

SAIC MOTOR 上海汽车

中国2010年上海世博会汽车全球合作伙伴联合成员
A Joint Member of Global Automobile Partner of Expo 2010 Shanghai China

Vision & Strategy on FCV Commercialization

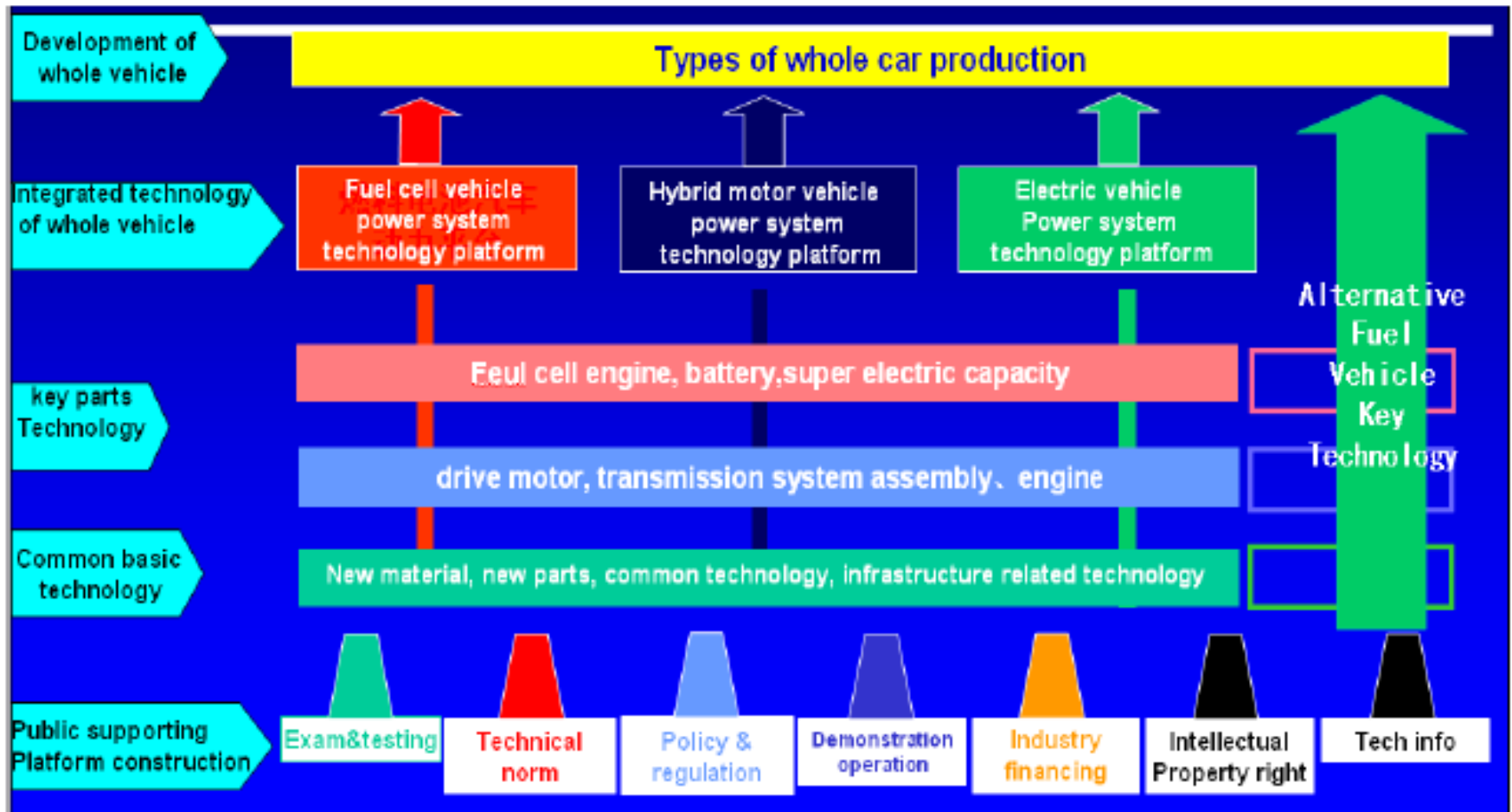
Dr. Chendong Huang
Deputy General Manager
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SAIC Motor Corporation

