

Research and Development of CO₂-Capture system

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Abstract

For many years, we have been aware that, as an energy enterprise, our business activities have a large impact on the global environment. In particular, we have led efforts to control CO₂, one of the main causes of global warming. In the Japanese electric power industry, we continue to be a pioneer, contributing to CO₂ control through diverse measures.

More specifically, in 1990, we were the first Japanese electric power company to establish the philosophy to global environmental protection, and, in 1991, we created our Global Environmental Action Plan with guidelines for our business behavior. Since then, we have been pursuing comprehensive efforts by following our New ERA Strategy, which is what we call our comprehensive global warming prevention measures. We can categorize our CO₂ countermeasures using the keywords “reduce” “capture” and “sequestration.”

Our first keyword is “reduce.” We were one of the first electric power companies in Japan to make efforts for nuclear power generation, and now this is the source for more than 50% of our electric power. Recently, we actively promote nuclear power technology since it does not generate CO₂. We continue to be one of the leaders of its use in Japan.

Our second keyword is “capture.” Since the beginning of 1990, we have been working with Mitsubishi Heavy Industries on the development of chemical absorption methods to collect CO₂ from combustion exhaust gas, making us the first electric power company in the world to be involved in such research. One focus of this development research was to create the most efficient absorption liquid possible. We took the lead in this endeavor, and, in 1994, we developed an absorption liquid that was 20% more efficient in absorbing CO₂ than that commonly used at the time, making it the most efficient in the world. Following that, we further increased efficiency by more than 10% through continued improvements to system design in areas other than the absorption liquid. At present, we have realized efficiency that is 35% greater than in the past and we continue to lead the world in this regard. In addition, this technology has been introduced in 5 other locations around the world, typically in applications related to increased urea production, and we expect that it will be used in power generation plants as a global warming countermeasure.

Our third keyword is “sequestration.” Our group is advancing the development of technologies to fix CO₂ deep below ground in the coal layer. The technology was originally pursued in the USA and Canada with the goal of CH₄ production. Since 2002, our subsidiary has been investigating the effectiveness of CO₂ sequestration and CH₄ generation in Japan’s coal beds, which are heavily folded, as part of a nationally sponsored project. This year is the final year of the first phase of the project, and a large-scale CO₂ injection experiment is currently conducted.

We are proud to claim that we are the only company in Japan that pursues CO₂ countermeasures that are both this comprehensive and this practical.