



# Alaska Railbelt Carbon Capture and Storage (ARCCS) Project

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Objectives, Locations, Participants, Approach, Scope, Community Benefits, etc. are merely proposed and are still being negotiated with DOE

# Project Overview

## ➤ Objectives

- To accelerate wide-scale deployment of CCUS by assessing and verifying the feasibility of using the proposed storage complex in southcentral Alaska for the safe and cost-effective commercial-scale storage of anthropogenic CO<sub>2</sub> emissions.

## ➤ Main Organizations

- University of Alaska Fairbanks
- Energy & Environmental Research Center
- Advanced Resources International
- International Reservoir Technologies
- Div. of Geological & Geophysical Surveys
- Blueprint Alaska, Friends of West Susitna, Flatlands Energy Corp, etc.

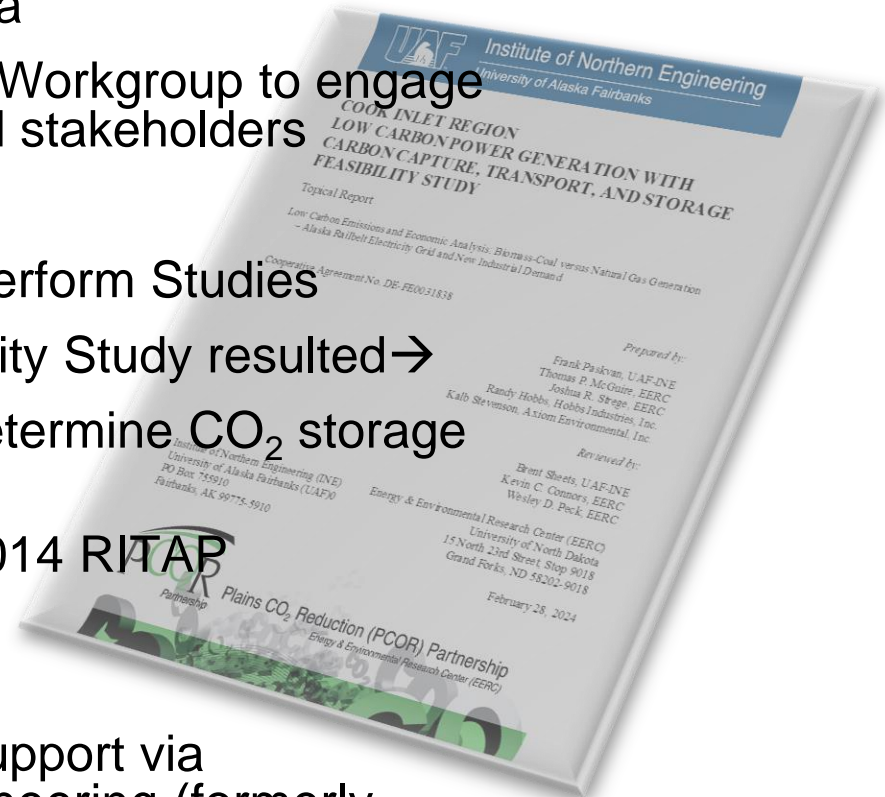
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# Project Overview

