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International Hydrogen
Energy Centre

HIGHLIGHTS FROM THE INTERNATIONAL HYDROGEN ENERGY CENTRE

Demonstration project on production of green hydrogen and ammonia underway in Baotou, China

The global transition towards cleaner energy sources has been gaining momentum, and the focus has shifted towards green hydrogen (GH₂) as a clean energy alternative. In this context, the construction of the International Hydrogen Energy Metallurgy and Chemical Demonstration Zone in Baotou, Inner Mongolia, marks a significant milestone in the pursuit of sustainable and zero-carbon technologies.

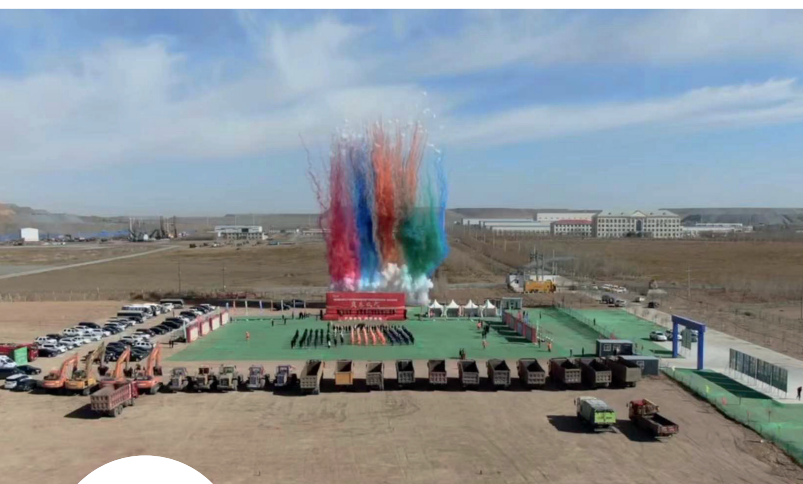
The project is led by the International Hydrogen Energy Centre (IHEC), supported by the United Nations Industrial Development Organization (UNIDO), and hosted by the Beijing Tsinghua Industrial Research and Development Institute (TIDRI) and the Chinese metal manufacturer, the Mintal Group.

Ammonia is produced in vast quantities worldwide for agricultural fertilizers. However the traditional production method uses natural gas or other fossil fuels to provide both the hydrogen feedstock and the energy to power the synthesis process. As a result, ammonia production releases almost 1.5% of global CO₂ emissions. Reducing the amount of carbon dioxide produced during the ammonia manufacturing process is therefore critical to achieve net-zero targets by 2050.

The best way to reduce carbon emissions when making ammonia is to use GH₂, which is hydrogen produced via water electrolysis using renewable electricity.

In its first phase, the IHEC project will build a 1.5GW wind power farm to produce green hydrogen for green ammonia synthesis. The first batch of 390,000 tonnes of green ammonia per year is set to be supplied in early 2025. China's first set of 2×550,000 tons of direct reduced iron will be built using GH₂ as a reducing agent.

This project is an excellent example of a large industrial cooperation. Mintal Group, a prominent enterprise in China's green metallurgy industry, has developed the innovative load-dependent motion technology of direct coupling hydrogen production from renewable energy and dynamic ammonia synthesis. The company carried out the overall project design with Hualu Engineering Technology, builds wind farm projects with the Huadian Group and Mingyang Smart Energy Group, and works with Topsoe to construct the green dynamic ammonia plant. The feasibility study report was completed in close cooperation with ThyssenKrupp Technology (Shanghai), the General Electric Power Planning and Design Institute, and Aerospace Changzheng Chemical Engineering.



The ground-breaking ceremony: industrial-zone in Baotou

About partners

TIDRI, established in 1998 by the Beijing Municipal Government and Tsinghua University, focuses on driving innovation and developing scientific and technological breakthroughs. The Institute also serves as a high-tech incubating centre for advanced industries, including those involved in hydrogen energy.

IHEC, established in July 2021 with the support of Beijing Municipal Government and China's Ministry of Commerce in cooperation with UNIDO, conducts research and development on low-carbon hydrogen energy. The Centre is an important knowledge partner of UNIDO's Global Programme for Hydrogen in Industry.



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On 15 April, 2023 the day before the ground-breaking ceremony marking the start of construction of the industrial zone, nearly 200 representatives of stakeholders from different regions, countries and industries attended the China-Europe Hydrogen Energy Industry Forum in Baotou. At the event, organized by the IHEC, participants discussed the role of hydrogen in the clean energy transition and the potential for cooperation between China and Europe.

Prominent speakers included Huang Zhiqiang, Executive Vice-Chairman of the Inner Mongolia Autonomous Region, who invited entrepreneurs to invest in renewable hydrogen production in Inner Mongolia, and Gunther Beger, Managing Director of UNIDO's SDG Innovation and Economic Transformation Directorate, who emphasized the organization's support for the decarbonization of industry, and expressed its willingness to collaborate on the development of new technology for a zero-carbon economy.



The China-Europe Hydrogen Energy Industry Forum



The video message of Mr. Gunther Beger (UNIDO)

IHEC makes progress on the development of green hydrogen

The International Hydrogen Energy Centre has actively promoted the development of hydrogen energy. Together with Beijing Sinohytec, the Centre led the world's largest demonstration project for hydrogen fuel cell commercial vehicles during the 2022 Beijing Winter Olympics. More than 850 hydrogen fuel cell buses were used to transport athletes and officials at the Games and nine green hydrogen refueling stations were built in Zhangjiakou, Hebei Province. The buses operated over 3.2 million kilometers and consumed about 200 tons of green hydrogen, saving an estimated 2,000 tons of carbon. This was the first time a hydrogen-powered transportation system was demonstrated on a large scale.



Demonstration project for hydrogen fuel cell vehicles

