

# The Application of Hydrogen & Fuel Cell Technology in China



**Bei Sun**

Re-Fire Technology

# OUTLINE

□ Fuel Cell Automotive Industry in China

□ Commercial Demonstration Operation Status of Fuel Cell Vehicle

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Hydrogen

『The future energy of 21st century』

Clean, zero-emission, wide sources and inexhaustible



Industrial byproduct



Electrolysed water



Chemical-based



Petrochemical-based



New hydrogen-producing technology

**250 kiloton**

Hydrogen by product from chlor-alkai industry in 2017, China

**136.9k**

7.5t fuel cell logistic vehicles running 200km/day for a year

# FCEV Industry Policies In China

《Made in China 2025》

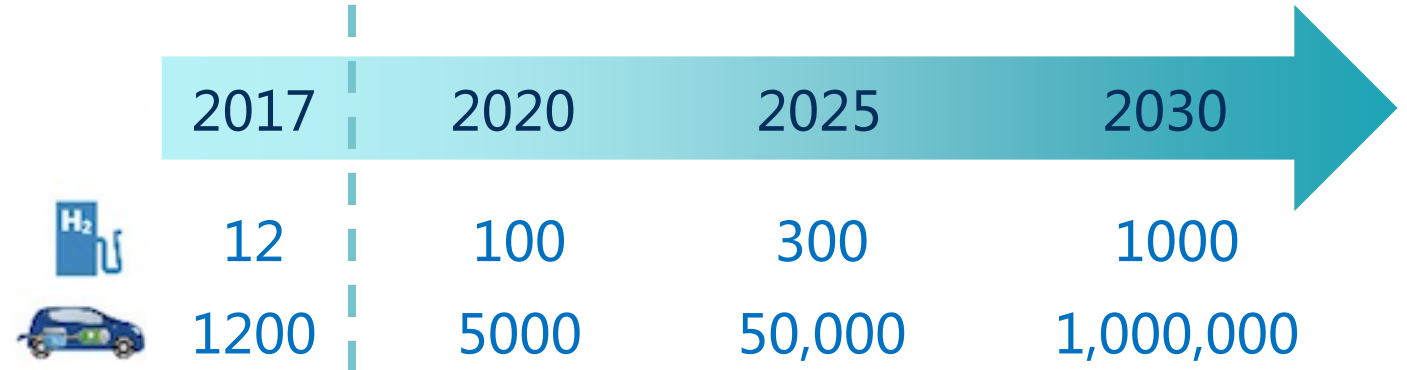
《National strategy innovation-driven development outline》

《Innovation Plan for Energy Technology Revolution (2016-2030)》

《Energy-saving and New Energy Vehicle Technical Roadmap》

....

“By 2020, 2025 and 2030 respectively, the scale of FCEV in China will reach 5000, 50k and 1 million units while Hydrogen filling station mounting up to 100, 300 and 1000 units.”



---from 《Energy-saving and New Energy Vehicle Technical Roadmap》

# The State Council/ MOST/ MIIT



The State Council



Department of Equipment Manufacturing Industry/  
Ministry of Industry and Information Technology /MIIT



