

**CHUGACH ELECTRIC ASSOCIATION, INC.
ANCHORAGE, ALASKA**

OPERATIONS COMMITTEE MEETING

AGENDA

Jim Nordlund, Chair
Sisi Cooper, Director
Bettina Chastain, Director

Dan Rogers, Director
Mark Wiggin, Director

July 10, 2024

4:00 P.M.

Chugach Board Room

- I. CALL TO ORDER (4:00 p.m.)
 - A. *Roll Call*
- II. APPROVAL OF THE AGENDA* (4:05 p.m.)
- III. APPROVAL OF THE MINUTES* (4:10 p.m.)
 - A. *May 1, 2024 (Mankel)*
- IV. PERSONS TO BE HEARD (4:15 p.m.)
 - A. *Member Comments*
 - B. *Southcentral Coal Generation with Carbon Sequestration (Flatlands Power) (4:25 p.m.)*
- V. NEW BUSINESS (scheduled) (4:55 p.m.)
 - A. *Election of Operations Committee Vice-Chair (Board) (4:55 p.m.)*
 - B. *Review Board Policy 206 – Statement of Functions of the Operations Committee (Board) (5:00 p.m.)*
 - C. *Recap on 2024 Election, Member Appreciation Event and Annual Meeting (Lewis-Boutte/Kurka/Pherson/Hasquet) (5:10 p.m.)*
 - D. *Quarterly Report on Beluga River Unit Performance (Armfield) (5:30 p.m.)*
- VI. EXECUTIVE SESSION* (scheduled) (5:45 p.m.)
 - Recess (20 minutes)
 - A. *Gas Supply Update (Rudeck/Herrmann) (6:05 p.m.)*
 - B. *Battery Energy Storage System (S. Highers/Miller/Laughlin) (6:25 p.m.)*
 - C. *CEO Project Specific Initiatives and Priority Area Goals (Miller) (6:45 p.m.)*
- VII. NEW BUSINESS* (continued) (7:15 p.m.)
 - A. *CEO Project Specific Initiatives and Priority Area Goals** (Miller) (7:15 p.m.)*
- VIII. DIRECTOR COMMENTS (7:25 p.m.)
- IX. ADJOURNMENT* (7:35 p.m.)

* *Denotes Action Items*

** *Denotes Possible Action Items*

7/5/2024 10:14:00 AM

CHUGACH ELECTRIC ASSOCIATION, INC.
Anchorage, Alaska

May 1, 2024
Wednesday
4:00 p.m.

OPERATIONS COMMITTEE MEETING

Recording Secretary: Amanda Mankel

I. CALL TO ORDER

Chair Wiggin called the Operations Committee meeting to order at 4:13 p.m. in the boardroom of Chugach Electric Association, Inc., 5601 Electron Drive, Anchorage, Alaska.

A. Roll Call

Committee Members Present:

Mark Wiggin, Chair
Jim Nordlund, Vice Chair
Bettina Chastain, Director
Sam Cason, Director
Sisi Cooper (telephonically)

Board Members Present:

Susanne Fleek-Green, Director (*via teleconference/joined in person at 4:20 p.m.*)
Rachel Morse, Director

Guests and Staff Attendance Present:

Arthur Miller	Dan Herrmann	Hans Thompson
Andrew Laughlin	Josh Travis	Emily Muller
Matthew Clarkson	Mike Brodie	Bart Armfield, Consultant
Allan Rudeck	Julie Hasquet	Bernie Smith, Member
Tiffany Wilson		Steve Gerlek, Consultant

Via Teleconference:

Sandra Cacy	Todd McCarty	Deborah Gardino
Heather Slocum	Stephanie Huddell	Teresa Kurka
Edward Jenkin, MEA		

II. APPROVAL OF THE AGENDA

Director Chastain moved, and Director Cason seconded the motion to approve the agenda with a friendly amendment to move item VI. A. Beluga River Unit Alaska Supreme Court – Legal Update to open session under item V. New Business and to remove item VII. A. Chief Executive Officer Evaluation and Compensation The motion passed unanimously.

III. APPROVAL OF THE MINUTES

Director Cason moved, and Director Nordland seconded the motion to approve the April 10, 2024, Operations Committee Meeting minutes. The motion passed unanimously.

IV. PERSONS TO BE HEARD

- A. *None.*

V. NEW BUSINESS

- A. *Legislative Update (Baker)*

Trish Baker, Manager of Government & Business Affairs, gave the Committee an update on Legislative GRIP Funding, Senate Bill 217, Senate Bill, House Bill 307, Community Solar, Green Bank, Carbon Sequestration, Gas Storage, Cook inlet Royalty Bills, and Undergrounding and responded to questions from the Committee.

- B. *Rate Case Update (Clarkson)*

Matthew Clarkson, Chief Legal Officer, gave the Committee an update on the current Rate Case and responded to questions from the Committee.

- C. *Beluga River Unit Alaska Supreme Court – Legal Update (Clarkson)*

Matthew Clarkson, Chief Legal Officer, gave the Committee an update on the Beluga River Unit Alaska Supreme Court and responded to questions from the Committee.

- D. *Gas Strategy Update (Rudeck)*

Allan Rudeck, Chief Strategic Officer, updated the Committee on our current focus areas for Gas Supply and Storage and responded to questions from the Committee.

VI. EXECUTIVE SESSION (20-minute recess)

- A. *LNG Import Project – Timeline, Diligence status, Agreement Overview and Cook Inlet Gas Storage (Gerlek/Herrmann/Thompson/Armfield/Rudeck)*
- B. *Eklutna Update (Board/Laughlin)*

At 4:47 p.m. Director Cason moved and Director Nordlund seconded that pursuant to Alaska Statute 10.25.175(c)(1) and (3), the Board of Directors go into executive session to: 1) discuss and receive reports regarding matters the immediate knowledge of which would clearly have an adverse effect on the finances of the cooperative; and 2) discuss with its attorneys matters the immediate knowledge of which could have an adverse effect on the legal position of the cooperative. The motion passed unanimously.

The meeting reconvened in open session at 7:50 p.m.

VII. NEW BUSINESS (scheduled)

- A. *Chief Executive Officer Evaluation and Compensation*

The board addressed this item with a motion that passed in the May 1, 2024 Special Board of Directors meeting.

VIII. DIRECTOR COMMENTS

Comments were made at this time.

IX. ADJOURNMENT

At 8:02 p.m., Director Cason moved, and Director Nordland seconded the motion to adjourn. The motion passed unanimously.



Carbon Capture Use and Storage

CEA Operations Board Meeting

July 10, 2024

Alaska CCUS Workgroup and a Roadmap to Commercial Deployment

SPE Paper 213051

Frank Paskvan, Brent Sheets, UAF-INE; Tom McGuire, Kevin Connors, EERC; Haley Paine, DNR; Christine Resler, Esther Tempel, ASRC

Download item #6 at <http://INE.UAF.EDU/Carbon>

Cook Inlet Region Low Carbon Power Generation with Carbon Capture, Transport, and Storage Feasibility Study

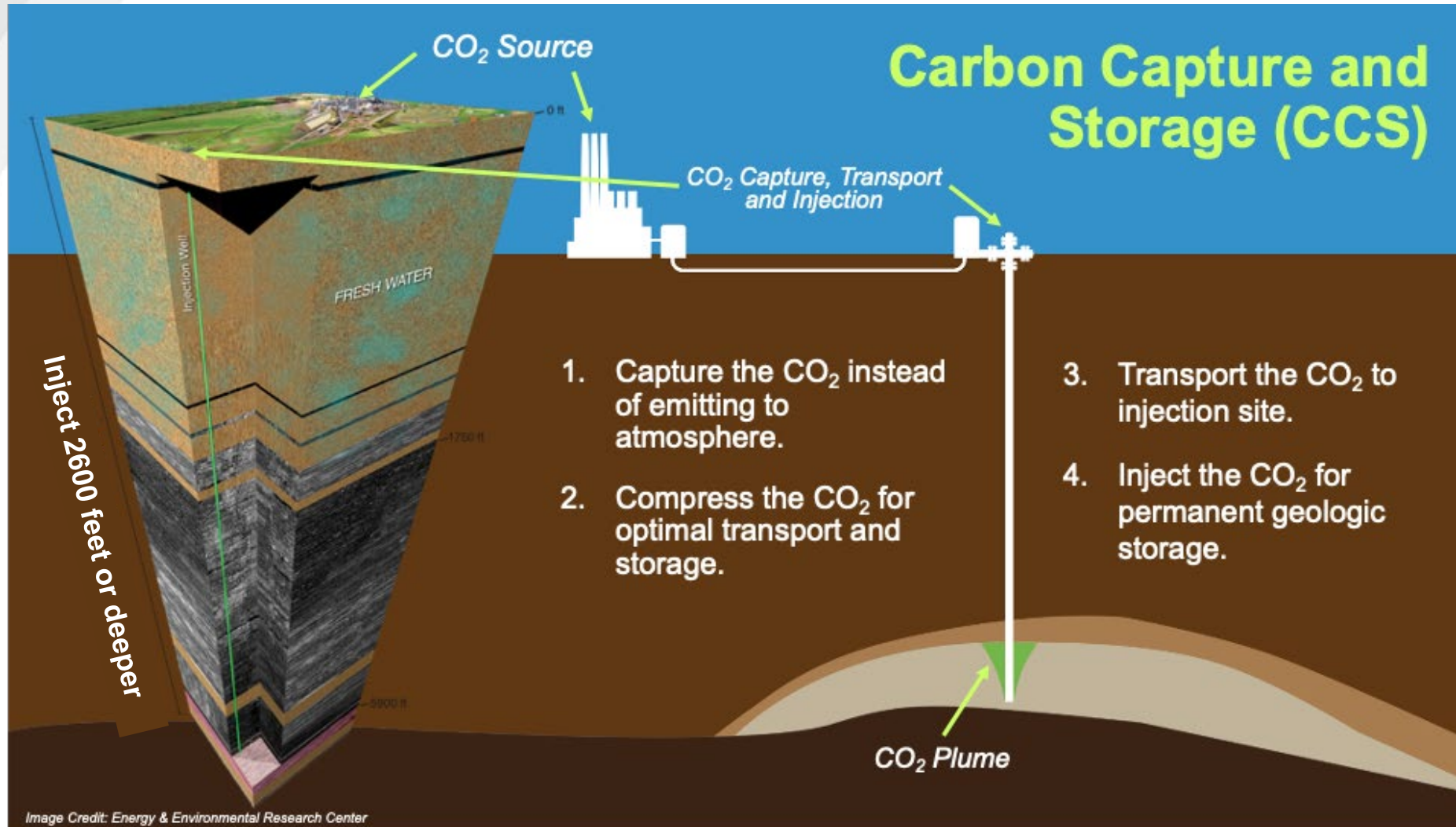
Download item #9 at <http://INE.UAF.EDU/Carbon>



For more information email CCUSAlaska@gmail.com

Critical Challenges. Practical Solutions.

What is CCS?



See short video,

Carbon Capture & Storage (CCS) 101 by Santos:

<https://www.youtube.com/watch?v=YHmoqyP6lFE>

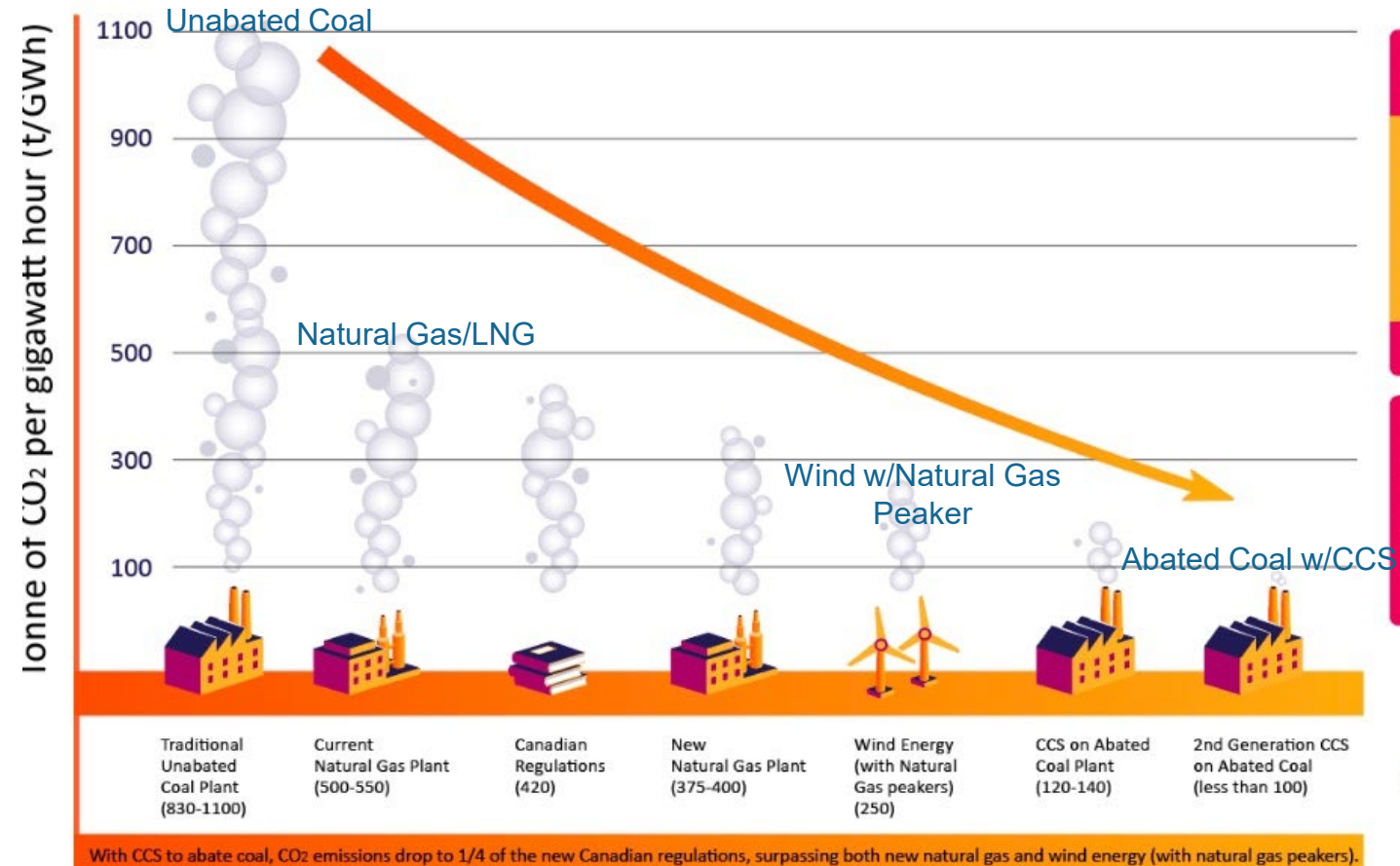


Why CCUS?



