

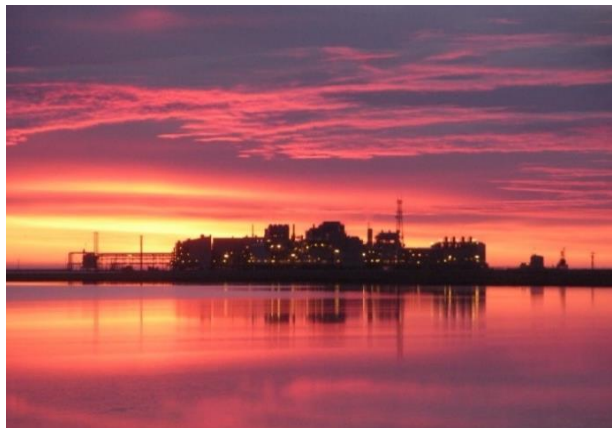
# HB 50 – Carbon Storage

## CCUS Opportunities for the State of Alaska

### House Resources Committee



Presented by  
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Alaska Department of Natural Resources  
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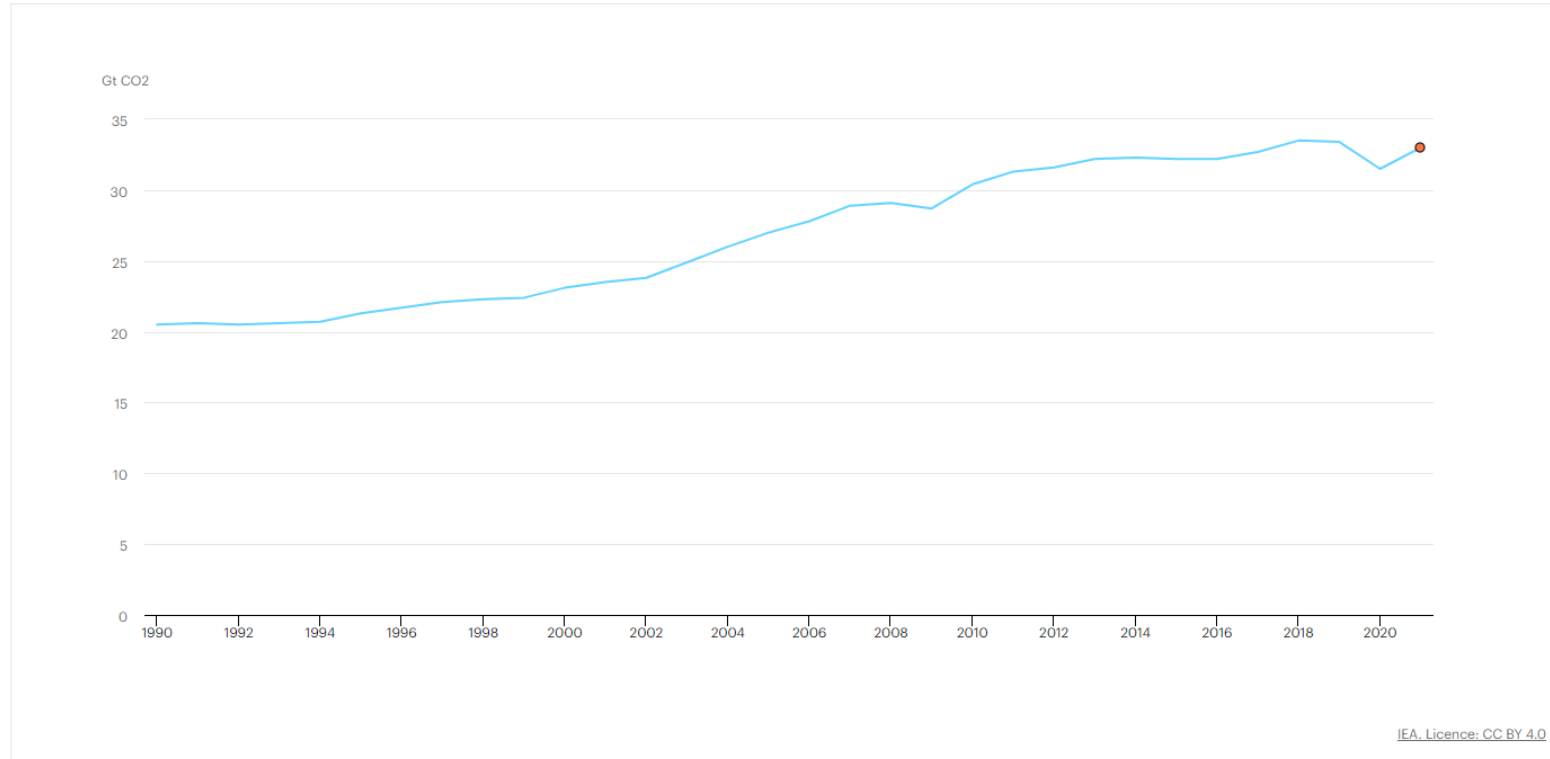