Ministry of Science and Technology /MIIT

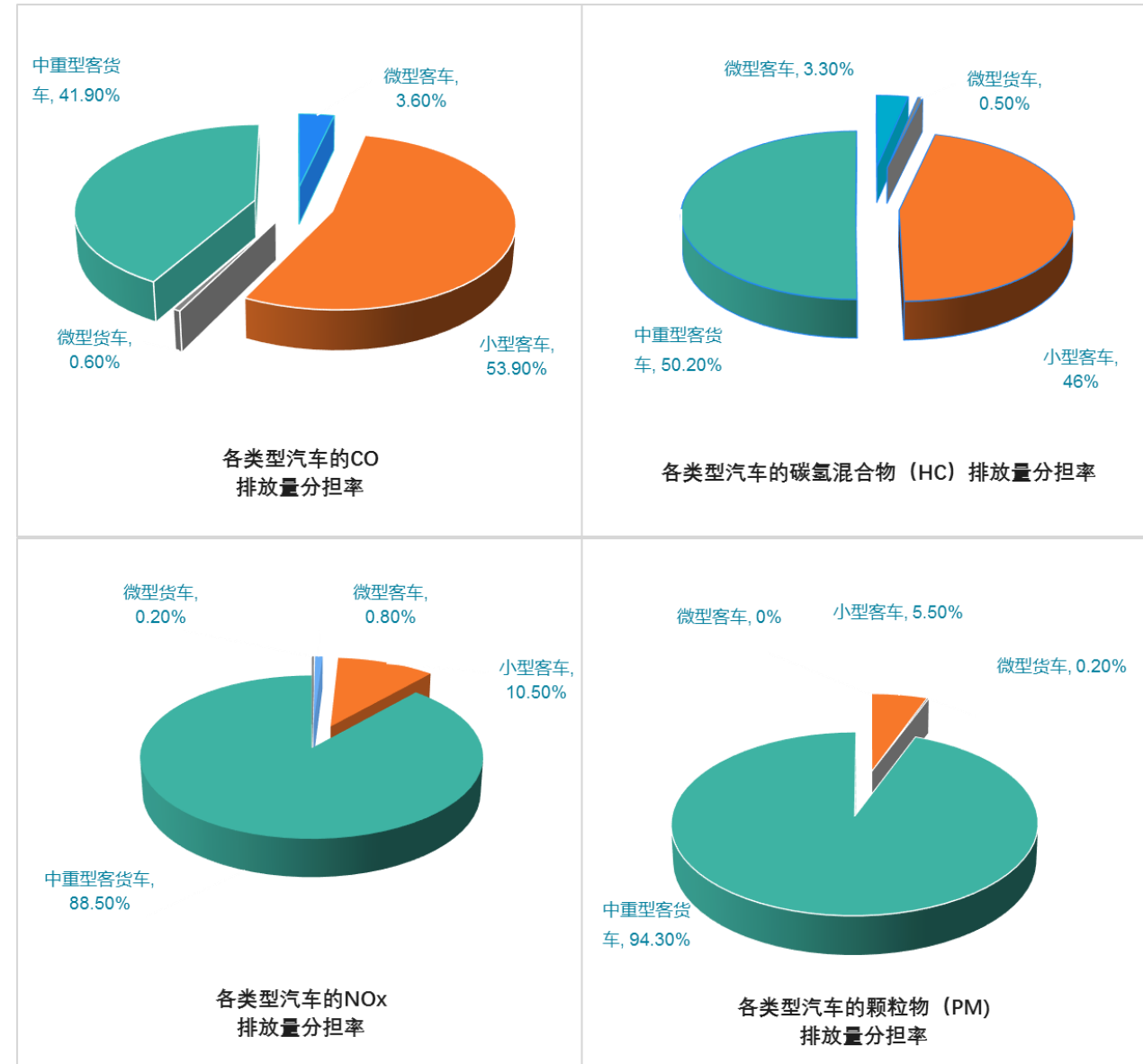
“Focus on FCEV demonstration operation, selecting the areas with strong government support and better fuel cell industry basis, secure the key links of the industrial chain with sound standards and system.”

“In late 13th Five-Year Plan and during the 14th Five-Year Plan period, great attention has been paid to the research of vehicle fuel cell core technology, hydrogen-producing technology, hydrogen storage and hydrogen filling.”