上海汽车集团股份有限公司新能源汽车事业部
SAIC MOTOR New Energy Vehicle Division

- ❖ **Chinese Government Policy on hydrogen & FC Technology**
- ❖ **Progress of hydrogen & FC Technology Demo**
- ❖ **SAIC Vision & Strategy on FCVs**
- ❖ **Remaining barriers for Commercialization**

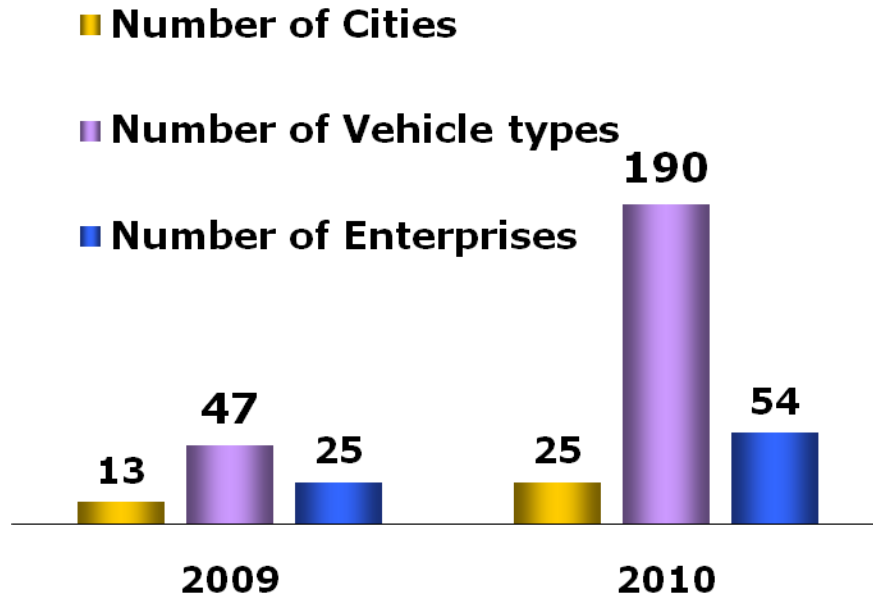
Part I Government Policy on hydrogen & FC