- World faces dual challenge of increasing energy demand and risks of climate change
- Cost for clean energy security globally more than doubles without CCUS¹
- Carbon (CO₂) Capture and Storage (CCS) also removes other pollutants
- CO₂ Use (CCUS) like agriculture can make electricity net-zero emissions, supports food and energy security
- Note Natural gas risks increased emitted methane, with 28X GHG effect of CO₂

CO₂ Emissions - Significantly Reduced with Carbon Capture & Storage (CCS)



CCS prevents pollution, by capturing:

90% CO₂
100% SO₂
50% NO_x
92% PM₁₀
70% PM_{2.5}

* numbers from Saskpower Boundary Dam 3 CCS Facility

2nd Generation CCS Abated Coal Plant will reduce the CO₂ emissions to well below 100t/GWh

* based on data from Shand CCS Feasibility Study

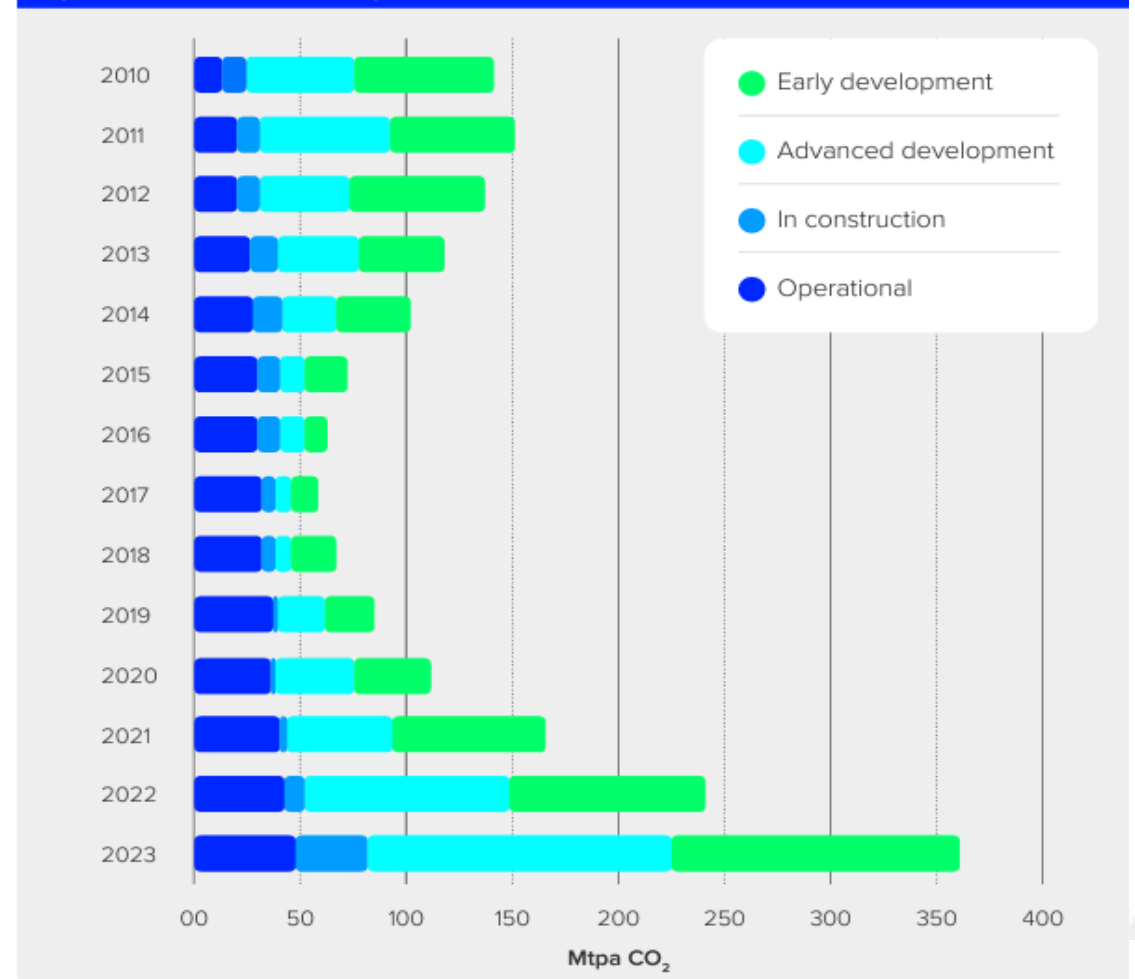


¹ Intergovernmental Panel on Climate Change, IPCC



- CCS successfully employed since 1970s
- In 2024, the U.S. EPA declared CCS technically and economically ready for deployment
- **Global CCS Institute Annual Report** key changes from 2022 to 2023:
 - **48% increase** The CO₂ capture capacity of all CCS facilities under development has grown to 361 million tonnes per annum (Mtpa) – growth of 48% since the 2022 report.
 - **198 new facilities** added to the development pipeline Currently 41 projects in operation, 26 under construction, plus 325 in advanced and early development

Figure 3.1-1: Capacity of commercial facilities since 2010

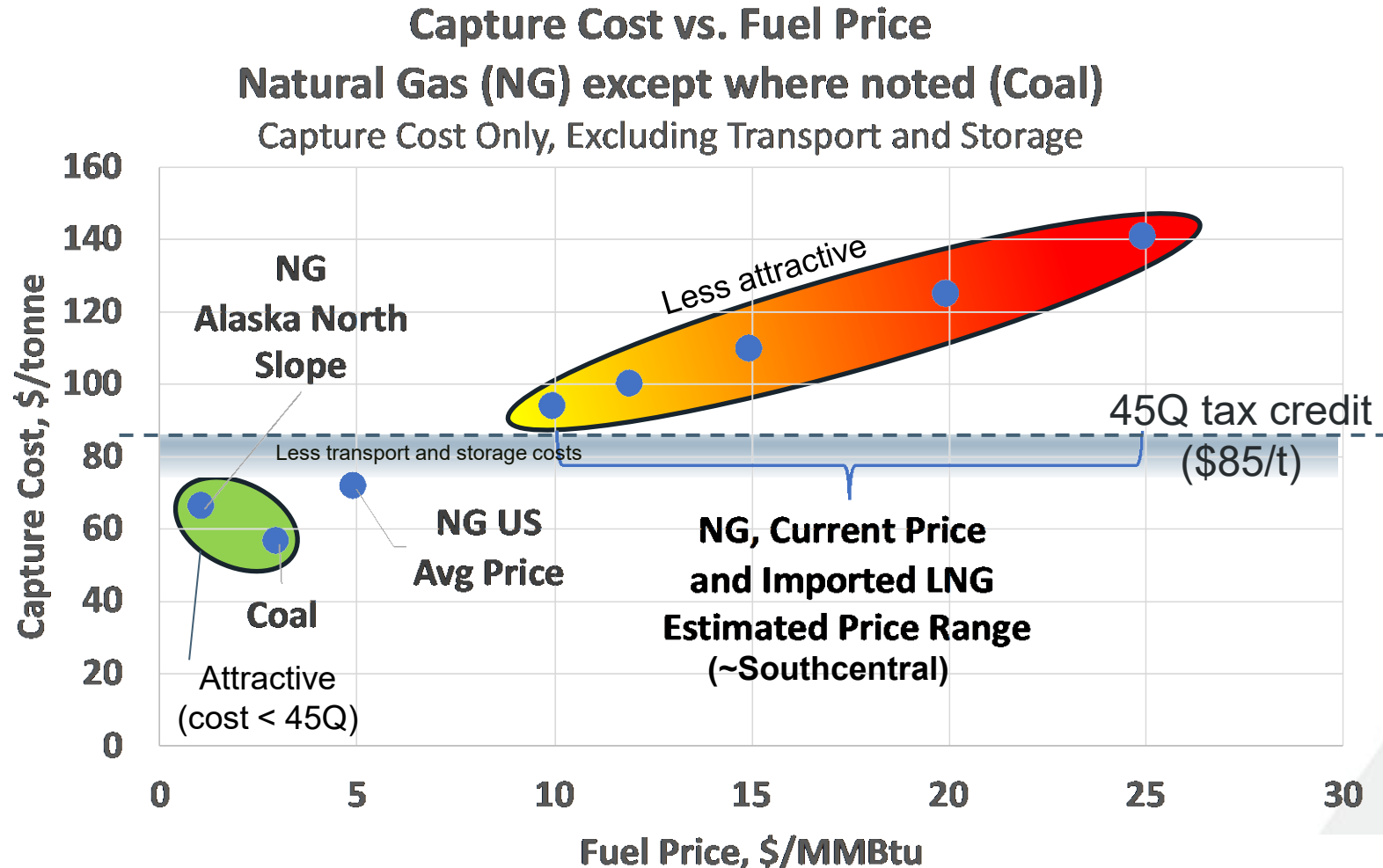


From: <https://status23.globalccsinstitute.com/>



Based on SPE paper 213051 Table 1, Paskvan et. al. ¹

- **Alaska Capture Screening**
 - Using typical Lower 48 costs
 - Fuel price a key cost driver
 - Capture cost only, excluding transport & storage costs
- **With Lower 48 costs and 45Q**
 - Natural gas capture attractive on North Slope
 - Natural gas capture less attractive for Southcentral. Expected to slightly increase electricity cost, and capture more technically difficult than for coal.
 - Coal capture looks attractive Statewide
- **Further work should be done for attractive projects**



¹ Cost methodology benchmarked against NETL, U.S. Department of Energy National Energy Technology Laboratory, 2015, "Cost and performance baseline for fossil energy plants volume 1a: Bituminous coal (PC) and natural gas to electricity" revision 3. July 6, 2015, DOE/NETL-2015/1723.

Low Carbon Biomass-Coal Power with CCS Technical & Economic Feasibility Study



Institute of Northern Engineering
University of Alaska Fairbanks

- **Cook Inlet Region Low Carbon Power Generation with Carbon Capture, Transport, and Storage Feasibility Study**
 - Download item #9 <http://INE.UAF.EDU/Carbon>
- **Evaluates technical and economic feasibility of low carbon (CO₂) power generation biomass-coal-fueled power plant with CCS in Southcentral for the Railbelt Grid**
- **Cost of electricity from biomass-coal power compared to natural gas power**
 - With and without CCS
 - At current and future natural gas fuel prices



- Coal is Lowest Cost Fuel ~ \$4/MMBtu
 - \$7 to \$10/MMBtu natural gas now
 - \$20 to \$35/MMBtu diesel
 - Imported LNG \$15 to \$25 /MMBtu ¹, similar price as diesel
- Coal Supply Local and Abundant.
 - The USA has 27% of the world's coal, with half of that in Alaska ²
- LNG Import brings Price and Supply Risk,
 - e.g. Pakistan received only 2/3 of contracted LNG supply in recent years ³
 - LNG tankers redirected to spot market
 - Rolling blackouts

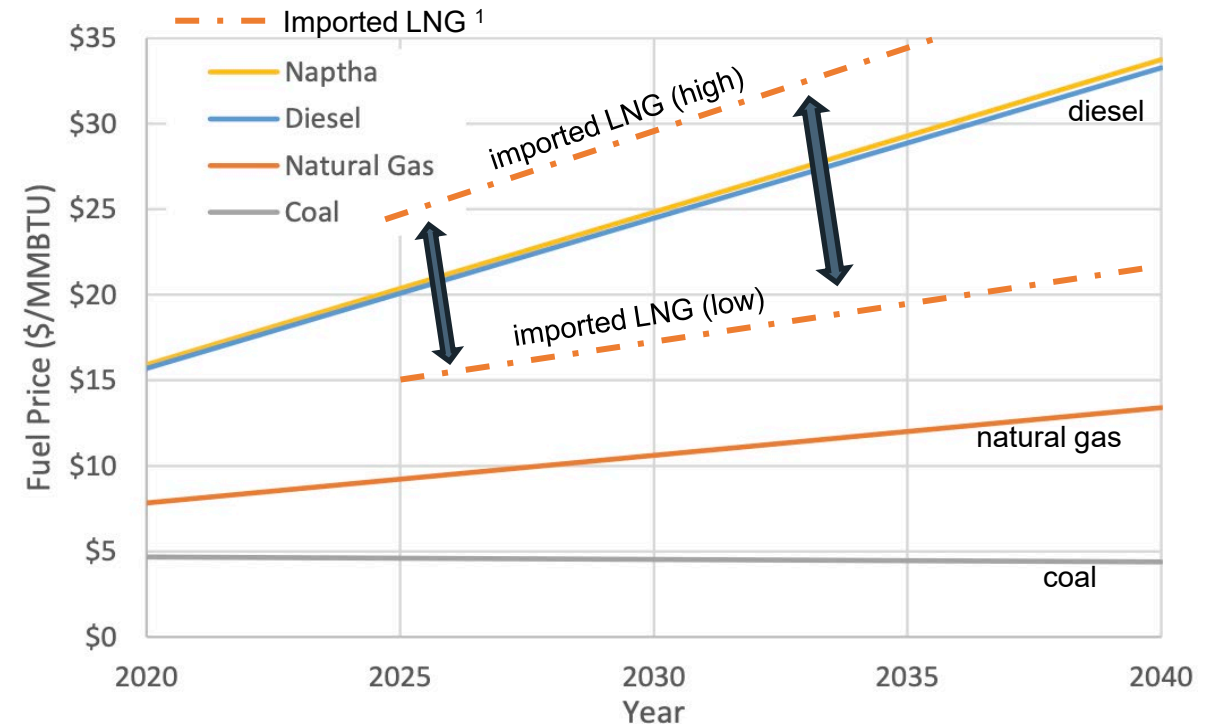


Figure 5. Assumed fuel price trajectories (2020\$)

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>

¹ Imported LNG price estimate from UAF study “Cook Inlet Region Low Carbon Power 2024”, Paskvan et. al.

² www.usibelli.com/coal/abundance

³ Bloomberg, Stephen Stapczynski and Faseeh Mangi, *How Energy Traders Left a Country in the Cold*, December 14, 2023, <https://www.bloomberg.com/features/2023-how-commodity-traders-switched-off-pakistan-energy/>