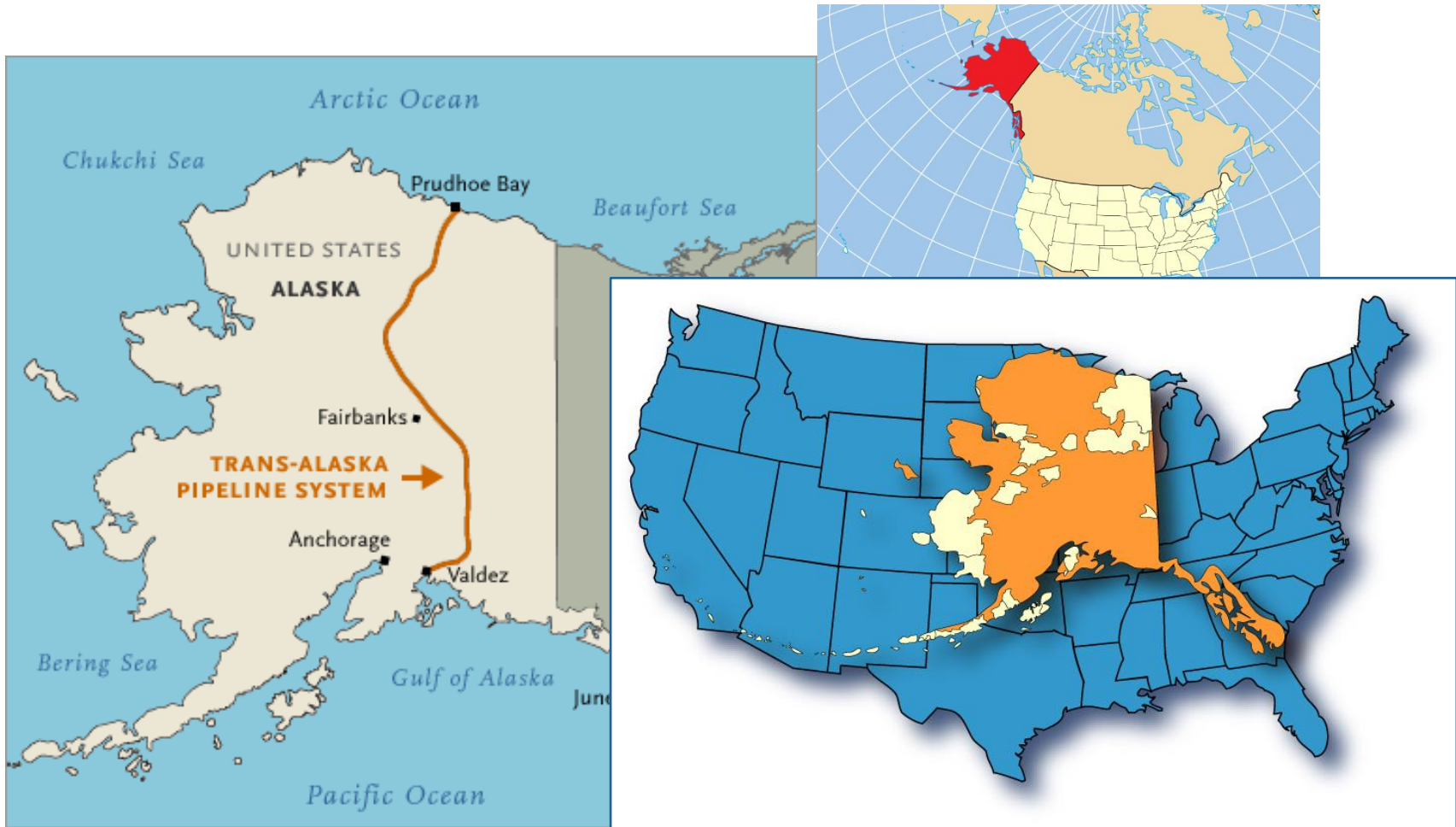
## ➤ Project History

- In 2019, began working on Carbon Capture Use and Storage
  - UAF-INE joined PCOR, Plains CO<sub>2</sub> Reduction Partnership, led by EERC at U. of North Dakota
- In 2022, UAF initiated Alaska CCUS Workgroup to engage industry, government, academia, and stakeholders
  - Supported Carbon Storage Bill
  - Hosted Discussions, Offered to Perform Studies
  - Power Generation CCUS Feasibility Study resulted →
- In 2024, initiate ARCCS Project to determine CO<sub>2</sub> storage volume northern Cook Inlet
- In 2024, applied for DOE DE-FOA-3014 RITAP funding to:
  - Continue CCUS Workgroup
  - Expand Alaska CCUS technical support via UAF B.S. Energy Resources Engineering (formerly Petroleum)



