

Role of CCS in Sustainable Energy Future

By Kenji Yamaji (RITE)

Director General, RITE

Abstract

“Sustainability” is an essential keyword for the 21st century. World summit on sustainable development (WSSD) held in Johannesburg in 2002 adopted five areas: WEHAB, namely, water, energy, health, agriculture, and biodiversity. Among them, energy and global warming are critical themes to be tackled in order to achieve a sustainable society.

Response measures to cope with climate change range widely. CCS (Carbon Capture and Storage) is an important element as a last resort in mitigating CO₂ emission. Many scenario studies, including that of RITE, show that CCS contributes almost 20% of the global emission reduction from the baseline in 2050 in emission halving scenarios. CCS will play particularly important role in electricity sector as well as iron and steel industry since the fossil fuels, notably coal, is expected to continue to be used for power generation and steel making. Clean use of fossil fuels consists of an essential technology to achieve a sustainable society.

After the Fukushima disaster, Strategic Energy Plan of Japan is being reconstructed. The role of CCS will be highlighted in the process of reconstruction of the Plan to achieve the 3E (Energy security, Economic efficiency, and Environmental compatibility) objectives of energy policy.

CCS technology development is a pillar of the research of RITE. Around ten thousand ton of CO₂, which was injected into a saline aquifer at Nagaoka site for 2003-2005, has been monitored for the storage stability while the capture technologies such as chemical absorption and membrane have been developed by RITE. With the Nagaoka project, RITE has developed monitoring system and simulation technique for long term behaviors of the stored CO₂. The Nagaoka project also actually demonstrated the storage integrity through the two major earthquakes.

The implementation of a larger scale CCS demonstration project in Japan is about to start. After the investigation phase of the project started in FY 2008, the demonstration project is ready to start at Tomakomai candidate site. While there is no single and absolute solution to energy and global warming issues, we should keep CCS as a viable option for achieving sustainable energy future.