Low Carbon Biomass-Coal Power with CCS

Results and Conclusions

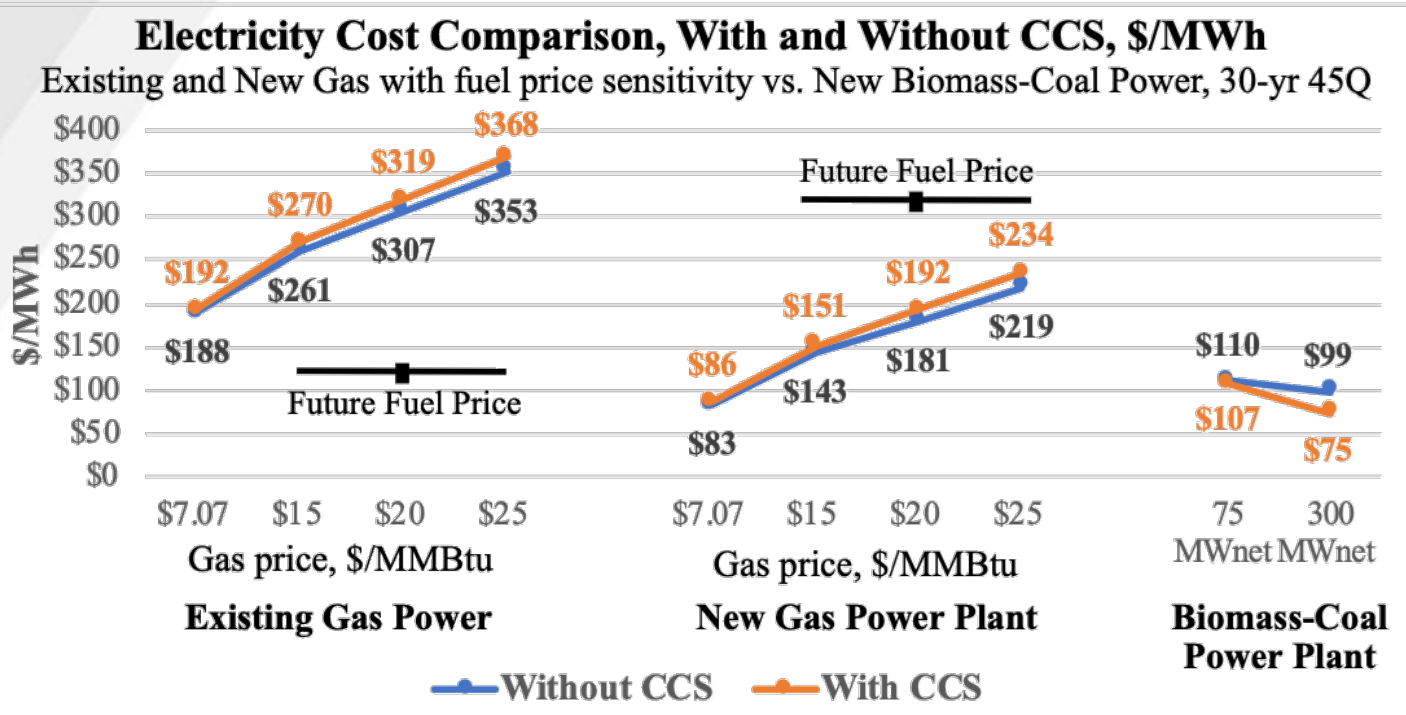
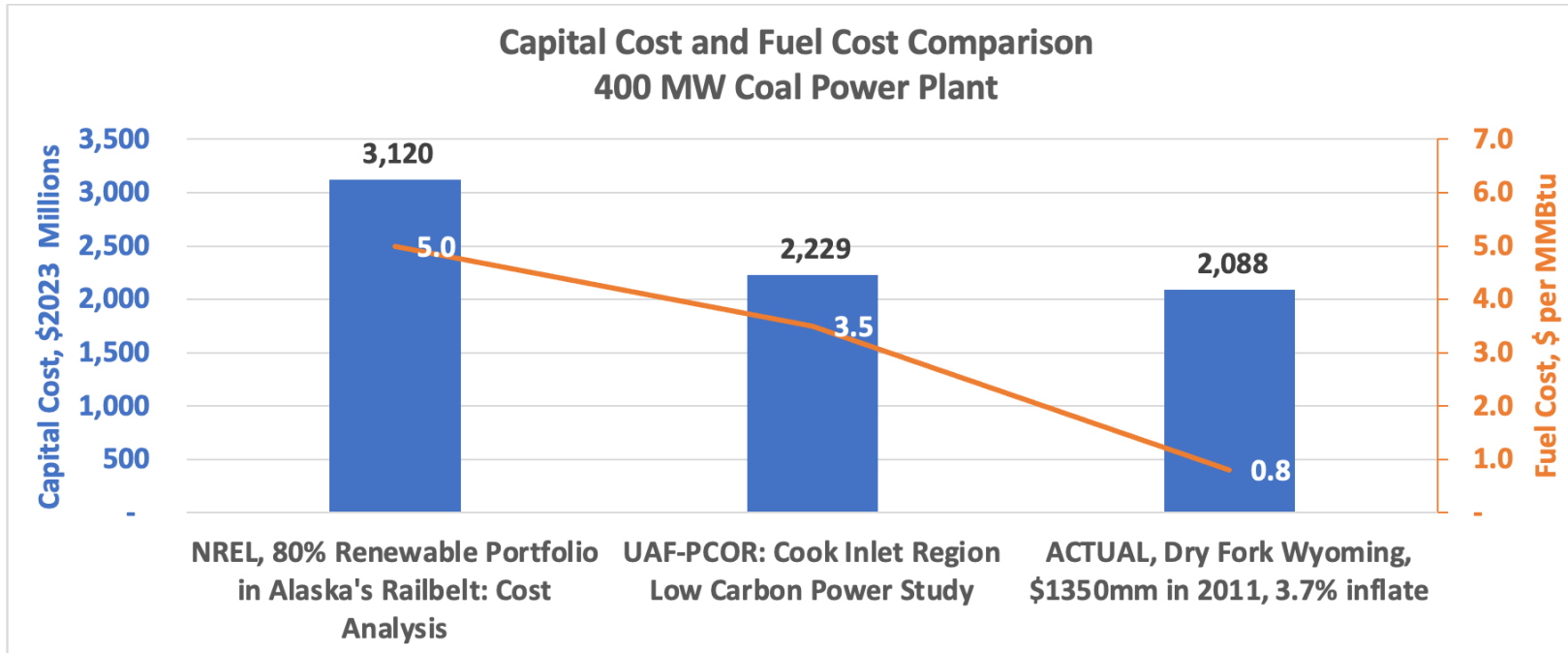


Figure 14. Electricity Cost Comparison, With and Without CCS, \$/MWh
Existing CEA G&T Gas and New Gas Power with fuel price sensitivity
vs. New Biomass-Coal Power, 30-year tax credit scenario.

- Biomass-coal electricity with CCS is attractive
 - Delivers affordable, reliable, clean, long-term energy security
 - Lower electricity cost than natural gas with or without CCS
 - Lower CO2 emissions than natural gas
 - Hundreds of years of local fuel supply
 - CCS lowers electricity cost since 45Q credits exceed CCS costs
 - CCS increases natural gas electricity cost since costs exceed 45Q credits, especially for high regional gas prices
- Lowering Railbelt electricity cost lowers Rural electricity cost through Power Cost Equalization
- Further engineering design can enable cost, technology, and site location improvements



Capital and Fuel Cost for Coal



- **NREL and ACEP did not consider coal-fired power with CCS as an option in their studies.**
- **NREL capital cost 140% of UAF estimate**
 - Coal capital cost not worked in detail. NREL capital based on 2010 RIRP¹.
 - Coal cost-competitive in “No new RE” scenario with new coal plants installed to meet power demand
- **NREL fuel cost 142% of UAF, 617% of Actual (mine-mouth Wyoming plant)**



¹Alaska Railbelt Regional Integrated Resource Plan (RIRP) 2010.

ARCCS Project Support to determine CO₂ storage volume of northern Cook Inlet



Institute of Northern Engineering
University of Alaska Fairbanks

Congress of the United States Washington, DC 20515

July 27, 2023

The Honorable Brad Crabtree
Assistant Secretary, Office of Fossil Energy and Carbon Management
Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585


Assistant Secretary Crabtree:

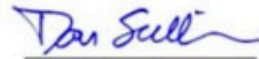
We are writing in support of the University of Alaska Fairbanks' Institute of Northern Engineering's (UAF-INE) proposal to the Department of Energy (DOE) CarbonSAFE Phase II funding opportunity. The UAF-INE's proposed "Alaska Railbelt Carbon Capture and Storage (ARCSS) Project" will evaluate carbon dioxide aggregated from sources for injection into a secure geologic storage complex.


Throughout Southcentral Alaska, there is a growing concern that the current energy supply will be unable to meet the anticipated regional electricity demand. As such, the region is looking at all-of-the-above alternative fuel sources that will bring Alaskans low-cost, reliable, and clean energy. Research by the Plains CO₂ Reduction (PCOR) Partnership Initiative concluded that a dual biomass and coal-fueled carbon capture and sequestration (CCS) power plant could achieve net zero emissions through carbon sequestration, helping to reduce carbon emissions while providing a domestic, low-cost solution to a region with some of the highest electricity rates in the country. Developing a CCS coal-fueled power plant in Alaska, such as the ARCSS Project, is an opportunity for an in-state secure base-load energy source. Alaska is a leader in embracing CCS technologies, being home to some of the largest geologic storage capabilities in the world. Safe carbon dioxide storage capacity is the cornerstone of CCS, and the ARCSS Project can be the foundation for the first fully carbon-neutral electricity grid.

Consistent with applicable law, policy, and guidance, we respectfully ask that you give due consideration to UAF-INE's application to the CarbonSAFE Phase II program. We ask that you keep our offices apprised of the outcome. Thank you for your consideration.

Sincerely,


Lisa Murkowski
United States Senator


Dan Sullivan
United States Senator


Mary Sattler Peltola
Representative for All Alaska

ARCCS Cost Share Commitments from:

- State of Alaska Office of the Governor
- Alaska State Legislature
- Advanced Resources International
- Flatlands Energy Corporation
- State of Alaska Department of Natural Resources
 - Division of Oil and Gas
 - Division of Geological and Geophysical Surveys
- Friends of West Susitna
- blueprint Alaska

ARCCS Project Support Letters from:

- The Alaska Congressional Delegation
- Hilcorp Energy Corporation
- Chugach Electric Assn.
- Cook Inlet Region Inc.
- Matanuska Susitna Borough
- Alaska Native Science and Engineering Program
- Alaska Energy Authority
- Nova Minerals Ltd
- U.S. Gold Mining Inc.

- **Questions?**

- Website: <http://INE.UAF.EDU/Carbon>
- Follow-up: CCUSAlaska@gmail.com

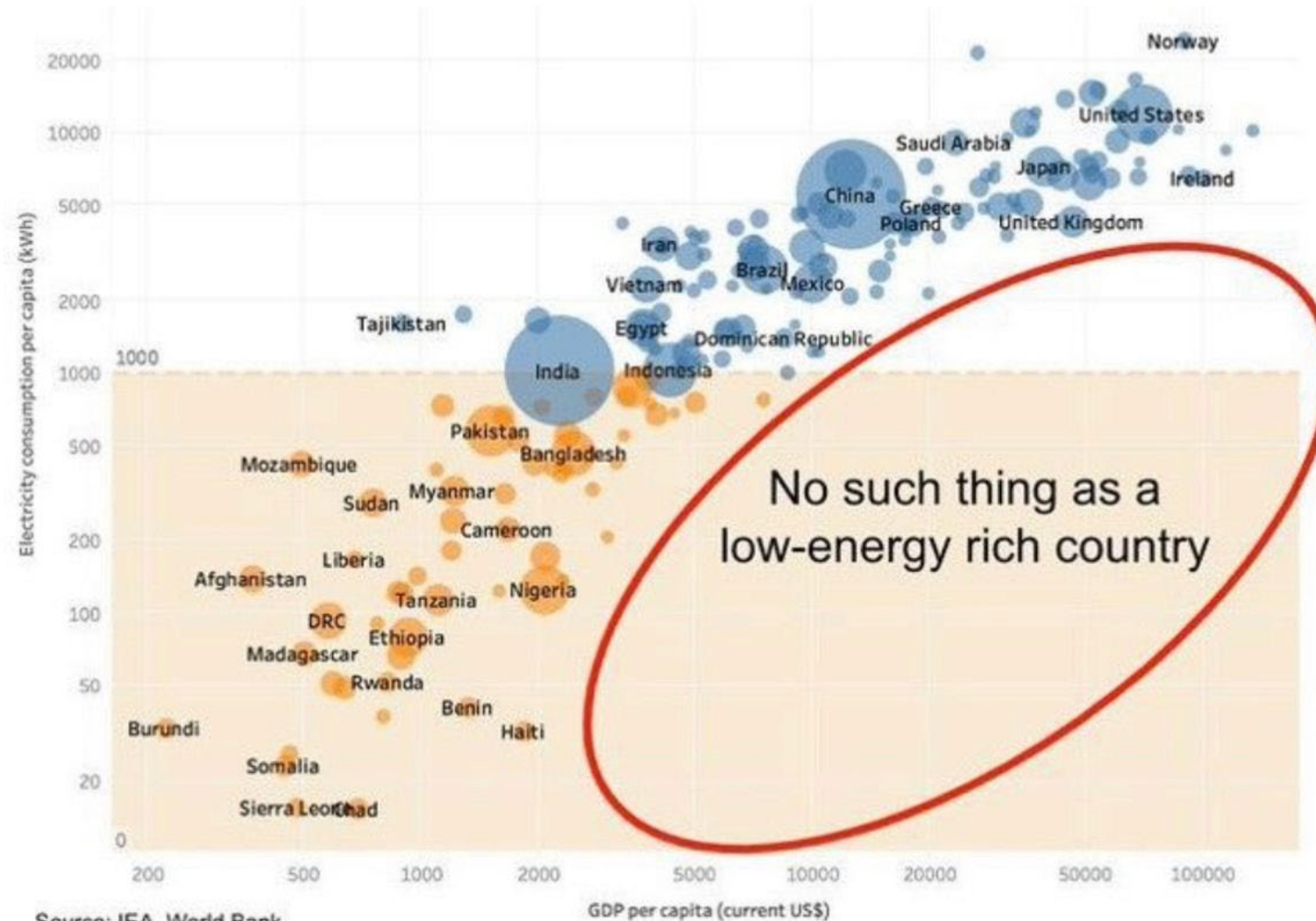


Electricity Powers Progress: Community Benefits



- Affordable, reliable power essential to human well being
- Alaska Electricity costs are high, energy demand per capita is second-highest in the nation, and Alaska is home to some of the lowest income socioeconomic groups in USA
- With Alaska's Power Cost Equalization (PCE) Program, Investments lowering Railbelt energy cost also lowers power costs Statewide
 - PCE serves 82,000 Alaskans in 193 communities largely reliant on diesel fuel for power generation by lowering electricity cost to level comparable to Railbelt cost.
 - See article by the State Governor on the railbelt grid: <https://gov.alaska.gov/state-labor-and-utilities-are-aligned-on-modernizing-the-railbelt-grid/>
 - Alaska facts: <https://www.eia.gov/state/print.php?sid=AK>

Electricity & Income (per capita, all countries)



Affordable and Reliable Energy through Carbon Capture Use and Sequestration

Petroleum Development Laboratory

Alaska CCUS Workgroup

ine.uaf.edu/carbon

PDL

Carbon Capture Use and Sequestration (CCUS)
has the potential to:

- ✓ reduce the cost of energy.
- ✓ meet future voluntary or required emission reductions.
- ✓ make oil-, gas-, and coal-fired heat and power plants nearly carbon-neutral.
- ✓ remove both CO₂ and pollutants.

CCUS research at UAF's Institute of Northern Engineering focuses on:

- building knowledge and establishing a legal and regulatory framework for Alaska.
- conducting feasibility studies to improve the use and sustainability of local energy resources.
- innovating new energy industries in Alaska (e.g. direct air capture of CO₂; hydrogen or ammonia-based fuel from natural gas).
- developing Alaska's workforce through the Energy Resources Engineering program at the University of Alaska Fairbanks starting in the fall of 2024.

UA is an affirmative action/equal opportunity employer, educational institution and provider and prohibits illegal discrimination against any individual:

www.alaska.edu/nondiscrimination.

All images by UAF/INE





- In 2019, began working on Carbon Capture Use and Storage (CCUS) per request of the Congressional Delegation
 - UAF-INE joined PCOR, Plains CO₂ 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 CO₂ storage volume northern Cook Inlet (pending matching funds)
- 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)





- **UAF-INE applied for Regional Initiative for Technical Assistance Partnerships (RITAP) funding from DOE DE-FOA-3014 to:**
 - Continues CCUS Workgroup
 - Expands CCUS technical support in Alaska via UAF B.S. Energy Resources Engineering (formerly Petroleum)
 - Funds for three years, if awarded
- **Builds Alaska capability to perform feasibility studies and geotechnical evaluation of secure CO₂ storage**
- **Supports Energy Industry Training for the Next Generation**

Project Title: Alaska CO₂ Reduction Network (ACORN) Project
Applicant Name: University of Alaska Fairbanks (UAF)
Principal Investigator: Dr. Abhijit Dandekar
Associated Organization: DNR Division of Geological & Geophysical Surveys, Marwan Wartes
Project Objectives:

Carbon capture use and sequestration (CCUS) in Alaska can attract new investments and create decarbonization options for power generation, industrial processes, and oil and gas operations that are vital to the State's economy. Decarbonizing in a safe, reliable, and cost-effective manner can enable continued clean operation of equipment, improve community health and welfare, and mitigate carbon risks. Building on UAF's momentum and past successes, the Alaska CO₂ Reduction Network (ACORN) Project will expand collaboration between industry, regulators, educators, technology providers, and investors. ACORN assists commercial CCUS deployment in the following ways:

- Supports transitioning UAF's successful, ABET-accredited B.S. Petroleum Engineering (PETE) program into Energy Resource Engineering (ERE). ACORN supports Faculty hiring (engineering, geosciences, and energy focused) for curriculum development and delivery. These Faculty will develop Alaska and America's future energy industry workforce, graduating versatile, robust professionals prepared for the energy challenges facing society.
- Supports ERE Faculty who will provide expert carbon capture and sequestration (CCS) technical assistance to industry projects and prepare CCS studies and feasibility reports. Reports and data will be publicly available via the new CCS database constructed by the Alaska Dept. of Natural Resources (DNR), and Alaska Oil and Gas Conservation Commission (AOGCC).
- Provides support from the DNR Division of Geological and Geophysical Surveys (DGGS), from the U. of North Dakota's Energy and Environmental Research Center (EERC), and from Petrotek. Their staff, among others, will serve on ACORN's Industry Advisory Board and be available to answer questions and support the ERE Faculty.
- Creates a stronger network and positive environment for CCS development in Alaska by continuing the Alaska CCUS Workgroup. The CCUS Workgroup has been meeting since 2021. ACORN will enable continuation of this Workgroup whose funding would otherwise expire September 2024.
- Creates Forums to promote interchange of ideas and sharing of experiences. Forums will employ the philosophy and guidelines of Society of Petroleum Engineers (SPE) Forums, designed to be collaborative, idea-generating meetings that stimulate new ideas and innovation to meet upcoming challenges to the industry. They bring together top technologists, innovators, and stakeholders to address specific industry challenges.
 - Technical Forums will be established by sub-basin and technical topic, inviting key individuals to collaborate across projects, interchange ideas, and share experiences.
 - A Community Benefits Forum will be established where Alaska's multiple CCS project teams can discuss and align on best practices, public engagement, and community benefits plans.
- Supports the DNR DGGS expansion of CCS data and report compilation for sedimentary basins around the state into the DNR and AOGCC's Alaska CCS database.