- 1. Global and State Carbon Statistics**
- 2. Storage Potential in Alaska**
- 3. Hypothetical Revenue Opportunities**
- 4. Risks & Opportunities of a Carbon Capture, Utilization, and Storage (CCUS) Regulatory Program**

# Carbon Dioxide Sources



## Global Energy-Related CO<sub>2</sub> Emissions 1991-2021



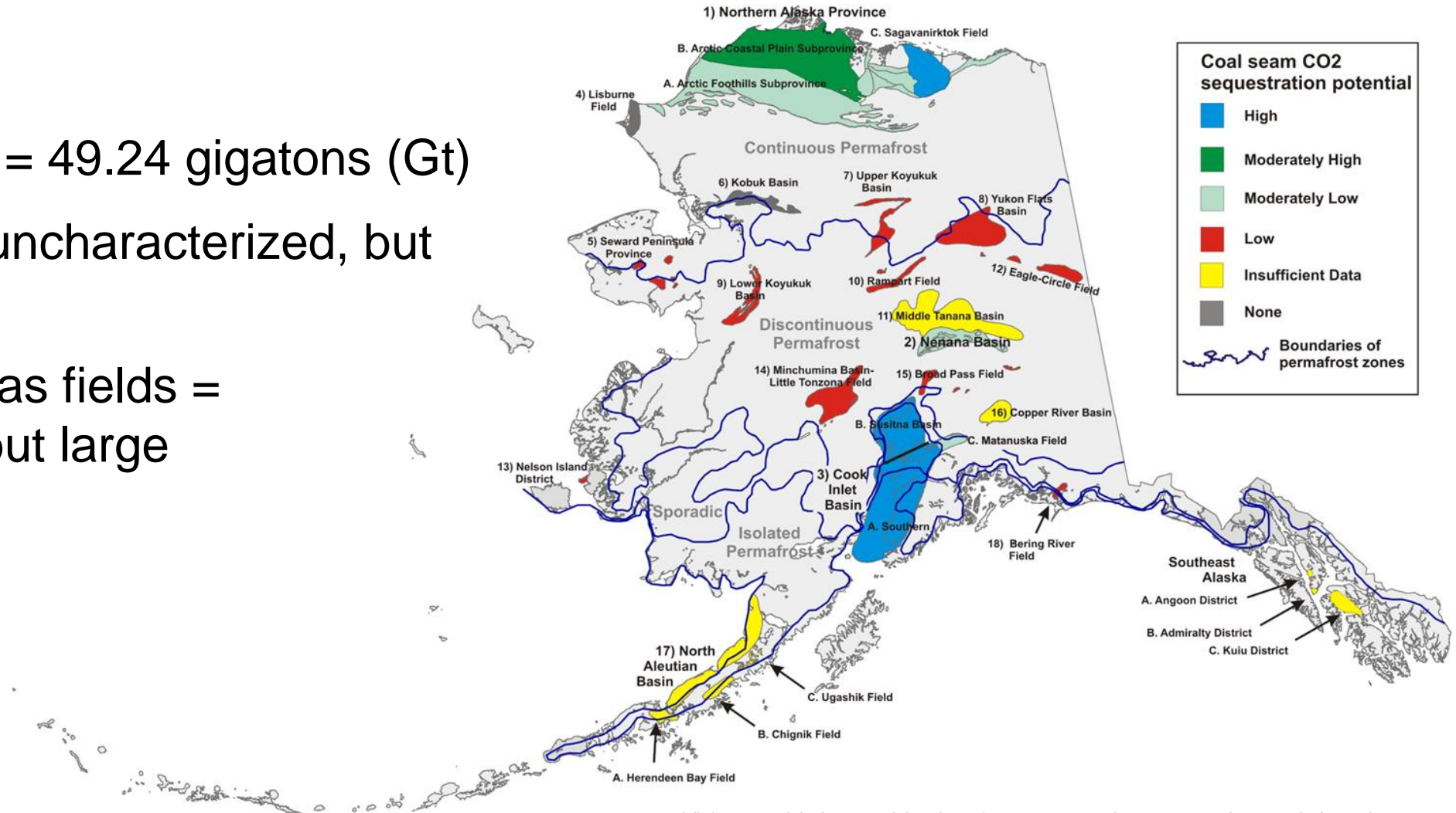
- Illustrative of magnitude of global emissions to compare with storage capacity in Alaska
- Not all sources of carbon are feasibly captured
- 0.014 Gt/year from Alaska stationary sources – power, oil & gas, industrial

