

# IEA-Advanced Motor Fuels ANNUAL REPORT 2016

An aerial photograph of a city, likely Pittsburgh, showing a dense urban skyline with numerous skyscrapers and buildings. A large river flows through the city, with a prominent steel truss bridge crossing it. In the foreground, there is a lush green forest and a multi-lane highway with several billboards. The entire scene is framed by a blue, curved, metallic-looking border that creates a tunnel-like effect.

China

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### *Drivers and Policies*

#### **Development Plan for an Energy-Saving and Alternative-Energy Automotive Industry (2012–2020)**

The automotive industry is a main industry in the Chinese economy and plays an important role in the country's economic and social development. Along with China's sustained, rapid economic development and accelerating urbanization, automotive demands continue to increase, and the energy shortage and environmental pollution problems that are resulting will become more prominent. Speeding up the cultivation and development of energy-saving and alternative-energy vehicles is urgently needed to effectively alleviate energy and environmental pressures and promote the sustainable development of the automobile industry. It is also needed as a strategic initiative to accelerate the transformation and upgrading of the automobile industry and to cultivate new economic growth and give China a competitive advantage internationally. China's plan was especially formulated to implement the decisions of the State Council to develop a strategic emerging industry and to strengthen energy savings and emission reductions, as well as to accelerate the cultivation and development of an energy-saving and alternative-energy automotive industry. The plan spans 2012–2020.

The goal is to make the pure electric drivetrain a main technology used in developing alternative vehicles and transforming the automotive industry. Currently, the focus is on promoting the industrialization of the pure electric and plug-in hybrid electric vehicle. As part of this focus, China will promote and popularize non-plug-in hybrid and energy-saving vehicles with internal combustion (IC) engines to improve the overall technological level of the country's automotive industry.

Alternative fuel vehicles will be developed according to local conditions. This is a necessary complement to reduce vehicle fuel consumption. The research and application of automotive alternative fuels manufacturing technology will be actively carried out. The development of alternative fuel vehicles will be encouraged in resource-rich regions of natural gas (including liquefied natural gas [LNG]), biofuels, and other fuels. China will explore the application of other alternative fuel technologies and promote the development of vehicle energy diversification.

#### **Existing National Standards on Alternative Motor Fuels**

- GB/T 23510-2009, "Fuel methanol for motor vehicles" was released on April 8, 2009, and implemented on November 1, 2009.
- GB/T 23799-2009, "Methanol gasoline (M85) for motor vehicles" was released on May 18, 2009, and implemented on December 1, 2009.
- GB 18047-2000, "Compressed natural gas as vehicle fuel" was released on April 3, 2000, and implemented on July 1, 2000. This standard specified the technical requirements for compressed natural gas (CNG) and the test method.
- GB 18350-2001, "Denatured fuel ethanol," and GB 18351-2001, "Ethanol gasoline for motor vehicles," were released on April 2, 2001, and implemented on April 15, 2001.
- GB 18351-2013, "Ethanol gasoline for motor vehicles (E10)," and GB/T 22030-2013, "Blendstocks of ethanol gasoline for motor vehicles," were released on October 10, 2013, and implemented on January 1, 2014.
- GB/T 20828-2007, "Biodiesel blend stock (BD100) for diesel engine fuels," was released in March 26, 2007, and implemented on May 1, 2014.
- GB/T 25199-2010, "Biodiesel fuel blend (B5)," was released on September 26, 2010, and implemented on February 1, 2011.
- GB/T 25199-2014, "Biodiesel fuel blend (B5)," and GB 20828-2014, "Biodiesel blend stock (BD100) for diesel engine fuels," were released on February 19, 2014, and implemented on June 1, 2014.
- GB/T 25199-2015, "Biodiesel fuel blend (B5)," and GB 20828-2014, "Biodiesel blend stock (BD100) for diesel engine fuels," were released on May 8, 2015, and implemented on May 8, 2015.

## **Advanced Motor Fuels Statistics**

In 2016, 197 million tons of crude oil were produced in China — a decrease of 7.3% year-on-year. Meanwhile 324 million tons of petroleum products were produced in China — an increase of 7.8% year-on-year. From January to December 2016, 289 million tons of petroleum products (including diesel and gasoline fuels) were consumed in China — an increase of 5.0% year-on-year. Of this, the consumption of gasoline fuels increased by 12.3% and diesel fuels decreased by 1.2%. Fuel consumption by road transportation vehicles is the main source of total Chinese gasoline and diesel consumption.

Natural gas is another main energy source for vehicles in China. In 2016, 137.1 billion cubic meters (m<sup>3</sup>) natural gas, were produced in China — an increase of 1.5 % year-on-year. Meanwhile, 72.1 billion m<sup>3</sup> natural gas were imported — an increase of 17.4 % year-on-year. From January to December 2016, natural gas consumption reached 205.8 billion m<sup>3</sup>— an increase of 6.6% from 2015.

In 2016, China's auto production and sales were 28.1 million vehicles and 28.0 million vehicles, respectively, with a year-on-year growth of 14.5% for production and 13.7% for sales.

CNG stations have spread over more than 300 cities across the country's 31 provinces. In 2015, there were 0.55 million new CNG vehicles, while total ownership reached 4.96 million cars — an increase of 12.5% over 2014. In 2015, there were about 245 new CNG stations, and the total number of stations was 4,700— an increase of 5.5% over 2014. In 2015, more than 46,000 new LNG vehicles were produced, while total ownership reached 0.230 million cars — an increase of 25.0% over the previous year. The total number of LNG stations increased to about 2,650 in 2015.