Development Strategy of Clean Vehicles during 10th and 11th Five Years Plan



“25 cities —1000 Vehicles ” large scale demonstration

➤ Developments

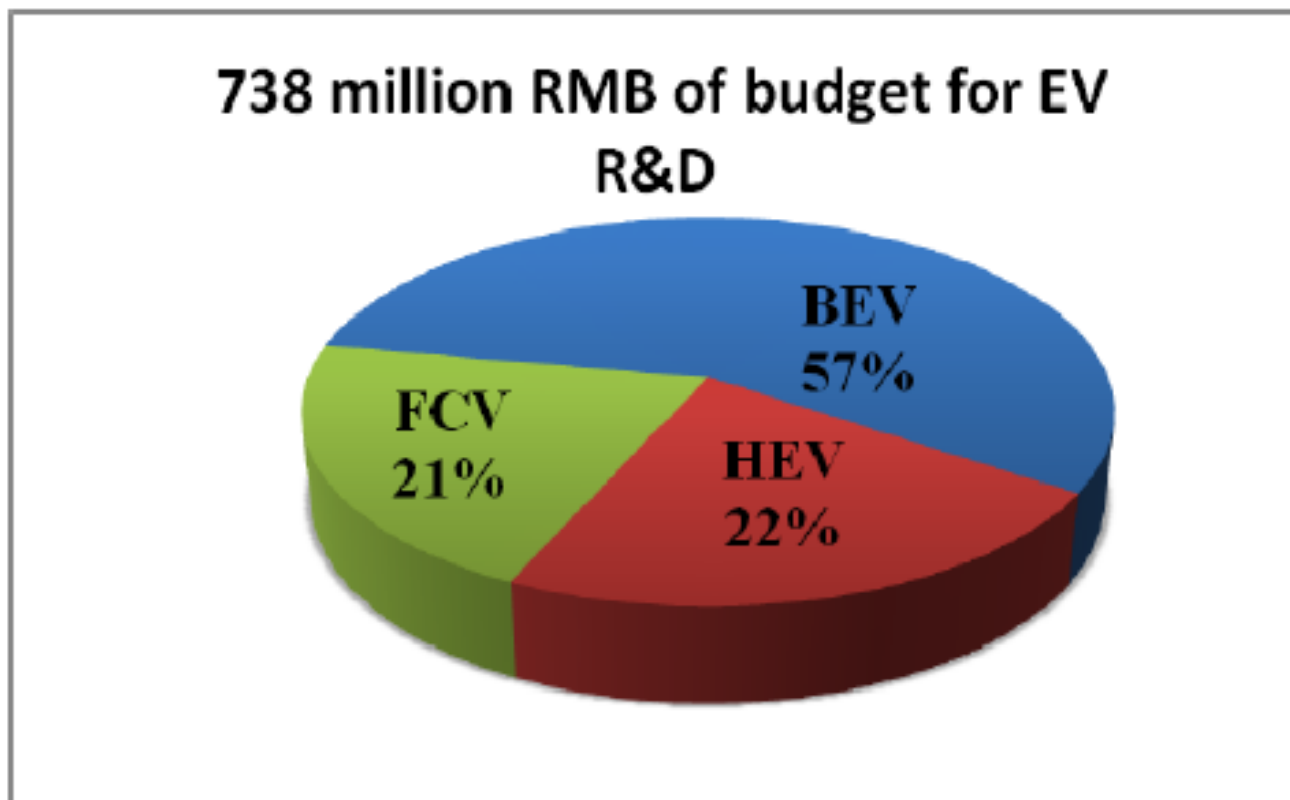


The government provided a one-off subsidy for the purchase of hybrid, electric, and fuel cell vehicles in some cities from 2009 to 2012.

➤ Financial subsidy policies

The demonstration cities and local governments participated in this activity should arrange appropriate counterpart funds. In 2010, 6 cities launched the pilot of subsidies for private purchase of electric vehicles.

R&D deployment of **Energy-saving & New Energy Vehicle** in “12th five-year-plan” (2011-2015, First Phase) by MOST.



Target

1. FC car (44 Million)

Target	2013	2015
Fuel efficiency (kg H ₂ /100km)	≤1.3	≤1.2
Range (km)	>400	>500
Cold star (°C)	-10~45	-30~45

2. FC Bus (25 Million)

Target	2013	2015
Fuel efficiency (kg H ₂ /100km)	≤8.5	≤8.0
Range (km)	>300	>350
Cold star (°C)	-10~45	-30~45

3. Demo and Validation orientated FC System (40 Million)

Density (stack): ≥1000W/kg; η ≥45~50%; Durability: ≥3000h

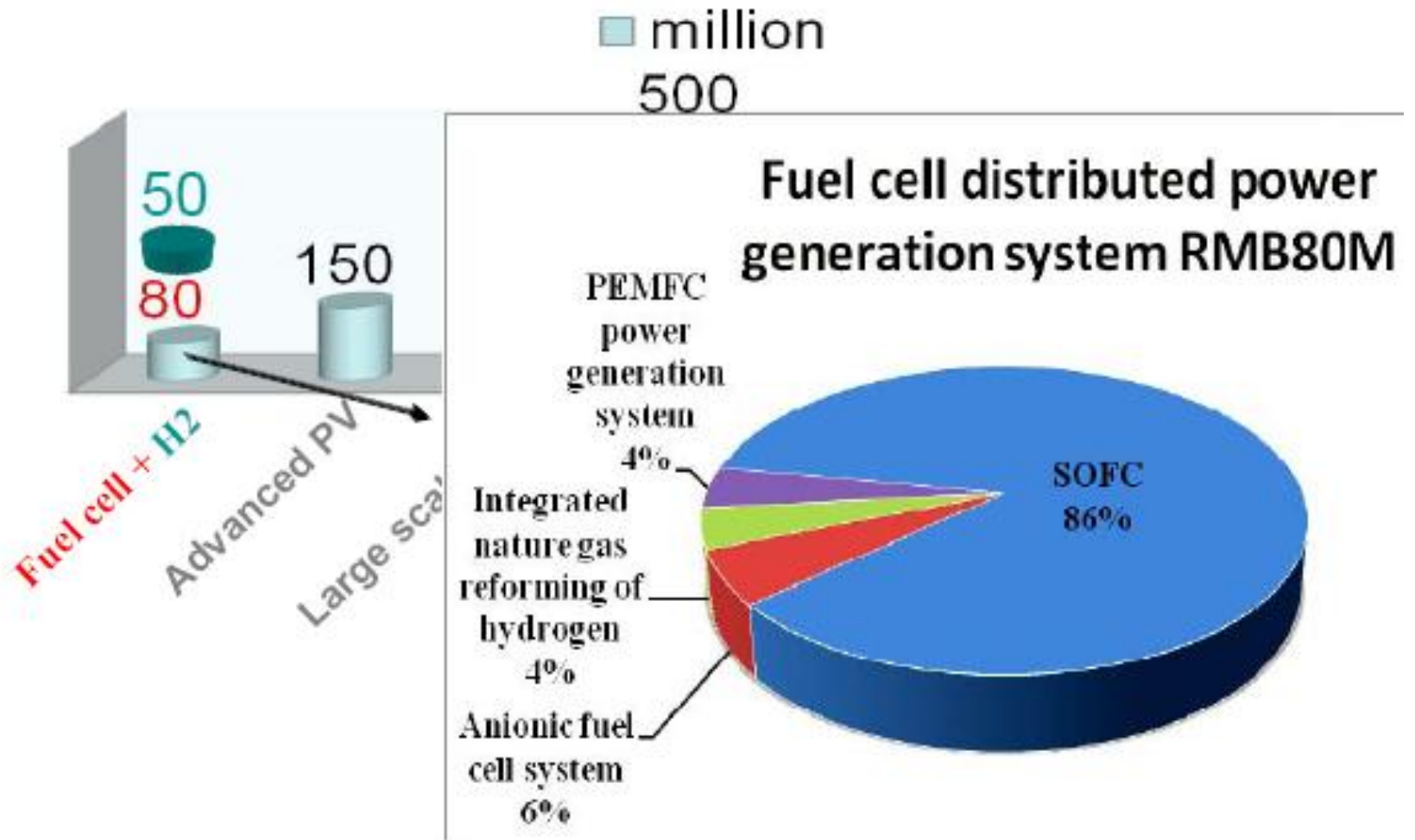
4. Next Generation FC system (40 Million)

