the scales in favor of new energy vehicles, consumers must also be convinced that the price and performance of the new energy vehicle can in fact meet their expectations.
- As a national priority, we can expect the China government to help by offering incentives for the retail consumer to purchase new energy vehicles.
- Chinese consumers have less experience with gasoline-powered cars, and are already accustomed to short distance, low-speed commuting – conditions very favorable for electric cars.

h The China government's willingness to invest in the infrastructure to support alternative propulsion technology will ultimately help drive *demand* side market acceptance

- This is where China has the opportunity to take the lead, and that will drive *supply* side investment in new technology
- For the development of NEVs, the infrastructure must come first - and this will drive supply-side innovation

It takes a combination of business and government working together to make this revolutionary change possible and **nowhere in the world is there a closer link between business and government than in China.**

Acronyms

NEV: New Energy Vehicle

PV: Passenger Vehicle

EV: Electric Vehicle

BEV: Battery Electric Vehicle

HEV: Hybrid Electric Vehicle

FCEV: Fuel Cell Electric Vehicle

CAFV: Combustion Alternative Fuel Vehicle

OEM: Original Equipment Manufacturer

UNDP: United Nations Development Programme

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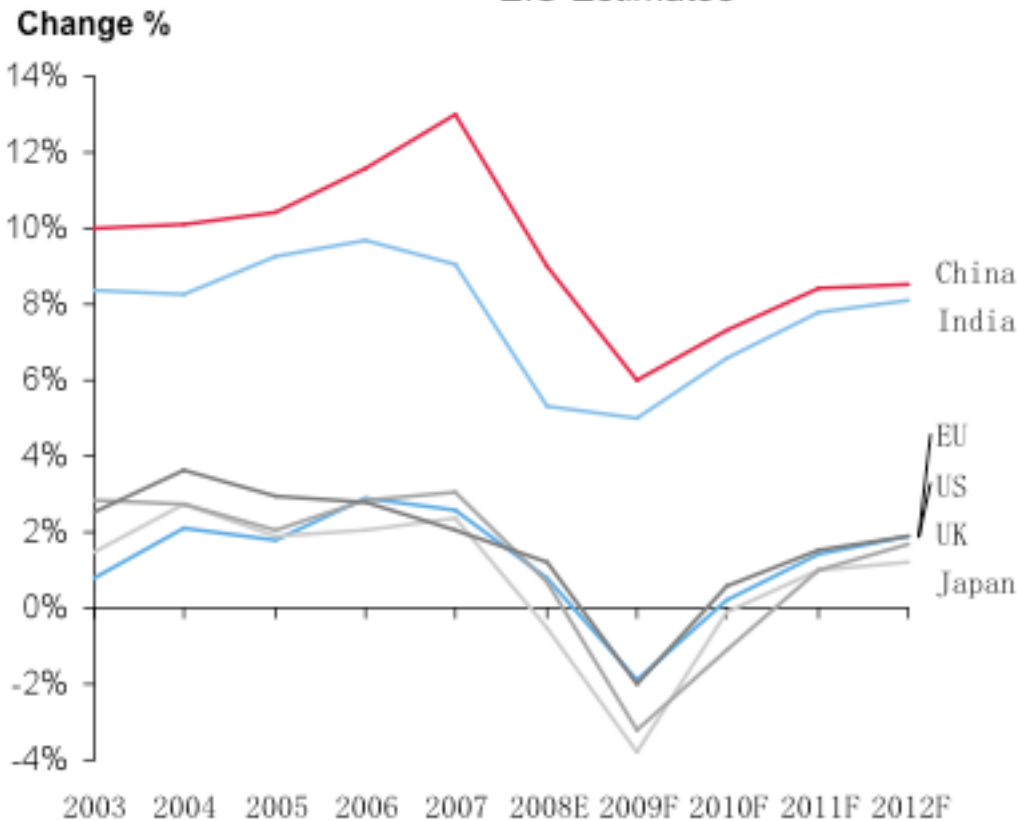


Backup

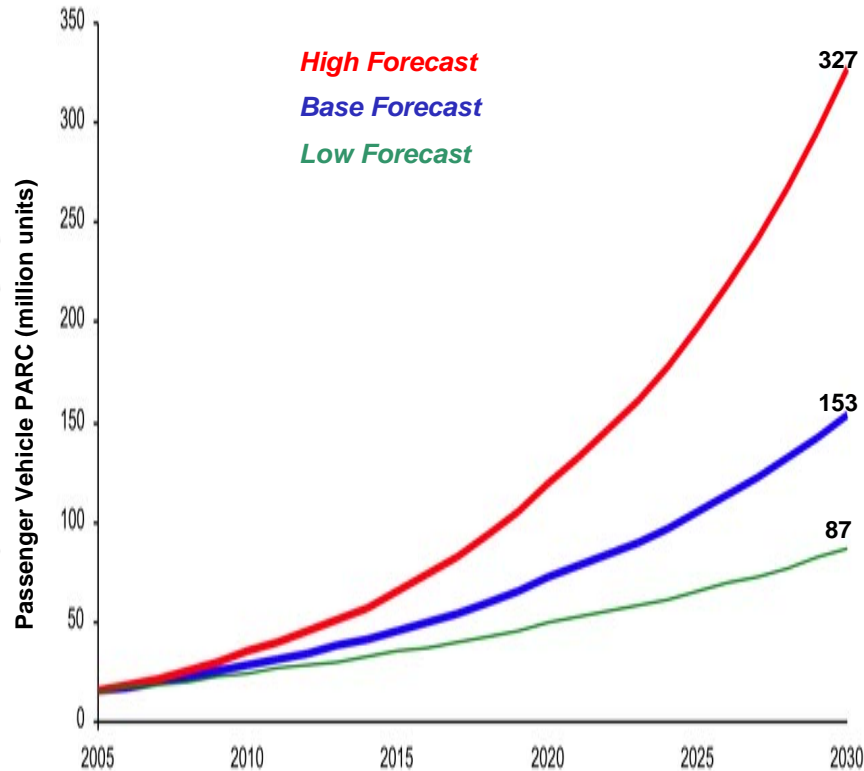


China Has Become The New “Engine Of World Economy”, Which Supports The Strong Growth Of China Auto Market

Real GDP Growth: Historical and Forecast
- EIU Estimates -



China Passenger Vehicle Installed Base (PARC) Forecast (2005-2030)



Note: Passenger vehicles contain sedans, MPVs and SUVs

Source: EIU; Global Insight, OPEC, DGS Report, Booz & Company analysis