



绿色终极能源

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2018



四川氢能源产业的建设与发展思路

Construction and Development
Ideas of Hydrogen Energy Industry
in Sichuan Province

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01

氢能源产业国内外发展现状

Development Status of Hydrogen
Energy Industry at Home and Abroad



国际发展现状

International Development Statuse



2014年发布了《氢能与燃料电池战略路线图》，制定了“三步走”发展计划。

In 2014, the "Strategy Roadmap for Hydrogen and Fuel Cells" was released, and a "three-step" development plan was formulated.



计划至2020年加州建设满足100万辆氢能汽车运行的基础设施，至2025年将有150万辆氢能汽车投入使用。

It is planned that by 2020, California will build an infrastructure that will meet the operation of 1 million hydrogen-powered vehicles, and by 2025 there will be 1.5 million hydrogen-powered vehicles in use.



2020年将有50万辆燃料电池汽车投入使用。

By 2020 there will be 500,000 fuel cell vehicles in use.



2008年就开始实施“低碳绿色增长战略”，对氢能与燃料电池领域加大投资力度。

In 2008, the "Low Carbon-Green Growth Strategy" was launched; to increase investment in hydrogen energy and fuel cells.



最早涉足燃料电池的地区之一，2008年推行了欧盟燃料电池联合行动计划项目。

One of the earliest areas involved in fuel cells. In 2008, they launched the EU Fuel Cell Joint Action Plan project.



2012年宣布实施“英国H2 Mobility”计划，目前已建成12座加氢站。

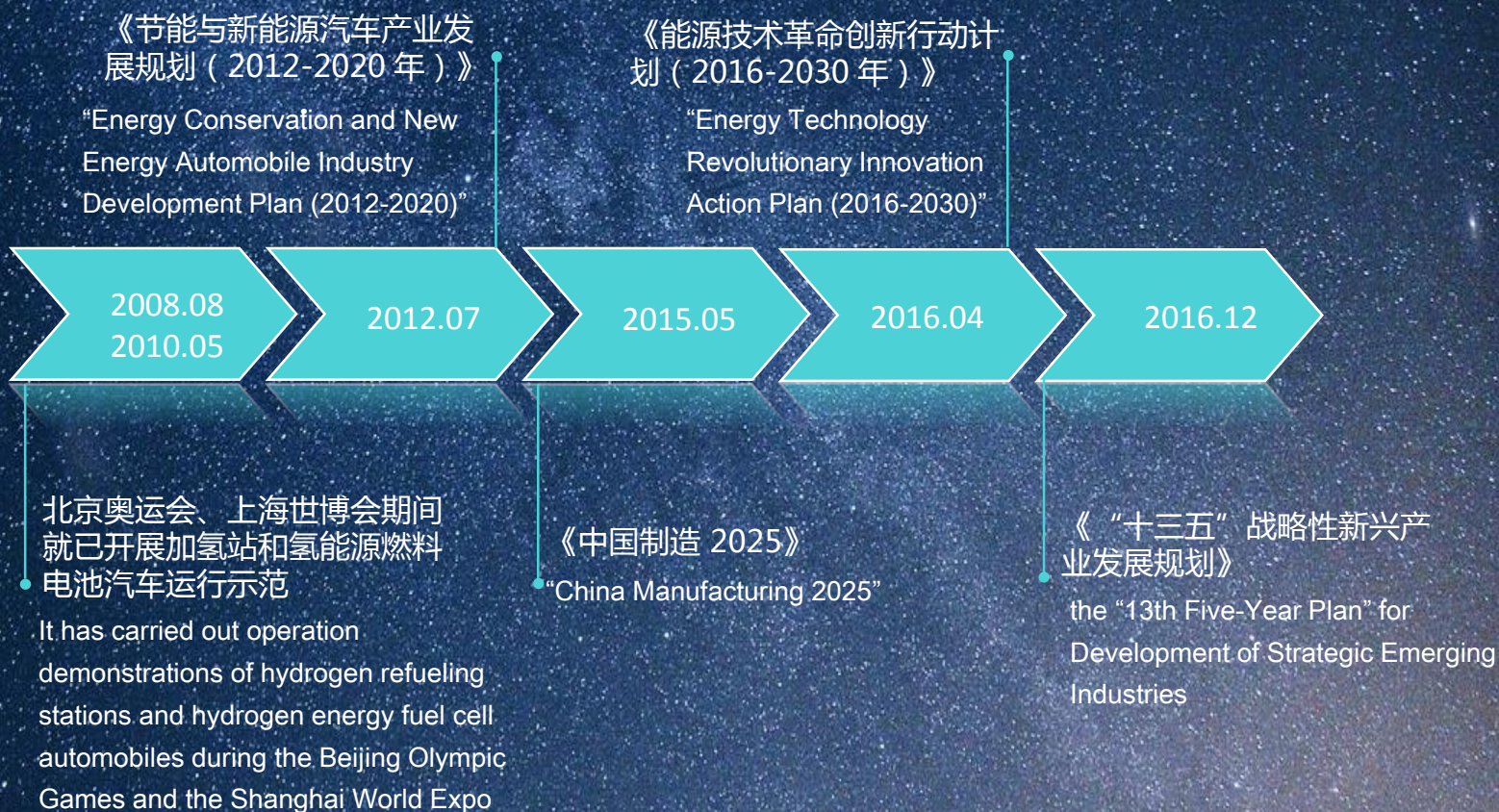
In 2012, the government announced the implementation of the "H2 Mobility UK" program, and 12 hydrogen refueling stations have been built.





