Abstract for ASBPA conference, 2020 Vision for Our Coasts: Navigating Stormy Times

Carbon capture and storage for climate change mitigation along the Texas coast

Emily C. Moskal*: emily.moskal@beg.utexas.edu; Ramon H. Trevino: ramon.trevino@beg.utexas.edu; Susan D. Hovorka: susan.hovorka@beg.utexas.edu; Timothy A. "Tip" Meckel: tip.meckel@beg.utexas.edu

Abstract:

As sea levels continue to rise and the severity of storms increase along the Gulf Coast due to the climate crisis, mitigation strategies are necessary to avoid worst case climate model scenarios. As seen during the months of stay-at-home orders prompted by the coronavirus, a reduction in travel is not enough to meet global carbon dioxide (CO_2) emissions reduction goals. Petrochemical and other industrial centers—and their associated emissions—are projected to increase in order to meet consumer demand. Carbon capture and storage (CCS) is the only mitigation option currently available to decarbonize many industries, including liquefied natural gas, cement, steel, refinery, and petrochemical plants. CCS is a process of capturing CO_2 from industrial point sources and storing it deep beneath the Earth's surface in porous rock reservoirs, selected based on an exhaustive list of criteria.

Containing some of the densest clusters of industrial CO_2 emissions in the U.S., Texas has the potential to lead the country in this technology's development and deployment. Researchers of the Gulf Coast Carbon Center (GCCC)—at the University of Texas at Austin's Bureau of Economic Geology—have shown that geological reservoirs beneath near-shore Texas state waters have enough CO_2 storage capacity to reduce CO_2 emissions (i.e., roughly 85 gigatons of CO_2) with specific sites capable of holding tens of megatons of CO_2—some of the largest capacities in the U.S. The first two commercial-scale storage projects, Petra Nova-West Ranch and Air Products-Hastings, are located onshore in the upper Gulf Coast. In 2018 the U.S. Department of Energy selected GCCC to lead a partnership of nearly 20 industry, academia, and governmental organizations in order to identify and address knowledge gaps, regulatory issues, infrastructure requirements, and geotechnical challenges associated with offshore CO_2 storage. It is one of the first projects to explore U.S. potential for offshore CCS, which has several advantages over onshore, including: 1) no freshwater aquifers, 2) single landownership, 3) more effective geotechnical technologies, and 4) potentially more public acceptance (by avoiding NIMBY sentiments).

To move toward a CCS system in Texas, GCCC is developing a vision for a system which will convert a depleted offshore gas field and associated saline aquifers into the nation's first offshore site. This vision would enable private investment and increase American progress towards a carbon-neutral economy. Communicating costs and benefits clearly to help make informed decisions regarding technological adoption is one of many directions of GCCC research. Evaluating environmental risks in terms of infrastructure installation versus benefits in terms of climate change mitigation, job opportunities, and decarbonization of carbon-intensive industries are part of developing the vision. Many different coastal stakeholder groups in Texas's Golden Triangle Area have been consulted in order to develop targeted messaging so that questions and concerns are addressed. Preliminary insights have been gained that will help inform coastal community communications.

* Presenter bio: Emily Moskal has been a research program coordinator at the Gulf Coast Carbon Center of the Bureau of Economic Geology, University of Texas at Austin since September 2018.