

# H2 may play key role in solving global warming, energy security issues, says expert

'The conversion of sunlight into fuels and chemicals offers an attractive prospect for energy storage'

By Shazia Hasan

KARACHI: "Japan introduced Liquefied Natural Gas in 1969 but it gained popularity after prices of crude oil went up," said Dr Ko Sakata, director, Hydrogen Programme, Institute of Applied Energy, Japan.

He was speaking at a symposium on 'Hydrogen, Carbon-free Fuel, Democratising the Energy' organised by the Pakistan Academy of Engineering (PAE) at a hotel here on Saturday.

In his keynote speech on 'Global hydrogen energy system towards the sustainable low-carbon society', Dr

Sakata explained about the hydrogen boom in the last century. "It is currently the dominant energy in the world," he said, adding that "the dissemination of energy systems is strongly dependent on external factors, such as global warming, resource of fossil fuel, geopolitics, competing energy systems, etc."

He said that the introduction of hydrogen, carbon-free fuel or CO2-free H2 was expected to induce innovation in supply chains. Also, large-scale import of H2 and realisation of distributed energy system based on H2 are the key factors in solving the issues of global warming and energy security, he added.

"There is a need for carrying out a full-scale study in terms of economy and safety," he said.

"Putting H2 systems on the future technology portfolio, continuous research and development and exploration of business model is important," he added.

Speaking about his own country, he said that the introduction of LNG had helped them a lot. "More energy was needed for customers in Japan and LNG was most suitable because it had higher combustion energy," he said. But LNG was more expensive than crude oil when it was first introduced in Japan. "Then the government brought in tax incentives to bring its cost down. By 1973, crude oil also went up in price and LNG costs became competitive," he added.

President of the PAE Dr Jameel Ahmed Khan said: "It is a settled issue in the scientific and engineering community that H2 is the future energy vector. All the developed countries of the world are seriously preparing themselves for the H2 economy.

"So how far is H2?" he asked. "Decarbonisation of the European energy system using H2 is estimated to be accomplished by 2030. The government of Japan, too, has recently

launched their 'Hydrogen Society Strategy' aiming to establishing a 'Hydrogen society' by 2040," he said.

"However, the success of H2 economy will depend upon how efficiently we produce H2 and use it in the energy conversion systems. At present all the products and materials of the chemical industry are totally reliant on fossil feedstock. This compulsion generates sufficient motivation to develop a sustainable process to produce fuels and chemical feedstock from water and carbon dioxide using solar energy," he said.

"H2 produced from solar energy has established itself as the most efficient, cleanest and non-petroleum commercial fuel of the 21st century," he pointed out. "The conversion of sunlight into fuels and chemicals offers an attractive prospect for energy storage.

Therefore, major efforts are being made to develop efficient catalysts for

water splitting as well as CO2 reduction," he said.

"Solarised production of H2 will also make the energy available right at the point of use. 'Energisation' of rural areas will be possible through solar hydrogen in a competitive manner. This is what we mean by the concept 'Democratising the energy'," he added pointing to the theme of the symposium.

Chairman, Department of Automotive and Marine Engineering, NED University, Syed Mushahid Hussain Hashmi, meanwhile, spoke about the current status of fuel cell technology.

Business Development Manager at Linde Pakistan Limited, engineer Ghufuran Bala, presented an overview of the 'Demo/pilot project using membrane process for H2 production at Mainz, Germany.

Mr Toshikazu Isomura, the Consul General of Japan in Karachi, also spoke (in fluent Urdu) on the occasion.