国内发展现状

Domestic Development Status





国内发展现状

Domestic Development Status



2017年9月上海市率先在国内推出了《氢能与燃料电池汽车发展规划》，提出于2025年建成50座加氢站。

in September 2017, Shanghai took the lead in launching the “Hydrogen Energy and Fuel Cell Automobile Development Plan” in China, and proposed to build 50 hydrogen refueling stations by 2025.

广东、江苏、山东、湖北、河北等省份相继出台氢能源与燃料电池产业政策及规划。到目前为止，全国已初步形成了长三角、珠三角等主要氢能产业集群。

Guangdong, Jiangsu, Shandong, Hubei, and Hebei have successively issued hydrogen energy and fuel cell industry policies and plans. So far, China has initially formed the Yangtze River Delta, Pearl River Delta and other major hydrogen industry clusters.



国内发展现状

Domestic Development Status

中国氢能产业基础设施发展蓝皮书





02

四川氢能产业发展基础与态势

Hydrogen Energy Industry Development
Foundation and Situation in Sichuan



资源禀赋

Endowment of Resources



四川被誉为“天府之国”，物产丰富、油气深藏，天然气、水电资源储量均位居全国前列，这些独特的资源优势，为氢能产业快速发展奠定了坚实的基础。

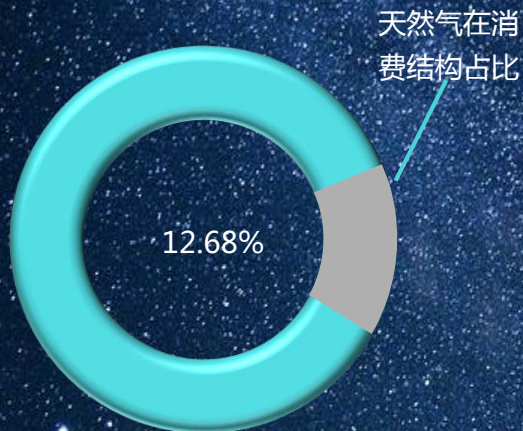
Sichuan is known as the "land of abundance", rich in natural resources, deep in oil and gas, and the reserves of natural gas and hydropower are among the top in China. These unique resource advantages lay a solid foundation for the rapid development of hydrogen energy industry.