Application in transportation; breakthrough in power density, durability, cold start, etc.

5. Advanced on-board storage system of hydrogen

70MPa hydrogen tank and fueling technology

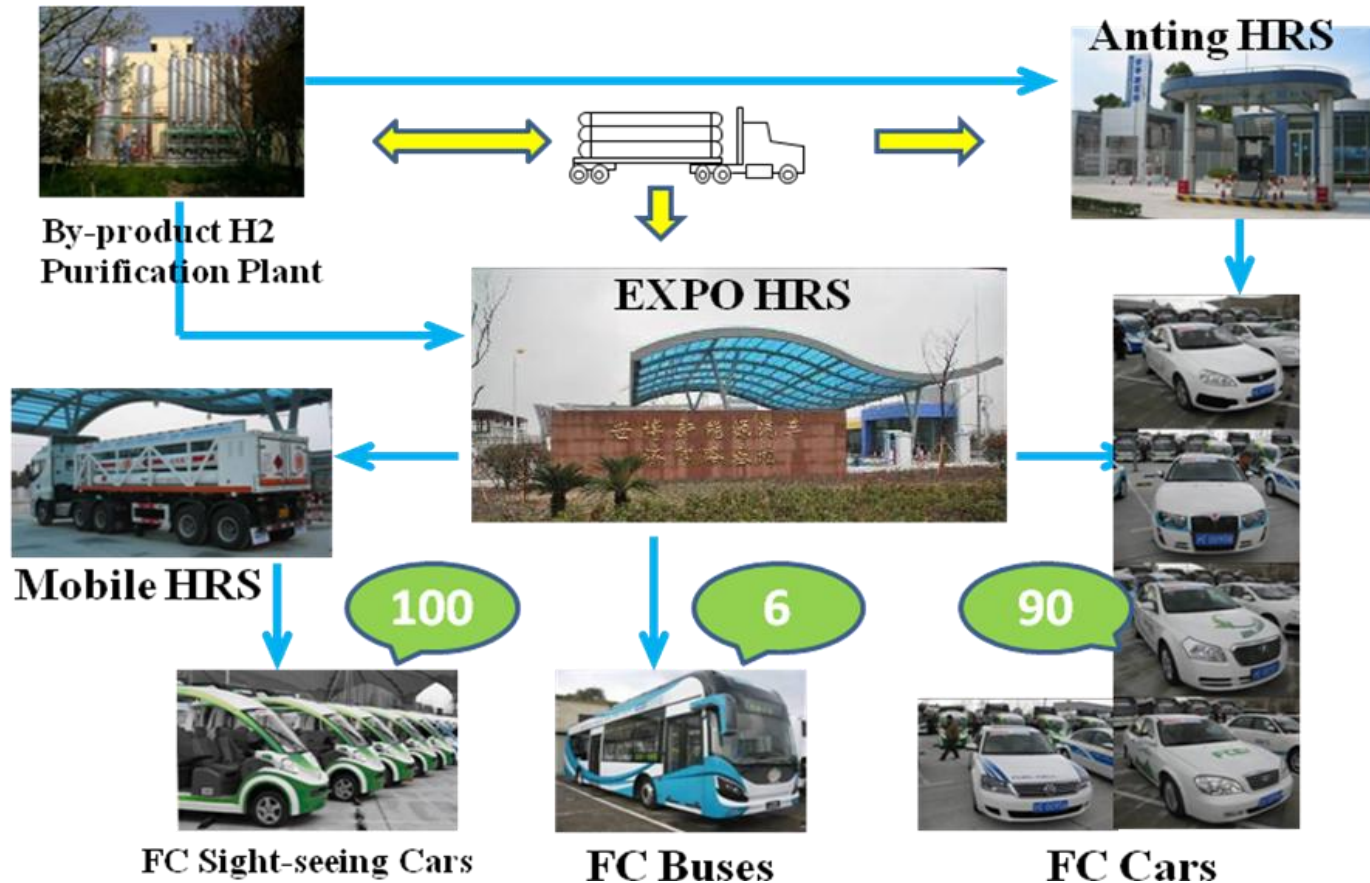
R&D deployment of **advanced energy technology** in “12th five-year-plan” (2011-2015, First Phase) by MOST.