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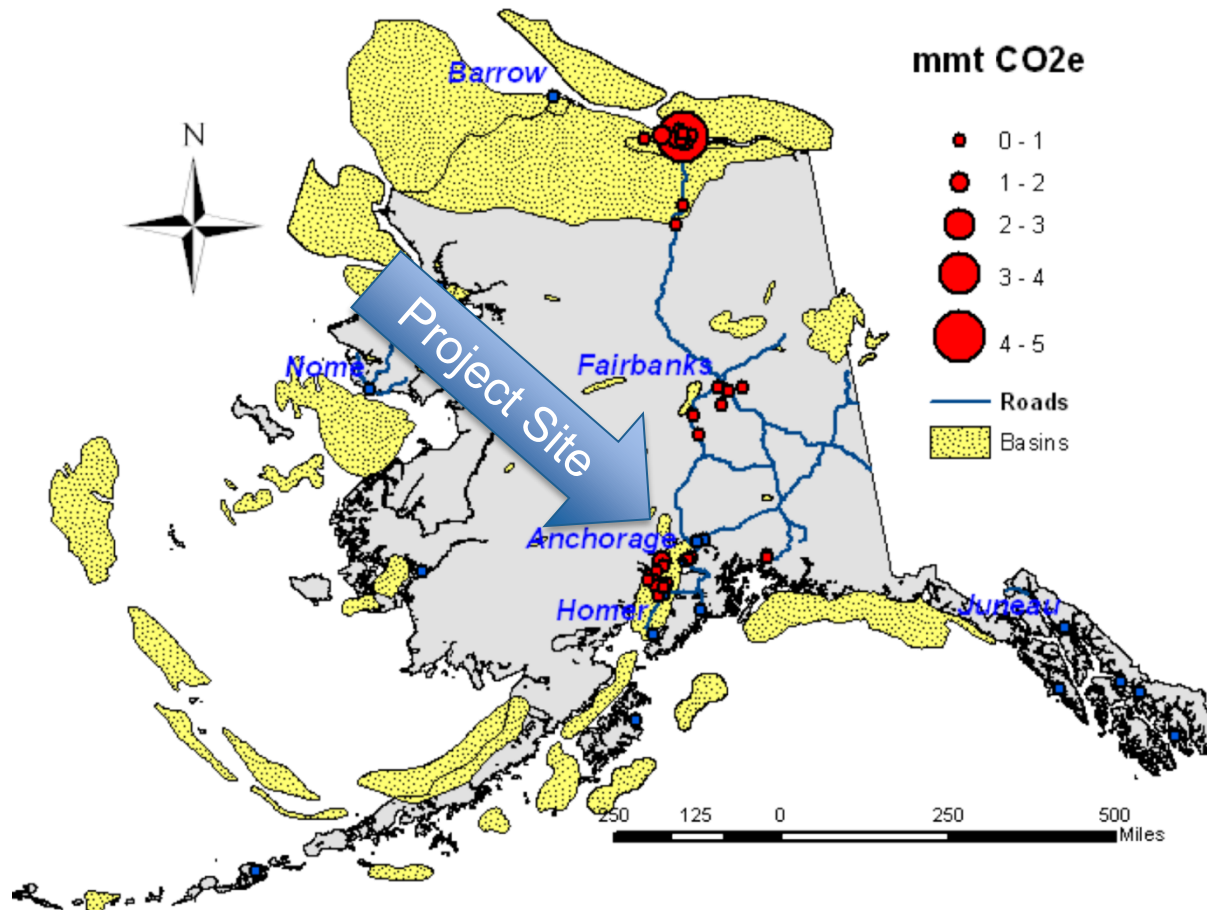
# Where is the Project Location?



