中国移动
China Mobile

Fuel Cell Deployment and Practice in China Mobile

BianSen
China Mobile Research Institute
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Outline

1. About China Mobile
2. Fuel cell Trials in China Mobile
3. Summary

Network of China Mobile

Network

GSM

Over **900,000** base stations, realizing “village connected” nationwide

TD-SCDMA

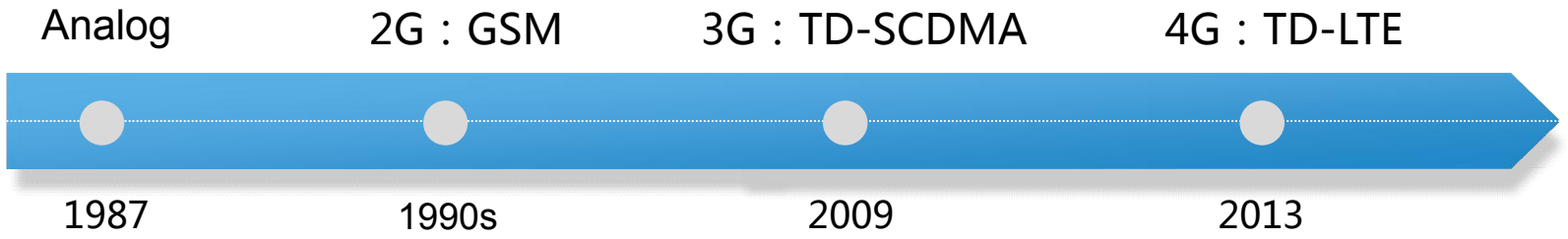
Over **500,000** base stations, coverage over all cities above county level and some towns

TD-LTE

Over **800,000** base stations, as the world’s largest 4G network

WLAN

Over **4.4 million** access points, covering universities, traffic hubs and business centers, etc..

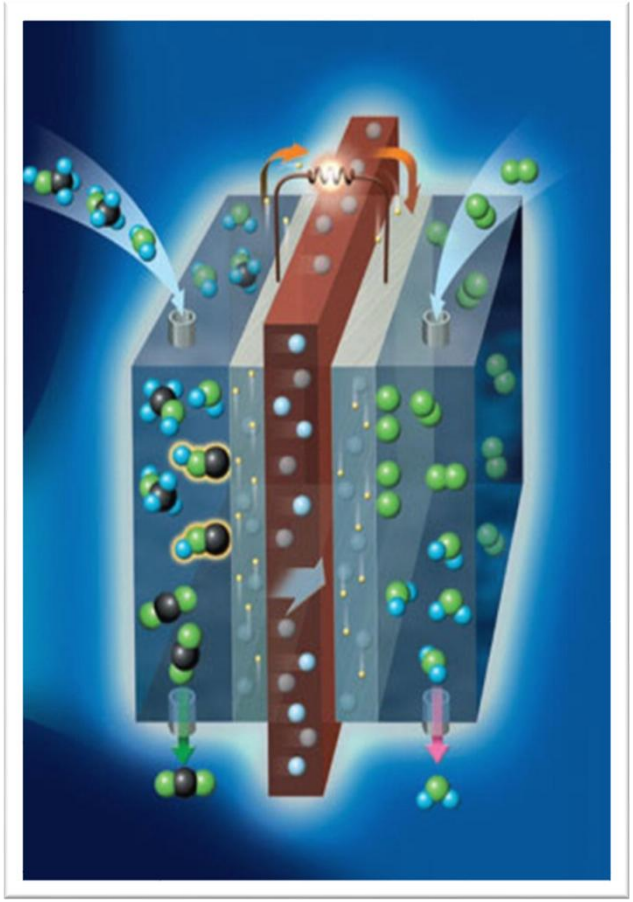


Fuel cell Trials in China mobile

Proton Exchange Membrane Fuel Cell (PEMFC)

With the global warming problem, fuel cell technologies are viewed as one of the most promising energy technologies for sustainable development due to their high energy efficiency and environment friendliness.

Compared with the other types of fuel cells, a proton exchange membrane fuel cell (PEMFC) shows attractive results with its advantages in low working temperature, high power density, fast response, good stability and zero emission when it works with pure hydrogen, furthermore it is suitable to be used as portable power supply and distributed power supply, such as hybrid vehicles and base station



Fuel cell trials in China Mobile

- More than 70 pilot sites were deployed in 17cities, 4 of which were out-of-service.
- In the year 2008, the first pilot site was deployed in Lanzhou, and it had been out-of-service due to lack of fuel source.
- 13 equipment suppliers.
- Hydrogen fuel cell pilot :83%, methanol fuel cell pilot station:15%, Self-circulated green base station:2%。