Part II Progress of Hydrogen & FC Technology Demonstration

FCVs Demonstration during Shanghai Expo

Schematic diagram of hydrogen supply chain in Expo Shanghai 2010



Demo Planning for Jiading



The first Clean Energy Ministerial (CEM) was held in Washington D.C. in July 2010. China, the United States and other countries jointly proposed an Electric Vehicle Initiative (EVI) .



R&D, Demonstrations and Activities

Asian Games



2010 Asian Games was held on Nov. 12 to 27 in Guangzhou, China. There were 42 events and 45 countries took part in Guangzhou Asian Games, which is the history of events up to Asian Games ever.



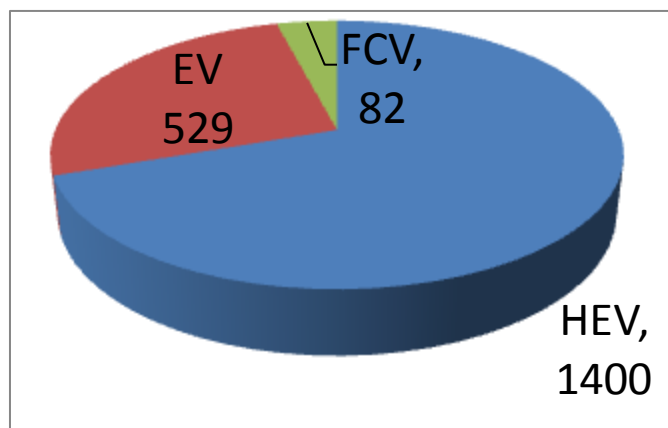
During the Asian Games in Guangzhou, 60 fuel cell vehicles were demonstrated in Athletes Village, Media Village and the demonstration run. All of the FCVs used for VIP, media reception and athletes pick-up.

R&D, Demonstrations and Activities

World University Games

➤ In August 2011, the 26th Universiade was held in Shenzhen. More than 100 countries and regions will take part in.

➤ Clean energy vehicles in WUG total 2011



➤ 47 electric car charging stations and a complete set of hydrogen fuel cell vehicle filling system are included in plan.



R&D and Demonstration of Hydrogen Station in China





WAN Gang

As a biennial event organized by International Association of Hydrogen Energy (IAHE), WHTC has become one of the most important worldwide conferences on hydrogen energy and been successfully organized four times. The 5th WHTC event will take place at Shanghai Everbright Convention & Exhibition Center in the heart of Shanghai during 25th-27th September 2013.

Hydrogen is a promising energy carrier to provide a clean, reliable, and affordable energy supply that can enhance Chinese economy and environment. Chinese government has paid much attention to hydrogen field and is willing to accelerate technological development of hydrogen energy. I warmly welcome friends from all countries to attend the great event.