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# Project Overview

## ➤ Project Location

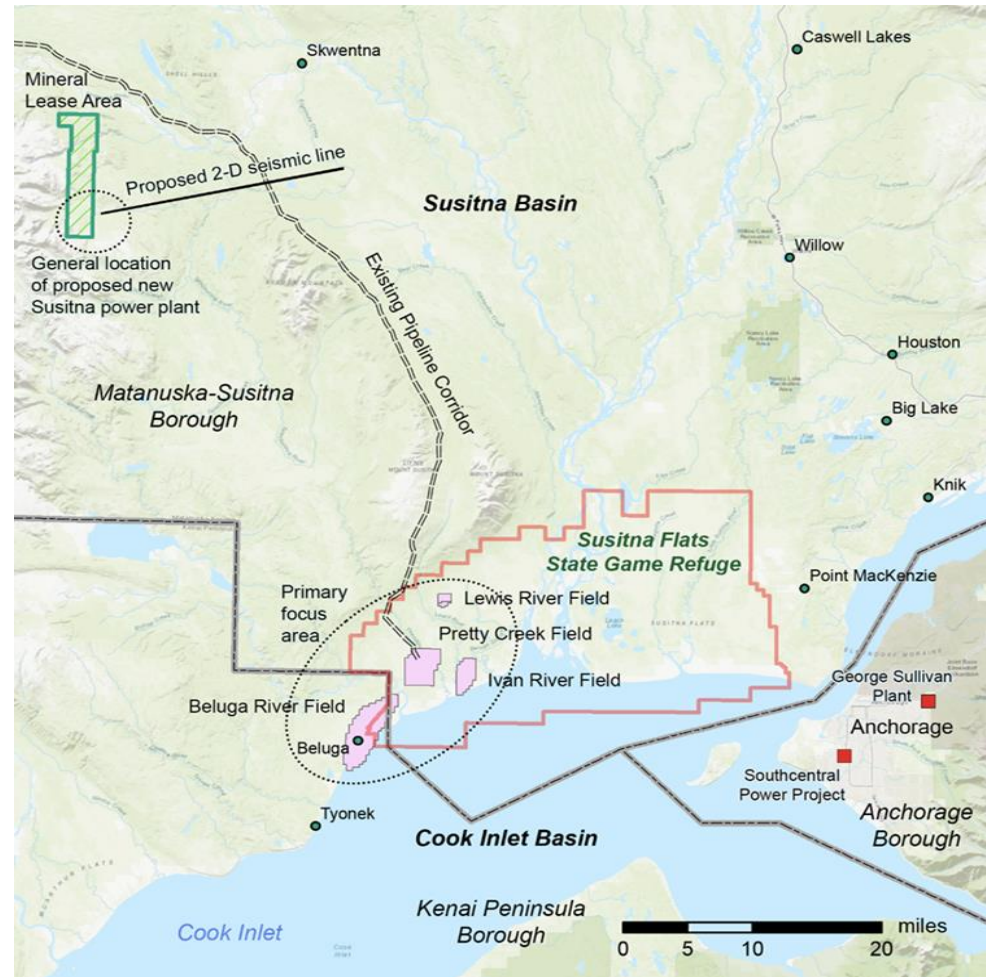




# Project Overview

## ➤ Project Location

- Capture CO<sub>2</sub> from a proposed 400 MW coal and biomass plant
- Electrical & CO<sub>2</sub> transmission using an existing corridor permitted for a proposed natural gas pipeline
- Electrical grid intertie & CO<sub>2</sub> storage at Beluga River Site & alternatives
- Examine aggregating CO<sub>2</sub> from two gas-fired generation stations nearby