No.	Scenarios for Fuel Cell
1	Hydrogen fuel cell for BTS back-up power
2	Methanol reforming hydrogen fuel cell for BTS back-up power
3	Methanol reforming hydrogen fuel cell for temporary main power supply
4	Hydrogen fuel cell for emergency power supply
5	Pilot site of Self-autonamy green base station

Pilot Sites- hydrogen fuel cell for Base Station back-up power

Hydrogen fuel cell for base station back-up power：

Chengdu- A pilot station of hydrogen fuel cell for base station back-up power -Dahe fish villa base station

Pilot station- hydrogen fuel cell for base station back-up power

Hydrogen fuel cell for base station back-up power：

Chengdu- A pilot station of hydrogen fuel cell for base station back-up power – Shuangjin road base station

Pilot station- hydrogen fuel cell for base station back-up power

Hydrogen fuel cell for base station back-up power：

Luoyang- A pilot station of hydrogen fuel cell for base station back-up power –Fengye international school base station

Pilot station- hydrogen fuel cell for base station back-up power

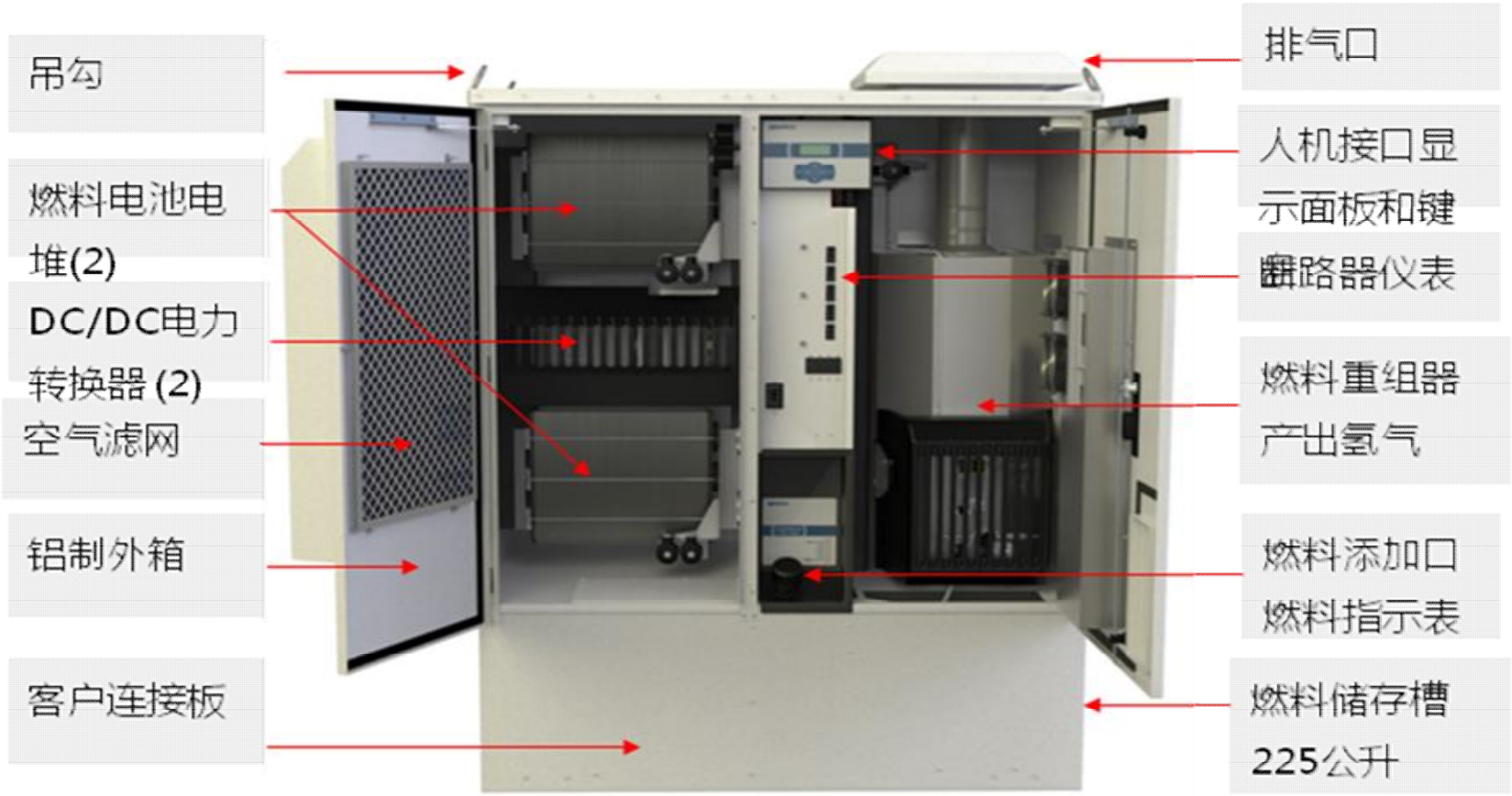
Hydrogen fuel cell for base station back-up power：