WAN Gang
Minister of Science and Technology of People's Republic of China
Honor Chair of WHTC 2013

I urge all engineers, scientists, environmentalists, decision makers and policy makers, who are involved in energy and environment, to participate in the World Hydrogen Technologies Convention 2013 (WHTC 2013). This will bring us closer to the age of abundant energy and clean environment.



T. Nejat Veziroglu

T. Nejat Veziroglu
President, International Association for Hydrogen Energy

Drive the world with hydrogen!
Based on hydrogen energy development needs, taking into account the world's largest developing country - China's positive attitude and the actual progress in hydrogen, we deeply wish WHTC2013 will be a wide bridge of energy, environment and economy between world and China.

MAO Zongqiang
Chairman of Chinese Association for Hydrogen Energy
Executive Chair of WHTC 2013



MAO Zongqiang

Welcome to WHTC 2013, Shanghai, China!

欢迎参加第五届世界氢能技术大会!

Location: Shanghai Everbright Convention & Exhibition Center, Shanghai, China
Date: 25th - 27th September 2013
Website: <http://www.whtc2013.com>

Organized by: International Association of Hydrogen Energy (IAHE)
Hosted by: Chinese Association for Hydrogen Energy (CAHE)
Supported by: Ministry of Science and Technology Government of Shanghai

Some Sponsors are:



Research and demonstration of hydrogen technologies are very active in China recently.



During World Expo 2010 Shanghai, 194 hydrogen fuel cell vehicles were demonstrated for 6 months



25kW electrolysis hydrogen generator system



220W fuel cell bicycle made in China



Annual domestic hydrogen energy conference

The great metropolis of SHANGHAI is undergoing tremendous economic expansions and has become one of the economy centers in Asia. It is also one of the most beautiful cities in China. You can find more information about Shanghai in the website of Shanghai Government: <http://www.shanghai.gov.cn/shanghai/node2301/index.html>



Shanghai Pudong New Area District



Nanjing Road



The World Expo 2010 Shanghai, 73 million visitors in 6 months



The Exhibition Center

Shanghai Everbright Convention & Exhibition Center
The Everbright exhibition center is one of the biggest exhibition centers in Shanghai.
<http://www.ebright.com.cn/index.php>

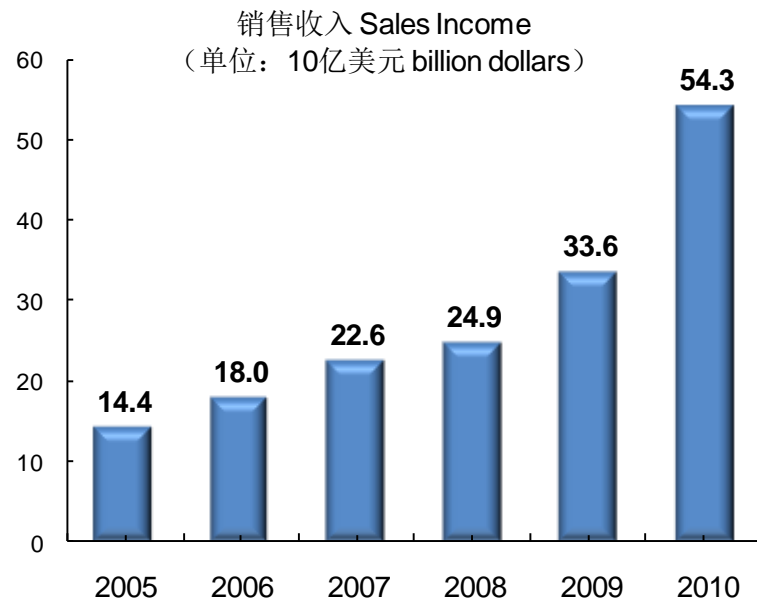


Part III SAIC Vision and Strategy on FCVs

SAIC Motor Profile

Sales & Market Share

In 2010, 19.4% domestic market share of SAIC vehicle in China



Rank of the 500 top businesses in Fortune

	2005Y	2006Y	2007Y	2008Y	2009Y	2010Y
SAIC rank	475	402	373	359	223	151

SAIC Motor NEV Current status

上汽新能源汽车发展里程 Milestones of SAIC Motor NEV



* CNG: Compressed Natural Gas
 DME : Dimethyl Ether
 SC: Super Capacitor
 FCV: Fuel Cell Vehicle
 HEV: Hybrid Electric Vehicle

