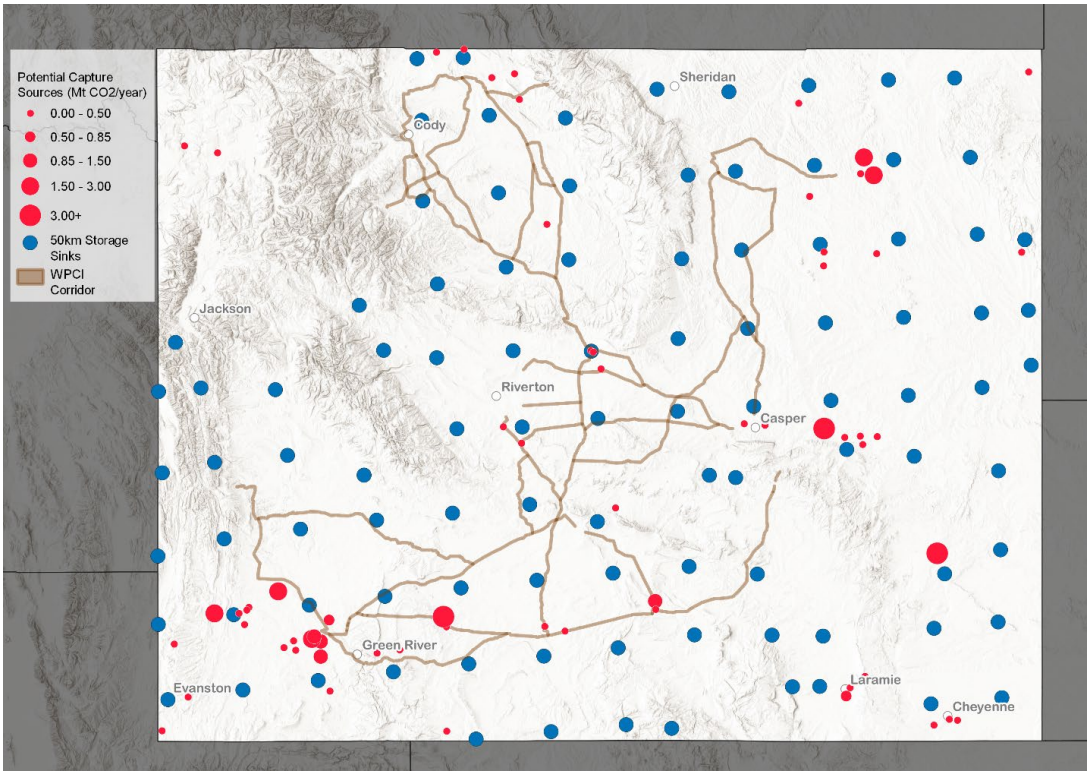
BUSINESS CASE ANALYSIS: NO STRANDED ASSETS

OVERVIEW

SimCCS^{PRO,} an optimization tool that creates regional network topology and corridors under multi-objective criteria, producing point-to-point pipeline financials (CAPEX/OPEX, pipeline diameters, and lengths of required pipeline, road, and railroad) for each source-to-sink configuration, was used to model pipelines could be employed to ensure all CO_2 in the state is captured for CCUS. Models were run both with and without giving preferential weights for following the WPCI right-of-way.



Map showing all potential emission sources, geologic storage locations, and the corridor footprint for the preferential WPCI routing surface.

MODELING INPUTS

Capture costs and volumes

- Any facility with capturable CO_2 emissions.
- Capturable volume & costs derived from NETL models.

Storage costs and potential

- Aggregated to a 50km x 50km grid cell.
- Storage costs and potential derived from the SCO_2T^{PRO} tool.