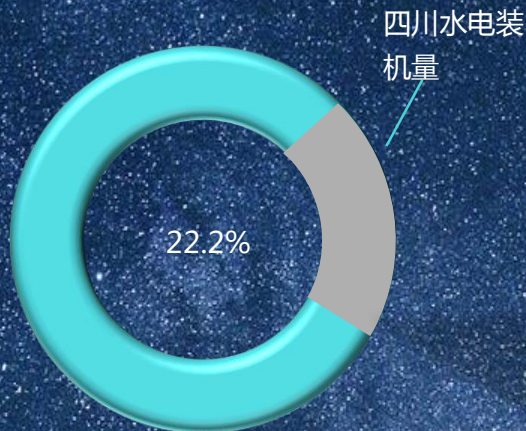
资源禀赋

Endowment of Resources



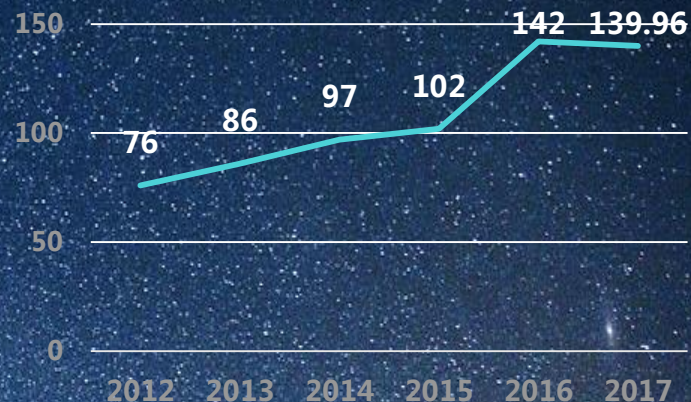
天然气资源量方面，常规天然气为12.07万亿立方米，页岩气27.5万亿立方米。2017年天然气产量和消费量分别达282亿、200亿立方米，在一次能源消费结构中的比重达12.68%

In terms of natural gas resources, it enjoys 12.07 trillion cubic meters of conventional natural gas reserves, and 27.5 trillion cubic meters of shale gas reserves. Its natural gas production and consumption reached 28.2 billion and 20 billion cubic meters respectively in 2017, accounting for 12.68% of the primary energy consumption.



水电方面，装机规模突破7000万千瓦，占全省总装机的80%，占全国装机总量的22.2%。

In terms of hydropower, the installed capacity has exceeded 70 million KWs, accounting for 80% of the total installed power in the province and 22.2% of the total installed power in the country.



据不完全统计，2012~2017年，四川电网水电“弃水”电量分别为76亿、86亿、97亿、102亿、142亿和139.96亿千瓦时。

According to incomplete statistics, from 2012 to 2017, the "abandoned" hydropower capacity of Sichuan Power Grid was 7.6 billion, 8.6 billion, 9.7 billion, 10.2 billion, 14.2 billion and 13.996 billion KWHs respectively.



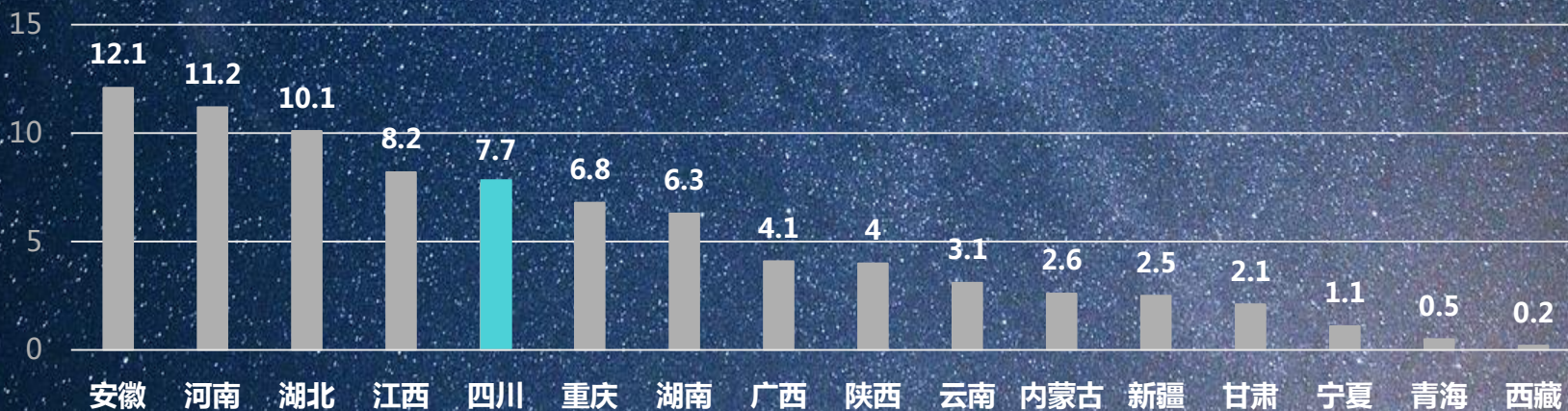
产业优势

Industry Advantages

四川作为“一带一路”战略规划的核心区域，在中西部16个省市区中制造业企业数量居第五位，具有较强的竞争能力，尤其是在资阳、自贡、郫都、龙泉、高新区汽车制造和清洁能源制造形成了氢能源关联产业优势。

As the core area of the “One Belt, One Road” strategic plan, Sichuan ranks fifth among the 16 provinces and municipalities in the central and western regions, with strong competitiveness, especially in Ziyang, Zigong, Qidu, Longquan and Gaoxin. District automobile manufacturing and clean energy manufacturing have formed the advantages of hydrogen energy related industries.

