CCS Pipeline Infrastructure Development in the Gulf Coast and Southeast US

A *SimCCS* Case Study

Rajesh Pawar and Bailian Chen
Los Alamos National Laboratory

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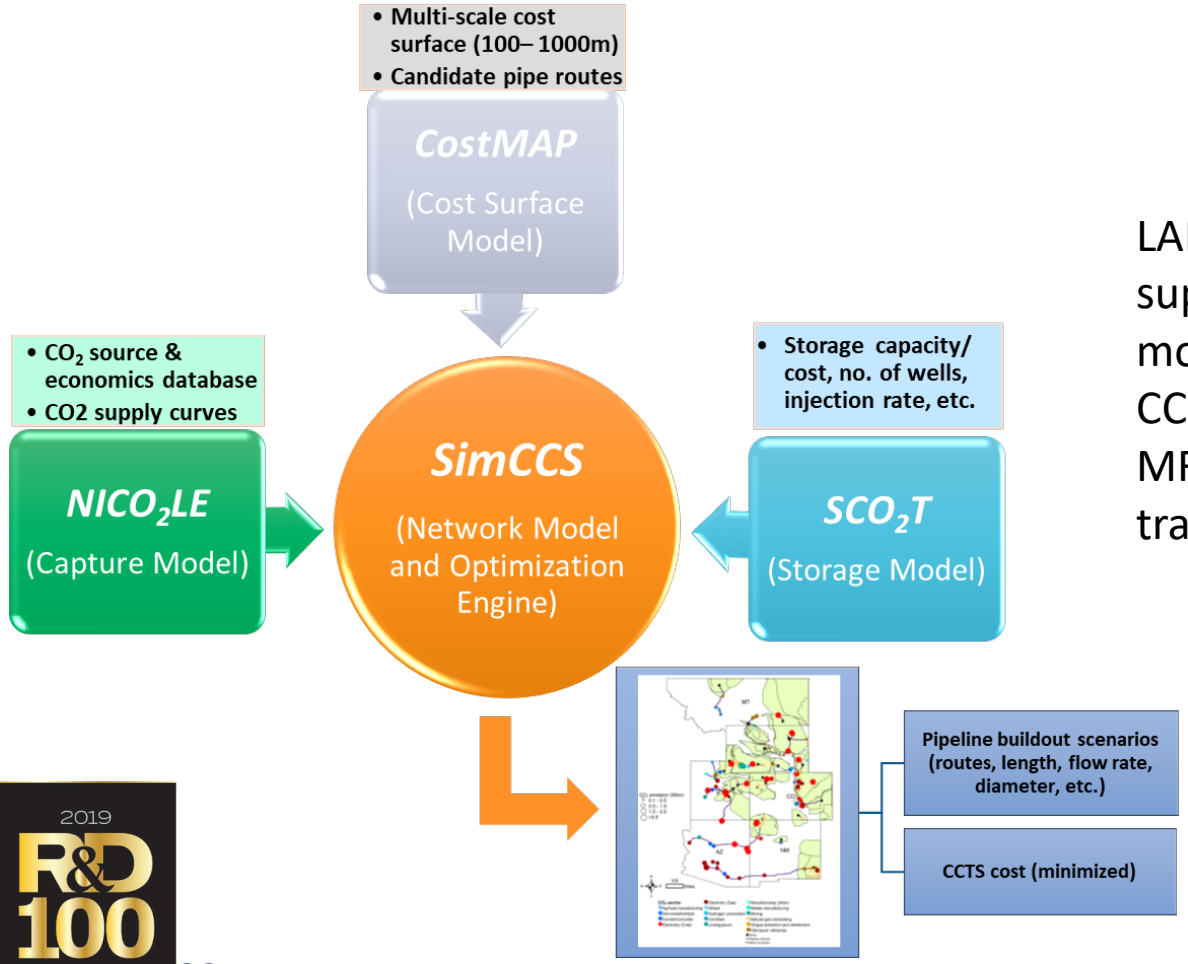
Large-scale CCS deployment will require development of regional CCS infrastructure

- Regional CO_2 transport infrastructures connecting regional sources to geologic sinks is a critical need
- CCS infrastructure is a long-term investment
- Strategic development of infrastructure could help address large number of sources and help save on costs
- Infrastructure that effectively connects multiple CO_2 point sources with multiple geologic sinks assures long-term use