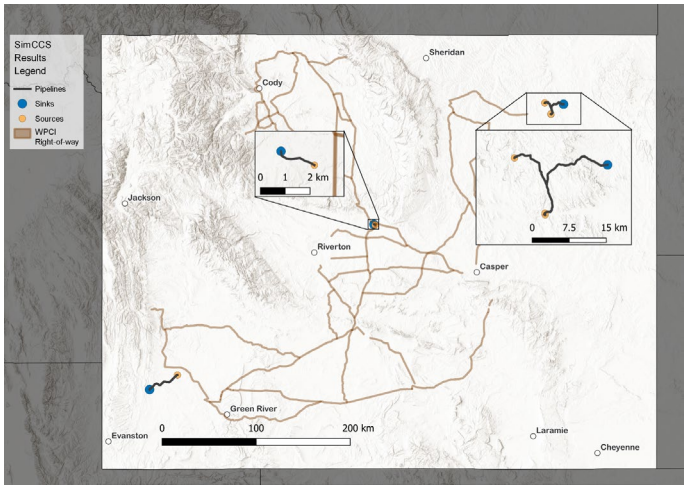
Transportation Network

- Default weights:
- Preferential WPCI right-of-way: routing surface is weighted so that it is more attractive to follow the pipeline corridor.

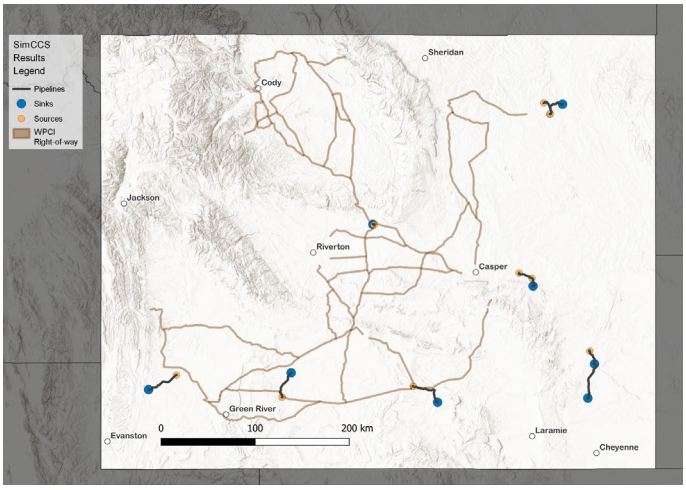
KEY TAKEAWAYS

- ✓ Results when pipelines followed the WPCI corridor and follow the default routing surface were very similar for costs; at each capture interval, total unit costs were within one dollar of one another.
- ✓ The number of sources that were captured were different at the 50% and 75% intervals.
- ✓ The length of pipeline for the 50% and 75% scenarios were different, with more km of pipeline required when the WPCI was not followed.
- ✓ Capturing the last 25% of emissions was the largest increase in costs across all intervals, increasing by almost \$14/tCO_2.

