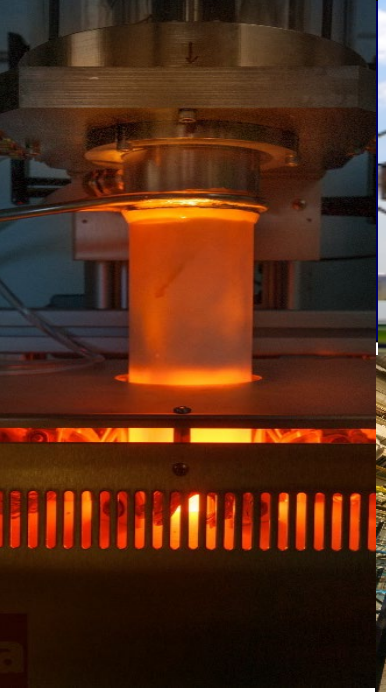
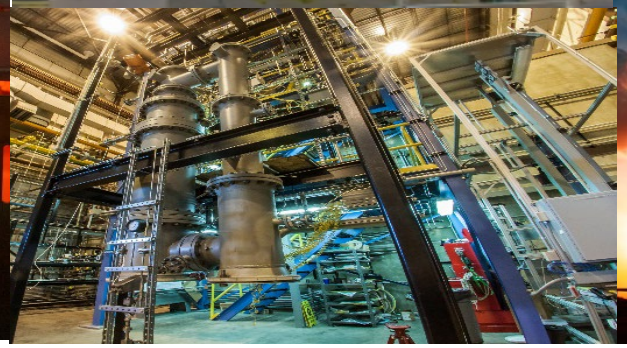
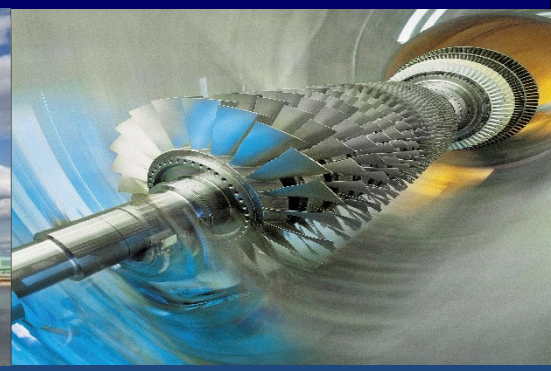




U.S. DEPARTMENT OF ENERGY | Office of Fossil Energy

4th International Offshore Workshop

US Storage Resource Assessments

February 12, 2020

Darin Damiani
Carbon Storage Program Manager
U.S. DOE Office of Fossil Energy

Offshore Resource Assessment & Regional Projects

Offshore Projects

1. Assessment of CO2 Storage Resources in Depleted Oil and Gas Fields in the Ship Shoal Area, Gulf of Mexico
2. Offshore Storage Resource Assessment
3. Offshore CO2 Storage Resource Assessment of the Northern Gulf of Mexico
4. Offshore Gulf of Mexico Partnership for Carbon Storage - Resources and Technology Development (GoMCarb)
5. Southeast Regional Carbon Storage Partnership: Offshore Gulf of Mexico
6. Southeast Offshore Storage Resource Assessment
7. Mid-Atlantic U.S. Offshore Carbon Storage Resource Assessment Project

=Area of Study

Offshore Storage Projects

- Resource Assessment Projects (2015): 5 Projects awarded, valued at $13.8M of DOE costs with additional cost share.
- Gulf of Mexico (GOM): “vast”, “nationally-significant”, CO_2 storage resource
  - Enormous data base from oil/gas industry operations
  - About 20 Gt storage capacity in active/depleted oil/gas fields/reservoirs
  - Initial characterization of three 30MT storage sites: High Island 24L field; High Island 10L field; Ship Shoal Block 84 and Block 107
  - Eastern GOM: multi-Gt storage resource in DeSoto Canyon Salt Basin and Sarasota Arch
- Atlantic continental shelf - New York to Florida
  - Sparse well control; “vintage” 2D seismic
  - Overall multi-Gt storage resource; potential storage complexes in Cretaceous-aged sediments
  - High storage resource per unit area (≥ 2.5 $MtCO_2/km^2$) in part of Northern Baltimore Canyon Trough
  - No highly critical risk factors identified that would impede CO_2 storage