North Slope

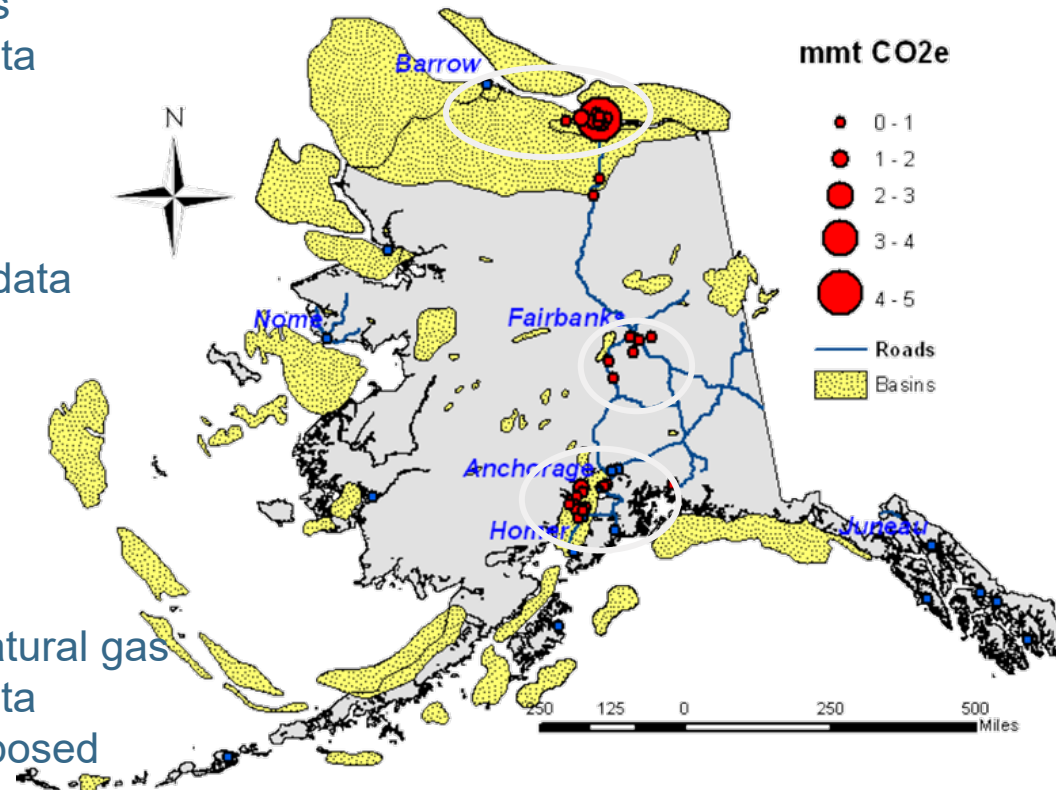
- * Natural gas fired
- * Low cost natural gas
- * O&G Subsurface data

Interior

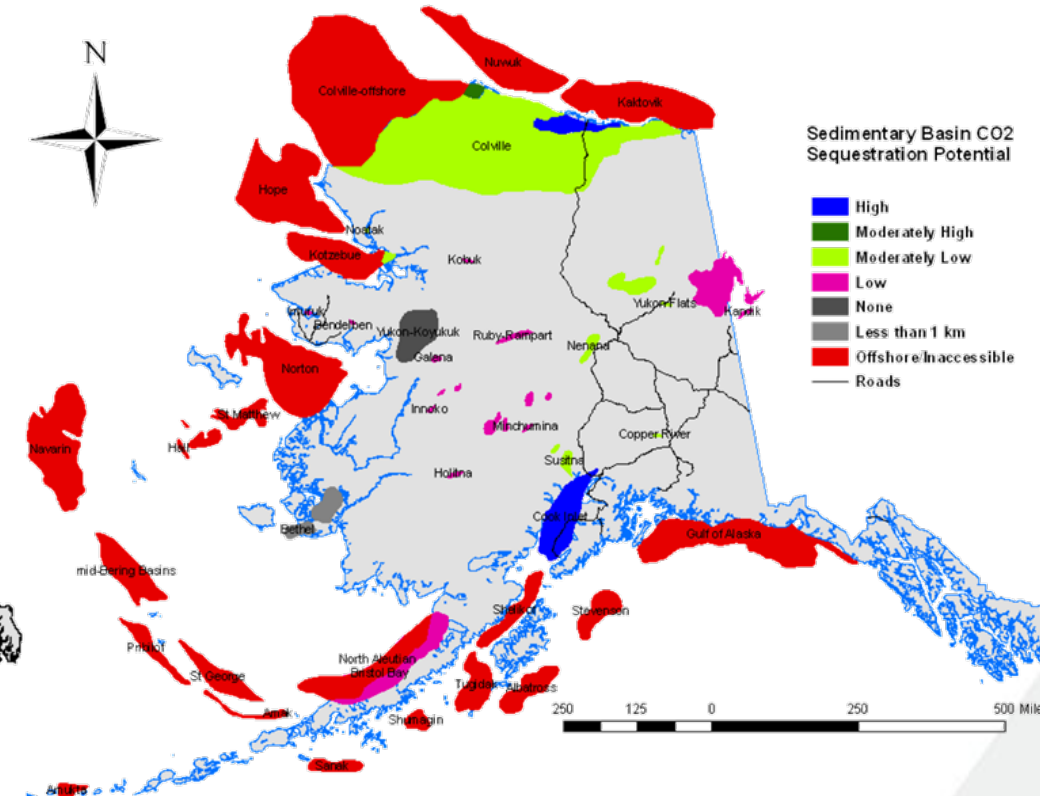
- * Coal fired
- * Limited subsurface data
- * Subsurface poorly understood, caprock concerns

Southcentral

- * Natural gas fired
- * High cost, scarce natural gas
- * O&G Subsurface data
- * ARCSS Project proposed



CO₂ Stationary Sources (red) & Deep Sedimentary Basins (yellow).



Sedimentary Basin Sequestration Potential (Shellenbaum and Clough, DNR, 2010)



North Slope

*Advantaged by
low-cost natural gas*

Natural gas-fired capture

Direct Air Capture (DAC)

**Subsurface data integration &
site-specific data gathering needed**

40 year track record of successful
CO₂ storage and use, ~15 TCF

Major Gas Sales 2015 LNG plan
sequestered CO₂ back in reservoir

Interior

*Existing coal plant
infrastructure*

Coal-fired capture

**Basic regional subsurface
data gathering needed.**

Address geotechnical concerns¹

Southcentral

*Proximity to Port,
potential for import*

Capture not attractive at natural gas
plants or refineries due to
gas supply shortage & high price

Coal or Hydrogen power with CCS
can address natural gas shortage,
food security, lower emissions

Imported CO₂ storage
(US West Coast or Asia-Pacific)

**Subsurface data integration &
site-specific data gathering needed**

¹ [Open Link: Seismic Hazard Considerations for
Carbon Sequestration in Alaska](#)

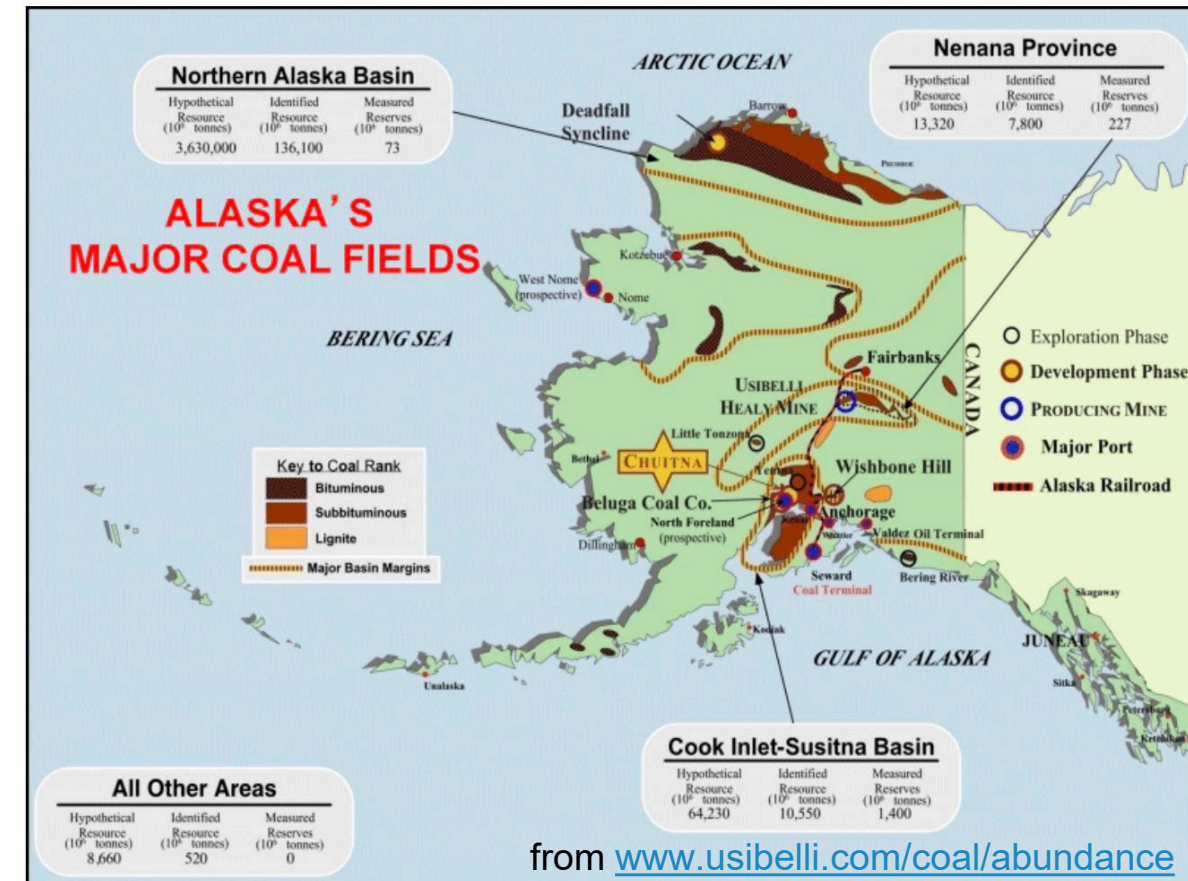


- Alaska's abundant Coal, Oil, and Natural Gas need CCS to be low carbon
- Thousands of years of coal in Alaska
 - EPA rule requires CCS for long-term coal-fired boilers by 1/12032 to run after 2039
 - New rules for Natural Gas in November?
 - Coal and natural gas can provide clean, reliable power
- Use of Alaska's abundant Coal, Oil, and Natural Gas resources may require CCS
 - With CCS, coal and natural gas power plants across Alaska can provide reliable power



Coal is the most abundant fossil fuel in the U.S.

27% of the world's coal is in the U.S.
and half of all U.S. coal resources are found in Alaska



FINAL CARBON POLLUTION STANDARDS FOR NEW AND EXISTING FOSSIL-FUEL FIRED ELECTRICITY GENERATORS			
Existing 111(d) Steam Generators		New Source and Reconstructed 111(b) Stationary Combustion Turbines	
Coal-Fired Boilers	Natural Gas and Oil-Fired Boilers	Phase I Date of promulgation or initial startup	Phase II Beginning in Jan 1, 2032
Long-term subcategory: For units operating on or after January 1, 2039 BSER: CCS with 90 percent capture of CO ₂ (88.4% reduction in emission rate lb/MWh-gross) by January 1, 2032	BSER: routine methods of operation and maintenance with associated degree of emission limitation: Base load unit standard: (annual capacity factors greater than 45%) 1,400 lb CO ₂ /MWh-gross Intermediate load unit standard: (annual capacity factors greater than 8% and less than or equal to 45%) 1,600 lb CO ₂ /MWh-gross. Low load units: (annual capacity factors less than 8%) a uniform fuels BSER and a presumptive input-based standard of 170 lb CO ₂ /MMBtu for oil-fired sources and a presumptive standard of 130 lb CO ₂ /MMBtu for natural gas-fired sources. Compliance date of January 1, 2030	Low Load Subcategory (Capacity Factor <20%)	
		BSER: Use of lower emitting fuels (e.g., hydrogen, natural gas and distillate oil) Standard: less than 160 lb CO ₂ /MMBtu	EPA is not finalizing a Phase II BSER for low load units
Medium-term subcategory: For units operating on or after Jan. 1, 2032, and demonstrating that they plan to permanently cease operating before January 1, 2039 BSER: co-firing 40% (by heat input) natural gas with emission limitation of a 16% reduction in emission rate (lb CO ₂ /MWh-gross basis) by January 1, 2030		Intermediate Load Subcategory (Capacity Factor 20% to 40%*) *Source-specific upper bound threshold based on EGU design efficiency	
		BSER: Highly efficient simple cycle technology with best operating and maintenance practices Standard: 1,170 lb CO ₂ /MWh-gross	EPA is not finalizing a Phase II BSER for intermediate load units
For units demonstrating that they plan to permanently cease operating before January 1, 2032 Units are exempt from the rule. Cease operations dates finalized in state plans for exemption purposes are federally enforceable.		Base Load Subcategory (Capacity Factor >40%*) *Operation above upper-bound threshold for Intermediate Subcategory	
		BSER: Highly efficient combined cycle generation with the best operating and maintenance practices Standard: 800 lb CO ₂ /MWh-gross (EGUs with a base load rating of 2,000 MMBtu/h or more) Standard: 800 to 900 lb CO ₂ /MWh-gross (EGUs with a base load rating of less than 2,000 MMBtu/h)	BSER: Continued highly efficient combined cycle generation with 90% CCS by Jan 1, 2032 Standard: 100 lb CO ₂ /MWh-gross EPA's standard of performance is technology neutral, affected sources may comply with it by co-firing hydrogen.
For new and existing units installing control technologies, a 1-year extension is available in situations in which implementation delays are due to factors beyond the EGU owner/operator's control. For existing units with cease operations dates, a 1-year extension is available in situations in which the unit is needed for reliability through a reliability assurance mechanism, provided appropriate documentation is submitted.			
Major Modifications 111(b) Coal-fired Steam Generators: Standards of performance for coal-fired units that undertake a large modification (<i>i.e.</i> , increases hourly emission rate by more than 10%) mirror the emission guidelines for existing coal-fired steam generators.			