SimCCS: A model to integrate different parts of the CCS value chain

SimCCS can help determine optimal, regional network of CO_2 sources, CO_2 sinks and CO_2 transport infrastructure that meet desired CCS goals

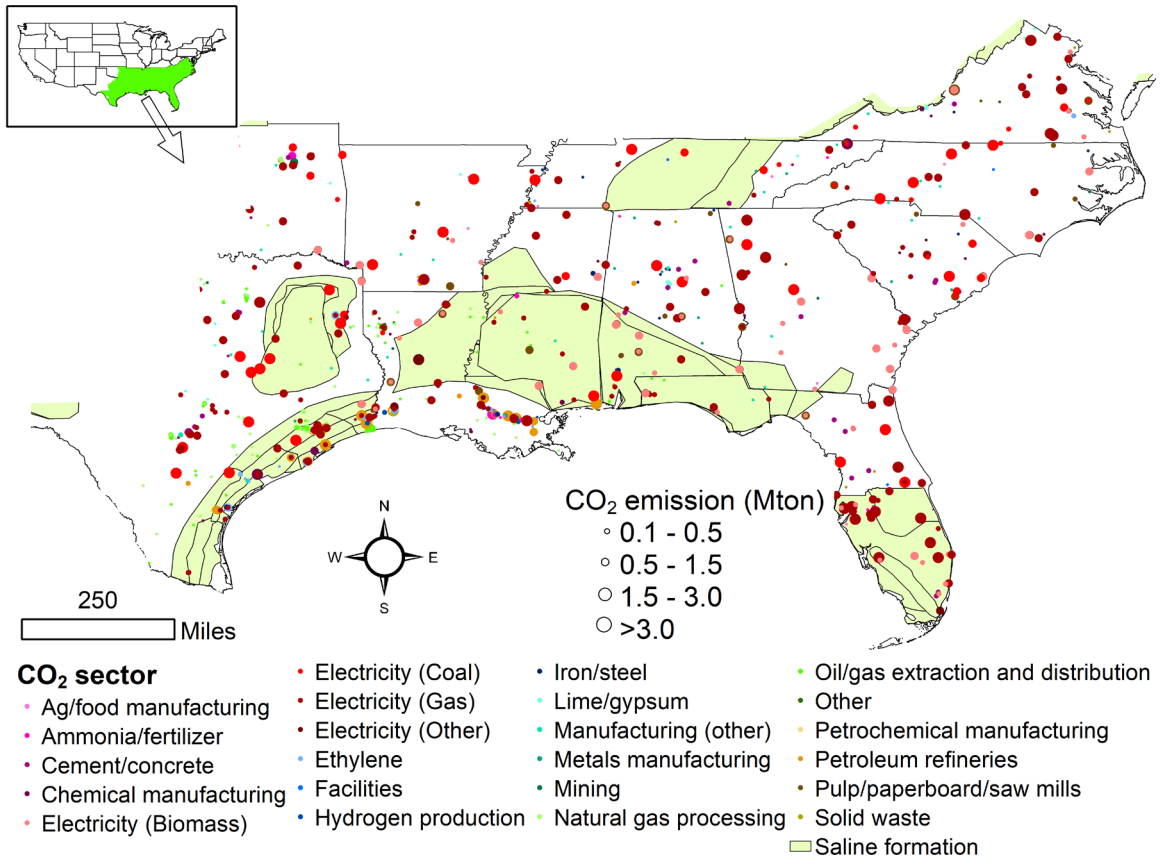


LANL is utilizing SimCCS to support infrastructure modeling in three regional CCUS initiatives (SECARB-USA, MRCI, CUSP) and one energy transition initiative (I-WEST)

2019 R&D 100 WINNER

Publicly available @ https://simccs.lanl.gov/

CO_2 emission sources and potential storage formations in the Southeast US region



45Q eligible point sources and saline storage formations in SE USA

- 3632 point sources:1.281 Gt/yr cum emissions
- 1063 45Q eligible point sources: 1.17 Gt/yr cum emissions
- 69 potential storage targets (saline formations)
- Data source for CO_2 point sources: EPA GHGRP & eGRID (2021)
- Date source for saline storage formations: NATCARB
- SECARB-USA Regional Initiative is updating the saline storage formation data