纳入一带一路战略规划中西部省市制造业企业数量（万户）排名





政策环境

Policy Environment

➤ “5+1” 特色产业体系 ‘5+1’ characteristic industrial system

是四川省打造的以电子信息、装备制造、食品饮料、先进材料、能源化工5个万亿级支柱产业和数字经济为主体的产业体系。

It is an industrial system built by Sichuan Province with five trillion-level pillar industries and digital economy, including electronic information, equipment manufacturing, food and beverage, advanced materials, and energy and chemical industry.

➤ 《四川省“十三五”能源发展规划》

The ‘13th Five-year’ Plan for Energy Development in Sichuan Province

“加强能源科技创新能力建设，包括电、冷、热、气、氢等多种能源智能协同的能源互联网基础设施建设”

“Strengthening the capacity building of energy science and technology innovation, including the energy and energy infrastructure construction of multiple energy sources such as electricity, cold, heat, gas and hydrogen”

➤ 《四川省政府关于深化四川电力体制改革的实施意见》

the Implementation Opinions of Sichuan Provincial Government on Deepening the Reform of Sichuan Electric Power System

“对大数据、新型电池、电解氢等绿色高载能产业，执行单一制输配电价每千瓦时0.105元，到户电价分别实现每千瓦时0.35元、0.35元、0.30元左右水平”

For green high-energy industries such as big data, new batteries, and electrolyzed hydrogen, the single-transmission and distribution price is 0.105 yuan per kWh, and the household electricity price is 0.35 yuan, 0.35 yuan, and 0.30 yuan per kWh respectively.”



发展态势

Development Trend

◆ 组建四川省氢能与燃料电池产业创新联盟

本着“政府主导、龙头带动、资源共享、合作共赢”的氢能产业发展原则，2018年2月8日，四川省天然气投资公司牵头联合省内外30余家单位成立了四川省氢能与燃料电池产业创新联盟。

◆ Established Sichuan Hydrogen Energy and Fuel Cell Industry Innovation Alliance

Based on the principle of "government leading, leader driving, resource sharing and win-win cooperation" for the development of hydrogen energy industry, on February 8, 2018, Sichuan Energy Investment Natural Gas Co., Ltd. led more than 30 enterprises and public institutions as well as scientific research institutions inside and outside the Sichuan Province to establish the Sichuan Hydrogen Energy and Fuel Cell Industry Innovation Alliance



四川省氢能与燃料电池产业创新联盟成立大会
Sichuan Hydrogen Energy and Fuel Cell Technology Industrial Alliance

◆大力推进氢能源产业链集群发展

四川省政府大力支持川内企业如四川省天然气投资公司、东方电气、成都客车、四川清能汽车、华气厚普、金星压缩机、天一科技、中材科技等在氢能产业“制、储、运、用”各环节开展技术、设备的研发以及推广应用，整体推动氢能源产业链集群发展。

◆Vigorously promote the development of hydrogen energy industry chain cluster

The Sichuan Provincial Government strongly supports Sichuan enterprises such as Sichuan Natural Gas Investment Company, Dongfang Electric, Chengdu Bus, Sichuan Qingneng Automobile, Huaqi Houpu, Jinxing Compressor, Sinoma Technology, etc. in the hydrogen energy industry, 'manufacturing, storage, transportation and use'. The development of technology and equipment, as well as the promotion and application of various links, promote the development of the hydrogen energy industry chain cluster as a whole.



PSA提纯氢气技术
PSA purification
hydrogen technology



储运氢设备
Hydrogen storage
and transportation
equipment



加氢站
Hydrogen
refueling station



氢燃料车动力系统
Hydrogen fuel car
power system



氢燃料汽车
Hydrogen powered
vehicle

◆ 建成投运西南地区首座加氢站

四川省天然气投资公司2018年2月在成都市郫都区建设投运了西南地区首个商业化运行的加氢站，设计日加注能力500公斤，目前已加注总量累计达5.4万标方，四川省自行研发制造的氢燃料电池客车总行驶里程已达10万公里。

Put into operation in Southwest China's first hydrogen refueling station

The first commercial hydrogen refueling station in southwest China was built and put into operation in Pidu District of Chengdu, with a designed daily refueling capacity of 500 kg. At present, the operation is stable, with a total hydrogen refueling capacity of 54000 m³ and a total hydrogen fuel cell bus mileage of 100000 km



加氢站现场
Hydrogen station



加氢站投运揭牌仪式
Hydrogenation station launching ceremony

◆ 四川省加氢站专项规划

2018年至2019年将建设10座加氢站，到2025年，全省将建设300座加氢站。

Special plan for Sichuan hydrogen refueling station

10 hydrogen refueling stations will be built from 2018 to 2019, By 2025, 300 hydrogen refueling stations will be built in the whole province



03

四川省氢能源产业发展思路

Ideas for Construction and Development
of Hydrogen Energy Industry in Sichuan

指导原则 Guiding principles

以四川氢能产业发展规划为指导，整合资源、统筹规划、创新思路、示范先行、协同发展，加快推进四川省氢能产业建设。

Guided by the development plan of Sichuan hydrogen energy industry, we will integrate resources, make overall planning, innovative ideas, demonstration first, and coordinated development, and accelerate the construction of hydrogen energy industry in Sichuan Province.





