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Comprehensive Research on Carbon Capture and Storage Legal Framework, Policy and Strategy

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The Paris Agreement aims to strengthen the global response to the threat of climate change by restricting the rise of global temperature in this century to less than 2°C above pre-industrial levels. To achieve this target, an ambitious carbon capture and storage (CCS) growth path is required, with many global CCS projects needed by 2050. The global consensus is that CCS will be a key technology for global decarbonisation.

Key issues for the installation, dissemination, and commercialization of CCS in Japan as well as in the Asian region are summarized in Table 1. Legal regulations and policies are considered necessary toward solving these issues in order to develop and commercialize CCS technologies. This study proposes two models for policy and legal frameworks in Japan while considering the possibility of achieving a common understanding and basis for implementing CCS laws and policies in the Asian region.

Table 1 Key issues for a policy and legal framework for introducing and promoting CCS technology in Japan.

Stage	Research & development stage	Demonstration stage (installation)	Commercialization stage
Key issues	· Prepare a strategic plan for CCS (quantified targets) under an energy plan and GHG mitigation targets · Address the importance and role of CCS and make decisions for building social consensus · Review the potential and technical feasibility of CO_2 storage	· Establish an evaluation method for leakage risk and environmental impact assessment · Develop safety technology by conducting full-chain pilot projects · Achieve cost efficiency for CCS projects and consider ways to incentivize financial support for CCS	· Throughout the stages of storage and post-closure management, establish responsible authority, permit systems for CCS operation, long-term monitoring processes, cost burden assessments and an insurance and compensation system (establish a CCS legislative framework) · Clarify the rules for transfer of responsibility, financial liability after the transfer and management systems, necessitated by the gap between the duration of business activities and the period of CO_2 storage (establish a CCS legislative framework)

For meeting domestic targets, creating opportunities for deploying CCS technology at the commercial scale is an urgent action for the state. There has yet to be a comprehensive policy and legal framework for CCS in Japan, however.

Optimizing policy instruments and identifying an optimal policy mix are extremely important tasks toward establishing a legal and policy framework for long-term liabilities and promotion of large-scale CCS technologies. These actions can promote, for instance, rationalization of CCS installation and operation costs and expansion of commercialization and scale of business. Based on the several existing frameworks, we propose a long-term CCS policy strategy framework for Japan that consists of two different frameworks: a CCS development and installation policy and a CCS legal framework, similar to IEA frameworks such as the EU CCS directive (Fig. 1).

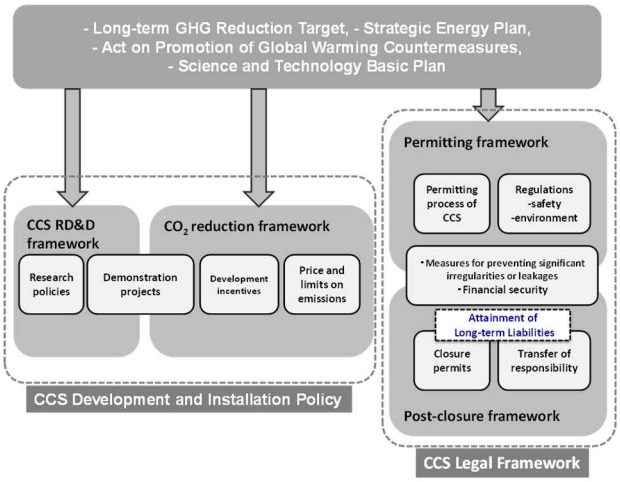

Fig. 1 Proposed policy strategy and legal framework for CCS development in Japan.

Considering the CCS legal framework, most CCS legal frameworks in developed countries, such the EU, USA and Australia have been institutionalized based on regulatory measures. On the other hand, based on experiences with national involvement, such as for the Act on Special Measures Concerning Promotion of Proper Treatment of PCB Wastes, it is also possible to install a legal framework in Japan by public involvement, using public funds. Therefore, we propose two potential legal frameworks, "a regulatory model" and "a public-works model." The regulatory model focuses on "command-and control" for CCS activities, thus the purpose of the model focuses on how a CCS law would restrict CCS operators and their CCS activities. On the other hand, the public-works model considers a joint approach to operating CCS projects between operators and the state.

As one of the key finding of this study, our cost-effectiveness analysis showed that the public-works model could potentially reduce the cost of the emission reduction technology portfolio compared to the regulatory model. It also suggests that CCS deployment should be applied for large emission sources such as coal-fired plants. Furthermore, our social research on public acceptance of CCS found that a positive effect on the regional economy could be expected at the planning stage. The results indicate that the public-works model for stakeholders in Japan seems to be preferable to the regulatory model, especially regarding the issues of long-term liability and operational efficiency.

Throughout this study, we have concluded that the public-works model could be applicable to a future policy and legal framework for commercialising CCS in Japan. This study has also proposed a range of potential policy and legal options regarding the framework shown in Fig.1, especially for the mid and long-term national targets and the long-term management for CCS activities.

In the 2050s, our future scenario analysis result suggests that CCS facilities will need to be installed in up to 60 to 70% of all thermal power plants and also for about 80% of the CO_2 emissions from plants in all sectors aside from thermal power plants. Therefore, we conclude that CCS-ready legislation should be considered, as its early enforcement will be required in the proposed CCS legal framework.

Journal article:

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