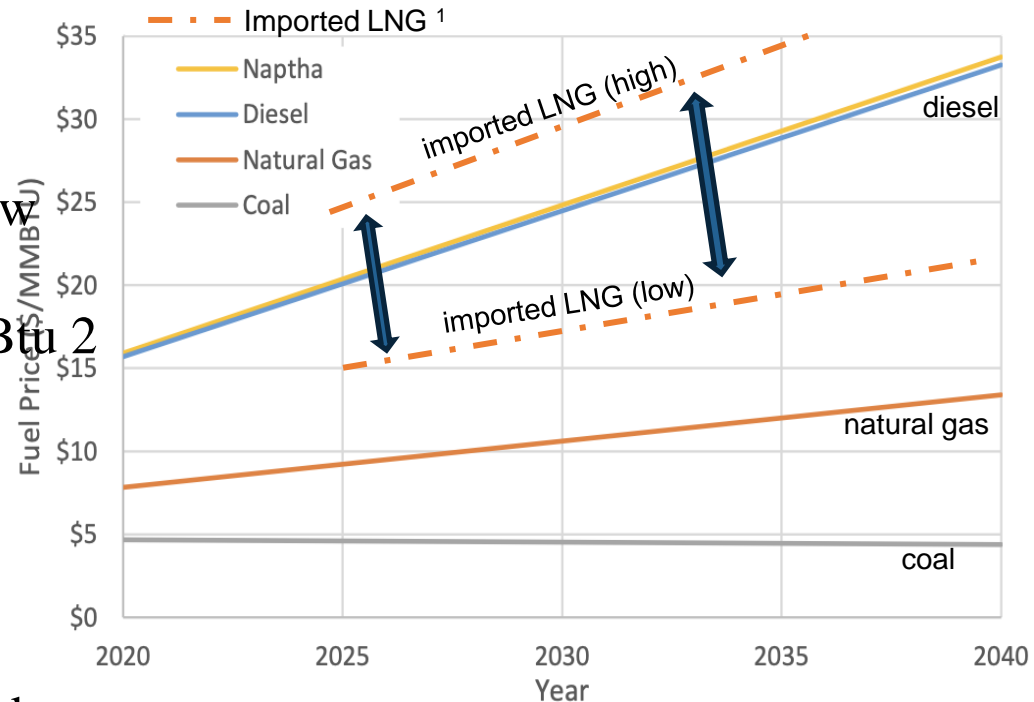


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# Project Overview

## ➤ Railbelt Power System Analysis

- Coal is the Lowest Cost Fuel  
~ \$4/MMBtu
  - ✓ \$7 to \$10/MMBtu natural gas now
  - ✓ \$20 to \$35/MMBtu diesel
  - ✓ Imported LNG \$15 to \$25 /MMBtu <sup>2</sup>
- Coal Supply Local and Abundant
- With CCS, Coal CO2 emissions:
- ✓ Half to quarter that of natural gas
  - ✓ Half of the wind power supported by natural gas power



**Figure 5. Assumed fuel price trajectories (2020\$)**

Fuel price forecasts from the Alaska Energy Authority, ref. *NREL Renewable Portfolio Standard Assessment for Alaska's Railbelt, 2022*, NREL/TP-5700-81698, <https://www.nrel.gov/docs/fy22osti/81698.pdf>

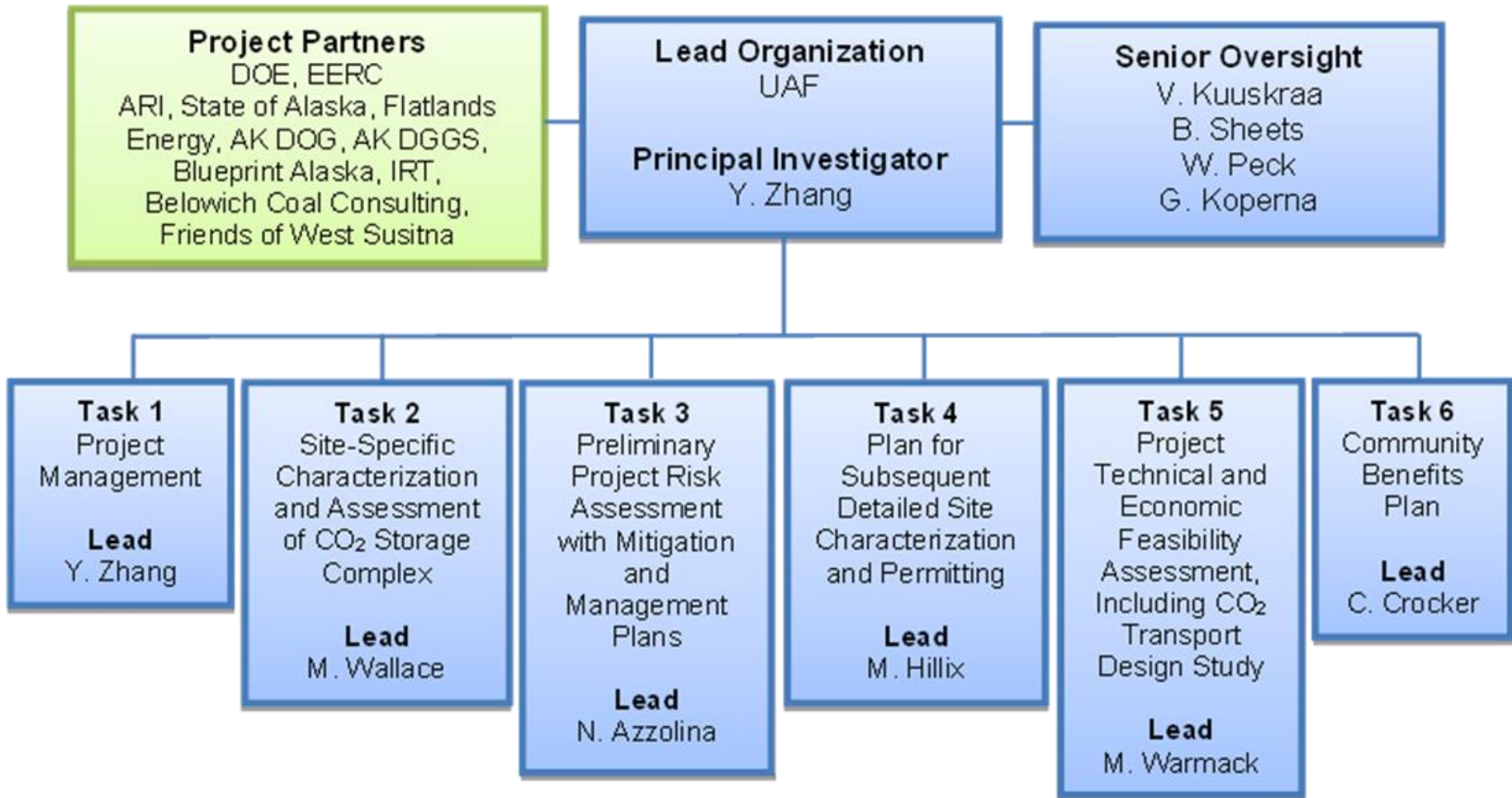
<sup>1</sup> Imported LNG price estimate from "Cook Inlet Region Low Carbon Energy 2024" and are still being negotiated with DOE