Interested parties can download a copy of the final rule from EPA's website at [Greenhouse Gas Standards and Guidelines for Fossil Fuel-Fired Power Plants](https://www.epa.gov/greenhouse-gas-standards-and-guidelines-fossil-fuel-fired-power)

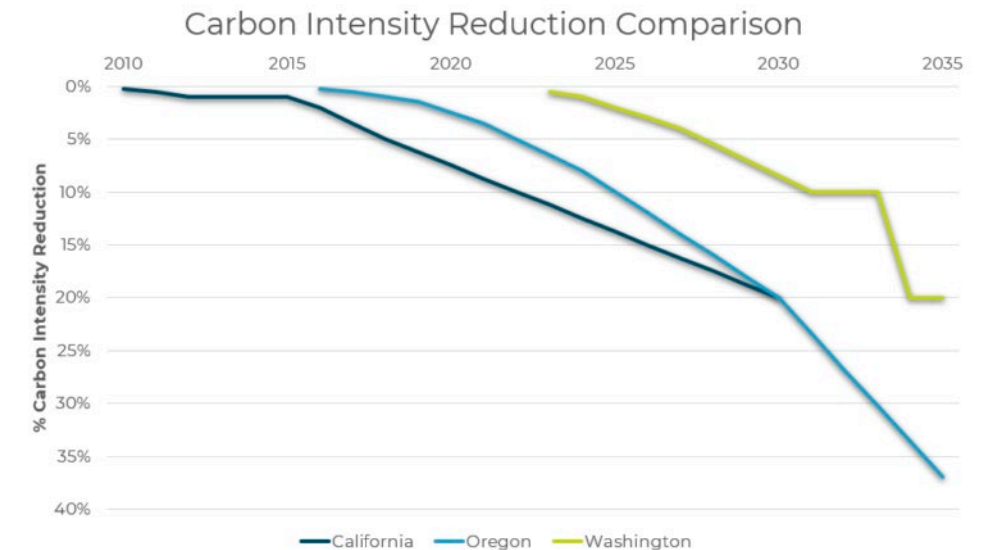
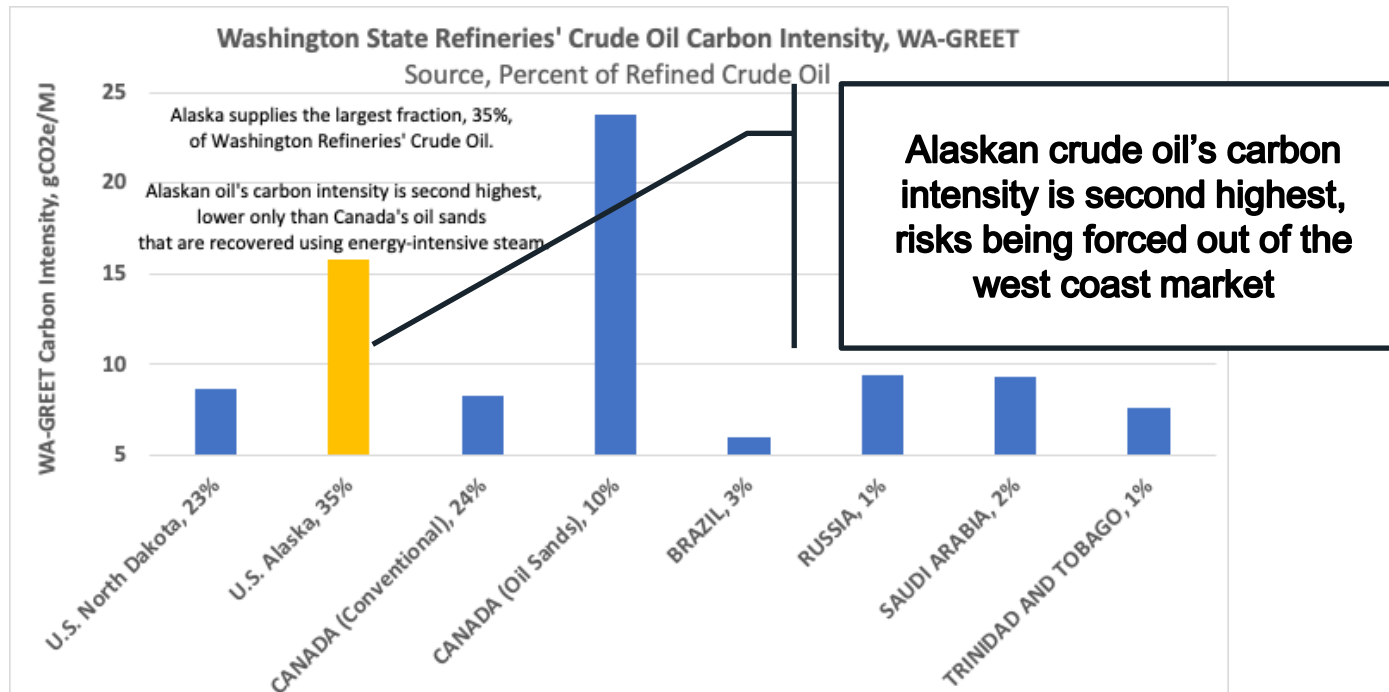


Why CCS?

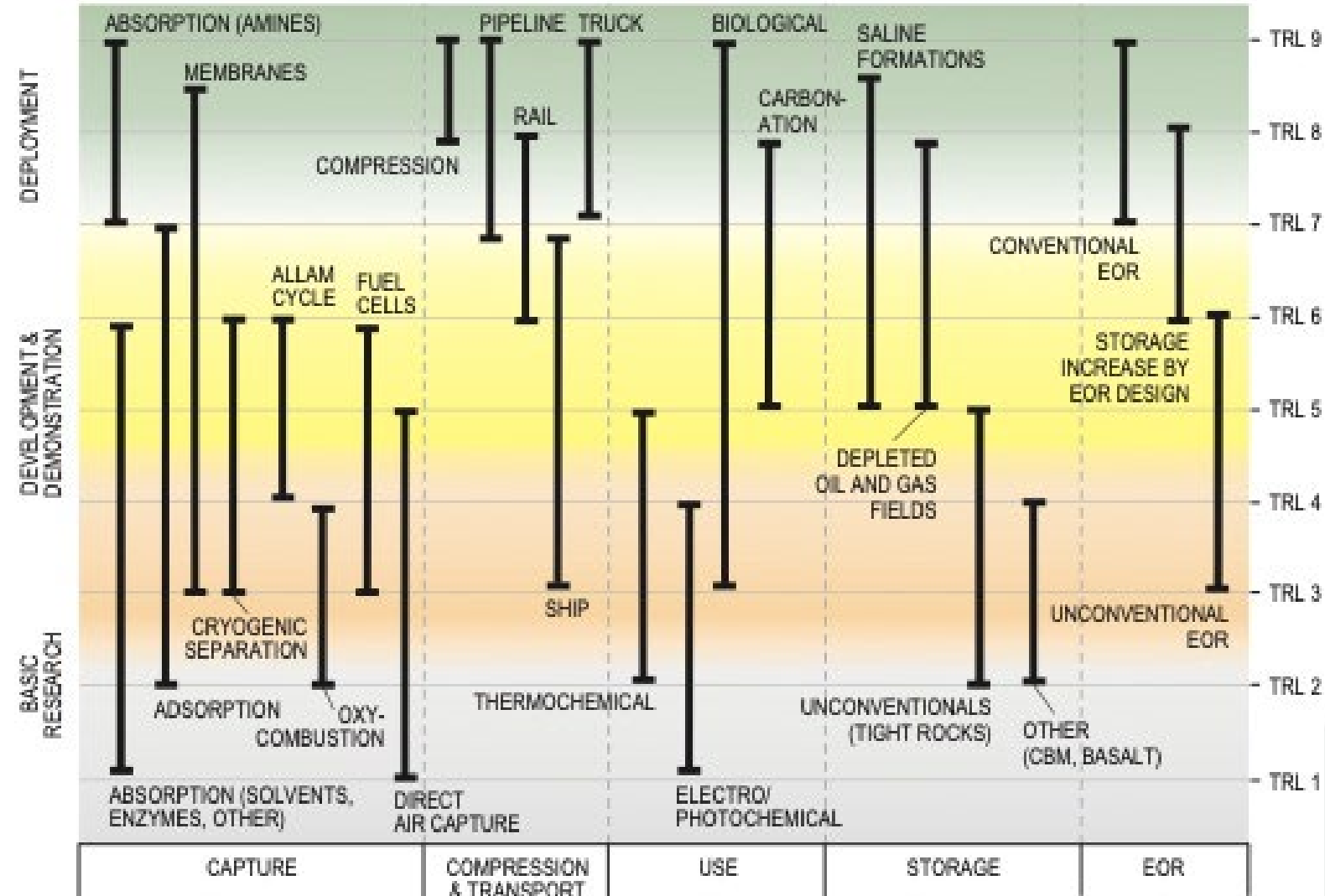
Voluntary or Required CO₂ Emissions



- Producers may volunteer to reduce CO₂ emissions, or may be forced to by regulations
 - California, Oregon, and Washington adopted their own clean fuel standards.
 - Washington, passed by the Legislature in 2021, requires fuel suppliers to reduce the carbon (CO₂) intensity of their products 20% below 2017 levels by 2038. (WA-GREET model)
 - Carbon Capture and Storage, CCS, is one of the most cost-effective ways to reduce crude oil carbon intensity. CCS may enable Alaskan Crude to remain acceptable to the market.



- Feasibility Study selected “Ready for Deployment”-level Technologies
 - Technology Readiness Level (TRL) 8 or 9:
 - Amine Absorption
 - Compression & Pipeline
 - Depleted gas fields (Saline aquifer backup)
- Technology will continue to evolve toward lower cost and higher efficiency systems



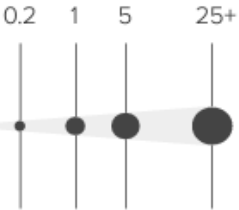
Source: NPC Roadmap, p. 32, 2019

Critical Challenges. Practical Solutions.



Figure 3.1–3:
CCS project pipeline
by industry and year
of operational
commencement.

Capture, transport
and/or storage
capacity (Mtpa CO₂)



- Early development
- Advanced development
- In construction
- Operational
- Under evaluation



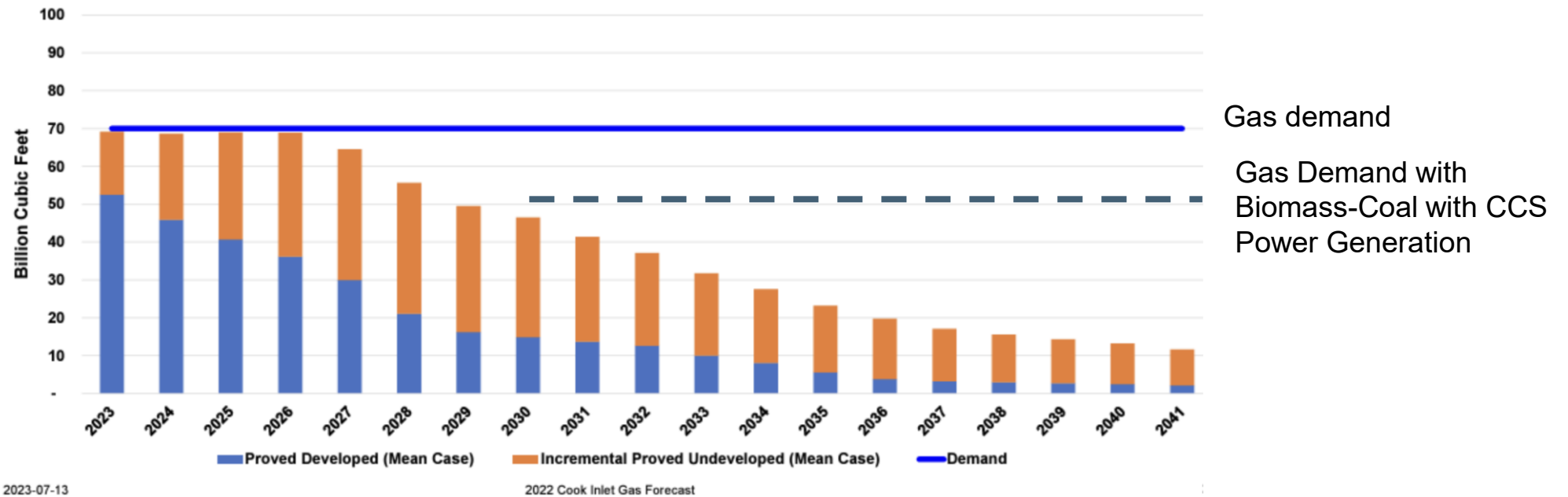


Figure 4b. Cook Inlet Proved Developed+Proved Undeveloped Mean Forecast, Truncated, DNR.

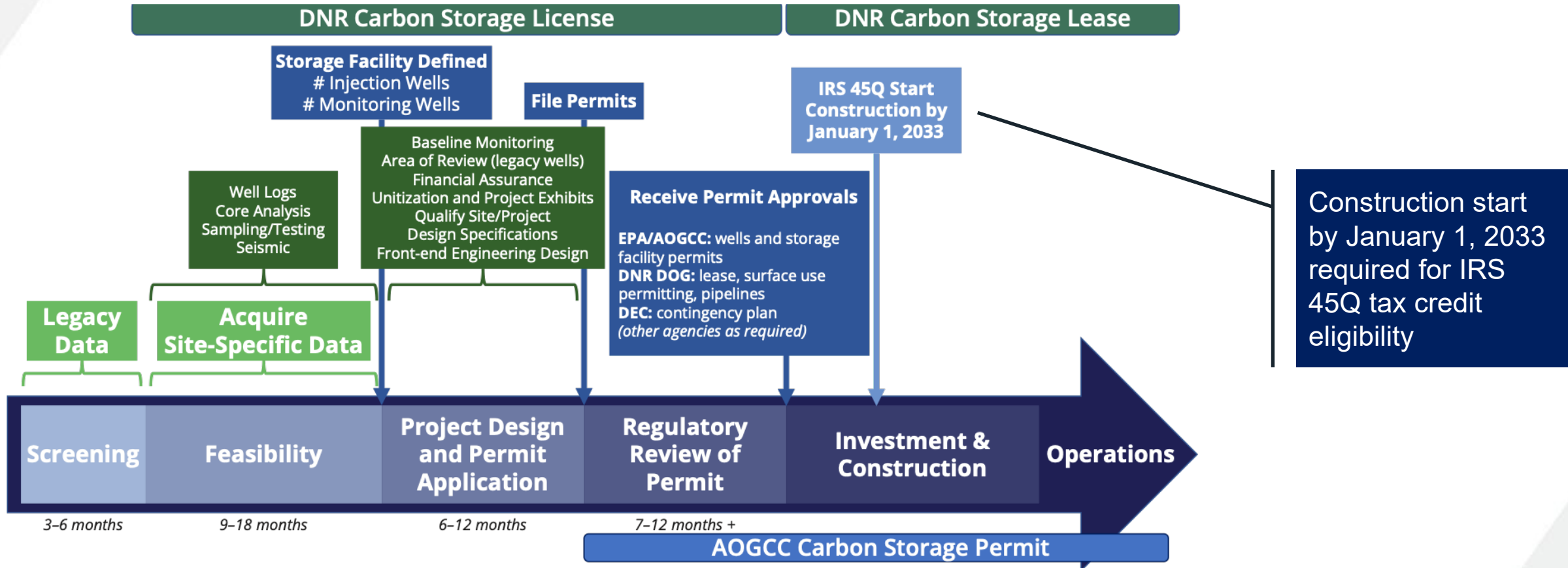




- Power generation timeline (from start of Front End Engineering Design, FEED, year 0):
 - 4 years: 405 MW Dry Forks Wyoming power plant
 - 5 years: consulting engineering firms
 - **6 years:** UAF Study Basis, conservative
- Ready to start FEED Study



Theoretical CCUS Project Timeline Under HB 50 / SB 49



Low Carbon Biomass-Coal Power with CCS Cost Estimates



Table 8. Combined Project Cost, Low Carbon Biomass-Coal Power Generation with CCS, 30-yr

