Technical Review Special Edition: Energy Systems

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Welcome to this special edition of our technical review featuring Energy Systems.

The business environment surrounding energy and climate preservation is facing complex and rapid changes, such as the transition to a carbon-neutral society, existing geopolitical risks, and rapid advancement of AI and digital technologies.

The pursuit of a carbon-neutral society involves the introduction of renewable energy as well as the spread of distributed power sources and energy storage technologies currently promoted in Europe. Equally importance is the adoption of renewable energy, hydrogen, and CCUS currently implemented in the Middle East, particularly in the UAE and Saudi Arabia. These two countries are working to establish a low-cost solar-energy based green-hydrogen production and supply system focusing on international hydrogen export market. They have set targets for achieving carbon neutrality by 2050 and 2060, respectively.

The Japanese government is moving forward with efforts to achieve carbon neutrality by 2050. The Japanese Basic Hydrogen Strategy was revised in 2023, establishing hydrogen and ammonia power generation as a driving force to complete their supply systems by 2030. Furthermore, the Seventh Basic Energy Plan and GX Vision 2040, formulated in 2025, outlined the directions of power source configuration and institutional development aimed at achieving decarbonization and economic growth.

In the United States, the Inflation Reduction Act (IRA) introduced in August 2022, temporarily accelerated investment in decarbonization technologies, however, as of 2025, there is increasing uncertainty regarding the continuity of the associated operational policies and cautious views on the future of the policy are spreading. Also in Australia, some hydrogen related projects are reportedly being revised or stalled, and challenges in the implementation phase of the energy transition are becoming apparent.

In terms of geopolitics, in addition to the prolonged conflict in Ukraine, tensions in the Middle East and East Asia have also been rising, leading to a greater awareness of the importance of energy security.

At the same time, a movement to position natural gas as a transition fuel is growing internationally, playing an important role in balancing decarbonization and stable

supply. Furthermore, with the rapid spread of generative AI, electricity demand from data centers is increasing globally making highly reliable, free of interruption, stable power supply more important than ever to sustain the required continuous training and operation of AI models.

Even during these changes in social environment, Mitsubishi Heavy Industries Group is steadily developing state-of-the-art technologies to meet both future energy demand and decarbonization. In particular, Energy Systems is developing technologies, products, and services that contribute to the energy transition targeting decarbonization on the energy supply side.

This Energy Systems Technical Review Special Edition report describes a variety of technologies and solutions toward the realization of a carbon-neutral society through nine reports. Energy Systems will continue to meet the needs of our customers and society by proposing realistic solutions with proven products, and services, including the technologies described above. We appreciate your continued understanding and support for our activities.