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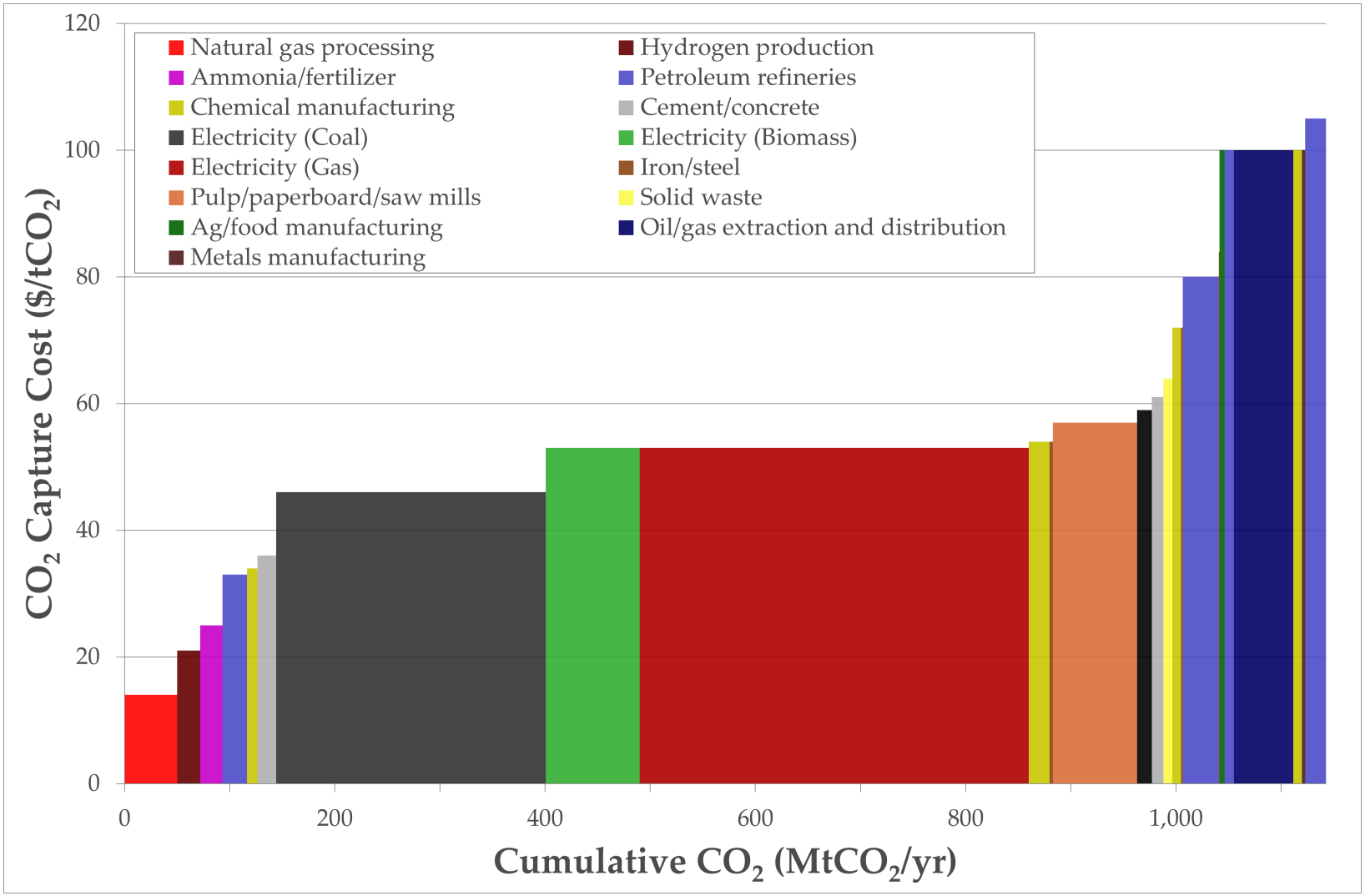
CO_2 supply curve – based on point source characteristics