	Units	Power Plant with CCS	
Power Plant Generation Net with CCS	MWe net with CCS	75	300
Total Capital:			
Power Plant, CCS Plant, Pipeline, Well, Storage	Net present US\$MM	1149	3627
Total Operating Capital Cost (30 years, 2.5% plant cost/yr)	Net present US\$MM	464	1555
Total Expense Cost (30 years)	Net present US\$MM	1657	6129
Power Plant Capital Cost (excluding power transmission)	Net Present US\$MM	650	2229
Power Plant Ongoing CAPEX (30 years, 2.5% plant/yr)	Net present US\$MM	319	1092
Power Plant OPEX (30 years)	Net present US\$MM	1190	4567
Carbon Capture Plant Capital Cost	Net present US\$MM	296	944
Carbon Capture Plant Ongoing CAPEX (30 years, 2.5% plant cost/yr)	Net present US\$MM	145	463
Carbon Capture Plant OPEX (30 years)	Net present US\$MM	389	1410
Pipeline Capital Cost	Net present US\$MM	97	133
Pipeline OPEX (30 years)	Net present US\$MM	17	17
Well Cost	Net present US\$MM	45	186
Storage (monitoring, facility fees, inspection, and testing)	Net present US\$MM	61	135



ARCCS Project

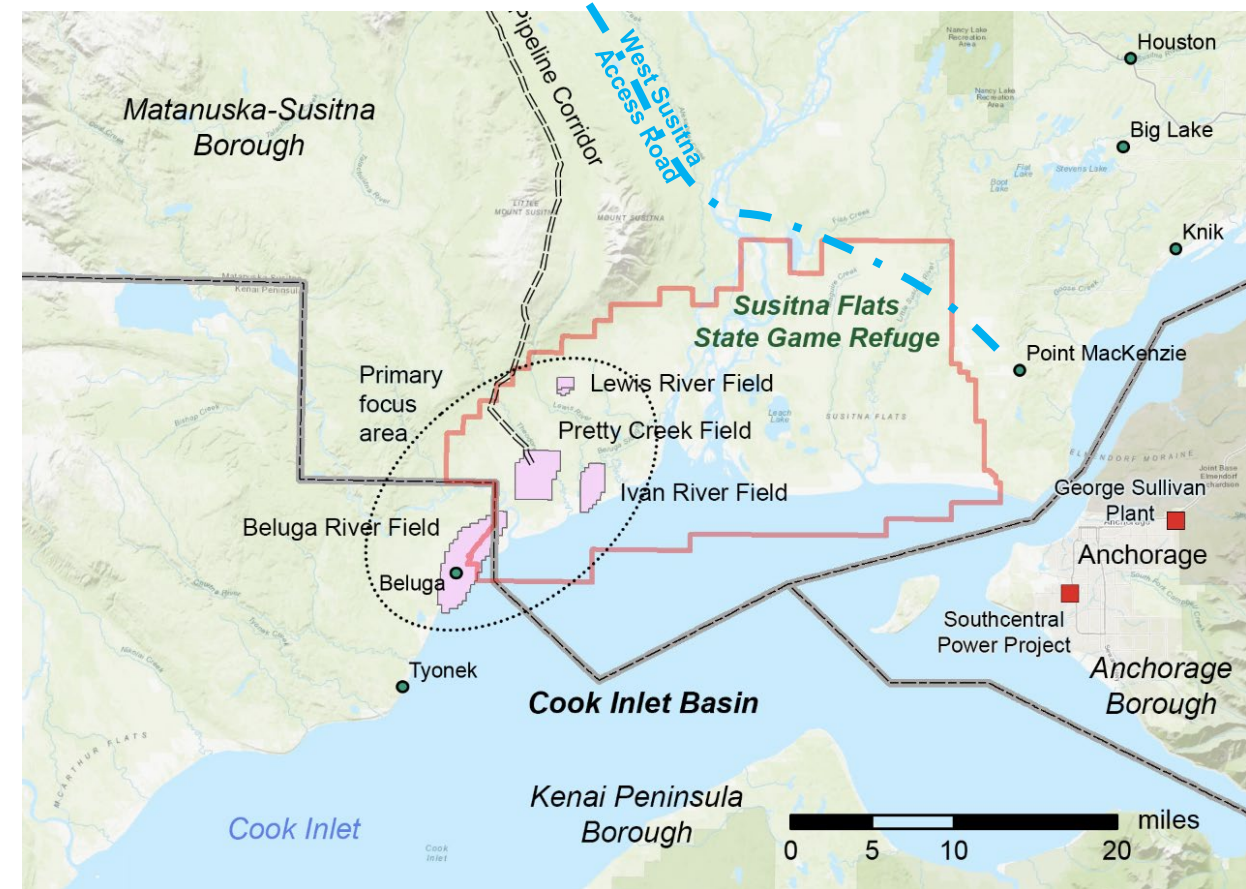
Determine CO₂ storage volume Northern Cook Inlet



Institute of Northern Engineering
University of Alaska Fairbanks

- Carbon Storage capacity, proved through engineering and geoscience, is key requirement for any CCS Project
- Beluga River Field has estimated 60+ years storage for 300 MW net biomass-coal power plant with CCS
- Project evaluates aggregating CO₂ from Chugach Electric's two Anchorage natural gas power plants
- DOE awarded \$9 million to UAF November 2023. Cannot be accepted until matching funds secured.
 - \$2.2 million matching funds request included in UA Budget

Alaska Railbelt Carbon Capture and Storage (ARCCS) Project



CHUGACH ELECTRIC ASSOCIATION, INC.

BOARD POLICY: 206

STATEMENT OF FUNCTIONS OF THE OPERATIONS COMMITTEE

I. OBJECTIVE

To state the functions of the Operations Committee. The purpose of the Operations Committee shall be to study, examine and report on matters assigned to it by the Board of Directors.


II. DUTIES AND RESPONSIBILITIES

- A. Annually conduct the performance evaluation for the Chief Executive Officer and provide a written report to the Board of Directors detailing the results of such evaluation on or before the first Board meeting in April as required by Board Policy 103.
- B. Reviews such other matters as may be specifically assigned to it by the Board.

III. COMMITTEE ORGANIZATION

- A. The Committee shall be comprised of five Board members.
- B. A quorum of the Committee shall consist of three members.
- C. The Board Chair shall appoint the Committee Chair as well as the Directors to serve on the Committee. The Committee shall elect from its membership a Vice Chair.
- D. The Committee shall meet as needed. The Committee Chair shall convene all meetings of the Committee. In his or her absence, the Committee Vice Chair shall convene meetings. The Committee Chair or a quorum of the Committee may call a special meeting of the Committee.
- E. The Committee Chair may appoint sub-committees from the Committee's membership to study specific areas. Written statements of the functions of such sub-committees should be prepared and reviewed periodically.

Date Approved: July 21, 2021

Attested: 
James Henderson
Secretary of the Board

2024 CHUGACH ELECTRIC ASSOCIATION BOARD OF DIRECTORS ELECTION EXECUTIVE SUMMARY

Survey and Ballot Systems
7653 Anagram Drive
Eden Prairie, MN 55344-7311
952-974-2300
1-800-974-8099

Matthew D. Fiala
Sr. Account Manager
(952) 974-2308
mafiala@gosbs.com
5/28/2024

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May 17, 2024

Dawn Bundick
Master Election Judge
5601 Electron Drive
PO Box 196300
Anchorage, AK 99519-6300

Dear Dawn Bundick:

As the election contractor, we are pleased to provide you with the official tabulation for the 2024 Election from ballots qualified in accordance with the election specifications, as approved by the Chugach Electric Association, Inc..

The following reports are tabulated from ballots received on or before May 17, 2024. These certified results account for 12,666 ballots cast from 89,974 eligible members, yielding a participation rate of 14.08%.

Also provided are supporting reports, including a DirectVote® Rating and a DirectVote® Comments Report.

We greatly appreciate the opportunity to serve the Chugach Electric Association, Inc. with election services and wish you great success in the coming year. If you have any questions regarding the enclosed information, please do not hesitate to call me at (800) 974-8099, Ext. 308.

Sincerely,

Matthew Fiala
Survey & Ballot Systems

Enclosure(s)

SUMMARY



CHUGACH ELECTRIC ASSOCIATION, INC. 2024 ELECTION

Eligible Voters:	89,974
Mail Ballots:	209
Electronic Ballots:	12,342
Duplicate - Mail Removed:	0
Duplicate - Electronic Removed:	0
Final Mail Ballots:	209
Final Electronic Ballots:	12,342
Onsite Ballots:	115
Natural Members Voted:	12,178
Non-Natural Members Voted:	488
Total Returns:	12,666
Percent Returned:	14.08%

Certified by Survey & Ballot Systems

 5/17/2024

 Matthew Fiala Date
 Survey & Ballot Systems

 5/17/2024

 Dawn Bundick Date
 Master Election Judge



CHUGACH ELECTRIC ASSOCIATION, INC. 2024 ELECTION

DIRECTOR - Four year term

Vote for: 2	Votes	Percent	
Dan Rogers	6,449	51.2%	DECISION
Mark Wiggin	6,675	53.0%	DECISION
Sam Cason	5,892	46.8%	
Todd Lindley	4,877	38.7%	
Total Valid Ballots:	12,592		
Total Unexercised:	74		
Total Invalid:	0		
Total Ballots Cast:	12,666		

Bylaw Amendment #1

Grammar, pronoun use, and other non-substantive edits

Vote for: 1	Votes	Percent	
Yes	9,384	76.6%	DECISION
No	2,870	23.4%	
Total Valid Ballots:	12,254		
Total Unexercised:	412		
Total Invalid:	0		
Total Ballots Cast:	12,666		

CHUGACH ELECTRIC ASSOCIATION, INC. 2024 ELECTION

Bylaw Amendment #2

Reduce the number of board meetings directors are compensated per year

Vote for: 1	Votes	Percent	
Yes	10,580	86.3%	DECISION
No	1,686	13.7%	
Total Valid Ballots:	12,266		
Total Unexercised:	400		
Total Invalid:	0		
Total Ballots Cast:	12,666		

Votes by Day: Paper & Electronic

*Note: 5/17/2024 does include the 115 Onsite Ballots cast by QR Code at Annual Meeting

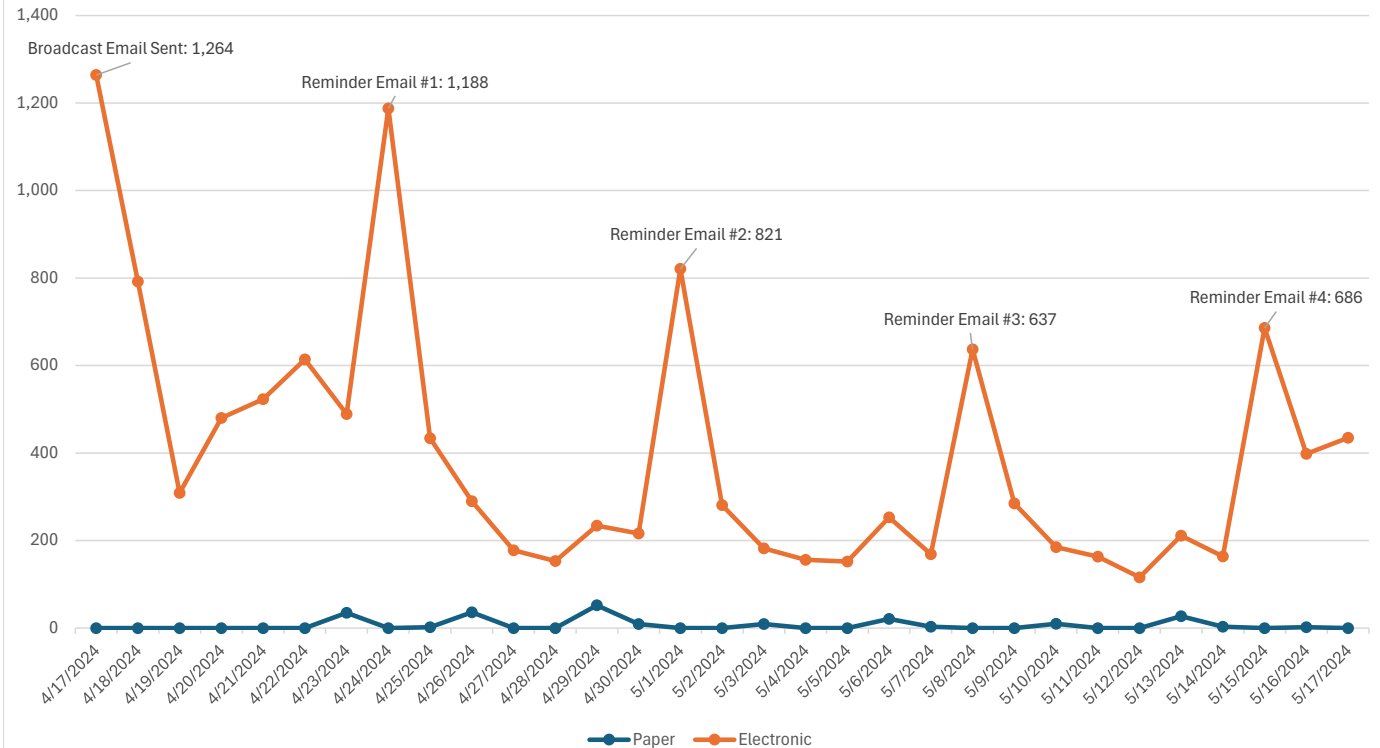
Total Returned:

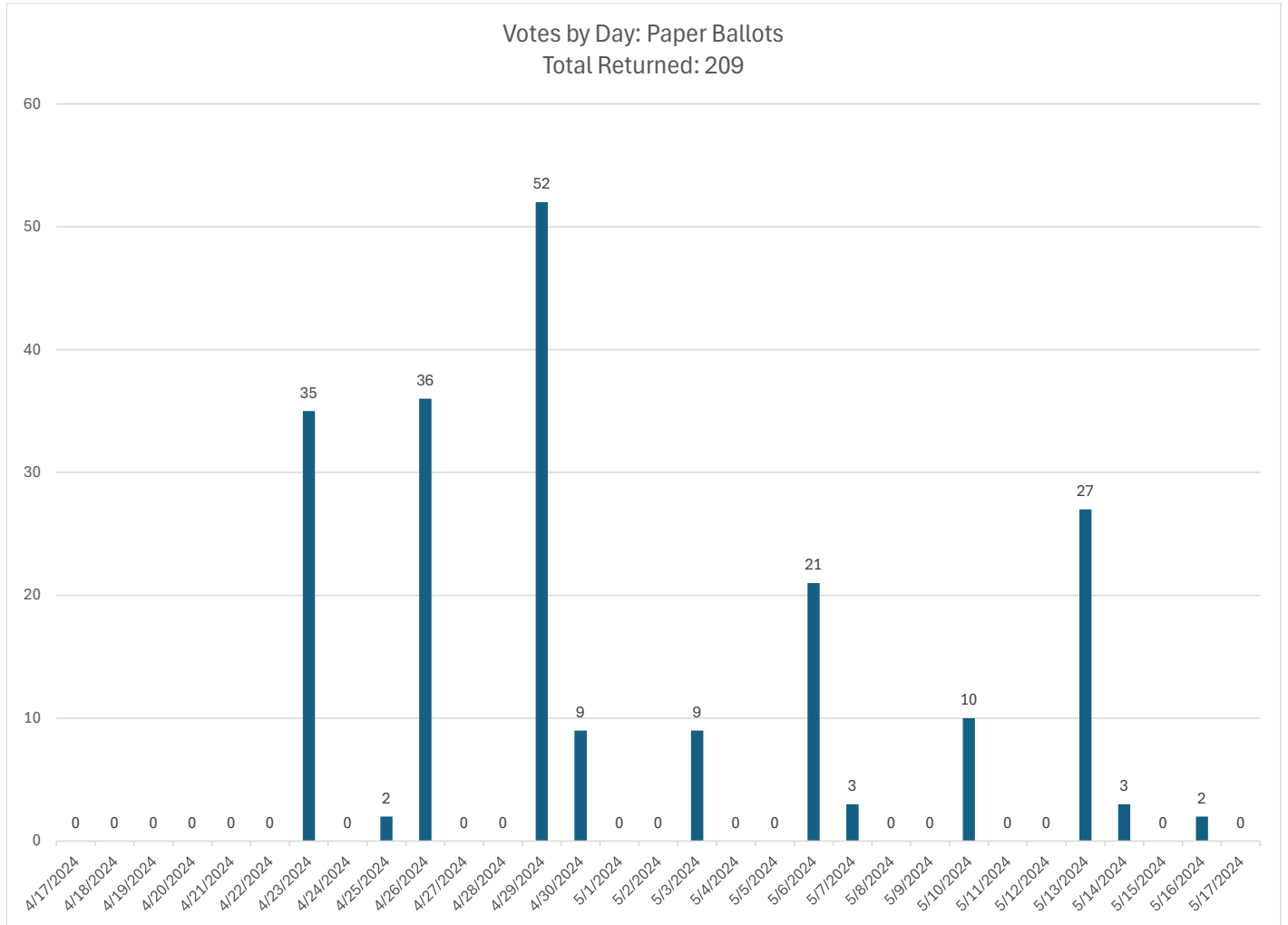
Paper Ballots = 209

Electronic Ballots = 12,342

Onsite Ballots = 115

Total Ballots = 12,666

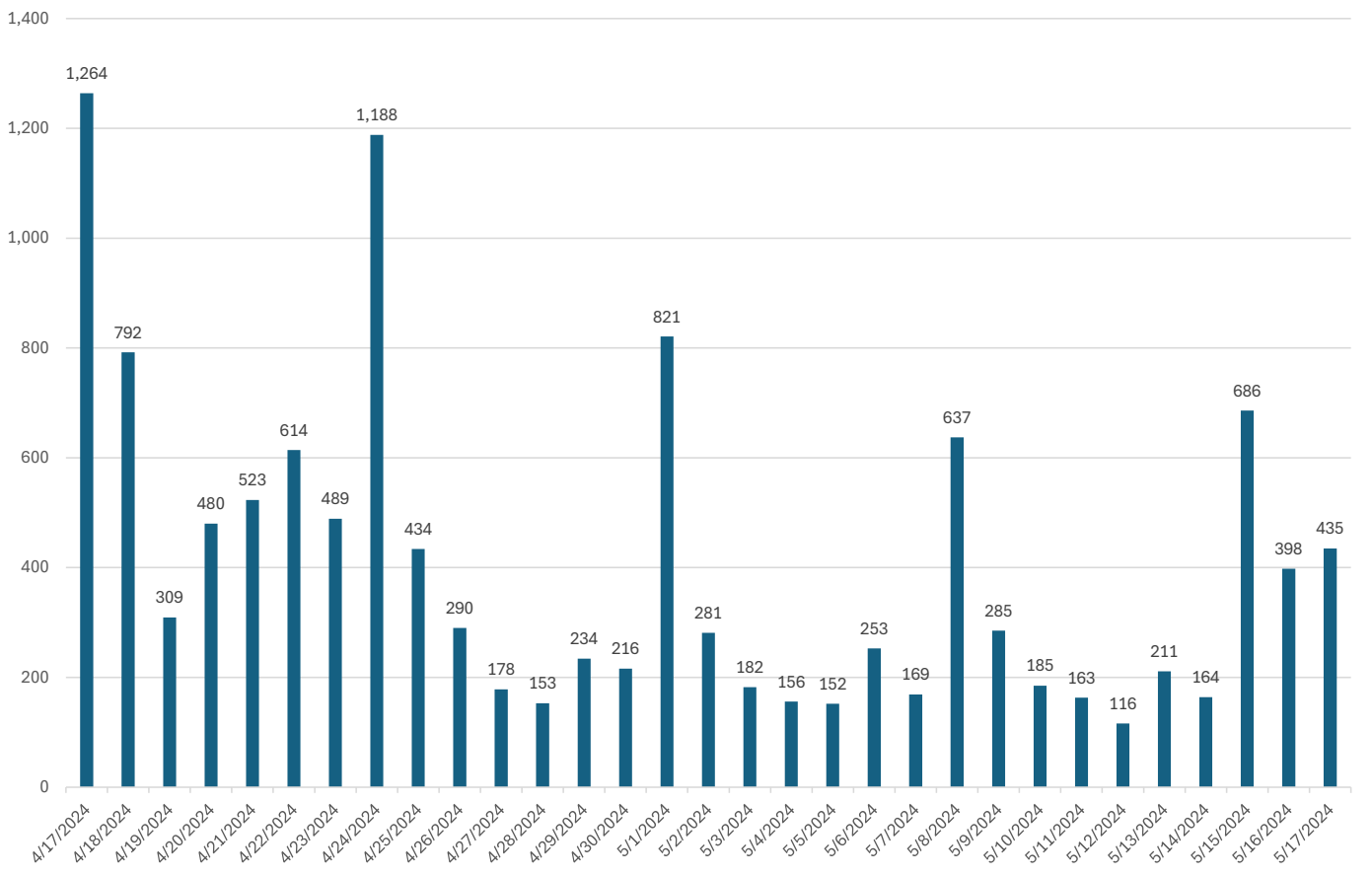


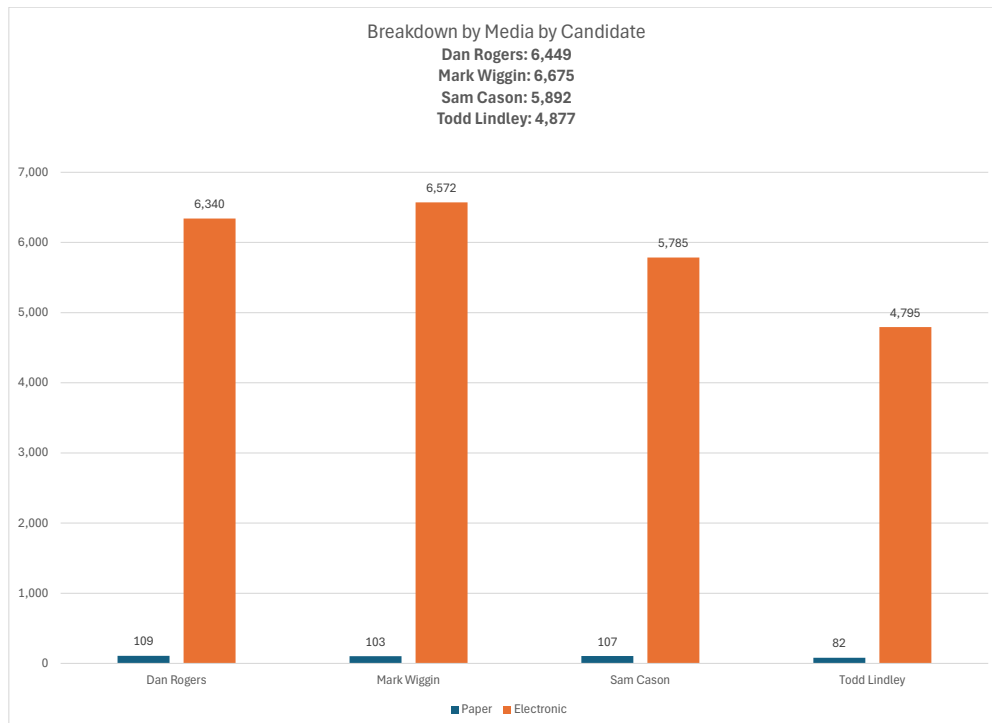
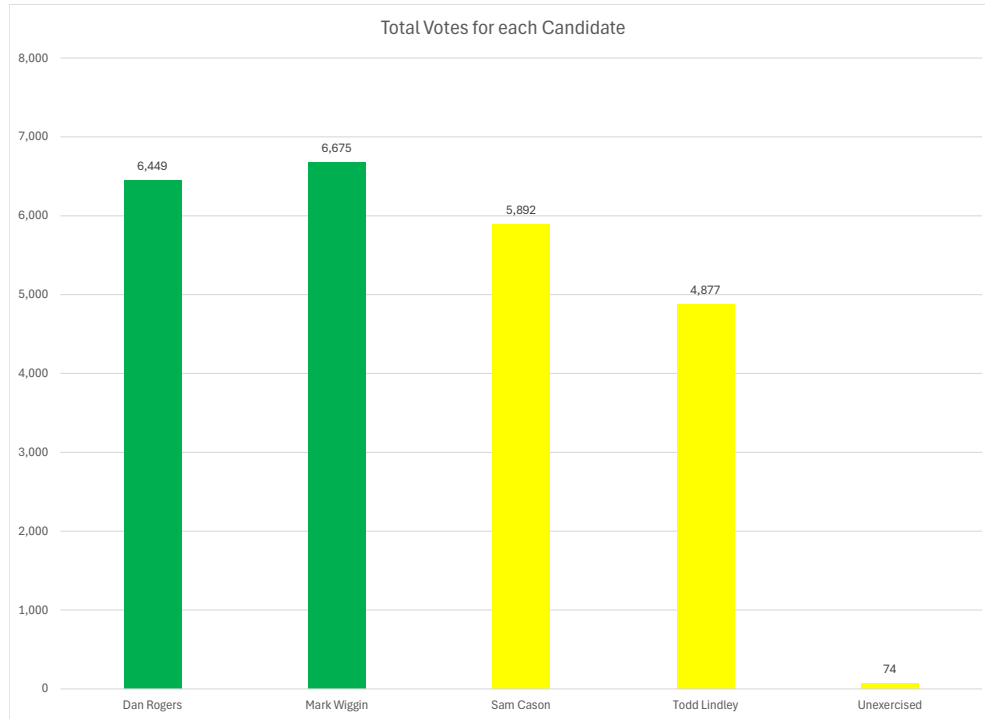