Luoyang- A pilot station of hydrogen fuel cell for base station back-up power –Fengxiang mountain villa base station

Pilot station- Methanol reforming hydrogen fuel cell for base station back-up power

Methanol reforming hydrogen fuel cell for base station back-up power：

Suqian- A pilot station of methanol reforming hydrogen fuel cell for base station back-up power



Pilot station- Methanol reforming hydrogen fuel cell for base station back-up power

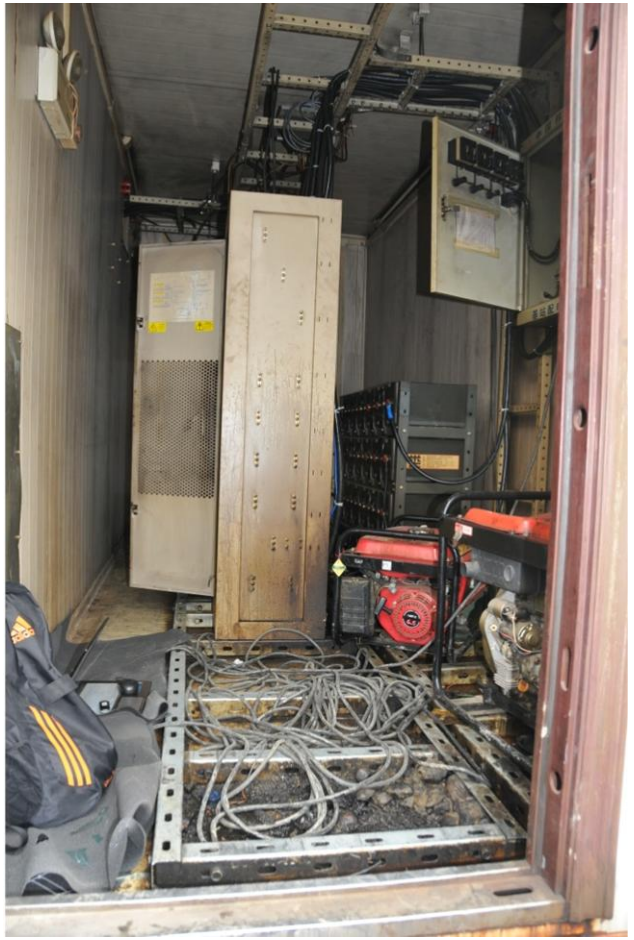
Methanol reforming hydrogen fuel cell for base station back-up power：

Suqian- A pilot station of methanol reforming hydrogen fuel cell for base station back-up power –Super base station

Pilot station- methanol reforming hydrogen fuel cell for temporary main power supply

Methanol reforming hydrogen fuel cell for temporary main power supply:

Chengdu- A pilot station of methanol reforming hydrogen fuel cell for temporary main power supply – Container base station



Pilot station- methanol reforming hydrogen fuel cell for temporary main power supply

Methanol reforming hydrogen fuel cell for temporary main power supply:

Chengdu- A pilot station of methanol reforming hydrogen fuel cell for temporary main power supply – Container base station

Pilot station- Hydrogen fuel cell for emergency power supply

Hydrogen fuel cell for emergency power supply：

Chengdu-A pilot station of movable emergency power supply

Power supply	Gasoline DC generator(2KW)	Fuel cell generator(2KW)
Weight	40kg	65Kg
Endurance	2h	2h
Noise	55-60dB	≦ 50 dB
Environment friendliness	Normal	Zero emission

Pilot station- Self-circulated green base station

The first self-circulated green base station in the globe that integrated with wind, solar and water