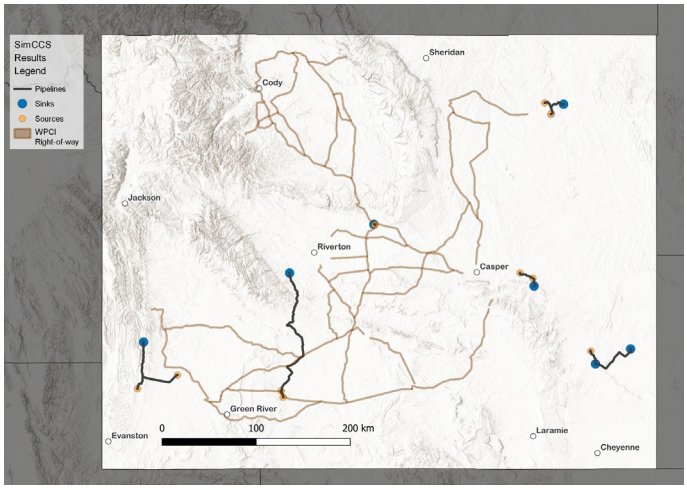
NO STRANDED ASSETS: Default Routing



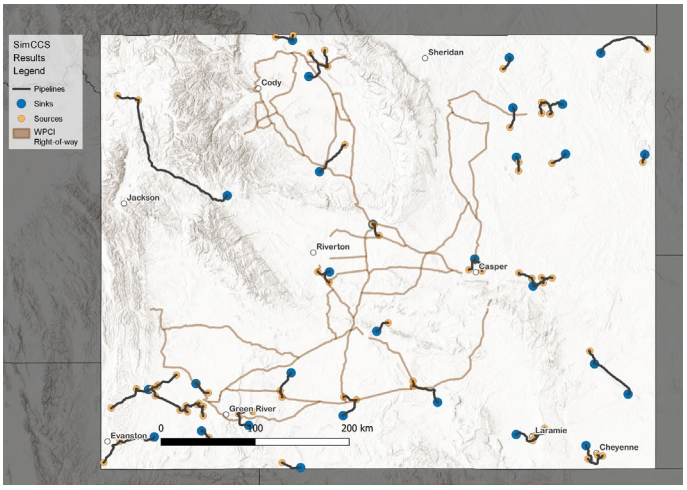
25% emissions captured



50% emissions captured



75% emissions captured

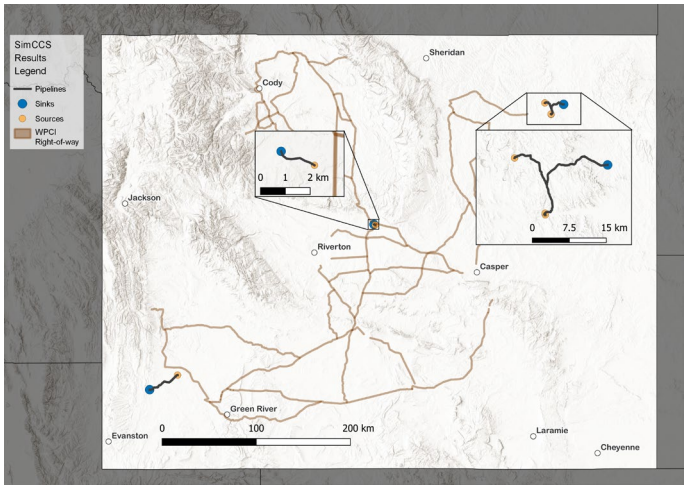


100% emissions captured

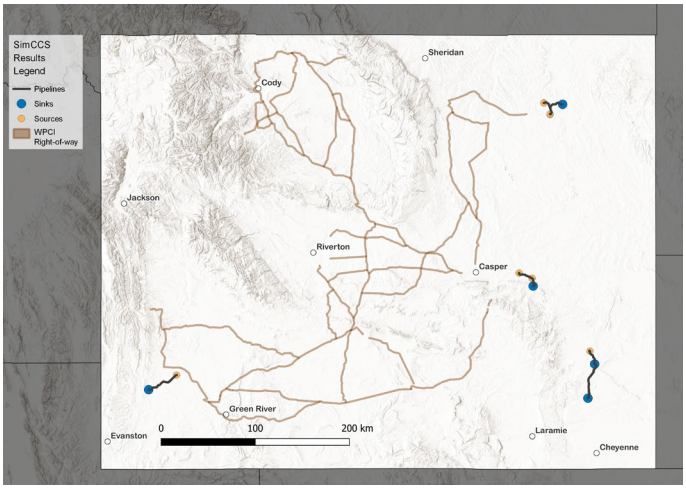
RESULTS

Variables	25 % Emissions	50 % Emissions	75 % Emissions	100 % Emissions
Number of Captured Sources	5	12	13	72
Number of Utilized Sinks	3	8	7	29
Length of Pipeline (km)	75	234	404	1309
Annual CO_2 Stored ($MtCO_2$/yr)	10.0074	20.0194	30.0527	42.3983
Capture Annual Cost ($M/yr)	970.2	1961.65	3008.44	4627.7
Total Transport Annual Cost ($M/yr)	17.65	48.81	99.24	270.28
Storage Annual Cost ($M/yr)	82.46	169.3	237.12	408.25
Total Annual Cost ($M/yr)	**1070.31**	**2179.77**	**3344.8**	**5306.23**
Capture Unit Cost ($/$tCO_2$)	96.95	97.98	100.11	109.15
Transport Unit Cost ($/$tCO_2$)	1.76	2.44	3.3	6.37
Storage Unit Cost ($/$tCO_2$)	8.24	8.46	7.89	9.63
UnitCost ($/$tCO_2$)	**106.95**	**108.88**	**111.3**	**125.15**