\*CO<sub>2</sub> emissions include emissions from all uses of fossil fuels for energy purposes. CO<sub>2</sub> emissions do not include emissions from industrial processes, industrial waste and non-renewable municipal waste.

# Alaska's Storage Opportunity



- Unmineable coals = 49.24 gigatons (Gt)
- Saline Aquifers = uncharacterized, but larger than coal
- Depleted oil and gas fields = uncharacterized, but large



Shellenbaum, D.P., and Clough, J.G. 2010. Alaska Geologic Carbon Sequestration Potential Estimate: Screening Saline Basins and Refining Coal Estimates: California Energy Commission



# Hypothetical Revenue Opportunities



## 1. Regional Power Facility

- 250,000 metric tons/year, \$2.50 metric ton/year
- 20-year life
- Acreage ~1200 acres during injection, \$20 acre/year



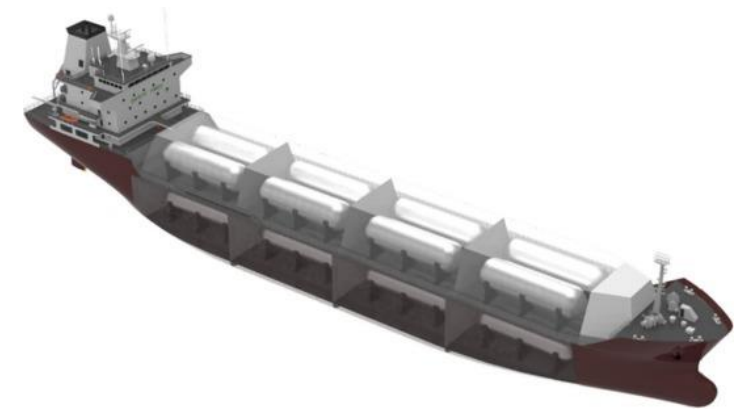
Chugach Electric Association, Inc. Southcentral Power Project

## 2. North Slope Emitting Facility

- 2,000,000 metric tons/year (50/50 EOR & Storage), \$2.50 metric ton/year (Storage)
- 20-year life
- Acreage ~10,000 acres during injection, \$20 acre/year

## 3. CO<sub>2</sub> Import & Sequestration Facility

- 10,000,000 metric tons/year, \$2.50 acre/year
- 40-year life
- Acreage ~ 50,000 acres during injection, \$20 acre/year



Conceptual design of CO<sub>2</sub> carrier.  
Comparison of CO<sub>2</sub> liquefaction pressures for ship-based carbon capture and storage (CCS) chain. Int J Greenhouse Gas Control, 52 (2016)

EOR = enhanced oil recovery

# Hypothetical Revenue Opportunities



- Not all CO<sub>2</sub> emissions are feasibly captured – technology continues to rapidly develop
- Capital expenditures to retrofit existing facilities cannot be met by existing incentives in some cases
- Import of CO<sub>2</sub> is dependent on further development of shipping technology and infrastructure