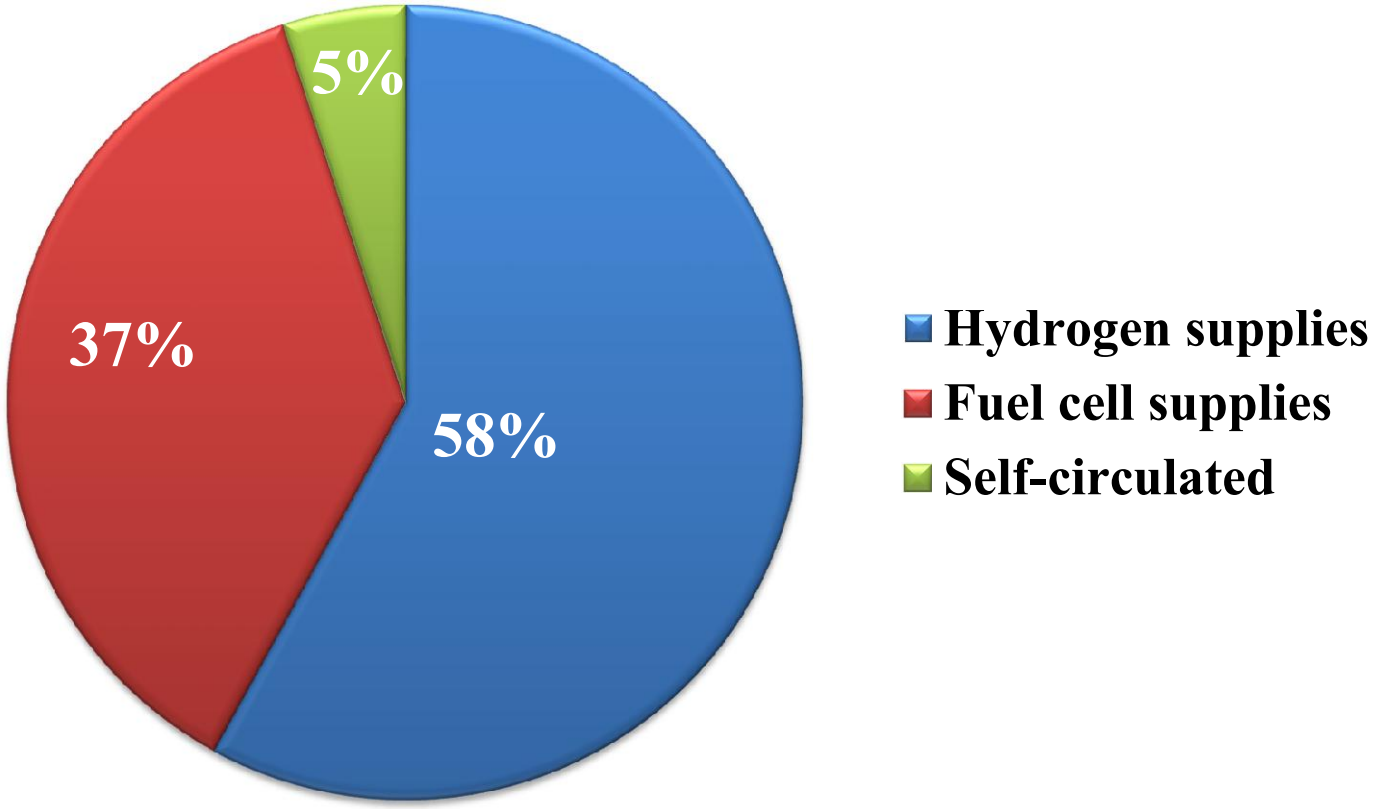
Support TD-SCDMA/TD-LTE network，free of commercial power, steady operation for 2 years

Pilot station- Self-circulated green base station

•If extra energy is generated by the wind and solar system, the base station is stimulated and the rest energy is used to electrolysis water. The hydrogen obtained by water electrolysis system will be stored for the fuel cell system

• If the energy obtained by the wind and solar system is insufficient, the stored hydrogen will be used to supply energy for the base station and the water generated by the fuel cell system will be recycled for further electrolysis

Pilot station fuel source supply



Price of hydrogen and methanol varies in different regions, the price of 40L hydrogen ranges from 55-160 RMB. The cost of hydrogen is 12-18 RMB per Kwh and that of methanol fuel cell is 2-3 RMB

Pilot station hydrogen fuel cell system power consumption:

- Hydrogen fuel cell back-up system power consumption: 20-90W
- Methanol fuel cell back-up system power consumption: More than 200W

Pilot station hydrogen fuel cell system start-up time

The start-up time of different hydrogen fuel cell pilot station varies from 2s to 3min

Comparison of power supply systems

	hydrogen fuel cell	lead-acid battery	HT lead-acid battery	Lithium battery	diesel/gasoline generator
Working temperature	-10℃-45℃	0℃-30℃	0℃-40℃	0℃-40℃	-5℃-45℃
Capable of continuous power supply	Yes	No	No	No	Yes
maintenance cycle	1 year	——	——	——	Depending on supplies
Maintainability	Periodic self-test, remote control	Periodic test	Periodic test	Periodic test	Depending on service condition
Start-up time	≤10S	——	——	——	≤3min
Buck-up time	Able to estimate accurately	Unable to estimate accurately	Unable to estimate accurately	Unable to estimate accurately	Able to estimate
Remote control	Yes	Yes	Yes	Yes	Yes
Life time	10 years	5 years	8 years	7-8 years	5 years
environment protection	Without contaminations	With contaminations	With contaminations	With contaminations	With contaminations

Summary

中国移动
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Thank you for your attention !