Permitting Commercial Geologic CO_2 Storage Projects

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Abstract

In recent decades, geologic carbon dioxide (CO_2) storage projects have become an increasingly promising approach to carbon management. Carbon capture, utilization, and storage (CCUS) is notable because it enables large-scale decreases in greenhouse gas emissions while supporting the longevity of existing energy generation infrastructure. A reliable, resilient, and affordable energy grid is essential to power the modern world and is central to the economy and industries of plains states. CCUS makes it possible to prioritize ambitious national and international climate goals and established approaches to maintain reliable energy production. In order to properly plan, design, and construct a commercial CCUS facility, project developers need to have a clear understanding of the regulatory requirements and a defined permitting process. Certainty in the regulatory and permitting process has increased dramatically in the United States since the U.S. Environmental Protection Agency (EPA) promulgated its first regulations for a new class of carbon dioxide (CO_2) injection wells Class VI in 2010. States, such as North Dakota and Wyoming, have received primary enforcement authority of these regulations, otherwise known as primacy, from EPA. North Dakota has been a leader among the states in developing legal and regulatory frameworks for the geologic storage of CO_2. The state has established a comprehensive regulatory program that is project-based with established pore space law and long-term liability arrangements, while also ensuring protection of human health and the environment. As of March 2023 North Dakota has issued four CO_2 storage permits, providing the commercial CCUS industry in North Dakota regulatory certainty. Most importantly, North Dakota was able to demonstrate an 8 to 10 month permitting process, from the time the permit application was filed with the State to the final permit approval decision. Concurrent with these regulatory developments, monetary incentives for the commercial deployment of CCUS projects have also evolved. The combination of the federal 45Q tax credit and incentives associated with Low Carbon Fuel Standard (LCFS) markets have expanded the business case for applying carbon capture, transport, and storage to the evolving ethanol and biofuels industry in the region. Successful CCUS projects depend on clear and applicable regulatory requirements that are thoroughly understood by project developers. It is evident that States are best positioned to regulate CO_2 storage through comprehensive regulations and permitting efficiencies. Further, tax incentives and an emphasis on low-carbon fuels compound to make CCUS more attractive to investors and states alike. It is important to take note of lessons learned in order to advance commercial deployment of CCUS throughout the plains and United States.