# Hypothetical Revenue Opportunities\*

Hypothetical State Revenues	Scenario	Scenario	Totals	Year 1 0	Year 2 1	Year 3 2	Year 4 3	Year 5 4	Year 6 5	Year 7 6	Year 8 7	Year 9 8	Year 10 9
	1	<b>Regional Power Facility CCUS</b>	<b>\$11,796,641</b>	<b>\$92,753</b>	<b>\$92,753</b>	<b>\$92,753</b>	<b>\$24,921</b>	<b>\$24,921</b>	<b>\$573,427</b>	<b>\$573,427</b>	<b>\$573,427</b>	<b>\$573,427</b>	<b>\$573,427</b>
		Exploration License	<b>Over 20 years</b>	\$92,753	\$92,753	\$92,753							
		Development Lease					\$24,921	\$24,921					
		Injection							\$625,000	\$625,000	\$625,000	\$625,000	\$625,000
		Additional EOR Oil Revenue											
		Reduced Pollution Charges							-\$51,573	-\$51,573	-\$51,573	-\$51,573	-\$51,573
	2	<b>North Slope Facility Standalone CCUS Project</b>	<b>\$210,761,893</b>	<b>\$371,013</b>	<b>\$371,013</b>	<b>\$371,013</b>	<b>\$99,686</b>	<b>\$99,686</b>	<b>\$10,472,474</b>	<b>\$10,472,474</b>	<b>\$10,472,474</b>	<b>\$10,472,474</b>	<b>\$10,472,474</b>
		Exploration License	<b>Over 20 years</b>	\$371,013	\$371,013	\$371,013							
		Development Lease					\$99,686	\$99,686					
		Injection							\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000	\$2,500,000
		Additional EOR Oil Revenue							\$8,385,059	\$8,385,059	\$8,385,059	\$8,385,059	\$8,385,059
		Reduced Pollution Charges							-\$412,584	-\$412,584	-\$412,584	-\$412,584	-\$412,584
	3	<b>CO2 Import for Sequestration (10m)</b>	<b>\$1,014,120,959</b>	<b>\$3,710,130</b>	<b>\$3,710,130</b>	<b>\$3,710,130</b>	<b>\$996,857</b>	<b>\$996,857</b>	<b>\$996,857</b>	<b>\$25,000,000</b>	<b>\$25,000,000</b>	<b>\$25,000,000</b>	<b>\$25,000,000</b>
		Exploration License	<b>Over 40 years</b>	\$3,710,130	\$3,710,130	\$3,710,130							
		Development Lease					\$996,857	\$996,857	\$996,857				
		Injection								\$25,000,000	\$25,000,000	\$25,000,000	\$25,000,000
		Additional EOR Oil Revenue											
		Reduced Pollution Charges											

Additional barrels of oil and revenue for North Slope facility assumes ½ of the CO<sub>2</sub> injected is for EOR purposes and other ½ is permanently sequestered.

Reduction in revenue to the Department of Environmental Conservation assumes that a certain factor of scheduled pollutants would be removed from the emissions process with every ton of CO<sub>2</sub> captured.

\*These scenarios represent a “best case,” hypothetical scenario relying on assumptions believed to be reasonable, including market conditions in other jurisdictions, and maturely developed capture, transportation and sequestration technology. They are developed purely for high-level scoping purposes. The Alaska market development will likely include a range of different commercial and economic arrangements.



## Low Risk to the State

- Alaska Oil and Gas Conservation Commission (AOGCC) & DNR have existing technical expertise to handle program standup resulting in relatively low cost
  - Initial funding of AOGCC's Class VI Program
    - \$1,058.0 (UGF) FY24 for 2 full-time positions
    - Expectation is that those costs are recoverable from the EPA's Underground Injection Control Class VI Grant Program
    - Ongoing AOGCC costs would be covered by program receipts (DGF)
  - Licensing program at DNR can be integrated with existing leasing IT infrastructure and subject matter expertise
    - DNR revised fiscal note for Division of Oil and Gas requests \$0.0 expenditure for FY24 and out-years
  - Additional technical personnel as interest coalesces – costs would be offset by regulatory charges or licensing fees
  - DEC possible theoretical reduction in revenue is a result of reduced pollution

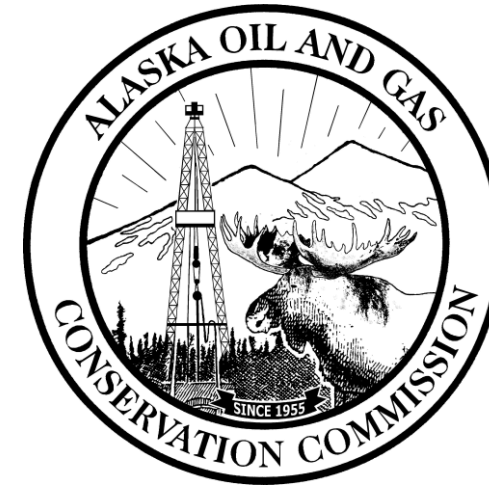


# Opportunities



- High potential value to the State of Alaska
- Extends life of existing royalty revenues by providing operators with additional opportunities for decarbonization
- Additional revenue opportunities through enhanced oil recovery and through royalty-like payments for the use of Alaska's pore space – possibly significant if the industry develops in Alaska
  - Contributions to both general fund and permanent fund as mineral revenue
- Builds upon, preserves and possibly grows existing, in-place industry workforce
- Additional opportunities for generating utilities

# QUESTIONS?



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