- ❖ **FCV and EV will be a key for future transportation**
 - ❖ **EV will be good for short range such as lower than 150km**
 - ❖ **FCV will be good for mid or long range such as larger than 400km**
- ❖ **FCV provide abundant applications for renewable energy, such as wind or solar energy**
- ❖ **FCV commercialization will start from**
 - ❖ **several key cities,**
 - ❖ **then form a hydrogen high way**
 - ❖ **eventually will be accepted by public**

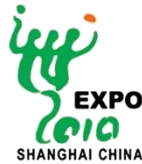
❖ **Upgrade FCV development, follow state-of-art FCV technology**

❖ **Roadmap**

❖ **Product Plan**

SAIC FCV Roadmap

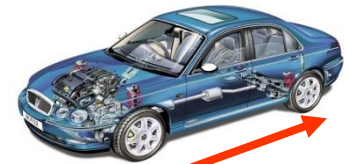
2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
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Cost

Performance

Safe and reliable



- ✓ PFCV
- ✓ 863
- 4th Generation

- ✓ PFCV
- ✓ 863
- 3rd Generation

- ✓ 863
- ✓ GM
- ✓ PFCV
- 2nd Generation

- ✓ 863
- 1st Generation

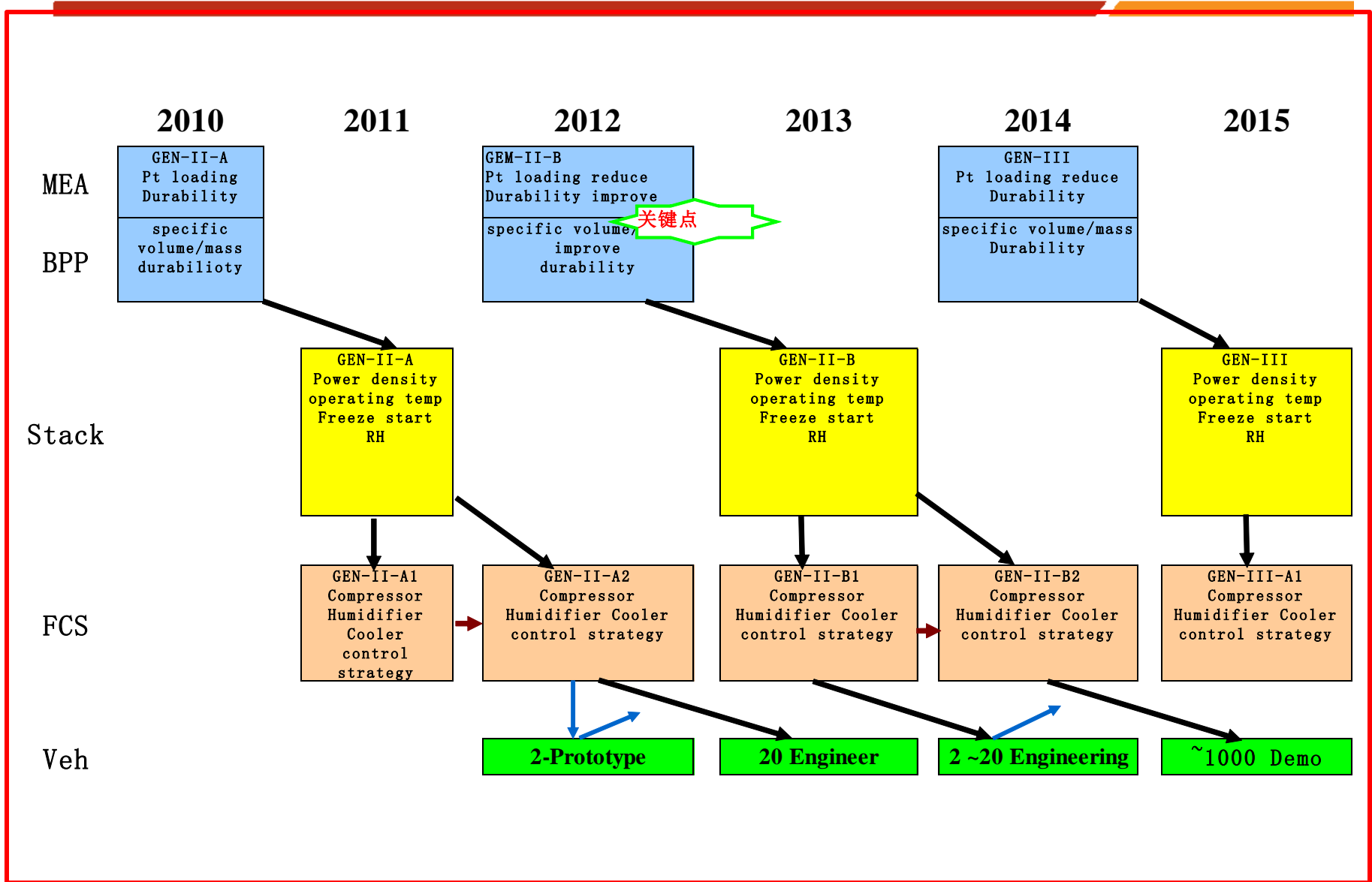
8FCVs

>20FCVs

Fleet

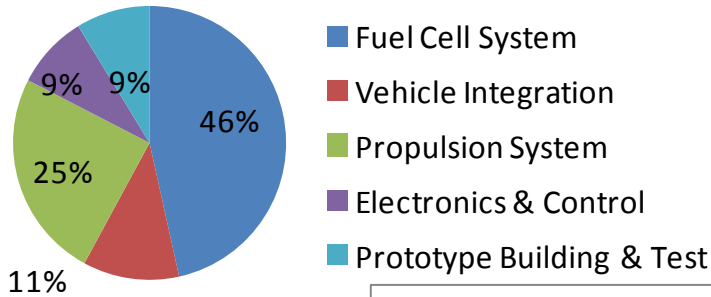
Fleet

FCV Product Plan

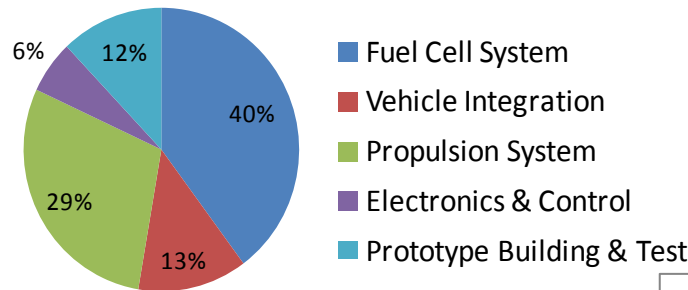


FCV Cost Reduction Plan

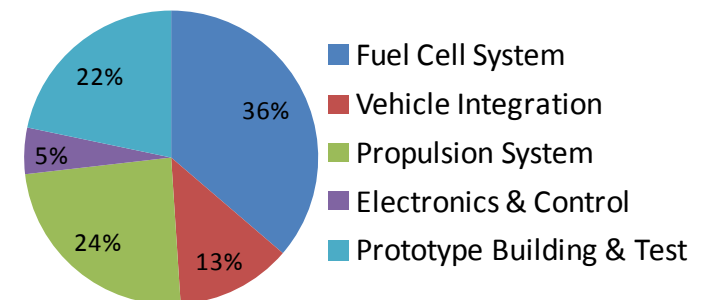