# FCEV- Best Alternative for Traditional Vehicles

According to statistics from Department of Ecology and Environmental Protection, vehicle emissions has become the primary contributor to PM2.5 in Beijing, Shanghai, Shenzhen and other major cities. If medium and heavy commercial vehicles (12.3% of vehicle holdings) were to be replaced by FCEVs, it could be forecast that:

- ✓ CO dropped by **42%**
- ✓ HC dropped by **50%**
- ✓ NOx dropped by **88%**
- ✓ PM dropped by **94%**



## Britain

prohibit the sale of new gasoline and diesel vehicles from 2040

## Germany, France, Netherland:

respectively prohibit the sale of fuel vehicles from 2030, 2040 and 2025

## China:

MIIT has convened

**Diesel Truck Pollution-control Seminar**  
formulating clear alternative plan

The Battle of the Blue Sky will further reduce emissions upon a three-year plan targeting diesel trucks



# Proposal of Local Government

**2017:** Shanghai Fuel Cell Vehicle Development Plan

**2020:** Pool over 100 FCEV related enterprises, with annual production value of FCV industry chain exceeding **15 billion** RMB; construct five to ten hydrogen filling stations and two passenger vehicle demonstration zones with operating scale up to 3000 vehicles.

**2026-2030:** realize the breakthrough of annual production value of Shanghai FCV industry chain exceeding **300 billion** RMB.

**Suzhou, Xian, Guangzhou, Wuhan and Foshan, etc. has also released local FCEV plans this year.**



# Commercial/ Governmental Demonstration



Until Aug. 2018, FCEV commercial operation can be found in Beijing, Shanghai, Shenzhen, Foshan, Guangzhou, Shiyuan, Zhengzhou, Rugao, Chengdu, Datong, Xinbin and Zhangjiakou, etc.

# OEMs & Traditional Energy

Domestic vehicle enterprises and traditional energy enterprises has released fuel cell development plan one after the other.



Under construction : 45  
Operation: 17



## Bus OEMs



## Truck/Utility OEMs



## Passenger Vehicle OEMs



# OEMs & Traditional Energy

## Hydrogen Council



Established on 2017 Davos World Economy Forum, is to promote the role of hydrogen energy technology in global energy transformation process to curb global warming.

**5 out of 53 enterprise members from 11 countries are from China:**

**Great Wall Motor, Weichai Power, National Energy Corporation, Sinopec and Re-fire.**



# New Opportunity - New Energy Truck & Utility Vehicle

## The State Council :

### *Synergizing E-commerce and Express Logistic Development*

Gradually increase the proportion of new energy vehicles in express logistics; Provide guidance to localities for better urban utility vehicle management policies in terms of reasonable areas and time periods arrangements, especially for express and other service vehicles.

## E-commerce Enterprises (JD.com, Green hand, etc.)

E-commerce logistics has embarked on a clean green road since the introduction of new energy logistic vehicles in 2017.

### **Surging E-commerce express businesses:**

Keep 50% accelerating rate annually

**200k**      **400k**

**2018**

**2020**



**Authority: Annual Production  
& Sale Volume Forecast**

# Logistics Fuel Cell EV

## Unique Features of FCEV

- ✓ Long driving range: >500km
- ✓ Apt for interprovincial, intercity express and freight transport
- ✓ Extended driving range with boosted hydrogen tank (Type III 35Mpa, III/IV 70Mpa)
- ✓ Economical energy with short filling time.
- ✓ Used as emergency backup power

## Common Features of FCEV and EV

- ✓ Zero carbon emissions
- ✓ Better driving experience than traditional vehicles
- ✓ Wide energy sources



# ZERO EMISSION URBAN DELIVERY







RAIR

中汽协 汽车动力  
蓄电和  
氢燃料电行业  
白名单企业 (第一批)





## VISION

Creating a sustainable future with fuel cell technologies

A nighttime photograph of a city street featuring elevated concrete tracks supported by pillars. The scene is illuminated by streetlights, creating starburst effects. Light trails from moving vehicles are visible on the road. A blue bus stop sign is prominent in the foreground on the right. The word "VISION" is overlaid in white text in the upper left corner.

**VISION**

Bringing fuel cell applications to life



# Welcome to Re-Fire

