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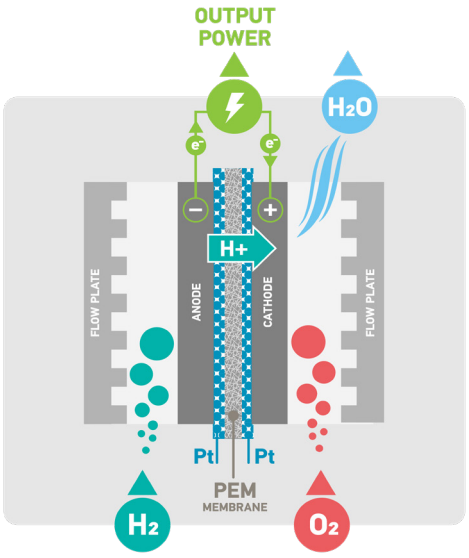

Inside a platinum-based hydrogen fuel cell

HYDROGEN IN SOUTH KOREA

Leading academic Professor Ock Taeck Lim shares his insights on the development of the hydrogen economy in his country

Professor Ock Taeck Lim is a leading academic in South Korea, having obtained a PhD in Mechanical Engineering from Keio University, Japan, in 2006. Today, he is Professor of Mechanical Engineering at Ulsan University and leads the university's Research Centre for Next Generation Hydrogen Fuel Cell Vessels. Professor Lim contributes to a number of projects that feed into the research strategies of both the South Korea government and Hyundai Heavy Industries. Professor Lim serves as a vice chair on the International Energy Agency's Executive Committee, Hybrid and Electric Vehicle Technology Collaboration Programme.

Why is developing a hydrogen economy important to South Korea?

South Korea ranked as the world's seventh-largest energy-consuming nation in 2022, with around 97 per cent of its energy needs being imported from overseas sources. The government is actively pursuing ways to reduce energy consumption while shifting towards more environmentally friendly sources. The government believes that hydrogen offers the prospect of decarbonisation alongside the promise of economic growth; to achieve its 2050 carbon neutrality goal, it is focused on establishing a clean hydrogen ecosystem.

What actions has the government taken to advance the hydrogen economy?

In November 2021 the Korean Government set out strategies for building a clean hydrogen industrial ecosystem in its 'First Hydrogen Economy Transition Basic Plan'. Since then, it has implemented follow-up measures to further stimulate the clean hydrogen economy. Essentially, the government wants to establish mid- to long-term policies for the hydrogen economy, designating it as a national strategic technology, expanding tax support, and laying the foundation for a clean hydrogen certification system to lead the world's best hydrogen economy. In addition, it has goals to subsidise hydrogen projects more widely, so investors can also seek government support where this is available.

How important will hydrogen imports be to South Korea?

By 2050, Korea aims to import around 82 per cent of its hydrogen requirement from overseas. Korean businesses are already investing in countries conducive to green hydrogen production and establishing strategic trading relationships. The government of South Korea intends to collaborate on hydrogen production with Australia, Canada, and Chile.

What is the current status of hydrogen refuelling roll-out in South Korea?

The Korean government offers subsidies to encourage the participation of private companies to expand the installation of hydrogen refuelling stations. It plans to build at least one hydrogen refuelling station per city. As at November 2023, South Korea had a total of 160 hydrogen refuelling stations nationwide. By 2030, the government is aiming for a hydrogen refuelling network of 660 stations.

What is the outlook for FCEV market growth over the next five to ten years?

As reported in the International Energy Agency's Global EV Outlook 2023, the fleet of FCEVs increased 40 per cent year-on-year in 2022, reaching over 72,000 vehicles globally. About 80 per cent of the global FCEV fleet is comprised of cars; the remainder is split evenly between trucks and buses, with around ten per cent each. In 2022, the fuel cell truck segment grew at a faster rate than cars and buses, increasing by 60 per cent. Specifically in Korea, the government has plans to deploy 300,000 hydrogen FCEVs, including 21,200 buses, by 2030.

Although FCEVs have shown promise in ushering in sustainable and low-carbon mobility, the FCEV industry faces several challenges. The biggest challenge is limited renewable power capacity, which creates a barrier for accessing low-cost green hydrogen for mobility applications. Other challenges include the lack of hydrogen transportation infrastructure for long distance trucks. Hydrogen transportation challenges may be overcome in the future by retrofitting existing natural gas pipelines for hydrogen transportation, which is expected to bring down the operational costs of FCEVs. Modular green hydrogen technologies that allow on-site hydrogen production also hold promise in reducing the cost of transporting hydrogen to refuelling stations, potentially bringing down FCEV operational costs.

Professor Ock Taeck Lim

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