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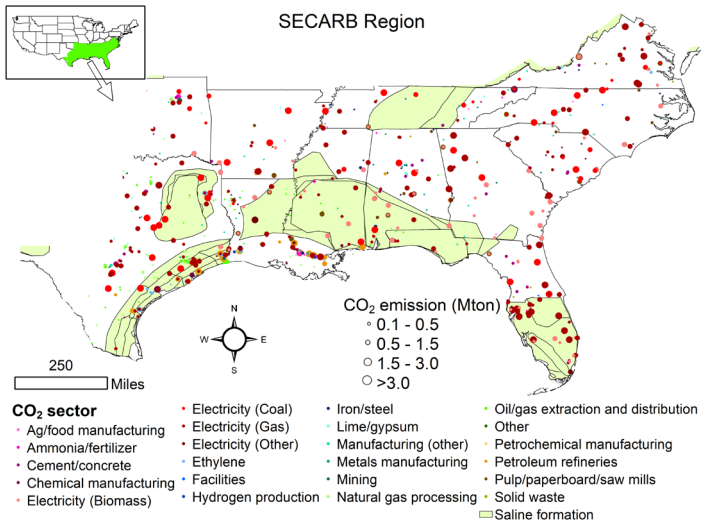
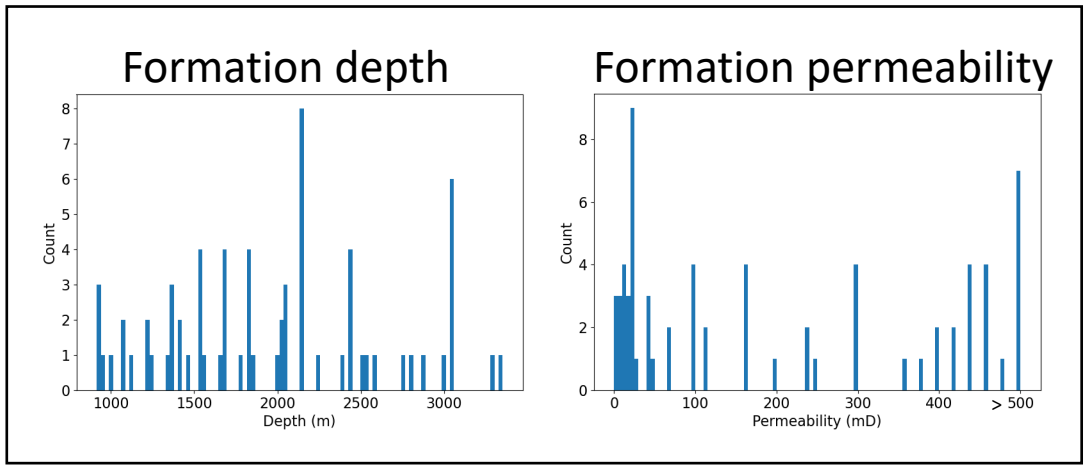
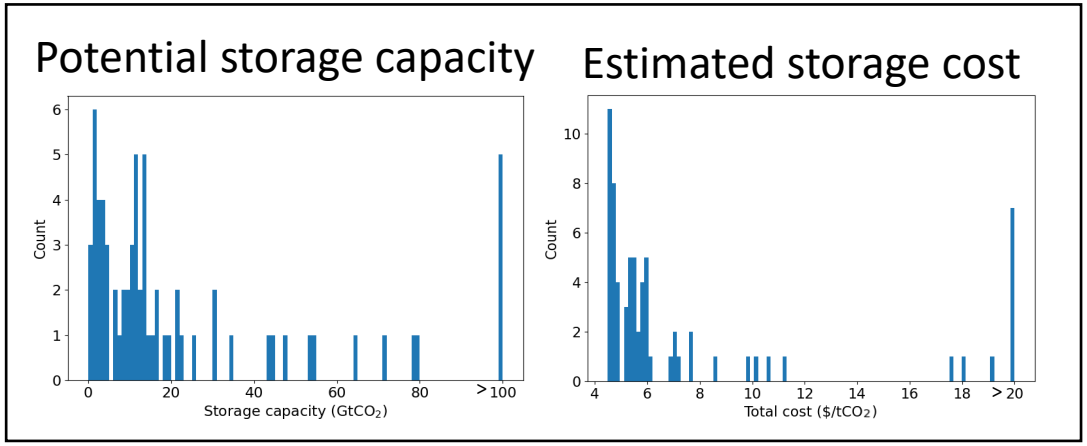
69 potential saline storage targets in the region with varying characteristics