总体目标 Overall objectives

以氢能全产业链建设为核心

提升四川创新能力和高端制造能力，争创国家级创新中心

集聚高端人才，形成产业集群，努力将四川建成为世界氢能产业高地

with the construction of the whole industrial chain of hydrogen energy as the core

enhance the innovation capacity and high-end manufacturing capacity of Sichuan, strive to create a national innovation center

gather high-end talents, form an industrial cluster, and strive to build Sichuan into a world hydrogen energy industry highland.



总体思路 Overall ideas

以“创新中心+投资公司+产业联盟”模式，形成“政、产、学、研、融、园、用”七位一体的氢能产业生态。聚集优势资源，对比国际一流，强化基础设施，突破核心技术，突出产业化推广。



with the model of innovation center + investment company + industrial alliance, a seven-in-one hydrogen energy industry ecology of "government, production, learning, research, integration, park and utilization" has been formed in Sichuan for gathering superior resources, comparing with the international first-class, strengthening infrastructure, breaking through core technologies and highlighting industrial promotion.



具体举措 Specific measures

实施“一个平台，一个中心，五个基地”的总体部署，围绕天然气管道掺氢、天然气掺氢汽车、氢燃料电池汽车和氢燃料电池备用电源等重点领域打造“制、储、运、用”的产业集群。其中：

Specific measures: implement the overall deployment of "one platform, one center and five bases" Focus on the natural gas pipeline hydrogen-doping, natural gas hydrogen-doped vehicles, hydrogen fuel cell vehicles and hydrogen fuel cell backup power supply and other key areas to create a "system, storage, transportation, use" industrial cluster.

“一个平台” “one platform”

组建政府氢能产业引导基金为基础的投资平台，为氢能产业的技术转化和项目落地提供充足的资金保障。

Establish a government-based hydrogen energy industry guidance fund-based investment platform to provide adequate financial support for the technical transformation and project landing of the hydrogen energy industry.



“一个中心” “one center”

组建氢能与燃料电池国家创新中心，集国内尖端技术人才和科研机构开展氢能产业产业链上各环节技术、设备等研发。

Set up a national innovation center for hydrogen energy and fuel cells, and focus on domestic leading-edge technical talents and scientific research institutions to carry out research and development of technologies and equipment in all aspects of the hydrogen energy industry industrial chain.



五个基地

- ◆ 氢气制备、储运、加气站等基础设施建设基地
- ◆ 氢燃料汽车和氢能装备制造基地
- ◆ 国家级氢能与燃料电池检测基地
- ◆ 氢能技术研发和产业孵化基地
- ◆ 氢能综合利用示范基地

Fives base Ground

- ◆ Infrastructure construction base for hydrogen preparation, storage and transportation, and gas station
- ◆ Hydrogen fuel vehicle and hydrogen energy equipment manufacturing base
- ◆ National hydrogen energy and fuel cell testing base
- ◆ Hydrogen energy technology research and development and industrial incubation base
- ◆ Hydrogen energy comprehensive utilization demonstration base



朋友们，氢能源的大发展、大机遇已经来临，必将成为新的投资热点。四川能投天然气公司是一家以从事清洁能源开发与利用的国有综合能源企业，为“天更蓝、地更绿、水更清”，我们在氢产业领域已经成功迈出了第一步。在此我诚挚的欢迎和邀请有志于氢能源产业发展的各界人士一道共谋发展、共创伟业。

Dear friends, the great development and opportunity of hydrogen energy have come and will surely become a new investment hot spot. Sichuan Energy Investment Natural Gas Co., Ltd. is a state-owned comprehensive energy enterprise engaged in the development and utilization of clean energy. The company has successfully taken the first step in the field of hydrogen industry for "bluer sky, greener ground and cleaner water". Here, I sincerely welcome and invite people from all walks of life who are interested in the development of hydrogen energy industry to work together for common development and great achievements.



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Thank you
谢谢大家！