Objectives, Locations, Participants, Approach, Scope, Community Benefits, etc. ~~Carbon Analysis 2024~~



# Technical Approach/Project Scope

## ➤ Project Execution Plan



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# Technical Approach/Project Scope

## ➤ Project Milestones

Task/ Subtask	Milestone (M) Title and Description	Planned Completion Date	Verification Method
2.2	M1 – Initiation of Permit Development	7/31/24	Progress of all milestones will be reported in the subsequent quarterly report.
5.1	M2 – Conceptual Basis of Plants and Pipeline Infrastructure Provided	9/30/24	
2.2	M3 – Initiation of Seismic Collection	12/31/24	
6.1	M4 – Initiation of the CLE Plan	12/31/24	
6.4	M5 – Initiation of J40 Plan	12/31/24	
1.0	M6 – DOE Working Group Participation Initiated	1/31/25	
6.2	M7 – Knowledge, Skills, and Abilities Registry Framework Developed	6/30/25	
6.3	M8 – DEIA Training Completed	6/30/25	
6.1	M9 – Listening Session/Open House Scheduled	7/31/25	
3.1	M10 – Initial Simulation Delivered for Risk Assessment	8/31/25	
2.3	M11 – Final Case Simulations Initiated	12/31/25	
6.2	M12 – Assessment of Workforce Development Completed	4/30/26	
6.4	M13 – J40 Engagement Activity Scheduled	4/30/26	
6.3	M14 – CCS Presentations to Workforce Development Groups Underrepresented in STEM	6/30/26	

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# Technical Approach/Project Scope

## ➤ Success Criteria

- **Subtask 2.2 – New Seismic Data Acquisition and Analysis.** The initiation of permit development for the seismic survey will allow for the successful completion of the seismic data acquisition.
- **Subtask 2.3 – Geologic Modeling and Simulation.** The successful initiation of a final case simulation (M11) will allow for the continued development of a project risk assessment and mitigation plan (Subtask 3.1) as well as the continued development and finalization of the technical and economic feasibility review (Subtask 5.3) and D10 – Feasibility Report.
- **Task 3.0 – Preliminary Project Risk Assessment with Mitigation and Management Plans.** The successful completion of M10 – Initial Simulation Delivered for Risk Assessment will allow for the identification and evaluation of project risks by the full project team and the completion of the site characterization and permitting plan (Deliverable [D]12).
- **Subtask 5.1 – Conceptual Basis of Plants, Pipeline Infrastructure, and CO2 Transportation Routing.** The receipt of the conceptual basis of plants and pipeline infrastructure (M2) will allow for the initiation of this subtask.
- **Task 6.0 – Community Benefits Plan.** The successful initiation of the community benefits plans (M5, M6) will empower project team members to build and strengthen community and stakeholder relationships while providing consistent messaging and mechanisms to incorporate feedback into future planning and messaging and relationship building.