SimCCS-SCO_2T



- Total capacity: 1718 GTons
- Sufficient to store ~1.17 GTons/yr for ~1468 yrs

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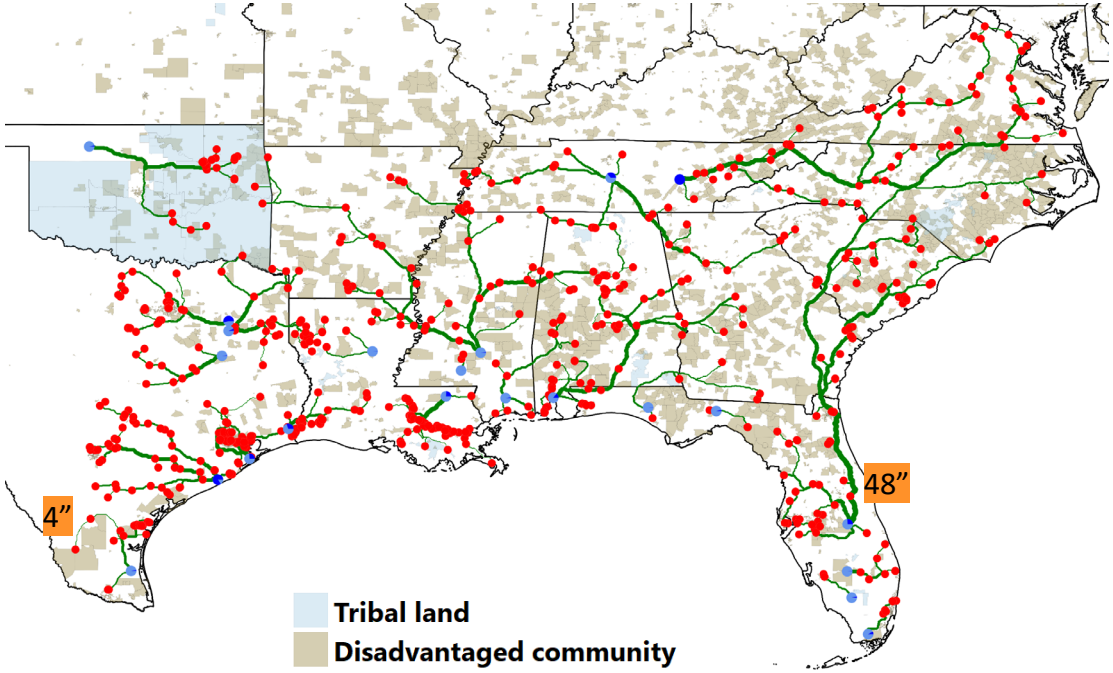
Potential regional deployment of CCS connecting all sources with suitable sinks

Scenario 1: Capture all 45Q eligible emissions, Pipelines avoid tribal lands & disadvantaged communities

