

Thoughts on the role of LNG

- Although Japan's goal is set to reduce energy consumption and GHG emissions (leading to smaller volumes of LNG), there could be **multiple scenarios to reach the ultimate goal of climate neutrality** - which is also the case for different countries
- Depending on performances of renewables and nuclear, as well as new energy technology, the **actual role of LNG may differ significantly** (mostly upside), also subject to efforts to make LNG even cleaner - which is also the case for different countries
- In the wake of the ongoing energy crisis, more mutual influences between regions and different energy sources should be observed - **Ways of energy transition should be carefully examined - Changes of recognition and more understanding of LNG and natural gas by general public should be carefully analysed**

Latest Developments in New Technologies in Japan

- Fuel Ammonia (from natural gas with CO₂ offset, or renewables)
 - ✓ Following JERA's zero-emission roadmap with utilization of fuel ammonia in late 2020, KANSAI, CHUGOKU, TOHOKU, KYUSHU ELECTRIC POWERS and J-POWER made announcements in 2021. Starting from co-firing.
- Hydrogen Use in the power, industrial and transport sectors
 - ✓ Projects are underway for both large and small turbines for power generation
 - ✓ Hydrogen boilers have already been deployed by some manufacturing industry
 - ✓ 7,250 FCVs and 158 hydrogen refuelling stations are in place as of March 2022
 - ✓ FC Trucks and FC Trains are under demonstration
- Methanation, Synthetic Methane, or E-methane
 - ✓ 1% of gas supply in 2030 - Tokyo Gas targets 80 mcm and Osaka Gas 60 mcm in 2030
 - ✓ Existing infrastructure and appliances can be used
 - ✓ Challenges include mass production technology and cost reduction, as well as international rules for recycled carbon fuels