<10 Vehicles — Per Vehicle Cost



<100 Vehicle — Per Vehicle cost



<1000 Vehicles — Per Vehicle Cost



Part IV Remaining Barrier for Commercialization

- ❖ **China only have four permanent Hydrogen station in Shanghai and Beijing.**
- ❖ **Other cities interest in building H2 station including Fushun and Dalian**
- ❖ **Lack of incentive for H2 station construction**
- ❖ **Lack of motivation**
- ❖ **Needs Mega Gas company be more proactive**

- ❖ **Hydrogen safety-regulation, education and demonstration**
- ❖ **Personal experiences-demonstration**
- ❖ **Cost about the same as conventional vehicle, needs government incentives**
- ❖ **Drivability about the same as conventional vehicle**

❖ **Must be close to conventional vehicle**

❖ **TCO will be less**

❖ **No compromise**

❖ **Advance on emission, NVH, drivability and fuel economy**

Summary

- ❖ **Chinese government has recognize the importance of H2 & FC**
- ❖ **China has been activity on FCV development and demonstration**
- ❖ **SAIC as #1 Auto OEM has strategy on FCV and hydrogen technology**
- ❖ **China still lack of sufficient hydrogen infrastructure**
- ❖ **China still need to overcome barriers for Fuel cell commercialization**