- Only saline storage
- 45Q tax credits: $50/ton

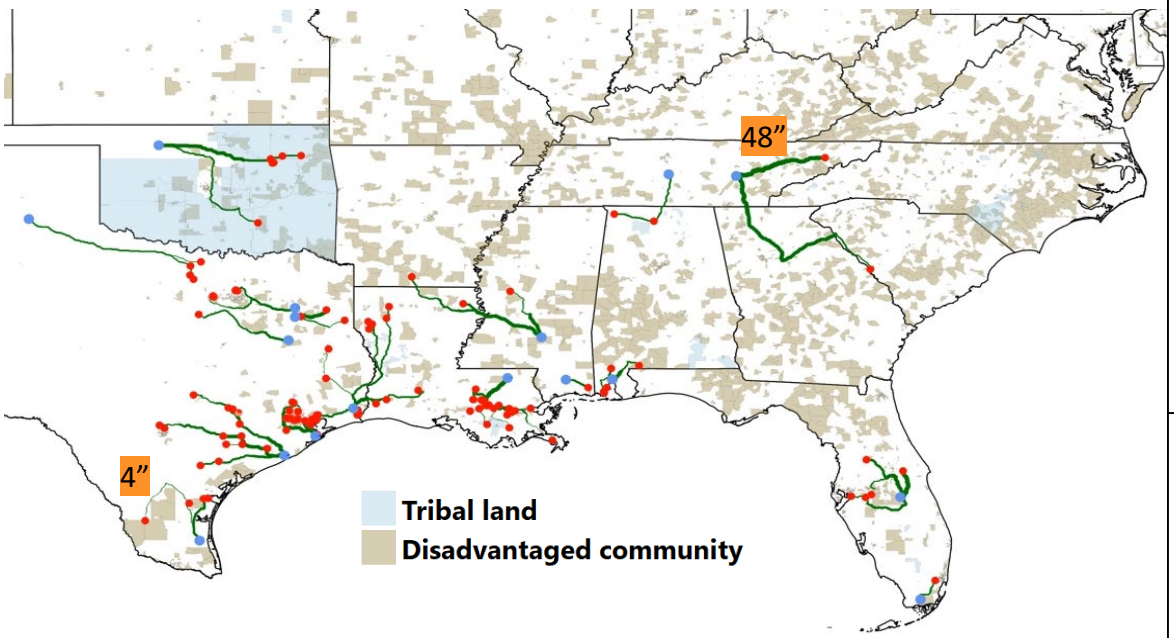


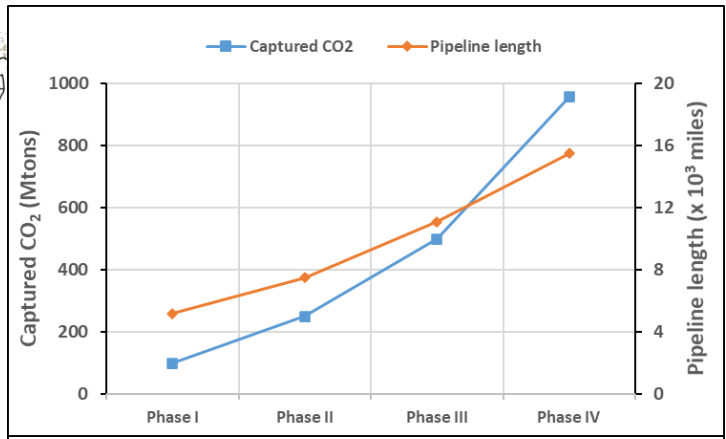
- Pipeline length: 14,890 miles
- Pipeline size: 4” – 48”
- Net cost: $10.05/ton
  - Pipeline cost: $2.57/ton

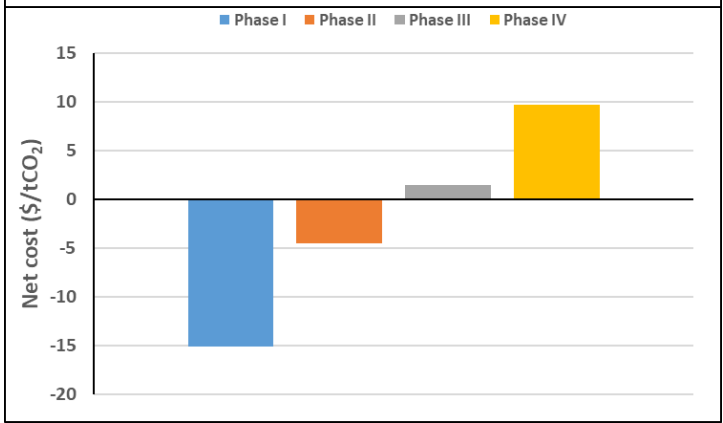
Potential regional deployment of CCS connecting all sources with suitable sinks

Scenario 2: Phased CCS infrastructure build-out

- Incremental CO_2 capture to meet net-zero emissions by 2050
- 45Q tax credits: $50/ton







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Conclusions

- Deployment of large-scale CCS will require large-scale regional infrastructure:
  - Capture CO_2 from multiple sources and transport it to multiple sinks
- Strategic investments in developing regional CO_2 transportation infrastructure can facilitate timely & efficient large-scale CCS deployment:
  - Phased build-out can encourage regional deployment
- Development of effective & efficient CCS infrastructure requires taking into consideration characteristics of point sources (for capture), region (for transport) & sinks (for storage)

Thank you!

rajesh@lanl.gov
bailianchen@lanl.gov