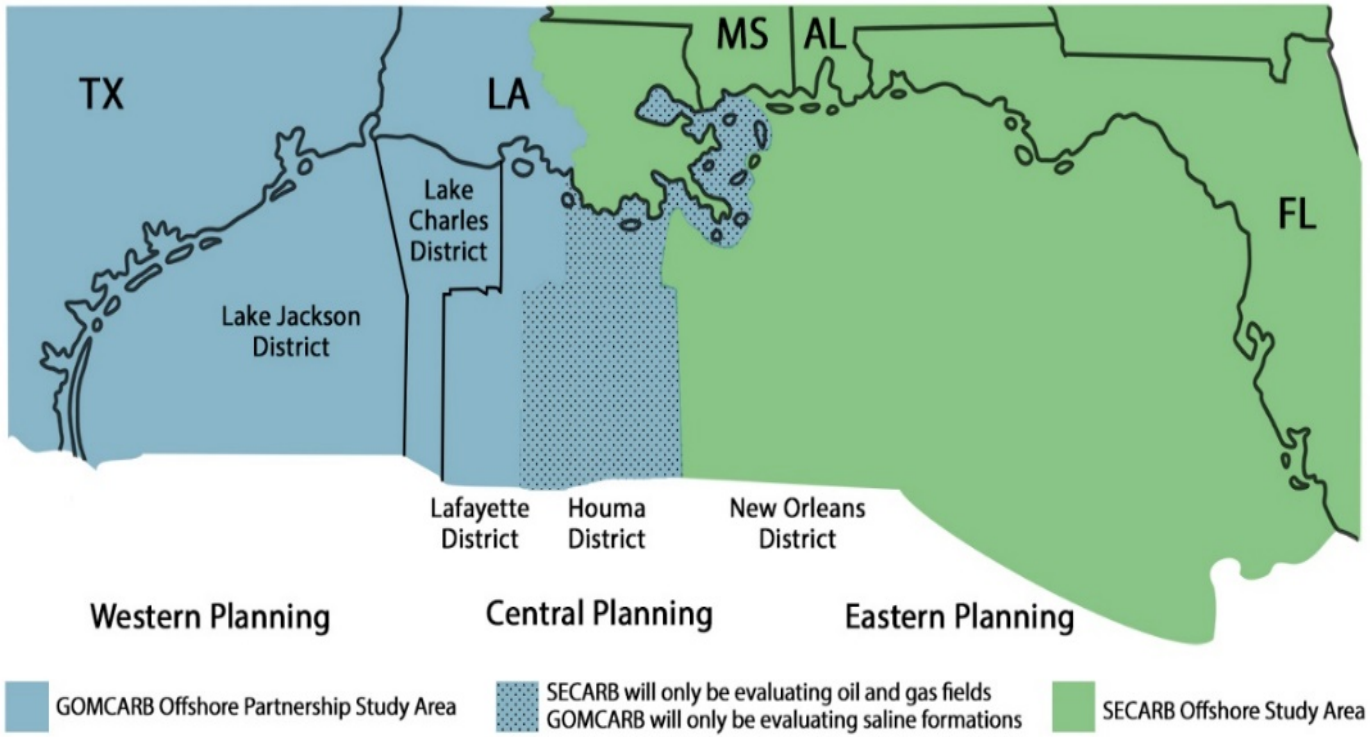
Offshore Regional Projects

- Offshore Regional Projects (2017): Awarded 2 projects, $16 million total.

Key Objectives:

- Combine the capabilities and experience of industry, academia, and government to develop and validate key technologies and best practices to ensure safe, long-term, economically-viable carbon storage in offshore environments

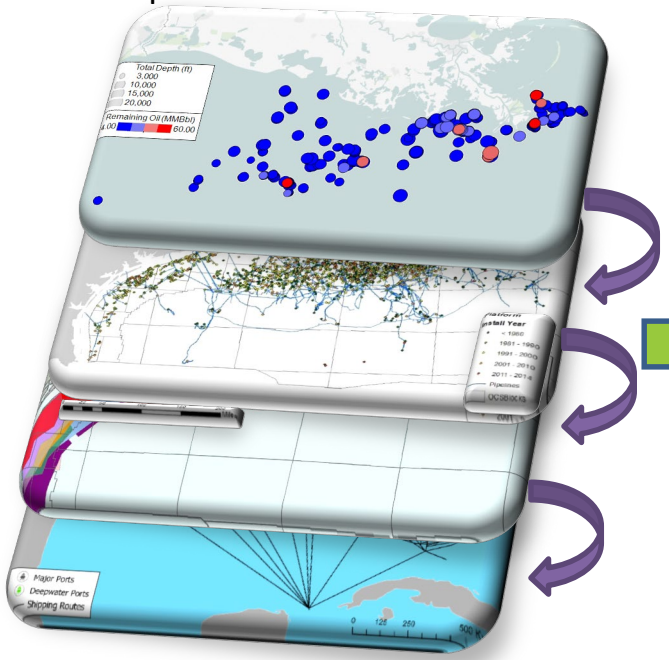
- Identify and address knowledge gaps, regulatory issues, infrastructure requirements, and technical challenges associated with offshore CO_2 storage



