

## **Speech at the IPHE conference**

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Respected Mr. chairmen,

Respected each national representatives,

Ladies and Gentlemen,

First, allow me on behalf of the Chinese delegation to congratulate on the successful opening of this conference. I wish to express gratitude to the hospitality, friendliness and thoughtful arrangement of the host. I wish to take this opportunity to state Chinese government's views and attitude on the hydrogen energy. The Chinese government always put more attention on the renewable energy, including the hydrogen energy. About 30 years ago, the government had already organized the Chinese hydrogen Fuel Cell project; involving over 300 researchers completed the research on the kilowatt Alkali Fuel Cell. Since 1995, the Fuel Cell project has been launched, including the Proton Exchange Membrane Fuel Cell, the Solid Oxide Fuel Cell and the Molten Carbonate Fuel Cell. In year 2000, we also began the national high-technology major project on Fuel Cell vehicles. This project budget is about 38 hundred million

RMB. By Approximately estimat, the induced investment is expected to be 2.4 billion. The hydrogen energy research was listed into the national important basic theory research items (973 project) to develop the fundamental research on production, storage and use of hydrogen energy. We also cooperate with UNDP and GEF, and prepare to demonstrate Fuel Cell bus in Beijing and Shanghai by inviting public bidding bid. We have already made corresponding plans for the production, storage and delivery of hydrogen energy.

Why China has to develop the hydrogen energy? Because the coal-based energy pattern and our limited oil and natural gas resources increase the uncertainty in terms of resource supply. In year 2002, China already had a net import of 80 million tons of oil, and that is one third of the country's total consumption. China also plans to search import natural gas from Russia and Southeast countries. Hydrogen energy is a recyclable power. There are many ways to produce it and can be obtain from localization. e.g. It can be produced by means of coal, water and other renewable resources. Thus, development and application of hydrogen energy will provide credible energy sources for supplying, and reduce China's reliance on oil import and sustainable development in the future. Coal is the main energy sources in China, which has caused to great pressure for the environment. The coal consumption in 2001 amounted to 1.24 billion tons, making up 67 percent of primary energy consumptions.

In the same year, the exhausted dust amount to 8.5 million tons, 15.62 million tons SO<sub>2</sub>. The greenhouse gas and CO<sub>2</sub> of energy consumption exhausted in China, which estimated amount to 1.9 billion tons, account for one tenth of the total of the world exhausted, was the second large exhausted country in the world. Hydrogen energy is clean because the process of using the terminal facility creates water, without any pollution. The development of the cleaned hydrogen energy is an important energy policy on protecting environment and decrease pollution, also is a choice for the Chinese energy in the future.

The hydrogen energy is also a new kind of energy supplying. Using it will form and develop a rising industrial which product hydrogen and utilize hydrogen, to become a new point of growth in national economy, and provide for new opportunity of employment. Its form and development in China make it enter into the sustainable development new era.

Thus hydrogen energy is a security, dependable, cleaned energy. To development hydrogen energy will enhance the energy supply security, improve the environment quality, and promote Chinese economy . It should be an important choice to satisfy with the Chinese energy supplying in the future development.

Chinese hydrogen energy development has a solid foundation. According to statistics, the Chinese hydrogen output amounts to 8 million tons in

2002. That number in the US, EU and Japan are 8.2 million, 7.1 million and 1.55 million tons respectively. It is obvious that China has stepped into one of the biggest hydrogen production country in the world. However, this hydrogen mainly is used as chemical materials instead of energy.

The hydrogen production capacity is strong, but the hydrogen technology is imbalance. At present, the large-scale petroleum energy equipments which produce hydrogen is mainly imported, as comparing with foreign countries, the domestic technology is insufficiency. However the hydrogen purification technology in China is comparatively outstanding, the Pressure Swing Adsorption (PSA) technology had reached 0.2 million steres throughput hydrogenper hours. The large-scale high pressure electrolyte water to produce hydrogen in China is quite advance, equipment have exported to the developed countries. China has the big ability to produce AB5 rare-earth alloy for hydrogen storage. The weight of storage hydrogen capacity is about 1.2 percent.

