Towards a sustainable energy system - The Chinese model

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Abstract:

Since the rapid economic development, energy consumption of China surpassed the US in 2010 to become the world largest. Coal is the largest primary energy source which emits more CO_2 and causes great environmental problems. China and the US formally ratified the Paris Climate Change Agreement during the G20 summit, in Hangzhou, China, which indicates China has seriously committed to reduce the greenhouse emissions.

China has been making great efforts to develop non-fossil fuel energy, such as nuclear, wind and solar, biomass, and to develop clean coal conversion technologies. Hydrogen, methanol and SNG are considered as energy storage media for transition from fossil fuels to a sustainable energy system. Shenhua Group, the largest coal company, is promoting coal conversion, methanol economy and H_2 initiative in China. Shenhua has demonstrated H_2 production from coal with CO_2 sequestration in saline aquifer. H_2 can be produced via electrolysis of water with renewable electricity; O_2 byproduct could be used for coal gasification, which is synergistic to coal conversion. With the renewable H_2, CO_2 in coal conversion could be converted into methanol or SNG for chemicals and fuels.

Hydrogen， methanol and methane economies are complement. Hydrogen is the cleanest fuel and is easily produced from renewable energy sources; however, storage, transportation and lack of infrastructure are great hurdles. Methanol, a liquid, and easily synthesized from CO_2 and renewable H_2, is great for fuels and chemicals. SNG synthesized from CO_2 and renewable H_2 is compatible with the existing natural gas infrastructure.

Biographical Statement of speaker:

Yulong Zhang, Ph.D, Principal Engineer, 1000 thousand talent expert in National Institute of Clean-and-low-carbon Energy (NICE), has been working in clean coal conversion for over 30 years. He has developed catalysts for methanol synthesis from CO and CO2 hydrogenation and is promoting methanol economy.

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