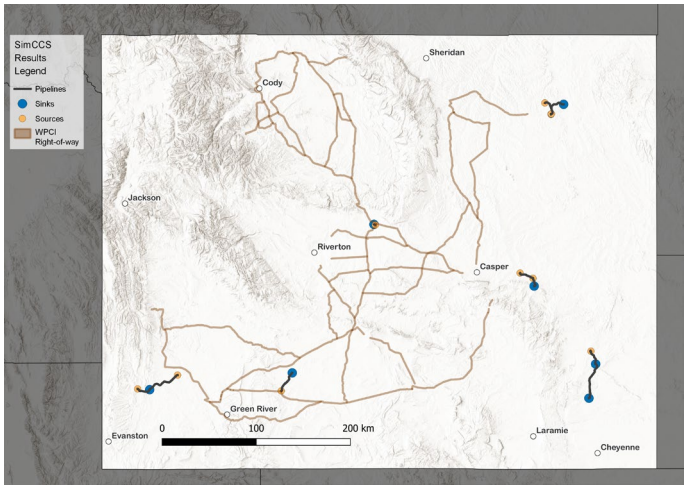
NO STRANDED ASSETS: Preferential WPCI Routing



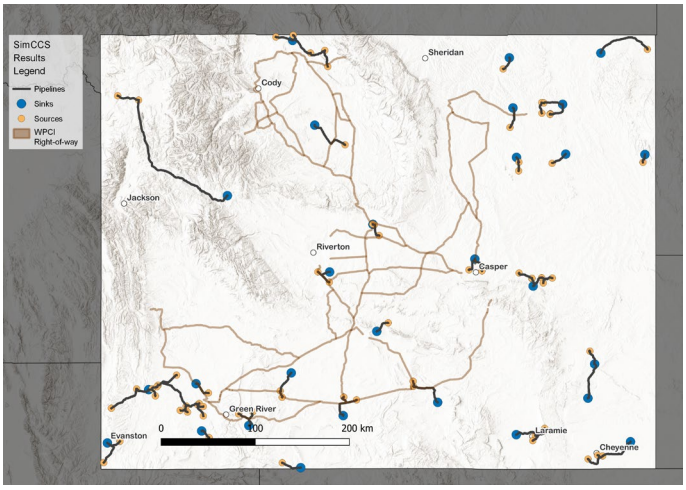
25% emissions captured, WPCI



50% emissions captured, WPCI



75% emissions captured, WPCI



100% emissions captured, WPCI

RESULTS

Variables	25 % Emissions WPCI	50 % Emissions WPCI	75 % Emissions WPCI	100 % Emissions WPCI
Number of Captured Sources	5	7	12	72
Number of Utilized Sinks	3	5	7	28
Length of Pipeline (km)	75	159	201	1290
Annual CO_2 Stored ($MtCO_2$/yr)	10.0074	20.0841	30.0203	42.3983
Capture Annual Cost ($M/yr)	970.2	1979.3	3005.21	4627.7
Total Transport Annual Cost ($M/yr)	17.92	35.51	46.57	265.8
Storage Annual Cost ($M/yr)	82.46	168.75	285.33	409.62
Total Annual Cost ($M/yr)	**1070.58**	**2183.56**	**3337.11**	**5303.13**
Capture Unit Cost ($/$tCO_2$)	96.95	98.55	100.11	109.15
Transport Unit Cost ($/$tCO_2$)	1.79	1.77	1.55	6.27
Storage Unit Cost ($/$tCO_2$)	8.24	8.4	9.5	9.66
UnitCost ($/$tCO_2$)	**106.98**	**108.72**	**111.16**	**125.08**