Multi-criteria CCUS Screening Framework of GOM OCS

- Incorporate multiple and disparate CCUS decision making criteria into a systematic, quantitative analysis of OCS in the GOM to identify areas with potentially high suitability for CO_2 storage

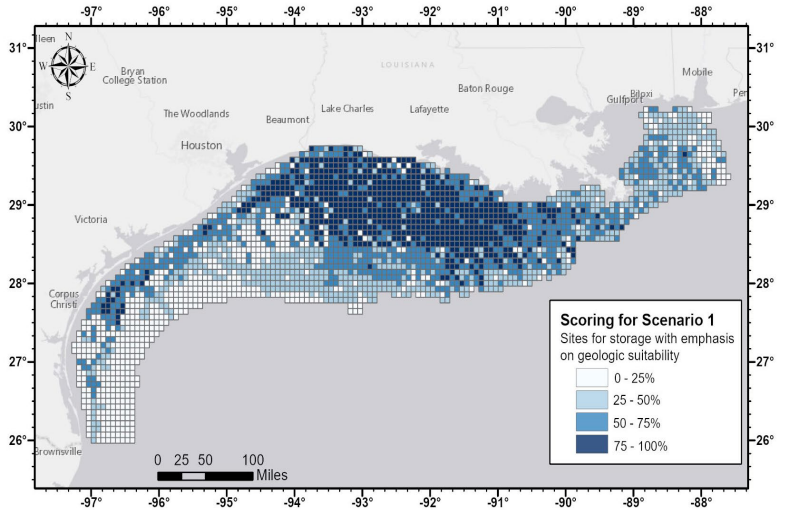
- Sites/regions best suited for offshore CO_2 storage would possess criteria and characteristics deemed appropriate for offshore CCUS applications; from both technical and logistical / feasibility-related standpoints

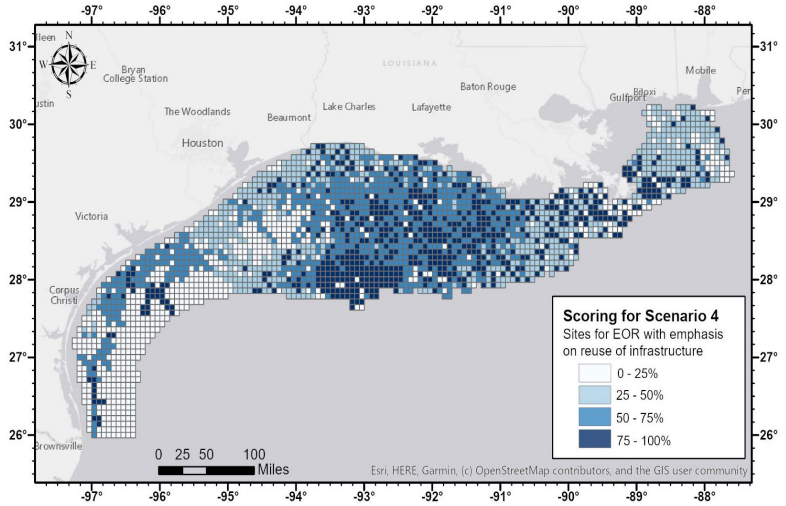


Incorporate criteria into a quantitative analysis to identify areas with potentially high suitability using NETL-developed (G&G team) Cumulative Spatial Impact Layer (CSIL) tool*

Number	Criteria
i = 1	Reservoir quality without depth ranked by quartile
i = 2	Sum of injectivity proxy
i = 3	Sum of oil in reserve (barrels)
i = 4	Number of active caissons
i = 5	Number of active well protectors
i = 6	Number of major active multi-purpose platforms
i = 7	Distance to closest onshore CO_2 source > 100,000 tonnes/year
i = 8	Pipeline right-of-way proxy
i = 9	Within major shipping route buffer area
i = 10	Water depth – saline reservoirs
i = 11	Water depth – oil reservoirs
i = 12	Above salt domes
i = 13	Plugged and abandoned wells
i = 14	Faults

