

Zero Breakthrough in Large-scale

Industrial Application of Green

hydrogen in China

| Scientific Commercialization



On August 30, SINOPEC announced that the Xinjiang Kuqa Green Hydrogen Demonstration Project, China's largest photovoltaic power generation direct green hydrogen project, was fully completed and put into operation, marking a zero breakthrough in the large-scale industrial application of green hydrogen in China. With the supporting photovoltaic power plant is completed. The project can produce green hydrogen at full capacity with the annual production of 20,000 tons of green hydrogen all near the supply of Sinopec Tahe Refining Company. It is used to replace the natural gas used in refining processing of hydrogen, modern oil processing and green hydrogen coupled with the development of low-carbon.

This project is the first project in China to utilize photovoltaic power generation to directly produce green hydrogen on a large scale. It utilizes the abundant solar energy resources in Xinjiang to directly produce green hydrogen, with an electrolysis capacity of 20,000 tons/year, a hydrogen storage capacity of 210,000 standard cubic meters, and a hydrogen transmission capacity of 28,000 standard cubic meters per hour. On June 30 this year, the project has successfully passed through the whole process of green hydrogen production.



And some of the hydrogen production workshops have been successfully put into operation to produce hydrogen. The project is implemented by Sinopec New Star Company, with the participation of Sinopec Guangzhou (Luoyang) Engineering Company, Sinopec Fifth Construction Company and Zhongyuan Construction Engineering Company. Green hydrogen is produced directly from renewable energy sources such as solar and wind power, and produces basically no greenhouse gases. China is rich in renewable resources, green

hydrogen production potential is huge, and the future development prospects are broad. As a strategic emerging industry, the development of green hydrogen industry and technological innovation can effectively guarantee the green and low-carbon development of the economy and society, the environment, energy and other comprehensive fields. And it becomes an important initiative to implement the "dual-carbon" goal.

The chemical industry is one of the key industries in China to achieve carbon neutrality, with high carbon emissions and energy and raw materials that are difficult to be completely replaced by electrification. Green hydrogen refining is seen as an important path for the chemical industry to realize green transformation. Taking the Kuqa Green Hydrogen Demonstration Project as an example, the green hydrogen produced by the project will replace the natural gas hydrogen produced by Tahe Refining.

The green hydrogen produced in this project will replace the hydrogen produced from natural gas in Tahe Refining, be used as a raw material for hydrogenation reaction, and ultimately enter into the oil products, realizing the greening of oil refining products. The project can reduce carbon dioxide emissions by 485,000 tons per year, which is the first time for green hydrogen refining to realize large-scale application, and has a significant demonstration effect on the large-scale use of green hydrogen in refining enterprises to achieve carbon emission reduction.

According to reports, as China's first large-scale green power green hydrogen project, the construction of the project is facing difficulties such as new process technology, large scale, and no mature engineering cases to learn from. SINOPEC through joint research, uncovered the list of marshals and other forms of breakthroughs to solve the new energy fluctuating power scenarios under flexible hydrogen production, and to the downstream refining enterprises continuous and stable supply of difficult problems.

Among them, facing the technical challenge of hydrogen production from renewable fluctuating power sources, SINOPEC has independently developed green power hydrogen production configuration optimization software to match the synchronous response of electric control equipment and hydrogen production equipment, realizing the "load moving with the source", and significantly improving the adaptability to fluctuations. In addition, the project has completed a 10,000-ton electrolytic water hydrogen production process and engineering technology, green hydrogen storage and transportation process technology and other innovations. They have achieved industrial applications, the project has declared more than 10 patents and know-how.

The project used photovoltaic modules, electrolysis tanks, hydrogen storage tanks, hydrogen pipelines and other major equipment and core materials are all localized, effectively promoting the development of China's hydrogen energy equipment enterprises. Taking the electrolyzer as an example, before the project was launched, the cumulative demand for 1000Nm³/h electrolyzer in China was less than 30 units, while only the Kuqa Green Hydrogen Demonstration Project required 52 units, which has strongly promoted the large-scale production of electrolyzer industry in China.