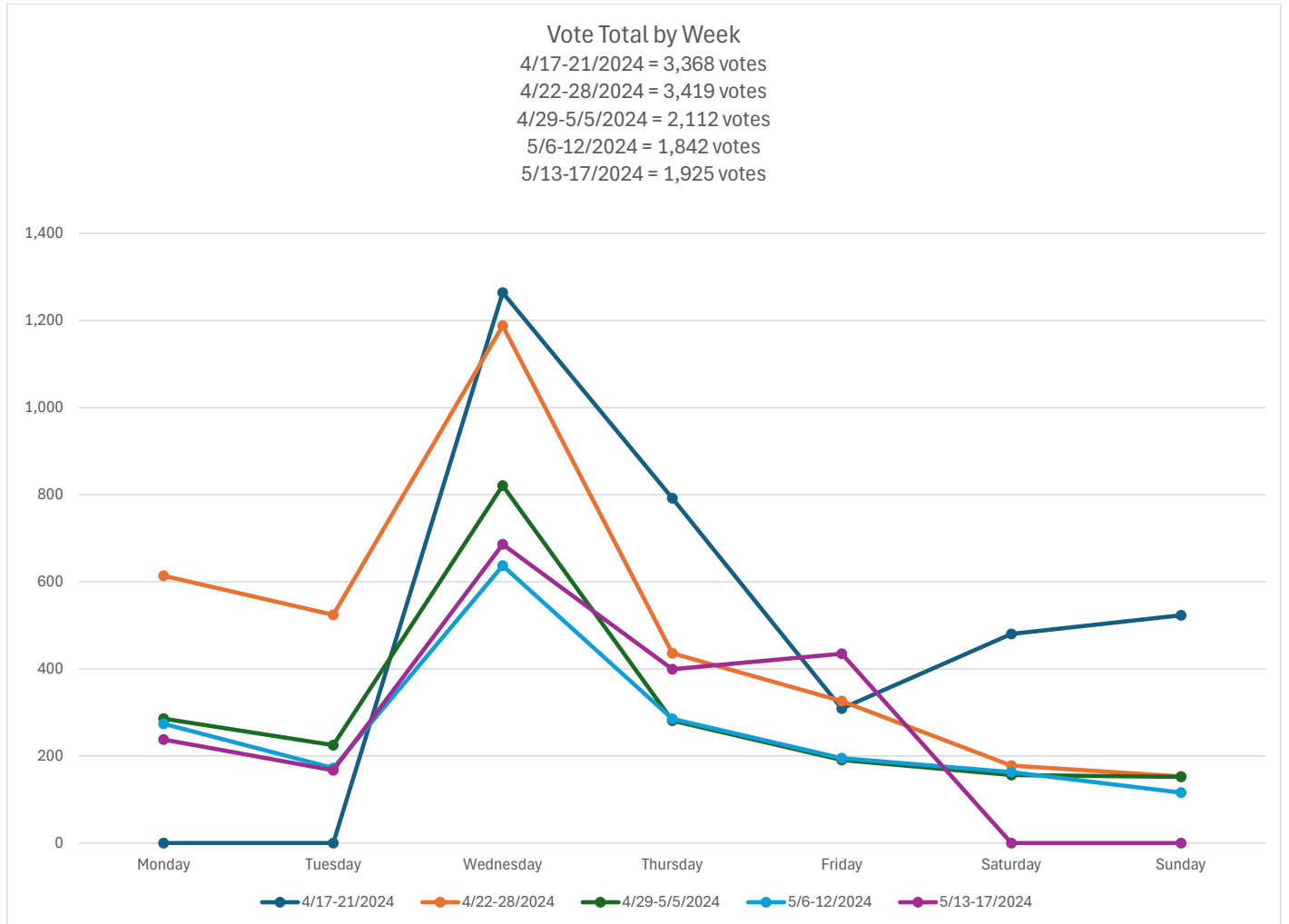
Votes by Day: Electronic Ballots

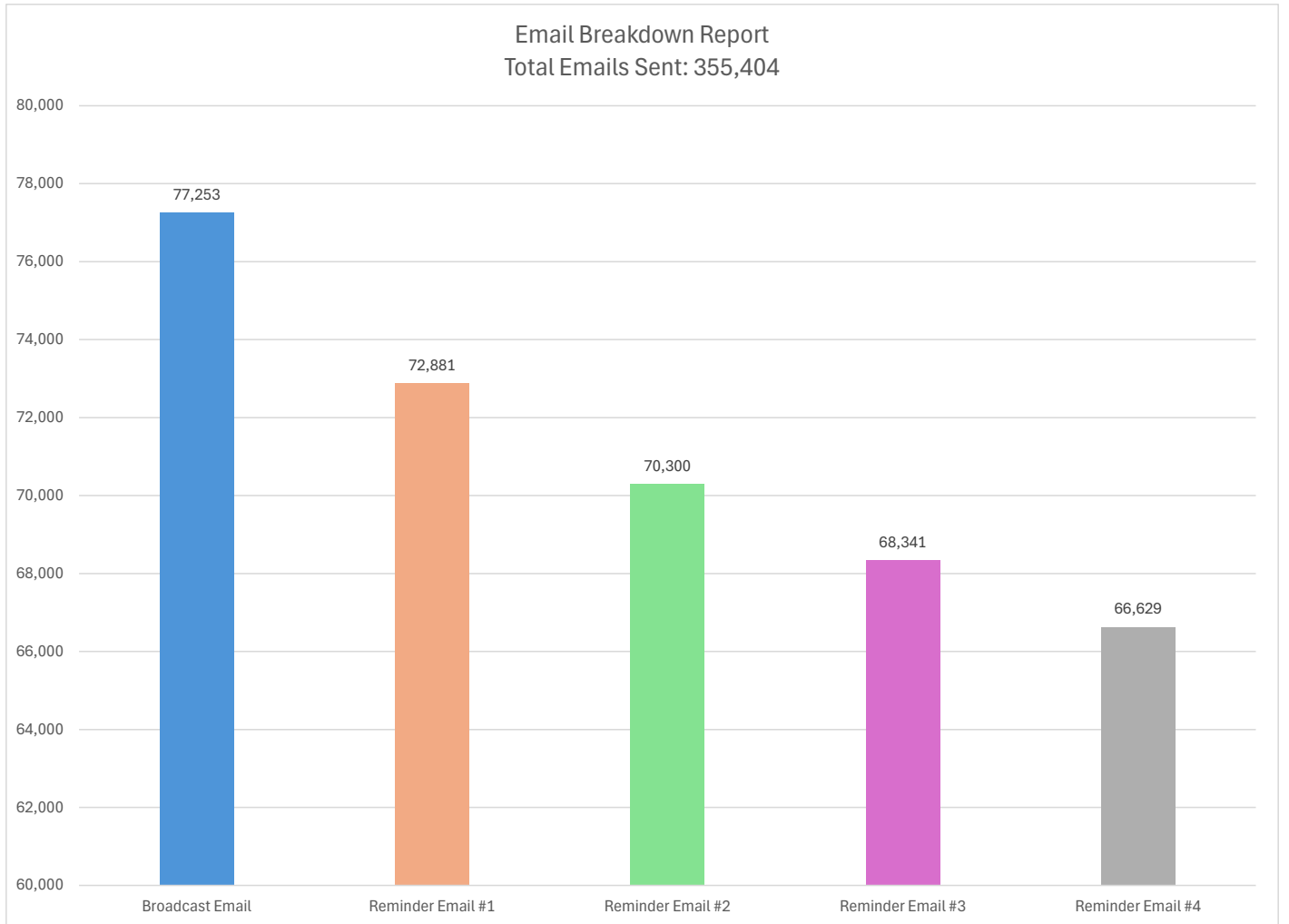
Total Returned: 12,342

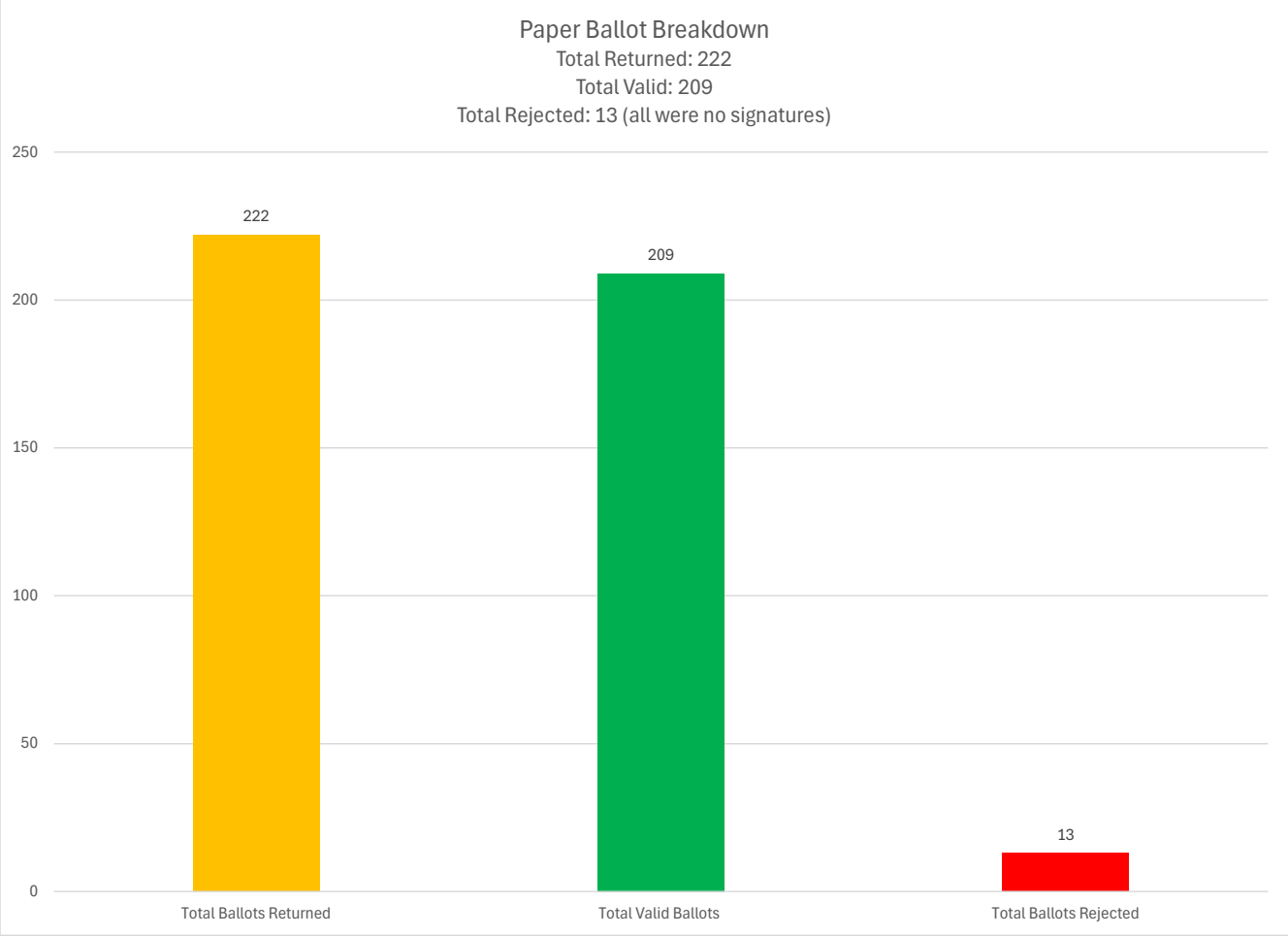
*Note: 5/17/2024 does include the 115 Onsite Ballots cast by QR Code at Annual Meeting









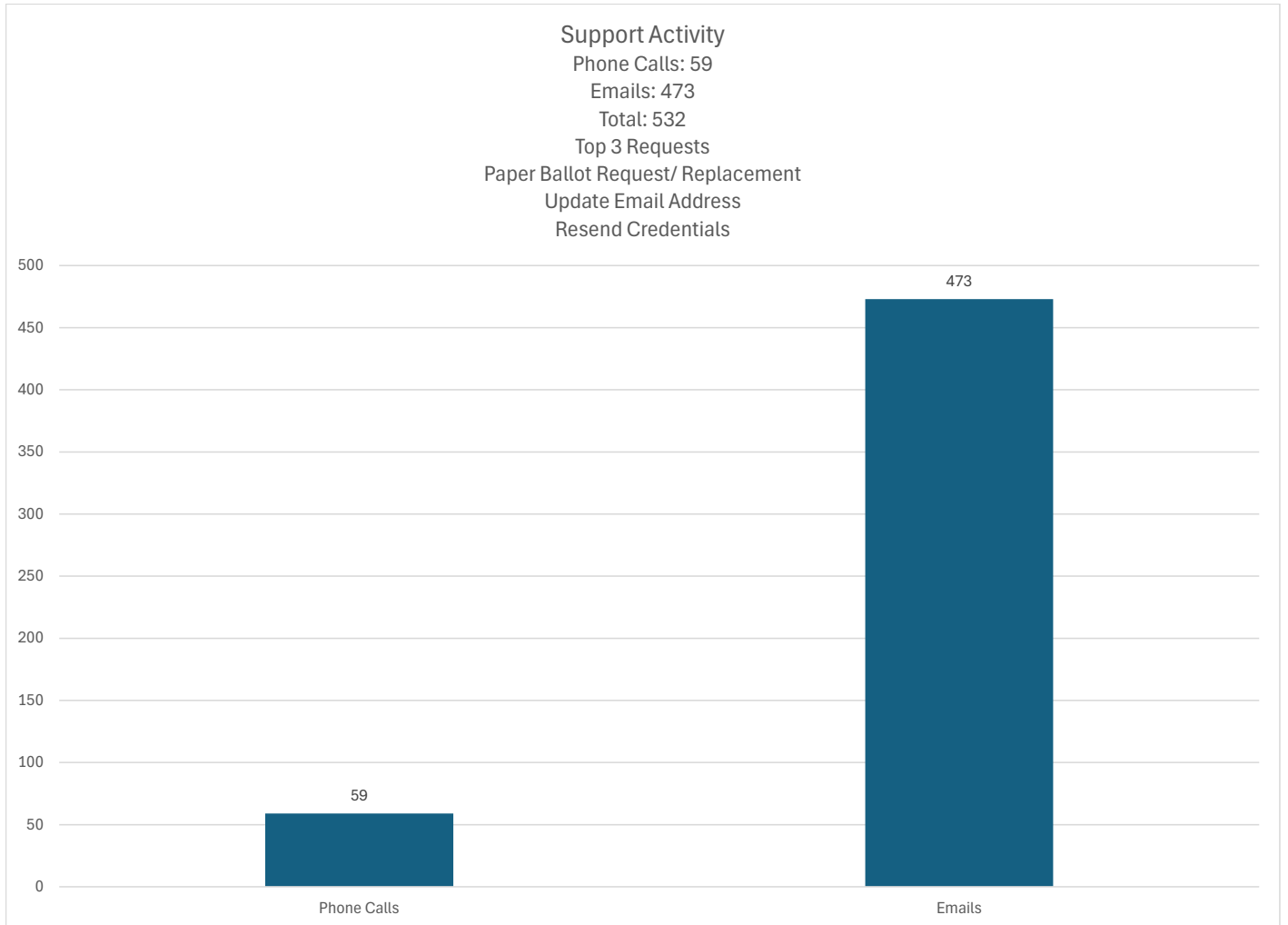


REPLACEMENT BALLOT REPORT



CHUGACH ELECTRIC ASSOCIATION, INC.
2024 ELECTION

Replacement Ballots Sent	26
Replacement Ballots Returned	14
Percent Returned	53.85%



Prize Drawing Winners	Date
SHAUN O PACARRO	4/24/2024
ZACHARY JONES	4/24/2024
TOMMY L JACKSON	5/1/2024
CAROLYN S RIGGAN	5/1/2024
LAWRENCE D CLEMENT	5/8/2024
LANA M BAILEY	5/8/2024
JORDYN ALEXA GRANT	5/15/2024
SHERRY SEDWICK	5/15/2024
NATALIE L WICKLUND	5/17/2024
BARBARA J WEBER	5/17/2024

DIRECTVOTE® RATING

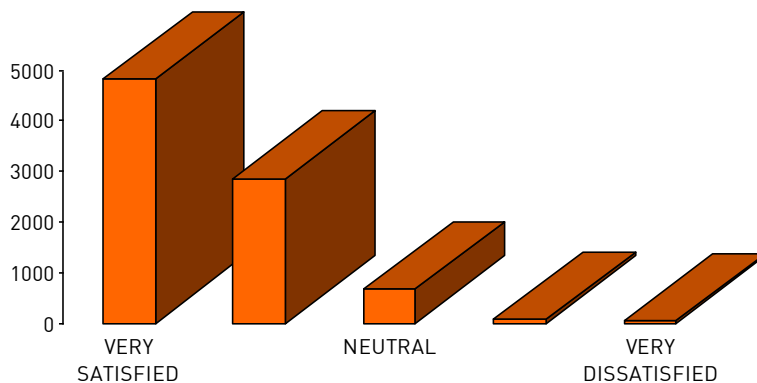


CHUGACH ELECTRIC ASSOCIATION, INC. 2024 ELECTION

Rating	Count	Percent	Count	Percent
VERY SATISFIED	4,839	38.8%	4,839	56.9%
SATISFIED	2,862	23.0%	2,862	33.7%
NEUTRAL	682	5.5%	682	8.0%
DISSATISFIED	66	0.5%	66	0.8%
VERY DISSATISFIED	50	0.4%	50	0.6%
NO COMMENT	3,958	31.8%		
TOTAL	12,457	100.0%	8,499	100.0%

Cumulative Breakdown:

(Less "No Comment")	Count	Percent
Very Satisfied or Satisfied	7,701	90.6%
Dissatisfied or Very Dissatisfied	116	1.4%



Cumulative NET Savings since 2016\$101,197,331

YTD Saving\$8,953,870

YTD Total Net Production5,074,136

Production - NET to Chugach

June 2024 Production (mcf)

	Jun-23	May-24	June-24		Jul-24
			Actual	Forecast	Forecast
NET Production	598,637	873,008	772,612	728,510	731,087
Average daily rate	19,955	28,830	25,754	24,284	23,583
Active wells	15	20	20		20

Average Daily Rate

Production Forecast to Actual - NET to Chugach (Mcf)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MONTHLY												
Forecast	869,725	763,632	821,864	772,415	775,147	728,510	731,087	743,374	756,871	821,535	830,330	895,253
Actual	845,522	768,635	920,635	873,008	893,725	772,612	-	-	-	-	-	-
Month Variance	(24,204)	5,003	98,772	100,592	118,577	44,102						
Variance %	-3%	1%	12%	13%	15%	6%						
Year to Date												
Forecast	869,725	1,633,358	2,455,221	3,227,637	4,002,784	4,731,294	5,462,381	6,205,755	6,962,626	7,784,161	8,614,491	9,509,744
Actual	845,522	1,614,157	2,534,792	3,407,800	4,301,524	5,074,136						
YTD Variance	(24,204)	(19,201)	79,571	180,163	298,740	342,842						
Variance %	-3%	-1%	3%	6%	7%	7%						

Budget Performance

BRU OPEX (NET to CEA) *				
	Forecast	Actual	YTD Cum Delta	Variance
Jan	\$975,573	\$1,148,432	\$172,859	18%
Feb	\$912,633	\$1,153,522	\$413,749	22%
Mar	\$975,573	\$890,205	\$328,381	11%
Apr	\$944,103	\$967,550	\$351,828	9%
May	\$975,573	\$903,058	\$326,255	7%
Jun	\$944,103	\$928,541	\$285,211	5%
Jul	\$975,573		\$0	0%
Aug	\$975,573		\$0	0%
Sep	\$944,103		\$0	0%
Oct	\$975,573		\$0	0%
Nov	\$944,103		\$0	0%
Dec	\$975,573		\$0	0%
	\$11,518,053	\$5,991,308	-	

2024 NET Expense Budget

YTD OPEX Burn

CAPEX Commitment

NET to Chugach	
Total CAPEX Budget	\$28,598,097
CAPEX Spend to date	\$8,789,315
Balance Remaining	\$19,808,782
BRU - Gas Transfer Price	
Field Ops	\$3.43
ARO Surcharge	\$0.53
Capital Recovery	\$2.49
GTP / mcf	\$6.45

CAPEX Burn

* BRU Gas Transfer Price effective 04/01/2024

* excludes taxes and royalty payments

Chugach Electric Association, Inc.
Anchorage, Alaska

Summary of Executive Session Topics for
Operations Committee Meeting on July 10, 2024
Agenda Item VI.

- A. Discussion of confidential and sensitive information regarding an update of the natural gas supply, public disclosure of which could have an adverse effect on the finances and legal position of the Association. (AS 10.25.175(c)(1) and (3))
- B. Discussion of confidential and sensitive information regarding the Battery Energy Storage System, public disclosure of which could have an adverse effect on the finances and legal position of the Association. (AS 10.25.175(c)(1) and (3))
- C. Discussion regarding personnel matters concerning the Chief Executive Officer's Project Specific Initiatives and Priority Areas of the Association. (AS 10.25.175(c)(4))

Executive Session Motion
(Financial, Legal and Personnel)
July 10, 2024

Chugach Electric Association, Inc.
Board of Directors Operations Committee Meeting

Agenda Item VI.

Move that pursuant to Alaska Statute 10.25.175(c)(1), (3) and (4), the Board of Directors go into executive session to: 1) discuss and receive reports regarding matters the immediate knowledge of which would clearly have an adverse effect on the finances of the cooperative; 2) discuss with its attorneys matters the immediate knowledge of which could have an adverse effect on the legal position of the cooperative; and 3) discuss personnel matters.

CHUGACH ELECTRIC ASSOCIATION, INC.
Anchorage, Alaska

OPERATIONS COMMITTEE MEETING
AGENDA ITEM SUMMARY

July 10, 2024

ACTION REQUIRED

AGENDA ITEM NO. VII.A.

<u> </u>	Information Only
<u> X </u>	Motion
<u> </u>	Resolution
<u> </u>	Executive Session
<u> </u>	Other

TOPIC

May 1, 2024 - April 30, 2025, Chief Executive Officer (CEO) Project Specific Initiatives and Priority Areas

DISCUSSION

As discussed in executive session.

MOTION

Move that the Operations Committee recommend the Chugach Electric Association, Inc. Board of Directors approve the May 1, 2024, through April 30, 2025 CEO Project Specific Initiatives and Priority Areas as discussed in executive session.