After 20 years effort, China has established a research and development consisting of junior college and scientific research department. China also has a developed hydrogen energy market's contingent of state-run industrial enterprises, joint stock and private enterprises.

The higher level academies are the main forces of Chinese hydrogen energy research. According to the inadequacy statistics, there are dozens universities and academies attended to the hydrogen energy research. Including the research and development of hydrogen, Fuel Cell technology, hydrogen production from sunlight, , biomass, naturalgas ; storage hydrogen research and hydrogen energy software project. Some laboratory of The Academy of sciences of China is also activity in joining the hydrogen research and development. On the basis of science research and development, some joint-stock industrial enterprises established. Such as the Fuel Cell industrial enterprises, there are some big and small enterprises in China producing fuel cell from the production of a few watts to thousands of watts, and some small fuel cell have been exported in batch.

As hydrogen energy is a long-term project, domestic investment is mainly from governments and enterprises. Since 1995 till present, The Ministry of Science and Technology (MOST) had put huge investment. According to incomplete statistics, during the 9th five-year plan, it invested about 30 million RMB on hydrogen energy. The "973 hydrogen plan" invested 30 million RMB. The "863 magnificent automobile patent program invested 0.38 billion RMB. The 10th five-year plan invested 30 million RMB. The investment fromMOST lead the direction of the local government and industries investment. According to incomplete statistics, China has

invested a total of 2.4 billion for hydrogen energy development. What's more, the National Natural Science Fund Committee of China and The Academy of sciences of China also invested in scientific research fund for promoting Chinese hydrogen energy R&D.

The Chinese industry had played important role in the field of hydrogen production, storage and use. In particular, private sector has been the pathfinder in exploiting the Chinese hydrogen energy market, with financing task and risk burden all on themselves.. .

It should be point out that the Chinese hydrogen energy developst on its special way. There is a large area in China, each area's condition is greatly difference, so hydrogen energy development is not the same in different area. As competition with some fossil energy, natural gas and coal, it is the key factor how to obtain cheap hydrogen. Combination of the Chinese energy structure, it can be assume that coal still is the important source of large-scale cheap hydrogen in the coming decades. Thus it is well on the way to develop the new technology and new process on coal to produce hydrogen. The research and develop on the Fuel Cell in China has made great progress, the fuelcell vehicle is also being made. From the view on cars cost and hydrogen supplying; it is estimate that the fuelcell buses will firstly commercialize in China. At the same time, the hydrogen- gas Internal Combustion Engine (ICE) cars and hydrogen-natural gas mixture ICE cars will be future

development. China is a developing country, and its financial support on hydrogen energy is limited. We will take the best way to carry on the substitution on Chinese hydrogen energy.

In order to accelerate the Chinese hydrogen energy development, we will recognize and arrange from stratagem's view, and establish the national hydrogen development research workgroup, whose leaguer comes from each government departments, academes and advisory committee. We will make out the national hydrogen energy development stratagems and plans in 2004, which will direct the Chinese hydrogen energy practice.

On the basis of the tenth "five-years science and technology plan", it will continue list the hydrogen energy research program on the eleventh "five-years science and technology plan". To develop hydrogen energy from Chinese practice, and stress to develop the equipment technology which the environmental favorable and a lager-scale cheap hydrogen, and to carry on the research on Fuel Cell technology and hydrogen-combustion technology, to deploy the hydrogen's new store technology, to consider the long-term hydrogen's large-scale pipeline transportation technology. At the same time, acceleration on formulates the national standard and code on hydrogen energy technology, and enhances the media and education on hydrogen energy.

We also make attention to cultivate hydrogen energy market. Not only give investment to higher academies and research institutes, we also will

give focus to private companies and treat equally all competitors for the national project. We will support any proposed projects as long as they are innovative and realistic.

Ladies and gentlemen, it needs a long time to change energy structure, perhaps, it will take decades or generations effort. However, we must begin that journey. The Chinese people say, "A thousand-li journey is started by taking the first step". Let us work together and strive for new success on hydrogen energy economy.

Thank you!