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# Technical Approach/Project Scope

## ➤ High Impact Project Risks

High Impact Risks	Mitigation/Response Strategy
Budget Insufficient to Complete Project	The PI will work with task leads to ensure priority is given to schedule and use of allocated hours. Hours and schedule will be tracked using the UAF's internal project cost-tracking system.
Insufficient Data Availability	The project team has extensive experience in CCUS, including conducting an initial screening with Flatlands Energy for the proposed project area. Significant data are available for the project area, and Hilcorp has kindly committed to sharing data. A letter of support is included. Additionally, a 2D seismic survey is planned to acquire additional site-specific data.
CO <sub>2</sub> Sources Inadequate	Flatlands Energy is proposing a new coal-fired power plant that will generate ~2.6 Mtpa CO <sub>2</sub> . Chugach Electric has up to 746,000 Mtpa and is also committed to participating. Letters of commitment are included. Additionally, the region has other CO <sub>2</sub> sources that can be considered to ensure a minimum of 50 Mt of CO <sub>2</sub> in a 30-year period.
Lack of Resource Availability	The project team is committed to providing the necessary personnel and software resources to carry out project activities. The team has long-standing relationships with Computer Modelling Group (CMG) and Schlumberger and has used their software on multiple projects.

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# Technical Approach/Project Scope

## ➤ High Impact Project Risks (Continue)

High Impact Risks	Mitigation/Response Strategy
Poor Communication Leads to Schedule or Cost Overruns	Regular update meetings will be held with the project team to ensure objectives are being pursued and that activities are focused on completing the project milestones. External project partners and other stakeholders will be included as needed. The schedule and budget will be periodically reviewed to ensure there are no deviations. Communication regarding progress, including any potential deviations from the schedule or budget, will occur with the DOE project manager via phone calls, email, and quarterly reports.
Loss of PI, Task Lead, or Key Researcher(s) to Health Matters or Attrition	Project goals, milestones, and schedule will be communicated to task leads and all researchers regularly.
Fieldwork-Based Injuries (e.g., seismic survey)	Subcontractors and all field personnel will be required to complete all safety training and exercise journey management practices to deployment and will participate in on-site safety meetings prior to fieldwork. Personal protective equipment will be standard practice and worn for all field activities, including fire-resistant out covering, hardhat, safety glasses, and steel-toed boots.

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# Community Benefits Plans

## ➤ Efforts

- In-depth social characterization of the project area in the context of the greater region
- Identification of audiences, including communities with environmental justice concerns, disadvantaged communities, and Alaska natives
- Developing messaging goals and content
- Selecting methods for engaging stakeholders (e.g., media campaigns, one-on-one contact, listening sessions, open houses, etc.)
- Strategies for incorporating stakeholder feedback
- Developing a timeline for implementation of the plan; and creating a system for tracking engagement outcomes and gauging impact
- Through feedback on plan implementation (Milestone [M] 4), two-way engagement opportunities (M9), new knowledge, and lessons learned, continual evaluation and updates to the community and labor engagement (CLE) plan will occur throughout the life of the project



# Community Benefits Plans

## ➤ SMART Milestones

Category and Commitment	Budget Period 1 SMART Milestones	SOPO Task Reference
<b>Community and Labor Engagement</b>		
Engage community and stakeholder groups based on a plan developed in the first 90 days of the project.	M4 – Initiation of CLE plan	Task 6.1
Share project information and gather community feedback at an open house or similar event.	M9 – Listening session/open house scheduled	Task 6.1
<b>Investing in Job Quality and a Skilled Workforce</b>		
Prepare the next generation for clean energy jobs.	M7 – KSA registry framework developed	Task 6.2
Ensure adequate job training and pathways to apprenticeships for individuals in underrepresented and disadvantaged communities are available.	M12 – Assessment of workforce development completed	Task 6.2
<b>Diversity, Equity, Inclusion, and Accessibility</b>		
Actively promote and foster DEIA at all levels of the organization and operations.	M8 – DEIA training completed	Task 6.3
Raise awareness and interest in STEM subjects in underrepresented and disadvantaged communities.	M14 – CCS presentations to workforce development groups underrepresented in STEM	Task 6.3
<b>Justice40 Initiative</b>		
Engage disadvantaged communities based on a plan developed in the first 90 days of the project.	M5 – Initiation of J40 plan	Task 6.4
Ensure that 40% of the benefits of the project flow to disadvantaged communities.	M13 – J40 engagement scheduled; activity to be determined after further evaluation of benefits and impacts to nearby disadvantaged communities	Task 6.4

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# Next Steps

- **Finalize the award**
- **Implement all the tasks according to plan**
- **Hopefully, continue to Phase III and Phase IV**

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# Acknowledgment

- Department of Energy
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- Evelyn Lopez, NETL



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# Thank You



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