By the end of 2015, there were more than 1,100 filling stations with gasoline with a low proportion of methanol in Shanxi Province. There were approximately 63 stations with gasoline with a high proportion of methanol (M85 and M100). The annual production ability of methanol fuels was about 5.0 million tons. The annual sales of methanol gasoline fuels was more than 0.6 million tons.

## **Research and Demonstration Focus**

### **Promotion of Methanol Gasoline Vehicles Pilot Project**

At the end of February 2012, the Ministry of Industry and Information Technology announced that three pilot projects involving methanol vehicles had been launched in Shanxi, Shanghai, and Shaanxi Provinces. This indicated that methanol gasoline had entered a new era of development. By the end of 2013, 26 provinces had entered the field, to different degrees, where five provincial governments had organized and implemented the pilot projects.

Shanghai is one of the cities that are carrying out the methanol vehicle pilot project required by the Ministry. As part of that project, a taxi test was conducted for 36 months. The cumulative quantity of methanol gasoline used for refuelling has risen to 1,551,200 L. The traveling distance covered by vehicles running on this fuel was 9,695,300 km during the 36-month test, without any related security incidents.

Shanxi Province was the first province to promote the use of methanol gasoline. The province now has 14 production bases. There are more than 900 filling stations operated by Sinopec, Petro China, and the Government that sell methanol gasoline. In 2012, sales reached 800,000 tons. In 2013, a total of 281 methanol vehicles (four models) ran in the pilot operation carried out in Shanxi Province. The pilot cities included Jinzhong, Changzhi, Xi'an, Baoji, Xianyang, Yulin, Hanzhong, and Shanghai.

In June 2015, 100 methanol taxis appeared on the streets of Guiyang, which officially marked the national pilot run of methanol vehicles in the city. By the end of 2015, more than 300 methanol taxis ran on the streets of Guiyang.

By the end of 2015, 628 methanol pilot cars were cumulatively utilized in Shanxi, Shanghai, Shaanxi, Guizhou, and Gansu Provinces. On March 13, 2013, Jinzhong City took the lead in launching the methanol auto pilot in the country. One hundred and fifty methanol cars completed a 2-year pilot run in December 2015. During the pilot, operating vehicles ran 21.29 million km. The largest single vehicle

operating range was 244,000 km. The total consumption of methanol fuel was 3.27 million L, and the alcohol consumption rate was 15.35 L per 100 km.

## **Outlook**

On June 28, 2012, the State Council officially issued the Development Plan for Energy-Saving and Alternative Energy Vehicle Industry (2010–2020), which defines the technical pathways and main goals of energy-saving and alternative-energy vehicle development. By 2050, the accumulative output of pure electric vehicles and plug-in hybrid vehicles will reach 500,000; by 2020, the capacity will reach 2 million, and the accumulative production and sales amount will reach more than 5 million. The plan clarified five tasks: (1) technical innovation project for energy-saving and alternative-energy vehicles, (2) scientific plan for industry structure, (3) accelerated promotion of demonstrations, (4) active promotion of charging equipment manufacturing, and (5) enhancement of step utilization and recycling of power batteries.

- In terms of industrial structure, China should focus on building the power battery industry to form two to three leading enterprises with an output of more than 10 billion watt hours; establishing the research and production capability for key materials; and developing two to three key industries for components and materials, such as anodes and cathodes, diaphragms, and electrolytes.
- In terms of application and commercialization, China should enlarge the demonstration scope of alternative-energy vehicles in public areas of medium- and large-sized cities; carry out a pilot program for subsidizing the private purchase of alternative-energy vehicles; explore different business models for alternative-energy vehicles, battery leasing, and charging services; and greatly promote and popularize energy-saving vehicles.
- In terms of the construction of charging facilities, China should focus on (a) developing and implementing pilot programs for charging facilities within cities, (b) bringing charging facilities into the relevant industrial areas of city-wide transportation systems and construction, and (c) actively carrying out the spreading slow-charging mode at private and public parking stands.

According to the study of the China Industrial Gases Industry Association, China will usher in the golden age of natural gas vehicle development over the next 10 years. According to the national plan, by 2020, China's natural gas vehicle (LNG and CNG vehicles) output could reach 1.2 million vehicles per year, including buses and trucks at 200,000 (LNG cars accounting for 50%), and passenger cars at 1 million (LNG cars accounting for about 20%). By 2020, the population of natural gas vehicles will reach 10.5 million, which means the position of natural gas as the number one alternative vehicle fuel will be unshakable.

Plans are that by 2020, the use of methanol gasoline will be up to 2.4 million tons, the number of refitted vehicles will reach 120,000, and new methanol load vehicles will reach 40,000.

## **Additional Information Sources**

- China Association of Automobile Manufacturers (CAAM), <http://www.caam.org.cn/>
- China Automotive Technology and Research Center (CATARC), [http://www.catarc.ac.cn/ac\\_en/index.htm](http://www.catarc.ac.cn/ac_en/index.htm)
- China EV Corporation, <http://www.chinaev.org/>
- National Development and Reform Commission, <http://www.ndrc.gov.cn/fzgggz/jjyx/gjyx/>
- 2013 Yearbook of Energy-Saving and New Energy Vehicles, China Economic Publishing House, 2014, <http://www.chinabookshop.net/energysaving-energy-vehicles-yearbook-2013-english-p-19196.html?osCsid=sb14t34uh7lm5b88jdmcvd1v62>