Qualitative input from experts to weigh the importance of each for 4 separate scenarios

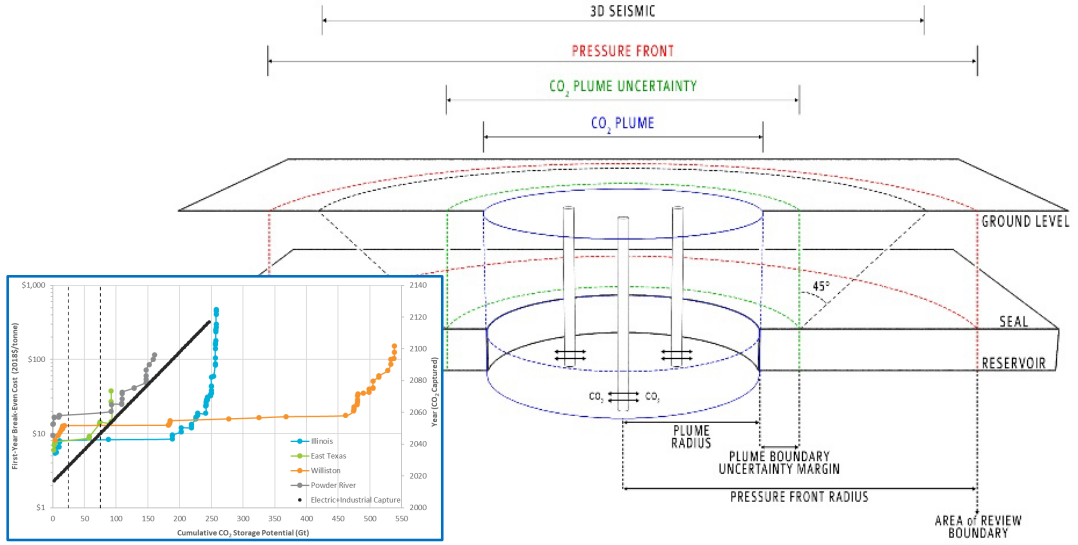


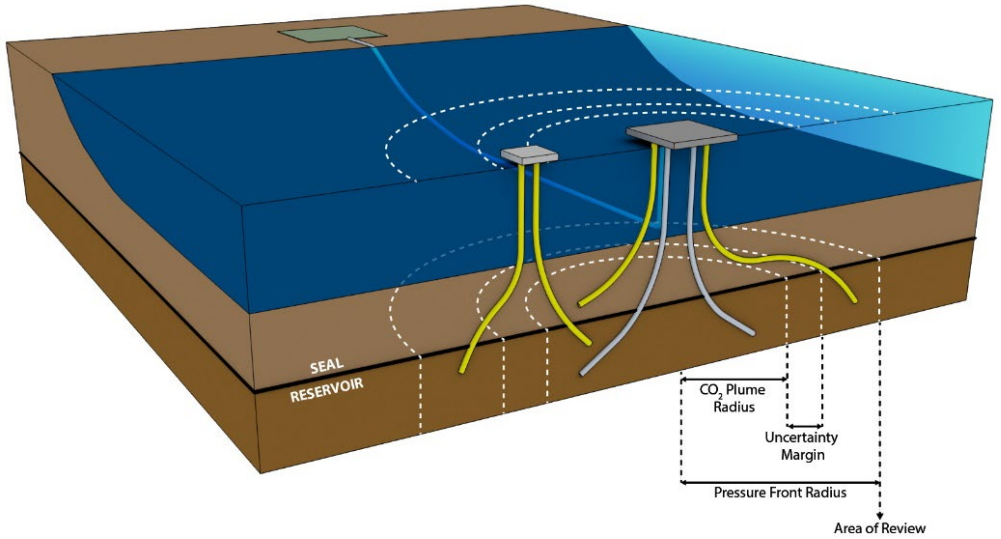


*Romeo, Lucy, Nelson, Jake, Wingo, Patrick, Bauer, Jennifer, Justman, Devin, and Rose, Kelly (In Press). *Cumulative Spatial Impact Layers: A Novel Multivariate Spatio-Temporal Analytical Summarization Tool*. Transactions in GIS.

FE/NETL Offshore CO_2 Saline Storage Cost Model

- Extension of onshore CO_2 Storage Cost Model
- Will model storage costs for single reservoir or multiple reservoirs
- Will be a key tool for helping to estimate cost of pilot-project(s)
- Challenges: estimates based on cost of regulatory compliance but regs for storage in federal waters is not yet firmly established.





Thank you !